

Olympia Conservation Area
Habitat Management and Monitoring Plan
2023 Annual Report
(TE58263C-0)



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**Olympia Conservation Area HMMP
2023 Annual Report**

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Executive Summary

This report documents the work that was conducted in 2023 to implement the *Olympia Conservation Area Habitat Management and Monitoring Plan* (HMMP: McGraw 2020). The HMMP identifies the restoration, management and monitoring tasks, as well as adaptive management framework, for management of the Olympia Conservatio Area (OCA)—a 6.3-acre conservation area located within the San Lorenzo Valley Water District’s (District’s) 180-acre Olympia Watershed Property. The OCA supports endangered species and sensitive habitat found in the Santa Cruz Sandhills—a unique ecosystem found only on outcrops of Zayante soils, which features unique assemblages of plants and animals that include seven endemic plants and animals found nowhere else in the world (Table 1; McGraw 2004b). The OCA was set aside by the District to mitigate impacts of its capital improvements and operations and maintenance projects on rare species and sensitive habitat in the Sandhills. Work to implement the HMMP is covered under federal incidental take permit TE58263C-0.

2023 Activities

In 2023, Jodi McGraw Consulting (JMc) implemented a series of habitat restoration, management, and enhancement projects, as well as conducted monitoring in the OCA.

Habitat Management, Restoration, and Enhancement

In the fourth year of implementing the HMMP, which was approved by the United States Fish and Wildlife Service in summer 2020, JMc implemented the following to manage, restore, and enhance habitat:

1. **Exotic plant management**, to control populations of exotic plant species that outcompete native plants, including the four endemic species, and degrade habitat for native animals, including the endangered insects;
2. **Access management**, to prevent impacts associated with unauthorized access to the area; and
3. **Restoration** to maintain and enhance habitat conditions in the 0.17-acre area (Figure 2) degraded by a prior stand of silver wattle (*Acacia dealbata*).
4. **Enhancement of the Ben Lomond wallflower** (*Erysimum teretifolium*) population, by caging flowering individuals to prevent deer herbivory, which greatly reduces seed production and thus population growth. Caging adult wallflower to prevent herbivory promoted seed production, which aided work to collect seed that was dispersed into the Acacia Restoration Area in 2023 as part of the Santa Cruz Wallflower Enhancement at Olympia Conservation Area (Section 2.4.3.3).

Exotic Plant Management

On March 6 and 15, and May 17, 2023, JMc re-treated the following invasive plant species originally treated in 2020 within the OCA (Figure 2; Section 2.1):

1. Invasive brooms: French broom (*Genista monspessulana*), and Portuguese broom (*Cytisus striatus*);
2. Invasive thistles: Prickly lettuce (*Lactuca serriola*), Italian thistle (*Carduus pycnocephalus*), and

3. Bull thistle (*Cirsium vulgare*); and
4. Velvet grass (*Holcus lanatus*).

Exotic plant removal required only two person days, reflecting the effectiveness of annual control, which will be conducted again in spring 2024.

Ben Lomond Wallflower Enhancement

To increase the population of Ben Lomond wallflower, JMc caged 255 adult (flowering) plants to prevent herbivory by deer, which greatly reduce wallflower seed production (McGraw 2004b) and could contribute to declines in the already small population that could lead to its extirpation as a result of demographic or environmental stochasticity (McGraw 2020; Section 2.2). The plants were caged using 2" mesh that will avoid inhibiting access by pollinators, in order to promote seed production and increase the population. The cages will be moved in winter and early spring 2024 to cage the new cohort of adults and further promote the population.

Access Management

In 2023, the SLVWD contracted with the Land Trust of Santa Cruz County to conduct monthly monitoring of the Olympia Watershed Property including the OCA, while JMc conducted quarterly monitoring to assess conditions including evaluate signs of trespass or vandalism within the site. No such human activities were detected in the OCA during monitoring and management activities at the site in 2023, when JMc also installed six new signs were posted on the perimeter of the OCA (Figure 4). Ongoing monitoring will be used to prevent unauthorized access that can degrade habitat in the OCA.

Restoration

In 2023, JMc maintained and enhanced the 0.17-acre silver wattle (*Acacia dealbata*, or 'acacia') area in the OCA (Figure 2; Section 2.4). The area featured acacia stumps, branches, and thick leaf litter (duff) on and in the soil following felling and partial removal of the trees between October 2011 and January 2012. This biomass was degrading habitat for the endangered plants and insects by physically inhibiting their use and promoting dense cover of exotic grasses and forbs.

In 2021, JMc initiated restoration by:

1. Removing the acacia stumps, branches, and surface leaf litter;
2. Removing of the partially decomposed acacia biomass/organic matter within the soil, to prevent ongoing establishment of exotic plants; and
3. Seeding the area with site-collected native herbaceous plants and subshrubs (characteristic of the sand parkland community (McGraw 2021b); and,
4. Planting 15 coast live oak (*Quercus agrifolia*) around the perimeter of the restoration area, to restore the structure to the native plant community and provide an additional food source.

In 2022, JMc maintained the Restoration Area through biweekly irrigation, exotic plant removal, and maintenance of the planted oaks and conducted a combination of qualitative monitoring and plot-based monitoring to evaluate conditions and assess the status toward achieving the goals and objectives (McGraw 2023a). Based on the results of the monitoring, JMc conducted the following in 2023:

1. **Soil Loosening:** Used shovels to loosen the soil within areas where native plant cover (all cover) was low and the soil appeared to be compacted as a result of the prior heavy equipment work;
2. **Native Plant Seeding:** Broadcast seeded 1,518.2 grams of site collected seed that contained 14 species native to the sand parkland community, which is the target for the area; and
3. **Ben Lomond Wallflower Seeding:** We sowed 18.935 grams of clean seed of Ben Lomond wallflower, that was collected from the naturally occurring population upslope (south) of the restoration area pursuant to a California Department of Fish and Wildlife 2081(a) permit for the state-listed endangered plant ((2081(a)-23-009; McGraw 2023b).

Monitoring and Adaptive Management

In 2023, JMc conducted Conservation Area Condition Monitoring (Section 3.1) and photomonitoring (Section 3.2) to evaluate and document the conditions of the OCA to increase its effectiveness as outlined in Section 5.3 of the HMMP (McGraw 2020). Table 3 identifies the results of the quarterly Conservation Area Condition Monitoring conducted in 2023 to assess the general habitat conditions and determine the need for management to address stressors including exotic plants and issues related to access, as well as other factors such as erosion and disease.

Figure 5 illustrates the locations of the 11 permanent photo monitoring stations reoccupied in 2023 to evaluate changes in habitat conditions over time, including progress of the acacia area restoration. Figure 6 illustrates a series of photographs taken over the three-year period of photomonitoring in the Acacia Restoration Area. They demonstrate visually how the area has greatly increased in the cover of native plants, most notably the endangered Ben Lomond spineflower, during the three-year period.

2024 Activities

In 2024, JMc will conduct habitat restoration, enhancement, management, and monitoring to follow up on the work in 2023 and as outlined in the implementation schedule in the HMMP (McGraw 2020).

In 2024, management will include three elements:

1. **Control exotic plants** including ornamental pine and exotic annual grasses and forbs, as well as re-treating the exotic plants managed in 2023 (Section 2.1), to prevent their reoccurrence.
2. **Enhance the Ben Lomond wallflower population**, by caging flowering individuals to prevent deer herbivory, which greatly reduces seed production and thus population growth; and
3. **Maintain the 0.17-acre acacia Restoration Area** through irrigation and related plant maintenance (e.g., spot weeding), and exotic plant control.

Additional Ben Lomond wallflower seed will also be collected and dispersed into the restoration area in 2024 as outlined in the application used to secure the CDFW permit (McGraw 2023b; Section 4.1.3).

In 2024, monitoring will consist of the following two elements:

1. **Conservation Area Condition Monitoring**, to examine conditions of the site on a quarterly basis to identify issues and determine the need for remedial actions;

2. **Photomonitoring**, to track changes in the condition of the vegetation and habitat area over time; and
3. **Quantitative Plot Monitoring**: the acacia Restoration Area will be monitored using the permanent plots established in 2022 (Figure 7) to evaluate whether the treatment is achieving the goals and objectives and to assess the establishment of Ben Lomond wallflower.

Projects Mitigated Through the OCA

The District did not use the OCA to compensate for impacts on sandhills species in 2023 (Section 5). Since its establishment in 2017, the OCA has been used to mitigate the impacts of four projects that have collectively used 91,977 sf (2.11 acres) of the OCA (Table 5). To date, the District has contributed \$281,930.21 to the endowment that the District uses to fund implementation of the HMMP for the OCA (Table 5). The remaining 4.16 acres are anticipated to be utilized to mitigate the impacts of future District infrastructure projects as well as operations and maintenance activities on the sandhills species, including those projects covered in a habitat conservation plan (HCP) that the District is preparing to cover activities in the sandhills over a 25-year period.

1 Introduction

This report documents the work that was conducted in 2023 to implement the *Olympia Conservation Area Habitat Management and Monitoring Plan* (HMMP: McGraw 2020). The HMMP identifies the restoration, management, and monitoring tasks, as well as adaptive management framework, for management of the Olympia Conservatio Area—a 6.3-acre conservation area located within the San Lorenzo Valley Water District’s (District’s) 180-acre Olympia Watershed Property. The conservation area was set aside by the District to mitigate impacts of its capital improvements and operations and maintenance projects on rare species and sensitive habitat in the Sandhills. The HMMP was approved by the United States Fish and Wildlife Service in summer 2020, when the District initiated work to implement the plan.

This document provides brief background information about the OCA, and then describes the work conducted in 2023 and the plan for implementation in 2024. Additional information about the OCA and its management is provided in the HMMP (Section 1.2; McGraw 2020).

1.1 Conservation Area Overview

The Olympia Conservation Area is a 6.3-acre area that supports endangered species and sensitive habitat found in the Santa Cruz Sandhills—a unique ecosystem found only on outcrops of Zayante soils, which supports unique assemblages of plants and animals that include seven endemic plants and animals found nowhere else in the world (Table 1; McGraw 2004b). The District established the Olympia Conservation Area in 2017 by granting to the Land Trust of Santa Cruz County (Land Trust) a conservation easement. The OCA was protected to compensate for impacts to sandhills species and habitat as part of the District’s Probation Tank Replacement Project, which was permitted under federal incidental take permit TE58263C-0.

Table 1: Olympia Conservation Area Summary

| Species and Communities | Status in Olympia Conservation Area |
|---------------------------------|--|
| <u>Species</u> | |
| Santa Cruz kangaroo rat | Suitable Habitat |
| Zayante band-winged grasshopper | Species Present |
| Mount Hermon June beetle | Species Present |
| Ben Lomond spineflower | Species Present |
| Ben Lomond wallflower | Species Present |
| Ben Lomond buckwheat | Species Present |
| Silverleaf Manzanita | Species Present |
| <u>Communities</u> | |
| Sand Parkland | 3.3 acres |
| Sand Chaparral | 0.94 acres |
| Sandhills Woodlands and Forests | 2.8 acres |
| Riparian | 0.2 acres |
| Ornamental | 0.01 acres |
| Total Area | 7.3 acres |

¹ The Olympia Conservation Area is a 6.3-acre area that is part of the SLVWD's 180-acre Olympia Wellfield. This plan assessed the contiguous 1.0-acre Mayer Conservation Easement area, which was previously protected but is not actively managed.

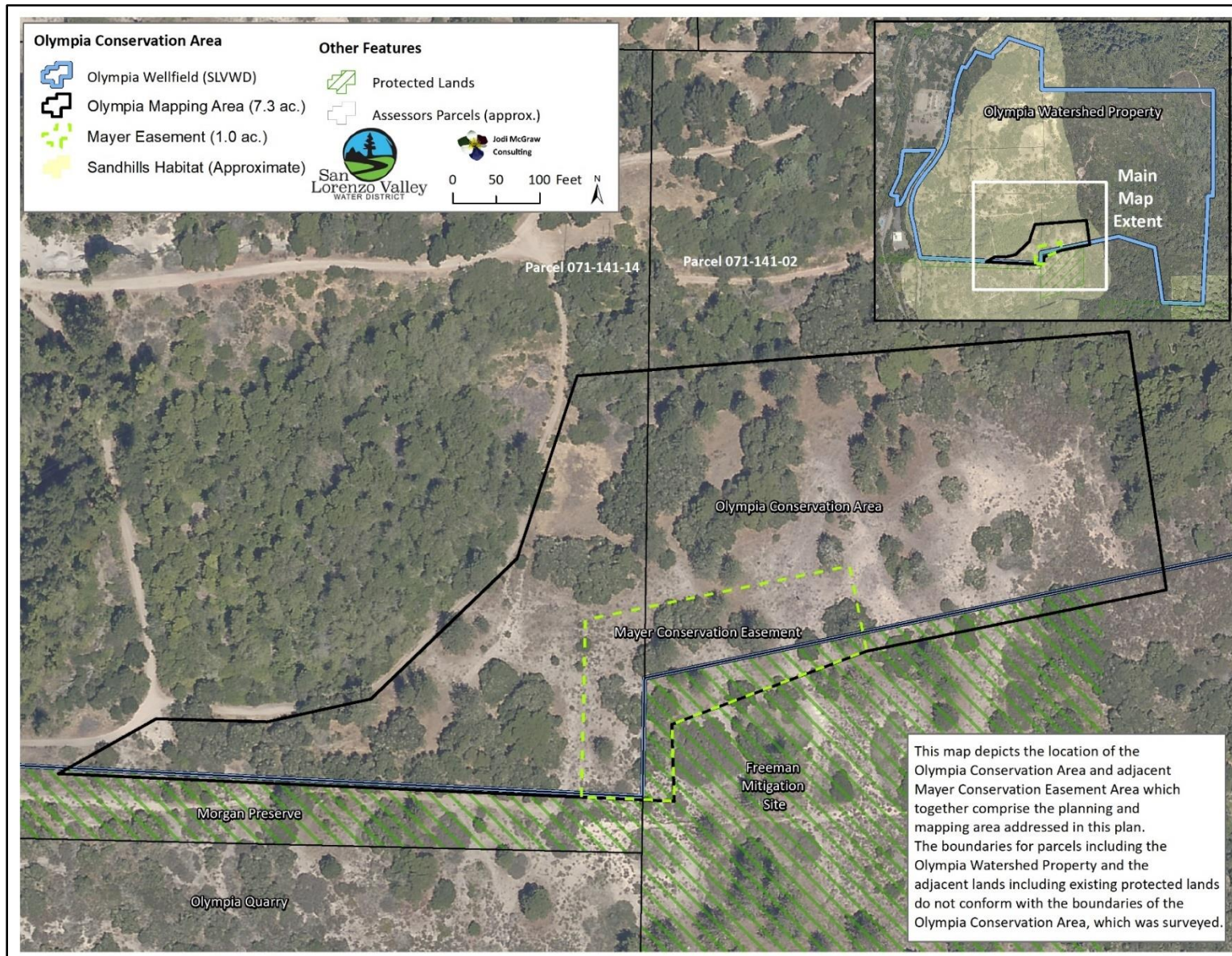


Figure 1: Olympia Conservation Area showing Mayer Conservation Easement Area and Olympia Mapping Area

Rather than setting aside just the habitat required to mitigate that project (0.995 acres; McGraw 2017), the District protected and committed to managing a larger area of Sandhills habitat to both provide for more meaningful conservation and provide a mechanism to mitigate its future capital improvement projects and operations and maintenances activities in the sandhills (McGraw 2017). With each project for which the District uses the OCA as compensatory mitigation, the District contributes funds to a non-wasting endowment used to fund implementation of the HMMP, as describe in Section 6 therein (McGraw 2020). Chapter 6 of this report lists the District projects that have used the OCA as mitigation, the acreage of habitat in the OCA used by prior projects versus the area available to mitigate future projects, and the funds that the District has contributed to the endowment used to fund management of the OCA.

1.2 The HMMP

The HMMP describes the process by which it will be updated as part of the HCP planning process, including to fold in additional lands. In the meanwhile, it describes how the existing OCA will be restored, managed, and monitored, with greater detail provided for the initial 5-year phase of management. Specifically, the HMMP describes: the sandhills communities and species; the goals and objectives for management; the habitat management restoration, and enhancement strategies and techniques; the monitoring, reporting and adaptive management elements; a schedule, budget, and responsibilities for the initial phase of management; and guidelines for species protection during implementation of plan activities (McGraw 2020).

The HMMP addresses a 7.3-acre area that includes the OCA as well as the Mayer Conservation Easement Area—a 1.0-acre easement area established when the District granted a conservation easement in 2002 to the Center for Natural Lands Management (Figure 1). The OCA surrounds the Mayer easement on three sides; accordingly, the HMMP addressed the Mayer Conservation Easement area to enable seamless and thus more effective management. Implementation of the HMMP is covered under federal incidental take permit TE58263C-0.

1.3 The Report

This report was prepared to document the HMMP activities during 2023, the fourth year of implementation. The report documents the following:

1. **Chapter 2 - Habitat Management, Restoration, and Enhancement:** The habitat management, restoration, and enhancement activities conducted, and the species protection measures implemented;
2. **Chapter 3 - Monitoring and Adaptive Management:** Results of monitoring conducted, and any new information and changed conditions as well as modifications to management and monitoring approaches identified through the adaptive management framework;
3. **Chapter 4 - 2024 Activities:** The planned management and monitoring for the following year based on the schedule in the HMMP (McGraw 2020);
4. **Chapter 5 - Projects Mitigated through the Olympia Conservation Area:** The District projects that have used the OCA as mitigation, the acreage of habitat in the OCA used by prior projects versus the area available to mitigate future projects, and the funds that the District has contributed to the endowment used to fund management of the OCA.

2 Habitat Management, Restoration, and Enhancement

This section outlines the habitat restoration, enhancement, and management implemented in 2023, which entailed:

1. **Exotic plant management**, to control populations of exotic plant species that outcompete native plants, including the four endemic species, and degrade habitat for native animals, including the endangered insects;
2. **Enhancement of the Ben Lomond wallflower** (*Erysimum teretifolium*) population, by caging flowering individuals to prevent deer herbivory, which greatly reduces seed production and thus population growth;
3. **Access management**, to prevent impacts associated with unauthorized access to the area; and
4. **Restoration** of the 0.17-acre area (Figure 2) degraded by a prior stand of silver wattle (*Acacia dealbata*).

2.1 Exotic Plant Management

In 2023, JMc implemented high-priority invasive plant management in the OCA as outlined in Year 3 of the HMMP (McGraw 2020). Specifically, on March 6 and 15, 2023, JMc treated the following invasive plant species occurring within the OCA (Figure 2):

1. Invasive brooms: French broom (*Genista monspessulana*), and Portuguese broom (*Cytisus striatus*);
2. Invasive thistles: Prickly lettuce (*Lactuca serriola*), Italian thistle (*Carduus pycnocephalus*), and Bull thistle (*Cirsium vulgare*); and
3. Velvet grass (*Holcus lanatus*).

On May 17, 2023, JMc removed additional velvet grass while it was in flower and distinguishable from more widespread exotic annual grass species.

The treatment areas included 40 mapped patches totaling 4,780 square feet (Figure 2). Prior to the treatment, JMc examined the site to look for any additional occurrences of the target species. Spring vetch (*Vicia sativa*), while mapped in 2018, was not observed in 2023 and was not treated. The single ornamental pine (*Pinus cf. contorta*) is senescent. The tree will be removed if/when it begins to impact the native plant community (e.g., if it falls; Section 3.4).

French broom and Portuguese broom, and periwinkle were removed through hand pulling. Prickly lettuce, bull thistle, Italian thistle, and velvet grass were grubbed out using a Pulaski. The grass was bagged, as were the flower heads of the thistles. All exotic plant biomass was removed from the site.

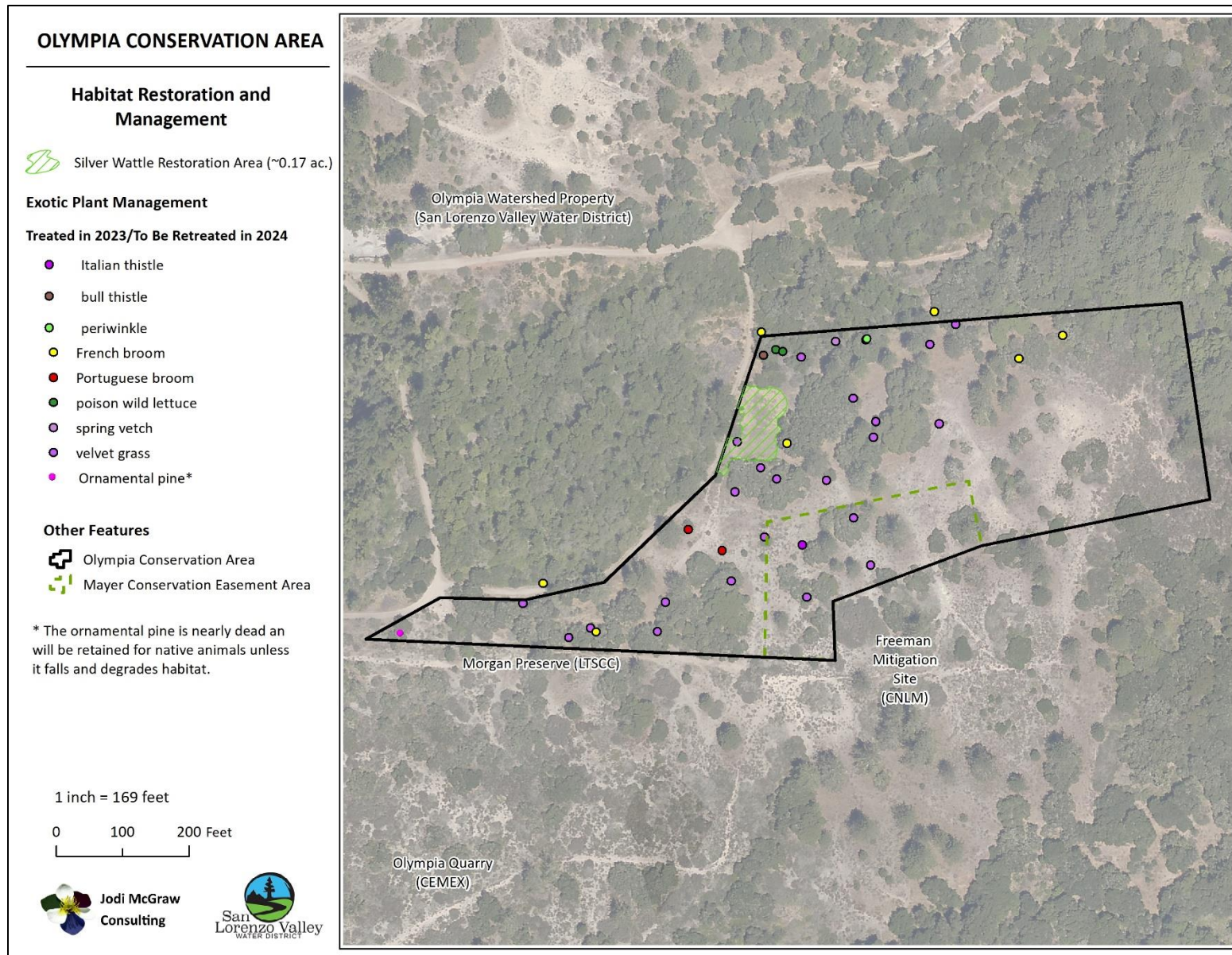


Figure 2: Habitat Management and Restoration Treatment Areas

Exotic plant removal required only two person days, reflecting the effectiveness of annual control, which will be conducted again in spring 2024.

2.2 Ben Lomond Wallflower Enhancement

On January 30 and 31, and February 2, 6, 7, March 15, and April 11, JMc worked with interns from UC Santa Cruz Environmental Studie Program to cage adult Ben Lomond wallflower within the OCA to prevent herbivory by black tailed deer (*Odocoileus hemionus columbianus*). Though deer are native, their populations may be unnaturally large due to reduced predation and/or increased availability of food in landscaped areas in the region. Their herbivory greatly reduces wallflower seed production (McGraw 2004b) and could contribute to declines in the already small population that could lead to its extirpation as a result of demographic or environmental stochasticity (McGraw 2020).

To protect the adult wallflowers from herbivory, the crew searched areas known to be occupied by Ben Lomond wallflower, as well as unoccupied but suitable habitat (McGraw 2020), to identify individuals that were likely to flower in spring based on their size and/or evidence of bolting (i.e., initiation of a flowering stalk). These individuals were caged using four-foot-tall wire cages made within 2" diameter avian wire, in order to avoid limiting access by pollinators such as the chalcedon checkerspot butterfly (*Euphydryas chalcedona*). A total of 255 adults were caged (Figure 3b).

Caging adult wallflower to prevent herbivory promoted seed production, which aided work to collect seed that was dispersed into the Acacia Restoration Area in 2023 as part of the Santa Cruz Wallflower Enhancement at Olympia Conservation Area (Section 2.4.3.3).

2.3 Access Management

In 2023, District staff conducted tasks to manage access at the Olympia Watershed Property, of which the OCA is a part.

1. **Site Patrols:** in 2023, the District continued to with the Land Trust of Santa Cruz County to have the entire Olympia Watershed Property patrolled to assess public uses including detect any access into the Olympia Conservation Area.
2. **Fence and Sign Maintenance:** The District maintained the current fences and signs that are designed to promote compliance with the closure of OCA to unsupervised public access (Figure 3c). In addition, six new signs were posted on the perimeter of the OCA (Figure 4).

No trespass has been observed since February 2021, when JMc detected through quarterly monitoring that a motorcycle trespassing within the Olympia Watershed Property drove through the OCA and the District immediately repaired the fence on the northern border where the ingress to the conservation area occurred (McGraw 2022a).



Figure 3: Habitat Restoration and Management images, showing: a) intact sand parkland cleared of brooms between 2021-2023, b) cages installed in 2023 to protect Ben Lomond wallflower from herbivory, c) signage and fencing to prevent access within the OCA, d) Ben Lomond spineflower rosettes within the Acacia Restoration Area, e) oak trees on the perimeter of the 0.17-acre Restoration Area, and f) JMC biologists tilling the soil prior during the soil loosening treatment prior to 2023 re-seeding. Photographs by Jodi McGraw Consulting.

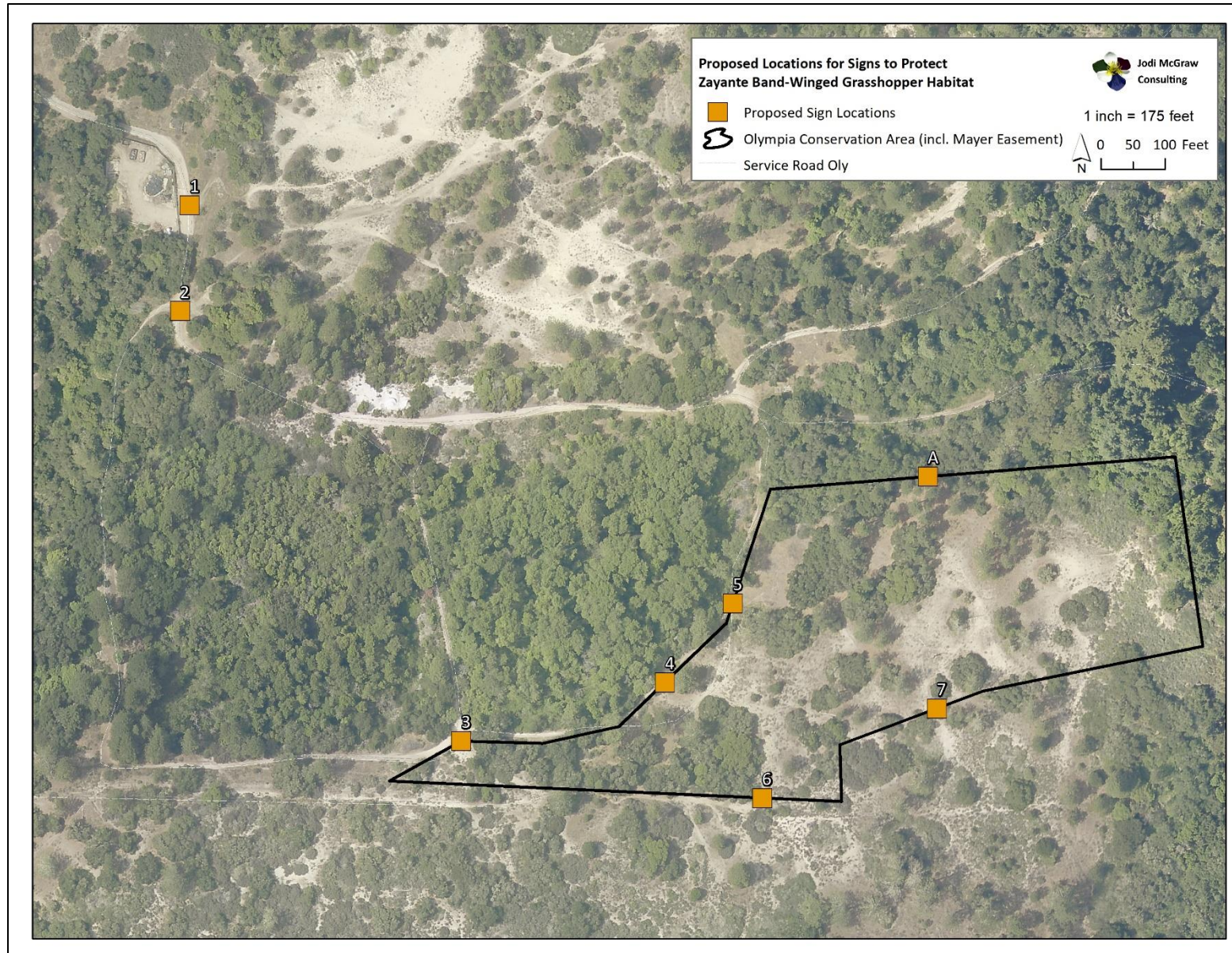


Figure 4: Signs posted on the perimeter of the OCA in January 2023

2.4 Restoration

In 2023, JMc maintained the 0.17-acre former acacia (silver wattle; *Acacia dealbata*) area in the northwestern corner of the Olympia Conservation Area (Figure 2) through restoration area maintenance and seeding a mix of native, site-collected seeds. It also entailed sowing seed of Ben Lomond wallflower that was collected from the naturally-occurring population in the OCA, as outlined in Section 2.4.3.3 and detailed in the annual report for the wallflower enhancement project (Appendix A).

2.4.1 Background

Between October 2011 and January 2012, the District felled the stand of acacias as part of a larger effort to control the invasive tree throughout the Olympia Watershed Property (SLVWD 2012). However, the acacia biomass was left to biodegrade in place. Despite the passage of approximately one decade, in fall 2021 the area featured recalcitrant woody debris including cut stumps and branches, and areas of dense litter from the only partially decomposed leaves and fruits on the soil surface. Additionally, the soil featured a relatively thick layer of organic matter from the partially decomposed biomass from the acacias.

The remaining woody debris, litter, and organic matter degraded the sand parkland habitat through a variety of mechanisms including (McGraw 2004a,b, 2020):

1. The nitrogen-fixing acacias increased the soil nitrogen, which promoted competitive exotic grasses including rip gut brome (*Bromus diandrus*), rattail fescue (*Festuca myuros*), and smooth cat's ears (*Hypochaeris glabra*), which dominated the plant cover and exerted strong competitive effects of the native herbaceous plants;
2. The branches and leaf litter on the soil surface, as well as the larger pieces of partially decomposed organic matter in the soil, inhibit establishment of smaller-seeded native plants and can promote larger seeded exotic plants, such as rippgut brome; and
3. The dense exotic plants (>50% cover) degraded habitat for the Zayante band-winged grasshopper, which preferentially occurs in areas of sparse (<20%) plant cover, and may have also impacted Mount Hermon June beetle, by reducing cover of native plants that can provide a food source for the fossorial larvae.

Thus, the acacia removal area was identified as a priority for restoration in the HMMP (McGraw 2020). Restoration of the area to feature open canopy sand parkland habitat suitable for the endangered plants and insects could increase their populations within the OCA. It also has the potential to connect occupied habitat in the OCA to that further north in the Olympia Watershed Property, thus creating an important corridor for dispersal of the endangered species between the habitat areas and promote the populations of Zayante band-winged grasshopper population and other endangered species within the property (McGraw 2020).

In fall 2021, JMc implemented the following initial treatments to restore the 0.17-acre acacia area (McGraw 2021b):

1. Removed the acacia biomass on the soil surface;
2. Removed of the acacia biomass/organic matter within the soil;

3. Seeded the area with a mix of site-collected native plants; and,
4. Planted 15 coast live oak (*Quercus agrifolia*) around the perimeter of the restoration area.

In 2022, JMc conducted the following to maintain and enhance the site (McGraw 2023a):

1. Hand pulled the acacia that established from seedlings and root sprouts;
2. Manually removed other invasive plants that established in the restoration area;
3. Maintained the oaks that were planted, through irrigation and hand removal of dense growth around the saplings;
4. Loosening the soil in the fall in bare areas where soil was compacted from heavy equipment use, using a shovel to turn over (till) the soil; and
5. Overseeding the area with a mix of site-collected native plants, after the soil loosening treatment.

2.4.2 2023 Restoration Area Maintenance

In 2023, JMc maintained the Acacia Restoration Area by conducting invasive plant removal and irrigation and plant maintenance of the 14 coast live oaks that were installed in 2021 and that survived the first year post planting, when a single tree succumbed to what appear to be drought stress.

Irrigation of the 14 surviving coast live oaks occurred at approximately monthly intervals during the summer drought, which in 2023 occurred between June and November 2023 (Figure 3e). The drip irrigation was run for 1-2 hours each time to promote water infiltration and promote root growth.

During irrigation, the oaks were also weeded, as needed, and monitored for signs of herbivory, desiccation stress, and disease, which

Silver wattle acacia seedlings observed germinating in the Restoration Area in spring and summer 2022. were pulled. No other invasive species were observed in the Restoration Area in 2022.

2.4.3 2023 Restoration Treatments

In 2023, JMc conducted three coordinated treatments to further enhance habitat in the restoration area:

1. **Soil Loosening:** Used shovels to loosen the soil within areas where native plant cover (all cover) was low and the soil appeared to be compacted as a result of the prior heavy equipment work;
2. **Native Plant Seeding:** Broadcast seeded 1,518.2 grams of site collected seed that contained 14 species native to the sand parkland community, which is the target for the area; and
3. **Ben Lomond Wallflower Seeding:** We sowed 18.935 grams of clean seed of Ben Lomond wallflower, that was collected from the naturally occurring population upslope (south) of the restoration area.

2.4.3.1 Soil Loosening

To increase the cover and richness of native plants in the southern and eastern portions of the Restoration Area, we used a shovel to dig down eight to ten inches and turn over the soil, thus tilling or pock marking the soil. The tilling was preceded by: 1) hand removal of invasive plants, and 2) raking of thatch from exotic plants. Two people then worked for 1 hour each to ‘till’ the soil by turning over the ground throughout the area that lacked native plant cover (Figure 3f); scattered diggings were also throughout the rest of the Restoration Area, which also featured open sand soil from fresh gopher mounds covered approximately 3% of the Restoration Area. After completing the soil loosening treatment, which created nearly contiguous ‘holes’ in the affected area, JMc used rakes to even out the soil surface prior to seeding.

During the course of the soil loosening treatment, which was designed to address soil compaction that was thought to have been caused by the heavy equipment used to remove the acacia biomass in 2021, JMc observed that the soil was visibly siltier and whiter than typical Zayante soil, which is a grey sand. The soil, when turned over, occurred as plates. These observations suggest the soil may feature silt deposited in the area during historic mining that pre-dates ownership by the District. The mining byproduct piled in the area, which may have been dredged from the adjacent silt ponds to increase pond capacity, may have promoted establishment of acacias. While the manually tilling is hoped to loosen the soil and promote tilth, the altered soil conditions may present challenges to the restoration. Specifically, silt tends to promote the invasion and spread of exotic plants that are not adapted to the Zayante sand soil, as well as promotes compaction which may limit native sandhills plants direction (e.g., by inhibiting seed germination and seedling establishment).

The tilling and subsequent seeding occurred on October 29, 2023, after 0.34 inches of rain fell October 22 and 23. The light rainfall moistened the soil and made it marginally easier (less dusty) to perform the soil loosening. There was no sign of germination, though it is possible that some seed was germinating and was not yet visible aboveground, it is also likely that the rain was not sufficient to promote a high rate of seed germination.

2.4.3.2 Native Plant Seeding

In 2023, JMc conducted a third year of seeding within the Restoration Area. On October 29, 2023, JMc broadcast a total of 1,518.2 grams of site-collected seed from 14 plant species native to the sand parkland community (Table 2). The seed was harvested from the site between May and October, cleaned to reduce excess chaff, and then weighed and mixed. Prior to seeding by hand, JMc mixed the seed with rice hulls, which acted as a carrier and as a visual aid to during dispersion of the seed, which was hand broadcast in two, perpendicular passes. The seed was preferentially sown in areas of relatively low plant cover in the southeastern portion of the Restoration Area, with a lower allocation also put in the northern area which featured relatively high cover of native plants, in order to promote diversity.

2.4.3.3 Ben Lomond Wallflower Enhancement

In 2023, JMc also seeded Ben Lomond wallflower into the Restoration Area. The seed was collected, stored, and seeded pursuant a Scientific, Educational, or Management Permit issued by the California

Table 2: Seed collected in 2023 from the OCA and seeded into the Acacia Restoration Area

| Species | Common Name | Life Form | Weight (g) |
|---|-----------------------------------|----------------|----------------|
| <i>Acmispon glaber</i> | deer weed | Subshrub | 690.3 |
| <i>Castilleja exserta</i> | owl’s clover | Annual herb | 16.3 |
| <i>Chorizanthe pungens var. hartwegiana</i> | Ben Lomond spineflower | Annual herb | 23.6 |
| <i>Clarkia purpurea ssp. quadrivulnera</i> | wine cup clarkia | Annual Herb | 0.3 |
| <i>Corethrogyne filaginifolia</i> | California aster | Perennial herb | 112.4 |
| <i>Diplacus aurantiacus</i> | sticky monkeyflower | Subshrub | 8.8 |
| <i>Eriogonum nudum var. decurrens</i> | Ben Lomond buckwheat | Perennial herb | 169.3 |
| <i>Eriophyllum confertiflorum</i> | golden yarrow | Subshrub | 160.3 |
| <i>Heterotheca sessiliflora ssp. echiodes</i> | bristly golden aster | Perennial herb | 31.5 |
| <i>Lupinus albifrons var. albifrons</i> | silver bush lupine | Woody shrub | 16.9 |
| <i>Monardella sinuata ssp. nigrescens</i> | northern curly leaved monardella | Annual herb | 1.3 |
| <i>Navarretia hamata ssp. parviloba</i> | hooked navarretia | Annual herb | 0.4 |
| <i>Pseudognaphalium ‘zayantense’</i> | everlasting (undescribed endemic) | Perennial herb | 278.9 |
| Total | | | 1,518.2 |

Department of Fish and Wildlife (Appendix A), which regulates take of state-listed species (2081(a)-23-009 which was obtained through an application submitted in spring 2023 (McGraw 2023b). Appendix A provides the annual report to CDFW that was prepared in compliance with the permit terms to document the seed collection and dispersal, which is summarized below.

On October 29, 2023, JMc broadcast the seed that was collected from 65 adult wallflower July 7, July 19, and August 12023 in the sand parkland habitat upslope (south) of the Restoration Area. The seed was homogenized, cleaned, weighed, and then analyzed for density through sampling 10 samples of known weight that were approximately 0.06 grams each to determine the number of seeds with apparently viable embryos. The seed available weighed 18.935 g and contained an average of 1,969 seeds per gram (SD = 151), such that a total of approximately 37,288 seeds were collected in 2023.

Like the native plant seed, the wallflower seed was mixed with rice hulls (an inert carrier to facilitate even seeding) and spread in two perpendicular passes. The seed was dispersed evenly throughout the Restoration Area to increase opportunities for wallflower establishment in various microsites, including freshly disturbed areas which are likely most suitable, as well as some areas with existing plant cover which may facilitate seedlings by acting as nurse plants by providing shade to reduce desiccation stress and nutrients, in case of silver bush lupine, which is a nitrogen-fixing shrub.

After broadcasting of the wallflower seed, JMc used a rock rake was used to tamp the soil and promote soil to seed contact.

2.5 Species Protection Measures

During the course of management in 2023, JMc and District staff implemented the applicable species protection measures identified in Appendix C of the HMMP. These measures are collectively designed to reduce short-term, direct negative impacts to the listed species including the Mount Hermon June

beetle, Zayante winged-grasshopper, Ben Lomond spineflower, and Ben Lomond wallflower during the course of management.

In 2023, ground-disturbing activities included pre-seeding treatments, plant maintenance, and exotic plant removal. While impacts to the fossorial Mount Hermon June beetle and Zayante band-winged grasshopper were minimal, restoration personnel conducted the following measures to minimize ground disturbance:

1. staged project materials, equipment, and biomass (e.g. exotic plant biomass) on designated staging areas located in degraded habitat.
2. confined ground-disturbing activities to the designated restoration areas.
3. carried, rather than dragged, materials between the staging area(s) and the treatment areas.
4. monitored all soil-disturbing activities for Mount Hermon June beetle larvae.

No Mount Hermon June beetle or Zayante band-winged grasshoppers were observed during the treatments; therefore, no direct take in terms of impacts to individuals is anticipated to have occurred in 2023.

3 Monitoring and Adaptive Management

In 2023, JMc conducted Conservation Area Condition Monitoring (Section 3.1) and photomonitoring (3.2) to evaluate and document the conditions of the OCA to increase its effectiveness as outlined in Section 5.3 of the HMMP (McGraw 2020). Restoration Area quantitative monitoring, which is conducted every-other year, was conducted in 2022 and will be conducted again in 2024.

3.1 Conservation Area Condition Monitoring

In 2023, the Olympia Conservation Area was monitored at quarterly intervals (January, April, September, and December) by JMc to identify exotic plants as well as evaluate access, erosion, disease, and other issues. The quarterly monitoring was used to assess general habitat conditions and determine the need for management as part of the Conservation Area Condition monitoring outlined in the HMMP and detailed in Table 3, which identifies the results of monitoring in 2023.

| Table 3: Results of 2023 Conservation Area Condition Monitoring | | |
|--|--|---|
| Condition | Methods | Observations |
| Access Management | | |
| Fences | Visually inspect fence and document | The fences were intact. |
| Signs | Visually inspect interpretive and 'sensitive habitat' signs | The interpretive sign and sensitive habitat signs were intact. |
| Access | Look for signs of access including footprints, dog and horse tracks and feces, debris, play equipment, etc. | No signs of trespass were observed. |
| Exotic Plants | | |
| Early Detection-Rapid Response | Visually inspect conservation area with an emphasis on invasion 'hot spots' (e.g. perimeter, trails, riparian area, etc.) to detect new invasive plant occurrences | No new invasive plant species were detected. |
| Examine Prior Invasive Plant Treatment Areas | Visually inspect prior invasive plant treatment areas to assess the need for follow-up treatments | Monitoring of the 2020 – 2022 treatment areas was conducted in January 2023. In May 2023, follow-up treatments were conducted to remove brooms, thistles, and velvet grass. |
| Other Factors | | |
| Other Factors | Monitors should examine the site for other conditions that could influence management, including plant die-off or dieback due to disease or drought | No issues were identified. |

3.2 Photomonitoring

In 2023, JMc reoccupied the 11 photostations established in 2021 (McGraw 2021b) to track changes in community structure and species composition over time and specifically evaluate the acacia restoration area. Stations P1 - P9 (Figure 5) were established in spring 2021 to capture important baseline conditions as well as representative habitats and features including:

1. **Plant Associations:** Representative conditions of the 14 plant associations (McGraw 2020);
2. **Endemic Plant Occurrences:** Patches of the four rare plants;
3. **Endemic Insect Habitat:** Suitable habitat for the Zayante band-winged grasshopper and Mount Hermon June beetle; and,
4. **Management Issues:** Invasive plants, dense exotic plants, ingress/egress areas, and erosion features (i.e., trails on steep slopes).

Additionally, stations P15 and P16 were added in fall 2021 to evaluate recovery of the acacia restoration area. Figure 6 illustrates a series of photographs taken over the three-year period of photomonitoring in the Acacia Restoration Area. They demonstrate visually how the area has greatly increased in the cover of native plants, most notably the endangered Ben Lomond spineflower, during the three year period.

3.3 Adaptive Management

In 2022, the ornamental pine that was slated to be removed from the OCA appeared to have died and the decision was made that year to remove the biomass if/when it impacted the native plant community, such as by falling and creating dense leaf litter and woody debris that suppresses native plants and inhibits use of the habitat for the listed insects. Until that time, it was retained standing to provide habitat for other native animals including woodpeckers and insects that consume dead/decaying wood. In 2023, the tree was observed to still be alive though, given the large dieback observed in 2022, the tree likely has a high probability of mortality in the near future. Though the tree could be removed, it is recommended that this be conducted when it dies and falls over as noted above, and that the budget for that task be applied to higher-priority management and monitoring actions (Section 4).

Collection and seeding of Ben Lomond wallflower were delayed until 2023 when the requisite Scientific, Educational, or Management Permit was obtained through Section 2081a of the California Endangered Species Act (Section 2.4.3.3).

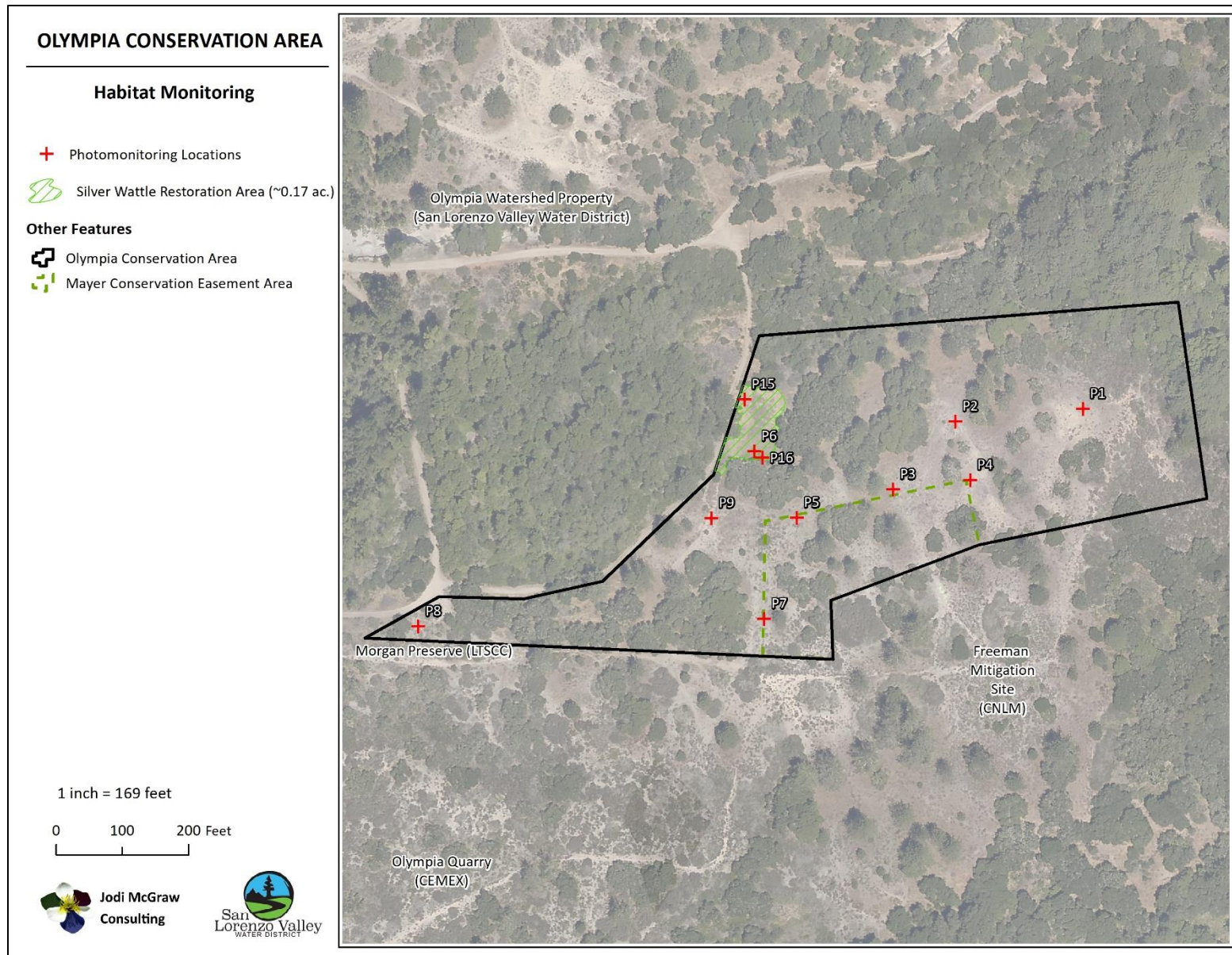


Figure 5: Photomonitoring Stations within the OCA

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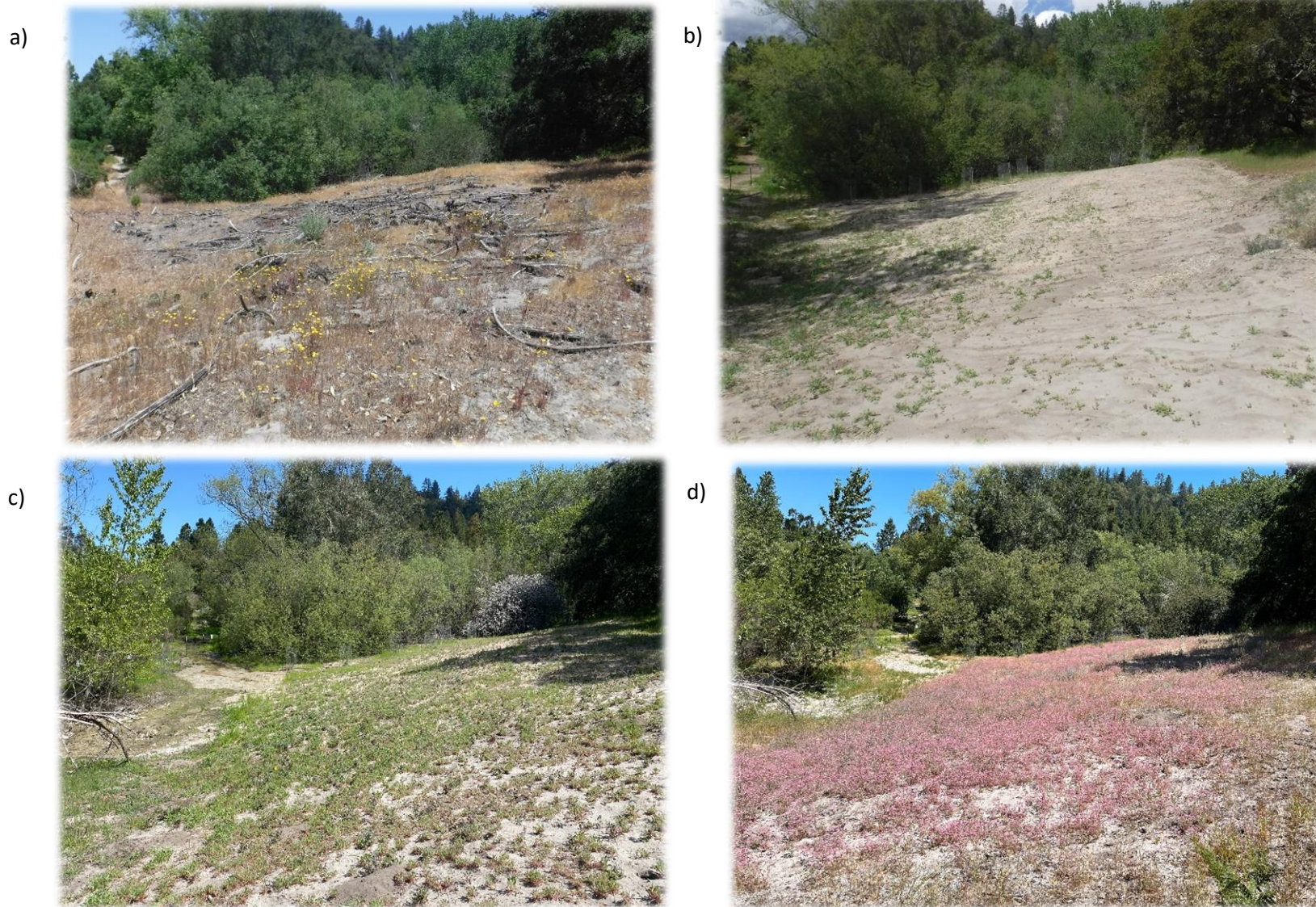


Figure 6: Acacia Restoration Area Photomonitoring: (a) before restoration in June 2021, (b) first season post-treatment in April 2022 (c) second year post-treatment in April 2023 (d) second season post-treatment in June 2023, after Ben Lomond spineflower had more fully developed. Photographs by Jodi McGraw Consulting.

4 2024 Management and Monitoring

This section outlines the habitat restoration, management, and monitoring planned for 2024. It was developed based on the schedule for the first five years of management as outlined in the HMMP and the results of management and monitoring in 2023.

4.1 Habitat Restoration, Enhancement, and Management

In 2024, the District will implement three habitat restoration, enhancement, and management projects:

1. Control plants that were controlled in 2023 (Section 2.1), to prevent their re-establishment;
2. Enhance the Ben Lomond wallflower population, by caging flowering individuals to prevent deer herbivory, which greatly reduces seed production and thus population growth;
3. Maintain the 0.17-acre acacia Restoration Area through exotic plant control.

4.1.1 Exotic Plant Management

In 2024, exotic plant management will be conducted to treat the following exotic plants conduct follow-up treatments for the invasive brooms, thistles, and velvet grass treated in 2023 (Section 2.1). In addition, the biomass of the ornamental pine will be removed if/when it impacts the native plant community, such as by falling and creating dense leaf litter and woody debris that suppresses native plants and inhibits use of the habitat for the listed insects; otherwise, it will be retained standing to provide habitat for other native animals including woodpeckers and insects that consume dead/decaying wood (Section 3.4).

All exotic plants will be managed through manual or mechanical means; no herbicides will be used. The treatments will be conducted in a manner to minimize negative impacts on the endangered species and sensitive habitat, as Section 4.1.2 of the HMMP (McGraw 2020).

4.1.2 Ben Lomond Wallflower Enhancement

In 2024, the District will conduct a fourth year of caging for adult Ben Lomond wallflower to prevent herbivory by deer, which greatly reduces seed production and could contribute to declines in the already small population that could lead to its extirpation as a result of demographic or environmental stochasticity (McGraw 2020).

During February of 2024, a biologist will revisit known areas occupied by Ben Lomond wallflower to identify individuals that are likely to flower that spring based on their size and/or evidence of bolting (i.e., initiation of a flowering stalk). These individuals will then be caged using 4' tall wire cages made of 2" avian wire or 2" x 4" welded wire, which is necessary to avoid limiting access by pollinators such as the chalcidon checkerspot butterfly (*Euphydryas chalcedona*). Cages installed in 2021-2023 will be repurposed and new cages will be created, as needed, to protect all adult plants.

4.1.3 Restoration

In 2024, the restoration area will be maintained through the following:

1. Irrigation to maintain the coast live oaks; and
2. Exotic plant control to prevent establishment of invasive plants and dense occurrences of exotic plants.

Exotic plant control will be determined based on the results of monitoring (Section 4.2) and will include manual and mechanical treatments. For example, weed whacking will be used to control any dense occurrences of exotic grasses and forbs, where doing so will not significantly impact the native plants; hand pulling and hoeing will be used to remove isolated plants (e.g., brooms, thistles, invasive vines).

In May 2024, quantitative monitoring will be conducted in the plots established in 2022 to evaluate native plant cover and richness as well as establishment of wallflower (Section 4.2.3).

Ben Lomond wallflower seed will again be collected and seeded into the treatment area in fall 2024.

4.2 Monitoring

In 2023, monitoring will consist of the following elements:

4. **Conservation Area Condition Monitoring**, to examine conditions of the site on a quarterly basis to identify issues and determine the need for remedial actions;
5. **Photomonitoring**, to track changes in the condition of the vegetation and habitat area over time; and
6. **Quantitative Plot Monitoring**: the acacia Restoration Area will be monitored using the permanent plots established in 2022 to evaluate whether the treatment is achieving the goals and objectives and to assess the establishment of Ben Lomond wallflower.

4.2.1 Conservation Area Condition Monitoring

In 2024, JMc will continue to conduct Conservation Area Condition Monitoring at quarterly intervals in order to identify exotic plants as well as evaluate access, erosion, disease, and other issues. The quarterly monitoring was used to assess general habitat conditions and determine the need for management as part of the Conservation Area Condition monitoring outlined in the HMMP and Table 3.

4.2.2 Photomonitoring

In 2024, the 11 permanent photomonitoring stations established in 2021 will be reoccupied (Figure 5). The photostations will be used to evaluate changes in habitat conditions, including plant community structure and general species composition, over time.

4.2.3 Restoration Area Monitoring

In May 2024, the acacia Restoration area will be monitored to evaluate whether it is achieving the goals and objectives (inset box), assess Ben Lomond wallflower establishment, and to identify the need for any follow-up treatments or other remedial actions as outlined in the HMMP (McGraw 2020). Monitoring in 2024 will include both qualitative assessments of conditions of the site, and collection of quantitative data to evaluate specific metrics that reflect the desired conditions (i.e., success criteria) and track changes over time and/or compare conditions to reference sites. Qualitative monitoring will be conducted quarterly in conjunction within the Conservation Area Condition monitoring, to visually assess site conditions and evaluate plant establishment including invasive plant species, to determine the need for follow-up treatments.

Quantitative monitoring will be conducted in spring 2024 to assess the status toward achieving the restoration goal and the quantitative objectives (inset box). The 7 plots (2m x 2m) that were randomly located and monumented in restoration area (Figure 7) will be re-monitored to assess abiotic and biotic conditions, including native and exotic plant cover and richness and the abundance of wallflower (Table 4). To compare habitat within the treatment area to intact habitat, the 7 reference plots (2m x 2m) randomly located and monumented in intact sand parkland habitat near the treatment area will also be re-monitored.

Silver Wattle (Acacia) Restoration Area Goals and Objectives (McGraw 2020)

Goal: Restore habitat for the native herbaceous plants and Zayante band-winged grasshopper, and enhance habitat for the Mount Hermon June beetle in the 0.17-acre area where silver wattle was removed.

Objectives:

- O1: Establish an assemblage of native plant species similar in structure and species composition to the adjacent sand parkland habitat surrounding the treatment area; specifically, the restoration areas will have native plant richness and native plant cover that is at least 90% of that found in the adjacent sand parkland habitat surrounding the Project site after five years.
- O2: Establish Ben Lomond spineflower in the restoration area, with average absolute cover of at least 5% after five years.
- O3: Establish Ben Lomond wallflower in the restoration area, with average absolute cover of at least 1% after five years.
- O4: Establish Ben Lomond buckwheat in the restoration area, with average absolute cover of at least 3% after five years.
- O5: Provide food for the Mount Hermon June beetle by establishing a diverse assemblage of native plants, including native plant cover and richness that is at least 90% of that in adjacent sand parkland habitat surrounding the Project site after five years.
- O6: Provide suitable habitat for the Zayante band-winged grasshopper, by establishing native plant species that are either host plants for the Zayante band-winged grasshopper (ZBWG) or that provide important habitat for ZBWG, such as silver bush lupine (*Lupinus albifrons* var. *albifrons*) and bristly golden aster (*Heterotheca sessiliflora* ssp. *echioides*), which should achieve at least 3% cover in the restoration areas, while average absolute exotic plant cover will be less than 20% after five years.
- O7: Prevent widespread establishment of any invasive plants, including brooms, thistles, velvet grass, which will collectively average no more than 5% absolute cover after 5 years.

Table 4: Variables to be measured during Quantitative Monitoring of the Restoration Area in 2024

| Variables | Description |
|---------------------|--|
| Soil Depth | The soil depth reading (cm) given by a 3-foot long (92-cm) soil probe. |
| Soil Moisture | The soil moisture, recorded as a percentage. |
| Disturbance | Cover of soil disturbance by type ² |
| Litter Cover | The percentage of the plot covered by litter, defined as herbaceous plants, tree and shrub leaves from the prior year(s), and the plant species that is/are the source of the litter. |
| Litter Depth | The litter depth recorded in centimeters (cm) to the nearest half cm. |
| Woody Debris | The percentage of the plot covered by woody debris (shrub or tree stems or branches), and the plant species that are the source of the woody debris. This does not include dead standing biomass; only woody debris lying on the ground. |
| Bare Ground | The percent cover of the plot featuring bare ground. |
| Plant Species Cover | Visual estimate of absolute cover by species using cover increments ¹ . |
| Wallflower Density | The number of wallflower individuals in each of three stage classes: seedling, juvenile, and adult. |

¹ Absolute cover estimated using 0.1, 0.5, 0, and any whole integer between 1 and 100%.

² Soil Disturbances: animal diggings/burrows, trails, slides/erosion, and grading (or other mechanical)

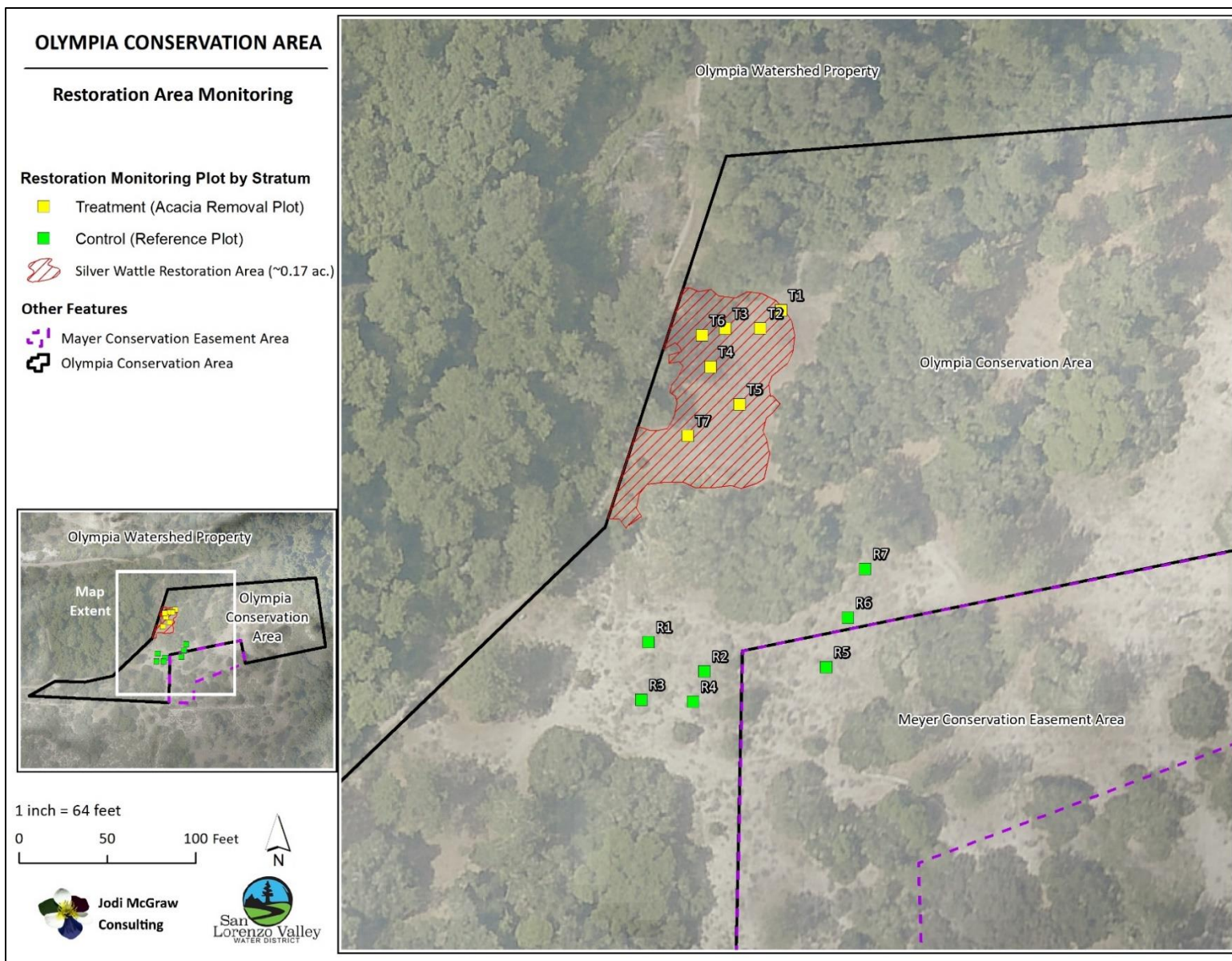


Figure 7: OCA Restoration Area Monitoring Plots

5 Projects Mitigated through the Olympia Conservation Area

This section documents the District projects that have been implemented through the Olympia Conservation Area and the associated endowment contributions, which are summarized in Table 5. There were no additional projects mitigated using the OCA during 2023.

5.1 Background

The District established the Olympia Conservation Area to compensate for impacts to sandhills species and habitat as part of the District's capital improvement and maintenance projects (Section 1.1). With each project for which the District uses the OCA as compensatory mitigation, the District contributes funds to a non-wasting endowment used to fund HMMP implementation (McGraw 2020).

5.2 Projects to Date

Since its establishment in 2017, the OCA has been used to mitigate the impacts of four projects that have collectively used 91,977 sf (2.11 acres) of the OCA (Table 5). The remaining 4.16 acres are anticipated to be utilized to mitigate the impacts of future District infrastructure projects as well as operations and maintenance activities on the sandhills species, including those projects covered in a habitat conservation plan (HCP) that the District is preparing to cover activities in the sandhills over a 25-year period. The HCP will identify additional conservation areas, as well as expand habitat restoration, management, and monitoring, as part of an update to the HMMP developed as part of the HCP planning process.

To date, the District has contributed \$281,930.21 to the endowment that the District uses to fund implementation of the HMMP for the OCA (Table 5). Future contributions will be made at rates that are adjusted to reflect inflation (e.g., using the consumer price index) to ensure that the total size of the non-wasting endowment will be sufficient to fund management and monitoring in perpetuity once the District has completed its contributions.

Table 5: District projects that have mitigated impacts to sandhills species through the OCA between 2017 and 2023, showing the area of habitat impacts and area of mitigation in square feet and the contribution made by the District to the endowment that is used to manage and monitor the OCA per the HMMP.

| Project | Reference Document | Habitat Area (sf) | | Mitigation Comments | Endowment Contribution (\$) | | Endowment and Total Area Comments |
|--|--------------------|-------------------|----------------|--|-----------------------------|----------------------|---|
| | | Project Impact | Mitigation | | Total | Per SF of Mitigation | |
| Probation Tank HCP | McGraw 2017 | 17,100 | 43,360 | <ul style="list-style-type: none"> • 4:1 ratio for 4,580 sf of permanent impacts • 2:1 for 12,520 sf of temporary impacts. • Higher ratios due to higher quality habitat relative to other projects | \$121,380.00 | \$2.80 | Contributions made: 10/18 (\$25,000) and 5/19 (\$96,380). Initial rate of \$2.69/sf for 2017 was inflated for 2018 payment at 2%. |
| Pasatiempo Wells Emergency Project | SLVWD 2017 | 11,419 | 18,491 | <ul style="list-style-type: none"> • 3:1 ratio for 3,536 sf of permanent impacts • 1:1 for 7,884 sf of temporary impacts with restoration of temporary impact areas | \$61,543.00 | \$3.33 | Contributions made January 2019 exceeded calculated amount by \$708.90: \$3.33/sf rather than \$3.29/sf. |
| Lewis Tank Replacement Emergency Project | DDA 2019 | 14,325 | 28,851 | <ul style="list-style-type: none"> • 3:1 ratio for 21,789 sf of permanent impacts • 1:1 for 7,062 sf of temporary impacts with restoration of temporary impact areas | \$94,918.61 | \$3.29 | Contribution made 3/26/20. Rate used as for Pasatiempo Wells Project |
| Quail Hollow Pipeline Emergency Project | McGraw 2022 | 255 | 1,275 | <ul style="list-style-type: none"> • 5:1 ratio for mix of permanent and temporary impacts • No restoration of temporary impact areas (located along road) | \$4,088.60 | \$3.21 | Contribution made 9/15/23. Rate based on base 2017 rate (\$2.69/sf) inflated at 19.2% per CPI between 2017 and 2022. |
| Total to Date | | 43,099 | 91,977 | | \$281,930.21 | | 2.11 acres of mitigation in the OCA have been used to date |
| Total OCA Area | | | 273,124 | | | | The OCA is 6.270066 acres in area |
| Remaining Mitigation in the OCA | | | 181,147 | | | | 4.16 ac remain for mitigating future projects |

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References

- California Native Plant Society. 2019. Inventory of rare and endangered plants of California. Sacramento, CA. Accessed on-line at: <http://www.rareplants.cnps.org/>
- California Department of Fish and Wildlife (CDFW). 2019. Special Animals List. August 2019. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline>.
- Denise Duffy Associates. 2019. Emergency Endangered Species Act Consultation for the San Lorenzo Valley Water District Lewis. Memorandum to Chad Mitcham, United States Fish and Wildlife Service July 9, 2019. 20 pages.
- Denise Duffy Associates. 2020. Quail Hollow Pipeline Replacement Project Final Initial Study and Mitigated Negative Declaration. Prepared for the San Lorenzo Valley Water District. November 2020. 230 pages.
- Hill, K. and R. O'Malley. 2009. A picky palate? The host plant selection of an endangered June beetle. *Journal of Insect Conservation*. DOI 10.1007/s10841-009-9257-7.
- Land Trust of Santa Cruz County. 2017. Olympia Watershed Conservation Easement Baseline Condition Report. October 27, 2017. 9 pages plus appendices.
- McGraw, J. M. 2004a. Interactive effects of disturbance and exotic species on the structure and dynamics of an endemic Sandhills plant community. University of California, Berkeley, California. 309 pages.
- McGraw, J. M. 2004b. Sandhills conservation and management plan: a strategy for preserving native biodiversity in the Santa Cruz Sandhills. Report submitted to the Land Trust of Santa Cruz County, Santa Cruz, CA. 354 pages.
- McGraw, J. M. 2017. Low-Effect Habitat Conservation Plan for the San Lorenzo Valley Water District's Probation Tank Replacement Project Felton, Santa Cruz County, California. Submitted to the US Fish and Wildlife Service. February 2017. 73 pages plus appendices.
- McGraw, J. M. 2020. Olympia Conservation Area Habitat Management and Monitoring Plan. Prepared by Jodi McGraw Consulting for the San Lorenzo Valley Water District. September 2020. 190 pages
- McGraw, J. M. 2021a. Olympia Watershed Property Riparian Woodland and Oak Woodland Restoration. Report submitted to Pacific Gas & Electric, and The San Lorenzo Valley Water District. September 2021. 17 pages.
- McGraw, J. M. 2021b. Olympia Conservation Area Habitat Management and Monitoring Plan 2020 Annual Report. Report submitted to the San Lorenzo Valley Water District. January 2021. 14 pages.
- McGraw, J. M. 2022a. Olympia Conservation Area Habitat Management and Monitoring Plan 2021 Annual Report. Report submitted to the San Lorenzo Valley Water District. January 2022. 18 pages.

- McGraw, J. M. 2022b. Quail Hollow Pipeline Replacement Project: Mount Hermon June Beetle Species Protection and Mitigation Measures. Technical Memorandum submitted to the San Lorenzo Valley Water District. September 15, 2023. 3 pages.
- McGraw, J. M. 2023a. Olympia Conservation Area Habitat Management and Monitoring Plan 2022 Annual Report. Report submitted to the San Lorenzo Valley Water District. January 2023. 34 pages.
- McGraw, J. M. 2023b. Olympia Conservation Area Santa Cruz (Ben Lomond) Wallflower Enhancement Project. 2081(a) Permit Application Submitted to the California Department of Fish and Wildlife. May 9, 2023. 11 pages.
- McGraw, J. M. and N. Chrislock. 2019. Scotts Valley Middle School Modernization Project Habitat Conservation Plan: Final Report. Jodi McGraw Consulting, Freedom, CA. Prepared for Scotts Valley Unified School District. Report submitted to the United States Fish and Wildlife Service, Ventura, CA. 37 pages.
- San Lorenzo Valley Water District. 2017. Emergency Repairs of the San Lorenzo Valley Water District's Pasatiempo Wells #6 and #7. Letter from Brian Lee, District Manager of SLVWD to Chad Mitcham, Biologist, United States Fish and Wildlife Service. November 17, 2017. 13 pages.
- U.S. Department of Agriculture. 1980. Soil Survey of Santa Cruz County. Soil Conservation Service, United States Department of Agriculture and University of California Agriculture.
- United States Fish and Wildlife Service (USFWS). 1994. Endangered and threatened wildlife and plants; endangered status for three plants and threatened status for one plant from sandy and sedimentary soils of central coastal California. Federal Register **59**:5499-5509.
- United States Fish and Wildlife Service (USFWS). 1997. Endangered and threatened wildlife and plants; determination of endangered status for two insects from the Santa Cruz Mountains of California. Federal Register **62**:3616-3628.

**6 Appendix A: Annual report for the Santa Cruz Wallflower Enhancement at
Olympia Conservation Area (Permit 2081[a]-23-009-RP)**