Draft

SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT (EIR)

STATE CLEARINGHOUSE NO 2007072036

FOR THE

SAN FRANCISCO BAY AND DELTA SAND MINING PROJECT

Prepared for

California State Lands Commission

100 Howe Avenue, Suite 100-South

Sacramento, California 95825-8202

August 2025

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

The California State Lands Commission (CSLC or Commission) has prepared this Supplemental Environmental Impact Report (SEIR) in accordance with the California Environmental Quality Act (CEQA; Pub. Res. Code §21000 et seq.) and its implementing regulations, the CEQA Guidelines (14 Cal. Code Regs. §15000 et seq.). The Commission holds title to and manages tidelands and submerged lands and beds of navigable waterways for the benefit of all people of the State for statewide Public Trust purposes, which include waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. The Commission may grant leases on these State lands for such purposes as, but not limited to, ports, marinas, docks and wharves, and dredging.

Two marine aggregate companies, Martin Marietta Marine Operations, LLC (Martin Marietta) and Lind Marine Inc. (Lind), or their predecessors in interest, have held leases issued by the Commission to harvest sand commercially (sand mining) within San Francisco Bay and the western Delta for more than 80 years. Martin Marietta and Lind are referred to collectively in this SEIR as the Lessees or Applicants. Following the Commission's certification of the San Francisco Bay and Delta Sand Mining Project Environmental Impact Report (State Clearinghouse No. 2007072036) on October 12, 2012 (2012 EIR), the CSLC authorized two leases for the Applicants to conduct sand mining in the Central San Francisco Bay and Suisun Bay in 2012 and 2013, respectively. The leases are provided in Appendix A. The Central Bay leases were reapproved by the Commission in 2016 based on analysis documented in the 2012 EIR.

ES.1 PROJECT OVERVIEW AND LOCATIONS

ES.1.1 Overview of the Revised Project

The Applicants applied to the CSLC to authorize continued commercial mining of sand for 10 additional years from the date of lease issuance at reduced maximum annual and total sand mining volumes over the proposed lease term (Revised Project) relative to the maximum annual and total volumes previously evaluated under the 2012 EIR for the term of the prior Leases. More specifically, the Revised Project proposes a reduction in the authorized annual materials extraction volume in four out of the six existing lease areas (inclusive of the private Middle Ground lease): the authorized lease volume would be reduced by 289,866 cubic yards per year [cy] from 2,039,866 cy to 1,750,000 cy. The proposed authorized volumes in two Central Bay leases would remain unchanged. Further, the Applicants currently use five of the nine offloading

facilities described and examined in the 2012 EIR.[1] For purposes of analysis, this SEIR for the Revised Project addresses continued use of the Petaluma, Mare Island, Collinsville, Pier 92, and Tidewater offloading facilities. The issuance of new Leases for the Revised Project would require discretionary action by the Commission and compliance with CEQA.

ES.1.2 Locations

The 2012 EIR describes the sand mining lease area boundaries and the parcel numbers that comprise the existing Leases in Part III, Section 2.2.2 (2012 EIR, p. 2-2) and Part III, Section 2.3.1 (2012 EIR, p. 2-7 et seq.). No change is proposed to the existing lease area boundaries, which are shown in Figures ES-1 and ES-2.

Briefly, the Applicants currently are conducting sand mining in six lease areas in the Central San Francisco Bay (Central Bay) and in the Suisun Bay[2] area of the western Sacramento-San Joaquin Delta (Delta). The Central Bay leases constitute 2,601-acres and consist of nine parcels of submerged lands within four leases currently issued by the Commission (Figure ES-1). The Suisun Bay lease area totals 938 acres and consists of two parcels of submerged lands within a single Commission-issued lease (Figure ES-2). In addition to the Commission-issued Leases, a third, privately-owned lease area (not under the jurisdiction of the Commission) authorizes sand mining in the Middle Ground Shoal of Suisun Bay (Figure ES-2). Although outside of Commission jurisdiction, the 2012 EIR and this SEIR also consider the potential impacts of sand mining within the private Middle Ground Shoal lease area.

[1] The use of particular offloading sites does not require Commission authorization, but are included in the scope of the SEIR analysis consistent with the 2012 EIR.

[2] Suisun Bay is the easternmost of the four main basins that make up San Francisco Bay.

Figure ES-1. Central SF Bay Lease Areas

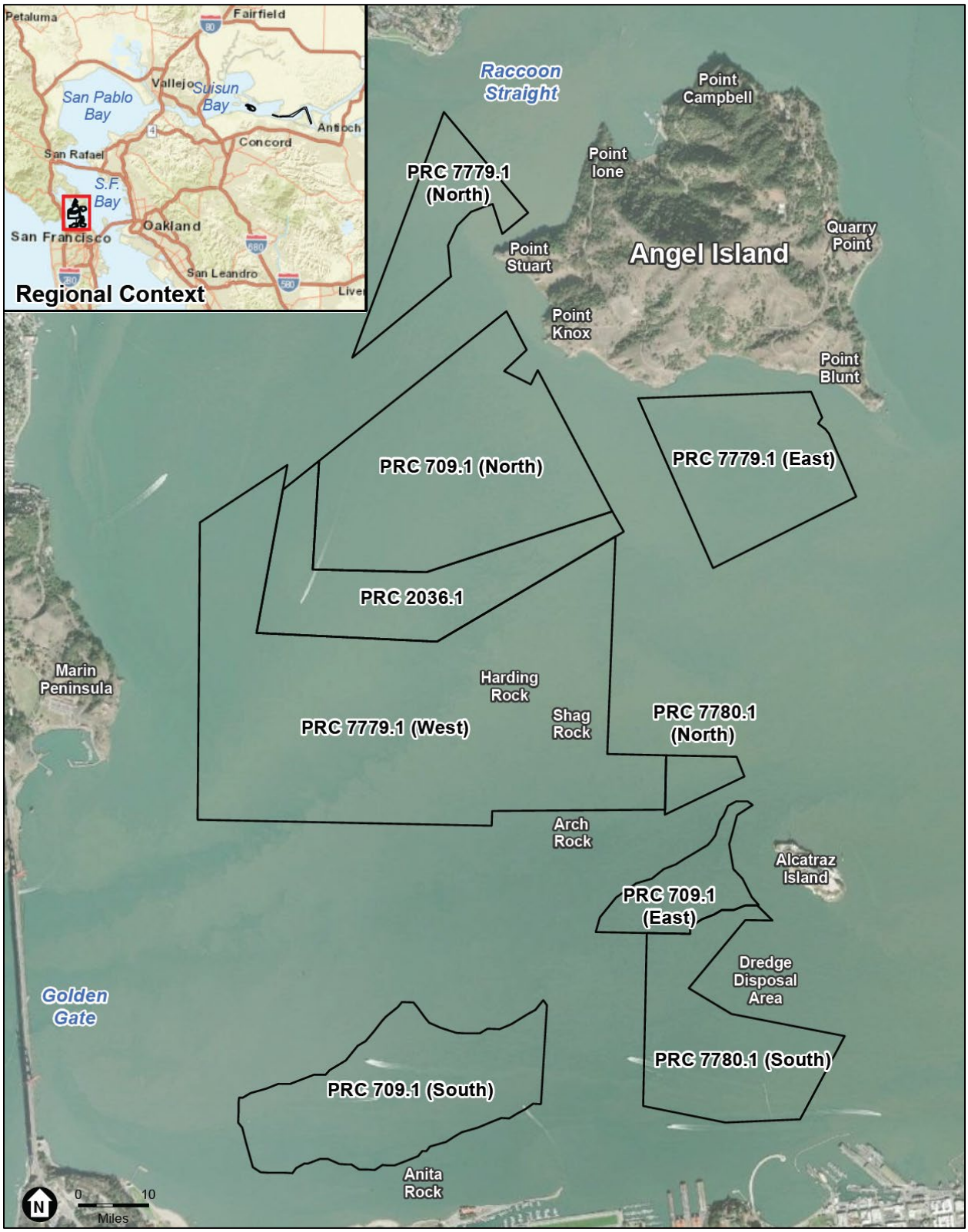
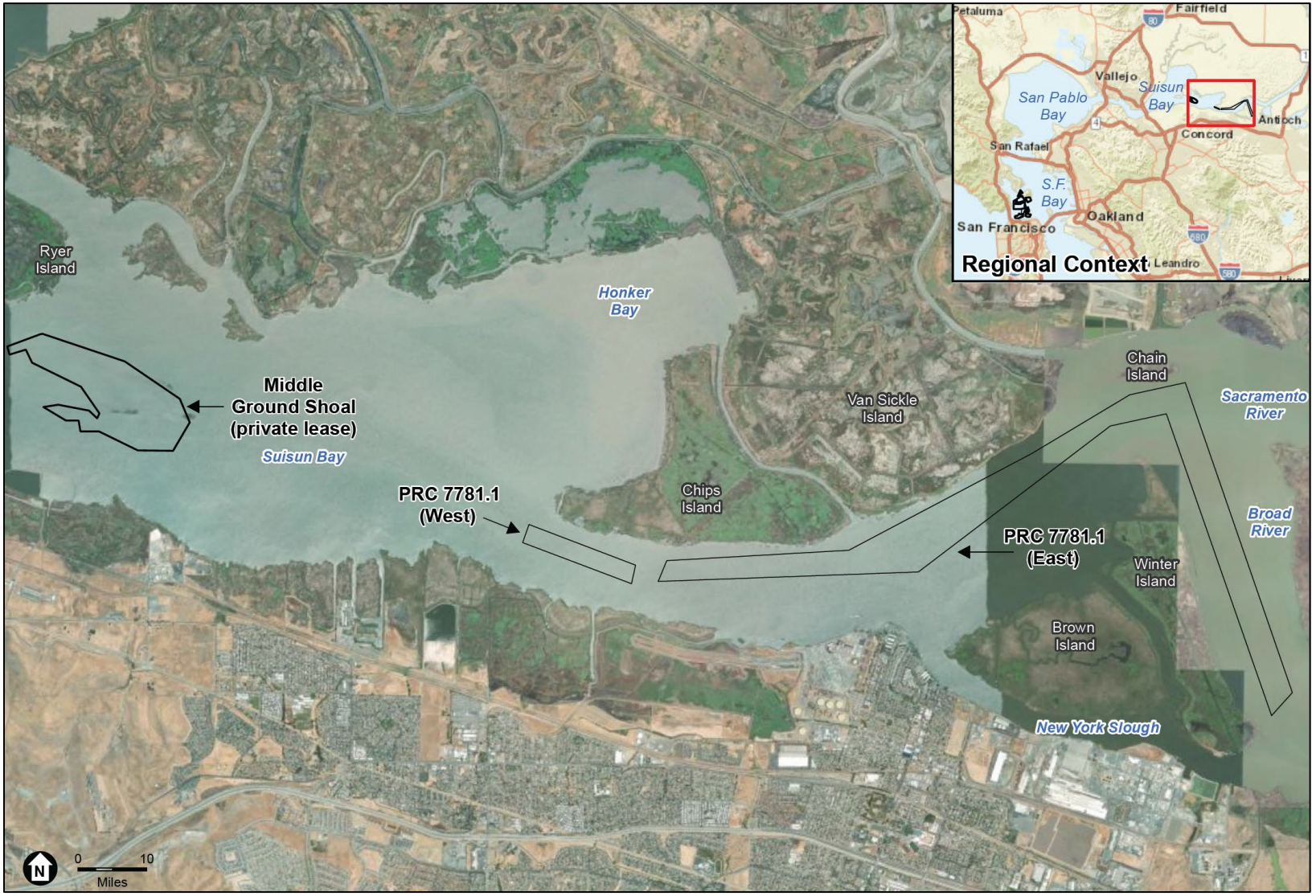


Figure ES-2. Suisun Bay Lease Areas



Source: ESA, 2022

ES.2 PURPOSE, FOCUS, AND USE OF THIS SEIR

ES.2.1 Purpose of this SEIR

An EIR (like the 2012 EIR) is an informational document intended to inform public agency decision makers and members of the public of the potential significant environmental effects of a project, identify possible ways to minimize those effects, and describe reasonable alternatives to the project (14 Cal. Code Regs. §15121). The purpose of a supplemental EIR (like this SEIR) is to document the minor additions or changes necessary to make an original EIR adequate for a revised project, and it only needs to contain the information necessary to meet that purpose. A supplemental EIR augments the previous EIR to address a limited set of issues, and the two must be considered together when the lead agency determines whether to issue a further approval for the project (14 Cal. Code Regs. §15163).

The Revised Project, as proposed, is a modification of the project analyzed in the 2012 EIR (2012 Project), namely the continuation of the San Francisco Bay and Delta Sand Mining Project for an additional 10-year lease term at reduced total and annual permitted extraction volumes with the delivery of mined sand to fewer offloading sites than analyzed in the 2012 EIR. Because new scientific information (i.e., the technical studies identified in Section 1.2.3 of this SEIR), was developed subsequent to the 2012 EIR and could affect the previous analysis, the Revised Project is analyzed in light of that new information. Because only minor changes are necessary to make the 2012 EIR apply to the Revised Project, the Commission is preparing an SEIR.

The information in this SEIR supplements, and incorporates by reference, information from the following documents:

- The 2012 EIR certified by the Commission on October 19, 2012
- Findings of the Commission as a CEQA lead agency pursuant to CEQA Guidelines section 15091 (Item 101, October 19, 2012)
- Leases PRC 709.1, PRC 2036.1, PRC 7779.1, and PRC 7780.1, approved by the Commission on October 19, 2012
- Lease PRC 7781.1, approved by the Commission February 22, 2013 (Item C42, February 22, 2013)

- The 2016 re-approval of the 2012 EIR, certified by the Commission on June 28, 2016 (Item C33, June 28, 2016)[3]

ES.2.2 Focus of this SEIR

This SEIR documents and analyzes the changes between the San Francisco Bay and Delta Sand Mining Project analyzed in the 2012 EIR and the proposed Revised Project. While, arguably, the Commission may rely on the 2012 EIR in considering whether to approve the Revised Project, the development of new technical studies (listed in Section 1.2.3) of potentially substantial importance has been identified by CSLC as rendering an SEIR appropriate under Sections 15162 and 15163 of the CEQA Guidelines.

This SEIR focuses on two areas:

1) Proposed changes to the project described and analyzed in the 2012 EIR, consisting of:
   i) the proposed issuance of new Leases for a 10-year period;
   ii) the proposed reduction in the authorized annual materials extraction volume in four of the six lease areas from 2,039,866 cy to 1,750,000 cy; and
   iii) continued use of current material offloading facilities, which are a subset of sites identified in the 2012 EIR.
2) A consideration of monitoring and technical studies conducted since certification of the 2012 EIR to assess whether they contain new information of substantial importance for purposes of CEQA.

The SEIR assesses the Revised Project as modified from the project described in the 2012 EIR and informed by the new technical studies. Because the Revised Project is substantially a continuation of the activities described in the 2012 EIR, the impact analysis of many of the resource areas addressed in the 2012 EIR is

[3] In November 2015, the First District Court of Appeal upheld the 2012 EIR pursuant to CEQA, finding that the Commission's analyses of Project impacts were supported by substantial evidence. The Court held that the Commission had not adequately considered its obligations under the common law Public Trust Doctrine and remanded the case to the trial court. In June 2016, the Commission prepared a public trust analysis and reapproved the Central Bay leases in compliance with the Court's ruling, which was upheld by the Court on October 31, 2018. The information and impacts analyses presented in the 2012 EIR for purposes of complying with CEQA remain relevant to the current analysis.

unchanged. As analyzed in SEIR Section 3, Project Impacts and Mitigation Measures, the SEIR focuses on the following resource areas: Air Quality and Greenhouse Gas Emissions, Biological Resources, Cultural and Tribal Cultural Resources, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Recreation, and Mineral Resources. The consistency analysis documented in SEIR Section 3.9 determined that the Revised Project would otherwise not affect the conclusions reached in the 2012 EIR.

ES.2.3 Use of this SEIR

As described in the 2012 EIR, Part III, Section 1.3, sand mining in the Bay and Delta is a highly regulated activity. This SEIR is intended to provide the Commission and each responsible and trustee agency with the information required to exercise its jurisdictional responsibilities with respect to the Revised Project, which would be considered at a noticed public meeting of the Commission. The SEIR will be used by the Commission to determine whether to approve the application and grant new 10-year leases of California sovereign lands to the Applicants for the purpose of mining sand.

The SEIR is also intended to provide information needed by other State and local agencies with jurisdiction to exercise their responsibilities in issuing discretionary permits associated with the Revised Project. To continue mining sand from the lease parcels and privately owned Middle Ground shoals site, the Applicants require discretionary approvals from the responsible agencies listed in SEIR Section 1.4, Project Permits and Approvals.

ES.3 SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

In this SEIR, the terms "effect" and "impact" are synonymous and can refer to effects that are either adverse or beneficial.

- **Direct effects** are caused by the Revised Project and occur at the same time and in the same place as the Revised Project.
- **Indirect effects** are caused by the Revised Project but occur later in time or further in distance, though still reasonably foreseeable.
- **Residual impacts** are impacts that still meet or exceed significance criteria after application of mitigation and therefore remain significant.
- **Cumulative impacts** are the changes in the environment resulting from the incremental impact of the Revised Project when added to other past,

present, and reasonably foreseeable probable future projects. To the extent that the effects of past projects are reflected in baseline conditions, this analysis does not double-count them. Future projects are "reasonably foreseeable" if they were either proposed or approved at the time development of this SEIR was initiated (see Table 3.1-2, Cumulative Projects List in Section 3.1.5 of this SEIR). Cumulative impacts could result from individually minor but collectively significant activities from projects that take place over time.

- **Short-term impacts** are those expected to occur during mining activities related to the Revised Project that do not have lingering effects for an extended period once active mining is complete.
- **Long-term impacts** are those that persist for an extended period after mining activities are completed.

As described in this Draft SEIR, Chapter 3, the Revised Project would rely on continued implementation of the project design features, best management practices, and mitigation measures to minimize environmental impacts. For the following resource areas, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact identified in the 2012 EIR:

- Biological Resources
- Hazards and Hazardous Materials
- Air Quality and Greenhouse Gas Emissions
- Cultural and Tribal Cultural Resources
- Land Use and Recreation

Consistent with the analysis in the 2012 EIR, the Revised Project would result in one significant unavoidable impact (Impact BIO-8) for purposes of CEQA.

ES.4 SUMMARY OF ALTERNATIVES

ES.4.1 Project Purpose and Objectives

CEQA and the CEQA Guidelines require a lead agency to analyze a reasonable range of alternatives to a proposed project that could feasibly attain most of the basic objectives of the project while substantially reducing or eliminating its

significant environmental effects. A project's statement of objectives describes the purpose of the project and the reasons for undertaking it. As explained in Section 2.2 of this SEIR, the purpose of the Revised Project, as stated by the Applicants, is to assure the availability of marine sands for commercial and public purposes within the greater San Francisco Bay area. The basic objective of the Revised Project is to continue to mine sand at an economically viable level over the next 10 years to make this mineral resource available for commercial and public use.

ES.4.2 Alternatives Considered

The following alternatives were evaluated in this SEIR:

- Revised Project
- No Project Alternative

See SEIR Section 4, Alternatives.

ES.4.3 Environmentally Superior Alternative

As explained in Section 6.6 of the 2012 EIR, CEQA Guidelines section 15126.6(d) requires an EIR to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. Section 15126.6(e)(2) further states, in part, that "*If the environmentally superior alternative is the "No Project" alternative*, the EIR shall also identify an environmentally superior alternative among the other alternatives."

SEIR Section 5.7 explains that the No Project Alternative would be the environmentally superior alternative because it would avoid all of the potential significant impacts of the Revised Project. Thereafter, consistent with the direction in CEQA Guidelines section 15126.6(e)(2) and based on the comparison of alternatives provided in Section 4 of this SEIR, Section 5.7 explains that the Commission preliminarily has identified the Revised Project as the environmentally superior alternative.

ES.5 KNOWN AREAS OF CONTROVERSY

CEQA Guidelines section 15123(b) requires an EIR to include a brief summary of areas of known controversy. Any of the environmental issues considered during public scoping or in this Draft SEIR could become an issue of controversy. Preliminarily, the Commission has identified areas of controversy as including the

issues and questions raised in comments received during the scoping process summarized in Section 1.2.5 of this SEIR. Scoping input received is provided in Appendix B and relates to: baseline conditions in the lease areas, potential impacts on cultural resources or tribal cultural resources; consistency with the San Francisco Bay Plan; hydrology and water quality, including sediment, bathymetry, morphology, and sand loss; biological resources, including aquatic and terrestrial species and habitat; and the Public Trust. Each of these areas of known controversy is being evaluated by the Commission as part of its consideration of potential significant impacts, mitigation measures, and alternatives and in the context of any decision whether to approve the Revised Project.

ES.6 ISSUES TO BE RESOLVED

CEQA Guidelines section 15123(b) also requires an EIR to identify issues to be resolved, which include the choice among alternatives and whether or how to mitigate significant impacts. The following major issues are to be resolved:

- Determine whether the SEIR adequately describes the environmental impacts of the Revised Project.
- Choose among alternatives.
- Determine whether the recommended mitigation measures should be adopted or modified.
- Determine whether additional mitigation measures need to be applied to the Revised Project.

ES.7 ORGANIZATION OF THIS SEIR

This SEIR presents information, including information required by CEQA (14 Cal. Code Regs. §15122-15131) and pursuant to the Commission's non-CEQA considerations, as shown below.

- Executive Summary: Consistent with CEQA Guidelines section 15123, this SEIR contains a brief summary that describes the Revised Project and its environmental consequences (including potential significant impacts and mitigation measures and alternatives that could avoid or reduce potential significant impacts), areas of controversy known to the Commission, and issues to be resolved.

- Table of Contents: Consistent with CEQA Guidelines section 15122, this SEIR contains a table of contents to assist readers in navigating the document.

- Section 1, Introduction: Contains a brief introduction to the application for new Leases to conduct sand mining activities within the lease areas over another 10-year period, including the Revised Project location and background and an overview of the environmental review process.

- Section 2, Project Description: Consistent with CEQA Guidelines section 15124, Section 2 discloses and shows on a detailed map the precise location and boundaries of the Revised Project, provides a statement of Applicants' objectives for the Revised Project, and generally describes the Revised Project's characteristics. Section 2 also identifies the agencies that are expected to use the SEIR in their decision making, and lists permits and other approvals that may be required to implement the Revised Project.

- Section 3, Project Impacts and Mitigation Measures: Consistent with CEQA Guidelines section 15125, Section 3 of this SEIR describes the environmental setting. Consistent with CEQA Guidelines sections 15126, 15126.2, 15126.4, and 15130, Section 3 also considers and discusses the direct, indirect, and cumulative environmental impacts of the Revised Project as well as mitigation measures that could, if implemented, avoid or reduce potential significant effects. Consistent with CEQA Guidelines section 15128, Section 3 identifies effects found not to be significant.

- Section 4, Alternatives: Consistent with CEQA Guidelines sections 15126(f) and 15126.6, Section 4 of this SEIR discusses alternatives, including a "no project" alternative.

- Section 5, Other Considerations: Consistent with CEQA Guidelines sections 15126 and 15126 subsections (c), (d), and (e), Section 5 addresses potential significant environmental effects that cannot be avoided if the Revised Project is implemented and considers significant irreversible environmental changes, and growth-inducing impacts. Economic and social effects are considered consistent with CEQA Guidelines section 15131. Other Commission considerations, such as CSLC's Public Trust responsibilities, also are discussed in SEIR Section 5.

- Section 6, Mitigation Monitoring Program.

- Section 7, Report Preparation and References. Consistent with CEQA Guidelines section 15129, SEIR Section 7 identifies the entities, organizations, and persons consulted as well as the people involved in the preparation of the SEIR.

This SEIR also contains the appendices listed below:

- Appendix A Existing Sand Mining Leases
- Appendix B Scoping Materials
- Appendix C Benthic Study
- Appendix D Bathymetric and Hydrodynamic Study
- Appendix E Consideration of Post-2012 Technical Studies
- Appendix F Existing 2012 Project Mitigation (as Amended) and Incidental Take Permits
- Appendix G Biological Resources Supplemental Information

Table ES-1. Summary of Environmental Impacts for the Revised Project

Impact No.	Potential Impact (brief title)	Impact Class	Mitigation Measures
Section 3.2 Biological Resources			
BIO-1	Potential displacement of special status species. Commercial sand mining in the San Francisco Bay-Delta may result in the direct and indirect physical displacement of special status fish species, including delta smelt, longfin smelt, green sturgeon, Chinook salmon, steelhead trout, and Pacific herring, Fishery Management Plan-managed pelagic fish and groundfish, marine bird species such as California brown pelican, and protected marine mammals, including California gray whale, humpback whale, California sea lion, harbor seal, and harbor porpoise.	III	LTS Impact; no mitigation necessary.
BIO-2	Potential impacts on fish and wildlife species from increased noise. Sand mining activities under the Revised Project result in increased noise at the location of the suction drag head on the seafloor that can result in increased disturbance to marine biota, especially fish, including special status fish species.	III	LTS Impact; no mitigation necessary.

Table ES-1. Summary of Environmental Impacts for the Revised Project

Impact No.	Potential Impact (brief title)	Impact Class	Mitigation Measures
BIO-3	Potential sand mining impacts on benthic habitat, infauna, epifauna, and foraging habitat.	III	LTS Impact; no mitigation necessary.
BIO-4	Discharge of suspended sediments under the Revised Project may potentially release contaminants into waters that affect plankton and wildlife species.	III	LTS Impact; no mitigation necessary.
BIO-5	Disturbance of sediments at the seafloor under the Revised Project could result in increased turbidity, SSC, and release of contaminants that potentially impact plankton and wildlife species.	III	LTS Impact; no mitigation necessary.
BIO-6	The Revised Project could result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging.	II	Implement MM BIO-6: Establish a 100-foot buffer around hard bottom areas within and adjacent to Central Bay mining leases.
BIO-7	The Revised Project will cause entrainment and mortality of common and managed aquatic species.	III	LTS Impact; no mitigation necessary.
BIO-8	The Revised Project operation of sand mining activities will cause entrainment and mortality of delta and longfin smelt.	I	Implement MM BIO-8: Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt.

Table ES-1. Summary of Environmental Impacts for the Revised Project

Impact No.	Potential Impact (brief title)	Impact Class	Mitigation Measures
BIO-9	The Revised Project could cause the entrainment and mortality of green sturgeon, white sturgeon, Chinook salmon and steelhead trout during sand mining.	II	Implement MM BIO-9a: Applicants shall minimize the potential for entrainment and mortality of white sturgeon. Implement MM BIO-9b: Applicants shall implement operational restrictions and requirements for the avoidance and minimization of entrainment of Chinook salmon.
BIO-10	Potential effects on fish movement and migration.	III	LTS Impact; No mitigation necessary.
CE BIO-1	Contribution to cumulative effects on biological resources.	III	LTS Impact; No mitigation necessary.
Section 3.3 Mineral Resources			
MIN-1	Loss of availability of a known mineral resource of value to the region or residents of the State.	III	LTS Impact; No mitigation necessary.
MIN-2	Loss of availability of a locally important mineral resource recovery site.	III	LTS Impact; No mitigation necessary.
CE MIN-1	Contribute to cumulative loss of availability of mineral resources.	III	LTS Impact; No mitigation necessary.
Section 3.4 Hydrology and Water Quality			
HYD-1	The Revised Project would have potentially adverse effects on water quality.	III	LTS Impact; No mitigation necessary.

Table ES-1. Summary of Environmental Impacts for the Revised Project

Impact No.	Potential Impact (brief title)	Impact Class	Mitigation Measures
HYD-2	The Revised Project would result in potentially adverse effects on the hydrology and geomorphology of the Bay and Delta.	III	LTS Impact; No mitigation necessary.
CE HYD-1	Contribution to cumulative effects on water quality.	III	LTS Impact; No mitigation necessary.
CE HYD-2	Contribution to cumulative effects on hydrology (sediment transport and coastal morphology).	III	LTS Impact; No mitigation necessary.
Section 3.5 Hazards and Hazardous Materials			
HAZ-1	Potential for accidental leak or spill of hazardous materials.	II	Implement MM. HAZ-1: Provide a California Non-tank Vessel Contingency Plan/ Certificate of Financial Responsibility.
HAZ-2	Hazard to the public or environment.	III	LTS Impact; No mitigation necessary.
CE HAZ-1	Contribution to cumulative effects on hazards and hazardous materials.	III	LTS Impact; No mitigation necessary.
Section 3.6 Air Quality and GHG Emissions			
AIR-1	Conflict with or obstruct implementation of an applicable air quality plan.	III	LTS Impact; no mitigation necessary.
AIR-2	Violate air quality standard or contribute substantially to air quality violation.	III	LTS Impact; no mitigation necessary.
AIR-3	Contribute to cumulative emissions of criteria pollutants for which the region is in non-attainment under an ambient air quality standard.	III	LTS Impact; no mitigation necessary.

Table ES-1. Summary of Environmental Impacts for the Revised Project

Impact No.	Potential Impact (brief title)	Impact Class	Mitigation Measures
AIR-4	Expose sensitive receptors to substantial pollutant concentrations.	III	LTS Impact; no mitigation necessary.
AIR-5	Generate objectionable odors.	III	LTS Impact; no mitigation necessary.
AIR-6	Expose people to increased risk of cancer.	III	LTS Impact; no mitigation necessary.
AIR-7	Result in acute or chronic non-cancer health risk.	III	LTS Impact; no mitigation necessary.
AIR-8	Result in emissions of GHGs that may have an impact on climate change.	II	Implement MM AIR-1 Greenhouse Gas (GHG) Reduction Plan.
AIR-9	Result in GHG emissions that may conflict with any applicable plan, policy, or program.	II	Implement MM AIR-1 Greenhouse Gas (GHG) Reduction Plan.
CE AIR-1	The Revised Project has a low potential to cause a cumulatively considerable contribution to potential significant cumulative effects on air quality.	III	LTS Impact; no mitigation necessary.
Section 3.7 Cultural and Tribal Cultural Resources			
CUL-1	Inadvertent discovery of archaeological historic resources, prehistoric Native American sites, or tribal cultural resources.	II	Implement MM CUL-1a: Cease operations and notify CSLC and USACE. Implement MM CUL-1b and MM CUL-3 Cease operations and notify consulting Native American tribes if the find is Native American in origin

Table ES-1. Summary of Environmental Impacts for the Revised Project

Impact No.	Potential Impact (brief title)	Impact Class	Mitigation Measures
CUL-2	Disturbance of a paleontological resource or unique geological feature.	III	LTS Impact; No mitigation necessary.
CUL-3	Inadvertent discovery of human remains.	II	Implement MM CUL-3: Cease operations and notify County Coroner.
CE CUL-1	Contribute to cumulative impacts resulting from inadvertent discovery of cultural or tribal cultural resources.	II	Implement MM CUL-1a, MM CUL-1b, MM CUL-3, and MM CUL-4: Cease operations and notify consulting Native American tribe if find is Native American in origin.
Section 3.8 Land Use and Recreation			
LU-1	Incompatible land uses.	III	LTS Impact; No mitigation necessary.
LU-2	Incompatible recreational uses.	III	LTS Impact; No mitigation necessary.
LU-3	Residual impacts on recreational resources; interference with sand replenishment at down-current beaches.	III	LTS Impact; No mitigation necessary.
LU-4	Conflicts with adopted land use policies.	II	Implement MM AIR-1, MM BIO-6, MM BIO-8, MM BIO-9a, MM BIO-9b, MM HAZ-1, MM CUL-1, MM CUL-3, MM CUL-4.
CE LU-1	Contribution to cumulative effects on land use and recreation.	II	Implement MM AIR-1, MM BIO-6, MM BIO-8, MM BIO-9a, MM BIO-9b, MM HAZ-1, MM CUL-1, MM CUL-3, MM CUL-4.

1.0 INTRODUCTION

Two marine aggregate companies, Martin Marietta Marine Operations, LLC (Martin Marietta) and Lind Marine Inc. (Lind), or their predecessors in interest, have held leases issued by the California State Lands Commission (CSLC or Commission) to harvest sand commercially (sand mining) within subtidal areas of San Francisco Bay and the western Delta for more than 80 years. Martin Marietta and Lind are referred to collectively in this Supplemental Environmental Impact Report (SEIR) as the Lessees or Applicants. The Commission last authorized leases for the Applicants to conduct sand mining in the Central San Francisco Bay and Suisun Bay in 2012[4] and 2013,[5] respectively. Copies of the 2012 leases, and the 2013 lease (collectively, Leases) are provided in Appendix A, *Existing Leases*. The Applicants have applied to the CSLC for new Leases to conduct sand mining activities within the lease areas over another 10-year period. An additional private lease area in the Middle Ground Shoal of Suisun Bay (not under Commission jurisdiction) is also evaluated in this SEIR.

1.1 PROJECT LOCATION AND BACKGROUND

Issuance of the 2012 and 2013 Leases followed the Commission's certification of the San Francisco Bay and Delta Sand Mining Project Environmental Impact Report (EIR)(State Clearinghouse No. 2007072036) on October 19, 2012 (2012 EIR). The 2012 EIR describes the sand mining lease area boundaries and the parcel numbers that comprise the existing Leases in Part III, Section 2.2.2 (2012 EIR, p. 2-2) and Part III, Section 2.3.1 (2012 EIR, p. 2-7 et seq.). No change is proposed to the existing, approved boundaries of the lease areas.

The Applicants currently are conducting sand mining in four lease areas in the Central San Francisco Bay (Central Bay) and two in the Suisun Bay[6] area of the western Sacramento-San Joaquin Delta (Delta). The Central Bay leases constitute 2,601-acres and consist of nine parcels of submerged lands within four leases currently issued by the Commission (Figure 1-1). The Suisun Bay lease area

[4] The Central Bay leases approved by the Commission October 19, 2012 (Item 101) include PRC 709.1, PRC 2036.1, PRC 7779.1, and PRC 7780.1. These leases were re-approved by the Commission June 28, 2016 (Item 33).

[5] Lease PRC 7781.1 was approved by the Commission February 22, 2013 (Item 42).

[6] Suisun Bay is the easternmost of the four main basins that make up San Francisco Bay. One lease, PRC 7781, is on State lands and another, Middle Ground Shoal, is on private lands.

totals 938 acres and consists of two parcels of submerged lands within a single Commission-issued lease (Figure 1-2). In addition to the Commission-issued Leases, a third, privately-owned lease area, totaling 367 acres (not under the jurisdiction of the Commission), authorizes sand mining in the Middle Ground Shoal of Suisun Bay (Figure 1-2). Although outside of Commission jurisdiction, the 2012 EIR and this SEIR also consider the potential impacts of sand mining within the private Middle Ground Shoal lease area.

1.2 OVERVIEW OF ENVIRONMENTAL REVIEW PROCESS

1.2.1 Project Context with Respect to CEQA

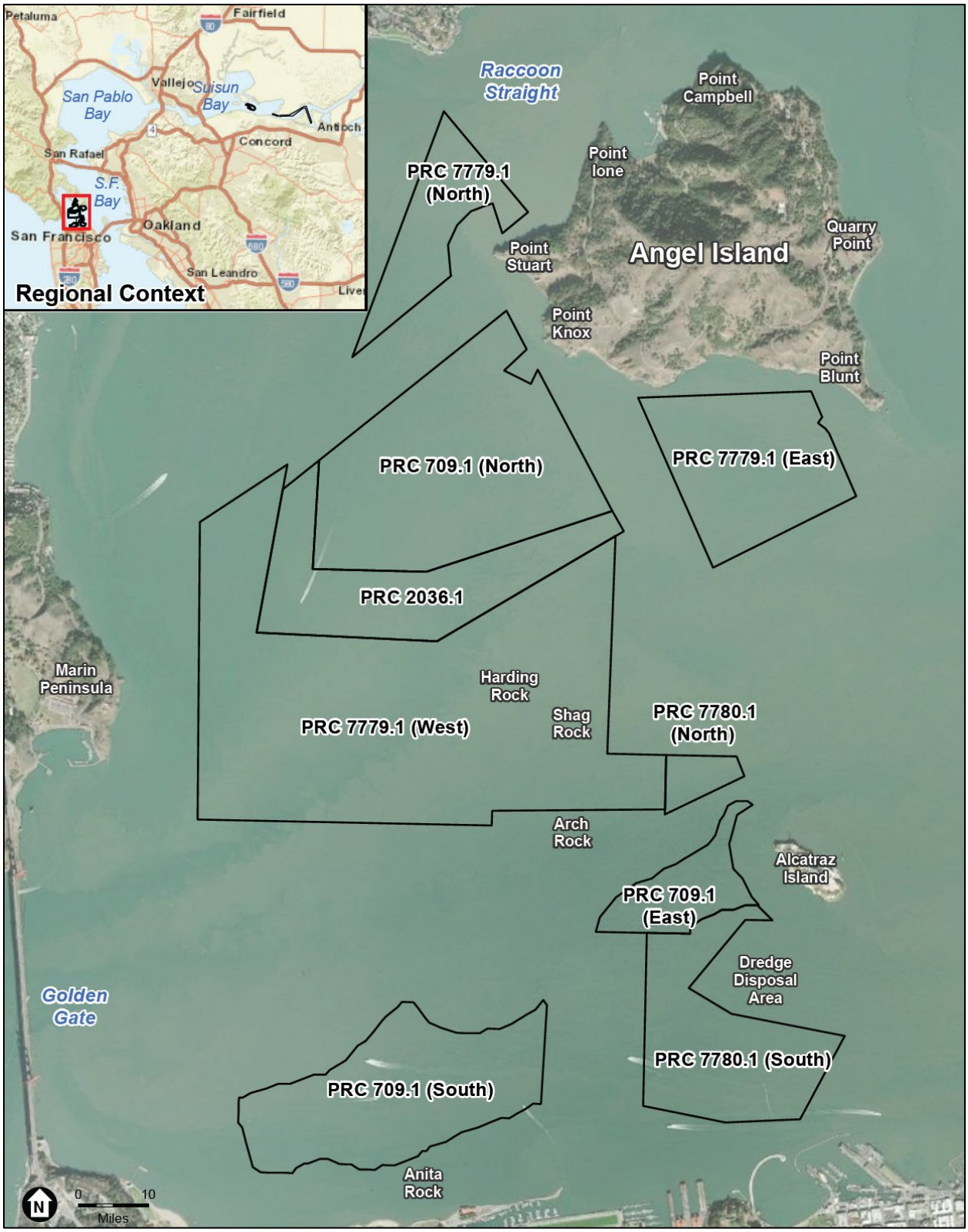
The Applicants applied to the Commission to authorize leases for the commercial mining of sand for 10 additional years at reduced maximum annual and total sand mining volumes over the proposed lease term (Revised Project) relative to the maximum annual and total volumes previously evaluated under the 2012 EIR for the prior lease term. No change is proposed to the existing lease area boundaries (Figures 1-1 and 1-2). The issuance of new leases is a discretionary action by the Commission requiring compliance with the California Environmental Quality Act (CEQA).

1.2.2 Previous CEQA Document

The Commission prepared the San Francisco Bay and Delta Sand Mining Project Environmental Impact Report (State Clearinghouse No. 2007072036) to assess the potential environmental effects of issuing the current Leases. The Commission certified the EIR on October 12, 2012 (2012 EIR).

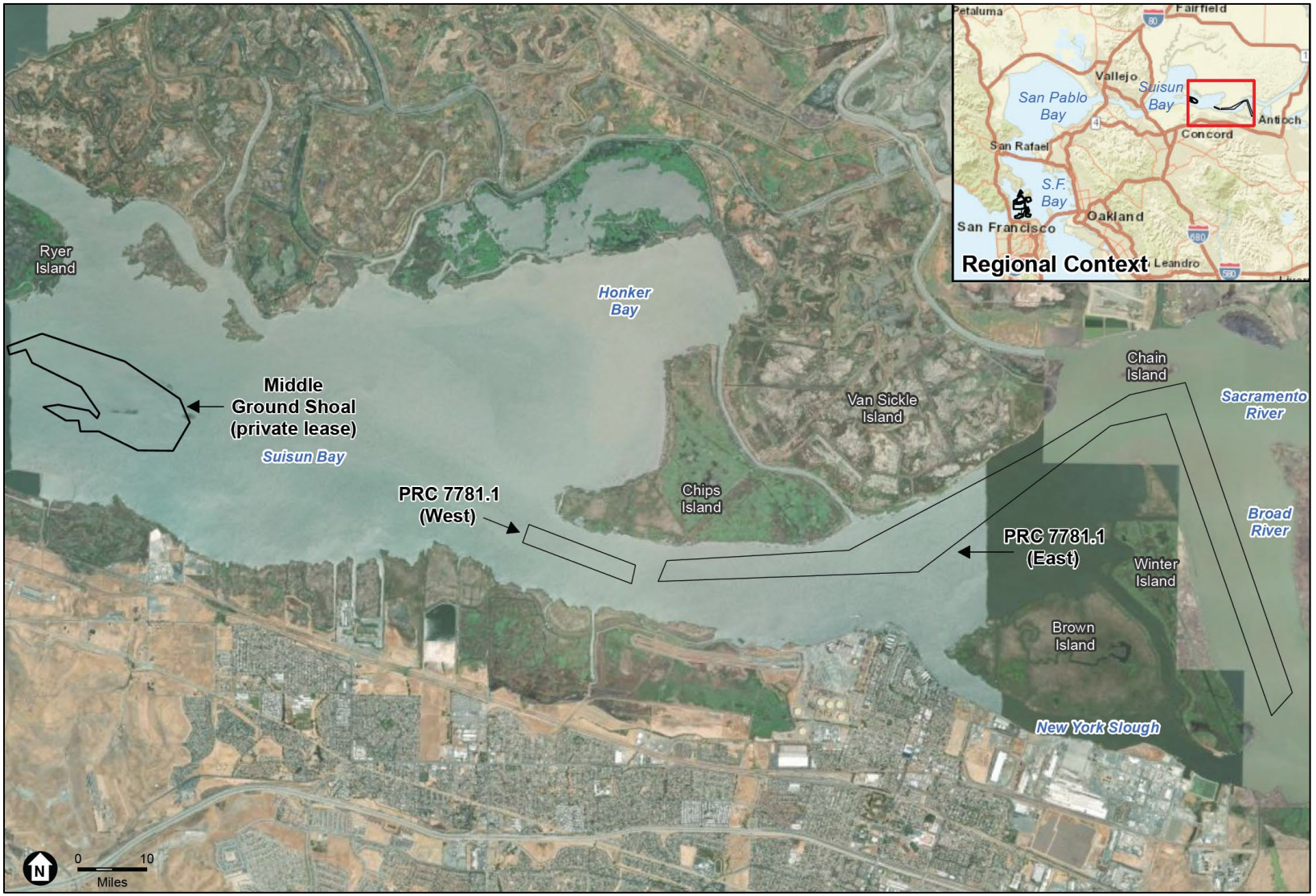
Following approval of the Leases, San Francisco Baykeeper, Inc. (Baykeeper) sued, challenging the Commission's approvals pursuant to CEQA and the Public Trust Doctrine. The San Francisco County Superior Court denied Baykeeper's claims, upholding both the EIR and the Commission's implementation of its public trust responsibilities. Baykeeper appealed, resulting in two opinions by the Court of Appeal. The first, issued November 18, 2015, resolved the CEQA claims in the Commission's favor, upholding the EIR and its analysis of project-level and cumulative impacts, including the EIR's discussion and analysis of potential impacts on sediment transport and coastal geomorphology. However, the Court found that the Commission had not adequately considered its obligations under the common law Public Trust Doctrine as part of its 2012 Project approval.

Figure 1-1. Lease Areas – Central Bay



Source: ESA, 2022

Figure 1-2. Lease Areas – Suisun Bay



Source: ESA, 2022

See *San Francisco Baykeeper, Inc. v. State Lands Commission* (2015) 242 Cal.App.4th 202. In June 2016, the Commission prepared a public trust analysis and reapproved the Central Bay leases in compliance with the Court's ruling (Item 33, June 28, 2016). Baykeeper again challenged the Commission's public trust findings, which resulted in a second published decision by the Court of Appeal. The second decision, filed October 31, 2018, upheld the Commission's public trust analysis, ruling that the Commission performed its duty to take the public trust into account before it reapproved the Central Bay leases and that substantial evidence supported the Commission's findings that the Project would not impair public trust uses or values. See *San Francisco Baykeeper, Inc. v. State Lands Commission* (2018) 29 Cal.App.5th 562.

The Revised Project would consist of a continuation of the ongoing operations described and analyzed in the 2012 EIR for 10 additional years at reduced annual and total volumes of sand extraction over the renewed lease term relative to those previously evaluated in the 2012 EIR for the prior lease term. Part III, Section 2.2 of the 2012 EIR (p. 2-2 et seq.) provides background information, including history and context for the sand mining operations that continue to be in effect. The information presented in the 2012 EIR remains relevant to the current analysis and is not repeated in this SEIR.

1.2.3 Preparation of Technical Studies Since 2012 EIR

The 2012 EIR was prepared based on input from the community, regulatory agencies, and technical analyses by relevant experts. It considered facts, reasonable assumptions based on facts, and expert opinion regarding bathymetry and sediment dynamics relating to deposition and erosion (among many other potential impact areas). Technical study of these and related considerations has continued since certification of the 2012 EIR. For example, as a condition of the permits approved in 2015 by the San Francisco Bay Conservation and Development Commission (BCDC) and the San Francisco Bay Regional Water Quality Control Board (RWQCB), the permittees (Lessees/Applicants) were required to fund certain scientific studies to increase the understanding of physical and biological systems in the San Francisco Bay and Delta (Bay-Delta), and the potential impacts of sand mining on those systems. To facilitate such permit conditions, BCDC and two Technical Advisory Committees (TACs) of sediment experts commissioned several studies to provide review and interpretation of benthic and sediment transport, geomorphology, and water quality, among other topics.

The following monitoring and technical studies, in chronological order, have been prepared since certification of the 2012 EIR. The studies (7-10) listed below were commissioned by BCDC and the California State Coastal Conservancy (SCC):

1) Hanson Marine Operations and Lind Marine, Inc. Sand Mining Water Quality Monitoring Program Results Report (NewFields, 2018a)

2) *Benthic Assessment of Sand Mining in Central San Francisco and Suisun Bays Data Report (*NewFields, 2018b)

3) *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys* (eTrac Inc., 2018a)

4) *Additional Analysis Report 2008 – 2014 – 2018 Bathymetric Survey Comparison Central San Francisco Bay Lease Area Surveys* (eTrac Inc., 2018b)

5) *Technical Memorandum Benthic Assessment of Sand Mining Supplemental Data Evaluation* (NewFields, 2020)

6) *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys* (eTrac Inc., 2023)

7) *Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay* (Anchor QEA, 2023)

8) *Sand Budget and Sand Transport in San Francisco Bay* (McKee et al. 2023)

9) *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast* (Deltares 2023a, 2023b, 2023c)

    - *Part 1: Morphodynamic change and bedform dynamics*
    - *Part 2: Mining volume and area analysis*
    - *Part 3: Synthesis*

10) *Fingerprinting Sand and Its Transport History through San Francisco Bay: Implications for Sand Mining and Its Environmental Effects* (Malkowski et al. 2023)

11) Benthic Infauna Data Analysis (AMS, 2025)

12) *Sand Mining Impact Analysis: Desktop morphology study; Sediment transport modeling study* (Fenical/Coast and Harbor Engineering, 2025)

1.2.4 Draft Supplemental EIR

1.2.4.1 Rationale for Supplemental EIR

Once a project has been subject to environmental review and approved by a decision-making body, Public Resources Code section 21166 and CEQA Guidelines[7] section 15162 limit the circumstances under which further environmental review under CEQA must occur. A subsequent or supplemental EIR must be prepared when:

1) substantial changes are proposed in the project that will require major revisions of the EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

2) substantial changes occur with respect to the circumstances under which the project is being undertaken that will require major revisions in the EIR due to the involvement of new significant, environmental effects or a substantial increase in the severity of previously identified significant effects; or

3) new information of substantial importance, which was not known and could not have been known at the time the EIR was certified, becomes available and shows any of the following: 1) new significant effects, 2) substantially more severe significant effects, or 3) that mitigation measures or alternatives exist that would substantially reduce one or more significant effects, but the Applicants decline to adopt the mitigation measures or alternatives.

As discussed in more detail in section 1.3.1, below, based on a preliminary assessment of application materials submitted for the Revised Project, CSLC staff determined that one or more of the triggering conditions merited further inquiry, specifically the availability of new scientific information developed subsequent to the 2012 EIR, but that only minor additions or changes would be necessary to make the 2012 EIR adequate, under CEQA, to analyze the Revised Project. Therefore, pursuant to Public Resources Code section 21166 and CEQA Guidelines sections 15162 and 15163, CSLC staff determined that an SEIR is appropriate.

[7] The State CEQA Guidelines are found at California Code of Regulations, title 14, section 15000 et seq.

1.2.4.2 Limits of SEIR Content

The CEQA Guidelines are clear that a supplement to an EIR need only contain the information necessary to make the previous EIR adequate for the project as revised (14 Cal. Code Regs. § 15163, subd. (b)).

The SEIR augments the 2012 EIR, and the two must be considered together when the Commission determines whether to issue new Leases (14 Cal. Code Regs. §15163(e)).

1.2.5 Public Scoping (2023)

CEQA Guidelines section 15083 provides that a "Lead Agency may … consult directly with any person … it believes will be concerned with the environmental effects of the project." Scoping is the process of early consultation with affected agencies and the public before completion of a draft EIR. CEQA Guidelines section 15083(a) states that scoping can be "helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." Scoping is an effective way to bring together and consider the concerns of affected state, regional, and local agencies, the project proponent, and other interested persons (14 Cal. Code Regs. § 15083, subd. (b)). The purpose of scoping is to determine the scope of information and analysis to be included in an EIR, and thereby to ensure that an appropriately comprehensive and focused EIR will be prepared that provides a firm basis for informed decision-making.

On May 25, 2023, pursuant to Public Resources Code section 21080.4 and State CEQA Guidelines section 15082, subdivision (a), CSLC issued the Notice of Preparation (NOP) of a Supplemental EIR (SEIR) and Notice of Public Scoping Meeting for the Revised Project to responsible and trustee agencies, Tribes, and other interested parties. Through the NOP, CSLC staff solicited written and verbal comments on the SEIR's scope during a 30-day comment period and held one in-person and one hybrid (in-person and virtual (Zoom)) public scoping meeting on June 8, 2023, to solicit verbal comments on the scope of the SEIR. At the beginning of the hybrid meeting, staff learned that the Zoom link provided was incorrect, so on June 9, 2023, CSLC posted on its website and emailed to interested parties notice of an additional virtual meeting that was held on June 20, 2023. No oral comments were provided at any of the three scoping meetings. The NOP and Notice of Additional Scoping Meeting are provided in Appendix B.

Written comments received on the NOP during the scoping period are listed in Table 1-1, which lists the agencies, organizations, and individuals who submitted comments during the scoping period.

Table 1-1. Scoping Commenters

Date	Commenter
Agencies	
6/2/23	Native American Heritage Commission
6/16/23	California Water Board, San Francisco Bay Regional Water Quality Control Board
6/26/23	California Water Board, San Francisco Bay Regional Water Quality Control Board
6/26/23	Delta Stewardship Council, A California State Agency
6/26/23	State of California – Natural Resources Agency, Department of Fish and Wildlife
Organizations	
6/26/23	San Francisco Baykeeper and Citizens Committee to Complete the Refuge (CCCR)
6/26/23	Marin Audubon Society
Individuals	
6/26/23	Libby Lucas
6/27/23	Mary Jane Schramm

1.3 PURPOSE AND SCOPE OF SUPPLEMENTAL EIR

1.3.1 Purpose of Supplemental EIR

The purpose of a supplemental EIR is to document the minor additions or changes necessary to make an original EIR adequate for a revised project, and it only needs to contain the information necessary to meet that purpose. A supplemental EIR augments the previous EIR to address a limited set of issues, and the two must be considered together when the lead agency determines whether to issue a further approval for the project (14 Cal. Code Regs. § 15163). As described below in Section 2.1, *Project Summary*, the Revised Project, as proposed, is a modification of the project analyzed in the 2012 EIR (2012 Project), namely the continuation of the San Francisco Bay and Delta Sand

Mining Project for an additional 10-year lease term at reduced total and annual permitted extraction volumes and the use of fewer offloading sites. Also, new scientific information (the technical studies identified in Section 1.2.3) was developed subsequent to the 2012 EIR and the Revised Project is analyzed in light of that new information. Because only minor changes are necessary to make the 2012 EIR apply to the Revised Project, CSLC is preparing an SEIR.

As described in the 2012 EIR, Part III, Section 1.3, sand mining in the Bay and Delta is a highly regulated activity. This SEIR is intended to provide the Commission and all responsible and trustee agencies with the information required to exercise its jurisdictional responsibilities with respect to the Revised Project, which would be considered at a noticed public meeting of the Commission. The SEIR will be used by the Commission to determine whether to approve the application and grant new 10-year leases of California sovereign lands to the Applicants for the purpose of mining sand.

The SEIR is also intended to provide information needed by other State and local agencies with jurisdiction to exercise their responsibilities in issuing discretionary permits associated with the Revised Project. To continue mining sand from the lease parcels and privately owned Middle Ground shoals site, the Applicants require discretionary approvals from responsible agencies; these agencies are listed in Section 1.4 Project Permits and Approvals. As discussed in Section 1.2.3, since certification of the 2012 EIR, numerous technical studies have been developed that assess sediment transport within and near the Revised Project area and serve to inform agencies in the decision-making process.

1.3.2 Scope of Supplemental EIR

The SEIR documents and analyzes the changes between the San Francisco Bay and Delta Sand Mining Project analyzed in the 2012 EIR and the proposed Revised Project. While, arguably, the Commission may rely on the 2012 EIR in considering whether to approve the Revised Project, the development of new technical studies (listed in Section 1.2.3) of potentially substantial importance has been identified by CSLC as rendering an SEIR appropriate under Sections 15162 and 15163 of the CEQA Guidelines.

This SEIR focuses on two areas:

1) Proposed changes to the project described and analyzed in the 2012 EIR, consisting of:

   i) the proposed issuance of Leases for an additional 10-year period;

ii) the proposed reduction in the authorized annual materials extraction volume in four (PRC-709.1, -7780.1, -7781.1, and Grossi Middle Ground: BCDC Permit 16-78 [Lind]) out of the six lease areas (the authorized lease volume would be reduced by 289,866 cubic yards per year [cy] from 2,039,866 cy to 1,750,000 cy). The proposed authorized volumes in two Central Bay leases (PRC-2036.1 and -7779.1) would remain unchanged; and

iii) continued use of current material offloading facilities, which are a subset of sites identified in the 2012 EIR.[8]

2) A consideration of monitoring and technical studies conducted since certification of the 2012 EIR (listed in Section 1.2.3) to assess whether they contain new information of substantial importance for purposes of CEQA.

The primary analysis within the SEIR, discussed in Section 3, consists of assessing the Revised Project as modified from the project described in the 2012 EIR and informed by the new technical studies. Because the Revised Project is substantially a continuation of the activities described in the 2012 EIR, the impact analysis of many of the resource areas addressed in the 2012 EIR is unchanged. Therefore, the scope of this SEIR is limited to the resource areas listed in Section 1.3.4. The project consistency analysis documented in Section 3.9 determined that the Revised Project would otherwise not affect the conclusions reached in the 2012 EIR.

1.3.3 Baseline Conditions

The California Environmental Quality Act requires that a new project's baseline reflect the actual physical environmental conditions at the time EIR preparation starts; however, where a project has already undergone full CEQA review, the agency need only assess changes to the previously approved project, substantial changes in circumstances, or new information of substantial importance if such changes and new information meet the criteria under Public Resources Code section 21166 and Guidelines section 15162. A supplemental EIR is not meant to re-analyze everything from the original EIR. It specifically focuses on the new or changed aspects of the project or its environment, ensuring that the original EIR is still adequate in light of those changes. In short, this SEIR compares the Revised Project against that approved in the 2012 EIR, it does not conduct a renewed

[8] The use of particular offloading sites does not require Commission authorization, but are included in the scope of the SEIR analysis consistent with the 2012 EIR.

comparison against existing environmental conditions. When an agency is evaluating a proposed change to a project that has previously been reviewed under CEQA, the agency *must* apply CEQA's standards limiting the scope of subsequent environmental review. 14 Cal. Code Regs. § 15162; *Abbatti v Imperial Irrig. Dist.* (2012) 205 Cal.App.4th 650; *Sierra Club v City of Orange* (2008) 163 Cal.App.4th 523, 542. Consistent with this principle, the project impacts reviewed in the prior EIR are properly treated as part of the environmental baseline in a subsequent or supplemental EIR. *Communities for a Better Environment v. South Coast Air Quality Management Dist.,*(2010) 48 Cal. 4th 310, 326 note 11, *Fairview Neighbors v. County of Ventura,* (1999) 70 Cal.App.4th 238, 242. In effect, "the baseline for purposes of CEQA is adjusted such that the originally approved project is assumed to exist." Remy, Thomas, Moose & Manley, Guide to CEQA (11th ed 2007). On this basis, the baseline and existing conditions for purposes of this SEIR assumes the occurrence of the fully authorized sand mining lease volumes, as analyzed and disclosed in the 2012 EIR and as further described in Section 2.3.1 and shown in Table 2-2, *Permitted Sand Mining Volumes, Current and Proposed*.[9]

1.3.4 Potential Impacts

Consistent with CEQA Guidelines section 15163, subdivision (b), this supplement to the 2012 EIR contains "only the information necessary to make the previous EIR adequate for the project as revised." Consequently, this Supplemental EIR identifies potential significant impacts of the proposed Revised Project on the environment and indicates if and how the impacts can be avoided or reduced by mitigation measures or alternatives. The following resource areas would not be impacted by the Revised Project, and are therefore eliminated from consideration in this Supplemental EIR: aesthetics and visual resources; agriculture and forestry resources; geology and soils; noise; population and housing; public services; transportation and traffic; and utilities.

As described in Section 3.0, *Environmental Analysis*, the following sections provide information on potentially significant environmental effects associated with the Revised Project: biological resources (Section 3.2); mineral resources (Section 3.3); hydrology and water quality (Section 3.4); hazards and hazardous materials (Section 3.5); air quality and greenhouse gases (Section 3.6); cultural

[9] The baseline conditions analyzed in the 2012 EIR which used the 5-year average annual mining volumes was found to be an appropriate measure as required under 14 C.C.R. §15125(a), *S.F. Baykeeper v. SLC* (2015), 242 Cal. App. 4th 202, 217-18.

and tribal cultural resources (Section 3.7); and land use and recreation (Section 3.8).

1.3.5 Cumulative Impacts Analysis

An EIR must discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (14 Cal. Code Regs. §15130). "Cumulative impacts" refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (14 Cal. Code Regs. §15355). An individual project's incremental effects are cumulatively considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Pub. Res. Code §21083(b)(2)). Section 3.1.5, Cumulative Effects Scenario, identifies relevant considerations including the applicable geographic scope of the cumulative analysis ("Cumulative Scenario Study Area") and other projects to be considered in the cumulative effects analysis for the Revised Project.

1.4 AGENCY USE OF SUPPLEMENTAL EIR

As of December 31, 2022, the Leases are in holdover status allowing for mining on a month-to-month basis until the Commission considers certification of this SEIR and issuance of new leases. The Leases required the Applicants to submit new lease applications two years prior to the expiration of the leases, which was done. This SEIR will serve as the CEQA environmental compliance document for the Commission in considering issuance of the new leases.

In addition, the SEIR will be relied on by several other agencies with jurisdiction over the project that will consider issuance of permits or entitlements in their responsible agency capacity under CEQA. These agencies and their roles are described briefly below. The Revised Project may also be of interest to Native American tribes and Trustee Agencies, the latter of which are agencies without permitting jurisdiction but nonetheless possessing jurisdiction over natural resources affected by the Revised Project.

1.4.1 Current and Anticipated Approvals/Permits

In addition to the Leases issued by the Commission, sand mining activities also are regulated by permits and other authorizations from the agencies listed below. Each existing approval or other authorization contains obligations in the form of conditions, limitations, and restrictions, as well as various impact minimization measures and monitoring and reporting requirements, that are

enforceable independent of the CSLC Leases. The Applicants' ongoing sand mining activities are governed by the following agencies (specific entitlements are described in Table 1-2):

- U.S. Army Corps of Engineers (USACE): USACE regulates the mining of construction-grade sand within the lease areas pursuant to permits issued under the Rivers and Harbors Act Section 10 and federal Clean Water Act Section 404. These permits must be consistent with the San Francisco Bay Coastal Zone Management Program and require compliance with the Operating Procedure for the Vessel Traffic Safety System (VTSS) of San Francisco, as monitored by the U.S. Coast Guard (USCG) Captain of the Port, to avoid hazards to commercial or military navigation.
- San Francisco Bay Conservation and Development Commission (BCDC): BCDC regulates commercial sand extraction within BCDC's jurisdiction, including Bay tidal areas, pursuant to the McAteer-Petris Act. Among other things, permit conditions govern the methods and depths of mining and contain conditions to protect water quality and biological resources (among other environmental resources).
- The San Francisco Bay Regional Water Quality Control Board (RWQCB): As authorized under the Porter-Cologne Water Quality Control Act, the RWQCB has primary responsibility for the coordination and control of water quality in the San Francisco Bay area. The RWQCB also oversees the National Pollutant Discharge Elimination System (NPDES) General Permit, which regulates wastewater discharges from aggregate mining, sand washing operations, and sand offloading facilities to surface waters, such as the San Francisco Bay. Under Section 401 of the federal Clean Water Act, RWQCB must provide a water quality certification for any federally permitted activity that may result in a discharge into federal waters (USACE permits, referenced above). Among other things, permit conditions regulate mining locations and depths and protect water quality.
- The Surface Mining and Geology Board (SMGB): SMGB has approval authority over reclamation plans prepared pursuant to the Surface Mining and Reclamation Act (SMARA, Public Resources Code § 2710 et seq.) and its implementing regulations (14 Cal. Code Regs. § 3500 et seq.) for the lease areas.

Table 1-2. Entitlements Associated with Lease Areas
(note: Permit extensions have been granted by relevant agencies during the CEQA environmental review process)

	Central Bay Entitlements			
	Presidio Shoals	**Point Knox South**	**Point Knox Shoals**	**Alcatraz South Shoal**
CSLC	PRC 709.1	PRC 2036.1	PRC 7779.1	PRC 7780.1
	All CSLC leases in holdover status since December 31, 2022			
USACE	24305S	2441N	24997N	23573S
	All USACE permits expired June 1, 2025			
BCDC	2013.004.00 expired April 29, 2025			
SMGB	See Note 1	See Note 1	See Note 1	See Note 1
RWQCB	Order No. R2-2015-0008 (applies to Hanson/Martin Marietta's mining leases)			
CDFW	ITP #2081-2013-047-03 extended through December 31, 2025, for all Hanson/Martin Marietta sand mining leases			
Middle Ground Entitlements				
CSLC	N/A			
USACE	24996N and 25653N expired June 1, 2025			
BCDC	2013.003.00md expired April 29, 2025; extended to June 2026.			
SMGB	See Note 1			
RWQCB	Order No. R2-2015-0009 (applies to Lind's mining lease)			
CDFW	ITP #2081-2012-012-03 extended through April 30, 2025, for all Lind sand mining leases			
Suisun Channel Entitlements				
CSLC	7781.1 in holdover status since December 31, 2022			
USACE	2013-00130S expires June 1, 2025			
BCDC	2013.005.00md expires April 29, 2025			
SMGB	See Note 1			
RWQCB	Order No. R2-2015-0010 (applies to Suisun Associates' mining lease)			
CDFW	ITP #2081-2012-012-03 extended through April 30, 2025, for all Lind sand mining leases			

Notes:

1. The SMGB has approval authority over the reclamation plans prepared pursuant to SMARA for the sand mining sites. The SMGB considers the reclamation plans valid and current.

Source: Hanson Marine Operations, Inc. Application to Commission for New Leases (CSLC, 2020).

- California Department of Fish and Wildlife (CDFW): Regulates operating sand mining vessels under its Office of Oil Spill Prevention and Response (OSPR) program and may issue permits for the incidental "take" of any proposed, threatened, or endangered species under the California Endangered Species Act (CESA). Among other conditions, any authorized "take" of state-listed species must be fully mitigated. As indicated in Responses to Comments D-9 in the 2012 EIR, mining activities in the Central Bay are exempt from CDFW jurisdiction under Fish and Game Code Section 1600 et seq. which does not extend over tidal waters. The need for a Lake and Streambed Alteration Agreement (LSAA) for non-tidal waters east of Carquinez Strait (Suisun Bay and the Western Delta) would be determined by CDFW based on its jurisdictional limit.
- Delta Stewardship Council (DSC): The DSC must ensure that covered actions occurring within the Sacramento-San Joaquin Delta are consistent with the Delta Plan prepared and adopted pursuant to the Delta Reform Act of 2009.

Table 1-2 summarizes the entitlements authorizing sand mining within the Revised Project lease areas or applicable current permits.

1.5 ORGANIZATION OF SUPPLEMENTAL EIR

Preparation of the Draft SEIR has followed and been informed by the scoping process. Article 9 of the CEQA Guidelines (14 Cal. Code Regs. §§15120–15132) establishes the required contents of an EIR. These contents, as they apply to the environmental analysis of the Revised Project, are summarized below.

- **Table of contents or an index**
- **Executive Summary**
- **Project description:** A description of the Revised Project is provided in Draft SEIR Chapter 2. Project Objectives and Permits and other Approvals are provided in Chapter 1.

- **Environmental setting:** The environmental setting for the Revised Project is described on a resource-by-resource basis in the 2012 EIR and, for the areas of focus in this SEIR, in Draft SEIR Chapter 3.
- **Analysis of direct, indirect, and cumulative impacts of the proposed project:** Potential impacts of the Revised Project are described in Draft SEIR Chapter 3 to determine whether the conclusions about potential effects of the proposed Revised Project differ from the analysis documented in the 2012 EIR.
- **Consideration and discussion of mitigation measures proposed to minimize potential significant impacts:** As described in Draft SEIR Chapter 3, the Revised Project will not result in any new significant impacts or substantial increases in the severity of impacts previously identified in the 2012 EIR. One new mitigation measure, CUL-4, has been identified, which relates to the inadvertent discovery of tribal cultural resources. Because tribal cultural resources was not finalized and approved as a category in the CEQA Guidelines Appendix G environmental checklist until September 2016, the 2012 EIR did not separately analyze potential impacts to these resources. Therefore, MM CUL-4 has been added to the SEIR to address any inadvertent discovery of tribal cultural resources during mining activity. It is not anticipated, however, that the Revised Project will result in any new significant impacts. All other impacts, which remain unchanged in significance and severity, are summarized in Chapter 3, *Environmental Analysis*.
- **Organizations and persons consulted:** Federal, state, and local agencies; tribal entities and members; and organizations and individuals consulted pursuant to the preparation of this Draft SEIR are identified in Section 7.3, Entities Consulted and Recipients of the Draft SEIR.

1.6 PUBLIC ENGAGEMENT

1.6.1 EIR Repository Sites and Information Sources

As required by CEQA, this Draft SEIR, along with the 2012 EIR, is being made available for agency and public review and comment for at least 45 days. Copies were provided to the State Clearinghouse for circulation to interested state agencies. Printed copies of the Draft SEIR and electronic copies of all appendices and all documents referenced in the Draft SEIR are available for public review during normal business hours at the California State Lands Commission office at 100 Howe Ave., Suite 100 South, Sacramento, CA 95825. An electronic copy of the Draft SEIR is available on the CSLC's website: www.slc.ca.gov/ceqa/sf-delta-sand-mining-2023.

Notifications of the availability of the Draft SEIR and information about how to access it were sent directly to responsible, trustee, and local agencies; the State

Clearinghouse of the Governor's Office of Land Use and Climate Innovation; County Clerk's offices of San Francisco, Contra Costa, Solano, and Sacramento counties; and the tribal entities and members, organizations, and individuals identified in Section 7.3, Entities Consulted and Recipients of the Draft SEIR. Notice of the availability of the Draft SEIR was also published in the San Francisco Examiner.

1.6.2 Submitting Public Comments on the Draft SEIR

Please submit any written comments on the Draft SEIR to the following address:

Mr. Christopher Huitt
Senior Environmental Scientist
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825
Email: CEQA.comments@slc.ca.gov (Subject Line – SF Bay and Delta Sand Mining Project Draft SEIR Comments)

CSLC will review all comments received during the public review period and provide written responses in a Final SEIR. The Final SEIR will be made available to agencies and the public and provide a basis for agency decision-making.

2.0 PROJECT DESCRIPTION

2.1 PROJECT SUMMARY

Two marine aggregate companies, Martin Marietta and Lind, hold Leases issued by the Commission to harvest sand commercially (sand mining) within San Francisco Bay and the western Delta. Martin Marietta and Lind are referred to collectively in this Draft Supplemental Environmental Impact Report (SEIR) as the Applicants. The Applicants have applied to the Commission to authorize leases for commercial sand mining for 10 additional years at reduced maximum annual and total volumes of sand extraction over the new lease term (the Revised Project) relative to the maximum annual and total volumes evaluated in the San Francisco Bay and Delta Sand Mining Project Environmental Impact Report (State Clearinghouse No. 2007072036) on October 12, 2012 (2012 EIR) for the prior lease term (see Table 2-2 below for comparison of current and proposed lease volumes). The boundaries of the leases are shown in Figures 1-1 and 1-2. No change is proposed to the existing lease area boundaries. The Revised Project (encompassing the CSLC leases and the private Middle Ground Shoal lease) is a continuation of the ongoing operations described and analyzed in the 2012 EIR. Part III, Section 2.2 of the 2012 EIR (p. 2-2 et seq.) provides background information, including history and context for the sand mining operations that continue in effect. The description of mining activities, as presented in detail in the 2012 EIR (and summarized below in Section 2.3) remains relevant to the current analysis.

2.2 PROJECT OBJECTIVE

The purpose of the Revised Project, as stated by the Applicants, is to assure the availability of marine sands for commercial and public purposes within the greater San Francisco Bay area. Per the Applicants, the objective is to continue to mine sand at an economically viable level over the next 10 years to make this mineral resource available for use in commercial and public construction, including but not limited to residential and commercial projects, public infrastructure (e.g., roads, bridges, and buildings), and shoreline protection and beach replenishment projects.

2.3 CURRENTLY AUTHORIZED MINING VOLUMES AND ACTIVITIES

The following section describes the fully authorized sand mining lease volumes, as analyzed and disclosed in the 2012 EIR.

2.3.1 Summary of Leases

Table 2-1 summarizes the currently authorized sand mining leases in the Bay-Delta.

Table 2-1. Currently Authorized Leases

Lease Area	Location/Lease No.	Lease terms[1]	Authorized Annual Lease Volumes (cy)[2]
California State Lands Commission Central Bay	PRC 709.1: Presidio, Alcatraz (Martin Marietta)	Jan.1, 2013 – Dec. 31, 2022	340,000
	PRC 2036.1: Point Knox South (Martin Marietta)	Jan.1, 2013 – Dec. 31, 2022	450,000
	PRC 7779.1: Point Knox Shoal (Martin Marietta)	Jan.1, 2013 – Dec. 31, 2022	550,000
	PRC 7780.1: Alcatraz South Shoal (Martin Marietta)	Jan.1, 2013 – Dec. 31, 2022	200,000
	Total CSLC Central Bay Leases		**1,540,000**
California State Lands Commission Suisun Bay/ Delta	PRC 7781.1: Suisun Bay/Western Delta (Lind)	Jan.1, 2013 – Dec. 31, 2022	300,000
Total California State Lands Commission Leases (All Areas)			**1,840,000**
Private Suisun Bay	Grossi Middle Ground: San Francisco Bay Conservation and Development Commission (BCDC) Permit 16-78 (Lind)[4]	CSLC leases not applicable to this parcel.	199,866[3]
Total Annual Authorized Volume[5] (California State Lands Commission and Private Leases)			**2,039,866**

Notes:

1. All CSLC leases have been in holdover status since December 31, 2022.
2. The current authorized lease volumes are consistent with those proposed in the 2012 EIR.
3. The 2012 EIR evaluated a sand extraction volume limit of 200,000 cy.
4. The SEIR considers the whole of the Revised Project; thus, the private lease is included in this table for informational purposes.
5. Mining activities are further limited by agency permits; this table does not represent fully authorized mining activities per jurisdictional permits.

2.3.2 Mining Techniques

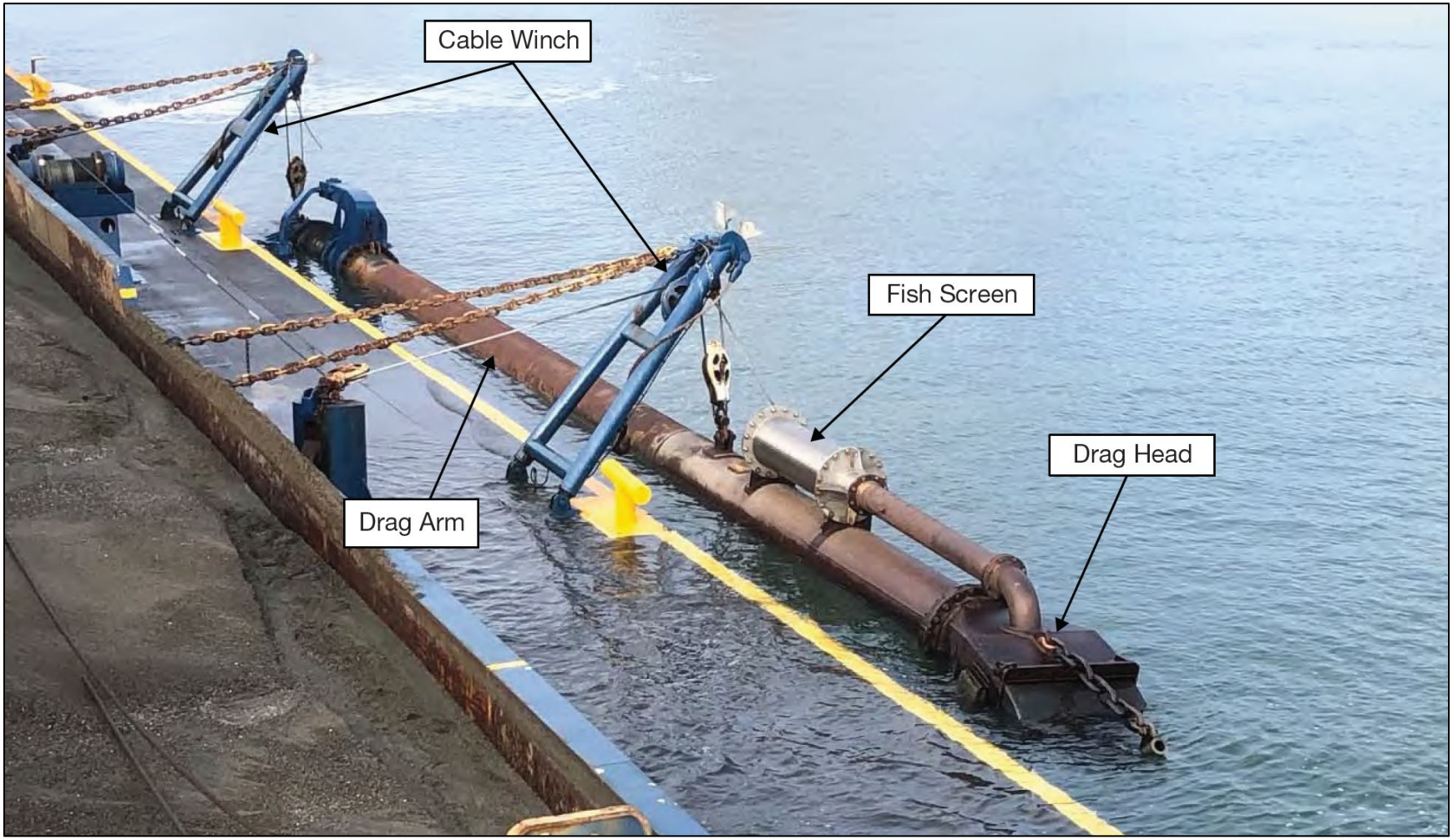
Part III, Section 2.3.2 (p. 2-10 et seq.) of the 2012 EIR describes the general methods and process of sand mining. The general methods of sand mining remain as described in the 2012 EIR. To summarize, the process of sand mining begins by using a tugboat to move a specialized suction dredge barge from its dock to a position within one of the lease areas. To begin mining in the Central Bay leases, a drag arm, which looks like a large pipe with a metal drag head, is lowered to the sandy bottom. The drag head contains a screen to prevent large rocks or materials from being entrained (Figures 2-1 and 2-2). To begin mining in the Delta leases, a dredge arm, without a drag head is lowered to the sandy bottom. For both areas, water from the Bay or Delta is entrained in the suction head, generating a water and sand slurry to mobilize sand from the Bay or Delta bottom and pumps it into a hopper on the barge.

The existing drag head also contains a suction vent fitted with a positive barrier fish screen (Figures 2-1 and 2-2). The fish screen is designed [based on guidance from the California Department of Fish and Wildlife (CDFW), the National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS)] to meet a flow rate of 3.8 cubic feet per second (cfs), approach velocity of 0.2 feet-per-second, and slot velocity of 0.5 feet-per-second or less to minimize potential entrainment and mortality of fish during sand mining events. The fish screens were added to the sand mining equipment in 2013 as a project design feature to ensure compliance with the Biological Opinion issued by the USFWS and NMFS as well as permit conditions/take minimization measures included in the CDFW Incidental Take Permits.[10] BCDC, as a condition of its permit, also required the fish screens on intake vents as impact Minimization Measure 1b; the fish screens are part of existing mining operations.

As described and analyzed in Part III of the 2012 EIR Section 4.5.4 (p. 4.5-17), several motors and pumps used for sand mining were replaced with "cleaner" equipment (with respect to air quality and greenhouse gas emissions); this cleaner equipment also is part of existing mining operations. The California Air Resources Board (CARB), Harbor Craft program, issued a Compliance Plan and Demonstration of Compliance in December 2017. No new equipment or replacement of existing equipment is proposed as part of the Revised Project.

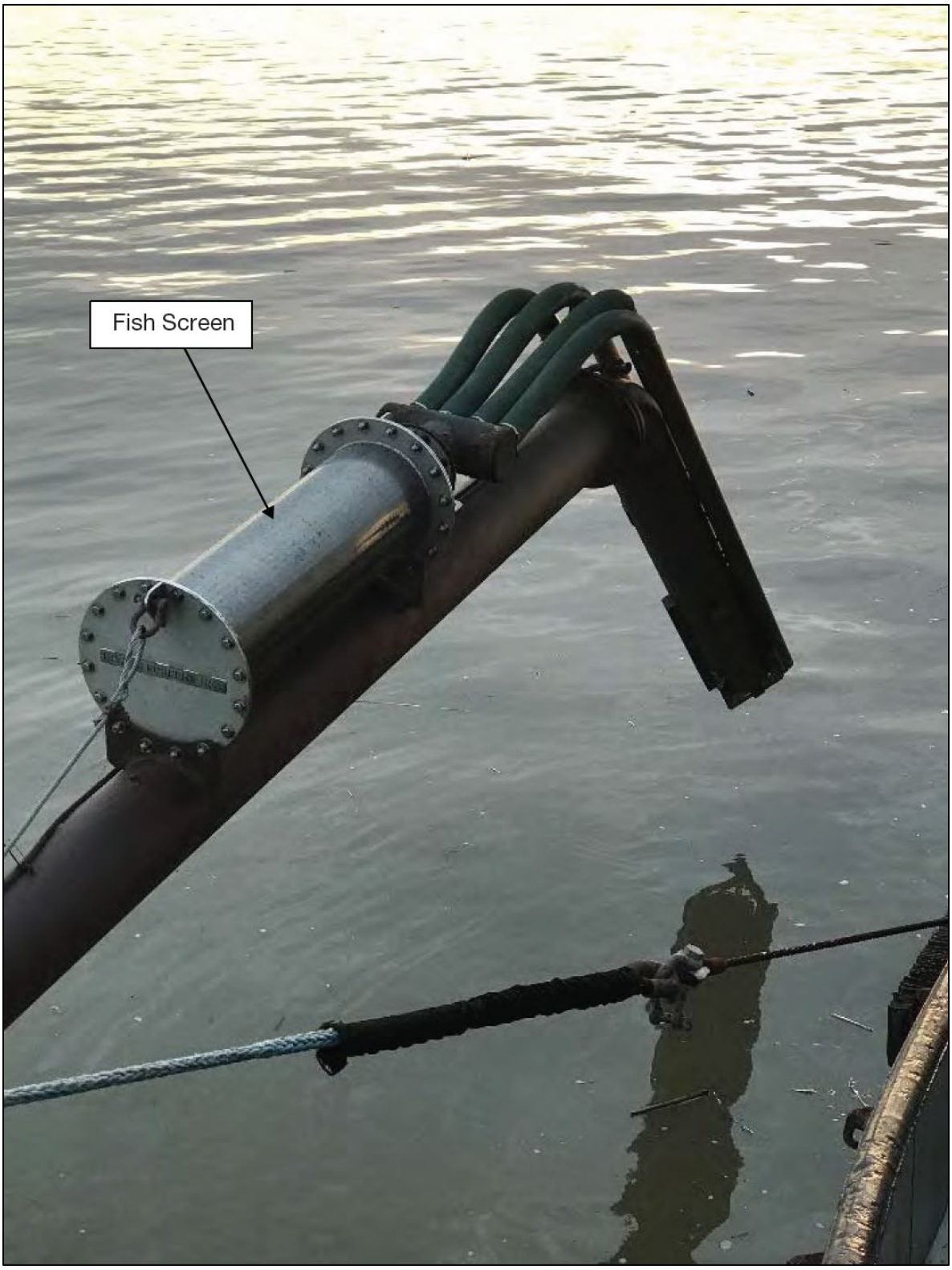
[10] The ITP was issued pursuant to California Fish and Game Code section 2081 for the incidental take of listed fish species (Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, delta smelt, and longfin smelt).

Figure 2-1. Martin Marietta Hydraulic Suction Drag Arm Assembly with Fish Screen



Source: Lehigh Hanson (Martin Marietta), 2020

Figure 2-2. Lind Marine Drag Arm (without Drag Head)



Source: Lehigh Hanson (Martin Marietta), 2020

2.3.3 Mining Events

Part III, Section 2.3.3 of the 2012 EIR (p. 2-20 et seq.) describes the characteristics of typical mining events. For example, the duration of sand mining events in the Central Bay Leases generally last from 3 to 5.5 hours, with a range of 1.0 hour to over 11.0 hours (2012 EIR, p. 2-23). A mining event is complete when the barge is full (to capacity) with sand. In the Central Bay, sand mining typically occurs in relatively deep water (from 30 to 90 feet deep).

Sand mining In the Middle Ground Shoal and in Suisun Bay leases typically occurs in waters 15 to 45 feet deep and currently is subject to seasonal restrictions and permit conditions[11] (2012 EIR, p. 2-23), and lasts 5 to 7.5 hours per event. Sand mining activity typically occurs throughout the year and may occur up to 24 hours per day during peak periods of mining (2012 EIR, p. 2-25). The Revised Project proposes no change to the timing or permitted water depths for mining operations.

Part III, Section 2.3.3 of the 2012 EIR (p. 2-21 et seq., including Figures 2-14a through 2-14d, 2-15, and 2-16) presented the sand mining locations recorded for the six quarters preceding issuance of the Notice of Preparation (NOP) (April 2007 through June 2008) for the 2012 EIR. This information showed that sand mining locations were not uniformly distributed across the lease areas, but rather were clustered within areas where suitable sand deposits were known to occur.

Part III, Section 2.3.2 of the 2012 EIR (p. 2-17, including Figure 2-10) described material offloading including the transportation of sand by the Applicants to offloading facilities and the sand mining offloading process using barges. The 2012 EIR did not consider operations at offloading facilities, as the offloading facilities are covered by separate entitlements at existing port facilities and will not result in any changes to existing operations. The Revised Project proposes no changes to the methods of transportation of sand to the offloading facilities or the offloading process. The Revised Project would continue to use five of the nine offloading facilities previously described in the 2012 EIR (Figure 2-3, below).

[11] Existing USACE and Regional Water Quality Control Board permits contain conditions to minimize entrainment take of larval longfin smelt: no mining is permitted in depths less than minus 25 feet mean lower low water (MLLW), December -June. No mining is permitted in depths less than minus 15 feet MLLW from July-November, per USACE Permit No. 2013-00129S; Waste Discharge Requirements and Water Quality Certification Order No. R2-2015-0008; BCDC Permit No. 2013.003.003md.

Mining events currently include the following project design features and restrictions which would be carried forward under the Revised Project (CSLC 2020):

- No mining can occur within 200 ft of any shoreline. Within Central Bay, mining cannot occur within 250 ft of depths less than -30 ft Mean Lower Low Water (MLLW). For lease areas in Suisun Bay, mining cannot occur within 250 ft of depths less than -9 ft MLLW, within depths less than -25 ft MLLW between December and June, and within depths less than -15 ft MLLW between July and November.
- Hanson (Martin Marietta) must establish 100-foot buffers from the outward edge of hard bottom features within and adjacent to the Central Bay mining leases.
- Fish screens have been installed on Hanson (Martin Marietta) and Lind mining equipment to minimize or avoid risks associated with entrainment of fish. The screens have a mesh opening of 0.068 inch, which is sized to prevent salmonids and sturgeon from being entrained into the suction pipes.
- To avoid or minimize disturbance of sandy deep-water habitat, Hanson (Martin Marietta) and Lind must keep the end of the pipe and/or drag head as close to the bottom as possible, and no more than three feet from the bottom whenever feasible when clearing the pipe. When priming the pump, the drag head is put on the bottom.
- Sand mining is restricted to specific lease areas and is not permitted outside of these areas. In addition, Hanson (Martin Marietta) and Lind are restricted to specific volumes per year in each of these lease areas.
- To minimize or avoid potential impacts on larval Delta smelt in Suisun Bay, Hanson (Martin Marietta) and Lind agreed in October of 2014 with the fisheries agencies (USFWS, NMFS, and CDFW) to restrict mining volumes during the more sensitive months (December through June).
- The total unscreened water diversions from sand mining are limited to 261acre-feet annually. This restriction also helps reduce entrainment and water quality impacts.

2.3.4 Mining Volumes

Annual and total sand mining volumes authorized in the Leases were approved by the Commission following certification of the 2012 EIR and are listed in Table 2-2. As stated previously in Section 2.3, the baseline for this SEIR encompasses the fully authorized sand mining lease volumes, as analyzed and disclosed in the 2012 EIR.

2.4 DESCRIPTION OF PROPOSED CHANGES

The Revised Project proposes to use equipment and methods that are substantially similar to those described and analyzed in the 2012 EIR and existing Leases for another 10-year period. Proposed changes to existing, ongoing operations are described below.

2.4.1 Issuance of New Leases

The Applicants propose to extend the activities described and analyzed in the 2012 EIR for 10 additional years from the date of lease issuance. This analysis assumes that if the Revised Project were approved, the Commission would authorize leases for continued mining operations for a period of 10 years, and the private Grossi Middle Ground lease would also be permitted by BCDC for a period of 10 years.

2.4.2 Decrease in Mining Volumes

The Revised Project proposes a reduction in the maximum allowable annual volume of sand harvested for three of the five CSLC leases and the private lease (from the volumes approved under the 2012 EIR). Authorized volumes for the other two CSLC leases are proposed to remain the same. Impacts of the current annual Commission-authorized lease volumes were analyzed in the 2012 EIR. Table 2-2 provides the current allowable annual volume and the proposed annual revised volumes for each lease. The proposed annual volumes are reductions from those previously authorized by the Commission but are equivalent to peak annual mining volumes currently permitted by other jurisdictional agencies (e.g., BCDC).

Table 2-2. Permitted Sand Mining Volumes, Current and Proposed

	Location/Lease No.	Current Annual Authorized Lease Volumes (cy)	Proposed Annual Revised Project Volumes (cy)
Central Bay	PRC 709.1: Presidio, Alcatraz (Martin Marietta)	340,000	235,000
	PRC 2036.1: Point Knox South (Martin Marietta)	450,000	450,000
	PRC 7779.1: Point Knox Shoal (Martin Marietta)	550,000	550,000
	PRC 7780.1: Alcatraz South Shoal (Martin Marietta)	200,000	160,000
	Total CSLC Central Bay Leases	**1,540,000**	**1,395,000**
Suisun Bay/Delta	PRC 7781.1: Suisun Bay/Western Delta (Lind)	300,000	235,000
Total CSLC Leases (All Areas)		**1,840,000**	**1,630,000**
Private/ Suisun Bay	Grossi Middle Ground: BCDC Permit 16-78 (Lind)[1]	199,866[2]	120,000
Total Volume (CSLC and Private Leases)		**2,039,866**	**1,750,000**

Notes: Units are shown in cubic yards per year

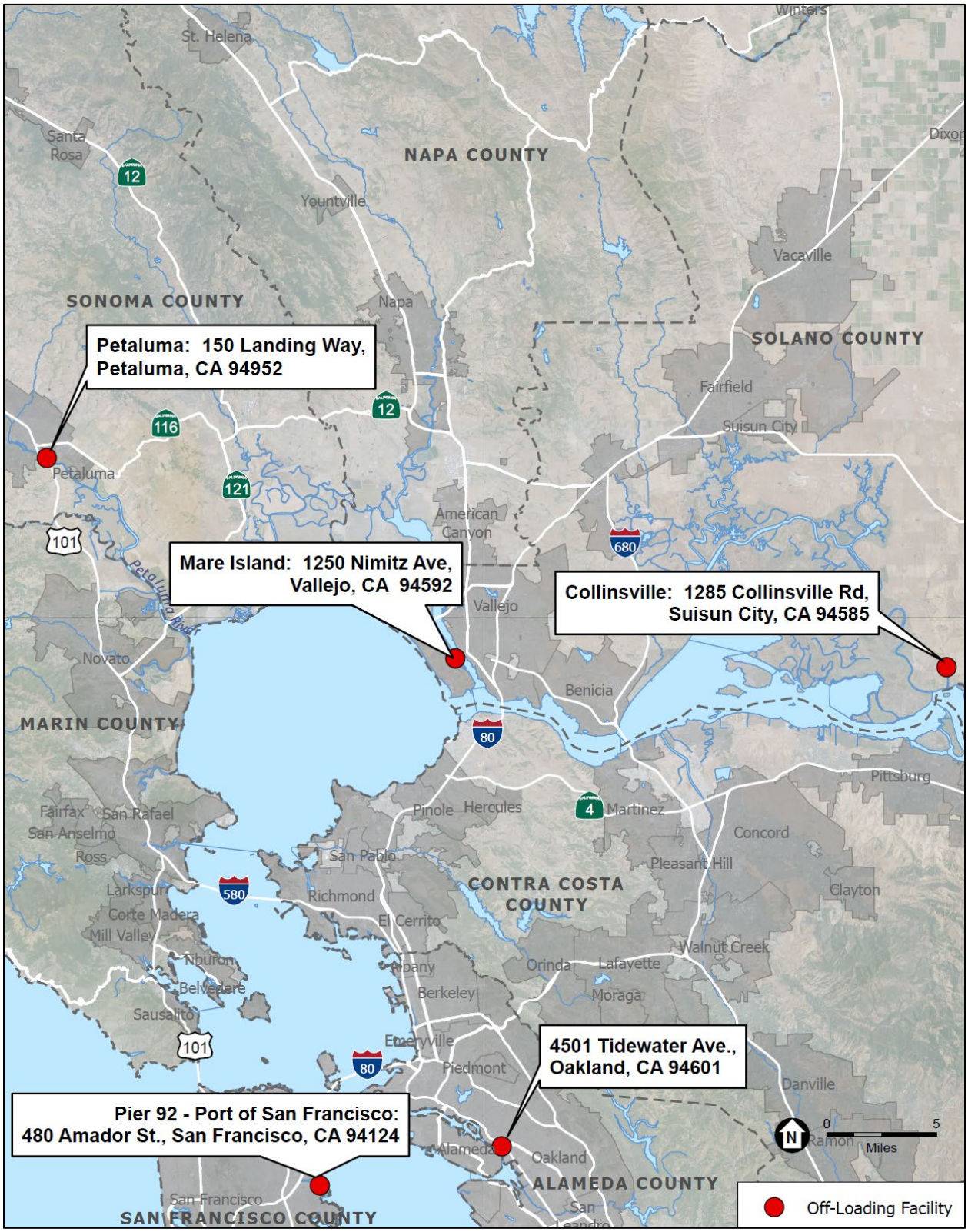
1. The private Grossi Middle Ground lease does not require Commission authorization, but mining volumes are presented for information and are included in the scope of the SEIR analysis. This approach is consistent with the 2012 EIR.
2. The 2012 EIR evaluated a volume limit of 200,000 cy.

Source: Hanson Marine Operations, Inc. Application to the Commission for New Leases (CSLC, 2020)

2.4.3 Offloading Facilities

The Applicants currently use five out of the nine offloading facilities described and examined in the 2012 EIR (see Figure 2-10, p. 2-18 of 2012 EIR). For purposes of analysis, this SEIR for the Revised Project addresses continued use of the Petaluma, Mare Island, Collinsville, Pier 92, and Tidewater offloading facilities as shown in Figure 2-3.

Figure 2-3. Location of Off-Loading Facilities



Sources: ESRI, 2022; ESA, 2022; Martin Marietta, 2023

3.0 ENVIRONMENTAL ANALYSIS

3.1 INTRODUCTION TO ENVIRONMENTAL ANALYSIS

This chapter describes the relevant environmental and regulatory setting; identifies the significance criteria and thresholds relied upon in the analysis; and evaluates the direct, indirect, and cumulative environmental impacts of the Revised Project to determine whether its implementation could result in one or more new significant impacts or a substantial increase in the severity of any significant impacts previously identified in the San Francisco Bay and Delta Sand Mining Project Environmental Impact Report (State Clearinghouse No. 2007072036) on October 12, 2012 (2012 EIR). The analysis of Revised Project impacts in this chapter focuses on the environmental issue areas listed below:

- Biological Resources
- Mineral Resources
- Hydrology and Water Quality
- Hazards and Hazardous Materials
- Air Quality and Greenhouse Gas Emissions
- Cultural and Tribal Cultural Resources
- Land Use and Recreation

As discussed in Section 1.2.3, above, a primary impetus for development of this SEIR are the 12 technical studies produced since the 2012 EIR. This SEIR evaluates whether those technical reports contain new information of substantial importance for purposes of CEQA. The studies, which topically include analyses of water quality, benthic habitats, bathymetry, and sand transport, are discussed below in Biological Resources (Section 3.2), Mineral Resources (Section 3.3), Hydrology and Water Quality (Section 3.4), and Hazards and Hazardous Materials (Section 3.5). To conclude briefly, none of the studies provided new information that shows, as compared to the 2012 EIR, any of the following: 1) new significant effects, 2) substantially more severe significant effects, or 3) that mitigation measures or alternatives exist that would substantially reduce one or more significant effects.

Section 3.9 provides an assessment of the Revised Project's consistency for the remaining eight resource areas discussed in the 2012 EIR: aesthetics, agricultural resources, geology and soils, noise, population and housing, public services, transportation, and utilities and service systems. This initial section of Chapter 3

introduces key concepts and the framework for the analysis of potential resource impacts in this chapter.

3.1.1 Environmental Baseline

As stated in Section 1.3.3 of this SEIR, CEQA requires that a new project's baseline reflect the actual physical environmental conditions at the time EIR preparation starts; however, where, as here, a project has already undergone full CEQA review, the agency need only assess changes to the previously approved project, substantial changes in circumstances, or new information of substantial importance if such changes and new information meet the criteria under Public Resources Code section 21166 and Guidelines section 15162. The 2012 EIR fully disclosed the impacts of the approved Project based on maximum mining volumes. In order to more appropriately compare the Revised Project to that analyzed under the 2012 EIR, the baseline for this SEIR is the level of activity associated with the authorized sand mining lease volumes, as analyzed and disclosed in the 2012 EIR and further described in Section 2.3.

3.1.2 Types of Impacts

The terms "effect" and "impact" are synonymous and can refer to effects that are either adverse or beneficial.

- **Direct effects** are caused by the Revised Project and occur at the same time and in the same place as the Revised Project.
- **Indirect effects** are caused by the Revised Project but occur later in time or further in distance, though still reasonably foreseeable.
- **Residual impacts** are impacts that still meet or exceed significance criteria after application of mitigation and therefore remain significant.
- **Cumulative impacts** are the changes in the environment resulting from the incremental impact of the Revised Project when added to other past, present, and reasonably foreseeable probable future projects. To the extent that the effects of past projects are reflected in baseline conditions, this analysis does not double-count them. Future projects are "reasonably foreseeable" if they were either proposed or approved at the time development of this SEIR was initiated (see Table 3.1-2, Cumulative Projects List in Section 3.1.5 of this SEIR). Cumulative impacts could result from individually minor but collectively significant activities from projects that take place over time.

- **Short-term impacts** are those expected to occur during mining activities for the Revised Project that do not have lingering effects for an extended period once active mining is complete.
- **Long-term impacts** are those that persist for an extended period after mining activities are completed.

3.1.3 CEQA Significance Criteria and Determinations

CEQA lead agencies rely on impact significance criteria as benchmarks to determine whether changes to the existing environment caused by a project or an alternative would cause a significant adverse effect. CEQA defines a significant impact on the environment as "a substantial, or potentially substantial, adverse change in the environment" (Public Resources Code section 21068), and the CEQA Guidelines further clarify that a significant impact is a substantial adverse change "in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (14 Cal. Code Regs. section 15382).

Public agencies have broad discretion to devise questions for use as significance criteria. The significance criteria relied on in the 2012 EIR reflect the CSLC's exercise of that discretion. To guide the Commission (as the lead agency for the Revised Project) in determining whether the Revised Project or an alternative may cause a significant impact on the environment, the preparers of this SEIR have considered the same series of questions that the Commission considered in the 2012 EIR to provide a basis for comparison for determining whether implementation of the Revised Project could result in one or more new significant impacts or a substantial increase in the severity of any significant impacts previously identified in the 2012 EIR. This SEIR supplements the scope of resources analyzed in the 2012 EIR to consider potential impacts on tribal cultural resources as defined in Public Resources Code section 21074 and consistent with direction provided in Assembly Bill 52 (Gatto, 2014). The analysis of the Revised Project's impacts on tribal cultural resources relies on the significance criteria suggested in Section XVIII of the CEQA Guidelines Appendix G environmental checklist.

Consistent with the 2012 EIR, the same classes of impact types are used in this SEIR to assess the impacts of the Revised Project. The impact classifications are:

- If the impact of an action remains significant, i.e., at or above the significance criteria, it is deemed to be **Class I** (*significant adverse impact that remains significant after mitigation*).
- If an action creates a significant, adverse impact, which can be reduced based on compliance with mitigation to a level below the pertinent significance criteria, it is determined to be **Class II** (*significant adverse impact that can be eliminated or reduced below an issue's significance criteria*).
- If an action creates an adverse impact above the baseline condition, but such impact does not meet or exceed the pertinent significance criteria, it is determined to be adverse, but less than significant or **Class III** (*adverse impact that does not meet or exceed an issue's significance criteria*).
- An action that provides an improvement to an environmental issue area in comparison to the baseline information is defined as **Class IV** (*beneficial impact*).

3.1.4 Mitigation Measures

As described in Section 1.0, the Commission authorized four leases for the Applicants to conduct sand mining in the Central San Francisco Bay in 2012 and one in Suisun Bay in 2013. The Central Bay leases were reapproved by the Commission in 2016, and the private Grossi Middle Ground lease, which is located on privately owned land and not subject to authorization by the Commission, was reapproved by BCDC in 2015. The Commission adopted all of the mitigation measures presented in the 2012 Final EIR as applicable to each of the leases. This SEIR evaluates whether the Revised Project could result in any new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR and, if so, also considers whether modification or supplementation of the 2012 mitigation measures is appropriate. When new or substantially increased significant impacts are identified, one or more feasible mitigation measures are identified to avoid or reduce the impact below the established threshold. The effectiveness of a mitigation measure is determined by evaluating the impact remaining after its application. Those impacts meeting or exceeding the impact significance criteria after mitigation are considered residual impacts that remain significant (Class I). Implementation of more than one mitigation measure may be needed to reduce an impact below a level of significance.

3.1.5 Cumulative Effects Scenario

3.1.5.1 Cumulative Considerations in this SEIR

This section provides a list and map identifying other projects near the Lease Areas that would cause incremental impacts that could combine with those of the Revised Project to cause or contribute to cumulative effects. CEQA Guidelines section 15130 requires a discussion of the cumulative impacts of a project when the project's incremental contribution to a significant cumulative effect is "cumulatively considerable." A project's incremental effects are considerable when viewed in combination with the effects of past, present, and reasonably foreseeable probable future projects. An EIR, however, should not discuss impacts which do not result in part from the project evaluated in the EIR. Where a CEQA agency is examining a project with an incremental effect that is not "cumulatively considerable," the agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable. An incremental, project-specific contribution to a cumulative impact is less than cumulatively considerable and is not significant if, for example, the project is required to implement or fund its fair share of a mitigation measure(s) designed to alleviate the cumulative impact.

Consistent with CEQA, the analysis of potential cumulative impacts is "guided by the standards of practicality and reasonableness" (CEQA Guidelines §15130(b)). The purpose of the cumulative analysis is to allow decision-makers to better understand the impacts that might result from approval of past, present, and reasonably foreseeable future projects, in combination with the Revised Project addressed in this SEIR. The CEQA Guidelines advise that a discussion of cumulative impacts should reflect both their severity and the likelihood of their occurrence (CEQA Guidelines §15130(b)).

Consistent with CEQA Guidelines section 15130(b), the Commission, as CEQA lead agency, has prepared a list of past, present, and reasonably foreseeable probable future projects that could result in related or cumulative impacts. This list includes projects outside the control of the lead agency. Existing conditions within the cumulative impacts area of effect reflect a combination of the natural condition and the effects of past actions in the affected area. The following factors also were used to determine an appropriate list of projects to be considered in this cumulative analysis:

- Similar Environmental Impacts – The analysis considers past, present, and reasonably foreseeable projects that would contribute to effects on

resources also affected by the Revised Project (i.e., air quality and greenhouse gas emissions, biological resources, cultural resources, tribal cultural resources, hazards and hazardous materials, hydrology and water quality, land use and recreation, and mineral resources).

- Geographic Scope – The appropriate geographic area of cumulative analysis is identified for the resource areas of focus in this SEIR as dictated by relevant physical and/or environmental boundaries. The geographic scope of the cumulative effects analysis (i.e., the cumulative effects study area) may extend beyond the scope of the direct effects of the Revised Project, but not beyond the scope of its indirect effects. As defined in the 2012 EIR, the geographic boundary for the cumulative analysis generally encompasses the waters and shoreline of central and northern (excluding southern) San Francisco Bay, San Pablo Bay, and Suisun Bay, and within 5 miles upstream and downstream of the Suisun Bay/Delta lease area. For hydrology and water quality impacts related to sediment transport, the boundary extends beyond the Golden Gate Strait to include Ocean Beach and its offshore sand bar (2012 EIR Figure 3-4; p. 3-19). For the purposes of the SEIR, the geographic study area cumulative analysis of the Revised Project remains the same. See Table 3.1-1, which summarizes the different geographic areas used to evaluate cumulative impacts for each of the primary resource areas analyzed in this SEIR.
- Timing and Temporal Scope – Incremental impacts of the Revised Project (whether of limited duration or longer term) could combine with the incremental impacts of other projects to cause or contribute to cumulative effects if the Revised Project's periods of activity or ongoing impacts would occur at the same time as the effects of the other projects considered in the cumulative effects analysis.

3.1.5.2 Characterization of Cumulative Effects Conclusions in this SEIR

The analysis documented in the 2012 EIR determined whether the Leases would cause or contribute to any cumulatively significant impact and, if so, whether the contribution would be "cumulatively considerable" as defined by CEQA Guidelines section 15065(a)(3). The analysis in this SEIR focuses on whether changes to the previously-described 2012 Project (i.e., the Revised Project) would cause any new significant impact or any substantial increase in the severity of a significant impact already disclosed and evaluated in the 2012 EIR.

Table 3.1-1. Geographic Considerations in Cumulative Analysis

Resource Area	Geographic Area
Air Quality and Greenhouse Gas Emissions	Revised Project site and vicinity (i.e., the San Francisco Bay Estuary region), including central San Francisco Bay, San Pablo Bay, Carquinez Strait, and Suisun Bay and channels.
Biological Resources	Revised Project site and vicinity, including the floor of the Bay and western Delta.
Cultural Resources and Tribal Cultural Resources	Revised Project site and vicinity, including Bay and Delta waters.
Hazards and Hazardous Materials	Revised Project site and vicinity (i.e., waters of the Bay and Delta) primarily within the context of the area regulated by the San Francisco Bay Regional Water Quality Control Board's Basin Plan but also the potential for sediment transport to affect habitat and geomorphology in the Bay, the Delta, and the San Francisco Littoral Cell.[12]
Hydrology and Water Quality	Revised Project site and vicinity, including areas of the Bay and Delta that are regulated by broad land use plans such as BCDC's San Francisco Bay Plan.
Land Use and Recreation	Revised Project site and vicinity, (i.e., the San Francisco Bay Estuary region), including central San Francisco Bay, San Pablo Bay, Carquinez Strait, and Suisun Bay and channels.
Mineral Resources	Revised Project site and vicinity including known mineral reserves from the floor of the Bay and western Delta.

[12] A littoral cell is an individual coastal segment within which littoral sediment transport is bounded or contained. The San Francisco Littoral Cell typically includes coastal stretches between Point Lobos in the north and Fort Funston in the south and is characterized by sediment movement alongshore due to prevailing oceanographic and meteorological conditions influencing beach erosion, accretion, and overall shoreline stability.

3.1.5.3 Cumulative Scenario Projects

Section 3.5.3 of the 2012 EIR (p. 3-18 et seq.) described the cumulative projects considered in that analysis. For this SEIR, Table 3.1-2 identifies a current list of projects that have potential to be part of the cumulative scenario; their locations are shown on Figure 3.1-1. To identify them, the Commission solicited input from agencies and others during the scoping process about past, present, and reasonably foreseeable probable future projects that would cause impacts that could combine with those of the Revised Project. Table 3.1-2 also describes the approximate geographic location and timing of effects of each of the potentially cumulative projects. These projects include a range of project types. They primarily consist of management plans, infrastructure and capital improvement projects, as well as private site development projects. These projects would or reasonably could be constructed and/or operated in a similar timeframe as implementation of the Revised Project and so could contribute incremental impacts that could combine with those of the Revised Project to cause or contribute to cumulative effects. Because a number of the projects identified as cumulative projects are market-driven and/or have yet to be fully funded, the status and construction dates are not certain. Therefore, for the purposes of this cumulative analysis, the Commission assumes they would cause impacts concurrently (in the next ten years) with the Revised Project.

Table 3.1-2. Cumulative Projects List

Project	Description	Location	Project Status and Documentation
San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044	The RDMMP is a 20-year plan for the dredging and placement of sediment from the 10 federal navigation projects in San Francisco Bay maintained by the U.S. Army Corps of Engineers (USACE). The RDMMP establishes a regional Federal Standard Base Plan, i.e., the least cost, environmentally acceptable, and technically feasible dredge material conveyance and placement option.	Federal navigation channels within and surrounding San Francisco Bay and San Pablo Bay, Carquinez Strait and Suisun Bay.	Draft RDMMP Environmental Assessment (EA)/EIR released in 2024. NOP released March 14, 2024. https://ceqanet.opr.ca.gov/2024020498/2
USACE Long Term Management Strategy	The goals for the Long-Term Management Strategy (LTMS) are to maintain, in an economically and environmentally sound manner, navigation channels in San Francisco Bay; conduct dredged material disposal in the most environmentally sound manner; maximize the use of dredged material as a resource; and maintain the cooperative permitting framework for dredging/disposal. Recent updates to the LTMS include strategic placement of in-bay sediment for beneficial reuse for	Federal navigation channels within and surrounding lands of San Francisco Bay and San Pablo Bay, Carquinez Strait and Suisun Bay.	Plan formulation relies on the Regional Draft Materials Management Plan over a 20-year timeframe. https://www.spn.usace.army.mil/Missions/Projects-and-Programs/Current-Projects/LTMS/

Project	Description	Location	Project Status and Documentation
	wetlands restoration in SF and Suisun Bays.		
Port of San Francisco Pier 39-43.5 Remediation Project	The Pier 39-43.5 Remediation Project is a multi-phase initiative focused on the removal and management of contaminated sediments along the northern waterfront of San Francisco, maintained through coordinated oversight by the Port of SF and Pacific Gas & Electric. The project establishes a site-specific remediation strategy that integrates dredging, capping, pile driving, and slope stabilization for managing historical polycyclic aromatic hydrocarbon (PAH) contamination in intertidal and subtidal zones.	Encompasses approximately 47 acres of sediment between the East Basin Marina (Pier 39) and Pier 43.5, extending up to 1,000 feet offshore into San Francisco Bay.	Draft Mitigated Negative Declaration (MND) released in 2021. NOAA Fisheries Acoustic Monitoring Plan finalized in 2025. Water Board Tentative Cleanup Order issued January 2022.
Port of San Francisco Waterfront Project	The project involves a multi-phase shoreline resilience initiative led by the Port of SF and USACE to address seismic vulnerability, coastal flooding, and long-term sea level rise. The program establishes a regional base plan integrating flood defenses, seismic upgrades, and nature-based solutions as the least-cost, environmentally acceptable, and	Spanning 7.5 miles of shoreline under Port of SF jurisdiction, from Aquatic Park in the north to Heron's Head Park in the south. Key segments include the Embarcadero Seawall, Fisherman's Wharf,	Draft Integrated Feasibility Report and Environmental Impact Statement released in early 2024. https://www.sfport.com/media/9476/download?inline=

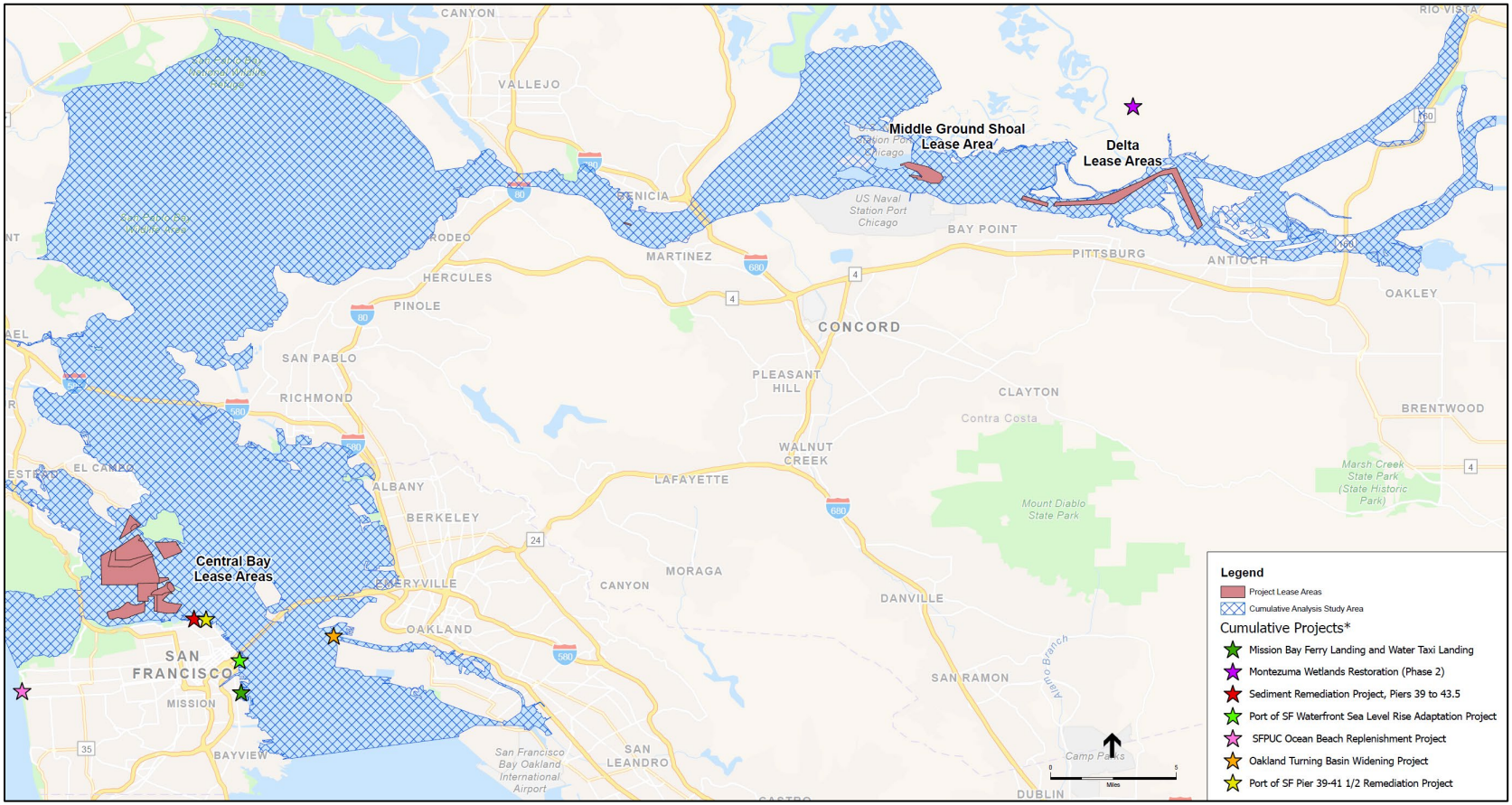
Project	Description	Location	Project Status and Documentation
	technically feasible approach to protect critical infrastructure and communities.	Mission Bay, and Islais Creek/Bayview.	
Oakland Turning Basin Widening Project	The Oakland Turning Basin Widening Project is a navigation improvement effort led by the USACE and the Port of Oakland. The project aims to expand the inner and outer harbor turning basins and involves dredging, pile driving, and shoreline modifications to reduce emissions and improve navigational safety.	Located in the Oakland Inner Harbor and adjacent to Alameda's shoreline, with improvements spanning Market Street, Embarcadero West, and Mitchell Avenue.	Final EIR certified by Port of Oakland in March 2025. https://www.spn.usace.army.mil/Missions/Projects-and-Programs/Current-Projects/Oakland-Harbor-Turning-Basins-Widening/.
Ocean Beach Replenishment Project	The purpose of the Ocean Beach Replenishment Project is to implement a long-term coastal management strategy for South Ocean Beach that addresses shoreline erosion and climate change-related sea level rise. The project entails construction of a multi-use trail, beach access stairway, removal of structures, and sand replenishment, among other components.	San Francisco at Ocean Beach along the Great Highway between Sloat and Skyline boulevards.	Phase 1 was constructed in 2021; Relocation and import of 40,000 cubic yards of sand from north to south Ocean Beach occurred in the Spring of 2025.

Project	Description	Location	Project Status and Documentation
San Francisco Bay Strategic Shallow-Water Placement Pilot Project	The Project is led by the U.S Army Corps of Engineers (USACE) and proposes to place approximately 100,000 cubic yards of dredged sediment from the Port of Redwood City Operations and Maintenance Project in shallow tidal waters offshore of the California Department of Fish and Wildlife's (CDFW) Eden Landing Ecological Reserve (Eden Landing).	In San Francisco Bay, 2 miles offshore of the CDFW Eden Landing Ecological Reserve.	EA/Initial Study/ND (#2022100155) approved February 3, 2023. https://ceqanet.opr.ca.gov/2022100155
Montezuma Wetlands Restoration (Phase 2)	The project (a private joint venture of Levine Fricke, Inc. and San Francisco Bay Restoration Authority) consists of pumping dredged sediment into the Phase 2 placement cells over three years in Suisun Marsh, Solano County. The dredged sediment will come from various dredging projects around San Francisco Bay that would otherwise dispose of their sediment in the ocean to be beneficially used for salt marsh restoration or at in-bay disposal sites, including Alcatraz.	The project site is located in Suisun Marsh, bordered to the west by Montezuma Slough and to the east by the Montezuma Hills.	San Francisco Bay Restoration Authority provided recommendations and funding in March 2023 for Phase 2. Construction is currently in process (as of July 2025).

Project	Description	Location	Project Status and Documentation
Suisun Marsh fish screen rehabilitation	The project, led by CDFW and Suisun Resource Conservation district, involves replacement exterior water control structures and installation of essential fish screen devices. Phase 2 involves design and reconstruction of essential fish screens to protect fish and 382 acres of managed wetlands of Suisun Marsh.	Montezuma Slough in Suisun Marsh.	NOD filed in August 2020. San Francisco Bay Restoration Authority approved funding for Phase 1 and Phase 2 in 2020 and 2022, respectively; additional funding approved in 2024. Fish screens have been installed on intakes along Montezuma Slough as of 2025. https://ceqanet.opr.ca.gov/2003112039/13

Source: (CEQAnet, 2025)

Figure 3.1-1. Location of Cumulative Projects



*Notes: The following cumulative projects were not depicted on this figure

- The Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay encompasses the waters of San Francisco, San Pablo, and Suisun Bays.
- San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044 includes Federal navigation channels within and surrounding SF Bay and San Pablo Bay, Carquinez Strait and Suisun Bay.

Source: ESA, 2025; ESRI, 2024; California State Lands Commission, 2009

3.2 BIOLOGICAL RESOURCES

This section identifies and evaluates potential impacts on biological resources, principally fishes, marine mammals, and marine invertebrates, to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than was disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.2.1 Baseline Conditions

The 2012 EIR (p. 1-12) states the following regarding baseline conditions for Biological Resources:

> Impacts on biological resources are assumed to have occurred since sand mining in the Project areas first started, and the ongoing disturbance that occurred during this time is considered part of the baseline condition. The EIR examines the effects of any changes in mining practices or methods, locations, and level of intensity relative to the average level of operations occurring from 2002 to 2007 and also examines the potential for cumulative effects of future sand mining in combination with past sand mining.

As described in Section 1.3.3 of this SEIR, the baseline condition for purposes of this analysis is the level of activity associated with the authorized sand mining lease volumes and the ongoing obligations such as mitigation measures and conditions of approval resulting from the Commission's 2012 EIR and lease authorizations. See Appendices A and F for details.

3.2.2 Environmental Setting

Section 4.1.1 of the 2012 EIR (pp. 4.1-1, et seq.) describes the environmental setting for the Project including biological resources, aquatic habitats, and associated biota for San Francisco Bay, the North Bay/San Pablo Bay, and Suisun Bay, and provides a summary of existing biological resource conditions. Those descriptions remain accurate for the purposes of the SEIR analysis, and have been considered alongside the supplemental information (see Section 1.2.3) found in the following reports, each of which has become available since publication of the 2012 EIR:

1) Hanson Marine Operations and Lind Marine, Inc. Sand Mining Water Quality Monitoring Program Results Report (NewFields, 2018a)
2) *Benthic Assessment of Sand Mining in Central San Francisco and Suisun Bays Data Report (*NewFields, 2018b)
3) *Technical Memorandum Benthic Assessment of Sand Mining Supplemental Data Evaluation* (NewFields, 2020)
4) Benthic Infauna Data Analysis (AMS, 2024)

3.2.2.1 Biological Communities

The biological communities environmental setting in this SEIR relies primarily on Section 4.1.1 of the 2012 EIR. Where appropriate to the assessment of potential effects from the Revised Project, new data and research has been added in this SEIR to update the information originally presented in the 2012 EIR.

3.2.2.2 Physical Environmental Setting

The San Francisco Bay and Delta (Bay-Delta) is the largest estuary on the West Coast of the United States covering roughly 550 square miles (Conomos et al. 1985; BCDC 2023). As described in the 2012 EIR (pp. 4.1-1 to 4.1-2), San Francisco Bay is divided into four sub-embayments, the Central Bay, South Bay, San Pablo Bay (North Bay), and Suisun Bay. The sand mining leases evaluated in the 2012 EIR and in this SEIR are held in west Central Bay and Suisun Bay (West Delta). The descriptions of the Central Bay and West Delta in Section 4.1.1 of the 2012 EIR remain accurate for the purposes of the SEIR.

<u>Turbidity and Nutrients</u>

Turbidity and sedimentation affect habitat suitability within the Bay-Delta. High turbidity limits light penetration in the water column, which can define habitat for critical species (Brown et al. 2013). Historically, 80-90 percent of the sediment that entered San Francisco Bay came from the eroded drainage basins of the Sacramento and San Joaquin Rivers (Krone 1979). However, water diversions, upstream dams, and flood control barriers in a post-mining era have led to the depletion of the downstream sediment pool (Schoellhamer et al. 2013; Achete et al. 2017). This sediment input is the main factor affecting turbidity throughout the Bay-Delta region and decreased sediment loads may have system-wide effects which could reduce ambient turbidity levels (Achete et al. 2017).

A water quality monitoring study of aggregate sand mining discharge plumes at the Central and West Delta mining lease sites between 2015 and 2016 reported

that "Overall, the monitoring results from both surveys demonstrate that discharges from sand mining operations do not adversely impact the water column with regards to chemical concentrations or toxicity, and that any physical effects related to plume turbidity are spatially limited and ephemeral in nature" (NewFields 2018a). These findings are consistent with the findings in the 2012 EIR Section 4.1.4 (pp. 4.1-44 to 4.1-46).

3.2.2.3 Open Water Pelagic Environment

As discussed in the 2012 EIR Section 4.1.1 (p. 4.1-3), the predominant habitat of the Bay-Delta region is pelagic[13], and the physical, chemical, and biological properties change with time and space. Each embayment is tidally influenced by Pacific Ocean waters flowing into Central Bay through the Golden Gate and by the freshwater flow from the Sacramento-San Joaquin River Delta.

Plankton Community

The pelagic environment is largely inhabited by planktonic[14] organisms but is also home to fishes and marine mammals moving through the deep-water channels of the Bay-Delta. The plankton community of the Bay-Delta was described in greater detail in the 2012 EIR Section 4.1.1 (p. 4.1-4) and remains applicable to this SEIR.

Phytoplankton

Phytoplankton are microscopic algae that produce chlorophyll[15] and form the foundation of the marine food web. Common taxa, as well as the distribution and salinity tolerance of phytoplankton in the Bay-Delta are described in the 2012 EIR, Section 4.1.1 (pp. 4.1-4), but nutrients also play a key role. The Bay-Delta has long been considered a low productivity estuary relative to its nutrient concentrations (Dugdale et al. 2007), as the Sacramento and San Joaquin rivers contribute large nitrogen loads from agricultural sources (Saleh and Domagaski 2021). Therefore, the Bay-Delta is classified as a high nutrient, low chlorophyll zone (Cloern 2001). Phytoplankton growth is largely controlled by light limitation (which is influenced by turbidity and sedimentation), grazing by microzooplankton,

[13] Pelagic refers to the open water portion of an aquatic habitat.

[14] Plankton are generally small, passively or weakly moving organisms, including algae, larval invertebrates and protozoans that float or drift in great numbers in salt water, especially at or near the surface.

[15] Chlorophyll is the name of the green pigment that plants use to make food during a process called photosynthesis.

and filter feeding by the invasive clam, *Potamocorbula amurensis* (Cloern and Dufford 2005). Otherwise, no substantive changes have occurred to the phytoplankton community inhabiting the Bay-Delta, and the information in the 2012 EIR remains applicable.

Zooplankton

Zooplankton are microscopic animals that spend all or part of their lifecycle within the water column. These organisms feed predominantly on phytoplankton, small suspended organic particles, or other zooplankton. Zooplankton community composition varies seasonally within the Bay-Delta and is a function of salinity gradients, residence time/flow, temperature, and phytoplankton abundance (Hartman et al. 2021).

The common zooplankton taxa observed between Carquinez Strait and South Bay as described in Section 4.1.1 (p. 4.1-4) of the 2012 EIR remains applicable and relatively unchanged with a few exceptions as follows. Areas of Suisun Bay and the Delta were historically dominated by freshwater copepods, cladocerans, rotifers, and bivalve veligers (Ambler et al. 1985), but following the introduction of *P. amurensis* (Kimmerer et al. 1994), this area is now dominated by copepods like *Limnoithona tetraspina* and *Pseudodiaptomus forbesi* (Winder and Jassby 2011; Gearty et al. 2021; Bashekin et al. 2023).

Pelagic Fish Community

The 2012 EIR (pp. 4.1-4 to 4.1-8) described the pelagic fish community inhabiting the sand mining lease areas of the Central Bay and West Delta from 2000-2007. Fish populations regularly shift in dominance and abundance over time. This may be due to factors such as changes in water flow, invasive species, and anthropogenic stressors (Moyle et al. 2016). To accurately assess the potential effects of the Revised Project on the pelagic fish community, data from the Interagency Ecological Program (IEP) was reassessed at the same locations as in the 2012 EIR (Appendix G, Biological Resources Supplemental Information) for the years 2016-2023. During this time, 35 pelagic fish taxa were collected in the Central Bay of which four species, northern anchovy (*Engraulis mordax*), Pacific herring (*Clupea pallasii*), jacksmelt (*Atherinops californiensis*), and Pacific sardine (*Sadinops sagax*) represented over 98 percent of the species caught (Appendix G, Table G-1, Biological Resources Supplemental Information). These were the same four dominant species reported and assessed in the 2012 EIR.

Between 2016 and 2023, 20 species were collected in the IEP midwater trawls in the West Delta. The seven most commonly captured species were the same as those reported from 2000-2007, and discussed in the 2012 EIR, Section 4.1.1 (Table 4.1-2, p. 4.1-7). These taxa continue to account for over 90 percent of total fish abundance in the area. These dominant species include northern anchovy (*E. mordax*), American shad (*Alosa sapidissima),* striped bass (*Morone saxatilis),* Pacific herring (*C. pallasii*), longfin smelt (*Spirinchus thaleichthys),* threadfin shad (*Dorosoma petenense*), and Chinook salmon (*Oncorhynchus tshawytscha*) (Appendix G, Table G-3, Biological Resources Supplemental Information).

The 2012 EIR (Section 4.1.1, pp. 4.1-7 to 4.1-8) described declines as well as state and federal protections of some of the dominant fish taxa of the Bay-Delta. Declining species include northern anchovy (*E. Mordax*), Pacific sardine *(S. sagax),* steelhead (*O. mykiss*), Chinook salmon (*O. tshawytscha*), delta smelt (*Hypomesus transpacificus*), and longfin smelt (*S. thaleichthys*). When the 2012 EIR was drafted, longfin smelt (*S. thaleichthys)* was listed as threatened under the California Endangered Species Act (CESA). In July 2024, the San Francisco Bay-Delta distinct population segment (DPS)of longfin smelt was also listed as endangered under the Federal Endangered Species Act (FESA) (CNDDB 2025).

Marine Bird Community

The marine bird community discussion in the 2012 EIR, Section 4.1.1 (pp. 4.1-8 to 4.1-9) remains relevant for the purpose of this SEIR analysis. However, the populations of some marine bird species in Central San Francisco Bay have actually increased in recent years (Audubon 2018; NPS 2021). In 2023, there were 3,900 Brandt's cormorant (*Phalacrocorax penicillatus*) nests on Alcatraz Island alone, almost double their historic numbers in the area. This upward trend is likely due to changes in prey availability and reproductive success. Since then, nest totals have not matched the 2023 peak, but have remained at healthy levels (GGBA 2024). Other marine birds that have been increasing in number in Central San Francisco Bay include double-crested cormorants (*Phalacrocorax auritus*), western gulls (*Larus occidentalis*), and pigeon guillemots (*Cepphus columba*) (Audubon 2018; Rauzon et al. 2019).

Marine Mammal and Sea Turtle Communities

The discussion of marine mammals and sea turtles presented in the 2012 EIR (pp. 4.1-8 to 4.1-9) remains relevant for the Revised Project, with a few updates on population densities and occurrences. Several species of marine mammals inhabit

the Bay-Delta, using the area for foraging, migration, haul-out or resting areas, and breeding (USACE 2011; Carretta et al. 2022). As presented in the 2012 EIR, the most common species within the Revised Project area include the harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and harbor porpoise (*Phoecena phoecena*). Harbor porpoises (*P. phoecena*) can be found foraging year-round in Central Bay, reoccupying the area after more than a 60-year absence (NMFS 2015; Stern et al. 2017). In 2017, estimates of the San Francisco-Russian River harbor porpoise (*P. phoecena*) stock were between 7,000 and 8,000 individuals (Forney et al. 2020). The northern elephant seal (*Mirounga angustirostris*) has also become a more frequent visitor to the Central and North Bay, with annual numbers increasing and young of the year observed hauling out or stranding on San Francisco Bay beaches (NMFS 2015; Hernández 2019). More recently in warm years, bottlenose dolphins (*Tursiops truncatus*) have been sighted near the Central Bay dredge leases between the Golden Gate and Alcatraz Island. New research suggests that their northern range has expanded into San Francisco Bay (Keener et al. 2023). Southern (California) sea otters (*Enhydra lutris nereis*) and Stellar sea lions (*Eumetopias jubatus*) have also been observed in San Francisco Bay.

The population of gray whales (E*schrichtius robustus*) had increased along the West Coast, peaking at approximately 27,000 individuals in 2016 (NOAA 2025). However, between 2018 and 2023 there was an unusual mortality event that decreased the population by nearly 45 percent (NOAA 2025; SFGATE 2025). This mortality event has been attributed to arctic ecosystem changes and a potential reduction in food (NOAA 2025). In 2024, the West Coast gray whale population appeared to begin recovering (NOAA 2025). During the 2025 northward migration, there has been an unusual increase in gray whale observations within San Francisco Bay compared to 2024, with more than 30 gray whale sightings. In 2024, only six sightings occurred (SFGATE 2025; California Academy of Sciences 2025). It is unknown whether the increase in sightings has been of separate individuals or multiple sightings of the same individual. However, it was reported that up to nine individuals were observed within San Francisco Bay at one time and that some individuals have remained within San Francisco Bay for up to 20 days (SFGATE 2025). These individuals likely entered San Francisco Bay to forage (California Academy of Sciences 2025; SFGATE 2025).

There are seven species of sea turtles globally, six of which are found within U.S. waters (Smithsonian Institution 2023). These six species include, hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and olive ridley (*Lepidochelys olivacea*). No sea turtles are expected to occur in

the Revised Project area, but leatherback sea turtles (*D. coriacea*) have occasionally been observed in Central San Francisco Bay (Appendix G, Biological Resources Supplemental Information).

3.2.2.4 Benthic and Demersal Environment[16]

Soft Substrate

The benthic invertebrate community can be classified into infauna that live within the substrate and epifauna that live on the substrate. At any given site, these communities appear as a patchwork of different species groups that are experiencing and recovering from local disturbances such as sand or current movement. Different invertebrate taxa respond differently to environmental conditions and disturbance; thus, the makeup of the invertebrate community reflects the quality and character of the environment where the groups reside (Chapman et al. 1987; Thompson et al. 2012).

The discussion in the 2012 EIR (pp.4.1-10 to 4.1-12) on soft substrate habitat and taxa remains relevant for the Revised Project. However, since the 2012 EIR was certified, three additional assessments of the benthic infaunal communities in Central Bay and West Delta have been conducted (NewFields 2018b, 2020; AMS 2024). The following discussion compares the findings of those studies with infaunal studies presented in the 2012 EIR. In total, five assessments have been made of the infaunal and epifaunal communities inhabiting Central Bay and West Delta aggregate sand mining leases.

The first study was conducted in 1990 by MEC and Cheney (1990) and provided a high-level evaluation of the infaunal community in the Alcatraz shoal region of Central Bay. In 2009, a broader and more comprehensive evaluation of the benthic communities inhabiting the Central Bay and West Delta sand mining leases was conducted by Applied Marine Sciences (AMS 2009a) to inform the 2012 EIR. The third and fourth assessments were performed by NewFields (2018b, 2020), and the fifth was conducted by AMS (2024), which only focused on the Central Bay. The assessments of the benthic infauna inhabiting the Central Bay mining leases reported a low diversity, low abundance community composed of roughly 100 taxa. These taxa appeared to be heavily influenced by currents, resuspension of clays, silts, and organic matter, and movement of surface sands

[16] The benthic zone is the ecological region that includes the sediment surface and subsurface. The demersal zone is the lowest portion of the water column that is near to and influenced by the seafloor.

(AMS 2009a; NewFields 2018b, 2020). AMS (2009a) examined the regionwide benthic infaunal community which was dominated by worms and amphipods and included nematodes, polychaetes, oligochaetes, and nemerteans. Total animal density was estimated at about 2,000 individuals per square meter, which is similar to other findings in the Alcatraz Shoal region of Central Bay (MEC and Cheney 1990). Other dominant taxa reported by AMS included several native and introduced bivalves (clams) and sea cucumbers (*Leptosynapta* spp.). Central Bay samples identified that dominant taxa could be separated into five sub-groups. One sub-group was characterized by high species diversity with equally abundant amphipod, bivalve, and polychaete species; this community was associated with the coarsest sand and gravel. A second sub-group, with slightly higher species diversity, was dominated by the bivalve, *Nutricola* spp., followed by polychaetes, amphipods, bivalves, and nematodes. The three remaining sub-groups showed extremely low species diversity. Of these three subgroups, two were overwhelmingly dominated by nematodes with a lesser abundance of polychaetes (AMS 2009a). NewFields (2018b) surveyed one Central Bay sand mining lease (Point Knox Shoal) and one control site, and taxonomically identified the animals retained on a 1.0 millimeters (0.04 inches) sorting screen. The AMS (2009a) study analyzed all benthic infaunal organisms collected in each grab. NewFields (2018b) reported that the infaunal community in the Point Knox Shoal lease area in Central Bay and associated control site were similar to the community reported by AMS (2009a), in that it was dominated by worms, amphipods, nemerteans, and the bivalve, *Tellina carpente*r.

In West Delta, the invertebrate benthic community is dominated in abundance and biomass by two invasive clams: *P. amurensis* and *Corbicula fluminea* (NOAA 2007; AMS 2009a; NewFields 2018b). Other key taxa include polychaetes and the small marine crustacean*, Nippoleucon hinumensis* (NOAA 2007). In the studies supporting the 2012 EIR, AMS (2009a) observed an overwhelming dominance by *P. amurensis* in Middle Ground Shoal and West Delta mining leases. NewFields (2018b) reported that *P. amurensis* was the dominant benthic infaunal organism in West Delta Lease 7781. They also reported the occurrence of the polychaete *Marenzelleria viridis*, the amphipod *Gammarus daiberi*, and the marine isopod *Synidotea laticauda*.

As part of the NewFields (2018b) infaunal study, sediment profile imaging (SPI) data was collected to evaluate the infaunal community successional stage. Benthic infaunal communities generally occur as one of three successional stages (Pearson and Rosenberg 1978; Rhoads and Germano 1986). Stage I infaunal organisms are typically opportunistic, tubicolous, surface-dwelling

polychaetes that quickly colonize the seafloor following disturbance. Stage II organisms are typically shallow-dwelling bivalves or tube-dwelling amphipods. Stage II communities are considered transitional communities before reaching Stage III. Stage III communities are the highest successional stage consisting of long-lived, infaunal, deposit-feeding organisms, such as tubeworms and bivalves. NewFields (2018b) characterized both the Central Bay and West Delta sand mining leases as comprising predominantly Stage I infaunal communities, similar to that seen in the 2012 EIR. They attributed this to the high current velocities and unstable sediments. Similar findings were reported by AMS (2009a; 2024) and NewFields (2020).

Hard Substrate

Hard substrate in the Bay-Delta consists of both natural and artificial surfaces. Natural substrates include boulders, rock outcroppings, and low relief rock. Artificial hard substrate includes submerged concrete breakwalls, bulkheads, vessels, pilings, riprap, and pipelines. Pilings, riprap, and pipelines can be found in every region of the Bay-Delta, and are a dominant feature along all Bay-Delta waterfronts. The Central Bay has the largest concentration of natural hard substrate in the Bay-Delta (Greene et al. 2007; NOAA 2007). The western portion of Central Bay between Alcatraz Island and the Golden Gate, contains four submerged rocks or pinnacles: Arch Rock, Harding Rock, Shag Rock, and Blossom Rock. Several of which rise to within 12 meters (40 feet) of the sea surface. However, most of these rock features were flattened to minimize navigation hazards. As a result, each feature is surrounded by rubble and boulder fields. The West Delta mining leases have no known natural or artificial hard benthic substrate in or adjacent to them (NOAA 2007).

As presented in the 2012 EIR p. 4.1-48, the hard substrate areas in Central Bay provide habitat for an assemblage of marine algae and invertebrates. Submerged hard bottom substrate is typically covered by a mixture of turf organisms such as hydroids, bryozoans, tunicates, encrusting sponges, encrusting diatoms, and anemones. At least six species of sponges, seven species of bryozoans, and the hydrozoans, *Ectopleura crocea* and *Garveia franciscana*, are found inhabiting both natural and man-made hard substrates. Commonly observed isopods and amphipods include the surface deposit feeders *Gnorimosphaeroma* sp. and *Synidotea laevidorsalis*, the algae grazers *Ampithoe valida*, *Sphaeroma quoianum*, and *Eogammarus confervicolus*, the carnivores *Hopkinsia plana*, and *Incisocalliope derzhavini*, as well as *Jassa marmorata* and *Stenocthoe laevidorsalis.* Barnacles are also found in subtidal areas on pier pilings, exposed rock outcropping, and debris (NOAA 2007).

Megabenthic Invertebrates and Dungeness Crabs

The discussion of megabenthic invertebrates in the 2012 EIR (pp.4.1-12 to 4.1-13) remains applicable to the Revised Project. Due to the importance of the Bay-Delta to the life history of Dungeness crabs (*Metacarcinus magister*), the discussion of this commercially important species has been updated for the Revised Project.

Dungeness crabs (*M. magister*) are the most commercially important true crab in the Pacific Northwest and California and provide food to numerous other species (Mooi *et al*. 2007). The IEP San Francisco Bay Study conducted monthly crab surveys between 1980 and 2018. More Dungeness crabs (*M. magister*) were found in Central Bay compared to West Delta (IEP 2019). Dungeness crabs (*M. magister*) spawn in the Pacific Ocean in December and January and juveniles utilize San Francisco Bay for nursery habitat (Wild and Tasto 1983). Larvae are carried by currents or ride under the bells of jellyfish into San Francisco Bay and migrate to San Pablo Bay where they reside through the summer (Wickham 1979; Mooi et al. 2007; Baykeeper 2013; ODFW 2022). In the fall, the young crabs follow the deeper channels of the Central Bay back out to the ocean (Baykeeper 2013). Traditionally, adult males (15.9 centimeters [6.3 inches] carapace width) have been harvested off the coast between November and June (Mooi *et al*. 2007).

Demersal Fish Community

The 2012 EIR (pp. 4.1-13 to 4.1-15) described the demersal fish community inhabiting the sand mining lease areas in Central Bay and West Delta from 2000-2007. This analysis remains applicable to the Revised Project. The demersal zone encompasses the area of the water column near the seafloor. The IEP fish data was reassessed for the years 2016-2023 for the same locations described in the 2012 EIR (Appendix G, Biological Resources Supplemental Information). Between 2016 and 2023, over 55 demersal fish taxa were recorded in the Central Bay (Appendix G, Biological Resources Supplemental Information, Table G-4). This community was dominated by the same five species as the 2000-2007 time period described in the 2012 EIR (p. 4.1-13). These taxa continue to account for over 88 percent of total fish abundance. These species include English sole (*Parophrys vetulus*), speckled sanddab (*Citharichthys stigmaeus*), bay goby (*Lepidogobius lepidus*), plainfin midshipman (*P. notatus*), and Pacific staghorn sculpin (*Leptocottus armatus*) (Appendix G, Biological Resources Supplemental Information).

Between 2016 and 2023 the demersal fish community in West Delta exhibited lower species richness than Central Bay (Appendix G, Biological Resources Supplemental Information, Table G-5). Thirty taxa were identified, and the seven most common species were the same as those recorded in the 2000-2007 otter trawls and described in the 2012 EIR (p. 4.1-15). These taxa continue to account for over 90 percent of the total recorded fish abundance. These dominant species include Shokihaze goby (*Tridentiger barbatus*), striped bass (*M. saxatilis*), yellowfin goby (*A. flavimanus*), starry flounder (*P. stellatus*), Pacific staghorn sculpin (*L. armatus*), longfin smelt (*S. thaleichthys*), plainfin midshipman (*P. notatus*), Shimofuri goby (*Tridentiger bifasciatus*), and English sole (*P. vetulus*) (Appendix G, Biological Resources Supplemental Information).

Submerged Aquatic Vegetation

The submerged aquatic vegetation (SAV) habitat discussion in the 2012 EIR, Section 4.1.1 (pp. 4.1-12 to 4.1-13) remains unchanged for the purpose of this SEIR analysis. Revised Project activities will be constrained to areas of the Bay-Delta that are too deep for SAV beds to occur.

3.2.2.5 Special Status Species

Several species that occur in the vicinity of the Revised Project are protected under federal and/or state endangered species laws, under federal and state marine mammal protection regulations, or have been designated as Species of Special Concern by the CDFW. The categorization of special status species presented in Section 4.1.1 (pp. 4.116 to 4.1-24) of the 2012 EIR remains the same for the Revised Project, and the special status species discussed in the 2012 EIR remain largely unchanged. However, since the drafting of the 2012 EIR, several taxa have become special status species that must be considered in the evaluation of the Revised Project (Appendix G, Biological Resources Supplemental Information). Additionally, the populations of most marine mammals inhabiting the Bay-Delta and California Coastal waters have increased in population abundance and occurrence (Appendix G, Biological Resources Supplemental Information). Since 2012, the red abalone (*Haliotis rufescens*) has been listed as a California species of concern but is not expected in the Revised Project area as it is primarily found north of the San Francisco Bay-Delta. Additionally, the sunflower sea star (*Pycnopodia helianthoides*) was FESA proposed -threatened. Longfin smelt (*S. thaleichthys*) have also been listed as threatened under the FESA and white sturgeon (*Acipenser transmontanus*) were listed for consideration of protection under the CESA. Longfin smelt (*S. thaleichthys*) had previously been protected under the CESA and were included

in the 2012 EIR assessment. Changes to special status species listings and populations since the drafting of the 2012 EIR are discussed in the subsections below.

Marine Mammals

All marine mammals within U.S. waters are protected under the Marine Mammal Protection Act, and some species are also protected under the FESA. The special status marine mammals that reside or are commonly observed in the Bay-Delta and have the potential to occur within the Project area were discussed in the 2012 EIR (pp. 4.1-22 to 4.1-23) and in Section 3.2.2.3 (Marine Mammal and Sea Turtle Communities) above.

Fishes

Protected or special status fish species with the greatest potential to occur within the Revised Project area, either seasonally or year-round, and those for which the Revised Project area could provide suitable habitat were discussed in the 2012 EIR, Section 4.1.1 (pp. 4.1-16 to 4.1-20). Since the adoption of the 2012 EIR, longfin smelt (*S. thaleichthys*) was listed as endangered under the FESA. It was previously listed only as threatened under the CESA when evaluated in the 2012 EIR. White sturgeon (*A. transmontanus*) was also listed for consideration of protection under the CESA in July 2024. On September 6, 2024, the California Fish and Game Commission (CFGC) established emergency regulations for white sturgeon sport fishing (Cal. Code Regs. Tit. 14 § 5.78) indicating the agency is concerned about over harvest. On March 25, 2025, CFGC issued a Notice of Proposed Changes in Regulations for white sturgeon sport fishing to make the emergency regulations permanent. While the CFGC regulations are limited to sports fishing and do not implicate the Revised Project, it reflects the attention and concerns CFGC holds for the species. White sturgeon (*Acipenser medirostris*), is an anadromous fish that ranges from the Gulf of Alaska to Baja California, Mexico, but primarily inhabits large coastal rivers and associated estuaries. The white sturgeon in the San Francisco Bay-Delta represent the southernmost spawning population. Between February and June, white sturgeon migrate from the San Francisco Bay-Delta into the Sacramento-San Joaquin rivers and watersheds to spawn and then return to the estuary. Newly hatched juveniles swim for several days within the water column before settling near the bottom in the freshwater regions of the Bay-Delta. Larger juveniles and some adults then migrate back to the Bay-Delta while other adults migrate to the ocean. Juvenile and adult white and green sturgeon inhabit the benthic habitat

of the Bay-Delta, and are known to forage and travel through the Revised Project Area (Appendix G, Biological Resources Supplemental Information).

Marine Birds

Protected or special status bird species that have the greatest potential to occur within the Revised Project area, either seasonally or year-round, and those for which the Revised Project area could provide suitable habitat were discussed in the 2012 EIR, Section 4.1.1(p. 4.1-21). There have been no changes to the status of these taxa since the drafting of the 2012 EIR (Appendix G, Biological Resources Supplemental Information). As mentioned above in Section 3.2.2.3 (Marine Bird Community), some protected and special status marine bird populations in Central Bay have increased.

Sea Turtles

All sea turtles are classified as endangered or threatened (Appendix G, Biological Resources Supplemental Information) under the FESA in all or part of their ranges (Carretta et al. 2022; NOAA 2023b; NOAA 2023c; Sea Turtle Conservancy 2023). Since 2012, loggerhead sea turtles (*C. caretta*) have been divided into nine DPS with four segments listed as threatened and five listed as endangered. Green sea turtles (*C. mydas*) have been divided into 11 DPS, three of which are listed as endangered and eight are listed as threatened (USFWS 2021; NOAA 2023f).

No sea turtles are expected to occur in the Revised Project area, except as presented in Section 3.3.2.3 (Marine Mammal Community and Sea Turtles), above. Leatherback sea turtles (*D. coriacea*) have occasionally been observed in Central San Francisco Bay (Appendix G, Biological Resources Supplemental Information).

Invertebrates

Invertebrates of special concern include abalones (*Haliotis* spp.) and the sunflower sea star (*P. helianthoides*) (Appendix G, Biological Resources Supplemental Information). No abalone species are expected to occur within the Revised Project area. In 2023, NOAA proposed listing the sunflower sea star (*P. helianthoides*) as threatened under the FESA due to sharp declines from outbreaks of Sea Star Wasting Syndrome (NOAA 2023d; NOAA 2023e). Sunflower sea stars (*P. helianthoides*) are not expected at the sand mining sites within the West Delta, but there is a low chance that they could be present at the hard

substrate pinnacles located within some of the Central Bay mining leases (NPS 2020; NOAA 2023d).

3.2.2.6 Critical Habitat

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) designate critical habitat for species that have been listed as threatened or endangered. The discussion of Critical Habitat in the 2012 EIR (p. 4.1-23) remains current for the Revised Project.

Magnuson-Stevens Act Managed Fish Species

The 2012 EIR Section 4.1.1 (pp. 4.1-30, to 4.1-31) described the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requirements for EFH, and the species protected under the MSA in Northern and Central California. These requirements have all been updated since the drafting of the 2012 EIR (PFMC 2024c; PFMC 2024a; PFMC 2024d; PFMC 2024b). Information on MSA managed fish species occurring within the Bay-Delta was presented in the 2012 EIR in Section 4.1.1 (pp. 4.1-4 to 4.1-8, 4.1-13 to 4.1-20 and 4.1-23 to 4.1-28) in conjunction with the discussions on pelagic and demersal fish communities and special status species. Similarly, critical species managed under MSA are discussed in the pelagic and demersal fish community and special status species sections above.

Appendix G (Biological Resources Supplemental Information) presents a detailed list of all fish and invertebrate species managed under MSA and the life stages that may occur in the Bay-Delta. Of key importance to these species is the protection of EFH and Habitat Areas of Particular Concern (HAPC). For the Pacific Coast Groundfish FMP, estuaries, seagrass beds, canopy kelp, rocky reefs, and other "areas of interest" such as seamounts, offshore banks, and canyons are designated as HAPC (PFMC 2024c).

For coastal pelagic fishes, the estuarine and coastal waters from the surface to 1,000 meters (3,281 feet) depth are critical habitat (NOAA 2022). All taxa managed under the Coastal Pelagic Species FMP are found in the coastal waters of the Bay-Delta (Appendix G, Biological Resources Supplemental Information).

The Pacific Coast Salmon FMP (2024d) outlines spatially explicit EFH for Chinook (*O. tshawytscha*), Coho (*Oncorhynchus kisutch*), and Puget Sound pink (*Oncorhynchus gorbuscha*) salmon. The inland spawning habitat is the most essential to these species (all areas designated as HAPC for salmon are inland),

and all three remain present in marine coastal waters. The marine EFH for each species extends from the inland extreme high tide line out to the 200 nautical mile (370 kilometers) Exclusive Economic Zone offshore Washington, Oregon, and California north of Point Conception (PFMC 2024d). The Revised Project area is therefore included within the EFH for these species (Appendix G, Biological Resources Supplemental Information).

Essential fish habitat for highly migratory species includes all marine waters and substrate necessary for spawning, breeding, feeding, or growth to maturity of several shark, tuna, marlin, swordfish, and dorado (mahi-mahi) species (PFMC 2024b, Appendix G, Biological Resources Supplemental Information). These species are rarely reported in the Bay-Delta (Appendix G, Biological Resources Supplemental Information).

Marine and Estuarine Non-Native/Invasive Species

Non-native marine animals and algae inhabiting the Bay-Delta are those that have been inadvertently or intentionally removed from their native region and introduced into California waters. Non-native species can also be referred to as introduced, nonindigenous, alien, or exotic species. Once a non-native species is established in a new geographic location and causes impacts, it is considered an invasive species. The introduction of these species displaces native organisms, restructures ecosystems, disrupts local economies (i.e., fisheries, agriculture, and recreation), and may even pose health threats to humans (CDFW 2022). The Bay-Delta has the highest number of non-native marine and estuarine species globally, with nearly 300 as of 2024. There are 74 non-native crustacean species, 40 non-native mollusk species, 35 non-native fishes, and 32 non-native annelids (Fofonoff et al. 2018; CDFW 2022). The discussion of non-native/invasive species in the 2012 EIR (pp. 4.1-28 to 4.1-29) remains relevant to the evaluation of the Revised Project's effects on marine habitat and species. However, NewFields (2018b) did confirm observations made by AMS (2009a) that the Asian clam (C. fluminea) and overbite clam (P. amurensis) dominated the benthic infaunal community of the West Delta. NewFields (2018b) also reported the presence of the non-native arthropod, G. daiberi, the invasive marine isopod, S. laticauda, and the invasive mysid shrimp, Hyperacanthomysis spp. in the West Delta mining lease.

3.2.2.7 Commercial and Recreational Fishing

The 2012 EIR (pp. 4.1-4 to 4.1-8 and 4.1-13 to 4.1-15) discussed the fish taxa in Central San Francisco Bay and West Delta. Since the drafting of the 2012 EIR,

concerns about potential anthropogenic effects on commercial and recreational fishing have increased. Therefore, for the Revised Project potential effects on species that are either commercially or recreationally fished have also been considered.

Commercial Fishing

The Bay-Delta and waters immediately offshore of San Francisco are utilized for both commercial and recreational fishing. Commercial fishing methods include trolling, trawling, and trapping. Although over 150 species or groups were commercially landed in San Francisco Bay between 2020 and 2024 (CDFW 2025), 25 of these species accounted for 99 percent of the landings by tonnage (Appendix G, Biological Resources Supplemental Information). Those taxa that account for the majority of the total landings between 2020 and 2024 include, Dungeness crab (*M. magister*), market squid (*Doryteuthis opalescens)*, California halibut (*Paralichthys californicus*), Chinook salmon (*O. tshawytscha*), sablefish (*Anoplopoma fimbria*), cabezon (*Scorpaenichthys marmoratus*), Petrale sole (*Eopsetta jordani*), northern anchovy (*E. mordax*), and bocaccio (*Sebastes paucispinis*).

Recreational Fishing

Recreational fishing conducted from rocky shores, sandy beaches, docks, private boats, and commercial party boats, landed over 90 species or groups between 2020 and 2024 in San Francisco Bay (RecFIN 2025; Appendix G, Biological Resources Supplemental Information). However, only 16 of these species accounted for 90 percent of the landings in tonnage. The dominant fish taxa caught by recreational fishers include, California halibut (*P. californicus*), lingcod (*O. elongatus*), striped bass (*M. saxatilis*), jacksmelt (*A. californiensis*), Pacific sanddab (*Citarichthys sordidus*), leopard shark (*Triakis semisfasciata*), bat ray (*Myliobatis californica*), and assorted rockfishes (*Sebastes* spp.) including: brown, blue, yellowtail, canary, vermillion, black, copper, bocaccio, and gopher, (*S. auriculatus, S. mystinus, S. flavidus, S. pinniger, S. miniatus, S. melanops, S. caurinus, S. paucispinis,* and *S. carnatus,* respectively).

3.2.3 Regulatory Setting

Section 4.1.2 of the 2012 EIR (pp. 4.1-29, et seq.) describes the regulatory setting for the analysis of biological resources, including federal, state, and local regulations. The section provided summary information about pertinent federal, state and local regulations as they apply to marine resources. In addition,

updates to the CEQA Guidelines in 2018 clarified the mitigation value of governmental regulations, namely that "[c]ompliance with a regulatory permit or other similar process may be identified as mitigation if compliance would result in implementation of measures that would be reasonably expected, based on substantial evidence in the record, to reduce the significant impact to the specified performance standards." (Tit. 14, Cal. Code of Regs. Section 15126.4(b)). The descriptions provided in the regulatory setting remain otherwise unchanged for the purposes of this SEIR analysis.

3.2.4 Significance Criteria

Consistent with CEQA Guidelines Appendix G in effect at the time of the 2012 EIR publication, Section 4.1.3 of the 2012 EIR (p. 4.1-37) determined that the Project would have a significant impact on biological resources if:

- There is a potential for the Project to "take" any part of the population of a special status species (such as a state or federally endangered species) through direct effects or indirect harm through the disturbance or loss of habitat.
- A net loss occurs in the functional habitat value of a sensitive biological habitat, or any Area of Special Biological Significance.
- There is a potential for the movement or fish migration to be impeded.
- A substantial loss occurs in the population or habitat of any native fishes or vegetation or if there is an overall loss of biological diversity, with substantial defined as any change that could be detected over natural variability.

The 2018 update to the CEQA Guidelines Appendix G environmental checklist clarified that a substantial adverse effect on state as well as federal wetlands would constitute a significant adverse effect. However, the Revised Project is not anticipated to occur within or create an effect upon delineated wetlands. Therefore, the 2018 CEQA Guidelines Appendix G updates do not affect the significance criteria being evaluated in this SEIR. Accordingly, for the purpose of analyzing whether the Revised Project, as substantively similar to the project that was analyzed in the 2012 EIR, would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR with respect to biological resources, the significance criteria considered in the 2012 EIR remain current.

3.2.5 Direct and Indirect Effects

3.2.5.1 2012 Project

The 2012 Final EIR, Section 4.1.4, presented the following impact determinations for Biological Resources:

> **Impact BIO-1**: Potential displacement of special status species - Commercial sand mining in the San Francisco Bay-Delta may result in the direct and indirect physical displacement of special status fish species, including delta smelt, longfin smelt, green sturgeon, Chinook salmon, steelhead trout, and Pacific herring, Fishery Management Plan-managed pelagic fish and groundfish, marine bird species such as California brown pelican, and protected marine mammals, including California gray whale, humpback whale, California sea lion, harbor seal, and harbor porpoise (Less than Significant, Class III).
>
> **Impact BIO-2**: Potential impacts to fish and wildlife species from increased noise - Sand mining activities result in increased noise at the location of the suction drag head on the seafloor that can result in increased disturbance to marine biota, especially fish, including special status fish species (Less than Significant, Class III).
>
> **Impact BIO-3**: Potential sand mining impacts on benthic habitat, infauna, epifauna, and foraging habitat - San Francisco Bay-Delta sand mining results in the temporary disturbance, alteration and loss of soft substrate benthic habitat and associated benthic infauna and epifauna, which could affect foraging habitat for special status fish, marine bird species, such as California brown pelican, and protected marine mammals including California gray whale, humpback whale, California sea lion, harbor seal, and harbor porpoise and affect Bay-Delta food web dynamics (Less than Significant, Class III).
>
> **Impact BIO-4**: Discharge of suspended sediments may potentially release contaminants into waters that affect plankton and wildlife species - The discharge of suspended sediments in the overflow plume during sand mining will increase suspended sediment concentrations (SSC) and potentially release organic and inorganic contaminants into Bay-Delta waters affecting plankton and fish populations including delta smelt, longfin smelt, green sturgeon, Chinook salmon, steelhead trout, Pacific herring, and Fishery Management Plan-managed pelagic fish and groundfish (Less than Significant, Class III).

Impact BIO-5: Disturbance of sediments at the seafloor could result in increased turbidity, SSC, and release of contaminants that potentially impact plankton and wildlife species - Disturbance of sediments at the seafloor during sand mining could result in increased turbidity and suspended sediment concentrations at the seafloor and the potential release of organic and inorganic contaminants to Bay-Delta waters affecting plankton and fish populations including special status fish species such as delta smelt, longfin smelt, green sturgeon, Chinook salmon, steelhead trout, Pacific herring, and Fishery Management Plan-managed pelagic fish and groundfish (Less than Significant, Class III).

Impact BIO-6: Sand mining could result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging - Resettlement of discharged sediments from the barge overflow plume and disturbed sediments at the seafloor during sand mining could potentially result in the smothering, burial, or loss of soft substrate benthic infauna and epifauna, and hard substrate epifauna, and could indirectly reduce fish foraging (Potentially Significant, Class II).

Impact BIO-7: Sand mining will cause entrainment and mortality of common and managed aquatic species - The Project will cause the entrainment and mortality of common and managed juvenile and adult fish, invertebrates, and plankton, including Dungeness crab, Pacific herring, and Fishery Management Plan-managed pelagic fish and groundfish during sand mining (Less than Significant, Class III).

Impact BIO-8: Regular operation of sand mining activities will cause entrainment and mortality of delta and longfin smelt - The Project would result in a significant impact to delta smelt and longfin smelt as a result of entrainment and mortality during sand mining operations impacting delta smelt and longfin smelt thereby exceeding the established significance level criteria thresholds (Significant, Class I).

Impact BIO-9: Green sturgeon, Chinook salmon, and steelhead trout will be impacted during sand mining - The Project will cause the entrainment and mortality of green sturgeon, Chinook salmon and steelhead trout during sand mining (Potentially Significant, Class II).

Impact BIO-10: Potential effects on fish movement and migration - Physical modification of bottom habitat through the removal of sediment

has the potential to affect fish movement or migration (Less than Significant, Class III).

The CSLC adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action. Five mitigation measures related to biological resources were adopted (Appendix F, Table 1):

- **MM BIO-6**. Establish a 100-foot buffer around hard bottom areas within and adjacent to Central Bay mining leases.
- **MM BIO-8a**. Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt.
- **MM BIO-8b**. Applicants shall provide off-site mitigation to compensate for the impacts of the taking that may be unavoidable.
- **MM BIO-9a**. Sand mining halted during peak Chinook salmon migration. *(As noted in Appendix F, although the name of MM BIO 9a remains, the conditions of the ITP were adopted, and a variance was authorized February 18, 2025, which replaced the conditions of MM BIO-9a, and MM BIO 9b entirely with the conditions of the ITP.)*

3.2.5.2 Revised Project

This analysis evaluates any potential significant changes to the physical environment that would result due to implementation of the Revised Project relative to the baseline condition. It compares the impact conclusion to the impact conclusion in the 2012 EIR regarding the same consideration and then determines whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts. For the reasons discussed below, implementation of the Revised Project would not cause any new significant impacts or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

The studies identified in Section 1.2.3 as having been completed since certification of the 2012 EIR provide additional information about physical environmental conditions in the lease areas; however, the information and conclusions they provide are consistent with information presented and conclusions reached in the 2012 EIR. The water quality and benthic infauna studies listed in Section 3.2.2 have been considered in the following analysis but do not change the impact determinations reached in the 2012 EIR regarding biological resources.

Would the Revised Project result in potential displacement of special status species?

Impact BIO-1: Potential displacement of special status species.

Commercial sand mining in the San Francisco Bay-Delta may result in the direct and indirect physical displacement of special status fish species, including delta smelt, longfin smelt, green sturgeon, white sturgeon, Chinook salmon, steelhead trout, and Pacific herring, Fishery Management Plan-managed pelagic fish and groundfish, marine bird species such as California brown pelican, and protected marine mammals, including California gray whale, humpback whale, California sea lion, harbor seal, and harbor porpoise (Less than Significant, Class III).

The Revised Project may have minor direct impacts to the free movement or foraging of special status fish, birds, and marine mammals during active sand extraction activities in the Central Bay and West Delta. However, as described in Section 4.1.4 of the 2012 EIR, the potential effects are expected to be minimal since sand mining in these locations occurs for only a few hours during each sand mining event, physically occupies a small area of the region they are mining in, and during mining, the equipment remains predominantly stationary. For these reasons, the temporary displacement of fishes, marine mammals, and marine birds from active mining areas is considered less than significant. No mitigation is required. Accordingly, the Revised Project, which proposes a continuation of less than significant project activities, with an approximately 14 percent reduction in annual mining extraction volumes compared to those previously authorized by the Commission, would not cause a new significant impact or a substantial increase in the severity of a significant impact on special status species from displacement.

Would the Revised Project result in potential impacts on fish and wildlife from increased noise?

Impact BIO-2: Potential impacts on fish and wildlife species from increased noise.

Sand mining activities under the Revised Project would result in increased noise at the location of the suction drag-head on the seafloor that can result in increased disturbance to marine biota, especially fishes, including special status fish species (Less than Significant, Class III).

Sand mining operations under the Revised Project produce additional noise from the vessels and equipment used to extract sand. As described in Section 4.1.4 of the 2012 EIR, noise generated by sand mining is marginally above ambient levels and only within the range detectable by fishes (and most

likely marine mammals) over a very small area of the Bay-Delta located immediately around the sand mining operation. Noise levels generated by the hydraulic suction dredge are within the sound range that can elicit behavioral responses, such as altered swimming direction and speed, by fishes and marine mammals. However, these elevated sound levels are expected to only occur immediately adjacent to the drag head and below levels that are likely to cause physical damage to sensory receptors or other physiological effects (Hanson Environmental 2004). For these reasons as presented in Section 4.1.4 of the 2012 EIR, impacts from increased noise is considered less than significant. No mitigation is required. Accordingly, the Revised Project, which proposes a continuation of the less than significant project activities with an approximately 14 percent reduction in annual mining extraction volumes and an associated reduced duration of mining activities, would not cause a new significant impact or a substantial increase in the severity of a significant impact due to noise.

Would the Revised Project result in potential impacts on benthic habitat?

Impact BIO-3: Potential sand mining impacts on benthic habitat, infauna, epifauna, and foraging habitat.

Sand mining under the Revised Project results in the temporary disturbance, alteration and loss of soft substrate benthic habitat and associated benthic infauna and epifauna, which could affect foraging habitat for special status fish, marine bird species, such as California brown pelican, and protected marine mammals including California gray whale, humpback whale, California sea lion, harbor seal, and harbor porpoise and affect Bay-Delta food web dynamics (Less than Significant, Class III).

As described in the 2012 EIR, Section 4.1.4, sand mining results in short-term changes in habitat composition and associated marine infauna and epifauna in areas of the Bay-Delta mining leases where sand extraction has just occurred; however, these changes do not appear to last more than a few years and do not appear to result in any detectable changes in infaunal composition or habitat function.

Since 2012, several additional special studies (Appendix E) were conducted assessing potential changes to benthic infaunal communities from aggregate dredging activities (NewFields 2018b, 2020; AMS 2024), and to water quality from dredging operations (NewFields 2018a). The NewFields (2018a) study on potential impairment to water quality from aggregate sand mining concluded that, "… discharges from sand mining operations do not adversely impact the water column with regards to chemical concentrations or toxicity, and that any

physical effects related to plume turbidity are spatially limited and ephemeral in nature." This finding supports the 2012 EIR determination that no impairment of the receiving water's beneficial uses as defined by the California Water Board for the Bay-Delta occurs because of aggregate sand mining as proposed in the Revised Project. The three studies assessing benthic infaunal community changes from aggregate sand mining determined that the lease sites in Central Bay and West Delta that had been recently mined showed no statistically significant impact to the benthic community from sand mining. In both Central Bay and West Delta, sediment grain size was a strong predictor of infaunal abundance, and in the West Delta, salinity also played a role in organism density. An examination of individual sites suggests that any damage to benthic communities would be highly localized, of short duration, or not visible due to the physical nature of the area. Both AMS (2009a) and NewFields (2018b, 2020) indicated that the infaunal communities inhabiting the lease sites were characterized as Type I successional communities and therefore are quick to recover and recolonize following physical disturbance. Benthic recovery of infaunal communities appeared to occur within two years of mining (AMS 2009a). The dynamic nature of the study sites, particularly in Central Bay, due to the strong, tidal currents, have likely led benthic species to recover quickly, but may also naturally prevent the benthic infaunal community from ever reaching a more complex state (NewFields 2018b). A reanalysis of the NewFields (2018b) field data determined that any long-term adverse impacts to the benthic habitat or benthic community, in either composition, metrics, or indices used in the reevaluation, could not be detected. Study sand mining sites in Central Bay and West Delta are located in high energy environments (i.e. strong bottom currents) which lead to the observed primarily sandy sediments, gradation of sediment particle size, low carbon composition, and community composed of predominantly successional Stage 1 benthic taxa. The study further concluded that the studied dredging sites are in a constant state of natural disturbance and benthic recolonization (NewFields 2020). The AMS (2024) study compared data and results from the AMS (2009a) and NewFields (2018b) datasets to assess whether any long-term changes in benthic community composition could be detected in the dredging leases. AMS (2024) concluded that sand mining was not a significant driver of differences in benthic macroinvertebrate community composition or abundance. Finally, aggregate sand mining does not typically occur in the same exact location. Once mining occurs along a designated track, referred to as a "worm track," extraction of sand along that same worm track does not occur again for some time, since the drag head pipe is pre-set for a specific depth. New worm tracks may transit across an existing worm track

but typically do not reenter the same worm track or piece of seafloor recently mined (AMS 2009a).

The findings from all three studies support the findings of the original AMS (2009a) study and the 2012 EIR impact analysis. Substrate and habitat variability, including natural variability, outweigh potential short-term or long-term effects of sand mining on benthic macroinvertebrate communities. The impact of aggregate sand mining on benthic habitat, community and functionality were Less than Significant. The new technical studies reflect data and trends consistent with the findings of the 2012 EIR, but do not provide new information of substantial importance for the purposes of CEQA.

Any increase in turbidity from sand mining is not expected to affect foraging habitat of marine birds, including special status species, in the Bay-Delta. The San Francisco Bay-Delta experiences naturally elevated turbidity levels, and as stated in NewFields (2018a) and in Section 4.2.2.2 (Turbidity and Nutrients), turbidity plumes associated with sand mining are small and of short duration and, as presented above (Section 3.2.2.2), Bay-Delta waters are highly turbid naturally. Additionally, during the current sand mining lease period, populations of special status species, including Brandt's and double crested cormorants, as well as other marine birds have been steadily increasing in Central Bay (Audubon 2018; Rauzon et al. 2019; GGBA 2024).

In summary, the Revised Project activities remain less than significant and propose a 14 percent reduction in annual mining extraction volumes and therefore a reduction of mining activities. Therefore, there would not be any new significant impact or substantial increase in the severity of a significant impact related to mining on benthic habitat, infauna, epifauna, and foraging habitat.

Would the Revised Project result in discharge of suspended sediments that may potentially release contaminants?

Impact BIO-4: Discharge of suspended sediments under the Revised Project may potentially release contaminants into waters that affect plankton and wildlife species.

The discharge of suspended sediments in the overflow plume during sand mining will increase suspended sediment concentrations (SSC) and potentially release organic and inorganic contaminants into Bay-Delta waters affecting plankton and fish populations including delta smelt, longfin smelt, green sturgeon, white sturgeon, Chinook salmon, steelhead trout, Pacific herring, and

Fishery Management Plan-managed pelagic fish and groundfish (Less than Significant, Class III).

As described in the 2012 EIR, Section 4.1.4, sand mining operations under the Revised Project are expected to continue to discharge fine sediment fractions, consisting of clays, silts, and organic material by means of an overflow plume (Hanson 2004). This plume causes increases in the suspended sediment concentration (SSC) of Bay-Delta waters, which typically disperse after three to four hours following the completion of a mining event (Hanson 2004; NewFields 2018a). In addition to increases in SSC from the overflow plume, the release of sediment fines could also result in increased organic and inorganic contaminant loading of Bay-Delta waters, posing increased risk of toxicity exposure to Bay-Delta biota, including plankton, fishes, invertebrates, marine mammals, and marine birds.

As discussed in Impact BIO-3, above, since the 2012 EIR, a water quality monitoring study was conducted of aggregate sand mining discharge plumes at both the Central and West Delta mining lease sites between 2015 and 2016 (NewFields 2018a). Study findings concluded that "Overall, the monitoring results from both [water quality] monitoring surveys demonstrate that discharges from sand mining operations do not adversely impact the water column with regards to chemical concentrations or toxicity, and that any physical effects related to plume turbidity are spatially limited and ephemeral in nature" (NewFields 2018a).

The findings from NewFields (2018a) confirm the original 2012 EIR impact analysis which determined that sand mining operational discharges resulted in minimal, short-term effects on SSC concentrations and potential contaminant levels and that their potential impact on marine biota was Less than Significant (Level III). The new technical studies reflect data and trends consistent with the findings of the 2012 EIR, but do not provide new information of substantial importance for the purposes of CEQA. Accordingly, the Revised Project, which proposes a reduction in mining extraction volumes and therefore a 14 percent reduction of mining activities, would not cause a new significant impact or substantial increase in the severity of a significant impact related to increased contaminant concentrations in Bay-Delta waters such that they would impair marine biota, including special status species.

Would the Revised Project result in sediment disturbance that could result in increased turbidity, SSC, and release of contaminants?

Impact BIO-5: Disturbance of sediments at the seafloor under the Revised Project could result in increased turbidity, SSC, and release of contaminants that potentially impact plankton and wildlife species.

Disturbance of sediments at the seafloor during sand mining could result in increased turbidity and suspended sediment concentrations at the seafloor and the potential release of organic and inorganic contaminants to Bay-Delta waters affecting plankton and fish populations including special status fish species such as delta smelt, longfin smelt, green sturgeon, white sturgeon, Chinook salmon, steelhead trout, Pacific herring, and Fishery Management Plan-managed pelagic fish and groundfish (Less than Significant, Class III).

Sand mining operations under the Revised Project are expected to continue to disturb and resuspend seafloor sediments, consisting of clays, silts, and organic material that are intermixed with the extracted sand in the immediate vicinity of the drag head (Hanson 2004). As discussed in the 2012 EIR, Section 4.1.4, similar levels of SSC and contaminant exposure to marine biota, including special status species, can be expected in the near vicinity of the suction drag head as are experienced in the discharge plume. The findings of NewFields (2018a), discussed in Impact Bio-3 and Bio-4, above, remain equally applicable to the small turbidity plume surrounding the suction drag head with no adverse effect on Bay-Delta water quality and concurrent effects on marine biota, including special status species.

Additionally, as presented in the 2012 EIR, Section 4.1.4, the amount of time demersal fish and other benthic taxa are exposed to increased SSC and potential contaminant concentrations is less than the required exposure times that result in physiological effects to marine taxa. The high energy regime present in the areas of the sand mining leases in the Bay-Delta that cause the natural grading of seafloor sediments will also quickly dissipate any seafloor sediment plumes caused by the suction drag head. Consequently, the potential effect of resuspended sediments around the suction drag head from the Revised Project remains Less Than Significant (Class III). Additionally, the Revised Project, which proposes a continuation of less than significant project activities albeit with a 14 percent reduction in annual mining extraction volumes and therefore a reduction of mining activities, would not cause a new significant impact or substantial increase in the severity of a significant impact related to increased turbidity and contaminant concentrations in Bay-Delta waters near

the suction drag head such that they would impair marine biota, including special status species.

Would the Revised Project result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging?

Impact BIO-6: The Revised Project could result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging.

Resettlement of discharged sediments from the barge overflow plume and disturbed sediments at the seafloor during sand mining could potentially result in the smothering, burial, or loss of soft substrate benthic infauna and epifauna, and hard substrate epifauna, and could indirectly reduce fish foraging (Potentially Significant, Class II).

As presented in the 2012 EIR, Section 4.1.4, the Revised Project has the potential to resuspend fine fraction bottom sediments that naturally resettle on the seafloor by means of the discharge plume. These resettled sediments then have the potential to bury benthic infauna and epifauna down current of the sand mining operation. The resettlement of these fine sediments will occur over a broad region of the seafloor (Hammer et al. 1993; Newell et al. 1998; Nairn et al. 2004). The higher the energy in the water column, the larger the area over which these sediments will be resettled. As noted in the 2012 EIR, the Bay-Delta aggregate sand mining leases are considered very high energy environments. Therefore, the Revised Project, which proposes a 14 percent reduction in mining extraction volumes and therefore a reduction of mining activities, would not cause a new significant impact or substantial increase in the severity of a significant impact related to the smothering or burial of soft substrate infauna and epifauna, as determined in the 2012 EIR and would remain Less than Significant (Class III).

As further discussed in the 2012 EIR, Section 4.1-4, within and adjacent to the Central Bay mining leases are the Bay-Delta's largest amount of natural sub-tidal hard substrate, such as Arch Rock, Harding Rock, Shag Rock, and Blossom Rock (NOAA 2007). Hard substrate and their associated biological communities are considered HAPC by NOAA and important habitat for special status species managed under the MSA. Although smothering of marine biota at hard bottom habitats is not expected, as discussed in the 2012 EIR, the potential for mechanical collision of Project equipment (which also applies to the Revised Project) could result in a potentially significant impact to both the habitat and its associated marine community. Implementation of Mitigation Measure BIO-6 as set forth in the 2012 EIR and as repeated (unchanged) below would continue to

reduce potential impacts to a Potentially Significant level Class II) and not result in any substantial increase in the severity of a significant impact on soft or hard substrate habitats or biota than was disclosed in the 2012 EIR.

> **Mitigation Measure BIO-6: Establish a 100-foot buffer around hard bottom areas within and adjacent to Central Bay mining leases.** Sand mining dredging operations must maintain a sufficient buffer zone around all hard bottom areas, especially Harding, Shag, and Arch rocks, such that dredging equipment does not come into physical contact with these sensitive hard bottom areas. This buffer zone will, at a minimum, be 100 feet from the outward edge of any hard bottom feature. In the event dredging equipment comes into physical contact with any hard bottom area during the term of the leases, it shall be immediately reported to the CSLC, who shall establish a new minimum buffer zone distance.

Would the Revised Project result in entrainment and mortality of common and managed aquatic species?

Impact BIO-7: The Revised Project will cause entrainment and mortality of common and managed aquatic species.

The Revised Project will cause the entrainment and mortality of common and managed juvenile and adult fish, invertebrates, and plankton, including Dungeness crab, Pacific herring, and Fishery Management Plan-managed pelagic fish and groundfish during sand mining (Less than Significant, Class III).

As discussed in the 2012 EIR, Section 4.1.4, sand mining operations under the Revised Project may have minor direct impacts on invertebrate, managed pelagic fish, groundfish, and other taxa that occur in aggregate sand mining leases due to entrainment (AMS 2009b). As assessed in the 2012 EIR, this impact is Less than Significant (Class III). Accordingly, the Revised Project, which proposes a continuation of less than significant project activities albeit with a 14 percent reduction in annual mining extraction volumes and therefore a reduction of mining activities, would not cause a new significant impact or substantial increase in the severity of a significant impact related to entrainment of invertebrate fauna, common fish, and managed pelagic fish and groundfish.

Would the Revised Project result in entrainment and mortality of delta and longfin smelt?

Impact BIO-8: The Revised Project operation of sand mining activities will cause entrainment and mortality of delta and longfin smelt.

The Revised Project would result in a significant impact to delta smelt and longfin smelt as a result of entrainment and mortality during sand mining operations impacting delta smelt and longfin smelt thereby exceeding established significance level criteria thresholds (Significant, Class I).

As presented in the 2012 EIR, sand mining operations as assessed for the 2012 Project were expected to have a significant impact on delta and longfin smelt, as a result of entrainment, either through the water intake for the suction drag head or the suction drag head itself. Entrainment of delta and longfin smelt occurs primarily through the suction drag head water intake. Minimal entrainment, if any, occurs through the drag head itself. However, delta and longfin smelt are expected to exhibit some avoidance behavior of the drag head (AMS 2011). Increased turbidity and suspended sediment from disturbance of the bottom as well as the sound and vibrations produced by the dredge vessel when lowering the intake pipe through the water column should cause individuals to avoid the area (Wildish and Power 1985; Collin and Hart 2015). Additionally, delta smelt inhabit and visually search for food near the surface during daylight hours, while mining occurs in the benthos, further reducing the potential for entrainment (Hobbs et al. 2006; Bennett and Burau 2015). By comparison, longfin smelt are known to migrate throughout the entire water column potentially increasing their susceptibility to entrainment by sand mining activities relative to delta smelt (Bennett et al. 2002; Hobbs et al. 2006).

The water intake for the suction drag head is located several meters above the drag head itself. The conclusion in the 2012 EIR, Section 4.1.4, was based on an entrainment analysis conducted as part of the 2012 EIR (AMS 2009b). The basis of this conclusion was that the water intake for the suction drag head had minimal screening and the intake flow volume and velocity were unconstrained. As a result, the 2012 EIR imposed two mitigation measures to partially mitigate and then provide compensation for estimated delta and longfin smelt mortality due to aggregate sand mining in Central Bay and West Delta. Mitigation Measure BIO-8a from the 2012 EIR imposed timing, location, and other requirements on sand mining in West Delta and Central Bay (MM BIO-8a). Mitigation Measure BIO-8b required Applicants to provide compensation for the

incidental take of delta and longfin smelt that could still be entrained even with the implementation of MM BIO-8a.

In October 2014, as part of the CDFW ITP process, the Applicants agreed to design, construct, and install a positive barrier fish screen (fish screen) as discussed in Section 2.3.2 (Mining Techniques) of this SEIR. The fish screen has a mesh opening of 0.068 inches (1.7 millimeters) to prevent fish entrainment. The screens are also sized to provide an approach velocity of 0.2 feet-per-second to allow early life stages of fish to swim past. The use of this fish screen has substantially reduced the potential for entrainment of longfin and delta smelt during aggregate sand mining in Central Bay and West Delta. The fish screens have been in place since 2015 and are incorporated into the design features of the Revised Project. The fish screen, and other requirements imposed by CDFW's ITP, resulted in CSLC amendments to MMs BIO-8a, -8b, -9a and -9b that occurred after the 2012 EIR certification[17] (see Appendix F).

As a result, the potential for entrainment of delta and longfin smelt by the Revised Project through the water intake for the suction drag head and the drag head itself has been significantly reduced but not eliminated. Longfin smelt could still be entrained through the drag head, as they swim throughout the water column. By comparison, delta smelt remain closer to the surface during daylight hours to feed (Bennett et al. 2002; Hobbs et al. 2006; Bennett and Burau 2015). This distinction between the species makes the potential for delta smelt to become entrained extremely unlikely because, as discussed above, delta smelt typically remain closer to the surface, which is substantially shallower than the

[17] After project approval, an agency has discretion in interpreting how mitigation measures are complied with, within reasonable bounds. As the court explained in Stone v. Board of Supervisors (1988) 205 Cal. App. 3d 927, 935, an agency must interpret the conditions it imposes in "a reasonable manner, consistent with its intent at the time the condition was enacted." The interpretation is "reasonable in the CEQA context only if it imposes no significant new or adverse environmental impacts" (Id.). Here, it was reasonable for the CSLC to interpret that the combination of the Applicants' installing the fish screen and obtaining Incidental Take Permit (ITP) approval as consistent with its intent in imposing MMs BIO-8a and -8b because, to obtain an ITP, an applicant must demonstrate that the proposed taking of a listed species is incidental to an otherwise lawful activity, that the applicant will minimize and mitigate the impacts of the taking, and that the taking will not appreciably reduce the likelihood of the species' survival and recovery for purposes of federal law or, for purposes of state law, that it will not jeopardize the continued existence of the species.

location of the suction drag head water intake and the suction drag head itself. Additionally, the pressure wave created by lowering the suction pipe into the water column, prior to startup, would likely cause temporary dispersion of any longfin or delta smelt in the immediate vicinity of the drag head and drag head intake pipe, with attached fish screen.

However, since longfin smelt inhabit the entire water column of the Bay-Delta, the potential of some individuals being entrained through the suction drag head itself remains. As explained on p. 3.1-3 of this SEIR, "To guide the Commission…in determining whether the Revised Project or an alternative may cause a significant impact on the environment, the preparers of this SEIR have considered the same series of questions that the Commission considered in the 2012 EIR to provide a basis for comparison for determining whether implementation of the Revised Project could result in one or more new significant impacts or a substantial increase in the severity of any significant impacts previously identified in the 2012 EIR." Consistent with the significance criteria identified in Section 4.1.3 of the 2012 EIR, a significant impact on biological resources would result if there is a potential for "take" of any part of the population of a special status species (such as State or federally endangered species) to occur through direct effects or indirect harm through the disturbance or loss of its habitat. Even with the fish screen in place, there remains low potential for take of listed delta or longfin smelt to occur. Take of any individual delta smelt or longfin smelt, if it occurs, would be a significant impact.

The implementation of Mitigation Measure BIO-8 would require Applicants to implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt, including a requirement to obtain incidental take authorization from CDFW. CDFW could not (consistent with CESA) issue an ITP unless the impacts of the authorized take are minimized and fully mitigated, the minimization and mitigation measures are roughly proportional to the impact, adequate funding is provided for implementation and monitoring, and issuance of the permit will not jeopardize the continued existence of the species (Fish and Game Code Section 1081[b], [c]). Examples of the kinds of conditions that CDFW could include in an ITP for the Revised Project are reflected in the ITP for the 2012 Project, which is included in Appendix F.

An ITP for the Revised Project, in combination with other operational measures and the Revised Project design feature to install, operate, and maintain a positive barrier fish screen designed in accordance with NMFS and CDFW intake screen design criteria, would greatly reduce the impact, but not to a less than

significant level. The 2012 EIR Mitigation Measure BIO-8a will continue to be implemented and has been renumbered for the Revised Project in this SEIR to Mitigation Measure BIO-8 and edited appropriately for the Revised Project. Mitigation Measure BIO-8b (identified in the 2012 EIR) has been removed from the SEIR because the ITP identified in Mitigation Measure BIO-8 will include compensatory mitigation, as required, to fully address all impacts to delta and longfin smelt. While the Revised Project's 14 percent reduction in mining extraction volumes and associated reduction of mining activities would reduce the impact, there still remains a potential for take of listed delta or longfin smelt to occur, and therefore the impact remains a Significant Impact (Class I), consistent with the 2012 EIR. For these reasons, the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact on delta and longfin smelt entrainment than was disclosed in the 2012 EIR.

Mitigation Measure BIO-8: Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt.

- Timing of dredging relative to the location of 2 parts per thousand (ppt) salinity (X2). To protect delta and longfin smelt and potentially eggs and larvae from mortality related to entrainment, sand mining activities shall be restricted upstream of the X2 location from December 1 through June 30 each year. The degree and duration of mining restrictions, and the specific locations where mining should be restricted during this sensitive seasonal period will be based on factors including the specific location of X2 relative to mining activities, species presence and relative abundance in the Revised Project area based on sampling data from the nearest survey stations, and the overall status of the species (population trend). Specific seasonal restrictions will be set through consultation with CDFW and would likely be a requirement of any ITP that may be issued for the Revised Project.

- Restrictions imposed in any ITP required for the Revised Project are expected to have comparable effect as current restrictions on sand mining operations, which, as specified in the NMFS Biological Opinion and the USFWS Letter of Concurrence, serve to avoid and minimize take of delta and longfin smelt. These conditions include restrictions on pump priming, limiting the total mining volume, prohibiting mining in areas of shallow water depth and in proximity to shorelines, restricting

mining to the designated lease areas which are away from sensitive habitat, and monitoring and reporting the location of each mining event.

- Applicants will consult with CDFW and obtain ITPs for their activities prior to the commencement of any new mining under any renewed lease issued by CSLC or BCDC for the Revised Project. To further minimize take, the Applicants shall keep the end of the pipe and drag head as close to the bottom as possible, and no more than three feet from the bottom, when priming the pump or clearing the pipe.

- The Applicants shall provide a copy of any final ITP issued by CDFW and any amendment to a final ITP to the CSLC and BCDC within five working days of receipt.

Would the Revised Project impact green sturgeon, white sturgeon, Chinook salmon, and steelhead trout?

Impact BIO-9: The Revised Project could cause the entrainment and mortality of green sturgeon, white sturgeon, Chinook salmon and steelhead trout during sand mining. (Potentially Significant, Class II).

As presented in the 2012 EIR, Sections 4.1.4, sand mining operations under the Revised Project may have the potential to entrain green sturgeon, Chinook salmon, and steelhead trout through the water intake of the suction drag head or the drag head itself. As described above, in addition to the aforementioned sensitive species addressed in the 2012 EIR, the white sturgeon was listed for consideration for protection under the CESA in July 2024. On September 6, 2024, CFGC established emergency regulations for white sturgeon sport fishing (Cal. Code Regs., tit. 14, § 5.78) and, at its August 13-14, 2025 meeting, is scheduled to consider continuing the seasonal restrictions and the catch-and-release fishery. According to CFGC, the proposed regulation amendments are necessary to help ensure the species is protected during the CESA candidacy period. While the life history and movement patterns of white sturgeon in the San Francisco Bay-Delta are similar to those of green sturgeon (Appendix G, Biological Resources Supplemental Information), the white sturgeon's CESA listing as a candidate species is conservatively provided a separate consideration in this SEIR. CDFW has not yet determined what, if any, actions (e.g., the NMFS and USFWS operational procedures) would be needed to address non-sportfishing impacts to the species. As such, the SEIR considers the Revised Project's impact on white sturgeon to be potentially significant, pending any requirements and

restrictions to minimize and avoid any identified take that would be set through consultation and permitting with CDFW for the Revised Project. To address the Revised Project's potential significant impact on white sturgeon, the Revised Project would be required to implement a new Mitigation Measure BIO-9a (as distinct from MM BIO-9a in the 2012 EIR) to reduce the potential impact to white sturgeon to less than significant.

As discussed in the 2012 EIR, implementation of NMFS and USFWS operational procedures would reduce the impacts on green sturgeon and steelhead trout to less than significant. The Revised Project, which proposes a continuation of mining activities including implementation of NMFS and USFWS operational procedures, with an approximately 14 percent reduction in annual mining extraction volumes compared to those previously authorized by the Commission, would not cause a new significant impact or a substantial increase in the severity of a significant impact to green sturgeon or steelhead trout. Consistent with the conclusions in the 2012 EIR, no additional mitigation is required for impacts on green sturgeon or steelhead trout.

The Revised Project includes the operation of a positive barrier fish screen (fish screen) as discussed in Section 2.3.2 (Mining Techniques) of this SEIR. The fish screen has a mesh opening of 0.068 inches (1.7 millimeters) to prevent fish entrainment. The screens are also sized to provide an approach velocity of 0.2 feet-per-second to allow early life stages of fish to swim past, further reducing the potential for entrainment of green sturgeon, white sturgeon, and steelhead trout.

The operation of the fish screen under the Revised Project would similarly reduce the potential entrainment of Chinook salmon. In the 2012 EIR, which did not include operation of a fish screen, the implementation NMFS and USFWS operational procedures was described as potentially less than adequate for preventing the entrainment of Chinook salmon, especially smolts. Consequently, in the 2012 EIR Mitigation Measures BIO-9a and BIO-9b were adopted to reduce the potential for a significant impact on Chinook salmon from sand mining in Central Bay and West Delta. Additionally, the 2012 EIR stated that additional measures may be imposed by CDFW as part of the issuance of an ITP to further ensure that potential significant impacts to Chinook salmon from sand mining were mitigated under the CESA. As discussed in Impact BIO-8, above, a key requirement that CDFW imposed in the issued ITP to the Applicants was the design, construction and use of a fish barrier that met their specifications for intake flow and velocity. As a result of this requirement in the CDFW ITP, MMs

BIO-9a and -9b were amended and the change was adopted by CSLC on February 18, 2015 through the variance process identified in Appendix F.

Similar to the impact conclusions presented in the 2012 EIR, the Revised Project is expected to result in the incidental take of Chinook salmon. However, the amount of potential entrainment of Chinook salmon under the Revised Project is expected to be substantially less than was described in the 2012 EIR due to the operation of the fish screen, and the Revised Project's 14 percent reduction in mining extraction volumes, and the associated reduction in mining activities. To further reduce any remaining potential for take of Chinook salmon to occur, the Revised project would be required to implement revised MM BIO-9b. With the implementation of this MM, the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

Mitigation Measure BIO-9a: Applicants shall minimize the potential for entrainment and mortality of white sturgeon.

- Applicants will consult with CDFW as to whether an ITP is required for their activities prior to the commencement of any new mining under any renewed lease issued by CSLC or BCDC for the Revised Project. If an ITP is required by CDFW, it must be obtained before initiating any new mining under the Revised Project. The Applicants shall provide a copy of the final ITP issued by CDFW and any amendments to that permit to the CSLC and BCDC within five working days of receipt.

Mitigation Measure BIO-9b: Applicants shall implement operational restrictions and requirements for the avoidance and minimization of entrainment of Chinook salmon.

- Current restrictions on sand mining operations, as specified in the NMFS Biological Opinion and the USFWS Letter of Concurrence serve to avoid and minimize take of Chinook salmon. These conditions include restrictions on pump priming, limiting the total mining volume, prohibiting mining in areas of shallow water depth and in proximity to shorelines, restricting mining to the designated lease areas which are away from sensitive habitat, and monitoring and reporting the location of each mining event. Restrictions imposed in the final ITP for the Revised Project are expected to have comparable effect.

- Applicants will consult with CDFW and obtain ITPs for their activities prior to the commencement of any new mining under any renewed lease issued by CSLC or BCDC for the Revised Project. To further minimize take, the Applicants shall keep the end of the pipe and drag head as close to the bottom as possible, and no more than three feet from the bottom, when priming the pump or clearing the pipe.
- The Applicants shall provide a copy of the final ITP issued by CDFW for the Revised Project and any amendments to this permit to the CSLC and BCDC within five working days of receipt.

In addition to the conditions of the final ITP, the following avoidance and minimization measures (developed in consultation with federal and state fish and wildlife agencies) to fully protect and mitigate impacts to juvenile Chinook salmon shall be implemented:

- Operation and maintenance of the positive barrier fish screen on sand mining equipment;
- Implementation of NMFS and USFWS operational restrictions on pump priming and clearing;
- Review and approval by state and federal resource agencies of the mining operations of entrainment and impingement of juvenile salmonids avoidance measures within each agency's authority; and
- Compliance monitoring and reporting to CDFW and other state and federal agencies.

Would the Revised Project effect fish movement and migration?

Impact BIO-10: Potential effects on fish movement and migration.

Physical modification of bottom habitat through the removal of sediment under the Revised Project has the potential to affect fish movement or migration. (Less than Significant, Class III).

As discussed in Section 4.1.4 of the 2012 EIR, the Revised Project may have minor direct effects on the bottom topography of Central Bay and West Delta sand mining leases. These modifications to seafloor topography are expected to have only a minor effect on benthic fish movements and little to no effect on special status fish species movements and migration since these species migrate through mid-depth and surface waters of the Bay-Delta and not along the

seafloor. Accordingly, the Revised Project, which proposes a 14 percent reduction in mining extraction volumes and therefore a reduction of mining activities, would not cause a new significant impact or substantial increase in the severity of a significant impact related to the movements or migratory movements of Bay-Delta fish, as determined in the 2012 EIR.

3.2.6 Cumulative Effects

Impact CE BIO-1: The Revised Project has a low potential to cause a cumulatively considerable contribution to potential significant cumulative effects on biological resources (Less than Significant, Class III).

The 2012 EIR analyzed potential cumulative effects on biological resources in Section 4.1.6 (pp. 4.1-60 and 4.1-61), concluding that the 2012 Project would not result in a considerable contribution to any significant cumulative effect. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As analyzed in Section 3.3.5 of this SEIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact (either directly or indirectly) on biological resources and so would result in the same incremental contribution to potential cumulative effects as was disclosed in the 2012 EIR. The incremental impacts of implementing activities consistent with the San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044 would be substantially similar to the incremental impacts of the RDMMP's predecessor, which was evaluated as part of the cumulative scenario for the 2012 EIR (see 2012 EIR, p. 3-24). As described in Section 3.1.5, recent updates to the USACE Long Term Management Strategy include conducting dredged material disposal in the most environmentally sound manner to include strategic placement of in-bay sediment for beneficial reuse for wetlands restoration in SF and Suisun Bays. The Port of San Francisco remediation and waterfront projects also involve shoreline resilience and wetland restoration. These cumulative projects would not combine with the effects of the Revised Project to result in effects that would be cumulatively considerable. The incremental biological resources impacts of the Revised Project (in combination with the less than significant incremental impacts of the San Francisco Bay Strategic Shallow-Water Placement Pilot Project and the incremental impacts of the Montezuma Wetlands Restoration project and Suisun Marsh fish screen rehabilitation project – each of which would be beneficial over the long-term) would not be cumulatively considerable, and so would be

less than significant. For these reasons, the Revised Project would cause no new significant cumulative impact and no substantial increase in the severity of a significant cumulative impact on biological resources than was disclosed in the 2012 EIR.

3.3 MINERAL RESOURCES

This section identifies and evaluates issues related to mineral resources to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than was disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.3.1 Baseline Conditions

The 2012 Final EIR (p. 1-12) states the following regarding baseline conditions for Mineral Resources:

> The effects of past sand mining on the availability of sand resources are considered part of the baseline condition. The EIR examines the potential for continued sand mining to result in loss of access to other mineral resources, as well as long-term or permanent depletion of sand resources.

As described in Section 1.3.3 of this SEIR, the baseline condition for purposes of this analysis is the level of activity associated with the authorized sand mining lease volumes and the ongoing obligations such as mitigation measures and conditions of approval resulting from the Commission's 2012 EIR and lease authorizations. See Appendices A and F for details.

3.3.2 Environmental Setting

Section 4.2.1 of the 2012 EIR describes the environmental setting and includes a discussion of mineral resources within the 2012 Project area, including sand and construction aggregate. It covers such topics as aggregate availability and replenishment, non-fuel minerals, oyster shell mining, and the overall regional context for the sand mining resources evaluation. Those descriptions remain accurate for the purposes of the SEIR, and have been considered alongside the supplemental information found in the following reports, each of which has become available since publication of the 2012 EIR:

1) *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys* (eTrac Inc., 2018a)
2) *Additional Analysis Report 2008 – 2014 – 2018 Bathymetric Survey Comparison Central San Francisco Bay Lease Area Surveys* (eTrac Inc., 2018b)

3) *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys* (eTrac Inc., 2023)

4) *Sand Mining Impact Analysis: Desktop morphology study; Sediment transport modeling study* (Fenical/Coast and Harbor Engineering, 2025)

5) *Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay* (Anchor QEA, 2023)

6) *Sand Budget and Sand Transport in San Francisco Bay* (McKee et al., 2023)

7) *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast* (Deltares, 2023a, 2023b, 2023c)

   a) *Part 1: Morphodynamic change and bedform dynamics*

   b) *Part 2: Mining volume and area analysis*

   c) *Part 3: Synthesis*

8) *Fingerprinting Sand and Its Transport History through San Francisco Bay: Implications for Sand Mining and Its Environmental Effects* (Malkowski et al. 2023)

3.3.2.1 Regional Context

Section 4.2, Mineral Resources, of the 2012 EIR discussed the historical context of sand mining in San Francisco Bay, describing the millions of cubic yards of sand and gravel that have been mined from Bay-Delta floor shoals since 1915, including approximately 20 million cubic yards of sediment extracted during 1936 through 1938 from the Point Knox Shoal area near Angel Island that was used as fill material to create Treasure Island for the 1939 Golden Gate International Exposition. Sand mining in recent decades has been conducted under mining leases granted by the CSLC and BCDC. Under the latest CSLC mining leases, for the years 2013 through 2022, 1,540,000 cubic yards of sand per year was permitted by CSLC for mining from the Central Bay lease areas and 300,000 cubic yards per year were permitted from the Suisun Bay/Western Delta lease areas (see Table 2-1 in SEIR Section 2.0, Project Description). Up to 199,866 cy annually was permitted for mining from the Middle Ground Shoal lease area.

As discussed in Section 2.0 of this SEIR, the Revised Project proposes a reduction in the maximum allowable annual volume of sand harvested for three of the five CSLC leases and the private Grossi Middle Ground lease. Sand mining volumes for the other two CSLC leases are proposed to remain the same. Impacts of the current annual Commission-authorized lease volumes were analyzed in the 2012

EIR. Total annual volumes of sand mined through all leases, including the private Middle Ground lease, is proposed to be reduced from 2,039,866 cubic yards (cy) to 1,750,000 cy.

Sand Sources and Availability

Regarding the sources of sand available for harvesting and replenishment of the resource in Central Bay, Section 4.2.1 of the 2012 EIR described the sand resource as not being replenished through natural processes. According to the 2012 EIR, the available resource is largely limited to material already in place.

Regarding the sources of sand available for harvesting and replenishment of the resource in Suisun Bay and Western Delta, Section 4.2.1 of the 2012 EIR described the sand resource as not having a clear trend regarding sediment depletion in the sand mining lease areas. The exception was within the deeper areas of the Middle Ground lease, where measurable depletion was described as indicating that the available resource is largely limited to material already in place.

The 2012 EIR's assertion that the available sand resources in Central Bay and Suisun Bay and Western Delta are limited to material already in place is largely supported by the post 2012 studies listed above (described further in Appendix E, Consideration of Post-2012 Technical Studies).

- Both the eTrac Inc. 2018a and eTrac Inc. 2018b reports determined net erosion (more sand left the Bay-Delta than was deposited) between 2014 and 2018, indicating that replenishment of sand resources is not occurring.
- The eTrac Inc. 2023 Change Analysis Report showed a minor average sediment accretion (more sand was deposited in the Bay-Delta than left) between 2019 and 2023. However, the amounts are within the vertical uncertainty[18] of the analysis. Therefore, the data showed no significant change in bathymetry during the study period.
- There is consensus among the remaining post 2012 studies including: Anchor QEA 2023; McKee et al. 2023; Deltares 2023; Malkowski et al. 2023; and CHE 2025. These studies generally identified sand materials available for

[18] Vertical uncertainty is the result of inherent errors and uncertainties in the equipment used to collect the depth values in the bathymetry data. "Vertical" refers to the vertical dimension (as opposed to horizontal dimension) which is the depth of the Bay bed. If the bathymetric change reported was less than the vertical uncertainty, the change was not significantly different from zero.

harvesting within Central Bay as limited to material in place. Among the studies, there was some disagreement as to whether limited sand input was being received from local tributaries. All studies also assumed or determined that no substantial sand transport was occurring between the Central Bay and Suisun Bay. Finally, none of the studies suggested that Central Valley streams were providing substantial input of sand resources.

3.3.3 Regulatory Setting

Section 4.2.2 of the 2012 EIR (p. 4.2-5 et seq.) describes the regulatory setting for the analysis of mineral resources. Laws and regulations summarized include: Section 10 of the Rivers and Harbors Act (33 U.S.C. §401 et seq.) with respect to navigable waters and the U.S. Army Corps of Engineers' jurisdiction over sand mining in the San Francisco Bay and the Bay-Delta System; the California Department of Conservation mineral resources division's authority pursuant to Public Resources Code sections 600-690; the California Surface Mining and Reclamation Act (SMARA) and the regulations adopted by the Surface Mining and Geology Board (SMGB) to implement SMARA for marine sand mining operations in the San Francisco Bay-Delta area (14 Cal. Code Regs. § 3500 et seq.). Relevant plans and policies summarized in Section 4.2.2 of the 2012 EIR include: the San Francisco Bay Plan, the Suisun Marsh Local Protection Program, the Solano County Component of the Suisun Marsh Local Protection Program, and the Solano County General Plan. The 2012 EIR's description of the regulatory setting remains accurate for the purposes of this analysis, with additional consideration of the extraction, development, and permitting authority granted under the McAteer-Petris Act and the Suisun Marsh Preservation Act, as well as certification of federal permits under the Coastal Zone Management Act. Key details are summarized below for ease in reference.

As described in the 2012 EIR, SMGB regulations govern the reclamation of mined lands and conduct of surface mining in accord with SMARA (14 Cal. Code Regs. §3500 et seq.). The SMGB approved reclamation plans and financial assurances for Bay and Delta sand mining operations most recently in its 2023-2024 Annual Report (SMGB, 2024). Upon completion and certification of the SEIR, and issuance of new leases for the subject lease parcels, if approved, the SMGB would require the current reclamation plans and financial assurances to be amended and re-approved, as necessary. See SEIR Section 1.4, Project Permits and Approvals, which lists these approvals as among other discretionary authorizations that may be required for the Revised Project to proceed as proposed.

The 2012 EIR also discussed the San Francisco Bay Plan, which is administered by BCDC. BCDC has permit approval authority over mineral extraction and dredging operations in the waters of San Francisco Bay (including Suisun, San Pablo, Honker, Richardson, San Rafael, San Leandro and Grizzly bays, and the Carquinez Strait). See SEIR Section 1.4, Project Permits and Approvals, which identifies permit approval from BCDC as among the authorizations needed before the Revised Project could be implemented in the lease areas. Under Government Code section 66632(a), a permit is required from BCDC to extract materials exceeding $20 in value from areas within BCDC's jurisdiction. Under Public Resources Code section 66664.4, dredging is defined as "the extraction of sand, mud, or other materials from San Francisco Bay, its tributaries, the delta, or coastal state waters." Other than policies pertaining to dredging and mining of shell deposits, the Bay Plan does not explicitly address mining or mineral resources. The Bay Plan's policies related to projects involving dredging activities in subtidal areas include the following:

1. Any proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms and wildlife; (d) aquatic plants; and (e) the Bay's bathymetry. Projects in subtidal areas should be designed to minimize and, if feasible, avoid any harmful effects.

2. Subtidal areas that are scarce in the Bay or have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eelgrass beds, sandy deep water or underwater pinnacles) should be conserved. Filling, changes in use; and dredging projects in these areas should therefore be allowed only if: (a) there is no feasible alternative; and (b) the project provides substantial public benefits.

3.3.4 Significance Criteria

Consistent with Section 4.2.3 of the 2012 EIR (pp. 4.2-8 and 4.2-9), an adverse impact on mineral resources is considered significant and would require mitigation if the Revised Project would result in:

- The loss of availability of a known mineral resource that would be of value to the region and the residents of the State; or
- The loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other use plan.

These criteria reflect State and local policy that recognizes the importance of mineral resources in meeting society's needs and are intended to ensure the disclosure of a proposed project's potential to preclude mineral extraction, for example by developing a land use over or adjacent to a deposit of mineral resources that was incompatible with or that would preclude mining activities. As such, these criteria are understood and interpreted as primarily concerning the potential loss of access to known mineral resources.

Neither the 2018 updates to the CEQA Guidelines Appendix G environmental checklist nor the Court of Appeal's decision in *San Francisco Baykeeper, Inc. v. State Lands Commission* (2015) 242 Cal.App.4th 202 merits revision of the significance criteria considered in the 2012 EIR. Accordingly, for the purpose of analyzing whether changes in the project that was analyzed in the 2012 EIR would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR with respect to mineral resources, the significance criteria considered in the 2012 EIR remain current.

3.3.5 Direct and Indirect Effects

3.3.5.1 2012 Project

The 2012 Final EIR, Section 4.2.4, presented the following impact determinations for Mineral Resources:

- Impact MIN-1: Loss of availability of a known mineral resource - Renewal of sand mining leases for an additional 10-year period would not result in the loss of availability of a known mineral resource of regional or statewide value (Less than Significant, Class III).
- Impact MIN-2: Loss of availability of a locally important mineral resource recovery site - Renewal of sand mining leases for an additional 10-year period would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other use plan (Less than Significant, Class III).

The CSLC adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action. No mitigation measures related to mineral resources were adopted (Appendix F, Existing Mitigation).

3.3.5.2 Revised Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the Revised Project relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. For the reasons discussed below, implementation of the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact that was disclosed in the 2012 EIR.

Would the Revised Project result in a loss of availability of a known mineral resource that would be of value to the region and the residents of the State?

Impact MIN-1: Renewal of sand mining leases for an additional 10-year period would not result in the loss of availability of a known mineral resource of regional or statewide value (Less than Significant, Class III).

The lease parcels on which the Applicants propose to mine sand are not designated on State or local maps as areas having minerals of State, regional, or local importance; however, the parcels contain construction-grade sand, an important component of construction aggregate needed to meet local development needs. The Revised Project consists of the continued mining of sand, the only known mineral resource within the lease parcels, and therefore would not preclude or cause the loss of access to the sand as a mineral resource.

Oyster shells, which are mined for their mineral content, are the only known mineral resource in the Bay-Delta other than sand and gravel. As disclosed in the 2012 EIR, Section 4.2.4, oyster shell deposits are not located within the sand mining lease areas. Given that the Revised Project lease areas are identical to that in the 2012 EIR, sand mining under the Revised Project would not interfere with mining (and resultant loss of availability) of known oyster shell beds and neither would they preclude the future development of mineral resources other than sand, should such resources be identified within any of the lease areas in the future.

The Applicants propose to continue to conduct the activities within the lease areas described and analyzed in the 2012 EIR. Proposed equipment and methods for the Revised Project will be substantially similar to that analyzed in the 2012 EIR. New 10-year terms from the date of lease issuance are proposed.

This analysis assumes that if the Revised Project were approved, the Commission would authorize continued mining for a period of 10 years. As described in SEIR Section 3.3.2.1, Regional Context, the Revised Project proposes a reduction in the maximum allowable annual volume of sand harvested for three of the five CSLC leases and the Grossi Middle Ground private lease. Authorized volumes for the other two CSLC lease areas are proposed to remain the same. Impacts of the current annual Commission-authorized lease volumes and the annual volumes for the private Grossi Middle Ground lease area were analyzed in the 2012 EIR.

As concluded in the 2012 EIR, 10 years of mining sand from the lease areas in the Central Bay and Delta is expected to reduce the amount of sand that would be available for future mining in most of the lease areas. As disclosed in the 2012 EIR, sand in the Central Bay is not considered a "renewable" resource because sand is not thought to be replenished by sand carried by river and tidal currents to the mining lease areas (2012 EIR, p. 4.2-10; citing CHE 2009). Therefore, sand mined in the Central Bay and Suisun Bay and Western Delta is limited to the material in place. This conclusion was supported by multiple studies conducted post 2012 as described above in Section 3.3.2.1 (see also Appendix E).

It should be noted that the Sand Impact Analysis: Desktop morphology study; Sand transport modeling study (CHE 2025) modeling output shows a lack of available sand in two lease areas in the Central Bay compared with proposed mining volumes under the Revised Project (Table 3.3-1). Specifically, CHE 2025 predicts that PRC 7779.1 West and PRC 7780.1 North, do not appear to contain enough available sand to support proposed mining volumes. However, this is due to modeling of the depth of sand mining at a maximum depth of 90 feet, which does not represent the total amount of sand available. It is also likely a result of the conservative modeling approach used in CHE 2025 which extracted the full 10-year cumulative proposed mining volume at one time, versus gradually over the 10-year lease period. This conservative approach does not account for sand transport which occurs within the Central Bay with material in place and is expected to replenish the mined lease areas with sand from nearby in the Central Bay. As a result of this localized replenishment, it is expected that enough material will be available within the lease areas to support the proposed volumes under the Revised Project. If localized material replenishment does not occur quickly enough, it could result in a need to cease mining operations within a particular authorized lease area until locally replenished.

Table 3.3-1. Approximate Volumes of Material Available in Zones Feasible for Mining[19]

Lease Area	Approximate Volume Available for Mining (CY)	Proposed Mining Volume (CY)
PRC 2036.1	5,392,500	4,500,000
PRC 709.1 East	3,819,800	------
PRC 709.1 North	21,900,600	------
PRC 709.1 South	12,755,200	2,350,000
PRC 7779.1 East	7,297,500	------
PRC 7779.1 North	2,574,700	------
PRC 7779.1 West	5,272,300	5,500,000
PRC 7780.1 North	537,000	1,600,000
PRC 7780.1 South	7,567,700	------
PRC 5871.1	6,706,900	------
Middle Ground	3,948,700	1,200,000
7781.1 Lease Area West	5,471,600	------
7781.1 Lease Area East	59,522,600	2,350,000

Source: Sand Mining Impact Analysis (CHE 2025).

Consistent with the assumptions relied upon and conclusions reached in the 2012 EIR, this SEIR acknowledges that mining of a non-renewable mineral resource can generally be expected to eventually deplete the resource. As discussed in Section 3.3.4 above, the significance criteria used for this section are based on the State's interest in ensuring that important mineral resource deposit areas be available for mineral resource extraction and not be lost to the development of incompatible land uses. The Revised Project, with its purpose being the extraction of mineral resources, is consistent with this goal, and

[19] As stated above, the available sand volume for Leases PRC 779.1 West and 7780.1 North appears to be less than the total volume to be mined as a result of the conservative modeling approach described previously. The available volumes in the table do not account for replenishment from adjacent sand sources.

therefore the Revised Project's impact on known mineral resources is less than significant.

Would the Revised Project result in a loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other use plan?

Impact MIN-2: Renewal of sand mining leases for an additional 10-year period would not result in the loss of availability of a locally important mineral resource recovery site delineated in a local general plan, specific plan, or other use plan (Less than Significant, Class III).

As noted in SEIR Section 3.7.3, the discussion of the regulatory setting in the context of the analysis of impacts on land use and recreation, the applicable land use plans in the Project area consist of the Bay Plan, the Suisun Marsh Protection Program, the Solano County Component of the Local Protection Program, the McAteer-Petris Act, the Suisun Marsh Preservation Act, the Coastal Zone Management Act, and the Solano County General Plan. Sand mining activity pursuant to the leases would be in compliance with all regulations imposed by the applicable statutes and regulations. Only the Solano County General Plan directly addresses mineral resources in the context of natural gas located below the tidal marshes, managed wetlands, sloughs and bays of the Suisun Marsh; none of the plans identify mineral resources within the water areas where sand mining would be conducted. Sand mining proposed by the Revised Project in the Central Bay and Delta, conducted at or near the surface of the Bay floor, would not affect the availability of natural gas. Therefore, impacts associated with the loss of availability of a locally important mineral recovery site as delineated in local plans are less than significant.

3.3.6 Cumulative Effects

Impact CE MIN-1: The Revised Project would not cause a cumulatively considerable contribution to any significant cumulative effect regarding mineral resources (Less than Significant, Class III).

The Final 2012 EIR evaluated potential cumulative effects on mineral resources in Section 4.2.6 (p. 4.2-12), concluding that the 2012 Project would not result in a cumulatively considerable contribution to any significant cumulative effect on mineral resources. For the reasons discussed below, the Revised Project would

cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

The Revised Project would have a less-than-significant impact regarding a loss of availability of a known mineral resource, because the Revised Project would not preclude or prevent developing a mineral resource, or cause a loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other use plan. None of the other projects identified in Table 3.1-2, Cumulative Projects List, in SEIR Section 3.1.5, Cumulative Effects Analysis, would hinder or restrict access to the known mineral deposits in the Bay-Delta. Therefore, any incremental impacts of the other projects on mineral resources could not combine with those of the Revised Project to contribute to any significant cumulative impact on mineral resources. The Revised Project's cumulative effect would be less than significant.

3.4 HYDROLOGY AND WATER QUALITY

This section identifies and evaluates issues related to hydrology and water quality to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than was disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.4.1 Baseline Conditions

The 2012 Final EIR (at pp. 1-12) states the following regarding baseline conditions for Hydrology and Water Quality:

> The effects of past sand mining on Bay and Delta water quality, bathymetry, geomorphology, and hydrodynamics are considered part of the baseline condition. The impact analysis is limited to the consideration of future effects of this kind relative to the level of mining operations that occurred, on average, from 2002 to 2007, as well as the cumulative effects of proposed future mining in combination with past mining.

As described in Section 1.3.3, for purposes of this SEIR, the analytical baseline condition is the fully authorized sand mining lease volumes as approved in leases for the Central San Francisco Bay and Suisun Bay in 2012 and 2013, and reapproved for the Central Bay leases in 2016 (collectively, the *Leases*), and the ongoing obligations imposed by mitigation measures identified in the 2012 EIR as well as conditions of approval of the Leases. See Appendices A and F for details.

3.4.2 Environmental Setting

Section 4.3.1 of the 2012 EIR describes the environmental setting for the Project's consideration of hydrology and water quality including topics such as regional setting and climate, surface water hydrology and drainage (including in the Delta – Sacramento and San Joaquin River Watershed, other major Bay Area watersheds, and regarding ocean water input and tides), estuarine circulation, sediment dynamics (including sediment distribution and transport and the supply of sediment to the Bay-Delta Estuary), bathymetry and morphology of the San Francisco Bay (including the Central Bay, Suisun Bay, and changes in bathymetry), water and sediment quality including pollutant concentrations, salinity, suspended sediments, and sediment contamination. Those descriptions

remain accurate for the purposes of the SEIR analysis, except as supplemented or emphasized below.

3.4.2.1 Sediment Dynamics and Bathymetry

In the period since the 2012 EIR, several additional studies have been conducted to investigate various aspects of sediment transport, including bathymetry, geomorphology, and hydrodynamics. These studies were focused on assessing potential effects of sand mining.

The following monitoring and technical studies have been prepared since certification of the 2012 EIR. In its capacity as lead agency for purposes of CEQA, Commission staff identified the studies listed below as those most likely to inform the Commission's analysis of the Revised Project. The last four studies (numbered 9-12) listed below were commissioned by BCDC and the California State Coastal Conservancy (SCC):

1) Hanson Marine Operations and Lind Marine, Inc. Sand Mining Water Quality Monitoring Program Results Report (Newfields 2018a)
2) *Benthic Assessment of Sand Mining in Central San Francisco and Suisun Bays Data Report (*Newfields 2018b)
3) *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys* (eTrac Inc. 2018a)
4) *Additional Analysis Report 2008 – 2014 – 2018 Bathymetric Survey Comparison Central San Francisco Bay Lease Area Surveys* (eTrac Inc. 2018b)
5) *Technical Memorandum Benthic Assessment of Sand Mining Supplemental Data Evaluation* (Newfields 2020)
6) *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys* (eTrac Inc. 2023)
7) *Sand Mining Impact Analysis: Desktop morphology study; Sediment transport modeling study* (Coast and Harbor Engineering 2025)
8) *Benthic Infauna Data Analysis* (AMS 2025)
9) *Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay* (Anchor QEA 2023)
10) *Sand Budget and Sand Transport in San Francisco Bay* (SFEI and Deltares 2023)

11) *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast* (Deltares 2023a, 2023b, 2023c)

    a) *Part 1: Morphodynamic change and bedform dynamics*

    b) *Part 2: Mining volume and area analysis*

    c) *Part 3: Synthesis*

12) *Fingerprinting sand and its transport history through San Francisco Bay: Implications for sand mining and its environmental effects (Malkowski et al. 2023)*

One additional study not part of the list above, Fregoso et al. (2024), conducted additional bathymetry analysis that is described in the text of this section.

Bathymetry

In the 2012 EIR, Appendix G, bathymetry analyses based on available bathymetric data were used to compare bed topography of the Bay-Delta estuary from different times and to assess the relative trends and changes in volume. This assessment was based upon hydrographic survey data from multiple sources; the data were compiled, processed, filtered, and gridded to produce realistic bottom surfaces from which volume changes could be calculated. In the 2012 EIR, these bathymetric analyses showed that San Francisco Bay bed was net erosional over the period 1942 – 2008 based on these studies: Fregoso et al. (2008); Capiella et al. (1999); Jaffe et al. (1998); and McKee et al. (2002).

Fregoso et al. (2024) conducted similar analyses of bathymetric data over longer time periods than previous studies (e.g., Fregoso et al. 2008). The authors used bathymetric data to create digital elevation models and calculate bathymetric change and sediment volume change over time. The analysis considered four subembayments of San Francisco Bay: Suisun Bay; San Pablo Bay; Central Bay; and South Bay. The authors found that from the 1950s to 1980s, there was a Bay-wide net loss of sediment, i.e., all four subembayments had net loss of sediment. In contrast, from the 1980s to 2010s, only three of the four subembayments had a net loss of sediment; Central Bay had net accretion of sediment and was estimated to have gained 18 million cubic meters ($Mm^{3)}$)of sediment.

Six bathymetry studies conducted after 2012 (eTrac, Inc. 2018a; eTrac, Inc. 2018b; eTrac, Inc. 2023; Deltares 2023a; Deltares 2023b; and Deltares 2023c) are considered in this SEIR (items 3, 4, 6, and 11 in list above and further described in

Appendix E). These studies either (1) analyze bathymetric data to calculate change in San Francisco Bay bed volume over time (eTrac, Inc. 2018a; eTrac, Inc. 2018b; eTrac, Inc. 2023; Deltares 2023b; and Deltares 2023c) or (2) summarize and analyze sand mining volumes over time (Deltares 2023a and Deltares 2023c). Fregoso et al. (2024), conducted additional bathymetry analysis that is included here.

For the first type of analysis (analysis of bathymetric data), additional bathymetry data was collected and analyzed for lease areas within San Francisco Bay (west Central Bay, Suisun Bay, and Middle Ground) to assess changes in bed elevation that would indicate erosion (loss) or accretion (gain) of sediment. These analyses were conducted over various time periods depending on the study and are converted to vertical change per year for comparison purposes. For the bed in lease areas in west Central Bay, analyses by eTrac, Inc. found insignificant net accretion of 0.06 meters (insignificant because less than stated vertical uncertainty of 0.15 meters) over the period 2008 – 2014, or 0.010 meters per year accretion (eTrac, Inc. 2018b) followed by insignificant net erosion of 0.11 meters (insignificant because less than stated vertical uncertainty of 0.15 meters) over the period 2014 – 2018, or 0.028 meters per year erosion (eTrac, Inc. 2018a) and insignificant net accretion of 0.08 meters (insignificant because less than stated vertical uncertainty of 0.13 meters) over the period 2019 – 2023, or 0.020 meters per year accretion (eTrac, Inc. 2023). Over the entire period (2008 – 2023), the net change of the bed in lease areas in west Central Bay was insignificant from zero because the differences in bathymetry between surveys are within the stated vertical uncertainty of the methods and analysis.

For the bed in lease areas of Suisun Bay, analyses by eTrac, Inc. found net erosion of 0.18 meters over the period 2014 – 2018, or 0.045 meters per year erosion (eTrac, Inc. 2018a) and insignificant net accretion of 0.03 meters (insignificant because less than stated vertical uncertainty of 0.15 meters) over the period 2019 – 2023, or 0.008 meters per year accretion (eTrac, Inc. 2023). Over the entire period (2014 – 2023), the net change of the bed in lease areas in Suisun Bay was erosional because the differences in bathymetry between the 2018 and 2014 surveys showed measurable net erosion and the subsequent surveys (2023 compared to 2019) showed an insignificant change in bathymetry (i.e., within the stated vertical uncertainty of the methods and analysis).

For the bed in lease areas of Middle Ground analyses by eTrac, Inc. found net accretion of 0.28 meters over the period 2014 – 2018, or 0.070 meters per year accretion (eTrac, Inc. 2018a) and insignificant net accretion of 0.03 meters

(insignificant because less than stated vertical uncertainty of 0.15 meters) over the period 2019 – 2023, or 0.013 meters per year accretion (eTrac, Inc. 2023). Over the entire period (2014 – 2023), the net change of the bed in lease areas in Middle Ground was accretional.

Detailed bathymetric studies of mining effects were conducted by Deltares (2023b and 2023c). In these studies, a 'ring analysis' was conducted to evaluate changes to the bathymetry in response to mining activity at two spatial scales ranging from the extent of the mining area (an "inner ring") to a ring 100 meters wide immediately surrounding the mining area (an "outer ring"). The analysis was conducted over several time periods that spanned various intensities of sand mining. In west Central Bay, six distinct rings were investigated with the ring analysis method, while in Suisun Bay, one ring was investigated. The location of all seven rings were determined by an independent science panel.

The results of Deltares (2023b) are not directly comparable to the studies described above because the vertical change values presented in Tables 2-4 through 2-9 are for different intervals between bed elevation data sets and for different spatial extents, as discussed below (Deltares 2023b). For the rings in the lease areas in west Central Bay, results from Deltares (2023b) averaged over all six lease areas of interest show net erosion over all time periods, for both inner and outer rings. The results were averaged over all rings to provide comparison to the eTrac results presented above which show bathymetry results averaged over the lease areas; while not identical, the eTrac results for all lease areas are similar to Deltares' results for all inner rings, noting that the Deltares' inner rings cover less of the mining lease area than the eTrac lease area results. Over the period 1997 – 2008, the average of the six inner rings was 0.98 meters erosion (Deltares 2023b). Over the period 2008 – 2014, the average of the six inner rings was 0.18 meters erosion (Deltares 2023b) or 0.03 meters per year erosion (Deltares 2023c). Over the period 2014 – 2018, the average of the six inner rings was 0.57 meters erosion (Deltares 2023b) or 0.16 meters per year erosion (Deltares 2023c). Over the period 2018 – 2019, the average of the six inner rings was 0.41 meters erosion (Deltares 2023b) or 0.25 meters per year erosion (Deltares 2023c). Comparing the average of all inner and outer rings (Table 3.4-1, bottom row), the magnitude of the average mean change was always greater for the inner ring than the outer ring. These studies indicated the presence of local depressions in the bed after mining that, in some cases, infilled over time, indicating transport of sediment into that area of the bed (Deltares 2023c). In other cases, the depression in the lease areas remained over time, indicating lower rate of recovery to the prior bed elevation due to sand transport and net

deposition (Deltares 2023c). Over the period from 2008 to 2019, recovery rates ranged from 14 percent to 141 percent.

Deltares (2023a, 2023b, and 2023c) do not explicitly discuss vertical uncertainty in underlying bathymetry data, but the data sources were the same as for eTrac, Inc. (2018a, 2018b, and 2023). eTrac, Inc. studies (2018a, 2018b, and 2023) state uncertainties of 0.15 meters for 2008 – 2014 and 2014 - 2018 periods and 0.13 meters for 2018 – 2019. Assuming these vertical uncertainties apply to the Deltares analyses, change over the 2008 – 2014 period is insignificant from zero and change during the other two periods exceeds the vertical uncertainty. Thus, the Deltares studies show the change in the mined ring areas studied in west Central Bay was net erosive over the entire period. This is in contrast to the eTrac studies which showed the change across the entirety of each lease areas studied in west Central Bay was not significantly different from zero over the entire period (2014 – 2019).

For the one ring area in Suisun Bay, results of the ring analysis (Deltares 2023b) show net erosion over the entire time period (2014 – 2019). Over the period 2014 – 2018, the inner ring had -1.62 meters erosion (Deltares 2023b) or 0.46 meters per year erosion (Deltares 2023c). Over the period 2018 – 2019, the inner ring had 0.86 meters erosion (Deltares 2023b) or 0.53 meters per year erosion (Deltares 2023c). Comparing inner and outer rings (Table 3-2, Deltares 2023b), the magnitude of the mean vertical change was greater for the inner ring than the outer ring (Table 3.4-1).

Table 3.4-1. Average Vertical Change for Inner and Outer Rings

		Mean vertical change (m) from Deltares (2023b)									
		1997-2008		2008-2014		2014-2018		2018-2019		2008-2019	
Ring	Lease ID	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer
1	2036	-3.16	-2.29	0.03	0.02	-1.08	0.10	-0.41	-0.32	-1.45	-0.19
2	7779 W	-0.66	-0.49	0.18	0.18	-0.60	-0.10	-0.14	-0.29	-0.56	-0.21
3	7779 W	-0.95	-1.31	-0.63	-0.40	-1.15	-0.14	-0.99	-0.39	-2.77	-0.93
4	7780 N	-0.85	-0.87	-0.23	-0.19	-0.62	-0.29	-1.45	-0.67	-2.30	-1.14
5	709 S	0.18	0.92	-0.26	-0.30	-0.35	0.23	0.30	0.08	-0.31	0.00
6	709 S	-0.45	-0.61	-0.17	0.07	0.38	0.16	0.25	0.19	0.46	0.42
Average		**-0.98**	**-0.78**	**-0.18**	**-0.10**	**-0.57**	**-0.01**	**-0.41**	**-0.23**	**-1.16**	**-0.34**

Relating the Deltares and eTrac, Inc. studies presented above for Suisun Bay, both sets of studies show that Suisun Bay was net erosive over the entire period (2014 – 2019).

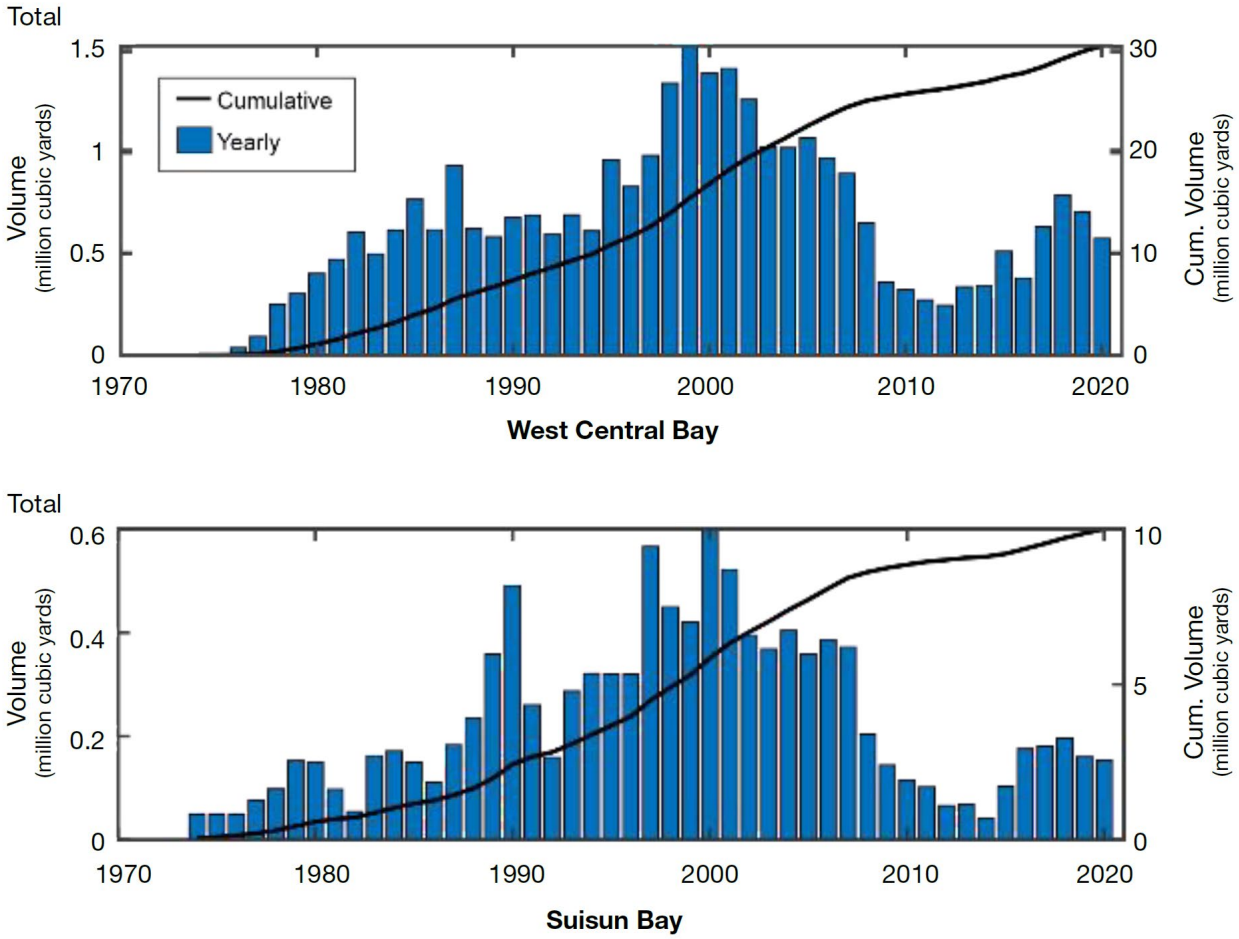
Table 3.4-1. Results from Deltares (2023b) Tables 2-4 through 2-9 for west Central Bay showing average vertical change for each area of interest (Ring) for Inner (extent of mining area) and Outer (100-meter buffer surrounding Inner ring) rings by time period. In this report, it is assumed that the average over all Inner and Outer rings allows for comparison to other studies considered.

In Deltares (2023 b; 2023c), the ring analysis was carried further in west Central Bay by developing "extended buffer rings" around the inner rings described above. The extended buffer rings consisted of ten concentric 100-meter-wide buffer rings surrounding the inner rings, extending a total of 1,000 meters in all directions outward from the mining area. The purpose of this analysis was to investigate the effects of mining further away from the mining areas (Inner rings) than just the 100-meter-wide outer ring immediately adjacent to the inner rings. The results of this analysis showed that mining effects were seen between 200 and 500 meters from the mining area during only one period 1997 – 2008 and for only one of the six rings, the one mined most extensively during this period. For the remaining time periods and rings, no such mining effects were observed beyond 100 meters from the mining areas (inner rings).

For the second type of analysis, Deltares (2023a) summarized sand mining volumes over time for specific lease areas in west Central Bay and Suisun Bay. Table 2-2 and Figure 2-7 in Deltares (2023a) show total annual mining volumes in west Central Bay peak around the year 2000 (shown in Figure 3.4-1, top panel). Table 2-4 and Figure 2-11 in Deltares (2023a) show total annual mining volumes in Suisun Bay peak also around the year 2000 (shown in Figure 3.4-1, bottom panel).

Analysis of the relationship between bed bathymetry and mining volume was conducted in Deltares (2023c). This analysis entailed comparing net change to the bed determined from the ring analysis of bathymetry surveys to mining volumes over time. The study found that during a period of lower mining volume (2008-2014), the bed in west Central Bay was "mostly accretive", while during periods of higher mining volume (1997-2008, 2014-2018, and 2018-2019), the bed was "mostly erosive" (Deltares 2023c). For Suisun Bay, the study found that greater magnitude of mean vertical change with the ring occurred during the period having the largest mining volume extracted, whether considering the total amounts or the annually averaged amounts (Deltares 2023c).

Figure 3.4-1. Yearly and Cumulative Mining Volumes from Mining Lease Areas in West Central Bay and Suisun Bay between 1970 and 2021.



The studies described in this section relate only to physical changes to the bed of San Francisco Bay; for information on potential biological impacts due to these physical changes, see Section 3.2. As a whole, the studies described in this section provide additional information that was not available in 2012; however, the information and conclusions they provide are consistent with information presented and conclusions reached in the 2012 EIR. None of the new studies affects the impact determinations reached in the 2012 EIR for any of the resource areas.

Geomorphology

In addition to the observed changes in the bathymetry discussed above, several studies have also considered the geomorphic processes which may explain the observed bathymetric changes. These geomorphic processes include bay-wide

sand transport, sediment fluxes of sand into the bay, bedform dynamics, and geochemical analysis to identify sand sources.

In the 2012 EIR, the state of the science related to sand transport through San Francisco Bay viewed the system as having sediment connectivity, or the net sediment transport is downstream from the Delta, through one subembayment to the next, somewhat like a "conveyor belt" that transported sand from Central Valley rivers through San Francisco Bay sub-embayments towards the Pacific Ocean. For example, a bedform analysis coupled with numerical modeling suggested net seaward-directed bedload sediment transport from the Bay-Delta estuary (Barnard et al. 2010; Dallas and Barnard 2011).

Three geomorphology studies conducted after 2012 (SFEI, USGS, Deltares 2023; Deltares 2023a; and Malkowski et al. 2023) are considered in this SEIR (items 10, 11, and 12 in list above). These studies either (1) analyze sediment fluxes (SFEI, USGS, Deltares 2023), (2) analyze bedforms (Deltares 2023a), or (3) conduct geochemical analyses (Malkowski et al. 2023).

The first type of analysis based on calculation of sediment fluxes showed that sand inflows to San Francisco Bay are predominantly from the local tributaries adjacent to the estuary (81 percent of total inflow) with the remainder sources from the Pacific Ocean (19 percent). Sand inflow from the Central Valley is estimated to be zero. McKee et al. (2023) state that the bed of the entire Bay appeared to decrease in median grain size over study period (i.e., finer-grained sediments increasing). In terms of Bay-scale outflows, the authors state that San Francisco Bay supplied the Pacific Ocean with 1.7 million tons/year (Mt/y) of total (mud and sand) sediment of which 0.26 Mt/y (15 percent) was sand-size sediments. The authors state that sand mining was the largest loss of sand from Bay (1.17 Mt/y or 66 percent of the total sand outflow) and navigational dredging for navigation at 19 percent. The authors also state that sand mining and navigational dredging accounted for 30 percent and 24 percent, respectively, of the outflows in the total sediment budget. At the sub-embayment scale, the authors found that sand mining accounted for 56 percent of total sand outflow for Suisun Bay and 61 percent of that for Central Bay. The authors found that net sand transport was directed towards the ocean in all sub-embayments except Lower South Bay (which experienced landward net sediment transport) and from the Delta into Suisun Bay, which was estimated as zero net sand flux.

For the second type of analysis based on bedform analysis, bedform dynamics were investigated to infer the relative rates and directions of sand transport at

different locations across west Central Bay, Middle Ground, and Suisun Bay (Deltares 2023a). For these three regions, results showed generally variable sand transport directions over time and space. While sand mining does not appear to affect bedform dynamics, the relative recovery rates of bed elevations in mining depressions does correlate with the level of bedform activity.

The third type of analysis based on geochemical analyses investigates the source of sand deposits in and around San Francisco Bay (Malkowski et al. 2023). The analysis uses detrital zircon geochronology and sand petrography on samples obtained from mining operations and from shallow core samples of the bay's bed. Analysis of 27 samples shows that sand is transported primarily from supply from local watersheds and far exceeds supply from the Central Valley rivers. For Central Bay, results show that sand is likely sourced from the outer coast and was not transported from the Central Valley rivers in the modern period (i.e., previous 200 years). Overall, these results are counter to the prior assumption of sediment connectivity thought to apply for the 2012 EIR. This connectivity hypothesis supposed that sand is currently being continually routed from Central Valley rivers through Suisun Bay, Central Bay and the outer coast. These recent results suggest instead that Suisun Bay and Central Bay have distinct sources from each other and minimal transport from the Central Valley and between them. Sand in the Suisun Bay lease block appears to be sourced from local Coast Range drainages or to perhaps be relic sand input into San Francisco Bay from hydraulic gold mining. Sand in the Central Bay lease blocks is interpreted as a combination of sand eroded from outer coast sources that was transported through the Golden Gate and perhaps relic sand from the Sacramento-San Joaquin Delta that deposited during a period of lower sea level several thousand years ago. Results suggest mining in the lease areas is extracting relic sand from Suisun and Central Bays and that sand transport is localized and not connected throughout the sub-embayments. The authors propose a sand transport model with disconnected (and locally sourced) deposition centers in Suisun, San Pablo, and Central Bays. The revised hypothesis suggests that Suisun and San Pablo Bays receive limited sand supply from the Sacramento-San Joaquin Delta and instead are largely fed from local Coast Range sources. The authors interpret that sand in Central Bay is largely supplied by flood tides and wave-driven littoral transport that convey sand through the Golden Gate and into the Central Bay from the outer coast.

3.4.2.2 Water Quality

Section 4.3.1 of the 2012 EIR (pp. 4.3-2 – 4.3-5, and 4.3-10 – 4.3-15) describes the environmental setting for the Project's consideration water quality (including pollutant concentrations, salinity, suspended sediments, and sediment contamination). Those descriptions remain accurate for the purposes of the SEIR analysis, except as supplemented or emphasized below.

A water quality monitoring study conducted by Newfields (2018a) of aggregate sand mining discharge plumes at both the Central and Suisun Bay mining lease sites between 2015 and 2016 reported that "Overall, the monitoring results from both surveys demonstrate that discharges from sand mining operations do not adversely impact the water column with regards to chemical concentrations or toxicity, and that any physical effects related to plume turbidity are spatially limited and ephemeral in nature" (Newfields 2018a). These findings are consistent with the findings in the 2012 EIR Section 4.1.4, pp. 4.1-44 to 4.1-46.

3.4.3 Regulatory Setting

Section 4.3.2 of the 2012 EIR (p. 4.3-16 et seq.) describes the regulatory setting for the analysis of impacts on hydrology and water quality, including:

- Federal Rivers and Harbors Act and Clean Water Act provisions authorizing regulatory oversight by U.S. Army Corps of Engineers (USACE); and the National Toxics Rule and the California Toxics Rule (CTR), including related authority of U.S. Environmental Protection Agency (U.S. EPA). For example, as explained in the 2012 EIR (p. 4.3-17), the CTR establishes ambient aquatic life criteria for 23 priority toxics, ambient human health criteria for 57 priority toxics, and a compliance schedule provision which authorizes the State to issue schedules of compliance for new or revised National Pollutant Discharge Elimination System (NPDES) permit limits based on the Federal criteria when certain conditions are met. The Coastal Zone Management Act administered by BCDC for San Francisco Bay.

- State laws and regulations including the Porter-Cologne Water Quality Control Act and related oversight by the State Water Resources Control Board (State Board) and regional water quality control board (RWQCBs).

- Regional plans and policies including the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), which designates beneficial uses and water quality objectives; the Bay-Delta Plan; and the State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays,

and Estuaries of California (also known as the State Implementation Policy, SIP). These regional plans and their policies are implemented by the State Board and the San Francisco Bay RWQCB. Regional plans and policies summarized in 2012 EIR Section 4.3.2 also include the San Francisco Bay Plan and related oversight by the Bay Conservation and Development Commission (BCDC) and the CALFED Bay-Delta Program, which was established the California Bay-Delta Authority (CBDA).

- Waste discharge requirements (as issued and in effect for the Project).

These agencies continue to oversee compliance with laws and regulations, plans and policies governing hydrology and water quality that continue in effect. The description of the Regulatory Setting in Section 4.3.2 of the 2012 EIR remains accurate for the purposes of the SEIR's analysis of potential impacts of the Revised Project on hydrology and water quality.

3.4.4 Significance Criteria

Consistent with section 4.3.3 of the 2012 EIR (p. 4.3-23), the Revised Project would have a significant impact on water quality if:

- The water quality objectives promulgated by the SFBRWQCB are exceeded;
- The water quality criteria contained in the California Toxics Rule are exceeded;
- Project operations or discharges change background levels of chemical and physical constituents or elevate turbidity levels such that long-term changes in the receiving environment of the site, area or region occur, or such that beneficial uses of the receiving water are impaired or degraded; or
- Contaminant levels in the water column, sediment, or biota are increased to levels shown to have the potential to cause harm to marine organisms even if the levels do not exceed formal objectives.

Consistent with section 4.3.3 of the 2012 EIR (p. 4.3-23), the Revised Project would have a significant impact on hydrology and geomorphology if:

- It altered the topography of an area in a manner which would result in substantial erosion or sedimentation.

The 2018 updates to the CEQA Guidelines Appendix G environmental checklist made only non-substantive revisions to the hydrology- and water quality-related significance criteria that were in effect when the 2012 EIR was prepared. Therefore, the 2018 CEQA Guidelines Appendix G updates do not affect the significance criteria being evaluated in this SEIR. Accordingly, for the purpose of analyzing whether changes in the project that was analyzed in the 2012 EIR would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR with respect to hydrology or water quality, the significance criteria evaluated in the 2012 remain current.

3.4.5 Direct and Indirect Effects

3.4.5.1 2012 Project

The 2012 Final EIR, Section 4.3.4 presented the following impact determinations for Hydrology and Water Quality:

> Impact HYD-1: Potentially adverse effects on water quality - The overflow plume generated during sand mining operations may impact water quality through localized increases in turbidity and suspended solids, through possible increases in associated nutrients, metals, and organic matter, and localized decreases in dissolved oxygen from oxidation of suspended organic material (Less than Significant, Class III).
>
> Impact HYD-2: Potentially adverse effects on the hydrology and geomorphology of the Bay and Delta - Sand mining could result in pronounced changes to the hydrodynamics (e.g., current speeds), salinity, sediment transport, and/or bottom morphology of the Bay-Delta estuary. Such changes could impact water quality and/or lead to substantial erosion or sedimentation within or beyond the Bay-Delta estuary (Less than Significant, Class III).

The CSLC adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action. No mitigation measures related to hydrology and water quality were adopted (Appendix F).

3.4.5.2 Revised Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the Revised Project relative to the baseline condition, compares that impact conclusion with the

impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. For the reasons discussed below, implementation of the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

As discussed in Section 2.0 of this SEIR, the Revised Project proposes a reduction in the total annual volumes of sand mined through all leases, including the Middle Ground lease, from 2,039,866 cubic yards (cy) to 1,750,000 cy (14 percent decrease).

Water Quality

Would the Revised Project have a significant impact on water quality?

Impact HYD-1: The Revised Project would have potentially adverse effects on water quality.

The overflow plume generated during sand mining operations may impact water quality through localized increases in turbidity and suspended solids, through possible increases in associated nutrients, metals and organic matter, and localized decreases in dissolved oxygen from oxidation of suspended organic material (Less than Significant, Class III).

The 2012 EIR, Section 4.3.4 determined that the impact would be less than significant. Sand mining operations under the Revised Project would be substantially similar to those implemented under the 2012 Project. However, under the Revised Project the total amount of sand permitted for extraction would be reduced compared to the 2012 Project, resulting in a reduction of the total number of overflow plumes. As described above in Section 3.4.2.2 a water quality monitoring study conducted by Newfields (2018a) of aggregate sand mining discharge plumes at both the Central and Suisun Bay mining lease sites between 2015 and 2016 reported that "Overall, the monitoring results from both surveys demonstrate that discharges from sand mining operations do not adversely impact the water column with regards to chemical concentrations or toxicity, and that any physical effects related to plume turbidity are spatially limited and ephemeral in nature" (Newfields 2018a). Because these new technical studies reflect data and trends consistent with the findings of the 2012 EIR, they do not provide new information of substantial importance for purposes of CEQA. For these reasons, the Revised Project would cause no new significant

impact and no substantial increase in the severity of a significant impact relative to the impact discussed in the 2012 EIR for water quality.

Additional Mitigation: None required.

Sediment Transport

Would the Revised Project have a significant impact on the hydrology and geomorphology of the Bay and Delta?

Impact HYD-2: The Revised Project would result in potentially adverse effects on the hydrology and geomorphology of the Bay and Delta.

Sand mining could result in pronounced changes to the hydrodynamics (e.g., current speeds), salinity, sediment transport, and/or bottom morphology of the Bay-Delta estuary. Such changes could impact water quality and/or lead to substantial erosion or sedimentation within or beyond the Bay-Delta estuary (Less than Significant, Class III).

The 2012 EIR, Section 4.3.4 determined that the impact would be less than significant. Sand mining operations under the Revised Project would be substantially similar to those implemented under the 2012 Project. However, under the Revised Project the total amount of sand permitted for extraction would be reduced compared to the 2012 Project. For the reasons described in the following narrative, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact discussed in the 2012 EIR for the hydrology and geomorphology of the Bay and Delta.

Bathymetry and Geomorphology

As described in Section 3.4.2.1, studies of bathymetric change and geomorphic processes were conducted prior to and during the mining lease considered in the 2012 EIR. Bathymetric changes were evident in the mined areas, less discernable in 100-meter rings surrounding seven of the mined areas and not directly discernable more than 100 meters from any of the mined areas. In addition based on multiple studies conducted after the 2012 EIR (Deltares 2023c, Appendix E), no changes were detected further from the mined areas, where decreased sediment supply attributable to mining could deplete sand resources used to support beach conditions or shoreline tidal wetlands.

As described in Section 2.4.2 the Revised Project proposes a reduction in the maximum allowable annual volume of sand harvested for three of the five CSLC

leases and the private lease as compared to the 2012 Project. The 2012 Project CSLC leases authorize a total annual extraction volume of 1,540,000 cy in the Central Bay leases, whereas the Revised Project if approved would authorize a smaller total annual extraction volume in the Central Bay leases of 1,395,000 cy (Table 2-2). Vertical changes in the bed of lease areas were shown to be positively related to the volume of sand mined, where periods of lower mining volumes were associated with smaller vertical changes to the bed. If the Revised Project is removing less sand than during other periods in the past, this will result in smaller vertical changes to the bed in lease areas. More than 100 meters from the lease areas, i.e. beyond the outer ring around each lease areas, the smaller mined volumes for the Revised Project are anticipated to have less than discernable effects, like the 2012 Project was observed to cause.

Since the changes to bathymetry are limited to the mined areas for the 2012 Project, and not significant outside of the mined areas, then bathymetric changes would be less than significant for the Revised Project.

Hydrodynamics and Sediment Transport

Two hydrodynamic modeling studies conducted after 2012 (Anchor QEA 2023 and Coast Harbor Engineering 2025) are considered in this SEIR (items 7 and 9 in list above). These studies conducted modeling of San Francisco Bay tidal hydrodynamics, wind waves, and sediment transport to study the potential effect of sand mining on predicted sediment transport pathways and rates.

In the first modeling study (Anchor QEA 2023), scenarios were developed to replicate two hydrologic conditions: high Delta outflow (June 15, 2018 through November 20, 2019) and low Delta outflow (June 15, 2014 through June 14, 2015. The modeling also considered two starting bathymetric conditions. Modeling scenarios used observed bathymetry representative of existing conditions, including depressions in the bed due to sand mining. For Without Mining scenarios, the model scenarios were modified by adding sand to the bed in the mining areas approximating mined sand volumes for the period from June 15, 2018 to November 20, 2019. This Without Mining bathymetry is meant to represent hypothetical conditions under which mining had not recently occurred. By comparing sand transport sources, pathways, and rates between the model runs, the study assessed the potential effects of sand mining on sand transport for both high-flow and low-flow conditions. Sand sourced from local tributaries remained near creek mouths and was a negligible contribution to sand transport and dispersal throughout the Bay.

Over the annual time scale of the model scenarios, results show that sand transport is not linked between the two areas with mining leases, Suisun Bay and Central Bay. In Suisun Bay, regional sand transport was sensitive to Delta outflow, with transport downstream (toward the ocean) during high outflow and upstream (away from the ocean) during low outflow. The predicted effects of mining in Suisun Bay were limited to decreased downstream sand transport in the vicinity of the mining areas and did not extend outside of Suisun Bay. Central Bay sand transport was more variable across the sand mining lease areas. The predicted transport and deposition mostly occurred in the western portion of Central Bay, in the vicinity of the lease areas. Total sand transport to the Pacific Ocean was predicted to decrease for the Without Mining scenarios as compared to the existing conditions scenarios. However, this decrease only resulted in difference in sand thickness between the existing conditions and Without Mining scenarios of up to 1 centimeter immediately due west of the Golden Gate Strait and less than 0.1 centimeter along Ocean Beach to the south of the Golden Gate Strait (Anchor QEA, Figure 6.2-5 and Figure 6.2-6). The changes attributed to mining were similar in magnitude to the difference between the high-flow and low-flow scenarios.

In the second modeling study (Coast and Harbor Engineering 2025), sediment transport modeling was conducted to evaluate potential impacts of proposed sand mining in the Central Bay and Suisun Bay areas of San Francisco Bay. Impacts of Proposed Mining were evaluated relative to No Proposed Mining. Proposed Mining is defined by the total sand volume proposed to be mined over the next ten years, approximately 17.5 million cubic yards (CY). No Proposed Mining is the existing bed conditions, typically as observed in 2019 bathymetric surveying. Authors assumed instantaneous removal of 10 years of proposed mining as an initial condition to simplify computations, provide a conservative upper bound of the impacts, and show evolution over time. This assumption is considered conservative because the entire ten years of mining was assumed to occur prior to the beginning of the simulations, which in the numerical modeling caused larger changes in hydrodynamics and transport than would occur under the actual proposed mining schedule, which would distribute this mined volume over ten years. In addition, full dynamic coupling between hydrodynamics and bed change was excluded in the modeling, which prolongs the stronger hydrodynamic changes in the modeling that are generated immediately following the deepening of the seabed (ten-year volume all at once). Compared to previous modeling (Anchor QEA 2023), study authors used identical simulation periods but with more grain-size classes and an updated sand transport formulation. The analysis also included an assessment of

the sand volumes available for mining based on bed elevations in the 2019 multibeam hydrographic survey data (eTrac 2019) and constraints imposed by equipment and permit conditions.

Results showed that relative to No Proposed Mining, the Proposed Mining is not likely to cause a significant impact on sediment transport and sand budgets in areas outside the immediate vicinity of the lease areas. For example, predicted changes in areas outside the Golden Gate, such as the San Francisco Bar or Ocean Beach, are minimal (e.g., less than one millimeter, similar to the finding of relative difference in sand thickness outside the Golden Gate Strait in the Anchor QEA (2023) study). These minimal changes are also consistent with the modeling study completed for the 2012 EIR, which predicted the reduction in volume of sand transported through the Golden Gate that may be attributed to mining to be only about 0.2-0.3 percent of the long-term erosion rate of the Bar. Changes in bed elevation caused by the Proposed Mining relative to No Proposed Mining are likely to be limited to the vicinities of the lease areas. Neither of the two modeling studies show any substantial change attributable to sand mining in the Bay just north of the San Francisco shoreline, which is consistent with lack of observed bed elevation changes in the extended buffer ring analysis (Deltares, 2023c).

Based on these modeling results, which predict limited sediment connectivity within San Francisco Bay and from the Bay through the Golden Gate, the Revised Project would not cause significant effects outside of the immediate mining areas.

Additional Mitigation: None required.

3.4.6 Cumulative Effects

CE HYD-1: The Revised Project has a low potential to cause a cumulatively considerable contribution to cumulative effects on water quality (Less than Significant, Class III).

The Final 2012 EIR analyzed potential cumulative effects in Section 4.3.6, [*Cumulative Projects Impact Analysis*] (p. 4.3-36 et. seq.), concluding that the project would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As analyzed in Section 3.4.5 of this SEIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact (either directly or indirectly) and so would result in the same incremental contribution to potential cumulative effects as was disclosed in the 2012 EIR. All of the projects summarized in Table 3.1-2 in Section 3.1.5.3 initially were considered for inclusion in this cumulative analysis; however, some were eliminated because, upon further investigation, they appear not to be associated with impacts that could combine with those of the Revised Project. Examples include the Suisun Marsh fish screen rehabilitation project, which involves attaching a replacement exterior water control structure to an existing fish screen facility. This project would be expected to cause only localized effects and so would be unlikely to cause impacts that could combine with the effects of the Revised Project, and thus is not considered further in this cumulative analysis.

By contrast, other projects summarized in SEIR Section 3.1.5.3 do have potential to cause impacts that could combine with those of the Revised Project involve dredging and potential impacts similar to the Revised Project. They include: the San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044, San Francisco Bay Strategic Shallow-Water Placement Pilot Project, and Montezuma Wetlands Restoration (Phase 2). The incremental impacts of implementing activities consistent with the RDMMP would be substantially similar to the incremental impacts of the RDMMP's predecessor, which was evaluated as part of the cumulative scenario for the 2012 EIR (see 2012 EIR, p. 3-24). The incremental water quality impacts of the Revised Project (in combination with the incremental impacts of the cumulative projects) would not be cumulatively considerable, and so would be less than significant. For these reasons, the Revised Project would cause no new significant cumulative impact and no substantial increase in the severity of a significant cumulative impact on water quality than was disclosed in the 2012 EIR.

CE HYD-2: The Revised Project has a low potential to cause a cumulatively considerable contribution to cumulative effects on hydrology (Less than Significant, Class III).

The Final 2012 EIR analyzed potential cumulative effects on hydrology (specifically sediment transport and coastal morphology) in Section 4.3.6, [Cumulative Projects Impact Analysis] (p. 4.3-38 et. seq.), concluding that the 2012 Project would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the Revised

Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As analyzed in Section 3.4.5 of this SEIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact (either directly or indirectly) on hydrology and so would result in the same incremental contribution to potential cumulative effects as was disclosed in the 2012 EIR. Like the 2012 Project, the Revised Project is expected to further alter the morphology of the seabed in the Lease Areas, with concomitant, though minor and less-than-significant effects on circulation, sediment transport, and water quality. The Revised Project's incremental impacts could combine with the impacts of some of the projects on the cumulative projects list (Table 3.1-2, in Section 3.1.5.3) to cause or contribute to cumulative effects.

Other projects that involve dredging or the placement of dredged materials could cause impacts that combine with those of the Revised Project to cause or contribute to a cumulative impact on hydrology. Such projects include: the San Francisco Bay Strategic Shallow-Water Placement Pilot Project, the Montezuma Wetlands Restoration (Phase 2) project, dredging for navigation, and the Oakland turning basin widening project. Other changes along the San Francsico Waterfront and at Ocean Beach could further contribute to cumulative conditions. Of these, the incremental impacts of implementing activities consistent with the RDMMP would be substantially similar to the incremental impacts of the RDMMP's predecessor, which was evaluated as part of the cumulative scenario for the 2012 EIR (see 2012 EIR, p. 3-24). The 2012 EIR also considered Oakland turning basin widening and various project involving dredging as part of the cumulative impacts analysis, such as the Hamilton Wetlands Restoration Project Dredged Material Aquatic Transfer Facility, San Francisco Water Emergency Transit Authority (WETA) Ferry System Expansion, Trans Bay Cable installation, the long term management strategy (LTMS) for Delta Sediments, and the deepening of existing ship channels as part of the Sacramento River Deep Water Ship Channel and San Francisco Bay to Stockton Navigation Improvement projects (see Table 3-3, p. 3-24 et seq. in the 2012 EIR).

The Revised Project's incremental impact combined with the incremental impacts of the cumulative projects would likely reduce the volume of sediment transported from Central Bay through the Golden Gate annually within a range representing approximately 0.2 – 0.3 percent of the long-term rate of erosion of the Bar. Consistent with the conclusions presented in the 2012 EIR, the CSLC

considers this reduction in sediment transport, and any secondary effects on coastal morphology, to be a less-than-significant impact, and a less-than-cumulatively considerable contribution to a cumulative impact. Accordingly, the Revised Project would cause no new significant cumulative impact and no substantial increase in the severity of a significant cumulative impact on hydrology than was disclosed in the 2012 EIR.

3.5 HAZARDS AND HAZARDOUS MATERIALS

This section identifies and evaluates issues related to hazards and hazardous materials to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.5.1 Baseline Conditions

The 2012 Final EIR (p. 1-12) states the following regarding baseline conditions for Hazards and Hazardous Materials:

> Past sand mining effects that are considered part of the Project baseline condition include any past accidents or upsets associated with mining operations that resulted in the release of, or exposure to, hazardous substances. The EIR considers the potential for new impacts of this kind (see also the discussion of human health risks in Section 4.5, Air Quality).

As described in Section 1.3.3 of this SEIR, the baseline condition for purposes of this analysis is the level of activity associated with the authorized sand mining lease volumes and the ongoing obligations such as mitigation measures and conditions of approval resulting from the Commission's 2012 EIR and lease authorizations. See Appendices A and F for details.

3.5.2 Environmental Setting

Section 4.4.1 of the 2012 EIR describes the environmental setting for the EIR's consideration of hazards and hazardous materials, including topics such as vessel traffic, spill response capability, vessel incidents inside and outside San Francisco Bay, and Bay Area vessel traffic control systems. Vessel transit into, within, and out of the SF Bay, spill response planning and implementation, and occasional incidents and accidents continue generally as described in 2012 EIR Section 4.4.1. Very few major vessel incidents have occurred in San Francisco Bay since 2012. For example, on January 7, 2013, the double-hulled oil tanker *Overseas Reymar* allided with the San Francisco Bay Bridge, resulting in damage to the tanker but no oil spill. Since 2012, no hazards or hazardous materials-related vessel incidents have involved sandmining vessels. The U.S. Coast Guard (USCG) continues to implement a Traffic Separation Scheme, including

regulated navigation areas (RNAs), and manage vessel traffic in San Francisco Bay as described in the 2012 EIR. The description of the Environmental Setting in Section 4.4.1 of the 2012 EIR remains accurate for the purposes of the SEIR's analysis of potential impacts of the Revised Project on hazards and hazardous materials.

3.5.3 Regulatory Setting

Section 4.4.2 of the 2012 EIR (p. 4.4-3 et seq.) describes the regulatory setting for the analysis of hazards and hazardous materials. It describes federal and state laws and regulations as well as regional plans and policies that govern marine vessels and spills, hazardous materials and hazardous waste transportation and clean up, hazardous materials management plans, and worker safety. It also describes jurisdiction exercised by a variety of federal, state, and regional regulatory agencies, such as the USCG, U.S. Environmental Protection Agency (U.S. EPA), National Oceanic and Atmospheric Administration (NOAA), U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), San Francisco Bay Conservation and Development Commission (BCDC), Department of Toxic Substances Control (DTSC), and California Division of Occupational Safety and Health (Cal/OSHA). These agencies continue to oversee compliance with laws and regulations, plans and policies governing hazards and hazardous materials-related considerations, which continue in effect. The description of the regulatory setting in Section 4.4.2 of the 2012 EIR remains accurate for purposes of the SEIR's analysis of potential impacts of the Revised Project on hazards and hazardous materials. Consistent with the 2012 EIR (p. 4.4-3), This analysis relies on the same definition of "hazardous material" that was relied upon in the 2012 EIR, i.e., a material that "because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment" (Health and Safety Code §25501(n)).

3.5.4 Significance Criteria

Consistent with the significance criteria identified in Section 4.4.3 of the 2012 EIR (pp. 4.4-9 and 4.4-10), the Revised Project would have a significant adverse impact on hazards and hazardous materials if:

- Current or future operations are not consistent with Federal, State, or local regulations

- Any facility or operation, existing or proposed, does not conform to its contingency plans or other hazard or risk-related plans that are in effect

Also as indicted in Section 4.4.3 of the 2012 EIR, the Revised Project would have a significant adverse impact on hazards and hazardous materials relating to the adequacy of emergency response capabilities or resulting in potential injury or death if:

- The potential exists for fires, explosions, releases of flammable or toxic materials, or any other accidents that could cause injury or death to members of the public

- Existing and proposed emergency response capabilities are not adequate to mitigate emergency conditions the project has the potential to cause

The 2018 updates to the CEQA Guidelines Appendix G environmental checklist did not materially revise the significance criteria for hazards and hazardous materials that were in effect at the time the 2012 EIR was prepared. Therefore, the 2018 CEQA Guidelines Appendix G updates do not affect the significance criteria being evaluated in this SEIR. Accordingly, for the purpose of analyzing whether changes in the project that was analyzed in the 2012 EIR would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR with respect to hazards and hazardous materials, the significance criteria considered in the 2012 EIR remain current.

3.5.5 Direct and Indirect Effects

3.5.5.1 2012 Project

The 2012 Final EIR, Section 4.4.4 presented the following impact determinations for Hazards and Hazardous Materials:

- Impact HAZ-1: Potential for accidental leak or spill of hazardous materials - The proposed Project includes the routine use of hazardous materials that could create a significant hazard to the public or environment if accidentally spilled or released (Potentially Significant, Class II).

The CSLC adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action. One mitigation measure related to hazards and hazardous materials was adopted (Appendix F, Existing 2012 Project Mitigation as Amended):

- MM HAZ-1– Provide a California Non-tank Vessel Contingency Plan (CANTVCP) to the CSLC.

On May 21, 2014, the Commission approved a variance to MM HAZ-1 to allow the Applicant to maintain a current certificate of financial responsibility (COFR) in lieu of a CANTVCP for Lease PRC 7781.1 in Suisun Bay/Western Delta. MM HAZ-1, as amended by the approved variance, remains in effect.

3.5.5.2 Revised Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the Revised Project relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. For the reasons discussed below, implementation of the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

The studies identified in Section 1.2.3 as having been completed since certification of the 2012 EIR provide additional information about physical environmental conditions in the lease areas; however, the information and conclusions they provide are consistent with information presented and conclusions reached in the 2012 EIR and none of the new studies affects the impact determinations reached in the 2012 EIR regarding hazards and hazardous materials.

Would the Revised Project result in potential for accidental leaks or spills of hazardous materials?

Impact HAZ-1: The Revised Project includes the routine use of hazardous materials that could create a significant hazard to the public or environment if accidentally spilled or released. (Potentially Significant, Class II).

The same sand mining barges and tugboats currently used by the Applicants would be used to conduct sand mining operations under the Revised Project. Similar to the 2012 Project analyzed in Section 4.4.4 of the 2012 EIR, the Revised Project includes the routine use of hazardous materials that could result in a hazard to the public or the environment if accidentally spilled or released. The operation of barges with dredging equipment and tugboats involves the routine

use of fuel, oil, coolants, lubricants, and other hazardous materials. The inventories of potentially hazardous materials included in the 2012 EIR (2012 EIR Table 4.4-2) are substantially similar to the types and quantities that would be in use under the Revised Project.

Implementation of MM HAZ-1 as set forth in the 2012 EIR and as repeated below (and amended by the previously authorized variance) would reduce potential impacts to a less-than-significant level. Accordingly, the Revised Project, as substantially a continuation of the Project described in the 2012 EIR, would not cause a new significant impact or a substantial increase in the severity of a significant impact resulting from the potential spill or release of hazardous materials than was disclosed in the 2012 EIR.

> **MM. HAZ-1. Provide a California Non-tank Vessel Contingency Plan/ Certificate of Financial Responsibility**. ~~Jerico~~ The Applicant shall, within three (3) months of certification of this Supplemental Environmental Impact Report, provide to the CSLC a California Non-tank Vessel Contingency Plan (CANTVCP), reviewed and approved by the California Department of Fish and ~~Game~~ Wildlife Office of Oil Spill Prevention and Response, demonstrating that adequate measures are in place to prevent and respond to accidental releases of hydraulic fluids, solvents, oils, and residual fluids. Documentation and maintenance of a current Certificate of Financial Responsibility (COFR) and Spill Contingency Plan shall be provided to CSLC for vessels deemed exempt from submitting a CANTVCP~~/oil spill contingency plan~~.

Rationale for Mitigation

The CANTVCP or COFR with spill contingency plan requirement is designed to mitigate the risk of accidental spills and control discharge of hazardous materials under normal operating conditions. Complying with this regulatory requirement and implementing the best management practices specified in the CANTVCP and Vessel General Permit (or comparable COFR with spill contingency plan) would ensure that oils and other hazardous materials are properly managed and would minimize the potential for accidental releases to occur, which reduced the impact to less-than-significant levels.[20]

[20] The U.S. EPA requires all commercial vessels of 79 feet or more in length to secure a Vessel General Permit (VGP) for oil and other pollutant discharges incidental to normal operation, under the CWA's National Pollution Discharge Elimination System (NPDES). The VGP is a set of requirements including Best

Would the Revised Project result in a significant adverse impact on hazards and hazardous materials relating to the adequacy of emergency response capabilities or resulting in potential injury or death?

Impact HAZ-2: Potential for hazard-related injury or death. The Revised Project could create a significant hazard to the public or environment resulting in injury or death due to risk of fire, explosion, release of flammable or toxic materials, or other accidents and if emergency response capabilities were inadequate. (Less than Significant, Class III).

As disclosed in Section 1.1.5 of the 2012 EIR (p. 1-9) and in Section 4.0 of the 2012 EIR (p. 4-2), the 2012 Project would not cause a significant adverse impact directly or indirectly due to an increased demand on emergency response providers including fire or police. The Revised Project would use the same sand mining barges and tugboats currently used by the Applicants to extract less material each year over the new lease term relative to the maximum annual and total volumes evaluated under the 2012 EIR for the prior lease term and would mine smaller volumes within the lease areas originally analyzed. For these reasons, the Revised Project would not cause any increase in the baseline level of risk of fire, explosion, release of flammable or toxic materials, or any other accident that could cause injury or death to members of the public. For the same reasons, the Revised Project also would not increase the baseline demand on emergency response capabilities. The Revised Project, like the 2012 Project, would not cause a significant adverse impact on hazards or hazardous materials. Accordingly, the Revised Project, as substantially a continuation of the Project described in the 2012 EIR, would not cause a new significant impact or a substantial increase in the severity of previously identified significant impact on hazards or hazardous materials disclosed in the 2012 EIR.

Management Practices (BMPs) that addresses 28 types of vessel discharges for the purpose of minimizing their impact on surrounding waters. Compliance with the VGP includes requirements for material storage, environmental controls, routine vessel inspections, corrective actions, and recordkeeping.

3.5.6 Cumulative Effects

Impact CE HAZ-1: The Revised Project has potential to cause a cumulatively considerable contribution to potential significant cumulative effects on hazards and hazardous materials (Potential Significant, Class II).

The 2012 EIR analyzed potential cumulative effects on hazards and hazardous materials in Section 4.4.6 (p. 4.4-12), concluding that the 2012 Project could result in a potentially significant cumulative impact related to the improper use or spill of hazardous materials, but that the impact would not be cumulatively considerable if identified mitigation (2012 EIR MM HAZ-1) was implemented. The same is true of the Revised Project: For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As discussed in Section 3.5.5 of this SEIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact (either directly or indirectly) and so would result in the same incremental contribution to potential cumulative effects on hazards and hazardous materials as was disclosed in the 2012 EIR. The incremental impacts of implementing activities consistent with the San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044 would be substantially similar to the incremental impacts of the RDMMP's predecessor, which was evaluated as part of the cumulative scenario for the 2012 EIR (see 2012 EIR, p. 3-24). The incremental hazards and hazardous materials-related impacts of the Revised Project (in combination with the less than significant incremental impact of the San Francisco Bay Strategic Shallow-Water Placement Pilot Project and the incremental impacts of the Montezuma Wetlands Restoration and Suisun Marsh fish screen rehabilitation project) could be cumulatively considerable; however, the Revised Project's incremental contribution would be reduced sufficiently by the implementation of MM HAZ-1 to ensure that it would not be cumulatively considerable. Accordingly, consistent with the conclusions reached in the 2012 EIR, the Revised Project would have a less than significant cumulative effect, and so would cause no new significant cumulative impact and no substantial increase in the severity of a significant cumulative impact than was disclosed in the 2012 EIR.

3.6 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This section identifies and evaluates issues related to air quality and greenhouse gas (GHG) emissions to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than were disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.6.1 Baseline Conditions

The 2012 Final EIR (p. 1-12) states the following regarding baseline conditions for air quality:

> The annual level of emissions of criteria air pollutants and toxic air contaminants from mining operations occurring, on average, between 2002 and 2007 is considered the baseline for the air quality analysis… the potential for increased human health risk associated with 10 additional years of exposure to toxic air contaminants and increased global warming effects associated with 10 more years of greenhouse gas (GHG) emissions.

As described in Section 1.3.3 of this SEIR, the baseline condition for purposes of this analysis is the level of activity associated with the authorized sand mining lease volumes and the ongoing obligations such as mitigation measures and conditions of approval resulting from the Commission's 2012 EIR and lease authorizations. See Appendices A and F for details.

3.6.2 Environmental Setting

Section 4.5.1 of the 2012 EIR describes the environmental setting for the 2012 Project's consideration of air quality and GHG emissions, including the topics of climate and meteorology, existing air quality, and sensitive receptors. Those descriptions remain accurate for the purposes of this SEIR analysis, except as supplemented below to provide updated existing air quality data for the San Francisco Bay Area Air Basin (Basin).

3.6.2.1 Existing Air Quality

The Bay Area Air Quality Management District (BAAQMD) operates a regional air quality monitoring network that regularly measures the concentrations of criteria air pollutants. The 2012 EIR presented air quality measurement data for the years 2006 through 2008. Since the preparation of the 2012 EIR, the BAAQMD has released new air quality measurement data. Table 3.6-1 presents recent air quality data for ozone, nitrogen dioxide (NO_2), and particulate matter 10 microns and 2.5 microns or less in diameter (PM_{10} and $PM_{2.5}$, respectively) for the Basin. BAAQMD no longer posts carbon monoxide data because carbon monoxide emissions are no longer a concern in the Basin with respect to achieving the ambient air quality standards.

The measured concentrations presented in Table 3.6-1 are compared to California Ambient Air Quality Standards (CAAQS) and/or National Ambient Air Quality Standards (NAAQS). The data are similar to those presented in the 2012 EIR for years 2006 through 2008. The ozone, PM_{10}, and $PM_{2.5}$ standards were exceeded multiple times during the period from 2021 through 2023 whereas the NO_2 standards were not exceeded.

3.6.3 Regulatory Setting

Section 4.5.2 of the 2012 EIR (p. 4.5-5 et seq.) describes the regulatory setting for the analysis of air quality and GHG emissions. It includes summary information about criteria air pollutants, toxic air contaminants (TACs), GHG emissions and climate change, federal regulations, state regulations, and the local regulatory setting. The descriptions provided in the regulatory setting remain accurate for the purposes of this analysis, except as supplemented below to provide updated information about NAAQS, California's GHG emissions inventory, State regulations, and local regulations.

3.6.3.1 Criteria Air Pollutants

Since the preparation of the 2012 EIR, the emissions concentrations of two NAAQS have been reduced. Table 3.6-2 presents the updated NAAQS for 8-hour ozone and annual $PM_{2.5}$.

Table 3.6-1. San Francisco Bay Area Ambient Air Quality Summary (2021 – 2023)

Pollutant	Standard	Monitoring Data by Year		
		2021	2022	2023
Ozone				
Highest 1-Hour Average (ppm)		0.113	0.122	0.091
Days over State Standard	0.09	5	4	0
Highest 8-Hour Average (ppm)[a]		0.086	0.080	0.079
Days over National Standard	0.070	10	5	4
Days over State Standard	0.070	10	6	4
Nitrogen Dioxide (NO_2)				
Highest 1-Hour Average (ppm)		0.050	0.051	0.119
Days over State Standard	0.18	0	0	0
Days over National Standard	0.10	0	0	9
Annual Average (ppm)	0.030[b]	0.012	0.013	0.012
Particulate Matter (PM_{10})				
Highest 24-Hour Average (µg/m^3)[a]		45.1	44.5	54.8
Estimated Days over State Standard[c]	50	0	n0	7
Estimated Days over National Standard[c]	150	0	0	0
State Annual Average (µg/m^3)[a]	20	20.1	21.3	18.4
Particulate Matter ($PM_{2.5}$)				
Highest 24-Hour Average (µg/m^3) [a]		45.0	37.3	49.0
Estimated Days over National Standard	35	2	3	3
Annual Average (µg/m^3) [a]	12 [b]	13	13	11

Notes: ppm = parts per million; µg/m^3 = micrograms per cubic meter

a. Averages represent State statistics, which are compiled differently than national statistics and, as a result, may differ slightly.

b. State standard.

c. Measurements of PM_{10} are usually collected every 6 days; "estimated days" mathematically estimates how many days concentrations would have been greater than the level of the standard had each day been monitored.

Source: CARB 2025a

Table 3.6-2. National Criteria Air Pollutant Standards

Pollutant	Averaging Time	National Standard
Ozone	8 Hour	0.070 ppm
Fine Particulate Matter ($PM_{2.5}$)	Annual	9.0 µg/m^3

Notes: ppm = parts per million; µg/m3 = micrograms per cubic meter
Source: CARB 2024a

3.6.3.2 Greenhouse Gas Emissions and Climate Change

The California Air Resources Board (CARB) estimated that in 2022, California produced 371 million metric tons of carbon dioxide equivalent (CO_2e) emissions (CARB 2024b). This amount is approximately 2 percent less than the amount reported for 2021 (the previous year), and 22 percent less than the amount reported for 2008 (the year of emissions that were reported in the 2012 EIR). CARB found that the transportation sector was the primary source responsible for generating 38 percent of the State's GHG emissions in 2022, followed by industrial sources at 20 percent, electricity generation at 16 percent, and commercial and residential at 11 percent. Harbor craft and port activities are identified as among the transportation sector sources included in GHG emissions inventory for 2022 (CARB 2024c).

3.6.3.3 State Regulations

Ocean-Going Vessels at Berth Regulation

The purpose of the *2020 At-Berth Regulation* is to increase reductions in emissions from ocean-going vessels while they are docked at California ports. The original Ocean-Going Vessel At-Berth Regulation was approved in December 2007 with compliance requirements that began in 2014. The 2007 At-Berth Regulation affects the following three vessel categories: container ships, passenger ships, and refrigerated-cargo ships at six California ports, including Oakland and San Francisco. Compliance requirements for vessels include visit requirements and emission or power reduction requirements, both of which were phased in over time to the current 80 percent reduction requirement.

CARB's State Implementation Plan, Assembly Bill 617 (Garcia, 2017), California Climate Change Scoping Plan, Mobile Source Strategy, and California Sustainable Freight Action Plan (Executive Order B-32-15) include commitments to evaluate the existing 2007 At-Berth Regulation for opportunities to further reduce emissions from vessels. These actions included the development of the

new 2020 At-Berth Regulation to achieve further emission reductions by including smaller fleets, additional vessel types (such as roll-on/roll-off vehicle carriers and tankers), and additional operations. The new regulatory efforts were designed to achieve public health improvements near port communities, reduce exposure to toxic air emissions in disadvantaged communities, and meet emission reduction goals for oxides of nitrogen (NOx).

The U.S. Environmental Protection Agency (USEPA) granted CARB's authorization request for the 2020 At-Berth Regulation with its authorization published in the Federal Register on October 20, 2023. Each vessel visit to a regulated California port or marine terminal must use a CARB Approved Emission Control Strategy to control emissions for the duration of the visit, unless the visit qualifies for an exception or an alternative compliance option is used (CARB 2025b).

Commercial Harbor Craft

Since the original adoption of the Commercial Harbor Craft Regulation in 2008, and its amendment in 2010, commercial harbor craft vessel owners have replaced older engines with newer and cleaner engines, which reduced the emissions of air pollutants including diesel particulate matter (DPM), $PM_{2.5}$, NOx, sulfur oxides (SOx), reactive organic gases (ROG), and GHG emissions. In 2022, a new set of amendments were adopted to expand the applicability of the regulation to more vessel types and require cleaner upgrades and newer technology. The 2022 Amendments were designed to provide significant health benefits, avoid premature death and mortality, and protect workers and on-vessel passengers from exposure to diesel and other combustion-generated air pollutants. The 2022 Amendments went into effect on January 1, 2023.

On January 6, 2025, USEPA granted California Clean Air Authorization of most elements of its Commercial Harbor Craft Regulation.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05 (see 2012 EIR p. 4.5-10). Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs the state government to do the following (Office of the Governor 2015):

- Incorporate climate change impacts into the state's 5-Year Infrastructure Plan.
- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change.
- Factor climate change into state agencies' planning and investment decisions.
- Implement measures under existing agency and departmental authority to reduce GHG emissions.

Executive Order B-30-15 required CARB to update the AB 32 Climate Change Scoping Plan discussed in the 2012 EIR (see p.4.5-12) to incorporate the 2030 target. On September 8, 2016, Governor Brown signed Senate Bill 32 (SB 32), which codified the 2030 reduction target (i.e., 40 percent below 1990 levels) called for in Executive Order B-30-15. CARB's 2017 Scoping Plan update (discussed below) addresses the 2030 target (Office of the Governor 2015).

2017 Scoping Plan Update

CARB approved the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017. The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 million metric tons CO_2e, and that further commitments will need to be made to achieve an additional reduction of 50 million metric tons CO_2e beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the cap-and-trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit and 2050 goal set forth by Executive Order B-30-15 (CARB 2017).

Assembly Bill 1279 (California Climate Crisis Act)

Signed into law in September of 2022, Assembly Bill 1279 (Muratsuchi) requires the state to achieve two things by 2045 or sooner: 1) net zero GHG emissions; and 2) a reduction in statewide anthropogenic GHG emissions of 85 percent below 1990 levels. Assembly Bill 1279 requires CARB to ensure that the 2022 Scoping Plan, described further below, identifies and recommends measures to

achieve carbon neutrality, and to identify and implement policies and strategies for CO_2 removal and carbon capture, utilization, and storage technologies.

2022 Scoping Plan for Achieving Carbon Neutrality

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan), adopted by CARB in December 2022, expands on prior Scoping Plans and responds to Assembly Bill 1279 by outlining a technologically feasible, cost-effective, and equity-focused path to achieve the state's climate target of reducing anthropogenic emissions to 85 percent below 1990 levels and achieving carbon neutrality by 2045 or earlier. The actions and outcomes in the plan are designed to achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon (CARB 2022).

3.6.3.4 Local Regulations

The Revised Project lease areas are located within the jurisdiction of the BAAQMD, the local agency responsible for preparing, adopting, and implementing stationary and area air emissions control measures and standards. Specifically, BAAQMD conducts monitoring, evaluation, and education programs; implements control measures to reduce emissions from stationary sources; issues permits to operate for stationary sources and inspects emissions sources; and enforces air quality regulations. Updates to BAAQMD's clean air plan and CEQA guidelines and thresholds of significance that have occurred since the 2012 EIR are described below.

BAAQMD 2017 Clean Air Plan

The 2017 Clean Air Plan: Spare the Air, Cool the Climate (2017 Clean Air Plan) was adopted on April 19, 2017, by the BAAQMD in cooperation with the Metropolitan Transportation Commission, the San Francisco Bay Conservation and Development Commission (BCDC), and the Association of Bay Area Governments to provide a regional strategy to improve air quality within the Basin and meet public health goals. The control strategy described in the 2017 Clean Air Plan includes a wide range of control measures designed to reduce emissions and lower ambient concentrations of harmful pollutants, safeguard public health by reducing exposure to air pollutants that pose the greatest health risk and reduce GHG emissions to protect the climate.

The 2017 Clean Air Plan addresses four categories of pollutants including ground-level ozone and its key precursors: ROG and NOx; PM, primarily $PM_{2.5}$ and precursors to secondary $PM_{2.5}$; air toxics; and GHG emissions. The control measures are categorized based on the economic sector framework including stationary sources, transportation, energy, buildings, agriculture, natural and working lands, waste management, and water (BAAQMD 2017). The following transportation sector control measures are applicable to ocean-going vessels or commercial harbor craft:

- TR20: Ocean Going Vessels. Replicate the Green Ship Program that has been implemented at the ports of Los Angeles and Long Beach. Financial incentives for cleaner Tier 2 and Tier 3 oceangoing vessels to call at the ports serve as the basis of the Green Ship Program. Measure TR20 also recognizes the need to monitor progress under such programs and augment them as necessary to ensure sufficient results.
- TR21: Commercial Harbor Craft. Focus on assisting fleets to achieve early compliance with the CARB harbor craft air toxic control measure and supporting research efforts to develop and deploy more efficient engines and cleaner, renewable fuels for harbor craft.

BAAQMD CEQA Guidelines and Thresholds of Significance

The BAAQMD updated and adopted its CEQA Guidelines in April 2023 (BAAQMD 2023). The update, referred to as the 2022 CEQA Guidelines, was adopted to provide recommended quantitative significance thresholds along with directions on recommended analysis methods. BAAQMD states that the quantitative significance thresholds are "advisory and should be followed by local governments at their own discretion," and that lead agencies are fully within their authority to develop their own thresholds of significance. However, BAAQMD offers the thresholds for lead agencies' use in evaluating CEQA impacts of projects in the Basin.

The annual air quality operational significance thresholds included in the BAAQMD's 2022 CEQA Guidelines for ROG, NOx, and $PM_{2.5}$ are 10 tons per year and are less than the annual significance thresholds of 15 tons per year included in the BAAQMD's 1999 CEQA Guidelines for ROG and NOx, which were used in the evaluation of air quality impacts in the 2012 EIR (the BAAQMD 1999 CEQA Guidelines do not include significance thresholds for $PM_{2.5}$). The BAAQMD significance threshold for PM_{10} has not changed since the 1999 guidelines.

If using the BAAQMD 2022 CEQA Guidelines, the Revised Project would have a significant air quality impact if it would expose persons to substantial levels of TACs, such that the probability of contracting cancer exceeds 10 in one million, or if it would expose persons to pollutants such that a chronic Hazard Index of 1.0 would be exceeded. In addition, a significant impact would occur under the BAAQMD 2022 CEQA Guidelines if the Revised Project would result in an incremental increase in annual average concentrations of $PM_{2.5}$ of more than 0.3 microgram per cubic meter ($\mu g/m^3$) at a sensitive receptor location (BAAQMD 2023).

For all relevant purposes, the air quality significance thresholds identified in the 2022 CEQA Guidelines are the same as the significance thresholds adopted by BAAQMD in 2010 and discussed in the 2012 EIR.[21] Therefore, for purposes of providing a comparative analysis that allows the Commission to determine whether the Revised Project would cause a new significant impact or a more substantial significant impact than was disclosed in the 2012 EIR, the analysis in this SEIR relies on BAAQMD's 1999 CEQA Guidelines; BAAQMD's 2022 thresholds are discussed in Section 3.6.5 relative to the direct and indirect effects analysis for informational purposes only.

In response to SB 32 and 2017 Scoping Plan Update targets for 2030 and Assembly Bill 1279 targets for carbon neutrality no later than 2045, the 2023 update to the BAAQMD 2022 CEQA Guidelines include CEQA significance thresholds for GHGs emissions; however, the updated thresholds address land use projects such as residential and commercial developments and are therefore not applicable to the Revised Project.

3.6.4 Significance Criteria

Consistent with Section 4.5.3 of the 2012 EIR (p. 4.5-15), the Revised Project could have a significant adverse impact on air quality if it would:

- Conflict with or obstruct implementation of an applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable of any criteria pollutant for which the Project region is non-attainment under an applicable Federal or State

[21] The main difference between the significance thresholds is that the BAAQMD 2022 CEQA Guidelines includes clarifications for assessment of proposed sensitive receptors, which is not applicable to the Revised Project.

ambient air quality standard (including releasing emissions which exceed quantitative thresholds of ozone precursors); or

- Create objectionable odors affecting a substantial number of people.

Consistent with Section 4.5.3 of the 2012 EIR (p. 4.5-15), an adverse impact on human health from exposure to toxic air contaminants is considered significant and would require mitigation if the Revised Project would:

- Expose sensitive receptors to substantial pollutant concentrations;
- Expose people to an increase risk of cancer of 10 new cases per million exposed individuals; or
- Result in an acute or chronic non-cancer Hazard Index greater than 1.0.

Consistent with Section 4.5.3 of the 2012 EIR (pp. 4.5-15 and 4.5-16), the Revised Project would be considered to have a significant impact on climate change if it were to:

- Result in any GHG emissions above the baseline level, where the baseline level is included in the State's inventory of GHG emissions; or
- Result in any GHG emissions not included in the State's inventory of GHG emissions; or
- Conflict with any applicable plan, policy or program intended to reduce GHG emissions adopted by the State pursuant to AB 32.

The 2018 update to the CEQA guidelines Appendix G environmental checklist for air quality included only non-substantive revisions to air quality and GHG emissions-related significance criteria. Therefore, the 2018 CEQA Guidelines Appendix G updates do not affect the significance criteria being evaluated in this SEIR. Accordingly, for the purpose of analyzing whether changes in the project that was analyzed in the 2012 EIR would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR with respect to air quality and GHG emissions, the significance criteria considered in the 2012 EIR remain current.

3.6.5 Direct and Indirect Effects

3.6.5.1 2012 Project

The 2012 EIR, Section 4.5.4, presented the following impact determinations for air quality and GHG emissions:

- Impact AIR-1: Emissions of criteria pollutants – Sand mining activities would result in emissions of criteria air pollutants that may conflict with or obstruct implementation of an applicable air quality plan or may violate an air quality standard or contribute significantly to an existing violation (Less than Significant, Class III).
- Impact AIR-2: Potential impacts on climate change – Sand mining activities would result in emissions of GHGs that may have a significant impact on climate change, or would conflict with an applicable plan, policy or program adopted by the State for the purpose of reducing GHGs (Potentially Significant, Class II).
- Impact AIR-3: Potential health risk from diesel particulate matter – Sand mining activities would result in emissions of diesel particulate matter (DPM), a toxic air contaminant (TAC), associated with use of diesel equipment potentially exposing nearby sensitive receptors to health risks (Less than Significant, Class III).
- Impact AIR-4: Potential odor impacts – Sand mining activities could generate objectionable odors (Less than Significant, Class III).

The Commission adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action in 2012. One mitigation measure (MM) for Impact AIR-2 presented in 2012 EIR Section 4.5.4 related to GHG emissions was adopted (Appendix F):

- MM AIR-2 – Prepare and implement a Greenhouse Gas (GHG) Reduction Plan

3.6.5.2 Revised Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the Revised Project relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. For the reasons discussed below, implementation of the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

The studies identified in Section 1.2.3 as having been completed since certification of the 2012 EIR provide additional information about physical environmental conditions in the lease areas; however, the information and conclusions they provide are consistent with information presented and conclusions reached in the 2012 EIR and none of the new studies affects the impact determinations reached in the 2012 EIR regarding air quality and greenhouse gas emissions.

Would the Revised Project have a significant adverse impact on air quality?

Impact AIR-1: The Revised Project would result in emissions of criteria air pollutants that may conflict with or obstruct implementation of an applicable air quality plan (Less than Significant, Class III).

The 2012 EIR concluded in the context of Impact AIR-1 (p. 4.5-16 et seq.) that sand mining activities would result in a less-than-significant impact related to a potential conflict with or obstruct implementation of an applicable air quality plan because the project emissions would not exceed the BAAQMD annual thresholds of significance. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR associated with this criterion.

The BAAQMD-recommended measure for determining if a project would support the goals of applicable air quality plans is consistent with CEQA thresholds of significance. If CEQA thresholds of significance are exceeded, then the Revised Project would not be considered to support the applicable air quality plan goals, and the associated impact would be significant. Alternatively, if the CEQA thresholds of significance are not exceeded, then the Revised Project would be considered to support the applicable air quality plan goals, and the associated impact would be less than significant.

The emissions analysis presented in the 2012 EIR assumes the mining levels would reach maximum levels beginning in 2014, when the mining volume was projected to increase to the full amount proposed by the Applicants, that is, 2,040,000 cubic yards per year (cy/yr). For the Revised Project, the Applicants are proposing a reduction in the maximum allowable annual volume of sand harvested to 1,750,000 cy/yr. This would amount to a net reduction of 290,000 cy/yr of sand allowed to be harvested, which is 14 percent less than was evaluated in the 2012 EIR (p. 4.5-16 et seq.). While it can be reasoned that the net reduction in sand harvested would correspond with a similar reduction in

mining activities and engine emissions, this SEIR conservatively assumes that no emission reductions would result.

Criteria pollutant emissions for the Revised Project would result in no net change in emissions compared to 2012 Project disclosed in the 2012 EIR and would continue to be below the BAAQMD 1999 significance thresholds (see Table 3.6-3).

Therefore, consistent with the determination for the 2012 Project, the Revised Project would cause a less than significant (Class III) impact from emissions potentially conflicting with or obstructing implementation of an applicable air quality plan. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to applicable air quality plans.

Table 3.6-3. Estimated Annual Project Criteria Pollutant Emissions

Scenario	Annual Emissions (tons per year)			
	NO_x	PM*	ROG	CO
Annual Average (2002 – 2007) Baseline Disclosed in 2012 EIR				
Total Emissions	84.8	3.1	8.0	25.3
Fully Approved (2014) Project Disclosed in the 2012 EIR				
Total Emissions	96.7	4.9	12.6	39.9
Change from 2012 EIR Baseline	12.0	1.8	4.6	14.5
BAAQMD 1999 Significance Threshold (exceeded if change >15)	15	15	15	N.A.
Does the change from baseline exceed the significance threshold?	No	No	No	No

Notes: *Emissions of particulate matter (PM) represent both PM_{10} and $PM_{2.5}$ emissions.

Source: Based on 2012 EIR Table 4.5-7.

Impact AIR-2: The Revised Project would result in emissions of criteria air pollutants that may violate an air quality standard or contribute significantly to an existing violation (Less than Significant, Class III).

The 2012 EIR concluded in the context of Impact AIR-1(p. 4.5-16 et seq.) that sand mining activities would result in a less-than-significant impact related to

potentially violating an air quality standard or contributing significantly to an existing violation because the net change in project emissions would not exceed the BAAQMD annual thresholds of significance. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR associated with this significance criterion.

As discussed above, the net emission estimates for the Revised Project relative to the baseline evaluated in the 2012 EIR would continue to be below the BAAQMD significance thresholds designed to evaluate whether a project may violate an air quality standard or contribute significantly to an existing violation.

Therefore, consistent with the determination for the 2012 Project, the potential for the Revised Project's emissions to violate an air quality standard or contribute to an existing violation of an air quality standard would result in a less-than-significant impact. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to a potential violation of an air quality standard or contribution to an existing violation of an air quality standard.

Impact AIR-3: The Revised Project would contribute to cumulative emissions of criteria pollutants for which the Project region is non-attainment under an applicable ambient air quality standard (Less than Significant, Class III).

The 2012 EIR concluded in the context of Impact AIR-1(p. 4.5-16 et seq.) that sand mining activities would result in less-than-significant cumulative impacts on air quality because the net change in 2012 Project emissions would not exceed the BAAQMD annual thresholds of significance. For the reasons discussed below, the same is true for the Revised Project. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR associated with this significance criterion.

According to the BAAQMD 2022 CEQA Guidelines, if a project would exceed the identified significance thresholds, its emissions would be considered cumulatively considerable, resulting in significant adverse air quality impacts on the region's existing air quality conditions (BAAQMD 2023). Alternatively, if a project would not exceed the identified significance thresholds, then the project would not be considered cumulatively considerable and would result in less-than-significant air quality impacts. As noted in the local regulatory setting, for all

relevant purposes, the air quality significance thresholds identified in the (BAAQMD) 2022 CEQA Guidelines are the same as the significance thresholds adopted by BAAQMD in 2010 and discussed in the 2012 EIR. As discussed above for Impact AIR-1 in this SEIR, the net emission estimates for the Revised Project relative to the baseline evaluated in the 2012 EIR would continue to be below the 1999 thresholds and current (2022) BAAQMD significance thresholds.

Therefore, consistent with the determination for the 2012 Project, the impact of the Revised Project emissions being potentially cumulatively considerable would be less than significant. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to cumulative effects on air quality.

Impact AIR-4: The Revised Project could generate objectionable odors (Less than Significant, Class III).

The 2012 EIR concluded in the context of Impact AIR-4 (pp. 4.5-23 and 4.5-24) that the only notable source of odors from sand mining operations is from the combustion of diesel fuel to operate the vessels and that a less-than-significant impact would result from the 2012 Project. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR regarding the generation of objectionable odors.

The Revised Project proposes to reduce permitted mining volumes (and subsequent emissions) and would not require the creation of new offloading facilities, and therefore the odor impacts would remain less than significant. Therefore, consistent with the determination and rationale documented in the 2012 Project, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to the generation of odors.

Would the Revised Project cause an adverse impact on human health?

Impact AIR-5: The Revised Project would result in emissions of diesel particulate matter (DPM), a toxic air contaminant (TAC), associated with use of diesel equipment, potentially exposing nearby sensitive receptors to health risks (Less than Significant, Class III).

The 2012 EIR concluded in the context of Impact AIR-3 (p. 4.5-22 et seq.) that public exposure to TACs that would be generated by diesel equipment used to

conduct sand mining activities could lead to an increase in the risk of cancer. The 2012 EIR further concluded that sand mining activities would not increase the probability of contracting cancer by greater than 10 in one million and, therefore, that the impact would be less than significant. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact related to exposing nearby sensitive receptors to health risks that were disclosed in the 2012 EIR.

Health risks at offsite receptors identified in the 2012 EIR were determined by conducting dispersion modeling of the DPM emissions associated with mining activities (see 2012 EIR Appendix C for details on modeling methodology and assumptions). The 2012 EIR found that proposed mining activities at the PRC 709.1 South parcel would result in the highest cancer risk of 4.4 chanced per one million for all project sites evaluated, and the greatest DPM (a surrogate for $PM_{2.5}$) annual average concentrations would be 0.21 µg/m^3 due to worker exposure (see 2012 EIR, p. 4.5-23). The BAAQMD's current (2022) significance threshold for $PM_{2.5}$ concentrations is 0.3 µg/m^3. As discussed under Impact AIR-1 in this SEIR, the Revised Project would result in a total net reduction of 290,000 cy/yr of sand allowed to be harvested, which is 14 percent less than was evaluated in the 2012 EIR; and the Revised Project would reduce the amount of sand specifically harvested at the PRC 709.1 lease location by 105,000 cy/yr, which is 31 percent less than was evaluated in the 2012 EIR.

Since the emissions used in the health risk assessment presented in the 2012 EIR are directly proportional to the maximum allowable annual volume of sand harvested, the Revised Project would result in exposure levels to DPM and $PM_{2.5}$ emissions that would be less than those disclosed in the 2012 EIR for the approved project and would result in a less-than-significant impact. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to cancer risk or exposure to $PM_{2.5}$ concentrations.

Impact AIR-6: The Revised Project would expose people to increased risk of cancer (Less than Significant, Class III).

The 2012 EIR concluded in the context of Impact AIR-3 (p. 4.5-23) that proposed mining activities at the PRC 709.1 South parcel would result in the project's highest cancer risk of up to 4.4 chances per one million, which is less than the significance threshold of 10 chances per one million. Accordingly, the 2012 EIR concluded that a less-than-significant impact would result. For the reasons

discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact related to exposing people to increased risk of cancer than was disclosed in the 2012 EIR.

The Revised Project would reduce the maximum amount of sand harvested at the PRC 709.1 lease location by 105,000 cy/yr, which is 31 percent less than was evaluated in the 2012 EIR. Since the emissions used in the health risk assessment presented in the 2012 EIR are directly proportional to the maximum allowable annual volume of sand harvested, the Revised Project would result in exposure levels to TAC DPM emissions that would be less than those disclosed in the 2012 EIR for the approved project and would result in a less-than-significant impact. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to cancer risk.

Impact AIR-7: The Revised Project could result in acute or chronic non-cancer health risks (Less than Significant, Class III).

As described above, the 2012 EIR found that mining activities would result in a health risk to nearby sensitive receptors from emissions of DPM that would be less than significant. Since the Revised Project would reduce the maximum amount of sand harvested compared to the amount of sand harvested that was evaluated in the 2012 EIR health risk assessment, the Revised Project reasonably could be expected to result in less health risks to nearby sensitive receptors than was disclosed for the 2012 Project. Therefore, consistent with the determination for the 2012 Project, the impact of the Revised Project's health risks, including acute and chronic non-cancer health risks, would be less than significant. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR relating to health risk.

Would the Revised Project have a significant impact on climate change?

Impact AIR-8: The Revised Project would result in emissions of GHGs that may have a significant impact on climate change (Potentially Significant, Class II).

The 2012 EIR concluded in the context of Impact AIR-2 (p. 4.5-20 et seq.) that sand mining activities would result in a potentially significant impact related to the generation of GHG emissions, and that implementation of Mitigation Measure AIR-2 would reduce the impact to a less-than-significant level. For the reasons discussed below, the Revised Project would cause no new significant

impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR associated with climate change.

Based on a review of the Statewide GHG inventory for 2008, the 2012 EIR found that it included a survey of commercial harbor vessels, and so it was assumed to have taken into account GHG emissions associated with sand mining. A review of the most current version of the State's inventory of GHG emissions for 2022 came to the same conclusion because harbor craft and port activities are identified as transportation sector sources included in the inventory. Therefore, if the Revised Project would cause GHG emissions above the baseline level, it would be considered to have a significant effect on climate change. For the reasons discussed below, the Revised Project would not increase GHG emissions above the baseline level, and so would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR associated with GHG emissions and climate change.

Tugboat engines, barge engines, and auxiliary engines/generators used during mining and offloading events that would be associated with the Revised Project would emit GHG emissions. However, implementation of the Revised Project would result in a reduction in the maximum allowable annual volume of sand harvested to 1,750,000 cy/yr, which would amount to a net reduction of 290,000 cy/yr of sand allowed to be harvested, equal to 14 percent less than evaluated in the 2012 EIR. While it can be reasoned that the net reduction in sand harvested would correspond with a similar reduction in mining activities and engine emissions, this SEIR conservatively assumes that no GHG emission reductions would result. Because sand mining emissions are directly proportional to the maximum allowable annual volume of sand harvested, it is assumed that the Revised Project emissions associated with tugboat engines, barge engines, and auxiliary engines/generators that would be used during mining and offloading events would emit 14 percent less GHG emissions than the total approved project emissions disclosed in the 2012 EIR.

GHG emission estimates for the Revised Project relative to the baseline as disclosed in the 2012 EIR are presented in Table 3.6-4. As shown in the table, the net change in emissions due to the Revised Project compared to the baseline is 1,675 metric tons CO_2e per year, which is an emissions reduction of more than 1,000 metric tons compared to the approved project. However, since the Revised Project GHG emissions would continue to exceed the significance threshold, the impact would be significant and, consistent with the determination for the 2012 Project, also would be subject to mitigation.

Table 3.6-4. Revised Project Estimated Annual Project GHG Emissions

Activity	GHG Emissions (metric Tons CO_2e per Year)
Annual Average (2002 – 2007) Baseline Disclosed in 2012 EIR	5,400
Project Emissions Disclosed in 2012 EIR	8,247
Net Change Disclosed in 2012 EIR	2,847
Revised Project	*7,075*
Net Change from 2012 Baseline	*1,675*
Revised Project – 10 Year Lifecycle of Revised Project	70,746

Source: Based on 2012 EIR Table 4.5-8

Implementation of Mitigation Measure AIR-1 is carried forward (substantially unchanged) from 2012 EIR (as shown below in underline/strikethrough text), where it was identified as Mitigation Measure AIR-2. See SEIR Appendix F, Existing Mitigation. The implementation of this mitigation measure would reduce the Revised Project's impact on climate change to a less-than-significant level through the preparation and implementation of a GHG Reduction Plan to ensure that Revised Project GHG emissions do not exceed the significance threshold. Consistent with the significance conclusion reached for the 2012 Project, the Revised Project's impact on climate change would be less than significant with mitigation incorporated. Because the impact conclusion is the same as was reached in the 2012 EIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR related to GHG emissions.

> **Mitigation Measure MM AIR-1 – ~~Prepare and~~ Implement a Greenhouse Gas (GHG) Reduction Plan.** Prior to startup of any new sand mining operations, the Revised Project Applicants shall prepare and submit to the California State Lands Commission (CSLC) staff for approval a GHG Reduction Plan that demonstrates how the Applicants will lower and/or offset Revised Project-related GHG emissions, such that GHG emissions will not exceed 5,400 metric tons of CO_2e in any calendar year during the 10-year lease period, or a total of 54,000 metric tons for the 10-year life of the Project. The GHG Reduction Plan shall include:

- A detailed baseline inventory that identifies and calculates all sources of GHG emissions during the last full calendar year of mining operations. This inventory shall be verified by an accredited third-party verification body and reported to The Climate Registry.
- A description of the strategies that the Applicants will employ to reduce and/or offset GHG emissions. Examples of such strategies include:
    - "Cold ironing" of vessels, where power from the electrical grid is substituted for diesel power during off-loading and while vessels are docked.
    - Use of biofuels or biofuel blends as a substitute or partial substitute for fossil fuels used to power tugs and barges.
    - Purchase of carbon offset credits verified by the Climate Action Registry.
- Detailed calculations showing the expected reduction in GHG emissions that will result from the implementation of each strategy.

Each year during the 10-year lease period, the Applicants shall conduct another inventory of GHG emissions that shall be verified and reported. In lieu of submitting the project level inventory of GHG emissions to the Climate Registry on an annual basis, the miners shall, as indicated in their Greenhouse Gas Reduction Plan, submit annual inventories to CSLC and the Mitigation Monitoring Team and will provide annual inventory verification performed by a qualified third party such as TRC Solutions. The Applicants shall provide the verified results of this inventory to the CSLC along with a description of how the GHG Reduction Plan is being implemented and documentation showing GHG offsets or reductions.

Rationale for Mitigation

Mitigation Measure AIR-1 would lower or offset GHG emissions from the Revised Project to 2012 EIR baseline levels, thereby mitigating the Project's significant contribution to global warming to a less-than-significant level.

The Revised Project would not result in any GHG emissions that were not included in the State's inventory of GHG emissions. Consistent with the determination for the 2012 Project, the Revised Project would have no impact regarding this consideration. Harbor craft and port activities are identified as transportation sector sources included in the State's GHG emissions inventory for 2022 (CARB

2024c). Therefore, the GHG emissions that would be associated with the Revised Project are included in the State's inventory of GHG emissions (see Impact AIR-8). The Revised Project would cause no change, and no impact, associated with any GHG emissions not included in the State's inventory of GHG emissions.

Impact AIR-9: The Revised Project would result in emissions of GHGs that may conflict with an applicable plan, policy, or program intended to reduce GHG emissions adopted by the State pursuant to AB 32 (Potentially Significant, Class II).

In the context of Impact AIR-2 (p. 4.5-20 et seq.), the 2012 EIR concluded that sand mining activities would result in a potentially significant impact related to a conflict with an applicable plan, policy, or program, and that implementation of 2012 EIR Mitigation Measure AIR-2 would reduce the impact to a less-than-significant level. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR associated with this significance criterion.

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan), adopted by CARB in December 2022, expands on prior Scoping Plans and set the goal for achieving carbon neutrality by 2045 or earlier. As this SEIR discusses in the context of Impact AIR-8, the net change in emissions due to the Revised Project would continue to exceed the baseline emissions disclosed in the 2012 EIR, which could result in a conflict with the State's carbon neutrality goal. Therefore, the Revised Project's impact is considered potentially significant and, consistent with the determination for the 2012 Project, also would be subject to mitigation.

Implementation of Mitigation Measure MM AIR-1 (set forth above) would reduce the impact to a less-than-significant level through the preparation and implementation of a GHG Reduction Plan to ensure that Revised Project GHG emissions do not exceed the threshold of significance. Consistent with the significance conclusion reached for the 2012 Project, the Revised Project's impact on climate change would be less than significant with mitigation incorporated. Because the impact conclusion is the same as was reached in the 2012 EIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR related to GHG emissions.

> **Mitigation Measure AIR-1.** Implement a Greenhouse Gas (GHG) Reduction Plan.

Rationale for Mitigation

Mitigation Measure MM AIR-8 would lower or offset GHG emissions from the Revised Project to 2012 EIR baseline levels, thereby mitigating the Project's significant contribution to global warming to a less-than-significant level.

3.6.6 Cumulative Effects

Because GHG emissions related impacts are inherently cumulative, see the analysis presented in the context of Impacts AIR-8 and AIR-9, above, which conclude that the Revised Project would have a potentially significant (Class II) cumulative effect on GHG emissions.

Impact CE AIR-1: The Revised Project has a low potential to cause a cumulatively considerable contribution to potential significant cumulative effects on air quality (Less than Significant, Class III).

The 2012 EIR analyzed potential cumulative effects in Section 4.5.6 (pp. 4.5-31 and 4.5-31), concluding that the 2012 Project would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As analyzed in Section 3.6.5 of this SEIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact (either directly or indirectly) and so would result in the same incremental contribution to potential cumulative effects as was disclosed in the 2012 EIR. The incremental impacts of implementing activities consistent with the San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044 would be substantially similar to the incremental impacts of the RDMMP's predecessor which was evaluated as part of the cumulative scenario for the 2012 EIR (see 2012 EIR, p. 3-24). The incremental air quality and GHG emissions impacts of the Revised Project (in combination with the less than significant incremental impact of the San Francisco Bay Strategic Shallow-Water Placement Pilot Project and the incremental impacts of the Montezuma Wetlands Restoration and Suisun Marsh fish screen rehabilitation project) would not be cumulatively considerable, and so would be less than significant. For these reasons, the Revised Project would cause no new significant cumulative impact and no substantial increase in the severity of a significant cumulative impact than was disclosed in the 2012 EIR.

3.7 CULTURAL RESOURCES AND TRIBAL CULTURAL RESOURCES

This section identifies and evaluates issues related to cultural resources and tribal cultural resources to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than was disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.7.1 Baseline Conditions

The 2012 Final EIR (p. 1-12) states the following regarding baseline conditions for cultural resources:

> Impacts on submerged cultural resources could have occurred during past sand mining events. Such past disturbance is considered part of the baseline condition. This EIR considers the potential for future disturbance of submerged cultural resources.

Impacts on tribal cultural resources are assessed in consultation with culturally affiliated California Native American tribes listed with the Native American Heritage Commission in accordance with Public Resources Code Section 21080.3. Impacts on submerged tribal cultural resources, including archaeological resources and human remains, could have occurred during past sand mining events. Impacts on tribal cultural resources as a result of past sand mining events are considered part of the baseline condition. This SEIR considers the potential for future disturbance of submerged tribal cultural resources.

As described in Section 1.3.3 of this SEIR, the baseline condition for purposes of this analysis is the level of activity associated with the fully authorized sand mining lease volumes and the ongoing obligations such as mitigation measures and conditions of approval resulting from the Commission's 2012 EIR and lease authorizations. See Appendices A and F for details.

3.7.2 Environmental Setting

Section 4.6.1 of the 2012 EIR describes the environmental setting for the Project's consideration of cultural resources, including prehistoric resources, historic-period resources, and paleontological resources, and provides a summary of existing conditions in the Project area. Those descriptions remain accurate for

the purposes of the SEIR analysis, except as supplemented below regarding the potential for tribal cultural resources to occur in the Revised Project area.

Section 4.6.1 of the 2012 EIR describes tribal outreach completed for the Project. This included a sacred lands search request and a request for Native American contacts list from the Native American Heritage Commission (NAHC) on April 3, 2009. The NAHC's response was received on July 8, 2009, and stated that the sacred lands survey did not have records of specific cultural resources in the Project area. Letters were sent to the individuals and organizations provided by the NAHC on August 3, 2009. No responses were received.

For purposes of developing this SEIR, the CSLC contacted the NAHC, which maintains two databases, the Sacred Lands File and Native American Contacts, to assist cultural resources specialists in identifying cultural resources of concern to California Native American tribes. CSLC staff contacted the NAHC in November 2022 to obtain information about known cultural and tribal cultural resources in the Project Area and request a list of Native American Tribal representatives who may have geographic or cultural affiliation in the Project Area. The NAHC responded on December 12, 2022, stating that the Sacred Lands File database did include previously identified sacred sites in the Project Area and directed staff to contact the Federated Indians of Graton Rancheria (FIGR). The NAHC also forwarded a list of 25 additional tribal contacts for 17 Native American tribes, which the CSLC used for outreach and coordination. Three California Native American tribes have geographic or cultural affiliation in the San Francisco Bay/Delta and had submitted a written request to the CSLC for notification of CEQA projects pursuant to AB 52 (see generally, Pub. Resources Code, § 21080.3.1).

On May 30, 2023, the CSLC sent Project notification letters and an invitation to consult under AB 52 to the United Auburn Indian Community of the Auburn Rancheria, the Wilton Rancheria, and the Chicken Ranch Rancheria Me-Wuk Indians of California. The CSLC also notified the 18 tribes on the NAHC contact list, including the FIGR, to ensure those tribes would have an opportunity to provide meaningful input on the potential for tribal cultural resources to be found in the project area and recommend steps to be taken to ensure adverse impacts to tribal cultural resources are avoided. The outreach letters sent in May 2023 included chairpersons and representatives of the following:

- Amah Mutsun Tribal Band of Mission San Juan Bautista
- Costanoan Rumsen Carmel Tribe

- Indian Canyon Mutsun Band of Costanoan
- Muwekma Ohlone Indian Tribe of the SF Bay Area
- North Valley Yokuts Tribe
- The Ohlone Indian Tribe
- Wuksache Indian Tribe/Eshom Valley Band
- The Confederated Villages of Lisjan
- Kletsel Dehe Band of Wintun Indians
- Buena Vista Rancheria of Me-Wuk Indians
- Cachil Dehe Band of Wintun Indians of the Colusa Indian Community
- Federated Indians of Graton Rancheria
- Guidiville Indian Rancheria
- Ione Band of Miwok Indians
- Nashville Enterprise Miwok-Maidu-Nishinam Tribe
- Tsi Akim Maidu
- Tule River Indian Tribe
- Yocha Dehe Wintun Nation

CSLC staff held consultation meetings with two tribes listed with the NAHC: Confederated Villages of Lisjan on August 16, 2023, and Wilton Rancheria on September 6, 2023. Neither tribe identified any specific tribal cultural resources in the Revised Project area. Wilton Rancheria requested additional information about the offloading sites which CSLC staff provided. No additional requests were made by the tribes.

3.7.3 Regulatory Setting

Section 4.6.2 of the 2012 EIR (p. 4.6-7 et seq.) describes the regulatory setting for the analysis of cultural resources. Topics include federal regulations (National Historic Preservation Act and Abandoned Shipwreck Act) and State regulations (California Environmental Quality Act and San Francisco Bay Plan). Those descriptions provided in the regulatory setting remain accurate for the purposes of this analysis, except as supplemented below with respect to tribal cultural resources.

3.7.3.1 Federal

There are no federal laws or regulations specifically related to tribal cultural resources. Section 106 of the National Historic Preservation Act considers historic properties, which also includes traditional cultural properties. Refer to Section 4.6.2 of the 2012 EIR for a summary of Section 106 of the National Historic Preservation Act.

3.7.3.2 State

In September 2014, the California Legislature enacted Assembly Bill (AB) 52 (Gatto), which added provisions to the Public Resources Code regarding the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes. In particular, AB 52 requires lead agencies to analyze project impacts on tribal cultural resources separately from impacts on archaeological resources (Public Resources Code §§21074, 21083.09). The law defines tribal cultural resources in a new Section, Public Resources Code Section 21074. AB 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (Public Resources Code §§21080.3.1, 21080.3.2, 21082.3).

Specifically, Public Resources Code Section 21084.3 states:

a) Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.

b) If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process provided in Section 21080.3.2, the following are examples of mitigation measures that, if feasible, may be considered to avoid or minimize the significant adverse impacts:

    1) Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

    2) Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

A) Protecting the cultural character and integrity of the resource.

B) Protecting the traditional use of the resource.

C) Protecting the confidentiality of the resource.

3) Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

4) Protecting the resource.

In addition, the Governor's Office of Land Use and Climate Innovation (formerly the Governor's Office of Planning and Research) updated Appendix G of the CEQA Guidelines to provide sample questions regarding impacts on tribal cultural resources (see California Code of Regulations, Title 14, Division 6, Section 15000-15387, Appendix G).

3.7.4 Significance Criteria

Consistent with Section 4.6.3 of the 2012 EIR (p. 4.6-11) an adverse impact on cultural resources is considered significant and would require mitigation if it would result in any of the following:

- A substantial adverse change in the significance of a historical resource as defined in the State CEQA Guidelines section 15064.5;
- A substantial adverse change in the significance of a unique archaeological resource;

Consistent with Section 4.6.3 of the 2012 EIR (p. 4.6-11) an adverse impact on paleontological resources is considered significant and would require mitigation if it would result in:

- Disturbance or destruction of a unique paleontological resource or site or unique geologic feature; or

Consistent with Section 4.6.3 of the 2012 EIR (p. 4.6-11) an adverse impact on human remains is considered significant and would require mitigation if it would result in:

- Disturbance of any human remains, including those interred outside of formal cemeteries.

For the purpose of analyzing whether the Revised Project would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts on cultural resources that were disclosed in the 2012 EIR, the significance criteria evaluated in 2012 remain current.

The 2012 EIR did not separately analyze potential impacts to tribal cultural resources, which was not finalized and approved as a category in the CEQA Guidelines Appendix G environmental checklist until September 2016. For the Revised Project, impacts to tribal cultural resources are considered and discussed under Impact CUL-1. An adverse impact on tribal cultural resources is considered significant and would require mitigation if it would result in the following:

- A substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
    - Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or
    - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Public Resources Code Section 5024.1(c). In applying the criteria, the State Lands Commission shall consider the significance of the resource to a California Native American tribe.

3.7.5 Direct and Indirect Effects

3.7.5.1 2012 Project

The 2012 Final EIR, Section 4.6.4 presented the following impact determinations for cultural resources:

- Impact CUL-1: Inadvertent discovery of historical resources or "unique archaeological resources" - Sand mining activities could potentially result in the inadvertent discovery of archaeological historic-period resources (e.g., shipwrecks) or prehistoric Native American sites (Potentially Significant, Class II).

- Impact CUL-2: Inadvertent discovery of paleontological resources - Sand mining activities would not disturb or destroy a unique paleontological resource or site or unique geologic feature (Less than Significant, Class III).

- Impact CUL-3: Inadvertent discovery of human remains - Sand mining activities could potentially result in the discovery of human remains (Potentially Significant, Class II).

The Commission adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action. Two mitigation measures related to Impacts CUL-1 and CUL-3 were adopted (Appendix F):

- MM CUL-1: Cease operations and notify the California State Lands Commission (CSLC) and U.S. Army Corps of Engineers (USACE)
- MM CUL-3: Cease operations and notify County Coroner.

3.7.5.2 Revised Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the Revised Project relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. For the reasons discussed below, implementation of the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

The studies identified in Section 1.2.3 as having been completed since certification of the 2012 EIR provide additional information about physical environmental conditions in the lease areas; however, the information and conclusions they provide are consistent with information presented and conclusions reached in the 2012 EIR and none of the new studies affects the impact determinations reached in the 2012 EIR regarding cultural resources and tribal cultural resources.

Would the Revised Project result in the inadvertent discovery of historical resources or unique archaeological resources, or tribal cultural resources?

Impact CUL-1: Sand mining activities could potentially result in the inadvertent discovery of archaeological historic-period resources (e.g., shipwrecks) or prehistoric Native American sites, or tribal cultural resources (Potentially Significant, Class II).

No historical resources or unique archaeological resources have been recorded in the Revised Project area. The Revised Project area has a low potential to contain buried or submerged cultural resources. However, the possibility cannot be entirely discounted. Project personnel should, therefore, be alerted to the possibility of encountering cultural materials during Project implementation, and apprised of the proper procedures to follow in the event that such materials are found. Implementation of Mitigation Measure (MM) CUL-1 as set forth in the 2012 EIR and as repeated (unchanged) below would reduce potential impacts to a less-than-significant level. Accordingly, the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact on historical resources or unique archaeological resources than was disclosed in the 2012 EIR.

Impacts on tribal cultural resources are assessed in consultation with the affiliated California Native American tribes in accordance with Public Resources Code Section 21080.3. This analysis considers whether the Project would cause damaging effects to any tribal cultural resource, including archaeological resources and human remains.

CSLC staff sent letters to the culturally affiliated Native American tribes and individuals that may have interest in the Revised Project. Meetings were held with two Native American tribes, and no tribal cultural resources listed or eligible for listing in the California Register or in a local register of historical resources were identified in the vicinity of the Revised Project. In addition, the CSLC, in its discretion and supported by substantial evidence, did not identify any tribal cultural resources in the Revised Project area.

As described in Section 4.6.2 of the 2012 EIR, there are no known sacred, ceremonial, or gathering places in the Project area. However, the potential exists for archaeological resources or human remains to be uncovered during ground-disturbing activities, and an impact on tribal cultural resources would be significant. MMs CUL-1 and CUL-3 (as set forth in the 2012 EIR and repeated below as MM CUL-1a and MM CUL-3, respectively) would apply to

archaeological resources and human remains that are also considered tribal cultural resources. In addition, if cultural materials or potential human remains are identified that could be California Native American in origin, CSLC staff would contact the consulting California Native American tribes as described in MM CUL-1b. Implementation of the two 2012 EIR MMs CUL-1 and CUL-3 as supplemented by newly-identified MM CUL-1b would reduce potential impacts on tribal cultural resources to a less-than-significant level.

MM CUL-1a: Cease operations and notify the California State Lands Commission (CSLC) and U.S. Army Corps of Engineers (USACE). If an inadvertent discovery is made of items of historic or prehistoric archaeological potential, all work activities shall immediately cease in the area of discovery. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include shipwreck remains, including wood, iron, and steel-hulled ships as well as smaller ferrous materials such as anchors, iron ballast, chain, iron hull fasteners, rigging, and fittings of various types. The Applicants shall take the following actions:

1. After cessation of activity, the Applicants shall immediately contact the CSLC and USACE. The Applicants shall not resume work in the area of the discovery until authorization is received from the CSLC and the USACE.
2. If CSLC staff determines that a historical or archaeological resource may be present within the Revised Project site, the Applicants shall retain the services of a qualified archaeologist who meets the Professional Qualifications Standards contained in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. In the case of a shipwreck or other maritime resources, a qualified maritime archaeologist shall be retained. The archaeologist will make an immediate evaluation of the discovery and will advise CSLC staff whether it is a resource of potential scientific/historical/cultural significance. The archaeologist will make a recommendation as to what action, if any, is warranted. Based on this information, CSLC staff may require, if warranted, specific additional measures to be implemented by the Applicants no more than 48 hours from receipt of the recommendation.

3. Measures might include: Preservation in situ of the archaeological resource (avoidance); archaeological data recovery; salvage and conservation of all or part of the resource if reasonably feasible (i.e., shipwreck); or further evaluation. CSLC staff may also require that the Applicants immediately implement a site security program if the resource is at risk from vandalism, looting, or other damaging actions.
4. Artifacts found on lands under the jurisdiction of the CSLC are considered the property of the State of California. Any disposition of these artifacts requires the approval of the CSLC.
5. The archaeologist shall submit an archaeological resources report to CSLC staff. This report shall include an evaluation of the historical significance of any discovered archeological resource, as well as a description of the archaeological and historical research methods employed.

Mitigation Measure CUL-1b: Cease operations and notify consulting Native American tribes if the find is Native American in origin. If potential tribal cultural resources are identified, procedures outlined in MM CUL-1a shall be followed. Work stoppages shall remain in place until a qualified archeologist and Tribal Monitor/Representative from the consulting Tribes have jointly determined the nature and significance of the discovery. The Tribal Monitor/Representative shall be asked to continue to monitor for tribal cultural resources. Tribal cultural resources shall neither be photographed nor be subjected to any studies beyond such inspection as may be necessary to determine the nature and significance of the discovery. The exact location of the resources shall be kept confidential and measures shall be taken to avoid future disturbance and potential vandalism. If feasible, impacts to previously unknown tribal cultural resources shall be avoided through preservation in place. If the on site archeologist and Tribal Monitor/Representative determine that damaging effects on the tribal cultural resource can be avoided in place, then work in the area may resume provided the area of the discovery remains clearly marked for no further disturbance. If the on site archeologist and Tribal Monitor/Representative determine that the find may be significant and if avoidance of the find is determined to be infeasible, CSLC shall be notified. CSLC staff shall work with the consulting Tribes on treatment/mitigation of the discoveries. Measures shall include documentation of the resource or other actions such as treating the resource with culturally appropriate dignity and protecting the cultural character and integrity of the resource. The Applicants shall be

responsible for the resultant mitigation costs as well as associated curation costs. All significant findings will be documented in a summary report that will be provided to pertinent consulting parties within a year of the finding.

Would the Revised Project result in the inadvertent discovery of paleontological resources?

Impact CUL-2: Sand mining activities would not disturb or destroy a unique paleontological resource or site or unique geologic feature (Less than Significant, Class III).

Any ground-disturbing activity has the potential to expose previously unknown paleontological resources. However, as described in Section 4.6.2 of the 2012 EIR, the sand shoals that would be targeted for sand mining are too young geologically and too unstable to produce fossils. For these reasons, potential disturbance or damage to paleontological resources or unique geologic features is considered to be a less-than-significant impact. No mitigation is required. Accordingly, the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact on paleontological resources than was disclosed in the 2012 EIR.

Would the Revised Project result in the inadvertent discovery of human remains?

Impact CUL-3: Sand mining activities could potentially result in the discovery of human remains (Potentially Significant, Class II).

The discovery of human remains is an extremely remote possibility within the Revised Project area. However, since the nature of the Project would involve ground-disturbing activities, it is possible that such actions could unearth, expose, or disturb previously unknown human remains. Project personnel should be alerted to the possibility of encountering human remains during Project implementation, and apprised of the proper procedures to follow in the event they are found as described in MM CUL-3, as set forth in the 2012 EIR and repeated (unchanged) below. Implementation of this mitigation measure would reduce potential impacts to a less-than-significant level. For these reasons, the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact on human remains than was disclosed in the 2012 EIR.

MM CUL-3: Cease operations and notify County Coroner. If human remains are discovered during sand mining activities, State Health and Safety Code section 7050.5 requires that no further disturbance shall occur

until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code section 5097.98. If the remains are determined to be those of a Native American, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent (MLD) of the deceased Native American, who, within 48 hours, will recommend what course of action should be taken in dealing with the remains. The Applicants, MLD, and CSLC staff will make all reasonable efforts to develop an agreement for the treatment, with all appropriate dignity, of any human remains and items associated with the remains (State CEQA Guidelines section 15064.5(d)). The agreement would take into consideration the appropriate removal, analysis, custodianship, and final disposition of the human remains and items associated with the remains. If an agreement cannot be reached, then the landowner or authorized representative shall reinter the human remains and associated items with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. (Pub. Resources Code Section 5097.98(e)).

3.7.6 Cumulative Effects

Impact CE CUL-1: The Revised Project has a potential to cause a cumulatively considerable contribution to potential significant cumulative effects on cultural resources and tribal cultural resources (Potentially Significant, Class II).

The Final 2012 EIR analyzed potential cumulative effects on cultural resources in Section 4.6.6 (p. 4.6-15), concluding that the 2012 Project would not result in a cumulatively considerable contribution to any significant cumulative effect on cultural resources. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As discussed in Section 3.6.5 of this SEIR, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact (either directly or indirectly) and so would result in the same incremental contribution to potential cumulative effects as was disclosed in the 2012 EIR. Similar to the 2012 Project, cumulative projects in the vicinity of the Revised Project could have a significant impact on previously undiscovered cultural resources and tribal cultural resources during ground-disturbing activities. The potential impacts of the Revised Project when considered in combination with similar impacts from other projects in the cumulative effects study area (such as

the San Francisco Bay Strategic Shallow-Water Placement Pilot Project and the Montezuma Wetlands Restoration and Suisun Marsh fish screen rehabilitation project) could result in a significant cumulative impact on cultural resources and tribal cultural resources. However, implementation of MMs CUL-1a, CUL-1b, and CUL-3 for the Revised Project would require that work halt in the vicinity of a find until it is evaluated, and, in the case of human remains, reviewed by the County Coroner. In addition, consulting California Native American tribes would be notified if the find was Native American in origin. These measures would limit the severity of the Revised Project's incremental contribution sufficiently to ensure that the Revised Project's contribution to cumulative impacts would not be considerable, and the impact would be less than significant with mitigation incorporated.

Mitigation for Impact CE CUL-1: Implement Mitigation Measures CUL-1a, CUL 1b, and CUL-3.

3.8 LAND USE AND RECREATION

This section identifies and evaluates issues related to land use and recreation to determine whether the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than was disclosed in the 2012 EIR. This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR.

3.8.1 Baseline Conditions

The 2012 Final EIR (at p. 1-12) states the following regarding baseline conditions for Land Use and Recreation:

> The EIR examines whether the proposed sand mining operations would conflict with current plans and policies of the various agencies with land use and similar authority over Bay and Delta resources and evaluates potential Project conflicts with recreational uses in the Central Bay and Delta. This section also considers the potential for residual impacts at down current beaches resulting from Project impacts on sediment supply and transport within the Bay-Delta system. (Potential changes to sediment supply and transport are examined in more detail in Section 4.3, Hydrology and Water Quality.)

As described in Section 1.3.3 of this SEIR, the baseline condition for purposes of this analysis is the level of activity associated with the authorized sand mining lease volumes and the ongoing obligations such as mitigation measures and conditions of approval resulting from the Commission's 2012 EIR and lease authorizations. See Appendices A and F for details.

3.8.2 Environmental Setting

Section 4.7.1 of the 2012 EIR describes the environmental setting for the Project's consideration of land use and recreational resources including topics such as surrounding land uses, offloading sites, and the lease areas, including the Central San Francisco Bay, Suisun Bay, and the western Sacramento-San Joaquin River Delta. Consistent with the 2012 EIR, the Revised Project is located within water areas of the San Francisco and Suisun Bays and would not affect onshore land uses. The 2012 EIR summarized uses of these waters and submerged lands, including shipping, commercial and recreational fishing, recreational boating, other water-oriented recreational activities, and estuarine

and wildlife habitat. Those descriptions remain accurate for the purposes of the SEIR analysis.

3.8.3 Regulatory Setting

Section 4.7.2 of the 2012 EIR (p. 4.7-2 et seq.) describes the regulatory setting for the analysis of land use and recreational resources, including federal and state laws and regulations, regional plans and policies, and state and local protection plans. The section provides summary information about public open spaces and park lands, use of San Francisco and Suisun Bays, and land use designations. It also outlines jurisdiction exercised by the Army Corps of Engineers, U.S. Fish and Wildlife Service, California State Lands Commission, San Francisco Bay Conservation and Development Commission (BCDC), California Department of Fish and Game[22], and other federal, state, and regional regulatory agencies. The descriptions of the regulatory setting provided in Section 4.7.2 of the 2012 EIR remain accurate for the purposes of this analysis of the Revised Project's potential impacts on land use and recreation except as supplemented below.

The 2012 EIR summarizes land use and recreation plans and policies of BCDC in Section 4.7.2. BCDC has since revised the San Francisco Bay Plan (Bay Plan). In October 2019, BCDC amended the Bay Plan to incorporate tidal marsh and tidal flats, subtidal areas, and environmental justice and social equity policies to address sea level rise, environmental justice, and social equity issues (BCDC 2020). The Bay Plan was reprinted in May 2024 to incorporate these amendments and reflect ongoing regional needs and updates.

Consistent with the 2012 EIR, the land use designations and related policies of the general plans of the counties within which the lease areas are located do not extend to the lease sites, with the exception of Solano County. Both the Solano County General Plan (General Plan) and the Solano County Component of the Suisun Marsh Local Protection Program (LPP)and the Suisun Marsh Habitat Management, Preservation, and Restoration Plan have undergone updates since publication of the 2012 EIR, primarily pertaining to land-based wetland restoration projects. The 2018 Amendment to the LPP included updates to land use descriptions for water bodies and courses, parks and recreation, and marsh, as well as changes in land use designations (Solano County 2018). The Suisun Marsh Habitat Management, Preservation, and Restoration Plan was initiated in 2011, implemented in 2014, and updated in 2021 to align with state climate resilience goals to restore Baylands and wetlands near Suisun Bay. The land use

[22] now the California Department of Fish and Wildlife.

designations pertaining to the Revised Project area remain consistent with the 2012 EIR designations. Thus, no amendments or changes that would considerably inform the analysis of the Revised Project's impact on land use and recreational resources have been implemented.

3.8.4 Significance Criteria

Consistent with Section 4.7.3 of the 2012 EIR (p. 4.7-16 et seq.), an adverse impact on land use or recreation is considered significant and would require mitigation if Revised Project construction or operation would result in:

- Incompatible adjacent land uses as defined by planning documentation;
- Conflicts with planning efforts to protect recreational resources;
- Residual impacts on sensitive water-oriented recreation due to interference with the sand replenishment at beaches down-current from mining operations;
- Conflicts with adopted land use plans or policies; or
- Conflicts with any applicable habitat conservation plan or natural community conservation plan.

In 2017, the Habitat Conservation Plan for Pacific Gas and Electric Company's (PG&E) San Francisco Bay Area Operations and Maintenance was published. This habitat conservation plan pertains to PG&E operations and maintenance and, thus, does not impact the Revised Project Area. Because there are no applicable habitat conservation plans or natural community conservation plans in the Revised Project vicinity, this last criterion is not considered further in this analysis. The 2018 updates to the CEQA Guidelines Appendix G environmental checklist moved the analysis of natural community conservation plans and habitat conservation plans from the Land Use and Recreation analysis to the Biological Resources analysis and made other minor revisions. Therefore, the 2018 CEQA Guidelines Appendix G updates do not affect the significance criteria being evaluated in this SEIR. Accordingly, for the purpose of analyzing whether changes in the project that was analyzed in the 2012 EIR would cause any new significant impact or any substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR with respect to land use and recreation, the significance criteria considered in the 2012 EIR remain current.

3.8.5 Direct and Indirect Effects

3.8.5.1 2012 Project

The 2012 Final EIR, Section 4.7.4 presented the following impact determinations for Land Use and Recreation Resources:

- Impact LU-1: Incompatible land uses - Sand mining operations, which are industrial in nature, could be incompatible with and therefore disruptive to adjacent or nearby non-industrial land uses (such as residences, schools, hospitals, and other sensitive land uses) (Less than Significant, Class III).

- Impact LU-2: Incompatible recreational uses - Sand mining operations would be located within the Bay and Delta waterways and therefore could interfere with water based recreational activities in those water areas, such as recreational fishing (from watercraft) and boating (Less than Significant, Class III).

- Impact LU-3. Residual impacts on recreation resources due to interference with sand replenishment at down-current beaches - The extraction of sand from the mining sites could result in depletion of down-current beaches if it interfered with sediment transport mechanisms by which sand is supplied to such down-current areas and replaces material that is continually eroded through ongoing physical processes (Less than Significant, Class III).

- Impact LU-4: Conflicts with regional or local land use plans or policies - Project inconsistency or conflict with adopted land use plans or policies could result in environmental impacts that the plans and policies were adopted to prevent (Potentially Significant, Class II).

The CSLC adopted a Mitigation Monitoring Program (MMP) as part of its discretionary action (Appendix F). To address potential conflicts with the San Francisco Bay Plan, the Suisun Marsh Protection Program, the Solano County Component of the Suisun Marsh Local Protection Program, and the Solano County General Plan, measures pertaining to Sections 4.1, Biological Resources, 4.4, Hazards and Hazardous Materials, 4.5, Air Quality, and 4.6, Cultural Resources, were applied as mitigation for Impact LU-4. This includes the following:

- MM AIR-2 – Prepare and implement a Greenhouse Gas Reduction Plan
- MM BIO-6. Establish a 100-foot buffer around hard bottom areas within and adjacent to Central Bay mining leases

- MM BIO-8a. Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt
- MM BIO-8b. Applicants shall provide off-site mitigation to compensate for the impacts of the taking that may be unavoidable
- MM BIO-9a. Sand mining halted during peak Chinook salmon migration[23]
- MM HAZ-1 – Provide a California Nontank Vessel Contingency Plan (CANTVCP) or Certificate of Financial Responsibility (COFR) to CSLC
- MM CUL-1 – Cease operations and notify California State Lands Commission and Army Corps of Engineers
- MM CUL-3 – Cease operations and notify County Coroner

3.8.5.2 Revised Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the Revised Project relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the Revised Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. For the reasons discussed below, implementation of the Revised Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

The studies identified in Section 1.2.3 as having been completed since certification of the 2012 EIR provide additional information about physical environmental conditions in the lease areas; however, the information and conclusions they provide are consistent with information presented and conclusions reached in the 2012 EIR and although none of the new studies affects the impact determinations reached in the 2012 EIR, the two studies below are relevant to the land use and recreation impact analysis.

1) *Sand Mining Impact Analysis: Desktop morphology study; Sediment transport modeling study* (Fenical/Coast and Harbor Engineering, 2025)

[23] Note: CSLC approved a variance (February 18, 2015) from Mitigation Measure BIO-9a requirements to implement replacement measures in lieu of MM BIO-9a and MM BIO-9b (Appendix F).

2) *Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay* (Anchor QEA, 2023)

Would the Revised Project involve incompatible land uses as defined by planning documentation?

Impact LU-1: Incompatible land uses. Sand mining operations, which are industrial in nature, could be incompatible with and therefore disruptive to adjacent or nearby non-industrial land uses (such as residences, schools, hospitals, and other sensitive land uses) (Less than Significant, Class III).

As discussed above, applicable land use plans in the Revised Project area consist of the Bay Plan developed by BCDC, the Suisun Marsh Local Protection Program and associated restoration developed by BCDC and CDFW, the Solano County Component of the Suisun Marsh Local Protection Program and the Solano County General Plan, consistent with the 2012 EIR. The Applicants propose to extend the activities analyzed in the 2012 EIR for 10 additional years from the date of lease issuance, using equipment and methods substantially similar to those proposed in the 2012 EIR, as stated in Section 2.4, Description of Proposed Changes. The Revised Project proposes a reduction in the maximum allowable annual volume of sand harvested for three of the five CSLC leases and the Grossi Middle Ground private lease. Impacts on adjacent land uses as defined by planning documentation were analyzed in Section 4.7.4 in the 2012 EIR and found to be less than significant.

The Revised Project mining lease parcels are located within the waters of the San Francisco Bay, Suisun Bay, and the Sacramento-San Joaquin River Delta, approximately 1,000 to 2,800 feet from the nearest developed land areas. No changes are proposed to the location of the Applicants' currently permitted mining operations or the manner in which mining operations would be conducted. The 2012 EIR did not consider operations at offloading sites, as they are not within the purview of the existing or proposed leases. Transportation of the mined sand to the offloading facilities and offloading of barges was considered as part of the Project in the 2012 EIR. According to Section 2.3.3, Mining Events, the Revised Project proposes no changes to the methods of transportation of sand to the offloading facilities and would continue to use five of the nine offloading facilities previously described in the 2012 EIR (see Figure 2-3). Therefore, the Revised Project would cause no new significant impact and no substantial increase in the severity of the impact discussed in the 2012 EIR for this criterion.

Additional Mitigation: None required.

Would the Revised Project conflict with planning efforts to protect recreational resources?

Impact LU-2: Incompatible recreational uses. Sand mining operations would be located within the Bay and Delta waterways and therefore could interfere with water-based recreational activities in those water areas, such as recreational fishing (from watercraft) and boating (Less than Significant, Class III).

Section 4.7.4 of the 2012 EIR determined that the impact would be less than significant. Recreational activities, such as fishing and boating, continue to occur in the San Francisco Bay, Suisun Marsh, and Suisun Bay, with heightened activity expected on weekends and holidays. Thus, consistent with the 2012 EIR, sand mining operations could interfere with recreational activities in the Revised Project area and its vicinity. However, the activities in this area are similar or substantially the same as those discussed in the 2012 EIR, and the Revised Project proposes using equipment and methods that are substantially similar to those currently used and permitted under the existing leases and permits, as described in Section 2.3.2 of the 2012 EIR. The presence of mining barges and equipment in lease areas could temporarily create navigational obstacles for recreational fishing boats or vessels in the San Francisco and Suisun Bays. However, given the ongoing absence of conflicts between sand mining operations, any associated equipment, and water-contact and non-contact recreational activities, it can be reasonably assumed that conflicts would continue to be minimal. For these reasons, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact discussed in the 2012 EIR for this criterion.

Additional Mitigation: None required.

Would the Revised Project result in residual impacts on sensitive water-oriented recreation due to interference with the sand replenishment at beaches down-current from mining operations?

Impact LU-3: Residual impacts on recreation resources due to interference with sand replenishment at down-current beaches. The extraction of sand from the mining sites could result in depletion of down-current beaches if it interfered with sediment transport mechanisms by which sand is supplied to such down-current areas and replaces material that is continually eroded through ongoing physical processes (Less than Significant, Class III).

As discussed in Section 3.4, Hydrology and Water Quality, two hydrodynamic modeling studies were conducted after 2012 that conducted modeling of San Francisco Bay tidal hydrodynamics, wind waves, and sediment transport to

study the potential effect of sand mining on predicted sediment transport pathways and rates (Anchor QEA 2023 and Coast Harbor Engineering 2025). As discussed in Section 3.4, relative to No Proposed Mining, the studies found that Proposed Mining is not likely to cause a significant impact on sediment transport and sand budgets in areas outside the vicinity of the lease areas, such as the San Francisco Bar or Ocean Beach. In addition, no morphological impacts are likely outside of the immediate vicinity of the sand mining areas. Because the Revised Project would not substantially affect sediment transport outside the lease areas, the residual impacts of sand mining on down-current beach depletion or erosion would be less than significant.

Additional Mitigation: None required.

Would the Revised Project conflict with adopted land use plans or policies?

Impact LU-4: Conflicts with regional or local land use plans or policies. Project inconsistency or conflict with adopted land use plans or policies could result in environmental impacts that the plans and policies were adopted to prevent (Potentially Significant, Class II).

Applicable land use plans in the Revised Project area include the San Francisco Bay Plan, the Suisun Marsh Protection Plan, the Solano County Local Protection Plan, and the Solano County General Plan. The Project's consistency with these plans was analyzed in the 2012 EIR in Table 4.7-3. That analysis remains accurate for the Revised Project because, as discussed in Section 1.2.2, the Revised Project would consist of a continuation of the ongoing operations described and analyzed in the 2012 EIR for an additional 10 years, albeit at reduced annual and total volume of extraction, using substantially similar methods and equipment. In addition, the amendments to the plans do not pertain to the Revised Project's potential impacts under this criterion, as discussed in Section 3.8.3, Regulatory Setting.

Implementation of the mitigation measures below would ensure the Revised Project's consistency with land use plans and policies specifying that mining operations be conducted in an environmentally sound manner that minimizes interference with critical wildlife activities and maintains public trust responsibilities and needs. Implementation would also ensure consistency with applicable land use plans and policies concerning the protection of aquatic organisms, sensitive fish species, wildlife and their respective habitats, and other Bay and Delta natural resources. No mitigation measures other than those identified below for other resource-specific impacts would be necessary. For the reasons discussed

above, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact discussed in section 4.7.4 in the 2012 EIR for this criterion.

Mitigation Measure AIR-1. Implement a Greenhouse Gas (GHG) Reduction Plan.

Mitigation Measure MM BIO-6. Establish a 100-foot buffer around hard bottom areas within and adjacent to Central Bay mining leases.

Mitigation Measure MM BIO-8. Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt.

Mitigation Measure MM BIO-9a. Applicants shall minimize the potential for entrainment and mortality of white sturgeon.

Mitigation Measure MM BIO-9b. Applicants shall implement operational restrictions and requirements for the avoidance and minimization of entrainment of Chinook salmon.

Mitigation Measure MM HAZ-1. Provide a California Non-tank Vessel Contingency Plan/Certificate of Financial Responsibility.

Mitigation Measure MM CUL-1a. Cease operations and notify California State Lands Commission and Army Corps of Engineers.

Mitigation Measure MM CUL-1b. Cease operations and notify consulting Native American tribes if the find is Native American in origin.

Mitigation Measure MM CUL-3. Cease operations and notify County Coroner.

3.8.6 Cumulative Effects

Impact CE LU-1: The Revised Project has potential to cause a cumulatively considerable contribution to potential significant cumulative effects on land use and recreation (Potential Significant, Class II).

As recognized in Section 4.7 in the 2012 EIR (p. 4.7-18), "Water-contact and non-contact recreational activities, including fishing and boating, are recognized as important uses of the San Francisco Bay, the Suisun Marsh and Suisun Bay, and vicinity. As such, the potential exists for sand mining operations to interfere with

recreational activities in the Project area," including (as described on p. 4.7-19 of the 2012 EIR) if it causes or contributes to down-current beach depletion or erosion or (as described on p. 4.7-20 of the 2012 EIR) if it conflicts with plans and policies specifying that mining operations are to be conducted in an environmentally sound manner, that agencies protect public trust resources, and that mining operations be carried out in a manner that minimizes interference with critical wildlife activities.

Section 4.7.6 in the 2012 EIR analyzed potential cumulative effects on land use and recreation in Section 4.7.6 (p. 4.7-24), concluding that, with the implementation of the recommended mitigation measures at the project level, the 2012 Project would not result in a cumulatively considerable contribution to any significant cumulative effect on land use or recreation. For the reasons discussed below, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR.

As discussed in Section 3.8.5, above, sand mining operations would have a less-than-significant impact on the planning efforts designed to protect recreational resources at or surrounding the Revised Project area. The Revised Project would not conflict with nearby land uses and would, thus, not contribute to cumulative impacts on these areas. As discussed in Impact LU-4, the Revised Project could conflict with adopted land use plans or policies particularly pertaining to wildlife, wildlife habitat, tidal marshes and flats, and public trust responsibilities. However, implementation of the Mitigation Measures identified in Impact LU-4 (i.e., Mitigation Measures AIR-1, BIO-6, BIO-8, BIO-9a, BIO-9b, HAZ-1, CUL-1a, CUL-1b, and CUL-3) would reduce the Revised Project's contribution to cumulative conflicts with plans and policies to less than significant.

The Revised Project's less than significant incremental impact on land use planning and recreation could combine with the incremental impacts of the projects identified in Section 3.1.5 of this SEIR to cause a significant cumulative effect on water-contact and non-contact recreational activities, including fishing and boating, beach use, or other public trust resources. The incremental impacts of implementing activities consistent with the San Francisco Bay Regional Dredged Material Management Plan (RDMMP) 2025-2044 would be substantially similar to the incremental impacts of the RDMMP's predecessor, which was evaluated as part of the cumulative scenario for the 2012 EIR (see 2012 EIR, p. 3-24). The incremental impacts of the San Francisco Bay Strategic Shallow-Water Placement Pilot Project, Montezuma Wetlands Restoration, and

Suisun Marsh fish screen rehabilitation project, while not individually significant, could, once combined with the incremental contributory impact of the Revised Project, result in a significant cumulative effect on consistency with land use planning for recreational resources or pertaining to wildlife, wildlife habitat, tidal marshes and flats, and public trust responsibilities. The Revised Project's incremental contribution could be reduced to less than cumulatively considerable (i.e., less than significant) with the implementation of Mitigation Measures AIR-1, BIO-6, BIO-8, BIO-9a, BIO-9b, HAZ-1, CUL-1a, CUL-1b, and CUL-3 because they would sufficiently enhance consistency with adopted land use plans or policies including the San Francisco Bay Plan, the Suisun Marsh Protection Plan, the Solano County Local Protection Plan, and the Solano County General Plan. For these reasons, the Revised Project would cause no new significant cumulative impact and no substantial increase in the severity of a cumulative significant impact than was disclosed in the 2012 EIR.

3.9 PROJECT CONSISTENCY

A supplemental EIR augments the previous EIR to address a limited set of issues. Because the Revised Project is essentially a continuation of the activities described in the 2012 EIR and because none of the studies listed in Section 1.2.3 as having been completed following certification of the 2012 EIR affects the impact significance conclusions reached in the 2012 EIR, the impact analysis of many of the resource areas addressed in the 2012 EIR is unchanged. Therefore, the scope of this SEIR is limited to the resource areas listed in Section 1.3.4; the project consistency analysis discussed in this section concludes that the Revised Project would otherwise not alter the conclusions reached in the 2012 EIR.

3.9.1 Introduction

The SEIR documents and analyzes the changes between the San Francisco Bay and Delta Sand Mining Project analyzed in the 2012 EIR and the proposed Revised Project. The highly regulated activities associated with the Revised Project would occur in substantially the same manner as those analyzed in the 2012 EIR. The Revised Project would continue the use of current material offloading facilities, which are a subset of sites identified in the 2012 EIR and proposes a reduction in the authorized annual materials extraction volume in four out of the six lease areas. No new information of substantial importance to the Revised Project that was not known and could not have been known at the time the 2012 EIR was certified as complete has become available. Based on an initial review and analysis, the Revised Project would have no impact or a less-than-significant impact on eight environmental issue areas: aesthetics, agricultural resources, geology and soils, noise, population and housing, public services, transportation, and utilities and service systems. The primary reasons for these determinations are set forth below.

3.9.2 Aesthetics

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on aesthetics. The same is true for the Revised Project. The proposed Revised Project would not involve any changes to current operations that could have an adverse effect on a scenic vista, substantially damage scenic resources, degrade the existing visual character or quality of the area, or create new sources of light and glare. Therefore, no impact on the visual quality of the Project area would occur. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the

severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to aesthetics.

3.9.3 Agricultural Resources

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on agricultural resources. The same is true for the Revised Project. There are no agricultural resources within the area of potential effect of the proposed Revised Project; therefore, no impact on agricultural resources would occur. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to agricultural resources.

3.9.4 Geology and Soils

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no significant impact on geology and soils. The same is true for the Revised Project. The proposed Revised Project would continue to remove and disturb the Bay substrate within the proposed lease areas; there are no anticipated changes to current operations. Current operations have no significant impact on geology or soils, such as the loss of topsoil or the exposure of people and structures to seismic hazards, landslides, or other geologic hazards. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to geology and soils.

Effects on the geomorphology of the Bay floor, on sediment supply and transport, and on the hydrodynamics of Bay waters are considered in this SEIR in Section 3.4, Hydrology and Water Quality.

3.9.5 Noise

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on noise. The same is true for the Revised Project. The proposed Revised Project is not anticipated to generate operational noise greater than that presently resulting from current operations under baseline conditions. Therefore, the Revised Project would not expose people to higher levels of noise than are currently experienced, or to cause new sources of noise or vibration. Therefore, no noise impact would occur. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to noise.

Potential impacts of noise and vibration on aquatic wildlife are considered in this SEIR in Section 3.2, Biological Resources.

3.9.6 Population and Housing

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on population and housing. The same is true for the Revised Project. The Revised Project would not result in the direct construction of new housing or infrastructure and would not displace people from existing housing. Thus, the Revised Project would not have an impact on population and housing. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to population and housing.

3.9.7 Public Services

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on public services. The same is true for the Revised Project. The Revised Project would not directly increase demands on or require the construction of additional fire or police facilities, school facilities, parks, or any other public service. Therefore, no impact on public services would occur. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to public services.

3.9.8 Transportation

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on transportation. The same is true for the Revised Project. The Revised Project is not anticipated to involve any changes to current operations that would affect land or water transportation, including possible effects on roadways, parking, and navigational channels. Therefore, no new impact on transportation would occur. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to transportation.

3.9.9 Utilities and Service Systems

Section 1.1.5 of the 2012 EIR concludes that the then-proposed sand mining would have no impact on utilities and service systems. The same is true for the Revised Project. The Revised Project would not require the expansion of existing

utilities, including water supply, wastewater treatment, and power. Thus, no impact on utilities and service systems would occur. Accordingly, the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact relative to the impact disclosed in the 2012 EIR with respect to utilities and service systems.

4.0 ALTERNATIVES

4.1 INTRODUCTION TO ALTERNATIVES

The California Environmental Quality Act (CEQA) and the CEQA Guidelines require a lead agency to analyze a reasonable range of alternatives to a proposed project that could feasibly attain most of the basic objectives of the project while substantially reducing or eliminating its significant environmental effects. CEQA also requires an EIR to evaluate a "no project" alternative to allow decision-makers to compare the impacts of approving a project with the impacts of not approving it. Other than the requirement to analyze a "no project alternative," no ironclad rule governs the nature or scope of the alternatives to be discussed other than the rule of reason, which demands that an EIR set forth only those alternatives necessary to permit a reasoned choice and examine in detail only the alternatives that the lead agency determines could feasibly attain most of the project's basic objectives. The range of feasible alternatives is selected and discussed in a manner to foster meaningful public participation and informed decision making (14 Cal. Code Regs. §15126.6).

Consistent with these tenets of CEQA, this Section describes the key considerations used to identify and screen potential alternatives for the Revised Project, explains why potential alternatives were eliminated from further consideration, and describes the alternatives that were carried forward for more detailed analysis.

4.2 ALTERNATIVES DEVELOPMENT AND SCREENING

4.2.1 Alternatives Development and Screening Methodology

The Commission screened and thereafter selected alternatives to be analyzed in greater detail based on the considerations listed in CEQA Guidelines section 15126.6, chiefly:

> *An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which*

> *are infeasible…. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.*

In implementing this guidance, the Commission identified alternatives to the Revised Project, screened them using the four screening criteria described below, and then either retained them for further analysis or eliminated them as described below.

4.2.2 Alternatives Identification

Alternatives typically involve changes to the location, scope, design, extent, intensity, or methods of construction or operation of a proposed project. The Commission identified and developed alternatives to the Revised Project based on input received from comments on the Notice of Preparation (NOP), information presented or developed by the Commission, comments received during consultation with responsible and trustee agencies, and information provided by the Applicants.

The Commission screened alternatives based on the four screening criteria enumerated below to foster meaningful public participation and informed decision making. The results of the screening process are presented in the sections that follow.

4.2.3 Screening Criteria

4.2.3.1 Screening Criterion 1: Project Objectives

Screening criterion one is whether a potential alternative would meet most of the basic project objectives. A project's statement of objectives describes the purpose of the project and the reasons for undertaking it. Alternatives that fail to meet the fundamental project purpose need not be addressed in detail in the EIR (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* [2008] 43 Cal.4th 1143).

As explained in Section 2.2 of this SEIR, the purpose of the Revised Project, as stated by the Applicants, is to assure the availability of marine sands for commercial and public purposes within the greater San Francisco Bay area. The basic objective of the Revised Project is to continue to mine sand at an economically viable level over the next 10 years to make this mineral resource available for commercial and public use.

4.2.3.2 Screening Criterion 2: Potential Feasibility

Screening criterion two is whether the potential alternative would be "potentially feasible." In this context, feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (Pub. Res. Code §21061.1; CEQA Guidelines §§15126.6, 15364). According to CEQA Guidelines section 15126.6(f)(1), "Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives." Although EIRs must contain a discussion of potentially feasible alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by lead agency decision-makers who may consider evidence beyond that found in this EIR (Pub. Res. Code §21081(a)(3)).

4.2.3.3 Screening Criterion 3: Avoidance or Substantial Reduction of Significant Impacts of the Revised Project

Screening criterion three is whether a potential alternative would be able to avoid or substantially lessen any of the potentially significant impacts of the Revised Project. Existing mitigation measures identified in the 2012 EIR have been revised or supplemented as follows in Chapter 3, Project Impacts and Mitigation Measures:

To address the Revised Project's potential significant unavoidable impact on delta and longfin smelt as described in Impact BIO-8, mitigation measures from the 2012 EIR have been updated to require the following: :

- **Mitigation Measure MM BIO-8**: Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt.

To address the Revised Project's potential to cause a significant impact relating to the entrainment and mortality of white sturgeon and Chinook salmon during sand mining as described in Impact BIO-9, mitigation measures from the 2012 EIR have been updated to require the following

- **Mitigation Measure BIO-9a**. Applicants shall minimize the potential for entrainment and mortality of white sturgeon.

- **Mitigation Measure BIO-9b**. Applicants shall implement operational restrictions and requirements for the avoidance and minimization of entrainment of Chinook salmon.

New Revised Project Mitigation Measure added for tribal cultural resources which was not specifically analyzed in the 2012 EIR.

- **Mitigation Measure MM CUL-1b.** Cease operations and notify consulting Native American tribes if the find is Native American in origin.

4.2.3.4 Screening Criterion 4: Remote or Speculative

Screening criterion four is whether the implementation of a potential alternative is remote or speculative (CEQA Guidelines §15126.6(f)(2)). A lead agency may conclude that an alternative is remote or speculative if significant changes in governmental policy or legislation would be needed to carry it out or if it is unlikely as a practical matter to be carried out within the reasonable future or is contingent on the occurrence of uncertain future events. In *Bowman v. City of Petaluma* (1986) 185 Cal.App.3d 1065, for example, the Court upheld a lead agency's conclusion that an alternative was made infeasible on the basis of its resulting in "years of additional delay while [it] was designed, designs were approved, rights of way were secured by purchase or eminent domain, an independent environmental review was pursued to completion, and [it] was finally built." Eliminating unrealistic or conjectural alternatives from detailed analysis in the EIR allows decision makers and members of the public to focus on alternatives capable of being approved and carried out in lieu of the project as proposed.

4.2.4 Results of the Screening Process

Potential alternatives were reviewed against the above criteria. Four alternatives were eliminated (see Section 4.3 below) based on the infeasibility of mining methods, the potential of the alternative to cause additional or more severe impacts, or the inability of the alternative to meet the "underlying fundamental purpose" of the Revised Project. Those alternatives that were found to be technically feasible and consistent with the Revised Project's basic objective were reviewed to determine if the alternative had the potential to reduce the environmental impacts of the Revised Project.

In light of the facts of the Revised Project and CEQA's direction that an EIR consider "only those alternatives necessary to permit a reasoned choice," the Commission, as lead agency, has determined that there are no suitable alternatives to the Revised Project that would meet the fundamental purpose of the Revised Project or most of the basic project objectives. Accordingly, the agency has determined that it is appropriate to analyze two alternatives in detail: the Revised Project and a No Project Alternative.

4.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FULL EVALUATION

Consistent with CEQA Guidelines Section 15126.6(c), an EIR should identify "any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination." The 2012 Project and the Revised Project are substantially similar to one another in that they share a common purpose and would result in substantially similar impact conclusions (a single new mitigation measure (MM CUL-1b) --for tribal cultural resources-- has been identified in the context of the Revised Project relative to the 2012 Project). In addition, a new mitigation measure (MM BIO-9a) – for impacts on white sturgeon has been identified to reflect the species new consideration as a sensitive species by CDFW. Based on the observation of these similarities, the CSLC elected to revisit the potential alternatives initially considered in the 2012 EIR in the current context. The 2012 EIR initially considered four potential alternatives that ultimately were rejected from more detailed consideration: Mining of Shipping Channels Alternative, Import of Sand Alternative, Central Bay Only Alternative, and Suisun Bay and Delta Only Alternative (2012 EIR Section 3.2, pages 3-4 through 3-7). Each is discussed below (see Sections 4.2.3.1 through 4.2.3.4). Further, based on the observation of similarities between the 2012 Project and the Revised Project, the CSLC revisited the suite of alternatives that the 2012 EIR carried forward for more detailed analysis and determined that, among them, the Clamshell Dredge Mining Alternative (2012 EIR Section 3.3.3, pp. 3-13 through 3-15) does not pass screening criteria in the context of the Revised Project (see Section 4.3.5, below).

In addition, CSLC requested input about potential alternatives from agencies and members of the public during the scoping period, but no potential alternatives were suggested in response. The NOP expressly invited input to assist CSLC in identifying and evaluating potential alternatives. One entity, the Native American Heritage Commission (NAHC), provided responsive input. A copy of the NAHC's letter is provided in Appendix B to this SEIR. In it, the NAHC

suggested that if a project may have a significant impact on a tribal cultural resource, then the lead agency's CEQA document must discuss whether feasible alternatives or mitigation measures exist to avoid or substantially lessen the impact on the identified tribal cultural resources. As described in Section 3.4, Cultural and Tribal Cultural Resources, the Revised Project would not cause a significant impact on a tribal cultural resource. Therefore, facts and evidence regarding the Revised Project's potential effects on tribal cultural resources do not support the development of an alternative focused on avoidance or reduction of impacts on tribal cultural resource-related considerations.

4.3.1 Mining of Shipping Channels Alternative

As described in 2012 EIR Section 3.2.1 (page 3-4), "[t]his alternative would restrict sand mining to areas that are maintained through periodic dredging of shipping channels." The CSLC rejected this alternative as infeasible in the 2012 EIR: "This alternative is considered technically infeasible, because, for the most part, sand of the grain size and quality sought by the sand miners (i.e., sand having a low percentage of fine material – silts, clay, and mud) is not deposited in the shipping channels." Because this continues to be true for the Revised Project, the CSLC has rejected the Mining of Shipping Channels Alternative as infeasible in this SEIR.

4.3.2 Import of Sand Alternative

As described in 2012 EIR Section 3.2.2 (page 3-4), "[t]his alternative would involve importation of sand from outside the Bay Area region, most likely from British Columbia or Mexico. Material would be imported by ocean barge or ship." The CSLC rejected this alternative in the 2012 EIR "because it does not meet the Project objective and because it would likely result in substantial new GHG emissions that would conflict with California climate change policy" (2012 EIR Section 3.2.2, pages 3-4 and 3-5).

The 2012 Project and the Revised Project share a common purpose, which is to renew necessary permits and approvals to continue mining sand at an economically viable level in San Francisco Bay for the next 10 years (see 2012 EIR Section 3.1.1, page 3-1; see also, Section 2.2 of this SEIR). Accordingly, the CSLC's rationale for rejecting the Import of Sand Alternative in the 2012 EIR remains valid for the Revised Project, the CSLC has rejected this alternative also in this SEIR: the alternative does not meet the objective of the Revised Project and so has been eliminated from more detailed consideration on the basis of Screening Criterion 1: Project Objectives.

Separately, the CSLC also has rejected the Import of Sand Alternative in this SEIR because (as was concluded in the 2012 EIR), it would likely result in substantial new GHG emissions that would conflict with California climate change policy. As explained in SEIR Section 3.6.3, Regulatory Setting, GHG emission reduction targets have gotten increasingly more strict since the 2012 EIR was certified: Assembly Bill 1279 (California Climate Crisis Act) requires the state to achieve net zero GHG emissions by 2045 or sooner as well as a reduction in statewide anthropogenic GHG emissions of 85 percent below 1990 levels. For these separate and independent reasons, the CSLC has rejected the Import of Sand Alternative from more detailed consideration in this SEIR.

4.3.3 Central Bay Only Alternative

As described in 2012 EIR Section 3.2.3 (page 3-5), "[t]he Central Bay Only Alternative would restrict sand mining to the Central Bay lease sites," which would reduce the total volume of sand proposed to be mined to 1,540,000 cubic yards. This volume is approximately 75 percent of the total volume of cubic yards per year for the Central Bay, Suisun Bay/Delta, and private lease areas as reported in Table I-1 of the 2012 EIR (page 1-3). The CSLC initially considered this potential alternative in the 2012 EIR because it would "avoid impacts on State and federally listed species in Suisun Bay and the western Delta" (2012 EIR, page 3-5). However, the CSLC then rejected it from more detailed consideration in the 2012 EIR "because it would foreclose all sand mining opportunities for one of the Applicants" and so would not achieve the objective of the 2012 Project.

Based on the proposed annual Revised Project volumes identified in Table 2-2 of this SEIR, the Central Bay Only Alternative would reduce the total volume of sand proposed to be mined to 1,395,000 cubic yards. This volume is approximately 80 percent of the proposed total volume of cubic yards per year for all lease areas. The CSLC's rationale for rejecting the Central Bay Only Alternative in the 2012 EIR continues to be true for the Revised Project, the CSLC has rejected the Central Bay Only Alternative in this SEIR based on Screening Criterion 1: Project Objectives.

4.3.4 Suisun Bay and Delta Only Alternative

As described in 2012 EIR Section 3.2.3 (page 3-5), "[t]his alternative would restrict mining to the Suisun Bay and western Delta mining leases only; no mining would occur in the Central Bay." Assuming that responsible agencies would authorize sand mining in the private lease area, this alternative would reduce the total

volume of sand proposed to be mined to 300,000 cubic yards, which is approximately 25 percent of the total volume of cubic yards per year for the Central Bay, Suisun Bay/Delta, and private lease areas as reported in Table I-1 of the 2012 EIR (page 1-3). The CSLC initially considered this potential alternative in the 2012 EIR because it would "would avoid impacts associated with mining in the Central Bay, particularly entrainment of the longfin smelt (Impact BIO-8)" (2012 EIR, page 3-5). However, the CSLC then rejected it from more detailed consideration "because the limited mining volumes would substantially limit the ability of this alternative to achieve the Project objective."

Based on the proposed annual Revised Project volumes identified in Table 2-2 of this SEIR, the Suisun Bay and Delta Only Alternative would reduce the total volume of sand proposed to be mined to 355,000 cubic yards. This volume is approximately 20 percent of the proposed total volume of cubic yards per year for all lease areas. Because the limited mining volumes would substantially limit the ability of the alternative to achieve the Revised Project objective of continuing to mine sand at an economically viable level over the next 10 years, the CSLC has rejected the Suisun Bay and Delta Only Alternative in this SEIR based on Screening Criterion 1: Project Objectives.

4.3.5 Clamshell Dredge Mining Alternative

As described in 2012 EIR Section 3.3.3 (page 3-13), the Clamshell Dredge Mining Alternative would mine sand using a clamshell bucket and crane rather than a suction dredge. The CSLC initially considered this alternative because the clamshell dredge method would substantially reduce the suction dredge's potential for entrainment of fish, but noted that the alternative could "mobilize more sediment into the water column, create a more extensive or severe turbidity plume, and take about five times longer to mine the same amount of material, thus resulting in greater amounts of air emissions" (2012 EIR, page 3-13). Further, "Central Bay currents would make clamshell dredge mining difficult to complete as an alternative" (2012 EIR, page 3-15).

As analyzed in SEIR Section 3.2, Biological Resources, the Revised Project would have a significant impact due to the potential entrainment and mortality of delta and longfin smelt even with the fish screen in place because the established significance threshold would be exceeded if the Revised Project has a potential to "take" any part of the population of a special status species (such as a state or federally endangered species) through direct effects or indirect harm through the disturbance or loss of habitat. Because the Clamshell Dredge Mining Alternative would reduce, but not avoid, the potential to take an

individual of a special status fish species, the Clamshell Dredge Mining Alternative would have the same impact in this regard as the Revised Project. Therefore, the CSLC has rejected the Clamshell Dredge Mining Alternative in this SEIR based on Screening Criterion 3: Avoidance or Substantial Reduction of Significant Impacts of the Revised Project.

4.4 ALTERNATIVES EVALUATED IN THE SEIR

4.4.1 No Project Alternative

4.4.1.1 Description

If the Revised Project is not approved, then none of the proposed changes identified in Section 2.4 of this SEIR would occur: new leases would not be issued in the Central Bay or the Suisun Bay/Delta, and the Commission would not authorize continued mining for a period of 10 years. The Petaluma, Mare Island, Collinsville, Pier 92, and Tidewater offloading facilities would be made available for use by others.

Under this alternative, this SEIR analysis assumes that the demand for sand currently served by the Project would be met either by other local sources, (such as local quarries and aggregate materials recycling facilities), or that sand would be imported in greater volumes than it currently is from more distant sources, such as British Columbia (Vancouver Island) or Mexico (Baja California), or would be provided by some combination of these sources. Section 4.5.5 of the 2012 EIR (p. 4.5-24 et seq.) identified aggregate quarries in the greater Bay Area that produce, or appear to produce, sand and showed the location of those quarries in Figure 4.5-1 (2012 EIR, p. 4.5-25). Although some Bay Area sand producers have ceased operations since the 2012 EIR was certified,[24] multiple sources of Bay Area sand continue to be available. Other potential local construction sand sources include, among others: in Marin County, Dutra's San Rafael Rock Quarry (Dutra Group 2021); in Conta Costa County, Martin Murietta's Clayton Aggregates (Martin Murietta 2025a, 2025b), the DeSilva Gates' Sunol Plant (DeSilva Gates 2025) and Brooks Island Sandstone Quarry (Perazzo and Perazzo 2025); in Alameda County, DeSilva Group's Sunol Valley

[24] Three examples include CEMEX Lapis sand plant (near Marina), which closed in 2023 as the last coastal sand mine operating in the contiguous United States; the Lehigh Permanente Quarry, which ceased quarrying are related operations, including sand extraction, in 2023 (San Jose Spotlight 2022); and Graniterock's Santa Cruz sand plant, which closed in January 2025 (Graniterock Supply 2025b).

Aggregate Quarry (Lamphier Gregory 2019), and Cemex's Pleasanton Eliot Aggregates Quarry (Cemex 2025); in San Mateo County, West Coast Aggregates' Pilarcitos Quarry (Coastside News 2024); in Santa Clara County, Stevens Creek Quarry (Stevens Creek Quarry, Inc. 2024); and in Monterey County, Graniterock's Quail Hollow Quarry (Graniterock Supply 2025a).

4.4.1.2 Comparison of Revised Project and The No Project Alternative

If the No Project Alternative were selected, then this SEIR assumes that air quality impacts associated with the supply of sand from other mining operations or sources would increase. 2012 EIR Table 4.5-12 (p. 4.5-28) summarized the comparison of the air quality impacts of the Project with the No Project Alternative and related discussion disclosed that increased health risk effects caused by increased operations of land-based quarries could be significant and unavoidable, since toxic air contaminants emitted by land-based quarries may impact residential developments and other sensitive receptors than offshore mining activities and water transportation. In the context of the Revised Project, this continues to be true.

The 2012 EIR determined that if demand could not be met by local sources, then sand would be imported from more distant sources such as British Columbia or Mexico. As analyzed in the 2012 EIR (p. 4.5-27 et seq.), transport of materials from British Columbia or Mexico would involve greater consumption of fossil fuels than sand mined locally. Most of the resulting emissions would occur off the coast and would therefore result in a lesser impact regarding criteria pollutant emissions generated within the Bay Area Air Basin.

If the No Project Alternative is selected, then none of the impacts of the Revised Project would occur with respect to remaining resources, such as biological resources, cultural and tribal cultural resources, hazards or the potential for incidents or accidents resulting in release of hazardous materials, hydrology and water quality, land use and recreation, and mineral resources. Specifically regarding cultural resources, the 2012 EIR disclosed (p. 4.6-14) that the high degree of sand movement on the bay floor due to natural forces would continue to degrade unrecorded cultural resources if they are present. In the context of the Revised Project, this continues to be true for cultural resources, including cultural resources that are also tribal cultural resources. Specifically regarding mineral resources, the No Project Alternative would not preclude future mining of the lease areas, and therefore would not have a significant adverse effect on the availability of known mineral resources.

4.4.2 Reduced Project Alternative

4.4.2.1 Description

This alternative would reduce permitted annual mining volumes to a level equivalent to the 2018-2022 average mined within the lease area (the five years immediately preceding issuance of the NOP). The total amount of material mined would be 701,612 cy per year, which is approximately 1,048,388 cubic yards per year less than is proposed under the Revised Project. It also is less than the baseline volume assumed for the Revised Project. The specific mining volumes for each lease parcel are shown in Table 4-2. Mining methods and off-loading would be the same as proposed for the Revised Project.

Although this alternative would permit less sand mining than is proposed under the Revised Project, it is feasible and would attain most of the Revised Project's objective because it reflects the Applicants' current mining levels averaged over a five-year period. Although total mining revenues would be reduced compared to the Revised Project because less sand would be mined under this alternative, variable costs associated with mining operations (such as CSLC royalty payments, labor, fuel, and vessel and equipment maintenance costs) also would be reduced. Because fixed costs associated with mining operations, which may include the cost of leasing offloading sites and vessel and equipment capital costs, would be distributed over less total revenue, net revenues from the mining operations would be somewhat reduced compared to those of the Revised Project.

4.4.2.2 Comparison of Revised Project and the Reduced Project Alternative

The Reduced Project Alternative could have grater impacts than the Revised Project on air quality and GHG emissions (the Revised Project's impacts on air quality and GHG emissions are analyzed in Section 3.6) as well as on noise (the Revised Project's impacts on noise are analyzed in Section 3.9.5). This is because it is assumed, as with the No Project Alternative, that under the Reduced Project Alternative, the construction industry's demand for sand beyond that supplied by the alternative would be met by land-based Bay Area quarries, aggregate recycling facilities, and greater volumes of sand imported from Mexico or British Columbia. 2012 EIR Table 4.5-13 (page 4.5-30) demonstrated that with each increment of reduced sand mining from the Bay and Delta (assuming that the demand for sand would be met from other sources) emissions of NOx, PM10, and CO2e rise substantially. This conclusion remains valid. Also, as with the No Project Alternative, it would be speculative to assume that, under the Reduced

Project Alternative, any particular quarry or facility would supply all of the material currently supplied from the Applicants' sand mining operations. In general; however, increased production at land-based quarries may lead to higher health risks, since toxic air contaminant emissions from land-based quarries may be more likely to impact residential developments and other sensitive receptors than offshore mining activities and transportation. For example, as disclosed in the EIR for the San Rafael Rock Quarry's 2009 Reclamation Plan Amendment (Marin County Community Development Agency 2009, page 4.2-26), existing residences are located as close as 150 feet from the fence line and 1,200 feet from the main quarry pit. The air quality and public health impacts that could result from increased sand production from existing sources that are located closer to sensitive receptors than the Revised Project could be significant and unavoidable.

The Reduced Project Alternative would have the same impact as the Revised Project on biological resources (delta and longfin smelt, white sturgeon, and Chinook salmon) because as long as sand mining occurs, there remains some potential for take of a listed or candidate species to occur. Mitigation Measures MM BIO-8 , MM BIO-9a, and MM BIO-9b would be required for the Reduced Project Alternative. Otherwise, because this alternative would reduce sand mining in the Bay and Delta to a greater extent relative to baseline levels than the Revised Project, it otherwise could result in further reductions in the significance of identified impacts. Nonetheless, the impact conclusions would remain the same as for the Revised Project because the same types of activities would occur in the same locations over the same 10-year period as for the Revised Project. The same mitigation measures would be necessary.

5.0 OTHER CONSIDERATIONS

As noted in Section 1, Introduction, the State Lands Commission (CSLC or Commission), in its capacity as lead agency under the California Environmental Quality Act (CEQA), certified the San Francisco Bay and Delta Sand Mining Project Environmental Impact Report (EIR) (State Clearinghouse No. 2007072036) (2012 EIR) on October 19, 2012. The Commission then authorized leases to two marine aggregate companies, Martin Marietta Marine Operations, LLC (Martin Marietta) and Lind Marine Inc. (Lind), or their predecessors in interest, to harvest sand commercially (sand mining) within the Central San Francisco Bay and Suisun Bay in 2012 and 2013, respectively. The Central Bay leases were reapproved by the Commission in 2016. The leases are referred to collectively as the *Leases*, and Martin Marietta and Lind are referred to collectively as the *Lessees* or *Applicants*.

The Applicants applied to the CSLC for new Leases to authorize commercial mining of sand for 10 additional years at reduced maximum annual and total sand mining volumes over the proposed lease term (Revised Project) relative to the maximum annual and total volumes previously evaluated under the 2012 EIR including the private Grossi Middle Ground lease. The Commission has prepared this Supplemental Environmental Impact Report (SEIR) to evaluate the potential significant environmental effects of the Revised Project.

In this Chapter 5, other considerations required by CEQA are addressed in Sections 5.1 through 5.7, socioeconomic effects are addressed in Section 5.8, environmental justice is addressed in Section 5.9 climate change and sea level rise considerations are addressed in Section 5.10, potential effects on Public Trust resources and values are considered in Section 5.11.

5.1 OVERVIEW OF OTHER CEQA CONSIDERATIONS

CEQA (Pub. Res. Code §21000 et seq.) and its implementing regulations, the CEQA Guidelines (14 Cal. Code Regs. §15000 et seq.), require an EIR to:

- Identify and focus on the significant environmental effects of a proposed project (§15126.2(a)) and describe any significant impacts that can be mitigated but not reduced to a level of insignificance (§15126.2(c))

- Mitigate a project's energy use if analysis reveals that the project may result in significant environmental effects due to wasteful, inefficient, or

unnecessary consumption or use of energy, or wasteful use of energy resources (Pub. Res. Code §21100(b)(3); 14 Cal. Code Regs. §15126.2(b))

- Identify significant irreversible environmental changes that would be caused by a proposed project should it be implemented (§15126.2(d))
- Identify any growth-inducing impacts of a project such as the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment (§15126.2(e))
- Identify any known areas of controversy or issues to be resolved (§15123(b))
- Identify the environmentally superior alternative (§15126.6(e)(2))

These elements are discussed in Sections 5.2 through 5.7 below.

5.2 SIGNIFICANT, AND SIGNIFICANT UNAVOIDABLE IMPACTS

CEQA Guidelines section 15126.2(a) requires an EIR to identify and focus on the significant environmental effects of a proposed project. Section 3, Project Impacts and Mitigation Measures, of this SEIR does so on a resource-by-resource basis and identifies mitigation measures to reduce potential significant adverse impacts.

CEQA Guidelines section 15126.2(c), requires an EIR to describe any significant impacts that cannot be reduced to a level of insignificance. Consistent with the conclusions of the 2012 EIR, Section 3 of this SEIR identified one significant unavoidable (Class I) impact on delta and longfin smelt (Impact BIO-8). All other identified impacts would be less than significant after mitigation.

5.3 ENERGY USE

CEQA requires an EIR to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (Pub. Res. Code §21100(b)(3); 14 Cal. Code Regs. §15126.2(b)). CEQA Guidelines Appendix F, Energy Conservation explains that the goal of conserving energy implies the wise and efficient use of energy. Appendix F further guides that "Potentially significant energy implications of a project shall be considered in an EIR to the extent relevant and applicable to the project."

Considerations relevant to an analysis of energy efficiency as identified in CEQA Guidelines Appendix F include the following:

- Energy consuming equipment and processes that will be used during project implementation including, if appropriate, the energy intensiveness of materials and equipment required for the project.
- Total energy requirements of the project by fuel type and end use.
- Energy conservation equipment and design features.
- Identification of energy supplies that would serve the project.

The Revised Project would continue to use the same equipment and implement the same processes as the Lessees currently do. The equipment employed; fuel volumes, sources, and demands; and other energy requirements of the Revised Project also would be the same as under current (baseline) conditions. The Revised Project would have no effect on local and regional energy supplies or on peak or base period energy demands, and would not require or provide additional energy capacity because there would be no net change on energy resources relative to baseline conditions. For these reasons, the revised Project would have no impact on the type of environmental factors contemplated by CEQA Guidelines Appendix F.

Section VI of CEQA Guidelines Appendix G suggests that lead agencies consider whether a proposed project could either result in potentially significant environmental impacts due to wasteful, inefficient, or unnecessary consumption of energy resources; or conflict with or obstruct a state or local plan for renewable energy or energy efficiency. The Revised Project would do neither. For the reasons discussed above, the Revised Project would cause no change to baseline conditions (and so no CEQA impact) on the consumption of energy resources locally or regionally. It also would not conflict with or obstruct any state or local plan for renewable energy, such as California's 100 percent zero-carbon energy planning goal by 2045 or the Commission's leadership in geothermal energy permitting and leasing on State-owned lands and participation in planning and management initiatives to sustainably develop floating offshore wind in federal waters off the California coast.

Consistent with CEQA (Pub. Res. Code §21100(b)(3)), the CEQA Guidelines (14 Cal. Code Regs. §15126.2(b), Appendix F, and Appendix G), the Commission has evaluated the potential energy impacts of the Revised Project and determined that it would have no impact on energy efficiency considerations.

5.4 IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines section 15126.2(d) requires an EIR to identify significant irreversible environmental changes that would be caused by a proposed project should it be implemented. However, CEQA (Pub. Res. Code §21100.1) and the CEQA Guidelines (14 Cal Code Regs. §15127) limit the application of this requirement exclusively to EIRs that are prepared in one of the following actions: (a) The adoption, amendment, or enactment of a plan, policy, or ordinance of a public agency; (b) The adoption by a local agency formation commission of a resolution making determinations; and (c) A project which will be subject to the requirement for preparing an environmental impact statement (EIS) pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA). Because the Revised Project consists of lease extensions and is not a plan, policy or ordinance, because the CSLC is not a local agency formation commission,[25] and because the Revised Project does not require the preparation of an EIS under NEPA, the provisions of CEQA Guidelines section 15126.2(d) do not require this SEIR to identify significant irreversible environmental changes of the Revised Project.

5.5 GROWTH INDUCEMENT

CEQA Guidelines section 15126.2(e) requires an EIR to identify any growth-inducing impacts of a project. In general terms, a project may induce spatial, economic, or population growth in a geographic area if it meets any one of the four criteria identified below:

- Removal of an impediment to growth (e.g., establishment of an essential public service or the provisions of new access to an area);
- Economic expansion or growth (e.g., changes in revenue base or employment expansion);
- Establishment of a precedent-setting action (e.g., an innovation, a change in zoning, or general plan amendment approval); or

[25] A Local Agency Formation Commission (LAFCO) is a California state-mandated, independent agency created that oversees and regulates the boundaries of local government agencies, including cities and special districts. LAFCOs were created by the State Legislature in 1963 and are governed by the Cortese-Knox-Hertzberg Act. By comparison, the CSLC was formed in 1938 by the State Lands Act and manages state-owned lands, including tide and submerged lands. See Section 4.9 for additional details.

- Development or encroachment in an isolated area or one adjacent to open space (i.e., being different from an "infill" type of project).

Section 6.3 of the 2012 EIR explains that the "environmental effects of induced growth are secondary or indirect impacts of a project. Growth can result in significant increased demand on community services and public service infrastructure; increased traffic, noise, degradation of air and water quality; and conversion of agricultural land to urban uses". Based on the considerations above, assessing the growth-inducement potential of a project such as the San Francisco Bay and Delta Sand Mining Project involves answering the question: Would the proposed sand mining operation remove an obstacle to growth and thus directly or indirectly support more economic or population growth or residential construction in the surrounding environment? The analysis in the 2012 EIR considered a variety of factors, such as economic conditions of the region, adopted growth management policies in the affected communities, and the availability of adequate infrastructure before concluding that the project would not be considered growth-inducing.

As described in Section 2.4 of this SEIR, the Revised Project would extend the activities described and analyzed in the 2012 EIR for 10 additional years, decrease the maximum allowable mining volumes, and continue the use of the Petaluma, Mare Island, Collinsville, Pier 92, and Tidewater offloading facilities. These proposed changes to existing, ongoing operations would not affect consideration of the factors that supported the Commission's 2012 determination and in and of themselves also would not be considered growth-inducing.

5.6 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

CEQA Guidelines section 15123(b) requires an EIR to include a brief summary of areas of known controversy. Any of the environmental issues considered during public scoping or in this Draft SEIR could become an issue of controversy. Preliminarily, the Commission has identified areas of controversy as including the issues and questions raised in comments received during the scoping process summarized in Section 1.2.5 of this SEIR. Scoping input received is provided in Appendix B and relates to: baseline conditions in the lease areas, potential impacts on cultural resources or tribal cultural resources; consistency with the Delta Plan; hydrology and water quality, including sediment, bathymetry, morphology, and sand loss; biological resources, including aquatic and terrestrial species and habitat; and the Public Trust. Each of these areas of known controversy is being evaluated by the Commission as part of its consideration of potential significant impacts, mitigation measures, and

alternatives and in the context of any decision whether to approve the Revised Project.

CEQA Guidelines section 15123(b) also requires an EIR to identify issues to be resolved, which include the choice among alternatives and whether or how to mitigate significant impacts. The following major issues are to be resolved:

- Determine whether the SEIR adequately describes the environmental impacts of the Revised Project.
- Choose among alternatives.
- Determine whether the recommended mitigation measures should be adopted or modified.
- Determine whether additional mitigation measures need to be applied to the Revised Project.

5.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

As explained in Section 6.6 of the 2012 EIR, CEQA Guidelines section 15126.6(d) requires an EIR to include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. Section 15126.6(e)(2) further states, in part, that "*If the environmentally superior alternative is the "No Project" alternative*, the EIR shall also identify an environmentally superior alternative among the other alternatives."

As analyzed in Section 4 of this SEIR, the No Project Alternative would be the environmentally superior alternative because it would avoid all of the potential significant impacts of the Revised Project. Therefore, consistent with the direction in CEQA Guidelines section 15126.6(e)(2) and based on the comparison of alternatives provided in Section 4 of this SEIR, among the other alternatives, the Commission preliminarily has identified the Reduced Project Alternative as the environmentally superior alternative. Additional information received in or developed during the agency and public review period for the Draft SEIR or during the Project approval process that could affect the Lead Agency's decision in balancing the respective benefits and consequences of the alternatives. Therefore, this preliminary determination as to which alternative is the Environmentally Superior Alternative will be confirmed or corrected in the Final SEIR.

5.8 SOCIOECONOMIC EFFECTS

5.8.1 Background

CEQA Guidelines section 15064(e) and section 15131 advise lead agencies that economic and social changes resulting from a project "shall not be treated as significant effects on the environment." However, such effects "may be used to determine the significance of physical changes caused by the project" (CEQA Guidelines §15131(b)). Evidence of social or economic impacts that do not contribute to, or are not caused by, physical impacts on the environment does not constitute substantial evidence of a potential significant CEQA impact (Pub. Res. Code §21080(e)(2); see also, *V Lions Farming, LLC v. County of Kern* (2024) 100 Cal.App.5th 412).

Section 5 of the 2012 EIR concluded that the San Francisco Bay and Delta Sand Mining Project analyzed in the 2012 EIR would result in no adverse socioeconomic effect. For the reasons discussed below, Commission staff has reached the same conclusion for the Revised Project.

5.8.2 Setting

To determine whether the Revised Project could cause a new significant impact or a substantial increase in the severity of previously identified significant impact relating to socioeconomics than was disclosed in the 2012 EIR, CSLC staff relied on the same 7-county study area relied on for this purpose in the 2012 EIR: San Francisco, Marin, Sonoma, Napa, Solano, Contra Costa, and Alameda counties. This study area takes into account the lands surrounding the sand mining lease areas and offloading facilities.

Table 5.8-1, *Socioeconomic Statistics, Population and Employment Sectors,* summarizes the estimated 2020 population of the State and seven Bay Area counties proximal to sand mining extraction or offloading operations (i.e., Alameda, Contra Costa, Marin, Napa, San Francisco, Solano, and Sonoma) as well as employment sectors by overall percentage of employment. (U.S. Census Bureau 2021a, 2021b).

5.8.3 Analysis and Conditions

A socioeconomic effect could occur if the Revised Project led to a substantial increase or reduction in sand mining operations in San Francisco Bay (e.g., if the number of operating sand mining tugs and barges were to meaningfully

Table 5.8-1. Socioeconomic Statistics, Population and Employment Sectors

Subject	California	San Francisco County	Alameda County	Marin County	Napa County	Sonoma County	Solano County	Contra Costa County
Total population	39,538,223	873,965	1,682,353	262,321	138,019	488,863	453,491	1,165,927
Agriculture, forestry, fishing and hunting, mining	2.0%	0.4%	0.3%	0.3%	4.2%	2.9%	0.8%	0.7%
Construction	6.6%	3.3%	5.9%	1.2%	6.0%	8.7%	10.5%	8.1%
Manufacturing	8.9%	5.7%	11%	1.1%	13.3%	9.6%	9.3%	6.3%
Wholesale trade	2.1%	1.1%	1.8%	0.6%	2.2%	2.6%	1.7%	1.5%
Retail trade	9.9%	8.2%	7.9%	1.6%	8.9%	10.9%	11.7%	10.3%
Transportation and warehousing, and utilities	6.2%	4.5%	5.9%	1.0%	3.6%	3.9%	6.2%	5.6%
Information	2.9%	6.3%	3.8%	1.0%	1.1%	2.0%	1.7%	2.0%
Finance and insurance, and real estate and rental and leasing	5.3%	8.4%	5.0%	1.3%	4.2%	4.5%	4.7%	7.1%

Subject	California	San Francisco County	Alameda County	Marin County	Napa County	Sonoma County	Solano County	Contra Costa County
Professional, scientific, and management, and administrative and waste management services	14.6%	26.6%	21.7%	2.8%	12.7%	14.0%	9.9%	19.2%
Educational services and health care and social assistance	22.3%	19.5%	21.2%	2.4%	21.9%	22.1%	22.1%	22.2%
Arts, entertainment, and recreation, and accommodation and food services	9.7%	8.1%	7.4%	1.3%	12.3%	9.3.%	9.5%	8.4%
Other services, except public administration	4.8%	4.0%	4.3%	1.3%	4.3%	5.0%	5.0%	4.6%
Public administration	4.6%	4.0%	3.7%	0.9%	5.3%	4.4%	6.8%	3.9%

Sources: U.S. Census Bureau 2021a, 2021b.

change); if the volume of extracted sand substantially increased; or if the Revised Project resulted in the displacement of specific industry sectors, small businesses, or communities that rely on the land and its resources for their livelihood (e.g., if community of subsistence fishermen were displaced by the Revised Project).

An increased number of operating tugs and barges would require the employment of additional operators, deck hands, and shoreside personnel. Conversely, a decrease in number would lead to a reduction in these jobs. The number of jobs involved is not large; approximately 20 full-time equivalent (FTE) employee positions are directly involved as crew members on sand extraction tugs and barges. This is a minuscule fraction of the number of employed persons in the San Francisco Bay Area. Given that no change in the number of tugs and barges has been included in the proposed Project, no socioeconomic effect relating to a change in the marine industry sector associated with tug and barge use would occur.

A second, separate socioeconomic effect could result if the Revised Project increased the volume of extracted sand compared to the baseline volume. Such an increase would increase the availability of local sand to some construction projects, potentially replacing sand procured from other sources at a higher price. This would cause a marginal decrease in the cost of new construction where that sand is used. However, sand is one of the lowest-cost construction commodities, so the change in cost would likely be a very minor component of the overall cost of a construction project and unlikely to have substantial ripple effects as a consequence (such as increased demand). As the volume expected to be extracted is lower than was extracted under previous permits, the Revised Project would have no socioeconomic effect relating to construction industry sectors or building materials suppliers.

A third type of socioeconomic effect could result if the Revised Project displaced specific industry sectors, small businesses, or communities that rely on the land and its resources for their livelihood. This could occur if, for example, the Revised Project caused the level of activity at any of the offloading sites to change substantially, requiring the reduction of shoreside mobile equipment, operators, and management personnel; or if community of subsistence fishermen were displaced by the Revised Project. The Revised Project would reduce the maximum allowable annual volume of sand harvested by a total of 289,866 cubic yards per year. The Applicants currently use five out of the nine offloading facilities described and examined in the 2012 EIR (i.e., Petaluma, Mare Island, Collinsville,

Pier 92, and Tidewater offloading facilities) and, as described in Section 2.4.3 of this SEIR, the Revised Project would continue to do so. The change in annual harvested volume suggests that activity levels could be affected at offloading sites; however, the use of any particular offloading site may be influenced by a number of factors, including proximity to the mining sites, regional demand for mined sand, and site ownership or use agreements between the sand miners and the site operators. Because the Revised Project would continue existing, ongoing operations within the same lease areas using the same techniques and the same subset of offloading facilities, no socioeconomic effect relating to displacement of people or businesses would occur.

For these reasons, the Revised Project would cause no new significant impact and no substantial increase in the severity of previously identified significant impact on socioeconomics than was disclosed in the 2012 EIR.

5.8.4 Relationship to Alternatives

The 2012 EIR found that under the No Project Alternative, the local need for sand would be met using existing quarries and facilities. This could result in some displacement of employment at the offloading sites, as they become less active and more sand is mined, processed, and transported from sources on land. To the extent that the need for sand is met by imported sand transported to the Bay Area by ship, the offloading facilities would continue to be active. There would be a loss of direct employment of those workers who operate and maintain the tug and barge fleet.

5.8.5 Cumulative Effects

Because the Revised Project would have no direct or indirect socioeconomic effect, it could not cause or contribute to any cumulative socioeconomic impact.

5.9 ENVIRONMENTAL JUSTICE

Environmental justice is defined by California law as "the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies" (Gov. Code §65040.12). This definition is consistent with the Public Trust Doctrine's principle that management of trust lands is for the benefit of all people.

The CSLC adopted an updated Environmental Justice Policy and Implementation Blueprint in December 2018 to ensure that environmental justice is an essential consideration in the agency's processes, decisions, and programs (CLSC 2018). The twelve goals outlined in the Policy reflect an urgent need to address the inequities of the past, so they do not continue. Through its policy, the CSLC reaffirms its commitment to an informed and open process in which all people are treated equitably and with dignity, and in which its decisions are tempered by environmental justice considerations. Among other goals, the policy commits CSLC to "Strive to minimize additional burdens on and increase benefits to marginalized and disadvantaged communities resulting from a proposed project or lease" (CLSC 2018).

Consistent with California law and the CSLC's Public Trust responsibilities, the CSLC discussed the distributional patterns of high-minority and low-income populations on a regional basis, characterized the distribution of such populations adjacent to the sand mining lease areas and the barge offloading facilities, and analyzed potential impacts in Section 5.2 of the 2012 EIR. The CSLC concluded that the San Francisco Bay and Delta Sand Mining Project analyzed in the 2012 EIR would result in no significant adverse effect on environmental justice considerations. For the reasons discussed below, CSLC staff have determined that the Revised Project would cause no new significant impact and no substantial increase in the severity of previously identified significant impacts relating to environmental justice considerations than was disclosed in the 2012 EIR.

5.9.1 Background

The U.S. Council on Environmental Quality (CEQ 1997) Environmental Justice Guidance defines "minorities" as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic origin, or Hispanic. The total minority population is calculated by subtracting the white alone, not Hispanic or Latino population from the total population. According to the CEQ Environmental Justice Guidance, minority populations should be identified if:

- A minority population percentage exceeds 50 percent of the population of the affected area.
- The minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (for example, a governing body's jurisdiction, neighborhood census tract, or other similar unit).

In addition, the CEQ Environmental Justice Guidance defines "low-income populations" as populations with mean annual incomes below the annual statistical poverty level (CEQ 1997). The CEQ does not provide a discrete threshold for determining when a low-income population should be identified for environmental justice. However, for consistency with the 2012 EIR, this analysis defines "low-income populations" in terms of household income. For 2025, the federal poverty guideline was defined as a household income less than $14,580 for a one-person household, and $24,860 for a family of three (U.S. Department of Health and Human Services 2025). Considering household income at the census block level (a census block presents a more granular resolution than a census tract; typically a census tract is made up of several census blocks), this analysis considers a population to be an environmental justice population if the low-income percentage (i.e., the percentage below the federal poverty guideline) of a census block is equal to or greater than 1.2 times that of the Community of Comparison.[26]

Census block groups with potentially significant minority populations are those having a percentage minority population more than 1.2 times that of the Community of Comparison.

The CSLC's Environmental Justice Policy and Implementation Blueprint (CLSC 2018) uses the terms "disadvantaged," "marginalized," and "vulnerable" interchangeably, intending to encompass a broader group of people than included in the definitions contemplated by SB 1000,[27] such as other low-income

[26] The concept of a Community of Comparison provides a basis for determining how disadvantaged a region might be, in relation to the community that surrounds it. Typically, the Community of Comparison is the smallest political entity that encompasses an impacted area. Generally it is a city, but other Communities of Comparison can occur. For example, the offloading site on the Petaluma River is on unincorporated land but is within the Sphere of Influence of the city of Petaluma. If it became necessary to examine environmental justice issues for an impacted region adjacent to that offloading site, the city of Petaluma's Sphere of Influence would be the most appropriate Community of Comparison.

[27] Footnote 1 of the Commission's policy (CSLC 2018) provides this explanation: "'*Disadvantaged communities*' is defined in… Health and Safety Code section 39711 as including those communities identified by CalEPA to be disadvantaged, taking into consideration environmental pollution and other hazards and concentrations of low income, high unemployment, and other socioeconomic factors. To identify these communities, CalEPA developed CalEnviroScreen and designated the highest scoring 25 percent of census tracts as disadvantaged communities. SB 1000 (Government Code §65302) defines

and minority populations that are disproportionately burdened by or less able to prevent, respond, and recover from adverse environmental impacts. It also uses the term *Native Nations* to encompass the federally and non-federally recognized California Native American tribes and tribal entities included on the list maintained by the Native American Heritage Commission.

5.9.2 Setting

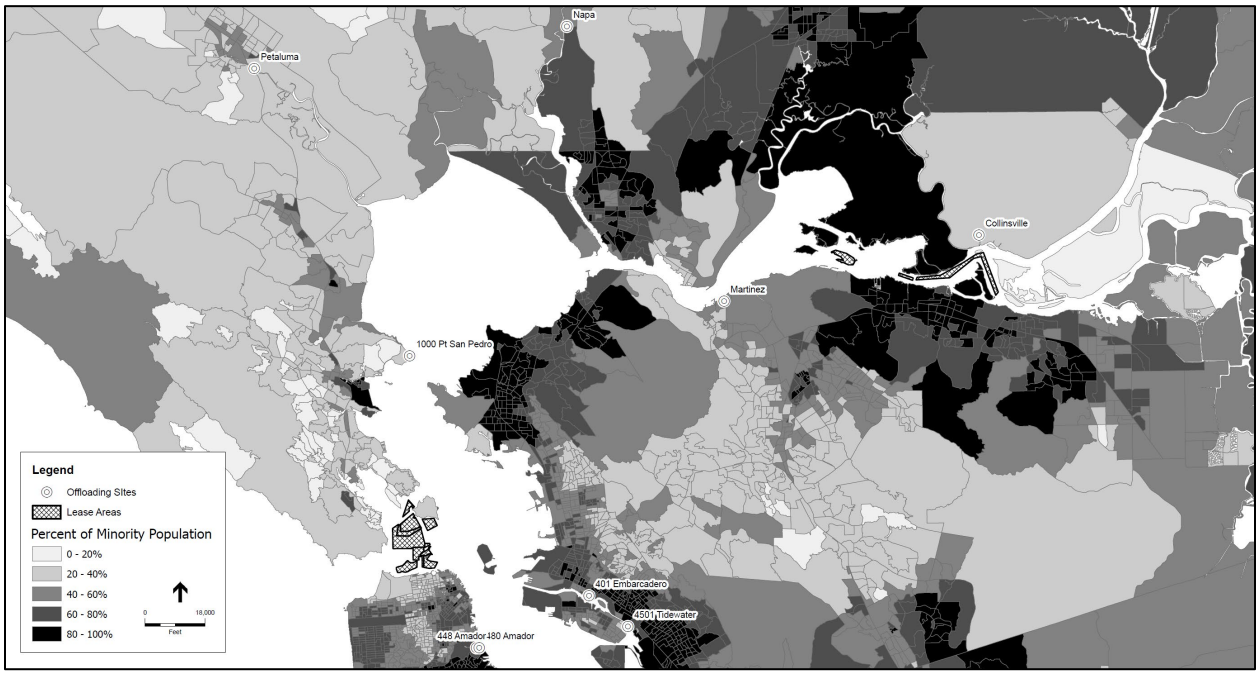
To determine whether the environmental justice aspects of the Revised Project could cause a new significant impact or a substantial increase in the severity of previously identified significant impact on environmental justice considerations than was disclosed in the 2012 EIR, CSLC staff relied on the same 7-county study area relied on for this purpose in the 2012 EIR: San Francisco, Marin, Sonoma, Napa, Solano, Contra Costa, and Alameda counties. This 7-county study area takes into account the lands surrounding the sand mining lease areas and offloading facilities.

Table 5.9-1 presents demographic data in the 7-county study area based on the most recently available information from U.S. Census 2021 American Community Survey 5-Year Estimates (U.S. Census Bureau 2021a, 2021b).[28] Using the definitions provided above, and the 2025 Demographic Update data, each census block group was evaluated for its percentage of minority populations. Separately, the average household income and household size for each census block group was used to evaluate the block group's relationship to the Federal poverty guideline. Figure 5-1 illustrates the percentage of minority populations in each block group. Figure 5-2 illustrates the ratio of household income level to poverty guideline, by block group. These maps also show the lease area boundaries and offloading sites. Several, but not all, of the offloading sites are in or very near areas that have high minority populations, low incomes, or both.

disadvantaged communities as including those identified by CalEPA's methodology, as well as 'an area that is a low-income area that is disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation.'"

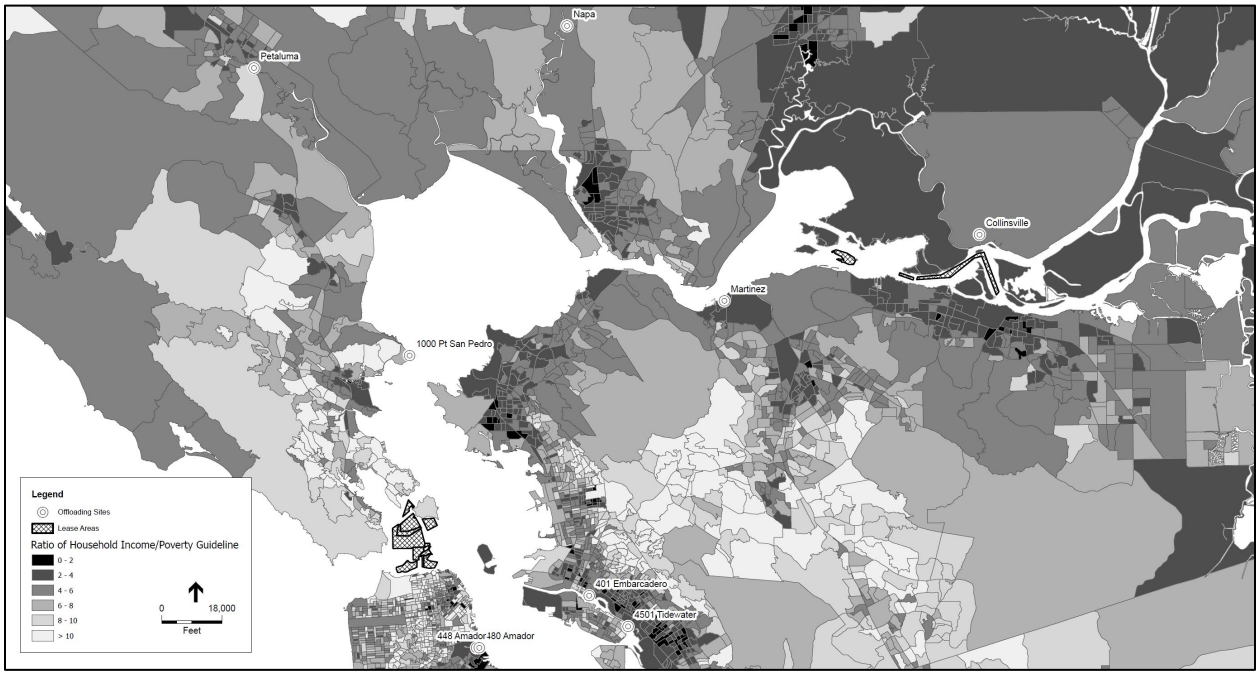
[28] American Community Survey estimates come from a sample population but collect more information and may be available sooner than data forms from the most recent full census of 2020. Because they are based on a sample of population, a certain level of variability is associated with the estimates. Supporting documentation on the American Community Survey's data accuracy and statistical testing can be found on the American Community Survey website in the Data and Documentation section available here: census.gov/programs-surveys/acs.

Figure 5-1. Percentage of Minority Population by Block Group



Source: Census, 2020; California State Lands Commission 2008, 2011; Hanson Marine Operations 2008; Hanson and Jerico 2007

Figure 5-2. Ratio of Mean Household Income to Federal Poverty Guideline by Block Group



Source: Census, 2023; California State Lands Commission 2008, 2011; Hanson Marine Operations 2008; Hanson and Jerico 2007

Table 5.9-1. Environmental Justice Statistics, Demographic Data

	Subject			
	Total population	**Median household income**	**Percent Minority**	**Percent below the poverty level***
California	39,538,223	$95,521	60.60%	12.00%
San Francisco County	873,965	$126,730	60.20%	12.00%
Alameda County	1,682,353	$119,931	69.40%	9.50%
Marin County	262,321	$139,644	28.20%	9%
Napa County	138,019	$104,686	49.50%	9%
Sonoma County	488,863	$100,707	38.80%	8.90%
Solano County	453,491	$100,027	61.00%	10.40%
Contra Costa County	1,165,927	$122,794	58.40%	8.30%

Notes:

* Poverty threshold as defined in the American Community Survey is not a singular threshold but varies by family size. Census data provides the total number of persons for whom the poverty status is determined and the number of people below the threshold. The percentage is derived from this data.

Sources: U.S. Census Bureau 2021a, 2021b.

5.9.3 Analysis and Conditions

5.9.3.1 Population and Economic Characteristics

Section 5.2.2 of the 2012 EIR explains that extraction activities on the leases do not present typical environmental justice concerns because the leases are so far removed from residential areas that the activities on the leases have no material effect on any residential area. For this reason, the 2012 EIR focused its environmental justice analysis on two considerations: (1) the possibility that the proposed sand mining could affect the health of low-income or minority populations who rely on fishing in the Bay to supplement their diet; and (2) impacts on low-income or minority populations near offloading areas. Because the Revised Project would use the same lease areas and fewer offloading sites as analyzed in the 2012 EIR and because proposed activities

would occur no closer to any residential area, the focus for this SEIR remains directed at the two considerations identified in the 2012 EIR.

In regard to the first issue, the 2012 EIR reached the conclusion that the likelihood of the Project causing an increased risk of disease in minority or low-income populations, or any person catching Bay fish for food, is negligible.

Regarding impacts on low-income or minority populations near offloading areas, the only impact that has the potential to affect populations in residential areas near offloading areas is toxic air emissions. As noted in Section 4.5 of the 2012 EIR regarding Air Quality, during offloading, toxic air emissions from diesel-powered equipment occur close to residential areas at (and only at) the Oakland Tidewater offloading site. For that location, the air emissions modeling results described in Section 4.5 and depicted in Figure C-4 in Appendix C of the 2012 EIR, showed a dispersion plume of diesel particulate matter in the immediate vicinity of the offloading site.

As described in the 2012 EIR, the innermost area shown in Figure C-4 represents an increased risk of additional cancer cases at a rate of 10 additional cancer deaths per million, but that area covers industrial land uses only. However, the outermost area, representing an increased risk at a rate of one to two cancer deaths per million, covers some residences. Other areas between the innermost and outermost areas do not cover any residences. At the time the 2012 EIR Notice of Preparation was issued, these impacts were below the CEQA threshold of significance for toxic air emissions established by the Bay Area Air Quality Management District (BAAQMD) (BAAQMD 1999). However, because BAAQMD had recently adopted new CEQA Guidelines which reduced the significance threshold for health risk to one additional cancer death per million in areas that are most heavily impacted by toxic air emissions (BAAQMD 2010), the 2012 EIR examined the vicinity of the Oakland Tidewater offloading site in accordance with the then-updated BAAQMD guidelines to determine if the population was either low-income or high-minority relative to its Community of Comparison, which is the city of Oakland.

BAAQMD has since updated its guidelines again in 2022, but did not reduce the significance threshold for cancer deaths due to toxic air emissions any further. As discussed in the context of air quality in Section 3.6, the Revised Project would result in toxic air contaminant exposure levels that would be less than those disclosed in the 2012 EIR for the approved project and would continue to result in less-than-significant impacts relative to the 1999 BAAQMD significance thresholds as well as relative to the current (2022) BAAQMD significance

thresholds. Therefore, the conclusions reached in the 2012 EIR regarding these health impacts on a high-minority or low-income community are unchanged.

Consistent with the CSLC's Environmental Justice Policy, which includes a commitment to work with Federal, State, regional, and local agencies to ensure consideration of disproportionate impacts on relevant populations, by instant or cumulative environmental pollution or degradation, the 2012 EIR examined the vicinity of the Oakland Tidewater offloading site, referred to as the Oakland Offloading Vicinity, which covers portions of two Census block groups. Table 5.9-2 compares these two Census block groups to the city of Oakland as a whole, in terms of minority population. Table 5.9-3 makes the same type of comparison, in terms of household income as it relates to the 2025 Federal poverty guideline. The Federal poverty guideline amount varies with the number of persons per household, so the amount can vary from block group to block group. Therefore, for this comparison, in each block group, the average number of persons per household was used to determine a poverty guideline income level applicable to that block group.

In sum, the minority population levels in the Oakland Tidewater Offloading Vicinity do not present an environmental justice issue, because the proportion of minority residents in each of the two block groups is not significantly more than in Oakland as a whole. However, with regard to income level, block group 4073.001 has a significantly higher percentage of households below the Federal Poverty Guideline (as it applies to that block group) than does the city of Oakland. Therefore, the CSLC Environmental Justice Policy would apply to this block group and will be considered by CSLC staff during review of the lease application.

5.9.2.2 California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen 4.0 Results

Developed by CalEPA's Office of Environmental Health Hazard Assessment (OEHHA), CalEnviroScreen identifies California communities with the highest pollution burdens and vulnerabilities and considers environmental, health, and socioeconomic information to produce scores and rank every census tract in the state. A census tract with a high score is one that experiences a much higher pollution burden than a census tract with a low score. State and local agencies use CalEnviroScreen to better understand and address environmental concerns in California communities. The latest version of the tool, CalEnviroScreen 4.0, analyzes the latest data from 21 indicators of environmental, public health and socioeconomic conditions in California's 8,000 census tracts to help policymakers prioritize activities and funding to assist communities that are disproportionately

Table 5.9-2. Minority Populations in Oakland Offloading Vicinity

	Population	
	Total	**Percent Minority**
City of Oakland	**436,504**	**71.3%**
Census Block Group 4073.001	1,366	91.1%
Census Block Group 4073.002	2,577	79.3%

Notes:

a. Counts are based on aerial photos taken in early 2025.

b. Block groups with potentially significant minority populations are those having a percentage minority population more than 1.2 times that of the Community of Comparison, and residential buildings within the Area of Concern.

Source: ESRI 2025

Table 5.9-3. Low-Income Households in Oakland Offloading Vicinity

	Households		
	Total	**Percent Below Federal Poverty Guideline**	
City of Oakland	**167,909**	**13%**	---
Census Block Group 4073.001	427	29.6%	15
Census Block Group 4073.002	451	21.4%	40

Notes:

a. Counts are based on aerial photos taken in early 2025

b. Block groups with potentially significant low-income populations are those having a percentage of low-income households more than 1.2 times that of the Community of Comparison, and residential buildings within the Area of Concern.

Source: ESRI 2025

burdened by multiple sources of pollution by promoting compliance with environmental laws, prioritizing site-cleanup activities and identifying opportunities for sustainable development. These indicators range from air and drinking water contaminants to pesticide use, toxic releases, cleanup sites, low birth weight infants, poverty and unemployment. A supplemental analysis accompanying the latest version of CalEnviroScreen showed the dramatic differences in the racial composition of the state's census tracts depending on their pollution burdens and vulnerabilities. The analysis found that the population of the top 10 percent of neighborhoods with the highest pollution burdens and vulnerabilities consist of 91 percent people of color, while the population of the 10 percent of neighborhoods with the lowest pollution burdens and vulnerabilities is 67 percent white.

CalEnviroScreen was not available as a tool during the preparation of the 2012 EIR, so the Commission is considering the results reported below for the first time in the context of the Revised Project. For purposes of the SEIR, the Census Tracts in which are located the five sites that will continue to be used for offloading activities were examined for the level of environmental and socioeconomic burden they carry, as compared to other communities in the state.

The Census Tract which encompasses the Petaluma offloading site has a CalEnviroScreen 4.0 percentile score of 60.6, placing it in the 61st to 70th percentile statewide. This indicates a moderate level of cumulative environmental and socioeconomic burdens compared to other communities in the state. The Census Tract in which the Mare Island offloading site is located falls within the 81st to 85th CalEnviroScreen 4.0 percentile statewide, suggesting it experiences higher cumulative environmental burdens than many other communities in the state. The offloading site located in Suisun City has a CalEnviroScreen 4.0 percentile score of 65-70 percent, representing a moderate-to-high environmental burden. Both the Tidewater offloading site in Oakland and the San Francisco offloading site, located in the Bayview-Hunter's Point neighborhood, fall within the 91st to 95th percentile according to CalEnviroScreen 4.0 data, placing them in some of the most highly burdened communities with respect to environmental and socioeconomic concerns, marking both of these as communities disproportionately burdened by environmental pollution.

Primary sources of pollutant exposures in these areas are traffic (i.e., exhaust from vehicles containing a large number of toxic chemicals, including oxides of nitrogen, carbon monoxide, and benzene), air quality (ozone and particulate matter), drinking water contamination, and hazardous waste facilities. Although these communities are undeniably environmental justice communities burdened

by multiple sources of pollution, the analyses contained in the SEIR show that the Revised Project would not cause an adverse change to existing conditions and so would not cause a significant environmental justice impact.

5.9.4 Relationship to Alternatives

The only environmental justice issue that would be affected under the No Project Alternative is the health risk from toxic air contaminants to populations in the vicinity of the Oakland offloading site. The No Project Alternative could potentially have lower impacts to air quality at the Oakland offloading site, and thus potentially fewer environmental justice impacts.

5.9.5 Cumulative Effects

As described, the Revised Project is essentially a continuation of existing sand mining operations, with some modification of the quantities that are permitted to be extracted. Although the cumulative effects scenario has been updated relative to the 2012 EIR (see SEIR Section 3.1.5), the analysis provided on a resource-by-resource basis in Section 3 of this SEIR shows that the Revised Project would cause no new significant impact and no substantial increase in the severity of a significant impact in the cumulative context than was disclosed in the 2012 EIR, including on any of the environmental factors that could disproportionately affect high-minority or low-income populations.

5.10 CLIMATE CHANGE AND SEA LEVEL RISE

5.10.1 Environmental Setting

Climate change, including sea level rise, impacts geophysical conditions of coastal zones in California, including in and around San Francisco Bay and in areas overlying the Revised Project site. Climate change and sea level rise will accelerate and exacerbate natural coastal processes, such as erosion and sediment transport; the intensity and frequency of storms, and wave action, currents; and ocean chemistry. Sea level rise is primarily driven by the thermal expansion of sea water as well as the melting of polar ice caps and land ice. Accelerating rates of sea level rise are attributed to increasing global temperatures due to human-induced greenhouse gas emissions.

According to the Intergovernmental Panel on Climate Change (IPCC)'s Sixth Assessment Report (AR6), global mean sea level increased by 0.7 feet between 1901 and 2018 (IPCC 2023). The average rate of sea level rise was 0.05 inches per year between 1901 and 1971, increasing to 0.07 inches per year between 1971 and 2006, and further increasing to 0.1 inches per year between 2006 and

2018. AR6 attributes the global retreat of glaciers since the 1990s and the decrease in Arctic Sea ice area between 1979 and 1988 as well as 2010 and 2019 to human-induced climate change via greenhouse gas emissions.

In addition to higher sea levels, climate change will cause higher intensity and more frequent precipitation that will further impact coastal areas (Sweet et al. 2022). The combination of these conditions will likely result in increased storm surge, wave run up, and flooding in and near coastal areas as well as in rivers and tidally-influenced waterways. Climate change and sea level rise will cause changing erosion and sedimentation rates, therefore impacting beaches, coastal landscape, and riverine areas. These areas will likely experience quicker rates of erosion due to increased run-up, wave force, and total water levels. Nonetheless, sediment deposition and accretion could accelerate along some shorelines, estuaries, and coasts, as rivers and creeks are expected to experience more intense sedimentation pulse events as a result of strong winter storms (intensifying sediment-bearing runoff) and periods of drought (intensifying the erodibility of watershed soils). Erosion, loss of shoreline, storm surge, and increased wetland inundation are all potential effects of accelerated sea level rise that could displace coastal human, vegetation, and wildlife populations, intensify coastal flooding, damage infrastructure, and lead to the loss of recreation areas, access to beaches, and public and private property.

5.10.2 Regulatory Setting

Executive Order B-30-15 instructed all State agencies to take climate change into account when making planning and investment decisions and to prioritize actions that enhance climate preparedness. More recent legislation has built on Executive Order B-30-15, ensuring its GHG emissions targets are legally binding and setting even more vigorous climate goals for California, including Senate Bill 32 in 2016, Executive Order B-55-18 in 2018, and Assembly Bill 1279 in 2022. The following discussion of climate change and sea level rise is intended to provide the regional overview and context considered by Commission staff pursuant to this Executive Order as well as facilitate the Commission's consideration of the Revised Project.

Because sea level rise could have substantial effects on coastal environments, federal and state agencies have developed guidance for incorporating sea level rise into project design and planning. The San Francisco Bay Conservation and Development Commission (BCDC) adopted its revised San Francisco Bay Plan Climate Change Policy Guidance in 2021. As revised, BCDC's policy provides non-regulatory information to assist in the development of prospective

projects regarding the requirements of climate change policies with permit applicants, local jurisdictions, and the public (BCDC 2021). It outlines State guidance on sea level rise, addresses the need to plan and prepare for sea level rise, and provides guidance on Bay Plan climate change policies and permitting. Its sea level rise projections reflect those outlined in the 2024 State Sea Level Rise Guidance document, discussed below.

The IPCC adopted a set of emission scenarios referred to as representative concentration pathways (RCPs), which represent a set of four future pathways named for the associated radiative forcing level[29] in 2100 relative to pre-industrial values: RCP 8.5, RCP 6.0, RCP 4.5, and RCP 2.6. In 2018, the Ocean Protection Council (OPC) published its State of California Sea-Level Rise Guidance document, which was updated and replaced in 2024. The 2018 document used three of the above RCPs to predict sea level rise, while the 2024 version provides sea level scenarios spanning a range of emissions pathways rather than several sets of probabilistic projections each linked to a different RCP (OPC 2024). The 2024 version reflects the more recent scientific research on sea level rise projections, incorporating the IPCC's 2023 AR6 report and NOAA's 2022 Federal Sea Level Rise Technical Report, titled Global and Regional Sea Level Rise Scenarios for the United States. These updates were incorporated into the report through a set of five California Sea Level Scenarios from 2020 to 2150 (OPC 2024). These scenarios are summarized for 2030, 2050, 2100, and 2150 in Table 5.10-1, San Francisco Sea Level Projections, by Scenario, below.

5.10.3 Environmental Considerations

Although the BCDC climate change and sea level rise policy guidance is advisory, the BCDC encourages projects to maintain consistency with it. The guidance directs projects to consider sea level rise in their planning, design, and engineering throughout the project life cycle and that, when necessary, projects pursue alternatives that minimize risks to the project and nearby coastal resources.

[29] The radiative forcing level refers to the globally averaged heat-trapping capacity of the atmosphere measured in watts/ square meter.

Table 5.10-1. San Francisco Sea Level Projections, by Scenario (in feet)[a]

	Low	Int-Low	Interm-ediate	Int-High	High
Year					
2030	0.3	0.4	0.4	0.4	0.4
2050	0.5	0.6	0.8	1.0	1.3
2100	1.0	1.6	3.1	4.8	6.5
2150	1.3	2.6	6.0	8.1	11.7
Exceedance Probabilities [b]					
Low Confidence Processes, Low Warming	90%	49%	7%	1%	<0.1%
Low Confidence Processes, High Warming	99.5%	96%	49%	20%	8%

Notes:

a. These projections represent the median values (50th percentile) for Sea Level Scenarios for California, relative to a 2000 baseline. Each scenario is defined and labeled according to the target value of global mean sea level rise in 2100: low (1.0 ft by 2100); Intermediate-Low (1.6 ft by 2100); Intermediate (3.3 ft by 2100); Intermediate-High (4.9 ft by 2100); High (6.6 ft by 2100).
b. The exceedance probabilities for the Sea Level Rise Scenarios are based on IPCC warming level-based global mean sea level projections.

Source: OPC 2024.

The inundation or flooding risk presented by sea level rise would not affect the Revised Project, as it is primarily located within submerged lands already overlain by water depths of 35-50 feet or more. While it is not expected that sea level rise would have direct impacts on sand mining operations, secondary impacts are more difficult to predict. As discussed in Section 5.10.1, sea level rise is expected to lead to the narrowing of beaches. Independently, a loss of coastal sediment could cause a loss of beach width. If these secondary impacts did occur, they would be considered effects of the environment on the project, not effects of the project on the environment.

As discussed in Section 3.4, Hydrology and Water Quality, changes to bathymetry and geomorphology are limited to the mined areas and, relative to No Proposed Mining, the Revised Project is not likely to cause a significant

impact on sediment transport and sand budgets in areas outside the vicinity of the lease areas, such as the San Francisco Bar or Ocean Beach. Section 3.4 also states that linkages between sub-embayment's sediment supply and exports are limited in the San Francisco Bay and sand transport between Central Bay and Suisun Bay is not observed. Thus, no substantial change in volume of sediment in the littoral system, and therefore a potential loss of beach area, is not expected to occur as a result of the Revised Project, as it is not expected to affect sediment transport outside of the immediate vicinity of the lease areas. Therefore, any changes to coastal sediment properties or beach widths pertaining to sea level rise would not be connected to the Revised Project and there would be **no impact.**

5.11 PUBLIC TRUST

The Commission is primarily a land and resource trust manager. The Commission has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. All tidelands and submerged lands, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust. The State holds these lands, known as "sovereign lands" for the benefit of all the people of the State, subject to the Public Trust. Public Trust purposes include, but are not limited to, waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. The Commission may grant leases on these State lands for such purposes as, but not limited to, ports, marinas, docks and wharves, mining, and dredging. The Revised Project involves the continued use of State sovereign lands under the CSLC's jurisdiction for Public Trust purposes.

Pursuant to its Public Trust responsibilities, the Commission is assessing the potential effects of the Revised Project on Public Trust resources and values. The Commission analyzed the Project approved under the 2012 EIR and found sand mining to be a Public Trust use under the purposes of waterborne commerce and navigation (Item 33, June 18, 2016). That analysis and its conclusion applies to the Revised Project. In this SEIR, environmental resource specialists have worked with Commission staff to define the environmental setting as it pertains to the Public Trust, define impact criteria for each identified resource issue area, describe effects (whether adverse or beneficial), and develop avoidance and minimization measures to reduce adverse effects to ensure that continued

mining operations, if approved, would be conducted in an environmentally sound manner that minimizes interference with other Public Trust values. The potential effects of the Revised Project on Public Trust resources and values are analyzed on a resource-by-resource basis in Section 3, Environmental Analysis.

6.0 MITIGATION MONITORING PROGRAM

As the Lead Agency under the California Environmental Quality Act (CEQA), the California State Lands Commission (CSLC) is required to adopt a program for reporting or monitoring regarding the implementation of mitigation measures (MMs) for the proposed San Francisco Bay and Delta Sand Mining Project (Revised Project), if it is approved, to ensure that the adopted MMs are implemented as defined in this Supplemental Environmental Impact Report (SEIR). This Lead Agency responsibility originates in Public Resources Code section 21081.6(a) (Findings, Mitigation Monitoring and Reporting), and the State CEQA Guidelines sections 15091(d) (reporting on or monitoring mitigation) and 15097 (Mitigation Monitoring or Reporting).

6.1 MONITORING AUTHORITY

The purpose of a Mitigation Monitoring Program (MMP) is to ensure that measures adopted to mitigate or avoid significant impacts are implemented. A MMP can be a working guide to facilitate not only the implementation of mitigation measures by Project proponents, but also the monitoring, compliance, and reporting activities of the CSLC and any monitors it may designate.

As Lead Agency, CSLC may delegate duties and responsibilities for monitoring to other qualified environmental monitors or consultants as deemed necessary, and such monitoring responsibilities may be assumed by responsible agencies, such as the California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service, National Marine Fisheries Service (NMFS), San Francisco Regional Water Quality Control Board (RWQCB), BCDC, USACE and the affected jurisdictions. The number of monitors assigned to the Revised Project will depend on the number of concurrent mining activities and their locations. The CSLC or its designee(s), however, will ensure that each person delegated any duty or responsibility is qualified to monitor compliance.

Any mitigation measure (MM) that requires the approval of the CSLC must allow at least 60 days for adequate review time. When an MM requires that a mitigation program be developed during the design phase of the project, the applicant must submit the final program to CSLC for review and approval at least 60 days before mining begins. Other agencies and jurisdictions may require additional review time. It is the responsibility of the environmental monitor assigned to each measure to ensure that appropriate agency reviews and approvals are obtained.

CSLC or its designee will also ensure that any deviation from the procedures identified under the monitoring program is approved by CSLC. Any deviation and its correction shall be reported immediately to the CSLC or its designee by the environmental monitor assigned to the mining event.

6.2 ENFORCEMENT RESPONSIBILITY

The CSLC is responsible for enforcing the procedures adopted for monitoring through the environmental monitor assigned to each mining event. Any assigned environmental monitor shall note problems with monitoring, notify the appropriate agencies or individuals about any problems, and report the problems to the CSLC or its designee.

6.3 MITIGATION COMPLIANCE RESPONSIBLITY

The Applicants are responsible for successfully implementing all the mitigation measures in the MMP and is responsible for assuring that these requirements are met by all of its mining contractors and field personnel. Standards for successful mitigation also are implicit in many MMs that include such requirements as obtaining permits or avoiding a specific impact entirely. Other mitigation measures include detailed success criteria. Additional mitigation success thresholds will be established by the applicable agencies with jurisdiction through the permit process and through the review and approval of specific plans for the implementation of the MMs.

6.4 GENERAL MONITORING PROCEDURES

6.4.1 Environmental Monitors

Monitoring procedures will be conducted during the mining events. The CSLC and the environmental monitor(s) are responsible for integrating the mitigation monitoring procedures into the mining events in coordination with the Applicants. To oversee monitoring procedures and to ensure success, the environmental monitor assigned to each mining event must be on site during that portion of an event that has the potential to create a significant environmental impact or other impact for which mitigation is required. The environmental monitor is responsible for ensuring that all procedures specified in the monitoring program are followed.

6.4.2 General Reporting Procedures

Site visits and specified monitoring procedures performed by other individuals will be reported to the environmental monitor assigned to the relevant mining events. A monitoring record form will be submitted to the environmental monitor by the individual conducting the visit or procedure so that details of the visit can be recorded and progress tracked by the environmental monitor. A checklist will be developed and maintained by the environmental monitor to track all procedures required for each MM and to ensure that the timing specified for the procedure is adhered to. The environmental monitor will note any problems that may occur, and any appropriate actions taken to rectify the problem.

6.4.3 Public Access to Records

The public is allowed access to records and reports used to track the monitoring program. Monitoring records and reports will be made available for public inspection by the CSLC or its designee on request.

6.5 TABLE OF MITIGATION

This section presents the mitigation monitoring table (Table 6-1) for each resource area that requires mitigation measures. Table 6-1 includes those MMs required to avoid, minimize, or mitigate the potential impacts of the Revised Project. The CSLC is responsible for ensuring the implementation of the measures. For MMs from the 2012 EIR that are unchanged and also applicable to the Revised Project, CSLC would coordinate with responsible agencies to ensure their implementation. Impacts that do not require mitigation are not included (see Executive Summary for a summary description of all impacts associated with the Revised Project).

For each significant impact, the following information is listed.

- Impact (number, title, and classification);
- Mitigation Measure (summary text of the measure);
- Location (where the impact occurs and where the mitigation measure should be applied);
- Monitoring reporting action (the action to be taken by the monitor or Lead Agency);

- Effectiveness criteria (how the agency can know if the measure is effective);
- Responsible agency; and
- Timing (during operation, etc.).

Table 6-1. Mitigation Monitoring Program

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
BIO-6: The Revised Project could result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging (Potentially significant, Class II).	BIO-6: Establish a 100-foot buffer around hard-bottom areas within and adjacent to Central Bay mining leases. Sand mining dredging operations must maintain a sufficient buffer zone around all hard bottom areas, especially Harding, Shag, and Arch rocks, such that dredging equipment does not come into physical contact with these sensitive hard bottom areas. This buffer zone will, at a minimum, be 100 feet from the outward edge of any hard bottom feature. In the event dredging equipment comes into physical contact with any hard bottom area during the term of the leases, it shall be immediately reported to the CSLC, who shall establish a new minimum buffer zone distance.	Hard bottom areas within and adjacent to Central Bay mining leases	Applicants to submit quarterly E-Trac data of Central Bay mining events.	Evidence that sand mining has taken place only outside the 100-foot buffer and hard bottom areas in the vicinity of the Central Bay leases.	CSLC	Quarterly E-Trac data to be submitted.
BIO-8: The Revised Project operation of sand mining activities will cause entrainment and mortality of delta and longfin smelt (Significant, Class I).	BIO-8: Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt. • Timing of dredging relative to the location of 2 parts per thousand (ppt) salinity (X2). To protect delta and longfin smelt and potentially eggs and larvae from mortality related to entrainment, sand mining activities shall be restricted upstream of the X2 location from December 1 through June 30 each year. The degree and duration of mining restrictions, and the specific locations where mining should be restricted during this sensitive seasonal period will be based on factors including the specific location of X2 relative to mining activities, species presence and relative abundance in the Revised Project area based on sampling data from the nearest survey stations, and the overall status of the species (population trend). Specific seasonal restrictions will be set through consultation with CDFW and would likely be a requirement of any ITP that may be issued for the Revised Project.	Applicable to all mining locations.	Applicants shall submit to CSLC written documentation that they have obtained an Incidental Take Permit (ITP) and have complied with the conditions contained in the ITP.	Evidence of a CDFW-approved Incidental Take Permit	CSLC/CDFW	Within 12 months of issuance of new leases approval, permits shall be obtained. Provide evidence of ITP issuance and any amendments to these permits within 5 days of permit issuance.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	• Restrictions imposed in any ITP required for the Revised Project are expected to have comparable effect as current restrictions on sand mining operations, which, as specified in the NMFS Biological Opinion and the USFWS Letter of Concurrence, serve to avoid and minimize take of delta and longfin smelt. These conditions include restrictions on pump priming, limiting the total mining volume, prohibiting mining in areas of shallow water depth and in proximity to shorelines, restricting mining to the designated lease areas which are away from sensitive habitat, and monitoring and reporting the location of each mining event. • Applicants will consult with CDFW and obtain ITPs for their activities prior to the commencement of any new mining under any renewed lease issued by CSLC or BCDC for the Revised Project. To further minimize take, the Applicants shall keep the end of the pipe and drag head as close to the bottom as possible, and no more than three feet from the bottom, when priming the pump or clearing the pipe. • The Applicants shall provide a copy of any final ITP issued by CDFW and any amendment to a final ITP to the CSLC and BCDC within five working days of receipt.					
BIO-9: The Revised Project could cause the entrainment and mortality of green sturgeon, white sturgeon, Chinook salmon and steelhead trout during sand mining. (Potentially Significant, Class II).	BIO-9a: Applicants shall minimize the potential for entrainment and mortality of white sturgeon. • Applicants will consult with CDFW as to whether an ITP is required for their activities prior to the commencement of any new mining under any renewed lease issued by CSLC or BCDC for the Revised Project. If an ITP is required by CDFW, it must be obtained before initiating any new mining under the Revised Project. The Applicants shall provide a copy of the final ITP issued by CDFW and any amendments to that permit to the CSLC and BCDC within five working days of receipt.	Applicable to all mining locations.	Applicants shall submit to CSLC written documentation that they have obtained an Incidental Take Permit (ITP) and have complied with the conditions contained in the ITP.	Evidence of a CDFW-approved Incidental Take Permit and compliance with its conditions.	CSLC/CDFW	Within 12 months of issuance of new leases approval, permits shall be obtained. Provide evidence of ITP issuance and any amendments to these permits within 5 days of permit issuance.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
BIO-9: The Revised Project could cause the entrainment and mortality of green sturgeon, white sturgeon, Chinook salmon and steelhead trout during sand mining. (Potentially Significant, Class II).	BIO-9b: Applicants shall implement operational restrictions and requirements for the avoidance and minimization of entrainment of Chinook salmon • Current restrictions on sand mining operations, as specified in the NMFS Biological Opinion and the USFWS Letter of Concurrence serve to avoid and minimize take of Chinook salmon. These conditions include restrictions on pump priming, limiting the total mining volume, prohibiting mining in areas of shallow water depth and in proximity to shorelines, restricting mining to the designated lease areas which are away from sensitive habitat, and monitoring and reporting the location of each mining event. Restrictions imposed in the final ITP for the Revised Project are expected to have comparable effect. • Applicants will consult with CDFW and obtain ITPs for their activities prior to the commencement of any new mining under any renewed lease issued by CSLC or BCDC for the Revised Project. To further minimize take, the Applicants shall keep the end of the pipe and drag head as close to the bottom as possible, and no more than three feet from the bottom, when priming the pump or clearing the pipe. • The Applicants shall provide a copy of the final ITP issued by CDFW for the Revised Project and any amendments to this permit to the CSLC and BCDC within five working days of receipt. In addition to the conditions of the final ITP, the following avoidance and minimization measures (developed in consultation with federal and state fish and wildlife agencies) to fully protect and mitigate impacts to juvenile Chinook salmon shall be implemented: • Operation and maintenance of the positive barrier fish screen on sand mining equipment;	Applicable to all mining locations.	Applicants shall submit to CSLC written documentation that they have obtained an Incidental Take Permit (ITP) and have complied with the conditions contained in the ITP.	Evidence of a CDFW-approved Incidental Take Permit and compliance with its conditions.	CSLC/CDFW	Within 12 months of issuance of new leases approval, permits shall be obtained. Provide evidence of ITP issuance and any amendments to these permits within 5 days of permit issuance.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	• Implementation of NMFS and USFWS operational restrictions on pump priming and clearing; • Review and approval by state and federal resource agencies of the mining operations of entrainment and impingement of juvenile salmonids avoidance measures within each agency's authority; and • Compliance monitoring and reporting to CDFW and other state and federal agencies.					
HAZ-1: Potential for accidental leak or spill of hazardous materials (Potentially Significant, Class II)	HAZ-1: Provide a current California non-tank Vessel Contingency Plan (CANTVCP)/ Certificate of Financial Responsibility (COFR) and spill response plan to the CSLC.	As applicable.	Provide evidence of CDFW approval of CANTVCP/ COFR and spill response plan to CSLC.	Evidence of approved CANTVCP or equivalent COFR and spill response plan.	CDFW Office of Spill Prevention and Response/ CSLC.	Within three months of certification of the EIR.
AIR-8: The Revised Project would result in emissions of GHGs that may have a significant impact on climate change (Potentially Significant, Class II).	AIR-1 Implement a Greenhouse Gas Reduction Plan Prior to startup of any new sand mining operations, the Project Applicants shall prepare and submit to the California State Lands Commission (CSLC) staff for approval a GHG Reduction Plan that demonstrates how the Applicants will lower and/or offset Project-related GHG emissions, such that GHG emissions will not exceed 5,400 metric tons of CO_2e in any calendar year during the 10-year lease period, or a total of 54,000 metric tons for the 10-year life of the Project. The GHG Reduction Plan shall include: • A detailed baseline inventory that identifies and calculates all sources of GHG emissions during the last full calendar year of mining operations. This inventory shall be verified by an accredited third-party verification body and reported to The Climate Registry.	Applicable to all mining locations.	Applicants shall provide the verified results of this inventory to the CSLC along with a description of how the GHG Reduction Plan is being implemented and documentation showing GHG offsets or reductions.	Verified annual GHG inventories must demonstrate reduction or offset of GHG emissions to target level.	CSLC or designated monitor.	Annual reports to be submitted to CSLC by March 31 each year.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	• A description of the strategies that the Applicants will employ to reduce and/or offset GHG emissions. Examples of such strategies include: o "Cold ironing" of vessels, where power from the electrical grid is substituted for diesel power during off-loading and while vessels are docked. o Use of biofuels or biofuel blends as a substitute or partial substitute for fossil fuels used to power tugs and barges. o Purchase of carbon offset credits verified by the Climate Action Registry. • Detailed calculations showing the expected reduction in GHG emissions that will result from the implementation of each strategy. Each year during the 10-year lease period, the Applicants shall conduct another inventory of GHG emissions that shall be verified and reported. In lieu of submitting the project level inventory of GHG emissions to the Climate Registry on an annual basis, the miners shall, as indicated in their Greenhouse Gas Reduction Plan, submit annual inventories to CSLC and the Mitigation Monitoring Team and will provide annual inventory verification performed by a qualified third party such as TRC Solutions. The Applicants shall provide the verified results of this inventory to the CSLC along with a description of how the GHG Reduction Plan is being implemented and documentation showing GHG offsets or reductions.					

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
AIR-9: The Revised Project would result in emissions of GHGs that may conflict with an applicable plan, policy, or program intended to reduce GHG emissions adopted by the State pursuant to AB 32 (Potentially Significant, Class II).	AIR-1 (as described for Impact AIR 8)	Applicable to all mining locations.	Applicants shall provide the verified results of this inventory to the CSLC along with a description of how the GHG Reduction Plan is being implemented and documentation showing GHG offsets or reductions.	Verified annual GHG inventories must demonstrate reduction or offset of GHG emissions to target level.	CSLC or designated monitor.	Annual reports to be submitted to CSLC by March 31 each year.
CUL-1: Sand mining activities could potentially result in the inadvertent discovery of archaeological historic-period resources (e.g., shipwrecks) or prehistoric Native American sites, or tribal cultural resources (Potentially Significant, Class II).	CUL-1a: Cease operations and notify CSLC and U.S. Army Corps of Engineers (USACE). If an inadvertent discovery is made of items of historic or prehistoric archaeological potential, all work activities shall immediately cease in the area of discovery. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include shipwreck remains, including wood, iron, and steel-hulled ships as well as smaller ferrous materials such as anchors, iron ballast, chain, iron hull fasteners, rigging, and fittings of various types. The Applicants shall take the following actions: 1. After cessation of activity, the contractor shall immediately contact the CSLC and USACE. The contractor shall not resume work in the area of the	Applicable to all mining locations.	Applicants to provide immediate notification of any inadvertent discovery and evidence that operations have ceased in the immediate area of the discovery. Applicants to provide annual report of all inadvertent discoveries and responses.	Evidence of appropriate response to inadvertent discovery including reporting and ceasing operations in the vicinity of the discovery.	CSLC	Ongoing during the lease period; annual reports to be submitted by March 31 each year.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	discovery until authorization is received from the CSLC and the USACE. 2. If CSLC staff determines that a historical or archaeological resource may be present within the Revised Project site, the Applicants shall retain the services of a qualified archaeologist who meets the Professional Qualifications Standards contained in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. In the case of a shipwreck or other maritime resources, a qualified maritime archaeologist shall be retained. The archaeologist will make an immediate evaluation of the discovery and will advise CSLC staff whether it is a resource of potential scientific/historical/cultural significance. The archaeologist will make a recommendation as to what action, if any, is warranted. Based on this information, CSLC staff may require, if warranted, specific additional measures to be implemented by the Applicants no more than 48 hours from receipt of the recommendation. 3. Measures might include: Preservation in situ of the archaeological resource (avoidance); archaeological data recovery; salvage and conservation of all or part of the resource if reasonably feasible (i.e., shipwreck); or further evaluation. CSLC staff may also require that the Applicants immediately implement a site security program if the resource is at risk from vandalism, looting, or other damaging actions. 4. Artifacts found on lands under the jurisdiction of the CSLC are considered the property of the State of California. Any disposition of these artifacts requires the approval of the CSLC. 5. The archaeologist shall submit an archaeological resources report to CSLC staff. This report shall include an evaluation of the historical significance of any					

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	discovered archeological resource, as well as a description of the archaeological and historical research methods employed.					
CUL-1: Sand mining activities could potentially result in the inadvertent discovery of archaeological historic-period resources (e.g., shipwrecks) or prehistoric Native American sites, or tribal cultural resources (Potentially Significant, Class II).	CUL-1b: Cease operations and notify consulting Native American tribes if the find is Native American in origin. If potential tribal cultural resources are identified, procedures outlined in MM CUL-1 shall be followed. Work stoppage shall remain in place until a qualified archeologist and Tribal Monitor/Representative from the consulting Tribes have jointly determined the nature and significance of the discovery. The Tribal Monitor/ Representative shall be asked to continue to monitor for tribal cultural resources. Tribal cultural resources shall neither be photographed nor be subjected to any studies beyond such inspection as may be necessary to determine the nature and significance of the discovery. The exact location of the resources shall be kept confidential and measures shall be taken to avoid future disturbance and potential vandalism. If feasible, impacts to previously unknown tribal cultural resources shall be avoided through preservation in place. If the on-site archeologist and Tribal Monitor/Representative determine that damaging effects on the tribal cultural resource can be avoided in place, then work in the area may resume provided the area of the discovery remains clearly marked for no further disturbance. If the on-site archeologist and Tribal Monitor/Representative determine that the find may be significant and if avoidance of the find is determined to be infeasible, CSLC shall be notified. CSLC staff shall work with the consulting Tribes on treatment/mitigation of the discoveries. Measures shall include documentation of the resource or other actions such as treating the resource with culturally appropriate dignity and protecting the cultural character and integrity of the resource. The Applicants shall be responsible for the	Applicable to all mining locations.	Applicants to provide immediate notification of discovery (as described for CUL-1) and if CSLC staff determined a potential tribal cultural resource may be present CSLC shall notify the consulting Native American tribes.	Same as CUL-1.	CSLC and consulting Native American tribes.	Ongoing during the lease period; annual summary report to be submitted by March 31 of each year.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	resultant mitigation costs as well as associated curation costs. All significant finding will be documented in a summary report that will be provided to pertinent consulting parties within a year of the finding.					
CUL-1: Sand mining activities could potentially result in the inadvertent discovery of archaeological historic-period resources (e.g., shipwrecks) or prehistoric Native American sites, or tribal cultural resources or (Native American) human remains (Potentially Significant, Class II).	Implement CUL-3 (as listed under Impact CUL-3).	Applicable to all mining locations.	Same as CUL-1.	Same as CUL-1.	County Coroner/CSLC.	Same as CUL-1.
CUL-3: Inadvertent discovery of human remains (Potentially Significant, Class II)	CUL-3: Cease operations and notify County Coroner. If human remains are discovered during sand mining activities, State Health and Safety Code section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code section 5097.98. If the remains are determined to be those of a Native American, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent (MLD) of the deceased Native American, who, within 48 hours, will recommend what course of action should be taken in dealing with the remains. The Applicants, MLD, and CSLC staff will make all reasonable efforts to develop an agreement for the treatment, with all appropriate dignity, of any human remains and items associated with the remains (State CEQA Guidelines section 15064.5.d).	Applicable to all mining locations.	Same as CUL-1.	Same as CUL-1.	County Coroner/CSLC.	Same as CUL-1.

Impact	Mitigation Measure	Location	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	The agreement would take into consideration the appropriate removal, analysis, custodianship, and final disposition of the human remains and items associated with the remains. If an agreement cannot be reached, then the landowner or authorized representative shall reinter the human remains and associated items with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. (Pub. Resources Code Section 5097.98.e).					
LU-4	Implement MM AIR-1, MM BIO-6, MM BIO-8, MM BIO-9a, MM BIO-9b, MM CUL-1a, CUL-1b, MM CUL-3, and MM HAZ-1.	Applicable to all mining locations.	As stated above. See MMs (BIO-6, BIO-8, BIO-9a, BIO-9b, CUL-1a, CUL-1b, CUL-3, and HAZ-1).	As stated above. See MMs (BIO-6, BIO-8, BIO-9a, BIO-9b, CUL-1a, CUL-1b, CUL-3, and HAZ-1).	As stated above. See MMs (BIO-6, BIO-8, BIO-9a, BIO-9b, CUL-1a, CUL-1b, CUL-3 and, HAZ-1).	Ongoing during the lease period; annual reports (applicable for MM AIR-1, MM CUL-1a, CUL-1b, and MM CUL-3) to be submitted by March 31 each year.

7.0 REPORT PREPARATION

This section presents the preparers and technical reviewers of this document. A consultant team headed by Environmental Science Associates prepared this document under the direction of the California State Lands Commission (CSLC).

7.1 LEAD AGENCY

California State Lands Commission

Christopher Huitt, Senior Environmental Scientist, Division of Environmental Science, Planning, and Management, Project Manager

Nicole Dobroski, Chief, Division of Environmental Science, Planning, and Management

Alexandra Borack, Assistant Chief, Division of Environmental Science, Planning and Management

Joseph Fable, Senior Attorney, Legal Division

Yessica Ramirez, Environmental Justice and Tribal Liaison

7.2 CONSULTANTS (UNDER CONTRACT WITH CSLC)

Environmental Science Associates

Michael Manka, Project Manager

Maria Hensel, Deputy Project Manager (Hazards and Hazardous Materials)

Matt Brennan, Ph.D., Senior Engineering Hydrologist (Hydrology and Water Quality

Maureen Downing-Kunz, Ph.D., Senior Engineering Hydrologist (Hydrology and Water Quality; Appendix E, Consideration of Post-2012 Technical Studies)

Justin Gragg, M.S., Principal Hydrologist (Hydrology and Water Quality)

Janna Scott, J.D. Project Director (QA/QC)

Matthew Fagundes (Air Quality and Greenhouse Gas Emissions)

Heidi Koenig, RPA (Cultural and Tribal Cultural Resources)

Kendra Hartmann, J.D. (Mineral Resources; Socioeconomic Effects and Environmental Justice)

Rosalind Searle (Land Use and Recreation, Climate Change and Sea Level Rise)

Applied Marine Sciences

Jay Johnson, Principal Senior Oceanographer (Entrainment Assessment, Benthic Survey and Analysis, Sand Mining Technical Study Peer Review Biological Resources)

Ellen Goldenberg, Senior Marine Biologist (Biological Resources Sand Mining Technical Study Peer Review, Benthic Changes Special Study)

Dane Hardin, Senior Marine Scientist, Principal (Benthic Study and Analysis, Benthic Changes Special Study)

Aroon Melwani, Ph.D., Senior Scientist, Central Coast Managing Partner (Benthic Changes Special Study)

Paul Salop, Senior Scientist, Principal (Entrainment Assessment)

Theresa Venello, Ph.D., Senior Oceanographer (Biological Resources, Benthic Changes Special Study)

Coast & Harbor Engineering

Scott Fenical, P.E., Principal (Hydrodynamic Modeling, Morphological Analysis)

Francis Salcedo, P.E., Associate (Hydrodynamic Modeling, Morphological Analysis)

7.3 AGENCIES CONSULTED

San Francisco Bay Conservation and Development Commission

Native American Heritage Commission

California Water Board, San Francisco Bay Regional Water Quality Control Board

Delta Stewardship Council

California Natural Resources Agency

California Department of Fish and Wildlife

7.4 REFERENCES CITED

Chapter 1 Introduction

AMS (Applied Marine Sciences, Inc.). 2025. *Benthic Infauna Data Analysis*. Prepared for California State Lands Commission.

Anchor QEA. 2023. *Synthesis of Sediment Transport Modeling with Previous Studies and Application to Management Questions.* Draft. Prepared for California State Coastal Conservancy, Independent Science Panel Sand Studies Technical Advisory Committee.

CSLC (California State Lands Commission). 2020. Hanson Marine Operations, Inc. Application to California State Lands Commission for New Leases No. PRC709, 2036,7779 and 7780. December 22, 2020.

eTrac Inc. 2018a. *Change Analysis Report, Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys.*

eTrac Inc. 2018b. *Additional Analysis Report 2008 – 2014 – 2018 Bathymetric Survey Comparison Central San Francisco Bay Lease Area Surveys.*

eTrac Inc. 2023. *Change Analysis Report Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys.*

Fenical/Coast and Harbor Engineering. 2025. *Sand Mining Impact Analysis: Desktop Morphology Study; Sediment Transport Modeling Study*. Prepared for California State Lands Commission.

Deltares. 2023a. *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast*. Part 1, "Morphodynamic Change and Bedform Dynamics."

Deltares. 2023b. *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast*. Part 2, "Mining Volume and Area Analysis."

Deltares. 2023c. *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast*. Part 3, "Synthesis."

Malkowski, M.A., Z.T. Sickmann, B. Jaffe, T. Fregoso, and D. Mohrig. 2023. *Fingerprinting Sand and Its Transport History through San Francisco Bay: Implications for Sand Mining and Its Environmental Effects.* Prepared for

California State Coastal Conservancy and San Francisco Bay Conservation and Development Commission.

McKee, L.J., T. Zi, S.A. Pearce, C. Grosso, A. Wong, M. Weaver, S. Dusterhoff, J. Lowe, E. Elias, and F. Roelvink. 2023. *Sand Budget and Sand Transport in San Francisco Bay*. A report prepared by SFEI-ASC for the State Coastal Conservancy (SCC) and the San Francisco Bay Conservation and Development Commission (BCDC). SFEI Contribution #1125. Richmond, CA.

NewFields (NewFields Sediment Management and Marine Sciences). 2018. *Benthic Assessment of Sand Mining In Central San Francisco and Suisun Bays: Data Report*. Edmonds, WA. Prepared for Hanson Marine Operations, Oakland, CA, and Lind Marine, Inc., Petaluma, CA. April 26, 2018.

Newfields(NewFields Sediment Management and Marine Sciences). 2018b. *Benthic Assessment of Sand Mining in Central San Francisco and Suisun Bays Data Report*.

NewFields (NewFields Sediment Management and Marine Sciences). 2020. "Benthic Assessment of Sand Mining Supplemnental Data Evaluation." Technical memorandum from Tim Hammermeister to San Mining Benthic TAC. January 21, 2020.

Chapter 2 Project Description

California State Lands Commission. 2012. Meetings Archive. Voting Record/Staff Reports. Calendar Item 101, "Consider Certification of a Final Environmental Impact Report and Issuance of Four New General Leases—Miner Extraction to Hanson Marine Operations for Sand Mining Operations in San Francisco Bay." October 19, 2012. Available: https://www.slc.ca.gov/Meeting_Summaries/2012_Documents/10-19-12/Items_and_Exhibits/101.pdf.

California State Lands Commission. 2013. Meetings Archive. Voting Record/Staff Reports. Calendar Item 42, "Issuance of a New General Lease—Minerals Extraction." February 22, 2013. Available: https://www.slc.ca.gov/Meeting_Summaries/2013_Documents/02-22-13/Items_and_Exhibits/C42.pdf.

Chapter 3 Environmental Analysis

Introduction to the Environmental Analysis

CSLC (California State Lands Commission). 2020. Hanson Marine Operations Inc. Lease for Sand Mining—Application for New Leases – Leases No. PRC 709.1, 2036.1, 7779.1, 7780.1. Submitted December 22, 2020.

CEQAnet. 2025. Governor's Office of Land Use & Climate Innovation. California Environmental Quality Act CEQAnet Web Portal. https://ceqanet.lci.ca.gov/.

Biological Resources

Achete, F., M. van der Wegen, J.A. Roelvink, and B. Jaffe. 2017. "How Can Climate Change and Engineered Water Conveyance Affect Sediment Dynamics in the San Francisco Bay-Delta System?" *Climate Change* 142:375–389.

ADFG (Alaska Department of Fish and Game). 2022. Special Status Species. Available: https://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.main. Accessed October 2022.

Allee, W.C., A.E. Emerson, O. Park, T. Park, and K.P. Schmidt. 1949. *Principles of Animal Ecology*. Philadelphia, PA: Saunders.

Allen L.G. 2014. Sportfish Profiles: Lingcod (*Ophiodon elongates*). Nearshore Marine Fish Research Program. Available: http://www.csun.edu/~nmfrp/lingcod.html.

Allen, L.G., M.A. Yoklavich, G.M. Cailliet, and M.H. Horn. 2006. "Bays and Estuaries." In: *The Ecology of Marine Fishes: California and Adjacent Waters*, eds. L.G. Allen, D.J. Pondella, and M.H. Horn, pp. 119–148. Berkeley and Los Angeles: University of California Press.

Allen, L.G., R. Robertson, and B. Lea. 2010. *Hypsypops rubicundus*, Garibaldi Damselfish. *The IUCN Red List of Threatened Species* 2010: e.T183367A8100806. Available: http://dx.doi.org.10.2305/IUCN.UK.2010-3.RLTS.T183367A8100806.en. Accessed August 2022.

Alpine, A.E., and J.E. Cloern. 1992. "Trophic Interactions and Direct Physical Effects Control Phytoplankton Biomass and Production in an Estuary." *Limnology and Oceanography* 37:946–955.

Ambler, J.W., J.E. Cloern, and A. Hutchinson. 1985. "Seasonal Cycles of Zooplankton from San Francisco Bay." *Hydrobiologia* 129:177–197.

AMS (Applied Marine Sciences, Inc.). 2009a. *Benthic Survey of Commercial Aggregate Sand Mining Leases in San Francisco Bay and Western Delta, August 2008.* Prepared for ESA and California State Lands Commission. March 2009.

AMS (Applied Marine Sciences, Inc.). 2009b. *Assessment and Evaluation of Fish and Invertebrate Entrainment Effects from Commercial Aggregate Sand Mining in San Francisco Estuary*. Prepared for ESA and California State Lands Commission.

AMS (Applied Marine Sciences, Inc.). 2015. *Subtidal Habitats and Associated Macrobenthic and Fish Communities Observed Offshore Coastal California Along Fiber Optic Cable Routes*. Prepared for ICF International.

AMS (Applied Marine Sciences, Inc.). 2025. *Changes in Benthic Communities at Commercial Aggregate Mining Leases in Central San Francisco Bay.* Prepared for ESA and California State Lands Commission.

Armstrong, D.A., B.G. Stevens, and J.C. Hoeman. 1981. *Distribution and Abundance of Dungeness Crab and Crangon Shrimp, and Dredging-Related Mortality of Invertebrates and Fish in Grays Harbor, Washington.* Technical Report to Washington Department of Fisheries and U.S. Army Corps of Engineers, Seattle District, by School of Fisheries, University of Washington, Seattle.

Avila, M., and R. Hartman. 2020. "San Francisco Estuary Mysid Abundance in the Fall, and the Potential for Competitive Advantage of *Hyperacanthomysis longirostris* over *Neomysis mercedis*." *California Fish and Wildlife* 106(1):19–38.

Ayala, G.S. 2021. *Eelgrass (*Zostera marina*) Invertebrate Community Recovery Following an Extreme Low Salinity Event.* Master's thesis, San Francisco State University.

Barnard, P.L., D.M. Hanes, D.M. Rubin, and R.G. Kvitek. 2006. "Giant Sand Waves at the Mouth of San Francisco Bay." *Eos* 87(29).

Barnard, P.L., D.H. Schoellhamer, B.E. Jaffe, and L.J. McKee. 2013. "Sediment Transport in the San Francisco Bay Coastal System: An Overview." *Marine Geology* 345:3–17.

Bashevkin, S.M., C.E. Burdi, R. Hartman, and A. Barros. 2023. "Long-Term Trends in Seasonality and Abundance of Three Key Zooplankters in the Upper San Francisco Estuary." *San Francisco Estuary and Watershed Science* 21(3):1–30.

Bashevkin, S.M., and B. Mahardja. 2022. "Seasonally Variable Relationships between Surface Water Temperature and Inflow in the Upper San Francisco Estuary." *Limnology and Oceanography* 67:684–702.

Bashevkin, S.M., B. Mahardja, and L.R. Brown. 2022. "Warming in the Upper San Francisco Estuary: Patterns of Water Temperature Change from Five Decades of Data." *Limnology and Oceanography* 67:1065–1080.

Baxter, R., K. Hieb, S. DeLeon, K. Fleming, and J. Orsi. 1999. *Report of the 1980–1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California.* The Interagency Ecological Program for the Sacramento–San Joaquin Estuary. Stockton: California Department of Fish and Game.

Baykeeper (San Francisco Bay Keeper). 2013. The Dungeness Crab's Amazing Journey. Available: https://baykeeper.org/news/column/dungeness-crab%E2%80%99s- amazing-journey. Accessed April 2025.

BCDC (San Francisco Bay Conservation and Development Commission). 2023. San Francisco Bay and Estuary. Available: https://bcdc.ca.gov/bay_estuary.html. Accessed January 2023.

Bearzi, M. 2005. "Aspects of the Ecology and Behaviour of Bottlenose Dolphins (*Tursiops truncatus*) in Santa Monica Bay, California." *Journal of Cetacean Research and Management* 7:75–83.

Bever, A.J., M.L. MacWilliams, and D.K. Fullerton. 2018. "Influence of an Observed Decadal Decline in Wind Speed on Turbidity in the San Francisco Estuary." *Estuaries and Coasts* 41:1943–1967.

Bollens, S.M., J.K. Breckenridge, R.C. Vanden Hooff, and J.R. Cordell. 2011. "Mesozooplankton of the Lower San Francisco Estuary: Spatio-temporal Patterns, ENSO Effects and the Prevalence of Non-indigenous Species." *Journal of Plankton Research* 33(9):1358–1377.

Borginis, E., and K.E. Boyer. 2015. "Salinity Tolerance and Competition Drive Distributions of Native and Invasive Submerged Aquatic Vegetation in the Upper San Francisco Estuary." *Estuaries and Coasts*. DOI: 10.1007/s12237- 015-0033-5.

Boyer, K., J. Miller, E. Borgnis, M. Patten, and J. Moderan. 2016. *Salinity Effects on Native and Introduced Submerged Aquatic Vegetation of Suisun Bay and the Delta.* Final report to the CALFED Ecosystem Restoration Program and California Department of Fish and Wildlife, grant #E1183007/ERP-11- S11.

Boyer, K.E., J.T. Lewis, W.J. Thornton, and R.S. Schneider. 2012. San Francisco Bay expanded inventory of submerged aquatic vegetation. Maps: http://online.sfsu.edu/katboyer/Boyer_Lab/Pondweeds!.html Final Report for National Oceanographic and Atmospheric Administration Southwest Fisheries.

Boyer, K.E., and S. Wyllie-Echeverria. 2010. *Eelgrass Conservation and Restoration in San Francisco Bay: Opportunities and Constraints*. Final Report for the San Francisco Bay Subtidal Habitat Goals Project.

Boyer, K.E., C. Zabin, S. De La Cruz, E. Grosholz, M. Orr, J. Lowe, M. Latta, J. Miller, S. Kiriakopolos, C. Pinnell, D. Kunz, J. Moderan, K. Stockmann, G. Ayala, R. Abbott, and R. Obernolte. 2017. Chapter 17: "San Francisco Bay Living Shorelines Restoring Eelgrass and Olympia Oysters for Habitat and Shore Protection." In: *Living Shorelines: The Science and Management of Nature-Based Coastal Protection,* eds. D.M. Bilkovic, M.M. Mitchell, M.K. La Peyre, and J.D. Toft, Chapter 17, pp. 333–362. CRC Press.

Brown, L.R., W.A. Bennett, R.W. Wagner, T. Morgan-King, N. Knowles, F. Feyrer, D.H. Schoellhamer, M.T. Stacey, and M. Dettinger. 2013. "Implications for Future Survival of Delta Smelt from Four Climate Change Scenarios for the Sacramento–San Joaquin Delta, California." *Estuaries and Coasts* 36:754–774.

Brown, L.R., W. Kimmerer, J.L. Conrad, S. Lesmeister, and A. Mueller-Solger. 2016. "Food Webs of the Delta, Suisun Bay, and Suisun Marsh: An Update on Current Understanding and Possibilities for Management." *San Francisco Estuary and Watershed Science* 14(3):1–41.

California Trout. 2022. Status of 32 Kinds of Salmon, Steelhead, and Trout. Available: https://caltrout.org/sos/native-species. Accessed October 2022.

Carlton, J.T. 1999. "The Scale and Ecological Consequences of Biological Invasions in the World's Oceans." In: *Invasive Species and Biodiversity Management*, eds. O. Sandlund, P. Schei, and A. Viken, pp. 195–212. Kluwer, Dordrecht, The Netherlands: Kluwer. Google Books.

Carr, L.A., and K.E. Boyer. 2014. "Variation at Multiple Trophic Levels Mediates a Novel Seagrass-Grazer Interaction." *Marine Ecological Progress Series* 508:117–128.

Carr, L.A., K.E. Boyer, and A.J. Brooks. 2011. "Spatial Patterns of Epifaunal Community Structure in San Francisco Bay Eelgrass (*Zostera marina*) Beds." *Marine Ecology* 32:88–103.

Carretta, J.V., E.M. Oleson, K.A. Forney, M.M. Muto, D.W. Weller, A.R. Lang, J. Baker, B. Hanson, A.J. Orr, J. Barlow, J.E. Moore, and R.L. Brownell Jr. 2022. *U.S. Pacific Marine Mammal Stock Assessments: 2021.* U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-663. Available: https://doi.org/10.25923/246k-7589.

CCWD (Contra Costa Water District). 2007. *Trends in Hydrology and Salinity in Suisun Bay and the Western Delta.* Water Resources Department. Concord, CA.

CCWD (Contra Costa Water District). 2010. *Historical Fresh Water and Salinity Conditions in the Western Sacramento–San Joaquin Delta and Suisun Bay.* Water Resources Department. Concord, CA.

CDFW (California Department of Fish and Wildlife). 2001. Bay Shrimp. In: *California's Living Marine Resources: A Status Report*, pp. 439–442.

CDFW (California Department of Fish and Wildlife). 2015a. Pacific Lamprey (*Entosphenus tridentatus*).

CDFW (California Department of Fish and Wildlife). 2015b. Western River Lamprey (*Lampetra ayresi)*.

CDFW (California Department of Fish and Wildlife). 2018. Longfin Smelt. Available: https://wildlife.ca.gov/Conservation/Fishes/Longfin-Smelt. Last updated January 3, 2018. Accessed January 2023.

CDFW (California Department of Fish and Wildlife). 2021. Delta Smelt. Available: https://wildlife.ca.gov/Conservation/Fishes/Delta-Smelt. Last updated November 5, 2021. Accessed January 2023.

CDFW (California Department of Fish and Wildlife). 2022. What Are California Marine Invasive Species? State of California. Last updated December 27, 2022. Accessed January 2023.

CDFW (California Department of Fish and Wildlife). 2023. California Natural Resources DataBase. Available: http://www.nrdb.org.

CDFW (California Department of Fish and Wildlife). 2025. Final California Commercial Landings. Available: https://wildlife.ca.gov/Fishing/Commercial/Landings. Accessed April 2025.

Chapman, E.D., A.R. Hearn, G.P. Singer, W.N. Brostoff, P.E. LaCivita, and A.P. Klimley. 2015. "Movements of Steelhead (*Oncorhyncus mykiss*) Smolts Migrating through the San Francisco Bay Estuary." *Environmental Biology of Fishes* 98:1069–1080.

Chapman, P.M., R.N. Dexter, and E.R. Long. 1987. "Synoptic Measures of Sediment Contamination, Toxicity and Infaunal Composition (the Sediment Quality Triad) in San Francisco Bay." *Marine Ecology Progress Series* 37:75–96.

Chin, J.L., D.L. Woodrow, M. McGann, F.L. Wong, T. Fregoso, and B.E. Jaffe. 2010. *Estuarine Sedimentation, Sediment Character, and Foraminiferal Distribution in Central San Francisco Bay, California*. U.S. Geological Survey Open-File Report 2010-1130.

Cloern, J.E. 2001. "Our Evolving Conceptual Model of the Coastal Eutrophication Problem." *Marine Ecological Progress Series* 210:223–253.

Cloern, J.E. 2018. "Patterns, Pace, and Processes of Water-Quality Variability in a Long-Studied Estuary." *Limnology and Oceanography* 64:S192–S208.

Cloern, J.E., and R. Dufford. 2005. "Phytoplankton Community Ecology: Principles Applied in San Francisco Bay." *Marine Ecology Progress Series* 285:11–28.

Cloern, J.E., A.D. Jassby, T.S. Schraga, E. Nejad, and C. Martin. 2017. "Ecosystem Variability along the Estuarine Salinity Gradient: Examples from Long-Term Study of San Francisco Bay." *Limnology and Oceanography* 62:S272–S291.

Cloern, J.E., T.S. Schraga, E. Nejad, and C. Martin. 2020. "Nutrient Status of San Francisco Bay and Its Management Implications." *Estuaries and Coasts* 43:1299–1317.

Cohen, A.N. 2010. *Impacts of the Removal or Disturbance of Sediments, Shells or Bedrock in San Francisco Bay.* San Francisco Bay Subtidal Habitat Goals Report.

CNDDB (California Natural Diversity Database). 2025. Special Animals List. Sacramento: California Department of Fish and Wildlife.

Conomos, T.J., R.E. Smith, and J.W. Gartner. 1985. "Environmental Setting of San Francisco Bay." *Hydrobiologia* 129:1–12.

Cormier, R., and M. Pitkin. 2008. *Pocket Guide to Birds of San Francisco Bay*. PRBO Conservation Science and California Partners in Flight. Available: https://pointblue.org/wp-content/uploads/2018/06/SFBayBirdPocketGuide4webPDFreduced-1.pdf.

Cosentino-Manning, N., B. Goeden, J. Kelly, M. Latta, K. Schaeffer, and C. Sweeney. 2010. *San Francisco Bay Subtidal Habitat Goals Report: Conservation Planning for the Submerged Areas of the Bay*.

Dege, M., and L.R. Brown. 2004. "Effect of Outflow on Spring and Summertime Distribution and Abundance of Larval and Juvenile Fishes in the Upper San Francisco Estuary." *American Fisheries Society Symposium* 39:49–65.

Dell'Apa, A., L. Schiavinato, and R.A. Rulifson. 2012. "The Magnuson-Stevens Act (1976) and Its Reauthorizations: Failure or Success for the Implementation of Fishery Sustainability and Management in the US?" *Marine Policy* 36(3):673–680.

Demers, S.A., J.Y. Takekawa, J.T. Ackerman, N. Warnock, and N.D. Athearn. 2010. "Space Use and Habitat Selection of Migrant and Resident American Avocets in San Francisco Bay." *The Condor* 112(3):511–520.

Dick, E.J., S. Ralston, and D. Pearson. 2007. *Status of Cowcod,* Sebastes levis*, in the Southern California Bight*. Santa Cruz, CA: National Marine Fisheries Service, Southwest Fisheries Science Center, Fisheries Ecology Division.

Dugdale, R.C., F.P. Wilkerson, V.E. Hogue, and A. Marchi. 2007. "The Role of Ammonium and Nitrate in Spring Bloom Development in San Francisco Bay." *Estuarine, Coastal, and Shelf Science* 73:17–29.

EPA (U.S. Environmental Protection Agency). 2010. Endangered Species Protection Program, Endangered Species Facts: Tidewater Goby.

Feyrer, F., B. Herbold, S.A. Matern, and P.B. Moyle. 2003. "Dietary Shifts in a Stressed Fish Assemblage: Consequences of a Bivalve Invasion in the San Francisco Estuary." *Environmental Biology of Fishes* 67:277–288.

FishBase. 2025. FishBase ver. 04/2025. Available: https://www.fishbase.se/search.php. Accessed April 2025.

Fofonoff, P.W., G.M. Ruiz, B. Steves, C. Simkanin, and J.T. Carlton. 2018. Welcome to CalNEMO! California Non-native Estuarine and Marine Organisms. Available: http://invasions.si.edu/nemesis/calnemo/. Accessed 2025.

Forney, K.A., J.E. Moore, J. Barlow, J.V. Carretta, and S.R. Benson. 2020. "A Multidecadal Bayesian Trend Analysis of Harbor Porpoise (*Phocoena phocoena*) Populations Off California Relative to Past Fishery Bycatch." *Marine Mammal Science* 37:546–560.

Gearty, A.J., T.R. Ignoffo, A.M. Slaughter, and W.J. Kimmerer. 2021. "Growth and Reproductive Rates of the Dominant Copepod *Pseudodiaptomus forbesi* in Response to Environmental Factors and Habitat Type in the Northern San Francisco Estuary." *Aquatic Ecology* 55:825–848.

Gewant, D.S., and S.M. Bollens. 2005. "Macrozooplankton and Microzooplankton of the Lower San Francisco Estuary: Seasonal, Interannual, and Regional Variation in Relation to Environmental Conditions." *Estuaries* 28(3):473–485.

Gilbert, P.M. 2010. "Long-Term Changes in Nutrient Loading and Stoichiometry and Their Relationships with Changes in the Food Web and Dominant Fish Pelagic Fish Species in the San Francisco Estuary, California." *Reviews in Fisheries Science* 18(2):211–232.

Goertler, P., B. Mahardja, and T. Sommer. 2021. "Striped Bass (*Morone saxatilis*) Migration Timing Driven by Estuary Outflow and Sea Surface Temperature in the San Francisco Bay-Delta, California." *Scientific Reports* 11(1510).

Greene, H.G., J.L. Bizzarro, S. Watt, B.E. Dieter, and T.L. Vallier. 2007. *Impacts of Bay Floor Disturbances on Benthic Habitats in San Francisco Bay.* Geological Association of Canada, Special Paper.

Greene, H.G., C. Endris, T. Vallier, N. Golden, J. Cross, H. Ryan, B. Dieter, and E. Niven. 2013. "Sub-tidal Benthic Habitat of Central San Francisco Bay and Offshore Golden Gate area—A Review." *Marine Geology* 345:31–46.

Grigg, E.K., A.P. Klimley, S.G. Allen, D.E. Green, D.L. Elliott-Fisk, and H. Markowitz. 2009. "Spatial and Seasonal Relationships between Pacific Harbor Seals (*Phoca vitulina richardii*) and Their Prey, at Multiple Scales." *Fishery Bulletin* 107(3):359–272.

Hammock, B.G., S.P. Moose, S.S. Solis, E. Goharian, and S.J. The. 2019. "Hydrodynamic Modeling Coupled with Long-term Field Data Provide Evidence for Suppression of Phytoplankton by Invasive Clams and Freshwater

Exports in the San Francisco Estuary." *Environmental Management* 63:703–717.

Hartman, R.K., S.M. Bashevkin, A. Barros, C.E. Burdi, C. Patel, and T. Sommer. 2021. "Food for Thought: Connecting Zooplankton Science to Management in the San Francisco Estuary." *San Francisco Estuary and Watershed Science* 19(3):1–13.

Hearn, A.R., E.D. Chapman, G.P. Singer, W.N. Brostoff, P.E. LaCivita, and A.P. Klimley. 2013. "Movements of Out-Migrating Late-Fall Run Chinook Salmon (*Oncorhynchus tshawytscha*) Smolts through the San Francisco Bay Estuary." *Environmental Biology of Fishes*. DOI: 10.1007/s10641-013-01849.

Herbold, B., and P.B. Moyle. 1989. "The Ecology of the Sacramento–San Joaquin Delta: A Community Profile." *U.S. Fish and Wildlife Service Biological Reports* 85(7.22).

Hernández, L. 2019. "Rare San Francisco Sighting: Young Elephant Seal at Aquatic Park Draws Crowds." *The San Francisco Chronicle,* April 19, 2019. Available: https://www.sfchronicle.com/bayarea/article/Rare-San-Francisco-sighting-Young-elephant-seal-13782062.php. Accessed December 2022.

Hestir, E.L., D.H. Schoellhamer, J. Greenberg, T. Morgan-King, and S.L. Ustin. 2016. "The Effect of Submerged Aquatic Vegetation Expansion on a Declining Turbidity Trend in the Sacramento–San Joaquin River Delta." *Estuaries and Coasts* 39:1100–1112.

Hieb, K. 1999. "Cancer Crabs." In: *Report on the 1980-1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California*, ed. J.J. Orsi. Available: http://www.estuaryarchive.org/archive/orsi_1999.

Hieb, K. 1999. "Caridean Shrimp." In: *Report on the 1980-1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California,* ed. J.J. Orsi. Available: http://www.estuaryarchive.org/archive/orsi_1999.

Hutton, P.H., J.S. Rath, and S.B. Roy. 2017. "Freshwater Flow to the San Francisco Bay-Delta Estuary over Nine Decades (Part 1): Trend Evaluation." *Hydrological Processes* 31:2500–2515.

IEP (Interagency Ecological Program). 2019. San Francisco Bay Study. Available: https://filelib.wildlife.ca.gov/Public/BayStudy/CatchMatrices/. Accessed April 2025.

IEP (Interagency Ecological Program). 2024. San Francisco Bay Study. Available: https://filelib.wildlife.ca.gov/Public/BayStudy/CatchMatrices/. Accessed April 2025.

Jassby, A. 2008. "Phytoplankton in the Upper San Francisco Estuary: Recent Biomass Trends, Their Causes and Their Trophic Significance." *San Francisco Estuary and Watershed Science* 6(1).

Johnson, P.B., K.L. Martin, T.L. Vandergon, R.L. Honeycut, R.S. Burton, and A. Fry. 2009. "Microsatellite and Mitochondrial Genetic Comparisons between Northern and Southern Populations of California Grunion (*Leuresthes tenuis*)." *Official Publication of the American Society of Ichthyologists and Herpetologists* 3:465–474.

Jorgensen, S., A.P. Klimley, and A.F. Muhlia-Melo. 2009. "Scalloped Hammerhead Shark *Sphyrna lewini*, Utilized Deep-Water Hypoxic Zone in the Gulf of California." *Journal of Fish Biology* 74:1682–1687.

Katz, J., P.B. Moyle, R.M. Quiñones, J. Israel, and S. Purdy. 2012. "Impending Extinction of Salmon, Steelhead, and Trout (Salmonidae) in California." *Environmental Biology of Fishes* 96(10–11):1169–1186.

Keener, W., M.A. Webber, T.M. Markowitz, M.P. Cotter, D. Maldini, R.H. Defran, M. Rice, A.J. Debich, A.R. Lang, D.L. Kelly, A.G. Kesaris, M. Bearzi, K. Causey, D. Anderson, L. Shuster, and D.W. Weller. 2023. "Northern Range Expansion of California Coastal Bottlenose Dolphins (*Tursiops truncatus*)." *Aquatic Mammals* 49(1):29–43.

Kelly, J.T., A.P. Klimley, and C.E. Crocker. 2007. "Movements of Green Sturgeon, *Acipenser medirostris*, in the San Francisco Bay Estuary, California." *Environmental Biology of Fishes* 79:281–295.

Kimmerer, W.J., E. Gartside, and J.J. Orsi. 1994. "Predation by an Introduced Clam as the Likely Cause of Substantial Declines in Zooplankton of San Francisco Bay." *Marine Ecology Progress Series* 113:81–93.

Kimmerer, W.J., T.R. Ignoffo, A.M. Slaughter, and A.L. Gould. 2014. "Food-Limited Reproduction and Growth of Three Copepod Species in the Low-Salinity Zone of the San Francisco Estuary." *Journal of Plankton Research* 36(3):722–735.

Kimmerer, W.J., A.E. Parker, U.E. Lidström, and E.J. Carpenter. 2012. "Short-Term and Interannual Variation in Primary Production in the Low-Salinity Zone of the San Francisco Estuary." *Estuaries and Coasts* 35:913–929.

Kimmerer, W.J., and J.K. Thompson. 2014. "Phytoplankton Growth Balanced by Clam and Zooplankton Grazing and Net Transport into the Low-Salinity Zone of the San Francisco Estuary." *Estuaries and Coasts* 37:1202–1218.

Krone, R.B. 1979. "Sedimentation in the San Francisco Bay System." In: *San Francisco Bay: The Urbanized Estuary Investigations into the Natural History of San Francisco Bay and Delta with Reference to the Influence of Man*, American Association for the Advancement of Science, Pacific Division, pp. 85–96.

Kudela, R.M., M.D.A. Howard, S. Monismith, and H.W. Paerl. 2022. "Status, Trends, and Drivers of Harmful Algal Blooms Along the Freshwater-to-Marine Gradient in the San Francisco Bay-Delta System." *San Francisco Estuary and Watershed Science* 20(4):1–51.

Lee, H., B. Thompson, and S. Lowe. 2003. "Estuarine and Scalar Patterns of Invasion in the Soft-Bottom Benthic Communities of the San Francisco Estuary." *Biological Invasions* 5:85–102.

Lehman, P. 2022. "The Increase of Cyanobacteria and Benthic Diatoms over 43 Years in Upper San Francisco Estuary, California." *Estuarine, Coastal and Shelf Science* 275:107988.

Lewis, L.S. 2024. *Fish Communities and Dissolved Oxygen in Wetlands of the San Francisco Estuary.* Final report submitted to the San Francisco Estuary Institute.

Love, M.S., and J.K. Passarelli. 2020. *Miller and Lea's Guide to the Coastal Marine Fishes of California.* Published by the Cabrillo Marine Aquarium. March 2020.

Love, M.S., and M. Yoklavich. 2008. "Habitat Characteristics of Juvenile Cowcod, *Sebastes levis* (Scorpaenidae), in Southern California." *Environmental Biology of Fishes* 82:195–202.

Lowry, D., S. Wright, M. Neuman, D. Stevenson, J. Hyde, M. Lindeberg, N. Tolimieri, S. Lonhart, S. Traiger, and R. Gustafson. 2022. *Endangered Species Act Status Review Report: Sunflower Sea Star (*Pycnopodia helianthoides*)*. Final report to the National Marine Fisheries Service, Office of Protected Resources. October 2022.

MacWilliams, M., A.J. Bever, and E. Foresman. 2016. "3-D Simulations of the San Francisco Estuary with Subgrid Bathymetry to Explore Long-Term Trends in Salinity Distribution and Fish Abundance." *San Francisco Estuary and Watershed Science* 14(2):1–24.

Mahardja, B., S.B. Bashevkin, C. Pien, S. Khanna, D. Pearson, B. Davis, and R. Basu. 2025. "Heatwaves and Rising Temperatures in the Upper San Francisco Estuary: Trends and Effects on Ecosystems and Humans." San Francisco Estuary and Watershed Science 23(1):1–49.

MBARI (Monterey Bay Aquarium Research Institute). 2004. Biological Assessment. Contained in Appendix G of *Final Environmental Impact Report/Environmental Impact Statement for the Monterey Accelerated Research System Cabled Observatory*. 2005. Prepared for the California State Lands Commission, Monterey Bay National Marine Sanctuary. Prepared by the California State Lands Commission, Monterey Bay National Marine Sanctuary, and Aspen Environmental Group. State Clearinghouse # 2004051138, Federal Docket # 04-11738, CSLC EIR/EIS # 731. July 2005.

MEC and Cheney (MEC Analytical Systems, Inc., and M.H. Cheney). 1990. *Report on Sandmining in San Francisco Bay. Tidewater Sand and Gravel Company*. November 1990.

Mercury News. 2016. "Rare Beaked Whale Found on Marin Beach." *The Mercury News*, September 5, 2016. Available: https://www.mercurynews.com/2016/08/31/rare-beaked-whale-found-on-marin-beach. Accessed October 25, 2018.

Merkel & Associates. 2004. *Baywide Eelgrass (*Zostera marina*) Inventory in San Francisco Bay: Eelgrass Atlas.* Prepared for the California Department of Transportation and NOAA Fisheries.

Merkel & Associates. 2005. *Baywide Eelgrass (*Zostera marina*) Inventory in San Francisco Bay: Eelgrass Bed Characteristics and Predictive Eelgrass Model.* Report prepared for the State of California Department of Transportation in cooperation with NOAA Fisheries.

Merkel & Associates. 2006. *Eelgrass Habitat Surveys for the Emeryville Flats and Clipper Cove, Yerba Buena Island, October 1999 through October 2005.* Report prepared for the State of California Department of Transportation in cooperation with NOAA Fisheries.

Merkel & Associates. 2009. *San Francisco Bay Eelgrass Atlas, October- 52 November 2009.* Submitted to California Department of Transportation and National Marine Fisheries Service.

Merkel & Associates. 2016. *Annual Report 2015 Eelgrass (*Zostera marina*) Restoration and Baywide Inventory*. San Francisco-Oakland Bay Bridge Eelgrass Mitigation Funds Active Restoration and Monitoring Project.

Miller, J.A., and A.L. Shanks. 2004. "Evidence of Limited Larval Dispersal in Black Rockfish (*Sebastes melanops*): Implications for Population Structure and Marine-Reserve Design." *Canadian Journal of Fisheries and Aquatic Sciences* 61(9):1723–1735.

MMC (Marine Mammal Commission). 2018. Marine Mammal Species and Populations of Concern. Available: http://www.mmc.gov/priority-topics/species-of-concern/. Accessed October 8, 2018.

MMC (Marine Mammal Commission). 2022. Marine Mammal Species and Populations of Concern. Available: http://www.mmc.gov/priority-topics/species-of-concern/. Accessed October 2022.

Mooi, R., V.G. Smith, M.G. Burke, T.M. Gosliner, C.N. Piotrowski, and R.K. Ritger. 2007. *Animals of San Francisco Bay: A Field Guide to the Common Benthic Species.* San Francisco: California Academy of Sciences.

Moyle, P.B. 2002. *Inland Fishes of California.* Revised and expanded. Berkeley: University of California Press.

NMFS (National Marine Fisheries Service). 2022. National ESA Critical Habitat Geodatabase. Updated August 9, 2022. Available: https://www.fisheries.noaa.gov/inport/item/65207. Accessed January 2023.

NMFS (National Marine Fisheries Service). 2023. Delta Smelt (*Hypomesus transpacificus*). ECOS Environmental Conservation Online System. Available: https://ecos.fws.gov/ecp/species/321. Accessed April 2025.

NMFS et al. (National Marine Fisheries Service, National Oceanic and Atmospheric Administration, and California Department of Transportation. 2015. "Taking of Marine Mammals Incidental to Specified Activities; San Francisco-Oakland Bay Bridge Pier E3 Demolition via Controlled Implosion." *Federal Register* 80(185):57509–57692, September 24, 2015.

NOAA (National Oceanic and Atmospheric Administration). 2004. "Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon (*Oncorhynchus tshawytscha*) and Steelhead (*O. mykiss*) in California." *Federal Register* 69(237).

NOAA (National Oceanic and Atmospheric Administration). 2007. *Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay*. Santa Rosa, CA: National Marine Fisheries Service. June 2007.

NOAA (National Oceanic and Atmospheric Administration). 2011. "Endangered and Threatened Wildlife and Plants: Final Rulemaking to Designate Critical Habitat for Black Abalone." *Federal Register* 76(208):66806–66844, October 27, 2011.

NOAA (National Oceanic and Atmospheric Administration). 2014. Alaska Marine Mammal Stock Assessments—Northern Fur Seal (*Callorhinus ursinus*): California Stock. Accessed October 2018.

NOAA (National Oceanic and Atmospheric Administration). 2020. *National Marine Fisheries Service Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation*. Prepared for U.S. Bureau of Reclamation, Mid-Pacific Region. January 2020.

NOAA (National Oceanic and Atmospheric Administration). 2021a. Northern California Steelhead. Available: https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/northern-California-steelhead. Accessed January 2023.

NOAA (National Oceanic and Atmospheric Administration). 2021b. Harbor Porpoise (Phocoena Phocoena): Northern California/Southern Oregon Stock. Available: https://media.fisheries.noaa.gov/2022-08/2021-HARBOR%20PORPOISE%20Northern%20CaliforniaSouthern%20Oregon%20Stock.pdf. Accessed April 2025.

NOAA (National Oceanic and Atmospheric Administration). 2022. West Coast Coastal Pelagic Species. Available: https://www.fisheries.noaa.gov/species/west-coast-coastal-pelagic-species. Accessed December 2022.

NOAA (National Oceanic and Atmospheric Administration). 2023a. Chinook Salmon (Protected). Available: https://www.fisheries.noaa.gov/species/chinook-salmon-protected. Accessed January 2023.

NOAA (National Oceanic and Atmospheric Administration-Fisheries). 2023b. ESA Threatened and Endangered Species database. Available: https://www.fisheries.noaa.gov/species-directory/threatened-endangered. Accessed January 2023.

NOAA (National Oceanic and Atmospheric Administration). 2023c. Sea Turtles. Available: https://www.fisheries.noaa.gov/sea-turtles#overview. Accessed March 2023.

NOAA (National Oceanic and Atmospheric Administration). 2023d. Sunflower Sea Star. Available: https://www.fisheries.noaa.gov/species/sunflower-sea-star. Accessed April 2025.

NOAA (National Oceanic and Atmospheric Administration). 2023e. NOAA Fisheries Proposes Listing Sunflower Sea Star as Threatened under Endangered Species Act. Available: https://www.fisheries.noaa.gov/feature-story/noaa-fisheries-proposes-listing-sunflower-sea-star-threatened-under-endangered-species. Accessed April 2025.

NewFields (NewFields Sediment Management and Marine Sciences). 2018a. *Hanson Marine Operations and Lind Marine, Inc. Sand Mining Water Quality Monitoring Program, Final Results Report.* Prepared for Hanson Marine Operations and Lind Marine, Inc. August 10, 2018.

NewFields (NewFields Sediment Management and Marine Sciences). 2018b. *Benthic Assessment of Sand Mining in Central San Francisco and Suisun Bays.* Prepared for Hanson Marine Operations and Lind Marine. April 26, 2018.

NewFields (NewFields Sediment Management and Marine Sciences). 2020. "Benthic Assessment of Sand Mining Supplemental Data Evaluation." Technical memorandum from Tim Hammermeister to Sand Mining Benthic TAC. January 21, 2020.

Nichols, F.H. 1979. "Natural and anthropogenic influences on benthic community structure in San Francisco Bay." In: *San Francisco Bay—The Urbanized Estuary: San Francisco, California*, ed. T.J. Conomos, pp. 409–426. Pacific Division, American Association for the Advancement of Science.

NPS (National Park Service). 2020. Where Are All the Sea Stars? Available: https://www.nps.gov/articles/where-are-all-the-sea-stars.htm. Accessed April 2025.

ODFW (Oregon Department of Fish and Wildlife). 2022. The Life of Dungeness Crab. Available: https://www.dfw.state.or.us/mrp/shellfish/crab/lifehistory.asp. Accessed February 2023.

Pearson, T.H., and R. Rosenberg. 1978. "Macrobenthic Succession in Relation to Organic Enrichment and Pollution of the Marine Environment." *Oceanography and Marine Biology Annual Review* 16:229–311.

Perry, R.W., R.A. Buchanon, P.L. Brandes, J.R. Burau, and J.A. Israel. 2016. "Anadromous Salmonids in the Delta: New Science 2006–2016." *San Francisco Estuary & Watershed Science* 14(2):Article 7, 1-28.

Perry, R.W., J.R. Skalskim, P.L. Brandes, P.T. Sandstrom, A.P. Klimley, A. Ammann, and B. MacFarlane. 2010. "Estimating Survival and Migration Route Probabilities of Juvenile Chinook Salmon in the Sacramento–San Joaquin River Delta." *North American Journal of Fisheries Management* 30:142–156.

PFMC (Pacific Fishery Management Council). 2024a. *Coastal Pelagic Species Fisheries Management Plan.* Portland, OR. As Amended Through Amendment 21, April 2024.

PFMC (Pacific Fishery Management Council). 2024b. *Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species*. Portland, OR. As Amended Through Amendment 8, October 2024.

PFMC (Pacific Fishery Management Council). 2024c. *Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery.* As Amended Through Amendment 33. December 2024.

PFMC (Pacific Fishery Management Council). 2024d. *Pacific Coast Salmon Fishery Management Plan for Commercial and recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California*. As Revised Through Amendment 24. February 2024.

Ray, G.L. 2005. *Invasive Marine and Estuarine Animals of California.* Aquatic Nuisance Species Research Program.

RecFIN (Recreational Fisheries Information Network). 2025. CTE001 – Recreational Fishery Catch Estimate Report: Number of Fish, and Metric-Tons (mt). Available: https://reports.psmfc.org/recfin/f?p=601:1::INITIAL:NO. Accessed April 2025.

Rhoads, D.C., and J.D. Germano. 1986. "Interpreting Long-Term Changes in Benthic Community Structure: A New Protocol." *Hydrobiology* 142:291–308.

Ritter, C.J., J.C. Olson, W.P. Cochlan, K.E. Boyer, M. Goodison, G.M. Ruiz, and M.B. Ogburn. 2025. "Accessing Fish Distribution in Richardson Bay, California:

A Preliminary Dual-Frequency Identification Sonar and Environmental Data Approach." *San Francisco Estuary and Watershed Science* 23(1):Article 5, 1–20.

Rogers-Bennett, L. 2007. "Is Climate Change Contributing to Range Reductions and Localized Extinctions in Northern (*Haliotis kamtschatkana*) and Flat (*Haliotis wallensis*) Abalones?" *Bulletin of Marine Science* 81(2):283–296.

Roman, J. 2010. "Aquatic Invasive Species." The Encyclopedia of Earth. Available: http://editors.eol.org/eoearth/wiki/Aquatic_invasive_species.

Ruiz, G.M., P.W. Fofonoff, B. Steves, S.F. Foss, and S.N. Shiba. 2011. "Marine Invasion History and Vector Analysis of California: A Hotspot for Western North America." *Diversity and Distributions* 17:362–373.

Sabal, M., S. Hayes, J. Merz, and J. Setka. 2016. "Habitat Alterations and a Nonnative Predator, the Striped Bass, Increase Native Chinook Salmon Mortality in the Central Valley, California." *North American Journal of Fisheries Management* 36:309–320.

Saleh, D., and J. Domagalski. 2024. "Concentrations, Loads, and Associated Trends of Nutrients Entering the Sacramento–San Joaquin Delta, California." *San Francisco Estuary and Watershed Science* 19(4):1–25.

Santos, M.J., L.W. Anderson, and S.L. Ustin. 2011. "Effects of Invasive Species on Plant Communities: An Example Using Submersed Aquatic Plants at the Regional Scale." Biological Invasions 13:443–457.

Schaeffer, K., K. McGourty, and N. Consentino-Manning. 2007. *Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay.* NOAA National Marine Fisheries Service and Restoration Center.

Schoellhamer, D.H., and J.R. Burau. 1998. "Summary of Findings about Circulation and the Estuarine Turbidity Maximum in Suisun Bay, California." USGS Fact Sheet-047-98.

Schoellhamer, D.H., S.A. Wright, and J.Z. Drexler. 2013. "Adjustment of the San Francisco Estuary and Watershed to Decreasing Sediment Supply in the 20th Century." *Marine Geology* 345:63–71.

SCRFA (Science and Conservation of Fish Aggregations). 2018. Database and Publication Resources. Available: https://www.scrfa.org/database-scrfa/. Accessed August 2022.

Sea Turtle Conservancy. 2023. Information About Sea Turtles: Conservation Strategies. Available: https://conserveturtles.org/information-sea-turtles-conservationstrategies/#:~:text=Sea%20turtles%20are%20given%20legal,loggerhead%20is%20listed%20as%20threatened. Accessed March 2023.

SFEI (San Francisco Estuary Institute). 2019. Eelgrass Data Management and Project Tracking. Available: https://www.sfei.org/projects/eelgrass-data-management-and-project-tracking. Accessed April 2025.

Shellenbarger, G.G., and D.H. Schoellhamer. 2011. "Continuous Salinity and Temperature Data from San Francisco Estuary, 1982–2002: Trends and the Salinity-Freshwater Inflow Relationship." *Journal of Coastal Research* 27(6):1191–1201.

Shelton, A.O., T.B. Francis, G.D. Williams, B. Feist, K. Stick, and P.S. Levin. 2014. "Habitat Limitation and Spatial Variation in Pacific Herring Egg Survival." *Marine Ecological Progress Series* 514:231–245.

Smithsonian Institution. 2023. Meet the Seven Sea Turtle Species. Available: https://ocean.si.edu/ocean-life/reptiles/meet-seven-sea-turtle-species. Accessed March 2023.

Sommer, T., C. Armor, R. Baxter, R. Breuer, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. "The Collapse of Pelagic Fishes in the Upper San Francisco Estuary." *Fisheries* 32(6):270–277.

Sommer, T., F. Mejia, M. Nobriga, F. Feyrer, and L. Grimaldo. 2011. "The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary." *San Francisco Estuary & Watershed Science* 9(2):1–16.

Stellheim, K., M. Willmes, L.S. Lewis, J. Sweeney, J. Merz, and J.A. Hobbs. 2022. "Diversity in Habitat Use by White Sturgeon Revealed Using Fin Ray Geochemistry." *Frontiers in Marine Science* 9(859038):1–18.

Stern, J.S., W. Keener, I.D. Szczepaniak, and M.A. Webber. 2017. "Return of Harbor Porpoises (*Phocoena phocoena*) to San Francisco Bay." *Aquatic Mammals* 43(6):691–702.

Tasto, R.N. 1979. "San Francisco Bay: Critical to the Dungeness Crab?" In: *San Francisco Bay: The Urbanized Estuary*, ed. T.J. Conomos. San Francisco, CA: Pacific Division of the American Association for the Advancement of Science.

Thomas, M.J., A.L. Rypel, G.P. Singer, A.P. Klimley, M.D. P.I, E.D. Chapman, and N.A. Fangue. 2022. "Movement Patterns of Juvenile Green Sturgeon (*Acipenser mediostris*) in the San Francisco Bay Estuary." *Environmental Biology of Fishes* 105:1749–1763.

Thompson, B., J.A. Ranasinghe, S. Lowe, A. Melwani, and S.B. Weisberg. 2012. "Benthic macrofaunal assemblages of the San Francisco Estuary and Delta, USA." *Environmental Monitoring and Assessment* 185(3):1–15.

UC Davis (University of California, Davis). 2017. Division of Agriculture and Natural Resources, California Fish Website. Available: http://calfish.ucdavis.edu. Accessed October 31, 2017.

USACE (U.S. Army Corps of Engineers). 2011. *Pier 36/Brannan St. Wharf Project Incidental Harassment Authorization Permit Application. San Francisco, San Francisco County, California.*

USFWS (U.S. Fish and Wildlife Service). 2005. *Recovery Plan for the Tidewater Goby (*Eucyclogobius newberryi*)*. Portland, OR.

USFWS (U.S. Fish and Wildlife Service). 2021. Endangered Species. Available: https://www.fws.gov/endangered/. Accessed December 2021.

USFWS (U.S. Fish and Wildlife Service). 2023. List of Federal Endangered Species. https://www.fws.gov/program/endangered-species. Accessed January 2023.

USFWS (U.S. Fish and Wildlife Service). 2025. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the San Francisco Bay-Delta Distinct Population Segment of the Longfin Smelt. 50 CFR Part 17. *Federal Register* 90(9):3765–3783, January 15, 2025. Available: https://www.federalregister.gov/documents/2025/01/15/2024-29641/endangered-and-threatened-wildlife-and-plants-designation-of-critical-habitat-for-the-san-francisco. Accessed April 2025.

Vroom, J., M. van der Wegen, R.C. Martyr-Koller, and L.V. Lucas. 2017. "What Determines Temperature Dynamics in the San Francisco Bay-Delta System." *Water Resources Research* 53:9901–9921.

Ward, D.H. 2022. *Abundance of Eelgrass (*Zostera marina*) at Key Black Brant (*Branta bernicla nigricans*) Wintering Sites along the Northern Pacific Coast of Baja California, Mexico, 1998–2012*. U.S. Geological Survey Open-File Report 2022-1078. Available: https://doi.org/10.3133/ofr20221078.

WDFW (Washington Department of Fish and Wildlife). 2022. Threatened and Endangered Species. Available: https://wdfw.wa.gov/species-habitats/at-risk/listed. Accessed October 2022.

Wickham, D.E. 1979. "The Relationship between Megalopea of the Dungeness Crab, *Cancer magister*, and the Hydroid, *Velella velella*, and Its Influence on Abundance Estimates of *C. magister* megalopae." *California Department of Fish and Game* 65:184–186.

Wild, P.W., and R.N. Tasto. 1983. "Life History Environment and Mariculture of the Dungeness Crab *Cancer magister* with Emphasis on the Central California USA Fishery Resource." *Fish Bulletin of the California Department of Fish and Game* 172:1–352.

Winder, M., and A.D. Jassby. 2011. "Shifts in Zooplankton Community Structure: Implications for Food Web Processes in the Upper San Francisco Estuary." *Estuaries and Coasts* 34:675–690.

Work, P.A., M.A. Downing-Kunz, and D. Livsey. 2017. *Record-High Specific Conductance and Water Temperature in San Francisco Bay during Water Year 2015*. U.S. Geological Survey Open-File Report 2017–1022. Available: https://doi.org/10.3133/ofr20171022.

Mineral Resources

Anchor QEA. 2023. *Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay*. Prepared for California State Coastal Conservancy and San Francisco Bay Conservation and Development Commission.

Deltares. 2023a. *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast*. Part 1, "Morphodynamic Change and Bedform Dynamics."

Deltares. 2023b. *Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast*. Part 2, "Mining Volume and Area Analysis."

Deltares. 2023c. Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast. Part 3, "Synthesis."

eTrac Inc. 2018a. *Change Analysis Report, Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys.*

eTrac Inc. 2018b. *Additional Analysis Report, 2008–2014–2018 Bathymetric Survey Comparison Central San Francisco Bay Lease Area Surveys.*

eTrac Inc. 2023. *Change Analysis Report, Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys.*

Fenical/Coast and Harbor Engineering, 2025. *Sand Mining Impact Analysis: Desktop Morphology Study; Sediment Transport Modeling Study.*

Malkowski, M.A., Z.T. Sickmann, B. Jaffe, T. Fregoso, and D. Mohrig. 2023. *Fingerprinting Sand and Its Transport History through San Francisco Bay: Implications for Sand Mining and Its Environmental Effects.* Prepared for California State Coastal Conservancy and San Francisco Bay Conservation and Development Commission.

McKee, L.J., T. Zi, S.A. Pearce, C. Grosso, A. Wong, M. Weaver, S. Dusterhoff, J. Lowe, E. Elias, and F. Roelvink. 2023. *Sand Budget and Sand Transport in San Francisco Bay.* A report prepared by SFEI-ASC for the State Coastal Conservancy (SCC) and the San Francisco Bay Conservation and Development Commission (BCDC). SFEI Contribution #1125. Richmond, CA.

SMGB (California Department of Conservation, State Mining and Geology Board). 2024. *California State Mining and Geology Board, 2023-2024 Annual Report.*

Hydrology and Water Quality

(AMS) Applied Marine Sciences, Inc., 2025. Changes in Benthic Communities at Commercial Aggregate Mining Leases in Central San Francisco Bay.

Anchor QEA, 2023. Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay. A report prepared for the California State Coastal Conservancy and the San Francisco Bay Conservation and Development Commission.

Capiella, K., Malzone, C., Smith, R., Jaffe, B., 1999. Sedimentation and bathymetry changes in Suisun Bay (1867–1990). U.S. Geological Survey Open-File Report 99–563.

Coast and Harbor Engineering, 2025. Sand Mining Impact Analysis Supplemental Environmental Impact Report. Report to California State Lands Commission, January 2025.

Deltares, 2023a. Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast, Part 1: Morphodynamic change and bedform dynamics.

Deltares, 2023b. Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast, Part 2: Mining volume area analysis.

Deltares, 2023c. Understanding Impacts of Bay Sand Mining on Sand Supply and Transport in San Francisco Bay and Outer Coast, Part 3: Synthesis.

eTrac, Inc., 2018a. Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys Change Analysis Report.

eTrac, Inc., 2018b. Additional Analysis Report 2008 – 2014 – 2018 Bathymetric Survey Comparison Central San Francisco Bay Lease Area Surveys.

eTrac, Inc., 2023. Central San Francisco Bay and Suisun Bay Sandmining Lease Area Surveys Change Analysis Report.

Fregoso, T.A., Foxgrover, A.C., Jaffe, B.E., 2008. Sediment deposition, erosion, and bathymetric change in central San Francisco Bay: 1855–1979. U.S. Geological Survey Open-File Report 2008–1312 (46 pp.).

Fregoso, T.A., Foxgrover, A.C., and Jaffe, B.E., 2023, Sediment deposition, erosion, and bathymetric change in San Francisco Bay, California, 1971–1990 and 1999–2020 (ver. 1.1, June 2024): U.S. Geological Survey Open-File Report 2023–1031, 19 p., https://doi.org/10.3133/ofr20231031.

Fregoso et al. 2024. Sediment Deposition, Erosion, and Bathymetric Change in San Francisco Bay, California 1971-1990 and 1999-2020. Prepared in cooperation with the Regional Monitoring Program for Water Quality in Sand Francisco Bay. U.S. Department of the Interior. U.S. Geological Survey Open File Report 2023-1031. Version 1.1, June 2014.

Jaffe, B.E., Smith, R.E., Torresan, L., 1998. Sedimentation and bathymetric change in San Pablo Bay: 1856e1983. U.S. Geological Survey Open-File Report 98e759.

Malkowski, M., Z. Sickmann, B. Jaffe, T. Fregoso, and D. Mohrig, 2023. Fingerprinting sand and its transport history through San Francisco Bay: Implications for sand mining and its environmental effects. A report prepared by University of Texas (UT), Austin, UT Dallas, and the United States Geological

Survey for the California State Coastal Conservancy, and the San Francisco Bay Conservation and Development Commission.

McKee, L., N. Ganju, D. Schoellhamer, J. Davis, D. Yee, J. Leatherbarrow, and R. Hoenicke. 2002. Estimates of Suspended-Sediment Flux Entering San Francisco Bay from the Sacramento and San Joaquin Delta. San Francisco Estuary Institute (SFEI) Contribution 65, December 2002, 28 p.http://www.sfei.org/sfeireports.htm.

Newfields, 2018a. Hanson Marine Operations and Lind Marine, Inc. Sand Mining Water Quality Monitoring Program Results Report.

Newfields, 2018b. Benthic Assessment of Sand Mining in Central San Francisco and Suisun Bays Data Report.

Newfields, 2020. Technical Memorandum for Benthic Assessment of Sand Mining Supplemental Data Evaluation.

(SFEI and Deltares 2023) McKee, L.J., Zi, T., Pearce, S.A., Grosso, C., Wong, A., Weaver, M., Dusterhoff, S., Lowe, J., Elias, E., Roelvink, F., 2023. Sand budget and sand transport in San Francisco Bay. A report prepared by SFEI-ASC for the State Coastal Conservancy (SCC), and the San Francisco Bay Conservation and Development Commission (BCDC). SFEI Contribution #1125. Richmond, CA.

Hazards and Hazardous Materials

None used.

Air Quality and Greenhouse Gas Emissions

BAAQMD (Bay Area Air Quality Management District). 2017. *Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area. Final 2017 Clean Air Plan.* Adopted April 19, 2017. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en. Accessed April 23, 2025.

BAAQMD (Bay Area Air Quality Management District). 2023. *California Environmental Quality Act Air Quality Guidelines*. April 2023. Available: https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines. Accessed April 23, 2025.

CARB (California Air Resources Board). 2017. *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target*. November 2017. Available: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed April 23, 2025.

CARB (California Air Resources Board). 2022. *2022 Scoping Plan for Achieving Carbon Neutrality*. December 2022. Available: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents. Accessed April 23, 2025.

CARB (California Air Resources Board). 2024a. Table of Ambient Air Quality Standards. July 16, 2024. Available: https://ww2.arb.ca.gov/sites/default/files/2024-08/AAQS%20Table_ADA_FINAL_07222024.pdf. Accessed April 23, 2025.

CARB (California Air Resources Board). 2024b. California Greenhouse Gas Emissions from 2000 to 2022: Trends of Emissions and Other Indicators, 2000–2022 GHG Emissions Trends Report Data. September 20, 2024. Available: https://ww2.arb.ca.gov/ghg-inventory-data. Accessed April 23, 2025.

CARB (California Air Resources Board). 2024c. California Greenhouse Gas Emissions from 2000 to 2022: Inventory Categorization Crosswalk. September 20, 2024. Available: https://ww2.arb.ca.gov/ghg-inventory-data. Accessed April 28, 2025.

CARB (California Air Resources Board). 2025a. iADAM: Air Quality Data Statistics. Available: https://www.arb.ca.gov/adam/. Accessed April 22, 2025.

CARB (California Air Resources Board). 2025b. Ocean-Going Vessels At Berth Regulation. Available: https://ww2.arb.ca.gov/our-work/programs/ocean-going-vessels-berth-regulation. Accessed April 23, 2025.

Office of Governor Edmund G. Brown Jr. 2015. "Governor Brown Establishes Most Ambitious Greenhouse Gas Reduction Target in North America." News release, April 29, 2015. Available: https://archive.gov.ca.gov/archive/gov39/2015/04/29/news18938/index.html Accessed April 23, 2025.

Cultural and Tribal Cultural Resources

None used.

Land Use and Recreation

Anchor QEA. 2023. *Modeling Sand Transport and the Effect of Sand Mining in San Francisco Bay.*

BCDC (San Francisco Bay Conservation and Development Commission). 2020. *San Francisco Bay Plan*. Available: https://www.bcdc.ca.gov/wp-content/uploads/sites/354/2023/09/bayplan.pdf. Accessed April 18, 2025.

Fenical/Coast and Harbor Engineering. 2025. Sand Mining Impact Analysis Supplemental Environmental Impact Report. Report to California State Lands Commission, January 2025.

Solano County. 2018. Solano County Component of the Suisun Marsh Local Protection Program. Amended October 2, 2018. Available: https://www.solanocounty.com/civicax/filebank/blobdload.aspx?blobid=29446. Accessed April 18, 2025.

Project Consistency

None used.

Chapter 4 Alternatives

Cemex. 2017. Cemex Sand Mine Agreement Approved by California State Lands Commission. August 17, 2017. Available: https://www.cemexusa.com/w/cemex-sand-mine-agreement-approved-by-california-state-lands-commission#:~:text=TEXAS%20%2D%20Final%20approval%20of%20Cemex's,operations%20will%20cease%20in%202023. Accessed July 28, 2025.

Cemex. 2025. Pleasanton Eliot Aggregates Quarry. Available: https://www.cemexusa.com/w/pleasanton-eliot-aggregates-quarry. Accessed May 19 2025.

Coastside News. 2024. Pilarcitos Quarry expansion approved. January 17, 2013; updated August 13, 2024. Available: https://www.coastsidenews.com/news/pilarcitos-quarry-expansion-approved/article_e721f618-729a-5891-bb17-0883122b43e3.html. Accessed May 19, 2025.

DeSilva Gates. 2025. Materials Aggregates.

Dutra Group. 2021. San Rafael Rock Quarry. A Local Resource for Emergency Relief and Disaster Prevention. Available: https://www.sanrafaelrockquarry.com/#:~:text=In%20operation%20since%20the%201870s,roads%20and%20other%20public%20works. Accessed May 19, 2025.

Graniterock Supply. 2025a. Quail Hollow Quarry. Available: https://www.graniterock.com/location/quail_hollowl#:~:text=The%20Quail%20Hollow%20Quarry%20is,High%20Quality%20Silica%20Glass%20Sand. Accessed May 19, 2025.

Graniterock Supply. 2025b. Facebook Post. January 28, 2025. Available: https://www.facebook.com/Graniterock/posts/end-of-an-era-at-graniterocks-sand-plant-in-santa-cruz-mother-nature-puts-on-one/986927066793664/. Accessed July 28, 2025.

Lamphier Gregory. 2019. Sunol Valley Aggregate Quarry. Available: https://lamphier-gregory.com/sunol-valley/. Accessed May 19, 2025.

Marin County Community Development Agency. 2009. San Rafael Rock Quarry Amended Reclamation Plan and Amended Surface Mining and Quarrying Permit Environmental Impact Report. January 2009. Available: https://www.marincounty.gov/sites/g/files/fdkgoe241/files/2024-06/feir_volume_i_revised_deir.pdf. Accessed July 28, 2025.

Martin Marietta. 2025. Products: Aggregates. Available: https://www.martinmarietta.com/products/aggregates. Accessed May 19. 2025.

Perazzo, Peggy B. and Perazzo George (Pat). 2025. Contra Costa County - List of Stone Quarries, Etc. Available: https://quarriesandbeyond.org/states/ca/quarry_photo/ca-contra_costa_photos.html. Accessed May 19, 2025.

San Jose Spotlight. 2022. Santa Clara County cement facility shuttering for good. November 15, 2022. Available: https://sanjosespotlight.com/santa-clara-county-cupertino-palo-alto-cement-facility-plant-quarry-shuttering-for-good/. Accessed July 28, 2025.

Stevens Creek Quarry, Inc. 2024. Welcome to Stevens Creek Quarry, Inc. Available: https://www.scqinc.com/#:~:text=The%20SCQ%20family%20of%20Quarries,aggregate%20base%20rock%20and%20sand. Accessed May 19, 2025.

Chapter 5

BCDC (San Francisco Bay Conservation and Development Commission). 2021. San Francisco Bay Plan Climate Change Policy Guidance. Available: https://www.bcdc.ca.gov/wp-content/uploads/sites/354/2023/09/San-Francisco-Bay-Plan-Climate-Change-Policy-Guidance.pdf. Accessed May 2, 2025.

IPCC (Intergovernmental Panel on Climate Change). 2023. *AR6 Synthesis Report: Climate Change 2023.* Available: https://www.ipcc.ch/report/sixth-assessment-report-cycle/. Accessed May 1, 2025.

OPC (California Ocean Protection Council). 2024. *State of California Sea Level Rise Guidance: 2024 Science & Policy Update*. Available: https://opc.ca.gov/wp-content/uploads/2024/05/California-Sea-Level-Rise-Guidance-2024-508.pdf. Accessed May 1, 2025.

Sweet, W.V., B.D. Hamlington, R.E. Kopp, C.P. Weaver, P.L. Barnard, D. Bekaert, W. Brooks, M. Craghan, G. Dusek, T. Frederikse, G. Garner, A.S. Genz, J.P. Krasting, E. Larour, D. Marcy, J.J. Marra, J. Obeysekera, M. Osler, M. Pendleton, D. Roman, L. Schmied, W. Veatch, K.D. White, and C. Zuzak. 2022. Global and Regional Sea Level Rise Scenarios for the United States: Updated Mean Projections and Extreme Water Level Probabilities Along U.S. Coastlines. NOAA Technical Report NOS 01. National Oceanic and Atmospheric Administration, National Ocean Service, Silver Spring, MD. Available: https://sealevel.globalchange.gov/internal_resources/756/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf. Accessed April 30, 2025.

U.S. Census Bureau. 2021a. American Community Survey 5-Year Estimates. Available: https://www.census.gov/data/developers/data-sets/acs-5year.html.

U.S. Census Bureau. 2021b. American Community Survey 5-Year Estimates. https://www.census.gov/data/developers/data-sets/acs-5year.html.