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Memorandum

To: Assistant Regional Director, Ecological Services, Southwest Region, Albuquerque, New Mexico

From: New Mexico Ecological Services Field Supervisor, Albuquerque, NM
Arizona Ecological Services Field Supervisor, Phoenix, AZ
Colorado Ecological Services Field Supervisor, Lakewood, CO

Subject: Intra-Service Programmatic Section 7 Consultation on issuing Section 10(a)(1)(A) Recovery Permits for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) throughout its range

This document transmits the U.S Fish and Wildlife Service's (Service) Intra-Service programmatic biological opinion on the effects of issuing section 10(a)(1)(A) scientific research permits for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) (jumping mouse) throughout its range. This biological opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; [Act]). This programmatic biological opinion evaluates the impacts of authorizing take for purposes of enhancing the conservation of the jumping mouse and carrying out recovery actions. Although these actions may result in short-term adverse effects to the jumping mouse, the purpose of these actions is to facilitate the long-term conservation of the species. For reasons discussed within, it is our biological opinion that the proposed actions carried out pursuant to issuance of section 10(a)(1)(A) scientific research permits are not likely to jeopardize the continued existence of the jumping mouse.

Critical habitat was designated for the New Mexico meadow jumping mouse on March 16, 2016 (81 FR 14263). Our analysis shows that the proposed actions would not result in adverse effects to any physical or biological features of designated critical habitat or the functioning of any critical habitat designation or unit. The recovery actions addressed in this biological opinion are directed towards individuals and are not expected to adversely affect the species' designated critical habitat, occupied habitat, or unoccupied habitat. Impacts to habitat are expected to be of

such limited size and duration that they are anticipated to be insignificant. As such, effects to designated critical habitat impacts will not be further analyzed in this biological opinion.

This biological opinion is based on published literature, research reports, telephone conversations, field investigations, and other sources of information. A complete record of this consultation is on file at the New Mexico Ecological Services Field Office in Albuquerque, New Mexico.

Consultation History

On March 26, 2015, the Colorado Field Office, U.S. Fish and Wildlife Service, Region 6, completed the Intra-Service Programmatic Section 7 Consultation on Region 6's Section 10(a)(1)(A) Permitting Program for the New Mexico meadow jumping mouse. This consultation addressed the effects of issuing section 10(a)(1)(A) permits on jumping mice in Region 6.

On January 27, 2017, the U.S. Fish and Wildlife Service permit coordinators for Regions 2 and 6, along with the lead Service jumping mouse biologists from Arizona, Colorado, and New Mexico, discussed via telephone and agreed that a programmatic consultation covering range-wide activities authorized from issuing section 10(a)(1)(A) permits for the jumping mouse would be appropriate. This consultation programmatically covers section 10(a)(1)(A) permits issued in Regions 2 and 6 for the jumping mouse. This biological opinion considers the effects from issuing these permits (including the Service's Regional Directors' permits), and from providing Federal funding to carry out the activities discussed in this opinion, on the jumping mouse. The Regional Directors' permits are the mechanism for which Service personnel within Regions 2 and 6 conducting recovery actions for listed species receive authorization under the Act.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area is not limited to the "footprint" of the action, but rather encompasses modifications to the land, water, or air resulting directly or indirectly from the action. For the purposes of this programmatic consultation, the Service has determined that the action area includes any area in Regions 2 and 6 within the range of the jumping mouse that contains its suitable habitat.

Proposed Action

Pursuant to section 10(a)(1)(A) of the Act, the Service proposes to issue permits to purposefully take the New Mexico meadow jumping mouse for recovery or scientific purposes or to enhance the survival of the species. All activities authorized under section 10(a)(1)(A) of the Act must meet permit issuance criteria at 50 CFR 17.22, 17.32, or 17.52. Importantly, the Act and its

implementing regulations mandate that such activities be for the purposes of enhancement or conservation of listed species.

In determining whether to issue section 10(a)(1)(A) permits, the Service must consider and understand the following:

- (1) the probable direct and indirect effects that issuing the permits would have on the wild populations of the jumping mouse;
- (2) whether the permits, if issued, would in any direct or indirect way conflict with any known program intended to enhance the survival probabilities of the population from which jumping mice were, or would be, removed;
- (3) whether the purpose for which the permits are required would be likely to reduce the threat of extinction of the species;
- (4) the opinions or views of scientists or other persons or organizations having expertise concerning the species or other matters germane to the application; and
- (5) whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the applications.

The Regional Permit Coordinators and appropriate field office staff will ensure that relevant conservation measures identified in this biological opinion are incorporated into issued permits as enforceable terms and conditions. In accordance with the section 10(a)(1)(A) permit process, take will be permitted only for those activities that enhance the conservation and recovery of the jumping mouse. All data collected as a result of these actions will be reported to the Service on an annual basis to facilitate recovery planning.

The Service proposes to allow qualified permittees to conduct research, monitoring, and surveys that would contribute to the recovery of the jumping mouse. These recovery activities most commonly include: 1) surveys in the wild that involve capture (e.g., trapping), handling, marking (e.g., hair clipping or permanent marker pen), passive integrated transponder (PIT) tag insertion, radio-collaring, tracking, or baiting for track plates or camera traps of jumping mice; 2) collection of tissue or DNA samples for genetic purposes (e.g., ear/hair clipping or buccal swabs); and 3) salvage of dead specimens.

In addition, the proposed action includes any Federal funding that is provided from the Service to carry out the activities discussed in this biological opinion.

Conservation Measures

Conservation measures are actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action. These actions will be taken by the Federal agency or applicant, and serve to minimize or compensate for project effects on the species under review. These may include actions taken prior to the initiation of

consultation, or actions which the Federal agency or applicant have committed to complete in a biological assessment or similar document.

General Permit Conditions

To reduce adverse effects to the species, the following measures will be adhered to for all permits issued pursuant to section 10(a)(1)(A) of the Act for the jumping mouse:

1. All permittees must understand and agree to abide by 50 CFR Part 13, 50 CFR 17.22, and 50 CFR 17.61.
2. Only qualified individuals shall be authorized to conduct activities pursuant to any permit. All qualified individuals shall be specified on a List of Authorized Individuals attached to, or included in, each permit. The list, printed on Service letterhead, may identify special conditions or circumstances under which individuals are authorized to conduct permitted activities. Each individual shall be responsible for compliance with the terms and conditions of their permit.

Permittees must provide the following information for our analysis of their qualifications:

- a. A resume or curriculum vitae.
 - b. A qualifications statement detailing their experience with the species of interest, other jumping mouse species, other Federally listed small mammal species, or other small mammals, and the type of activity for which authorization is requested.
 - c. The names and phone numbers of at least two references that can verify experience with the species of interest, other jumping mouse species, other Federally listed small mammal species, or other small mammals, and document working with known jumping mouse experts or small mammal specialists.
3. All handling of listed wildlife shall be done in an expedient manner with minimal harm to the individuals being handled. Living specimens shall be handled and transported so as to minimize risk of injury or damage to health. Specific terms and conditions on each permit will ensure this.
 4. Permittees must carry a copy of their permit while conducting authorized activities.
 5. In the event that more direct or incidental injury/mortality than is authorized or exempted occurs, all permitted activities must immediately cease. The appropriate Service Project Leader and Regional Permit Coordinator must be contacted within 24 hours. The Project Leader must give approval before permitted activities may begin again and the Regional Permit Coordinator must amend the permit if necessary. An Injury/Mortality Documentation Report must be submitted to the Project Leader. The report shall include the circumstances that led to the injury/mortality and a description of the changes in activity protocols that will be implemented to reduce the likelihood of such injury or mortality in the future. The incident shall also be discussed in the annual report that is subsequently submitted.

6. Any specimen incidentally killed during covered activities shall be preserved according to standard museum practices for that species. Before expiration of the permit, specimens shall be properly labeled and deposited with a designated depository for that species. Complete collecting data must be submitted with each specimen. The permittee shall supply the depository with a copy of the permit to validate that the species supplied to the museum was taken pursuant to a valid permit.
7. Permittees must submit annual reports of activities to the appropriate field office and regional office by February 1st (or the date specified in the permit) each year the permit is in effect. Failure to submit annual reports will invalidate the permit. A renewal request will not be processed until the annual reports are received. Please reference the permit number (e.g., TE-XXXXX) when submitting annual reports or other correspondence regarding the permit. Annual reports provide the Service with information necessary to evaluate the success of permitted activities. If no activities occurred over the course of a year, that information shall be indicated in the annual report. Otherwise, the annual report should include, but not be limited to:
 - a. An introduction section addressing reasons and objectives for taking the species.
 - b. A methods section addressing data collection and analysis procedures.
 - c. A results section that contains the following information:
 - i. Summary presentations and discussions of important research results.
 - ii. Maps and descriptions of locations sampled.
 - iii. Results of all sampling efforts.
 - iv. Numbers of individuals intentionally (e.g., euthanasia) and incidentally killed, including dates, locations, and circumstances of take.
 - v. Other pertinent observations made during sampling or research efforts regarding the status or ecology of the species, including observed or perceived threats to the species in research areas.
 - d. Planned future activities for the upcoming year if authorized under the permit.
 - e. A conclusion section that specifically provides recommendations for the recovery of the species.
8. All reports or other documents that include information gathered under the authority of Regional section 10(a)(1)(A) permits (e.g., reports prepared by consulting firms or their clients) shall reference the permit number (e.g., TE-XXXXX) under which the information was gathered. Copies of such documents shall be provided to the appropriate field and regional offices upon their completion. Draft documents and other information resulting from work conducted under the authority of each permit shall be submitted to the Service upon request.
9. Permittees shall inform the appropriate field office by email or other written notification of all new localities of any listed species within seven days of their detection.
10. Permittees shall obtain the required permits and conduct activities in compliance with all applicable laws and regulations of the State, Federal, or tribal agencies upon whose lands work is carried out. Permits do not grant the right of trespass. Such permission must be obtained from private landowners or the land management agency. Permittees and

designated members of their staff must carry a copy of this permission and all other associated and required permits at all times while exercising the permit's activities.

11. Species and parts of species that are taken pursuant to a 10(a)(1)(A) permit remain the property of the U.S. Fish and Wildlife Service. Species listed on permits may not be sold, donated, or transferred without written authorization from the Service Project Leader.
12. To work with threatened or endangered species after a permit expires, a request for permit renewal must be received by the appropriate Permit Coordinator 30 days prior to the expiration date of the permit. Meeting this requirement allows continuation of authorized activities until the renewal application is acted upon. If this requirement is not met, the permit becomes invalid on the date of expiration. Any new activities or changes in activities that result in additional adverse effects to threatened or endangered species will require that the permit be amended. Permittees are not authorized to conduct any new activities or to change any permitted activities that result in additional adverse effects to threatened or endangered species until they have requested and have received a new or an amended permit.

Species-specific Conservation Measures

All recovery activities proposed to be conducted for the jumping mouse fall into the categories described above under the Proposed Action section. In addition to the general permit conservation measures described above, recovery permits issued for the jumping mouse will contain the following specific measures when applicable (any deviation from these measures requires approval from the appropriate Project Leader):

1. Capture of the jumping mouse:
 - a. Permittee is authorized to conduct jumping mouse surveys according to the most updated survey guidelines for the New Mexico meadow jumping mouse, located on the Region 2 Ecological Services website, or accessed by contacting the New Mexico Ecological Services Project Leader.
 - b. Jumping mice may be held for a maximum of 30 minutes and then shall be released at the capture site. If the potential for predation exists at the site, jumping mice shall be released in appropriate cover near the trap site.
 - c. A permitted biologist, as described in the protocol, will be present in the field to supervise setting and checking of traps.
2. Survey and sample of the jumping mouse:
 - a. If jumping mice are detected in a location where they have not been previously found, the appropriate Project Leader should be contacted within 24 hours or as soon as communication is possible (i.e., upon leaving remote areas).
 - b. Only non-invasive marking schemes are allowed (e.g., hair clipping or permanent marking pen). Mutilation marking schemes (e.g., toe-clipping or ear-clipping, the prominent notching of ears to identify individual mice) are not authorized; however, this does not preclude small ear clips for genetic analysis as described under 3a below. Marking schemes not discussed herein must be approved in advance by the appropriate Project Leader and Regional Permit Coordinator.

- c. Traps will be sterilized between survey sites to prevent the possible spreading of disease between populations.
 - d. Traps must be checked and rodents released prior to 0800 or prior to direct sunlight on the traps or survey site.
 - e. Any other small mammal inadvertently caught will be released unharmed immediately, unless otherwise permitted by a State or tribal agency.
3. The following steps will be followed when collecting ear tissue from the jumping mouse for genetic analysis:
 - a. Sterilized, surgical-grade scissors will be used to remove no more than an approximately 1.0 millimeter wide x 3.0 millimeter long section of tissue from the species' outer ear.
 - b. Tissue shall only be removed from one ear per individual.
 - c. After tissue collection, the jumping mouse will be observed to ensure it is exhibiting normal behavior before being released.
4. Sterile buccal swabs must be used when collecting DNA samples from the inside of the jumping mouse's mouth while it is held carefully during capture.
5. Methods and experience for affixing radio transmitter collars to jumping mice or other similar species must be submitted by the permittee and approved by the appropriate Project Leader prior to authorization for this activity.
6. The following steps will be followed when marking the jumping mouse with passive integrated transponder (PIT) tags:
 - a. Gently hold captured jumping mouse by the loose skin behind the shoulder blades.
 - b. Follow the manufacturer's instructions and the American Society of Mammalogists' guidelines for inserting PIT tags (Sikes *et al.* 2011). Specifically, bring the sterilized needle toward the loose skin, ensuring the longest part of the needle is closest to the mouse's skin.
 - c. Gently slip the needle into the loose skin, ensuring that it does not enter the body tissue.
 - d. Once the tip is subcutaneous, push the PIT tag trigger toward the needle, forcing the tag out of the needle and into the mouse.
 - e. Remove the needle and then gently massage the entry point before releasing the mouse.
7. The following steps will be followed when setting track plates or track boxes to detect jumping mice presence:
 - a. Any enclosed track box must have more than one entrance/exit to prevent jumping mice from being trapped inside by a predator. There must be an adequate escape route to minimize the track boxes' possible effects to increased predation opportunity.
 - b. If a survey is being conducted in a location where the jumping mouse has not been previously found, and one is detected, contact the appropriate Project Leader within 24 hours or as soon as communication is possible (i.e., upon leaving remote areas).

8. The following steps will be followed when baiting camera stations to detect jumping mouse presence:
 - a. Any enclosed bait station must have more than one entrance/exit to prevent jumping mice from being trapped inside by a predator. There must be an adequate escape route to minimize the bait station's possible effects to increased predation opportunity.
 - b. If a survey is being conducted in a location where the jumping mouse has not been previously found, and one is detected, contact the appropriate Project Leader within 24 hours or as soon as communication is possible (i.e., upon leaving remote areas).
9. Designated repositories and disposition of mortalities will be determined at the direction of the appropriate Project Leader.

STATUS OF THE SPECIES/CRITICAL HABITAT

The New Mexico meadow jumping mouse was proposed as an endangered species with critical habitat on June 20, 2013 (78 FR 37363; 78 FR 37328). On June 10, 2014, the jumping mouse was listed as endangered (79 FR 33119). Final designated critical habitat was published on March 16, 2016 (81 FR 14263). In addition to the summary information provided below, the Service completed a Species Status Assessment Report (SSA Report) for the jumping mouse on May 27, 2014, which is hereby incorporated by reference (USFWS 2014a). A Recovery Outline was also completed concurrent with the final rule listing designating the species as endangered (USFWS 2014b). The SSA Report provides a thorough assessment of jumping mouse biology and natural history and assesses demographic risks (such as small population sizes), threats, and limiting factors in the context of determining viability and risk of extinction for the species. In the SSA Report, we also compile biological data and a description of past, present, and likely future threats (causes and effects) facing the jumping mouse.

Life History

The jumping mouse life history (i.e., short active period, short life span, low fecundity, specific habitat needs, and low dispersal ability) makes populations highly vulnerable to extirpations when habitat is altered or eliminated. We found that there has been a significant reduction in occupied localities likely due to cumulative habitat loss and fragmentation across the range of the jumping mouse. The past and current habitat loss has resulted in the extirpation of historical populations, reduced the size of existing populations, and isolated existing small populations. Ongoing and future habitat loss is expected to result in additional extirpations of more populations. The primary sources of past and future habitat losses are from grazing pressure (which removes the needed vegetation) and water management and use (which causes vegetation loss from mowing and drying of soils), lack of water due to drought (exacerbated by climate change), and wildfires (also exacerbated by climate change). Additional sources of habitat loss are likely to occur from scouring floods, loss of beaver ponds, highway reconstruction, residential and commercial development, coalbed methane development, and unregulated recreation. In addition, because of the current conditions of isolated populations, when localities are extirpated, there is little or no opportunity for natural recolonization of the area due to the jumping mouse's limited movement and dispersal capacity.

Jumping mice hibernate for eight or nine months of the year. This is longer than most other mammals. Conversely, the species is only active three or four months during the summer. Within this short timeframe, jumping mice must breed, birth and raise young, and store up sufficient fat reserves to survive the next hibernation period. Jumping mice only live 3 years or less. They have one litter, with seven or fewer young, annually. Therefore, the jumping mouse has limited capacity for high population growth rates due to low fecundity (i.e., reproductive potential). As a result, if resources are not available in a single season, jumping mouse populations would be greatly stressed and would likely have lower reproduction and over-winter survival during hibernation.

The jumping mouse has exceptionally specialized habitat requirements to support its life history needs and maintain adequate population sizes. Habitat requirements are characterized by tall (24-inches or greater) dense riparian herbaceous vegetation primarily composed of sedges and forbs. In addition, there is often a woody riparian, willow (*Salix* spp.), or alder (*Alnus* spp.) overstory component found in occupied jumping mouse habitat. Suitable habitat is found where riparian-wetland vegetation achieves full growth potential associated with perennial flowing water or saturated soils. Jumping mice require this dense vegetation condition for cover from predation, vital food sources (insects and seeds), and structural material for day nests. Jumping mice must have abundant food sources during the summer so they can accumulate sufficient fat reserves to survive their long hibernation period. In addition, individual jumping mice also need intact upland areas (upslope and beyond the floodplain of river and stream flood plains) adjacent to riparian wetland areas to build nests or burrows to give birth to young in the summer and to hibernate in the winter. Some uncertainty exists about the hibernation sites relative to riparian areas. These suitable habitat conditions need to be in appropriate locations and of adequate sizes to support healthy populations of the New Mexico meadow jumping mice. Historically, these wetland habitats would have been in large patches (movements of 200 to 700 meters (m)/656 to 2,297 feet (ft) to disperse to other habitat patches within stream segments) located intermittently along long stretches of streams (USFWS 2014a).

Distribution

The jumping mouse is a small mammal whose historical distribution likely included riparian wetlands along streams in the Sangre de Cristo and San Juan Mountains from southern Colorado to central New Mexico, including the Jemez and Sacramento Mountains and the Rio Grande Valley from Española to Bosque del Apache National Wildlife Refuge, and into parts of the White Mountains in eastern Arizona.

Based on historical (1980s and 1990s) and current (from 2005 to present) data, the distribution and abundance of the jumping mouse has declined significantly range-wide. The majority of extirpations have occurred since the late 1980s to early 1990s, with about 70 formerly occupied locations now considered extirpated. Since 2005, there have been 43 documented remaining populations (12 in Colorado, 15 in New Mexico, and 16 in Arizona) spread across the eight geographic management areas described in the final listing rule. Ten of the 12 Colorado populations are located on the Southern Ute Indian Reservation in southwestern Colorado, and specific jumping mouse locations are not currently available from these sites. Nearly all of the

current populations are isolated and widely separated, and nearly all of the 43 populations located since 2005 have patches of suitable habitat that are too small to support resilient populations of jumping mice. In addition, at least 11 of the 43 populations documented since 2005 have been substantially compromised since 2011 (due to water shortages, grazing, or wildfire and post-fire flooding), and these populations could already be extirpated (see USFWS 2014a for a detailed discussion).

ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the Act, when considering the effects of the action on federally listed species, the Service is required to take into consideration the environmental baseline. Regulations implementing the Act define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultations in progress (50 CFR § 402.02). The environmental baseline defines the status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Status of the Species within the Action Area

Refer to the status of the species discussion, above, as the species' entire range is wholly contained within the action area.

EFFECTS OF THE ACTION

Regulations implementing section 7 of the Act define "effects of the action" as the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR § 402.02). All activities authorized by the Service under section 10(a)(1)(A) of the Act must meet permit issuance criteria at 50 CFR 17.22 and 17.32. All activities considered must be justified in relation to enhancement of survival and recovery, effects to the wildlife species, peer review, and qualifications of permittees. By definition, authorized activities should benefit species recovery with minimal adverse effects by qualified permittees.

Direct and Indirect Effects of the Proposed Action

Direct effects are defined as "...the direct or immediate effects of the project on the species or its habitats" (USFWS 1998). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR § 402.02). Indirect effects may occur outside of the immediate footprint of the project area, but would occur within the action area as defined.

No direct effects are anticipated from the proposed actions of issuing section 10(a)(1)(A) permits or providing Federal funding to carry out activities requiring these permits. All effects will be indirect from the implementation of the proposed permitted activities.

Permits issued under section 10(a)(1)(A) allow for actions otherwise prohibited by section 9 of the Act for scientific purposes or to enhance the propagation or survival of listed species. Although these actions are designed to contribute to species recovery, short-term adverse effects are likely to result. Negative effects of any proposed actions will be minimized through planning and implementation of conservation measures. In addition, the actions being proposed are planned and implemented by either Service wildlife biologists familiar with the recovery needs of the species, or permittees whose qualifications are reviewed by Service wildlife biologists experienced with the jumping mouse or related species. Therefore, given the requirements and issuance criteria for permitting these types of actions, we expect that the proposed action will result in collection of data that will inform management and protection of the mouse, thereby providing for long-term beneficial effects to the jumping mouse.

The analyses below describe how each action taken under issuance of section 10(a)(1)(A) permits is expected to affect the jumping mouse. The analyses identify research actions and their associated project elements and the likely responses of jumping mice exposed to these activities. They also describe the anticipated effects to the affected population and species in terms of reproduction, numbers, and distribution.

Research Actions

Actions covered by issuance of permits are designed to conduct scientific research to gather critical jumping mouse information that is necessary for developing recovery goals and criteria, as well as to evaluate when those criteria are met. These actions include, but are not limited to: individual or population surveys; population monitoring to determine range extent and management and habitat requirement information, which could include radio-transmitters, PIT tags, track plating, baited camera traps, etc.; and tissue collection for genetic purposes. The effects of most of these actions would be limited to short-term disturbance of individuals. However, as detailed below, the live-trapping and handling of individuals always poses some risk of injury or death. Despite required precautions to avoid these adverse effects, some jumping mice individuals would likely be harmed.

Live-Trapping:

Jumping mouse surveys are conducted by setting live traps in suitable habitat and capturing the animal for visual identification, and in some cases involve genetic material collection, radio collaring, and PIT tag insertion (discussed further below). Live-trapping results in purposeful take in the form of pursuit and capture of individuals for positive identification. This activity may result in incidental take by injuring or killing individuals during capture or handling. Jumping mice can be injured during live-trapping when body parts are closed in the spring-loaded doors, if they suffer from hypothermia or hyperthermia, or if they become more susceptible to predation while in the trap. The conservation measures listed earlier reduce the likelihood of these kinds of injuries or death.

Injury or death to jumping mice from live-trapping or handling should rarely occur. Of more than 128 captures of jumping mice during surveys and studies conducted by Frey (pers. comm. 2015), none were found dead or dying in traps and all torpid animals were released in good condition. One mouse was euthanized due to a hind limb injury possibly caused by the trap. Two mice died during handling: one died suddenly after a second ear snip was collected (after the first sample was taken then lost) and one died suddenly during a routine attempt to attach a radio collar (Frey 2013). To date, Frey's trapping effort has involved 51,398 trap-nights with 128 captures. Taken together, that is one death per every 17,132 trap-nights (Frey, pers. comm. 2015), or approximately 2.3 percent of all mice captured.

In 2015, during six weeks of trapping from June to August, Chambers (2016) captured 18 jumping mice and recaptured one animal (19 total captures). Two animals died from trap-related injuries (both were caught in the trap door, one by its leg and the other across the mid-section of the animal's body, and were dead upon discovery), thus representing a 10.5 percent mortality rate. In 2016, during three weeks of trapping from June to July, Chambers (2016) captured 36 jumping mice with two recaptures (38 total captures). Two mortalities occurred from trap-related injuries (one from the animal's leg being broken from getting caught in the trap, and subsequently euthanized, and the other from the animal's head getting caught in the trap, which was dead upon discovery), thus representing a 5.3 percent mortality rate.

Formal surveys for the conspecific Preble's meadow jumping mouse (*Z. h. preblei*) have been occurring in Colorado since 1998. Although we do not know the exact total number of mice that have been handled in that time, we estimate, based on the number of surveys that have been conducted over the years, that thousands of mice have likely been captured and handled, many of them multiple times. Researchers and surveyors reported a total of 43 mortalities (or approximately 2-4 percent of all mice captured). Of these, seventeen individuals were found dead in the trap, ten died after being caught in the trap door, and sixteen died while handling, for a total of 43 mortalities attributable to surveying and monitoring from 1998-2015. Some of the sixteen deaths that occurred during handling may have been due to the stress of prolonged handling for tissue collection or radio-collaring, but these were not always separated out by the researchers or the survey team. Outside of mortalities, few injuries were reported by surveyors and other researchers and these were due to getting a tail or leg caught in the trap door.

Some level of injury is also expected due to handling. Injuries to individuals will be minimized by implementing conservation measures such as providing food and bedding in the traps and reducing the time that mice spend in the traps and the amount of time they are handled (Powell and Proulx 2003). These effects are expected to be of short duration and individuals are assumed to resume normal behavior soon after being released. Breeding success of captured reproductive females may also be affected by overnight separation from their litters. These effects to females are assumed to be temporary and insignificant, but litter mortality may result from exposure or lack of food while the female is in the trap. Although we were unable to find any published studies on the topic, we assume that many factors would affect litter survival in the short absence of the female. These may include litter age and weather conditions at the time of the female's capture. The effects on the female and her young would be minimized by reducing the amount of time that a reproductive female is in the trap and by providing food in the trap.

Application of conservation measures and established survey methods are expected to reduce stress to individuals, as well as the number of accidental injuries. Surveying and monitoring has the possibility to affect all life stages, and individual responses likely range from no response to physiological stress to short-term altered behavior and in very rare occasions, death.

Mark and Release:

Mark and release involves marking individuals to gain information about their population size, ecological requirements, and life history. This activity requires the capture, handling, marking or collaring, release, and often recapture of the jumping mouse. Therefore, this method will adversely affect individuals through harassment and potential harm. Jumping mice may be harmed during handling through an increase in physiological stress, or from improper PIT tag placement or radio collar application. Adherence to the conservation measures and established protocols are expected to reduce effects for most jumping mice; these effects are expected to be mostly temporary and without any long-term population impacts.

Non-invasive forms of marking such as hair clipping or marking with a colored permanent marker are not expected to result in any injuries or deaths. It is a quick process that involves snipping a small amount of hair or putting a colored mark on the animal's belly or tail to uniquely identify an individual. Individuals of all ages can be marked using hair clipping or colored marker, while only adults can be marked with PIT tags, and radio-collaring is generally only done on animals greater than a certain weight (depending on the weight of the collar).

Mark and release will affect primarily adults and sub-adults, and responses likely range from physiological stress to death. Bodily injury may also result, which could be short-term or could also have a long-term effect such as reduced feeding success which may result in reduction in survival. Implementation of conservation measures and established survey methods are expected to reduce stress to individuals, as well as the number of accidental injuries or deaths.

Tissue Collection:

Tissue sampling for genetic analyses of jumping mice will adversely affect individuals through harassment and potential harm. Whether intentional or accidental, tissue removal may disrupt essential behaviors and reduce the individual's survival upon release. Only tissue collection in the form of a small ear clipping or hair sample is authorized. Samples will only be taken from adults or subadults, and could result in alarm or short-term physiological impairment, though are not expected to result in death.

Track Plates or Boxes and Baited Camera Stations:

Researchers have begun using track plates and baited camera traps to detect jumping mouse presence in new and known occupied sites. Track boxes have been used in Arizona and New Mexico to determine future live-trapping sites. Plastic shoe boxes are modified to hold an ink pad, contact paper to record jumping mouse tracks, and bait. The advantage to track boxes is that they do not detain mice or require routine examination as in the case of live trapping.

Jumping mouse mortality will not occur as a result of track boxes not being checked on a regular basis. Therefore, track box use is not anticipated to result in any adverse effects to the jumping mouse. Track boxes are used rather than open track plates because the jumping mouse activity period overlaps with the summer rain season in Arizona and New Mexico. Open track plates are more likely to be unusable after rain events than track boxes.

Baited camera stations have also been used to detect jumping mice on the Bosque del Apache National Wildlife Refuge. Motion sensor cameras are placed above bait stations set in openings in jumping mouse habitat.

We are not aware of how attracting jumping mice to track boxes, track plates, or baited camera stations affects their behavior or susceptibility to predation. Track boxes are required to have more than one entrance/exit in order to prevent jumping mice from being trapped inside and unable to escape from a predator entering the box. The contact paper used to record tracks is replaced often to prevent too many ink tracks from being recorded (making species identification difficult), which we believe may prevent predators from being attracted to the odor of rodent urine that may otherwise accumulate in the track box.

Interrelated or Interdependent Effects of the Proposed Action

Interrelated actions are those that are a part of a larger action and depend on the larger action for their justification and interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR § 402.02). No interrelated or interdependent actions have been identified in this consultation.

CUMULATIVE EFFECTS

The implementing regulations for section 7 define cumulative effects to include the effects of future State or private activities that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR § 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. State agencies in Arizona, New Mexico, and Colorado may issue scientific collecting permits to authorize permit holders to live-trap and handle jumping mice. However, these state permits are only issued after the Service issues a 10(a)(1)(A) permit to an authorized applicant. No other cumulative effects have been identified in this consultation.

SUMMARY OF EFFECTS

Although some harm or mortality may occur to the New Mexico meadow jumping mouse, the proposed action will lead to an increased understanding of the status, life history, and habitat requirements of this endangered species within the action area. The net effect of the proposed action (issuing research and recovery permits) is beneficial and will support management and recovery of the jumping mouse.

CONCLUSION

The regulatory definition of the Act's phrase "...jeopardize the continued existence of..." means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of the both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

After reviewing the current status of the jumping mouse, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the proposed action to issue section 10(a)(1)(A) recovery permits and fund such activities covered by these permits is not likely to jeopardize the continued existence of the New Mexico meadow jumping mouse. We support that conclusion based on the following rationale:

1. The majority of jumping mice captured under section 10(a)(1)(A) permits will be only temporarily harassed or harmed and will recover to full biological function in a short period of time.
2. We anticipate very few jumping mice will be killed as a result of research or recovery activities authorized by section 10(a)(1)(A) permits. Each season, based on previous research and monitoring trends, we anticipate increased live trapping effort to occur and new locations to be surveyed with varying success. There were 29 known jumping mouse populations when the species was listed in 2014 (79 FR 33119). Survey efforts across the range in 2015 and 2016 detected 14 additional jumping mouse populations (USFWS files). We believe as survey effort continues additional jumping mouse populations will be found. As a result, it is not possible to provide a specific number of jumping mice that may be killed over the life of this consultation. However, we anticipate mortality to be small. Based upon previous survey efforts, the likelihood of mortality is approximately 2-10 percent of all mice captured (see Live-Trapping section); this population decrease is not anticipated to have a measurable effect to the reproductive rate of jumping mice in the range-wide action area.
3. With the action anticipated to cause no appreciable decrease in the reproduction, numbers, or distribution of the species at the listed entity scale, and no change in the amount of habitat or isolation of populations, issuance of section 10(a)(1)(A) permits will not appreciably reduce the likelihood of survival and recovery of the New Mexico meadow jumping mouse.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service (50 CFR § 17.3) as "an act which

actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering.” Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to an applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, researchers and the appropriate Service Field Office staff must report the progress of the action and its impact on the species to the appropriate Regional Office Permit Coordinators as specified in the incidental take statement (see 50 CFR 402.14(i)(3)).

Amount or Extent of Take Anticipated

Incidental take in the form of harm, harassment, and mortality is anticipated to occur to jumping mice from live-trapping, capture, handling, marking, PIT tag insertion, radio collaring, and genetic tissue collection. The Service anticipates that the use of these techniques may result in the injury of ten percent of the total number of individual jumping mice handled or caught per survey season, or the death of five percent of the total number of individual jumping mice handled or caught per survey season. Incidental take will be authorized using number of individual mice for each section 10(a)(1)(A) permit issued, and the permittee will be required to contact the appropriate Field Office within 24 hours if take is exceeded for their permit. However, for purposes of this biological opinion, incidental take will be considered exceeded if more than ten percent of the total number of individual jumping mice handled or caught per survey season are injured, or if more than five percent of the total number of individual jumping mice handled or caught per survey season are killed. Incidental take is expected to occur in the form of harassment for all individuals that are captured, handled, or tracked using radio telemetry. Take in the form of harassment from capture or handling will be of short duration and individuals are assumed to return to normal behavior shortly after release.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to jeopardize the continued existence of the New Mexico meadow jumping mouse across its range.

Reasonable and Prudent Measures and Terms and Conditions

The Service believes no reasonable and prudent measures, in addition to the Conservation Measures stated above in the Description of the Proposed Action section, are necessary and appropriate to minimize take. Therefore, no terms and conditions, which implement reasonable and prudent measures, are necessary or provided.

Reporting and Monitoring Requirements

The implementing regulations for incidental take require that Federal agencies must report the progress of the action and its impact on the species (50 CFR 402.14(i)). To meet this mandate, the Service must annually review the extent of intentional and incidental take of listed species in Regions 2 and 6 that occurs in conjunction with the issuance of section 10(a)(1)(A) permits to ensure that the level of take anticipated in this biological opinion is not being exceeded.

Disposition of dead or injured listed animals

Upon finding dead, injured, or sick individual endangered or threatened species, initial notification must be made to the nearest Service Law Enforcement Office. In New Mexico, contact the Law Enforcement Office at 505-346-7828 or the New Mexico Ecological Services Field Office at 505-346-2525. In Colorado, the Law Enforcement Office may be reached at 720-981-2777 and the Colorado Ecological Services Field Office may be reached at 303-236-4773. In Arizona, contact the Law Enforcement Office at 480-967-7878 or the Arizona Ecological Services Field Office at 602-242-0210. Written notification must be made within five calendar days and include date, time, location, photograph, and any other pertinent information. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible condition. If feasible, remains of intact specimens of listed species will be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, information noted above will be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens will be made with the institution before carrying out of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any listed species survive treatment, the Service should be contacted regarding final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery programs, or to develop new information on listed species.

In addition to the Conservation Measures stated above, the Service recommends encouraging permittees to publish results obtained from actions taken under section 10(a)(1)(A) permits to make the information more widely available.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Service's proposal to issue section 10(a)(1)(A) permits for the New Mexico meadow jumping mouse. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Electronic cc:

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