Interim Survey Guidelines for the New Mexico Meadow Jumping Mouse

May 22, 2015

On June 10, 2014, the U.S. Fish and Wildlife Service (Service) issued a final rule to list the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) (jumping mouse) as an endangered species under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et. seq.) (Act). Consequently, there is a need for determining presence of the species to review ongoing or proposed actions within the range of the species. This document establishes guidelines for surveys to determine the presence/absence of the jumping mouse and its habitat. We strongly recommend that all individuals obtaining a section 10(a)(1)(A) recovery permit use these guidelines in conjunction with a training class and other documents (e.g., Frey 2013) that will be finalized by Summer 2015 in coordination with New Mexico Department of Game and Fish. Please also see the Final New Mexico Meadow Jumping Mouse Species Status Assessment Report for detailed information on the biology and natural history of the species (SSA Report; Service 2014).

These guidelines provide survey methodologies to determine presence/absence of the jumping mouse for projects within the range of the species and a standard method for reporting survey results. Research projects may have additional requirements and should be closely coordinated with the Service's lead species biologists (see contact information below). Information gathered from these procedures will: 1) help determine the appropriate level of consultation with the Service; 2) help determine the amount of incidental take of jumping mice resulting from ongoing or proposed projects; and 3) help minimize and avoid injury or mortality of individuals. These survey guidelines will only be used by those individuals holding valid section 10(a)(1)(A) recovery permit issued by the Service. In order to conduct trapping surveys, you must have a valid 10(a)(1)(A) recovery permit. These guidelines are to be used in concert with the terms and conditions of those permits. Please also contact the appropriate State agency to determine State-level permitting requirements within Colorado, Arizona, or New Mexico.

This guidance will be reviewed and modified as appropriate. Therefore, prior to initiating surveys, please check with your local Service office to verify that you are implementing the most up-to-date guidance. Surveys (habitat assessments and trapping) will be considered valid for through the next active season (e.g., if surveys are conducted in 2015, then the results would be considered valid up until the active season in 2017). Because the scope of ongoing or proposed actions varies temporally and spatially, if disturbance or development does not occur within this time period from the date of written approval from the Service, the appropriate Service Field Office must be contacted to request the possibility of an extension of the results. Other permits may be required by the land management agency or landowner for any field work on public, private, or tribal lands.

Specific circumstances may justify or necessitate modification of this guidance on a case-by-case basis. Such modifications are allowable if the applicant or its representative explains to the Service in writing why modifications are necessary; and the Service concurs with such adjustments in writing. The following contains general requirements of surveys. Adjustments to these guidelines may only be made with Service concurrence.

Habitat Requirements and General Areas for Surveys

The jumping mouse has exceptionally specialized habitat requirements characterized by dense riparian and tall herbaceous vegetation (average stubble height of at least 61 cm (24 in) (see Species Status Assessment Report; Service 2014). The herbaceous vegetation is composed primarily of forbs and sedges including, but not limited to the following diverse forbs: water hemlock (*Circuta douglasii*), field mint (*Mentha arvense*), marsh marigold (Caltha palustris), dogbane (*Apocynum cannabinum*), wild licorice (*Glycyrrhiza lepidota*), or cutleaf coneflower (*Rudbeckia laciniata*); and sedges including: common three-square (*Schoenoplectus pungens*), spikerush (*Eleocharis macrostachya*), beaked sedge (*Carex rostrata*), and water sedge (*Carex aquatilis*). Rushes (*Juncus* spp. and *Scirpus* spp.), numerous species of grasses such as slender wheatgrass (*Elymus trachycaulus*), brome (*Bromus* spp.), foxtail barley (*Hordeum jubatum*), redtop (*Agrostis gigantean*), timothy (*Phluem pretense*), rabbitsfoot grass (*Polypogon monspeliensis*), or Japanese brome (*Bromus japonicas*) are also commonly associated with jumping mouse habitat. Suitable habitat for this species should also contain sufficient seasonally available or perennial flowing waters to support the growth of tall, dense, riparian herbaceous plants and maintain moist soils.

The following are areas where the species could occur in Colorado, New Mexico, and Arizona (see Frey 2013) :

- Drainages in the White Mountains of Arizona above 4,500 feet elevation;
- Verde River watershed, Arizona above 3,000 feet elevation;
- Arkansas River watershed, Colorado above 4,000 feet elevation;
- Rio Grande watershed, Colorado;
- San Juan River watershed, Colorado and New Mexico;
- Canadian River watershed, New Mexico, above 4,500 feet elevation;
- Pecos River watershed, New Mexico, above 4,500 feet elevation;
- Rio Grande watershed, New Mexico, above 4,500 feet elevation (including the Chama River and Jemez Mountains);
- Drainages of the Sacramento Mountains, New Mexico, above 4,500 feet elevation;
- San Francisco watershed, New Mexico (Catron and Grant Counties); and
- Gila River watershed, New Mexico, above 4,500 feet elevation.

If the project area is located outside of the areas identified above, no habitat assessment or live trapping survey is recommended.

Surveys

Surveying for the jumping mouse is a two-tiered approach. The first level is an assessment to identify habitat in a project area. This would include all areas directly or indirectly affected by the proposed project. If it is determined that suitable habitat exists, the next step will be live trapping. Both the habitat assessment and live trapping survey should only be conducted by a person holding a valid section 10(a)(1)(A) recovery permit to ensure they meet minimum qualifications and have experience working with and identifying the jumping mouse and its habitat. These skills are essential to evaluate the suitability of habitat and to maximize the probability of detecting jumping mice if live trapping is conducted. Throughout the habitat assessment and surveying process, we encourage the section 10(a)(1)(A) permittees to maintain close coordination with a representative from the Service.

Determining the suitability of habitat present on project sites or whether to conduct a trapping survey cannot easily be addressed from a narrowly defined perspective. A series of factors influence the decision to conduct a trapping survey at a particular project site. These factors may include, but are not limited to: the quality and quantity of habitat present at the site, quality and quantity of habitat nearby (especially upstream and downstream within the same drainage), isolation or connectivity of the project site to other potential habitat, history of jumping mouse occurrence in the immediate area or upstream and downstream within the same drainage, the nature of any proposed project, or the potential for direct, indirect, or cumulative impacts the project may cause.

Habitat Assessments

Habitat assessments should be conducted by a person holding a valid section 10(a)(1)(A) recovery permit for the jumping mouse. Habitat assessments consist of evaluating riparian habitat to determine whether the parcel is suitable for jumping mouse habitation or use (e.g., travel corridor). Habitat assessments should be conducted during the active season for the jumping mouse, preferably after July 15, but prior to frost in the early fall. Defining characteristics of suitable habitat include:

Riparian communities along rivers and streams, springs and wetlands, or canals and ditches that contain:

- persistent emergent herbaceous vegetation especially characterized by presence of primarily forbs and sedges (*Carex* spp. or *Schoenoplectus pungens*); or

- Scrub-shrub riparian areas that are composed of willows (*Salix* spp.) or alders (*Alnus* spp.) with an understory of primarily forbs and sedges; and

- Flowing water that provides saturated soils (8 to 10 scale using a Lincoln soil moisture meter (Lincoln Irrigation Inc., Lincoln, Nebraska) throughout the

New Mexico meadow jumping mouse's active season that supports tall (average vertical cover of herbaceous vegetation of at least 61 cm (24 inches)) and dense herbaceous riparian vegetation composed primarily of sedges and forbs as described above in "Habitat Requirements and General Areas for Surveys".

Conservatively, if soil moisture is < 5 (using a calibrated Lincoln soil moisture meter inserted approximately inserted 2 inches into the ground; calibrating is accomplished by using a small screwdriver to adjust the knob on back so that the meter reads 10 when in obviously saturated soil with standing water), mean vertical cover is < 6 inches (measured using a Robel pole), and riparian herbaceous vegetation provides <25 percent of the ground cover, the site is not considered suitable habitat (see Frey 2013 for recommended sampling methods) and no live trapping surveys are recommended. Soil moisture should be recorded from the area of the project that contains the wettest soil and dense plant cover. Within the project area, 10 soil moisture readings should be taken at approximately 10 locations spaced at least 1 m apart.

A project occurring in poor or marginal habitat, but having potential to disrupt a travel corridor (such as construction of a road crossing at a creek) may also be of concern. In these cases, it may be desirable to survey higher quality habitat nearby rather than, or in addition to, surveying the immediate project site. Because of these complexities, on section 10(a)(1)(A) permittees familiar with the jumping mouse and capable of assessing project impacts must make the decision as to whether a particular project requires a trapping survey.

Some sites are either clearly not appropriate jumping mouse habitat or have very low potential to be jumping mouse habitat. A trapping survey for the jumping mouse is generally not recommended for these types of sites. For sites that are not appropriate habitat, the project proponent does not need written concurrence from the Service; however, we recommend that their project record maintain maps, location information, a description of the site, color photographs, and a description of why the site was deemed not appropriate for a trapping survey. General site photographs (overview shots of the site) in combination with close range photographs of vegetation and other features enhance the quality of the project record.

Examples of sites that are not appropriate jumping mouse habitat include, but are not limited to the following:

- Irrigation ditches or canals with little or no herbaceous riparian vegetation
- Sites that are entirely composed of dense stands of cattails (*Typha latifolia*)
- Sites along stagnant or standing water (e.g., stock ponds) or areas that contain large expanses of uniformly deep (> 5 cm (2 in)) standing water)
- Sites that lack any suitable patches of dense riparian herbaceous vegetation; unsuitable patches of microhabitat will typically have vertical cover of < 6

inches using a Robel pole and soil moisture < 5 (using a calibrated Lincoln soil moisture meter)

- Highly disturbed or modified sites that contain predominately rocky stream banks or bare ground, or are otherwise devoid of dense riparian herbaceous vegetation (i.e., herbaceous plants provide < 25 percent of the ground cover)

- Portions of stream channels diverted underground, completely armored with concrete, or covered with riprap that removes or significantly alters dense riparian herbaceous vegetation

Upon receiving all of the above information, the Service will evaluate and concur with the determination of whether the project site represents currently suitable habitat. Importantly, the loss and regrowth of jumping mouse habitat can fluctuate in the quality and location of dense riparian herbaceous vegetation between growing seasons, particularly due to removal or alteration from flooding, drought, or livestock grazing. Therefore, habitat assessments may need to be updated periodically if projects are not implemented within one year.

Live Trapping Surveys

Survey crews should generally consist of as few people as possible to prevent damaging fragile riparian habitat. Traps can also be set while standing in the water to minimize trampling of riparian habitat. At each location to be surveyed, trapping effort should consist of at least 500 trap nights over at least 3 consecutive nights, except for surveys conducted in June and September (all areas but the Rio Grande and Verde River above) that should increase effort to 700 trap nights over at least 5 consecutive nights. Traps will be set for a minimum of 3, but possibly up to 5 nights unless jumping mice are captured prior to last night of planned surveys. All traps will be removed immediately following the capture of an individual jumping mouse.

Surveys should be conducted between June 25 and September 15, except for areas in the Rio Grande, New Mexico, below Cochiti Pueblo or in the Verde River, Arizona where surveys will be conducted from May 20 to July 31 (Frey 2013).

In cases of limited riparian acreage (e.g., < 1 acre) of potential jumping mouse habitat, reducing trapping effort to as little as 400 trap nights (while maintaining a high trap density; spaced no more than 3 m apart) may be reasonable, but should be coordinated with the Service beforehand. If trapping effort is reduced, the rationale should be included in the final survey report. Alternatively, to support the conclusion that jumping mouse is not present on large riparian areas (> 10 acres) of apparently suitable habitat, or at or near an area of past documented occurrence, an expanded effort is likely to be required (i.e., more trap nights, multiple trapping efforts during the season, trapping over two seasons, and/or trapping in multiple locations within the suitable habitat).

Only small-mammal live traps (folding and non-folding) will be used in the surveying efforts. The recommended live traps are Sherman traps (usually model LFATDG), but larger and smaller sizes have also been used. Use of any other types of live traps or capturing devices to survey for the jumping mouse will require clearance from the Service prior to trapping. As traps are set, they should be checked for treadle sensitivity and proper door operation to make sure they will close when tripped by a mammal the size of a jumping mouse. Only traps in excellent condition (e.g., not badly dented or with holes) will be used. Bait and debris must not interfere with action of the treadle or door. Commercial horse sweet feed without added hay pellets should be used as bait.

Trap placement is crucial to successfully capture the jumping mouse (Frey 2013). Traps must be placed in small patches of required microhabitat components that include moist to saturated soils (measured between 8 and 10 with the Lincoln scale) (Frey 2013). Traps should be set along waterways within the densest patches of herbaceous vegetation available at a site (Frey 2013). When possible, surveyors should walk, collect data, and set/check traps by wading through the water to avoid or minimize trampling impacts to habitat (Frey 2013). Traps should be spaced no more than about 3 to 5 meters apart, but spacing depends on local habitat conditions. Additional traps can also be placed within high quality microhabitat patches, in order to saturate the best patches of habitat.

Consider marking each trap location with stakes, flagging, or other visible material or use an alternative method (such as sequentially numbers) to ensure traps are not overlooked. Field assistants can set and check their own trap lines; however, captured jumping mice should only be handled by a person holding a valid section 10(a)(1)(A) recovery permit to ensure they meet minimum qualifications and have experience working with and identifying the jumping mouse. One individual will handle the animals and the other record the data. The animals will be handled and data taken in a standard, routine order to minimize trauma to the animals and reduce the likelihood of unintended escape of captives and consequent loss of data.

Traps should be set in the early evening (beginning 3 hours before sunset, but no later than sunset) and checked as early as possible in the morning to avoid heating of traps by direct sunlight, unless unforeseen circumstances occur (to reduce stress and the potential for predation on trapped animals). Ideally, no more than 12 to 14 hours should pass from the time traps are set until they are checked. Traps should not remain set during warm daylight hours. Rainy weather should not preclude surveys; however, trap mortalities of small mammals can be reduced by adding small compressed pieces of insulation to the back of traps. Because large rain events can drown small mammals when traps become flooded, use best professional judgment on whether to survey during extremely heavy downpours of rain. Surveyors should be aware that when placing traps near a water body such as a stream that there is the potential for rising water and inundation of the traps during the night.

The surveyor should exercise care and be acquainted with and follow the Center for Disease Control's Hantavirus instructions and recommendations when surveying or handling rodents. Animal handling should also follow the recommendations of the American Society of Mammologists (Sikes et al. 2011). Animals removed from traps should be handled in small cloth, mesh, or ziplock bags. Data collected for each jumping mouse captured will include, but is not limited to weight, age (juvenile or adult), gender, reproductive status of jumping mice (e.g. mammary development or testes enlargement), and other pertinent body measurements (hindfoot length, tail length) of jumping mice captured.

All jumping mice captured should be quickly processed within close proximity of the capture location. Captured jumping mice will be released at the site of capture as soon as possible after being processed and data are recorded. During handling, if a jumping mouse exhibits signs of physiological stress (e.g., excessive heart rate) it will be released immediately.

The section 10(a)(1)(A) permittee is also responsible for reporting all other species that were trapped incidental to the jumping mouse. At least two digital photographs must be taken of captured individual jumping mice. Photographs should show the entire animal, including the hindfoot and tail and a clear image of the entire ear and pelage pattern (Frey 2013). Sufficient photographs will be required to separate meadow jumping mouse from western jumping mouse in areas of possible sympatry.

Between sampling sites, traps should be disinfected to limit the potential of spreading disease from site to site. For example, a 10 percent bleach or Lysol solution may be used to disinfect traps. To limit aquatic pathogens, traps and other equipment that contact water can also be disinfected using Sparquat 256. Traps should be thoroughly rinsed to off-site remove the scent of disinfectant.

While surveys, and in particular trapping studies, often necessitate participation by more than one person, the section 10(a)(1)(A) permittee should be on site at all times during setting and checking of live traps.

The lead species biologist at the Colorado (Terry Ireland, Grand Junction; terry_ireland@fws.gov; Alison Michael, Lakewood; alison_michael@fws.gov), Arizona (Dave Smith, Flagstaff; david_r_smith@fws.gov), or New Mexico Ecological Services Field Office (Eric Hein, Albuquerque; eric_hein@fws.gov) will be notified within 3 days in writing (email) of any jumping mouse captures, including mortalities.

Any inadvertent mortalities will be preserved (frozen) as voucher specimens. Jumping mice frequently revert to dormancy when confined to traps in cool weather. Warm a dormant animal (via body heat, sunlight, etc.) until recovered, and release where captured.

A habitat assessment for the jumping mouse shall complement and inform a written report in which the following live trapping survey information will be recorded. A complete

Survey Field Data Form from Frey (2013) or similar will also be included. This form must be completed for every jumping mouse trapping survey and site assessment and must be presented when submitting trapping or assessment reports to the Service.

- Describe and photograph the habitat, including the ecological condition, management history, and current land use of the site as appropriate

- Describe the elevation, and drainage type (e.g., perennial stream, ephemeral stream, beaver pond, associated wet meadow, streambank, irrigation ditch, seep, etc.)

- Date and time (setting traps; beginning and end of trap checks) of survey

- Survey effort (number trap-nights which is one night for which a trap is set (for example, four traps set for four nights equals 16 trap-nights))

- Soil moisture should be recorded using a Lincoln soil meter (Moisture should be measured from the area of the project that contains the wettest soil and dense plant cover. Within the project area, 10 soil moisture readings should be taken at approximately 10 locations spaced at least 1 m apart.)

- Type of trap and bait

- Weather conditions during the survey

- A description of the proposed project and a map showing the precise location of the project site. The project description needs to include the project name, GPS coordinates, and the County and State where the project is located. Additionally, the report should include a habitat assessment of the project site, the size of the total land parcel and riparian habitat, the distance of the project to the closest known occurrence of the jumping mouse, and any other pertinent information.

- Describe, using maps and/or aerial photographs, or photographs of habitats and microhabitats; classification of habitat and microhabitat types (including approximate acreages of each); size and location of areas sampled; topography and elevation; proximity to water; and surrounding land-use activities;

- A series of photos should be taken of the vegetation in the area, showing diversity, height, structure, and density.

- Appropriate scale maps showing all locations of captured jumping mice with associated GPS information;

- In zones of sympatry (San Juan, Rio Grande, and Arkansas River watersheds, Colorado and Colfax, Mora, Rio Arriba, San Juan, San Miguel, Santa Fe, and Taos, Counties, New Mexico) between the New Mexico meadow jumping mouse and the western jumping mouse (*Zapus princeps*), identification will normally be based upon genetic analyses taken from ear clip tissue (Frey 2008), although the use of buccal swabs is currently under investigation. Where genetic samples cannot be taken, detailed close-up photos of the ears and dorsal pelage may suffice to identify the jumping mouse to species in these zones of sympatry.

- Names of surveyors and 10(a)(1)(A) recovery permit number.

If jumping mice are not found using this guidance, but the project is within the known historic range of the species, the Service will interpret the results, and, if necessary, will discuss conservation measures with the project proponent. Factors the Service will consider in interpreting such cases include jumping mouse observations within the same drainage, the continuity of habitat or vegetative types between occupied jumping mouse sites and the project site, existing and potential habitat suitability within the project site, results of other surveys in the project vicinity, and the opinions of other jumping mouse experts.

LITERATURE CITED

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