

### 5.3.23 Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)



**Vernal pool fairy shrimp**

Photo Credit: Ivan Parr

#### Status

- Federally Threatened

#### Ecological Requirements

- RCIS Regions: Inner Coast Range, San Antonio Valley (CDFW 2020)
- RCIS Natural Communities: Vernal Pool (CDFW 2020; USFWS 2005b).
- Occurs in cool-water vernal pools or vernal pool-like habitats (CDFW 2020; USFWS 2005b, 2007b)
- Threatened by incompatible grazing regimes and mosquito abatement programs (USFWS 2007b).
- Upland and buffer habitat important for vernal pool integrity (USFWS 2005).
- Full species account available: California Natural Diversity Database, RareFind 5 (CDFW 2020) and the U.S. Fish and Wildlife Service 2007 5-Year Review for vernal pool fairy shrimp (USFWS 2007b)
- RCIS Conservation Target: Moderate (large range; modeled suitable habitat is designated critical habitat)

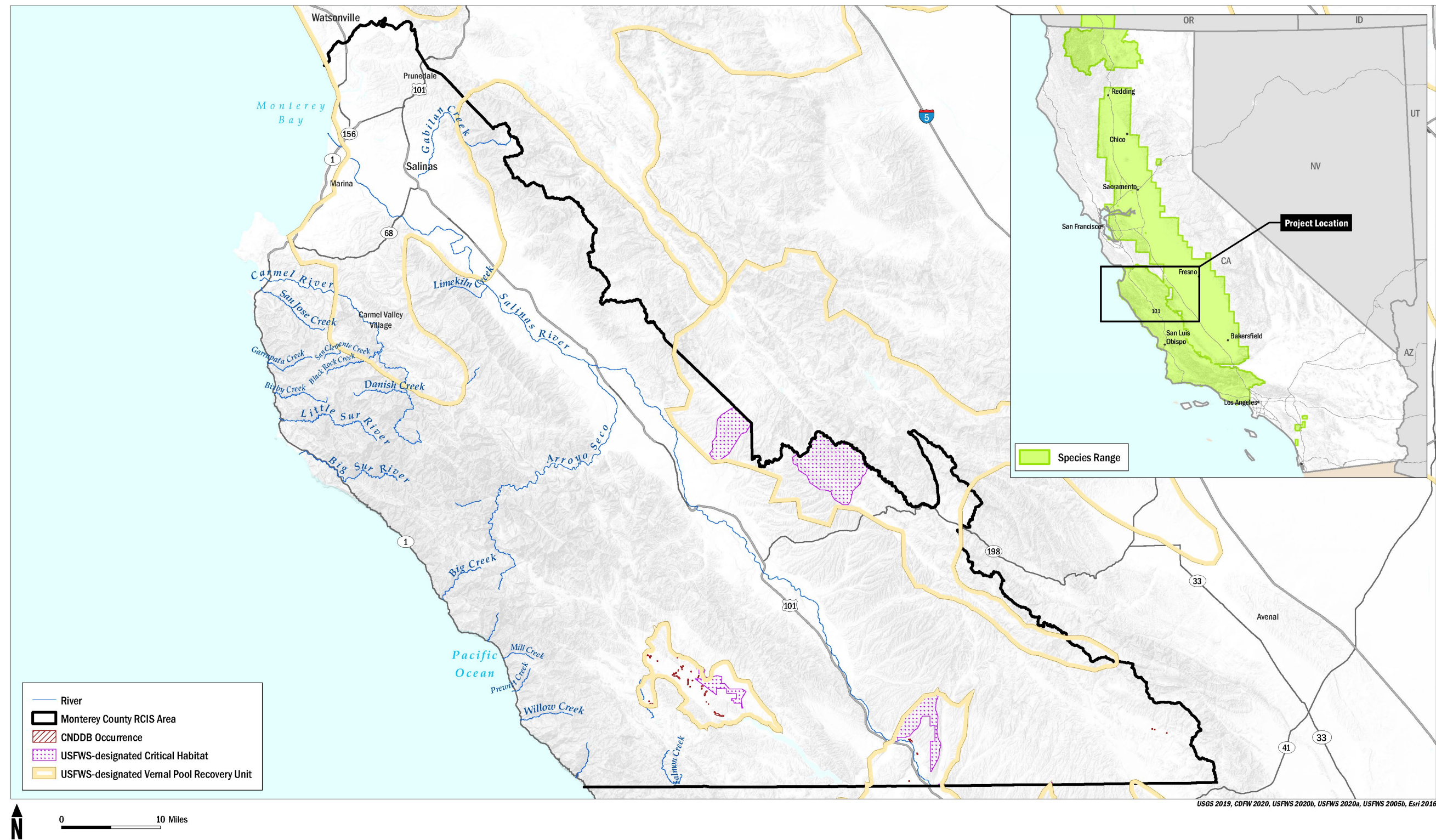
### Associated Non-Focal Species

- Western spadefoot (*Spea hammondi*)
- Contra Costa goldfields (*Lasthenia conjugens*)

### Climate Change Vulnerability Assessment

The U.S. Fish and Wildlife Service 2007 5-Year Review for vernal pool fairy shrimp (USFWS 2007c) projects potential climate change impacts to vernal pool fairy shrimp and vernal pool communities in California and many of these impacts are closely connected to the availability of water. More rainfall through intense precipitation events could result in an increase in suitable vernal pool habitat that would benefit vernal pool fairy shrimp. Or if a more hot and dry global circulation model occurs, the resulting droughts could negatively affect the amount of vernal pool habitat and increase the frequency of vernal pools drying before vernal pool fairy shrimp have completed their life cycle, or cause pool temperatures to exceed suitable temperatures for breeding.

The goals, objectives, and actions shown in Table 5-37. aim to protect, enhance, and restore present day suitable habitats for vernal pool fairy shrimp, as well as habitats that may become suitable in the future because of projected climate changes. Actions also address population stability, such as reintroductions, which may allow individuals to move to newly suitable habitats in the future. Figure 5-19 shows the range and modeled habitat for the vernal pool fairy shrimp.



**Figure 5-19. Vernal Pool Fairy Shrimp Range and Modeled Habitat**

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### Vernal Pool Fairy Shrimp Conservation Priorities, Goals, Objectives, and Actions

RC Goal 1, Water actions 1.1.1, 1.1.5, 1.1.7, and 1.1.8 apply to vernal pool fairy shrimp. Table 5-36 summarizes specific goals, objectives, and actions for the species.

#### Conservation Priorities

- Acquire and protect habitat in and around the U.S. Fish and Wildlife Service -designated Fort Hunter-Liggett core area, which contains 80% of occurrences in the RCIS area (USFWS 2005) (RC Objective 1.1).
- Enhance habitat in U.S. Fish and Wildlife Service -designated Fort Hunter-Liggett core area (VPFS Objective 1.2).

**Table 5-36. Vernal Pool Fairy Shrimp Goals, Objectives, and Actions**

Goal	Objective	Threats	Co-Benefits	Action
VPFS Goal 1. Promote persistence of vernal pool fairy shrimp's populations in the RCIS area through protection, restoration, and enhancement of habitat.	VPFS Goal 1.1: Protect known occurrences and allow expansion by protecting 16,000 acres of suitable habitat. Protect 85% of suitable habitat in the U.S. Fish and Wildlife Service-designated Fort Hunter-Liggett core area and 80% of occurrences in the RCIS area (USFWS 2005). Measure progress toward achieving this objective in acres of vernal pool habitat, number of occurrences, and associated/equivalent acres protected.	<ul style="list-style-type: none"> <li>• Habitat loss, degradation, fragmentation</li> <li>• Climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Other focal/non-focal species</li> <li>• Biodiversity</li> <li>• Climate change resilience</li> </ul>	RC Objective 1.1 (Protection) actions

Goal	Objective	Threats	Co-Benefits	Action
VPFS Goal 1.	VPFS Objective 1.2: Enhance occupied and suitable vernal pool fairy shrimp habitat in the RCIS area. Measure progress toward achieving this objective by acres of habitat and adjacent/equivalent acres enhanced.	<ul style="list-style-type: none"> <li>• Altered natural flow regime</li> </ul>	<ul style="list-style-type: none"> <li>• Other focal/non-focal species</li> <li>• Biodiversity</li> <li>• Water quality</li> </ul>	VPFS 1.2.1: Enhance hydrology of vernal pools or vernal pool complexes that are currently reducing in size (USFWS 2005).
VPFS Goal 1.	VPFS Objective 1.2:	<ul style="list-style-type: none"> <li>• Habitat loss, degradation, fragmentation</li> </ul>	<ul style="list-style-type: none"> <li>• Other focal/non-focal species</li> <li>• Biodiversity</li> </ul>	VPFS 1.2.2: Provide suitable upland habitat buffers to protect pollinators of vernal pool plants, dispersal of vernal pool plants and wildlife, and local watersheds, and sustain important predators of herbivores (USFWS 2005).

Goal	Objective	Threats	Co-Benefits	Action
VPFS Goal 1.	VPFS Objective 1.2:	<ul style="list-style-type: none"> <li>• Habitat loss, degradation, fragmentation</li> </ul>	<ul style="list-style-type: none"> <li>• Other focal/non-focal species</li> <li>• Biodiversity</li> <li>• Working lands</li> </ul>	VPFS 1.2.3: Create and implement managed grazing plans in/adjacent to vernal pools and vernal pool complexes (USFWS 2005).
VPFS Goal 1.	VPFS Objective 1.2:	<ul style="list-style-type: none"> <li>• Habitat loss, degradation, fragmentation</li> </ul>	<ul style="list-style-type: none"> <li>• Other focal/non-focal species</li> <li>• Biodiversity</li> <li>• Working lands</li> </ul>	VPFS 1.2.4: Assist local governments in developing habitat conservation plans and assist private landowners in developing landowner agreements (USFWS 2005).
VPFS Goal 1.	VPFS Objective 1.2:	<ul style="list-style-type: none"> <li>• Habitat loss, degradation, fragmentation</li> </ul>		VPFS 1.2.5: Develop and implement adaptive management plans, based on monitoring data and best available science (USFWS 2005).

Goal	Objective	Threats	Co-Benefits	Action
VPFS Goal 1.	VPFS Objective 1.2:	<ul style="list-style-type: none"> <li>Habitat loss, degradation, fragmentation</li> </ul>		VPFS 1.2.6 Implement education and outreach programs to inform partners and the public about recovery needs and opportunities for vernal pool ecosystems (USFWS 2005).
VPFS Goal 1.	VPFS Objective 1.2:	<ul style="list-style-type: none"> <li>Mosquito abatement programs</li> </ul>		VPFS 1.2.7: Limit use of mosquitofish as mosquito abatement in vernal pools with known occurrences and adjacent habitat (USFWS 2007b).
VPFS Goal 1.	VPFS Goal 1.3: Restore occupied and suitable vernal pool fairy shrimp habitat in the RCIS area. Measure progress toward achieving this objective by acres of habitat and adjacent/equivalent acres restored and occupied by vernal pool fairy shrimp.	<ul style="list-style-type: none"> <li>Habitat loss, degradation, fragmentation</li> </ul>		VPFS 1.3.1: Reintroduce vernal pool fairy shrimp to suitable or newly created habitat (USFWS 2005, 2007b).

Sources: CDFW 2015, 2020; USFWS 2005, 2007b