

GRANT FINAL REPORT

California Department of Fish and Wildlife
Office of Spill Prevention and Response
Agreement # 1475030

Complete Restoration of Point Reyes North Great Beach
Critical Dune Habitat
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Marin County, California

May 2017

INTRODUCTION:

PROJECT NEED BACKGROUND: Point Reyes National Seashore (Seashore) contains some of the highest quality remaining coastal dune habitat in the nation. However, this habitat has been seriously threatened over the last century by the rapid encroachment of European beachgrass (*Ammophila arenaria*) and ice plant (*Carpobrotus edulis*). These non-natives were planted extensively in the 19th and 20th centuries to stabilize the dune sand, primarily to prevent filling of adjacent lands and burial of roads and railroad tracks. By 2000, more than 1,000 acres of the 1,400 acres of dunes in the Seashore were dominated by European beachgrass and ice plant.

These species not only alter the natural process of sand movement, eliminating inland dune migration, but adversely affect the survival and spread of native plant and wildlife species. Indeed, two of the primary species that use dune habitat within the Seashore are at immediate risk of extinction due both directly and indirectly to beachgrass encroachment. Federally threatened western snowy plover (*Charadrius alexandrinus nivosus*) nest on beach shores directly adjacent to foredunes, but, as the foredunes are currently dominated by European beachgrass, they not only do not provide habitat for plovers, but actually provide habitat or cover for plover predators. A recent study supported the correlation between increases in European beachgrass cover and decreases in plover nesting attempts, concluding that plovers preferentially select open habitats for courtship and nesting, because they facilitate early detection of predators (Muir and Colwell 2010). Only 15 snowy plovers nested at PORE in 2010 and 2011, down 81% (from 74) in 1987, and of the 36 chicks that were hatched in 2011, only 11 survived to fledging (NPS, unpub.data). In 2012, nesting attempts dropped to seven (7), with three of those either in or directly adjacent to the restoration area (NPS, unpub. data).

Although this precipitous decline may be due to factors affecting plovers outside the park, lack of safe nesting habitat probably also plays a significant role, as declines have occurred despite extensive public education and nest fencing efforts by the Seashore. European beachgrass also provides cover or habitat for native deer mice that eat up to 82% of the seed of a federally endangered perennial dune plant species, Tidestrom's lupine (*Lupinus tidestromii*; Dangremond et al. 2010). In fact, recently completed population viability analyses by university researchers have shown that almost all of the Seashore's Tidestrom lupine populations are headed towards extinction, because they are not successfully reproducing due to seed predation (Dangremond et al. 2010; E. Pardini, Washington University, *pers. comm.*). European beachgrass also creates monotypic stands that directly displace native dune species such as the federally endangered beach layia (*Layia carnosa*) and other rare and non-listed species that act as nectar sources for the federally endangered Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*).

PREVIOUS AND CURRENT PROJECTS: Some of the Seashore’s highest quality dunes occur near Abbotts Lagoon at the northern end of the Great Beach. To protect some of these threatened, endangered, and rare plant species that use these dunes, the Seashore began a concerted restoration process in 2000. At least 50 acres were restored near Abbotts Lagoon using primarily hand removal and mechanical methods between 2000 and 2005. In 2011, another approximately 98 acres of European beachgrass was or is being removed from 200 acres near Abbotts Lagoon, just north of the 50 acres treated earlier. In 2012, approximately 25 additional acres were treated south of the 2011 project extent. In addition, the Seashore received funding from the National Park Service (NPS) to restore approximately 71.2 acres at the AT&T Dunes, located south of Abbotts Lagoon. That project was initiated in 2015.

This spatially sequential approach to dune restoration not only decreases the threat of recolonization by these vegetatively spreading species, but increases the amount of unfragmented, native coastal dune habitat available for key threatened and endangered species such as western snowy plover, Tidestrom’s lupine, beach layia, Myrtle’s silverspot, and others.

GRANT PROJECT: The area that received funding under the EEF grant leverages on these previous and current restoration efforts by restoring dunes in the southern portion of the Abbotts Lagoon Coastal Dune Restoration Area (Figure 1). The Project Area is located in coastal dunes just west of the former RCA radio transmission facility (currently North District Operations Center) and G Ranch along Sir Francis Drake Boulevard (Figure 1). Within the 45-acre Project Area, approximately 13 acres of the highly invasive and habitat-altering European beachgrass was removed using similar methods to those used between 2011 and 2013 in the Seashore and to other dune restoration projects in California (Figure 2). The grant project enabled the Seashore to link the two restoration projects – Abbotts Lagoon and AT&T -- by restoring the last, remaining stand of European beachgrass that remained in the expanded project area and, thereby, created almost 400 acres of unfragmented dune habitat.

The goal of the project is to reduce European beachgrass vegetative cover to less than 2% of its pre-restoration cover using herbicide treatment, with control of European beachgrass (<1%) expected in subsequent treatments after the grant project is completed. The grant project involved initial treatment of 13 net acres of European beachgrass, with a follow-up treatment of missed plants and any resprouts the next year.

METHODS:

BEACHGRASS TREATMENT: The EEF grant project was initiated in 2015, with follow-up re-treatment conducted in 2016. In 2015, the Seashore contracted with Hanford ARC, Inc., which performed the treatment in September 2015 and the follow-up treatment in 2016.

The herbicides used for treatment and re-treatment were 2% glyphosate (Aquamaster[®]; currently marketed as Roundup Custom[®]) and 1% imazapyr (Habitat[®]), with 1.5% surfactant (Competitor[®]) and 1% blue dye also incorporated. The Seashore obtains a Pesticide Use Permit annually for herbicides used.

Spraying of herbicide was conducted with a backpack sprayer and a calibrated, directed nozzle to control spray, which allowed for protection of existing native plant species (Figure 3). No spraying was conducted when winds at plant level exceeded 10 mph; during heavy fog conditions; 24 hours prior to a predicted rain with a 20% probability of occurring; and 24 hours after a rain event unless plants are dry. No-spray buffers will be



Figure 3. Crews spraying on Ammophila Mountain. Use of backpack sprayer allowed for protection of native plants.

established around rare plants (10 feet, unless drift shield employed), dune mat vegetation (10 feet, unless drift shield employed), wetlands (25 feet), wetlands with California red-legged frog (60 feet), and active western snowy plover nests (500 feet), as well as between the project area and adjacent organic pastures and cattle (25 feet; Figure 4). Hand removal was conducted for iceplant removal and for beachgrass removal in sensitive



Figure 4. 25-foot untreated buffer to pastures managed as organic.

resource areas (primarily native dune and wetlands), and hand or mechanical removal will be used directly adjacent to sensitive resource areas. Seashore and PRNSA staff worked with contracted crews to try and ensure full protection of non-target native plant species and any rare plant species encountered.

VEGETATION MONITORING: Photopoints were established within European beachgrass removal areas to track success of this project in eliminating beachgrass from the 13-acre project area. A random stratified approach was used to locate photopoints in ArcGIS. Photopoints were established within European beachgrass removal areas to track success of this project in eliminating beachgrass from the 13-acre project area.

Photopoints were selected based on the topography of the site, using high elevation points stratified across the project area. Ten (10) photopoint locations were established in 2015, using a GPS to record the selected locations. No physical materials were used to monument the sites, but the original photograph is used to help frame each photograph. Photographs are taken at the selected points facing four to eight different directions. Photographs have been taken in 2015 (October), 2016 (June), and 2017 (May).

RESULTS:

In 2015, work started on herbicide treatment of European beachgrass on Ammophila Mountain on September 23, 2015, with construction of secondary access routes to work areas. PRNSA also hired a temporary biologist who oversaw work of the contracted crew. Treatment began on September 24, 2015, and continued through October 19, 2015. We had some breaks in work due to rain and/or high winds. Ultimately, 11.1 acres of beachgrass underwent initial treatment: the attached graphic shows the actual treatment area (Figure 5).

Regrowth after the first year was visually estimated at between 1 and 3%. Re-treatment of these areas occurred on September 19, 2016 and took less than one day of contractor crew effort.

In spring 2017, visual surveys and monitoring of photopoints suggested that regrowth was still very minimal. In other projects, we have often seen a “boom” in regrowth of the primary target species in the second year, so this is a good sign. In addition, the photopoints from 2017 indicated that other species are beginning to recruit into the treated former beachgrass areas, including wild cucumber (*Marah fabaceus*; Attachment A). The Seashore will conduct re-treatment in fall 2017 and in future years.

CONCLUSIONS:

Based on visual assessment and monitoring results, chemical treatment appeared to be successful at eradicating invasive species in the Ammophila Mountain project area. Re-treatment will continue to be conducted in the future to ensure success of removal efforts. So far, restoration activities appears to be achieving the first part of our objective – eliminate invasive, non-native plants – but time will be needed to determine whether we can meet the second part of our objective – restore native vegetation communities and successional dynamics. In the future, we hope that restoration efforts will result in restoration of a diverse community of native Dune Scrub species, thereby creating a viable linkage between Abbots and AT&T Coastal Dune Restoration efforts.

REFERENCES:

Dangremond, E.M., E.A. Pardini, and T.M. Knight. 2010. Apparent competition with an invasive plant hastens the extinction of an endangered lupine. *Ecology*. 91(8): 2261-2271.

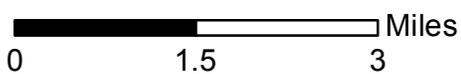
Muir, J. J., and M. A. Colwell. 2010. Snowy Plovers Select Open Habitats for Courtship Scrapes and Nests. *The Condor* 112:507–510.

**Abbotts Lagoon Dune Restoration
Phase IV - Ammophila Mountain**
Point Reyes National Seashore



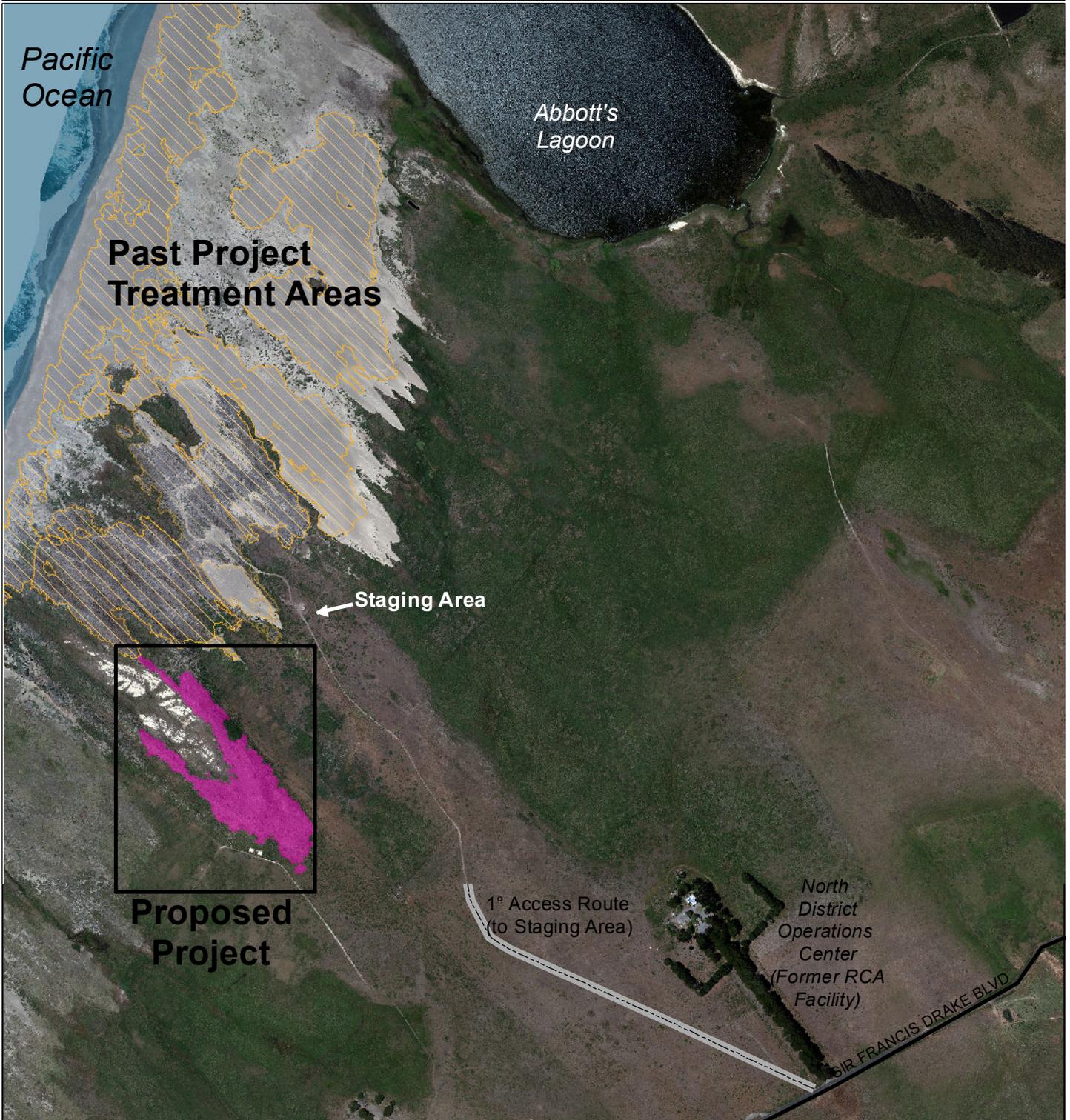
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Figure 1. Project Vicinity



Abbotts Lagoon Dune Restoration: Phase IV - Ammophila Mountain

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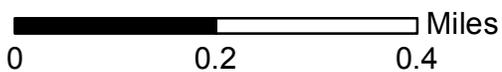
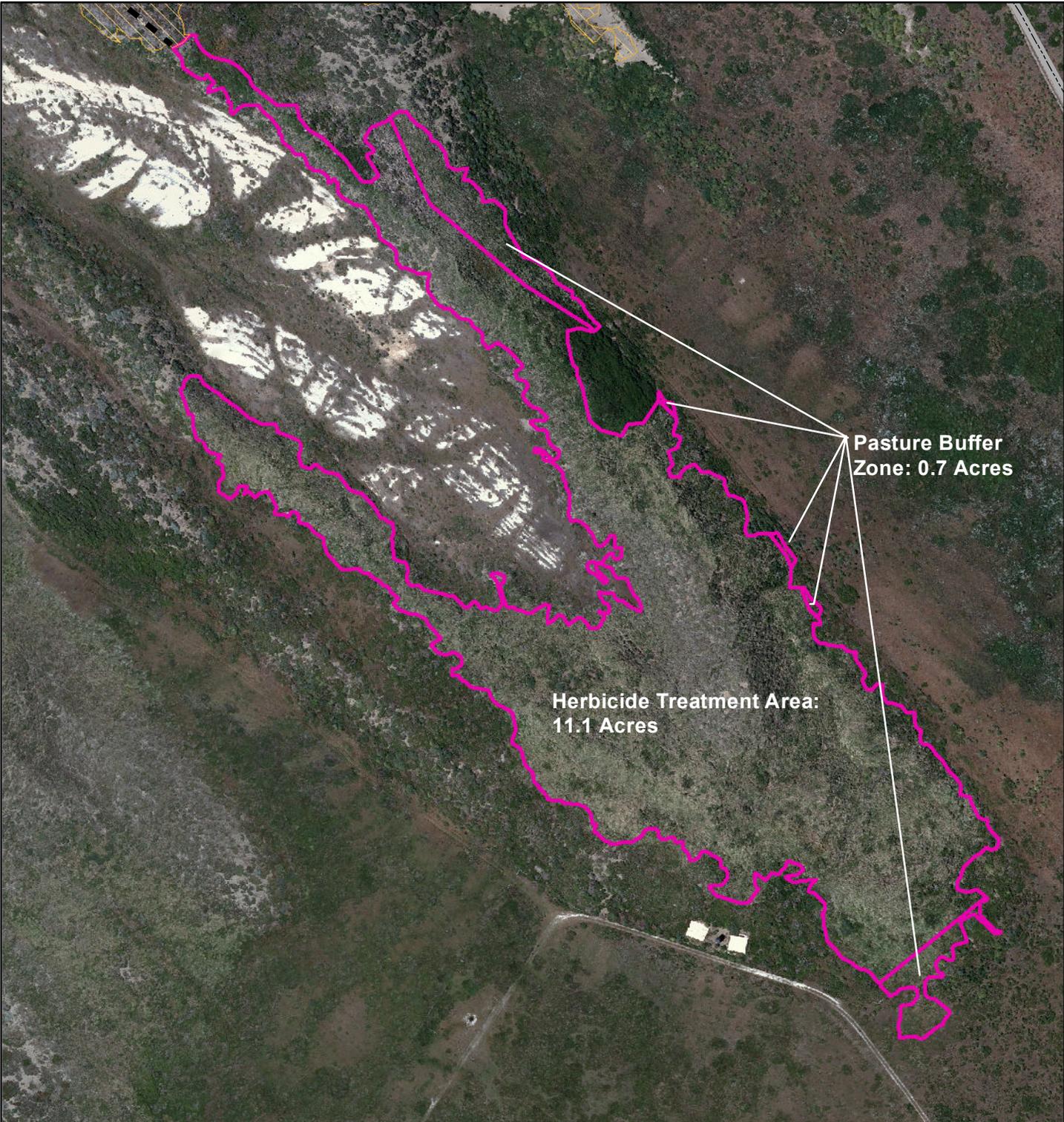


Figure 2. Project Area and Access Route

Abbotts Lagoon Dune Restoration: Phase IV - Ammophila Mountain

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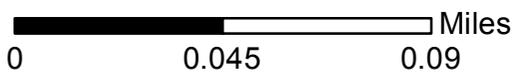
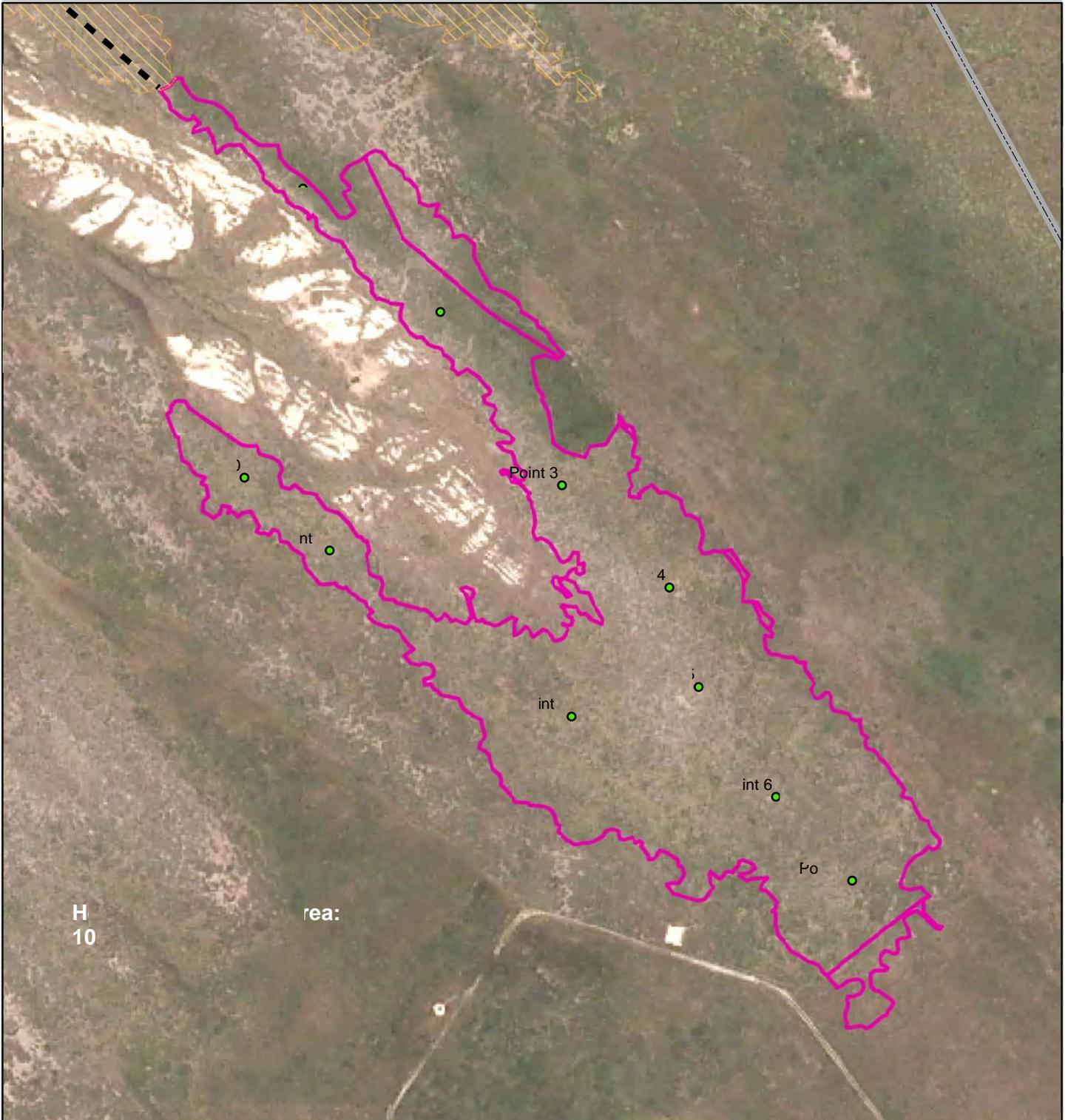


Figure 5. \$FMDOWork Area

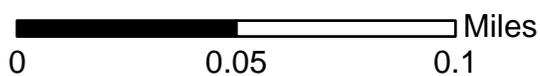
ATTACHMENT A: Photographs taken at Photpoints 1-10 during 2015, 2016, and 2017

Abbotts Lagoon Dune Restoration: Ammophila Mountain Photopoints

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Legend

Photo Points

- 1 -10
- 🌿 Treatment Boundary

AMAR MTN Photopoints
2015, 2016 & 2017

Point 1

2015



2016



2017



Point 2

2015



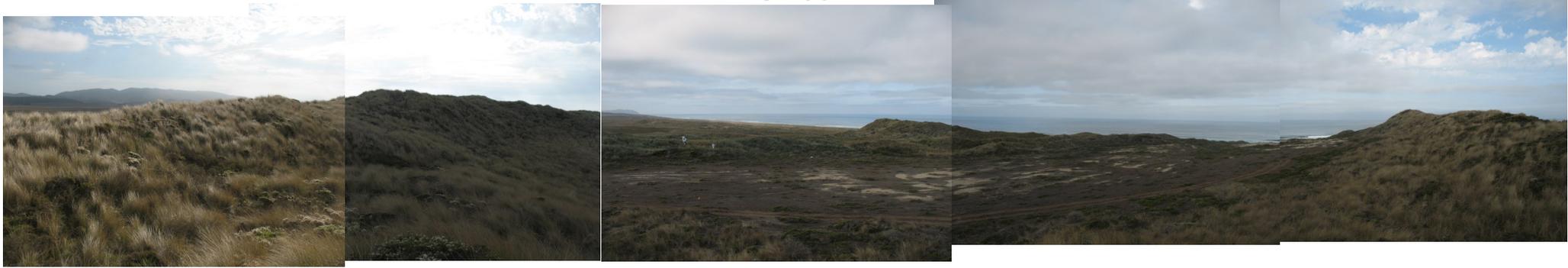
2016



2017



Point 3



2015



2016



2017

Point 4



2015



2016



2017

Point 5



2015



2016



2017

Point 6



2015



2016



2017

Point 7



2015



2016



2017

Point 8



2015



2016



2017

Point 9



2015



2016



2017

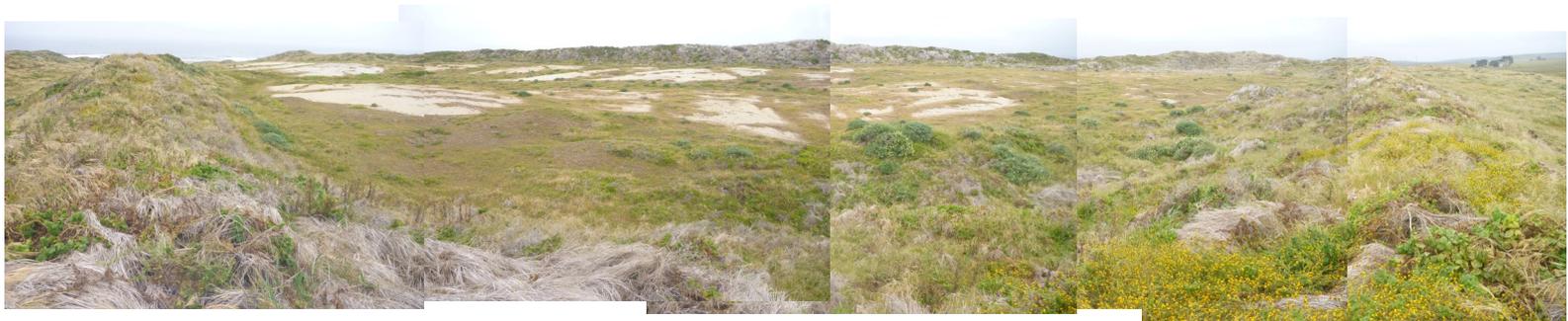
Point 10



2015



2016



2017

