

SCOPE OF WORK

EUROPEAN BEACH GRASS REMOVAL TO BENEFIT WESTERN SNOWY PLOVER AND LEAST TERN HABITAT ON GUADALUPE-NIPOMO DUNES NATIONAL WILDLIFE REFUGE

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1. GENERAL

The Guadalupe-Nipomo Dunes National Wildlife Refuge (Refuge) is located along the central Coast of California within the Guadalupe-Nipomo Dunes Complex (Dunes Complex), an 18-mile-long coastal dunes landscape that occupies approximately 20,000 acres of southwestern San Luis Obispo County and northwestern Santa Barbara County (**Figure 1**). The Dunes Complex is one of the largest coastal dune landscapes on earth and provides habitat for 1,400 known species of birds, plants and animals, including a variety of state and federally listed plant and animal species. The Dunes Complex (the Dunes) is designated National Natural Landmark has some of the highest dunes on the west coast of North America. It is a place of rare beauty and significance. The diverse landscape of the Dunes are characterized by both large, dynamic foredunes dominated by expanses of open sand, and stabilized back dunes colonized by coastal dune scrub. The 2,553-acre Refuge was established in 2000 as a satellite of the Hopper Mountain National Wildlife Refuge Complex (Refuge Complex), a branch of the U.S. Fish and Wildlife Service (Service), which is headquartered in Ventura, California. The Refuge was created to conserve central California coastal dune and associated wetlands habitats and support the recovery of native plants and animals that are federally listed as threatened or endangered.

The purpose of this project is to improve the delicate and dynamic foredune habitat where sensitive plants and nesting birds call home. The healthy function of the foredunes improves the functionality of the interconnected dune ecosystem.

The near shore foredune portions of coastal dunes are dynamic in nature and are characterized by large open sand sheets, tall dunes, and blowing sands. Vegetation found in the foredunes tends to be prostrate, hearty, and sparse. Introduced (non-native) invasive plant species such as European beach grass (*Ammophila arenaria*) threaten to convert the fragile dune ecosystem from coastal foredune and sand sheets, to non-native perennial grassland. European beach grass occupies naturally occurring voids in foredune vegetation. Once established, European beach grass unnaturally stabilizes sands forming steep parallel dunes. As European beach grass stabilizes the foredunes, effectively eliminating natural dynamism, the physical requirements of native species are no longer met; rather these newly stable areas favor European beach grass and facilitate its expansion. With time, areas colonized by European beach grass will form dense monospecific stands with little to none of the original floral diversity.

Not only do native foredune plants suffer from habitat loss resulting from invasive species expansion, the foraging and nesting habitat for the Western snowy plover (*Charadrius nivosus nivosus*) (WSPL) and California least tern (*Sternula antillarum brownii*) (CLTE) are also impacted. The Recovery Plan for the Pacific Coast Population of the Western Snowy Plover and the Recovery Plan for the California Least Tern, published by the US Fish and Wildlife Service for these two federally-listed species, explicitly acknowledge the threat presented by invasive species, and specifically European beach grass, and recommend the treatment of invasive species as a recovery action. Thus far, CLTE have not been documented breeding on the Refuge, however the nesting habitat preferences are similar to WSPL.

The Dunes Collaborative, a group which defines itself as a partnership between federal, state, private, and non-profit organizations committed to restoration of the Guadalupe-Nipomo Dunes Complex, has been working to develop a strategy to restore the Dunes. With aerial mapping and site reconnaissance, the Dunes Collaborative has divided the Dunes into Dune Protected Areas (DPAs). The DPAs are further divided into hub and core areas, **Figure 2**. The Dune Protected Areas are those locations within the Dunes that have the most pristine assemblage of dune plants and the lowest concentration of invasive species. The strategy is to focus restoration and protection within the DPAs and expand efforts out from those locations. This project is within a hub DPA, and some areas identified are within a core DPA.

The Land Conservancy of San Luis Obispo County has been awarded funding to treat beachgrass in the foredunes of the Refuge by the Dunes Collaborative (**Figure 3**). Funding has been secured to remove beachgrass from the northern foredunes for four years (November 2018-November 2022). Dunes Collaborative funding will be used simultaneously with this project to ensure foredune habitat throughout the Refuge has minimal beachgrass and native foredune vegetation can flourish. Collectively the funding will be used to remove the most beachgrass possible and potentially expanding current project boundaries.

The purpose of this project is to preserve and restore functionality and dynamism to foredune habitats within a 101.5-acre portion of Refuge identified as the most important breeding habitat for WSPL on the Refuge, and within the Refuge Priority Management Area 4, as

defined in the Comprehensive Conservation Plan, **Figure 4**. Tom Applegate, a WSPL habitat expert, distinguished this area as important due to the inland extent of the foredune habitat that is predominantly devoid of invasive species. Tom Applegate identified a 6.5-acre area within this habitat where European beach grass is starting to encroach into the open sand sheets from the more extensive stands of the invasive species to the north. This area will be referred to as the Primary Treatment Area (PTA). By focusing control efforts on the PTA, the southern movement of European beach grass into the core areas of the DPA and the superior WSPL habitat will be curtailed. During a recent site visit to the area, isolated outcroppings of European beach grass were observed south of the PTA, within the superior WSPL breeding habitat. This area will be referred to as the Secondary Treatment Area (STA). The area to the north of the PTA has greater quantity and density of European beach grass as the invasive species is carried south from the extensive stands in the northwestern portion of the Refuge. This area is referred to as the Tertiary Treatment Area (TTA), and is included here and depicted in **Figure 4**, will be treated as funding and time allows.

2. SCOPE

Project activities will include mapping, chemical treatment, and WSPL monitoring to gauge success of restoration efforts. Prior to chemical treatment, the actual distribution and density of outcroppings and stands of European beach grass will be mapped. Three treatment areas are outlined as the highest priority areas to benefit WSPL.

Mapping

Mapping will utilize aerial imagery, data from a recently completed aerial helicopter invasive species mapping effort, and Global Positioning System (GPS) and Geographic Information System (GIS) technology to create maps of location and density of European beach grass outcroppings and stands. The 2016 Aerial Invasive Plant Survey utilized a georeferenced 100 meter grid system superimposed on the Refuge boundary for mapping purposes. Mapping for this project will increase the resolution of that system by utilizing a 50 meter grid system within the 100 meter grid. Refer to **Table 1** Mapping Schedule for details on the strategy and schedule for mapping.

Before initial treatment of the PTA, actual locations and density of European beach grass outcroppings and stands will be mapped utilizing GIS and GPS systems. The European beach grass will be chemically treated for four consecutive seasons, with WSPL monitoring each year. The project area will be the locus for the treatment, with treatment area expanding west and northward as treatment results are realized. Isolated outcroppings of European beach grass discovered in previously treated areas during the mapping events will be treated along with the broader treatment area to ensure no southward movement of the population.

Table 1. Mapping Schedule

Project Area	Size	Goal	Date Range of Activity
Primary Treatment Area (PTA)	6.5	Determine distribution of European beach grass stands and outcroppings	October – January Year 1

Secondary Treatment Area (STA)	63	Determine distribution of European beach grass stands and outcroppings	October – January Year 1
All Treatment Areas	69.5	Determine distribution of European beach grass stands and outcroppings, locate new outcroppings in previously treated PTA and STA.	October – January Year 2
All Treatment Areas	101.5	Determine distribution of European beach grass stands and outcroppings within all treatment areas (PTA, STA, TTA), including new outcrops within previously treated areas.	October – January Year 3
All Treatment Areas	101.5	Determine distribution of European beach grass stands and outcroppings within all treatment areas (PTA, STA, TTA), including new outcrops within previously treated areas.	October – January Year 4

Treatment

Chemical treatment will utilize a chemical mixture deployed from backpack. Chemical treatments employ the herbicide solution comprised of 2% Glyphosate and 1% imazapyr. Refer to **Table 2** for schedule and strategy of treatments. Every effort will be made to conduct the initial treatment prior to the 2018 plover nesting season; however, if the contracting process is prolonged, the schedule will be delayed by one year.

Table 2. European Beach Grass Treatment Strategy and Schedule

Project Area	Size	Estimated European Beach grass Percent Cover	Approximate Area to be Treated	Date Range of Activity
Primary Treatment Area (PTA)	6.5 acres	0.0 – 10%	0.65 acres	January – February 2019
Secondary Treatment Area (STA) and PTA re-sprouts if identified	63 acres	0.0 – 1%	0.315 acres	November – February 2020
Re-sprouts in PTA and STA and expansion into TTA	101.5 acres	0.0 – 25%	5.42 acres	November 2020 – February 2021
Re-sprouts in PTA and STA and expansion into TTA	101.5 acres	0.0 – 25%	5.42 acres	November 2021- February 2022
		Total	5.42 acres	

Western Snowy Plover Monitoring

To gauge the success of the restoration efforts, the WSPL breeding population and foraging CLTE will be monitored and data will be compared to pre-restoration data. Western snowy plover monitoring will be performed by a qualified biologist. Observations of foraging CLTE will be recorded.

Surveys will be conducted by one biological monitor on foot. Surveys will focus on the beach and foredune area within a quarter mile of the beach, focusing inland monitoring within the PTA and STA. The Refuge commonly experiences high winds and efforts should be made to complete each survey before winds pick up.

The monitor will record observations of breeding WSPL by identifying all scrapes, nests, juveniles, adults, and band combinations. Each nest will be numbered in the order of discovery date. The monitor will record a description of the nest location based on markers on the beach and other landmarks. A GPS waypoint will also be recorded for each nest.

An expected hatch date will be determined for each nest based on the discovery date of a three-egg clutch. Each active nest will be monitored weekly and nest fate recorded. When an empty nest is past the expected hatch date, the monitor will check the nest site for eggshell pips and conduct a thorough search of the area for recently hatched chicks. In the event of a nest disappearance prior to expected hatch date, the nest site will be checked for evidence of predation or wind-buried eggs. Each brood of chicks observed will be counted weekly and location description recorded.

The Range wide Western Snowy Plover Breeding Window Survey will be completed at the Refuge within 3 days of scheduled date, weather permitting.

The monitoring schedule and treatment schedule are independent. The monitoring area will include the PTA, STA, and TTA to detect inland nesting, an increase of which may be contributed to restoration activities. Because natural systems do not immediately respond to changes in the environment, a final round of monitoring will occur in 2022 to measure the success of the habitat restoration in this core area for WSPL breeding. Refer to **Table 3** for the monitoring schedule associated with this project.

Table 3. Western Snowy Plover Monitoring and Reporting Schedule

Activity	Dates	Deliverables
Monitor	March 1, 2019 – September 30, 2019	Weekly updates
Monitoring Draft Report	October 31, 2019	Draft report for USFWS review
Monitoring Final Report	November 30, 2019	Final Report
Monitor	March 1, 2020 – September 30, 2020	Weekly updates
Monitoring Draft Report	October 31, 2020	Draft report for USFWS review
Monitoring Final Report	November 30, 2020	Final Report
Monitor	March 1, 2021 – September 30, 2021	Weekly updates

Monitoring Draft Report	October 31, 2021	Draft report for USFWS review
Monitoring Final Report	November 30, 2021	Final Report
Monitor	March 1, 2022 – September 30, 2022	Weekly updates
Monitoring Draft Report	October 31, 2022	Draft report for USFWS review
Monitoring Final Report	November 30, 2022	Final Report

The deliverables for the WSPL monitoring will include weekly updates provided electronically via email and a draft and final monitoring report for each breeding season to be submitted to the Ventura Field Office of U.S. Fish and Wildlife Service and the Refuge Complex. See **Table 4 Deliverable Schedule** for deliverable schedule.

3. COOPERATION

The Refuge will work closely with the Dunes Collaborative. The Dunes Collaborative defines itself as a partnership between federal, state, private, and non-profit organizations committed to restoration of the Guadalupe-Nipomo Dunes Complex, recovery of threatened and endangered species, and providing quality visitor experiences of this unique and fragile ecosystem. The Dunes Collaborative has formally adopted the principles of Ecosystem Based Management which stresses complexity and connectedness, and recognizes humans as part of an ecosystem. The success of this project will be made possible by the extensive network of landowners, land managers, dunes restoration practitioners, and educators assembled under the Dunes Collaborative umbrella.

4. PERIOD OF PERFORMANCE

The Period of Performance shall be from date of contract acceptance until October 31, 2023.

5. EVALUATION AND ACCEPTANCE

A timeline and list of deliverables is shown in **Table 4**.

Table 4. Deliverable Schedule

Date Range	Task	Goal	Deliverable
October 2017– January 2018 Year 1	Mapping PTA and STA	Determine location and density of European beach grass	GIS map
January – February 2019 Year 1	Treatment PTA	Treat European beachgrass in PTA	Informal site status update
March 1, 2019 – September 30, 2019	WSPL monitoring and reporting (funded by FWS)	Collect breeding success and population data of WSPL and CLTE	Weekly summaries, Draft Report, Final Report

November 2019 – February 2020 Year 2	Treatment PTA and STA for resprouts and begin treating TTA.	Treat European beachgrass in PTA and STA	Informal site status update
March 1, 2020 – September 30, 2020	WSPL monitoring and reporting	Collect breeding success and population data of WSPL and CLTE	Weekly summaries, Draft Report, Final Report
October 2020– February 2021 Year 3	Map and treat residual European beachgrass in PTA and STA. Map and treat TTA.	Treat European beachgrass in all three treatment areas and determining effectiveness of treatment.	Informal site status update
March 1, 2021 – September 30, 2021	WSPL monitoring and reporting	Collect breeding success and population data of WSPL and CLTE	Weekly summaries, Draft Report, Final Report
November 2021 – January 2022 Year 4	Map and treat residual European beachgrass in PTA, STA, and TTA.	Treat European beachgrass in all three treatment areas and determining effectiveness of treatment.	Informal site status update
March 1, 2022 – September 30, 2022	WSPL monitoring and reporting	Collect breeding success and population data of WSPL and CLTE	Weekly summaries, Draft Report, Final Report
November 30, 2022	Draft Summary Report	Summarize treatments, and response of WSPL	Draft Report for USFWS review
January 31, 2023	Final Report	Incorporate USFWS review	Final Report

6. TECHNICAL COORDINATORS

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7. BUDGET

The budget is shown in **Table 5: Budget for Three Treatment Areas**. Please note that these estimates are based on the approximate cover of European beachgrass during 2017 reconnaissance surveys (**Table 2**). The mapping effort proposed for each treatment area will provide a more accurate understanding of the actual size of each treatment area.

Table 5. Budget for three treatment areas

Task	Date	Estimated Cost
Pretreatment Mapping PTA	October Year 1	\$2,000
Treatment of PTA	November – February Year 1	\$2,500
Mapping STA & TTA	October Year 2	\$1,000
Treatment of PTA & STA	November – February Year 2	\$9,000
Treatment of PTA, STA, & TTA	November – February Year 3	\$6,500
Treatment of PTA, STA, & TTA	November – February Year 4	\$5,000
WSPL Monitoring	March 1, 2019 – September 30, 2019	\$20,000
WSPL Monitoring	March 1, 2020 – September 30, 2020	\$20,000
WSPL Monitoring	March 1, 2021 – September 30, 2021	\$20,000
WSPL Monitoring	March 1, 2022 – September 30, 2022	\$20,000
Final Report	January 31, 2023	\$3,000
Administration*	October Year 1	\$5,000
	Total	\$114,000
*Hopper Mountain National Wildlife Refuge Complex administrative costs		

References

- Applegate, Tom. 2016. Personal communication from Tom Applegate to Michael Brady, Hopper Mountain National Wildlife Refuge Complex Project Leader, via electronic mail. August 22, 2016.
- Ball, M. and Olthof, K. 2017. Aerial Invasive Plant Survey - Guadalupe-Nipomo Dunes National Wildlife Refuge. Unpublished Report, Wildlands Conservation Science, Lompoc, CA. 49 pp.

Figures

Figure 2. Dune Protected Areas

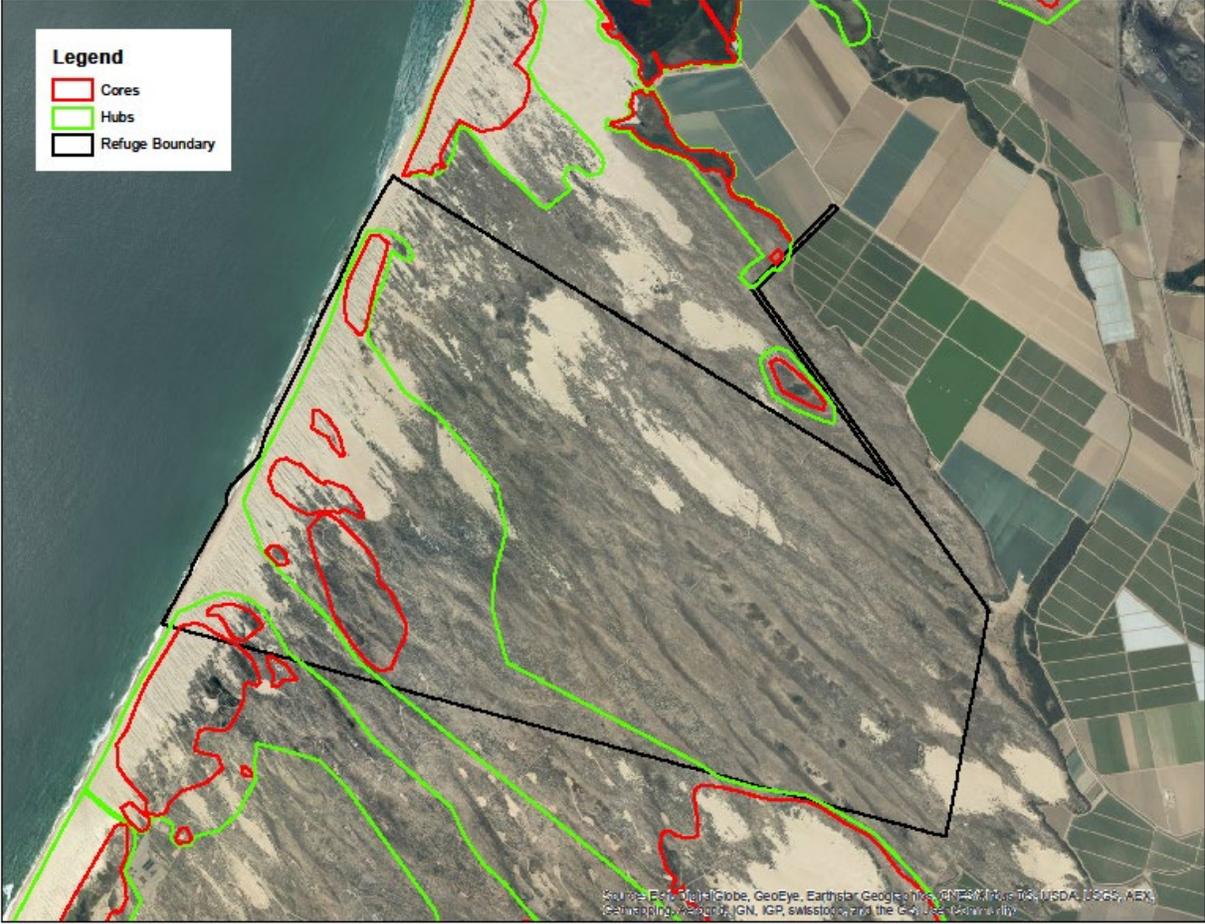


Figure 3. European Beachgrass Treatment Areas



Figure 4. European Beachgrass Treatment Areas

