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Memorandum

To: Kim Forrest, Refuge Manager, San Luis National Wildlife Refuge Complex; Los Banos, California, kim_forrest@fws.gov

From: Kim S. Turner, Acting Field Supervisor, Sacramento Fish and Wildlife Office; Sacramento, California KIM TURNER Digitally signed by KIM TURNER Date: 2022.04.15 15:19:16 -07'00'

Subject: Intra-Service Formal Consultation on the Trapping, Vaccination, and Emergency Translocations of Riparian Brush Rabbits at San Luis National Wildlife Refuge Complex

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed *Trapping, Vaccination, and Emergency Translocations of Riparian Brush Rabbits at San Luis National Wildlife Refuge Complex* (Proposal; proposed project), to be undertaken in San Joaquin, Stanislaus, and Merced Counties, California, and its effects on the federally endangered riparian brush rabbit (*Sylvilagus bachmani riparius*) and riparian woodrat (*Neotoma fuscipes riparia*), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). This biological opinion is based on information provided in the March 22, 2022, jointly developed Proposal, the *Temporary Housing, Vaccination, and Translocation of Riparian Brush Rabbits Program* (Service 2020a), and other sources of information, and was completed pursuant to the November 1, 2016, Service policy on *Streamlined Consultation Guidance for Restoration/Recovery Projects* and associated documents. The remainder of this document provides our biological opinion on the effects of the proposed project on the riparian brush rabbit and riparian woodrat.

BIOLOGICAL OPINION

Description of the Proposed Action

Introduction

When the threat of rabbit hemorrhagic disease virus serotype-2 ($RHDV_2$) began to emerge in California, an interagency riparian brush rabbit ad hoc emergency conservation team (Team) came together in the summer of 2020 to protect this endangered species from this new disease. Partners on the Team include the Service, California Department of Fish and Wildlife, Oakland Zoo, River Partners, California State University/Stanislaus Endangered Species Recovery Program, and the California Department of Food and Agriculture.

Rabbit hemorrhagic disease virus serotype-2 ($RHDV_2$) had been spreading in wild lagomorph populations in the southwestern United States and northern Mexico over the last few years, causing large-scale mortality events in black-tailed jackrabbits, desert cottontails, and domestic rabbits. In some instances, mortality rates of over 90% were observed (USDA 2018). A spatially explicit disease model incorporating riparian brush rabbit population data and habitat characteristics at the San Joaquin River National Wildlife Refuge (SJRNWR) indicated that, in the absence of any vaccinated animals and if mortality from $RHDV_2$ is high, the likelihood of a severe population decline causing extinction is high (Robin Russell/USGS, unpublished). Model scenarios indicated that having 15-20% of the estimated population vaccinated substantially lowers $RHDV_2$-caused extinction risk. $RHDV_2$ has been detected near the range of the endangered riparian brush rabbit, but has not yet been detected in the species. The virus, coupled with existing threats to the species such as habitat loss, flooding, and predation, threatens the riparian brush rabbit with extinction.

As part of the emergency response to combat the virus, the Team captured 20 riparian brush rabbits from the wild at SJRNWR and brought them into temporary captivity at the Oakland Zoo, where they were vaccinated and observed for possible vaccine reactions. The vets also collected blood prior to vaccination and at various times after vaccination (7-10, 14-20, and 60 days post-vaccination) for a serology study. After initial observations in temporary captivity, the Team proceeded to conduct a field vaccination program of wild riparian brush rabbits in their natural environment. In fall 2020, the Team trapped and vaccinated 242 riparian brush rabbits. Approximately six months later in spring 2021, the Team trapped and vaccinated 241 rabbits (50 of which were recaptures and received booster vaccines). Fall/spring vaccinations continued in 2021. To date, 762 wild riparian brush rabbit have been trapped and vaccinated with the Filavac VHD K C+V® vaccine (Filavie, France) and released back onto SJRNWR, 176 of which were booster shots administered to recaptured individuals. No adverse vaccine reactions have been observed in wild riparian brush rabbits. Vaccinated rabbits represent an estimated 17% to 26% of the estimated population on the SJRNWR.

Methods

Given the success of the *Temporary Housing, Vaccination, and Translocation of Riparian Brush Rabbits Program* (Service 2020a), the San Luis National Wildlife Refuge Complex (Complex) has proposed to continue vaccinations using an updated scope. The Proposal also includes emergency translocations, which is carried over from the 2020 scope. The current proposal covers two years, and includes two components, as follows:

1. Wild Population Biannual or Annual Vaccination

The program proposes to continue to trap, tag, vaccinate, and release wild riparian brush rabbits in high riparian brush rabbit density areas, including the SJRNWR, Caswell Memorial State Park (California Department of Parks & Recreation, CDPR), Dos Rios Preserve (River Partners), and the Oxbow Preserve (Center for Natural Lands Management, CNLM). Based on the 2020-2021 efforts, this Proposal aims to trap and administer $RHDV_2$ vaccines to 400-600 animals per year, pending staff and funding availability; for a two-year total of up to 1,200 vaccinations delivered. All locations have high quality habitat that is protected and managed for riparian brush rabbit, and have recent riparian brush rabbit observations. CDPR staff have become new partners in this effort, and have worked with Team members to survey the riparian brush rabbit population on Caswell, trained in riparian brush rabbit handling and vaccination procedures, and purchased vaccines. The Team will be assisting with surveying, trapping, handling, and vaccination of

Caswell riparian brush rabbits. It is expected that the Team will work with CNLM staff at the Oxbow Preserve at some future date to vaccinate their riparian brush rabbit population, thus providing protection to a more northern riparian brush rabbit population.

The Proposal currently calls for biannual vaccinations. Level of vaccination efforts may be reduced to once annually based on results from an ongoing serology study (i.e., if antibodies persist for one year or more). The serology study includes collection of blood samples and rectal swab samples from previously vaccinated riparian brush rabbits, new capture riparian brush rabbits prior to vaccination, and sympatric cottontails. Blood samples will be used for serology to detect exposure to the virus or vaccine and rectal swab samples will be used for viral detection and quantification via PCR.

2. Emergency Translocation

Emergency translocations may be enacted as a response to flooding within the range of the species. Rabbits captured for emergency translocation may be relocated elsewhere within the SJRNWR; translocated to the Dos Rios Preserve; or, on a case-by-case basis, translocated to the San Luis or Merced National Wildlife Refuge.

Riparian brush rabbits will not be captured unless necessary to rescue them from imminent flood danger. In addition to drowning, imminent flood danger also refers to starvation and/or predation that is caused by a flood-related shortage of food or shelter.

If $RHDV_2$ vaccines are available, the Team may choose to vaccinate rescued rabbits that are in good body condition. The decision to vaccinate will depend upon factors such as the (i) number of vaccines available, (ii) vaccination history of the captured riparian brush rabbits, (iii) likelihood of survival given current conditions, (iv) results of ongoing $RHDV_2$ modeling efforts, (v) location of the release site, and/or (vi) other circumstances.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the proposed project, the action area encompasses the entirety of the San Luis National Wildlife Refuge Complex, Caswell Memorial State Park, the Dos Rios Preserve, and the Oxbow Preserve.

Status of the Species

Riparian brush rabbit

For the most recent comprehensive assessment of the species' range-wide status, please refer to the *Species Status Assessment* (Assessment) (Service 2020a) and *5-Year Review, Riparian Brush Rabbit (Sylvilagus bachmani riparius)* (Review) (Service 2020b). No change in the species' listing status was recommended in the status review. Threats evaluated during the Assessment and Review have continued to act on the species since the documents were finalized, with flooding being the most significant effect. While the population of riparian brush rabbit remains small and fragmented, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Known populations at the SJRNWR and Caswell Memorial State Park in Stanislaus County, and the Oxbow Preserve in San Joaquin County, are protected through conserved land, but they are still subject to threats such as disease and predation, and in the case of the SJRNWR and Caswell, flooding. A population in the South Delta near Paradise Cut is not protected. All populations are subject to the threats defined in the Assessment and Review.

Riparian woodrat

For the most recent comprehensive assessment of the species' rangewide status, please refer to the *5-Year Review, Riparian Woodrat (Neotoma fuscipes riparia)* (Service 2020c). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the 2020 5-year review was finalized, with loss of habitat being the most significant threat. While there have been continued losses of riparian woodrat habitat throughout the species' range, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Environmental Baseline

Riparian brush rabbit

The distribution of the riparian brush rabbit includes a robust population within the SJRNWR and several fragmented occurrences along the San Joaquin River, Stanislaus River, and South Delta channels.

On a seasonal basis, the SJRNWR population of riparian brush rabbit is conservatively estimated to be 2,223, 2,556, 3,532, and 2,786 respectively for summer, fall, winter, and spring (Parrish 2021). The occupancy model for total abundance and density mirrored the seasonal patterns documented with relative abundance indices of the highest level in winter, lowest in summer, and intermediate in fall and spring. These abundances combine analysis of camera trap data from 2,104 acres of restored riparian habitat on the SJRNWR (which gave an estimate of 0.71 riparian brush rabbit/acre (95% CI: 1.29-2.31) for a total of 1,485 riparian brush rabbit (95% CI: 1,097-1,970) in the study area; Landers et al. 2020), home range data of riparian brush rabbit from prior translocations and radio telemetry studies, mapping riparian vegetation on SJRNWR, and applying the model across all riparian vegetation, not just the restored riparian habitat (Parrish 2021).

At Dos Rios Preserve, just across the San Joaquin River from SJRNWR, riparian brush rabbit were surveyed in restored riparian habitat using camera traps; resulting in an estimate of 85-124 riparian brush rabbit (Hagen et al. 2020). The Oxbow Preserve is estimated to house a similarly sized population, ranging from 20 to 125. Suitable habitat exists at Caswell, but the population status at that location is currently being analyzed.

Riparian woodrat

In our last status review we identified two known riparian woodrat populations: one along the Stanislaus River at Caswell Memorial State Park and the other at the SJRNWR (Service 2020c). In December 2012, six riparian woodrats were caught during a trapping survey at Caswell Memorial State Park (Kelly et al. 2014).

The SJRNWR population is thought to be smaller than the Caswell Memorial State Park population, although Parrish et al. (2020) notes that the species is detected frequently on camera traps. Automatic cameras set up on the refuge for a master's thesis study on riparian brush rabbits obtained over 300 pictures of riparian woodrats at six locations during the spring and summer of 2017 (Tarcha 2020).

Effects of the Action on Listed Species

Riparian brush rabbit

The program is anticipated to be beneficial for the riparian brush rabbit overall, but there is some low risk of adverse effects to individuals resulting from program activities. The proposed program involves relatively invasive procedures, including capture of individuals, handling, tagging, bleeding, and injection of vaccines. Riparian brush rabbits may injured or killed during capture and handling. To reduce risks, all activities in the proposed program will be conducted by members of the Team or members trained by the Team.

Infant or juvenile riparian brush rabbits may be unable to care for themselves if their mothers are captured, resulting in death of infants or juveniles due to starvation or increased predation; however, the program will release pregnant or lactating females, reducing the chances that infants and juveniles will experience these effects.

Handling individuals may result in accidental injury to or mortality of individuals, or in humans transmitting diseases other than $RHDV_2$ among captured individuals. Individuals captured and re-released may be temporarily subject to increased predation upon release.

In rare instances, the vaccine itself may result in adverse effects on individuals through side effects such as anaphylactic shock or other means.

Capture, handling, tagging, vaccinating, and release as part of emergency translocations have the potential to injure or kill riparian brush rabbits, but will only be conducted if needed to rescue them from imminent flood danger.

Since the activities will be low intensity within the species habitat (e.g., moving through the habitat to set or check traps), we expect any temporary effects on habitat to be negligible and no permanent effects.

While all of the above effects may occur during program implementation, we expect effects to be confined to individuals, and do not anticipate those effects on individuals to result in effects on the population as a whole.

Despite the risk of adverse effects on individuals, it is anticipated that the action will be beneficial for the species, even if injury to, or mortality of, some individuals occurs during program activities. The $RHDV_2$ virus is a potentially catastrophic disease that could, combined with existing threats such as seasonal flooding and predation, result in the extinction of the species. Implementation of the program is expected to conserve the species and result in the current population being more resilient to the effects of the $RHDV_2$ virus. Likewise, flooding is a potentially catastrophic event for riparian brush rabbits, and any capture that occurs as part of emergency translocation would be expected to have overall beneficial effects for translocated rabbits.

Riparian woodrat

Trapping of riparian brush rabbit also has the potential to capture riparian woodrats, which has the potential to injure or kill individuals. Handling individuals may result in accidental injury to or mortality of individuals. Infant or juvenile riparian woodrats may be unable to care for themselves if their mothers are captured, resulting in death of infants or juveniles due to starvation or increased predation. To minimize effects, all riparian woodrats captured would be immediately released at the capture site, and trapping would be conducted by trained individuals.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. 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. During this consultation, the Service did not identify any future non-federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

After reviewing the current status of the riparian brush rabbit and riparian woodrat, the environmental baseline for the action area, the effects of the proposed action and cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the riparian brush rabbit or riparian woodrat and will result in a net conservation benefit to the riparian brush rabbit. Effects to the riparian woodrat are expected to be minimal and will not result in mortality.

The Service reached these conclusions because:

A. The primary purpose of the proposed action is to conserve the riparian brush rabbit;
B. The proposed action was developed in coordination with the Service for that purpose;
C. The proposed action gives full consideration to, and is consistent with, the survival and recovery needs of the riparian brush rabbit and the role of the action area in providing for those needs;
D. There is either a proven track record for successful implementation of the proposed action, or there is a high level of certainty that the proposed action is likely to produce a beneficial impact for the listed species.
E. Adverse impacts (including those that conform to incidental take) are likely to be small in magnitude, temporary (meaning not continuous, recurring, or chronic), short-term and geographically local with respect to each local population being addressed.
F. The amount or extent of incidental take of listed species is likely to be low, and is not likely to have adverse population-level impacts to the affected listed species.
G. The Proposal is not likely to cause a permanent net loss of habitat, net loss of habitat function, net loss of critical habitat or a net loss of functional value of critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 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. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including 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 this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Refuge so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Refuge has a continuing duty to regulate the activity covered by this incidental take statement. If the Refuge (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, the Refuge must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

In this biological opinion, we have analyzed the effects of the proposed action of purposeful take of riparian brush rabbit as part of recovery activities for the species. The Service anticipates that all riparian brush rabbits within the action area may be subject to incidental take in the form of non-lethal harm and capture, and we anticipate that no more than 15 individual riparian brush rabbit per year will be subject to lethal take as a result of the proposed project, with the majority of incidental take occurring in the SJRNWR population.

Additionally, the Service anticipates the take of up to 5 riparian woodrat as a result of this proposed action. The incidental take is expected to be in the form of harass and harm during capture, handling, and release.

Reasonable and Prudent Measures and Terms and Conditions

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat. In order to be exempt from the prohibitions of section 9 of the Act, the Service must comply with the following nondiscretionary (if any) reasonable and prudent measures and terms and conditions and required reporting/monitoring requirements.

The Service believes the following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize impacts of purposeful and incidental take of the riparian brush rabbit and riparian woodrat:

A. All activities involving capture will be conducted by Service-approved biologists (members of the Team, or trained by the Team).

B. Dead specimens and/ or appropriate parts of dead specimens that are incidentally taken shall be preserved in accordance with standard museum practices. Collection data (e.g., dates and location) and deposition of carcasses must be reported in a subsequent document to the Service.

C. The Service will be notified (email is sufficient) within one week if riparian woodrats are incidentally captured.

D. The Service will be notified within one week (email is sufficient) if emergency translocations are conducted, with additional information included in the annual report.

E. An electronic report and any other pertinent supporting documents will be submitted to the Sacramento Fish and Wildlife Office annually, detailing the activities that were conducted and the knowledge gained as a result.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the action(s) outlined in the request. 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 retained (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 not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this biological opinion, please contact Samantha Lantz (samantha_lantz@fws.gov) or Amber Aguilera (amber_aguilera@fws.gov), at the letterhead address, via email, or at (916) 414-6723.

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Parrish, J. W. 2020. Endangered riparian brush rabbit distribution and abundance at the San Joaquin River National Wildlife Refuge. Directorate Resource Fellowship report, with oversight by R.W. Parris, F. Takahashi, and J. Sparks. 143 pp.

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Tarcha, C. 2020. Behavior and ecology of the riparian brush rabbit at the San Joawuin River National Wildlife Refuge as determined by camera traps. MS thesis, California State University, Stanislaus. 198 pp.

PERSONAL COMMUNICATIONS

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