Salton Sea Management Program
Draft Dust Suppression Action Plan

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DRAFT DUST SUPPRESSION ACTION PLAN

Introduction

The Salton Sea is California's largest lake. The Sea is thirty-five miles long and fifteen miles wide, the desert lake extends from the Imperial Valley into the Coachella Valley. The Sea's continuing decline in elevation and resulting exposure of lakebed negatively affects surrounding communities and reduces remaining habitat. Though saltier than the ocean, the Sea supports an abundance of wildlife and serves as a stopover for millions of migratory birds on the Pacific Flyway. Improving air quality and sustainable habitat at the Salton Sea are critical for the protection of public and ecological health.

Salton Sea, DWR

Salton Sea Regional Climate

Climatic conditions in the Salton Sea region are dominated by atmospheric changes associated with warm air from the high-pressure center of the Pacific Ocean. The coastal mountains prevent the intrusion of any cool, damp air from California coastal areas into the region. As a result, the region experiences clear skies, extremely hot summers, mild winters, and little rainfall. The climate in the Salton Sea region is one of great extremes. The local rainfall is about 2.5 inches per year while the temperatures can often reach above 110° F in the summer and below freezing in the winter. The flat terrain of the region and strong temperature differentials created by intense solar heating, producing winds and thermal inversions.

Exposed lakebed around Salton Sea
Photo: USA Today

The prevailing winds in the Salton Sea region are from the west-northwest through southwest, with infrequent winds from the southeast. The average wind speed is less than 7 miles per hour (mph). The prevailing winds from the west and northwest occur seasonally from fall through spring and blow from the north. Occasionally, the region experiences periods of extremely high wind speeds, exceeding 31 mph, most frequently during April and May.

The unique geographic and weather conditions in the Salton Sea region create daily weather conditions where a layer of cooler air at the ground surface becomes covered by a layer of warmer air, creating an inversion. These inversions are random in coverage and may scatter pollutants into the air. In valleys and low-lying areas, like the Salton Sea region, this condition increases from cold air flowing towards the Sea from the surrounding mountains and pooling on the valley floor.

Salton Sea Management Program Phase I: 10-Year Plan

The Salton Sea Management Program (SSMP) was established in 2017 and is led by the California Natural Resources Agency (CNRA) in collaboration with the Department of Water Resources (DWR) and the California Department of Fish and Wildlife (CDFW). The SSMP released the Phase I: 10-Year Plan in 2017 and updated it in 2018 to guide state projects at the Salton Sea over the next decade (2018-2028). The Phase I: 10-Year Plan lays out a high-level schedule for project locations and identifies acreage goals to meet the requirements of State Water Resources Control Board (State Water Board) WR 2017-0134. This order, adopted in 2017, outlined the State Water Board's oversight role in monitoring and ensuring progress toward the goals of the SSMP, and sets annual milestones for habitat restoration and dust-suppression projects.

To meet these milestones, the State has collaborated with key stakeholders, including Imperial Irrigation District (IID), to ensure coordinated efforts to implement dust control consistent with the Quantification Settlement Agreement (QSA) Joint Powers Authority (JPA), which was created to fund mitigation activities to address impacts of agricultural-to-urban water transfers. The QSA JPA includes the State, IID, Coachella Valley Water District (CVWD), and the San Diego County Water Authority.

In 2006, IID developed the Salton Sea Air Quality Management Program, in consultation with Imperial County Air Pollution Control District (ICAPCD), to be a comprehensive, science-based adaptive approach to meet air quality requirements of the QSA. The Phase I: 10-Year Plan recognizes that dust suppression will entail measures to address emissive exposed lakebed areas.

Dust Suppression Action Plan

To expedite the implementation of dust control projects, the State is developing a Dust Suppression Action Plan (DSAP) in collaboration with IID, California Air Resources Board (CARB), ICAPCD, and other stakeholders. The DSAP prioritizes and identifies approximately 8,200 acres of dust suppression projects at locations around the Salton Sea based on soil emissivity, prevailing wind patterns, threat to populated areas, and information obtained from community engagement (Figure 1). The DSAP is based on extensive data collected and analyzed by IID. The plan intends to expedite delivery of dust suppression projects through a streamlined planning and permitting process.

Public meeting in Mecca, CA Photo: DWR

As part of this effort, the State committed to a robust public engagement program. Public meetings were held in December 2019 in Mecca and Salton City to seek input about how dust affects local residents and potential locations and methods for dust suppression projects. Three more meetings are scheduled for late February and early March to gather community input to help refine the DSAP. A final DSAP will be released by May 2020 to identify and prioritize dust suppression projects. The plan will serve as a "living document" that will be refined over time through monitoring and adaptive management, as well as continued engagement with the community. The State will make a concerted effort to complete approximately 8,200 acres of dust suppression projects identified in the plan by the end of 2022.

Implementation

Overview

Near-Term Conceptual Priority Areas/Projects

IID has been leading efforts to collect air, water, meteorological, and soils data to identify the most emissive areas of the exposed lakebed and to prioritize dust control project locations. In addition, IID has been implementing projects and studies to determine longevity, durability, and performance measures. The State, using IID data as a foundation, has identified priority areas for near-term dust suppression projects around the Sea. The current areas under consideration for implementation in 2020 are listed in Table 1 and shown on Figure 1.The DSAP proposes to implement dust suppression projects using a two-phased approach (Phases A and B). Sites with high emissivity that are anticipated to have fewer permitting and access requirements were prioritized for implementation in Phase A, while sites with more complex requirements were selected for implementation in Phase B.

Phase A Projects: Areas that have soil composition and emissivity data, contain soils that are suitable for surface roughening, require minimal permitting, and have minimal listed species concerns.

Phase B Projects: Areas that are highly emissive or areas that require further data collection, design and planning and have more extensive environmental planning and permitting requirements. This phase also includes areas where surface roughening has previously been implemented and vegetation is needed to stabilize the furrows. The State may construct small test plots on areas that require additional planning and research.

Phase A and B Projects

Phase A-1

Species Conservation Habitat (SCH)

The SCH Project has completed CEQA and National Environmental Policy Act (NEPA) compliance for the project area and has access/ easement agreements in place with IID and BLM. Approximately 1,800 acres of surface roughening on exposed lakebed within the SCH area are expected to be constructed in Summer 2020.

Table 1 Project Areas/Subareas and Acres Per Phase

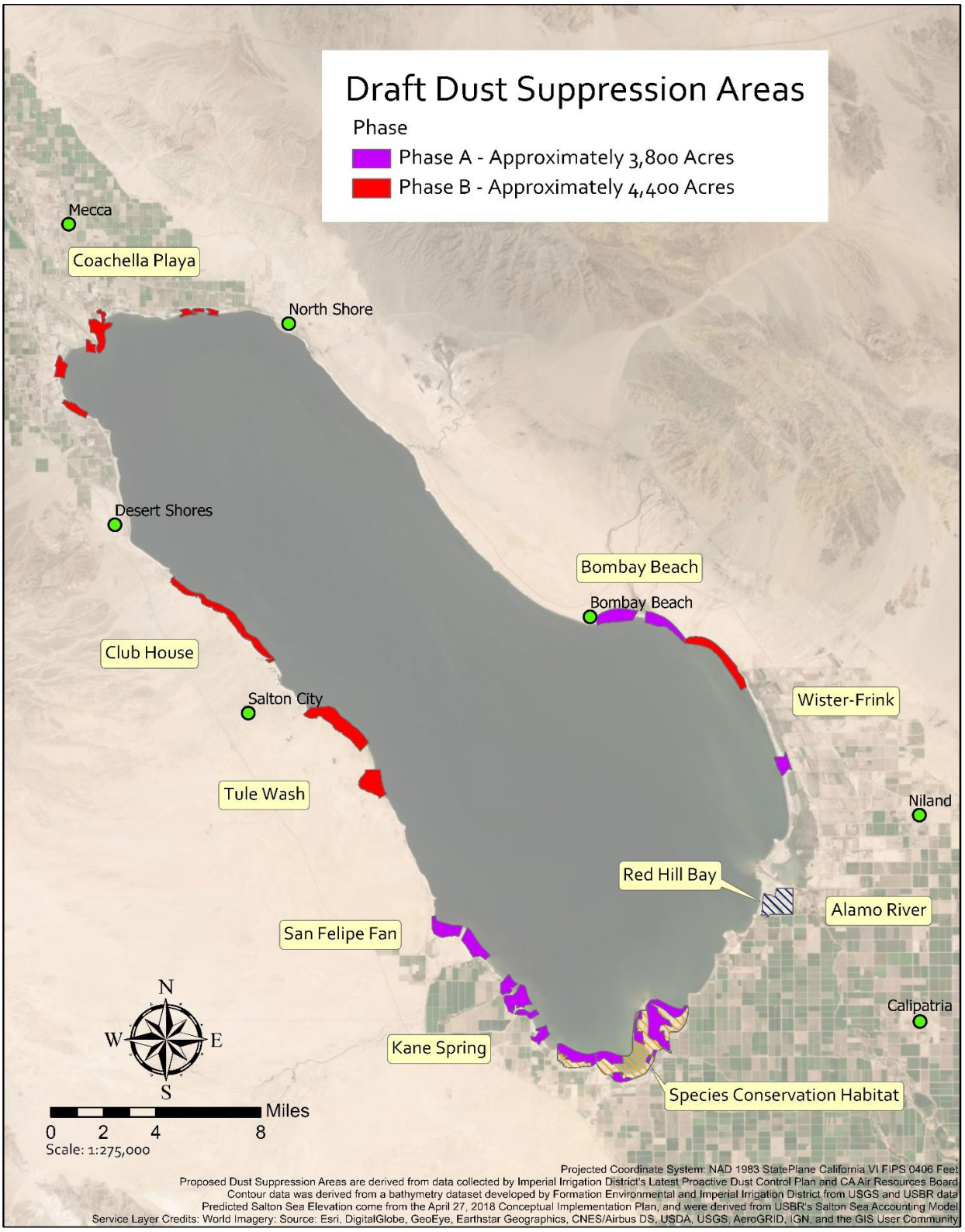
Project Area	Phase A (acres)	Phase B (acres)	Total Acreage
Species Conservation Habitat	1,800		1,800
Bombay Beach (BB 1 & 2)	200	555	755
Kane Spring (KS 1 - 4)	820		820
San Felipe Fan (SFF 1 & 2)	770	770*	770
Wister-Frink (WF-1)	190		190
Coachella Playa (CP 1-6)		980	980
Tule Wash (TW 1 & 2)		1302	1,302
Club House (CH -1)		780	780
Wister Frink (WF -2)		780	780
Approximate Total Acres	**3,800**	**4,400**	**8,200**

*Vegetated area will be the same as surface roughening and therefore is not included in the Phase total. Source: DWR, 2020

Phase A-2

CEQA and NEPA compliance must be completed prior to construction and to finalize access agreements with federal landowners. The State is currently working to secure landowner access. Access agreements are expected to take at least six months to execute and allow Phase A-2 construction to start in late summer to fall 2020. Phase A-2 consists of approximately 2,000 acres and includes:

Figure 1 Draft Dust Suppression Action Plan Preliminary Project Locations and Acres by Phase



Bombay Beach - 200 acres of surface roughening.

Kane Spring - 820 acres of surface roughening.

San Felipe Fan - 770 acres of surface roughening.

Wister-Frink - 190 acres of surface roughening.

Surface roughening Photo: DWR

Phase B

Areas identified for Phase B require more data to inform the most effective dust control methods. The State will work cooperatively with IID to collect and analyze data from these sites. Phase B projects, anticipated to be completed by end of 2022, include:

Bombay Beach - 550 acres may be vegetated with natives and/or become shallow water habitat.

Club House - Approximately 780 acres of dust suppression may be implemented using plot-based studies focused on vegetation, and physical barriers. If a water supply is available, then potential surface roughening may be implemented, with frequent operations and maintenance (O&M) activities, to ensure effectiveness.

Coachella Playa - Approximately 980 acres of surface roughening may be implemented.

San Felipe Fan - 770 acres of surface roughening from Phase A-2 may be converted to vegetation.

Tule Wash - Approximately 1,300 acres of dust suppression projects, will be implemented using plot-based studies focused on gravel cover, vegetation, and physical barriers. If a water supply is available, then potential surface roughening with frequent O&M to ensure effectiveness.

Wister-Frink - Approximately 780 acres of dust suppression projects may be implemented. Due to a complex soil profile, this site may be more suitable for ponding water; therefore, more planning is needed to inform design and construction.

While Club House and Tule Wash areas may not have soil suitability for surface roughening, these project areas remain near-term priorities because of the proximity to residential populations and the sites' high levels of potential emissivity. Options for controlling dust in these areas are under review. The lack of water sources to support vegetation enhancement and long-term success are also a challenge. Potential water sources include installation of groundwater wells with onsite storage and/or redirecting seasonal flows from the Tule Wash.

Landowners

As noted above, another key factor influencing projects in Phase A is landownership. The State owns very little property around the Salton Sea. Major landowners include IID, Reclamation, BLM, and the Torres-Martinez Tribe. Table 2 summarizes landownership of project areas. Figure 2 shows the current landownership at project areas.

Permitting and Environmental Compliance

As discussed above, the approach for projects under the DSAP will be to design projects to streamline permit requirements and enable timely project initiation. Project phasing has been determined in part to address timing limitations associated with some of the projects.

Table 2 Subareas and Landowners

Subarea Name	Landowners
Coachella Playa (CP-1)	CVWD/IID
CP-2	Torres-Martinez
CP-3	IID/ Torres-Martinez
CP-4	Torres-Martinez/ IID
CP-5	IID/ Reclamation
CP-6	Torres-Martinez/Private/CVWD
Bombay Beach (BB-1)	IID/ BLM/ Reclamation/ Private
BB-2	IID/ BLM/ Reclamation
Wister-Frink (WF-1)	IID
WF-2	IID/ City of Los Angeles/ BLM
Club House (CH-1)	IID/ Reclamation/ Torres-Martinez/ Private
Kane Spring (KS-1)	IID
KS-2	IID
KS-3	IID/ Reclamation
KS-4	IID/ Reclamation
Species Conservation Habitat (SCH-1)	IID/BLM
SCH-2	IID/BLM
SCH-3	IID
SCH-4	IID
SCH-5	IID/BLM
SCH-6	IID/BLM
San Felipe Fan (SFF-1)	IID/Reclamation
SFF-2	IID/Reclamation
Tule Wash (TW-1)	Reclamation/IID/ Private/ Federal
TW-2	Private/ Federal/ Reclamation

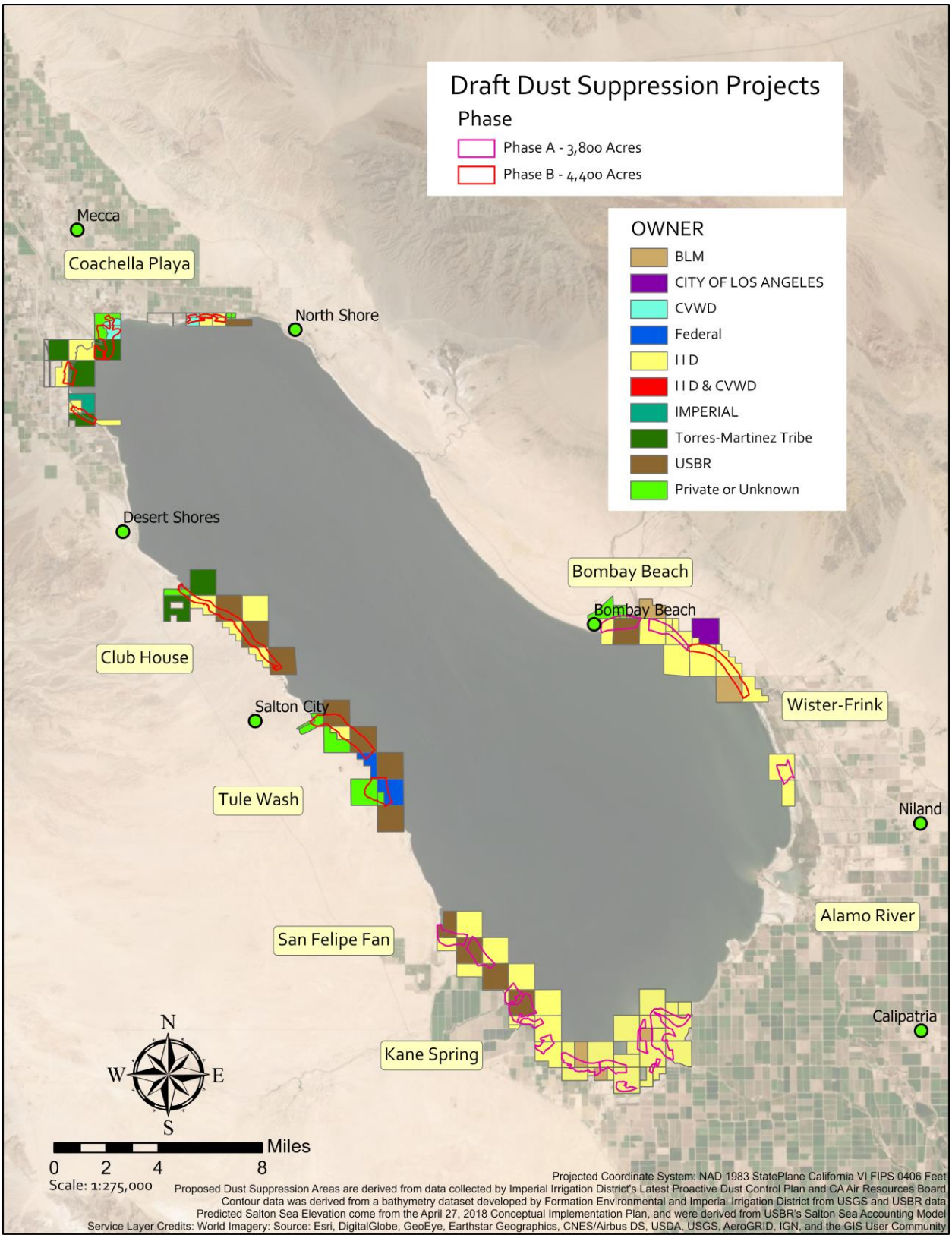
Source: DWR, 2020

U.S. Army Corps of Engineers (Corps) 404 Permitting

The Corps is working closely with the State on NEPA coverage for the SSMP projects in general and as such has been working closely with the State on data collection and compilation. The State worked with the Corps on the Bruchard Road project and developed a mutually acceptable approach for Corps permitting. Future projects on the exposed lakebed, including those permitted under the DSAP, will be permitted using this approach, which includes:

- A desktop review for potential aquatic resources under Corps jurisdiction;
- A field review to verify/augment desktop review to determine if any areas of Corps jurisdiction are within the project footprint; and
- If possible, areas determined to be within Corps jurisdiction will be eliminated from the project area.

Figure 2 Dust Suppression Project Areas Landowners



CDFW Lake and Streambed Alteration Agreement

The desktop and field reviews described above will provide the necessary information for Lake and Streambed notification with CDFW. Preparation of the notification, including fieldwork, could take 30 days. It is anticipated that a Lake or Streambed Alteration Agreement would be issued within 90 days of submittal of a notification, so up to 120 days from initiation to agreement executed is allotted.

Colorado River Regional Water Quality Control Board (RWQCB) 401 Certification/ Waste Discharge Requirements

The RWQCB would issue a 401 certification if the project were within Corps jurisdiction or a Waste Discharge Requirement permit if it is not. In either case, these are typically issued within 60 days of receiving a complete application. The data needed for the application would be collected during the desktop and field investigations for the Corps permit application. The process is anticipated to take up to 90 days, including data collection and permit processing.

Design and Construction

Project sites that are part of Phase A are planned to be surface roughening projects. Furrows created for surface roughening are typically designed perpendicular to the prevailing wind direction. Furrow dimensions are typically three feet below the ground surface and two feet above. Phase A surface roughening projects are expected to be constructed in 2020.

Projects in Phase B need more soil and air quality data to determine the best method to control emissivity. Phase B projects also include highly emissive areas on the west shore, which are composed of sandy soils and have little natural fresh water. Long-term success of projects in these areas will require using test plots of various project designs. Test plots will inform costs and best performing dust control methods to be implemented on a larger scale in those areas. Phase B projects are expected to commence in 2021.

Phase A Performance Measures

Dry Dust Suppression Projects

Project sites using surface roughening can be measured for success by using digital imagery. Digital imagery can confirm surface elevations with high resolution to determine success.

Vegetated Dust Suppression Projects

Vegetated dust suppression projects include establishment of hedgerows and dune stabilization. Vegetated dust suppression projects will be monitored for plant establishment, water use, and ability to reduce emissions. Monitoring of plant establishment within hedgerows will be based off density and can be accomplished by using aerial LiDAR or field surveys. Hedgerows will be dense enough that they are effective at slowing down wind speeds at the ground surface, but not so dense that the plants compete for resources and compromise plant development. Plantings intended for dune stabilization will be studied to determine appropriate plant densities and monitoring needs. Vegetated projects will also be monitored for dust control effectiveness similarly to dry dust suppression projects.

Vegetation planted in hedgerows Photo: DWR

Water Supply for Vegetation

A water supply is needed to establish long-term vegetation. When water is supplied for vegetation, flowmeters will be used to measure the amount of water applied. Hedgerows and dune stabilization plantings use water to germinate seeds for successful establishment. Once established, alternative water supplies will be evaluated.

Adaptive Management

Dust suppression methods will be evaluated over time for effectiveness and costs. The adaptive DSAP will include lessons learned from construction and maintenance of dust control methods and public input.

Operations and Maintenance

Maintenance of dust suppression projects will include monitoring of dust control effectiveness at project sites and redesign of methods for areas failing to meet dust control standards. IID is currently designing dust suppression projects to meet an estimated 95 percent reduction in sand motion set by ICAPCD. The State will also apply this design threshold standard. IID is using multiple monitoring techniques to identify when a project site requires dust control maintenance activities (augmentation or replacement). Monitoring includes aerial LiDAR, high wind event upwind/downwind PM_{10} monitoring, targeted sand motion monitoring, and visual (video camera) evidence. Monitoring will assist in determination of required maintenance.

Monitoring and Data Collection to Inform Phase B Projects

Data Collection and Monitoring of Exposed Lakebed

Areas identified for Phase B implementation need more data to inform the best dust control method. Data from soil samples, 360-degree cameras, monitoring wells, and meteorological and topographic survey data will be collected. While this data is being collected and analyzed, the State will advance environmental compliance and land access agreements. The State will implement appropriate methods when sufficient data is collected.

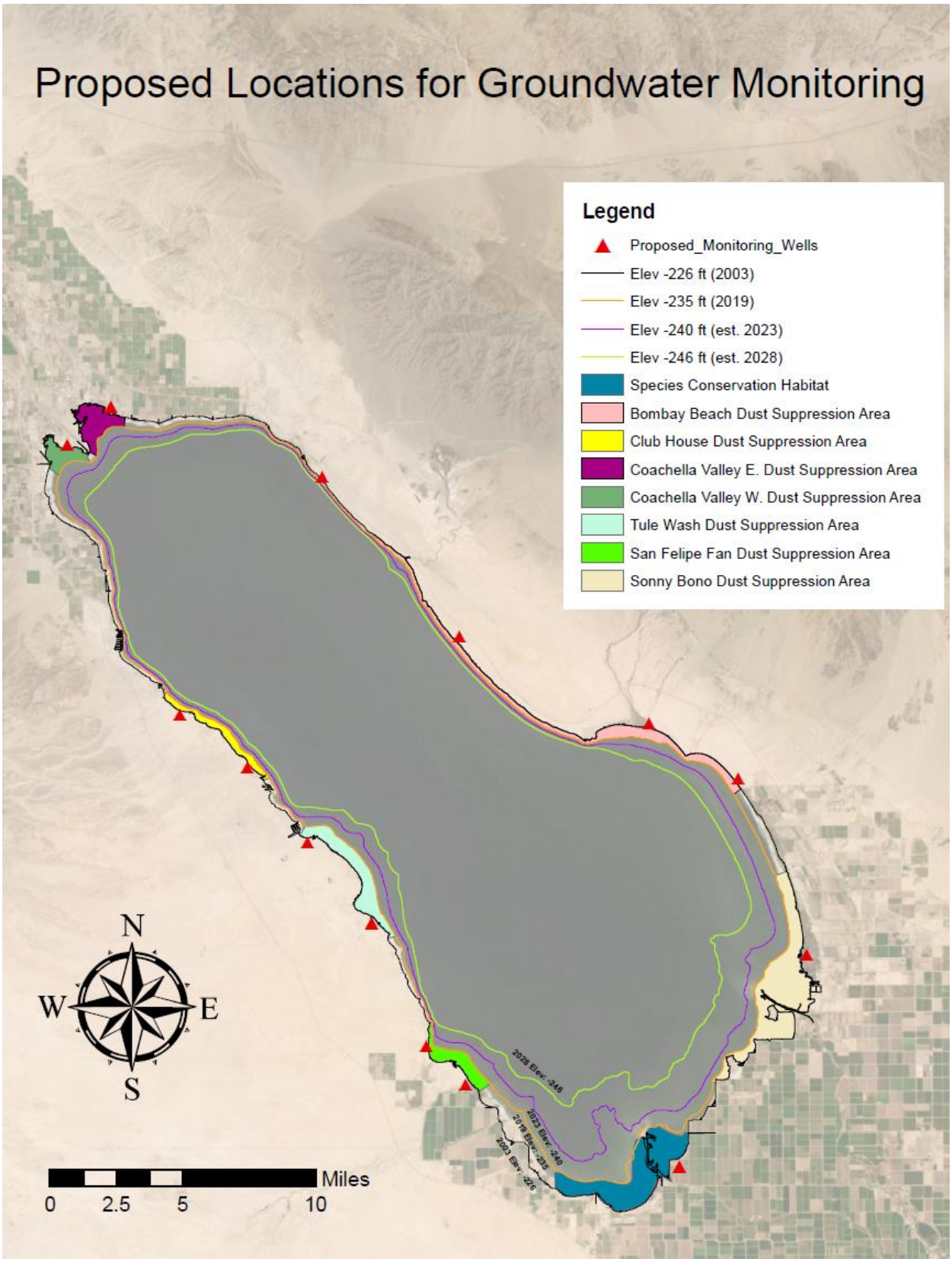
Test Plots

In cooperation with IID, the State plans to design and construct a series of plot-scale (smaller study area) studies to test methods for controlling sand migration on the west shore. Plot studies will evaluate dust control options designed to remediate exposed lakebed and reduce dust emissions, protect or re-enforce existing vegetated sand dunes and linear vegetated beach ridges. These plot studies are intended to inform the types of projects feasible at a large scale.

Groundwater Monitoring

The State is evaluating installation of groundwater monitoring wells at 14 locations around the Salton Sea near the 2003 shoreline (elevation = -226 feet NAVD 88) as shown on Figure 3. Hydrologic data including groundwater elevation, water table depth, water quality, and salinity levels will be collected from the wells. The proposed wells would be located at or near dust suppression project areas to support future revegetation efforts. The final number and location of wells will be informed by additional data collected from project sites.

Figure 3 Proposed Locations of Groundwater Monitoring Wells



Typical sized monitoring well piping with side slots will be installed at shallow aquifers to an anticipated depth of 30 feet. The piping size will be large enough to collect water samples from the observation wells at different groundwater depths. Accessory well protection devices will be used to prevent sediment from getting into the wells. During well installation, the State will collect soil samples at different soil depths to test for soil composition, moisture, density, porosity and permeability. A pressure test will be performed after the wells are installed to confirm functionality. The State will be responsible for coordinating all monitoring activities. Regular monitoring includes checking groundwater levels, water table depth and water quality. Monitoring data will be used to evaluate suitability of groundwater sources for vegetation growth. Observation wells will be maintained regularly to check for sediment accumulation.

Ongoing Air and Water Quality, Soils, and Groundwater Data Collection

The following discussion describes the current IID air and water quality, soils and groundwater data collection. The State will collaborate with IID on data collection to support studies associated with emissivity and Salton Sea ecosystem health.

Sand Flux Monitoring Equipment

The movement of sand (flux) across each project site using the direction of the prevailing high winds (wind speeds greater than 12 mph at 30 feet above ground level) will be monitored. Sand movement will be monitored at two locations at each site, one at the upwind boundary and one at the downwind boundary. Each monitoring site will be placed on a 15-foot- by-15-foot pad. Each site will have a sand flux monitor, a PM_{10} monitor, a data logger with telemetry capability, and a solar panel. Depending on dust and air quality levels at the site, video cameras may also be installed to track and transmit information about the origins of dust generation.

Dust storm near Salton Sea Photo: saltonseasense.com

Camera Surveillance for Plumes

If video cameras are required, then two cameras will be mounted on a single 30-foot pole at the upwind edge of a project site. One camera will face upwind in the prevailing high wind direction, and the other will face downwind to capture the entire project site.

Determining Effectiveness of Dust Particle (PM_{10}) Reduction

In addition, dust control efficiency testing will be performed using sand flux data. Lower sand movement between upwind and downwind monitors means that the dust control methods are effective. Higher dust particle concentrations across a project site means that dust, sand, and salt particles are becoming airborne, and the project is not effective.

Photo: CDFW