



December 16, 2014

Mr. Lawrence Goldzband, Executive Director
San Francisco Bay Conservation and Development Commission (BCDC)
455 Golden Gate Avenue, Suite 10600
San Francisco, CA 94102-7019

Via electronic mail to grace.gomez@bcdc.ca.gov

RE: Sand Mining Permit Applications

Dear Mr. Goldzband and Commissioners:

On behalf of San Francisco Baykeeper and our over 3,000 members who use and enjoy the environmental, recreational, and aesthetic qualities of San Francisco Bay and its surrounding tributaries and ecosystems, we respectfully submit these comments for consideration by staff and Commissioners, in advance of future hearings related to permit applications received from Hanson Marine Operations, Jerico Products, and Suisun Associates, for rights to increase commercial sand extraction from San Francisco Bay and Suisun Bay for at least ten more years. The vast majority of sand mined from the Bay over the past several decades has not been replenished, resulting in a permanent loss of sediment with far-reaching, irreversible effects on San Francisco's coastline. Nevertheless, the permit applications before the Commission allow mining to *increase* significantly, compared against recent extraction rates, and accelerate the exhaustion of non-renewable mineral resources in San Francisco Bay. To lessen these effects, Baykeeper recommends that the Commission revise the proposed extraction rate to be equal to the average extraction rate by these companies over the last 10 years. The 2005-2014 average reflects both peaks and troughs of mining intensity, and therefore fairly captures likely conditions over the next permit cycle.

Applicants argue that, notwithstanding the project's impacts to sediment supply and coastal erosion, the project should be approved because it provides great benefit to the construction industry and economic growth of the region.¹ However, the most recent two years have been marked by significant construction activity and yet local sand demand has remained low. Even more importantly, the simple fact that these interrelated companies maintain a near monopoly on sand extraction in the region does not automatically give them superseding importance over the serious environmental concerns at stake. The Commission, for example, did not permit Google to maintain a mobile data center afloat in San Francisco Bay, despite the widespread use of Google and its central importance to the technology economy of the Bay Area. The Bay Plan's authority over projects with substantial public benefit should be interpreted traditionally, to support projects with a truly public purpose, such as restoration, or aids to navigation; it is not enough to privatize a public resource for the production of a widely used commercial product.

¹ Letter from John Briscoe to Larry Goldzband, July 2, 2014, p. 3.

I. BCDC Should Incorporate Minimization Measures and Other Revisions into Any Sand Mining Permit Approvals.

As discussed below, the Bay Plan’s Tidal, Subtidal, and Climate Change policies all dictate that any approval of these permit applications should be heavily conditioned to lessen the burden that mining continues to place on the Bay and surrounding beaches. The Bay Plan repeatedly states that sediment decline in the Bay is an ever-worsening problem, with significant implications for coastal erosion, sandy habitats, recreational uses, and sea level rise vulnerability. The Bay Plan therefore provides strong policies that promote sustainable and balanced management of Bay resources.

The State Lands Commission’s EIR for the proposed project openly admits that sand mining has occurred and is occurring at unsustainable extraction rates, and that the proposed project would increase mineral extraction over the next ten years. Historic mining data supports this assertion (*Appendix 1, Historic Mining Volumes versus Proposed Permit Volumes*). This approach is simply contrary to the Bay Plan, which requires that the Bay’s sandy floor, tidal flats, and beaches be conserved, and impacts minimized. At a minimum, therefore, the Commission should require the mining companies’ unsustainable extraction rates to be lessened, rather than increased.

The EIR’s environmentally superior alternative provides a step in this direction, proposing that extraction rates not be increased:

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. (EIR at 3-15.)

The EIR found this alternative to be feasible but did not evaluate the feasibility of further reducing extraction rates to below the unsustainable levels represented by the 2002 to 2007 average. An even more reasonable extraction rate, serving to lessen environmental impacts consistent with Bay Plan policies, while remaining consistent with the mining companies’ historic business operations, could be based off of the most recent 10-year average (2005 to 2014), which includes roughly equal periods of intense mining activity, decline, and moderate use intensity.

Table 1. Sand Mining Volumes for Project Alternatives and 5/10-yr Average Extraction Volumes (cy/yr)²

| Lease Areas | Proposed Project | Reduced Project Alternative | 2008-2014 Annual Average (5-years) | 2005-2014 Annual Average (10-years) |
|--------------------|-------------------------|------------------------------------|---|--|
| Central Bay | 1,540,000 | 1,060,656 | 303,578 | 628,575 |
| Suisun Bay | 500,000 | 285,612 | 101,045 | 177,915 |
| Total | 2,040,000 | 1,346,267 | 404,623 | 806,490 |

² Based on data provided by BCDC. Extraction rate for 2014 scaled from Q1 and Q2 data. Refer to Appendix 1 for more details.

As shown above and in Appendix 1, since 2008 mining activity has decreased significantly, based on reduced local demand and increased imports, even as construction has increased. Importantly, analysis by the United States Geological Survey (“USGS”) of a 2014 bathymetric survey requested by BCDC staff states in-Bay erosion was *reversed* between 2008 and 2014, suggesting sand extraction during this period more closely approximated sand contributions to the area. During this five year period, annual extraction for all lease areas averaged 404,623 cy/yr, or 20% of the proposed extraction rate. Accretion, or build-up, of the Bay floor was observed in the vicinity of lease areas, though 79% more accretion was observed outside the lease areas. It was beyond the scope of the survey to determine causality of the accretion, though the 2008-2014 accretion rate, calculated at 0.8 million m³/yr, “stands in contrast to the change detected from 1997 to 2008,” which indicated erosion from throughout the study area of 1.3 million m³/yr.^{3,4} As shown in the Appendix 1 figures, 1997 to 2008 coincides with an era of peak extraction intensity over the last 40 years.

In conjunction with a reduced extraction rate set at the most recent 10-year average, we urge the Commission to require further a tracer study to track transport of sand from within the lease areas to areas along the outer coast, as well as a requirement to fund bathymetric surveys in lease areas every 5-years to detect change and permit appropriate management. Lastly, we request that the proposed permit terms be reduced from 10 years to 5, to allow for appropriate permit revisions or other adaptive management strategies based on the results of these required studies.

II. Historic and Emerging Science Show a Conclusive Connection Between Sand Mining and Coastal Erosion.

Historic sand mining in San Francisco Bay has already contributed to permanent sediment loss throughout the Bay and coastal systems, which would accelerate under the proposed permit terms. Studies show that during the 20th century, over 200 million cubic meters of sediment was directly removed from the San Francisco Bay Coastal System through dredging, aggregate mining, and borrow pit mining, including at least 54 million cubic meters of sand-sized or coarser sediment from Central Bay.^{5,6} During this time, over 150 million cubic meters of sediment loss was measured from the sand-dominated substrates of Central Bay, the Golden Gate, and ebb tidal delta.^{7,8,9}

An applicant-sponsored study conducted by Coast & Harbor Engineering (“CHE”) estimated approximately 11.6 million cubic yards, or 8.9 million cubic meters, of sediment were lost from the

³ Barnard, P. L. & Kvitek, R. G., 2010. Anthropogenic influence on recent bathymetric change in west-central San Francisco Bay. *San Francisco Estuary and Watershed Science*, 8(3).

⁴ Report: Bathymetric change analysis for west-central Bay and Suisun Bay, 2008-2014. 2014. Data analysis performed by Patrick Barnard, USGS, Pacific Coastal and Marine Science Center, Santa Cruz, CA. Multibeam data collected and processed by Rick Kvitek and Pat Lampietro, CSU Monterey Bay, Sea Floor Mapping Lab, Seaside, CA

⁵ Dallas, K. L. & Barnard, P. L., 2009. Linking human impacts within an estuary to ebb-tidal delta evolution.. *Journal of Coastal Research*, Volume 56, pp. 713-716.

⁶ Dallas, K. L. & Barnard, P. L., 2011. Anthropogenic influences on shoreline and nearshore evolution in the San Francisco Bay coastal system. *Estuarine, Coastal and Shelf Science*, Volume 92, pp. 195-204.

⁷ Hanes, D. M. & Barnard, P. L., 2007. Morphological evolution on the San Francisco Bight. *Journal of Coastal Research Special Issue*, Issue 50, pp. 469-473.

⁸ Fregoso, T. A., Foxgrover, A. C. & Jaffe, B. A., 2008. Sediment deposition, erosion, and bathymetric change in central San Francisco Bay: 1855-1979, s.l.: U.S. Geological Survey Open-File Report 2008-1312 (46 pp.).

⁹ Barnard, P. L. & Kvitek, R. G., 2010. Anthropogenic influence on recent bathymetric change in west-central San Francisco Bay.. *San Francisco Estuary and Watershed Science*, 8(3).

Central Bay sand mining lease areas between 1997 and 2008, an amount roughly equivalent to the reported volume of sand mined in these areas over this same time period. A “clear correlation appears between areas with measured erosion and the locations of mining events.” The CHE study further found that “the vast majority of sediment mined from the Central Bay lease areas during the past decade has not been replenished through natural processes,” estimating a permanent loss of between 85-95% of the sand mined.

Peer-reviewed research by the USGS indicates an even higher amount of sediment loss: 14.1 million cubic meters lost between 1997 and 2008, representing an approximately three-fold acceleration of the rate observed from 1947 to 1979 in the Central Bay.¹⁰ More recent science thoroughly documented in a special edition of *Marine Geology*, with featured findings appearing in Appendix 2 of this letter, established a “causal link” between sand removal in the Bay with “both the widespread erosion of the ebb tidal delta and extensive erosion of the adjacent south coast shoreline”.¹¹ Impacts of this erosion are visible along San Francisco’s Ocean Beach, forcing San Francisco and coastal management agencies to spend considerable time and money towards protection of sewerage and transportation infrastructure from eroding beaches, bluffs and roadways.

The permit applicants argue that their relative contribution to coastal erosion is smaller than many other contributing factors. But this ratio comparison fails to acknowledge that the more compromised the affected environment is, the lower the threshold for a new project’s impacts to be problematic. Accordingly, such an overall comparison provides no meaningful information at all, and should not be considered. (See, e.g., *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692,721; *CBE v. California Resources Agency* (2002) 103 Cal.App.4th 98, 120.) This principle against the ratio approach is further supported in the Bay Plan, as discussed below.

III. BCDC’s Authorities and Mandates Allow and Require BCDC to Impose Project Modifications to Conserve Bay and Coastal Resources.

A. The McAteer-Petris Act Gives BCDC Authority to Determine Whether and How to Approve a Project.

The McAteer-Petris Act requires any person wishing to extract materials from the Bay floor to first obtain a permit from BCDC, and provides that BCDC may approve such a project permit only if the nature of the proposed activities are consistent with the Bay Plan then in effect. (Government Code § 66632.) The Act further provides that, “[t]o effectuate those purposes, the commission may grant a permit subject to reasonable terms and conditions including the uses of land or structures, intensity of uses, construction methods and methods for dredging or placing of fill.” (Government Code § 66632(f).)

A review of applicable Bay Plan findings and policies, below, clearly demonstrates that the proposed permits’ use intensity must be reduced to achieve any semblance of consistency with the Bay Plan.

¹⁰ Barnard, P. L. & Kvitek, R. G., 2010. Anthropogenic influence on recent bathymetric change in west-central San Francisco Bay. *San Francisco Estuary and Watershed Science*, 8(3).

¹¹ Hein, J. R., Mizell, K. & Barnard, P. L., 2013. Sand sources and transport pathways for the San Francisco Bay coastal system, based on X-ray diffraction mineralogy. *Marine Geology*, 345, 154-169.

1. *The Bay Plan's Tidal Lands Policies Directly Bear upon the Sand Mining Permit Applications.*

Sand Mining from the Bay has caused, and, as proposed, would increase, the loss of sediment available for shoreline beach replenishment. The Bay Plan recognizes this problem in two findings describing the importance of tidal flats, which the Plan defines as follows:

Tidal flats occur from the elevation of the lowest tides to approximately Mean Sea Level and include . . . sandflats . . . Historically, around 50,000 acres of tidal flats occurred around the margins of the Bay; approximately 29,000 acres remain—a reduction of over 40 percent. (Finding H.)

It is against this backdrop of already having lost 40% of tidal flats that the Commission must consider this project. The continued, unsustainable extraction of sand from the Bay will only increase losses of sandy tidal areas. As the Bay Plan describes:

Sedimentation is an essential factor in the creation, maintenance and growth of . . . tidal flat habitat. Scientists studying the Bay have observed that the volume of sediment entering the Bay annually from the Sacramento and San Joaquin Delta is declining. . . . As sea level rise accelerates, the erosion of tidal flats may also accelerate, thus potentially exacerbating shoreline erosion and adversely affecting the ecosystem and the sustainability of ecosystem restoration projects. An adequate supply of sediment is necessary to ensure resilience of the Bay ecosystem as sea level rise accelerates. (Finding L.)

Buffers are areas established adjacent to a habitat to reduce the adverse impacts of surrounding land use and activities. Buffers also minimize additional loss of habitat from shoreline erosion resulting from accelerated sea level rise and allow tidal habitats to move landward. . . . (Finding N.)

These findings raise particular concern for the proposed sand mining permits that would further decrease the available sediment to maintain tidal flats and buffer zones in tidal areas, increasing erosion and, as a result, vulnerability to sea level rise. Accordingly, the Bay Plan sets forth three protective policies:

Tidal marshes and tidal flats should¹² be conserved to the fullest possible extent . . . [P]rojects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative. (Policy 1.)

Note here that the Plan goes beyond requiring avoidance or mitigation where feasible, and instead uses the strongest possible mandate, “to the fullest possible extent.” Further, the Oxford English Dictionary defines “conserve” to mean, “to preserve or keep; to maintain in a continuous existence.” Again, because the permittees’ privatization of a public resource for production of a widely-used commercial product does not rise to the level of a substantial public benefit, the Bay Plan requires that sand mining essentially have no impact to tidal flats.

¹² According to the Bay Plan, all use of the word “should is mandatory.”

In addition, the Bay Plan requires that:

Projects should be sited and designed to avoid, or if avoidance is infeasible, minimize adverse impacts on any transition zone present between tidal and upland habitats. (Policy 3.)

Here, the Bay Plan allows for some level of impact to transition zones between the tidal zone and upland habitat, but still requires that these impacts be avoided if feasible, and if not, at least minimized. In this way, the Bay Plan requires BCDC to implement minimization measures that may not have been included in the CEQA process prior (discussed further, below), as CEQA requires the implementation of feasible mitigation measures and alternatives to reduce or avoid project impacts to below the stated CEQA threshold of significance, while the Bay Plan goes further by requiring all minimization measures be implemented.

Lastly, the Bay Plan requires further study of ongoing impacts to sediment supply and transport:

The Commission should support comprehensive Bay sediment research and monitoring to understand sediment processes necessary to sustain and restore wetlands. Monitoring methods should be updated periodically based on current scientific information. (Policy 5.)

Here, the Bay Plan allows the Commission to require further study as a condition of project approval.

2. *The Bay Plan's Subtidal Lands Policies Directly Bear upon the Sand Mining Permit Applications.*

The Bay Plan's subtidal lands policies echo many of the same concerns as its policies protecting tidal reaches, with a focus instead on changes to the Bay floor itself:

The Bay is a dynamic ecosystem influenced by natural processes on tidal and seasonal scales, as well as by events that occur annually or on longer-term scales. The depth and shape of the Bay (its bathymetry) is at any moment the result of the interacting forces of erosion and deposition of sediment. This natural balance has changed during the past 150 years due to such human actions as hydraulic mining . . . and dredging, all of which have significantly altered the Bay's historic sedimentary processes. (Finding G.)

Furthermore, the value of a particular subtidal area to a species is influenced by the Bay's physical characteristics (including sediment type, depth, salinity, temperature and currents), by process (such as sediment movement, sand replenishment, wind and wave action, erosion and deposition) . . . (Finding H.)

Building on these findings, the Bay Plan contains three policies pertinent here:

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

This policy calls into question not only the effects sand mining will have in the immediate vicinity of any mining operation, but also examines the broader effects on sediment movement throughout the Bay and outer coast. Again, harmful effects must be avoided altogether if feasible; and at a minimum, must be minimized.

Similarly, the Bay Plan requires that:

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

Approximately 8% of the Bay floor is comprised of sandy shoals, and the amount of sand available for both habitat and mineral resource use has steadily decreased; the impacted resources should therefore certainly qualify as scarce. To “conserve” means to protect, or to maintain, but the proposed project would increase an already-unsustainable sand mining extraction rate. Therefore, at a minimum, the use intensity of the proposed permits should be decreased to begin to achieve consistency with this policy.

Lastly, again, the Bay Plan requires the Commission to obtain further expansion of scientific information on the Bay’s subtidal areas, including:

(a) inventory and description of the Bay’s subtidal areas; (b) the relationship between the Bay’s physical regime and biological populations; (c) sediment dynamics, including sand transport, and wind and wave effects on sediment movement; (d) areas of the Bay used for spawning, birthing, nesting, resting, feeding, migration, among others, by fish, other aquatic organisms and wildlife; and (e) where and how restoration should occur. (Policy 5.)

The EIR studies, supported by the permit applicants, were too temporally and spatially limited to inform the Commission the extent to which these Bay Plan policies may or may not be satisfied. In the face of such incomplete information, permit applicants may attempt to deride any Commission approach that would exercise caution as governed by a “paralyzing principle,” but such is not the case.¹³ Policy 5 requires the further study of unknown or under-studied Bay sandy habitats, to support informed agency decision-making.

3. The Bay Plan’s Climate Change Policies Directly Bear upon the Sand Mining Permit Applications.

Last but certainly not least, the further loss of sediment along shoreline beaches will increase vulnerability to sea level rise. Permit applicants turn this fact on its head, and argue that provision of sand will support local construction projects engineered to help defend the region from the impacts of rising seas.¹⁴ A review of Bay Plan findings shows that the Commission has adopted the opposite approach, favoring, instead, to support natural systems as sustainable adaptation measures.

¹³ Letter from John Briscoe to Larry Goldzband, July 2, 2014, “The ‘precautionary’ or ‘paralyzing principle.’”

¹⁴ Memorandum from Christine Bordreau, et al. to Brenda Goeden, et al., July 14, 2014, p. 3.

Natural systems and human communities are considered to be resilient when they can absorb and rebound from the impacts of weather extremes or climate change and continue functioning without substantial outside assistance. Systems that are currently under stress often have lower adaptive capacity and may be more vulnerable or susceptible to harm from climate change impacts. . . . (Finding F.)

Adaptation actions that protect existing development and infrastructure can include protecting shorelines . . . (Finding G.)

[B]eaches . . . are particularly vulnerable to flooding from sea level rise and storm activity Flooding of, or damage to these areas would adversely affect the region's quality of life, if important public spaces and recreational opportunities are lost. (Finding I.)

The principle of sustainability embodies values of equity, environmental and public health protection, economic vitality and safety. The goal of sustainability is to conduct human endeavors in a manner that will avoid depleting natural resources for future generations and producing no more than can be assimilated through natural processes, while providing for improvement of the human condition for all the people of the world. Efforts to improve the sustainability of natural systems and human communities can improve their resilience to climate change by increasing their adaptive capacity. (Finding J.)

The EIR for the proposed project fully admits that historic sand mining extraction rates have been unsustainable, and that proposed future sand extraction rates are increased from those of the past. This approach flies in the face of the Bay Plan's Climate Change Findings F through J. Coastal resilience is already under severe stress, a condition the proposed permits would only worsen. The Bay Plan therefore provides several requirements. First, Policy 1(a) provides that the Bay Plan's Climate Change findings and policies apply to projects within San Francisco Bay, which obviously include the proposed mining permits. The Bay Plan then requires that:

To address the regional adverse impacts of climate change, undeveloped areas that are both vulnerable to future flooding and currently sustain significant habitats or species, or possess conditions that make the areas especially suitable for ecosystem enhancement, should be given special consideration for preservation and habitat enhancement and should be encouraged to be used for those purposes. (Policy 4.)

[A]dvance regional public safety and economic prosperity by protecting: . . . (iii) infrastructure that is crucial to public health or the region's economy, such as airports, ports, regional transportation, wastewater treatment facilities, major parks, recreational areas and trails. (Policy 7.)

The proposed project's impact of increasing Ocean Beach erosion, for example, directly implicates these policy requirements. Rates of coastal erosion along the outer coast south of the Golden Gate are the highest for the entire coast of California and have accelerated by 50% between Ocean Beach and Pt. San

Pedro since the 1980s, coinciding with intense sand mining activities in the Bay.^{15,16,17} As a result, critical infrastructure, including San Francisco's Great Highway and the Oceanside Wastewater Control Plant, face dire threats from coastal erosion, which is partly driving the creation and implementation of the Ocean Beach Master Plan, at significant cost to San Franciscans and other stakeholders.¹⁸ Further loss of coarse-grained sediment at Ocean Beach reduces San Francisco's resiliency and capacity for adaptation to sea level rise. Accordingly, the proposed permits must be completely evaluated and conditioned for consistency with the Bay Plan's Climate Change policies.

B. Neither CEQA nor the State Lands Commission's EIR Limit BCDC's Authority.

The project applicants are wrong to argue that the Commission's ability to require any minimization or avoidance measures in approving the proposed sand mining permits is in any way circumscribed by the EIR prepared for the project.¹⁹ As noted above, the McAteer-Petris Act expressly provides the Commission with the authority and duty to place conditions on any project approval, and nothing in the Act provides otherwise. The applicants' interpretation of the law runs contrary to California Supreme Court jurisprudence: "The foremost principle under CEQA is that the Legislature intended the act to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language." (*Laurel Heights Improvement Assn. v. Regents of Univ. of Calif.* (1988) 47 Cal.3d 376, 390.) To interpret any provision of CEQA to hamstring a responsible agency with specific jurisdiction and expertise over an affected resource is to use CEQA to diminish the state's ability to protect the affected environment.

As a responsible agency, the Commission must *consider* the EIR prepared by the State Lands Commission, and may not presume it to be invalid unless and until so determined by a reviewing court. (Pub. Resources Code § 21167.3(b).) Nevertheless, pursuant to CEQA, the Commission still "has responsibility for mitigating or avoiding ... the direct or indirect environmental effects of those parts of the project which it decides to carry out, finance, or approve." (CEQA Guidelines § 15096(g)(1).) Nothing in CEQA limits an agency's further duties provided in its enabling statute. (*See, e.g., Central Delta Water Agency v. State Water Resources Control Board* (2004) 124 Cal.App.4th 245, 274; *San Diego Coastkeeper v. California State Lands Commission* (2010) WL 5058429.)

IV. BCDC's Authorities and Mandates Do Not Implicate Any Constitutional Takings in This Matter.

Lastly, the Commission should not let veiled threats of "constitutional takings" alter its course.²⁰ Here, any modification or limitation imposed by the Commission upon any mining permit deemed necessary to protect vital Bay and coastal resources fall safely within the Commission's regulatory bounds, and will

15 Hapke, C. J., Reid, D. & Richmond, B., 2009. Rates and trends of coastal change in California and the regional behavior of the beach and cliff system. *Journal of Coastal Research*, 25(3), pp. 603-615.

16 Hapke, C. J. et al., 2006. National assessment of shoreline change: part 3: historical shoreline changes and associated coastal land loss along the sandy shorelines of the California coast, s.l.: U.S. Geological Survey Open File Report 2006-1219.

17 Dallas, K. L. & Barnard, P. L., 2011. Anthropogenic influences on shoreline and nearshore evolution in the San Francisco Bay coastal system. *Estuarine, Coastal and Shelf Science*, Volume 92, pp. 195-204.

18 Ocean Beach Master Plan available at www.spur.org

19 Letter from John Briscoe to John Bowers, September, 2014.

20 Letter from John Briscoe to John Bowers, September, 2014, p. 3.

not implicate any required compensation. In *Lucas v. South Carolina Coastal Council*, the U.S. Supreme Court identified

two discrete categories of regulator action as compensable without case-specific inquiry into the public interest advanced in support of the restraint. The first encompasses regulations that compel the property owner to suffer a physical 'invasion' of his property. . . . The second . . . is where regulation denies all economically beneficial or productive use of land. (505 U.S. 1003, 1029 (1992).)

Here, no application of the Bay Plan's policies would physically intrude upon any private property interest, nor would conditioning project approval deny all economically beneficial use. Moreover, even where regulation *does* deprive an owner of all economically beneficial use of property, governmental compensation is not required if "the proscribed use interests were not part of his title to begin with," including, for example, "a public navigable water held subject to Government's navigational servitude. . . ." (*Lucas, supra*, at 1030, nor would "the owner of a lake bed . . . be entitled to compensation when he is denied the requisite permit to engage in a land filling operation that would have the effect of flooding others' land.") Justice Kennedy, concurring in the *Lucas* opinion, added, "[c]oastal property may present such unique concerns for a fragile land system that the State can go further in regulating its development and use" (*Lucas, supra*, at 1035.) Here, the state's exercise of its overriding interest, right, and duty to protect public resources, even to the complete denial of the project, would not implicate any compensable taking.²¹

The permit applicants were aware of this fact before receiving lease approval from the State Lands Commission, as the EIR states:

When BCDC takes any action affecting lands subject to the public trust, it should assure that the action is consistent with the public trust needs for the area and, in case of lands subject to legislative grants, should also assure that the terms of the grant are satisfied and the project is in furtherance of statewide purposes. (EIR at 4.7-29.)

Mining projects are no exception to these rules. In *Keystone Bituminous Coal Association v. DeBenecitis*, 480 U.S. 470 (1987), the United States Supreme Court did not require any compensation to mining companies where a state statute was enacted requiring mining companies to leave 50% of existing coal deposits in place, underground, to support the surface of the land above. By analogy here, maintenance of the current 10-year extraction rate to support the conservation of coastal beaches should reach the same result. Nor did Congress' adoption of the Surface Mining Control and Reclamation Act of 1977 implicate any constitutional takings, even though vast limitations on previously-existing mining rights were imposed. (*Hodel v. Virginia Surface Mining & Reclamation Assn., Inc.*, 452 U.S. 264 (1981).)

Finally, any permit condition requiring further study of the impacted areas does not trigger any need for compensation as an exaction for the public good. Such study is rationally related to the scope of

²¹ In addition to the public protections provided for in *Lucas*, the U.S. Supreme Court declined to review the application of the common law doctrine of "custom" as applied by the Oregon courts in ruling that the public has a right of access to dry sand areas of beaches for recreational purposes. (*Stevens v. City of Cannon Beach*, 854 P.2d 449 (Or. 1993), cert. denied in *Stevens v. City of Cannon Beach*, 114 S.Ct. 1332 (1994).

authority and duty the Commission has been given through the McAteer-Petris Act and the Bay Plan to regulate the use of Bay resources in the public interest; and the conditioned study would clearly be roughly proportional to the scope of the project, as the project's impacts themselves would be under study. (See, *Dolan v. City of Tigard*, 512 U.S. 374, 390-396 (1994).)

V. Conclusion

In summary, we ask the Commission to consider three conditions for permit approval:

- 1) Establish an extraction rate equivalent to the current 10-year baseline (refer to Table 1);
- 2) Require the funding of analysis to quantify on-going impacts associated with sand mining, including a tracer study and completion of bathymetric surveys every five years; and
- 3) Reduce proposed permit duration from 10 years to 5 to allow for adaptive management.

Years of publicly-funded research and reams of peer-reviewed scientific papers identify a causal link between sand mining in San Francisco Bay and erosion along the coast. Researchers expressed their hope that with the release of this research "the planning community can now more skillfully address the challenges of managing sediment in SF Bay in a manner that promotes the sustainability of open-coast beaches and submarine habitats."²² This process affords an opportunity to rely on sound science to achieve tangible benefits in terms of habitat protection, climate resiliency and sustainable management of valuable sediment resources. We look forward to working with BCDC to enhance these benefits through improved coarse sediment management in San Francisco Bay.

Sincerely,

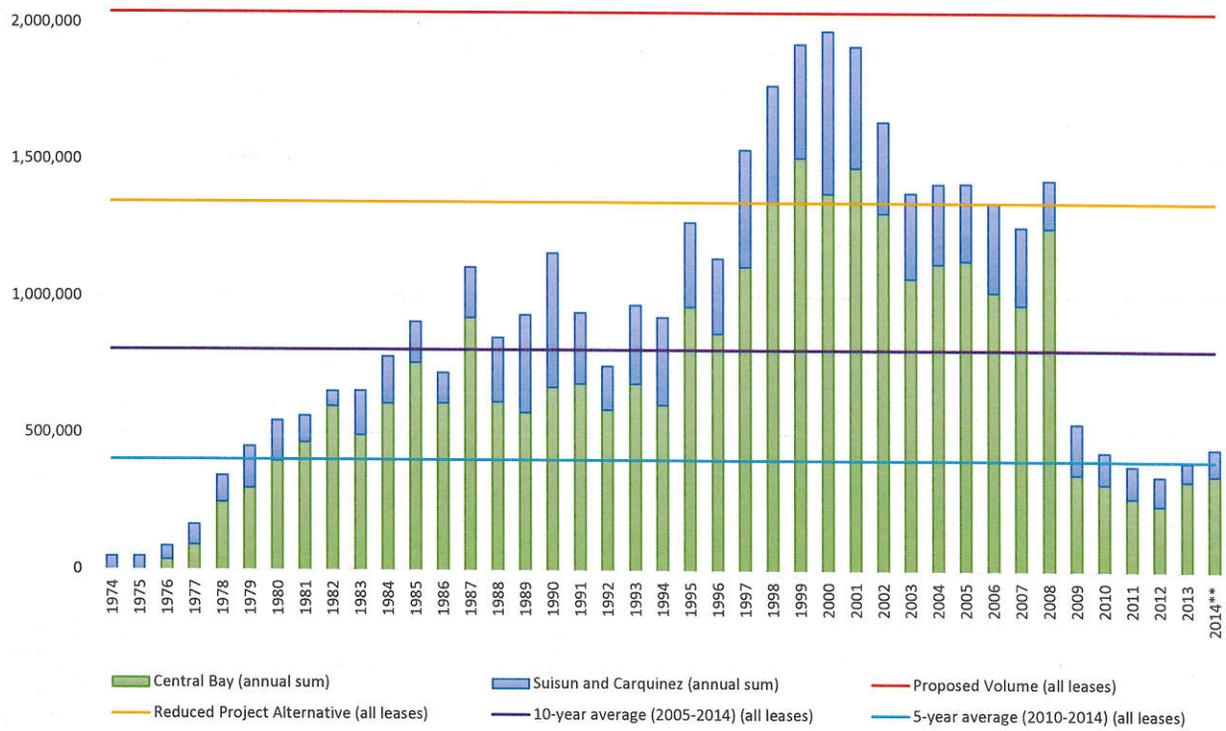
Ian Wren
Staff Scientist, San Francisco Baykeeper

Jason R. Flanders
Aqua Terra Aeris Law Group

²² Hein, J. R., Mizell, K. & Barnard, P. L., 2013. Sand sources and transport pathways for the San Francisco Bay coastal system, based on X-ray diffraction mineralogy. *Marine Geology*, 345, 154-169.

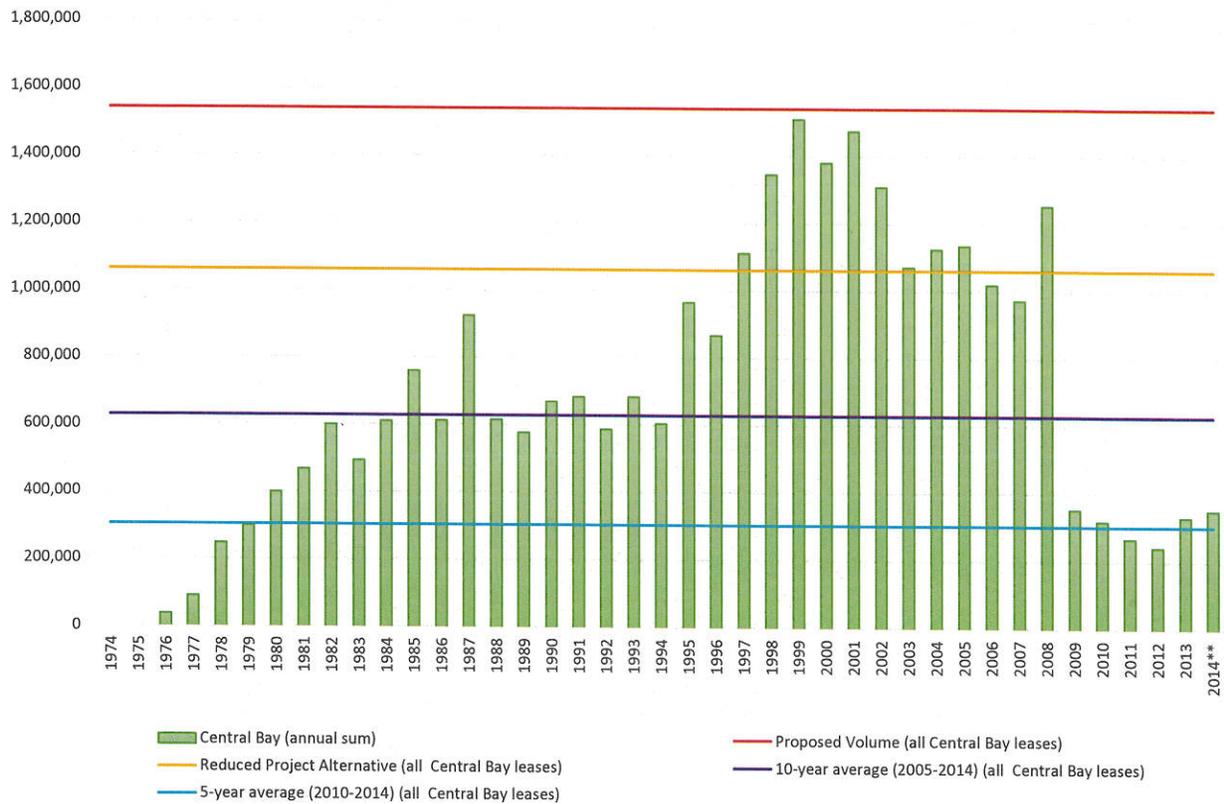
Appendix 1: Historic Mining Volumes versus Proposed Permit Volumes

Figure 1: Historic Mining Volumes, Proposed Permit Volumes and Historic Averages – Suisun and Central SF Bay Lease Areas (cubic yards/yr)



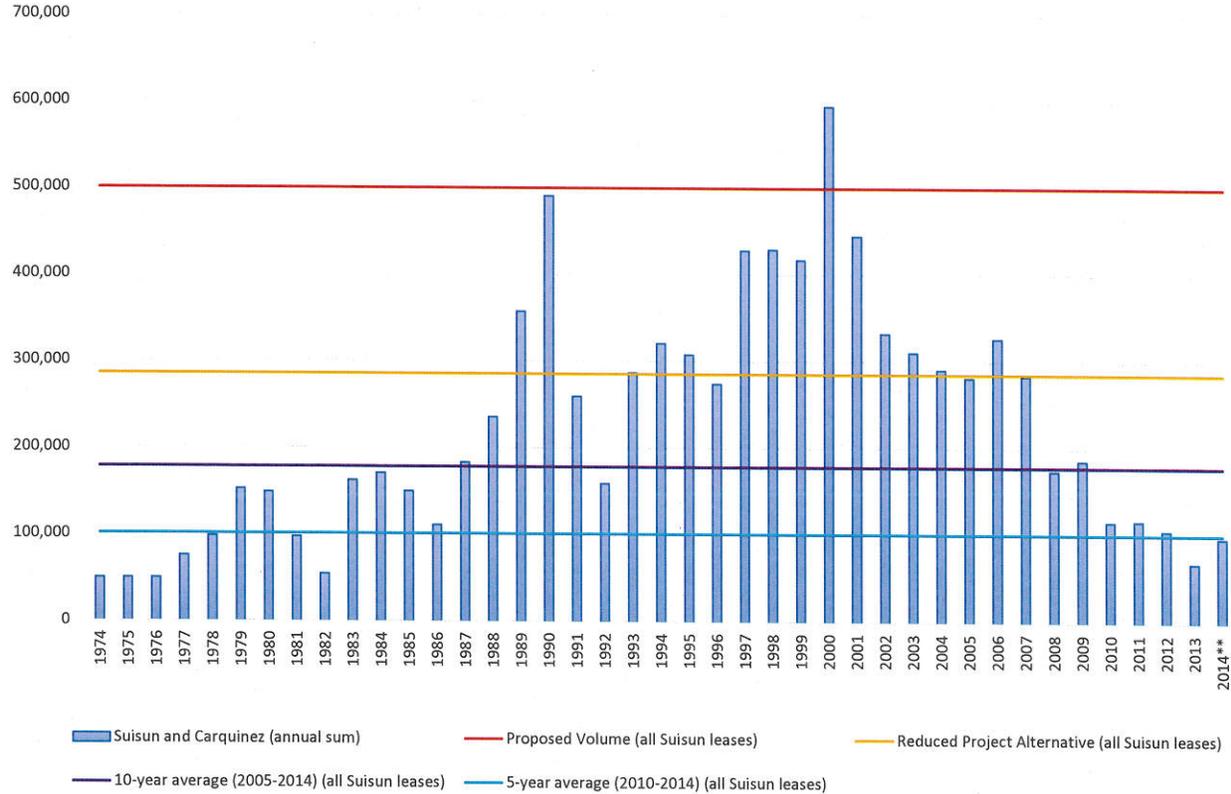
* Data provided by BCDC, based on quarterly reports from the mining companies
 ** 2014 volumes scaled for the year based on Q1 and Q2 data

Figure 2: Historic Mining Volumes, Proposed Permit Volumes and Historic Averages – Central SF Bay Lease Areas (cubic yards/year)



*2014 volumes scaled for the year based on Q1 and Q2 data

Figure 1: Historic Mining Volumes, Proposed Permit Volumes and Historic Averages – Suisun Bay Lease Areas (cubic yards)



*2014 volumes scaled for the year based on Q1 and Q2 data

Appendix 2: Findings from Recent Sediment Transport Research

A recent issue of *Marine Geology* presented ~20 papers focused on sediment transport research in the San Francisco Bay Coastal System. This special issue is considered a culmination of nearly 100 years of research on many topics, ranging from tidal marsh sustainability, suspended sediment transport, bedform migration and evolution, behavior of the open coast littoral system, and fluvial impacts. (Barnard, et al., 2013) Several papers were the output of a multi-faceted, multi-disciplinary provenance study designed to establish the primary sources, sinks, and inferred transport pathways of sand in the region. This research established links between anthropogenic activities and geomorphic change through extensive sampling and analysis of sediment from the seabed, bayfloor, beaches, representative rock units, and all major and some minor drainages. (Hein, et al., 2013) Anthropogenic activities, including aggregate mining, were definitively identified as directly limiting beach-sized sand supply to the outer coast. (Barnard, et al., 2013)

Specific findings:

- Authors conclude that the causal link between dredging/aggregate mining and coastal erosion is “...effectively established by the data presented in this special issue...” thereby “...the planning community can now more skillfully address the challenges of managing sediment in SF Bay in a manner that promotes the sustainability of open-coast beaches and submarine habitats.” (Hein, et al., 2013)
- This work highlights the need to more efficiently manage existing in-Bay sediment resources, as active aggregate mining and dredging occurs along well-defined sand transport pathways that carry sediment toward outer coast beaches, at removal rates that exceed the present-day sediment supply rates from all San Francisco watersheds (Barnard, et al., 2013).
- A definitive understanding of sediment sources, sinks and pathways in urbanized coastal-estuarine systems is essential for assessing the current and future effects of sediment-impacting activities, such as dredging operations, aggregate mining, shoreline armoring and watershed modifications. More informed management of sediment resources can promote the sustainability of fringing tidal wetlands and beaches, the first line of defense as sea level rises and potentially larger storms, increase the vulnerability of coastal environments over the next century and beyond, enhancing threats to public safety, vital infrastructure and ecosystems (Barnard, et al., 2013).
- Dredging and aggregate mining in the Bay, as well as watershed modifications, are correlated to ~150 million m³ of erosion from the floor of San Francisco Bay over the last half of the 20th century (Barnard & Kvitek, 2010). This significant erosion of the Bay floor is temporally correlated with similarly high volumes of erosion of the ebb-tidal delta at the mouth of San Francisco Bay (Hanes & Barnard, 2007) (Dallas & Barnard, 2009), as well as widespread erosion of adjacent, open-coast beaches (Hapke, et al., 2006) (Dallas & Barnard, 2011) (Barnard, et al., 2012a).
- Multi-decadal erosion and contraction of the ebb-tidal delta have modified sediment transport patterns along Ocean Beach, effectively driving more sediment toward the northern end of the beach and less toward the southern end. The modeled patterns are supported by observed beach and nearshore changes over inter-annual and multi-decadal time scales, including a 3-fold

increase in the rates of shoreline accretion at the north end over the last several decades and similarly higher rates of erosion at the south end have led to significant infrastructure damage (Barnard, et al., 2013).

- As the northern shoreline has continued to extend seaward, increasingly higher volumes of northward-moving sand are no longer trapped at Pt. Lobos at the north end of Ocean Beach, and instead move toward Baker Beach and eventually into the Central Bay at Crissy Field. For example, over the last decade, sedimentation forced the relocation of a tide gauge and caused shoaling within the adjacent yacht harbor. These three sites have been linked geochemically, and recently accelerating rates of shoreline accretion at Baker Beach and Crissy Field correlate temporally with observed changes at northern Ocean Beach. These trends and correlative impacts are expected to continue as higher sea levels and further reductions in sediment supply drive further contraction of the ebb-tidal delta. (Barnard, et al., 2013)
- Based on multiple techniques for assessing sand provenance, the Sierra Nevada Range is the dominant source of beach-sized sand to the San Francisco Bay Coastal System. This sand is actively transported into and through the Bay to the mouth of San Francisco Bay, and along the southern open coast. This dominant pathway for beach-sized sand material destined for the open coast directly intersects the two major active aggregate mining regions in San Francisco Bay, Suisun Bay and Central Bay (Barnard, et al., 2013).
- Sediment geochemistry indicates that local sediment sources predominate along the coast north of the Golden Gate and south of San Francisco, with Sierran sources supply sediment to northern San Francisco beaches (i.e. Baker and north Ocean Beaches) and the seafloor of the Golden Gate (Barnard, et al., 2013).
- Sediment found at northern Ocean Beach is linked geochemically to Baker Beach (and the adjacent Golden Gate sand wave field), and Crissy Field, representative of the dominant Sierran source, primarily via the Sacramento River-Suisun Bay-San Pablo Bay transport pathway. This is consistent with numerical modeling, in situ measurements, and bedform asymmetry that document a distinct pathway for sediment into San Francisco Bay along the northern shoreline of the San Francisco peninsula. However, sand at southern Ocean Beach and offshore are consistent with sand locally eroded from beach-backing cliffs comprising the Colma formation (Barnard, et al., 2013).
- Within the 20th century, over 200 million m³ of sediment was directly removed from the San Francisco Bay Coastal System through dredging, aggregate mining, and borrow pit mining, including at least 54 million m³ of sand-sized or coarser sediment from Central Bay (Dallas & Barnard, 2009) (Dallas & Barnard, 2011).
- Over 150 million m³ of sediment loss during the 20th century was measured from the sand-dominated substrates of Central Bay, the Golden Gate, and ebb tidal delta (Hanes & Barnard, 2007) (Fregoso, et al., 2008) (Barnard & Kvitek, 2010).
- Within the last century, rates of coastal erosion along the outer coast south of the Golden Gate is the highest for the entire coast of California (Hapke, et al., 2006) (Hapke, et al., 2009) and has accelerated by 50% between Ocean Beach and Pt. San Pedro since the 1980s (Dallas & Barnard, 2011).

- Aggregate mining removes approximately 0.9 million m³/yr of sand and gravel sized sediment in Central Bay and Suisun Bay (Hanson, et al., 2004), while dredging removes about 3 million m³/yr of sediment, with the majority of this material permanently removed from the San Francisco Bay Coastal System (Dredged Material Management Office, 2008) (San Francisco Estuary Institute, 2009). Together, these losses exceed the present annual sediment supply from the Sierras and local watersheds combined. Therefore, management of the current sediment inventory in the Bay will be critical (Barnard, et al., 2013).
- Bathymetric change analysis from 1997 to 2008 across aggregate mining lease sites on Presidio Shoals in southern Central Bay records a volume loss of ~2.3 million m³, most of this attributed to sand and gravel removed by aggregate mining (Barnard & Kvitek, 2010). This has significantly reduced the sediment available for transport to the mouth of San Francisco Bay and adjacent beaches (Barnard, et al., 2013).
- The consensus results highlight the regional impact of a sharp reduction in the primary sediment source to the San Francisco Bay Coastal System over the last century – the Sierras – in driving massive erosion of the Bay floor, ebb-tidal delta, and the highest regional shoreline retreat rates in California along the adjacent outer coast (Barnard, et al., 2013).
- The dominant regional direction of sediment transport is from the Bay seaward toward the ebb-tidal delta, and then primarily to the south (Barnard, et al., 2013). This link defines a critical pathway because large volumes of sediment have been removed from the Bay over the last century via channel dredging, aggregate mining and borrow pit mining. During this same period, comparable volumes of erosion from the ebb tidal delta over the same period have been observed, in addition to high rates of shoreline retreat along the adjacent, open-coast beaches. (Hein, et al., 2013)
- The Central Bay is a zone of mineralogical mixing from multiple sources and an important source of beach-sized sediment to the ebb tidal delta at the mouth of San Francisco Bay and outer coast region to the south (including Ocean Beach). This work is consistent with previous studies that connected the removal of 54 million m³ of sand from the area since 1900 to erosion of the ebb tidal delta and the adjacent south coast shoreline (i.e. Ocean Beach). (Dallas & Barnard, 2009) (Dallas & Barnard, 2011) (Barnard, et al., 2012a) (Barnard, et al., 2012b)
- Mineral signatures of sediment from the Sacramento and San Joaquin Rivers are consistent with sediments in the North and Central Bay, as well as Baker Beach, Ocean Beach and dune sandstone from Fort Funston, implying a link in sediment supply from these locations. (Hein, et al., 2013)
- Analysis of ~45,000 bedforms along the Bay flood indicates net transport of sand to the open coast, strongly suggesting that anthropogenic removal of sediment from the estuary, particularly along clearly defined seaward transport pathways, will limit the supply of sand to chronically eroding, open coast beaches (Barnard, et al., 2012b).

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