Abstract

The California Red-legged Frog (Rana draytonii) is a threatened species that is declining in its range. Pond restoration and enhancement efforts are tools that can reverse this trend by improving habitat conditions that support recovery goals for the California Red-legged Frog. By removing excess sediment and emergent vegetation at the Garin Newt Pond Wildlife Area, the pond’s hydroperiod increased, making it successful at supporting native amphibian breeding and larval survival. Following restoration efforts in 2017, California Red-legged Frog egg masses and tadpoles increased by 99% and 97% respectively. Using a two-sample t-test, comparing the long-term monitoring trends of adults and larvae sampled pre-restoration (2008 to 2017) and post-restoration (2018 to 2019), showed a statistically significant increase in all life stages of California Red-legged Frog. This new site-specific information will inform recovery efforts designed to preserve and manage habitat for this threatened species.

Introduction

This study was carried out at the Newt Pond Wildlife Area, which is part of Garin Regional Park, a wildlands area located in Hayward, California. Surveys were conducted for all life stages of the California Red-legged Frog from 2008 to 2019, during the months of January through August, using the U.S. Fish and Wildlife Service California Red-legged Frog habitat assessment and protocol-level survey guidelines (USFWS 2005). Data recorded included all life stages of the California Red-legged Frog observed, number of individuals observed, and size classes.

Methods

The study was carried out at the Garin Newt Pond Wildlife Area, which is part of Garin Regional Park, a wildlands area located in Hayward, California. Surveys were conducted for all life stages of the California Red-legged Frog from 2008 to 2019, during the months of January through August, using the U.S. Fish and Wildlife Service California Red-legged Frog habitat assessment and protocol-level survey guidelines (USFWS 2005). Data recorded included all life stages of the California Red-legged Frog observed, number of individuals observed, and size classes.

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Results

Since restoration efforts in the fall of 2017, the California Red-legged Frog population at the Newt Pond Wildlife Area has shown a statistically significant increase in the average number of egg masses (t = -4.7, df = 10, P = 0.0004) and the average number of larvae (t = -4.7, df = 10, P = 0.0001) (Figure 1). To compare the reproductive output (average number of egg masses and larvae) before (2008-2017) and after (2018-2019) restoration we used a two-sample t-test with α = 0.05 for all tests.

Discussion

Excess emergent vegetation is recognized as creating detrimental habitat conditions for California Red-legged Frog reproductive output because it prevents the surface water from reaching suitable temperatures for larval development (Scott, Rathbun, and Tatarian 2013). It is also known that sediment removal actions can increase seasonal pond depth, thus increasing a site’s inundation period during the spring and early summer, and its potential for successful native amphibian development. Prior to restoration, the Newt Wildlife Area pond was very shallow, choked with Cattails, and did not maintain water throughout the spring and summer, and its potential for successful native amphibian development.

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References