3.0 ALTERNATIVES AND CUMULATIVE PROJECTS

This section provides background information on two important elements of the Environmental Impact Report (EIR) for the San Francisco Bay and Delta Sand Mining Project (Project): the alternatives and cumulative effects analyses conducted by the California State Lands Commission (CSLC) as lead agency pursuant to State California Environmental Quality Act (CEQA) Guidelines sections 15126.6 and 15130 respectively. Section 3.1, Factors Used in Selection of Alternatives, describes the alternatives selection process. Section 3.2, Alternatives Eliminated from Full Evaluation, identifies alternatives to the proposed Project that were considered but eliminated from detailed evaluation. Section 3.3, Alternatives Evaluated in the EIR, describes the alternatives that were carried forward for analysis (analysis of these alternatives in comparison to the proposed Project is presented in Sections 4.1 through 4.7). Section 3.4, Comparison of Proposed Project and Alternatives, identifies where in the EIR the environmental effects of the proposed Project and the alternatives are compared. Section 3.5, Cumulative Projects, lists the cumulative projects that are considered in the cumulative impact analyses.

3.1 FACTORS USED IN SELECTION OF ALTERNATIVES

3.1.1 Alternatives Development and Screening Process

One of the most important aspects of the environmental review process is the identification and description of reasonable alternatives to a proposed project, including the No Project Alternative, and the evaluation of the merits of these alternatives to allow for a comparative analysis for consideration by decision-makers. This comparative analysis incorporates a project's objectives as follows: State CEQA Guidelines section 15126.6(a) requires consideration of a range of reasonable alternatives to a project or project location that "would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant impacts of the project." As stated in Section 1.0, Introduction, the Applicants identified the following Project objective:

- To obtain renewal of all necessary permits and approvals to continue mining sand at an economically viable level in San Francisco Bay for the next 10 years.

An alternative cannot be eliminated simply because it is more costly or if it could impede the attainment of all project objectives to some degree. However, the State CEQA Guidelines declare that an EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote or speculative. CEQA requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed Project.

3.1.2 Alternatives Screening Methodology

Alternatives to the proposed Project were selected based on comments received from the public and local, regional, State, and Federal agencies during the EIR scoping period and input from the Applicants and the EIR study team. The alternatives screening process consisted of the following steps:

Step 1: Define the alternatives to allow comparative evaluation.

Step 2: Evaluate each alternative in consideration of one or more of the following criteria:

- The extent to which the alternative would accomplish most of the basic goals and objective of the Project;
- The extent to which the alternative would avoid or lessen one or more of the identified significant environmental effects of the Project;
- The potential feasibility of the alternative, taking into account site suitability, economic viability, availability of infrastructure, General Plan consistency, and consistency with other applicable plans and regulatory limitations; and/or
- The requirement of State CEQA Guidelines section 15126.6(e) to consider a "no project" alternative and to identify, under specific criteria, an "environmentally superior" alternative in addition to the "no project" alternative.

Step 3: Determine suitability of the proposed alternative for full analysis in the EIR. If the alternative is unsuitable, eliminate it, with justification, from further consideration.

Step 4: Consider agency and public input regarding the feasibility and environmental impacts of potential alternatives and further refine the alternatives analysis to reflect this information.

Feasible alternatives that did not clearly offer the potential to reduce significant environmental impacts and infeasible alternatives were removed from further analysis. In the final phase of the screening analysis, the environmental advantages and disadvantages of the remaining alternatives were carefully weighed with respect to potential for overall environmental advantage, technical feasibility, and consistency with Project and public objectives; any alternative that did not provide environmental advantages compared to the proposed Project was also eliminated. At the screening stage, it is not possible to evaluate potential impacts of the alternatives or the proposed Project with absolute certainty. However, it is possible to identify elements of the proposed Project that are likely to be the sources of impact. As discussed in

Section 4.0, Environmental Analysis, the proposed Project has the potential for the following significant adverse impacts:

- Impacts on biological resources associated with suction dredge mining, including potential impacts to species listed under the Federal and State Endangered Species Acts (ESAs);
- Release of criteria air pollutants and contribution to climate change through emission of greenhouse gases (GHGs) associated with operation of fossil fuel-powered mining equipment
- Impacts on undiscovered submerged historical, archeological, and paleontological resources that could be disturbed, damaged, or destroyed by suction dredge mining activities;
- Potential release of hazardous substances through accidental spills or upset; and
- Conflicts with land use plans and policies.

For the screening analysis, the technical feasibility and regulatory feasibility of various potential alternatives were assessed at a general level; specific feasibility analyses were not conducted. The assessment of feasibility was directed toward the reverse reason; that is, to identify anything about the alternative that would be infeasible on technical or regulatory grounds. CEQA does not require elimination of a potential alternative merely because it would be more costly than the proposed Project. For the proposed Project, the primary technical and regulatory issues that could make an alternative infeasible relate to whether:

- The proposed alternative would rely upon mining methods or technologies that are unproven or unreliable;
- The proposed alternative would conflict with the terms and conditions in the existing lease agreements and permits regulating sand mining; and/or
- The proposed alternative would conflict with other laws or regulations pertaining to use of, and navigation through, the waters of the Bay and Delta.

3.1.3 Summary of Screening Results

Potential alternatives were reviewed against the above criteria. Four alternatives were eliminated 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 basic Project objective. Those alternatives that were found to be technically feasible and

consistent with the Project objective were reviewed to determine if the alternative had the potential to reduce the environmental impacts of the proposed Project.

Table 3-1 summarizes the evaluation and selection of potential alternatives to be addressed in the EIR. Those listed in the first column have been eliminated from further consideration (see rationale in Section 3.2, Alternatives Eliminated From Full Evaluation), and those in the second column are described in detail in Section 3.3, Alternatives Evaluated in the EIR, and are evaluated in Section 4.0, Environmental Analysis, of this EIR.

Table 3-1. Summary of Alternative Screening Results

Alternatives Eliminated from Consideration	Alternatives Evaluated in this EIR
Mining of Shipping Channels Alternative	No Project Alternative
Import of Sand Alternative	Long-term Management Strategy Conformance Alternative
Central Bay Only Alternative	Clamshell Dredge Mining Alternative
Suisun Bay and Delta Only Alternative	Reduced Project Alternative [1]

[1] ~~This alternative, which is described in Section 3.3.4, replaces the Reduced Project Alternative that was evaluated in the original version of the Draft EIR released in July 2010.~~

3.2 ALTERNATIVES ELIMINATED FROM FULL EVALUATION

Eight alternatives were evaluated for consistency with the Project objective. The following preliminary alternatives were initially considered but eliminated for various reasons stated below.

3.2.1 Mining of Shipping Channels Alternative

This alternative would restrict sand mining to areas that are maintained through periodic dredging of shipping channels. In this way, the total area of the Bay and Delta that would be subject to dredging would be reduced. 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.

3.2.2 Import of Sand Alternative

This 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. This alternative is eliminated 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.

3.2.3 Central Bay Only Alternative

The Central Bay Only Alternative would restrict sand mining to the Central Bay lease sites (PRC numbers 709, 2036, 7779, and 7780; see Figure 2-1a). Under this alternative, the total volume of sand proposed to be mined is 1,540,000 cubic yards, which would be roughly 399,000 cubic yards more than the baseline volume mined in the Central Bay (i.e., 2002-2007 average) and 500,000 cubic yards less than is proposed by the total Project (Table 3-2). Hanson would conduct all mining operations using the same equipment and mining methods identified for the proposed Project.

This alternative was considered to avoid impacts on State and federally listed species in Suisun Bay and the western Delta, which are described in Section 4.1, Biological Resources. This alternative is eliminated, however, because it would not reduce similar impacts on species in the Central Bay and, because it would foreclose all sand mining opportunities for one of the Applicants (Jerico, which currently conducts sand mining operations -- as Jerico and as part of the Suisun Associates joint venture -- only in the Suisun Bay and Delta); therefore, it would not achieve the Project objective.

3.2.4 Suisun Bay and Delta Only Alternative

This alternative would restrict mining to the Suisun Bay and western Delta mining leases only; no mining would occur in the Central Bay. The CSLC would issue a new lease for PRC 7781 (Suisun Associates), and the other responsible agencies may issue permits for the Middle Ground Shoal private lease area. Mining volumes would be limited to those proposed for these areas by the Applicants, that is, 200,000 cubic yards per year (cy/yr) from the Middle Ground Shoal lease area, and 300,000 cy/yr from PRC 7781. The total volume of sand mined would be limited to 500,000 cy/yr, which is approximately 220,000 cy/yr more than the 2007 baseline for these lease areas, but 1,540,000 cy/yr less than the Applicants' proposal for all mining lease areas. Mining would be conducted by both Hanson and Jerico, and mining methods would be the same as those proposed for the Project.

This alternative would avoid impacts associated with mining in the Central Bay, particularly entrainment of the longfin smelt (Impact BIO-8). This alternative is eliminated, however, because it would not reduce similar impacts in Suisun Bay and the

Table 3-2. Sand Mining Volumes for Each Alternative (in cy/yr)

	Baseline Volume (2002-2007 Average)	Project as Proposed	LTMS[1] Conformance Alternative	Clamshell Dredge Mining Alternative	Reduced Project Alternative[2]	No Project Alternative
State Lands Commission Parcels (and Current Leaseholder)						
PRC 709: Presidio Shoals (Hanson)	290,331	340,000	340,000	340,000	290,331	0
PRC 2036: Point Knox South (Hanson)	252,637	450,000	450,000	450,000	252,637	0
PRC 7779: Point Knox Shoal (Hanson)	390,440	550,000	550,000	550,000	390,440	0
PRC 7780: Alcatraz South Shoal (Hanson)	127,248	200,000	200,000	200,000	127,248	0
PRC 7781: Suisun Associates	85,746	300,000	300,000	300,000	85,746	0
PRC 5871	80,383	N/A	N/A	N/A	N/A	N/A
State Lands Lease Totals: Central Bay & Suisun Bay	**1,226,785**	**1,840,000**	**1,840,000**	**1,840,000**	**1,146,402**	**0**
Private Parcels (and Current Leaseholder)						
Grossi Middle Ground: BCDC Permit 10-90 [3] (Hanson)	0	50,000	50,000	50,000	0	0
Grossi Middle Ground: BCDC Permit 16-78 (M) (Jerico)	199,866	150,000	150,000	150,000	~~194,945~~ 199,866	0
Private Lease Totals: Middle Ground	199,866	200,000	200,000	200,000	~~194,945~~ 199,866	0
All Lease Totals	**1,426,650**	**2,040,000**	**2,040,000**	**2,040,000**	**1,346,267**[4]	**0**

NOTES:

Numbers may not sum exactly due to rounding.

N/A = Not Applicable

[1] LTMS = Long Term Management Strategy

[2] This alternative, which is described in Section 3.3.4, replaces the Reduced Project Alternative that was evaluated in the ~~original version of the~~ Draft EIR released in July 2010.

[3] BCDC = San Francisco Bay Conservation and Development Commission

[4] Total lease volume was used as a reference only. Analysis of individual lease areas as part of total baseline volume analyzed specific impacts for benthic organisms, fish entrainment studies and sand transport modeling.

Source: CSLC 2008, 2011; Hanson and Jerico 2007

Delta and because the limited mining volumes would substantially limit the ability of this alternative to achieve the Project objective.

3.3 ALTERNATIVES EVALUATED IN THE EIR

3.3.1 No Project Alternative

Description

State CEQA Guidelines section 15126.6(e) requires evaluation of the No Project Alternative to allow decision-makers to compare the impacts of approving a proposed project with the impact of not approving the project. Under the No Project Alternative, the CSLC would not issue the proposed new mining leases, mining would cease within the areas under the jurisdiction of the CSLC, and other regulatory agencies would not renew permits to allow sand mining to continue at Middle Ground Shoal, which is privately held, after the expiration of current permits. The San Francisco Bay Conservation and Development Commission (BCDC) permits, for example, expire in July 2012.

Under this alternative, it is assumed that the demand for sand for the Bay Area construction industry would be met either by other local sources (such as local quarries and aggregate materials recycling facilities), or that sand would be imported from more distant sources, such as British Columbia or Mexico, or by some combination of these sources. Local sources include several active quarries in the San Francisco Bay and Sacramento-San Joaquin Delta areas that produce construction aggregate, including sand, for local markets (Kohler 2006) (refer to Figure 4.5-1 in Section 4.5, Air Quality). With respect to more distant sources, Polaris Minerals Corporation recently commenced operations at its Richmond Terminal facility, which receives and distributes construction aggregate from British Columbia, Canada (Polaris Minerals Corp. 2009). Aggregate from Canada is also being shipped to Pier 92 in San Francisco and to the port of Redwood City (Kohler 2007).

Required Agency Approvals

The No Project Alternative does not require regulatory agency approval.

3.3.2 Long-Term Management Strategy (LTMS) Management Plan Conformance Alternative

Description

This alternative would require sand mining to comply with temporal and spatial restrictions on maintenance dredging activities contained in the *Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region Management Plan 2001* (LTMS Management Plan). The LTMS Management Plan is an interagency strategy and plan for maintenance dredging of federally designated navigation channels in San Francisco, San Pablo, and Suisun Bays, and the disposal of dredged materials in San Francisco Bay, the Pacific Ocean, and upland disposal sites for beneficial use. The following is excerpted from the LTMS Management Plan:

> "Federal and state lead agencies involved in the development of the LTMS Environmental Impact Statement/Environmental Impact Report (EIS/EIR) worked closely with US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and California Department of Fish and Game (CDFG) to identify potential impacts on listed species during dredging and disposal operations. Additionally, the LTMS agencies entered into formal consultation pursuant to Section 7 of the [Federal] Endangered Species Act (ESA) with the resource agencies to address the potential impacts that implementing the LTMS could have on listed species. The purpose of consultation was to provide the LTMS agencies, the resource agencies, and the dredging community with a set of common guidelines to minimize adverse impacts on listed species from dredging and disposal activities, and to establish a more predictable regulatory environment for these activities.
>
> "The consultations with NMFS, USFWS, and CDFG resulted in each of these agencies issuing a Biological Opinion addressing listed species and designated critical habitats under their respective jurisdictions. The Biological Opinions adopted the proposed restrictions on the timing and design of dredging and disposal projects developed in the LTMS planning effort. The Biological Opinions evaluate dredging and disposal activities relative to the LTMS guidelines and environmental windows. If the project can be accomplished during the work windows, the project is authorized for incidental take under the [State and Federal] ESAs. However, this section also describes the process that should be followed if a proposed project does not fall within the environmental windows set forth in the ROD [Record of Decision].
>
> "When planning dredging activities, project proponents should consider whether their project could be accomplished during the work window for that geographic area…. If the activity proposed is in the work window, the project is covered by the existing Biological Opinions and can take place with the normal permits and conditions. However, if the activity is proposed outside the work windows for that geographic area, project proponents will need to request that the US Army Corps of Engineers

[ACOE] initiate either informal or formal consultation on their behalf, with the appropriate resource agency for listed species and designated critical habitats.

"If a listed species is not federally listed, but is state listed (e.g., Pacific herring), the project proponent must consult with CDFG. This process involves contacting CDFG directly and discussing the rationale for dredging or disposal during the restricted period. If CDFG concurs with the determination of *no adverse effect* on listed species or designated critical habitat, it drafts a waiver for the project, which may contain additional conditions, and sends the waiver to the appropriate permitting agencies.

"To ensure protection of biological resources in the Bay, the LTMS agencies implement the following measure:

> *"Dredging and dredged material disposal activities that are conducted within the work windows* [as shown in Figure 3-1 of this EIR]*… do not require further Endangered Species Act consultation. The permitting agencies will closely review the rationale for any dredging and disposal projects proposing work outside the work windows. Pursuant to the federal and California Endangered Species Acts, any projects proposing deviation from the work windows are required to undergo consultation with the appropriate resource agency."*
>
> (LTMS Management Plan, pages 3-11, 3-14)

This alternative would place time and location restrictions on sand mining to conform with the environmental "work windows" (which indicate when dredging may occur in different parts of the Bay) shown in Figure 3-1, and described below.

- The permitted mining volumes for each of the Central Bay parcels (PRC lease numbers 709, 2036, 7779, and 7780; see Figure 2-1a in Section 2.0, Project Description) would be the same as for the proposed Project.

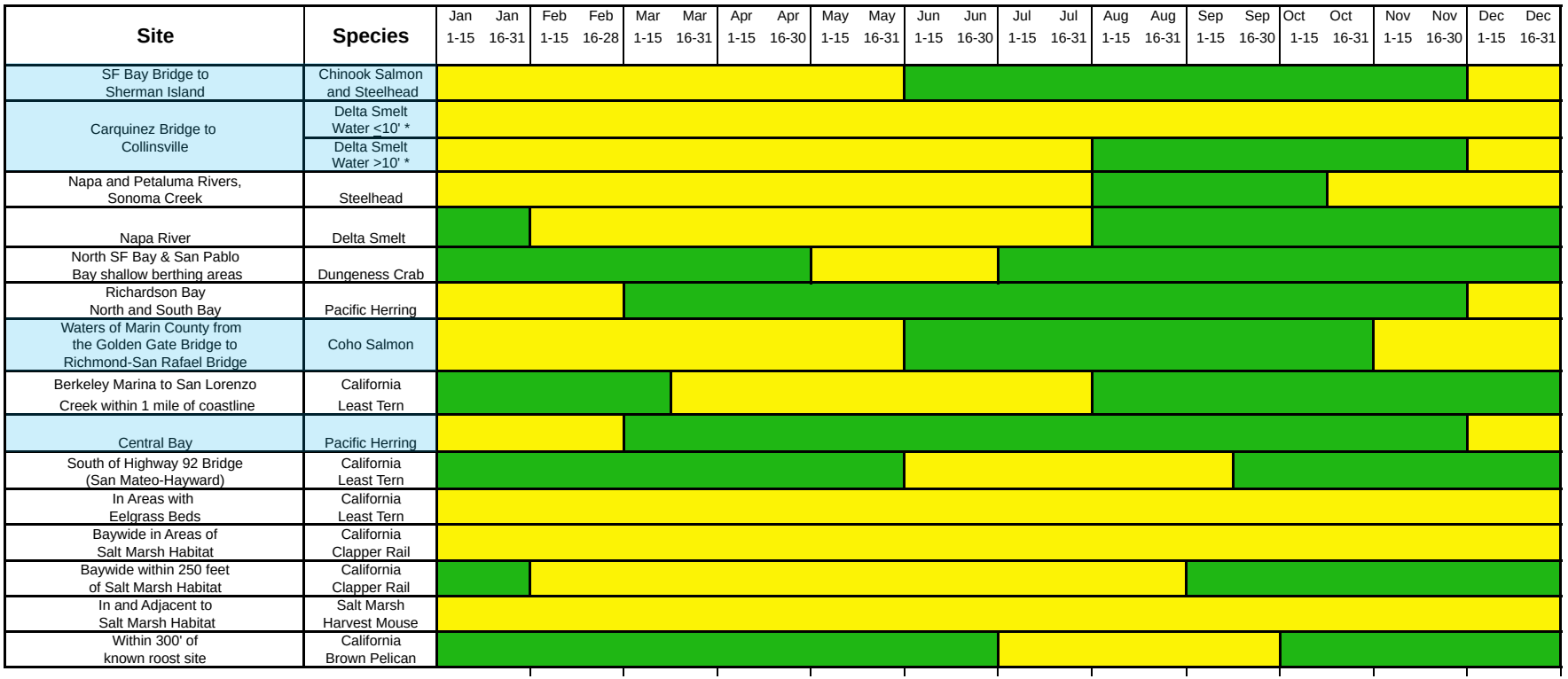
- Sand mining in the Central Bay would be restricted to the period June 1 through November 30, to avoid impacts on steelhead trout, Chinook salmon juveniles and adults, and Pacific herring.

- Mining in the portions of PRC lease areas 709 (North), 7779 (North, East, and West), and 2036 that are within Marin County (Figure 3-2) would be further restricted to the period June 1 through October 31 (that is, dredging would end October 31, instead of November 30) to avoid impacts on coho salmon.

The following additional considerations relevant to special status species are also applicable to this alternative.

- The green sturgeon has been listed as threatened and may further restrict dredging in the Central Bay and Delta.

Maintenance Dredging Work Windows by Area and Species



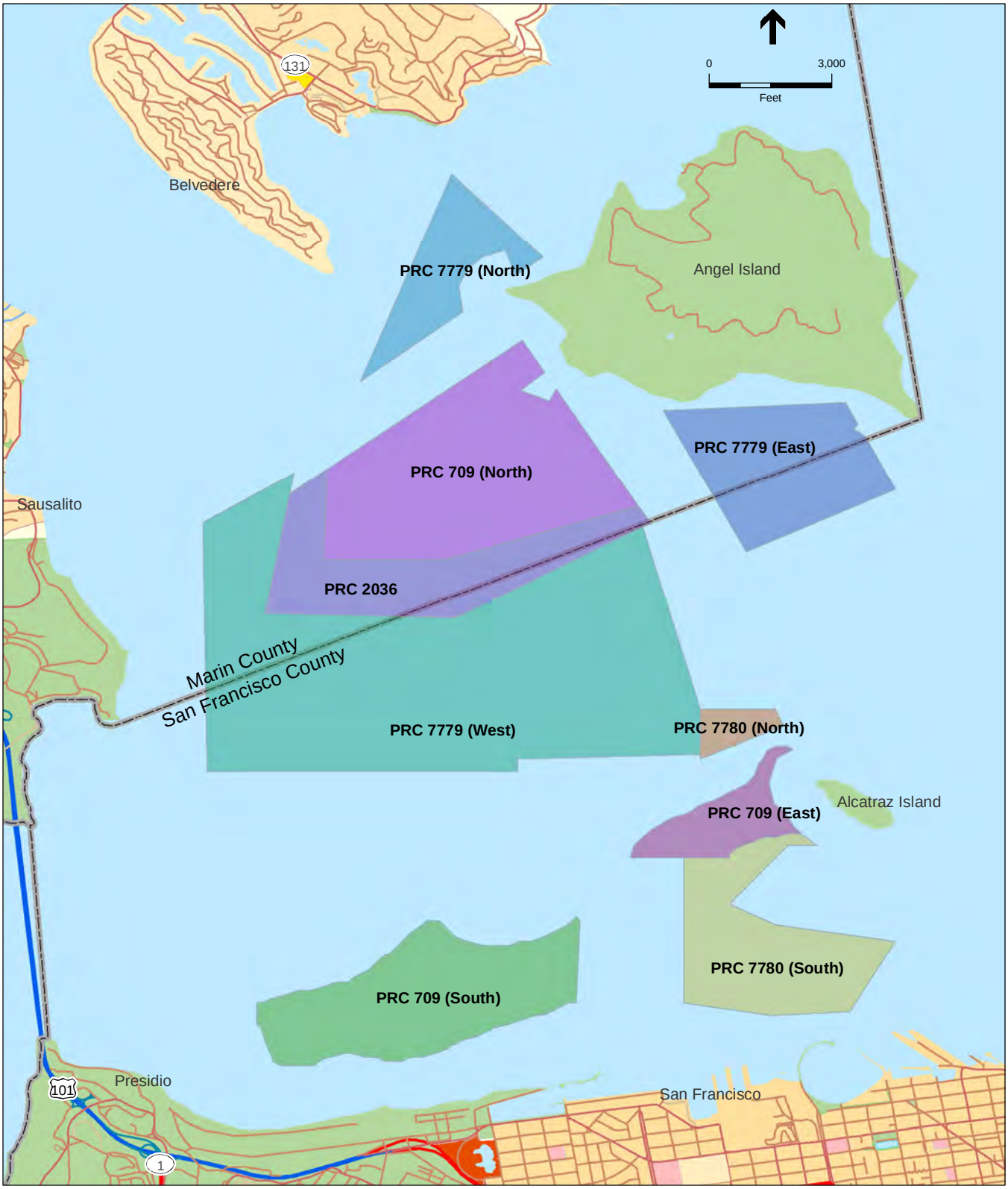
For more detailed information, see Appendix F of the LTMS Management Plan or the LTMS EIR/EIS.
* Depths are represented in MLLW, and are project depth, not including over dredge allowance
**This chart is for operations and maintenance dredging of existing navigational facilities. Other species may be affected by work in other areas.

Based on LTMS Management Plan Figure 3.2 Revised Draft Work Windows (green) 2/25/04

SOURCE: BCDC 2010

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure 3-1
LTMS Management Plan Dredging Work Windows by Area



San Francisco Bay and Delta Sand Mining EIR. 207475

SOURCE: ESRI 2008; California State Lands Commission 2008, 2011

Figure 3-2
Lease Areas in the Central Bay

- Measures required as conditions of the Biological and Conference Opinion (BO) issued by NMFS to address the effects of sand mining on Chinook salmon, steelhead trout, and green sturgeon would also apply to this alternative (see Section 4.1, Biological Resources) (NMFS 2006).

- There is no work window for Sacramento splittail or delta smelt established in the LTMS Management Plan for areas upstream of the Carquinez Bridge. As discussed in Section 4.1 Biological Resources, the USFWS issued a formal Letter of Concurrence in 2006 which indicated that, with implementation of permit conditions identified in the letter, sand mining activities in the Sacramento-San Joaquin Estuary are not likely to adversely affect delta smelt (USFWS 2006). As further discussed in Section 4.1, Biological Resources, consultation with CDFG staff indicates that delta smelt take would occur even with implementation of the above-referenced permit conditions and that an incidental take permit would be needed. The EIR includes additional mitigation measures (MM), BIO-8a and BIO-8b, based on discussions with CDFG staff. The permit conditions upon which the USFWS concurrence is based and MM BIO-8a and BIO-8b can be found in Section 4.1, Biological Resources; they would also apply to this alternative.

- Sacramento splittail has been delisted under the Federal ESA, and is not currently considered a special status species. Impacts of the Project on splittail are considered less than significant (Impact BIO-7). Therefore, it appears that conformance with the LTMS regarding work windows would not reduce the feasibility of mining sand from the Middle Ground Shoal and Suisun Associates (PRC 7781) lease areas.

- The longfin smelt was recently added to the State endangered species list. This species is not directly addressed in the LTMS. Mitigation to address take of this species is presented in Section 4.1, Biological Resources (MM BIO-8a and BIO-8b), and would also apply to this alternative.

The total volume of sand that would be permitted to be mined under this alternative would be the same as under the proposed Project (see Table 3-2). This alternative would, however, restrict mining to a five- to six-month period each year in the Central Bay, and a three-month period in Suisun Bay and the western Delta, which could make it difficult or impossible to mine the full amount of the permitted volumes. This alternative might prompt the Applicants to add mining equipment (such as additional tug-barge combinations) and mine more intensively during the work windows in order to mine the full permitted volume within the work window. Furthermore, this alternative would likely require the Applicants to stockpile materials at the offloading facilities for shipment during the periods when mining would not be allowed. Given the limited size of the offloading facilities, this could constrain mining operations, or prompt the Applicants to expand existing facilities or develop new offloading facilities.

The equipment and mining methods for this alternative would be the same as for the proposed Project. As described in Section 2.0, Project Description, the equipment that Hanson and Jerico use includes a trailing arm hydraulic suction dredge and hopper. Both Hanson and Jerico use the pothole or moving pothole sand mining method. As with the proposed Project, once the mining event is completed, the barge would be taken to one of several offloading facilities operated by Hanson and Jerico as shown in Figure 2-10 in Section 2.0, Project Description. As with the Project, operations at the offloading facilities, including landside transport of materials to and from the offloading facilities, would not be considered part of this alternative.

Required Agency Approvals

This alternative would require the same agency approvals as the proposed Project.

3.3.3 Clamshell Dredge Mining Alternative

Description

The Clamshell Dredge Mining Alternative would employ a clamshell bucket and crane, not a suction dredge, to mine sand. Clamshell dredging is accomplished by using a barge-mounted crane to lower a clamshell bucket to the sea floor until it sinks into the sediment. A bucketload of sediment is scooped up and brought back to the barge and deposited on it (Figure 3-3). Clamshell dredging does not require the creation of a slurry, and does not therefore use a large volume of seawater. The potential for entrainment of fish associated with suction dredge mining is consequently substantially reduced. Accidental capture or injury to fish is unlikely, as fish can avoid the bucket. However, compared to suction dredge mining, this mining method may 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. All other aspects of this alternative, including mining locations, off-loading locations, and mining volumes (shown in Table 3-2), would be the same as for the proposed Project, and as described in Section 2.0, Project Description. Mining would be conducted by both Hanson and Jerico, as with the proposed Project.

The applicants do not own or currently operate any clamshell dredge mining equipment and would be required to purchase or rent this equipment to mine sand at the same volume as suction dredging. Clamshell dredge mining would require two barges, one to operate the clamshell crane and one to receive, store, and transport the mined sand. Mining could occur only in areas where surrounding currents are minimal or with the

SOURCE: Copyright Michael Slater, www.BoatingSF.com

Figure 3-3
Clamshell Dredge Operation
in San Francisco Bay

assistance of a tug to keep the crane barge stable and on station; Central Bay currents would make clamshell dredge mining difficult to complete as an alternative.

Required Agency Approvals

This alternative would require all the same approvals as the proposed Project.

3.3.4 Reduced Project Alternative

Description

This alternative would reduce permitted annual mining volumes in all of the lease areas to a level equivalent to current baseline mining volumes (i.e., the 2002 to 2007 average mined at each Project parcel). The total amount of material mined would be 1,346,267 cy/yr, which is approximately 694,000 cubic yards less than is proposed under the Project. It is slightly less than the baseline volume assumed for the Project analysis because one of the Central Bay parcels mined during the baseline period is not proposed to be mined as part of the Project. The specific mining volumes for each lease parcel are shown in Table 3-2. Mining methods and off-loading would be the same as proposed for the Project, and mining would be conducted by Hanson and Jerico.

Although this alternative would permit less sand mining than is proposed under the Project, it is feasible and would attain most of the Project objective because it reflects the Applicants' current mining levels averaged over a five-year period. The baseline volumes on which this alternative is based address fluctuations that can occur from year to year in the mining industry. Although total mining revenues would be reduced compared to the proposed 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 proposed Project.

As with the No Project Alternative, it is assumed 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 imports from Mexico or British Columbia. The air quality implications of a shift in the source of sand are examined in Section 4.5, Air Quality.

State CEQA Guidelines section 15126.6(b) states that the consideration of alternatives is to focus on alternatives that are capable of substantially lessening the project's significant effects, even if these alternatives would impede to some degree attainment of the project objectives, or would be more costly. While this alternative could result in lower net revenues and profits for the Applicants relative to the proposed Project, revenues and profits would be similar to baseline operations; therefore this alternative is assumed to be economically feasible.

Required Agency Approvals

This alternative would require all the same approvals as the proposed Project.

3.4 COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

State CEQA Guidelines section 15126.6(d) requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed Project. Table ES-4 in the Executive Summary provides a comparison of the proposed Project with each of the alternatives. All of the alternatives, including the No Project Alternative, are evaluated in Section 4.0, Environmental Analysis. State CEQA Guidelines section 15126.6(e)(2) further states:

> The "no project" analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. *If the environmentally superior alternative is the "no project" alternative*, the EIR shall also identify an environmentally superior alternative among the other alternatives." (Emphasis added.)

The environmentally superior alternative is discussed in Section 6.0, Other Required CEQA Sections and Environmentally Superior Alternative.

3.5 CUMULATIVE PROJECTS

Section 15130 of the State CEQA Guidelines requires that an EIR discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in section 15065(c). As defined in section 15355, "cumulative impacts" refer to two or more individual effects (e.g., a combination of the project evaluated in the EIR together with other projects that cause related impacts) which, when considered together, are considerable or which compound or increase other environmental impacts. Where a lead agency is examining a project with an incremental effect that is not

"cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable. An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.

3.5.1 Boundary of Cumulative Projects Study Area

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, and is consistent with the Project analysis and numeric modeling domain shown in Figure 4.3-4 in Section 4.3, Hydrology and Water Quality, and the complete modeling domain shown in Figure D-7 of Appendix D of the bathymetric and hydrodynamic study included as EIR Appendix G. For air quality impacts, the boundary coincides with the San Francisco Bay Area Air Basin. The study area for cumulative projects is shown in Figure 3-4, and the locations of cumulative projects are shown in Figure 3-5 (see Table 3-3 at the end of this section for details of these cumulative projects). Within this geographic area, Project impacts have the potential to combine with impacts of other closely related projects and result in cumulatively considerable impacts.

3.5.2 Description of Cumulative Environment

The following generally describes the setting and existing environmental conditions within the Cumulative Projects Study Area for those resource areas having the greatest potential for cumulative impacts. More information on the setting may be found in each section of Section 4.0, Environmental Analysis.

The setting for the cumulative analysis is the waters, shoreline, and region of the San Francisco Bay and western Delta as they existed at the time of the Notice of Preparation (NOP) in 2007. This includes existing physical and regulatory conditions at that time. The cumulative analysis will examine the potential for Project-related impacts to combine with impacts of the Cumulative Projects identified in Table 3-3, to cause cumulative impacts to the waters, floor, and shoreline of the Bay and Delta, and to air quality within the San Francisco Bay Area region. The environmental and regulatory setting for each environmental topic is discussed briefly below, and in detail in Section 4.0, Environmental Analysis.

- **Biological Resources.** The cumulative analysis for biological resources will examine the potential cumulative impacts on the aquatic and benthic habitats of affected species in the San Francisco Bay Estuary region, including central San Francisco Bay, San Pablo Bay, Carquinez Strait, and Suisun Bay and channels. Multiple vertebrate and invertebrate communities potentially affected by the proposed Project and similar cumulative projects inhabit the San Francisco Estuary including benthic infauna and epifauna, mobile invertebrates such as shrimp and crabs, and demersal and pelagic fish.

- **Mineral Resources.** The cumulative analysis for mineral resources will examine potential impacts on limiting access to, or otherwise interfering with recovery of known mineral reserves from the floor of the Bay and western Delta.

- **Hydrology and Water Quality.** The cumulative analysis for hydrology and water quality will examine the potential for cumulative effects on the waters of the Bay and Delta, including the potential for changes to water quality, currents, and sediment transport. Cumulative impacts to water quality will be evaluated primarily within the context of the San Francisco Bay Regional Water Quality Control Board's Basin Plan water quality standards and objectives. Impacts related to sediment transport, which are not explicitly addressed in the Basin Plan, will be evaluated based on the potential to affect habitat and geomorphology in the Bay, the Delta, and the ocean. This includes the potential impact on replenishment of beach sands.

- **Hazards and Hazardous Materials.** The analysis of cumulative effects related to hazards and hazardous materials will focus on the potential for cumulative effects related to the release of hazardous substances to Bay and Delta waters.

- **Air Quality.** The proposed Project is located exclusively within the San Francisco Bay Area Air Basin. Project and cumulative air quality impacts will therefore only be considered within the San Francisco Bay Area Air Basin.

- **Cultural Resources.** Cultural resource impacts do not generally combine in a cumulative manner, since cultural resources occur in specific locations, and each cultural resource is essentially unique. The cumulative analysis will examine the combined potential for the cumulative projects to disturb or destroy known cultural resources that occur on the floor of the Bay and western Delta.

- **Land Use and Recreation.** The cumulative land use and recreation impacts analysis will focus primarily on the potential for the Cumulative Projects to interfere with attainment of goals and objectives of the broad land use plans for the Bay and Delta, including BCDC's San Francisco Bay Plan.

3.5.3 Description of the Cumulative Projects

The projects included in the cumulative analysis are listed in Table 3-3; their locations relative to the Project site are shown in Figure 3-5. Consistent with State CEQA

SOURCE: ESA 2009; ESRI 2008; California State Lands Commission 2008, 2011

Figure 3-4
Cumulative Analysis Study Area

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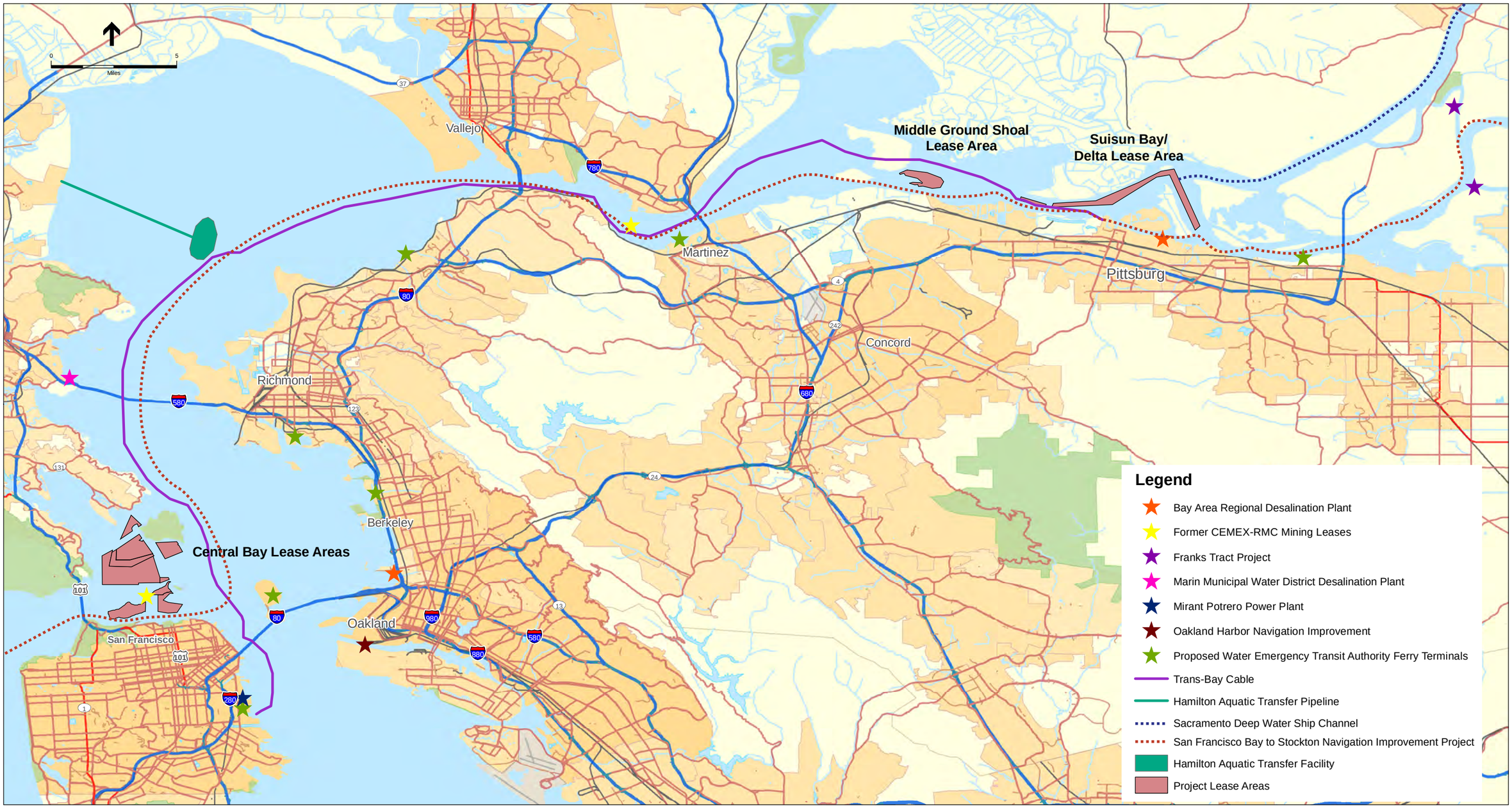

Figure 3-5
Location of Cumulative Projects

SOURCE: ESA 2011; ESRI 2008; California State Lands Commission 2008, 2011; Hanson Marine Operations 2008

Notes:
The Bay Area Regional Desalination Project is studying a third site for location of a facility on the ocean shore of San Francisco, but this location is outside the Cumulative Project Study Area;
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;
The Long Term Management Strategy for Delta Sediments encompasses the Sacramento-San Joaquin Delta.

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Guidelines section 15355, the list takes into account closely related past, present, and reasonably foreseeable future projects within the Cumulative Projects Study Area that have the potential to combine with impacts of the proposed Project in a cumulative manner. Specifically, projects included in the list take into account:

- Recently completed past projects;
- Projects that have been in existence for some time, and that have ongoing, known impacts that clearly have the potential to combine with proposed Project impacts in a cumulative manner;
- Projects requiring agency approval for which an application was received at the time the Project NOP was released;
- Projects that have been approved or are under construction; and
- Probable future projects that are determined to be reasonably foreseeable for other reasons.

Several projects were considered for inclusion in the cumulative analysis, but were eliminated because, upon further investigation, they appear not to be associated with impacts that could combine in a cumulative manner with those of the proposed Project. Examples of such projects include the following:

- **Power plants.** Several power plants that do not use or are planning not to use Bay or Delta water for cooling. These include the Pacific Gas and Electric (PG&E) Gateway Generating Station in Antioch; the Delta Energy Center in Pittsburg; the Marsh Landing Generating Station, to be located near Antioch; and the Willow Pass Generating Station, to be located in Pittsburg.
- **Marine Terminal Lease Renewals.** The CSLC is conducting environmental reviews for several marine terminal lease renewal projects. Since the lease renewals take into consideration continuing existing uses, these projects are not considered in the cumulative analysis.
- **San Francisco Bay Trail.** This Trail, which is under construction (portions are completed, while others are planned), would not be expected to use water from the Bay or Delta or otherwise disturb the floor of the Bay or Delta.
- **Other.** Upstream flood control projects, marina improvement projects, and other smaller projects along and adjacent to the shoreline of the Bay and Delta, that would be expected to have only localized environmental effects, and thus would be unlikely to combine with effects of the proposed Project, are not considered in the cumulative analysis.

Table 3-3. Other Projects in the Sand Mining Project Area with Potential for Cumulative Impacts

Project	Description	Location[1]	Project Status and Documentation
LTMS Management Plan for the Placement of Dredged Material in the San Francisco Bay	Interagency strategy and plan for ongoing dredging, including maintenance dredging of federally designated navigation channels in San Francisco Bay, San Pablo Bay, and Suisun Bay; and dredge materials disposal in San Francisco Bay, Pacific Ocean, and upland disposal sites for beneficial use.	Locations throughout the San Francisco Bay, San Pablo Bay, Carquinez Strait, and the Delta	Strategy and Plan in effect. - Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR was completed in December 1998 (Army Corps of Engineers (ACOE) et al., 1998). - Record of Decision (ROD) was signed in July 1999 (ACOE and U.S. Environmental Protection Agency [U.S. EPA] 1999). - LTMS Management Plan (ACOE et al. 2001) was completed in August 2000, adopted by BCDC in December 2000, and published in 2001.
Oakland Harbor Navigation Improvement (-50 Foot) Project	The -50 Foot Project supports deep draft navigation improvements at the Port of Oakland. Project components include widening and deepening of the Harbor Entrance, Outer and Inner Harbor Channels, and two turning basins to -50 feet Mean Lower Low Water (MLLW) as well as local business and utility relocations.	Oakland Harbor	Project completed in 2009 (Port of Oakland 2011). Final EIS/EIR completed in 1998 (ACOE and Port of Oakland 1998).
Hamilton Wetlands Restoration Project Dredged Material Aquatic Transfer Facility; Federal lead agency is ACOE; State lead agency is California State Coastal Conservancy (CSCC)	Evaluation of alternative approaches to deliver dredged material to the Hamilton Wetlands Restoration Project in Marin County.	San Pablo Bay, in vicinity of existing in-Bay dredged material disposal site SF-10	Draft EIS/EIR was published in October 2008 (ACOE and CSCC 2008). Final documents are expected to be completed in fiscal year 2012. http://www.spn.usace.army.mil/projects/hamiltonairfield.html
San Francisco Water Emergency Transit Authority (WETA) Ferry System Expansion (Note: predecessor agency was San Francisco Bay	WETA priorities are to create and adopt an Emergency Water Transportation System Management Plan (EWTSMP) for the Bay Area on or before July 1, 2009; create and adopt, on or before July 1, 2009, a transition plan to facilitate the transfer of existing public	San Francisco Bay, San Pablo Bay, and Suisun Bay	WETA adopted Ferry Implementation and Operations Plan in 2003 (WTA 2003a) based on Final Program EIR for the Expansion of Ferry Transit Service in the San Francisco Bay Area, prepared for WTA and completed in 2003 (WTA 2003b).

Table 3-3. Other Projects in the Sand Mining Project Area with Potential for Cumulative Impacts

Project	Description	Location[1]	Project Status and Documentation
Area Water Transit Authority [WTA])	transportation ferry services within the Bay Area region to WETA while ensuring continuity in the programs, services, and activities of existing public transportation ferry services; and to continue to deliver the 2003 Ferry		www.watertransit.org/newsInformation/eir.aspx#download.
	Implementation and Operations Plan with a focus on building and operating a comprehensive and environmentally friendly public water transit system of ferries, feeder buses, and terminals to increase regional mobility in the Bay Area.		EWTSMP was approved and adopted in June 2009. www.watertransit.org/CurrentProjects/EWTSPlan.aspx. The Transition Plan was also completed in June 2009. www.watertransit.org/files/TransitionPlan/TPFinal062009.pdf.
Trans Bay Cable (TBC)	The TBC Project involves the installation of a submarine High Voltage Direct Current (HVDC) transmission cable and associated onshore facilities to transmit electrical power and provide a dedicated connection between the East Bay near Pittsburg and the electrical transmission and distribution facilities serving the northern San Francisco peninsula. Use of a submarine HVDC cable allows for transmission of power over a long distance with minimal energy loss. Includes 53 miles of submarine and buried onshore HVDC cable installed beneath Suisun Bay, Carquinez Strait, San Pablo Bay and San Francisco Bay to a proposed converter station in San Francisco. Project construction completed and commercial operations began in 2010; expected operational life is at least 40 years.	City of Pittsburg, Suisun Bay, Carquinez Strait, San Pablo Bay, San Francisco Bay, city of San Francisco	Construction completed and project online in 2010. www.transbaycable.com/project-timeline/. Final EIR certified by city of Pittsburg in 2006 (City of Pittsburg 2006). www.ci.pittsburg.ca.us/pittsburg/pdf/tbc_feir/urs%20tbc%20feir/index.html.

Table 3-3. Other Projects in the Sand Mining Project Area with Potential for Cumulative Impacts

Project	Description	Location[1]	Project Status and Documentation
Marin Municipal Water District (MMWD) Desalination Plant	The MMWD proposed a desalination plant to treat water from San Rafael Bay for use as drinking water as part of the district's long-range water supply plan. The plant would be located on MMWD land near Pelican Way in the city of San Rafael, with the intake pipe located at the end of a pier next to the Richmond-San Rafael Bridge. The plant would have a capacity of 5 million gallons per day (mgd) with a possibility to incrementally increase capacity to 15 mgd. The Bay water would be treated in three phases: solid removal, reverse osmosis, and addition of materials for taste. The brine produced in the reverse osmosis process would be discharged into the bay and the solid sludge disposed in Redwood Landfill.	San Francisco Bay - Marin County north of west end of Richmond-San Rafael bridge	Studies for the EIR began in 1990 and were updated in 2005 with the construction of a pilot desalination plant. Final EIR (MMWD 2008) was certified in February 2009. www.marinwater.org/controller?action=menuclick&id=446. In April 2010 the MMWD Board of Directors put the desalination component of the long-range water supply plan on hold, primarily due to a drop in water demand. www.marinwater.org/controller?action=menuclick&id=226.
Bay Area Regional Desalination Project	Joint project of the Contra Costa Water District, East Bay Municipal Utility District, San Francisco Public Utilities Commission, and Santa Clara Valley Water District to investigate the potential for a regional desalination project.	Three study sites: oceanside in San Francisco, on San Francisco Bay in Oakland (near foot of Bay Bridge), and in the Delta (Pittsburg)	Pilot plant operation and study completed in June 2009. www.regioanldesal.com/. Preliminary plant design is expected in 2013 or 2014, design and environmental review from 2014 to 2017, and construction from 2017 to 2020. www.regionaldesal.com/schedule.html
LTMS for Delta Sediments	The Delta LTMS is a multi-agency cooperative planning effort to coordinate, plan, and implement beneficial reuse of sediments in the Sacramento and San Joaquin River Delta.	Sacramento and San Joaquin River Delta	Plan is under development
Mirant Potrero Power Plant	Power generating station within the city of San Francisco that until recently used Bay water for cooling.	City of San Francisco	Plant had operated for 45 years. In December 2010 (following a 2009 agreement between the City and Mirant to close the plant and the 2010 completion of the transbay power cable) the City and California Independent System Operator (ISO) announced the plant would cease operations on January 1, 2011.

Table 3-3. Other Projects in the Sand Mining Project Area with Potential for Cumulative Impacts

Project	Description	Location[1]	Project Status and Documentation
			www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2010/12/21/MN7G1GTAGE.DTL. Reports on entrainment and impingement of marine biota include: Tenera Environmental 2005. Potrero Power Plant 316(b) Entrainment Characterization Report for Potrero Power Plant Unit 3. Submitted to Mirant Potrero LLC, San Francisco, CA. Tenera Environmental 2007. Potrero Power Plant. Impingement Mortality Study Data Report. Submitted to Mirant Potrero LLC, San Francisco, CA.
Franks Tract Project	The Franks Tract Project is being proposed by California Department of Water Resources (DWR) and U.S. Bureau of Reclamation to improve the health of the Delta ecosystem and the operational reliability of State and Federal water projects. The project is proposed to protect fish resources, particularly species of concern, such as the delta smelt and longfin smelt, and to reduce seawater salinity intrusion into the Delta. The project would involve installing operable gates to control the flow of water at key locations (Threemile Slough and/or West False River) to limit the movement of these fish species and higher salinity water into Franks Tract during certain times of the year.	Western Delta: Threemile Slough and West False River	Joint EIS/EIR being prepared by DWR and U.S. Bureau of Reclamation; NOP (DWR and U.S. Bureau of Reclamation 2008) released September 18, 2008. Work on the Franks Tract Project slowed in 2008 due to funding constraints, although some work continued. As of February 2011 the Draft EIS/EIR was expected to be released in spring 2011, the Final EIS/EIR in fall 2011. According to the DWR website, as of September, 2012, the project has been delayed. ~~, and project construction expected to start in summer 2012.~~ http://www.water.ca.gov/frankstract/
Sacramento River Deep Water Ship Channel (SRDWSC)	The project, proposed by the ACOE and the Port of West Sacramento, would deepen the existing shipping channel to -35 feet mean lower low water and include selective widening of portions of the SRDWSC to improve economies of scale and overall navigation safety. The project was previously initiated but suspended in 1990. The project would involve	The SRDWSC between Collinsville and the Port of West Sacramento; the project would dredge river miles 0.0 to 35.0 of the 43.4-mile channel. The 8.4	Draft Supplemental EIS/Subsequent EIR released February 2011 for 45-day public comment period. The final EIS/EIR has not been ~~is expected to be~~ completed ~~in summer 2011~~. ~~[www.spn.usace.army.mil/projects/dwsc/SRDWSC_Public_Hearing_PPT.pdf]~~ Assuming six-month project-specific work

Table 3-3. Other Projects in the Sand Mining Project Area with Potential for Cumulative Impacts

Project	Description	Location[1]	Project Status and Documentation
	dredging an estimated total of approximately 8.1 million cubic yards of dredged material.	miles nearest the Port were previously dredged	windows are permitted, the project could be constructed in four years. http://www.spn.usace.army.mil/projects/dwsc/ ~~http://sacramentoshipchannel.org~~.
San Francisco Bay to Stockton Navigation Improvement Project	The project, proposed by the ACOE and the Port of Stockton would deepen two ship channels that together extend 75 nautical miles, from the Pacific Ocean just outside the Golden Gate to the Port of Stockton. The purpose of the project is to improve the efficiency of the movement of goods. Although portions of the two channels have been deepened in the past, authorized dimensions were not attained in all areas. The ACOE is reevaluating the authorized Federal project to determine the extent to which changes to channel dimensions are warranted. ~~http://www.spn.usace.army.mil/projects/stockton_navigation/documents.html~~.	Study area includes two reaches - the John F. Baldwin Ship Channel within San Francisco Bay (from the Golden Gate to Chipps Island) and the Stockton Deep Water Ship Channel from Chips Island to the Port of Stockton	Feasibility stage of a general reevaluation study; public scoping meetings held in April 2008. http://www.spn.usace.army.mil/projects/stockton_navigation/index.html
Past Sand Mining in San Francisco Bay, Carquinez Strait, Suisun Bay, and the western Delta	For the purposes of the cumulative analysis, this EIR considers previous sand mining as a project. In particular, this cumulative project encompasses the previous 10-year sand mining lease period in all lease areas in San Francisco Bay, Carquinez Strait, Suisun Bay, and the Western Delta (including those held by CEMEX).	San Francisco Bay, Carquinez Strait, Suisun Bay, and the western Delta	Mining no longer occurs under the previous lease agreements, but continues on a month-to-month basis, except in parcels PRC 5871 (in the Central Bay) and PRC 5733 (in Carquinez Strait), which were formerly leased by CEMEX.
Possible Future Sand Mining in San Francisco Bay, Carquinez Strait, Suisun Bay, and the western Delta	The potential for additional sand mining beyond the proposed 10-year lease period is considered a project for the purpose of the cumulative analysis. This cumulative project includes mining beyond the 10-year lease period for an unspecified period.	San Francisco Bay, Carquinez Strait, Suisun Bay, and the western Delta	No application has been made for future sand mining in the CSLC lease areas.

[1] See Figure 3-2 for the approximate location of projects.