Burrowing Owl Monitoring

Don Edwards San Francisco Bay National Wildlife Refuge
Warm Springs Unit

2022 Summary Report

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INTRODUCTION

In March 2019, Talon Ecological Research Group contracted with the Santa Clara Valley Habitat Agency (SCVHA) to monitor and manage the burrowing owl (*Athene cunicularia*) colony at Don Edwards San Francisco Bay National Wildlife Refuge — Warm Springs Unit (Warm Springs). In this report we summarize all monitoring and management activities conducted during Year 4 (January−December 2022) of this contract. We also provided detailed information in our monthly reports submitted to SCVHA and the U.S. Fish and Wildlife Service (USFWS).

SITE DESCRIPTION

Warm Springs is located south of Fremont, west of the Nimitz Freeway and east of the south end of the San Francisco Bay in Alameda County, California (Figure 1), and is included in the Santa Clara Valley Habitat Plan (ICF 2012) as an expanded study area. The site is managed by USFWS and encompasses 719 acres of vernal pool alkali grasslands. The area is divided into 10 fenced fields which are cattle grazed year-around. Besides burrowing owls, several endangered and special status plant and animal species occur at Warm Springs, including federally endangered vernal pool tadpole shrimp (*Lepidurus packardi*) and Contra Costa goldfields (*Lasthenia conjugens*), and the federally threatened California tiger salamander (*Ambystoma californiense*).

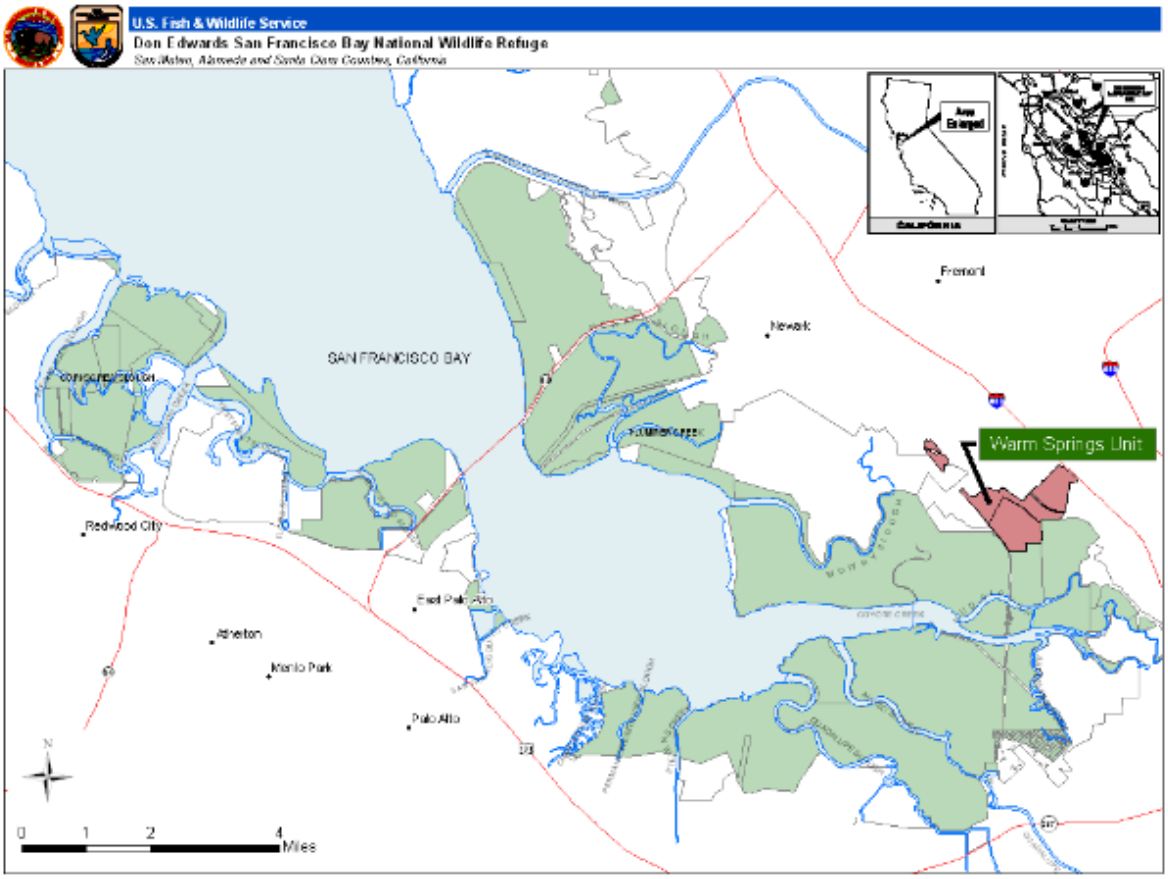

Figure 1. Don Edwards San Francisco Bay National Wildlife Refuge—Warm Springs Unit location.

MONITORING ACTIVITIES

Our survey team consisted of five experienced burrowing owl biologists: Philip Higgins, Ryan Phillips, Andrew Bradshaw, Grant Huber, and Sandra Menzel. In 2022, we only conducted three monthly surveys for burrowing owls, early during the breeding season in March, April, and May. Reduced survey frequency was based on low probability of breeding burrowing owl presence. During surveys in March and April, we walked transects throughout fields 1−7 and 10. We started the surveys in the early morning to increase probability for detection. During each survey, we scanned all areas for burrowing owl presence and inspected ground squirrel burrows for signs of burrowing owl activity, including whitewash, regurgitated pellets, feathers, prey remains, decoration, and bedding material. We recorded all burrowing owl observations, noting location, number of individuals, age and sex (if discernible), banding status, band number (if readable), behavior, and type of burrow used (artificial or natural). We also noted locations of burrows with signs of burrowing owl activity. Additionally, we took note of vegetation conditions and California ground squirrel (*Otospermophilus beechey*) presence in each field and recorded the species and number of predators observed. For the survey in May, we split up and each surveyor walked transects in one field focused on areas where burrowing owl activity had been observed during previous surveys and/or where they have nested in previous years in Field 1, 3, 5, 6, and 7. After walking transects, each surveyor set up one call-broadcast speaker in the field they surveyed. We broadcasted the burrowing owl's primary call and alarm call to attract owls/elicit a response. We periodically played the recording starting around dusk until 10:00 pm and frequently scanned the surroundings with binoculars.

RESULTS OF MONITORING ACTIVITIES

Burrowing Owl Observations

During the three surveys in 2022, the number of burrowing owls observed each month ranged from one individual in March to zero individuals observed in April and May (Figure 2, Table 1). For a fourth year in a row, no pairs nested at Warm Springs (Figure 3). We observed one burrowing owl in Field 6 and sign of activity in fields 3 and 4 (Figure 2, Table 1).

Band Resightings and Banding

In 2022, we did not observe any banded owls and did not conduct any banding.

Owl Fatalities

In 2022, we did not detect any burrowing owl fatalities.

Figure 2. Locations of burrows with burrowing owl activity observed at the Warm Springs Unit on 25 March 2022.

Table 1. Locations of burrowing owl activity observed at Don Edwards National Wildlife Refuge—Warm Springs Unit during monthly surveys in 2022.

Survey Date	Burrow #	UTM Easting	UTM Northing	BUOW Observation
3/25/2022	F6-11	591934	4149967	1 BUOW, unknown band status
3/25/2022	F3-28	590229	4149927	Fresh sign
3/25/2022	F4-13	590205	4150128	Old sign

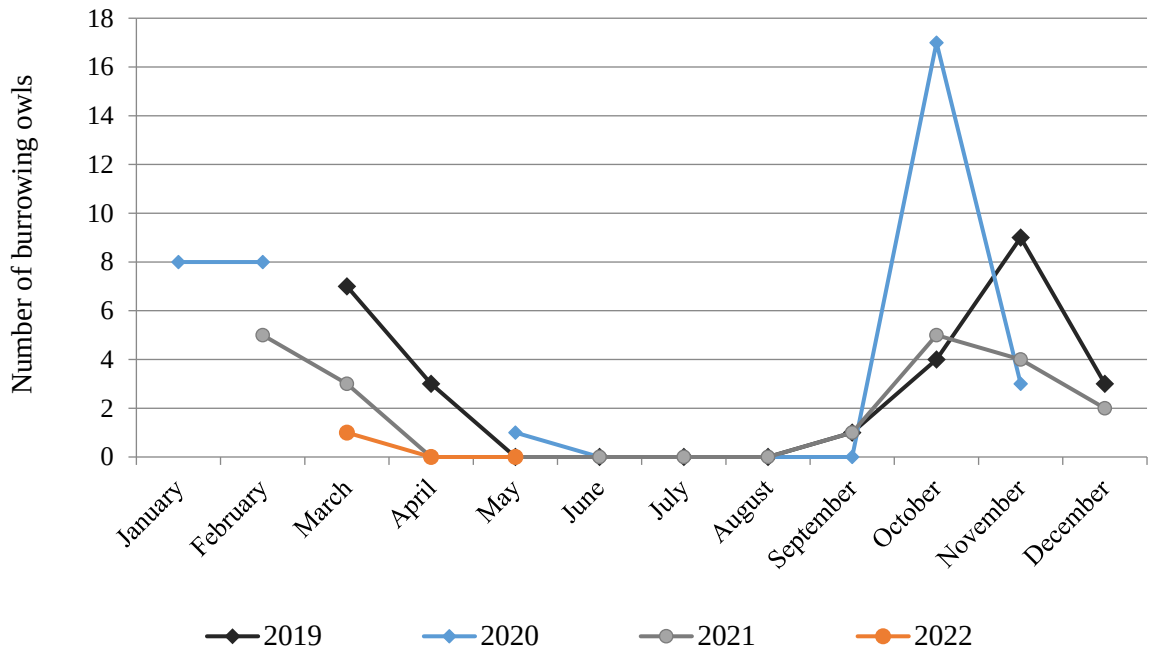

Figure 3. Number of burrowing owls observed during monthly surveys at Don Edwards National Wildlife Refuge—Warm Springs Unit, 2019−2022.

Habitat Conditions

Habitat conditions were suitable for burrowing owls with short vegetation in all fields. With continued drought conditions, we observed no flooding during our surveys. Vegetative growth was limited and vegetation height was optimal for burrowing owls in most areas this spring (Figure 3). Vegetation height was not a limiting factor for burrowing owl presence during the breeding season.

Figure 4. Suitable vegetation conditions for burrowing owls at the Warm Springs Unit. Photographed on 26 May 2022.

California Ground Squirrel Abundance and Distribution

California ground squirrels were patchily distributed throughout the management area, with large areas devoid of ground squirrel activity/burrows adjacent to areas where squirrels were abundant. All fields were at least partially occupied by this species. The availability of suitable burrows early in the breeding season (March/April) is essential for establishing breeding pairs on site. The availability of ground squirrel burrows was not a limiting factor for burrowing owl presence during the breeding season.

Prey

The abundance of prey items for burrowing owls at this site is unknown. Castings show that owls mainly feed on invertebrates, including earwigs, grasshoppers, and beetles. A few rock piles were previously installed to provide micro-habitats for prey species such as rodents and lizards. Year-around grazing may diminish habitat for prey species like California voles and western harvest mice. We noticed reduced abundance in grasshoppers likely due to drought conditions.

Predators

The only mammalian predator we encountered during our surveys were several observations of feral cats in Field 7 along the eastern fence line. We observed numerous birds of prey during each survey. Aerial predators of burrowing owls that we observed included:

- Golden Eagle (*Aquila chrysaetos*)
- Bald Eagle (*Aquila chrysaetos*)
- Red-tailed Hawk (*Buteo jamaicensis*)
- Peregrine Falcon (*Falco peregrinus*)
- Prairie Falcon (*Falco mexicanus*)
- Northern Harrier (*Circus hudsonius*)
- Swainson's Hawk (*Buteo swainsoni*)
- Ferruginous Hawk (*Buteo regalis*)
- American Crow (*Corvus brachyrhynchos*)
- Common Raven (*Corvus corax*)

MANAGEMENT ACTIVITIES

Supplemental Feeding

In 2017, we initiated a 3-year Supplemental Feeding Study for breeding burrowing owls at Shoreline Park and Moffett Airfield. In 2018, we included the Santa Clara-San Jose RWF in the study and finally, in 2019, we also included Warm Springs. No burrowing owls were present for feeding during the 2022 breeding season.

We also did not initiate the supplemental feeding protocol 2020 or 2021. In 2020, feeding occurred opportunistically at burrow F5-59 for one week in June while collecting data from a trail camera.

In 2019, we started supplementally feeding all three owls (one pair and one single adult) that were present during the survey in April. The feeding protocol prescribes that owls will be fed once a week for the first two weeks, and then twice a week starting during week 3. Unfortunately, after three feedings at the two active burrows in Field 3 and 6, we concluded that owls were no longer present, and we stopped feeding.

Vegetation Management

No vegetation management was conducted as part of this project in 2022. Due to the absence of burrowing owls and continued drought conditions with limited vegetative growth, the Talon Team determined that SFBBO staff would not need to conduct any work. No vegetation management was conducted in 2021. In 2020, SFBBO staff conducted targeted vegetation management during January−March and June−July, including weed whacking, hand pulling, and herbicide application.

COMMENTS

Surrounding Development

Adjacent open space (suitable burrowing owl habitat) north of Warm Springs was developed in 2020. Another large building complex was added along the southeast side of Bunche Drive (Figure 5). These developments diminished adjacent burrowing owl foraging habitat. Light pollution from the adjoining buildings has increased since additional construction was completed. Empty parking lots were brightly illuminated (Figure 6). Although not quantifiable, the additional lights likely impact wildlife species at the Warm Springs Unit. Additionally, the tall buildings provide perches for raptors that prey on burrowing owls, such as red-tailed hawks. Garbage disposal around the buildings may also attract mammalian predators including feral cats, raccoons, opossums, and rats. Furthermore, the destruction of the adjacent habitat pushes more predatory wildlife species, such as coyotes and large raptors, onto the refuge. As this grassland habitat is becoming more insular, more species will compete for the available resources, including prey items such as small rodents.

Figure 5. New building under construction along the northeastern edge of Field 6. Photographed on 14 August 2020.

Figure 6. Light pollution from the adjoining buildings at the Warm Springs Unit. Photographed on 26 May 2022.

Anticoagulant Rodenticides

In 2020, we detected numerous rodenticide bait boxes along adjacent buildings and around garbage disposal dumpsters. We checked out several of the labels on the boxes. Two of them did not identify the kind of bait that was used. One of the boxes was labeled to contain Contrac Blox with the active ingredient 0.005% Bromadiolone which is a potent anticoagulant rodenticide, second-generation, 4-hydroxycoumarin derivative and vitamin K antagonist, often called a "super-warfarin" for its added potency and tendency to accumulate in the liver of the poisoned organism.

Another box was labeled to contain Terad3 Blox with active ingredient Cholecalciferol 0.075%. Terad3 Blox is advertised as a new Vitamin D3 bait which kills anticoagulant-resistant rats and mice, and substantially reduces the risk of secondary poisoning. Terad 3 supposedly poses a low toxicity to birds.

Although we have not specifically tested burrowing owls at Warm Springs for traces of rodenticide, other studies have found that secondary poisoning from anticoagulant rodenticide is affecting many wildlife species.

USDA Predator Control

US Department of Agriculture (USDA)-APHIS Wildlife Services did not conduct predator control at Warm Springs in 2022.

RECOMMENDATIONS FOR 2023

- Reduced number of monthly burrowing owl surveys. Surveys should be conducted during the early part of the breeding season April−June.
- If breeding pairs are present, conduct focused vegetation management around occupied burrows.
- If breeding pairs are present, conduct supplemental feeding.