

5-YEAR REVIEW

Riparian Woodrat (*Neotoma fuscipes riparia*)

GENERAL INFORMATION:

Species: Riparian woodrat (*Neotoma fuscipes riparia*)

Date listed: February 23, 2000

FR citation(s): 65 FR 8881

Classification: Endangered

BACKGROUND:

Most recent status review:

The most recent status review of the riparian woodrat was a 5-year review completed by the Sacramento Fish and Wildlife Office in 2012 (Service 2012). [[CLICK HERE TO VIEW DOCUMENT](#)]

FR Notice citation announcing this status review:

A notice announcing initiation of the 5-year review for this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on July 26, 2019 (84 FR 36116-36118; Service 2019a). We did not receive any information from the public in response to the Federal Register Notice announcing this 5-year review.

ASSESSMENT:

Information acquired since the last status review:

This 5-year review was conducted by the U.S. Fish and Wildlife Service's (Service) Sacramento Fish and Wildlife Office (SFWO). Data for this review were solicited from interested parties through a Federal Register notice announcing this review on July 26, 2019. We also contacted species experts and the California Department of Fish and Wildlife (CDFW) to request data or information we should consider in our review. Additionally, we obtained data from the California Natural Diversity Database (CNDDDB; maintained by CDFW), conducted a literature search, and reviewed information in our files. Personal communications with species experts and annual reports submitted by project partners were our primary sources of information.

Population Status and Abundance

In our last status review we identified two known riparian woodrat populations (Service 2012, p. 3). One population, along the Stanislaus River at Caswell Memorial State Park (CMSP), had been known since before the subspecies was listed in 2000 (Service 2000, p. 8881). The other, about 8 kilometers (km) (5 miles (mi)) south at the San Joaquin River National Wildlife Refuge (SJRNR), was discovered subsequently (Service 2012, pp. 3, 6). The SJRNR population is considered smaller, and possibly vulnerable to extirpation, based on low trapping success and a

complete lack of observations of stick lodges (dens that riparian woodrats make out of sticks) in the area (Service 2012, pp. 6, 8).

Since that time, six riparian woodrats were caught during a December 2012 trapping survey at CMSP (Kelly *et al.* 2014, p.13). One of the captured riparian woodrats had also been caught in a previous survey at CMSP 4 years earlier. No additional trapping efforts have been conducted at CMSP since that time (Reith *in litt.* 2019, p.1). A single riparian woodrat was also captured at SJRNWR in May 2012 incidental to reintroduction and monitoring efforts for riparian brush rabbit (*Sylvilagus bachmani riparius*) (Kelly *et al.* 2014, pp. 6–8). A 2017 biological assessment of potential impacts from restoration on lands adjacent to the SJRNWR notes riparian woodrats had been captured at the refuge in 2005, 2009, 2011, and 2012, but mentions no subsequent captures (River Partners 2017, p. 19). However, 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 6 locations during the spring and summer of 2017 (Tarcha 2020, pp. 54, 71).

Taxonomy and Genetics

In our last status review (Service 2012, pp. 5, 9) we noted that a genetics study (Matocq 2002, p. 236) had raised the possibility that riparian woodrats might actually be a subspecies of the big-eared woodrat (*Neotoma macrotis*) rather than of the dusky-footed woodrat (*N. fuscipes*). We recommended that a genetics study be completed to clarify the phylogenetic relationships involved (Service 2012, p. 21). Such a study was published only a few months after we released the review (Matocq *et al.* 2012, entire). The authors found that riparian woodrats carry mitochondrial DNA (mtDNA) from both woodrat species, but their morphological characteristics and nuclear DNA suggests greater affinity with dusky-footed woodrats (Matocq *et al.* 2012, p. 5929). It remains unclear, however, which species the riparian woodrat populations originated from. It is possible they began near their current location as initially-separate big-eared and dusky-footed populations that slowly began interbreeding among themselves (Matocq *et al.* 2012, p. 5930). Such interbreeding may have been encouraged by habitat changes that isolated them from other big-eared woodrats in the Sierra foothills to the east, and from other dusky-footed woodrats in the coast range to the west. The last period of interbreeding with either of those groups appears to have occurred sometime between about 10,000 years ago (early Holocene) and several hundred years ago (Matocq *et al.* 2012, p. 5929). The time and isolation have resulted in several alleles that appear unique to riparian woodrats, although it may be those alleles are simply too rare to have been found yet in other woodrat subspecies.

The study also found evidence of repeated genetic bottlenecks in both the CMSP and SJRNWR populations (Matocq *et al.* 2012, p. 5930). These bottlenecks (dips in population size, likely due to past flooding events), combined with recent isolation between the two populations, have resulted in measurable genetic differences across the two riparian woodrat populations.

Threats

In our last status review we identified habitat loss from urban, commercial, and agricultural development as an ongoing threat (Service 2012, pp. 12). Since the only known riparian woodrat population locations are on protected lands in the CMSP and SJRNWR, current development of occupied habitat does not pose a serious concern. However, the impacts of past development are ongoing today because there are no sufficiently large areas of undeveloped riparian habitat into

which new riparian woodrat populations can expand (Service 2012, p. 12). That situation may improve somewhat in the future due to ongoing habitat restoration measures discussed under Conservation, below.

Additionally, development projects that are subject to Section 7 consultation or result in the issuance of an incidental take permit under the federal Endangered Species Act (ESA) typically include habitat compensation, which can reduce the severity of overall habitat loss typically associated with these projects. Habitat compensation can occur via a variety of mechanisms, including the purchase of credits at approved conservation banks, through permittee responsible mitigation, and through the development of habitat conservation plans (HCP's). However, there are currently no conservation banks or HCP's for the riparian woodrat. Two Section 7 projects that included permittee responsible mitigation for the riparian woodrat are discussed under Conservation – *Permittee Responsible Mitigation*, below.

We also noted in our last review that levee construction prior to the time of listing had caused flood risks at both population locations to increase. (Service 2012, p. 12). The levees contain and channel floodwaters, thereby increasing the intensity and duration of flooding between them. Conversion of habitat to agriculture outside the levees has also served to increase potential impacts from flooding by removing natural areas to which riparian woodrats can retreat. This situation remains unchanged, and has resulted in major flooding in 2017 at the SJRNWR (and presumably at the CMSP) from roughly February through July (Holt *in litt.* 2019, p. 1; Tarcha and Heffernan *in litt.* 2019, pp. 1–2). Impacts to the riparian woodrat populations due to the flooding in 2017 have not been determined, but are potentially significant.

Our last review also noted that fire risk at CMSP may have been heightened since the time of listing due to a lack of fuel management (Service 2012, p. 12). No additional fuel management activities have been carried out at CMSP since that time (Reith *in litt.* 2019, p. 1; Prevost *in litt.* 2019, p.1), so the level of threat from wildfires may have increased further.

Other potential threats noted in our last status review include inbreeding depression, competition and possible juvenile predation by black rats, long term drought, rodenticide applications in nearby areas, disease, and predation by foxes, coyotes, and feral cats and dogs. We have no information to indicate that changes in the risks associated with any of those potential threats have occurred since the last review.

Conservation

In 2011 a conservation organization (“River Partners”) purchased private lands (the Dos Rios Ranch) adjacent to the SJRNWR and has since restored 600 acres (ac) (243 hectares (ha)) of riparian habitat at the site (BOR 2018, p. 2). Although those lands are not known to currently be occupied by riparian woodrats, the restored land provides additional area into which individuals from the SJRNWR population may migrate or be transferred in the future through capture and release efforts. The restoration will also increase the total area over which floodwaters are able to spread unconfined by dikes, thereby helping to decrease the intensity and duration of flooding in the general area, including at SJRNWR and CMSP. In 2018, the Bureau of Reclamation completed an environmental assessment for a grant that would fund restoration on an additional 159 ac (64 ha) of riparian habitat on the Dos Rios property, including 3 ac (1.2 ha) of elevated land to serve as refugia during floods (BOR 2018, pp. 1–2).

Beginning in 2012, funding made available through the CALFED Bay-Delta Program (CALFED) has been used for acquisition and restoration of habitat in the area between CMSP and SJRNWR (CALFED 2011, p. A-44). These actions are in accordance with the Ecosystem Restoration Program Conservation Strategy, developed the year before under the same program (CALFED 2011, pp. 6, A-44).

Our last status review included a recommendation that expansion of the SJRNWR be aggressively pursued, with emphasis on connection to the San Luis NWR (Service 2012, p. 21). In 2017, we formally authorized this expansion and released a final plan for its accomplishment (Service 2017, p. 1). Under the plan, the refuge will work with willing landowners to expand refuge lands held either in fee title or through a conservation easement. Areas authorized for the expansion are identified in Figure 1 as “Alternative 2” (Service 2016, p. 27). The areas approved for acquisition total 10,738 ac (4,346 ha), and would extend the refuge south along the San Joaquin River until it connects with the San Luis NWR, as well as several miles along the Tuolumne River upstream from its confluence with the San Joaquin River. It would also expand the refuge up the Stanislaus River, around and beyond the CMSP. Although this plan merely authorizes expansion, which must still be accomplished in future years as opportunity and funding permit, it is a necessary first step towards significant restoration and expansion of riparian habitat into which riparian woodrats could expand. The expansion would also allow managers to take steps to help restore floodplain hydrology and provide additional lands onto which floodwaters can expand (Service 2016, p. 81).

Permittee Responsible Mitigation

Permittee-responsible mitigation, also sometimes referred to as turn-key mitigation, includes activities or projects undertaken by a permittee (or authorized agent) to provide compensatory mitigation to offset impacts from a single project. The permittee retains full responsibility for this mitigation. Ideally, permittee-responsible mitigation projects are established in advance of the project-related impacts they are offsetting.

Two projects requiring consultation under the ESA have been conducted since our last status review. The first involved installation of fish-screens at a water diversion on an easement within the SJRNWR (Service 2018, pp. 1, 4). The project was expected to disturb 0.84 ac of potential habitat (Service 2018, p. 9), but the Section 7 review process resulted in a commitment to restore that disturbed habitat along with 1.68 ac of additional potential habitat at a location beneficial to the riparian woodrat.

The second project involved structural improvements to a bridge on State Highway 99, about 8 km (5 mi) northeast of CMSP (Service 2019b, pp. 1, 13). The project is expected to disturb 0.43 acres of riparian woodrat habitat, but as a result of Section 7 consultations that habitat will be restored after project completion (Service 2019b, p. 9).

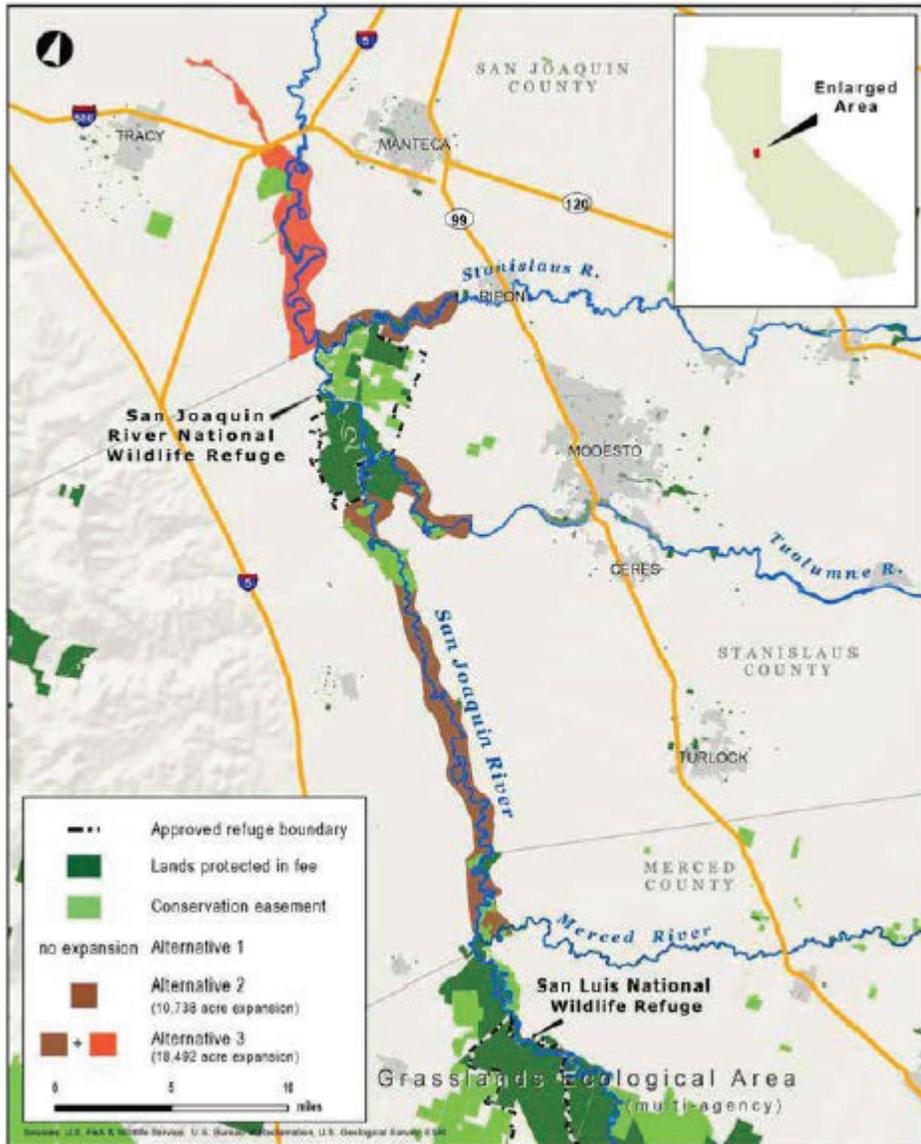


Figure 1: Areas authorized for expansion of the SJRNWR (Alternative 2–brown areas– only) (from Service 2016, p. 27).

Recovery Permits

Recovery permits issued under the ESA, also referred to as 10(a)(1)(A) permits, allow scientists to “take” listed species as a means to ultimately contribute to the recovery of the listed species. The data acquired from some actions covered under recovery permits (e.g., occurrence, abundance, distribution, etc.) allow us to make informed decisions for the species that will enhance their survival and recovery. Recovery permits can be issued for activities that directly aid the recovery of a species, such as captive breeding, reintroductions, habitat restoration, removal or reduction of threats, and educational programs. Our recovery permitting program aids in the conservation of listed species by ensuring permittees have adequate field experience and qualifications for conducting activities with the target listed species and, for most species, ensures that permittees are following standardized protocols while surveying. The recovery

permitting application process ensures that scientific proposals are crafted using the recommended actions laid out in the Recovery Plan for the target species. Habitat assessment guidelines and species specific survey protocols for the riparian woodrat can be found at: <https://www.fws.gov/sacramento/es/Permits/>. Minimum qualifications for permittees are available at: <https://fileshare.fws.gov/?linkid=KZi4zr6VWWXKS6ioMSNlm6T+aZ2rs51/8YDODS6ncAGbVD1eHPt0IQ>.

Conclusion:

After reviewing the best available scientific information, we conclude that riparian woodrat remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the ESA and analysis of the status of the species in the 2012 status review (Service 2012) remains an accurate reflection of the species current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

Recommendations remain similar to those in the 2012 status review (Service 2012):

1. Complete a formal recovery plan for this subspecies.
2. Continue acquisition of lands and restoration of habitat in accordance with the SJRNWR expansion plan.
3. Conduct genetic studies of the two known riparian woodrat populations to assess the danger of inbreeding depression.
4. Assess and manage the fuel fire load at CMSP.
5. Periodically survey existing riparian woodrat populations to provide population size estimates that can be updated over time.
6. Conduct management actions to lower black rat (*Rattus rattus*) population sizes at CMSP and SJRNWR. Management or eradication efforts should primarily be done using live trapping techniques, and must avoid the use of rodenticides. If possible, management or eradication efforts should be coupled with controlled experimental techniques to clarify the competitive relationships between black rats and riparian woodrats.
7. Survey the San Joaquin River and its tributaries to locate appropriate habitat for riparian woodrats, as well as to locate any riparian woodrat populations that may currently be unknown.
8. Investigate the potential benefits of relocating individuals from existing woodrat populations into appropriate habitat within the SJRNWR and its approved expansion areas, including

restored lands, in order to establish new populations. If the benefits outweigh the risks, develop and implement a program to carry out such relocations.

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