

CALIFORNIA COASTAL COMMISSION

South Coast Area Office
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F13a

5-15-1427-A1 (CALIFORNIA DEPT. OF FISH & WILDLIFE)

AUGUST 11, 2017

EXHIBITS

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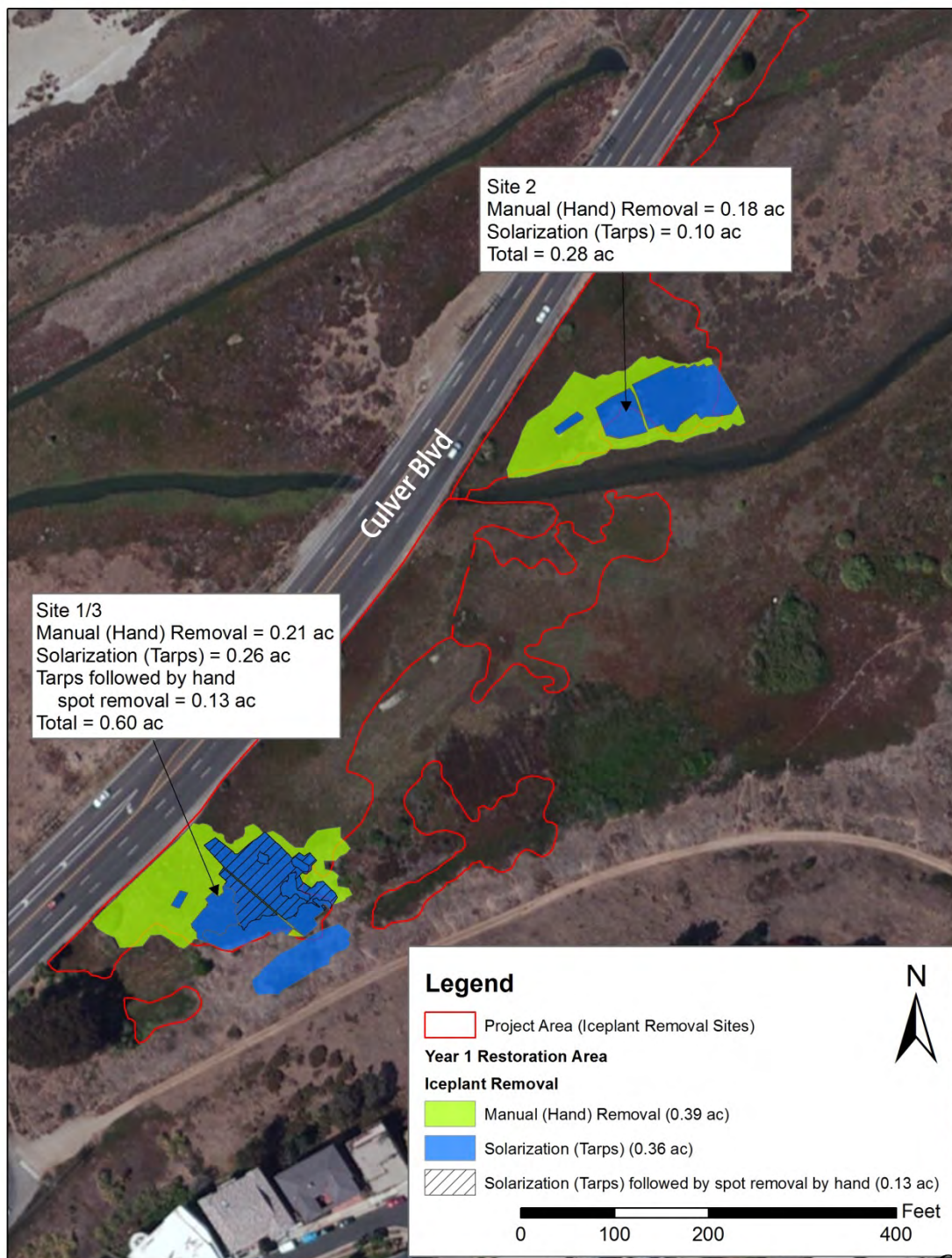


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5-15-1427-A1

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5-15-1427-A1

California Coastal Commission
South Coast Area Office
200 Oceangate, Suite 1000
Long Beach, CA 90802-4302

20 March 2017

Subject: Support Letter to amend CDP Permit #5-15-1427 for the Invasive Plant Removal Project at Ballona Wetlands Ecological Reserve

Dear California Coastal Commission:

In the Fall of 2016, The Bay Foundation completed the first phase of the iceplant removal project at the Ballona Wetlands Ecological Reserve (Reserve), which was funded by the Southern California Wetland Recovery Project's Community Wetland Restoration Grant Program in partnership with California Department of Fish and Wildlife (CDFW) and Friends of Ballona Wetlands. I was asked to conduct pre- and post-monitoring of birds for this project, and I'm familiar with the bird of the Ballona Wetlands from more than two decades of fieldwork and birding there.

The first phase of the project was successful and TBF removed over 15 tons of iceplant (more than 200 cubic yards) from the restoration area. In total, 0.88 acres were restored through iceplant removal from September to December 2016. Challenges that this project faced included the early-onset rains and restrictive timing on permit conditions, forcing the tarps to be pulled prior to full desiccation of iceplant in some areas. Extending the duration of tarp placement would likely result in full desiccation of the iceplant. A higher percentage of desiccated iceplant area could be easily achieved for future projects by amending the implementation start date on CDP Permit #5-15-1427 from 1 September to **1 August** and extending the end of the permit from February 1 to **March 15**. This would allow tarping methods to more efficiently desiccate iceplant, allow for targeted weed removal in early spring, and make efforts more cost-effective. Additionally, the tarps have a current maximum deployment period of two months; however, extending that time period to three months, combined with the earlier start date would allow for maximum efficiency.

Based on my experience, the area of iceplant removal is used to a limited extent by Belding's Savannah Sparrow and other local birds. From 2009-2012 I conducted quarterly area-search surveys of the entire Ballona Wetlands, and did not observe breeding in the area south of Culver Blvd. Most of the breeding was (and continues to be) north of Culver, with a handful of birds using the much more extensive habitat well east of the iceplant area, between the Ballona Freshwater Marsh and the road leading to The Gas Company facility. Furthermore, based on my surveys, the vast majority of breeding activity of the Belding's Savannah Sparrow occurs later in spring than mid-March, with birds establishing territories in late March, incubating in April, feeding young in May and June. By July, essentially the entire population is highly mobile, with first-year birds moving throughout the entire Ballona Wetlands area

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and not especially dependent on saltmarsh habitat. Thus, by August, there is really no danger of affecting nesting Belding's Savannah Sparrow (or any other locally-breeding bird species here).

Please consider approving and moving forward with amending the implementation dates of CDP Permit #5-15-1427.

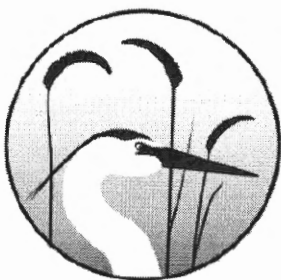
Sincerely,



Daniel S. Cooper
President, Cooper Ecological Monitoring, Inc.

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Ballona Wetlands Land Trust

May 2, 2017

Mandy Revell
Coastal Program Analyst
California Coastal Commission
South Coast Office
200 Oceangate, 10th Floor
Long Beach, CA 90802

Via Email: Mandy.Revell@coastal.ca.gov

RE: Opposition to Amendment to Coastal Development Permit No. 5-15-1427

Dear Ms. Revell,

As we have discussed via e-mail and telephone, starting with our phone conversation on April 3, the Ballona Wetlands Land Trust ("Land Trust") currently opposes the request by The Bay Foundation ("TBF") for an amendment to Coastal Development Permit No. 5-15-1427 ("the CDP"). The amendment request was apparently submitted to the California Coastal Commission ("Commission") on March 29, 2017 and received by the Commission on April 4, 2017. However, the Land Trust would be prepared to support the amendment request under certain conditions that are further detailed in this letter.

TBF's Executive Director, Tom Ford, has kindly scheduled a meeting with me on May 9, at which time we will hopefully find some common ground regarding how to move forward with this project. In the meantime, it is important for the Commission to treat the requested amendment as controversial, and not to simply grant staff approval without additional public discussion. That public discussion should include, if necessary, a hearing before the Commission.

Background

In 2015, TBF was awarded a \$28,000 grant from Earth Island Institute to remove invasive Iceplant from a portion of the Ballona Wetlands Ecological Reserve, in partnership with the landowner, the California Department of Fish and Wildlife ("CDFW"). On July 10, 2015, TBF and CDFW requested a permit exemption from the Commission which was denied by Commission staff on July 14. In December 2015, TBF began actively soliciting various entities to write letters to the Commission in support of their project. Many of these letters were from entities that have provided consulting services to TBF. Because TBF drafted a sample letter and encouraged entities to "feel free to just pop your logo on and sign," most of the letters contained nearly identical language and were generally not the result of independent analysis from the

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The Ballona Wetlands Land Trust | P.O. Box 5623 | Playa del Rey, CA 90295

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entities who sent them.

At the same time that TBF was soliciting these letters of support, TBF did not make a similar effort to inform the Land Trust about the project, even though TBF knew the Land Trust was an actively interested party. The Land Trust became aware of the project from a local newspaper article on March 2, 2016. As a result of this one-sided outreach, the staff report presented to the Commission contained approximately fifteen letters of support for the project, and not a single letter raising any concern about the project's implementation. The Commission approved TBF's permit by a 6-4 vote. Several Commissioner's encouraged TBF to do a better job of contacting public stakeholders in the future.

The project description included in the staff report to the Commission is as follows: "Removal of invasive Iceplant from a 3 acre area within the Ballona Wetlands Ecological Reserve south of Culver Blvd., utilizing solarization techniques over a two month time period. **Project area to be restored through natural native species recruitment, and some container plantings if necessary.**" (emphasis added). In September and October of 2016, TBF oversaw the removal of Iceplant from .88 acres of the 3 acres that were permitted under the CDP. Despite the Land Trust's concerns about the lack of communication prior to the March 2016 permit hearing, the Land Trust assisted with the Iceplant removal effort by discussing the project in our e-mail newsletter and contributing volunteer time.

In early January, various observers began noticing non-native plants emerging at the project site. On January 26, 2017, after my own observations of non-native growth at the project site, I contacted TBF's project manager by e-mail to report the emergence of non-native species and to inquire about what steps were being considered in response. I received no response to that e-mail or to multiple subsequent communications, including offers of financial assistance, until being contacted by Mr. Ford on April 21. Despite the encouragement by certain Commissioners for TBF to more proactively communicate with all stakeholders, the Land Trust only learned of the CDP amendment request in my April 3 telephone call with you. Certain extenuating circumstances contributed to this lack of communication, but do not justify it.

As of this writing, the impacted .88 acre area remains largely overrun with at least 10 different non-native species of vegetation, including returning Iceplant, Euphoria Terracina, Wild Radish, Castor Bean, Sweet Clover, Oxalis and others. Despite the current state of the .88 acres already impacted, TBF stated in a letter attached to its amendment request that "In total, 0.88 acres **were restored** from September to December 2016." (emphasis added). This statement is simply false by any reasonable definition of restoration, but specifically according to the definition provided in the project description of the Commission's staff report, i.e. the return to native habitat.

Concerns Regarding, and Opposition to, the CDP Amendment Request as Currently Written

The Commission was not well served by the March 2016 permit hearing, which was highly polarized and which included very little substantive discussion of how the project would actually

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achieve its stated goals. In addition to claims by members of the public that did not include supporting scientific evidence, TBF and Commission staff were overly confident in their testimony to the Commission about the likelihood of native species recruitment and downplayed the potential for non-native invasion of the project site. The project approach was repeatedly billed as the product of "tried and true" science, even though the relevant data and literature called for a more tempered optimism and contingency plans.

Specifically, erroneous claims were made that a 2008 tarping project at Ballona had successfully eradicated Iceplant from the 2008 project site, but those claims were based on an inaccurate recollection as to where that project had actually been implemented. Records obtained by the Land Trust and shared with the project team demonstrate that the 2008 project achieved mixed results, resulting in both native and non-native species, but not the eradication, or near eradication of Iceplant. Commission staff asked for, but were never provided, a success report for that project. Neither TBF nor Commission staff possessed any documentation to support the claims about the 2008 project.

Additionally, important information was omitted from the staff report which, had it been provided to the Commission, would have very likely resulted in additional or different special conditions for the CDP. For example, an early draft of TBF's project work plan indicated that "[a]dditional follow up will occur throughout the wet season and early spring to assess native plant recruitment and the need for another weeding event(s) in the spring." Although TBF recognized that wet season monitoring and possible spring weeding events were a best practice, spring weeding events are specifically prohibited by Special Condition 1 – Timing of Operations. The Land Trust has not yet seen any data from monitoring between December and the present, including any data compiled during quarterly monitoring protocols mandated by the implementation and monitoring plan. (Note: I have been told that monitoring data will be shared at or prior to the scheduled May 9th meeting). It is unclear why TBF is only now seeking to remove the seasonal weeding restriction, rather than providing the Commission with the relevant information (such as the letter from the project's ornithologist based on 2012 data) for its initial consideration. To the Land Trust, this feels like a "bait and switch," where the project was approved based on a highly confident pitch to the Commission, but now requires amendments to address factors of which TBF was already aware at the initial CDP hearing.

The Commission staff report also alluded to a seed bank analysis but did not provide any details of that analysis. However, other documents published by TBF seem to indicate high variability of the seed bank based on habitat, and that non-native species were also present in the seed bank surveys, sometimes in higher numbers than native species. The staff report also suggested that "desiccated Iceplant material will act as natural mulch in the restoration areas, which will help to control non-native species invasions," but many of the invading non-native plants are currently growing directly from the desiccated Iceplant.

Also with regard to timing of operations, TBF's final project report to its funding source indicates that tarping failed to desiccate Iceplant in significant areas of the project site. TBF's amendment claims that "[a] higher percentage of desiccated Iceplant area could be easily achieved for future projects by amending the implementation start date on CDP

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1427 from 1 September to 1 August.” While it may seem like common sense that a longer tarping period would achieve some increase in desiccation, the Land Trust is troubled by the lack of any scientific analysis to support this assertion, and by the lack of explanation as to why TBF did not make this case to the Commission initially, so as to prevent the special condition they are now trying to amend. Once again, an overly simplistic approach threatens to gloss over important questions about what other factors may have impeded desiccation and whether the timing of operations restriction might not still be detrimental to project success.

For all of these reasons, the Land Trust believes that simply granting TBF an amendment, without any additional conditions, would simply compound the problem at the project site. The Land Trust further believes that this amendment request provides an opportunity to correct the procedural shortcomings of the initial permit hearing, by requiring substantive discussion of the nuances of habitat restoration.

That said, the Land Trust supports, and wishes to assist with, the removal of non-native species that have invaded the existing project site. Therefore, the Land Trust is prepared to support the removal of the seasonal weeding restriction from the CDP if the following additional conditions are met:

- TBF publishes all monitoring data compiled to date, so as to identify all native and non-native species that have emerged at the project site, and the extent of vegetation cover for each species.
- TBF creates a reasonably detailed management plan which accounts for the variability in different species to be addressed, including root systems, propagation methods, best practices for removal, etc.
- The management plan would also analyze the benefit of using container plantings of native species from the approved palette and other strategies for improving conditions for native species and mitigating against additional non-native invasion.
- TBF agrees to extend the current two year monitoring period to five years, consistent with Commission norms and with the viability of non-native species currently present at the project site.
- TBF creates a multi-year budget to implement the updated management plan, and indicates sources of funding to support that budget.
- TBF agrees to postpone any additional tarping efforts on the 2.12 acres remaining on the CDP until such time as a reasonable degree of progress is achieved in converting the .88 acres already impacted to native habitat, pursuant to the project description.

It is important to note that the Land Trust is eager to assist in these efforts both with additional funding and staff and volunteer time. We are committed to a positive outcome for this important ecological reserve and we believe that such an outcome can be achieved by working together openly and collaboratively.

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In closing, we respectfully request that the above mentioned conditions be attached to any CDP amendment.

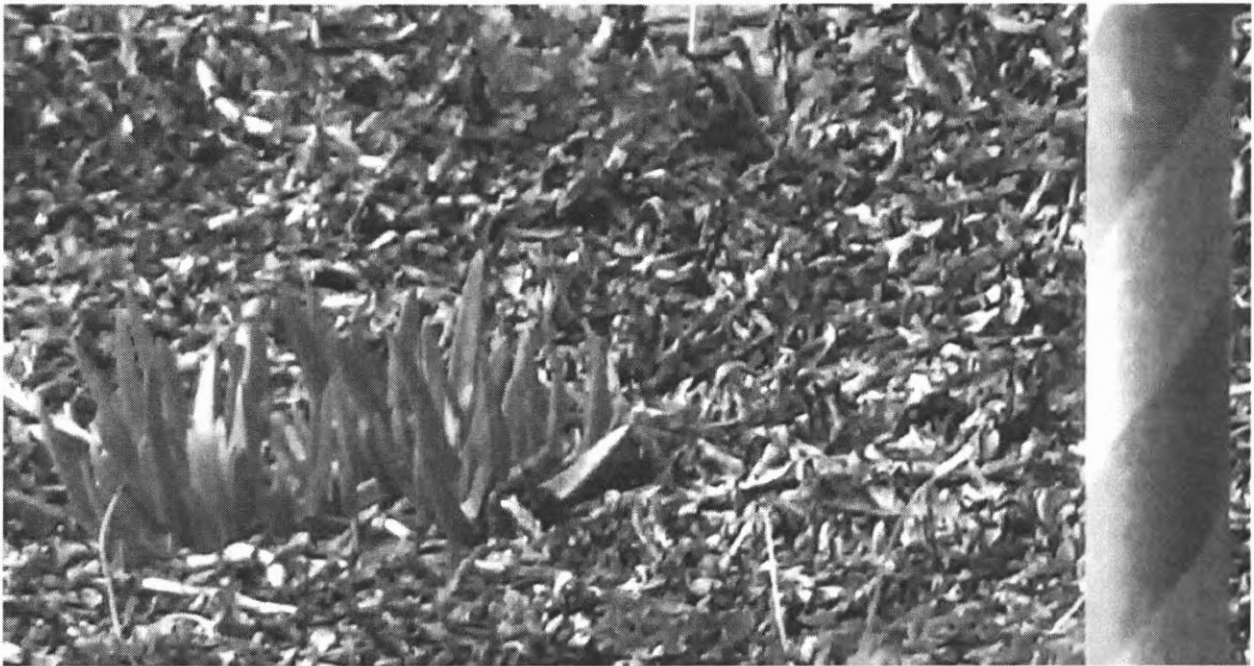
Sincerely,



Walter Lamb
President
Ballona Wetlands Land Trust
landtrust@ballona.org

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Returning Iceplant growing from desiccated Iceplant mulch in March 2017



Expansion of returning Iceplant on May 1, 2017

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Revell, Mandy@Coastal

From: patricia mc pherson <patriciamcpherson1@verizon.net>
Sent: Friday, May 05, 2017 5:31 PM
To: Revell, Mandy@Coastal
Subject: The Bay Foundation's CDP Amendment Request



Ms. Revell,

Grassroots Coalition requests the Bay Foundation's CDP AMENDMENT request be given public vetting in open discussion. Thus far there has been no public discussion of what has occurred since the removal of ice plant, namely a higher growth rate of non natives have flooded into the area where the ice plant was removed. At the time of CCC approval, the public was witness to a very fast-tracked and ill conceived project. No proof was provided of the Bay Foundation's ability to fulfill the task of nurturing natives back to the Ballona Wetlands section of experimentation.

Instead of a positive outcome, more non natives have taken hold which have a deeper root system and are difficult to contain.

Meanwhile, publicly, the Bay Foundation is touting the culling of ice plant a success. While the actual pulling out of ice plant was easy and was done....and that itself could be called successful, it is HIGHLY DISINGENUOUS that the outcome is a success. The current outcome is anything but successful and instead the Bay Foundation has allowed for a far greater amount of invasives TO INVAD. And, meanwhile, the Bay Foundation HAS REMOVED WATER SOURCE materials from the wildlife that have been depending upon the ice plant during the drought—for its water holding capacities.

The ice plant has always been a slow growth, simple removal plant that also acts as both 1) a place holder of necessary ground cover that also allows for native growth within it and, 2) ice plant provides a source of much needed WATER for the area's wildlife that eat the ice plant as a water source (container).

The site needs to be documented for what has now occurred in order to stand witness as to how such management actually plays out. Science should be a recordation of all attempts, whatever the result. When this action was requested by the Bay Foundation, there was no request to immediately replace open ground with natives and there was no strategy given as to follow up activities. Such lack of address to alternatives —up front --is

a red flag for Bay Foundation's credibility and ability to fulfill its stated objectives.

It is time to allow for public discussion and involvement regarding this project and its outcome and future.

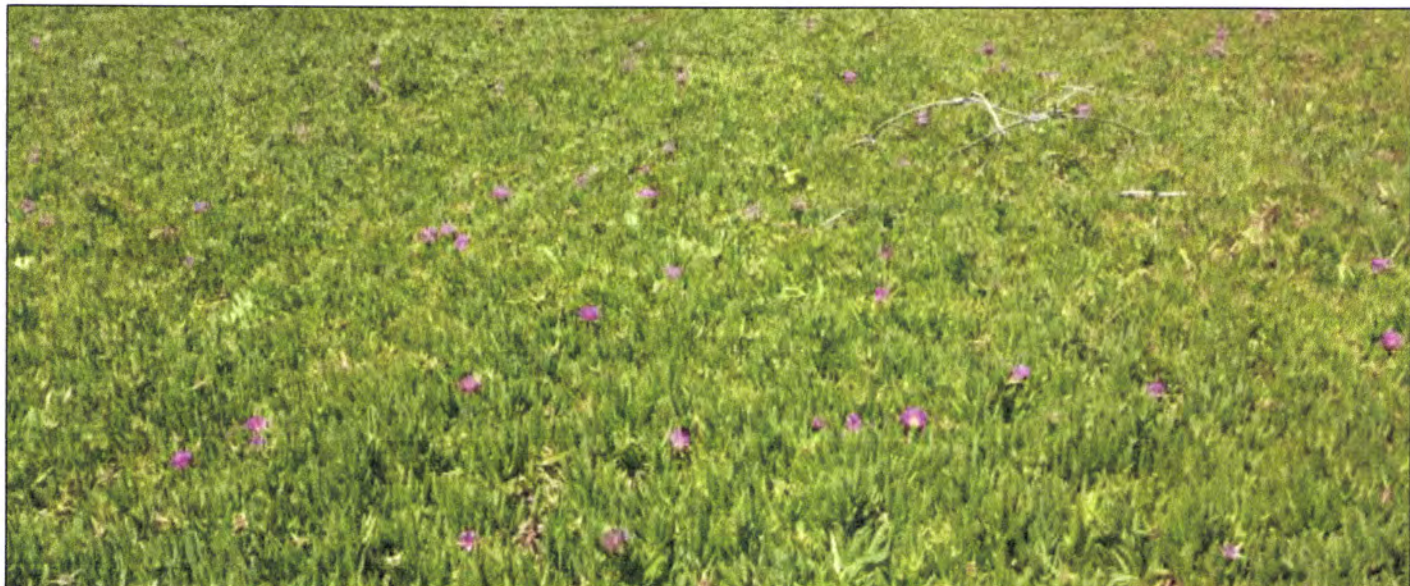
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Thank you,
Patricia McPherson, Grassroots Coalition

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Ballona Wetlands Ecological Reserve: Iceplant Removal and Wetland Restoration

Implementation and Monitoring Plan

June 2016

Prepared for the California Coastal Commission and the
California Department of Fish and Wildlife



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Ballona Wetlands Ecological Reserve: Iceplant Removal and Wetland Restoration

Implementation and Monitoring Plan

June 2016

Timing of Operations: Project operations, including vegetation eradication and removal, hauling, annual maintenance, and spot removal shall be prohibited from February 1 through August 30 to avoid impacts to avian species during breeding season in accordance with Coastal Commission Permit No. 5-15-1427.

Background

Over 96% of the vegetated estuarine wetlands have been lost over the past century and a half in the Los Angeles region (Stein et al. 2014). The Ballona Wetlands Ecological Reserve (Reserve), located on the Los Angeles County coast, is an example of this phenomenon, having suffered from over a century of abuse and land degradation. Historically a bar-built estuary of over 2,100 acres (Dark et al. 2011), the Reserve has been reduced in size to less than 600 acres of open space, with over half of the vegetated habitats dominated by non-native species and with significantly reduced or absent ecosystem functions (Medel et al. 2014).

Currently, only approximately one quarter of the Reserve is considered delineated wetlands (WRA 2011). Similarly to the rest of the site, much of the remaining wetland habitats suffer from invasive and non-native species encroachment. There are over 35 acres of iceplant throughout the site, and 10 acres of iceplant concentrated south of Culver Boulevard in Area B, in large patches within the wetland and adjacent sandy dune habitats. This project will focus iceplant removal efforts south of Culver Blvd, to stay within the area that will not be affected by the long-term restoration project and to provide the maximum possible ecological benefits to the habitats by removing contiguous patches.

The Bay Foundation (TBF), in partnership with the California Department of Fish and Wildlife (CDFW), received Wetland Recovery Project Community Restoration Grant Program funds to manually remove invasive vegetation while broadening community and public involvement and stewardship at the Reserve. The Reserve is undergoing an intense, large-scale restoration planning effort. TBF will organize public, community functions that will provide a diverse range of community members and students the opportunity to participate in hands-on wetland restoration activities to restore three acres of degraded wetland habitat, and become engaged in the larger restoration planning effort.

Project Goals

TBF will conduct 10 public, on-site restoration events engaging approximately 250-300 community members and students with the goal of educating participants about non-native and invasive vegetation and the need for their removal to create healthy wetland habitats. The project will focus on the removal of *Carpobrotus* spp., or iceplant, from a targeted area within the Reserve that will not undergo significant changes (e.g., re-grading) during construction or restoration (Appendix A: Site Map, Figure 1).

Removing iceplant and other non-native vegetation on site will help protect the remaining native flora that will be critical to the revegetation of the Reserve for the larger multi-year restoration effort. Iceplant is a creeping, mat-forming group of species that form dense monocultures causing a reduction in biodiversity and competing directly with native wetland species. Its removal, and subsequent introduction of native wetland species will provide an increase in the health and condition of the wetland habitats in Area B – south of Culver, and will allow for community engagement in restoration efforts at the Reserve. Restoration activities are in accordance with CDP No. 5-15-1427.



Figure 1. Photograph of an iceplant monoculture at the project location within the Reserve.

Ecological Benefits

Iceplant is a ground-hugging succulent that can grow deep, nearly impenetrable mats several feet thick which dominate resources along a range of soil moisture and nutrient conditions. Iceplant provides little protection or useable habitat for native birds and wildlife. Additionally, its shallow, fibrous root network consumes large quantities of available water year round further impeding the growth of native species with the largest impact occurring during times of drought. Most significantly, the highly competitive characteristics of iceplant for available nutrients, water, light, and space allows it to suppress the growth of native seedlings and often results in the growth of large, monospecific stands providing minimal habitat value.

Iceplant removal and native seeding will provide immediate and long-term ecological benefits to the Reserve. Following establishment, native vegetation will increase ecological function by providing habitat, food sources and opportunities for foraging by fish and birds, and protective cover for a variety of native fauna. New vegetation will increase native biodiversity and provide healthier habitat for several endangered and special concern species such as the Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) and South Coast marsh vole (*Microtus californicus stephensi*). Revegetation efforts will also increase the ability of local flora and fauna to compete against invaders, increasing the resilience of the restored areas and their ability to respond to urban stressors. Restored areas will be monitored to quantify native species richness, plant cover, and invertebrate biomass.

Invasive Plant Removal: Implementation

The removal of invasive species such as iceplant will occur through the implementation of two primary removal protocols during community restoration events, solarization and hand-removal. Solarization will be prioritized for the majority of the restoration areas as this protocol does not involve soil disturbance. Hand-removal may be implemented along margins or edges with intermixed native plant species to reduce impacts to native vegetation.

Invasive plants are those identified in the California Native Plant Society, Los Angeles – Santa Monica Mountains Chapter handbook entitled “Recommended List of Native Plants for Landscaping in the Santa Monica Mountains,” January 20, 1992, those species listed by the California Invasive Plant Council on any of their watch lists as published in 2007, and those otherwise identified by the Department of Fish and Wildlife or the United States Fish and Wildlife Service. No non-native or invasive vegetation species shall be planted on site as part of this restoration. Details for each of the two primary removal protocols are described below.

Removal Protocol 1: Solarization (no soil disturbance)

Solarization of iceplant monocultures will be the primary removal method implemented by project partners and participants using large black tarps to eliminate radiant sunlight. The tarps will be left on for approximately 1-3 months during warm weather, at which point the tarps will be removed and the desiccated iceplant material left in place. This technique allows for the eradication of iceplant without the use of herbicides or heavy soil disturbance. Leaving the desiccated iceplant in place also prevents erosion through the retention of the existing root structure, even though it will no longer be viable. Soil bacteria, fungi, and other microorganisms create a natural below ground ecosystem that will be maintained when the soil layers are not displaced.

The desiccated iceplant also acts as a form of mulch, helping to control non-native species invasions, while keeping the soil moisture high for native plants. Wetland habitats at the Reserve have been heavily disturbed and most are hydrologically disconnected from estuarine waters. Retaining moisture in the soils through the use of ‘mulch’ will encourage native salt marsh regrowth with fewer plantings or seedlings needed. Previous studies have confirmed the presence of a native seed bank beneath the iceplant (Johnston et al. 2011, 2012, R. Brody, pers. comm., 2015).

The following steps summarize Removal Protocol 1:

- 1) Tarps deployed to cover invasive vegetation monocultures (e.g. iceplant)
- 2) Edges staked down using garden stakes (approximately 1-3 feet between stakes to allow for small animal movement underneath the tarp)
- 3) Leave tarps in place for approximately 1-3 months during warm weather
- 4) Remove tarps
- 5) Leave desiccated iceplant material in place

Minimizing or eradicating soil disturbance through the retention of desiccated iceplant also allows for the preservation of culturally-sensitive areas. The protocols described above will retain any existing resources in place and have been approved by CDFW and their Native American consultants.

Removal Protocol 2: Hand-Removal (minimal soil disturbance)

Restoration events may also involve a small amount of additional hand-pulling of invasive species by volunteers along the margins of the iceplant monocultures in areas that are too patchy (with intermixed native plants) for broad-scale solarization. This will avoid impacts to existing native vegetation, and will allow for the spread and expansion of the remaining native plants into the newly restored micro-habitats. All non-native, invasive plants will be removed by hand or with hand tools (e.g. garden spade). Additionally, no herbicides or rodenticides will be employed as part of this restoration effort.

The following steps summarize Removal Protocol 2:

- 1) Restoration ecologists will lead volunteer groups – walking will occur over invasive species or desiccated iceplant monocultures to access the restoration areas
- 2) Hand-pulling of targeted invasive, non-native vegetation species:
 - a. Slowly remove invasive plant, including roots, by hand-pulling or using hand tools
 - b. Gently shake loose attached dirt (if present) from plant and roots
 - c. Replace dirt into hole (if hole was created) from removed plant area
- 3) Dispense of invasive, non-native plant into a green waste dumpster
- 4) Track and record area of restoration (geospatial); weight, condition, and species of removed plants; and basic volunteer statistics

* The protocols described above will retain existing resources in place and have been approved by CDFW and their Native American consultants.

Re-vegetation

Re-vegetation of the restoration area may occur in several ways, through an iterative adaptive management and monitoring process. The protocols to be implemented will depend on the recruitment success of the first growing season. The following three protocols summarize the techniques that will be implemented post-solarization or post-hand restoration. Protocol 1 will be implemented first, and after a thorough post-restoration monitoring evaluation after the first growing season, Protocols 2 and 3 may be implemented, if necessary. At the request of CDFW, re-vegetation protocols that involve no soil disturbance will be prioritized.

Re-Vegetation Protocol 1: Natural Recruitment (no soil disturbance)

Natural recruitment of native vegetation species from the existing seed bank may occur. This protocol involves passive monitoring to visually identify if native vegetation is recruiting naturally. No soil disturbance would occur. If recruitment of native vegetation occurs using this method, no further actions are required other than post-restoration monitoring.

Re-Vegetation Protocol 2: Hand-Seeding (no soil disturbance)

If subsequent post-restoration monitoring shows poor native plant recruitment or minimal species richness (e.g. only one species recruiting), then hand-seeding to supplement the native plant recruitment may be considered. Broadcast dispersing of native vegetation seeds and cuttings by hand in the restoration area would occur as part of this protocol. No soil disturbance would occur. If recruitment of native vegetation occurs using this method, no further actions are required other than post-restoration monitoring.

Re-Vegetation Protocol 3: Planting (minimal soil disturbance)

Targeted infill plantings with native species in the restored areas may be conducted, based on the success of the natural recruitment protocol and hand-seeding protocol implementation. Small, native (1 gallon or smaller) container stock may be considered if Re-Vegetation Protocols 1 and 2 are insufficient to achieve native vegetation recruitment. The plant palette reflects hardy, salt-tolerant species which can also withstand seasonal reduced hydrology. Vegetation planted on the site will consist of native plants present in the Reserve. The plant palette will be developed in greater detail, along with a final planting plan, after the first growing season to adaptively manage the restoration area and allow for maximum potential natural native plant recruitment to take place. The planting plan will be developed in coordination with CDFW and their Native American consultants. The palette may include (but not be limited to) the following native species, and will vary based on the recruitment success of the micro-habitats:

Marsh habitat species: *Salicornia pacifica*, *Distichlis spicata*, *Frankenia salina*, *Cressa truxillensis*, *Distichlis littoralis*, and *Juncus mexicanus* (in or adjacent to brackish areas)

Transition habitat / upland edge species: *Heliotropium curassavicum*, *Atriplex lentiformis*, *Distichlis spicata*, *Acmispon glaber*, *Encelia californica*, *Lupinus chamissonis*, *Ericameria ericoides*, *Salvia mellifera*, *Camissoniopsis spp*, *Salvia leucophylla*, and *Elymus triticoides*.

Scientific Monitoring

A rigorous scientific monitoring plan will allow for adaptive management of restoration activities. Table 1 summarizes the monitoring sampling design. It lists nine major parameters, the primary protocol(s) which will be implemented for each parameter, and the frequency of implementation.

Pre-restoration baseline monitoring will occur prior to the implementation of the restoration project to allow a comparison of the pre- and post-project conditions of the area. Ongoing implementation monitoring will occur throughout the duration of the restoration activities to adaptively manage and avoid impacts to native plant and wildlife species. Post-restoration monitoring will occur after restoration activities are concluded and will allow a scientific evaluation of the successes and challenges of the implementation strategies. Additionally, post-restoration data will contribute meaningful information towards adaptively implementing re-vegetation activities. It will allow for a thorough scientific evaluation of restoration efforts. If seedlings are not present during post-restoration monitoring after the wet season, supplemental seeding or planting may be required. At this time, a detailed re-vegetation plan will be written, in conjunction with CDFW and their consultants.

Table 1. Description of protocols to be implemented during pre-restoration baseline monitoring, implementation monitoring, post-restoration monitoring, and their minimum frequency of occurrence.

Parameter	Protocol	Pre-Restoration (Baseline)	During Project	Post-Restoration (Evaluation)	Post-Restoration Frequency
Invasive Vegetation Cover	GPS and GIS; Transect / Quadrat Cover	✓		✓	Semi-annually for two years
Seedling Density	Quadrat Density Counts			✓	Quarterly for two years
Vegetation Removal	Area, Species, and Weight		✓		N/A
Avifauna (Bird)	Visual Surveys for Presence and Behavior	✓	✓	✓	Immediately post-restoration and annually for two years
Other Wildlife (Mammals and Herpetofauna)	Visual Surveys for Presence	✓	✓	✓	Immediately post-restoration and annually for two years
Photo-Point	Permanent Photo-Points	✓	✓	✓	Immediately post-restoration and quarterly for two years
Volunteer Event Data	Counts		✓		N/A
Vegetation Planting	Size, Species, and Location		✓	✓	As needed
Cultural Resources	Identification and BMPs	✓	✓	✓	N/A

Individual Protocol Details

Each of the following subsections summarizes an individual protocol to be implemented as part of the monitoring program. For in depth details on objectives, equipment, field preparation, field methods, quality control check procedures, and datasheets, refer to the individual Standard Operating Procedures listed below within the California Estuarine Wetland Monitoring Manual, publically available for free download: <http://www.santamonicabay.org/california-estuarine-wetlands-monitoring-manual-level-3/>.

Invasive Vegetation Cover (GIS)

The composition and distribution of vegetation species across wetland habitats directly affects many ecosystem functions such as productivity, soil composition, and nitrogen and carbon exchange dynamics (Schwartz et al. 2000, Keer and Zedler 2002). Vegetation mapping methods employ *A Manual of California Vegetation* (Sawyer et al. 2009) as the standard for classification and delineation of most native and many non-native vegetation alliances and associations based on the presence and relative cover of co-dominant species. An updated version of the Manual can also be found online at explorer.natureserve.org.

Vegetation mapping protocols are described in detail in [SOP 3.5 Vegetation Mapping](#) (TBF 2015a). This protocol outlines a synthesized vegetation stand delineation strategy based on a combination of aerial imagery, office digitization (commonly in ArcGIS), and *in situ* field verification. This method uses a Trimble GPS unit and ArcGIS software to produce detailed, geospatially rectified vegetation maps, allowing for an analysis of vegetation alliance and association coverage. It will facilitate the adaptive management restoration activities.

Invasive Vegetation Cover (Transect)

Vegetation cover surveys can be used to provide a wide range of information and data, including: summarizing the prevalence of native and non-native plant cover in each habitat, determining species cover, relative species richness and diversity, and assessing canopy height. The primary objective of the transect- and quadrat-level cover surveys for this project is to assess the approximate cover of invasive, non-native vegetation over time. Transect- and quadrat-level plant cover data will be collected on five, 25-meter permanently identified transects randomly allocated within the restoration area. Both "Line-Intercept Transects" and "Cover Class Quadrats" will be implemented.

The transect survey methods are described, along with field data sheets, in [SOP 3.2 Vegetation Cover Surveys](#) (TBF 2015b). Line-Intercept Transects document every species observed directly below the transect tape where the vegetation crosses a minimum of 0.01 m. Line-intercept data will be summed by species and divided by the total length of transect to determine percent cover for each transect and habitat. Cover Class Quadrat surveys will be conducted using 1 m² PVC quadrats subdivided into 16 sub-quadrats. Ten quadrats will be completed along each transect. Cover class species data will be analyzed using the median of each Daubenmire cover category and averaged to determine percent cover within each transect with variability represented as standard deviation or error (TBF 2015b).

Seedling Density

A seedling density survey will be conducted on restored areas. This quantitative assessment method will allow for a post-restoration evaluation of germination success of native plant species. Individual seedlings will be counted within randomly selected quadrats as part of the Cover Class Quadrat vegetation cover assessment method. Data will be presented in germinated seedlings per square meter categorized by species and nativity, following assessment procedures described in [SOP 3.4 Seed Bank Germination](#) (TBF 2015c). Seedling density will be determined by adding the total number of individuals of each species in all quadrats per area and dividing by the total area of all the quadrats surveyed to determine density (e.g., Species A, 100 seedlings / 10 m² = 10 seedlings/m²). Photographs of each quadrat will also be collected concurrently.

Vegetation Removal

Photo-documentation will occur prior to and after invasive plant removal efforts, including solarization and community restoration events involving invasive plant removal. A quantitative weight and area estimate of removed invasive vegetation will be conducted during each restoration event, along with species-level identification of removed vegetation. See also "Volunteer Event Data", below, for additional details on human use data that will be collected.

Additionally, the site shall be visited weekly following the installation of tarps, until they are removed. During weekly site visits, environmental data including soil temperature, tarp surface temperature, and weather conditions shall be recorded. Additionally, the tarps shall be monitored for condition (e.g. ripping, staples pulled out, animal use). After tarps have been pulled, site visits for other monitoring activities will occur in the frequency for each individual protocols described in Table 1, above.

Avifauna (Bird)

The presence and distribution of avifauna within an ecosystem is often used as an index of habitat quality due to their diet and vulnerability to environmental conditions (Conway 2008). Avifauna data are useful to characterize representative avian assemblages and spatial distributions within a particular area. Bird survey methods are described in detail, along with field data sheets, in [SOP 5.1 Bird Abundance-Activity](#) (TBF 2015d).

There are two primary purposes of avifauna surveys for this project. First, it is to confirm a lack of breeding or nesting behavior prior to the commencement of restoration activities to ensure no disturbance. Second, it is to provide a general understanding of the bird community in the restoration area before and after restoration. This survey will be performed by an ornithologist and will entail both observational visual and auditory bird surveys. Additionally, breeding or nesting activity of birds will be recorded and, if present, will require the immediate delay of any restoration activities.

Other Wildlife (Mammals and Herpetofauna)

Observational data will be collected on mammal and herpetofauna present during the implementation of other survey protocols. Additionally, visual surveys including species-level presence and counts will be conducted throughout the restoration area prior to any restoration activities commencing.

Photo-Point

Photo point monitoring will occur to identify seasonal site changes or project-level changes as a result of the restoration activities (e.g. native vegetation community expansion). Survey methods are described in detail in [SOP 7.2 Level 2 Photo Point](#) (TBF 2015e). Permanent photo point locations will be established during baseline monitoring and the locations recorded using a GPS. Photographs can be used as qualitative assessments of broad-scale changes following community restoration activities and solarization of iceplant.

Volunteer Event Data

Volunteer event data will be collected for all public restoration events, including the date of the event, the number of participants, hours worked, and any incidental useful supplemental information such as the school and age group, etc. Data may be analyzed in conjunction with the Vegetation Removal data to evaluate average weight or area of invasive species removal by volunteer, as one example.

Vegetation Planting

Following any re-vegetation efforts, the site will be examined and photo-documented. Any problems with newly installed plants that might adversely affect the success of the restoration will be documented. Adaptive management or maintenance may occur as described in the protocols above.

Cultural Resources

If suspected cultural or historic artifacts are identified through monitoring in invasive vegetation removal or planting procedures described above, field staff conducting invasive plant management work will implement the following best management practices (BMPs) to avoid impacts.

Subsequent steps are as follows:

- 1) Immediately stop work
- 2) Contact the land manager (CDFW) via phone from the field
- 3) Replace the soil and artifact where it was found and photograph the location
- 4) GPS specific location and send location and photograph to land manager (CDFW)

In compliance with the Native American Graves Protection and Repatriation Act of 1990, CDFW will notify and consult affiliated tribal representatives for proper treatment of human remains, funerary, and sacred objects, should these be discovered.

Maintenance

Site visits will be conducted quarterly for a period of no less than two years to visually assess the restoration progress and evaluate the need for maintenance activities. The overall condition of the restoration areas will be noted, along with detailed observations including presence of invasive species re-growth or environmental stressors (e.g. prolonged dry periods) that may suggest maintenance actions are needed. Photographic documentation of any observations of concern will occur. If invasive vegetation such as iceplant returns to a restored area, adaptive management steps such as weed removal with hand tools may need to be taken.

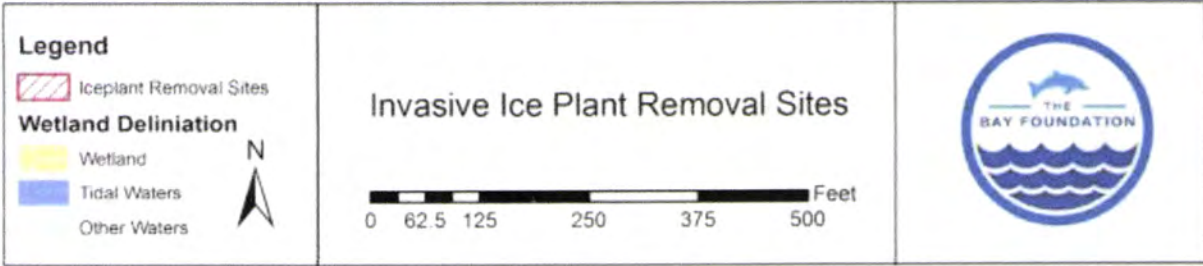
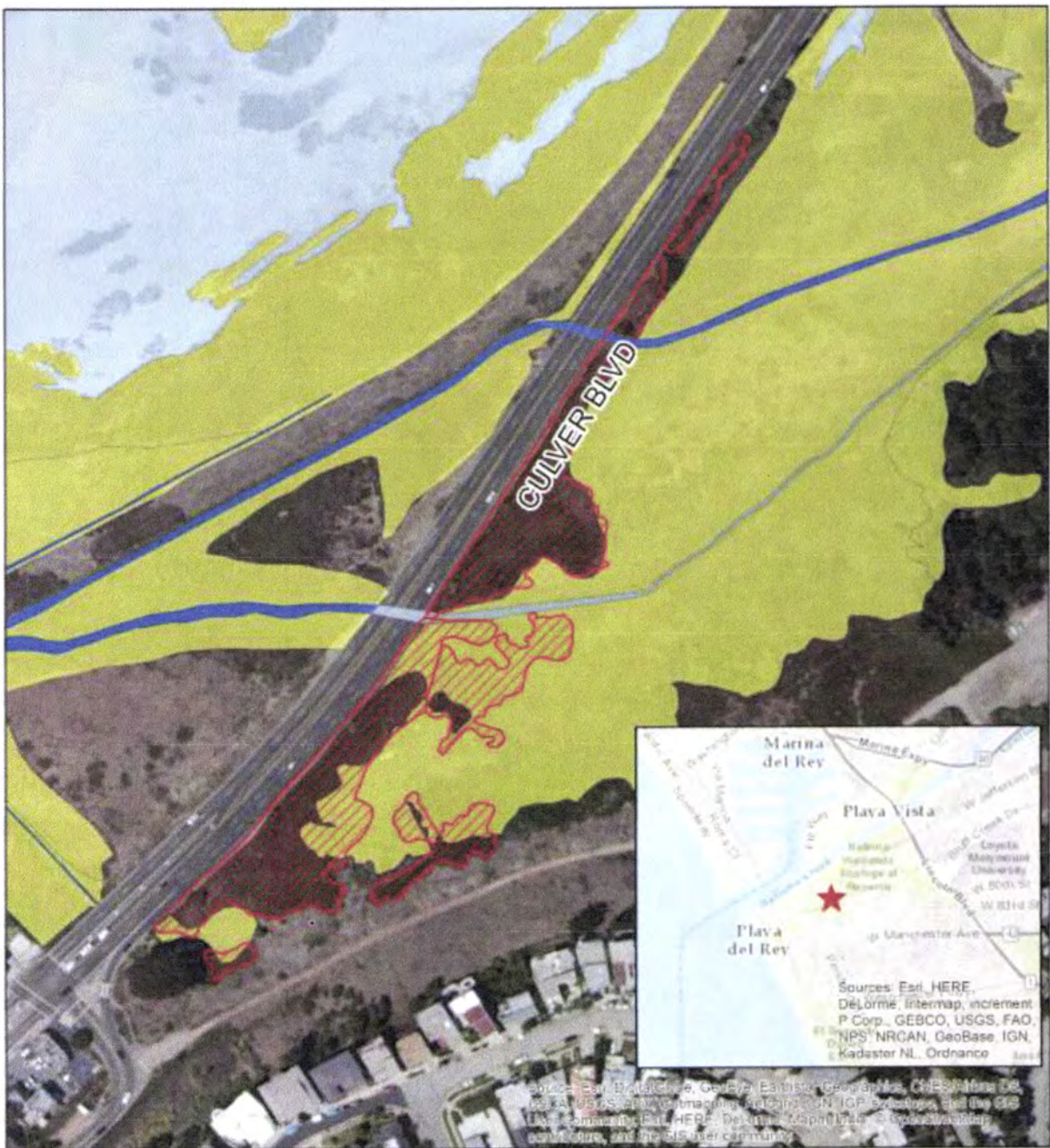
Reporting

A publically-available annual report will be compiled and produced at the culmination of each year of work. A year of work is between the beginning of August through end of July each year. It will be published on The Bay Foundation's website: www.santamonicabay.org, on the [Technical Report](#) page. Each annual report will contain summary details on restoration activities and monitoring results as well as photographs documenting the restoration activities over time. Annual reports will be published for a minimum of two years or through the duration of the restoration activities.

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Appendix A: Site Map – Invasive Iceplant Removal Sites





Ballona Wetlands Restoration: Community Iceplant Removal Project

Final Report

December 2016

Prepared for the Southern California Wetlands Recovery
Project and the California Department of Fish and Wildlife



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Final Report

Ballona Wetlands Restoration: Community Iceplant Removal Project

Prepared by: Karina Johnston, Melodie Grubbs, and Rodney Abbott; The Bay Foundation

Submitted to: Shawn Kelly, Southern California Wetlands Recovery Project
Richard Brody, California Department of Fish and Wildlife

Date: 29 December, 2016

Project Summary

The Bay Foundation (TBF), in partnership with California Department of Fish and Wildlife (CDFW), Friends of Ballona Wetlands (FBW), Loyola Marymount University, and community volunteers are conducting a project to remove invasive vegetation while broadening public involvement and stewardship at the Ballona Wetlands Ecological Reserve (Reserve). This report serves as the final product for the first phase, or the "*Ballona Wetlands Restoration through Community Partnership*" project, funded by the Southern California Wetlands Recovery Project's Community Wetland Restoration Grant Program (Grant #2015-001). This report summarizes restoration events conducted from 1 September through 30 November, 2016 and additional project activities through 22 December, 2016. Post-restoration project monitoring and additional community restoration events will be continued in 2017 through supplemental matching funding from various sources. Additionally, though this grant focused on an approximately 1-acre area, the full restoration area and permitting for the entire project (subsequent phases) cover an area of approximately 3 acres, which will be continued in future years when additional funding becomes available.

The project focused on the removal of *Carpobrotus spp.*, or iceplant, from a targeted area within Area B of the Reserve. Removing iceplant and other non-native vegetation on site will help protect the remaining native flora that will be critical to the revegetation of the Reserve for the larger multi-year restoration effort. Iceplant is a creeping, mat-forming group of species that form dense monocultures, causing a reduction in biodiversity and competing directly with native wetland species. Its removal will provide an increase in the health and condition of the wetland habitats at the Reserve in Area B – south of Culver, and has allowed for community engagement in hands-on restoration efforts. Pre- and post-restoration monitoring will evaluate the success of the project over time and will provide recommendations for additional community-level restoration opportunities on site and at other, similarly-impacted urban wetland systems throughout Southern California.

Two iceplant removal methods were implemented by project participants and are compared in this report for effort and effectiveness to inform future community-based hands-on restoration projects. The first method involved traditional hand-restoration through pulling out iceplant mats by the roots, shaking them to remove dirt and debris, and removing them from the site to be green-waste processed or composted. The second method involved covering areas affected by iceplant monocultures with large plastic tarps to eliminate radiant sunlight and leaving the desiccated iceplant in place as mulch.

We are grateful for the help of the many volunteers who participated in this restoration project, and appreciate all of their efforts and donated time. We also want to acknowledge and thank our partners, Friends of Ballona Wetlands, CDFW, and Loyola Marymount University. Additionally, we are especially grateful to the staff of E. Read and Associates for donating so much of their time to help the project succeed. We would not have been able to complete this project without them.

Appendix A follows this report and provides summary statistics and summary project information, including relevant online links. Appendix B provides additional photographs of the restoration areas.

Monitoring Methods Summary

Ornithologists performed pre-restoration bird surveys to confirm a lack of identified presence of bird nesting in the restoration areas and in the immediate vicinity of the project area. The final bird survey was conducted on 29 August, 2016, timed purposefully as close to the start of the restoration events as possible. No Belding's savannah sparrows were observed and no indication of nesting was detected for any bird species observed. Three additional pre-restoration monitoring survey days were conducted on 9, 18, and 23 August, 2016, with participation from CDFW, FBW, and several internship student volunteers. Additionally, a Cultural Resource Protocol was written and submitted to CDFW and the Native American monitor for approval. Once approved, a pre-restoration site visit was coordinated and specific strategies were finalized.

Weekly site checks were performed throughout the duration of the tarp deployment. Post-restoration surveys were conducted on 15, 18, and 29 November, 2016. Surveys conducted both pre- and post-restoration included vegetation cover, vegetation mapping, geo-referenced photo-point, wildlife presence and behavior, and cultural resources, in accordance with the Implementation and Monitoring Plan (June 2016), approved by CDFW and the Coastal Commission. For protocol and sampling frequency specifics, refer to the Implementation and Monitoring Plan.

Outreach and Public Engagement

A concerted effort was made before and throughout the implementation of this project to engage the community in a diverse number of ways. For example, before the project began, TBF discussed the project at several public meetings, facilitated a media article in the local paper, discussed the project with several stakeholder groups, and went through a public permitting process through the California Coastal Commission (Permit No. 5-15-1427). Additionally, a public website was created and maintained, including general information about the project, several photographs of the site, project documents, links to permit information and the Implementation and Monitoring Plan, and clickable interactive links to volunteer for an event: <http://www.santamonicabay.org/community-iceplant-removal-project/>. The website was updated frequently and will include future restoration opportunities through the continuation of the project, as funding becomes available.

Additionally, throughout the duration of the project, multiple social media and blog posts documenting community restoration and field survey events, as well as volunteer opportunities, were featured on TBF's facebook and twitter accounts. A total of 10 posts related to the project were posted on TBF's facebook page (<https://www.facebook.com/TheBayFoundation/>), which has nearly 2,700 followers, and twitter page (<https://twitter.com/SMBRF>), which has 954 followers (Figure 1). Additional online outreach to engage community volunteers included posting opportunities on www.volunteermatch.org. The Friends of Ballona Wetlands (<http://www.ballonafriends.org/>) conducted additional outreach focused on engaging school groups to attend restoration events. Other supporters and partner groups such as Heal the Bay and Loyola Marymount University's Center for Urban Resilience also conducted outreach for the project.



Figure 1. Screenshots of iceplant project-related posts on TBF social media.

Lastly, effort was made to help facilitate local media articles about the project. TBF released one formal media press release on 11 March, 2016, and interviewed for multiple newspaper articles. Several notable articles were published on 2 March, 2016, by the Argonaut Newspaper, and on 13 March, 2016 by the Daily Breeze – both local Los Angeles papers highlighting the need for restoration and information about iceplant. Additionally, Dr. Katherine Pease, staff scientist for Heal the Bay, wrote an inspiring article on the importance of restoration at Ballona. For a full list of related media for this project and links to online articles, see Appendix A.

Restoration Events

Following the Coastal Commission permit conditions (Permit No. 5-15-1427), restoration events began on 1 September, 2016. To maximize the potential sunlight availability and to increase the effectiveness of the tarping method, double restoration events were held on the first three restoration days. This allowed for the full deployment of all tarps to occur by 8 September, 2016. Table 1 provides summary details of all restoration events held from 1 September through 30 November, 2016 and includes statistics on the number of volunteers, number of hours, restoration activities, and site details. ***Over 15 tons of iceplant (more than 200 cubic yards) were removed from the restoration area to a green waste dumpster for composting.*** Weight was calculated by the dumpster rental company before processing the invasive vegetation waste and cubic yard area was estimated by the total dumpster space used throughout the duration of the project.

Exact total acreages of both the hand-restored and tarped restoration areas were calculated using a Trimble Geo7x GPS and mapped using GIS (Figure 2). Acreages are summarized in Table 2. Hand restoration efforts alone resulted in a restoration area of 0.39 acres (1,585 m²), and the total tarped restoration area was 0.36 acres (1,460 m²). Additionally, some of the tarped area also had to be hand-restored through additional restoration events in an area of 0.13 acres or 510 m². Collectively, hand-restored and tarped restoration areas covered a total of 0.88 acres (3,555 m²).

Table 1. Summary of restoration event statistics through 1 December, 2016.

Event Date / Time	Site / Area	# Volunteers	# Hours	Restoration Method
1 Sept – AM	Site 1	9	27	Tarping + Hand-restored
1 Sept – PM	Site 1	9	27	Tarping + Hand-restored
6 Sept – AM	Site 2	11	25.5	Tarping + Hand-restored
6 Sept – PM	Site 2	13	39	Tarping + Hand-restored
8 Sept – AM	Site 3	9	19.5	Tarping + Hand-restored
8 Sept – PM	Site 3 + 1	8	24	Hand-restored
13 Sept – AM	Site 1 + 2	9	16.5	Hand-restored
16 Sept – AM	Site 1 + 2	5	15	Hand-restored
20 Oct – AM	Site 1	10	22.5	Hand-restored
10 Nov - AM	Site 1	2	6	Hand-restored
15 Nov – AM	Site 1 + 2	60	240	Hand-restored
18 Nov – AM	Site 1	36	63	Hand-restored
Subtotal	----	181	525	----

Table 2. Summary of restoration areas and acreages through 1 December, 2016.

Restoration Activity	Area (m ²)	Area (Acres)
Hand-Restored	1,585	0.39
Tarp Cover	1,460	0.36
Tarp Cover + Hand-Restored	510	0.13
Total	3,555	0.88



Figures 3 and 4 are composed of aerial imagery pulled from Google Earth prior to the implementation of the project and during the implementation of the project. The time series includes both restoration sites when covered in invasive iceplant (left) and after several tarping and hand-restoration events (right). The right-hand side photographs were taken right before the tarps were removed from site.



Figure 3. Site 1 and 3: pre-restoration before project implementation (left, 8 February, 2016) and after tarp installation and several restoration events (right, 2 October, 2016) (Google Earth).



Figure 4. Site 2: pre-restoration before project implementation (left, 8 February, 2016) and after tarp installation and several restoration events (right, 2 October, 2016) (Google Earth).

Overall, restoration events were highly successful, with small but enthusiastic groups of engaged community members, local residents, and student participants. At the start of each event, an informational safety and cultural resource speech was given that also included a brief history of the Reserve, and the importance of healthy wetlands. All participants signed-in and turned in a waiver to track participation over time. Figures 5, 6, and 7 highlight some of the group activities and events. Appendix B highlights several additional photographs from each of the restoration areas.

School Group Participation

The restoration event held on 10 November, 2016 was comprised of TBF staff and two students from Santa Monica Community College. The students signed up for the event on www.volunteermatch.com to fulfill part of a community service requirement for an extra-curricular college group.

The restoration event held on 15 November, 2016 was dedicated to hosting a high school group from Palisades Charter High School. The high school group was composed of 60 students from two Urban Ecology classes, a course elective offered by the school. Aside from pulling an enormous amount of invasive iceplant, the teacher further engaged the students by additional in-class preparation and assigning a worksheet for the students to complete while on-site. The teacher took advantage of the restoration opportunity by focusing on topics including: the role of wetlands in an urban setting, invasive plants and the problems they cause, and the challenges of restoration. The students spent approximately four hours on-site, pulling iceplant from Sites 1 and 2, and completing their lessons. In-class hours were not counted towards contributed restoration volunteer time.

The restoration event held on 18 November, 2016 was composed of both community volunteers as well as an elementary school group composed of 30 fifth graders. The students received a tour of the Reserve by Friends of Ballona Wetlands and TBF, learning about native salt marsh species and the importance of healthy wetlands, and then dedicated the remainder of their time to pulling iceplant from Site 1 to clean up some of the tarped areas that still had some live iceplant.



Figure 5. Photographs of volunteers and students during restoration events at the Ballona Wetlands Ecological Reserve.



Figure 6. Photographs of student volunteers during restoration events at the Ballona Wetlands Ecological Reserve.



Figure 7. Photographs of volunteers during restoration events at the Ballona Wetlands Ecological Reserve.

Monitoring Results

A summary of the pre- and post-restoration monitoring results is included below. Note that species lists are not meant to be exhaustive, they are just identifications of the variety of flora and fauna that were seen on project surveys and monitoring days. In summary, both restoration methods were successful at removing iceplant and engaging the community and local school groups, and no wildlife were harmed as part of this restoration project.

Vegetation Cover

Vegetation transect data from Site 1 show a within-restoration area transition from 100% live iceplant pre-restoration to 100% dead iceplant and detritus post-restoration (Figure 8). No new seedlings had come in at the time of the final post-restoration survey (29 November 2016). The habitats surrounding Site 1 had a high diversity, including a depressional area with freshwater input during the wet season that had a mix of native brackish and salt marsh species, non-tidal salt marsh, and adjacent sandy-soil habitats. Therefore, the adjacent "control" data show a wide diversity of native and non-native vegetation surrounding the project area both pre- and post-restoration. These included common native species such as saltgrass (*Distichlis spicata*), pickleweed (*Salicornia pacifica*), alkali weed (*Cressa truxillensis*), common rush (*Juncus patens*), and alkali heath (*Frankenia salina*). Additionally, several non-native species were found adjacent to the restoration area, including iceplant, Australian saltbush (*Atriplex semibaccata*), and castor bean (*Ricinus communis*).

Vegetation transect data from Site 2 also showed a within-restoration area transition from 100% live iceplant pre-restoration to 100% dead iceplant and detritus post-restoration (Figure 9). Additionally, the tarped portion of Site 2 that was covering Australian saltbush also showed a 100% conversion from live saltbush to dead saltbush. No new seedlings had come in at the time of the final post-restoration survey (29 November 2016). Two shallow muted tidal channels and areas of non-tidal salt marsh surround the edges of Site 2 and are dominated by primarily native vegetation, including pickleweed, alkali heath, saltgrass, and alkali weed. Site 2 also has patchy iceplant remaining to the north and east of the project area, which will need to be removed in future restoration events. This area was not targeted during this phase of the project due to time constraints, but will be restored in 2017.

No vegetation transects were conducted within Site 3 due to its size, but mapping data are included below (see "Tarping Efficiency"). Further surveys will indicate whether native seedlings recruit into the restoration areas over time and to conclusively evaluate the effectiveness of the two types of restoration methods.

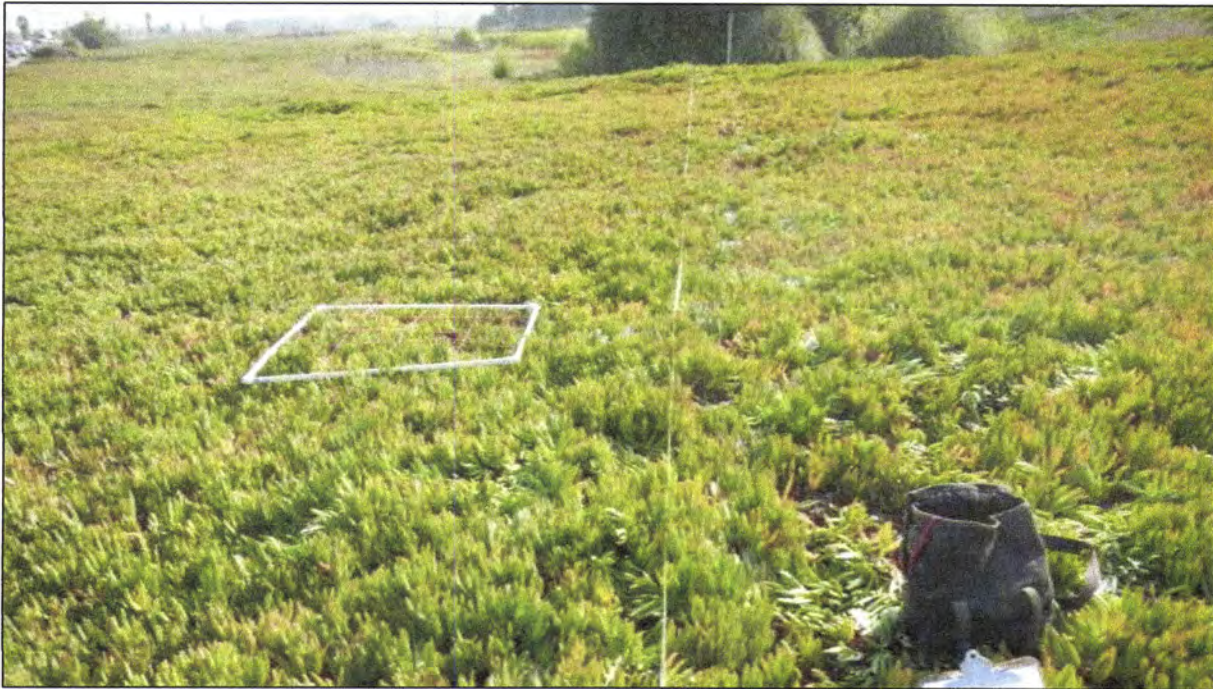


Figure 8. Transect 5 before restoration (top) and after tarping and some iceplant removal (bottom).



Figure 9. Transect 4 before restoration (top) and after tarping (bottom).

Tarping Efficiency

Following the removal of the tarps, it became apparent that Site 1 was not as successful in terms of overall iceplant solarization as Sites 2 and 3. Challenges included the early-onset rains and the overly-restrictive timing on the permit conditions, forcing the tarps to be pulled prior to the full desiccation of the iceplant in some areas. A post-tarp survey was conducted using a Trimble Geo7x GPS device and the efficacy of iceplant desiccation on Site 1 was thoroughly documented (Figure 10; Table 3). The success of desiccation was ranked as a percentage (estimated to the nearest 10%) ranging from 0% to 100% desiccation. All tarped areas had at least 10% desiccation, and most areas had much more success.

Sites 2 and 3 were fully successful, with 100% desiccation following tarp removal. The exception was sporadic and very small clumps of live iceplant along the edges of the tarp, which were subsequently hand-removed with very little effort. However, post-tarp surveys of iceplant desiccation at Site 1 showed that only 28.3% of the covered area of iceplant was completely desiccated (with a 100% efficiency of solarization), but more than 75% of the site had 50% or greater efficiency of solarization (Table 3). The areas in the middle of Site 1 with 30% and 50% efficiency had extremely thick mats of iceplant; in some areas, the iceplant was almost half a meter (approximately 1.5 feet) deep.

With the successful desiccation of Sites 2 and 3, and only partial desiccation of Site 1, a total of 86.7% of all tarped areas had a desiccation success rate of 50% or greater. Following the post-tarp surveys at Site 1, the remaining live iceplant was hand pulled during two community restoration events. While this involved some extra effort, the solarization still contributed significantly to the reduction in both effort and disturbance in all restoration areas.

While the Site 1 tarp area was only partially successful, Sites 2 and 3 showed complete success. The variability in tarping success likely occurred based on the depth of the iceplant mat within each restoration area, soil conditions, and other factors not explored as part of this project. Site 1 would have likely had greater success if the tarps were initially put out earlier in the summer. In the future, TBF recommends extending the tarping period to be able to have a start implementation date earlier in the summer, on or around 1 August 2016.

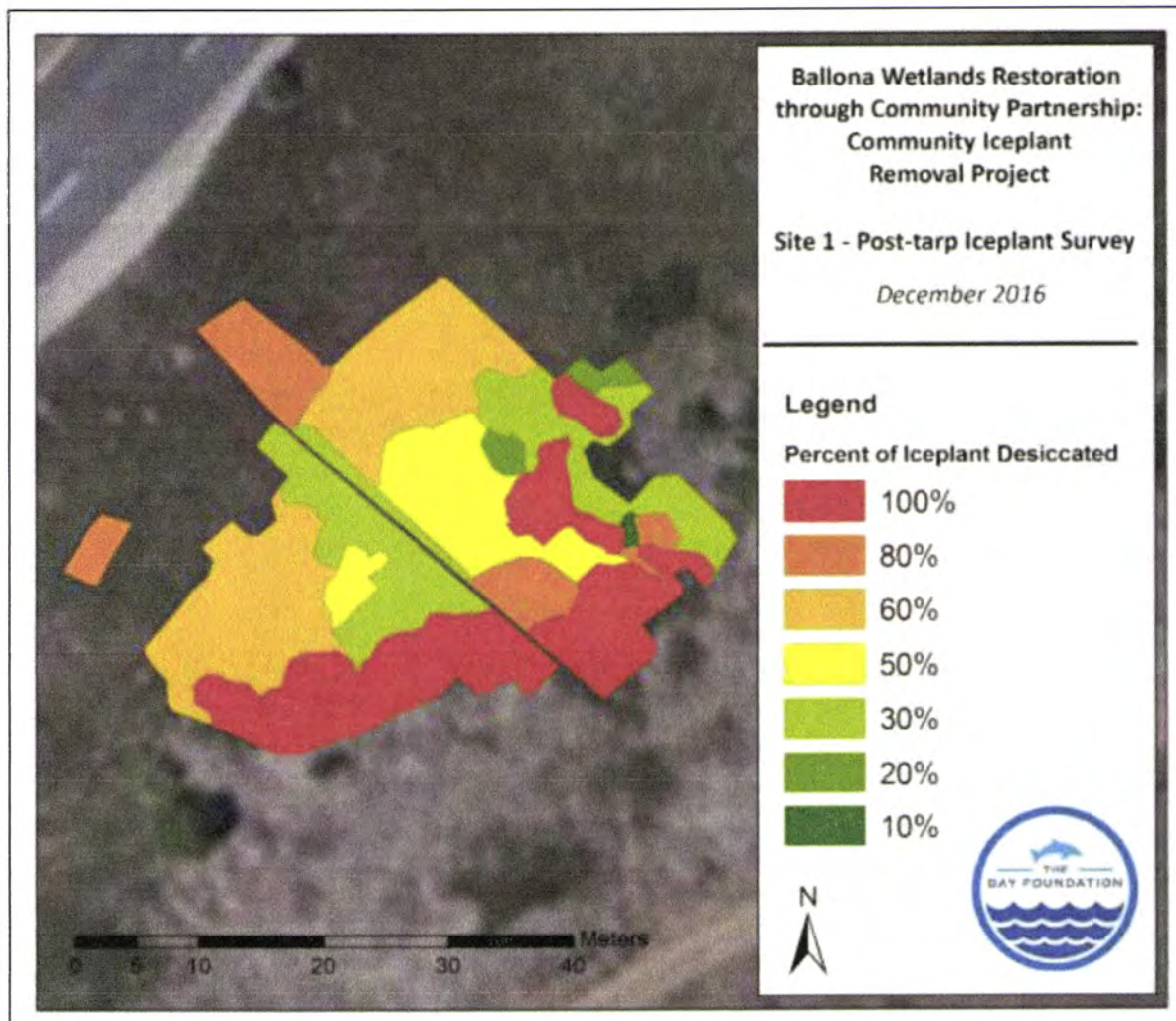


Figure 10. Site 1 only: Post-tarp iceplant survey documenting percent iceplant desiccated.

Table 3. Post-tarp efficiency survey results for Site 1 only.

Percent Desiccated	Area (%)
100%	208 m ² (28.3%)
80%	75 m ² (10.2%)
60%	201 m ² (27.3%)
50%	89 m ² (12.0%)
30%	147 m ² (20.0%)
20%	13 m ² (1.8%)
10%	2 m ² (0.3%)

Avifauna

Avifauna were identified through ornithological surveys conducted by Cooper Ecological Monitoring, Inc. and as part of wildlife observation and monitoring days conducted by TBF and the Friends of Ballona Wetlands. Table 4 includes a list of all species identified as part of these monitoring surveys. It should be noted that this is not intended as a comprehensive or exhaustive list of bird species using the restoration area and adjacent habitats; several other species were visually observed by community members during restoration events. No Belding's savannah sparrows were identified during the pre-restoration survey, and the ornithologist concluded that use of the restoration area by this species during the project was very unlikely to occur.

Frequently observed bird species included black phoebe, American crow, and pigeon. Many of the birds identified in Table 4 were seen in the clump of willows immediately adjacent to the project area, which was incidentally the result of the last iceplant removal / tarping project conducted in 2009. Several raptor species were observed hunting or foraging adjacent to or above the project site, such as red tailed hawk, red shouldered hawk, Cooper's hawk, and American kestrel. One osprey was observed hunting (flying) above the tide channel adjacent to Site 2.

In Table 4, "Other" includes both native habitats outside the restoration area or other adjacent habitats (native or non-native) not included as part of the restoration project. Wildlife and birds were counted adjacent to the project area to identify wildlife with the likely potential to use the restoration area. The category "Mixed Nativity" includes some areas that were hand-restored, but not tarped.

Table 4. Avifauna present during monitoring survey days.

Common Name	Iceplant	Other *	Mixed Nativity **	Notes / Habitat
Allen's hummingbird		X		willow clump
American crow		X	X	flying
American kestrel		X		telephone pole along Culver Blvd
Anna's hummingbird		X		willow clump
Barn swallow		X		
Black phoebe	X	X	X	only one seen in iceplant - perched on an extended stick
California towhee		X		
Common yellowthroat		X		willow clump
Cooper's hawk		X		flying (chasing pigeon)
Great egret		X		tide channel
House wren		X		willow clump and myoporum
Marsh wren		X		
Mourning dove		X		euphorbia and flying
Osprey		X		flew above tide channel
Pigeon		X		
Red tailed hawk		X		above eucalyptus (3)
Red-shouldered hawk		X		base of bluffs
Savannah sparrow		X		pickleweed - across channel from project site; possibly Belding's savannah sparrow (2)
Scrub jay		X		
Song sparrow		X		willow clump, myoporum, <i>Euthamia</i> , mulefat
Yellow warbler		X		eucalyptus

* Note: "Other" includes native habitats outside the restoration area or other adjacent habitats not included in the restoration. Wildlife and birds were still counted adjacent to the project area.

** Note: "Mixed Nativity" includes some areas that were hand-restored, but not tarped.

Wildlife Presence

Wildlife was identified during pre-monitoring surveys, as part of several restoration events, and during post-restoration surveys (Table 5). Commonly observed species included California ground squirrels, Western fence lizards, and wandering skipper. Western fence lizards were ubiquitous in every habitat type. Cottontail rabbits were frequently seen along the bluffs adjacent to the project area.

No wildlife mortality was observed under the tarps. In fact, several reptiles (Western fence lizards, an alligator lizard, and a juvenile gopher snake; Figures 11 and 12) and several amphibians (Pacific tree frogs, Figure 13) were identified and moved during restoration events because they were on, under, or immediately adjacent to the tarps. They were moved to native salt marsh habitats immediately adjacent to the restoration area so as to avoid disturbance during events.

The only mortality that was observed included several California ground squirrels and one cottontail rabbit killed through predation, each likely from a coyote or feral cats, which are both known to frequent the area. One dead raccoon was identified along Culver Boulevard, likely as a result of collision with a vehicle. These observed mortalities had nothing to do with the restoration project.

Table 5. List of wildlife (non-avifauna) identified during monitoring surveys.

Common Name	Iceplant	Other *	Mixed Nativity **	Notes
Cottontail rabbits		X		along bluff and base of bluff
CA ground squirrel	X	X	X	bluff and base of bluff; one in iceplant
South Coast marsh vole		X		pickleweed; adjacent to restoration area (1)
Western fence lizard	X	X	X	throughout restoration area and adjacent habitats
Alligator lizard	X	X		sunbathing on top of tarp (see photo)
Gopher snake	X	X		one juvenile found under tarp edge
Pacific tree frog	X	X	X	adjacent to tarps and on tarps (in rain puddles)
Wandering skipper	X	X	X	many found on surveys; primarily in saltgrass and heliotrope
Monarch butterfly		X		eucalyptus and flying/adjacent
Cabbage butterfly		X	X	mixed saltgrass and iceplant
Grey hairstreak		X		heliotrope
Common buckeye		X		heliotrope and saltgrass



Figure 11. Juvenile gopher snake found under the edge of one of the tarps on 16 September, 2016.



Figure 12. Alligator lizard found sunbathing on top of tarp during tarp-removal on 8 November, 2016.



Figure 13. Pacific tree frog found on top of a tarp during a restoration event on 10 November, 2016.

Photograph Series (Photo-Point)

A series of geotagged photo-points were established to document change over time at the restoration site. The following photos provide before and after visual representations of tarped and hand-pulled restoration activities. Figure 14 shows an example close up of a hand restoration site where iceplant was carefully removed around native saltgrass and alkali weed. Figures 15 through 17 document before and after tarping and hand-restoration at various points within the project area.

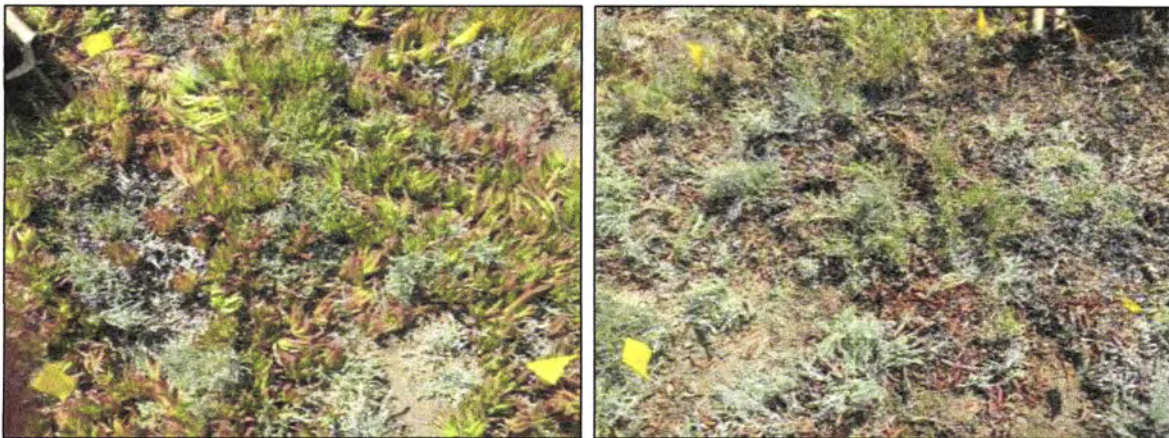


Figure 14. Photo point of pre-restoration square meter area of iceplant with intermixed native salt marsh species (top) and post-restoration photograph of the same square meter area after hand-pulling (bottom).



Figure 15. Photo point of Site 1 and 3 pre-restoration on 9 August 2016 (top) and post-restoration on 29 November 2016 (bottom).



Figure 16. Photo point of Site 1 and 3 pre-restoration on 1 September 2016 (top) and post-restoration on 29 November 2016 (bottom). Site 3 can be seen at the base of the bluff hill.



Figure 17. Photo point of Site 2 pre-restoration on 9 August 2016 (top) and post-restoration on 29 November 2016 (bottom).

Challenges

The primary challenges associated with this project came from a misunderstanding of the impacts of the tarp restoration method on iceplant and associated wildlife both from the public and from the Coastal Commission. There was unanimous consensus from the scientific community surveyed prior to the implementation of this project that the tarping method was a successful, low-impact, and cost-effective eradication method for iceplant. However, some community members still felt that there might be wildlife mortality under the tarps. Conclusions drawn from the implementation of this project support the scientific evaluations for similar projects throughout southern California; notably, that there was no wildlife mortality underneath the tarps. In fact, western fence lizards, alligator lizards, and Pacific tree frogs were numerous in and around the restoration area. No wildlife mortality was caused by the tarping restoration method. Conversely, it seemed as though reptiles, amphibians, mammals, invertebrates, and birds were all actively using the site and surrounding habitat areas similarly to activities seen on the pre-restoration surveys. Some reptiles and amphibians were found on top of or underneath the tarps, sunbathing or warming from the tarp heat.

Another challenge of this project was the initial lack of 100% success using the tarping method. The early-onset rains and the overly-restrictive timing on the permit conditions forced the tarps to be pulled prior to the full desiccation of the iceplant in several areas. While much of the site still had significant desiccation, an extension of the duration of tarp placement would solve the problem. Thus, a higher percentage of desiccated area could be easily solved for future projects by extending the tarping cover permit to be able to have a start implementation date earlier in the summer, on or around 1 August, 2016.

Conclusions

Iceplant is a ground-hugging succulent that can grow deep, nearly impenetrable mats several feet thick which dominate resources along a range of soil moisture and nutrient conditions. Iceplant provides little protection or useable habitat for native birds and wildlife. Additionally, its shallow, fibrous root network consumes large quantities of available water year-round, further impeding the growth of native species with the largest impact occurring during times of drought. Most significantly, the highly competitive characteristics of iceplant for available nutrients, water, light, and space allows it to suppress the growth of native seedlings and often results in the growth of large, monospecific stands providing minimal habitat value. Iceplant also alters soil conditions, making the influx of native vegetation species difficult.

The importance of iceplant removal at a site like the Ballona Reserve should not be understated. It is an invasive species that has increased in area on the Reserve by approximately 20% since the mid-2000's, covering approximately 30 acres of the Reserve (before the implementation of this project). While this project was focused on a relatively small area, it will serve to inform future hand-restoration efforts

both at the Reserve and throughout southern California. Additionally, it is an important way to engage the community and have a positive environmental impact. Many of the participants were incredibly enthusiastic and hard working, and the student participants were able to further integrate hands-on restoration activities with in-classroom learning.

The specific project location was chosen to evaluate the difference between tarped iceplant monocultures and adjacent intermixed areas of natives (predominantly a mix of iceplant and saltgrass). Tarping required much less effort and labor costs, though it was more expensive for materials and supplies (e.g. tarps, garden staples, bricks to hold down the edges). Tarping should still be seen as a cost-effective restoration method as the total cost of all supplies was less than \$2,000. The project could be replicated on a larger and even more cost-effective scale. Though tarping was not 100% effective across all restoration areas, it was still highly successful. With the addition of two restoration events, all remaining live iceplant within the tarped areas was removed. Lastly, it should be emphasized that there was no wildlife mortality associated with this method of restoration and it involved less disturbance, overall.

Hand-restoring through removal of iceplant by the roots was also successful, and a good way to avoid most impacts to intermixed native vegetation. There was an additional cost associated with labor, but it was mitigated with a variety of volunteer and student participants. There were small costs associated with materials and supplies for this restoration method too (e.g. gloves, burlap sacks), but more significant costs associated with the green waste dumpsters, especially for the areas with deep, thick iceplant mats that were large and heavy. This method was a great way to engage the community.

Both methods of iceplant removal will provide immediate and long-term ecological benefits to the Reserve. Following the establishment of native vegetation, ecological functions of the restored area will increase by providing habitat, food sources and opportunities for foraging by birds and other wildlife, and protective cover for a variety of native fauna. New vegetation will increase native biodiversity and provide healthier habitat for several endangered and special concern species such as the Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) and South Coast marsh vole (*Microtus californicus stephensi*). The new native vegetation will also increase the ability of local flora and fauna to compete against invaders, increasing the resilience of the restored areas and their ability to respond to urban stressors. Restored areas will continue to be carefully monitored to quantify change over time within and adjacent to the restoration areas and the results will continue to be publically reported.

This project is an incredibly important local example comparison of two types of low-impact restoration methods (tarping and hand-restoration). Continuing scientific monitoring over time will be important to inform future restoration efforts at the Reserve, and this report presents an unbiased dissemination of the results of the restoration project. This report will be published on TBF's project website, and will be submitted to the Coastal Commission.

Appendix A

Final CWRGP Project Information Sheet

PROJECT NAME: Ballona Wetlands Restoration through Community Partnership
(Grant #: 2015-001)

GRANTEE: The Bay Foundation (TBF)

A. Basic Project Information

- 1) *YEAR GRANT AWARDED:* 2015
- 2) *AMOUNT AWARDED:* \$28,000.00
- 3) *YEAR GRANT COMPLETED:* 2016
- 4) *AMOUNT SPENT:* \$27,992.68
- 5) *TOTAL ACRES RESTORED:* 0.88 acres
- 6) *NUMBER OF NATIVE PLANTS PLANTED:* None

This project is allowing for natural recruitment of native vegetation over time to reduce disturbance based on requests from the California Department of Fish and Wildlife and their Native American consultants.

- 7) *NUMBER OF NATIVE TREES PLANTED:* None

However, TBF is exploring the opportunity to supplement native regrowth of vegetation with willow cuttings from the project-adjacent clump of willows in the spring using matching funding. This was recommended by the Native American consultant.

- 8) *CUBIC YARDS OF INVASIVE PLANTS REMOVED:* >200 cubic yards; >15 tons

Over 200 cubic yards of invasive iceplant were removed from site, equating to over 15 tons in weight, measured through weighing of green waste dumpsters. Additionally, solarized (tarped) iceplant was left in place as mulch for water retention (and to reduce disturbance) on a little less than approximately half of the restored area and is estimated to equate to another 200 cubic yards and 15 more tons of iceplant 'removed' (see full report and Table 2 for details).

- 9) *NUMBER OF INVASIVE TREES REMOVED:* None

- 10) *CUBIC YARDS OF NON-PLANT MATERIAL REMOVED:* Miscellaneous trash pickup; <1 cy

None calculated, though restoration events also included some trash clean-up that occurred with old trash and debris that had been left on site over time (not as part of this project) (see, for example, photograph of an old tire found buried under several layers of iceplant).

- 11) *NUMBER OF VOLUNTEERS USED:* 181 volunteers
- 12) *NUMBER OF VOLUNTEER EVENTS HELD:* 12 events

13) *NUMBER OF VOLUNTEER HOURS CONTRIBUTED*: 525 hours for all events combined.

This number does not include additional staff contributed volunteer time or those from matching funds, or contributed time from expert scientists consulted as part of the project planning.

14) *NUMBER OF EDUCATIONAL SIGNS INSTALLED*: None

However, every volunteer event and school group tour received an informational speech prior to restoration including the history of the Ballona Reserve, the need for restoration and invasive species removal, and safety and cultural resources. Additionally, several teachers facilitated an interactive learning experience for their school groups through worksheets and on-site discussions, including discussions about urban wetlands, invasive plants and their problems, and the challenges of restoration.

B. Project Reach and Impact

1) DID YOUR PROJECT RECEIVE PRESS COVERAGE?

Yes, TBF released one formal media press release on 11 March, 2016, and interviewed for multiple newspaper articles. Several notable articles were published on 2 March, 2016, through the Argonaut Newspaper, and on 13 March, 2016 for the Daily Breeze – both local Los Angeles papers highlighting the need for restoration and information about iceplant. Additionally, Dr. Katherine Pease, staff scientist for Heal the Bay, wrote an inspiring article on the importance of restoration at Ballona. Media article and blog links are included below:

- 03-02-2016 – Argonaut: <http://argonautnews.com/killing-plants-to-save-the-wetlands/>
- 03-13-2016 – Daily Breeze: <http://www.dailybreeze.com/environment-and-nature/20160313/conservationists-target-ice-plant-invading-ballona-wetlands>
- 03-14-2016 – Maven's Notebook (near bottom):
<https://mavensnotebook.com/2016/03/14/news-worth-noting-delta-tunnels-a-poor-investment-for-the-bay-area-westlands-and-mountain-counties-letter-to-governor-brown-in-support-of-biomass-facilities-ballona-wetlands-5-yea/>
- 03-30-2016 – Argonaut opinion blog: <http://argonautnews.com/opinion-power-to-speak-a-win-for-science-in-the-ballona-wetlands/>
- 08-25-2016 – Argonaut: <https://issuu.com/argonautnews/docs/argonaut082516>
- 09-06-2016 – HomeTown News: no link; listed notice for volunteer days and events
- 09-08-2016 – Argonaut: <https://issuu.com/argonautnews/docs/argonaut090816>

Additionally, TBF put together a formal webpage for the project, which also served as a notification center for volunteers about events and ongoing work on the project. The webpage was updated frequently.

- TBF iceplant webpage: <http://www.santamonica-bay.org/explore/wetlands-rivers-streams/ballona-wetlands-ecological-reserve/community-iceplant-removal-project/>

2) PLEASE SUBMIT BEFORE AND AFTER PHOTOGRAPHS OF YOUR PROJECT SITE.

See full report for documented photo point locations before, during, and after the project implementation.

3) HAS THERE BEEN AN INCREASED NUMBER OF SPECIES USING THE SITE?

Post-restoration monitoring suggests initial results of reductions in invasive species, and the beginnings of returning of native salt marsh species. Additionally, birds, wildlife, and invertebrates such as butterflies continue to use the restoration areas and adjacent areas. Ongoing monitoring through matching funds will more thoroughly evaluate the return of species to the site over time and the establishment of new vegetation in the restored areas. The next report will be published in mid-summer 2017.

4) DID YOU USE SOCIAL MEDIA TO HELP ACHIEVE PROJECT GOALS? PLEASE LIST ALL RELEVANT WEBSITES, FACEBOOK SITES, INSTAGRAM/TWITTER HANDLES, ETC.

Yes, both TBF and the Ballona Wetlands Restoration Project regularly posted about volunteer events, project progress, photographs, and reporting information. A total of 10 posts related to the project were posted on TBF's facebook page (<https://www.facebook.com/TheBayFoundation/>), which has nearly 2,700 followers, and twitter page (<https://twitter.com/SMBRF>), which has 954 followers. Additional online outreach to engage community volunteers included posting opportunities on www.volunteermatch.org. Additionally, other community partners and participants such as Heal the Bay, Friends of Ballona Wetlands, Center for Urban Resilience, and LMU also shared or posted information about the project on their sites.

TBF and Ballona Restoration links below:

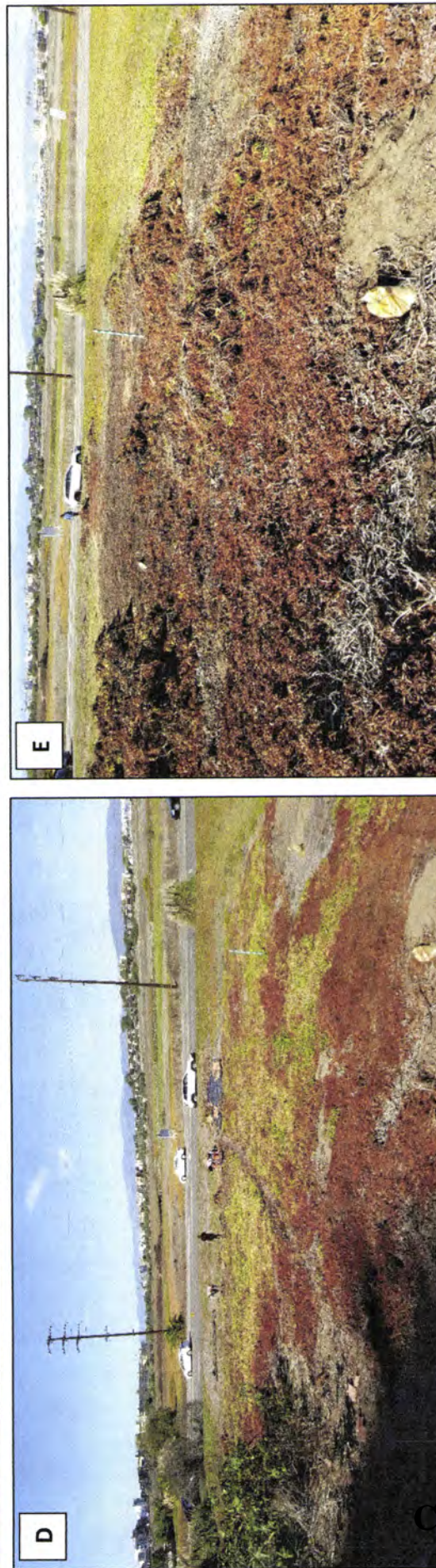
- TBF website: <http://www.santamonicabay.org/>
- Twitter: @SMBRF: <https://twitter.com/smb rf>
- Facebook: @TheBayFoundation: <https://www.facebook.com/pages/Santa-Monica-Bay-Restoration-Foundation/130999036940840>
- Instagram: @thebayfoundation: <https://www.instagram.com/thebayfoundation/>

- Ballona Wetlands Restoration Project website: <http://ballonarestoration.org/>
- Twitter: @restoreballona: <https://twitter.com/restoreballona>
- Facebook: @ballonarestoration: <https://www.facebook.com/ballonarestoration/>

5) ANY OTHER PROGRESS OR STORIES YOU WOULD LIKE TO SHARE?

Please see full report for additional details, photographs, and monitoring data.

Appendix B Site 1 Photographs



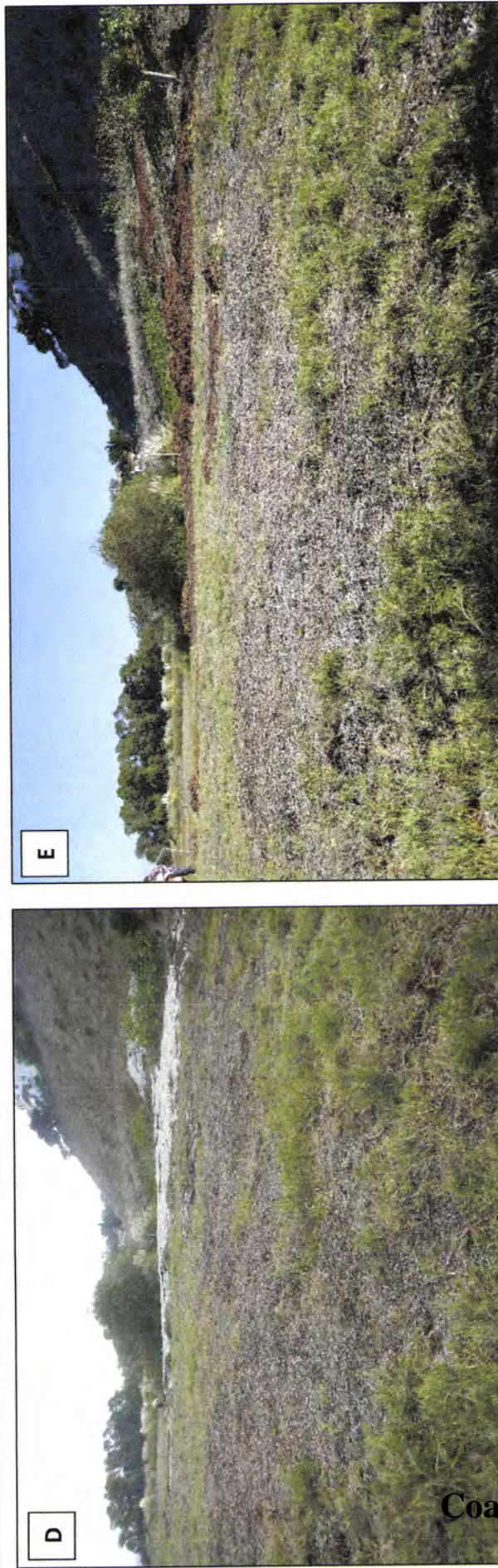
Photographs of Site 1 on (A) 28 May 2015; (B) 8 September 2016; (C) 26 October 2016; (D) 10 November 2016; (E) 29 November 2016

Appendix B Site 2 Photographs



Photographs of Site 2 on (A) 9 August 2016; (B) 6 September 2016; (C) 24 October 2016; (D) 15 November 2016; (E) 29 November 2016

Appendix B Site 1 and 3 Photographs



Photographs of Site 1 and 3 on (A) 28 May 2015; (B) 1 September 2016; (C) 13 September 2016; (D) 24 October 2016; (E) 29 November 2016