
Western Snowy Plover Habitat Restoration at Vandenberg Air Force Base, California: Torch Oil Spill Mitigation

Quarterly Report for Summer 2012 & End of Contract Summary

13 September 2012



Prepared for:

30th Space Wing Asset Management Flight
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1.0 Introduction

On 27 September 1997, a rupture occurred along a pipeline connecting offshore torch/platform Irene to the onshore processing facility. The spill released 163 barrels of crude oil into the ocean, spreading throughout 17 miles of northern Santa Barbara County coastline. The most heavily oiled beach was Surf Beach on Vandenberg Air Force Base (VAFB or Base). In October 2007, a *Torch/Platform Irene Oil Spill Final Restoration Plan/Environmental Assessment* was developed, which calls for mitigation through the restoration of sandy beach and dune habitat on Surf Beach, funded through the Natural Resources Damage Assessment and Restoration Fund. Restoration is to be accomplished through the eradication of invasive plant species and enhancement of coastal strand habitat for the federally threatened western snowy plover (*Charadrius alexandrinus nivosus*), a small shorebird that breeds on the beaches of VAFB.

In September 2007, the 30th Space Wing Asset Management Flight, Natural Resources Management (30 CES/CEANC) at VAFB, tasked ManTech SRS Technologies, Inc. (MSRS) with implementing the *Final Plan for the Removal of Selected Invasive Plants from Western Snowy Plover Habitat at Vandenberg Air Force Base* (SRS Technologies 2005). This plan calls for the eradication of invasive coastal dune vegetation, European beachgrass (*Ammophila arenaria*), iceplant (*Carpobrotus* spp.), and Sydney golden wattle (*Acacia longifolia*) from a 30.8 acre area along a 0.62 mile section of coastline from the Santa Ynez river mouth extending south to the beach access trail at Surf Station, referred to herein as Area D (Figure 1).

In August 2009, VAFB tasked MSRS with conducting the first phase of the restoration plan, which included: collection of baseline vegetation data, development of photo monitoring stations, mechanical mulching of Sydney golden wattle and herbicide treatment of European beachgrass and iceplant within the restoration site (Figure 1). Work began in September 2009 with the mechanical mulching of 6-acres of habitat infested with Sydney golden wattle, which controlled the trees and created a firebreak perimeter in preparation for a prescribed burn of the restoration site.

On 22 October 2009, VAFB Hot Shots in coordination with 30 CES/CEANC botanist, Ms. Luanne Lum, implemented a prescribed burn within the restoration area. The prescribed burn was the first step in a European beachgrass management schedule developed by Tim Hyland (California Department of Parks and Recreation) and Pete Holloran (Environmental Studies Department, University of California, Santa Cruz) for beaches in Santa Cruz County (T. Hyland, pers. comm.). In their work, fire was used to create optimal conditions for herbicide application by removing thatch, and promoting fresh regrowth of European beachgrass. Reemerging grass shoots were then treated with a 7 percent concentration of glyphosate herbicide containing a surfactant that facilitates adhesion of the herbicide to foliage. Though this method is reported to result in a 60-80 percent kill rate, successive retreatment was necessary to achieve target control goals.

During the 2010-11 contract period, MSRS performed repeated treatments of the restoration site using the glyphosate herbicide, brand named Rodeo® (Dow AgroSciences LLC). During that same period, test treatments of European beachgrass



Figure 1. Location of invasive plant infestations, photo monitoring stations, and public access within the snowy plover restoration area.

were conducted elsewhere on VAFB as part of a separate contract. These tests were intended to determine if the application of a low concentration imazapyr herbicide would result in a greater rate of beachgrass control than use of a high concentration glyphosate herbicide.

The results of testing trials indicate that imazapyr herbicides, brand name Polaris® (Nufarm Specialty Products) and Habitat® (DOW Chemical) significantly improve the effectiveness of beachgrass treatments over Rodeo®. Furthermore, use of imazapyr reduces herbicide use in terms of weight by 89-percent. Given this information, Ms. Lum obtained DoD and U.S. Fish and Wildlife Service authorization for MSRS to switch herbicides for the remainder of the restoration project.

This report summarizes herbicide treatment activities performed during Summer Quarter 2012 (1 June to 30 August 2012) and provides a final synopsis of all restoration activities performed during the entire contract period from 15 September 2011 to 14 September 2012.

2.0 Herbicide Treatment Summary

To minimize impacts on nesting western snowy plovers, invasive plant treatments during Summer 2012 were limited the public access area east of the Lawrence of Arabia trail fence line (Figure 2). Within this area, MSRS focused on the retreatment of European beachgrass and control of iceplant and Sydney golden wattle seedlings that routinely sprout within this portion of the restoration following the spring growing period. In addition to these primary target species, MSRS conducted focused treatments of four other persistent weed species present within this portion of the restoration site. Two of these species, lollipop tree (*Myoporum* sp.) and narrow leaved iceplant (*Conicosia pugioniformis*) were present within the project in low numbers prior to the start of restoration activities. Black mustard (*Brassica nigra*) and Russian thistle (*Salsola collinea*) were conversely unknown to the site and were most likely introduced by the mastication equipment used to clear the large Sydney golden wattle grove in 2009.

All seven species were treated using an herbicide cocktail combining 1-percent concentration imazapyr with 2-percent concentration glyphosate. Though imazapyr is highly effective at controlling all of these species, it is a slow acting herbicide and would therefore fail to kill the annual plant species such as black mustard, Russian thistle and narrow leaved iceplant before they had the chance to set viable seed. Glyphosate was added to the herbicide mixture because it is fast acting and controls these annual species quite effectively. In an attempt to exhaust the seed bank of all these invasive species, MSRS performed two complete treatments of all plants (including seedlings) within this 7.34 acre area. Treatments were separated by one and a half months to allow time for a second flush of seedlings to sprout and become viable the applicator.

In Summer 2012, MSRS treated 14.68 acres of infested habitat using 5.4 pounds of concentrated Polaris® and 29.1 pounds of concentrated Rodeo®. Table 1 provides a tabular summary of invasive weed treatment activities performed during this contract arranged by treatment quarter.

Over the course of the 2011-2012 contract period, MSRS performed two complete rounds of treatment of all invasive plants species within the entire restoration site. These treatments were performed using 5.2 pounds of concentrated Habitat®, 62.6 pounds of Polaris®, and 788.75 pounds of Rodeo® herbicide. Table 1 provides a tabular summary of invasive weed treatment activities performed during this contract arranged by treatment quarter.

Table 1. Invasive weed treatment summary by quarter and species.

Time Period	Species	Method of Control	Chemical Type	Chemical (lbs)	Invasives Treated (Acres)	Total Invasives Treated Within T&E Habitat (Acres)	Total Invasives Treated Within Wetland Habitat
Fall Quarter2011 (1 Oct – 31 Jan)	European Beachgrass	Foliar Herbicide	Polaris	5.2	4.95	22.12	0
			Rodeo	137.7			
	European Beachgrasses &Iceplant	Foliar Herbicide	Habitat	5.2	12.36		
			Polaris	4.8			
			Rodeo	432.31			
	European Beachgrass, Iceplant & SydneyGolden Wattle	Foliar Herbicide	Rodeo	189.54	4.81		
Winter Quarter 2012 (1 Feb – 31 Mar)	European Beachgrass	Foliar Herbicide	Polaris	45.0	23.46	24.06	0
	Iceplant	Foliar Herbicide	Polaris	2.2	0.6		
			Rodeo	0.1			
Spring Quarter 2012 (1 Apr – 30 Jun)	No treatments performed in restoration area during the snowy plover breeding season						
Summer Quarter 2012 (1 July – 30 Sept)	Black Mustard, European Beachgrass, Iceplant, Lollipop Tree, Narrow-Leaved Iceplant, Russian Thistle, Sydney Golden Wattle	Foliar Herbicide	Polaris	5.4	14.68	14.68	0
			Rodeo	29.1			
Overall Contract			Habitat	5.2	60.86*	60.86*	0
				62.6			

Totals	Polaris Rodeo	788.75			
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**Value reflects retreatments within the 30.8 acre restoration site.*

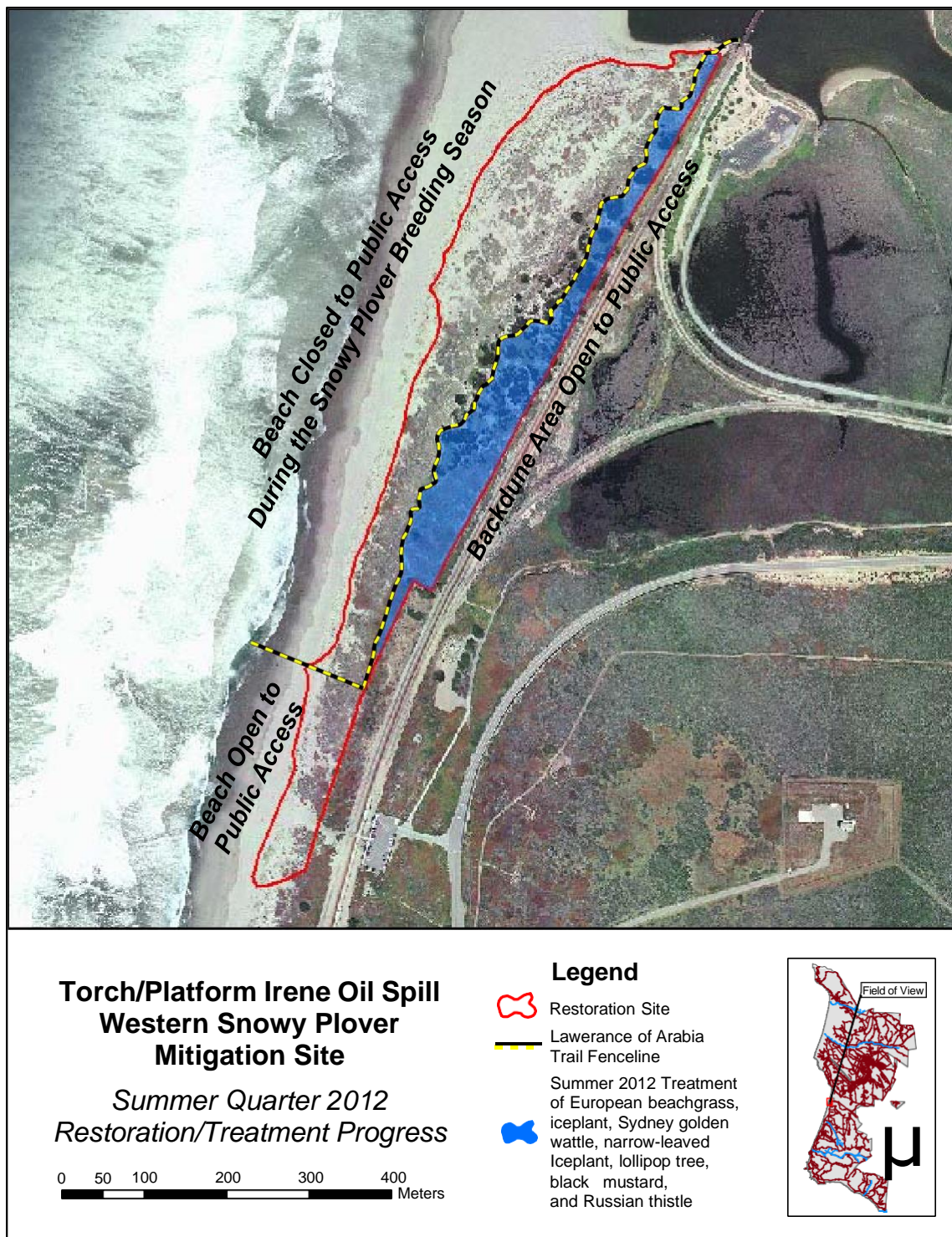


Figure 2. Invasive species control activities performed during Summer 2012.

3.0 Assessment of Treatment Success

On 6 September 2012, MSRS performed a photo monitoring at all 24 photo documentation stations within the Area D of the restoration area (Figure 1). A total of 126 images were taken representing multiple camera angles at each monitoring station. A complete set of monitoring images are provided in PDF format on a Compact Disk appendix attached to this report. Figures 3 through 6 provide a sample time series of monitoring images taken between September 2009 and September 2012.

Figures 3 and 4 illustrate the invasive plant control success within the back dune portion of the restoration site overlooking the area that was once densely vegetated with Sydney golden wattle and iceplant. Vegetation clearing and follow-up treatments in these areas have proven highly effective at controlling invasive plants. However, the ground remains choked with Sydney golden wattle wood chips and dead iceplant biomass. In its current state, these areas are not likely to support snowy plover breeding. However, this basin is scheduled to be filled with clean dune sand pushed in from the foredune during the upcoming winter. Filling in this backdune area with clean sand will act to speed up the breakdown of the large European beachgrass formed dune ridge that runs the length of the restoration site and effectively entomb the extensive invasive plant seed back within the backdune area. Most importantly, this action will open up all habitat within the restoration site for western snowy plover use prior to the start of the 2013 breeding season.

Figures 5 and 6 demonstrate that the control of European beachgrass along the large dune ridge is nearly complete. MSRS intends to perform one more complete treatment of all surviving beachgrass within the restoration site this fall to allow of 100-percent herbicide uptake by the plants before the site is recontoured with heavy equipment during late winter 2013.

When performing photo monitoring, the percent treatment success of iceplant and European beachgrass was assessed at each of the 51 treatment sectors within the restoration site. Results of this assessment are provided in Figure 7. At this stage of the restoration project, treatment success is high. Currently, all of the treatment sectors in Area D are showing greater than 90-percent control. Given this assessment, the site will be ready for recontouring this winter following one more round of herbicide treatment.

Once recontouring is complete, the site will require frequent routine “spot treatments” to control any rhizome material of European beachgrass that may survive recontouring. Additional treatments will be required to exhaust the seedbank of all other invasive species within the site. It would be best that these “successive treatments occur within the spring and summer months to ensure multiple successive kills of seedlings plants before they are given a chance to produce propagules. After this upcoming year of treatment is complete, MSRS believes that invasive weed control can be maintained with one to two reconnaissance-level treatments of the site per year.



Figure 3. Photo monitoring series at station D5 taken at a 137° azimuth showing effective control of Sydney golden wattle, iceplant, and European beachgrass. However, dead invasive plant ground cover remains an issue to be resolved during the upcoming contract period.



Figure 4. Photo monitoring series at station D6 taken at a 37° azimuth showing effective control of Sydney golden wattle, iceplant, and European beachgrass. However, dead invasive plant ground cover remains an issue to be resolved during the upcoming contract period.



SNPL_D5_300degrees_2009Sep



SNPL_D5_300degrees_2009Dec



SNPL_D5_300degrees_2011Feb



SNPL_D5_300degrees_2012Feb



SNPL_D5_300degrees_2012Sep

Figure 5. Photo monitoring series at station D5 taken at a 300° azimuth showing effective control of European beachgrass. The large dune ridge created by the historic growth of this species is scheduled to be recontoured this coming winter in an attempt to open up habitat for the western snowy plover.



SNPL_D17_215degrees_2009Sep



SNPL_D17_215degrees_2009Dec



SNPL_D17_215degrees_2011Feb



SNPL_D17_215degrees_2012Feb



SNPL_D17_215degrees_2012Sep

Figure 6. Photo monitoring series at station D17 taken at a 215° azimuth showing effective control of European beachgrass. The large dune ridge created by the historic growth of this species is scheduled to be recontoured this coming winter in an attempt to open up habitat for the western snowy plover.

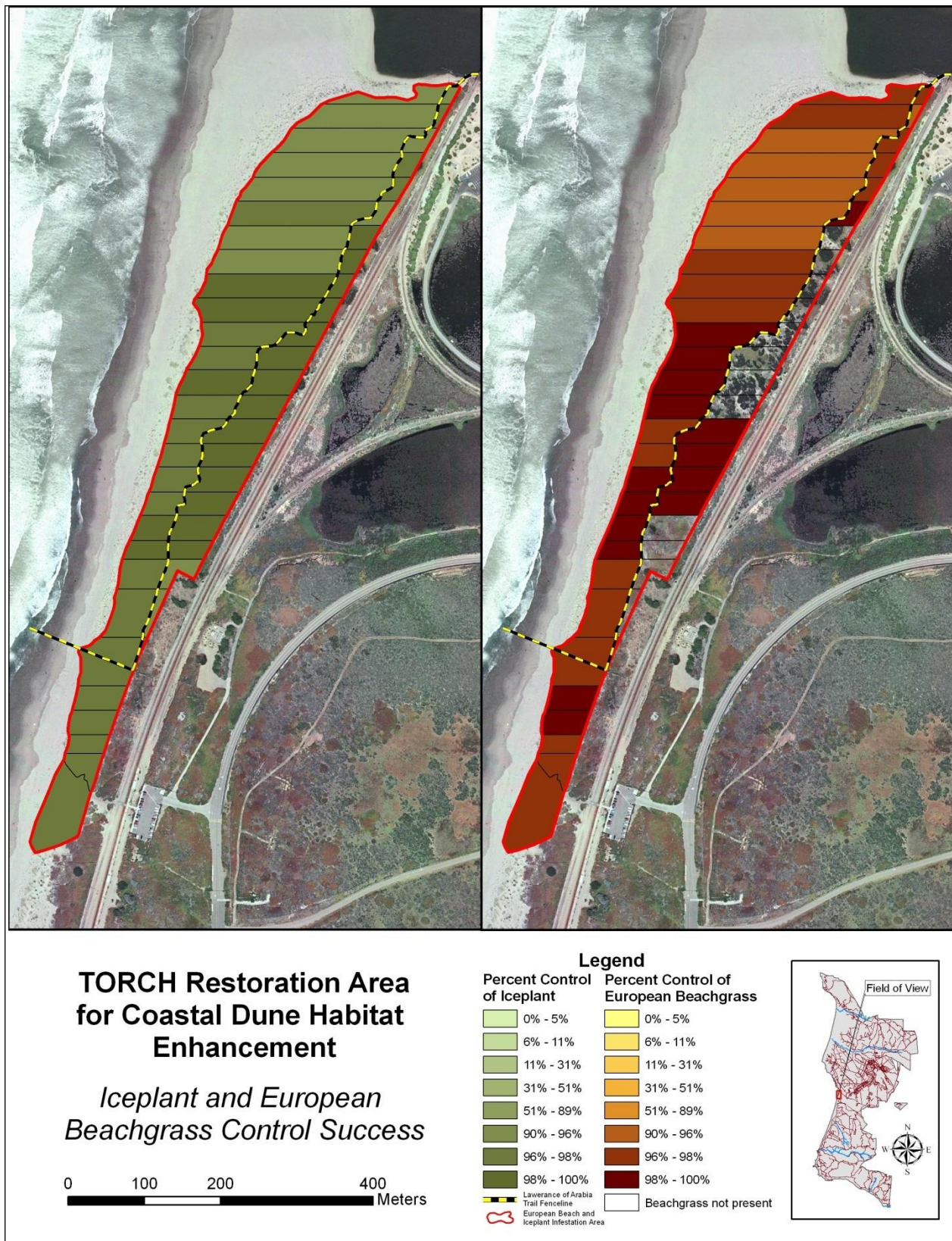


Figure 7. Map of iceplant and European beachgrass treatment success by treatment sector. The treatment assessment occurred of 6 September 2012.

4.0 Expense Reporting

Expenses incurred during the Summer Quarter 2012 reflect hours for chemical herbicide application, field mapping, photo monitoring, report preparation and herbicide purchasing (See Table 2).

Table 2. Expenses incurred during the period of performance (15 September 2011 to 14 September 2012).

Amount	
Labor Support	\$ 34,672.19
ODCs	\$ 15,406.20
TOTAL	\$ 50,078.39

5.0 References

ManTech SRS (MSRS). March 2011. Western Snowy Plover Habitat Restoration at Vandenberg Air Force Base, California- Torch Oil Spill Mitigation Summary Report for Period 14 August 2009 to 31 January 2011.13pp.

SRS Technologies. 2005. Final Plan for the Removal of Selected Invasive Plants from Western Snowy Plover Habitat at Vandenberg Air Force Base. 80pp.