California State Lands Commission

PART II – RESPONSES TO COMMENTS

Final Environmental Impact Report for the San Francisco Bay and Delta Sand Mining Project, September 2012

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PART II. RESPONSES TO COMMENTS

Pursuant to State California Environmental Quality Act (CEQA) Guidelines section 15088, the California State Lands Commission (CSLC), as CEQA Lead Agency, is required to evaluate comments on environmental issues received from persons who reviewed the Revised Draft Environmental Impact Report (EIR) prepared for the San Francisco Bay and Delta Sand Mining Project (Project) and to prepare a written response. The Lead Agency must respond to comments received during the noticed comment period and any extensions and may respond to late comments.

The State CEQA Guidelines further require the Lead Agency to describe in its written response the disposition of significant environmental issues raised (e.g., revisions to the proposed Project to mitigate anticipated impacts or objections). In particular, the major environmental issues raised when the Lead Agency's position varies from recommendations and objections raised in the comments must be addressed in detail giving reasons why any specific comments and suggestions were not accepted.

Twelve written comment sets were submitted on the Revised Draft EIR. Each comment received is given a unique identification (ID) number (please see Table II-1).

- Each commenter is given a unique comment code that refers to the agency, organization, or person submitting the comment.
- Individual comments are numbered in the margins of each comment letter and/or meeting transcript; correspondingly numbered responses follow each comment letter.

Part II of this final EIR contains both the comment letters on the Revised Draft EIR and the CSLC staff's Responses to Comments. Part III contains revisions to the text of the Revised Draft EIR that were made in response to comments received.

MASTER RESPONSES

To address multiple comments submitted on the same topics, several master responses were prepared. The master responses, listed below, are included at the beginning of the comment and response sets:

- Master Response 1, Project Impacts on Sediment Transport and Coastal Morphology
- Master Response 2, Baseline Used in the Analysis
- Master Response 3, Mineral Resources Impacts Significance Conclusions

New references cited in the master responses and not included in the Revised Draft EIR are provided at the end of each master response. References cited in the responses to individual comments not included in the Revised Draft EIR are provided at the end of Part II.

Table II-1. Commenters on Revised Draft EIR and Comment Identification Numbers Used in this Final EIR

Category	Name of Commenter	Date of Comment	Comment Set & ID	
State Agency	Brenda Goeden, Bay Conservation and Development Commission	1/3/2012	**A**	A-1 to A-48
	Michael Machado, Delta Protection Commission	12/27/2011	**B**	B-1 to B-3
	Kevan Samsam, Delta Stewardship Council	11/2/2011	**C**	Withdrawn
	Marija Vojkovich, Department of Fish and Game	1/9/2012	**D**	D-1 to D-10
	Steve Testa and Will Arcand, State Mining and Geology Board	12/13/2011, 12/21/2011	**E**	E-1 to E-3
Federal Agency	J.W. McPherson, United States Coast Guard	12/15/2011	**F**	F-1 to F-3
Organization	Carin High, Citizens Committee to Complete the Refuge	1/3/2012	**G**	G-1 to G-12
	Ian Wren, San Francisco Baykeeper and David Lewis, Save the Bay	12/15/2011	**H**	H-1 to H-26
Individual	Peter Baye	1/3/2012	**I**	I-1 to I-17
	Libby Lucas	12/31/2011, 1/2/2012	**J**	J-1 to J-13
	Orville Magoon	11/16/2011	**K**	K-1
Applicants	Mike Roth, Hanson Aggregates / Hanson Marine Operations, and on behalf of Jerico Products / Morris Tug and Barge	1/3/2012	**L**	L-1 to L-52

Master Response 1: Project Impacts on Sediment Transport and Coastal Morphology

Introduction and Summary

Several comments (including Comments A-5, A-6, A-22, A-45, G-5, H-5, H-7, H-10, H-13, I-2, I-7, I-9, J-2, J-7, and K-1) suggest that sand mining could adversely impact the evolution of the San Francisco Offshore Bar (Bar) and result in shoreline erosion because of the following reasons:

- Mining areas contain sand of appropriate size, and therefore may be a source of sediment deposited on the Bar;
- The volume of sand removed from the Bay is approximately equal to the amount eroded from the Bar during recent decades; and
- Deepened mining areas may intercept sediment being transported through the area of the mining leases, due to a change of flow hydrodynamics: essentially, the holes created by mining may become a trap for sediment; this sand would not be available for transport to the Bar.

These concepts were raised in comments on the Notice of Preparation by the San Francisco Bay Conservation and Development Commission (BCDC) and the U.S. Geological Survey (USGS) (please see Appendix B). Exploring these concepts was one of the principal aims of the hydrodynamic modeling and bathymetric analyses performed by Coast & Harbor Engineering (CHE) and described in Appendix G of the EIR. The CHE study was used in the EIR as the basis for Impact HYD-2 in Section 4.3, Hydrology and Water Quality: the conclusion reached in the EIR for Impact HYD-2 is that the extension of sand mining for a 10-year period is not expected to have a substantial effect on the amount of sand delivered to the Bar or coastal beaches, and the impact of the proposed Project on sediment transport and the geomorphology of the coastline and the floor of the Bay, Delta, and ocean would therefore be less than significant. The discussion of cumulative effects on sediment transport and coastal morphology found in Section 4.3, Hydrology and Water Quality, similarly concluded that the Project would not make a cumulatively considerable contribution to a cumulative impact on coastal morphology.

This Master Response reviews and summarizes the CHE study presented in Appendix G of the EIR, and presents supplemental analyses that confirm the EIR conclusions regarding Impact HYD-2 and the potential cumulative effects of the Project on sediment transport and coastal morphology. The results of these analyses clarify and quantify the conclusion reached in Appendix G of the EIR: if the Project is approved and sand mining continues at the proposed volume for a 10-year period, there is likely to be a reduction of 5,000-7,000 cubic yards of sediment transported from Central Bay through the Golden Gate annually. This range represents approximately 0.2 – 0.3 percent of the long-term rate of erosion of the Bar, as calculated by Hanes and Barnard (2007).[1] Consistent with the conclusions presented in this EIR, the CSLC staff considers this Project-associated 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.

Review of CHE's Original Modeling Effort

The focus of the CHE morphologic analysis and hydrodynamic modeling performed for the EIR (Appendix G) was to identify the changes that the Project may cause to seabed morphology, currents, salinity, and sediment transport. While the short-term impacts of removing sand from the floor of the Bay and Delta are readily apparent, and include the creation and persistence of mining holes, the longer-term impacts, and the changes that the mining holes may have on surrounding areas, were not understood. The CHE study consisted of two primary methods: (1) detailed analysis of the high-quality USGS 1997 and 2008 multi-beam survey data in Central Bay and a series of single-beam surveys in Suisun Bay and the Delta (please see Appendix G, Section 4.1); and (2) hydrodynamic and morphologic computer modeling using advanced numerical models. The one-year modeling simulations were intended to span all types of potential hydrodynamic

[1] Other, plausible reasons for the observed erosion rate of the Bar are summarized and discussed in the cumulative impact analysis of the EIR (Section 4.3.6).

conditions, including both weak and strong river flows; as such, the December 1, 1996 to December 1, 1997 period was used (please see Appendix G, Section 4.2).

Through the first method, that is, the analysis of the two USGS multi-beam survey data sets to determine changes in the seabed between 1997 and 2008 (a period roughly coincident with the previous sand mining leases), CHE found that approximately 95 percent of the reported volume mined from Central Bay during that time was not replenished by natural processes. Comparison of the two survey data sets demonstrated that no substantial accumulation of sediment occurred in the Central Bay lease areas during this period. This result leads to the conclusion that persistent pits created by Central Bay sand mining performed from 1997 to 2008 did not result in a measurable deficit of sand elsewhere, such as the Bar and Ocean Beach: had the pits been filled back in, it would be evidence that sand was being captured in the pits, and not transported to other locations. This, however, did not occur. The Project evaluated in the EIR would, if approved, continue mining in essentially the same locations, and for a similar time period; therefore, based on this first method of analysis, the same conclusion was reached regarding impacts of the proposed Project – the Project would not affect sediment transport outside of the immediate vicinity of the mining leases areas.

The second method, computer modeling, confirmed the findings of the USGS bathymetric survey data analysis: the modeling results indicated that, other than within and in the immediate vicinity of the mining and lease areas themselves, the changes induced by mining in the morphology of the seafloor within the Central Bay would be extremely small. Further, the modeling showed that extracting the proposed mining volume from the Central Bay lease areas would have a negligible impact upon the volume of the Bar and coastal areas outside of the Golden Gate.

Supplemental Analysis

In response to comments received on the Revised Draft EIR, and new information that has developed since publication of the Revised Draft EIR, CSLC staff directed the EIR preparers to undertake supplemental analysis, including new modeling, to further investigate and quantify the potential for the Project to reduce the volume of sediment transported through the Golden Gate to the Bar and Ocean Beach.

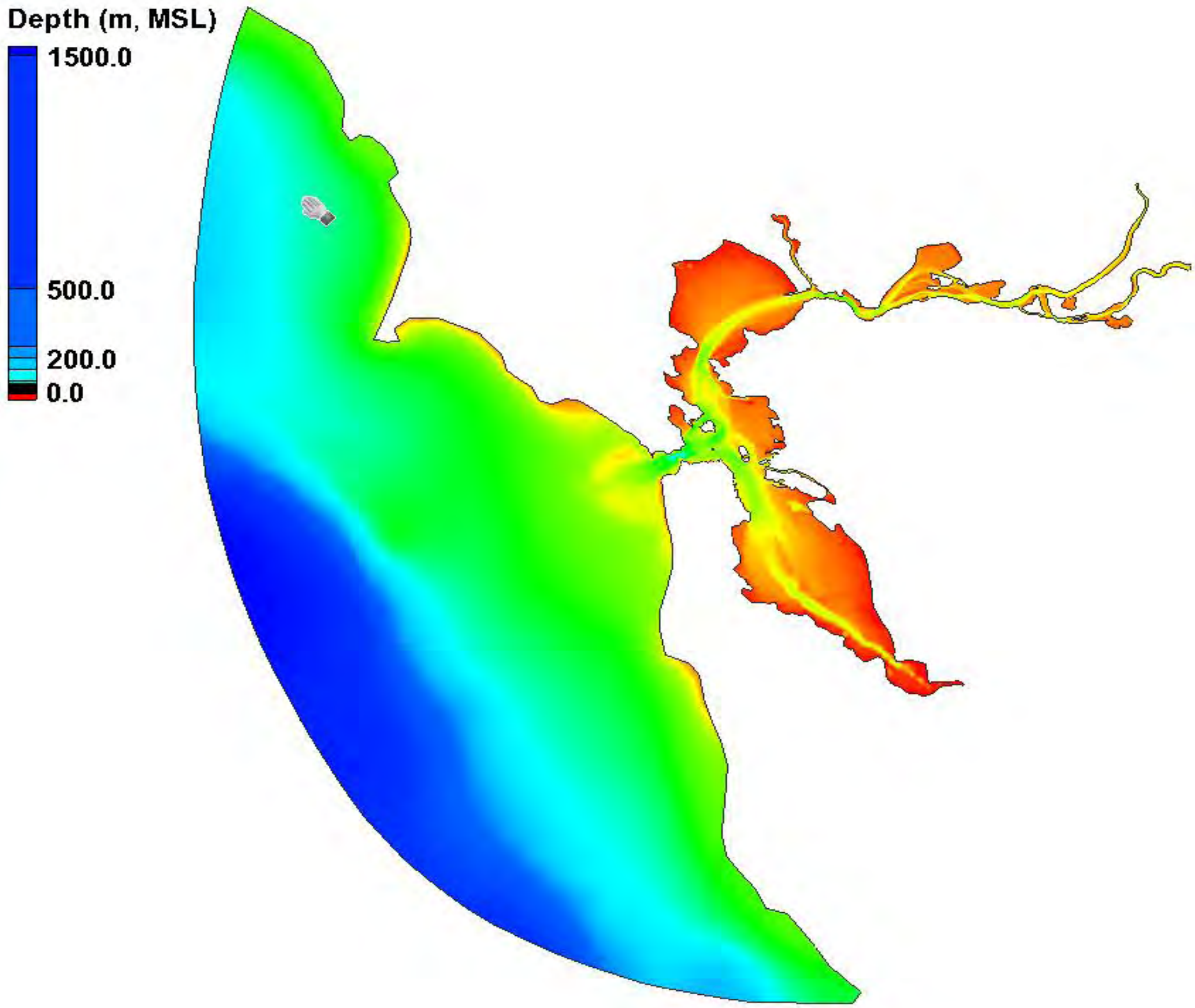
New information included recent but not yet published scientific articles that were cited by commenters and subsequently obtained by CSLC staff. These include two articles by USGS Coastal Geologist Patrick Barnard and others: a synthesis study on the “erosion hot spot” at Ocean Beach (Barnard et al. in press), and an analysis of the giant sand waves that are present immediately within and outside of the Golden Gate, performed to determine regional patterns of bedload sediment transport (Barnard et al. 2012). Both studies draw a connection between sediment transport within the Bay and the observed shrinking of the Bar and erosion at Ocean Beach. Of particular concern was the conclusion reached in the second article that the shape of the sand waves indicates that the direction of net sediment transport from the area just north of the San Francisco shoreline toward the Golden Gate. This conclusion corroborates earlier findings by Barnard et al. (2010), and CHE, which were based on sediment transport modeling and discussed in the Revised Draft EIR (please see Figure 4.3-5 in Section 4.3, Hydrology and Water Quality). Neither of the new studies, however, attempts to quantify the rate at which sediment is transported to the Bar, from the Central Bay, including the proposed mining lease areas, nor the effects that additional mining may have on sediment transport and coastal geomorphological processes. Nevertheless, these new studies led CSLC staff, in an abundance of caution, to extend the sediment transport analysis with a focus on the conclusion reached in the Revised Draft EIR, Section 4.3, Hydrology and Water Quality, Impact HYD-2, and the cumulative impact analysis.

The supplemental analysis of the modeling results described in EIR Appendix G, as well as supplemental sediment transport modeling presented in this Final EIR are intended to quantify the potential contribution of the Project, and in particular continued sand mining in the Central Bay lease areas, to the observed shrinking of the Bar, and therefore erosion within certain areas of Ocean Beach.

Neither the new scientific articles available since publication of the Revised EIR nor the supplemental modeling undertaken for the Final EIR constitutes “significant new information” as described in State CEQA Guidelines section 15088.5 subdivision (a). Because the Revised Draft EIR did not identify any significant impact to the hydrology and geomorphology of the Bay and Delta (Impact HYD-2) or significant cumulative effects on Sediment Transport and Coastal Morphology, and analysis of the new information and supplemental modeling continue to show there would be no significant impact that would result from the Project, recirculation of the EIR is not required.

Note on Hydrodynamic/Sediment Transport Modeling Domain

Comments on the Revised Draft EIR question whether the modeling effort reported in EIR Appendix G included areas outside of the Golden Gate in the “modeling domain” (i.e., the geographic area within which hydrodynamics, salinity, sediment transport, and morphological changes were modeled). Both the original modeling effort, as reported in Appendix G, and the supplemental modeling conducted for this Final EIR used a modeling domain that extends well outside the Golden Gate, and both north and south along the coast. The modeling domain includes the entirety of Ocean Beach, and extends further south as well. The modeling domain used in both modeling efforts is shown in Figure MR1-1.



SOURCE: Coast and Harbor Engineering

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure MR 1-1
Modeling Domain Used in All Modeling

General Approach to Modeling

The computer modeling involved three separate modeling runs. An "Existing Conditions" modeling run was used to characterize sediment transport and bed elevation changes without additional mining, by applying simulated tidal currents and river flows for a one-year period to a seabed defined by the USGS 2008 bathymetric multi-beam survey.[2]

The other two modeling runs (Scenario 1 and Scenario 2) applied the same currents and flows to a digitally-altered seabed, to reflect a range of possible changes to the seabed that may be caused by the proposed Project. In Scenario 1, the proposed mining volume for the entire 10-year lease period for each lease area was digitally removed at an equal rate across the entire lease area, resulting in a broad, relatively shallow mining "hole" covering the full extent of the lease area (proposed annual mining volumes are shown in Table 2-1 in EIR Section 2.0, Project Description; the location and designation for each lease area are shown in Figure MR1-2[3]), as shown in Figure MR1-3 (left side of figure). In Scenario 2, the proposed 10-year mining volume was removed only from a concentrated area within each lease area. The areas selected within each lease area were based on an evaluation of historic mining locations (please see Figures 2-14a through 2-14d in Section 2.0, Project Description). This resulted in less extensive, but deeper, mining holes in each lease area, as shown in Figure MR1-3 (right side of figure).

In all three modeling runs, the model predicted that after the one-year modeling period, changes would occur to the seafloor both within and outside of the lease areas. The potential effects of mining were evaluated by subtracting the changes predicted by the Existing Conditions modeling run from each of the Scenario modeling runs, to arrive at the net change attributable to the presence of the mining holes.

In both Scenario 1 and Scenario 2, the full 10-year proposed mining volume was digitally removed from the seabed in the mining parcels prior to beginning the modeling run. The model therefore assumed that the full effect of all 10 years of proposed mining would occur at once, and that this would occur just prior to commencement of the modeling run. This provides another conservative element to the modeling, since the maximum possible change associated with the 10-year Project duration is assumed to occur instantaneously.[4]

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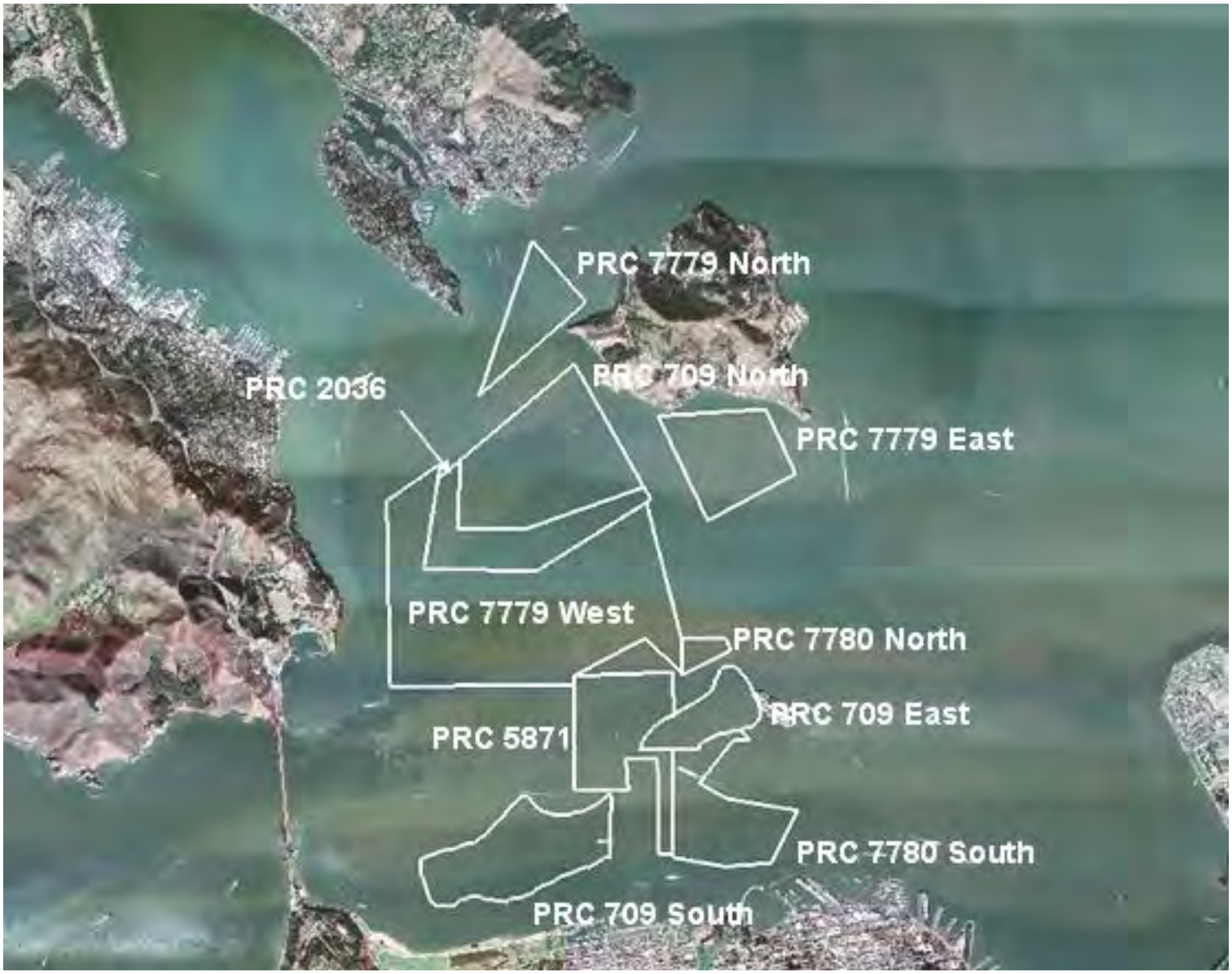
[2] The "Existing Conditions" scenario is reflective of, but distinct from, the No Project Alternative. The Existing Conditions Scenario shows, for the one-year modeling period, changes that would be expected to occur in the absence of any additional mining (i.e., without any manipulation of the USGS 2008 bathymetric surface prior to the modeling run). The No Project Alternative would differ from the Existing Conditions scenario, since four years have elapsed since the time of the 2008 Bathymetric Survey, and the seabed has been altered by mining, dredging, and other human and natural events.

[3] The Project does not include any mining in PRC 5871, though this lease area, which was formerly leased for sand mining, is shown in Figure MR1-2. Neither Scenario 1 nor Scenario 2 therefore altered the seabed in PRC 5871.

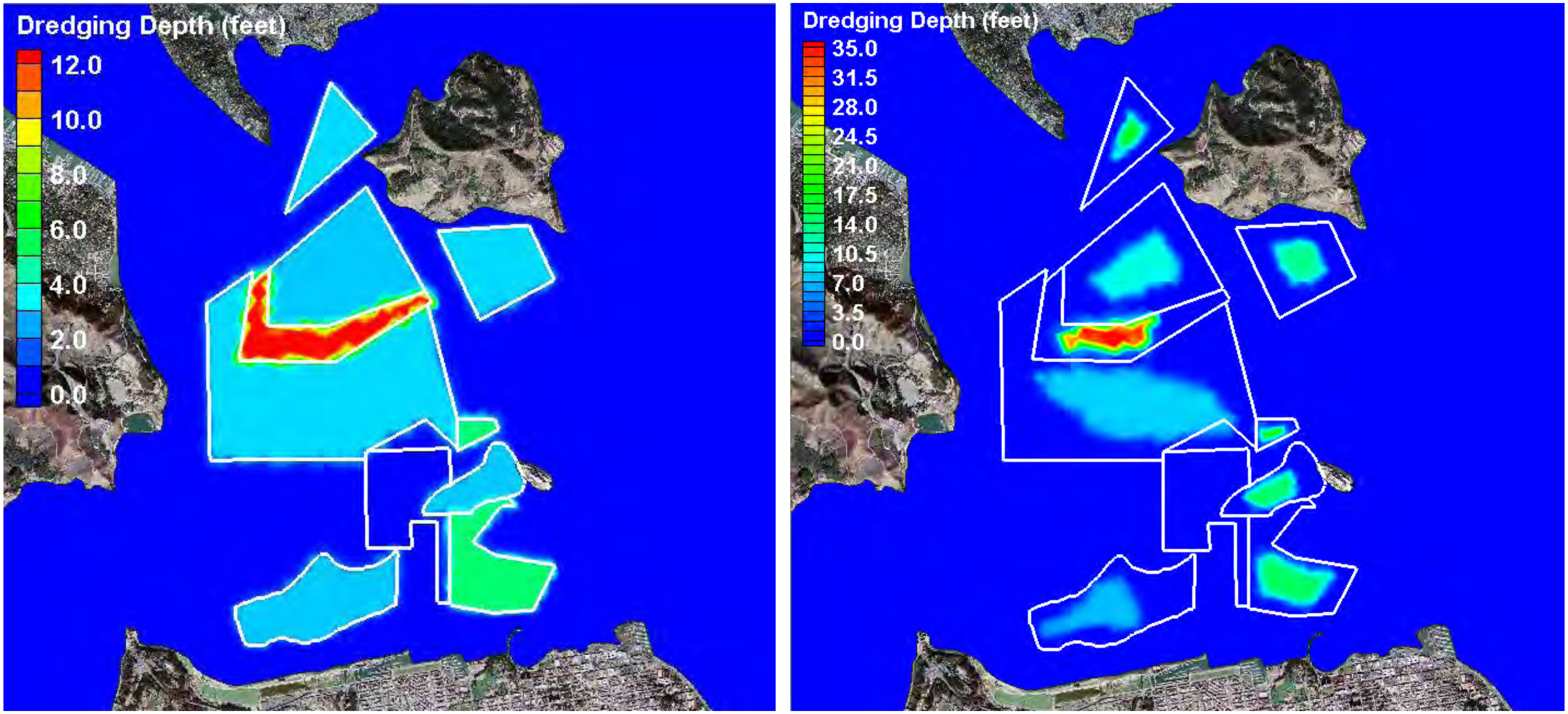
[4] The modeling shows the maximum impact between existing conditions and the proposed Project, not the incremental impact of the proposed Project over the baseline volume that is used to determine a significant impact under CEQA. It therefore provides a worst case analysis.



SOURCE: CSLC

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure MR 1-2
Central Bay Lease Areas



Scenario 1

Scenario 2

SOURCE: CSLC, Coast and Harbor Engineering

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure MR 1-3

Scenario 1 and Scenario 2 Alterations of the Seabed for Modeling

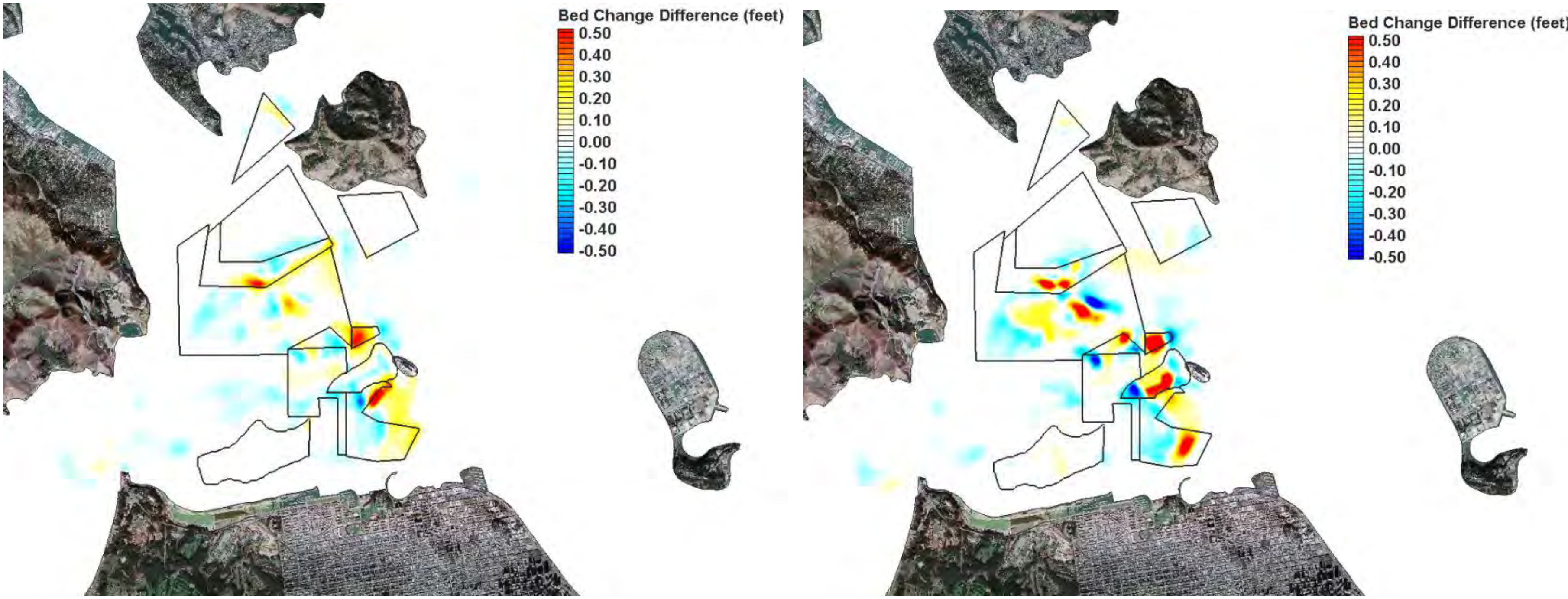
Supplemental Analysis of Original Modeling Effort: Seabed Changes within Central Bay

Figure MR1-4 shows the results of the original modeling conducted by CHE and reported in EIR Appendix G. The figure shows changes to the seabed elevation resulting from the Scenario 1 and Scenario 2 modeling runs, relative to the Existing Conditions modeling run; therefore, the changes may be interpreted as having been caused by the presence of the mining holes. Note that the two scenarios produced similar, but distinctly different results, indicating that the manner in which mining occurs (i.e., concentrated within particular areas of the lease parcel, or spread out over the parcel) will determine the resulting seabed changes. In both the Scenario 1 and Scenario 2 modeling runs, the seabed changes caused by the presence of the mining holes were in no case greater than 0.5 feet (6 inches). Some areas gained elevation, and other areas lost elevation. Limited areas outside the lease areas themselves, such as lease PRC 5871 (where no mining is proposed), show changes of this magnitude. Most of the area outside of the lease areas, however, shows much less change or no change (shown as white in the figure). In both modeling runs, some areas around the Golden Gate experience seabed elevation changes. The very light blue tones (indicating seabed elevation loss, or increased depth) and yellow tones (indicating seabed elevation gain, or decreased depth) shown in the figure indicate that these areas changed less than approximately 0.1 - 0.2 feet (1 - 2 inches), and that most of the area in the vicinity of the Golden Gate did not change at all.

CHE conducted additional analysis of the modeling runs in order to calculate the changes in the volume of sediment deposited on the seabed in each lease area in response to the presence of the mining holes. The results are shown in Table MR1-1. Net change is expressed as the gain or loss in the volume of sediment deposited in each lease area. Positive values indicate that the presence of the mining holes caused accretion; negative values indicate that the presence of the mining holes caused erosion. These values reflect the difference between the changes resulting from the Existing Conditions modeling run and each Scenario modeling run.

Table MR1-1 shows that at the conclusion of both the Scenario 1 and Scenario 2 one-year modeling runs, the Central Bay lease areas would have approximately 30,700 cubic yards more sediment compared to the Existing Conditions modeling run on an annual basis. This may be interpreted as the volume of sediment that would be “captured” on an annual basis by the holes created following the 10 years of mining.

In both Scenarios, most of the lease areas gain sediment (positive values in Table 1). Some lease areas, however, including PRC 5871, PRC 709 North, PRC 7779 East, show sediment loss. Predicted sediment loss is likely caused by a combination of factors, including presence of mining holes “upstream” of these areas -- the model predicts that the mining holes would capture some sediment that would otherwise drift to the mining areas immediately downstream -- as well as local hydrodynamic changes caused by the presence of the mining holes.



Scenario 1 Scenario 2

SOURCE: Coast and Harbor Engineering

Figure MR 1-4
Net Changes in the Seabed in Central Bay after One Year Modeling Run for Scenario 1 and Scenario 2

Table MR1-1. Modeled Net Annual Volume Changes in the Mining Lease Areas

Lease Area	Scenario 1 Volume Change (cy/yr)	Scenario 2 Volume Change (cy/yr)
PRC 709 South	1,746	2,438
PRC 5871	-6,780	-11,602
PRC 709 East	-663	12,406
PRC 7780 South	2,813	6,531
PRC 7780 North	15,170	23,357
PRC 7779 West	11,736	-9,232
PRC 2036	14,721	16,339
PRC 709 North	-10,538	-9,960
PRC 7779 East	-140	-1,449
PRC 7779 North	3,409	1,045
Total Central Bay	**31,473**	**29,874**

This applies to parcel PRC 5871, which loses sediment in both modeling runs, even though the model assumes no mining would occur within this parcel: it is likely that lease areas PRC 709 South, PRC 7780 South and PRC 709 East, intercept some of the sediment transport which otherwise would drift into lease area PRC 5871, resulting in a sediment deficit there. Lease areas PRC 709 North and PRC 7779 East are located immediately downstream of the heavily mined PRC 2036 in an area of flood-dominated net sediment transport. PRC 709 North and PRC 7779 East, therefore, experience a decrease in sediment volume, as sediment is "captured" by the large hole in PRC 2036, while PRC 2036 gains volume.

Table MR1-2 shows relative sediment volume changes predicted by the model to occur over a 10-year period, assuming constant in-fill at the annual volume change rates shown in Table MR1-1. This is interpreted as the long-term rate of sand replenishment for each lease parcel. As in Table MR1-1, in Table MR1-2 the positive values indicate that the presence of the mining holes caused accretion, or an increase in sediment volume, and negative values indicate erosion, or a loss of sediment. Table MR1-2 shows that the long-term rate of sand replenishment in the lease areas varies, but that overall, 10 years following the modeled mining scenarios, only approximately 2 percent of the mined volume would be replaced by natural processes. This holds true for both Scenario 1 and Scenario 2.

Table MR1-2. Volume of Modeled Sand Replenishment After Ten Years as a Percentage of Proposed Mining Volume in Central Bay Lease Areas

Lease Area	Scenario 1 Long-term Rate of Sand Replenishment (%)	Scenario 2 Long-term Rate of Sand Replenishment (%)
PRC 709 South	1.7	2.3
PRC 5871*	-	-
PRC 709 East	-1.6	15.0
PRC 7780 South	1.6	3.6
PRC 7780 North	71.5	80.3
PRC 7779 West	2.9	-2.4
PRC 2036	3.6	4.3
PRC 709 North	-5.6	-5.0
PRC 7779 East	-0.2	-1.4
PRC 7779 North	5.7	1.8
Total Central Bay	**2.1**	**1.9**

* In both Scenario 1 and Scenario 2, CHE modeling did not include altering the seabed within PRC 5871, since the Project does not include mining within this parcel.

As noted above in this Master Response, CHE's earlier analysis of actual (not modeled) bathymetry changes from 1997 and 2008 in Central Bay indicated that only about 5 percent of the material mined during that period in Central Bay had been replaced by natural processes. The rate of sand replenishment that actually took place between 1997 and 2008 (5 percent) is similar, though slightly more, than the rate that the modeling runs predict would occur after the proposed 10-year mining lease period.[5] Considering the complexities of the natural system, the relative similarity of the two

[5] The difference in these numbers could be due to several factors, including the following:

- Sediment transport modeling was performed only for sediment starting inside the Bay, with only tidal currents transporting sediment back inside. Since waves were not included in the modeling, the vast majority of sediment transport back into the Bay is missing from the modeling, thereby reducing the replenishment in some lease areas, most notably PRC 709 South (Presidio Shoals).
- Grain size samples in Central San Francisco Bay were extremely variable even in the same areas, making a highly accurate bed grain size distribution in the numerical modeling infeasible. Therefore some sediment sizes actually present are not present in the numerical model.
- The volume mined from Central San Francisco Bay during the period 1997-2008 was 13.5 million cubic yards as reported by the miners after bulking (i.e., the increase in volume between when the material is extracted with a suction dredge and deposited in the sand mining barge); in the modeling simulations the mining volume was approximately 11.5 million cubic yards.
- The natural replenishment calculated using measured bathymetry occurred over a 10-year period with incremental mining occurring throughout, whereas the modeling assumed that all 10 years of mining occurred prior to the one-year simulation, and the one-year rate of initial sedimentation (high rate) or erosion was linearly extrapolated to obtain 10-year replenishment volumes.

estimates, which were obtained using completely different analytical methods, provides a high level of confidence in the model predictions.

Supplemental Analysis of Original Modeling Effort: Seabed Changes Outside the Golden Gate

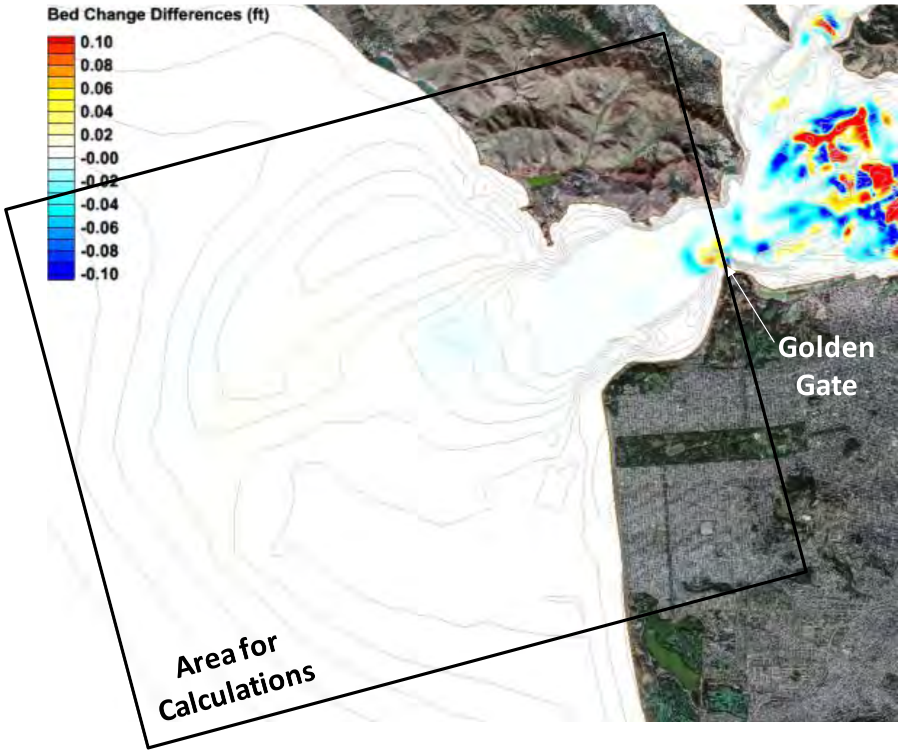
In addition to modeling changes in the seabed within Central Bay, CHE examined the modeling results to determine how the presence of the mining holes would affect the seabed outside of the Golden Gate, including the Bar. Figure MR1-5 shows the modeling results, focusing on the areas outside of the Golden Gate. The Golden Gate was defined in this case by the location of the Golden Gate Bridge. Blue colors indicate that the mining holes would cause erosion (a decrease in the elevation of the seabed), whereas red and yellow colors indicate that the mining holes would cause accretion (an increase in the elevation of the seabed).

Note that, while the color ramp for seabed elevation changes is the same for Figure MR1-5 as for Figure MR1-4, the scale is different: the maximum change in Figure MR1-5 is plus or minus 0.1 feet (about 1 inch), as opposed to 0.5 feet in Figure MR1-4. Therefore, areas showing little change in Central Bay in Figure MR1-4 appear to (but do not actually) show a greater change in Figure MR1-5. Note also that, while the “area for calculations” indicated in Figure MR1-5 is limited to the area of the Bar (which can be discerned from the bathymetric contours in the figure) and coastal areas as far south as the southern extent of Ocean Beach and as far north as Pirates Cove, the modeling domain extends far beyond this area, as described above and shown in Figure MR1-1. Beyond the “area for calculations,” no discernible changes are predicted by the model.

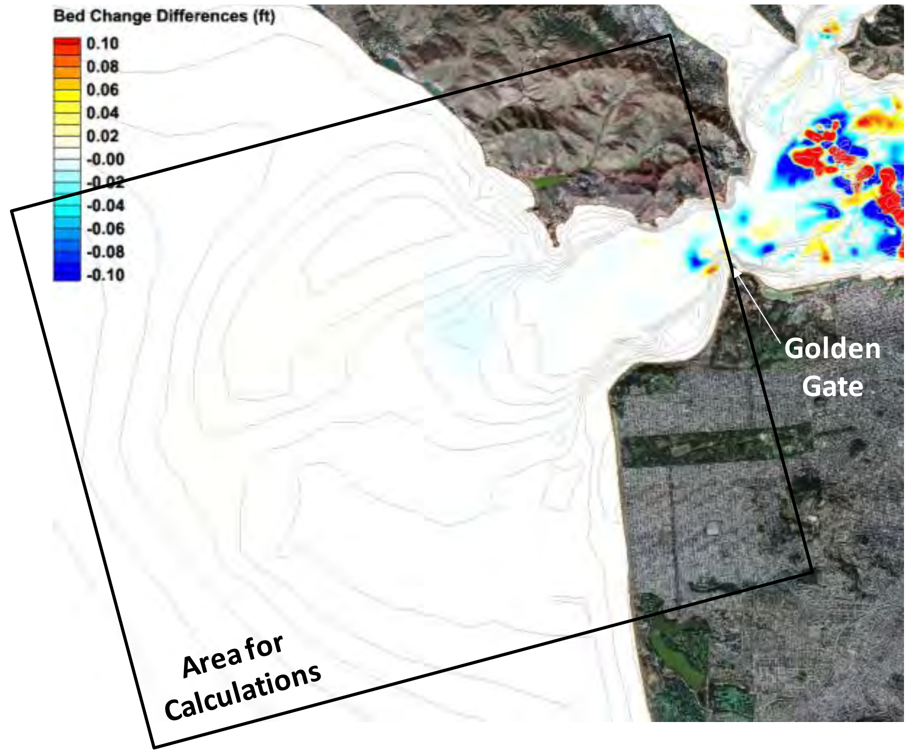
CHE calculated the change in volume of the seabed within the “area for calculations” shown in Figure MR1-5 for both Scenario 1 and Scenario 2 in order to discern the potential effect of the Project on areas outside the Golden Gate, including the Bar and Ocean Beach.

- The Scenario 1 modeling run resulted in a net loss of approximately 5,140 cubic yards in the area outside the Golden Gate.
- The Scenario 2 modeling run resulted in a net loss of approximately 6,670 cubic yards.

As with the results discussed above, these results show the changes following the one-year simulation of tidal currents and river flows relative to the Existing Conditions modeling run. In other words, the model predicts that the proposed mining of the Central Bay lease areas would cause a maximum reduction in the amount of sediment transported through the Golden Gate and deposited on the Bar of between about 5,000 and 7,000 cubic yards over a one-year period. These results indicate that a link exists between the mining areas and the offshore areas, but that the volume of sediment involved is small. These results are entirely consistent with previous CHE modeling results, which indicated that the Project would have no discernible effect on the Bar.



Scenario 1



Scenario 2

SOURCE: Coast and Harbor Engineering

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure MR 1-5

Net Changes in the Seabed in Areas Outside the Golden Gate after One-Year Modeling Run for Scenario 1 and Scenario 2

A recent study found that in the period 1956 to 2005, the Bar lost sediment at a rate of approximately 2.5 million cubic yards (1.9 million cubic meters) per year (Hanes and Barnard 2007). The new analysis of the original modeling runs conducted for this EIR presented above indicate that, should this rate of erosion continue, the Project would account for about 0.2 to 0.3 percent of this loss. Since the modeling uses the extremely conservative approach of assuming that all ten years of mining would occur just before the one-year simulation, and uses unusually high flows for the simulation, the actual contribution of the Project to the erosion of the Bar would likely be less than the model predicts, and there is little likelihood that the contribution would be any greater.

New Modeling - Sand Transported from Individual Lease Areas to the Golden Gate

While the additional analysis of the previous modeling effort described above demonstrates that the change in the volume of sediment transported from Central Bay to and through the Golden Gate would be relatively minor (compared to the historical rate of erosion of the San Francisco Bar), CSLC staff directed ESA and CHE to analyze which lease areas contribute the most to this change. This required a new modeling effort utilizing the same LAGRSED sediment transport model in pure “particle tracking mode” (i.e., the model would “track” each individual sand particle from its origin to its final destination at the end of the modeling period).

CHE modeled sediment transport over a 122-day period using data from the 1996-1997 winter tides and river flows, and extrapolated the results to a full one-year period. As with the previous modeling effort, CHE conducted three modeling runs, for Existing Conditions, Scenario 1, and Scenario 2. Also, as with the previous modeling, CHE subtracted the Existing Conditions results from each of the Scenario results to obtain the net change attributable to the presence of the mining holes. In the modeling runs, the lease areas were filled with sand particles and the transport of these particles from the lease areas to areas outside the Golden Gate was tracked and measured. The sand particle size distribution was the same used in the original modeling, except for lease area PRC 709 South, where a finer sand distribution (D50 ~0.15 mm) was selected following a literature search to refine this crucial modeling parameter. Therefore, two particle size distributions were used: one for lease area PRC 709 South, and another for all other lease areas. Table MR1-3 shows the grain size fractions used in the lease areas for the new modeling runs.

Table MR1-3: Grain Size Distribution Used for the New Modeling Runs

Grain Size (mm)	PRC 709 South	All Other Lease Areas
0.60	0%	20%
0.30	10%	60%
0.15	70%	20%
0.10	20%	0%

New Modeling Results

The volume of sand transported from each lease area to the Golden Gate was calculated for each day during the 122-day simulation, then extrapolated to a full one-year period. Figure MR1-6 shows the time series of sand volume transported from all of the Central Bay lease areas to areas outside the Golden Gate during the 122-day modeling run (left side of figure). The figure shows a time history of sediment volume transported outside the Golden Gate during the modeling run. Figure MR1-6 also shows how these transported volumes were linearly scaled from 122 days to a one-year period (right side of figure). As shown in the figure, the volume of sand transported from the lease areas to the Golden Gate is very similar for each of the mining Scenario modeling runs, and both Scenarios are slightly less than the Existing Conditions modeling run.

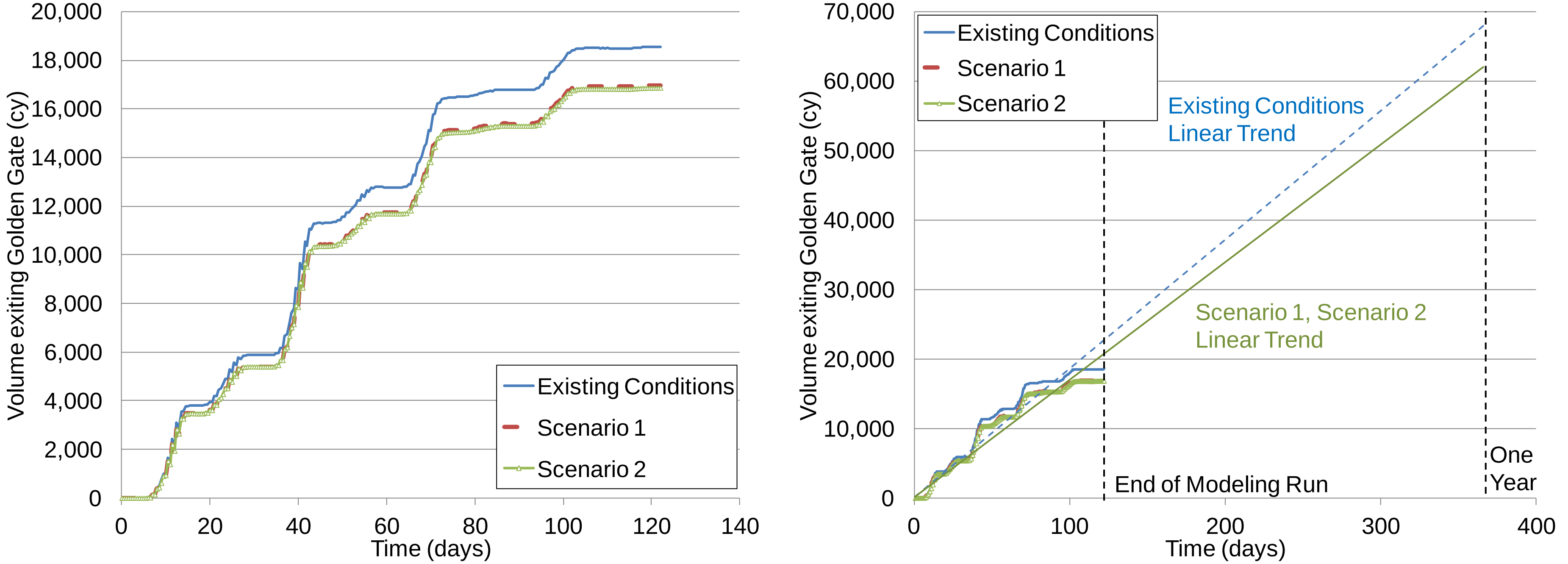
The Existing Conditions modeling run resulted in a total volume of approximately 68,000 cubic yards of sand transported through the Golden Gate. Scenarios 1 and 2 each resulted in roughly 62,000 cubic yards transported through the Golden Gate; the difference between Existing Conditions and each of the Scenario modeling results is about 6,000 cubic yards, a similar result to that reached in the original modeling effort.

Figure MR1-7 shows the relative volume of sand transported from each of the Central Bay lease areas through the Golden Gate for Existing Conditions, Scenario 1, and Scenario 2 for the one-year period. Table MR1-4 provides the predicted annual volumes of sand transported from each lease area to the Golden Gate, and the change between Existing Conditions and each mining Scenario.

Table MR1-4. Volumes of Sand Transported from Each Lease Area to Areas Outside the Golden Gate After One Year

Lease Area	Existing Conditions (cy)	Scenario 1 (cy)	Scenario 2 (cy)	Scenario 1 Reduction (cy)	Scenario 2 Reduction (cy)
PRC 709 South	9,207	8,511	7,997	697	1,210
PRC 5871	38,176	37,321	37,095	855	1,081
PRC 709 East	5,807	5,244	5,150	563	657
PRC 7780 South	4,286	2,873	3,484	1,414	802
PRC 7780 North	3,420	2,730	2,583	690	837
PRC 7779 West	6,337	5,251	5,330	1,086	1,007
PRC 2036	494	194	173	299	321
PRC 709 North	24	10	0	14	23
PRC 7779 East	32	13	2	20	31
PRC 7779 North	26	23	26	3	0
Total Central Bay	**67,810**	**62,170**	**61,840**	**5,640**	**5,970**

Note: Values reflect rounding



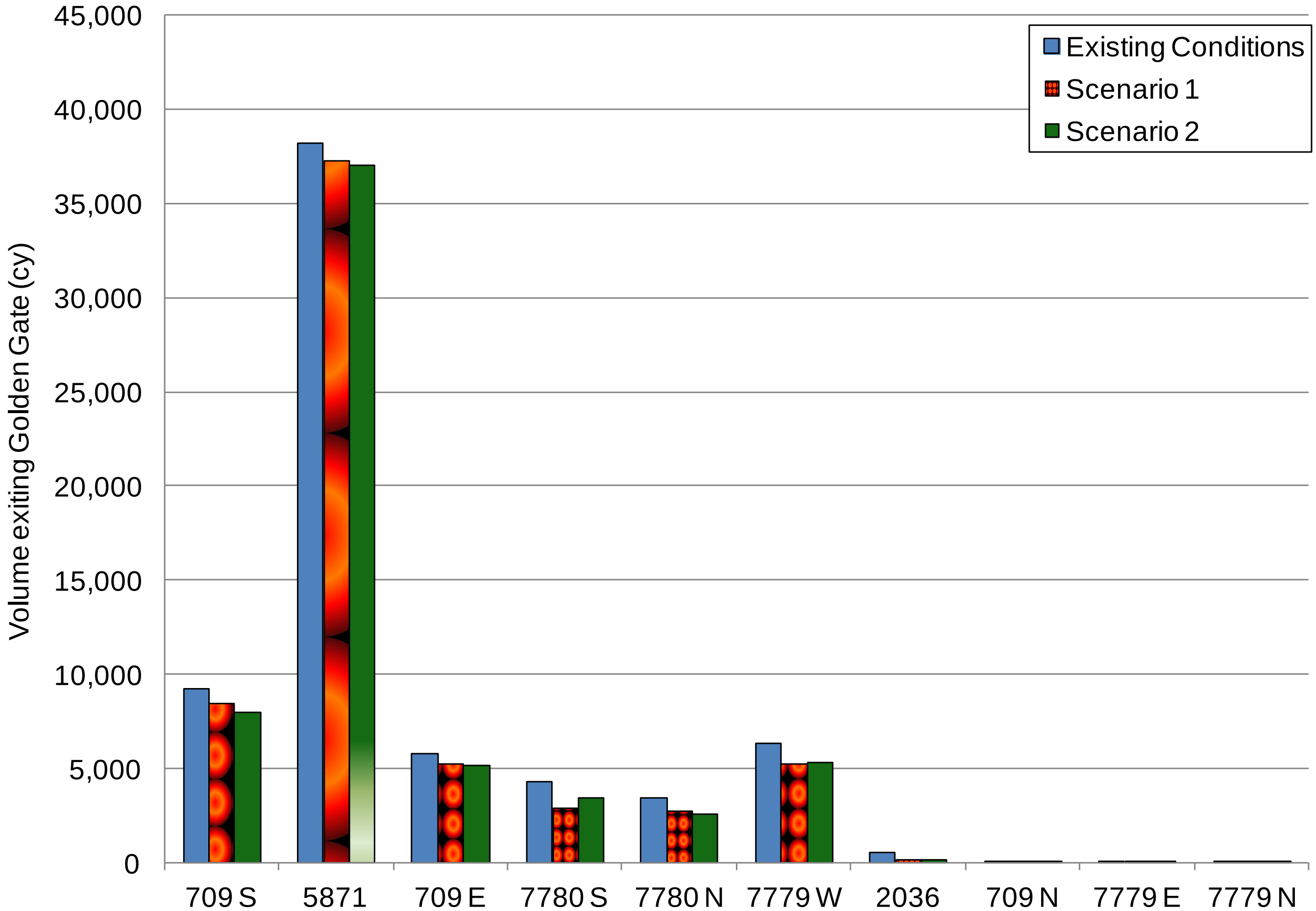
122-Day Run   Linear Extrapolation to One Year

SOURCE: Coast and Harbor Engineering

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure MR 1-6

Cumulative Volume of Sand Transported from Central Bay Lease Areas to the Golden Gate: 122-day Modeling Run, and Linear Extrapolation to One Year



SOURCE: Coast and Harbor Engineering

San Francisco Bay and Delta Sand Mining EIR . 207475

Figure MR 1-7
Volume of Sand Transported from Each Lease Area to the Golden Gate after One-Year Modeling Run

As shown in Figure MR1-7 and Table MR1-4, the lease areas in the southern part of Central San Francisco Bay (PRC 709 South, PRC 5871, PRC 709 East, PRC 7780 South, PRC 7780 North, and PRC 7779 West) contribute more sand to areas outside the Golden Gate. This is consistent with the flow and transport patterns in the Central Bay predicted in the previous analysis conducted by CHE (EIR Appendix G), and also analyses conducted by Barnard et al. (2012). These previous studies all showed ebb-dominated flow and sediment transport in the southern part of Central Bay, and flood-dominated flow and sediment transport in the northern part.

As noted above, the rate of erosion of the Bar is estimated to be 2.5 million cubic yards per year (Hanes and Barnard 2007). The results of the supplemental modeling effort described above shows that the potential contribution to this loss due to the proposed sand mining activities would be at most on the order of 0.2 percent per year. The rate of loss of sediment transported through the Golden Gate would tend to diminish after conclusion of the mining.

New Data on Grain Size Distribution

Subsequent to completing the new modeling described above, CHE and ESA obtained unpublished data on grain size distribution in Central Bay from USGS (Barnard and Foxgrover 2012). These data represent more recent measurements than were available when sediment size was selected for the modeling exercise. A comparison of the sediment size used in the modeling, and that in the USGS dataset from samples taken in the lease areas, indicates that the modeling exercise used slightly smaller average grain size than that indicated by the USGS dataset for these locations. This adds another element of conservatism to the modeling exercise, since the grain sizes used in the CHE modeling are more similar to those found offshore near Ocean Beach than those measured in Central Bay by USGS (i.e., a slightly smaller average grain size); therefore, the supplemental modeling effort may tend to over-predict the interaction between the lease areas and areas outside the Golden Gate.

Conclusion

Section 4.3.6, Cumulative Projects Impact Analysis (see Section 4.3, Hydrology and Water Quality in Part III of this Final EIR) is revised as follows:

> Many uncertainties remain regarding sediment transport and continuity within the Bay-Delta estuary system and outer coast areas. Nonetheless, a reduction in the supply of sediment from the Bay-Delta estuary is a possible (and plausible) cause of erosion observed at the San Francisco Bar. Historically, high rates of sediment contribution to the estuary's watershed, including hydraulic mining activities in the 19th century, may have contributed substantially to the formation and evolution of the San Francisco Bar. Thus, it may be shrinking over time simply due to a dramatic reduction in the supply of sediment from the Central Valley. Still, it is not clear how erosion or removal of sediment in different parts of the estuary, and over different temporal scales, may translate to a reduction in sediment supply from the Bay-Delta estuary to the San Francisco Bar. <u>However,</u>

supplemental analysis of the previous modeling effort and the results of new modeling presented in this EIR confirm the findings and conclusions previously reached for Impact HYD-2 and for cumulative effects of the Project on sediment transport, as reiterated below. The original CHE study presented in Appendix G of the EIR, and supplemental analyses confirm the EIR conclusions regarding Impact HYD-2 and the potential cumulative effects of the Project on sediment transport and coastal morphology. The results of these analyses clarify and quantify the conclusion reached in Appendix G of the EIR: if the Project is approved and sand mining continues at the proposed volume for a 10-year period, there is likely to be a reduction of 5,000-7,000 cubic yards of sediment transported from Central Bay through the Golden Gate annually. This range represents approximately 0.2 – 0.3 percent of the long-term rate of erosion of the Bar, as calculated by Hanes and Barnard (2007).[6] Consistent with the conclusions presented in this EIR, the CSLC considers this Project-associated 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.

Conclusion

~~If the overall reduction in sediment supply in the Bay-Delta system is the cause, or a contributing cause, of the erosion of the San Francisco Bar, it would be reasonable to conclude that the Project could make a considerable contribution to this process. In the absence of greater certainty regarding the physical processes at work, however, such a conclusion is considered speculative, and the cumulative impact is therefore less than significant.~~ The supplemental analysis of the previous modeling effort and the results of the new modeling effort conducted for this Final EIR both confirm the findings and conclusions reached in the Bathymetric and Hydrodynamic Study (Appendix G), in Impact HYD-2, and in this discussion of cumulative effects of the Project on sediment transport:

- the Project is not expected in itself, or in combination with other projects, to result in a substantial alteration of sediment transport patterns or the morphology of the seabed outside of the vicinity of the lease areas;

- the Project is not expected to result in a substantial decrease in the supply of sediment to the San Francisco Bar and Ocean Beach.

In summary, both the Project-level impact, and the contribution to a cumulative impact, would be less than significant. Current and future research may shed additional light on the causes of erosion of the San Francisco Bar. Should the CSLC receive an application for new sand mining leases beyond the period covered by the current Project, the CSLC staff shall reexamine the effects of sand mining on sediment transport and coastal morphology.

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[6] Other, plausible reasons for the observed erosion rate of the Bar are summarized and discussed in the cumulative impact analysis of the EIR (Section 4.3.6).

Disagreement Among Experts

The CSLC staff is aware that this is a controversial topic and that experts may disagree on the effects of sand mining on coastal erosion. According to the State CEQA Guidelines section 15151:

> Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.

This Master Response discloses and summarizes the main points of disagreement among experts. Please see also Comments A-6, A-42, A-43, A-45, H-12, H-13, I-4, and K-1, and the responses to these comments.

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Hanes, D.M. and Barnard, P.L. 2007. Morphological Evolution in the San Francisco Bight. Journal of Coastal Research SI 50:69-473.

Master Response 2: Baseline Used in the Analysis

Several commenters disagree with the Project baseline used in the EIR. These include Comments A-2, A-3, G-3, I-3, I-5, and I-16. This Master Response responds to comments that the baseline used in the EIR is too old to reflect current conditions, is arbitrary and fails to account for future economic conditions, and/or obscures and prevents disclosure and analysis of the Project's cumulative effects. Separate comments by the Applicants regarding the baseline used in the Biological Resources analysis (e.g., Comment L-5) are addressed in individual responses to those comments.

The baseline is the point of departure, or starting point, for the EIR analysis. In an EIR, the conditions that would exist should a project be approved are compared to the baseline condition; the difference between the two is the increment of change that forms the basis for conclusions regarding the significance of impacts.

The baseline may include the general physical environmental conditions, or setting, that existed at the time that the notice of preparation (NOP) for the Project was published. Having the NOP publication year as part of the baseline is consistent with State CEQA Guidelines section 15125, which states:

> An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.

However, CEQA allows the lead agency some leeway in its determination of the baseline by stating that the environmental setting at the time the NOP is published will "normally" constitute the baseline physical conditions against which the impacts of a project are evaluated. In some instances, as here, where the level of an existing operation can vary substantially from year to year, a lead agency may opt to consider an average level of operations over some period of years to characterize that existing operation.

The mining volume used as the baseline for the analysis in the EIR is the average volume of sand mined per year from 2002 to 2007 (i.e., the average of the 5 years of mining that occurred prior to publication of the NOP for this EIR; please see Table 2-1 in Section 2.0, Project Description). This approach recognizes that sand mining activity levels can fluctuate substantially from year to year depending on market demand and other factors: the average of several years best characterizes the overall level of mining activity at the time the NOP was published.

The intensity of sand mining operations from 2002 to 2007 was less than the average of the entire 10 years of mining under the previous parcel leases, and was also less than permitted levels. This provides a conservative baseline, since the lower the baseline level of operations, the greater the difference between the baseline and the Project, and thus the more pronounced the impacts associated with the Project. As described in the EIR in Section 1.0, Introduction, the determination of the Project baseline was not arbitrary. CSLC staff considered comments on the 2010 Draft EIR and recent legal decisions,[7] and carefully weighed the options for defining the baseline. Staff concluded that a baseline that accounts for mining levels over several years provides a more accurate measure of the current level of mining activity against which to evaluate Project impacts. Further, the most recent 5-year period up to the year the NOP was published was determined to best reflect recent overall levels of mining activity and to be appropriate and consistent with CEQA as the environmental baseline for the analysis.

As described in Master Response 1, "Existing Conditions" were used as the baseline setting only for the purposes of the Bathymetric and Hydrodynamic Study computer modeling (Appendix G and additional modeling). In the modeling study, the Existing Conditions scenario is similar to the No Project Alternative, where no additional mining would occur (please note, however, that the Existing Conditions scenario is based on 2008 bathymetry, as defined by the USGS multi-beam sonar survey of the Bay; the No Project Alternative would reflect conditions at the cessation of mining if the Project is not approved, presumably in 2012). Thus, the modeling shows the maximum impact between Existing Conditions and the proposed Project, not the incremental impact of the proposed Project over the baseline volume that is used to determine a significant impact under CEQA. It therefore provides a worst case analysis.

The baseline used in the EIR included mining during the baseline period at CSLC lease PRC 5871 due to its close physical proximity to Project parcels in the Central Bay, one of the two areas most directly affected by the Project. Mining conducted during the baseline period at a lease parcel in the Carquinez Strait was not considered part of the environmental setting due to its distance from the Project sites; however mining at this location is appropriately considered in the analysis of cumulative effects.

One commenter suggested that mining volumes in more recent years should have been included in the baseline period, because the guidance in State CEQA Guidelines section 15125 for using the time the NOP was published as the baseline is predicated on the completion of the EIR analysis within the time period indicated in State CEQA Guidelines section 15108. However, the State CEQA Guidelines and case law do not require or imply a narrow and rigid connection between the analysis timeframe and the environmental baseline. Moreover, inclusion of the unusually low mining volumes in years after NOP publication during the economic downturn commonly considered the most pronounced recession since the Great Depression would distort the baseline by understating the overall levels of mining in years prior to the expiration of the previous leases and commencement of EIR preparation.

One commenter indicated that the selected baseline period was inappropriate because the baseline levels were unlikely to be duplicated during the lease period of the

[7] *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4[th] 310.

proposed Project. Future economic conditions are unknown, and because the purpose of the baseline is to allow a comparison between the environmental impacts of existing conditions and those of the proposed project, this point is not relevant.

One commenter stated that the baseline used in the EIR is contrived and appears to be biased and dishonest, and unreasonably ignores multiple successive mining leases over time, thereby excluding and obscuring the cumulative effects of past mining and the additive effects of future mining. The comment implies that the Project baseline should reflect pre-disturbance conditions, and the Project should be defined to include past and future mining activities. The State CEQA Guidelines, however, do not suggest that CEQA intends a project baseline to reflect pre-disturbance conditions (please see § 15125 for example). The EIR does not ignore past mining effects, but rather includes these in the cumulative impact analysis. CEQA requires the analysis of both the direct and indirect environmental impacts of a given project (State CEQA Guidelines § 15126.2, subd. (a)) and the project's cumulative effects (State CEQA Guidelines § 15130). The Project being evaluated in this EIR is the renewal for a 10-year period of leases of public and private parcels in the Central Bay, Suisun Bay, and western Delta. This is the extent of time covered by the CSLC leases, and a future application for a new lease would entail new consideration of that future application. The baseline assumptions described in the EIR in Section 1, Introduction, and referenced in these comments are appropriately the baseline conditions for the analysis of Project impacts. As noted, CEQA also requires consideration of the cumulative effects of a project. The past, present, and foreseeable future projects considered for the cumulative analysis are described in Section 3.5, and include past and future mining at the Project lease parcels (please also refer to Table 3-3 in Section 3.0, Alternatives and Cumulative Projects, for the list of cumulative projects considered in the analysis).

Master Response 3: Mineral Resources Impacts Significance Conclusions

This Master Response responds to several comments (including Comments A-38, A-41, G-4, H-4, H-6, H-9, H-11, I-14, and J-3) regarding the conclusion of the EIR that the proposed Project would not have a significant impact on mineral resources. The commenters state that this conclusion is based on an incorrect interpretation of the Mineral Resources significance criteria, that the EIR fails to assess whether the sand resource is being depleted, that sand mining should be "sustainable," and that the EIR should have examined a "sustainable mining" alternative.

This conclusion of a less than significant impact is reached in Impact MIN-1 (Loss of availability of a known mineral resource) and MIN-2 (Loss of availability of a locally-important mineral resource recovery site). The conclusion that the Project would have less-than-significant impacts on Mineral Resources is based on a commonly used interpretation of the significance criteria for Mineral Resources impacts, as stated in Section 4.2, Mineral Resources, of the EIR; these criteria are based on the State CEQA Guidelines Appendix G checklist section for Mineral Resources. These criteria reflect State and local policies regarding the importance of mineral resources in meeting the needs of society. In particular, the State Surface Mining and Reclamation Act of 1975 (SMARA) states that,

> The Legislature hereby finds and declares that the extraction of minerals is essential to the continued economic well-being of the state and to the needs of the society, and that the reclamation of mined lands is necessary to prevent or minimize adverse effects on the environment and to protect the public health and safety. (Pub. Resources Code, § 2711, subd. (a).)

The significance criteria for Mineral Resources impacts used by the CSLC and most other lead agencies are intended to require disclosure of the potential for a proposed project to interfere with or prevent mineral extraction. Based on these criteria, a project that would limit access to a known mineral resource, such as a housing development proposed to be placed on top of or immediately adjacent to a known mineral deposit, may be deemed to have a significant impact with regard to Mineral Resources. Since the Project does not propose to limit access to or limit the availability of a known mineral resource, the EIR properly concludes that these impacts are less than significant.

Mining is inherently not a sustainable activity: it extracts raw materials from the earth at a rate greater than the natural processes that created the raw material. As pointed out in Section 4.2, Mineral Resources, while there has been speculation in the past that sand mined from the Bay and Delta is "renewable" because it was thought that it would be replenished by additional sand carried by river and tidal currents to the mining lease areas, the resource evaluation conducted for this EIR (Appendix G) indicates that, for most of the lease areas, very little replenishment occurred over the past 10 years of mining, and, for practical purposes, the mineral resource in these areas is limited to the material already in place. Therefore, as with other mining operations, the Project can be expected to deplete the resource.

Under SMARA, a surface mining operation must have a reclamation plan and financial assurance approved by its respective lead agency prior to engaging in surface mining activities (Pub. Resources Code, § 2770). Prior to approving a reclamation plan or financial assurance, a lead agency must provide the Department of Conservation's Office of Mine Reclamation the opportunity to review and comment on the documents (Pub. Resources Code, § 2774, subd. (c) et seq.). The State Mining and Geology Board (SMGB) serves as the SMARA lead agency for marine sand mining operations in the San Francisco Bay-Delta area, and is responsible for the review and approval of reclamation plans, financial assurances, and environmental review documents pertinent to such operations. The SMGB most recently approved reclamation plans and financial assurances for Bay and Delta sand mining operations on February 10, 2005, and January 12, 2006. If the CSLC certifies the EIR and approves the Project, the SMGB will conduct its own independent analysis of the current reclamation plans and financial assurances and reach its own conclusions concerning whether or not they need to be amended and re-approved.