

2.0 INVERTEBRATES - SL, SO, SS

2.1 San Diego Fairy Shrimp (*Branchinecta sandiegonensis*) – Category SL

Management Units with Known Occurrences

San Diego fairy shrimp are endemic to southern California and are restricted to vernal pools and other nonvegetated, temporary (i.e., containing water a short time) basins in coastal southern California and northwestern Baja California, Mexico (USFWS 2008). San Diego fairy shrimp are vernal pool (seasonal depressional wetlands) habitat specialists, found in small, shallow vernal pools 5–30 centimeters (2–12 inches) deep with a temperature range of 10–20 degrees Centigrade (USFWS 1997). They are occasionally found in ditches and road ruts that support suitable conditions (USFWS 2008). San Diego fairy shrimp are usually observed from January through March when seasonal rainfall fills vernal pools and initiates cyst (egg) hatching (Hathaway and Simovich 1996).

Within the MSPA, San Diego fairy shrimp is known from vernal pools and vernal pool complexes in MUs 1, 2, 3, 4, 5, and 6 in Tijuana Slough National Wildlife Reserve, Imperial Beach, Kearny Mesa, Chollas Heights, Sweetwater Reservoir, Marron Valley, Otay Mesa, Mission trails Regional Park, Santee, Poway, Ramona, Del Mar Mesa, Lopez Ridge, Mira Mesa, Carlsbad, and San Marcos (MSP-MOM 2014). They are also known from vernal pools on MCAS Miramar, which supports the largest contiguous block of habitat and highest number of occupied vernal pools within the range of the San Diego fairy shrimp (39 complexes; over 1,899 pools) (USFWS 2008). It is important to note that surveys may miss observing and collecting adults because not all vernal pools fill in a given year; pools may not fill long enough for dormant cysts to hatch; and, in any given pool that has ponded water long enough to hatch San Diego fairy shrimp cysts, only a small percentage of the cyst bank hatches (i.e., bet-hedging; Simovich and Hathaway 1997; Philippi et al. 2001).

Management Categorization Rationale

San Diego fairy shrimp should be managed as a Species Management Focus Category SL Species due to a very restricted distribution in the MSPA and threats from invasive plants, and because managing the general vegetation community

alone will not ensure persistence of the species. Management should focus on enhancing vernal pool habitat. In 1997, the San Diego fairy shrimp was listed as an endangered species (USFWS 1997).

The loss and modification of vernal pool habitat continues to be a significant threat to the San Diego fairy shrimp, especially in areas where urbanization is expected to expand (USFWS 2008). Destruction of watersheds and disruption of hydrological systems can create further impacts by creating barriers to dispersal, such that reproductive output may be inhibited (Bauder 1987). Vehicles may negatively affect fairy shrimp by disrupting pool hydrology and chemistry, crushing cysts, displacing adults or cysts to unsuitable locations, or creating conditions favorable for invasion of nonnative plants that degrade pool habitat (Hathaway et al. 1996). Destruction of watersheds and disruption of hydrological systems can create further impacts by creating barriers to dispersal, such that reproductive output may be inhibited (Bauder 1987). Other threats include loss of habitat and degradation due to filling, grading, discing, and leveling; urban and agricultural development; road projects; grazing; ORV use; trampling; invasion from weedy nonnative plants; trash dumping; soil compaction; erosion; drought; habitat fragmentation and isolation of vernal pool systems and complexes; and alteration of the watershed (USFWS 1997).

Management and Monitoring Approach

The overarching goal for San Diego fairy shrimp is to protect, enhance, and restore occupied and historically occupied habitat to create resilient, self-sustaining populations that provide for persistence over the long term (>100 years).

For the planning cycle of 2017–2021, the management and monitoring approach is to conduct annual qualitative surveys during the wet season to determine the presence of San Diego fairy shrimp in vernal pools on Conserved Lands. Every 3 years conduct dry season quantitative cyst soil sampling at a rotating panel of vernal pools to determine the density of San Diego fairy shrimp cysts, as identified by genetic analysis. Determine whether the pools fall into Level 1 (stable), Level 2 (enhancement), or Level 3 (restoration) management categories based on the presence of shrimp among pools in each complex. Track increases or declines in cyst densities over 3 monitoring years to determine if movement is triggered between management categories as identified in the VPMMP. If there is sufficient decline in San Diego fairy shrimp cyst density to trigger an increase in management levels as

identified in the VPMMP, then more intensive monitoring is required to determine topographic or hydrologic disturbances as described in the VPMMP.

For details and the most up-to-date goals, objectives, and actions, go to the MSP Portal San Diego Fairy Shrimp summary page: https://portal.sdmmp.com/view_species.php?taxaid=624043.

San Diego Fairy Shrimp References

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