

**San Diego Association of Governments
Rare Dune Species Restoration Project
Nature Collective
Quarterly Progress Report
Reporting Period: July 1, 2023 –September 30, 2023
Submission Date: **October 20, 2023**
SANDAG Contract Number: S1125507**

Quarterly Status Report Overview

During this reporting period Nature Collective staff continued with seed collection, propagation, and project planning. We hosted two volunteer events for biomass removal and weed control. During this quarter we began an in-house germination study for Nuttall's Acmispon (*Acmispon prostratus*). We collected quarterly vegetation transects and photo points at the end of the reporting period.

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Rare Coastal Dune Species Habitat Restoration Project – 2023 Q3 Progress Report

Work Performed this Period:

1. Task 1- Seed Collection & Propagation

During this quarter we started collecting seeds for propagation and spreading on 07/12/2023- we collected on six different dates throughout the quarter. This quarter we collected seed from nine species totaling 4.77 lbs. this. Details on species and weight per species are included in Table 1. We are 100% complete with seed collection efforts for Year 1.

| Species | Common Name | 7/12/23 | 7/21/23 | 8/9/23 | 8/24/23 | 8/25/23 | 9/13/23 | Total (g) | Total (lbs.) |
|--|----------------------------|---------|---------|--------|---------|---------|---------|-----------|--------------|
| <i>Abronia maritima</i> | sticky sand verbena | 328 | - | - | 138 | - | - | 466 | 1.027 |
| <i>Abronia umbellata</i> var. <i>umbellata</i> | pink sand verbena | 9 | - | - | - | - | - | 9 | 0.020 |
| <i>Acmispon prostratus</i> | Nuttall's acmispon | 211 | 293.1 | - | - | - | 110.3 | 614.4 | 1.355 |
| <i>Ambrosia chamissonis</i> | beach bur | 292 | - | - | 138 | - | - | 430 | 0.0948 |
| <i>Camissoniopsis cheiranthifolia</i> ssp. <i>suffruticosa</i> | beach primrose | 8 | - | - | - | - | - | 8 | 0.018 |
| <i>Chaenactis glabriuscula</i> var. <i>orcuttiana</i> | Orcutt's yellow pincushion | 16 | 6.02 | - | - | - | - | 22 | 0.0049 |
| <i>Croton californicus</i> | California croton | 8 | 2.69 | 7.5 | - | - | | 18.2 | 0.040 |
| <i>Eriogonum parvifolium</i> | seacliff buckwheat | - | - | | - | 260 | - | 260 | 0.0573 |
| <i>Nemacaulis denudata</i> var. <i>denudata</i> | coast woolly heads | 121 | 190.07 | - | 28 | - | - | 339.1 | 0.748 |
| Total | | | | | | | | 2166.7 | 4.77 |

Table 1. Seed Collected for Propagation and Spreading (g)

We have continued with propagation and seed treatments of sticky sand verbena (*Abronia maritima*), pink sand verbena (*Abronia umbellata* var. *umbellata*), sea cliff buckwheat (*Eriogonum parviflorum*), beach bur (*Ambrosia chamissonis*), beach primrose (*Camissoniopsis cheiranthifolia* ssp. *suffruticosa*), and California croton (*Croton californicus*). A majority of the collected seed has been given to San Diego Botanic Garden (SDBG), whom will be growing these species for planting in winter 2024.

We have set up an in-house germination study at our nursery to determine germination and seed viability rates of Nuttall's Acmispon (*Acmispon prostratus*).

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Photos of the germination study can be found in Appendix E: Photo 7 & 8. The germination study consists of 6 trays of rose pots with different treatments and locations. Each tray has 49 rose pots with 10 seeds or 5 fruits in them. We sowed approximately 2,940 seeds between 294 rose pots. The growing medium is 3.75 parts perlite to 1 part vermiculite. Seeds were either collected from West Basin Dunes (east of Highway 101) or Seaside Terrace Dune/Cardiff Living Shorelines (west of Highway 101). We will hand water the trays between every 2 to 4 days and then rotate the trays counterclockwise once a week. The seed collection location and tray treatments are shown below in Figure 1.

| | |
|---|---|
| Tray 1 - <u>Seed collected</u> : West Basin Dunes - <u>Seed treatment</u> : None- sown in fruit - <u>Amount sown</u> : 5 fruits (approx. 10 seeds) - <u>Number of rose pots</u> : 49 | Tray 4 - <u>Seed Collected</u> : Seaside Terrace Dune/Cardiff Living Shorelines - <u>Seed treatment</u> : None- sown in fruit - <u>Amount sown</u> : 5 fruits (approx. 10 seeds) - <u>Number of rose pots</u> : 49 |
| Tray 2 - <u>Seed Collected</u> : West Basin Dunes - <u>Seed treatment</u> : seed removed from fruit - <u>Amount sown</u> : 10 seeds - <u>Number of rose pots</u> : 49 | Tray 5 - <u>Seed Collected</u> : Seaside Terrace Dune/Cardiff Living Shorelines - <u>Seed treatment</u> : seed removed from fruit - <u>Amount sown</u> : 10 seeds - <u>Number of rose pots</u> : 49 |
| Tray 3 - <u>Seed Collected</u> : West Basin Dunes - <u>Seed treatment</u> : seed removed from fruit, soaked in boiling water for 3 minutes, and soaked in cooling water for 10 minutes - <u>Amount sown</u> : 10 seeds - <u>Number of rose pots</u> : 49 | Tray 6 - <u>Seed Collected</u> : Seaside Terrace Dune/Cardiff Living Shorelines - <u>Seed treatment</u> : seed removed from fruit, soaked in boiling water for 3 minutes, and soaked in cooling water for 10 minutes - <u>Amount sown</u> : 10 seeds - <u>Number of rose pots</u> : 49 |

Figure 1. Germination Study Treatments and Seed Collection Locations

We are approximately 80% complete with seed collection and propagation efforts for Year 1.

2. Task 2- Work & Monitoring Plan

This task has been completed.

3. Task 3- Seeding & Planting

Seeding and planting efforts have not yet commenced. Seeding efforts will begin in Fall 2023 and planting will begin in Winter 2024 or once the plants we have grown from seed are ready for outplanting. We began planning for seeding and planting efforts by conducting site visits to determine optimal locations for seed dispersal and container plants. We are 0% complete with this task.

4. Task 4- Maintenance

During this quarter we continued with maintenance- we completed multiple site visits to hand-pull weeds and determine other management needs. We hosted two volunteer events for weed control and biomass removal- these events took place on 08/09 and 09/11/2023. Volunteer events consisted of hand pulling non-native and invasive species including European sea rocket (*Cakile maritima*), yellow sweet clover (*Melilotus indicus*), crystal iceplant (*Mesembryanthemum crystallinum*), etc. We removed patches of biomass from beach primrose and deerweed at West Basin Dunes. These dead shrubs are being removed to create open sand areas for seeding of rare species in the fall. Maintenance for Year 1 is approximately 75% complete.

5. Task 5- Monitoring

We collected photo points for this quarter during September. Photo-point locations are shown in Appendix A: Map B. Photo monitoring from this quarter is included in Appendix B.

During this quarter we collected data for the 16 vegetation transect data (Appendix A: Map C). We use the same protocol that San Diego Audubon Society used for monitoring on their Coastal Dune Vegetation Enhancement Project- SANDAG contract number: 5004729. This protocol was used so that we could compare our data to another successful project. The vegetation transects involves a combination of point intercept and quadrats. The point intercept data is taken at every 0.25 m along a meter tape that runs for 10 meters. All vegetation is recorded at every 0.25 m, as well as ground cover and a height category. A 1 m sq quadrat is placed at the origin of 1 m, on the left side of the tape, within each quadrat vegetation; sand; bare ground; litter; and rock are designated a percent cover class. Any new species found in the quadrat that were not recorded for point intercept are recorded, we also recorded any additional species found along a 2-meter belt on the transect tape. Photos were taken at the start and end of each transect and are included in Appendix C. Figures 7-9 show the average native vs. non-native cover of the three sites and Figure 10-12 show the average species composition and ground cover of each site. Figures for the native vs. non-native cover of each transect are shown in Appendix D.

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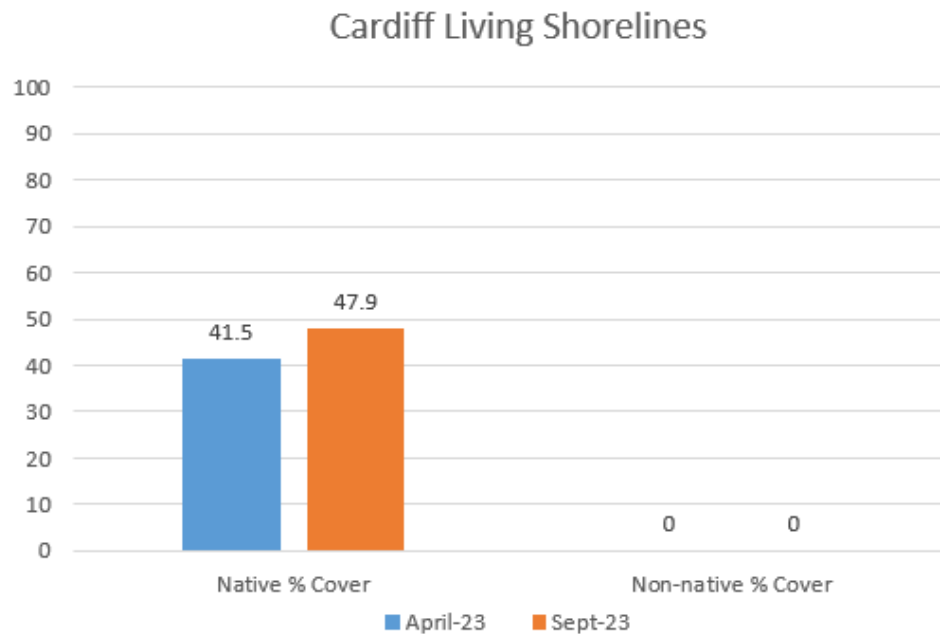


Figure 2. Native vs. Non-native Cover at Cardiff Living Shorelines

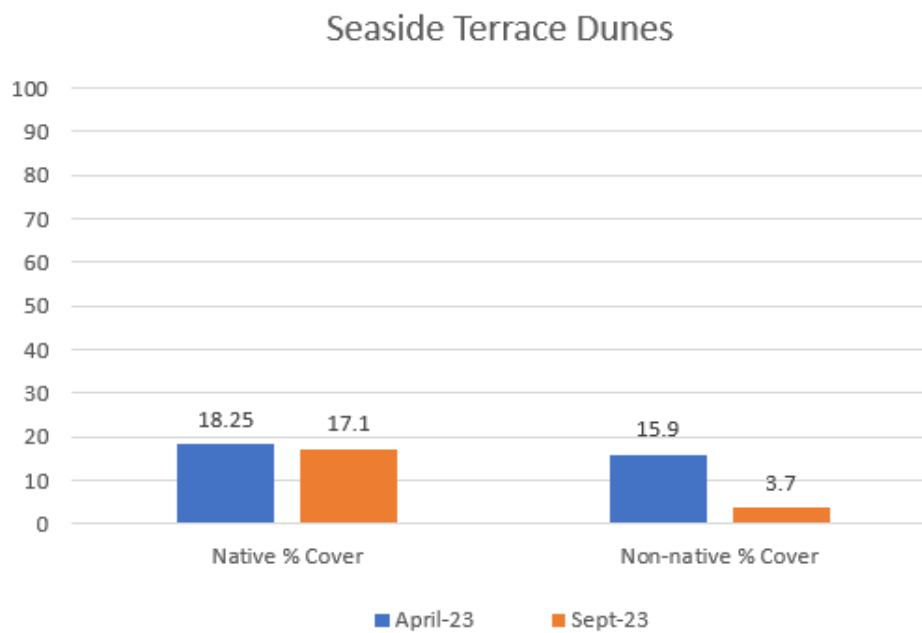


Figure 3. Native vs. Non-native Cover at Seaside Terrace Dunes

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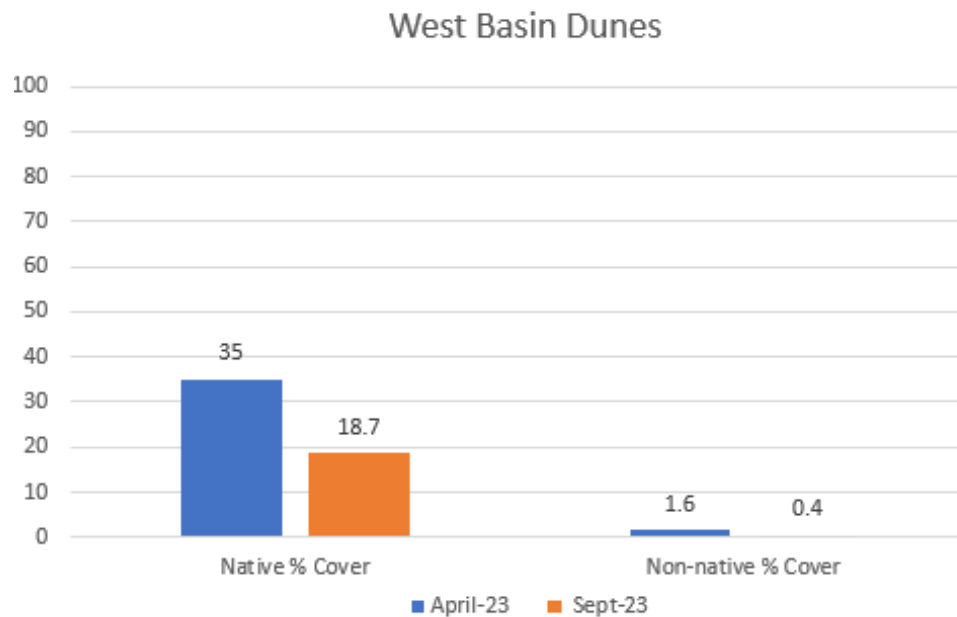


Figure 4. Native vs. Non-native Cover at West Basin Dunes

Cardiff Living Shorelines (CLS) shows a 6% increase in native cover this quarter. Photos 1 & 2 below show that native vegetation has increased cover on its own following winter storms. Seaside Terrace Dunes (STD) has the highest non-native cover and the lowest native cover. This can likely be attributed to winter storms impacting much of the dunes and heavy foot traffic bringing in an influx of non-native species. Sweet clover (*Melilotus indicus*) and burclover (*Medicago polymorpha*) were the prominent non-native species at STD, primarily in areas with high foot traffic. Volunteer events and repeated site visits focused on hand removal of non-native species at STD. Native cover at West Basin Dunes (WBD) is primarily comprised of native annuals (Nuttall's acmispon and coast woolly heads) or drought deciduous perennials, therefore lower native cover during dry months is expected.

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Photo 1. ESC_L1_03_T5 – April 2023



Photo 2. ESC_L1_03_T5 – September 2023

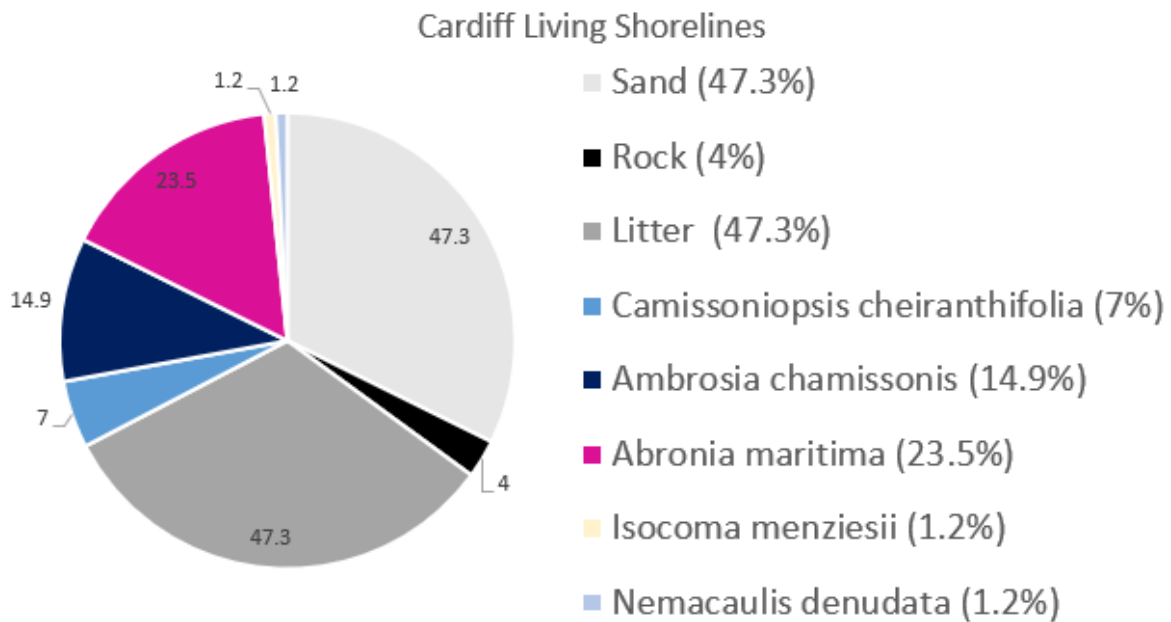


Figure 5. Species Diversity and Ground Cover at Cardiff Living Shorelines

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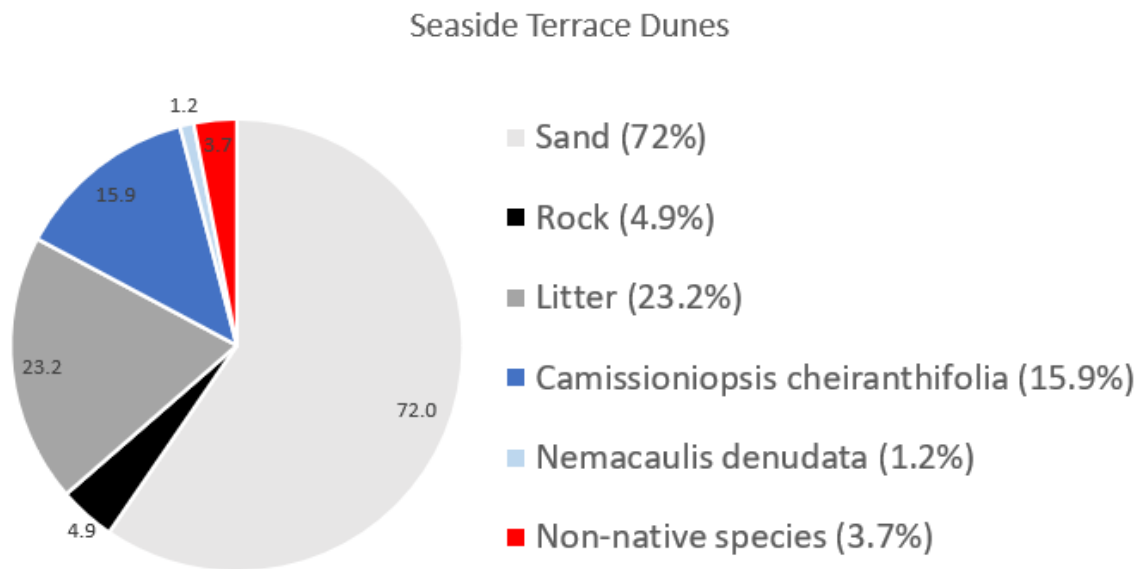


Figure 6. Species Diversity and Ground Cover at Seaside Terrace Dunes

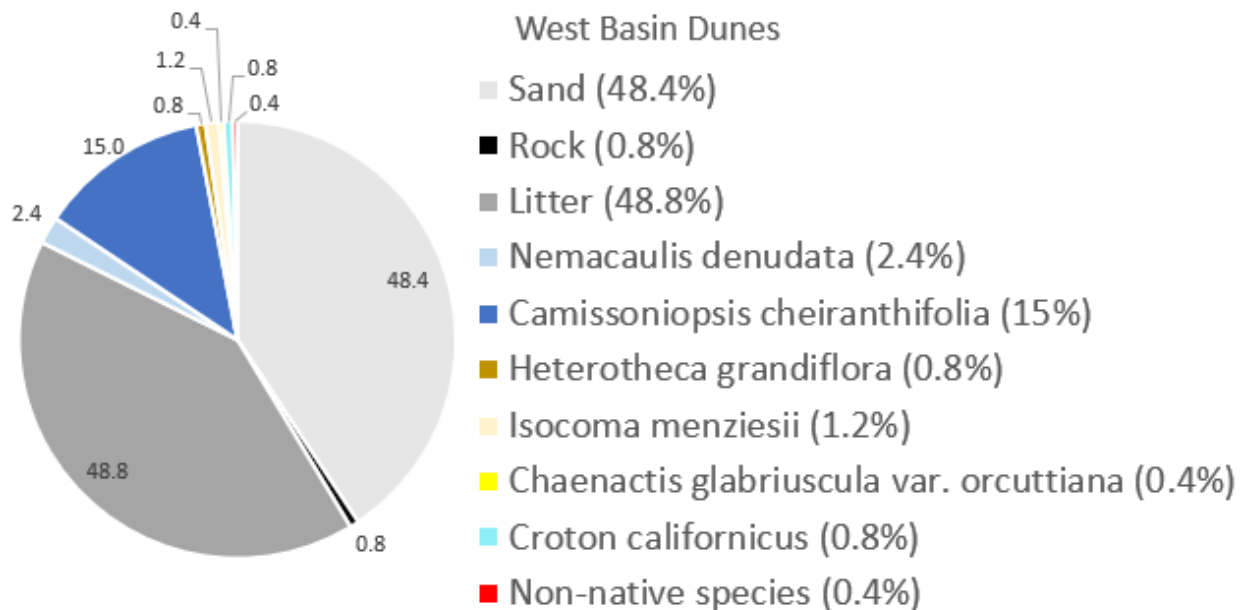


Figure 7. Species Diversity and Ground Cover at West Basin Dunes

Low species richness at CLS and STD is the result of limited species being planted during the implementation of these restoration sites. We expect species richness and diversity to increase following winter planting and seeding efforts. West Basin

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Dunes has the highest species richness, however large patches of biomass or “litter” – as recorded on the transect – were accumulated throughout the site. These patches inhibit the growth of other native species. The majority of this biomass was removed by volunteers this quarter and the remainder of the ground covering litter will be raked before seed is spread in the fall.

We are approximately 85% complete with monitoring for Year 1.

6. Task 6- Reporting & Media

During this period, we have completed quarterly reporting and updated our SDMMP Project Page. We are approximately 70% complete with reporting for Year 1.

7. Task 7- GOIN Program

We have not hosted a GOIN event this quarter. We are 0% complete with this task.

8. Task 8- Administrative

Tito Marchant, Ecology Director/ Project Manager, oversaw and participated in daily planning, project management, invoicing, germination study and restoration tasks during this period. We are approximately 15 % complete with this task.

Work Anticipated Next Period

We will continue with weed control using hand removal methods. We will anticipate spreading seed of sensitive species including Nuttall's acmispon, Orcutt's pincushion, and coast woolly heads according to fall/winter precipitation. We will continue with propagation and the Nuttall's acmispon germination study.

Issues to Note

As stated in the last quarterly report- after project planning began, we determined that we will more than likely not be able to meet two of our performance measures including “*Atriplex coulteri* – 200 individuals restored” and “*Phacelia stellaris*” – 200 individuals restored”. However, we anticipate restoring 400+ individuals of *Chaenactis orcuttiana* ssp. *glabriuscula* (Orcutt's yellow pincushion) to replace those performance measures. Orcutt's yellow pincushion is listed at California Rare Plant Rank 1B.1 – “Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California” and has only 20 presumed extant occurrences in California. (CNPS, RPP 2023) We do not expect to meet the original performance measures due to the lack of seed available to ethically collect from these sensitive species as well as the difficult germination requirements.

Photographs & Figures

All project photo monitoring, transect photo monitoring, project photos, and vegetation transect figures are included in the appendices following this report.

- Appendix B: Photo Monitoring – 09/12/2023
- Appendix C: Transect Photo Monitoring – Baseline
- Appendix D: 2023 Q3 Vegetation Transects Native vs. Non-native Cover
- Appendix E: 2023 Q3 Project Photos

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Performance Measures



2023 Q3
Performance Measur

References

California Native Plant Society (CNPS), Rare Plant Program (RPP). 2023. Rare Plant Inventory (online edition, v9.5). Website <https://www.rareplants.cnps.org> [accessed 20 July 2023].

Appendix A: Maps

Map A: Rare Coastal Dune Species Habitat Restoration Project Overview



Rare Dune Community - Project Overview

Map B: Photo Monitoring Points



Photo Monitoring Points - September 2023

Map C: Transect Monitoring Locations



Transect Monitoring Locations - September 2023

Appendix C: 2023 Q3 Photo Monitoring
09/27/2023



EMP11_PP01



EMP11_PP02



EMP11_PP03



EMP11_PP04



EMP11_PP05



EMP11_PP06



EMP11_PP07



EMP11_PP08



EMP11_PP09



EMP11_PP10



EMP11_PP11



EMP11_PP12



EMP11_PP13



EMP11_PP14



EMP11_PP15



EMP11_PP16



EMP11_PP17



EMP11_PP18



EMP11_PP19



EMP11_PP20



EMP11_PP21



EMP11_PP22



EMP11_PP23



EMP11_PP024



EMP11_PP25



EMP11_PP26



EMP11_PP27



EMP11_PP28



EMP11_PP29



EMP11_PP30



EMP11_PP31



EMP11_PP32

Appendix D: 2023 Q3 Transect Photo Monitoring

09/27/2023



ESC_L1_T1 South facing north



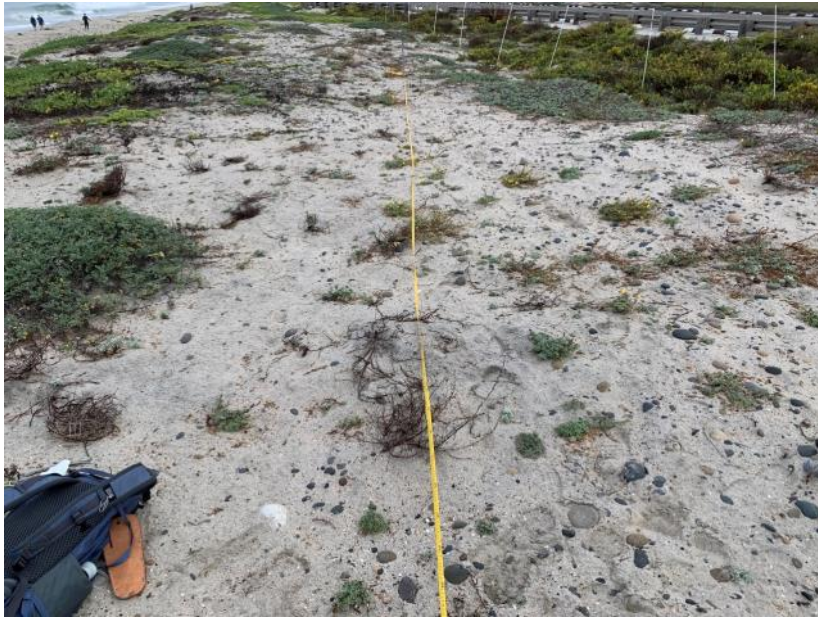
ESC_L1_T1 North facing south



ESC_L1_T2 South facing north



ESC_L1_T2 North facing south



ESC_L1_T3 South facing north



ESC_L1_T3 North facing south



ESC_L1_T4 South facing north



ESC_L1_T4 North facing south



ESC_L1_T5 South facing north



ESC_L1_T5 North facing south



ESC_L1_T6 South facing north



ESC_L1_T6 North facing south



ESC_L1_T7 South facing north



ESC_L1_T7 North facing south



ESC_L1_T8 South facing north



ESC_L1_T8 North facing south



ESC_L1_T9 South facing north



ESC_L1_T9 North facing south



ESC_L1_T10 South facing north



ESC_L1_T10 North facing south



ESC_L1_T11 South facing north



ESC_L1_T11 North facing south



ESC_L1_T12 South facing north



ESC_L1_T12 North facing south



ESC_L1_T13 South facing north



ESC_L1_T13 North facing south



ESC_L1_T14 South facing north



ESC_L1_T14 North facing south



ESC_L1_T30 South facing north



ESC_L1_T30 North facing south



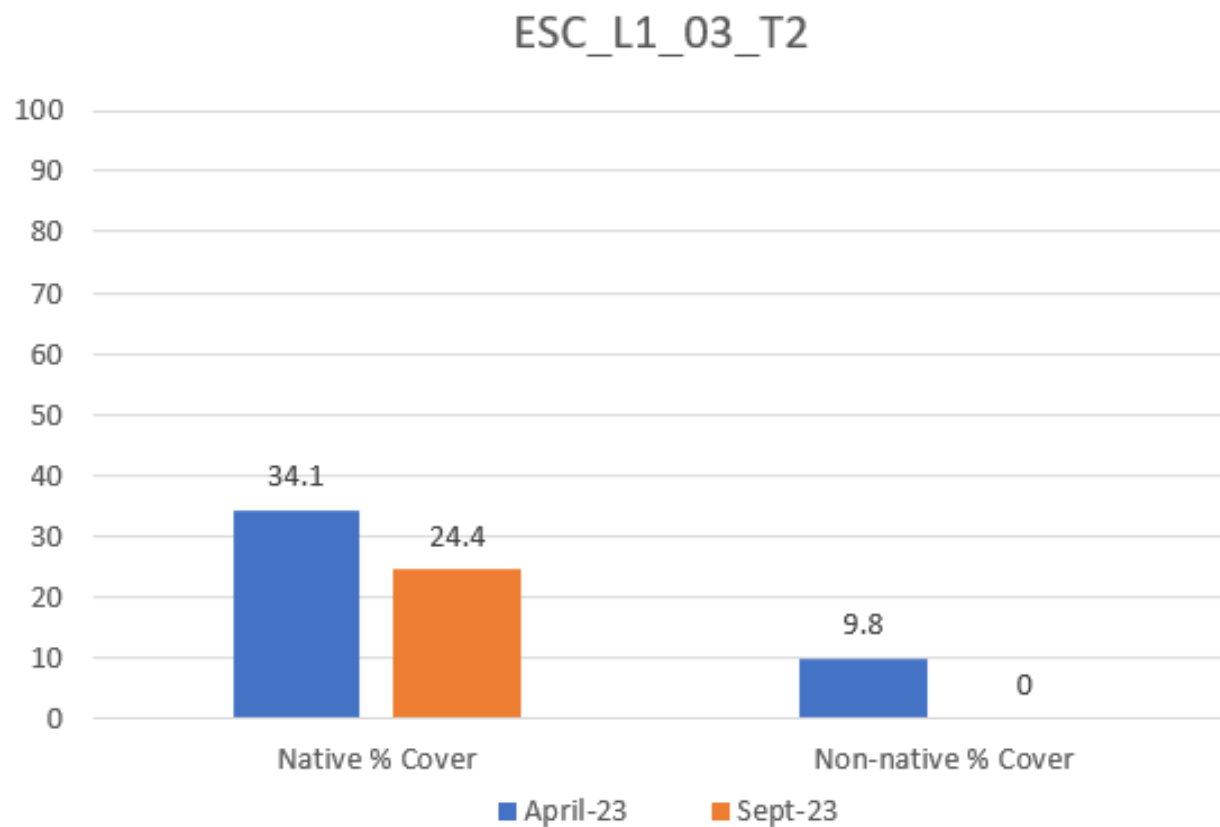
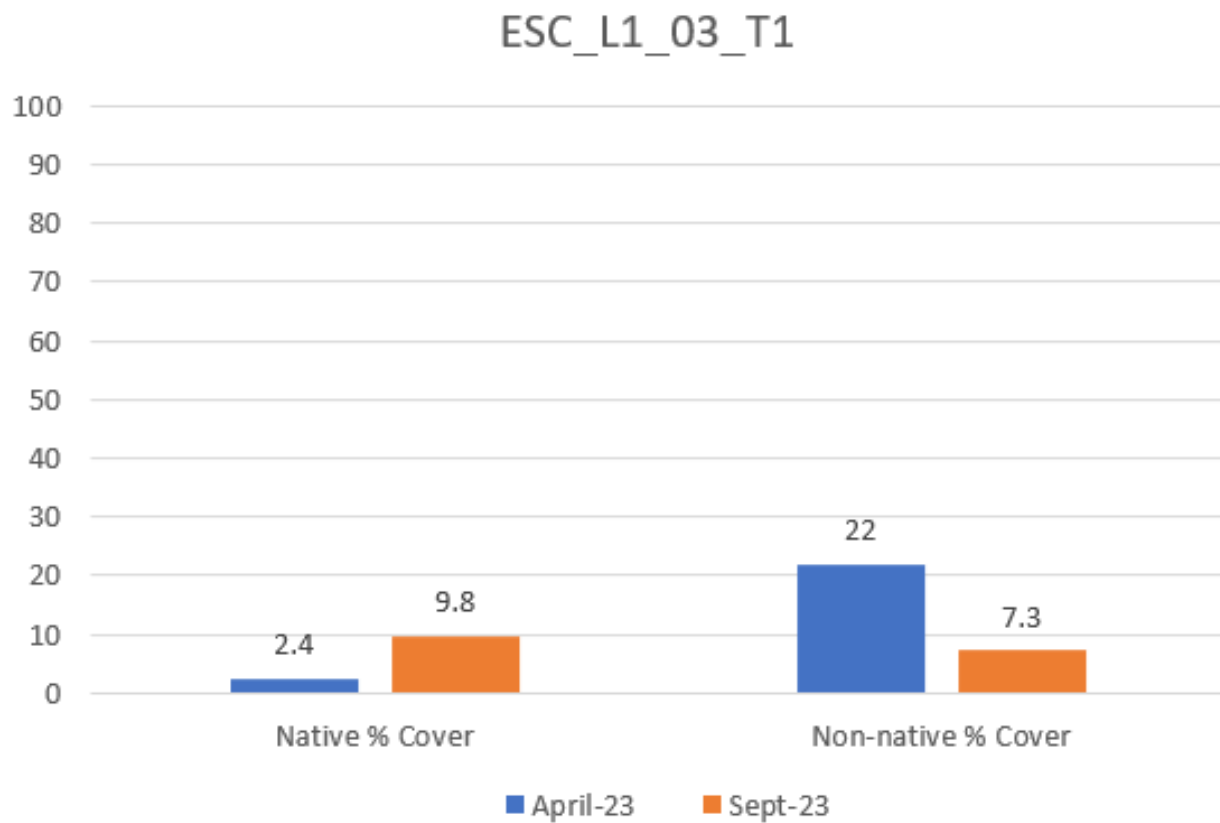
ESC_L1_T31 South facing north



ESC_L1_T31 North facing south

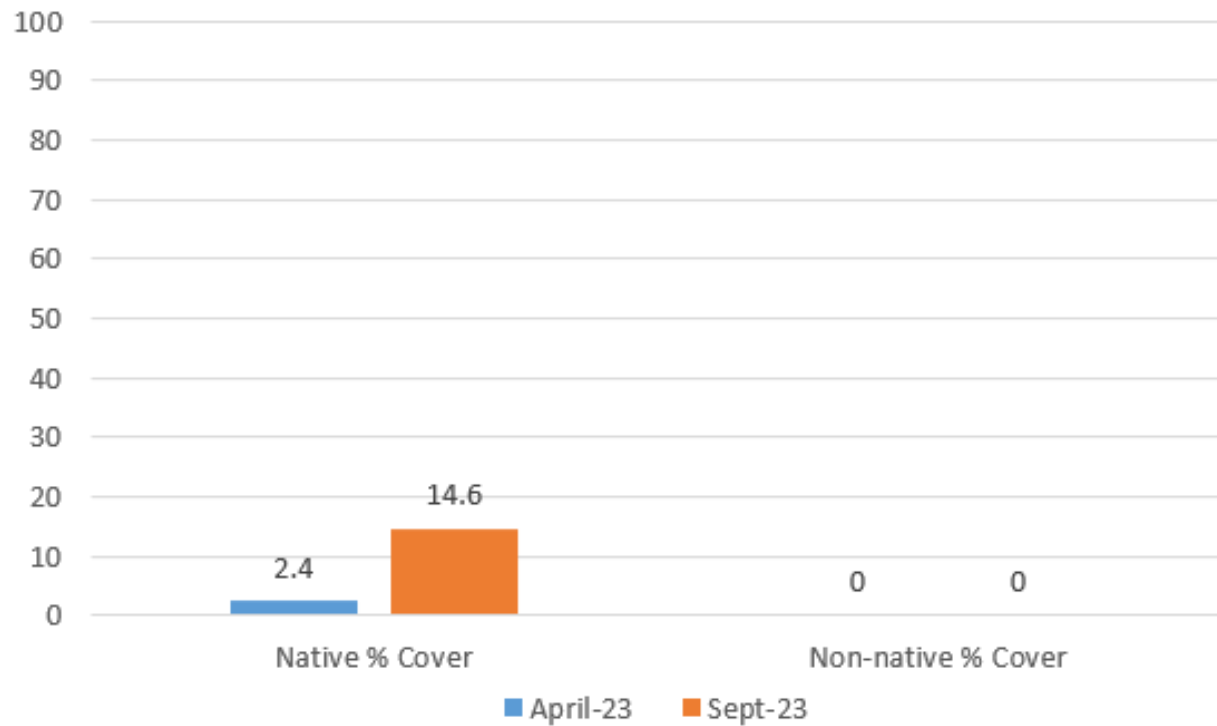
Appendix D: 2023 Q3 Vegetation Transects
Native vs. Non-native Cover

Seaside Terrace Dunes

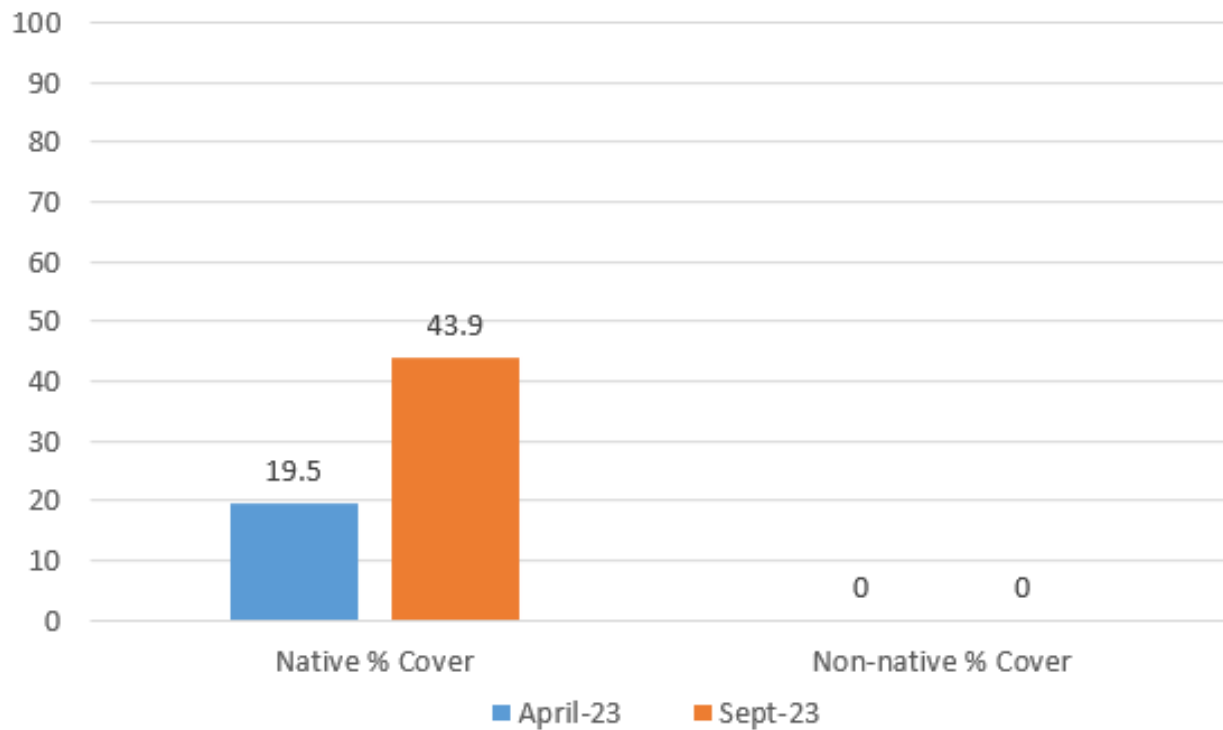


Cardiff Living Shorelines

ESC_L1_03_T3

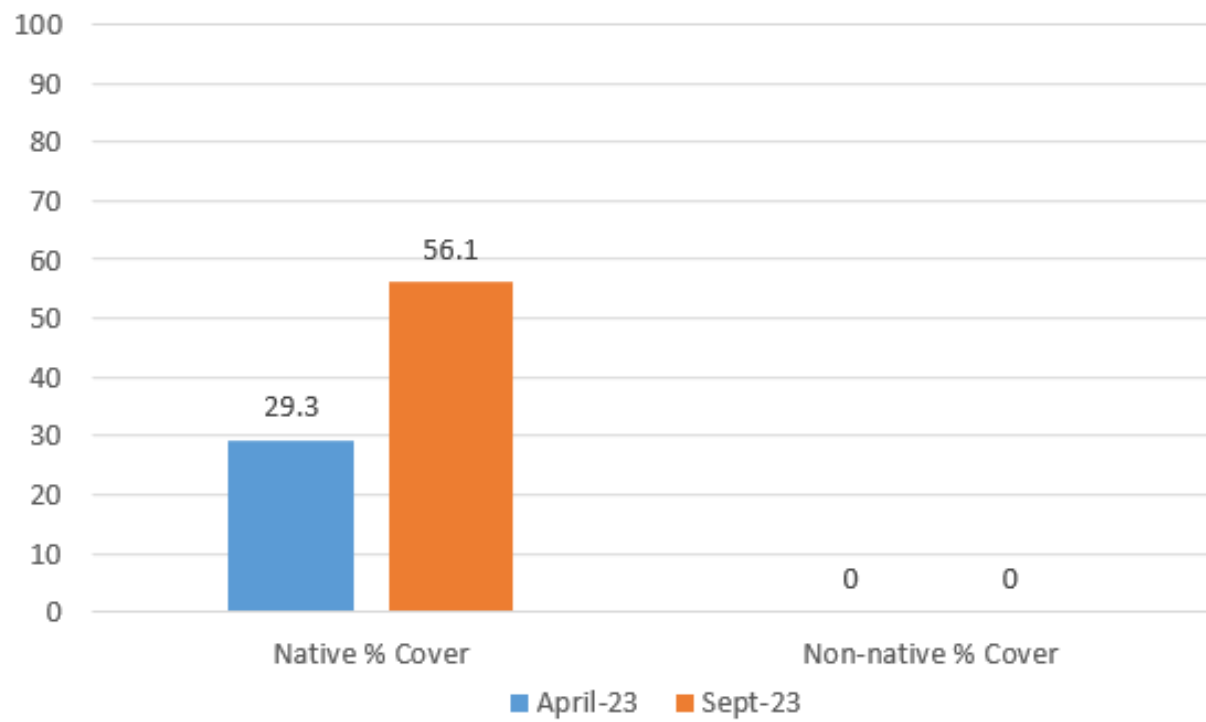


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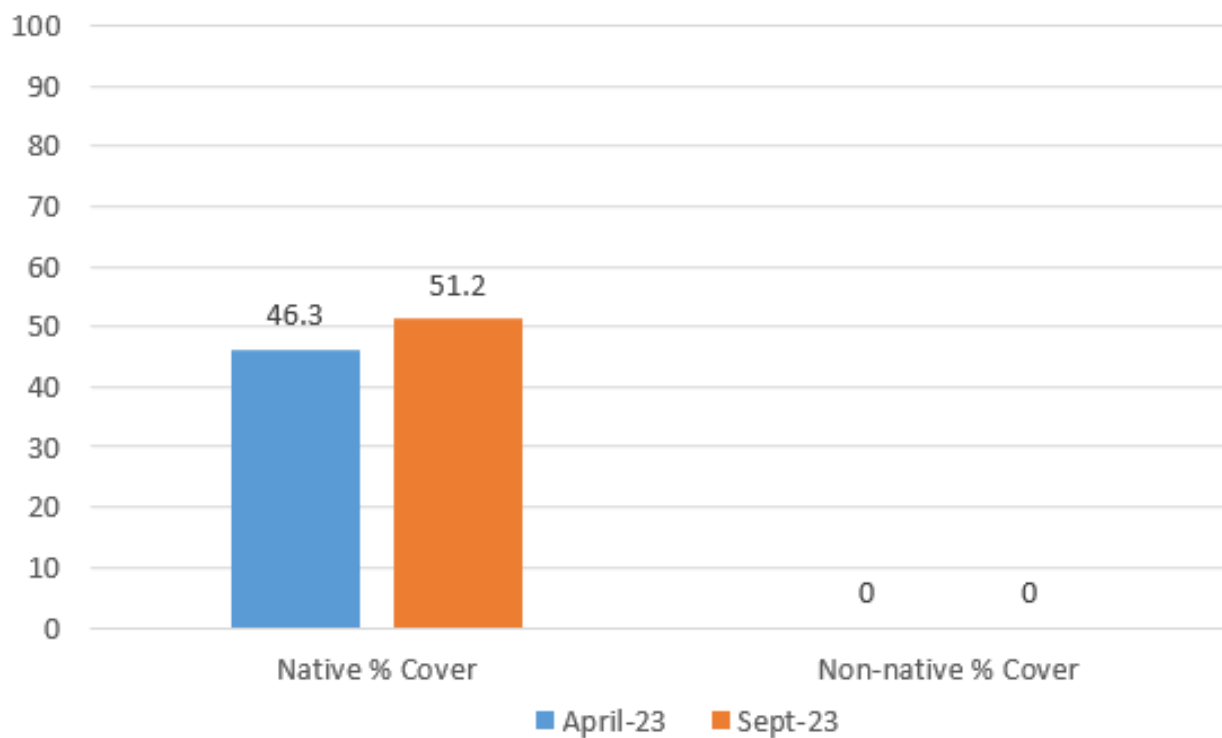


Cardiff Living Shorelines

ESC_L1_03_T5

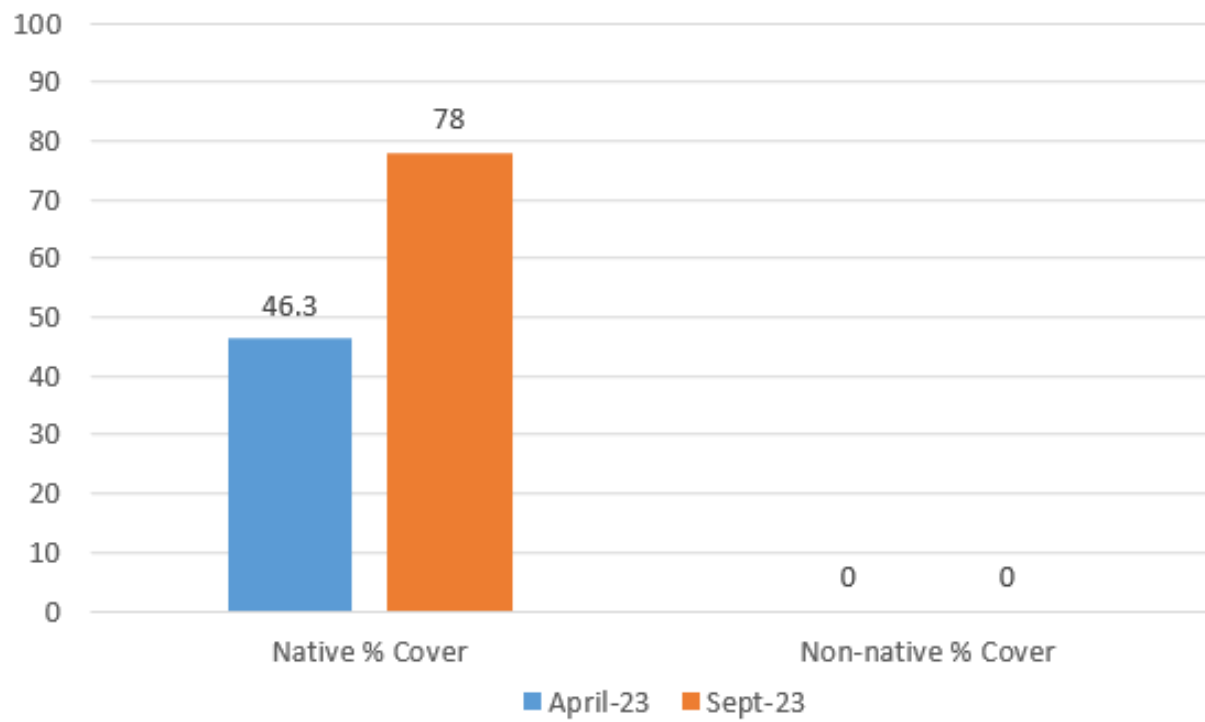


ESC_L1_03_T6

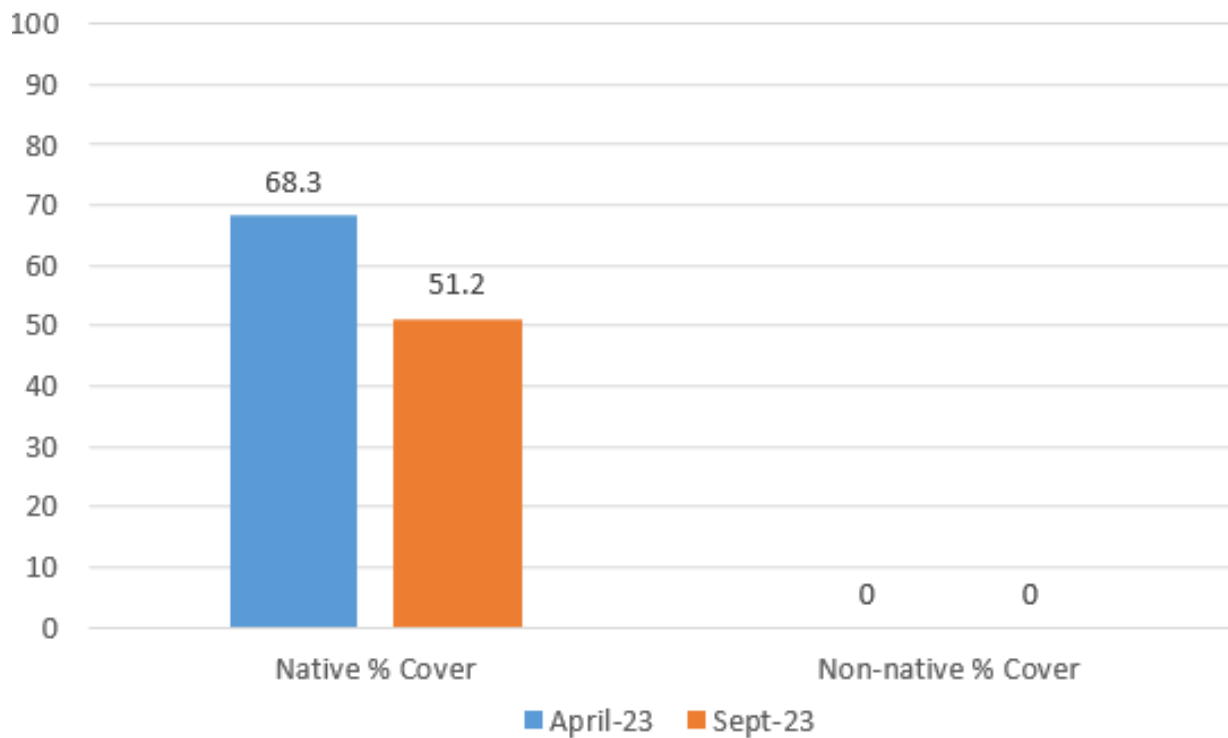


Cardiff Living Shorelines

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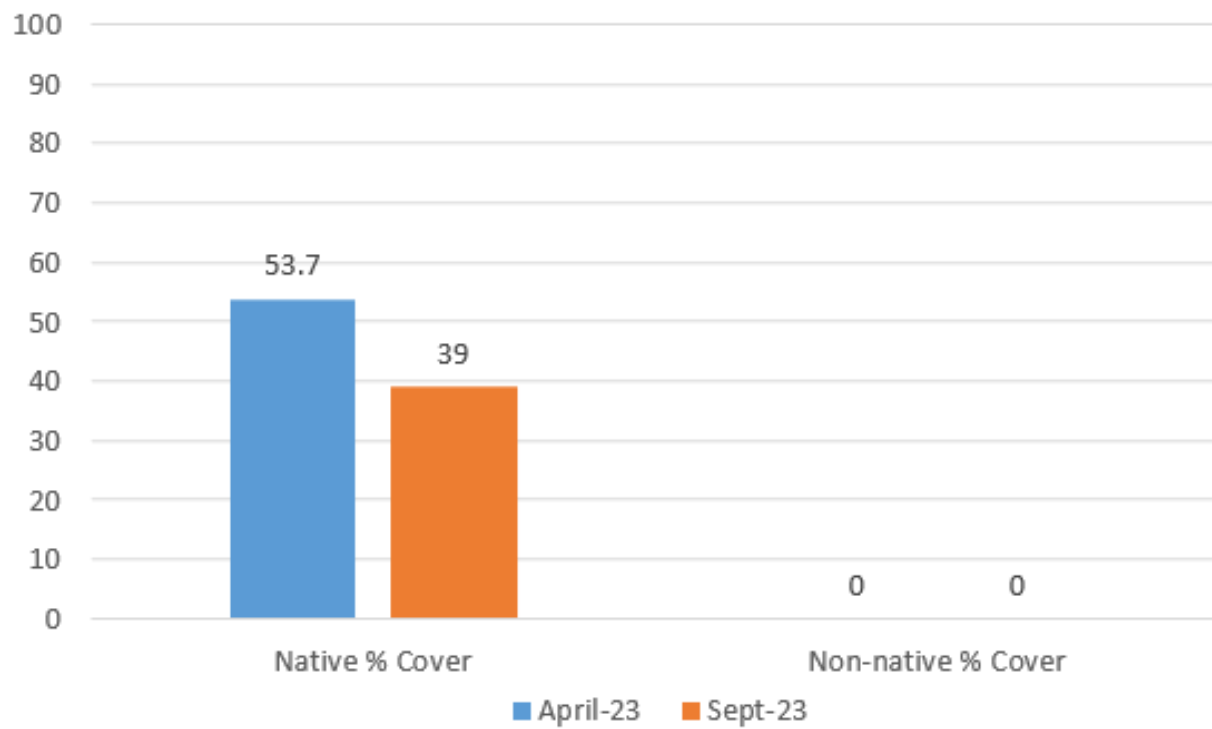


ESC_L1_03_T8

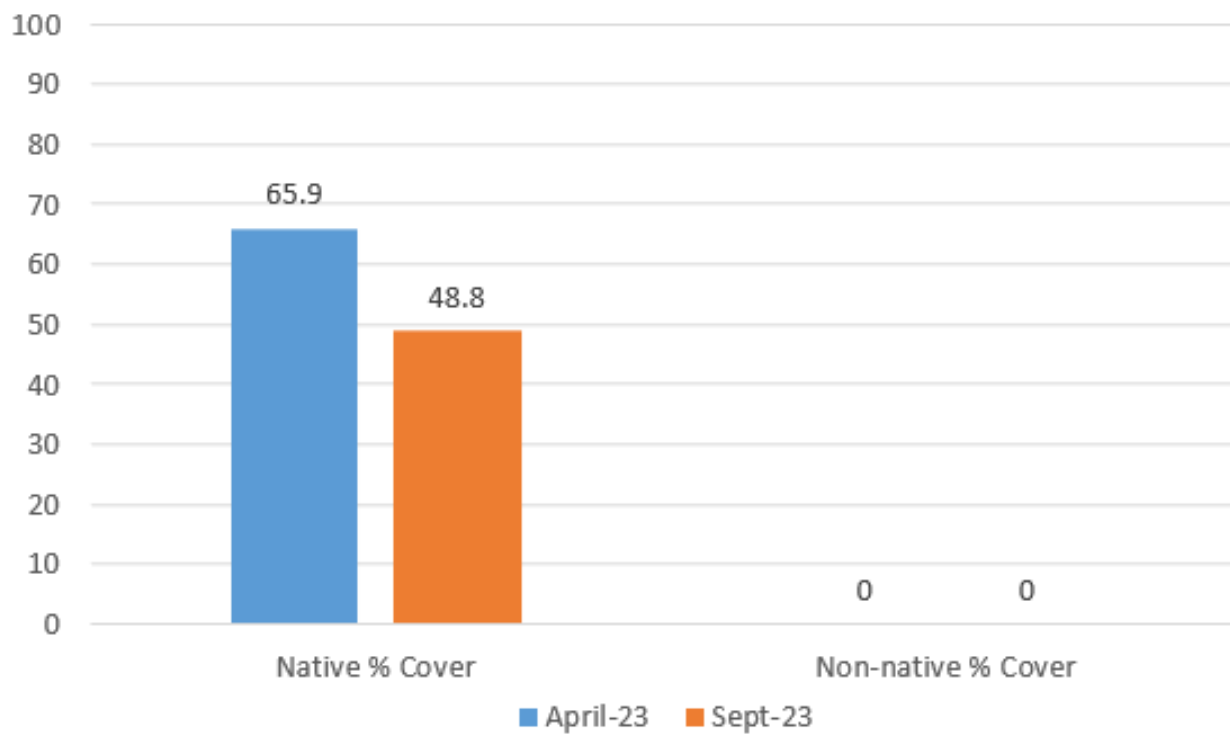


Cardiff Living Shorelines

ESC_L1_03_T9

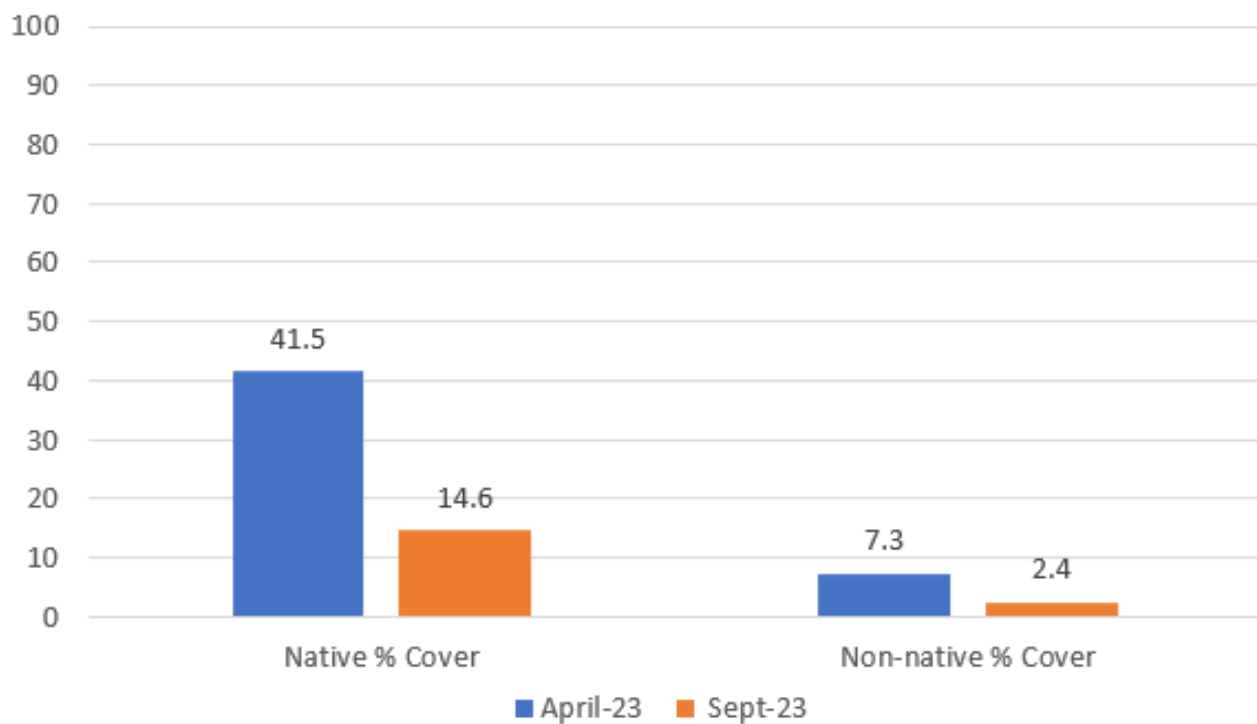


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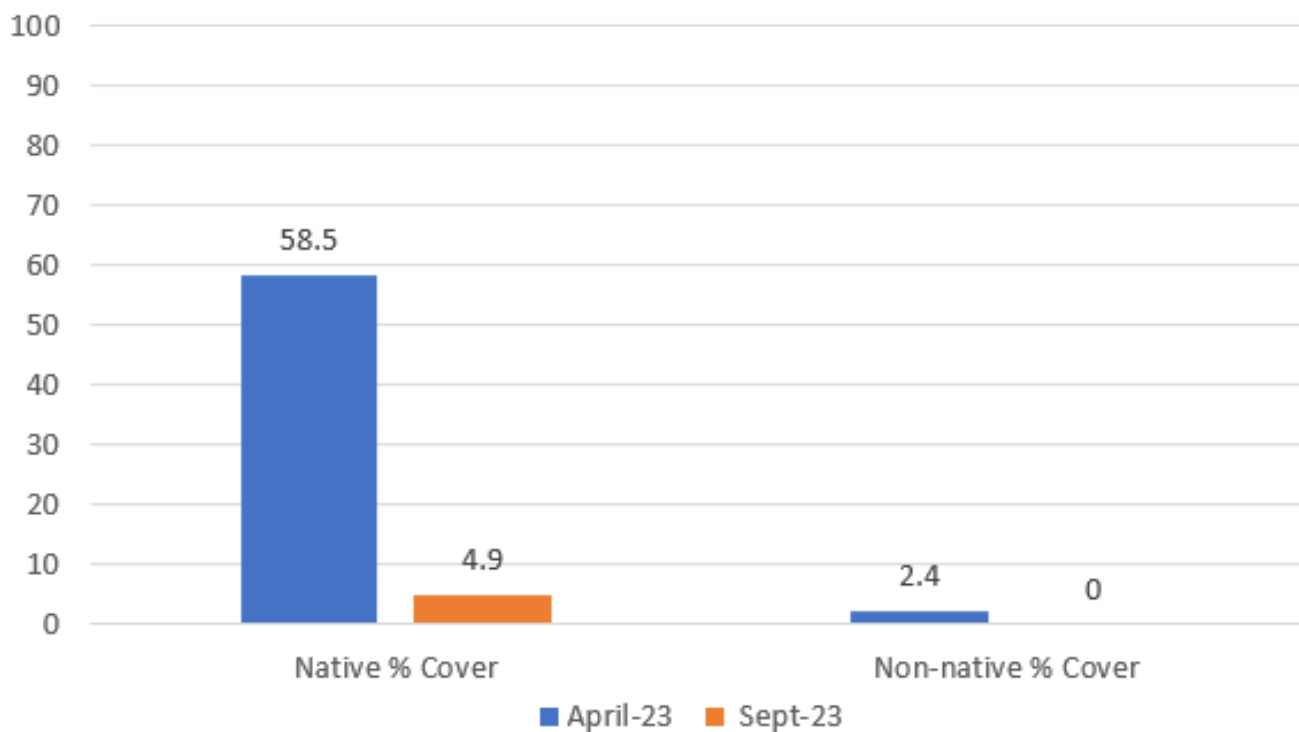


West Basin Dunes

ESC_L1_03_T11

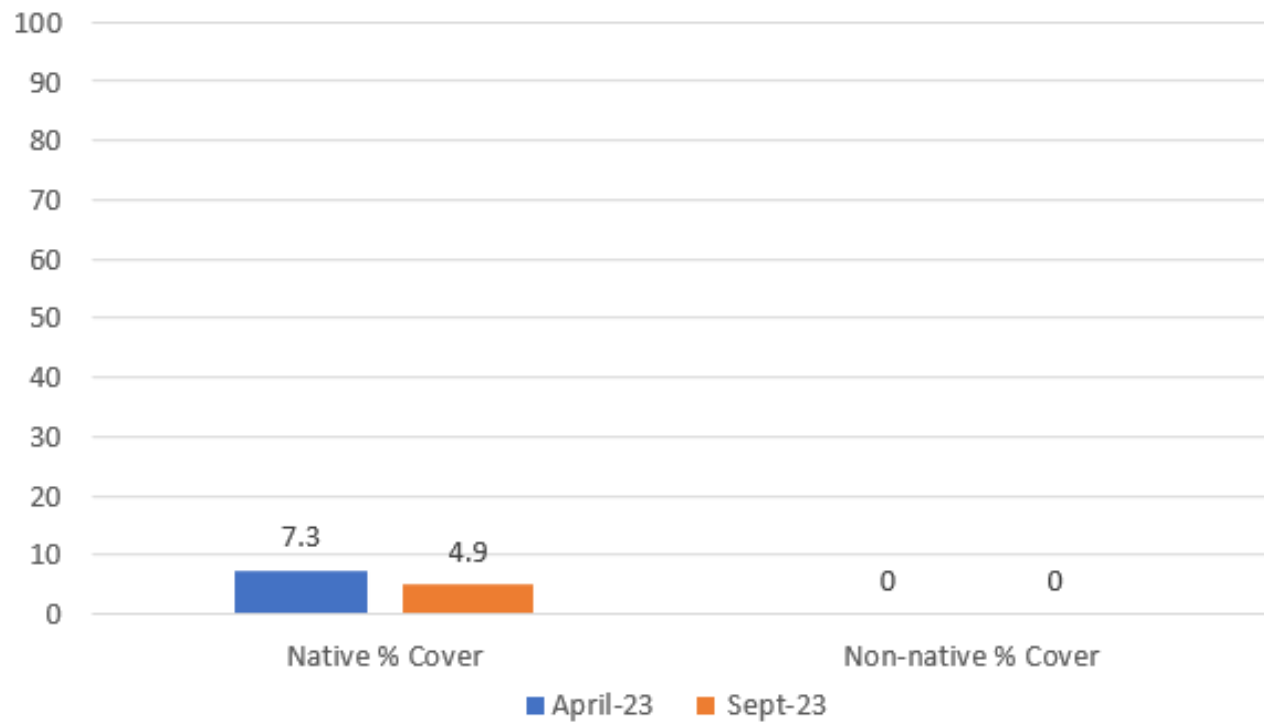


ESC_L1_03_T12

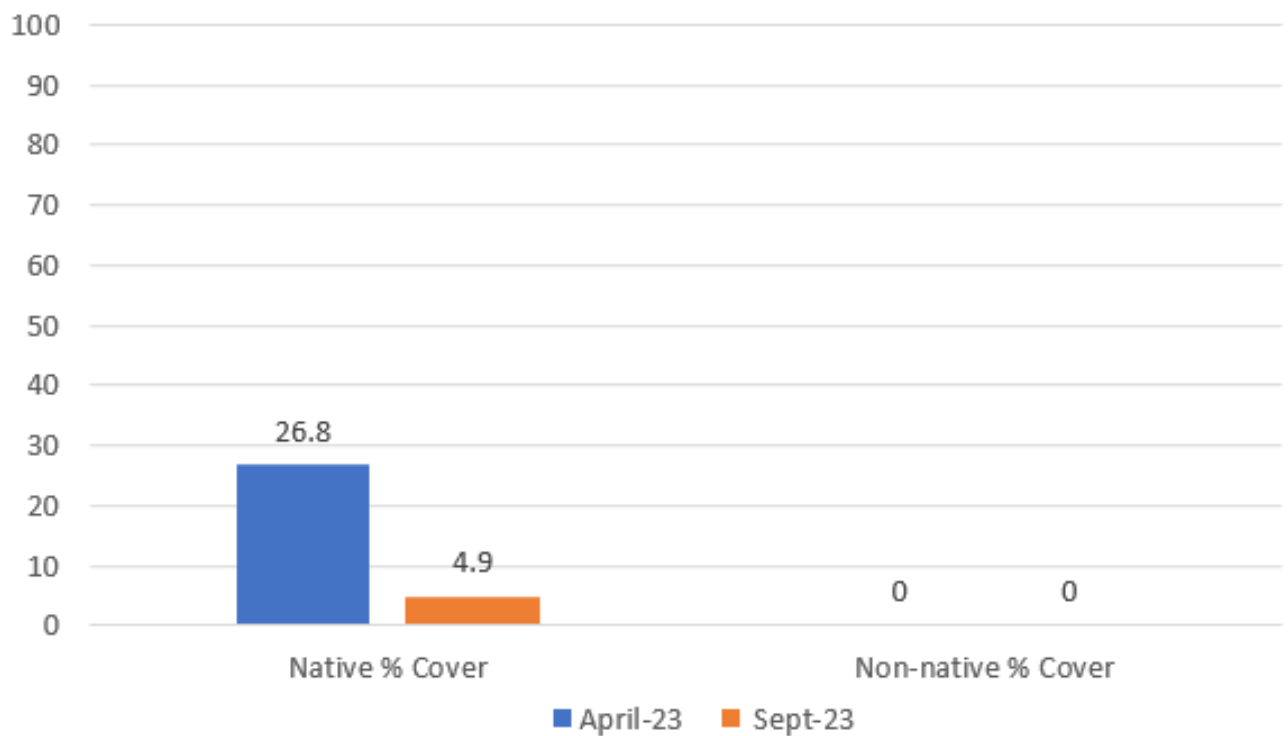


West Basin Dunes

ESC_L1_03_T13

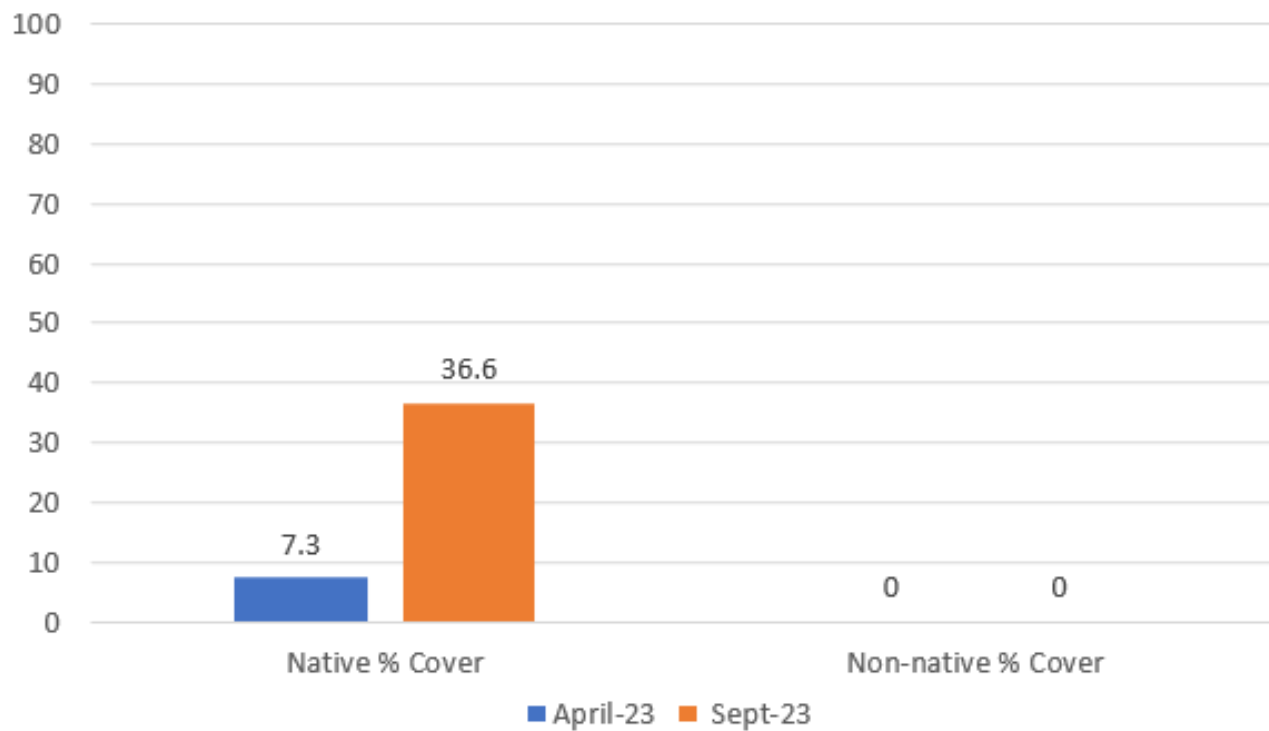


ESC_L1_03_T14

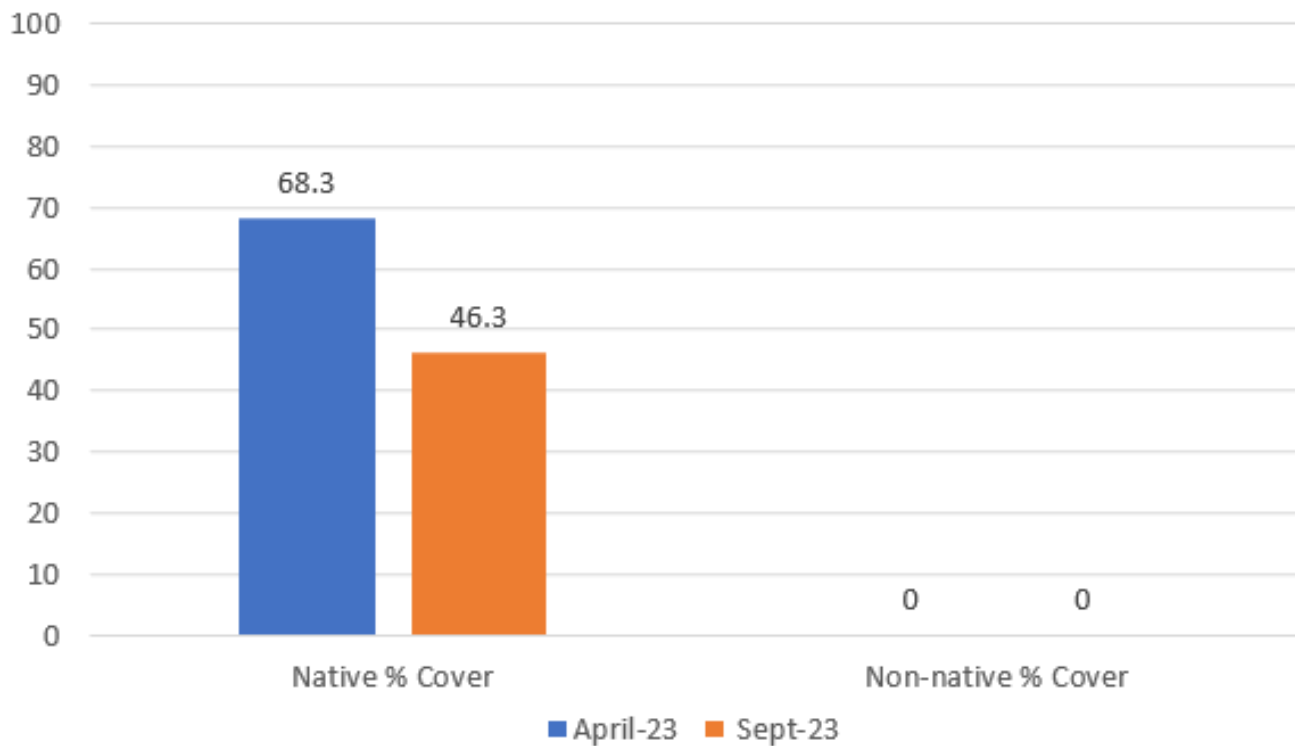


West Basin Dunes

ESC_L1_03_T15



ESC_L1_03_T16



Appendix E: 2023 Q3 Project Photos



Photo 1. Beach evening primrose growing from seed at Nature Collective's nursery



Photo 2. Before biomass removal at West Basin Dunes



Photo 3. After biomass removal at West Basin Dunes



Photo 4. Volunteers removing biomass at West Basin Dunes



Photo 5. Volunteers removing biomass at West Basin Dunes



Photo 6. Bags of biomass being removed from West Basin Dunes



Photo 7. Cleaning Nuttall's acmispon (*Acmispon prostratus*) at Nature Collective's nursery

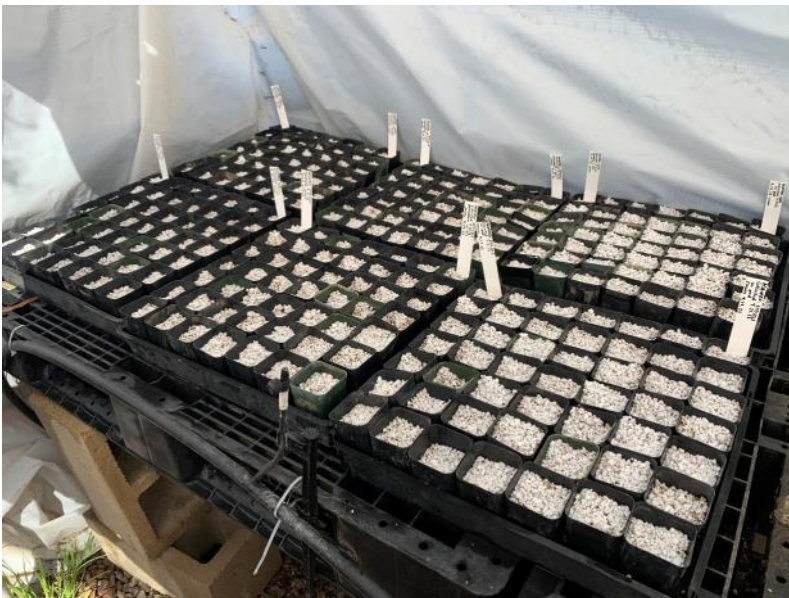


Photo 8. Nuttall's acmispon (*Acmispon prostratus*) germination study set up



Photo 9. Nature Collective staff collecting vegetation transect data