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STAFF REPORT: REGULAR CALENDAR

Consistency Determination No.: CD-0002-15

Federal Agency: U.S. Fish and Wildlife Service

Location: Seal Beach National Wildlife Refuge, Orange County
(Exhibit 1 and Exhibit 2)

Project Description: Thin-Layer Salt Marsh Sediment Augmentation Pilot Project to improve habitat quality for the endangered light-footed Ridgway's rail, to evaluate the overall effectiveness of the sediment augmentation process as a sea-level rise adaptation strategy for conserving salt marsh habitat along the California coast, and to evaluate the long-term carbon storage and sequestration benefits provided by tidal salt marsh habitat.

Staff Recommendation: Concurrence

SUMMARY OF STAFF RECOMMENDATION

The U.S. Fish and Wildlife Service submitted a consistency determination for a thin-layer salt marsh sediment augmentation pilot project on the Seal Beach National Wildlife Refuge in Orange County. The project is designed to improve habitat quality for the endangered light-footed Ridgway's rail (formerly known as the light-footed Clapper rail), to evaluate the overall

effectiveness of the sediment augmentation process as a sea-level rise adaptation strategy for conserving salt marsh habitat along the California coast, and to evaluate the long-term carbon storage and sequestration benefits provided by tidal salt marsh habitat. This project is the first of its kind on the California coast. Up to 13,500 cubic yards of clean dredged sediment will be spread over ten acres of degraded cordgrass habitat to create an 8- to 10-inch-thick layer of sediment. Natural revegetation of the site is expected to occur over a two-year period. Suitable sediment for the project will be provided by the Orange County Parks Department in association with its Sunset/Huntington Harbour Maintenance Dredging Project, which the Commission approved in April 2015 under coastal development permit 5-13-1379. The dredged sediment will be transported to the receiver site by a containment barge or slurry pipeline; sediment will be applied across the receiver site using a rainbow sprayer or pipeline. Pre- and post-sediment application monitoring of physical and biological responses to the project will occur over a five-year period, in order to evaluate the effectiveness of sediment augmentation to enhance salt marsh habitat. The project is scheduled for implementation between November 2015 and February 2016.

The placement of clean dredged sediment to restore salt marsh habitat will create temporary adverse effects on degraded cordgrass at the project site. However, the project includes mitigation measures that require restoration of salt marsh habitat to pre-project conditions should natural reestablishment of cordgrass fail to occur after sediment augmentation. The project includes adaptive management and mitigation measures, construction best management practices, and an extensive monitoring program. The staff recommends that the Commission find that the proposed project is consistent with the allowable use, alternatives, mitigation, and other tests contained in the wetland fill policy of the California Coastal Management Program (CCMP; Coastal Act Section 30233(a) and (b)).

The project is designed to provide safe and resilient nesting habitat for the endangered light-footed Ridgway's rail, enhance marine resources and habitat, and protect the biological productivity and quality of coastal waters. The placement of clean dredged sediment could affect marine resources and water quality during and immediately after sediment application. However, the project includes monitoring and mitigation measures that when implemented will minimize and/or avoid significant adverse effects at and adjacent to the project site. The staff recommends that the Commission find that the proposed project is consistent with the marine resources and water quality policies of the CCMP (Coastal Act Sections 30230, 30231, and 30240).

The project site is located within the boundaries of Naval Weapons Station Seal Beach and the Seal Beach National Wildlife Refuge. Public access and recreation is prohibited at the project site due to the Navy's military security restrictions and to protect sensitive coastal salt marsh habitat and listed species. The project will not result in any permanent changes to the current restrictions on public access and recreation in the Refuge. The staff recommends that the Commission find that the project is consistent with the public access and recreational boating policies of the CCMP (Coastal Act Sections 30210, 30212, 30214, and 30220).

Commission staff recommends **concurrence** with consistency determination CD-0002-15.

TABLE OF CONTENTS

I. <u>FEDERAL AGENCY’S CONSISTENCY DETERMINATION</u> ...	4
II. <u>MOTION AND RESOLUTION</u>	4
III. <u>FINDINGS AND DECLARATIONS</u>	4
A. <u>PROJECT DESCRIPTION AND BACKGROUND</u>	4
B. <u>WETLANDS</u>	10
C. <u>MARINE RESOURCES AND WATER QUALITY</u>	13
D. <u>PUBLIC ACCESS AND RECREATION</u>	18
E. <u>OTHER AGENCY APPROVALS AND CONSULTATIONS</u>	20

APPENDICES

<u>Appendix A – Substantive File Documents</u>	22
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EXHIBITS

- Exhibit 1 – Vicinity Map
- Exhibit 2 – Project Site Map
- Exhibit 3 – Photograph: View to the northwest across project site wetlands
- Exhibit 4 – Project Site with Buffer Area and Test Plots
- Exhibit 5 – Project Site and Dredge Area
- Exhibit 6 – Photographs: Views of project site at higher high tide

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

The U.S. Fish and Wildlife Service has determined that the project is consistent to the maximum extent practicable with the California Coastal Management Program.

II. MOTION AND RESOLUTION

MOTION:

*I move that the Commission **concur** with consistency determination CD-0002-15.*

Staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence in the determination and adoption of the following resolution and findings. An affirmative vote of the majority of the Commissioners present is required to pass the motion.

RESOLUTION:

*The Commission hereby **concurs** with consistency determination CD-0002-15 by the U.S. Fish and Wildlife Service on the grounds that the project is fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program.*

III. FINDINGS AND DECLARATIONS

A. PROJECT DESCRIPTION AND BACKGROUND.

The U.S. Fish and Wildlife Service ("Service") proposes to implement a pilot project to apply a thin layer of clean dredged sediment over ten acres of degraded cordgrass habitat within a 14-acre project site in Anaheim Bay on the Seal Beach National Wildlife Refuge ("Refuge") in Orange County (**Exhibit 1 and Exhibit 2**). The project is designed to improve habitat quality for the endangered light-footed Ridgway's rail (formerly known as the light-footed Clapper rail), to evaluate the overall effectiveness of the sediment augmentation process as a sea-level rise adaptation strategy for conserving salt marsh habitat along the California coast, and to evaluate the long-term carbon storage and sequestration benefits provided by tidal salt marsh habitat. The Refuge is located primarily on federal land located within the boundaries of the U.S. Navy's Naval Weapons Station Seal Beach and is managed by the Service as part of the National Wildlife Refuge System. The U.S. Navy owns in fee title the majority of the project site, with a smaller area of state tidelands at the western edge of the site owned by California State Lands Commission and leased to the Service for management as a national wildlife refuge.

In May 2012 the Service and the Navy gave their final approval to a *Comprehensive Conservation Plan* ("CCP") that provides guidance for how the Refuge should be managed over a 15-year period. The Coastal Commission's Executive Director had previously concurred with a negative determination (ND-043-11) for the CCP in September 2011. The CCP included a programmatic proposal to implement thin-layer sediment augmentation on the Refuge and a commitment by the Service to bring the details of the proposed project (when finalized) back to the Commission in a subsequent consistency determination. The environmental impacts of the proposed project are analyzed in a combined *Environmental Assessment/Initial Study* prepared

by the Service and the California State Coastal Conservancy. The Service approved the *Final EA/IS* and the *Finding of No Significant Impact* in September 2014, and the Conservancy certified the *Final Mitigated Negative Declaration* in October 2014.

The proposed project includes the following elements:

- Apply up to 13,500 cubic yards of clean sediment over 10 acres of the 14-acre site as a fairly uniform thin layer of sediment, approximately 8 to 10 inches deep. The sediment will cover existing salt marsh vegetation, which is expected to grow up through the added sediment, particularly Pacific cordgrass (*Spartina foliosa*), and/or naturally recruit from the surrounding existing seed bank (**Exhibit 3**). Revegetation of the site is expected to occur over a period of approximately two years.
- Within the 10-acre application site, greater depths of sediment will be applied to three test plots (each at a different depth ranging from a minimum of 12 inches to a maximum of 24 inches). The three plots, which will be approximately 50 feet by 50 feet, will be monitored to determine what, if any, effect the different depths of sediment disposal have on vegetative growth and species composition, as well as on the diversity and/or abundance of invertebrates (**Exhibit 4**).
- Sediment for this project will be provided by the Orange County Parks Department in association with its Sunset/Huntington Harbour Maintenance Dredging Project, which the Commission approved in April 2015 under coastal development permit 5-13-1379 (County of Orange). The Service and the Navy decided to use material from the Main Channel West dredge site for this pilot project based on the results of chemical and grain size suitability analyses conducted on the sediments at the proposed dredge site and at the 10-acre receiving site on the Refuge (**Exhibit 5**).
- The material dredged from the Main Channel West site will be transported to the project site using one or more methods of transport and application. Potential options for transport include the use of a small containment barge, which would travel from the dredge site up one of the two existing tidal channels that abut the project site. Alternatively, the sediment may be transported as slurry (i.e., a mixture of water and sediment) through a pipeline that would extend from the dredge site into the Refuge via one of the two adjacent tidal channels. The pipeline could be placed on the bed of the bay and channel or floated on the water surface from the maintenance dredge site to the project site. Once at the project site, sediment would be applied as slurry using a rainbow sprayer, open pipe, or end-of-pipe baffle impingement.
- It may be necessary to test various application methods at the beginning of the project to ensure uniform coverage. The sediment application process, which could take from four to six weeks to complete, will be adaptively managed to meet project design criteria, including achieving the desired depth of sediment within the confines of the 10-acre application site and minimizing the potential for introduction of sediment into the tidal channels that abut the site. The remaining four acres of the 14-acre site will provide a vegetated buffer around the augmentation site.

- To minimize the movement of sediment off the application site, sediment will not be applied during any high tides predicted to fully inundate the project site. In addition, an area of approximately four acres of existing salt marsh vegetation is included within the project site that would serve as a 50-foot-wide vegetated buffer between the augmentation site and the adjacent tidal channels. A silt fence or other appropriate barrier would be installed around the entire perimeter of the 10-acre application site. The combination of the buffer and silt fencing is intended to minimize the movement of sediment off the site and into the adjacent tidal channels during or following sediment application.
- An on-site monitor will be present during sediment application to monitor sediment movement and turbidity levels throughout the process. The monitor will have the authority to direct the contractor to adapt the application technique to avoid offsite impacts, as well as to require the implementation of additional measures, such as the instillation of a silt curtain or other appropriate barrier, should these measures be deemed necessary to avoid introducing sediment into adjacent habitat areas, particularly the adjacent tidal channels. A range of conservation measures and best management practices has been incorporated into the scope of the project to avoid adverse effects to environment.
- Using funding provided by the State Coastal Conservancy, the Service will prepare and implement a pre- and post-sediment application monitoring plan for the project. Monitoring results will inform the Service and other land managers of the effectiveness of thin-layer sediment augmentation in achieving the project objectives; provide an understanding of sediment movement and/or compaction over time; facilitate the evaluation of the physical and ecological responses of the marsh ecosystem to the action; and provide analysis related to carbon sequestration and carbon storage from maintaining and enhancing coastal salt marsh habitat. Monitoring results will be presented in annual reports, with workshops or webinars planned after two years and five years of monitoring. A final monitoring report will be provided to interested agencies and coastal land managers after the end of the five-year monitoring period. The Service will also prepare a document describing the application process, the effectiveness of various actions in retaining the sediment on site, and other lessons learned in order to facilitate the replication and continued improvement of this technique as a sea-level rise adaptation strategy.

The Service provided in its consistency determination and supporting documents a detailed discussion of the proposed project's purpose, need, and objectives. The proposal to raise the elevation of the marsh plain was initially suggested during the planning effort for the Refuge's *Comprehensive Conservation Plan* as a strategy for improving the habitat quality of the Refuge's cordgrass-dominated low marsh areas to support the Refuge's population of light-footed Ridgway's rails (**Exhibit 6**). The primary purpose of the proposed project is to evaluate the effectiveness of thin-layer sediment augmentation as an adaptation strategy for addressing the adverse effects of sea level rise and subsidence on coastal salt marsh habitat and the species that depend on that habitat for their survival. The Service states that:

Since migration of salt marsh to surrounding areas is not always feasible given the extent of development surrounding California's coastal wetlands, raising marsh plain elevations through thin-layer sediment augmentation may be the only tool available to sustain and improve coastal salt marsh habitat quality and the benefits it provides both as a carbon sink and as habitat supporting a wide range of fish and wildlife species, including listed species, that are dependent upon this habitat for forage, refuge, and breeding. The concept of thin-layer sediment augmentation originated with the recognition that marshes are adapted to respond to the natural process of sediment deposition.

In its consistency determination, the Service addressed the need for the project:

To ensure the long-term survival of the endangered light-footed Ridgway's rail, a sea level rise (SLR) adaptation strategy must be developed that can ensure the availability of adequate acreage of low coastal salt marsh along the southern California coast as sea level rises. Existing conditions at the Seal Beach NWR provide a unique opportunity to proactively develop and refine a SLR adaptation strategy that can then be implemented elsewhere over the next few decades to ensure the continued survival of this rail, as well as other listed and sensitive coastal salt marsh dependent species that occur along the California coast.

The Service further addressed the need for the project in its application (incorporated into the consistency determination) for grant funding from the California Department of Fish and Wildlife's *Wetlands Restoration for Greenhouse Gas Reduction Program*. In that application, the Service stated that:

We intend to demonstrate that the implementation of sediment augmentation along the California coast can provide net greenhouse gas (GHG) benefits along with benefits to other ecosystem services, including listed and sensitive species conservation . . . Tidal marshes accumulate and store carbon in their plant matter, roots, and soils and are recognized for their role in carbon sequestration and carbon storage . . . Unlike other carbon-dense ecosystems, tidal wetlands sequester carbon at dramatically large rates due to high primary productivity, continuous sediment burial, and low organic matter decomposition (Chmura et al. 2003). According to Coverdale et al. 2014 "if preserved, salt marshes are a sustainable solution to curtailing increasing atmospheric carbon."

The proposed project includes the following specific objectives:

- Enhance 10 acres of subsiding tidal salt marsh habitat by applying 10,000 to 13,500 cubic yards of clean dredge material as a fairly uniform thin layer of sediment, about 8 to 10 inches deep, to achieve and maintain a minimum three-inch increase in the marsh plain elevation within the project site two years after sediment augmentation.
- Within two years of sediment application, achieve stem heights and stem densities of Pacific cordgrass equal to or greater than pre-project conditions, and within five years of

sediment application achieve stem heights, stem densities, and below-ground root structures that exceed pre-project conditions and thereby result in a net increase in the carbon sequestration capacity within the site, as well as enhanced habitat quality to support the endangered light-footed Ridgway's rail and other salt marsh-dependent species.

- Within five years of sediment application, demonstrate that enhancing the vegetative cover within this tidal salt marsh site has produced net greenhouse gas benefits that can be duplicated in other tidal salt marsh habitat along the California coast that is threatened by sea-level rise and/or subsidence.
- Produce and disseminate a thin-layer sediment augmentation guidance document that describes the subject project, including a description of the procedures used to achieve uniform sediment depths and minimize movement of sediment offsite, and a discussion of the biological and physical monitoring results (including estimated carbon sequestration and carbon storage rates at the project site prior to and after sediment augmentation).

The Service reports that while thin-layer sediment augmentation has not been rigorously tested in California, the placement of fill material on an existing marsh plain to address subsidence and sea-level rise has been successfully implemented along the Gulf and East Coasts. In addition, the Service states that there is evidence that Pacific cordgrass is capable of growing up through a thin layer of sediment, based on studies at the Tijuana River National Estuarine Research Reserve (TRNERR) and the Seal Beach National Wildlife Refuge (SBNWR):

Ward et al. 2003 describes the establishment of Pacific cordgrass in Tijuana Estuary following sedimentation from winter storms, and post-construction monitoring for a restoration site in South San Diego Bay (Nordby Biological Consulting and TRNERR 2014) noted above ground plant coverage from cordgrass rhizomes after two years. Preliminary small-scale sediment application experiments at SBNWR showed that cordgrass and pickleweed were able to successfully grow through a layer of dredge material 12 inches deep within 36 weeks. This indicates a very high likelihood for success.

...

As we continued to discuss the potential for implementing this strategy on the Pacific Coast, we discovered considerable interest throughout California in identifying an adaptation strategy for preserving coastal salt marsh habitat, particularly in locations experiencing marsh degradation /subsidence (i.e., Elkhorn Slough, Humboldt Bay), as well as in areas with no room for inland migration (i.e., most south California marshes) and/or depleting sediment supplies (i.e., San Francisco Bay-Delta). Studies funded by the CA LCC [California Landscape Conservation Cooperative] to evaluate the effects of sea level rise on California's coastal habitats provide guidance for how and when this conservation strategy might be implemented in a particular area and in our case provide justification for why the SBNWR is the ideal location for testing this approach.

As noted previously, the proposed project is consistent with the Service's *Comprehensive Conservation Plan* for the Refuge. The project would address several actions described in the Service's *Light-footed Clapper Rail Recovery Plan* (USFWS 1985), including enhancing cordgrass vigor in Anaheim Bay. The Service also reports that:

The current proposal is also consistent with the National Fish, Wildlife and Plants Climate Adaptation Strategy (National Fish, Wildlife, and Plants Climate Adaptation Partnership 2012), which advocates for taking steps to address the effects of climate change, including sea-level rise, to help conserve ecosystems and make them more resilient. Additionally, consistent with the recommendations in Safeguarding California: Reducing Climate Risk, an Update to the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2014), this pilot project proposes an adaptation strategy that relies on sound science to highlight risks and help provide solutions, involves State, Federal, and local agency partnerships, and is designed to promote collaborative and iterative processes for crafting and refining climate risk management strategies.

Monitoring studies would commence concurrently with sediment augmentation. The Service states that a critical component of this pilot project will be pre- and post-sediment augmentation monitoring, in order to assess project outcomes and impacts, evaluate whether objectives are being achieved, and help refine adaptive management decisions. The project also includes the following measures of success that will be used to evaluate whether project objectives were met:

- Achieve and maintain a minimum three-inch increase in the marsh plain elevation within the project site two years after sediment augmentation.
- Within one year of sediment augmentation, provide foraging opportunities for migratory birds and the light-footed Ridgway's rail.
- Meet water quality and turbidity standards as regulated by the Clean Water Act.
- Meet requirements of the California Eelgrass Mitigation Policy.
- Within two years of sediment application, achieve stem heights and stem densities of Pacific cordgrass equal to or greater than pre-project conditions, and within five years of sediment application achieve stem heights, stem densities, and below-ground root structures that exceed pre-project conditions and thereby result in a net increase in the carbon sequestration capacity within the site, as well as enhanced habitat quality to support the endangered light-footed Ridgway's rail and other salt marsh-dependent species.
- Within two years of augmentation, achieve a diversity and abundance of benthic invertebrates within the project sediments that are similar to the selected reference site.

- Within one year of augmentation, provide foraging opportunities for migratory birds and foraging and nesting opportunities for the light-footed Ridgway's rail.
- Within four years of sediment application, demonstrate that enhancing the vegetative cover within this tidal salt marsh site has produced net GHG benefits that can be duplicated in other tidal salt marsh habitat along the California coast that is threatened by sea-level rise and/or subsidence.

Collection of data to establish existing conditions at and adjacent to the application site will take place between July and November 2015. Sediment application over the 10-acre site will occur between November 2015 and February 15, 2016 (in conjunction with the County of Orange's maintenance dredging project in Sunset/Huntington Harbour) and is expected to take approximately six to eight weeks.

B. WETLANDS.

Section 30233 of the Coastal Act states, in part:

(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize environmental effects, and shall be limited to the following:

...

(6) Restoration purposes

...

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for these purposes to appropriate beaches or into suitable longshore current systems.

The proposed sediment augmentation project needs to be examined for consistency with Section 30233 of the Coastal Act. Under this section, filling of open coastal waters and wetlands is limited to those cases where the proposed project is an allowable use, is the least damaging feasible alternative, and where mitigation measures are provided to minimize environmental impacts. The proposed sediment augmentation project is an allowable use under Section 30233(a)(6) for restoration purposes. The project is designed to restore degraded cordgrass habitat in the low salt marsh of Anaheim Bay, to improve habitat quality for the endangered light-footed Ridgway's rail, to evaluate the overall effectiveness of the sediment augmentation process as a sea-level rise adaptation strategy for conserving salt marsh habitat along the California coast, and to evaluate the long-term carbon storage and sequestration benefits provided by tidal salt marsh habitat.

The Service explained its alternative analysis in the project *Final Initial Study and Environmental Assessment (IS/EA)*:

In this EA, the range of alternatives is narrow because the purpose and need for the proposed action is very limited in scope. In developing a range of alternatives to the proposed action, the Service looked at what, if any, other sources of material might be available for use at the site, as well as what other locations within the Refuge might be considered. The only source of clean material of appropriate grain size that has been identified for this project to date is material that would be generated by a planned dredging project in the immediate vicinity of the Refuge. There are likely other potential sources of dredge material along the Los Angeles/Orange County coast, although none has been identified. The costs associated with transporting the sediments from a distant site to the Refuge would be high, and could affect the feasibility of the effort.

The following criteria were used in selecting the pilot project site: the site is included within the area designated for marsh enhancement in the Seal Beach NWR CCP (USFWS 2012); the site is situated in one of the lowest areas of the Refuge; the site consists primarily of vegetated marsh plain with limited tidal creeks; and the site is easily accessible from a barge or boat. Resource values for sites within the Refuge that meet the site selection criteria are fairly similar which means that identifying an alternative location for implementing this project would not result in sufficient differences in impact evaluation to warrant the inclusion of such an alternative. Therefore, the Service has concluded that the no action and proposed action represent a reasonable range of alternatives.

As noted in **Section A** of this report, the sediment source for the proposed project is the previously-permitted Sunset/Huntington Harbour maintenance dredging project of navigation channels and recreational boat berthing areas adjacent to the Refuge (CDP 5-13-1379, conditionally approved by the Commission in April 2015). The Service states that the decision to use materials from the dredging of the Main Channel West area was made by the Service and the Navy, based on the results of the sediment chemical and grain size analysis conducted at the dredge site and at the receiving site on the Refuge. The member agencies of the Southern California Dredged Material Management Team (which includes Commission staff representatives) determined in 2014 that the dredged sediments from the Main Channel West area were suitable for placement on the Refuge and that this project element was a beneficial reuse of dredged materials. The maintenance dredging project sponsors and the Service are coordinating their planning and permitting activities to ensure that dredging of the Main Channel West will take place during the optimal time frame for the Service to receive the sediments required for the restoration project. Therefore, given the constraints on the design, objectives, and sediment source and availability of the proposed project, and given the physical and chemical suitability of the dredged sediments for placement on the Refuge receiver site, the Commission agrees that there are no other feasible less environmentally damaging alternatives to the proposed project.

The proposed project would take place in cordgrass-dominated salt marsh habitat located within a 565-acre tidal salt marsh protected within the boundaries of the 965-acre Seal Beach National

Wildlife Refuge. The *Final Initial Study/Environmental Assessment (IS/EA)* for the project states that:

Cordgrass and Pacific pickleweed are the dominant species within the 14-acre project site. The height and cover of the cordgrass on the Refuge is compromised by relative lack of freshwater influence within the marsh (USFWS and U.S. Navy 1991) and land subsidence. The lower elevation of the salt marsh on the Refuge combined with short stem height, results in the complete inundation of the cordgrass stands in Anaheim Bay during all but the lowest of high tides. This prolonged immersion has additional adverse effects on plant vigor as a result of reduced oxygen availability to the roots and reduced sunlight to the stems (Massey et al. 1984).

The consistency determination examines the potential adverse impacts to wetland habitat from sediment augmentation and the mitigation measure incorporated into the project by the Service to avoid and minimize those impacts. Under the proposed action the elevation of a 10-acre area of marsh plain (or approximately 2.8 percent of the 565 acres of salt marsh habitat on the Refuge) would be raised through the application of a 6- to 10-inch layer of sediment, followed by five years of annual monitoring of the physical and ecological responses of the salt marsh ecosystem to the sediment placement. The Service predicts that sediment augmentation will create temporary (two to five years) impacts to the degraded cordgrass habitat at the project site. The Service states that this impact will be offset by the improved quality of the low salt marsh habitat at the project site resulting from raising the elevation of the marsh plain. However, the Service also acknowledges that failure of the project site to revegetate as predicted would represent a significant adverse effect to salt marsh habitat in the Refuge. To avoid this scenario, the project includes Mitigation Measure BIO-1:

Mitigation Measure BIO-1: *If, five years after sediment augmentation, reestablishment of native salt marsh vegetation to a density and percent cover similar to that present within the project site prior to sediment application has not occurred, the USFWS shall develop and implement a restoration plan to reestablish native salt marsh vegetation at a density and percent cover similar to pre-project site conditions. Site management and monitoring shall continue until salt marsh vegetation has been restored to the site in accordance with the specifications of the restoration plan.*

The Commission finds that incorporation of this mitigation measure into the proposed project will ensure that adverse impacts to salt marsh habitat that may arise from sediment augmentation will be fully addressed by restoration of the site to pre-project conditions by the Service.

The proposed thin-layer sediment augmentation project is designed to enhance and restore salt marsh habitat, determine if sediment augmentation is an effective sea level rise adaptation strategy for preserving coastal salt marsh habitat along the California coast, and evaluate the long-term carbon storage and sequestration benefits provided by tidal salt marsh habitat. The proposed project will be the first of its kind to be implemented on the California coast and holds the potential, due in large measure to the comprehensive monitoring measures incorporated into all phases of the project, to generate valuable information on the response of coastal salt marsh habitats to thin-layer

sediment augmentation. The project is consistent with the Seal Beach National Wildlife Refuge *Comprehensive Conservation Plan* strategy for improving the quality and resilience of the Refuge's cordgrass-dominated low salt marsh habitat. The placement of clean dredged sediment will create temporary adverse effects on degraded cordgrass habitat at the project site. However, the project includes mitigation measures that require restoration of salt marsh habitat to pre-project conditions should natural reestablishment of cordgrass habitat fail to occur after sediment augmentation. The project includes adaptive management and mitigation measures, construction best management practices, and an extensive monitoring program. In conclusion, the Commission finds that the proposed pilot project to apply a thin layer of clean dredged sediment over ten acres of degraded cordgrass habitat within a 14-acre project site in Anaheim Bay on the Seal Beach National Wildlife Refuge is consistent with the allowable use, alternatives, mitigation, and other tests contained in the wetland fill policy of the California Coastal Management Program (Coastal Act Section 30233(a) and (b)).

C. MARINE RESOURCES AND WATER QUALITY.

Section 30230 of the Coastal Act states:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Use of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30231 of the Coastal Act states:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Section 30240 of the Coastal Act states:

- (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
- (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

Marine Resources. The *Final IS/EA* describes the marine resources present at and adjacent to the project site:

The extent of inundation experienced in the Refuge's low marsh habitat, along with the reduced stem heights and percent cover of much of the cordgrass, directly affects habitat quality for the Refuge's population of light-footed Ridgway's rail (USFWS 2012).

*The 14-acre project site is surrounded to the north, south, and west by two major tidal channels that support shallow subtidal habitat. Surveys conducted in these channels in April 2013 by Merkel & Associates (M&A) identified multiple patches of eelgrass (*Zostera marina*) (refer to Figure 5).*

*The area within the vicinity of the Main Channel West dredge site and the 14-acre Refuge project site are known to support three federally listed endangered species, including the light-footed Ridgway's rail, California least tern, and eastern Pacific green turtle (*Chelonia mydas*). The rail and tern are also included on the California Endangered Species List. The eastern Pacific green turtle is included on the State's Special Animals List. No federally or State listed plant, fish, amphibian, or invertebrate species have been observed on the Refuge.*

Regarding the light-footed Ridgway's rail, whose protection is a primary emphasis behind the proposed project, the *Final IS/EA* reports that:

A recently completed USGS study of local subsidence at the Refuge (Takekawa et al. 2013b) indicates that the marsh is experiencing relative sea level rise rates of over 6 millimeters per year. This condition has resulted in the need for creative solutions for maintaining a healthy breeding population of light-footed Ridgway's rail on the Refuge.

One solution for addressing poor quality nesting habitat on much of the Refuge is the placement of artificial nesting platforms within the marsh. To date, approximately 95 artificial nesting platforms have been placed in the marsh for use by the rails.

Other management activities conducted on Seal Beach NWR to protect and assist in the recovery of the light-footed Ridgway's rail include pre-season nesting preparation, monitoring during the nesting season, minimizing human disturbance, and implementing predator management. Pre-season nesting preparation involves surveying, maintaining, and replacing nesting platforms that have been installed in Anaheim Bay.

The Service further reports that:

Studies conducted at the SBNRW in 2012 by USGS (Takekawa et al. 2013a) concluded that the long-term sustainability of the SBNRW's tidal salt marsh ecosystem faces threats from regional and local subsidence, limited sediment

availability, and sea-level rise. The effects of these threats on the Refuge's low marsh habitat quality were observed as early as the 1980s, when Massey et al. (1984) concluded, "the dearth of suitable nesting habitat in the coastal marshes of southern California [due to the absence of cordgrass of a suitable height] is a severely limiting factor to the growth of the Light-footed Clapper [now Ridgway's] Rail population." To address the current lack of natural nesting habitat for the rail on the SBNWR, about 90 artificial nesting platforms are maintained to provide safe, dry nesting sites for the rails. These platforms also provide year round sources of cover for rails during the higher high tides when most, if not all, salt marsh vegetation is submerged.

The consistency determination examines the potential adverse impacts to marine resources from implementation of the sediment augmentation project, and the mitigation measures incorporated into the project by the Service to avoid and minimize those impacts. Sediment augmentation-related activities on and adjacent to the project site would occur during a four- to six-week time period. To avoid impacts to nesting birds, no activities will be permitted during the avian nesting season. Further, the project is scheduled to occur in late fall or early winter when water temperatures are cooler, reducing the potential for the presence of sea turtles in the project area. The project includes Mitigation Measure BIO-2 to ensure that adverse effects to wildlife will be minimized:

Mitigation Measure BIO-2: *A qualified biologist shall be on site during construction to monitor for the presence of sensitive species and other wildlife. The biologist shall have the authority to halt construction when wildlife is observed within or near the project site. Work crews will be briefed on how to identify sea turtles and marine mammals that could occur in water areas affected by the implementation of the pilot project. The biological monitor will prepare incident reports of any observed sea turtle activity and shall provide such reports to National Marine Fisheries Service (NMFS) within 24 hours of an observation.*

Any work vessels (e.g., containment barge, workboat) moving about the project site shall comply with a five-mile per hour speed limit. In the event of a collision between the containment barge or workboat and a marine mammal or sea turtle, the USFWS shall immediately contact the NMFS Southwest Regional Office's Stranding Coordinator, and submit a report to the NMFS within 24 hours.

To reduce the potential for impacts to sea turtles, sediment transport and application within the Refuge shall only occur between November 1 and February 15, when water temperatures are lower.

The Service reports that tidal channels located adjacent to the sediment application site support eelgrass habitat. The introduction of sediment and increased turbidity within these channels could have an adverse effect on eelgrass beds. To minimize the potential for sediment to move off the site, the project includes a four-acre vegetated buffer around the 10-acre application site, and these areas will be monitored during sediment application. The project includes Mitigation

Measures BIO-3 and BIO-4 to ensure that any impacts to eelgrass from the project are identified and mitigated in accordance with existing policy:

Mitigation Measure BIO-3: *A vegetated buffer shall be maintained around the 10-acre application site, and the buffer area shall be monitored during sediment application to ensure that any sediment moving off the pilot project site is being trapped within the vegetated buffer area. If monitoring indicates that the sediment has the potential to migrate from the marsh into the adjacent tidal channel, additional measures shall be implemented to minimize the loss of sediment from the site. Such measures could include, but are not limited to, installing silt fencing, silt curtains, or straw wattles along the edge of the site.*

Mitigation Measure BIO-4: *Eelgrass surveys shall be conducted within the tidal channels that abut the 14-acre pilot project site, as well as another reference site within the Refuge, during the active growth phase for the vegetation (typically March through October). The distribution, density, and relationship to depth contours of any eelgrass beds that may be impacted by project implementation shall be thoroughly mapped and mapping protocols shall be consistent with those outlined in the Southern California Eelgrass Mitigation Policy (SCEMP). The same surveys shall be conducted within 30 days of completing the sediment application process and then annually for two years following application.*

If impacts to eelgrass from project implementation are identified, compliance with the SCEMP shall be initiated and monitoring of the mitigation area(s) and a suitable local reference site shall be implemented per the requirements of the SCEMP. Monitoring reports shall be filed with the resource agencies and the California Coastal Commission.

With respect to listed and sensitive species, the Service reports that application of sediment onto 10 acres of the 14-acre pilot project site could result in direct and indirect impacts to the light-footed Ridgway's rail. As discussed previously, no natural nesting of this listed species occurs within the project site due to the limited height of the existing cordgrass and the extent of inundation experienced at this location. While the project site does provide rails with foraging opportunities during lower tides, this activity will be eliminated at the 10-acre site for up to two years until cordgrass is reestablished to an optimum height. This temporary loss of foraging habitat represents a small portion (2.8 percent) of the total foraging habitat available for rails on the Refuge, and the Service concluded that this temporary loss would not adversely affect Ridgway's rails. In addition, no adverse impacts to the California least tern are anticipated as this species is not present on the Refuge between November and February 15 when the project will be implemented.

To avoid any direct take of Ridgway's rails and to reduce potential adverse effects to all avian species on the Refuge during project implementation, the project includes Mitigation Measure BIO-5:

Mitigation Measure BIO-5: *To avoid impacts to light-footed Ridgway's rails and other avian species in the vicinity of the project site, sediment application shall not occur during the nesting season. Additionally, the three artificial light-footed Ridgway's rail nesting platforms located within and adjacent to the project site shall be removed after the end of the breeding season (after September 15) preceding sediment application to minimize the presence of rails in the area.*

Prior to the daily application of sediment onto the pilot project site, a qualified biologist shall survey the 14-acre site and adjacent areas for the presence of rails and other birds. If any are present, an air horn or cracker shells will be deployed to move the birds off the site prior to sediment application. If noise proves ineffective, physical presence may be used to haze birds to move to other parts of the Refuge. Also, monitoring shall continue throughout the day to discourage rails and other birds from moving into the project site, particularly during periods when sediment is not being sprayed, such as during breaks or when adjustments in the application process are being implemented.

Water Quality. The Service's consistency determination has examined the potential adverse impacts to water quality from implementation of the sediment augmentation project, and incorporated mitigation measures into the project to protect water quality. The pilot project includes the application of up 13,500 CY of sediment onto 10 acres of the 14-acre project site and holds the potential to introduce sediments into two adjacent tidal channels. The Service reports that turbidity levels in tidal waters will increase, at least temporarily, if sediments in the dredge slurry move off the site and into the adjacent channels. As a result, monitoring of sediment movement, retention, and turbidity levels in adjacent tidal channels will occur during and after the sediment application process; sediment application methods will be adaptively managed to ensure that movement of sediment off the site is minimized.

The project includes Mitigation Measures WQ-1 and WQ-2 to ensure that appropriate actions are implemented to reduce turbidity and related water quality impacts potentially arising from the transport and application of dredged sediment to project site:

Mitigation Measure WQ-1: *Prior to initiation of sediment transport and application to the pilot project site, the USFWS shall submit an application to the Santa Ana Regional Water Quality Control Board for coverage under a 401 Certification. The USFWS shall implement all conditions included in the 401 Certification, including the implementation of measures to reduce potential increases in sedimentation, turbidity, and other impacts associated with the transport and beneficial use of dredge material for habitat enhancement.*

Mitigation Measure WQ-2: *To reduce the potential for sediment to enter adjacent waterways, best management practices (BMPs) shall be implemented during all phases of the project. BMPs shall include providing approximately four acres of vegetated buffer around the application site; periodic inspection of the slurried sediment pipeline (if used); and monitoring for excessive turbidity near the transport pipeline or containment barge and associated sediment distribution*

apparatus (e.g., rainbow sprayer, open pipe, end-of-pipe baffle impingement). If a substantial leak is identified in the slurry pipeline, the affected pipeline segment shall be immediately repaired or replaced, or a silt curtain or similar measure shall be employed to capture and retain sediment at the source of the leak.

Monitoring of sediment movement and turbidity levels shall occur during and after sediment application. Movement of sediment on the site shall be adaptively managed until adequately compacted to ensure that movement of sediment off the site is minimized. Measures such as installation of silt fencing, a silt curtain, or straw wattles shall be installed if proposed vegetative buffers around the site cannot adequately maintain the sediment within the project boundary.

Conclusion. The proposed thin-layer sediment augmentation project at a 14-acre coastal salt marsh plain in the Seal Beach National Wildlife Refuge is designed in part to provide safe and resilient nesting habitat for the endangered light-footed Ridgway's rail, enhance marine habitat and resources, protect the biological productivity and quality of coastal waters, and avoid significant disruption to wildlife habitat during placement of dredged materials. The placement of clean dredged sediment could affect marine resources and water quality during and immediately after sediment application. However, the project also includes monitoring and mitigation measures that when implemented will avoid significant adverse effects at and adjacent to the project site. The Commission therefore concludes that the proposed project is consistent with the marine resources and water quality policies of the California Coastal Management Program (Coastal Act Sections 30230, 30231, and 30240).

D. PUBLIC ACCESS AND RECREATION.

Section 30210 of the Coastal Act states:

In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

Section 30212 of the Coastal Act states, in part:

(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) adequate access exists nearby

Section 30214 of the Coastal Act states, in part:

(a) The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:

...

(3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses

Section 30220 of the Coastal Act states:

Coastal areas suitable for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

The proposed project would apply up to 13,500 cubic yards of clean dredged sediment on ten acres of the 14-acre project site in the Seal Beach National Wildlife Refuge, which is located entirely within the boundaries of the U.S. Navy's Naval Weapons Station Seal Beach. The U.S. Fish and Wildlife Service states in the consistency determination that public access is prohibited in this area due to the Navy's military security restrictions and to protect sensitive coastal salt marsh habitat and listed species. Although transport of sediment from the Main Channel West dredging area to the application site in the Refuge will partially occur in the main navigation channel between November 2015 and February 2016, the Service determined that this element of the project would have minimal, if any, effect on recreational boating activities within Sunset/Huntington Harbour and between the Harbour and the Pacific Ocean. The Service states that:

The material dredged from the Main Channel West site will be transported to the project site using one or more methods of transport and application. Potential options for transport include the use of a small containment barge, which would travel from the dredge site up one of the two existing tidal channels that abut the project site. Alternatively, the sediment may be transported as slurry (i.e., a mixture of water and sediment) through a pipeline that would extend from the dredge site into the Refuge via one of the two adjacent tidal channels. The pipeline could be placed on the bed of the bay and channel or floated on the water surface from the maintenance dredge site to the project site.

Notwithstanding the method(s) selected for transporting and applying the project sediments, the Service will require the project contractor to implement measures during dredging and sediment transport that will maintain boating access and navigation safety in the Main Channel West.

In conclusion, the proposed project will not result in any permanent changes to the current restrictions on public access and recreation in the Refuge. However, as noted in the Commission's adopted findings for the County of Orange's maintenance dredging project in Sunset/Huntington Harbour (CDP 5-13-1379), that project will enhance the safety of recreational boating and public access and as an associated benefit will beneficially reuse and provide the sediments to be placed in the Refuge for the subject pilot restoration project. The proposed transfer of sediments from the dredge area to the Refuge will avoid the peak summertime recreational boating use period. Therefore, the Commission finds that the project-related impacts to public access and recreational boating in areas adjacent to the Refuge will be temporary and

less than significant, and that the proposed sediment augmentation project is consistent with the public access and recreational boating policies of the California Coastal Management Program (Coastal Act Sections 30210, 30212, 30214, and 30220).

E. OTHER AGENCY APPROVALS AND CONSULTATIONS

U.S. Army Corps of Engineers

The Service has submitted applications to the Corps for permits under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

Department of the Navy

The Service is working in partnership with the Navy in the development and implementation of the project, including engineering and biological expertise. The 14-acre project site is located within the Seal Beach National Wildlife Refuge which itself is located within the Navy's Naval Weapons Station Seal Beach. The Navy owns the majority of the project site, with a small area at the western edge of the site owned by the California State Lands Commission and leased to the Service for management as a National Wildlife Refuge.

National Marine Fisheries Service

The Service received a letter from the NMFS concurring with the Service's determination that the project would not adversely affect Essential Fish Habitats and is not likely to adversely affect species listed as threatened or endangered or critical habitats designated under the Endangered Species Act. The letter also provided comments relative to compliance with the Marine Mammal Protection Act, and concluded that the project does not appear to pose a significant risk to marine mammals.

United States Geological Survey.

The Service will receive assistance from the Survey in monitoring activities related to sediment flux at the project site.

Santa Ana Regional Water Quality Control Board

The Service has submitted an application to the Regional Board for a Clean Water Act Section 401 Water Quality Standards Certification.

California Department of Fish and Wildlife

The Service was selected to receive funding from the Department's Wetlands Restoration for Greenhouse Gas Reduction Grant Program, which will be applied to monitoring work and analysis of carbon storage in the salt marsh.

California State Coastal Conservancy

The Service is working in partnership with the Conservancy in the development and implementation of the project, in particular the review and analysis of monitoring results. The Conservancy is also providing funding to assist in implementing pre- and post-sediment augmentation monitoring.

Orange County Parks Department.

The Service will receive the project dredge material from the County during the latter's maintenance dredging of the Main Channel West area in Sunset/Huntington Harbour, as well as engineering oversight during the sediment transport and augmentation activities.

APPENDIX A

SUBSTANTIVE FILE DOCUMENTS

1. CD-0002-15 (U.S. Fish and Wildlife Service), Thin-Layer Salt Marsh Sediment Augmentation Pilot Project, Seal Beach National Wildlife Refuge, Orange County.
2. Final Initial Study/Environmental Assessment and Final Mitigated Negative Declaration, Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project, U.S. Fish and Wildlife Service and California State Coastal Conservancy, September 16, 2014.
3. Finding of No Significant Impact, Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project, U.S. Fish and Wildlife Service, September 16, 2014.
4. Essential Fish Habitat Assessment – Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project (Orange County, California), U.S. Fish and Wildlife Service, January 7, 2015.
5. Request to Initiate Informal Section 7 Consultation – Seal Beach National Wildlife Refuge Thin-layer Salt Marsh Sediment Augmentation Pilot Project (Orange County, California), U.S. Fish and Wildlife Service, January 7, 2015.
6. Endangered Species Act Section 7(a)(2) Concurrence Letter for Salt Marsh Sediment Augmentation at Seal Beach National Wildlife Refuge, National Marine Fisheries Service, April 8, 2015.
7. Section 7 Biological Evaluation Form, U.S. Fish and Wildlife Service, March 26, 2015.
8. FY 2015/15 Wetlands Restoration for Greenhouse Gas Reduction Program, Grant Application to California Department of Fish and Wildlife, U.S. Fish and Wildlife Service.
9. Coastal Development Permit 5-13-1379 (Orange County Parks Department, maintenance dredging of navigation channels and berths in Sunset/Huntington Harbour, Orange County).
10. ND-043-11 (U.S. Fish and Wildlife Service), Comprehensive Conservation Plan for Seal Beach National Wildlife refuge, Orange County.
11. Thin Layer Placement of Dredged Material on Coastal Wetlands: A Review of the Technical and Scientific Literature, Gary L. Ray, U.S. Army Corps of Engineers, ERDC/EL TN-07-1, December 2007.

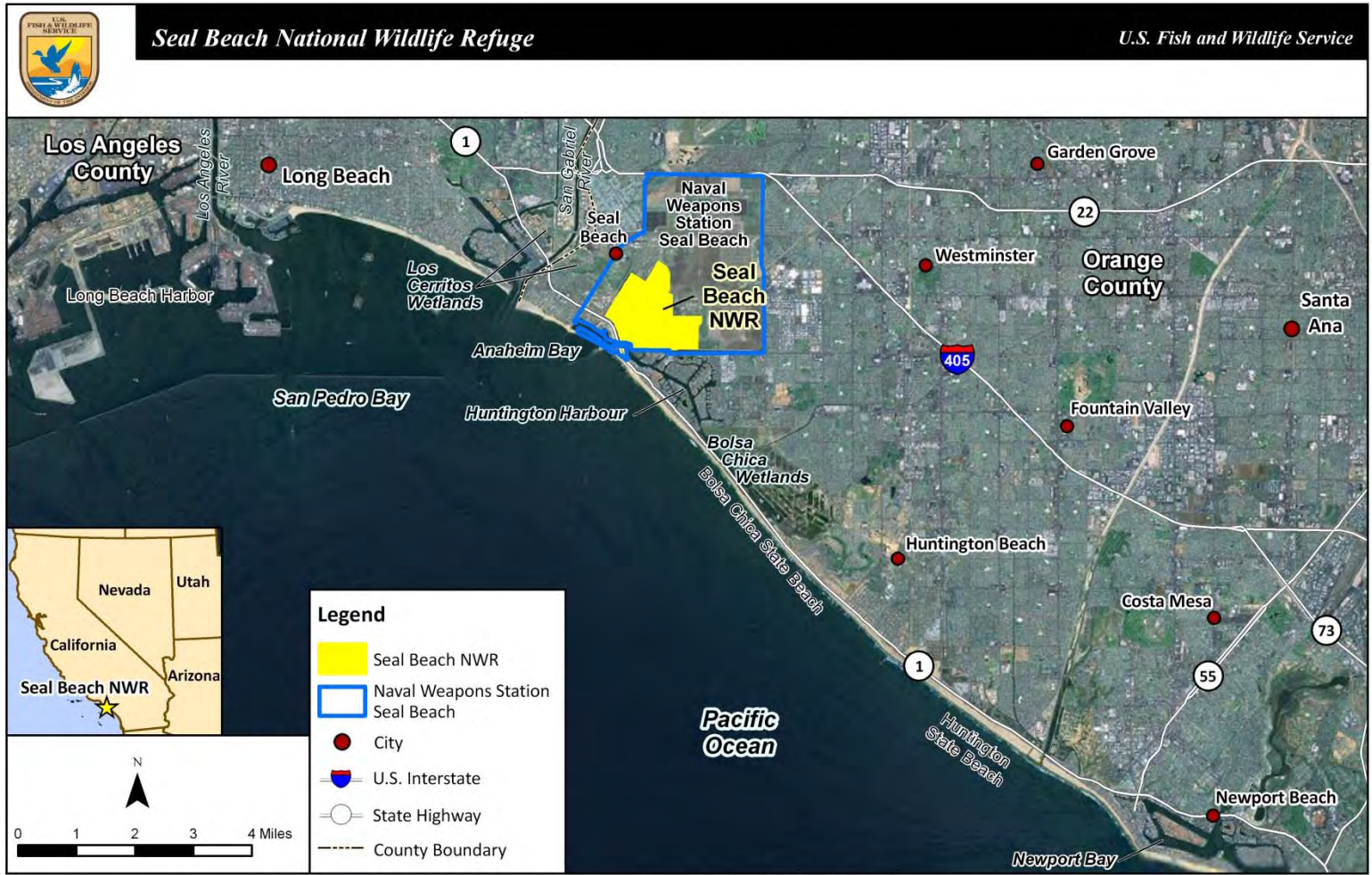


Figure 1. Vicinity Map

Exhibit 1
CD-0002-15

Thin-Layer Salt Marsh Sediment Augmentation Pilot Project - Seal Beach National Wildlife Refuge
Vicinity Map



U.S. Fish & Wildlife Service

Seal Beach
National Wildlife Refuge



Exhibit 2
CD-0002-15



Northern edge of the salt marsh
augmentation project site.

Exhibit 3
CD-0002-15

Thin-Layer Salt Marsh Sediment Augmentation Pilot Project - Seal Beach National Wildlife Refuge
Sketch Drawing



Augmentation area, perimeter buffer zone, test plots, trial area, and control site.

Exhibit 4
CD-0002-15



M/P DATE: Aug 01, 2014
 IMAGE SOURCE: US Navy
 C:\Users\kgilligan\Documents\ManagementFiles\ESRI\ESRDATA\Seal Beach Data\SealBeachSedimentAugmentationProject.mxd

0 500 1,000 1,500 2,000
 Feet

Legend

- Seal Beach NWR Boundary
- Salt Marsh Sediment Augmentation
- Main Channel West Dredge Area



Figure 4. Relationship of the Project Site to the Main Channel West Dredge Area



Conditions on the Refuge during higher high tide. Cordgrass habitat is flooded and nesting areas for light-footed Ridgway's rails are adversely affected.

Exhibit 6
CD-0002-15