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W 21b

STAFF RECOMMENDATION

ON CONSISTENCY DETERMINATION

Consistency Determination No.	CD-058-09
Staff:	LS-SF
File Date:	9/8/2009
60th Day:	11/7/2009
75th Day:	11/22/2009
Commission Meeting:	10/7/2009

FEDERAL AGENCY: **U.S. Army Corps of Engineers**

PROJECT LOCATION: Mission Bay and Mission Beach, City of San Diego, San Diego County (**Exhibits 1-3**)

PROJECT DESCRIPTION: Maintenance dredging of Mission Bay entrance and navigation channels and disposal of 745,000 cubic yards of dredged material on Mission Beach.

SUBSTANTIVE FILE DOCUMENTS:

1. Final Supplemental Environmental Assessment for San Diego River Mission Bay Jetty and Revetment Repair and Maintenance Dredging Project, Corps of Engineers, September 2009.
2. Consistency Determination CD-032-83 (Corps of Engineers, Mission Bay maintenance dredging).

EXECUTIVE SUMMARY

The Coastal Commission received a consistency determination from the U.S. Army Corps of Engineers for maintenance dredging approximately 745,000 cubic yards (cu.yds.) of clean sediment from the federal entrance and navigation channels in Mission Bay. The purpose of the proposed project is to maintain authorized channel depths in federal channels to allow for safe navigation for recreational and commercial vessels in Mission Bay. The clean, sandy material will be disposed primarily on Mission Beach (489,000 cu.yds.) with a smaller volume of fine-grained sands (256,000 cu.yds.) disposed into the surf zone immediately offshore of Mission Beach. The approach channel will be dredged to its authorized depth of -25 feet mean lower low water (MLLW), the entrance and main channels to -20 feet MLLW, and Mariners Cove to -15 feet MLLW. Dredging and disposal will take place between January 1 and April 1, 2010, and will use a combination of hydraulic, hopper, and clamshell dredging equipment.

The proposed project is consistent with the allowable use, alternatives, and mitigation policies of the California Coastal Management Program (CCMP)(Coastal Act Section 30233). The project will remove shoaling in the federal navigation channels in Mission Bay and improve recreational boating safety at the harbor. While the proposed dredging could interfere with recreational boating during dredge operations, any impacts will be temporary and are insignificant when compared to the benefit from removing the existing shoaling hazards in Mission Bay. The project will generate minor adverse effects on public access and recreation, primarily resulting from temporary beach closures during disposal and sand moving operations on the beach during the winter season. However, the project will improve public access and recreational opportunities due to the placement of clean and grain-size compatible sand along this stretch of Mission Beach. The project is consistent with the public access and recreational boating policies of the CCMP (Coastal Act Sections 30210, 30211, 30213, 30220, 30224, and 30234).

The project involves the dredging of only clean sediments in the Mission Bay navigation channels and these sediments are chemically and physically suitable for beach replenishment. Turbidity effects will be localized and temporary due to the high sand content of the dredged sediments. Fish, plankton, and benthic organisms will recolonize the disturbed dredge and disposal areas soon after project completion. The project dredging footprint was modified to avoid eelgrass beds and a post-construction eelgrass survey will be conducted to determine if any eelgrass beds were inadvertently affected by dredging. The Corps will mitigate any adverse impacts to eelgrass beds in accordance with the Southern California Eelgrass Mitigation Policy. The project is consistent with the marine resource and water quality policies of the CCMP (Coastal Act Sections 30230 and 30231).

Dredging and disposal will occur outside the California least tern nesting season and will not affect foraging or nesting activity. While the project will occur predominantly outside the California grunion spawning season (late March to August), all beach disposal operations between March 1 and April 1 will be monitored for the presence of grunion. Should grunion be present in substantial numbers, disposal will be modified to prohibit any disposal within the intertidal zone. The project is consistent with the environmentally sensitive habitat and

endangered species protection policies of the CCMP (Coastal Act Section 30240). By using the dredged materials to replenish Mission Beach, these sediments will remain in the San Diego long shore littoral system and the project is consistent with the sand supply policy of the CCMP (Coastal Act Section 30233(b)).

STAFF SUMMARY AND RECOMMENDATION

I. PROJECT DESCRIPTION. The U.S. Army Corps of Engineers (Corps) submitted a consistency determination for maintenance dredging approximately 745,000 cubic yards (cu.yds.) of clean sediment from the federal entrance and navigation channels in Mission Bay (**Exhibits 1 and 2**). The purpose of the proposed project is to maintain authorized channel depths in federal channels to allow for safe navigation for recreational and commercial vessels in Mission Bay. The clean, sandy material will be disposed primarily on Mission Beach (489,000 cu.yds) with a smaller volume of fine-grained sands (256,000 cu.yds.) disposed into the surf zone immediately offshore of Mission Beach (**Exhibit 3**). The approach channel will be dredged to its authorized depth of -25 feet mean lower low water (MLLW), the entrance and main channels to -20 feet MLLW, and Mariners Cove to -15 feet MLLW. Dredging and disposal will take place between January 1 and April 1, 2010, and will use a combination of hydraulic, hopper, and clamshell dredging equipment. Dredging is scheduled to occur 24 hours/day, seven days/week, while beach disposal will be limited to the hours of 7 AM to 7 PM seven days/week. The Commission last reviewed maintenance dredging in Mission Bay in August 1983 when it concurred with a consistency determination from the Corps (CD-032-83) for removal of 540,000 cu.yds. of sediment from Mission Bay and disposal at Mission Beach and Ocean Beach.

II. FEDERAL AGENCY'S CONSISTENCY DETERMINATION. The U.S. Army Corps of Engineers has determined the project consistent to the maximum extent practicable with the California Coastal Management Program (CCMP).

III. STAFF RECOMMENDATION.

The staff recommends that the Commission adopt the following motion:

Motion: I move that the Commission **concur** with consistency determination CD-058-09 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).

Staff Recommendation:

The staff recommends a **YES** vote on the motion. Passage of this motion will result in an agreement with the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

Resolution to Concur with Consistency Determination:

The Commission hereby **concurs** with the consistency determination by the U.S. Army Corps of Engineers, on the grounds that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

IV. FINDINGS AND DECLARATIONS:

The Commission finds and declares as follows:

A. Dredging and Filling. Section 30233 of the Coastal Act provides that:

(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:

. . .

(2) Maintaining existing, or restoring previously dredged, depths in existing navigation channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.

. . .

(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.

The proposed maintenance dredging and disposal project needs to be examined for consistency with Section 30233 of the Coastal Act. Under this section, dredging and filling of open coastal waters, including disposal of dredged materials, is limited to those cases where the proposed project is an allowable use, is the least damaging feasible alternative, and where mitigation measures are provided to minimize environmental impacts. The dredging and disposal of dredged materials from the maintenance of navigation channels is an allowable use under Section 30233(a)(2). The proposed disposal locations are on Mission Beach and in the adjacent surf zone, and are the least damaging feasible alternatives for disposal of the clean, sandy dredged materials. As discussed in the following sections of this report, mitigation measures are incorporated into the project where necessary to protect coastal resources. Therefore, the Commission finds that the proposed maintenance dredging project is consistent with the allowable use, alternatives, and mitigation tests contained in the dredge and fill policy of the California Coastal Management Program (CCMP) (Coastal Act Section 30233).

B. Public Access and Recreation. The Coastal Act provides the following:

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.*

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

30220. *Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.*

30224. *Increased recreational boating use of coastal waters shall be encouraged, in accordance with this division. . . .*

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.*

The consistency determination states that the Mission Bay project area supports a mix of recreational and commercial boating and fishing activities and that Mission Beach provides numerous public recreational opportunities. The purpose of the proposed project is to restore the authorized channel depths in the shoaled federal entrance and navigation channels to allow for continued, safe navigation for recreational and commercial boats in Mission Bay. The proposed maintenance dredging could interfere with recreational boating in Mission Bay but any impacts would be temporary and limited to the immediate area of dredging, and are insignificant when compared to the benefit from removing existing shoaling hazards. In addition, scheduling the work between January and April avoids the peak boating season and further minimizes project impacts on boating. The Corps also states that short-term beach closures during sand disposal operations at Mission Beach are considered insignificant impacts. Disposal will occur during the winter when beach use is at its lowest level, beach areas immediately adjacent to the disposal sites will remain open to the public, and beach nourishment will result in wider beaches and improved recreational opportunities.

Prior to the start of dredging and disposal operations, the Corps will inform boaters and beach users through a variety of outreach efforts of the navigation restrictions and temporary beach closures associated with the proposed project. Project notices will be published in local Notice to Mariners warning boat users about times, durations, and locations of construction activities. Project announcements will also inform the public that while the dredged material placed on Mission Beach may initially be darker in color, once the sand dries out it will lighten to match existing beach sands, and that while there may be some odor from the freshly dredged materials, this would be a temporary condition. In addition, after consultation with Commission staff and other members of the Southern California Dredged Material Management Team, the Corps agreed to modify the project by disposing sediments with elevated levels of fine-grained materials dredged from Mariners Basin and Main Channel West into the adjacent surf zone and not directly onto Mission Beach. This project modification will allow wave action to separate and transport seaward the fine-grained sediments from the coarse-grained sands that will nourish Mission Beach. Therefore, the Commission finds that the proposed maintenance dredging and beach nourishment project is consistent with the public access and recreational boating policies of the CCMP (Coastal Act Sections 30210, 30211, 30213, 30220, 30224, and 30234).

C. Marine Resources and Water Quality. The Coastal Act provides the following:

> 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.*

The consistency determination addresses the potential water quality impacts from dredging and disposal operations:

> *Dredging/placement activities will impact water quality by causing temporary, localized increases in turbidity, although required measures will considerably reduce this impact. Dredge materials are expected to be primarily sandy sediments; therefore, the sediment plume will be relatively localized to the area in the immediate vicinity of the dredge. The duration of the plume is expected to be short; suspended solid concentrations will likely return to background levels within one hour after dredging stops. Monitoring during dredging would ensure that turbidity levels are insignificant. Should the monitoring report*

elevated turbidity, dredging practices will be altered to reduce turbidity to an insignificant level.

The placing of dredged materials on Mission Beach will also result in localized turbidity impacts. Measures taken to protect endangered species (limiting beach disposal to identified windows or, if necessary to dredge outside the windows, to require a diked, single point disposal site) will control turbidity impacts to levels not anticipated to be significantly greater than ambient suspended concentrations cause by natural surf zone levels.

The consistency determination next examined grain size and sediment chemistry compatibility of the dredged sediments (**Exhibit 4**):

Grain Size Compatibility. The [Corps'] guidelines for sediment compatibility for beach nourishment are: (1) mean gradation curves of the dredge material must not be strikingly dissimilar to the mean gradation curves of the receiving beach. Furthermore, the composite curves of the dredge material should, for the most part, fall within the beach compatibility envelope as defined by the fine and coarse limits; and (2) the percentage of fine grain material (<0.074 mm) must be no more than 10% greater than the percentage of the finest grain size sample from Mission Beach. Sediment samples met both criteria and were determined to be suitable for beach nourishment; sampling results are included in Appendix F. There was some concern regarding the Mariners Basin and Main Channel West areas regarding suitability for beach disposal. Dredged sediment from those two areas will be disposed of, via extended pipeline, into the surf zone and will not be placed directly onto the beach.

Sediment Chemistry Compatibility. Sediments were assessed in accordance with the Inland Testing Manual (USEPA & USACE, 1998). Sediments were determined to be clean and suitable for use as beach nourishment for Mission Beach.

The sediment grain size and chemistry test results were evaluated by the members of the Southern California Dredged Material Management Team (SCDMMT). After the project was modified to dispose dredged materials from Mariners Basin and Main Channel West into the surf zone rather than directly onto Mission Beach with the other dredged sediments, the SCDMMT, including Commission, Regional Water Quality Control Board, and U.S. EPA staff representatives, concurred with the Corps' determination that the subject dredged materials are suitable for beach replenishment and surf zone placement.

The consistency determination analyzed potential project impacts on marine resources:

A survey was conducted to establish the location of eelgrass relative to the proposed dredging. The dredge template will be adjusted as much as possible to avoid impacts to eelgrass. The dredge footprint has been reduced to avoid eelgrass beds located during a survey in August 2009. Results of the survey are shown in Figure 4. Dredging in Mariners Basin will be restricted primarily to the two strips of non-vegetated shallows along the east and west margins. Main Channel East and West will be narrowed to avoid eelgrass beds

along the margins, and the section in the Main Channel area will be avoided. However, this is a navigation project, so some impacts may be unavoidable. A post-construction eelgrass survey will be conducted to determine if any existing eelgrass were impacted by the dredging portion of the project. If necessary, mitigation will be coordinated with the U.S. National Marine Fisheries Service (NMFS) and carried out in accordance with NMFS's Southern California Eelgrass Mitigation Policy.

In conclusion, the proposed dredged materials are physically and chemically suitable for beach and surf zone disposal. Turbidity effects will be localized and temporary due to the high sand content of the dredged sediments, and no loss of rocky intertidal or subtidal fish habitat will occur. While dredging and disposal may result in minor, short-term impacts to existing marine habitat, fish, plankton, and benthic organisms in Mission Bay and along Mission Beach, any affected species will recolonize the area after completion of project operations. The Commission has previously found when concurring with clean dredged material disposal operations that these types of impacts are not significant and do not require additional mitigation measures. The project dredging footprint was modified to avoid eelgrass beds and a post-construction eelgrass survey will be conducted to determine if any eelgrass beds were inadvertently affected by dredging. The Corps will mitigate any adverse impacts to eelgrass beds in accordance with the Southern California Eelgrass Mitigation Policy. Therefore, the Commission finds that the proposed project is consistent with the marine resources and water quality protection policies of the CCMP (Coastal Act Sections 30230 and 30231).

D. <u>Environmentally Sensitive Habitat/Endangered Species</u>. Section 30240 of the Coastal Act provides that:

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.
(b) Development in areas adjacent to environmentally sensitive habitat areas and park 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.

The proposed project may affect two federally listed species, the California brown pelican and California least tern:

The federally listed California brown pelican is a year-round resident of the southern California coastline. The brown pelican feeds primarily on surface-feeding fish in the nearshore waters. The species is very tolerant of human activity and utilizes various shoreline structures such as piers, breakwaters, groins, and buoys for roosting. The brown pelican is relatively common in nearshore waters. Activities of the brown pelican are restricted to feeding, overflying, and temporary resting.

> *The California least tern is present in small numbers from April to September. The California least tern forage near the disposal site, primarily on surface fishes such as topsmelt and anchovies. A nesting colony is located within Mission Bay.*

The Corps determined that the proposed project "would not adversely affect or jeopardize the continued existence of the California brown pelican" due to the small area that would be unavailable for foraging during the short-term dredging and disposal period. Regarding potential project impacts on the California least tern, the Corps states that:

> *. . . the proposed project will not adversely affect the California least tern. This determination is based on an April 1, 2010, date for completion of all construction activities. Formal consultation pursuant to Section 7 of the Endangered Species Act is not required for project implementation.*
>
> *However, if dredging takes place during the California least tern nesting season (April 1 to September 15) formal coordination with the U.S. Fish and Wildlife Service will be completed prior to any dredging during the nesting season. This coordination will include appropriate measures to ensure that dredging and disposal do not adversely impact the California least tern. These measures will include control of turbidity by the dredge and the use of a single, diked disposal point for on shore beach disposal operations.*

The placement of dredged material on Mission Beach and in the adjacent surf zone would only have minor and temporary impacts to terrestrial biological resources. Little or no vegetation is found on the Mission Beach replenishment site due to wave action and erosion. However, the California grunion does spawn at this location and the consistency determination examines potential project impacts on grunion at this location:

> *Dredging and beach replenishment are scheduled to be performed predominantly outside of the California grunion (late March to August) and entirely outside the California least tern (April 1 to September 15) spawning or nesting seasons. Beach disposal operations that occur between March 1 to April 1 will be subject to monitoring. Beach disposal operations will continue without change should monitoring show no grunion spawning on the disposal beach or that spawning is minimal with fewer than two hundred spawning fish on the disposal beach. Should substantial spawning be detected, beach disposal operations will be modified to preclude placement into or any activities within the intertidal zone. All materials will either be placed above the high tide line or into the nearshore. Therefore, impacts at the dredge disposal sites are expected to have no adverse effects on the California grunion . . . Restoration of the eroded beach will have a beneficial effect on the California grunion by enhancing the beach on which they spawn.*

The Corps has additionally clarified that the monitoring of beach disposal operations after March 1, 2010, intended to determine the extent of grunion spawning activity on Mission Beach disposal sites, will be undertaken by a qualified biological monitor approved by the National Marine Fisheries Service. As currently proposed, the project will not adversely affect the California least tern or California grunion. However, should the Corps determine that dredging

and disposal operations need to extend beyond April 1, 2010, the Corps has agreed to notify the Commission staff of this extension no later than March 15, 2010. At that time, the Commission staff, after consultation with Corps staff and state and federal resource agency representatives, will determine (and notify the Corps in a timely manner) the need for and scope of additional federal consistency review for any proposed project operations extending past April 1, 2010.

In conclusion, the proposed dredging and disposal of clean, sandy dredge materials from the Mission Bay entrance and navigation channels and on Mission Beach and the adjacent surf zone will not significantly affect environmentally sensitive habitat or the California brown pelican, California least tern, or California grunion that are found in this area. Therefore, the Commission finds that the proposed project is consistent with the environmentally sensitive habitat and endangered species protection policies of the CCMP (Coastal Act Section 30240).

E. <u>Sand Supply</u>. Section 30233(b) of the Coastal Act provides that:

> *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.*

The Corps proposes to dispose approximately 770,000 cu.yds. of clean sandy dredged material from Mission Bay on Mission Beach and in the adjacent surf zone. The proposed dredged materials are physically compatible for beach nourishment at this location, and as discussed previously do not contain levels of contaminants that preclude their placement on the beach or in the surf zone. By placing the materials at these locations, they will remain in the San Diego long shore littoral system. Therefore, the Commission finds that the proposed maintenance dredging project is consistent with the sand supply policies of the CCMP (Coastal Act Section 30233(b)).

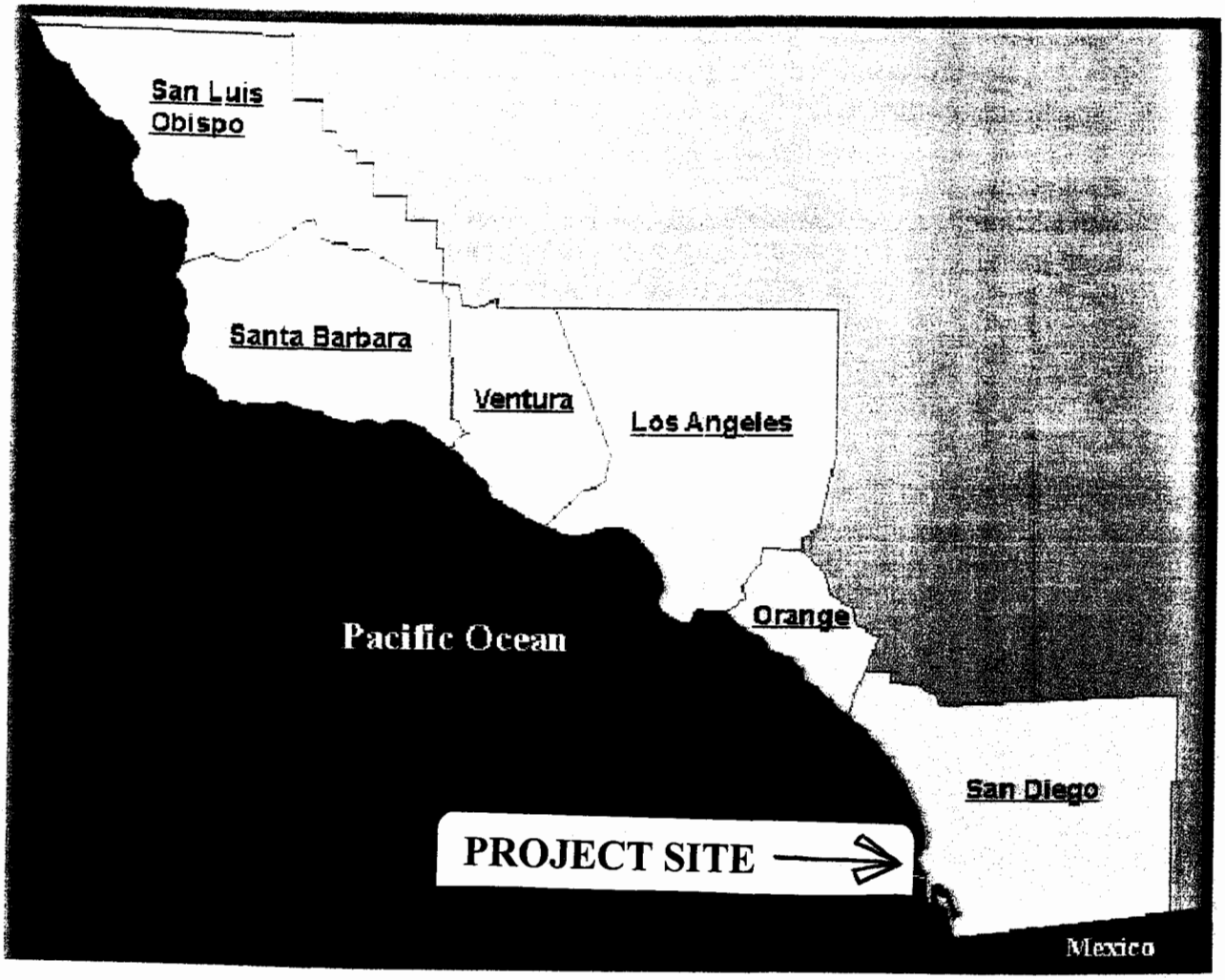

Figure 1 Project Location

EXHIBIT NO. 1
APPLICATION NO.
CD-058-09

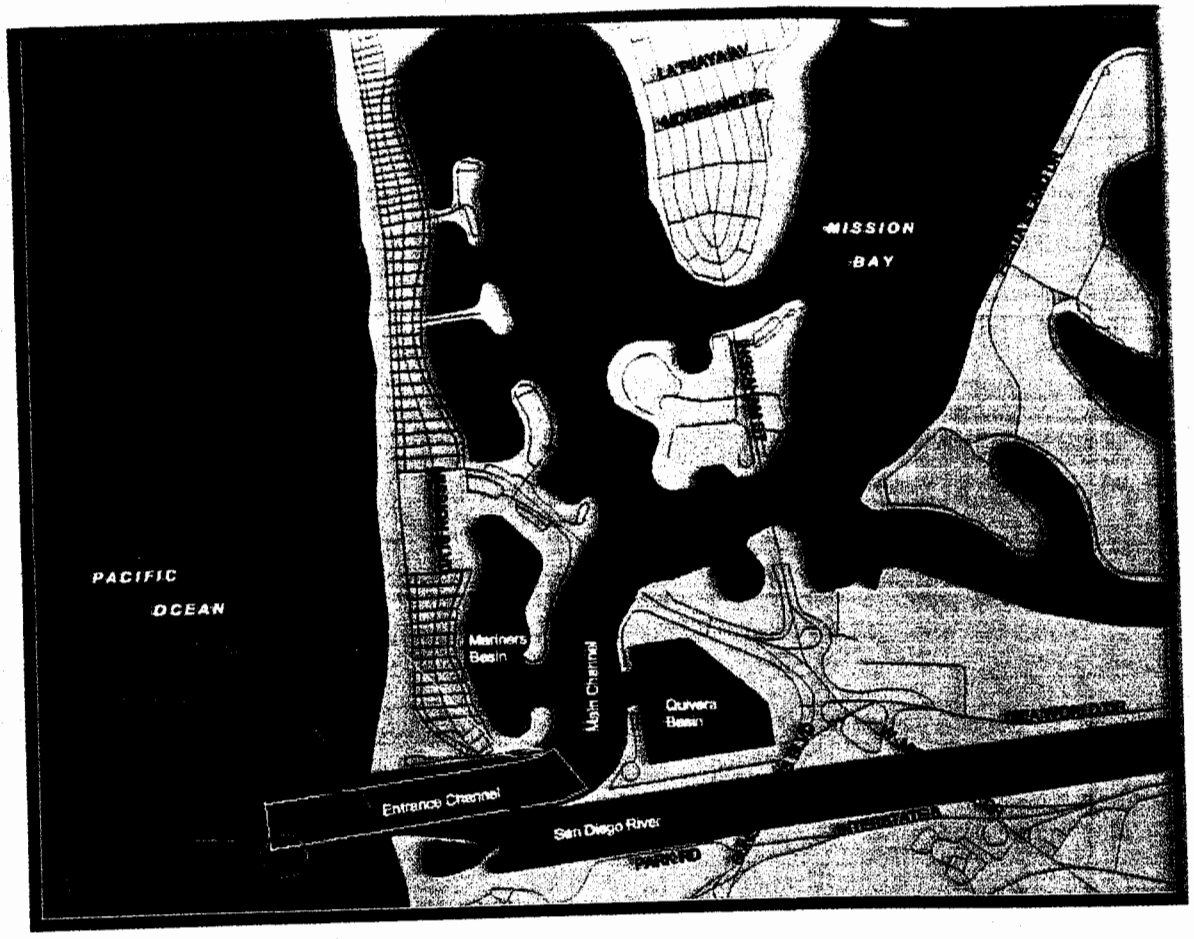

Figure 2 Project Area

Dredging will take place in the Entrance Channel,

Main Channel, and Mariners Basin

EXHIBIT NO. 2
APPLICATION NO.
CD-058-09

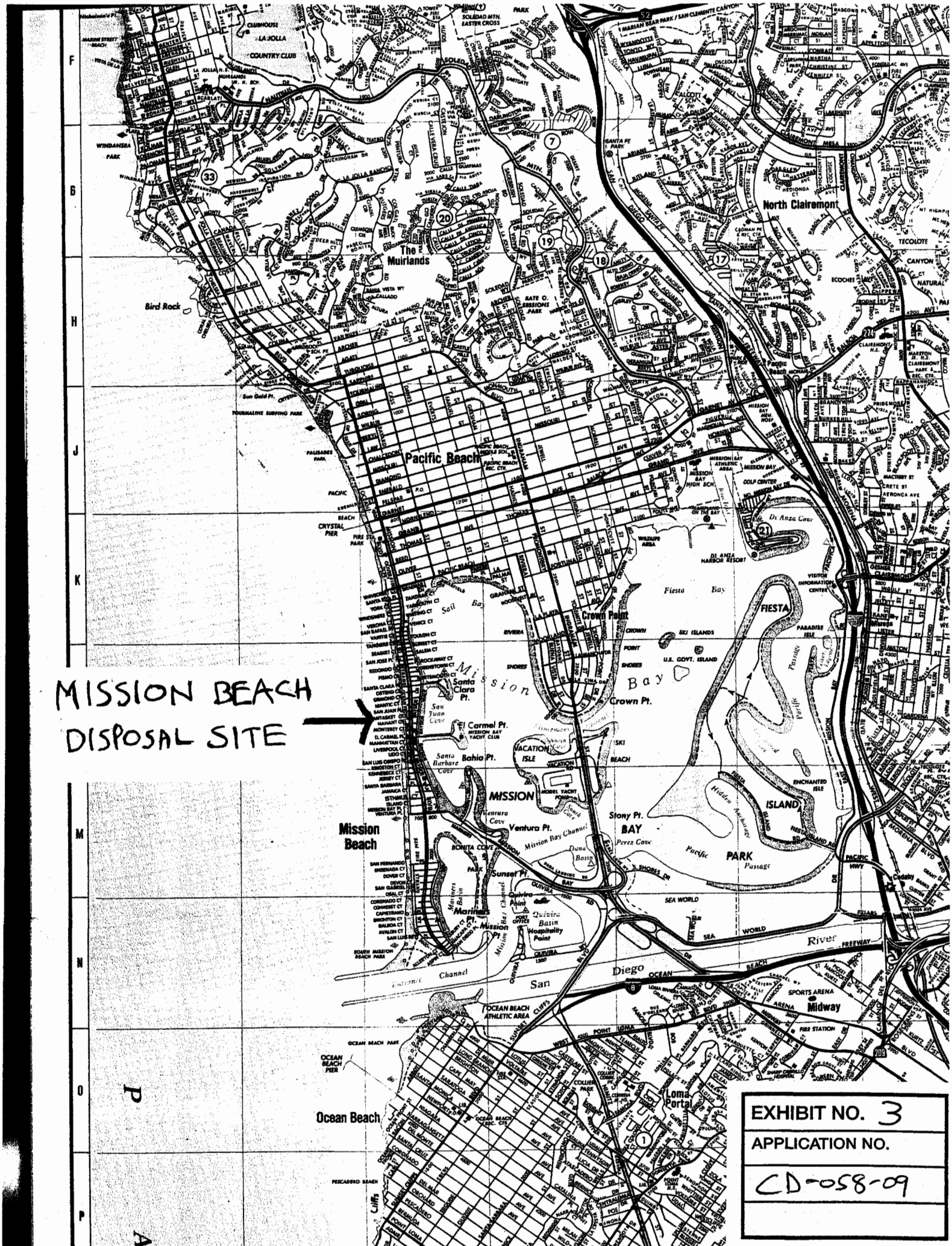

EXHIBIT NO. 3

APPLICATION NO.

CD-058-09

APPENDIX F

SEDIMENT SAMPLING RESULTS

EXHIBIT NO. 4

APPLICATION NO.

CD-058-09

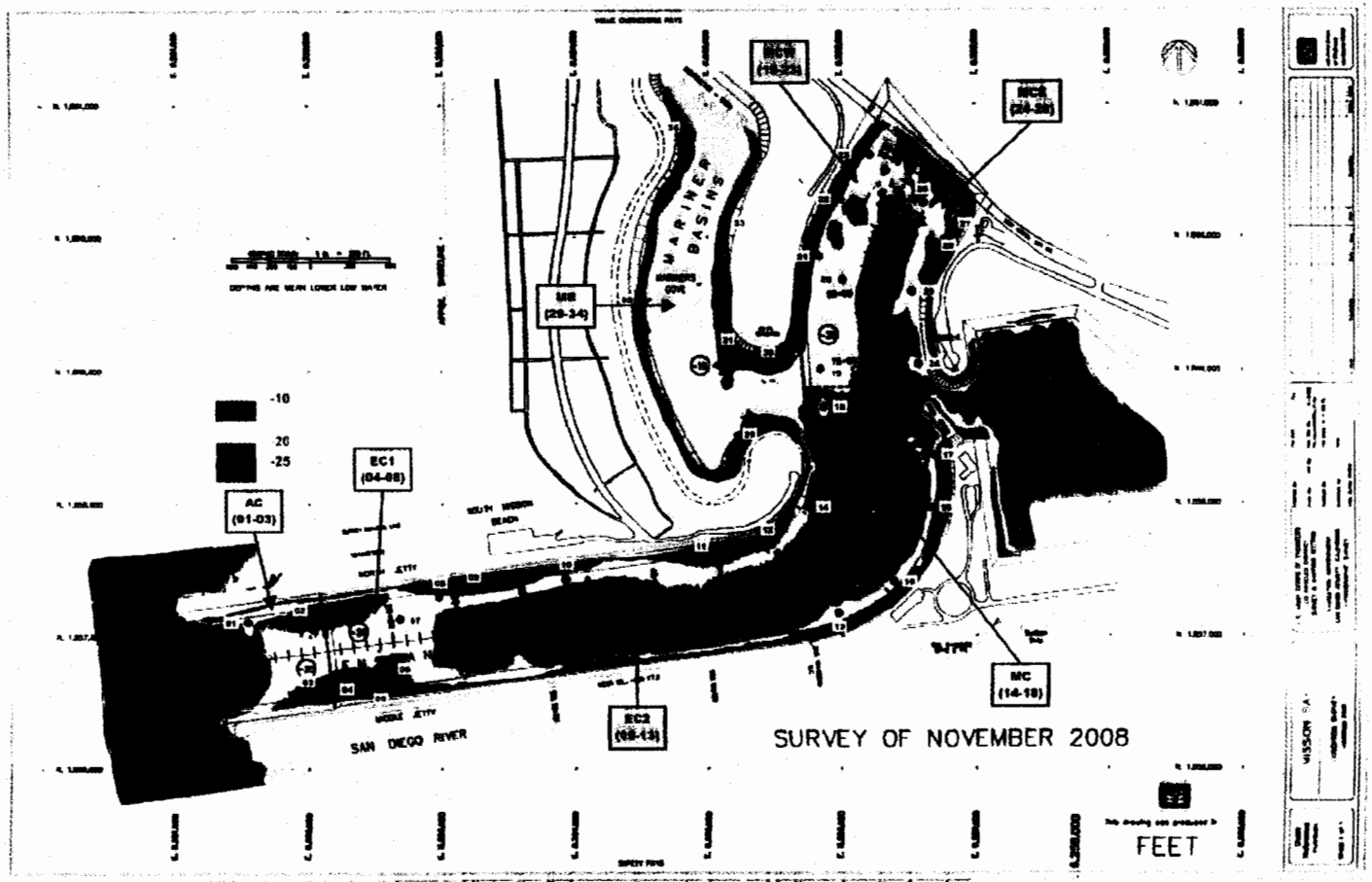

Figure 2. Mission Bay Bathymetry, Composite Areas and Sediment Sampling Locations.

1

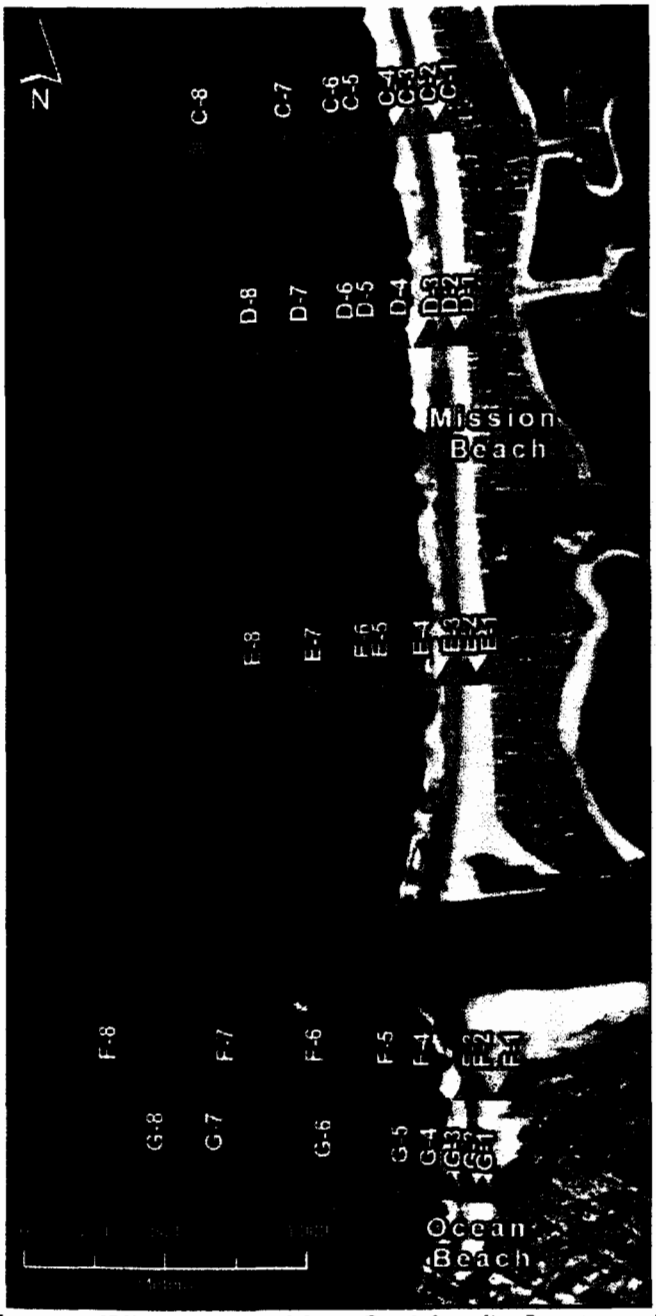

Figure 3. Location of Mission Beach and Ocean Beach Sampling Locations and Transects

Table 11. Weighted Average Dredge Area Gradations and Finest and Coarsest Receiving Beach Gradations.

Mission Bay Harbor Composite Area	Percent Passing													
	Gravel	Sand											Silt/Clay	
		Coarse		Medium				Fine						
	4	7	10	14	18	25	35	45	60	80	120	170	200	230
	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm
1 (AC)	100	100	100	99	99	98	96	92	77	49	12	3	2	2
2 (EC1)	100	100	100	100	99	99	97	93	70	30	6	2	1	1
3 (EC2)	100	100	100	100	99	99	99	96	80	55	26	9	4	3
4 (MC)	100	99	99	99	99	97	93	84	61	37	17	7	4	3
5 (MCW)	100	100	100	100	99	98	96	90	78	67	38	24	15	12
6 (MCE)	100	100	100	100	99	98	92	76	52	28	11	5	3	3
7 (MB)	99	99	99	99	99	98	95	85	63	40	21	14	11	10
Mission Beach	**Percent Passing**													
	Gravel	**Sand**											**Silt/Clay**	
		Coarse		**Medium**				**Fine**						
	4	**7**	**10**	**14**	**18**	**25**	**35**	**45**	**60**	**80**	**120**	**170**	**200**	**230**
	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm
Mission Beach - Fine Limit	100	100	100	100	100	100	100	100	98	95	80	45	18	7
Mission Beach - Average	99.8	99.7	99.6	99.4	99.1	98.1	95.5	90.7	79.9	58.7	30.6	13.4	6.25	3.64
Mission Beach - Coarse Limit	98	98	97	97	93	78	46	23	10	5	2	1	0	0
Ocean Beach	**Percent Passing**													
	Gravel	**Sand**											**Silt/Clay**	
		Coarse		**Medium**				**Fine**						
	4	**7**	**10**	**14**	**18**	**25**	**35**	**45**	**60**	**80**	**120**	**170**	**200**	**230**
	4.750mm	2.800mm	2.000mm	1.400mm	1.000mm	0.710mm	0.500mm	0.355mm	0.250mm	0.180mm	0.125mm	0.090mm	0.075mm	0.063mm
Ocean Beach - Fine Limit	100	100	100	100	100	100	100	100	100	97	77	31	11	6
Ocean Beach - Average	100	99.9	99.8	99.8	99.7	99.4	98.1	93.3	79.8	62.5	36.4	12.6	4.48	2.78
Ocean Beach - Coarse Limit	100	100	99	99	99	98	94	81	37	11	2	0	0	0

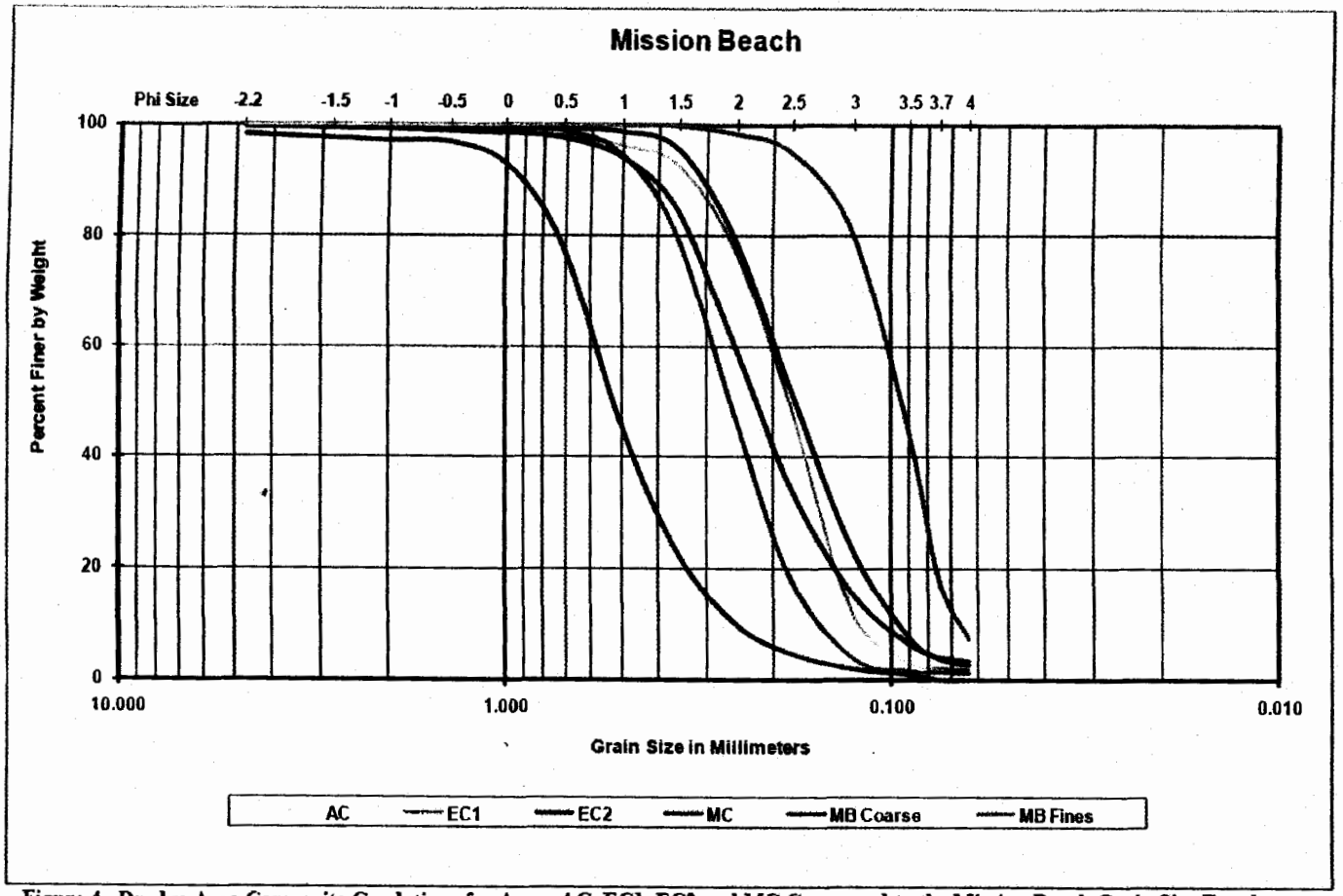

Figure 4. Dredge Area Composite Gradations for Areas AC, EC1, EC2 and MC Compared to the Mission Beach Grain Size Envelope.

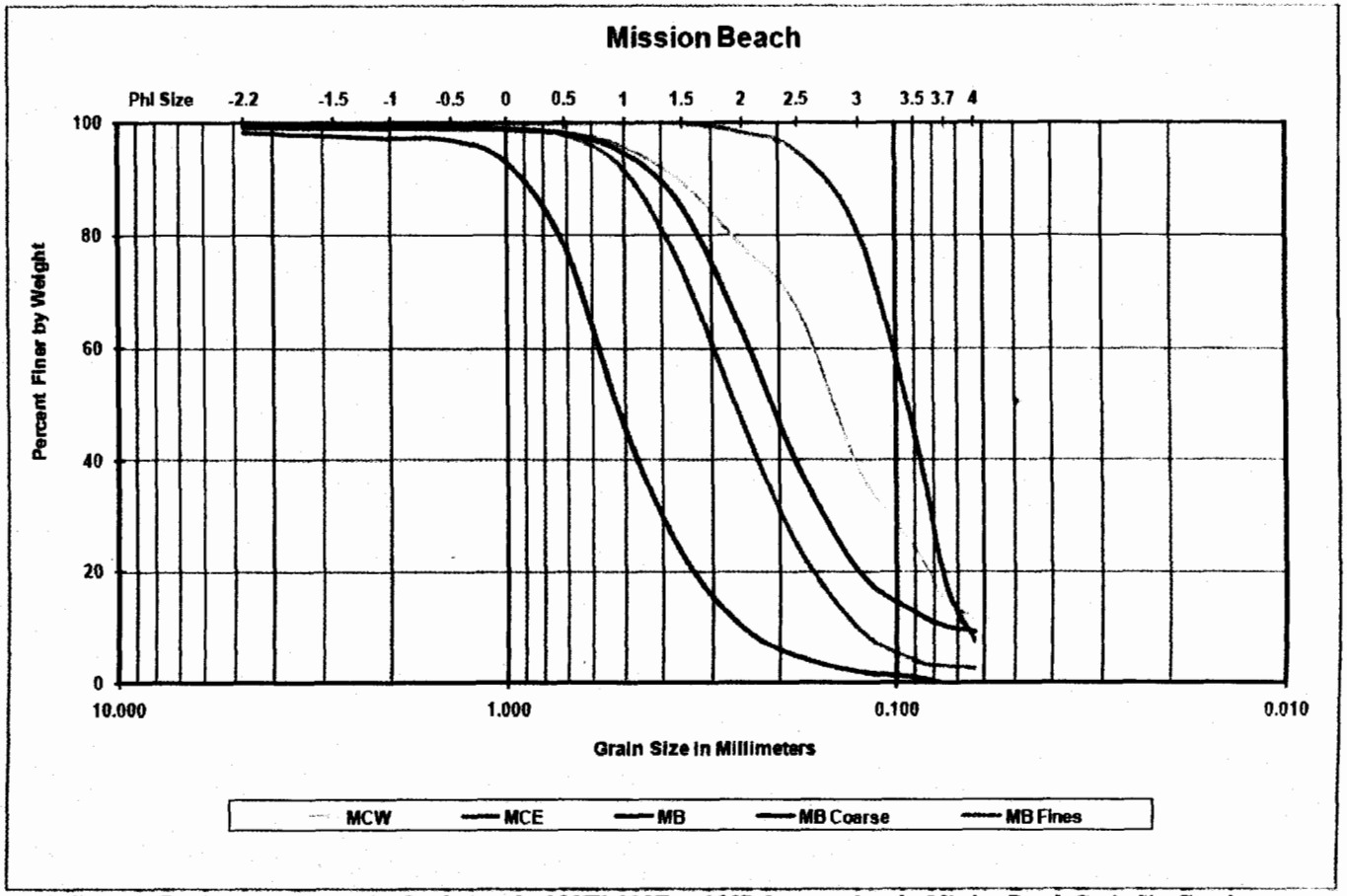

Figure 5. Dredge Area Composite Gradations for MCW, MCE and MB Compared to the Mission Beach Grain Size Envelope

Table 14. Sediment Chemistry Summary for Mission Bay Harbor Composite Samples.

Chemical Analyte	Units	Mission Bay Harbor Composite Samples						NOAA Screening[1]		Title 22[2]	
		Approach Channel	Entrance Channel	Main Channel	Main Channel-East	Main Channel-West	Mariners Basin	Salt ERL	Salt ERM	TTLC Wet-Weight	STLC
SEDIMENT CONVENTIONALS											
Percent Solids	%	82.8	86.5	71.8	75.9	71	74.9				
Total Organic Carbon	% dry	0.09	0.53	0.88	0.2	0.39	0.17				
Oil and Grease	% dry	0.02U	0.01J	0.01J	0.01J	0.01J	0.01J				
TRPH	% dry	0.02U	0.01J	0.01J	0.01J	0.01J	0.01J				
Water Soluble Sulfides	mg/kg dry	0.4U	0.4U	0.2J	0.4U	0.3J	0.2J				
Total Sulfides	mg/kg dry	1.2	0.3J	59.8	23.4	103.4	62.7				
METALS											
Arsenic	mg/kg dry	1.137	1.242	1.415	1.337	2.41	1.9	8.2	70	500	5
Cadmium	mg/kg dry	0.05U	0.037J	0.055	0.029J	0.111	0.051	1.2	9.6	100	1
Chromium	mg/kg dry	5.429	4.416	7.102	5.691	14.84	9.6	81	370	2500	560
Copper	mg/kg dry	1.177	0.862	2.641	2.363	5.989	4.419	34	270	2500	25
Lead	mg/kg dry	1.483	1.366	1.941	1.628	4.418	3.458	46.7	218	1000	5
Mercury	mg/kg dry	0.02U	0.02U	0.01J	0.01J	0.02	0.01J	0.15	0.71	20	0.2
Nickel	mg/kg dry	1.448	1.539	1.95	1.434	4.215	2.664	20.9	51.6	2000	20
Selenium	mg/kg dry	0.035J	0.05	0.077	0.067	0.132	0.089			100	1
Silver	mg/kg dry	0.097	0.078	0.062	0.064	0.082	0.074	1	3.7	500	5
Zinc	mg/kg dry	11.15	11.21	15.04	10.57	31.34	19.08	150	410	5000	250
ORGANICS - BUTYLTINS											
Dibutyltin	ug/kg dry	3U	3U	3U	3U	3U	3U				
Monobutyltin	ug/kg dry	3U	3U	3U	3U	3U	3U				
Tetrabutyltin	ug/kg dry	3U	3U	3U	3U	3U	3U				
Tributyltin	ug/kg dry	3U	3U	3U	3U	3U	3U				
ORGANICS - PAHs											
1-Methylnaphthalene	ug/kg dry	5U	5U	5U	5U	5U	5U				
1-Methylphenanthrene	ug/kg dry	5U	5U	5U	5U	5U	5U				
2,3,5-Trimethylnaphthalene	ug/kg dry	5U	5U	5U	5U	5U	5U				
2,6-Dimethylnaphthalene	ug/kg dry	5U	1.3J	5.4	1.2J	4.2J	1.8J				
2-Methylnaphthalene	ug/kg dry	5U	5U	5U	5U	5U	5U	70	670		
Acenaphthene	ug/kg dry	5U	5U	5U	5U	5U	5U	16	500		
Acenaphthylene	ug/kg dry	5U	5U	5U	5U	5U	5U	44	640		

Table 14. Sediment Chemistry Summary for Mission Bay Harbor Composite Samples.

Chemical Analyte	Units	Mission Bay Harbor Composite Samples						NOAA Screening[1]		Title 22[2]	
		Approach Channel	Entrance Channel	Main Channel	Main Channel-East	Main Channel-West	Mariners Basin	Salt ERL	Salt ERM	TTLC Wet-Weight	STLC
Anthracene	ug/kg dry	5U	5U	5U	5U	5U	5U	85.3	1100		
Biphenyl	ug/kg dry	5U	5U	1.3J	5U	5U	5U				
Dibenzothiophene	ug/kg dry	5U	5U	5U	5U	5U	5U				
Fluorene	ug/kg dry	5U	5U	5U	5U	5U	5U	19	540		
Naphthalene	ug/kg dry	5U	5U	5U	5U	5U	5U	160	2100		
Phenanthrene	ug/kg dry	5U	5U	5U	5U	5U	5U	240	1500		
Benzo(a)anthracene	ug/kg dry	5U	5U	5U	5U	3.9J	5U	261	1600		
Benzo(a)pyrene	ug/kg dry	5U	4.6J	3.5J	1.8J	5.5	5U	430	1600		
Benzo(b)fluoranthene	ug/kg dry	5U	2.4J	3.7J	5U	4.1J	2.2J				
Benzo(e)pyrene	ug/kg dry	5U	4.8J	2.5J	5U	4.2J	1.5J				
Benzo(g,h,i)perylene	ug/kg dry	5U	2.2J	1.8J	5U	4.2J	2.1J				
Benzo(k)fluoranthene	ug/kg dry	5U	5U	1.5J	5U	3J	1.2J				
Chrysene	ug/kg dry	5U	2.3J	2.1J	5U	5.9	5U	384	2800		
Dibenzo(a,h)anthracene	ug/kg dry	5U	5U	5U	5U	1.2J	5U	63.4	260		
Fluoranthene	ug/kg dry	5U	5U	5U	1.9J	5.1	1.7J	600	5100		
Indeno(1,2,3-cd)pyrene	ug/kg dry	5U	5U	1.6J	5U	3.4J	5U				
Perylene	ug/kg dry	5U	3.6J	3.1J	5U	2.8J	5U				
Pyrene	ug/kg dry	5U	3.2J	3.3J	3.8J	5.3	2.1J	665	2600		
Total Low Weight PAHs	ug/kg dry	0	1.3	6.7	1.2	4.2	1.8				
Total High Weight PAHs	ug/kg dry	0	23.1	23.1	7.5	48.6	10.8				
Total PAHs	ug/kg dry	0	24.4	29.8	8.7	52.8	12.6	4022	44792		
ORGANICS - PHTHALATES											
Benzyl butyl phthalate	ug/kg dry	50U	50U	50U	50U	50U	50U				
bis-(2-Ethylhexyl)phthalate	ug/kg dry	125U	125U	125U	125U	125U	125U				
Diethyl phthalate	ug/kg dry	125U	125U	125U	125U	125U	125U				
Dimethyl phthalate	ug/kg dry	75U	75U	75U	75U	75U	75U				
Di-n-butyl phthalate	ug/kg dry	100U	100U	100U	100U	100U	100U				
Di-n-octyl phthalate	ug/kg dry	20U	20U	20U	20U	20U	20U				
ORGANICS - PHENOLS											
2,4,6-Trichlorophenol	ug/kg dry	100U	100U	100U	100U	100U	100U				
2,4-Dichlorophenol	ug/kg dry	100U	100U	100U	100U	100U	100U				

Table 14. Sediment Chemistry Summary for Mission Bay Harbor Composite Samples.

Chemical Analyte	Units	Mission Bay Harbor Composite Samples						NOAA Screening[1]		Title 22[2]	
		Approach Channel	Entrance Channel	Main Channel	Main Channel-East	Main Channel-West	Mariners Basin	Salt ERL	Salt ERM	TTLC Wet-Weight	STLC
2,4-Dimethylphenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
2,4-Dinitrophenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
2-Chlorophenol	ug/kg dry	100U	100U	100U	100U	100U	100U				
2-Methyl-4,6-dinitrophenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
2-Nitrophenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
4-Chloro-3-methylphenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
4-Nitrophenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
Pentachlorophenol	ug/kg dry	100U	100U	100U	100U	100U	100U			50000	5000
Phenol	ug/kg dry	200U	200U	200U	200U	200U	200U				
ORGANICS - CHLORINATED PESTICIDES											
2,4'-DDD	ug/kg dry	2U	2U	2U	2U	2U	2U				
2,4'-DDE	ug/kg dry	2U	2U	2U	2U	2U	2U				
2,4'-DDT	ug/kg dry	2U	2U	2U	2U	2U	2U				
4,4'-DDD	ug/kg dry	2U	2U	2U	2U	2U	2U	2	20	1000	100
4,4'-DDE	ug/kg dry	2U	2U	2U	2U	2U	2U	2.2	27	1000	100
4,4'-DDT	ug/kg dry	2U	2U	2U	2U	2U	2U	1	7	1000	100
Total DDT	ug/kg dry	2U	2U	2U	2U	2U	2U	1.58	46.1	1000	100
Aldrin	ug/kg dry	2U	2U	2U	2U	2U	2U			1400	140
alpha-BHC	ug/kg dry	2U	2U	2U	2U	2U	2U				
alpha-Chlordane	ug/kg dry	2U	2U	2U	2U	2U	2U				
beta-BHC	ug/kg dry	2U	2U	2U	2U	2U	2U				
cis-Nonachlor	ug/kg dry	2U	2U	2U	2U	2U	2U				
DCPA (Dacthal)	ug/kg dry	10U	10U	10U	10U	10U	10U				
delta-BHC	ug/kg dry	2U	2U	2U	2U	2U	2U				
Dicofol	ug/kg dry	2U	2U	2U	2U	2U	2U				
Dieldrin	ug/kg dry	5U	5U	5U	5U	5U	5U	0.02	8	8000	800
Endosulfan I	ug/kg dry	2U	2U	2U	2U	2U	2U				
Endosulfan II	ug/kg dry	2U	2U	2U	2U	2U	2U				
Endosulfan sulfate	ug/kg dry	2U	2U	2U	2U	2U	2U				
Endrin	ug/kg dry	2U	2U	2U	2U	2U	2U			200	20
Endrin aldehyde	ug/kg dry	2U	2U	2U	2U	2U	2U				

Table 14. Sediment Chemistry Summary for Mission Bay Harbor Composite Samples.

Chemical Analyte	Units	Mission Bay Harbor Composite Samples						NOAA Screening[1]		Title 22[2]	
		Approach Channel	Entrance Channel	Main Channel	Main Channel-East	Main Channel-West	Mariners Basin	Salt ERL	Salt ERM	TTLC Wet-Weight	STLC
Endrin ketone	ug/kg dry	2U	2U	2U	2U	2U	2U				
gamma-BHC (Lindane)	ug/kg dry	2U	2U	2U	2U	2U	2U			4000	400
gamma-Chlordane	ug/kg dry	2U	2U	2U	2U	2U	2U				
Heptachlor	ug/kg dry	2U	2U	2U	2U	2U	2U			4700	470
Heptachlor epoxide	ug/kg dry	2U	2U	2U	2U	2U	2U				
Methoxychlor	ug/kg dry	2U	2U	2U	2U	2U	2U			100000	10000
Mirex	ug/kg dry	2U	2U	2U	2U	2U	2U			21000	2100
Oxychlordane	ug/kg dry	2U	2U	2U	2U	2U	2U				
Perthane	ug/kg dry	10U	10U	10U	10U	10U	10U				
Toxaphene	ug/kg dry	50U	50U	50U	50U	50U	50U			5000	500
trans-Nonachlor	ug/kg dry	2U	2U	2U	2U	2U	2U				
ORGANICS - AROCLORS											
Aroclor 1016	ug/kg dry	20U	20U	20U	20U	20U	20U				
Aroclor 1221	ug/kg dry	20U	20U	20U	20U	20U	20U				
Aroclor 1232	ug/kg dry	20U	20U	20U	20U	20U	20U				
Aroclor 1242	ug/kg dry	20U	20U	20U	20U	20U	20U				
Aroclor 1248	ug/kg dry	20U	20U	20U	20U	20U	20U				
Aroclor 1254	ug/kg dry	20U	20U	20U	20U	19J	20U				
Aroclor 1260	ug/kg dry	20U	20U	20U	20U	20U	20U				
Total Aroclor PCBs	ug/kg dry	20U	20U	20U	20U	20U	20U				
ORGANICS - PCB CONGENERS											
PCB003	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB008	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB018	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB028	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB031	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB033	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB037	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB044	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB049	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB052	ug/kg dry	2U	2U	2U	2U	2U	2U				

Table 14. Sediment Chemistry Summary for Mission Bay Harbor Composite Samples.

Chemical Analyte	Units	Mission Bay Harbor Composite Samples						NOAA Screening[1]		Title 22[2]	
		Approach Channel	Entrance Channel	Main Channel	Main Channel-East	Main Channel-West	Mariners Basin	Salt ERL	Salt ERM	TTLC Wet-Weight	STLC
PCB056+060	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB066	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB070	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB074	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB077	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB081	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB087	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB095	ug/kg dry	2U	2U	2U	2U	1.5J	2U				
PCB097	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB099	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB101	ug/kg dry	2U	2U	2U	2U	1.9J	2U				
PCB105	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB110	ug/kg dry	2U	2U	2U	2U	2.3	2U				
PCB114	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB118	ug/kg dry	2U	2U	2U	2U	1.6J	2U				
PCB119	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB123	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB126	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB128	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB138	ug/kg dry	2U	2U	2U	2U	2.1	2U				
PCB141	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB149	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB151	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB153	ug/kg dry	2U	2U	2U	2U	1J	2U				
PCB156	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB157	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB158	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB167	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB168+132	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB169	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB170	ug/kg dry	2U	2U	2U	2U	2U	2U				

Table 14. Sediment Chemistry Summary for Mission Bay Harbor Composite Samples.

Chemical Analyte	Units	Mission Bay Harbor Composite Samples						NOAA Screening[1]		Title 22[2]	
		Approach Channel	Entrance Channel	Main Channel	Main Channel-East	Main Channel-West	Mariners Basin	Salt ERL	Salt ERM	TTLC Wet-Weight	STLC
PCB174	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB177	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB180	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB183	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB187	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB189	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB194	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB195	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB200	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB201	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB203	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB206	ug/kg dry	2U	2U	2U	2U	2U	2U				
PCB209	ug/kg dry	2U	2U	2U	2U	2U	2U				
Total PCB Congeners	ug/kg dry	2U	2U	2U	2U	10.4	2U	22.7	180		
ERM Quotient	ug/kg dry	0.004	0.004	0.006	0.005	0.013	0.007				

1 Effects Range Low (ERL) and Effects Range Median (ERM) sediment quality objectives from Long *et al.* (1995).
2 California Code of Regulations Title 22 Total and Soluble Threshold Limit Concentrations
Bolded values exceed ERL values.
Bolded and underlined values exceed ERM values.
U = Not measured above reported sample reporting limit.
J = The result is an estimated quantity between the method reporting limit and the method detection limit, or it is an estimated value due to QC issues.
J- = Low biased estimated value.
UJ = The analyte was not detected above the reporting limit which may or may not be an accurate value.