

Collections of California Ringlet Butterflies (*Coenonympha tullia californica*) for Reintroduction in the Presidio of San Francisco

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Intro:

The California Ringlet (*Coenonympha tullia californica*), an oak woodland and grassland species, was described as abundant in many areas of the Coast Ranges and Bay Area by Art Shapiro (2007). Pellet (2006) found them to be the most common butterfly during standardized surveys of Stanford's Jasper Ridge Biological Preserve in San Mateo County. The species also appears to be stable in other urban areas with suitable habitat such as at Candlestick Park, San Francisco County and San Bruno Mountain, San Mateo County (personal observation). However, the species was driven to extirpation in the Presidio of San Francisco and was last observed in 2007 at both the Fort Scott and the Log Cabin grasslands (see iNaturalist record links below). Those are the only known records within the Presidio, although California Academy of Sciences has three records from SF County, none have specific locality information.

After more than 20 years of habitat restoration within the Presidio it is believed that suitable grassland habitat now occurs at a large enough scale to support this species (pers comm. Liam O'Brien and Stu Weiss). Given the nature of the species relatively weak flying ability (farthest recorded flight distance ~914 meters (Weissman, 1972)) and the distance between potential source populations (>3km), it is impossible for the species to recolonize the Presidio on its own. This project seeks to reestablish the species within the Presidio's main grassland site Inspiration Point beginning in the 2020 flight season.

Unfortunately, both Pellet (2006) and Shapiro (2007) represent the most up-to-date published assessments of the species' conservation status in the Bay Area. There are no contemporary published accounts to refer to in terms of the species current status, however, anecdotally the species appears to be abundant in many grassland sites throughout the Bay Area, including the Marin Headlands (pers comm. Liam O'Brien, Stu Weiss, and Art Shapiro). Based on iNaturalist.org observations (2010-2019), the species is wide spread across the headlands (see image below). Given the proximity of the Marin Headlands, similar climate, and robust population(s), the Presidio Trust is requesting permission to collect flying adults over at least three years, from a variety of grassland sites across the headlands, within the Golden Gate National Recreation Area's jurisdiction.

Methods:

Given that the butterfly is associated with grasslands, collections will focus on these sites across the headlands. Sites will be defined as distinct patches with clear demarcations. Separate patches will be targeted and no more than the predefined limit (to be determined by NPS) of adults will be collected from each patch. All efforts will be made to spread collections sites across the headlands, encompassing all patches within the range from Muir beach east to Marin City and south to Fort Baker, in order to maximize spatial distance between collections. Given the lack of significant barriers and total size of the headlands, it can be assumed that in general, this species is represented by one (meta) population.

Spreading out collections across this space will be an attempt to maximize genetic diversity and minimize impacts of removing individuals from the population.

The species is bivoltine (two generations per year), with one spring generation of adults followed by a summer generation of adults. Adults of both generations will be targeted and collected as distinct collection events. For example, if one grassland site produces up to X number of collected individuals in the spring, we are requesting to also collect up to X number of individuals from the summer generation at the same site. Collections will run from March to October across a minimum of three years. Post release monitoring during the release year(s) into the Presidio, as well as the following year(s), will inform the trajectory of establishment and help guide determination of the continuation or termination of collections.

In general, females are mated almost immediately upon emergence and will continue to lay eggs throughout their life. Although identifying the sex of Ringlets is not as straight forward as some butterflies, females can be identified based on relative size -- more round-- and behavior --relatively less active and non-chasing— (Art Shapiro, pers comm). Collections will primarily target females, but the collection of males will also occur, with a target ratio of 2:1 female to male, as there are occasional second (and/or late) matings (Weissman, 1972). In addition, the presence of males can act as a cue to females of good habitat, thus increasing the likelihood of the females remaining at the release site.

Collection sites will be accessed via federal fleet vehicles where road access is possible. On and off trail access will be on foot. Boots will be sterilized before, between, and after each site visit following standard park protocols. Collection groups will be comprised of Presidio Trust, Creekside Science, contracted consultant (Liam O'Brien), and possibly current park volunteers. Groups of limited sizes (minimize off-trail disturbance) will meander throughout the site, while swinging hand nets in an attempt to stir up the less active females.

Adults will be collected via hand nets, sexed to the best of our ability, and gently placed individually into small Tupperware containers with air holes. Each container will be labeled with collection info, which will be tracked via data sheets. These containers will be placed into a cooler containing ice packs buffered from direct contact of containers, and kept out of direct sunlight whenever possible. Collected individuals will then be driven to the Presidio and released at the designated site.

References:

Pellet, J. (2006). The butterfly assemblage of Jasper Ridge Biological Preserve.

Shapiro, A. M., & Manolis, T. D. (2007). *Field guide to butterflies of the San Francisco Bay and Sacramento Valley regions*. Berkeley, CA: University of California Press.

Weissman, K. F. G. (1972). *The population biology of Coenonympha tullia on Jasper Ridge: strategies of a bivoltine butterfly*. Department of Biological Sciences, Stanford University.

iNaturalist.org observations of *Coenonympha*: Marin Headlands (2010-2019) total: 23 observations



Presidio iNaturalist records (2007)

<https://www.inaturalist.org/observations/19020230>

<https://www.inaturalist.org/observations/19020209>