CALIFORNIA COASTAL COMMISSION
CENTRAL COAST DISTRICT OFFICE
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
PHONE: (831) 427-4863
FAX: (831) 427-4877
WEB: WWW.COASTAL.CA.GOV

W12b

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Staff report prepared:	9/16/2009
Staff Report prepared by:	Susan Craig
Staff Report approved by:	Dan Carl
Hearing date:	10/7/2009

COASTAL DEVELOPMENT PERMIT AMENDMENT APPLICATION

Application number.....**3-05-065-A3, Santa Cruz Port District Demonstration Project**

Applicant.....Santa Cruz Port District

Project location .....Santa Cruz Small Craft Harbor and Harbor Beach/Twin Lakes State Beach, City of Santa Cruz (Santa Cruz County)

Project description.....Amend five-year dredging permit to allow demonstration dredge and disposal project for up to 12,000 cubic yards of fine-grained (average of 30% sand) sediment into the nearshore environment offshore Harbor Beach/Twin Lakes State Beach in October 2009 only.

File documents.....Coastal Development Permit (CDP) and CDP Amendment files 3-05-065, 3-05-065-A2; 3-05-026, 3-00-034, 3-00-034-A2; U.S. Geological Survey Study of the Fate of Mixed Grain Sediment Dredged from the Santa Cruz Harbor, dated September 10, 2009; Sampling and Analyses Plan 2009-2010 Dredging Season by Red Hills Environmental, Inc., dated July 13, 2009.

Staff Recommendation ..**Approval with Conditions**

A.Staff Recommendation

1. Summary of Staff Recommendation

The Santa Cruz Port District (Port District) proposes to amend coastal development permit (CDP) 3-05-065 to allow for the one-time dredging of up to 12,000 cubic yards of fine-grained sediment (averaging 30% sand content, with the remainder consisting of silt and clay) from the inner harbor with disposal through a pipeline into the nearshore environment on weekdays between 4:00 p.m. and 11:00 p.m. in October 2009 only. The Port District is proposing this as a demonstration project as a means to determine if clean, fine-grained harbor sediments can be disposed into the nearshore area in a manner beneficial to downcoast beaches and without harm to coastal resources. The Port District proposes an extensive monitoring program to evaluate the impacts of the demonstration project on the beach and nearshore environment. The experiment is being timed this year so that the results of demonstration monitoring can be used to help inform the Port District's upcoming application applicable to long-term dredging next year (i.e., CDP 3-05-065's five-year term expires in 2010).

The Port District has undertaken three similar demonstration projects in the past as a means to explore appropriate dredging and beach nourishment opportunities, including to ensure that beach-generating materials are not blocked from making their way into the local sand supply system. These previous projects involved smaller amounts of fine-grained sediment than currently is proposed, and were done in 2001, 2003, and 2005. To evaluate the environmental effects of placing clean, fine-grain dredge material into the nearshore littoral zone, extensive monitoring programs were conducted before, during, and after each of the prior demonstration projects to ascertain if any finer-grain dredge sediment could be detected on the beaches or the nearshore benthic environment. The results of the data collected during the monitoring programs concluded that the demonstration projects did not significantly change, alter, or impact the beaches or nearshore marine benthic habitats in the study areas. The current proposal is intended to build upon these previous efforts in a way that will allow data gathered to be combined with previous data to help inform dredging and beach nourishment decisions generally, as well as specifically in terms of the Port District's upcoming CDP application to reauthorize its long-term dredge management plan.

Staff believes that the proposed project will provide valuable data for future decisions and that the project can be designed to avoid coastal resource impacts. Critical to avoiding such impacts is ensuring that the sediment in question is clean and suitable for unconfined aquatic disposal, that sediment is not disposed of during higher public recreational use times, and that other agencies must also approve the project before it can commence. With conditions to require Monterey Bay National Marine Sanctuary and other-agency review and approvals, as well as timing and sediment amount limitations, staff believes that the proposed one-time demonstration project is consistent with the Coastal Act's marine resource and public access policies. With these conditions, staff recommends that the Commission approve a CDP amendment for the proposed demonstration project. The motion and resolution to approve the CDP amendment are found directly below.

2. Staff Recommendation on Coastal Development Permit Amendment

Staff recommends that the Commission, after public hearing, **approve** the proposed permit amendment subject to the standard and special conditions below.

> **Motion:** I move that the Commission approve coastal development permit amendment number 3-05-065-A3 pursuant to the staff recommendation.
>
> **Staff Recommendation of Approval:** Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit amendment as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.
>
> **Resolution to Approve the Permit Amendment:** The Commission hereby approves a coastal development permit amendment for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of

Chapter 3 of the Coastal Act. Approval of the permit amendment complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

Staff Report Contents

B.Findings and Declarations

The Commission finds and declares as follows:

1. Project Location and Background

The Santa Cruz Small Craft Harbor (Harbor) is located in the City of Santa Cruz, at the northern tip of Monterey Bay, between Harbor Beach/Twin Lakes State Beach and its Seabright State Beach unit, and approximately 3,000 feet east (downcoast) of the San Lorenzo River mouth. The Harbor is a commercial fishing/small craft harbor with berthing facilities for approximately 920 boats. The Harbor includes the entrance channel, which extends from the end of the jetties to the fuel dock, and the inner harbor, which

consists of all portions of the harbor located north (inland) of the fuel dock.

The Harbor fronts the Monterey Bay National Marine Sanctuary (Sanctuary), which extends south from Marin County to Cambria Rock in San Luis Obispo County, and generally extends from the mean high tide seaward typically about 35 miles offshore. The Sanctuary is the nation's second largest marine sanctuary, protecting marine resources that include the nation's most expansive kelp forests, one of North America's largest underwater canyons, and the closest deep ocean environment to the continental United States.

Overall, the Harbor facilitates ocean-related functions such as boat-launching, berthing for commercial vessels and recreational boats, commercial fishing service and support, boat repair areas, marine-related retail/commercial businesses, restaurants, sailing programs, a yacht club and boat sales. The majority of boat use at the Harbor is for recreational, as opposed to commercial fishing, purposes.

The Harbor's entrance channel (located between its two jetties) receives sediment primarily from littoral drift at the harbor mouth and through the permeable jetties themselves. Shoaling of the harbor mouth entrance is common, and it has historically been corrected by regular maintenance dredging, with sediments added to the adjacent beach for nourishment. Entrance channel sediment has historically consisted almost entirely of sand. The inner harbor is situated at the lower reaches of the Arana Gulch watershed. Arana Creek flows through a culvert at the northern end of the Harbor into the upper harbor area waters. Sediments originating in the Arana Gulch watershed and making their way into the inner harbor have proved to be the most problematic for the Harbor in recent times, at times rendering the inner harbor area impassable to boats. The sediments from Arana Gulch consist predominantly of silts and clays with some sandy sediment mixed in.

Please see Exhibit A for a project location map and Exhibit B for a photograph of the project site.

2. Previous Demonstration Projects

In February 2001, the Commission approved an amendment (CDP 3-00-034-A1) to the Port District's previous five-year dredging and disposal permit. CDP 3-00-034-A1 allowed for the one-time dredging of 3,000 cubic yards of sediment from the inner harbor, with disposal by means of the offshore pipeline during February and/or March 2001. This sediment averaged 42% sand and 58% silt/clay and, after chemical and biological testing, was determined by the Army Corps of Engineers (ACOE) and U.S. Environmental Protection Agency (EPA) to be suitable for unconfined aquatic disposal. The Port District had requested the amendment because it contended that the ACOE's and EPA's 80% sand determination[1] was too restrictive and precluded the beneficial use of otherwise clean sediments, of

[1] CDP 3-00-034 required that all sediments deposited on the beach and into the nearshore environment consist of at least 80% sand, consistent with ACOE and EPA guidelines regarding dredging and beach replenishment. According to letters from the EPA dated April 26, 2000 and December 15, 2000, the 80% sand standard is a "rule of thumb" guideline to be applied in situations where more detailed information is lacking. However, "it is not the only appropriate ratio." Regarding the 2001 demonstration project, the April 26, 2000 EPA letter states that the "EPA is pleased that the Harbor's evaluation efforts will provide information that could be used as a basis for documenting that a higher percent of fine grain materials may be discharged for beach nourishment in a manner consistent with the Guidelines." The December 15, 2000 EPA letter states that there is flexibility within the Clean Water Act Guidelines that allows for

which a high percentage is made up of sandy material. The Santa Cruz Port District had proposed the amendment as a "demonstration" project to determine if clean, fine-grain harbor sediments could be disposed of into the nearshore area in a manner beneficial to downcoast beaches and without harm to coastal resources.

The 2001 demonstration project included a monitoring component to determine the effects of the disposal of fine-grain dredge material into the nearshore environment. The 2001 monitoring program was designed and implemented by scientists from Moss Landing Marine Laboratories to determine if sedimentary changes occurred on the beaches and nearshore benthic habitats in the vicinity of the Santa Cruz Harbor due to the placement of finer-grained dredged material into the nearshore environment. In addition to a scientific literature review, a variety of data were collected from February 18, 2001 to April 14, 2001 to monitor the experimental dredging event and the natural processes occurring in the study area. Stream flow data were used to calculate sediment discharge estimates. Oceanographic swell information was downloaded to monitor wave conditions and to calculate littoral drift estimates. Over 300 sediment samples were collected and grain size analyses performed. Over 300 water samples were also collected to observe changes in turbidity over time. Two separate geophysical surveys were executed to describe and quantify benthic habitats and sedimentary changes that may have occurred during the monitoring period. The scientists concluded, after complete integration and analyses of all the data types collected during the monitoring period, that the fine-grain material released into the nearshore environment did not significantly change, alter, or impact the beaches or nearshore marine benthic habitats in the study area.

In August 2003 the Commission approved a second amendment (CDP 3-00-034-A2) to the base dredging permit. CDP 3-00-034-A2 allowed for the yearly nearshore disposal of up to 3,000 cubic yards of inner harbor sediment, consisting of between 50% and 80% sand, for the remaining two years of CDP 3-00-034. Requirements for lab testing of the fine-grain dredge material, according to all criteria prescribed by ACOE and EPA regulations, remained in place. As with the original demonstration project, only "clean" dredge material, i.e., material deemed suitable for unconfined aquatic disposal by the ACOE and the EPA, could be disposed of into the nearshore environment.

The Commission conditioned its approval of CDP 3-00-034-A2 to require the submission of a monitoring program to again determine if sedimentary changes occurred along the beaches and nearshore benthic habitats in the vicinity of the Santa Cruz Harbor due to retention of fine-grain material. In February and April 2005, 7,050 cubic yards of material was dredged from the inner harbor and disposed of into the nearshore environment. Of this amount, 4,300 cubic yards consisted of an average of 85% sand and 15% silt/clay, disposal of which was allowed under the base permit. A total of 2,750 cubic yards of this inner harbor material consisted of an average of 71% sand and 29% silt/clay

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discharge of finer material for beach nourishment purposes, provided that site-specific information is available to determine any beach nourishment benefits or significant adverse impacts. The EPA felt that the proposed 2001 demonstration project could provide the kind of site-specific information necessary for further evaluation. Therefore, the EPA did not object to the proposed demonstration project, provided that the provisions of the monitoring program were enforced and that the results of the monitoring program were made available to the ACOE, the EPA, and other relevant agencies.

and was subject to the monitoring program required under CDP 3-00-034-A2. Results of the monitoring program (which was undertaken from February 10th to April 22nd) demonstrated that the discharge of fine-grain material did not cause any detectable changes in mean grain-size or silt and clay percentages beyond the range of normal winter background conditions.

In September 2005, the Commission approved CDP 3-05-026, a component of which allowed for the dredging of up to 10,000 cubic yards of fine-grain sediment from the inner harbor, with disposal through the offshore pipeline into the nearshore environment during October 2005 only. This approval also included additional monitoring designed to continue to evaluate the impacts to the beach or local benthic environment due to fine-grain sediment disposal into the nearshore environment. Dredging of the inner harbor took place in the evening hours between October 12 and October 31, 2005. An estimated 6,596 cubic yards of sediment composed of approximately 31% sand and 69% silt and clay was disposed of into the nearshore environment approximately 50 yards offshore of Twin Lakes State Beach. The monitoring program included beach and offshore sediment sampling, water quality measurements, beach monitoring observations, SCUBA diver observations, evaluation of nearshore waves and currents, multi-beam bathymetry surveys (including GIS-based benthic habitat maps), and numerical modeling. The monitoring study results again determined that there was no significant change in sediment sample mean grain-size or silt and clay percentage beyond the range of normal background conditions. The report further concluded that "strong evidence collected in three monitoring programs over the past 4.5 years indicates that the Santa Cruz Bight is a high-energy coastline that does not support the deposition of silt and clay sized particles… The results indicate that local wave and current energy are more than capable of efficiently transporting not only silt and clay sediment away from the SCH [Santa Cruz Harbor], but sand-sized material as well. This implies that the Santa Cruz Bight could accommodate a larger volume of inner SCH dredge sediment than is currently permitted."[2]

3. Base Permit Description and Project Amendment Description

The Santa Cruz Port District is proposing an amendment to CDP 3-05-065 as amended (through 3-05-065-A2).[3] The base CDP as amended covers a five-year period from October 2005 until October 2010 and allows for: 1) the annual dredging of a maximum of 350,000 cubic yards of entrance channel sediment, consisting of greater than 80% sand, with disposal of the sediment onto the beach or into the nearshore environment; 2) the annual dredging and disposal of an unlimited amount of inner harbor sediment consisting of at least 80% sand with disposal into the nearshore environment; 3) the annual dredging of a maximum of 3,000 cubic yards of inner harbor sediment consisting of between 50% and 79% sand with disposal into the nearshore environment, and; 4) the annual dredging of a maximum of 35,000 cubic yards of inner harbor sediment, which could consist of sediment averaging less than 50% sand, with disposal at an upland site or at a federally approved offshore disposal site.

The proposed amendment would further amend CDP 3-05-065 to allow a one-time demonstration

[2] Sea Engineering, Inc. *Fall 2005 Inner Santa Cruz Harbor Dredge Disposal Monitoring Program,* May 12, 2006.

[3] The amendments proposed under CDP 3-05-065-A1 were consolidated with a subsequent amendment requested by the Port District and were approved by the Commission under CDP 3-05-065-A2.

disposal project to allow for the dredging of up to 12,000 cubic yards of fine-grained sediment (averaging 30% sand, with the remainder consisting of silt and clays) from the area of the inner harbor located north of the Murray Street Bridge (see Exhibit B) with disposal of the sediment through the Port District's existing pipeline into the nearshore environment offshore of Harbor Beach and Twin Lakes State Beach. The proposed dredging and disposal would take place during weekdays between the hours of 4:00 p.m. and 11:00 p.m. in October 2009 only. The Port District would limit the disposal of fine-grained sediment (less than 80% sand content, with the remainder consisting of silts and clays) to a maximum of 550 cubic yards per day. The Port District proposes an extensive monitoring program to evaluate the impacts to the beach and local benthic environment due to fine-grain sediment disposal into the nearshore environment.

Please see Exhibit A for a location map and Exhibit B for a photograph of the Santa Cruz Harbor area. Please see Exhibit C for a copy of the proposed monitoring program.

4. Standard of Review

The proposed project is located within the Coastal Commission's retained coastal permitting jurisdiction. Thus, the standard of review for the proposed coastal development permit amendment is the Coastal Act. See Exhibit D for applicable Coastal Act policies.

5. Coastal Development Permit Determination

The project raises issues with respect to marine resources and offshore habitats, and also with respect to public recreational access along the shoreline and in the nearshore area, as follows:

Beach Replenishment: Coastal Act Section 30233(b) requires that dredge material suitable for beach replenishment be transported for such purposes to appropriate beaches. The sediments proposed for dredging average 30% sand, with the remainder consisting of silt and clay. Only material deemed clean and appropriate for unconfined aquatic disposal would be dredged and disposed of into the nearshore environment. In the past, the ACOE and the EPA have typically required that beach nourishment material be composed of at least 80% sand. The Port District contends that the 80% sand guideline is too restrictive. According to the Port District, the benefits of this project include 3,600 cubic yards of sandy material becoming available for beach replenishment, with transport of 8,400 cubic yards of silt and clay to the mid-shelf mud belt. Results of monitoring programs for the previous demonstration projects have indicated that the natural oceanographic conditions in the area remove finer sediments to the offshore mud belt and deposit sandy sediments on local beaches. The EPA indicates that Clean Water Act guidelines are flexible and can allow for discharge of finer material for beach nourishment purposes, provided that site-specific information is available to determine any beach nourishment benefits or significant adverse impacts. The project proposal includes a monitoring program that will determine the residence time of fine-grained material in the inner shelf (<30 m depth) and its movement off of the inner shelf to the mid-shelf (30-70 m depth) mud belt. Additional monitoring includes turbidity (suspended sediment) measurements and mapping, as well as quantitative and qualitative beach surveys to determine if the dredge disposal operations are resulting in significant deposition of fine-grained

material along the shoreline. Special Condition 4 requires submission of the results of the monitoring program to be submitted to the Executive Director. Thus, as conditioned, the proposed demonstration project is consistent with the dredging and beach replenishment priorities of Coastal Act Section 30233 because it ensures that dredge material suitable for beach replenishment will be placed into the nearshore environment where it will be available for transport to local beaches, and the information gathered will allow for better decision making on dredging as it relates specifically to the Santa Cruz Harbor, and generally as it relates to potential application of finer-grained materials elsewhere.

Water Quality: The proposed dredging and disposal project is expected to have short-term adverse impacts on water quality, including a temporary increase in turbidity and a decrease in dissolved oxygen levels. However, these impacts should be minor in magnitude and scope given that the amount of fine-grain sediment per disposal episode will be limited to no more than 550 cubic yards per day deposited into the nearshore environment in October when relatively more swell action and increased turbidity are expected (see Special Condition 1). Pre-dredge water conditions should recur shortly after each dredging and disposal episode. The project is conditioned to require ACOE, EPA, and Central Coast Regional Water Quality Control Board (RWQCB) review of the biological and chemical test results of the dredge material and approval by these agencies that the material is "clean" and thus suitable for unconfined aquatic disposal. As conditioned, the proposed project is consistent with Coastal Act Sections 30230 and 30231 regarding the maintenance of marine water quality.

Biological Resources
Sediment deposition can, in some cases, smother invertebrates and prevent algal spore settlement, and cause disturbance, transport, and, in some cases, destruction of benthic organisms. In this case, however, past monitoring data and oceanographic information regarding currents in the proposed disposal area indicate that fine-grained sediment will not settle out in the nearshore areas, and that the disturbance caused by the proposed project would be both limited and temporary. Also, the use of a hydraulic dredge will minimize disturbance and re-suspension of sediments at the dredge site.

That said, several endangered or threatened species historically have been found in the harbor area or just offshore (e.g., California brown pelican, steelhead trout, and tidewater goby). The underwater disposal of dredge material is not expected to affect the state and federally listed California brown pelican; it will occur outside the upstream/downstream migration seasons of the threatened steelhead trout; and the endangered tidewater goby has not been seen in many years and apparently no longer inhabits the watershed area adjacent to the Harbor. Thus, the proposed project is not expected to impact sensitive species. In addition, the project is conditioned to require Sanctuary and other agency approval before the proposed dredging and disposal may commence (see Special Condition 3). As conditioned, the project is consistent with Sections 30230 and 30231 of the Coastal Act regarding protection of species of special importance and maintenance of the biological productivity of coastal waters.

Public Recreational Access: The proposed project has both benefits and impacts to public recreational access. The proposed dredging project will strongly benefit public access and recreation by maintaining adequate water depths for berths in the inner Harbor. In addition, 3,600 cubic yards of the proposed dredge material is composed of sand, which will help replenish local beaches. However, placing such

material in the nearshore environment at a popular beach and offshore recreational area will be expected to degrade recreational use values during those times. The project has been designed to avoid high recreational use times as much as possible to limit such impacts. Specifically, dredging and disposal activities would take place between 4:00 p.m. and 10:00 p.m. on weekdays in October 2009 (only) to limit potential beach access impacts due to the project. Also, the project includes quantitative (beach grain size measurements) and qualitative (visual observations and photographs) beach monitoring during the dredging and disposal operations to help identify any impacts to recreational access due to the project. Thus, there is clearly some give and take with respect to access. On the whole, though, the project should result in recreational access enhancement, and information gleaned from the proposed monitoring should help guide upcoming long-term dredging decisions next year when the Port District's five-year CDP will be up for renewal. In short, as conditioned, the proposed project can be found consistent with the public access and recreational policies of the Coastal Act.

Other Issues: There have been some complaints in the past regarding the smell associated with past dredging and disposal episodes. It has been determined that the smell, a rotten egg smell, was the result of decaying seaweed in the dredge materials. Such seaweed materials have historically been found in the entrance channel sediments and not in the inner harbor sediments. The Port District has used the nearshore pipeline in an effort to minimize such smells and any related air quality issues. In terms of this proposed demonstration project, the inner harbor sediments in question are unlikely to include decaying seaweed, and thus it is unlikely that disposal of these sediments into the nearshore environment will raise the smell/air quality issues that have afflicted certain past entrance channel dredging and disposal episodes. In addition, the nearshore pipeline will be exclusively used for the demonstration project. As a result, smell/air quality issues are not expected with the demonstration project.

6. Conditions of Approval

A. Standard Conditions

1. **Notice of Receipt and Acknowledgment.** The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. **Interpretation.** Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.

3. **Assignment.** The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

4. **Terms and Conditions Run with the Land.** These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

B. Special Conditions

1. **Scope of Permit Amendment 3-05-065-A3.** This permit amendment authorizes the dredging and disposal of up to 12,000 cubic yards of inner harbor fine-grained sediment (30% average sand content) into the nearshore environment offshore Harbor Beach/Twin Lakes State Beach in October 2009 only. Disposal of the sediment into the nearshore environment shall be limited to between the hours of 4:00 p.m. and 11:00 p.m. on weekdays only, and shall not exceed a maximum of 550 cubic yards of fine-grained sediment per day.

2. **Testing Requirements.** All dredge materials shall be tested according to the requirements of the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and Central Coast Regional Water Quality Control Board using the most current testing methods and/or procedures of those agencies, and shall meet all U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and Central Coast Regional Water Quality Control Board disposal standards for unconfined aquatic disposal.

3. **Other Agency Approvals. PRIOR TO COMMENCEMENT OF DREDGING AND DISPOSAL OPERATIONS**, the Permittee shall submit to the Executive Director for review a copy of a valid permit, letter of permission, or evidence that no permit is necessary from the following agencies: U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Monterey Bay National Marine Sanctuary, Central Coast Regional Water Quality Control Board, and California Department of Parks and Recreation.

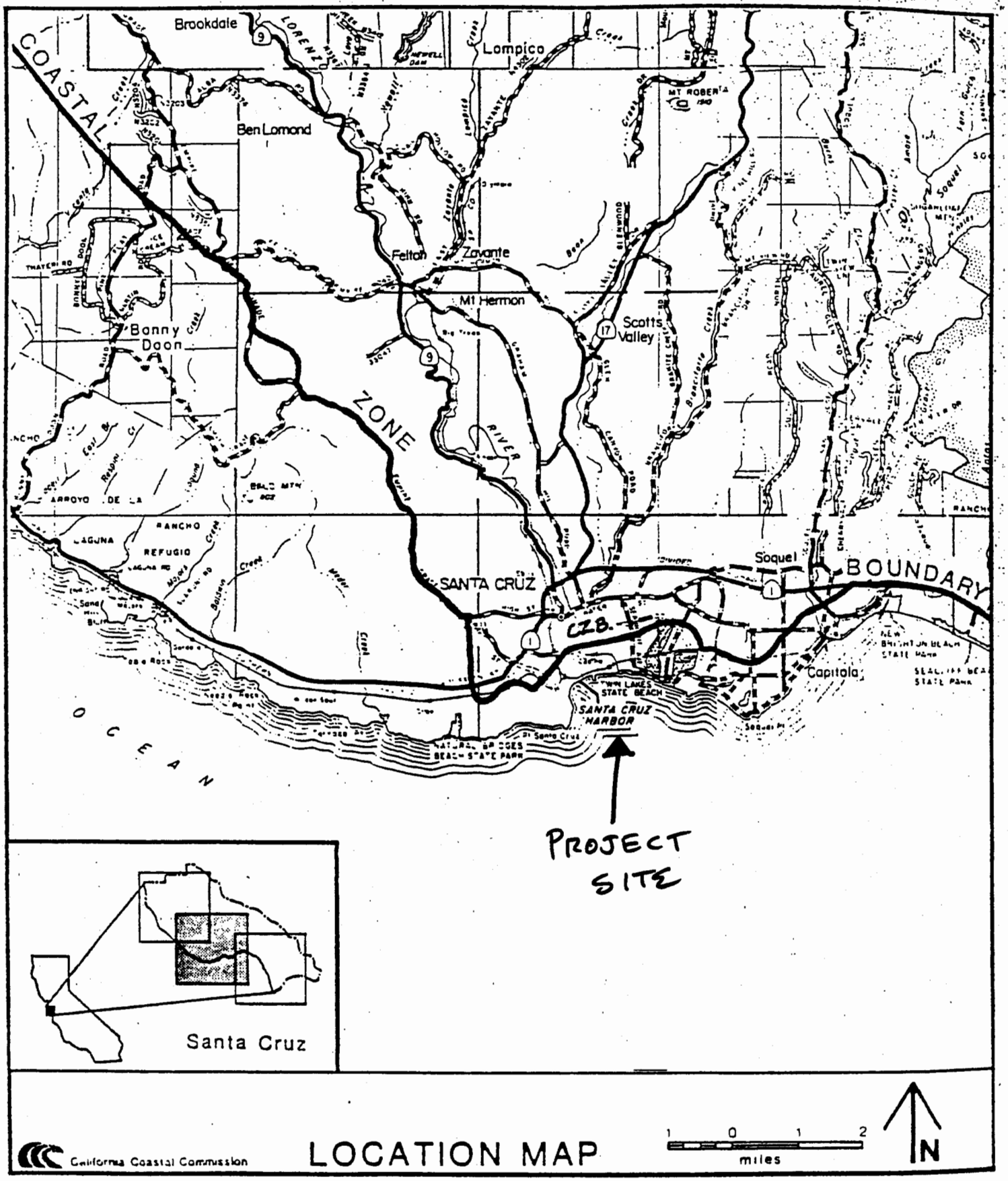
4. **Final Monitoring Report. WITHIN 30 DAYS AFTER RECEIVING THE FINAL MONITORING PROGRAM REPORT and no later than May 1, 2010**, the Permittee shall submit a copy of the final monitoring report to the Executive Director.

7. California Environmental Quality Act (CEQA)

Section 13096 of the California Code of Regulations requires that a specific finding be made in conjunction with coastal development permit applications showing the application to be consistent with any applicable requirements of CEQA. Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment. The Santa Cruz Port District, acting as the lead CEQA agency, found the project to be categorically exempt from CEQA requirements (per CEQA Guidelines Section 15304g).

The Coastal Commission's review and analysis of land use proposals has been certified by the Secretary of Resources as being the functional equivalent of environmental review under CEQA. The Commission has reviewed the relevant coastal resource issues with the proposed project, and has identified appropriate and necessary modifications to address adverse impacts to such coastal resources. All public comments received to date have been addressed in the findings above. All above findings are incorporated herein in their entirety by reference.

The Commission finds that only as modified and conditioned by this permit amendment will the proposed project avoid significant adverse effects on the environment within the meaning of CEQA. As such, there are no additional feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse environmental effects that approval of the proposed project, as modified, would have on the environment within the meaning of CEQA. If so modified, the proposed project will not result in any significant environmental effects for which feasible mitigation measures have not been employed consistent with CEQA Section 21080.5(d)(2)(A).



County of Santa Cruz

CCC Exhibit A Sheet 2 of 3
(page 1 **of** 1 **pages)**

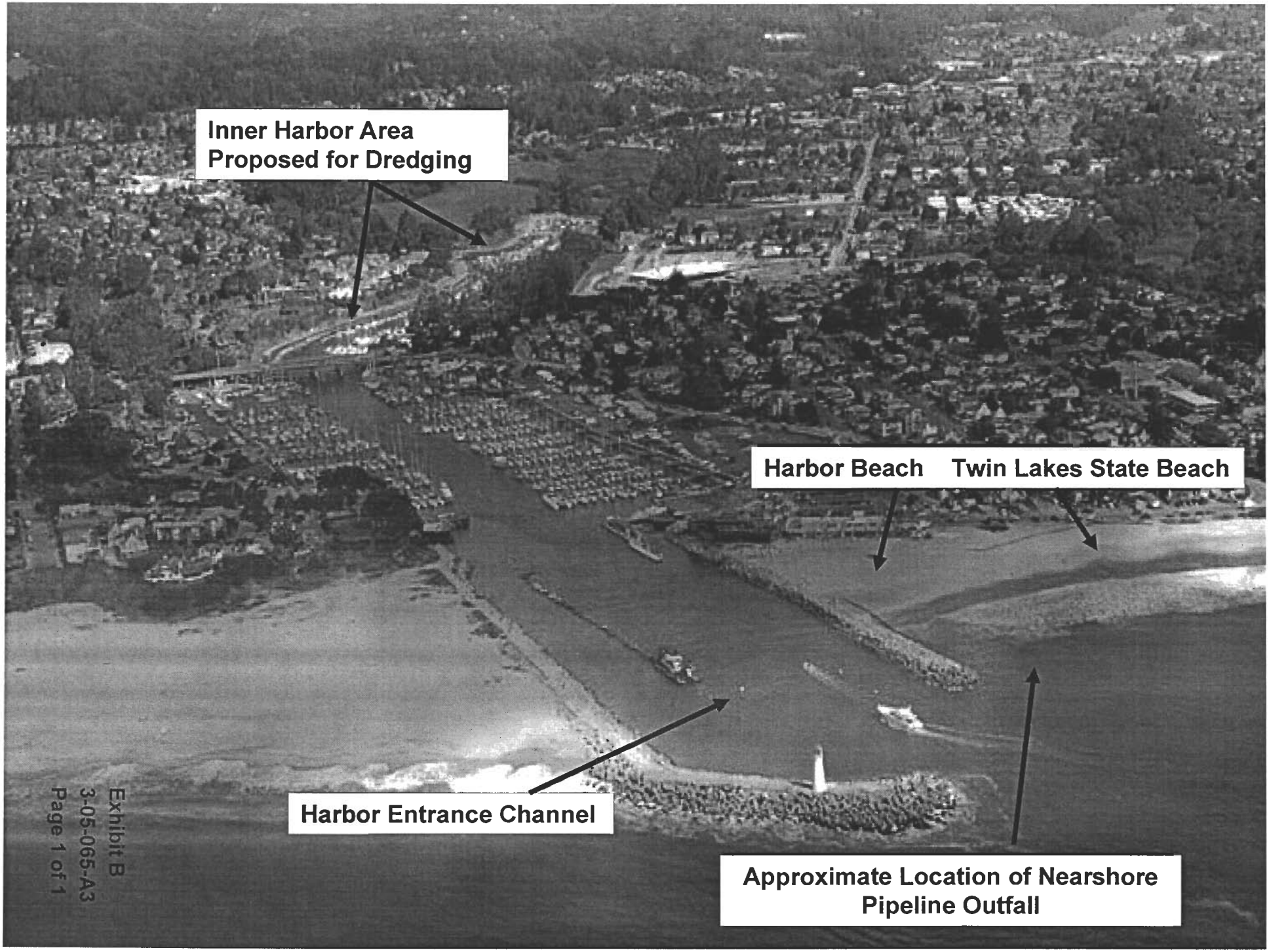


Exhibit B
3-05-065-A3
Page 1 of 1

U.S. Geological Survey Study of the Fate of Mixed Grained Sediment Dredged from the Santa Cruz Harbor

Scope of Work

September 10, 2009

Curt Storlazzi
U.S. Geological Survey 831-427-4721 phone
Pacific Science Center 831-427-4748 fax
Santa Cruz, CA 95060 cstorlazzi@usgs.gov

INTRODUCTION

The Santa Cruz Port District has requested a proposal from the U.S. Geological Survey (USGS) Western Coastal and Marine Geology Team (WCMG) to determine the fate of mixed grained (some sand, primarily silt and clay) sediment dredged from the upper half of Santa Cruz Harbor, Santa Cruz County, California. The rationale for this proposed work is a need to better understand the environmental consequences of dredging this type of material on the beach and continental shelf off Santa Cruz, California.

To meet these information needs, the USGS proposes a study to collect scientific data and model the fate of the dredged material using an integrated suite of oceanographic, geologic, and geochemical measurements built upon the 2008/2009 USGS Brown-2-Blue Project investigating the influence of river floods and winter storms on the character of the sea floor in northern Monterey Bay.

The goal of this project is not to repeat the results of the 2005 SEI dredge disposal demonstration study (SEI, 2005), which showed that no significant accumulation of dredged material occurred on the shoreline and inner (< 30 m depth) shelf during that demonstration project. The goal of the project proposed here is to determine the residence time of the fine-grained dredge disposal material in the inner shelf and its advection out of the inner shelf to the mid-shelf (30-70 m depth) mud belt identified by Edwards (2002). This effort will acquire some data that is complimentary to the 2005 SEI efforts, in that we will determine if the fine-grained material from the dredge disposal demonstration project resides for any time along the shoreline and on the inner shelf, potentially impacting beach and inner shelf habitat. However, the bulk of this effort will be to provide insight on the physical processes controlling the residence time of this material on, and its advection off, the inner shelf. By understanding these processes and patterns, we hope be able to provide more definitive guidelines on the grain sizes of material that can be dredged and disposed on the inner shelf under what sort of environmental conditions without resulting in significant accumulation of dredge material in areas of concern.

BACKGROUND

The area offshore the City of Santa Cruz in northern Monterey Bay is a complicated coastal setting of sea cliffs, small pocket beaches, and low-relief nearshore bedrock reefs (Storlazzi et al, 2008) that are impacted by a variable wave climate due to its south-facing orientation (Storlazzi et al., 2007). Spatially- and temporally variable wave conditions and the complex, shallow, rocky sea floor in this area have restricted comprehensive field surveys in the past. Recent innovations in field techniques and equipment now make it possible to perform a detailed analysis of the sedimentological nature and physical processes operating on this type of complex coastline. Understanding the sedimentology and physical processes off Santa Cruz is important not only because it is part of the Monterey Bay National Marine Sanctuary that oversees the rich coastal and marine ecosystems in the area, but also because these same environments are important areas for human vocational and recreational activities. It is increasingly important to provide scientific data that will allow the various government agencies involved with dredge disposal operations in the area make the best informed management decisions.

The 2005 SEI dredge disposal demonstration study (SEI, 2005) showed that, while there was elevated turbidity during the project, there was no significant accumulation of dredged material on the shoreline and inner shelf under the environmental conditions during that study. USGS repetitive bathymetric and acoustic mapping over the 2005/2006 winter (FIGURE 1) showed that in a

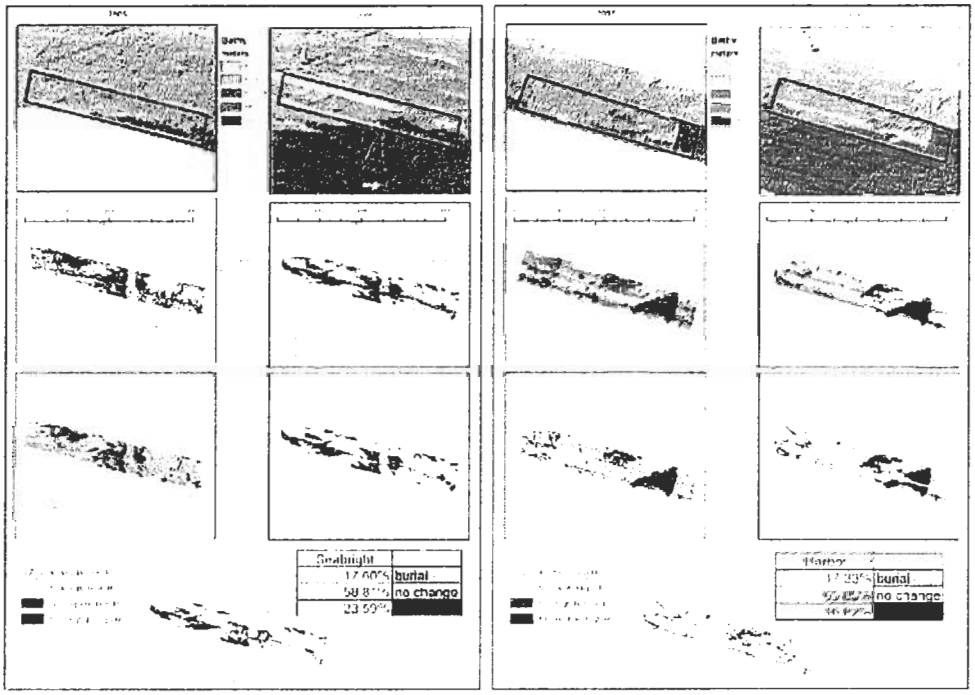


FIGURE 1. Burial and exhumation of bedrock reefs in northern Monterey Bay during the 2005/2006 winter.

CCC Exhibit C
(page 2 of 8 pages)

24,000 m^2 area encompassing the low-relief bedrock reefs off Seabright and Twin Lakes Beaches showed that approximately 20% and of these reefs were buried and/or exhumed due to fluvial discharge from the San Lorenzo River and beach erosion and accretion between September 2005 and April 2006.

Furthermore, 5 different seabed surveys at 42 stations in the study area during the 2008/2009 winter using the USGS Flying Eyeball system (Chezar and Rubin, 2004; Rubin et al., 2007) showed that surficial seabed sediment grain size in the area was predominantly a medium sand but varied, in space and time, by more than an order of magnitude (FIGURE 2). These data also showed that the

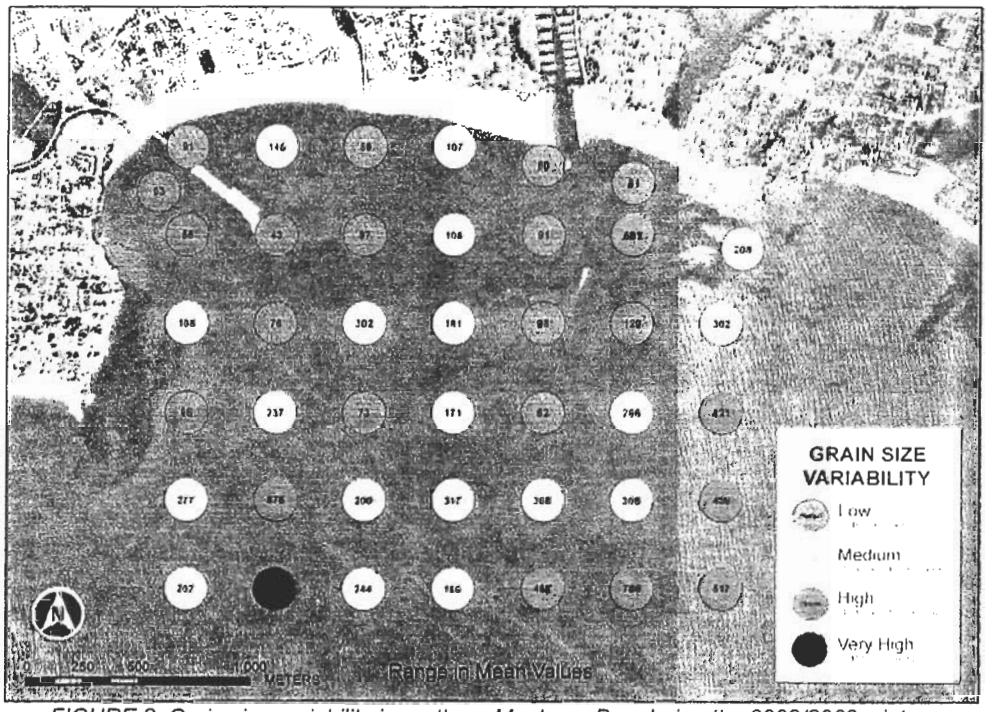


FIGURE 2. Grain size variability in northern Monterey Bay during the 2008/2009 winter.

shallow bedrock reefs off Seabright and Twin Lakes Beaches were buried 20-40% of the time between January and May 2009 (FIGURE 3).

METHODOLOGY

We propose a study to determine the residence time of the fine-grained dredge disposal material in the inner shelf and its advection out of the inner shelf to the mid-shelf mud belt. We will conduct an integrated study to characterize both the sedimentological nature of the coastline and inner shelf and the spatial and temporal variation in physical processes in the study site. These data will be collected un four different tasks by means of beach and inner shelf mapping, water column surveys, geochemical analyses of suspended sediment, oceanographic instrumentation, and numerical modeling. All of the data will be collected to NGDC standards and thus be the foundation for any future surveys conducted to investigate change in the sedimentology or physical processes at

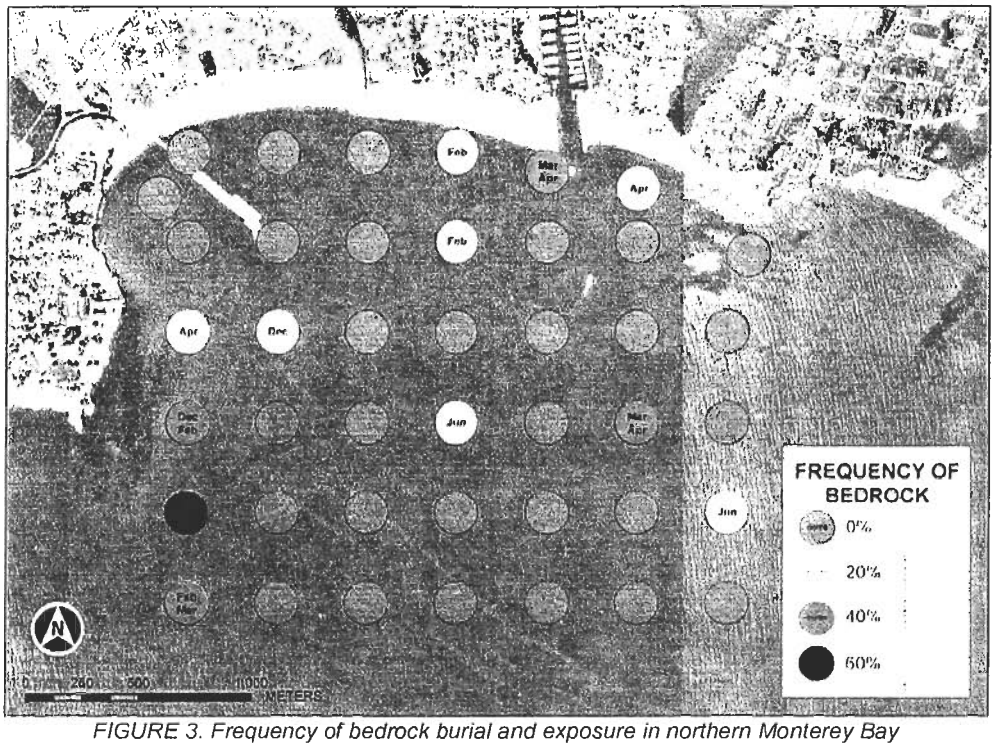


FIGURE 3. Frequency of bedrock burial and exposure in northern Monterey Bay during the 2008/2009 winter.

the study site. These surveys, scheduled to initiate September 2009 and run through November 2009, will determine the present impacts by the proposed dredge disposal demonstration project on the study area and provide insight into the types of material that could be dredged and disposed of at the site under what sets of environmental conditions in the future.

TASK-1: Time-Series Physical Process and Turbidity Measurements

The USGS will extend the deployment of the USGS Cabled Sea Floor Observatory off the end of the Santa Cruz Wharf past the summer of 2009 (FIGURE 4) to support the demonstration project. This system, the only sort of its kind in the world, provides continuous measurements of seabed grain size and the forcing physical mechanisms (tides, waves, currents, and/or internal waves [Storlazzi and Jaffe, 2002; Storlazzi et al., 2003]) and the resulting suspended sediment concentrations (turbidity) and grain sizes. This real-time, cabled observational platform system will be supplemented by three additional self-contained sea floor tripods to make similar physical (tide, wave, current, and suspended sediment concentration [turbidity]) measurements close to the discharge site off the harbor and further offshore near the 30 m/100 ft isobath where the mid-shelf mud belt begins. The time series data from these 4 stations will be used to:

(1) Determine if the ambient oceanographic conditions that typify the northern part of the bay are quiescent enough for fine-grained dredge sediment discharged during the project to fall out of suspension and accumulate in

significant amounts on the inner shelf, or if the conditions are energetic enough to keep the fine-grained sediment in suspension and be transported out to the mid-shelf mud belt.

(2) Provide continuous time series measurements of suspended sediment concentrations (turbidity) starting before and running through the course of the demonstration project.

(3) Provide the necessary boundary and calibration information for a numerical model of the demonstration project (see below).

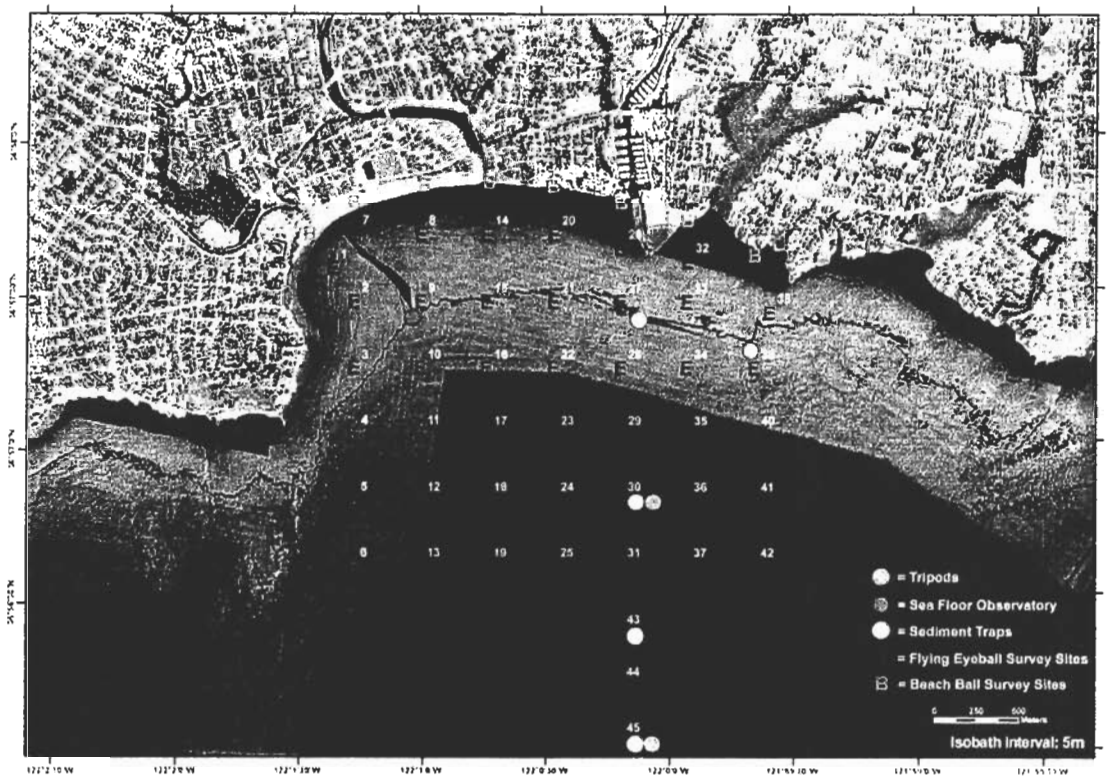


FIGURE 4. Proposed study sites in northern Monterey Bay for the 2009 dredge disposal demonstration project.

TASK-2: Grain Size and Turbidity Mapping

Sea Floor Grain Size Mapping:

The USGS will extend the monthly USGS Flying Eyeball (Chezar and Rubin, 2004; Rubin et al., 2007) surveys scheduled to terminate during the summer of 2009 through the end of the demonstration project. These surveys of surficial seabed sediment grain size, taken at 42 locations off Santa Cruz in water depths between 5 m/16 ft and 25 m/82 ft, were carried out during the 2008/2009 winter to investigate the impact of river floods and winter storms on the sediment distribution in northern Monterey Bay. These data are more accurate than grab samples that integrate with depth within the seabed and thus more accurately represent the active surface layer that would result from any dredge material settling on the seabed. The Flying Eyeball surveys will be focused on the dredge disposal area of operations, and the surveys will be conducted just before,

during, at the end, and 2 weeks after the demonstration project to determine if the dredge disposal operations are resulting in significant deposition of fine-grained material on the sea floor in the study area. The Flying Eyeball surveys over the 2008/2009 winter provided a first-of-it-kind view of the heterogeneous nature, both in space and time, of grain size variability on the inner shelf and will provide invaluable background information that will aid in the analysis of the data acquired during the demonstration project.

Beach Grain Size:
The Beach Ball uses similar technology to the Flying Eyeball but in a waterproof, hand-held package. Beach Ball surveys will be conducted at points in the swash zone and at the wet/dry line between Cowells Beach and Black Point to determine if fine-grained dredge material is being deposited onshore. These surveys will be conducted just before, during, at the end, and 2 weeks after the demonstration project in concert with the offshore Flying Eyeball surveys to determine if the dredge disposal operations are resulting in significant deposition of fine-grained material along the shoreline in the study area.

Together, the Beach Ball and Flying Eyeball data will provide quantitative data on surficial sediment grain size from the we/dry line on the subaerial beach, through the nearshore, and out to the mud belt on the mid continental shelf.

Beach Monitoring:
The quantitative data provided by the Beach Ball and Flying Eyeball systems will be supplemented by visual observations made by Santa Cruz Port District personnel on the beach adjacent to the disposal zone at all times during the dredging operations. Additional personnel will make observational sweeps and collect digital photography of the beaches peripheral to the disposal zone between the San Lorenzo River mouth (west) and 20th Avenue (east). These sweeps will be conducted to determine if fine sediment (mud) from the dredge disposal operations are impacting the beach and to advise dredge operators to cease if that occurs.

Nearshore Turbidity Mapping:
Vertical profiles of water temperature, salinity, and turbidity will be made using a SeaBird 19+ CTD with an additional D&A Instruments 880-um OBS-3 optical backscatter sensor, WetLabs 25-cm path length transmissometer, and Biospherical Instruments hemispherical PAR (photosynthetically-available radiation) sensor will be carried out in concert with the Beach Ball and Flying Eyeball surveys just before, during, at the end, and 2 weeks after the demonstration project at 14 of the Flying Eyeball sampling stations on the inner shelf. These profiles will be acquired to determine if the dredge disposal operations are resulting in significant changes in water column properties (turbidity, light availability for photosynthetic benthic organisms, etc) in the study area.

TASK-3: Suspended Sediment Sampling for Laboratory Analyses

The USGS will deploy four (4) sediment trap moorings across the inner shelf to collect material for geologic and geochemical analyses. These traps will provide suspended sediment samples to determine, via geochemical means, if the sediment originated from the demonstration project or was resuspended material deposited by the San Lorenzo River during the previous winter. These data, in conjunction with the data from the tripods and Flying Eyeball, should provide insight into the residence time, or lack thereof, of the dredge material on the inner shelf and the rate at which it is being advected out of the nearshore system.

TASK-4: Numerical Circulation and Sediment Transport Modeling

Lastly, the in situ data acquired via in situ sensors will be brought together with larger-scale CDIP and USGS wave models, COAMPS wind model products, CODAR sea-surface currents, and ROMS circulation models of the bay to provide boundary information and calibration data for a coupled wave-current-sediment transport numerical model for the project area. The Delft3D package will be used to develop a model of the demonstration project area in order to extrapolate the limited Eulerian point measurements spatially. The goal is to examine the effects of waves, winds, and tides on circulation and fine-grained sediment transport through the study area to provide insight into the ultimate fate of the dredge material.

PRODUCTS

All of the data will be collected to NGDC standards and thus be the foundation for any future surveys conducted to investigate change in geology or processes at the demonstration site.

A set of DVDs with the data and a preliminary report/data summary will be produced by April 2010.

A final project report will be completed in December 2010. This report will be an online USGS Open-File Report and will document all of the data collected under the project and provide guidance on future work.

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APPLICABLE COASTAL ACT SECTIONS

§ 30210: *In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.*

§ 30211: *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

§ 30212 (a): *Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects....*

§ 30213: *Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred.*

§ 30214 (a): *The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case....*

§ 30221: *Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.*

§ 30224: *Increased recreational boating use of coastal waters shall be encouraged, in accordance with this division, [..] providing harbors of refuge, and by providing for new boating facilities in natural harbors, new protected water areas, and in areas dredged from dry land.*

§ 30230: *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

§ 30231: *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

§ 30233: (a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following: (l) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities. (2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps. (3) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities. (4) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines. (5) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas. (6) Restoration purposes. () Nature study, aquaculture, or similar resource dependent activities.

§ 30233: (b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.

§ 30234: Facilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded. Existing commercial fishing and recreational boating harbor space shall not be reduced unless the demand for those facilities no longer exists or adequate substitute space has been provided. Proposed recreational boating facilities shall, where feasible, be designed and located in such a fashion as not to interfere with the needs of the commercial fishing industry.

§ 30234.5: The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.

§ 30240 (b): Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

§ 30255: Coastal-dependent developments shall have priority over other developments on or near the shoreline. Except as provided elsewhere in this division, coastal-dependent developments shall not be sited in a wetland. When appropriate, coastal-related developments should be accommodated within reasonable proximity to the coastal-dependent uses they support.