San Diego Association of Governments
Escondido Creek (Elfin Forest) Invasive Plant Control
Final Report
Reporting Period: October 2018-November 2020
SANDAG Contract Number: 5005503

Executive Summary

This project funded the removal of exotic, invasive species that threatened occurrences of the rare plants Enicinitas Baccharis (*Baccharis vanessae* or EB) and Orcutt's Brodiaea (*Brodiaea orcuttii* or OB) within the Keithley (formerly Los Cielos) Preserve.
(4.29) acres of Pampas grass, which previously dominated Meisha Canyon, a tributary to Escondido Creek where two small EB occurrences were discovered, was eliminated throughout the course of one comprehensive treatment and two follow-ups. Return visits have shown 100% of the over (100) pampas grass individuals are dead and not resprouting. The project also funded multiple treatments of (2.29) acres Arundo donax in a riparian area adjacent to another EB occurrence. The Arundo was significantly reduced, and retreatments will continue for another 2-3 years for eradication. The project also removed upland invasives threatening a large (over 700 individuals) OB occurrence; annual exotics were treated 2-4 times across an area of 31.5 acres, including mustard, fennel, palms, stinkwort, tocolote and ice plant.

Because the Keithley Preserve is managed in perpetuity by the Conservancy, maintenance will continue indefinitely to ensure control of invasive plants at the site. Sites are monitored monthly, and maintenance treatments will be scheduled according to need, with most treatment of annuals occurring in spring and summer and most treatment of perennials occurring in early fall.

The Conservancy is very appreciative to have received this funding. It jump-started the ongoing management of invasive exotics at the precious Keithley Preserve; it gave us the ability to tackle large and intimidating infestations, which in turn allows us to focus on fine-tuning in the future. The Keithley Preserve is a vibrant bastion of biodiversity in the Escondido Creek Watershed.

Escondido Creek Conservancy

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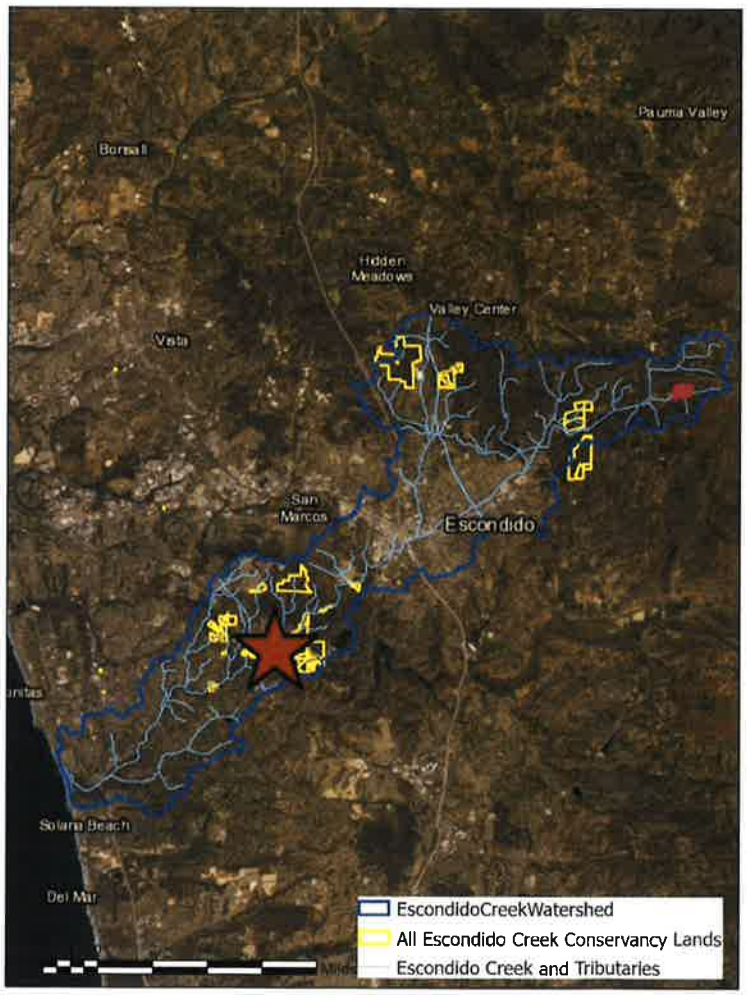
Project Background:
The primary purpose of this project was to protect and enhance occurrences of the rare plants Encinitas Baccharis and Orcutt's Brodiaea, both of which are found at the Keithley (formerly Los Cielos) Preserve in the Elfin Forest area southwest of the city of Escondido. The Keithley Preserve contains Diegan Coastal Sage Scrub, southern mixed chaparral, native grasslands, and multiple types of Riparian Forest. It is biologically rich, being located in the "Gnatcatcher core" habitat along the Escondido Creek, and is home to Coastal California Gnatcatchers in addition to the target plant species. The occurrences of EB and OB protected by this project represent significant portions of the plants' overall populations. This is particularly true in the case of EB, where only 13 occurrences are known (including the newly discovered site protected here) and of which two were cared for through this project. Because invasive plants are considered one of the principal threats to both EB and OB, this project aimed to address the threat by removing invasive plants.

Project Vicinity:



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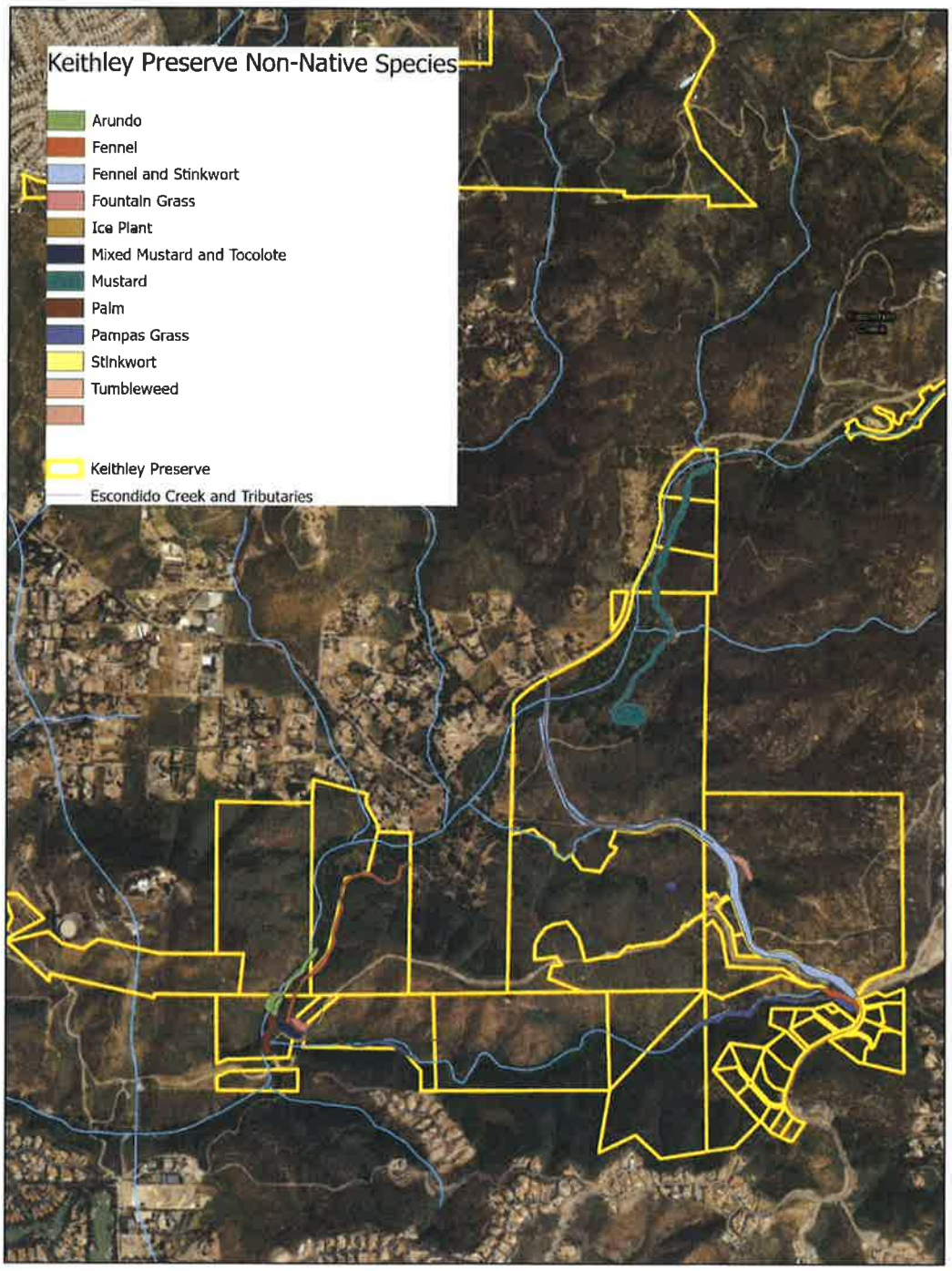
Invasive Plants within the Keithley Preserve:



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Project Goals:

Original Goal: Remove invasive pampas grass and ice plant from (3.4) acres of the preserve complex, which immediately threaten a newly discovered (December 2017) occurrence of Encinitas baccharis.

Outcome: Removed Pampas Grass and ice plant from a total of (4.36) acres of the Preserve complex in the immediate vicinity of an Encinitas baccharis occurrence. Ice plant responded readily to herbicide treatment and required only one retreatment. Additional Pampas grass was observed during treatment, resulting in the higher-than-anticipated acreage. Pampas grass and ice plant can be considered eradicated from the Preserve.

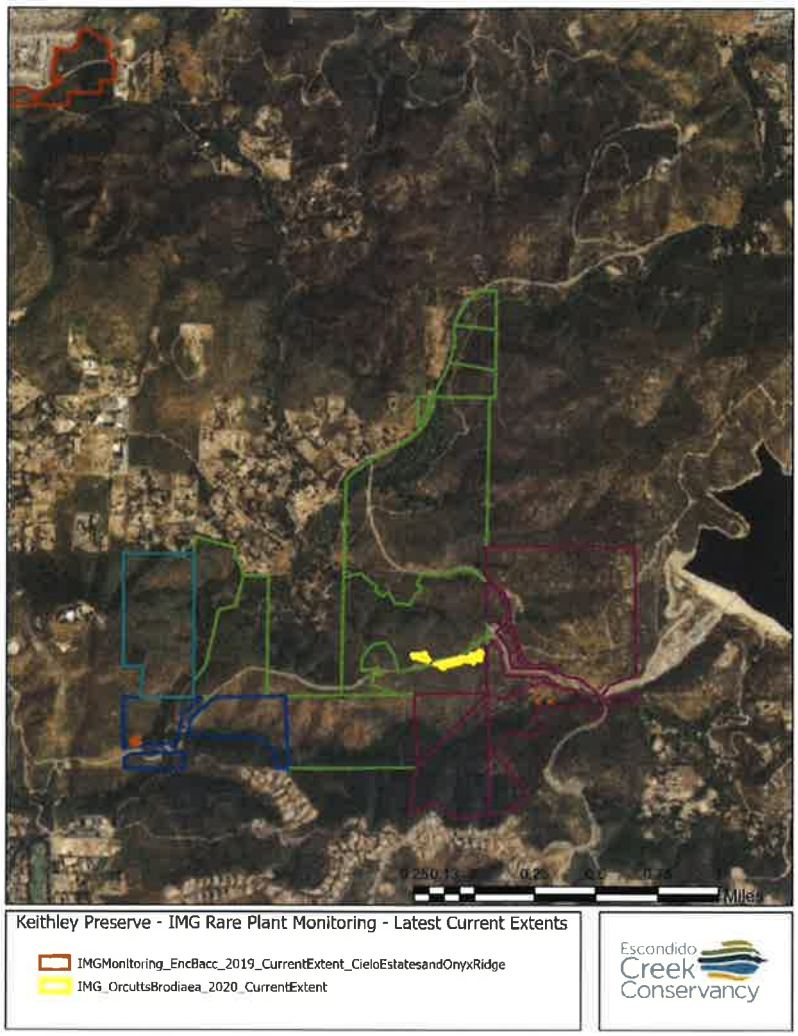
Original Goal: Remove exotic habitat-modifying plant species from 47.7 acres of the Los Cielos Preserve and therefore prevent potential encroachment onto two occurrences of Encinitas baccharis and Orcutt's brodiaea. This will include .5 acres of dense arundo, and selective removal of tumbleweed, mustard, stinkwort, fennel, tamarisk, fountain grass, small palms, from 43.8 acres of the preserve according to the stipulations of Carlsbad Watershed Network Invasive Species Control Program permit. This includes sensitive species monitoring to avoid negative impacts.

Outcome: Removed exotic habitat-modifying plant species from (38.06) acres of Los Cielos Preserve over the grant's 3 year life. Arundo donax has been significantly knocked back throughout the Presrve, and likely only needs two additional years of retreatments to the short regrowth. 2 Tamarisk individuals were treated, and, while smaller now, will also require ongoing treatment. Small palms have been eliminated from the Preserve. After 3-4 treatments, fountain grass has been eliminated from the site. Mustard, tocolote, tumbleweed, and fennel will require ongoing treatment. During the grant period, the invasive species Stinkwort, Dittrichia graveolens, became a new problem within the Preserve (as well as across San Diego County at large). Staff were able to observe and control this infestation before it became entrenched.

Arundo	2.291871041
Fennel	3.882192016
Fennel and Stinkwort	13.13012028
Fountain Grass	0.806699693
Ice Plant	0.071973696
Mixed Mustard and Tocolote	0.886825979
Mustard	10.26418018
Palm	1.299226992
Pampas Grass	4.291180676
Stinkwort	0.151787501
Stinkwort and Fennel	0.898119986
Tumbleweed	0.112007
Grand Total	38.08618504

Original Goal: IMG monitoring protocol of OB (May 2019), IMG monitoring protocol of EB (September 2019).

Outcome: IMG monitoring was completed for one occurrence of OB on May 14th 2019 and June 12, 2020. IMG monitoring was completed for two occurrences of EB by Conservancy land management staff on August 26 and 27, 2019. Maps and photos below:



Mapped Extents of Encinitas Baccharis and Orcutt's Brodiaea:

Orcutt's Brodiaea occurrence site within the Keithley Preserve.

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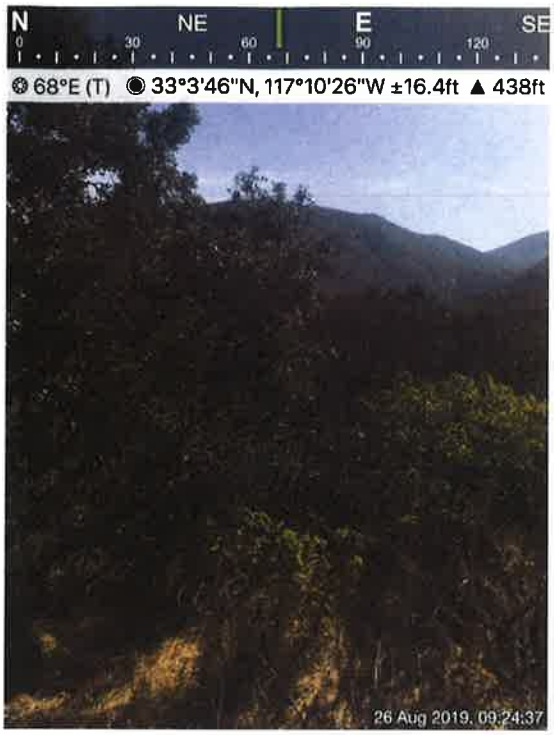
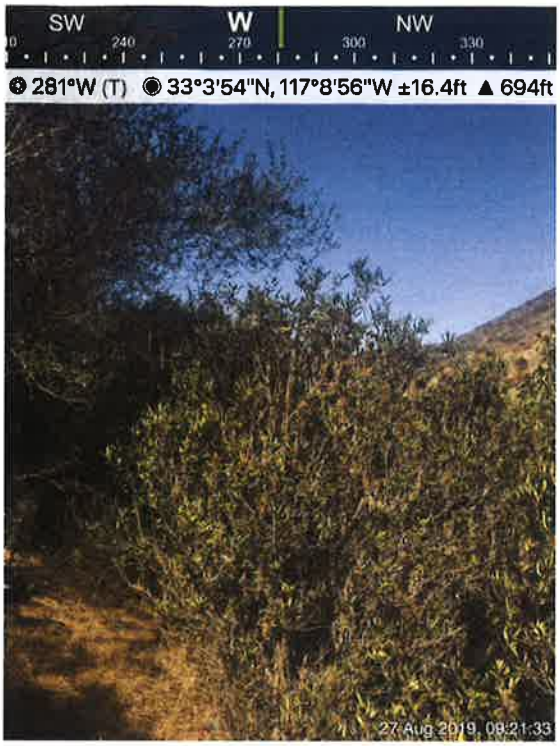


Encinitas Baccharis occurrence site within the Keithley Preserve.



Encinitas Baccharis occurrence site within the Keithley Preserve.

Original Goal: Post-grant period: monitor each treatment site and rare plant occurrence every other month for re-treatment needs until preserve-level eradication is achieved. Continued IMG monitoring of OB and EB according to the protocol.

Outcome: Ongoing

Work Performed by Task

Task 1- Sensitive Species Monitoring
Budget: $2,880.00 (from grant agreement)
Spent: $ 5,465.96

When work occurs during the avian nesting season, it is necessary to have a biological monitor onsite. Several times during this grant period, this type of monitoring was necessary, because the timing of rains (either late or early) necessitated understory invasive plant removal during the breeding season.
Conservancy land managers set up crews to begin work in certain project areas, as well as surveyed nearby trees, shrubs, and ground for nests in advance of and during work.

Conservancy land managers conducted sensitive species monitoring on the following dates:
4/17/19,4/24/19, 4/26/19, 4/29/19, 4/30/19, 5/24/19, 6/3/19, 6/5/19, 8/20/19, 8/21/19, 8/22/19, 8/23/19, 10/1/19, 4/15/20, 4/23/20, 5/14/20, 5/15/20, 7/14/20, 7/15/20, 7/16/20, 7/28/20, 8/3/20, 9/11/20, 9/15/20, 9/17/20, 9/18/20, 9/21/20, 10/29/20, 11/5/20, 11/6/20
One time during the project work it was necessary to employ outside assistance with biological monitoring. This was when work first began, and treatment of Pampas Grass was occurring in densely vegetated riparian areas. The work site was surveyed by Halcyon Environmental on February 25th, 2019.

Task 2-Invasive Plant Treatment in Area Surrounding EB/OB and Keithley Preserve
Budget: $62,693.55
Spent: $60,705.60

During the grant period, a small crew of habitat restoration technicians from the subcontractor Habitat West, Inc. worked to treat and retreat the invasive plant infestations described above. Crews used targeted herbicide application to rosette-stage plants via backpack sprayers and hand sprayers, hand-pulling, and the cut-stump method, depending on seasonality and target invasive species.

Crews treated invasive plant species on the following dates:
1/14/19, 1/16/19, 1/18/19, 1/19/19. 1/21/19, 1/22/19, 1/23/19, 1/28/19, 1/29/19, 1/30/19, 2/6/19, 2/7/19, 2/8/19, 2/9/19,2/11/19, 2/12/19, 2/25/19, 2/26/19, 2/27/19, 2/28/19, 4/1/19, 4/19,/19, 4/25/19, 4/26/19, 4/30/19, 5/1/19, 5/2/19, 5/3/19, 5/24/19, 5/28/19, 6/3/19, 6/6/19, 8/21/19, 8/22/19, 8/23/19, 9/30/19, 10/1/19, 10/11/19, 4/15/20, 4/23/20, 5/14/20, 5/15/20, 7/14/20, 7/15/20, 7/16/20, 7/28/20, 8/3/20, 9/11/20, 9/15/20, 9/17/20, 9/18/20, 9/21/20, 10/29/20, 11/5/20, 11/6/20

Task 3-IMG Monitoring of Encinitas Baccharis and Orcutt's Brodiaea in the Keithley Preserve.
Budget: $540.00 (from grant)
Spent: $2,475.00

IMG monitoring was completed for one occurrence of OB on May 14th 2019 and June 12, 2020. IMG monitoring was completed for two occurrences of EB by Conservancy land management staff on August 26 and 27, 2019. Please see above for photos and maps of monitoring. Monitoring results were submitted per protocol to the San Diego Management and Monitoring Program.

Task 4-Quarterly Reporting
Budget: $2,300.00 (from grant)
Spent: $2,092.50

Quarterly reports were submitted for each quarter of the grant period except for the 6th quarter, during which no project work was completed.

Reports were submitted for the following periods:
October-December 2018
January-March 2019
April-June 2019
July-September 2019
October-December 2019
April-June 2020
July-September 2020

This final report will substitute for the final quarterly report for October 2020 through November 20, 2020.

Task 5-Final Reporting
Budget: $720.00 (from grant)
Spent: $180.00

The final report is currently being submitted. Land Manager wrote the narrative portion of the final report and took photographs. Administrator compiled the final invoice.

Task 6-Administrative
Budget: $3,460.00 (from grant)
Spent: $2,161.00

Administrator worked on invoicing throughout the grant period. Administrator also purchased DIR registration at the grant initiation and again one year later. Administrator also added SANDAG to the Conservancy's insurance policy as an additional insured.

In-Kind Contribution- After administering the final invoice, we determined that we incurred additional costs in Task 2 and Indirect costs; Additional cost for Task 2 was $886.23 and additional cost for Indirect expenses was $623.78. Our organization was able to leverage $1,510.01 to cover these costs that were not covered in the awarded grant in order to successfully complete this project.

Photos:

Pampas Grass in Meisha Canyon – Before (Feb. 2019)

Pampas Grass (lack of) in Meisha Canyon – After (Nov. 2020)

Pampas Grass (treated and dying) in Meisha Canyon – During (Jul. 2019, Sept. 2019)

Pampas Grass (dead/decomposing and significantly reduced in size) in Meisha Canyon – After (Dec. 2020)

Ice Plant (during treatment) in Meisha Canyon - During (Mar. 2019)

Ice Plant (dead) in Meisha Canyon – After (Dec. 2020)

Stinkwort (a new 2020 problem in Keithley Preserve) along Via Ambiente – Before (Sept. 2020)

Stinkwort (a new 2020 problem in Keithley Preserve) along Via Ambiente – After (Dec. 2020)

Coast live oak seedling, dead Arundo rhizomes, untreated arundo in background – Before (Sept. 2020)

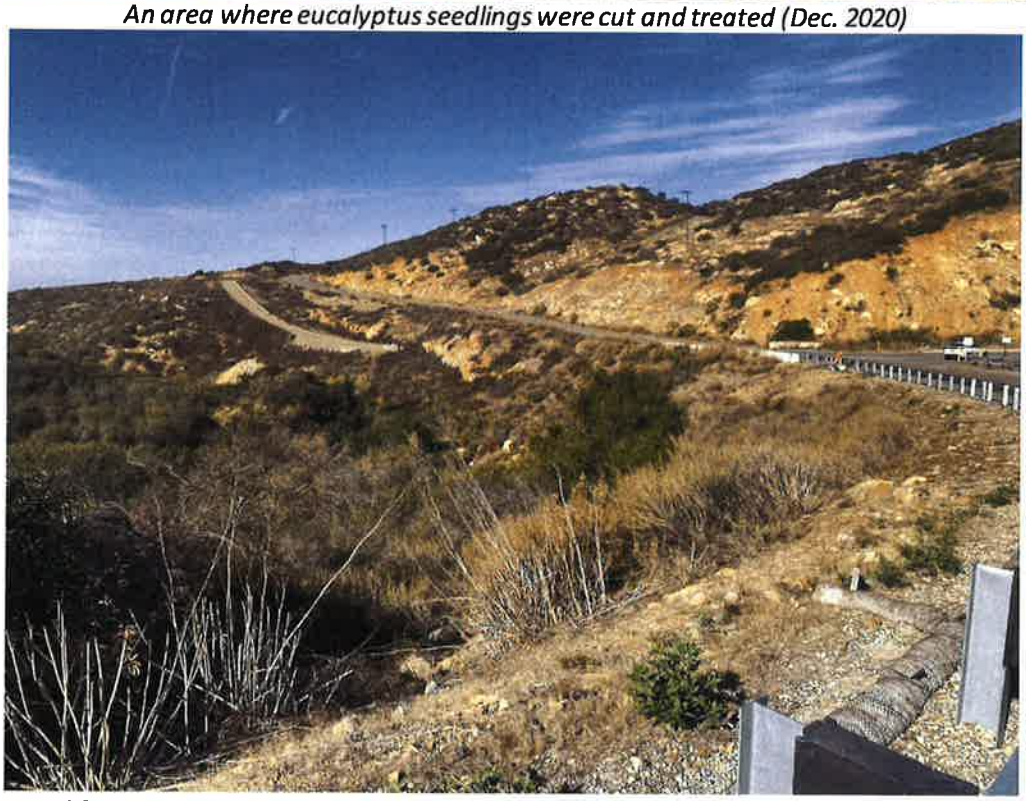
Fountain grass before (May 2019)

and after (Jul. 2019) treatment along the sewer road

Arundo donax removal – Before (Feb 2019)

Arundo donax – some have resprouted, *and some have not – During (Feb. 2020).*

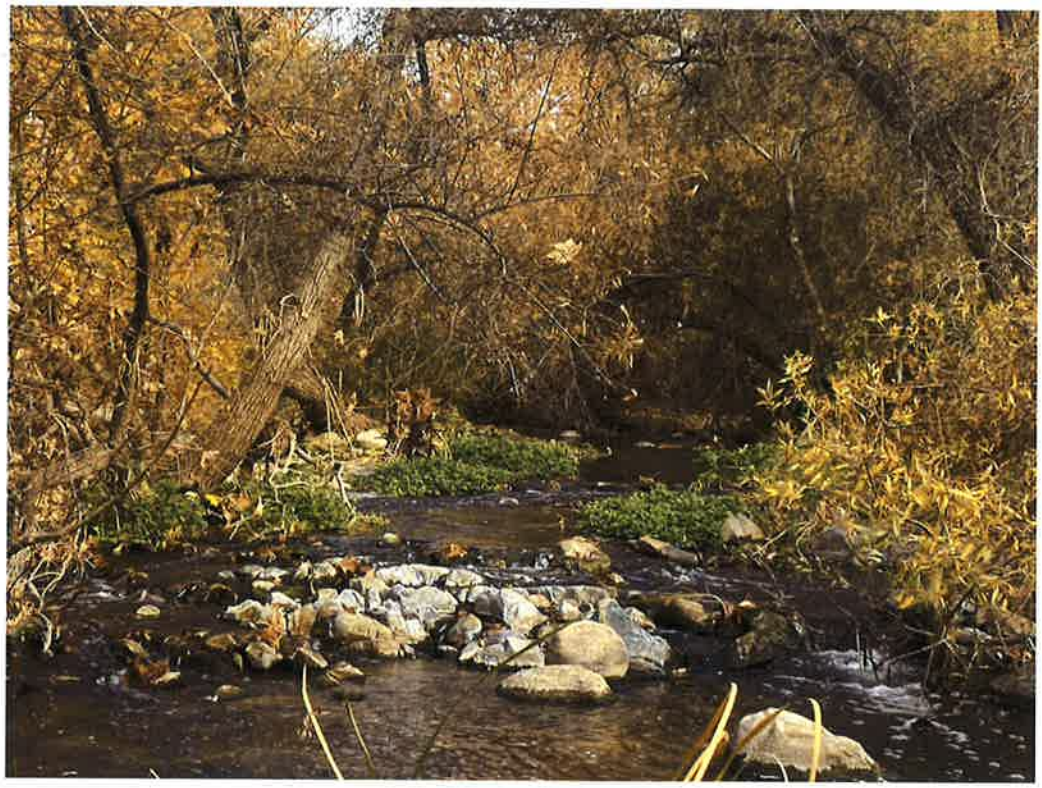
An area where eucalyptus seedlings were cut and treated (Dec. 2020)



Treated fennel; vulnerable road-edge habitat is coming back in Encelia californica (Dec. 2020)

IMG monitoring of Orcutt's Brodiaea, May 2019

IMG monitoring of Orcutt's Brodiaea, May 2019



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Conclusions

The project accomplished its goals and was a privilege to work on for the Conservancy land team.

Pampas Grass and ice plant were eradicated from the Preserve, removing the threat to EB and OB.

Arundo donax is under control within the Preserve. While it is not eradicated due to resprouts, the large biomass has been successfully removed from the Preserve. Retreatments are ongoing, and eradication is now financially and logistically feasible, as a result of the SANDAG EMP funding.

The success of the threat removal from MSP species occurrences was confirmed during IMG monitoring, which was conducted in 2019 and 2020, during which the Orcutt's Brodiaea occurrence increased from a few hundred to over 700 individuals. The Encinitas Baccharis occurrences are stable.

Ongoing management is necessary and will continue. Management steps include continuous (monthly) monitoring of project site by Conservancy staff, response to observed threats, and continued participation in the county-wide IMG (Inspect and Manage) rare plant monitoring program. *Arundo donax* in particular will require vigilant continued monitoring and management.

Appendices:

Attached to this communication is the long-term HMP for Keithley Preserve. Note that it has not yet been approved by the agencies, so is in "draft" form.