APPENDIX E

Wetland Assessment Report

Preliminary Desktop Assessment Report for Potential Wetlands

Salton Sea Management Program 10-year Plan

October 2021, Draft

Cardno®

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Acronyms

10-year Plan	Salton Sea Management Program's Phase I: 10-year Plan
Corps	United States Army Corps of Engineers
CWA	Clean Water Act
FAC	Facultative
FACW	Facultative Wetland
LOP	Letter of Permission
msl	mean sea level
OBL	Obligate
OHWM	ordinary high water mark
QSA	Quantification Settlement Agreement
report	Preliminary Desktop Assessment Report for Potential Wetlands
Sea	Salton Sea
SSMP	Saltan Sea
SSMP	Saltan Sea Management Program
WOTUS	Waters of the United States

1 Introduction/Purpose of the Assessment

This Preliminary Desktop Assessment Report for Potential Wetlands (report) presents the results of a desktop analysis completed in support of the Salton Sea Management Program's (SSMP's) Phase I: 10-year Plan (10-year Plan; California Natural Resources Agency et al. 2018) for which the California Natural Resources Agency, California Department of Water Resources, and the California Department of Fish and Wildlife—together, the SSMP team—are seeking a Department of the Army permit from the U.S. Army Corps of Engineers (Corps), Los Angeles District, under Section 404 of the Clean Water Act (33 United States Code §1344). The proposed SSMP Project is being planned to implement a total of 29,800 acres of aquatic habitat and dust control projects around the perimeter of the Salton Sea (or Sea). At least 50 percent of the acres must be created as habitat for fish and wildlife dependent on the Salton Sea ecosystem and the remainder will be projects to suppress dust.

The current Salton Sea was formed when Colorado River floodwater breached an irrigation canal that was being constructed in the Imperial Valley in 1905 and flowed into the Salton Sink. The hydrology of the Salton Sea has since been maintained by irrigation runoff in the Imperial and Coachella valleys and local rivers. Because the Sea is a terminal lake, increasingly concentrated salts have resulted in salinity that is approximately twice that of the ocean. The Salton Sea is also an important wildlife area. Although it has only existed for about 100 years, the Sea has become a critical resource for many species of resident and migratory birds, including several species of special concern, due to the widespread loss of wetland habitat elsewhere in the United States and Mexico. Increasing salinity has eliminated the marine fishery at the Salton Sea, limiting sport fishing to only the euryhaline tilapia. Tilapia and several smaller non-sport fish species currently sustain a number of bird species, but even tilapia will not tolerate the higher salinity anticipated as the Salton Sea continues to recede.

The Quantification Settlement Agreement (QSA)[1] imposes water conservation measures within the Imperial Irrigation District service area to allow the transfer of Colorado River water elsewhere, reducing the volume of agricultural runoff that constitutes the Salton Sea's chief source of water.

In addition, the habitat impacts resulting from the reduced inflow of water has increased the amount of exposed lakebed and increased fugitive dust emissions from the exposed lakebed. Dust, or particulate matter, is hazardous to human health. Particulate matter measurements at the Salton Sea Air Basin indicate this area met state and federal air quality standards for particulate matter (10 microns or smaller in diameter [or PM_{10}]) for 54 percent of the days in 2019 (California Air Resources Board 2021). The SSMP Project includes goals to improve habitat for birds and reduce fugitive dust emissions through a series of projects.

The proposed SSMP Project would be implemented at various locations around the perimeter of the Salton Sea in Riverside and Imperial counties. The amounts, types, and locations of aquatic habitat and dust suppression projects would be based on location and availability of a water supply, suitable soils, landscape/habitat compatibility, and the amount of emissions from the exposed lakebed.

This report provides an assessment of potential aquatic resources that may be subject to the Corps' jurisdiction under Section 404 of the Clean Water Act (CWA). Analysis in this report reflects current

[1] The Quantification Settlement Agreement consists of more than 30 agreements executed concurrently among certain Southern California water agencies in 2003. The State of California, the federal government, and others signed some of the agreements. That set of agreements is commonly referred to as the *QSA*. The Imperial Irrigation District was required to provide conserved water to the Sea to mitigate the effects of the transfer on salinity until 2017, at which point the delivery of mitigation water ceased.

conditions in the study area, as they can be distinguished by available aerial imagery and guided by reference materials focused on the Salton Sea margin.

Corps staff were consulted to determine the most effective method to assess potential wetlands for inclusion in the programmatic suite of projects covered under the SSMP 10-year Plan. The Corps determined that a desktop assessment would be sufficient for establishing Letter of Permission (LOP) procedures associated with the programmatic National Environmental Policy Act document, with an understanding that project-specific delineations would be completed as individual projects are identified to account for ongoing recession and changing conditions of the Sea. Specifically, a delineation of the limits of Waters of the United States (WOTUS) and special aquatic sites will be conducted and submitted to the Corps for review and subsequent verification prior to individual project implementation. No field work was conducted as part of this desktop assessment.

The Corps is serving as the lead agency for the environmental assessment that is being prepared, in compliance with the National Environmental Policy Act, for the 10-year Plan. The Corps intends to establish LOP procedures, which will outline the criteria individual projects will need to meet in order to be authorized by the Corps. The establishment of SSMP-specific LOP procedures is an alternative regulatory mechanism to the Corps' typical evaluation of standard permit applications for individual projects and activities that are regulated under Section 404 of the CWA. Some areas currently known as jurisdictional waters of the U.S. because they are inundated by the Salton Sea, may not be jurisdictional at the time of project development due to the ongoing receding nature of this water body. In addition, some areas that are currently barren may be colonized by wetland (hydrophytic) vegetation, forming jurisdictional wetlands as water, from drains and other sources, spreads out along the receding shoreline. As specific projects are identified in the future, the limits of WOTUS and special aquatic sites will be reassessed in aquatic resources delineations, which will be conducted prior to project implementation, to account for the ongoing recession and changing conditions of the Sea.

2 Study Area

The Salton Sea, located in southern Riverside and northern Imperial counties in Southern California, is California's largest lake. The Salton Sea lies west of the Chocolate Mountains, west of Salton City, north of Brawley, and south of Mecca, at approximate latitude 33°19'43.03"N and longitude 115°50'36.28"W. The study area for this desktop assessment encompasses the Salton Sea perimeter, which lies between the estimated 2028 shoreline and a 0.5-mile-wide buffer upslope from the 2003 shoreline (Figure 1).

Figure 2-1 Study Area

2.1.1 Hydrology

The current Salton Sea was formed when Colorado River floodwater breached an irrigation canal that was being constructed in the Imperial Valley in 1905 and flowed into the Salton Sink. The Sea has since been maintained by irrigation runoff in the Imperial and Coachella valleys and local rivers, including the New River, Alamo River, and Whitewater River. The Salton Sea is fed primarily by irrigation runoff from the Imperial Valley, which has decreased significantly following the 2003 QSA. The QSA imposes water conservation measures within the Imperial Irrigation District service area, which reduces the volume of agricultural runoff to the Sea. Reductions in return irrigation flows have reduced the amount of water input to the Salton Sea from 1.2 to 1.3 million acre-feet in the 1980s and 1990s to approximately 700,000 to 800,000 acre-feet in 2020. The deepest portions of the Salton Sea are currently less than 50 feet deep; however, the majority of the lake is between 1 and 3 feet in depth. Consequently, the inflow reduction is expected to decrease the area of surface inundation by nearly one-third by the middle of the century.

2.1.2 Soils

Soils information included in this description is primarily derived from the Bruchard Road Dust Suppression Project delineation (SPL-2019-00678) (Cardno 2019); no soils analysis was conducted for this desktop assessment. Indicators of hydric soils can reflect current, recent, or relict periods of saturation, inundation, and anaerobic conditions. As the Salton Sea gradually recedes exposing low-slope playa, relict conditions of the higher lake elevation can be observed in the spoil profile above the ordinary high water mark (OHWM) (Cardno 2019).

Tamarisk scrub wetlands sampled during the Bruchard Road Dust Suppression Project delineation exhibited soils meeting the conditions for the Depleted Matrix, Redox Depressions, or both indicators, and either or both soft Salt Crust and barnacle shells (from aquatic invertebrates) were present as wetland hydrology indicators (Cardno 2019). However, many of these features are present above the OHWM and are relictual of previous hydrologic conditions.

3 Methodology

A desktop assessment was completed to determine potential aquatic resources within the study area. Aerial imagery from 2018 (Aerial Archives 2019) was used to identify various vegetation communities and land use types, based on known vegetation patterns on aerial photography. The vegetation and land use categories were subsequently used to determine and map probable wetland habitats and areas of open water based on the appearance of vegetation on aerial photography. The extent of potential wetlands and other WOTUS within the study area was informed by this desktop vegetation mapping exercise using aerial imagery, information from the Bruchard Road Dust Suppression Project, and data from the National Wetlands Inventory (Aerial Archives 2019; Cardno 2019; U.S. Fish and Wildlife Service 2020).

3.1 Ordinary High Water Mark

During the Bruchard Road Aquatic Resources Project delineation, multiple drift lines were observed within the assessment study area, likely indicating the location of the OHWM. The OHWM was ultimately determined using current Corps guidance. The OHWM was determined for Bruchard Road Aquatic Resources Project using the most prominent woody debris drift line and break-in slope with the appearance of recent depositions: bird and fish carcasses, aquatic insects, larger pieces of woody debris not yet decaying, and greater levels of barnacle shell deposition. Hydric soils supported this determination of the OHWM and became more complex below this elevation (-233.6 feet mean sea level [msl]), with greater numbers and stronger displays of hydric soil indicators such as loamy gleyed matrix, depleted matrix, and redox depressions. Hydrologic indicators, which were also stronger below the OHWM, included soil saturation, high water table, and soil cracks. A review of hydrologic data since 2003 supports delineation of the OHWM at this elevation (Cardno 2019; Corps 2008a). The OHWM delineated for Bruchard Road Aquatic Resources Project in 2019 is the same OHWM that was applied for this desktop assessment and is established at -233.6 feet msl (Cardno 2019; Corps 1987, 2008a). It was determined that this OHWM is applicable to this desktop assessment because it was the most recent determination of the OHWM accepted by the Corps at the time the desktop evaluation was conducted.

The area of lake within the study area that was determined to be below the OHWM was mapped as Lacustrine Open Water. The water level of the Salton Sea is influenced primarily by regulated water inputs that have decreased substantially following approval of the QSA. Reduced inflows combined with high temperatures (the average mean temperature for Imperial, California, is 73.4 degrees Fahrenheit), little rainfall (the average precipitation for Imperial, California, from 1901–2018 was 2.8 inches), and the shallow depth in the southern portion of the lake have led to continued lowering of the OHWM. In a 2011 site investigation and subsequent site visits in 2012, the OHWM for the Salton Sea was determined to be -231 feet msl[2]; however, the changing conditions that have resulted under the QSA represent current "normal circumstances" show the rapid migration of the Sea's OHWM. This rapidly declining shoreline (from -231 feet msl in 2011 to -233.6 feet msl in 2019) is an expected condition at the Sea, and project-specific delineations will determine the OHWM based on the conditions that are present when individual projects are proposed.

The OHWM for other waters and tributaries was estimated based on the appearance of open water on aerial photography. This condition may change over time as rivers and drainage features become more incised as they erode the exposed lakebed or as these features spread out on the exposed lakebed forming wetlands and flooded areas. In general, the OHWM for tributaries to the Salton Sea above

[2] *Jurisdictional Delineation Report for the Salton Sea Species Conservation Habitat Project*, which was prepared jointly by Dudek and Chambers Group, Inc. (2012) and subsequently verified by the Corps on October 4, 2013 (File No. SPL-2010-00142-LLC).

the -233-foot contour are not expected to change substantially between the timing of the desktop evaluation in this report and project construction.

3.2 Vegetation Mapping

Vegetation communities were matched to the equivalent type (where applicable) in the *Manual of California Vegetation*, Second Edition (Sawyer et al. 2009).[3] Using the desktop vegetation mapping developed for this assessment, specific categories were considered probable wetlands and other WOTUS including open water, herbaceous wetland, tamarisk scrub, tamarisk woodland, and desert wash woodland. Examples of the aerial signatures for these types and descriptive information on determination methodology is provided in Table 3-1. Areas mapped as managed wetlands were not divided into more specific categories because these areas were not likely to be developed for projects since they already provide the functions that the projects would attempt to create. In addition, areas mapped as chenopod scrub were further categorized as probable wetland or not probable wetland based on landscape position in comparison to the Sea and other inundated features.

Additional analysis was conducted regarding playa wetlands, which are typically composed of sparse tamarisk or iodine bush. Per Corps guidance, the scale used to estimate plant cover was approximately 5,000:1 to consider larger swaths of habitat and map playa wetlands appropriately. Aerial imagery of the study area was analyzed at this scale to determine the areas that meet the 5 percent cover requirement to be considered playa wetlands as described in the Arid West Supplement (Corps 2008b).

As part of the desktop assessment, specific known signatures[4] for vegetation community/land use type were identified using aerial imagery (Table 3-1). These examples were used to complete the vegetation mapping exercise, which involved assigning vegetation communities/land use types within the study area to the known signatures on aerial imagery. Table 3-1 shows representative aerial signatures for specific vegetation communities/land use types.

The Arid West Regional Wetland Plant List (Lichvar et al. 2016) was used to determine the wetland indicator status of vegetation communities/signatures observed on aerial imagery during the assessment.

Potential wetlands within the study area were categorized as tamarisk scrub, tamarisk woodland, chenopod scrub (if wetland was noted), and herbaceous wetland. Managed wetlands and open waters were also identified as separate types. All other vegetation types were mapped as non-wetland types and include barren lake bottom, barren non-lake bottom, chenopod scrub (non-wetland), creosote bush scrub, desert wash woodland, non-native trees, disturbed/developed, dust suppression projects, and agriculture.

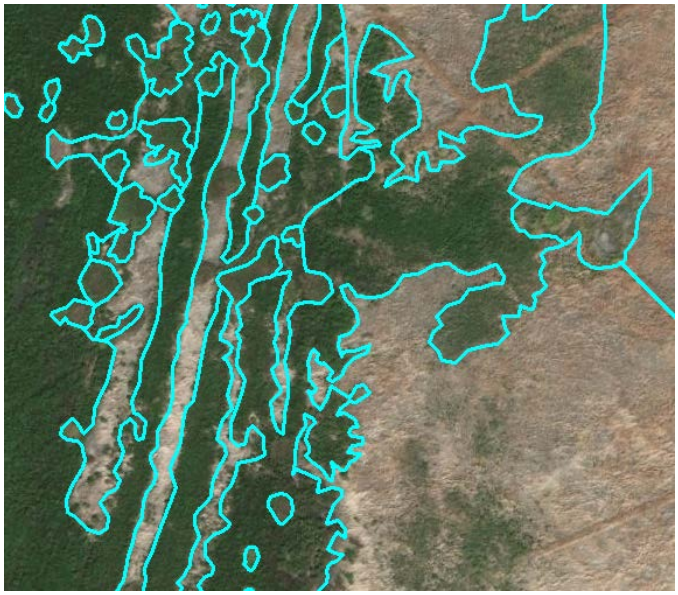
Mapped categories from this desktop assessment are described in Table 4-1 in Section 2, *Results*.

The Corps criterion for wetland vegetation is satisfied if the area is dominated by hydrophytic vegetation. Hydrophytic species include those species listed as Obligate (OBL), Facultative Wetland (FACW), or Facultative (FAC) in Lichvar et al. (2016).

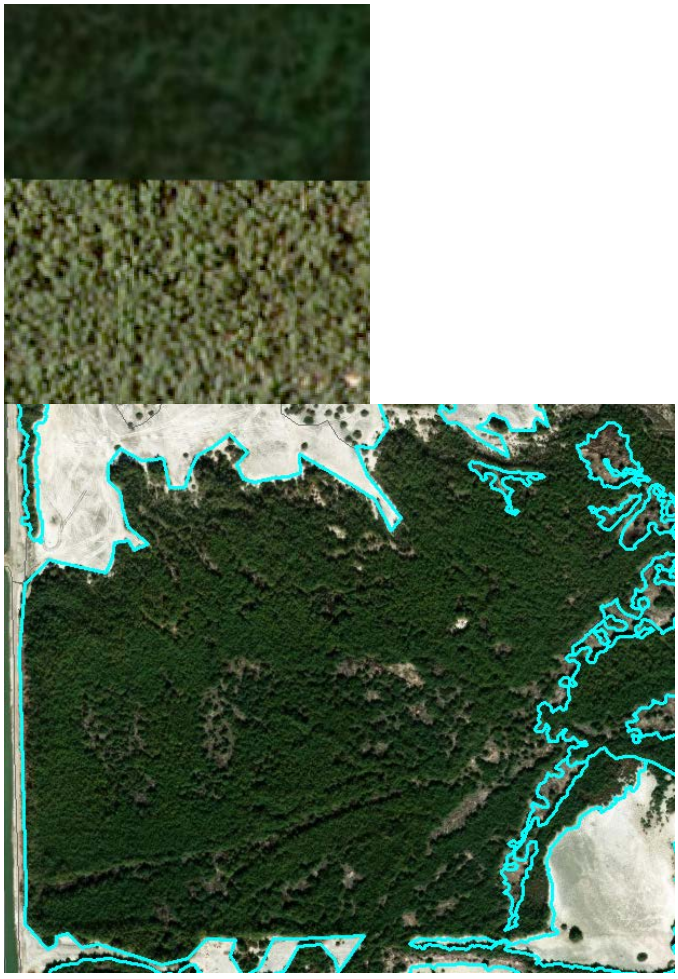
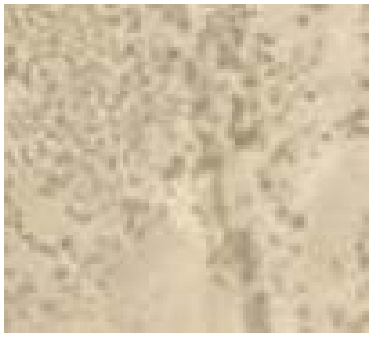
[3] Some land use and vegetation types do not have an applicable type in the *Manual of California Vegetation,* Second Edition. Examples include disturbed and developed areas, agriculture, and areas that could not be subdivided into more detailed categories (e.g., herbaceous wetland for which areas of cattails and common reed are not distinguishable from aerial photography). Table 4.4-2 in the Biological Resources section of the Salton Sea Management Program Environmental Assessment provides the approximate total acres of each vegetation type within the study area as well as the equivalent types from the *Manual of California Vegetation*, Second Edition.

[4] A vegetation signature is the pattern of the vegetation when viewed on an aerial photograph. Species and habitats can have different appearance depending on the species and habit stage that is shown in an aerial photograph.

Table 3-1 Vegetation Communities/Land Use Type and Aerial Imagery Signatures

Vegetation community/land use type	Aerial Imagery Signatures	Description
Herbaceous wetland	  	Areas adjacent to waterways that appear to be dominated by herbaceous vegetation, rather than shrubland or woodland.

Vegetation community/land use type	Aerial Imagery Signatures	Description
Chenopod scrub		Areas that are dominated by shrub vegetation that is lower in stature than tamarisk and generally dominated by iodine bush.
Managed wetlands		Areas mapped as California Department of Fish and Wildlife or U.S. Fish and Wildlife Service refuges.
Open Water		Areas that have little to no vegetation and are subject to regular inundation.

Vegetation community/land use type	Aerial Imagery Signatures	Description
Tamarisk woodland		Areas with 41% or more cover of tamarisk, as visible on aerial imagery.
Tamarisk scrub		Areas with 5 to 40% cover of tamarisk, as visible on aerial imagery.

Vegetation community/land use type	Aerial Imagery Signatures	Description
		
Desert wash woodland		Areas that have relatively sparse vegetative cover but consist of native species requiring extra water. Limited to areas where aerial imagery could rule out tamarisk as a dominant species.

Vegetation community/land use type	Aerial Imagery Signatures	Description
		

4 Results

Table 4-1 below provides the approximate total acres in the study area by plant community as well as total potential WOTUS that may require authorization under Section 404 of the CWA (Figure 4-1). Within the study area, a total of 73,563.0 acres have been identified as potential WOTUS. Vegetation communities and land use types at the Sea are shown in Figure 4-2.

Table 4-1 Wetlands

Plant Community	Description	Approximate Wetland or WOTUS Acres in the Study Area
Wetlands		
Chenopod scrub	At the Salton Sea, chenopod scrub is typically dominated by iodine bush (*Allenrolfea occidentalis*, a facultative wetland species [FACW]) in areas that are low lying, while better drained, often mounded sites are vegetated with different saltbush species, such as big saltbush (*Atriplex lentiformis*, a facultative [FAC] species), four-wing saltbush (*Atriplex canescens*, an upland species [UPL]), and/ or allscale scrub (*Atriplex polycarpa*, a facultative upland [FACU] species).	2,855
Tamarisk scrub	Tamarisk (*Tamarix* sp.) is an aggressive nonnative species that can outcompete native riparian species because of its ability to root deeply and withstand dry periods. Within the study area, it is found along agricultural canal and drainage margins, particularly in disturbed areas. Tamarisk is classified as an FAC wetland plant and often occurs in homogeneous stands. Tamarisk scrub wetlands sampled during the Bruchard Road Dust Suppression Project exhibited soils meeting the conditions for the Depleted Matrix, Redox Depressions, or both indicators, and either or both soft Salt Crust and barnacle shells (from aquatic invertebrates) were present as wetland hydrology indicators (Cardno 2019).	3,255
Tamarisk Woodland	Tamarisk woodland is similar to tamarisk scrub, except the vegetation is more robust and taller in profile, with upwards of 40% cover.	3,065
Herbaceous wetland	Herbaceous wetlands within the study area typically occur along the margins of rivers, agricultural canals, and small drainages. Periodic inundation and/or saturation of these areas allows the establishment of hydrophytic species, such as the nonnative species common reed (*Phragmites australis* [FACW]), and native species such as cattails (*Typha* spp., obligate species [OBL]) and salt grass (*Distichlis spicata* [FAC]). Common reed stands in the study area are typically found in more saline environments than cattails, while salt grass is more common in areas less consistently inundated and saline.	1,599
Managed wetlands	Managed wetlands in the study area typically involve marshlands that have been created or protected for the purpose of providing wildlife habitat. For the purposes of the desktop vegetation mapping, managed wetlands were mapped as a single type. They include areas of chenopod scrub, herbaceous wetland, roads, and open water. These areas are typically adjacent to agricultural fields and tributaries to the Salton Sea. The Imperial Wildlife Area and the Sonny Bono Salton Sea National Wildlife Refuge are two of the largest managed wetlands in the study area. Vegetation is present in some of these areas but not others.	3,862
POTENTIAL TOTAL WETLANDS		**20,524**

Plant Community	Description	Approximate Wetland or WOTUS Acres in the Study Area
Other (Non-wetland) Waters		
Lacustrine Open Water	Lacustrine open water includes areas of the Salton Sea that are below -233.6 feet mean sea level.	53,039
Riverine Open Water	Riverine open water includes areas of open water above -233.6 feet mean sea level. It includes inflows from rivers, drains, and creeks that discharge directly to the lakebed.	1,043
TOTAL POTENTIAL WATERS OF THE US		**74,606**

4.1 Lacustrine Open Water

The total mapped lacustrine open water within the study area was 53,039 acres.

4.2 Riverine Open Water

The total mapped riverine open water within the study areas was 1,043 acres. The three primary channels that contribute flows to the Salton Sea are the Whitewater River flowing from the north and the Alamo and New rivers flowing from the south. These rivers flow through extensive agricultural lands and operate functionally as agricultural ditches in within the study area before reaching the Salton Sea. The New and Alamo rivers provide nearly 80 percent of inflow to the Salton Sea. Inflows are typically highest in summer, carrying snowfall runoff; have reduced levels of salinity; and contain higher levels of dissolved oxygen than is normally present in open waters of the Salton Sea (State of California 2018).

4.3 Special Aquatic Sites

Potential special aquatic sites within the study area include mudflats and playas. The area below the OHWM may be considered a special aquatic site (mud flat), particularly because the water level seasonally fluctuates, due to the increased observations of aquatic insects, which may be a result of a productive ecosystem or be an important food source for other aquatic or terrestrial species. However, the potential for mud flats to exist above the OHWM is minimal because of the uniform topography of this portion of the study area and the lack of inundation resulting from the recession of the Salton Sea.

Playa wetlands generally comprise chenopod scrub or tamarisk scrub at low density, occupying 2,855 and 3,255 acres, respectively. Additional special aquatic sites consist of tamarisk woodland (3,065 acres), herbaceous wetlands (1,599 acres), and managed wetlands (3,862 acres).

Figure 4-1 Potential Wetlands and Waters of the U.S. within the Study Area of the Salton Sea

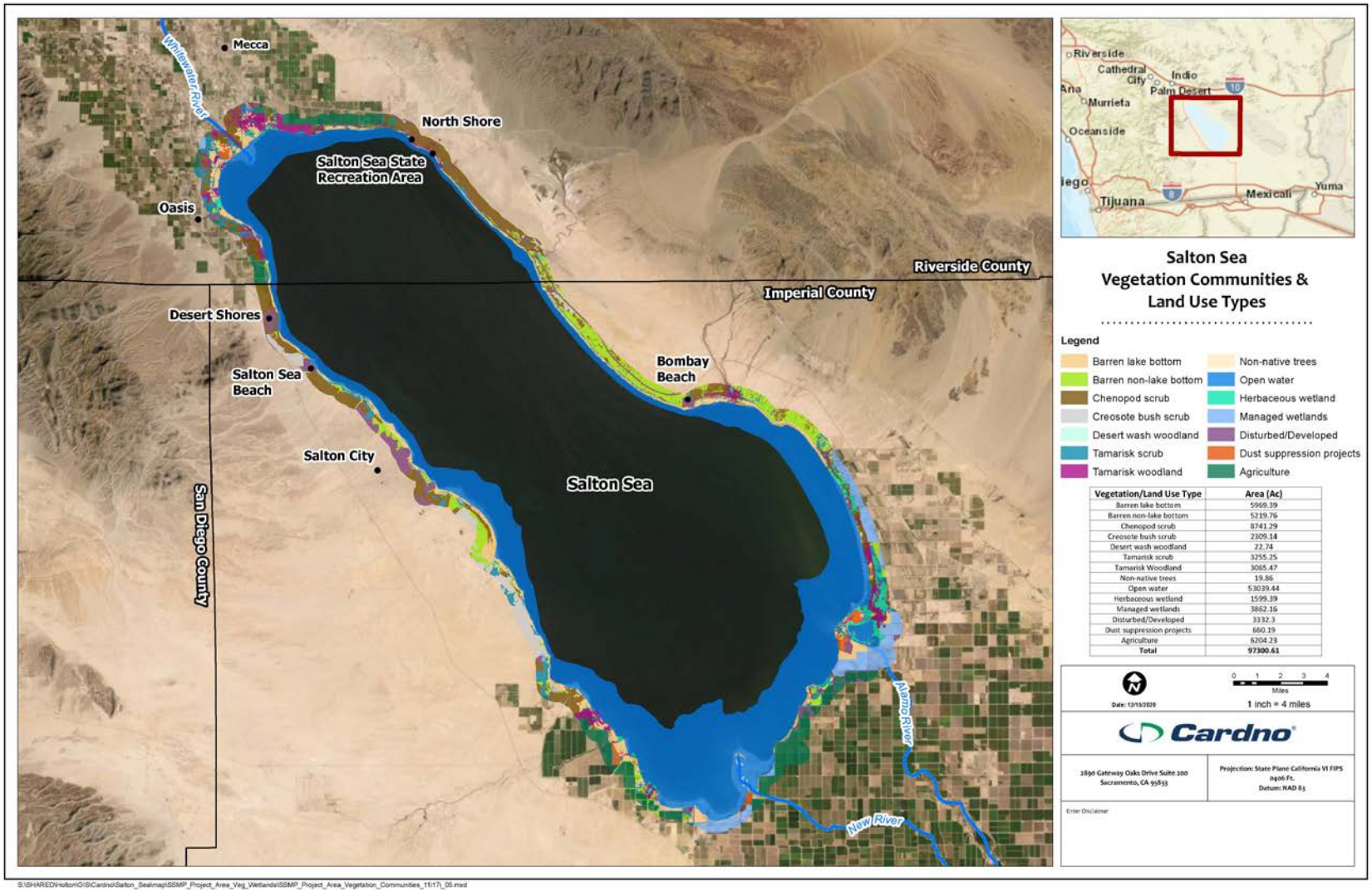


Figure 4-2 Vegetation Communities and Land Use Types at the Salton Sea

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