APPENDIX C

COMMENT LETTERS

DEPARTMENT OF TRANSPORTATION
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A-1

August 1, 2011

11-SD-5
PM VAR
Shipyard Sediment Remediation Project

Mr. Vicente Rodriguez
Regional Water Quality Control Board, Region 9
9174 Sky Park Ct., Suite 100
San Diego, CA 92123

Dear Mr. Rodriguez:

The California Department of Transportation (Caltrans) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the Shipyard Sediment Remediation Project. The Shipyard Sediment Remediation Project (Project) is located along the eastern shore of the central San Diego Bay, extending approximately from the Sampson Street extension on the northwest to Chollas Creek on the "southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west. The State highway serving the project is Interstate 5 (I-5). Caltrans would like to submit the following comments: A-1-1

- Mitigation Measure 4.1.1, states "Haul, delivery, and employee traffic shall be discouraged at I-5 southbound ramp/Boston Avenue intersection and on the roadway segment of Boston Avenue between 28th Street and the I-5 southbound (SB) ramp". Please clarify how this mitigation measure will be enforced. A-1-2

- On the TIA, Figure 2A & 2B, there are some discrepancies in the Existing Peak Hour Traffic Volume when comparing to Caltrans' 2009 volume within the intersections for on/off-ramps along I-5 as follow: A-1-3

  - Intersection #7, SB-off, AM Peak Volume should be 611 instead of 508.
  - Intersection #9, NB-off, cumulative AM/PM Peak Volume should be 714/491 instead of 383/436.
  - Intersection #9, NB-on, cumulative AM/PM Peak Volume should be 629/310 instead of 19/44. NB-on from 28th Street should also be included.
  - Intersection #10, SB-on, cumulative AM/PM Peak Volume should be 675/973 instead of 321/636.
  - Intersection #12, SB-on, cumulative AM Peak Volume should be 472 instead of 260.

- Based on the new Peak Volumes above, all Delays and Level of Service (LOS) Tables and Figures need to be re-calculated for these intersections. A-1-4

- It appears that Staging Areas 1-4 will access I-5 via intersection # 7, 9 & 10. Currently, intersections #7 & #9 operate at LOS F, and intersection #10 will degrade to LOS F with this project. Although the TIS called out to signalize intersection #10 as the proposed mitigation, additional measures could be made to minimize the impact to the local community by routing all trucks to SB Harbor Drive then use Civic Center Drive interchange. A-1-5

- All state-owned signalized intersection affected by this project shall be analyzed using the Intersecting Lane Vehicle (ILV) procedure per Highway Design Manual (HDM), Topic 406, Page 400-430. A-1-6

If you have any questions on the comments Caltrans has provided, please contact Anthony Aguirre of the Development Review Branch at (619) 688-3161. A-1-7

Sincerely,

JACOB ARMSTRONG, Chief
Development Review Branch

Mr. Vicente Rodriguez
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Re: Shipyard Sediment Remediation Project Draft Environmental Impact Report

Dear: Mr. Rodriguez

On behalf of the San Diego Unified Port District (District), thank you for the opportunity to review the Draft EIR for the Shipyard Sediment Remediation Project. The District has identified some areas within the Draft EIR that could be clarified in order to improve the documents thoroughness, clarity and compliance with the California Environmental Quality Act (CEQA). Our review includes comments regarding the content of the Draft EIR, in the following categories: A-2-1

1) Dewatering Sites;
2) Inconsistencies between the Draft EIR and Project's Cost Analysis Assumptions;
3) Sediment Sampling and Disposal;
4) Air Quality and Greenhouse Gas Emission Analysis; and
5) Mitigation Measures for the Convair Lagoon Alternative.

The District's comments and suggested revisions to the Draft EIR provided below are organized by these five categories.

DEWATERING SITES

The following comments are provided for the sediment staging areas identified in the Draft EIR for dewatering operations. The comments are organized by chapter, section and page number.

<u>Chapter 3, Project Description</u>

A. Page 3-1, Section 3.2, Project Location

EIR: *"The removal of the marine sediments will require upland areas for dewatering, solidification, and stockpiling of the materials and potential treatment of decanted waters prior to off-site disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas have been identified by the San Diego Water Board as potential sediment staging areas."* A-2-2

Comment: These five potential sediment staging areas appear to be disconnected parcels that are under the control of various District tenants or other entities. The availability and suitability of these parcels should be analyzed in greater detail. The Draft EIR should include a survey of the parcels accessibility, pavement durability and the water containment collection and removal systems that would be needed to ensure no releases occur from dewatering activities.

Comment: The Draft EIR should analyze less space intensive sediment dewatering systems, such as centrifuges and/or reagent dehydration of sediments, which could be used on barges and would allow for sediment to be directly off-loaded from barges to trucks for disposal. A-2-3

Comment: Staging Area 1 encompasses a significant portion of a 96-acre site that is occupied by Tenth Avenue Marine Terminal (TAMT). The Draft EIR has identified 36.14 acres in the south west section of the site as a "usable area". The report also identifies a 13.52 acre "usable area" site in the northeast portion of Staging Area 1 which is predominately occupied by Burlington Northern Santa Fe Railroad's (BNSF) major San Diego switching yard. The 36.14 acre "usable area" is partially comprised of the 20.5 acre Dole Fresh Fruit Company leasehold that is used as a container yard for weekly importation of bananas and other fresh fruit from Central America. The remaining 15.64 acres consists of the following; a portion of the San Diego Refrigerated Storage leasehold that is used for employee parking, container inspections by US Customs and Border Protection and for staging palletized break-bulk fruit cargos; a portion of the Cemex Pacific Coast Cement Corporation leasehold that is used for the importation of bulk cement; the wharf apron docks at Berth's 10-1 through 10-6 where a variety of cargos are handled when loading or unloading cargo vessels; and the remainder consisting of paved open areas that contain storage areas for cargo, space for cargo handling equipment, truck staging lanes, rail tracks and roadways. A-2-4

Use of all or any portion of these areas for the treatment of dredged sediments would have the following impacts at TAMT: (1) An average of 100 vessels per year dock at TAMT. The cargos consist mainly of 40-foot-long refrigerated containers or project cargos such as large wind mill components or large electrical transformers. Dole uses its entire facility to stage over 500 containers each week prior to delivery to West Coast markets or before being loaded back on board a vessel. Typical wind mill blades range in length from 130 feet to 160 feet and the tower sections can be up to 80 feet in length. These types of cargos normally cannot be stacked and tens of thousands of square feet of open space are needed to both store and handle them properly. A-2-5 (2) The terminal's system of roadways and rail track need to be kept clear to effectively move cargo, material and equipment on and off the facility. Any prolonged closure of any portion of the terminal's transportation system would have a significant impact on the efficiency of the entire terminal. A-2-6 (3) Within the area deemed as "useable" there are three tenant leaseholds. These leases would have to be re-negotiated, if the tenants are willing, to allow for this activity to occur. A-2-7 (4) The Port of San Diego is designated as a "Strategic Port" by the Federal Maritime Administration to handle military cargos. Under the San Diego "Port Planning Order" the Port is required to provide "staging space of no less than 8 acres" at TAMT within 48 hours after receiving notification from the US Military's "Surface Deployment and Distribution Command" (SDDC). Any materials or equipment within the 8-acre footprint would need to be relocated on or off the terminal within the stipulated time frame. Since 2008, two to four military operations have taken place each year at TAMT. A-2-8 (5) Any reduction in space at the Terminal will result in lost revenue due to a reduction in cargo volumes, increased costs due to ineffective handling of cargo and impact the ability of the Port to effectively market its maritime cargo handling facilities. A-2-9 (6) If any of the existing activities described above were required to be relocated to accommodate use of the TAMT as Staging Area 1, such relocation may result in significant environmental impacts at the relocation site, which would need to be evaluated in the Draft EIR. As a result of these constraints, the use of a significant portion of the TAMT as Staging Area 1 to conduct the dewatering operations is likely to be infeasible. A-2-10

Comment: Staging Area 2 also contains portions of the 96-acre TAMT site as well as a portion of the BNSF switching yard. "Useable Areas" within Staging Area 2 are further defined as: 0.57 acres within the Searles Valley leasehold (bulk cargo handler); 0.79 acres within the Stella Maris Seaman's Center leasehold as well as the approaches to the TAMT truck scale; 2.77 acres containing a truck staging lot that is used as an overflow lot by Dole and whenever military operations are taking place. This area also contains a one acre site which is slated for development to begin during the 2nd quarter of 2012 in which an office complex for the Maritime Operations Department and potentially an office and warehouse A-2-11 complex for the National Oceanic and Atmospheric Administration will be built. The remaining 2.59 acres contains both Port and BNSF property consisting of the lead rail tracks that serve TAMT as well as equipment storage areas for both entities. A-2-11

Use of these areas for onshore dewatering and treatment will have similar impacts as described above including leasehold issues, potential loss of the staging area if a "Port Planning Order" is invoked, disruption of both cargo handling operations, disruption of transportation infrastructure and development plans resulting in loss of revenue. As a result of these constraints, the use of a significant portion of the TAMT as Staging Area 2 to conduct the dewatering operations is likely to be infeasible. A-2-12

Comment: Staging Area 5 shows a "Useable Area" of 145.31 acres that consists of the 125 acre National City Marine Terminal (NCMT) with the remainder of the acreage split between BNSF property and the Dixieline Lumber leasehold on Port property. Pasha is the principal terminal operator at NCMT where it conducts operations consisting of the import, export, handling and storage of motor vehicles and a biweekly cargo service to and from Hawaii by Pasha's Hawaii Transport Lines (PHTL). During each of the last three years Pasha has received an average of approximately 243,000 vehicles on 165 vessels. PHTL annually ships and receives in excess of 100,000 tons of cargo consisting of a variety of high and wide cargos (cement trucks, fire trucks, sewer pipe, Ferris wheels, yachts, containers, recreational trailers, crates etc.) on 30 vessels in the Hawaiian trade. Dixieline Lumber and Weyerhaeuser Lumber, another lumber company which is not within the "useable area", receive approximately 96 million board feet of lumber each year on 12 lumber barges. All of these cargos require large open paved areas for storage plus roadways and rail tracks for handling and transport. Each month up to 26,000 vehicles can be stored on the terminal. A-2-13

The "Port Planning Order" applies to NCMT as well. If notification is made by SDDC 15 acres of staging space must be made available within 48 hours. Again, the use of NCMT for onshore dewatering and treatment will have significant lease issues, disruption of revenue producing cargo operations, have a negative effect upon marketing of the terminal and could interfere with national security if a PPO is initiated. As a result of these constraints, the use of the NCMT as Staging Area 5 to conduct the dewatering operations is likely to be infeasible. A-2-14

B. Pages 3-16 through 3-26, Figures

Comment: Figures 3-3 through 3-7, which identify the location of proposed staging areas, appear to be out of date. For example, the CP Kelko waterside leasehold does not reflect the recent demolition of waterside structures and the related increase in open space. This information should be updated in the Final EIR. A-2-15

INCONSISTENCIES BETWEEN THE DRAFT EIR PROJECT DESCRIPTION AND THE PROJECT'S COST ANALYSIS ASSUMPTIONS

The *Revised Tentative Cleanup and Abatement Order and Draft Technical Report* identifies a cost estimate for the Shipyard Sediment Remediation Project within Appendix 4, Section 32, Table A32-26. The District has identified some inconsistencies between the cost estimate project assumptions and the Shipyard Sediment Remediation Project Description provided in Chapter 3, Project Description, of the Draft EIR. A-2-16

In general, the District has identified inconsistencies that pertain to (1) the Construction Schedule, (2) Demolition and Capping Activities, (3) Landfill Disposal, (4) Dredge Quantity, and (5) Quarry Run Rock. Table 1, provided at the end of this comment letter, identifies each cost assumption, inconsistency in the Draft EIR, and applicable environmental issue. Below is a summary of the inconsistencies that have been identified between the cost estimate project description/assumptions and the Draft EIR project description, and their potential repercussions on the analysis contained in the Draft EIR. A-2-16

1. **Construction Schedule.** In the cost estimate, the construction scenario for the proposed project is described as '3 Construction Seasons,' without further definition. In the Draft EIR, the construction scenario is described as follows: *"There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season. The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. This scenario assumes that the dewatering, solidification, and stockpiling of the materials would occur simultaneously and continuously with the dredging. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern (April through August)."* A-2-17

   The construction scenarios described in the cost estimate and the Draft EIR are not consistent. The cost estimate identifies three construction seasons, while the Draft EIR identifies 12.5 months or 2.5 years to complete construction. Assuming one construction season equates to one year of construction, the cost estimate anticipates a longer duration of construction. If this extended period of construction is accurate, the Air Quality analysis within the Draft EIR may need to be revised to evaluate the extended construction timeline. An extended construction timeline could reduce air quality emission impacts, if the amount and type of daily construction is reduced from what is currently accounted for within the Draft EIR. A-2-18

2. **Demolition and Capping Activities.** The cost estimate identifies the demolition of an existing BAE pier, while the Draft EIR does not mention demolition of this pier. If demolition of the BAE pier is considered a component of the proposed project, the Project Description, and Air Quality and Transportation and Circulation analysis in the Draft EIR would need to be revised to reflect this demolition work. Demolition of the BAE pier would likely require off-site disposal, which would result in increased truck trips and associated air emissions. Additional construction equipment may also be required for this demolition, or equipment already identified in the Draft EIR may be used for longer periods of time, which would result in increased construction-related emissions. An increase in truck traffic and construction-related emissions from demolition of the BAE pier thus may result in greater impacts to Air Quality and Transportation and Circulation than accounted for in the Draft EIR. A-2-19

   The cost estimate also assumes that half of the total dredged area will receive 1-3 feet of clean sand for a cap. The Draft EIR assumes that only the pier and pilings will receive a clean sand cap. If half of the dredged area is to receive a sand cap, the Draft EIR should to be revised to reflect the additional placement and importation of sand within the Project Description, Transportation and Circulation and Air Quality EIR sections. In the Transportation and Circulation analysis, the importation of additional sand would increase truck trips and associated air emissions above levels currently accounted for in the Draft EIR. Additional construction equipment may also be required for the placement of the sand cap, or equipment already identified may be used for longer periods of time, which also would increase construction-related emissions. An increase in truck traffic and construction equipment emissions would likely result in greater impacts to Air Quality and Transportation and Circulation than accounted for in the Draft EIR. A-2-20

3. **Landfill Disposal.** The cost estimate identifies the Copper Mountain landfill in Arizona as the disposal site for all sediment. The Draft EIR identifies the Kettleman Hills landfill, in Kings County, A-2-21

California, as the disposal site for sediment classified as a hazardous material (up to 15 percent of the sediment) and the Otay Landfill in San Diego, California, as the disposal site for non-hazardous sediment (85 percent of the sediment). If dredged sediment is to be disposed of at the Copper Mountain landfill in Arizona, the Project Description, and Air Quality and Transportation and Circulation analysis in the Draft EIR should be revised. In the Transportation and Circulation analysis, the disposal location in Arizona would increase truck trip vehicle miles traveled. An increase in vehicle miles traveled by the disposal trucks would result in an associated increase in air emissions. If sediment is to be disposed of at the Copper Mountain landfill, the proposed project would likely result in greater impacts to Transportation and Circulation and Air Quality than accounted for in the Draft EIR. A-2-21

Additionally, the cost estimate assumes a total quantity of 171,500 cubic yards (cy) of sediment will be disposed after handling and dewatering activities. The Draft EIR identifies a total quantity of 164,910 cy to be disposed after handling and dewatering activities. If 171,500 cy of sediment must be disposed of off-site, the Draft EIR should be revised to reflect this additional quantity within the Project Description, Air Quality and Transportation and Circulation sections. An increase in off-site disposal would require additional truck trips, resulting in increased air emissions, and would potentially result in greater impacts to Transportation and Circulation and Air Quality than analyzed in the Draft EIR. A-2-22

4. **Dredge Quantity.** In addition to an initial 143,400 cy of dredging, the cost estimate identifies 28,100 cy of "Additional Dredging." Additional dredging is described "as needed for a second pass." The cost estimate states that this additional dredging will consist of two feet of dredging over one-half of the remedial area. Including initial and secondary dredging, the cost estimate identifies a total of 171,500 cy of sediment that will be dredged. However, the Draft EIR identifies a total of 143,400 cy of sediment that will be dredged. The Draft EIR does not identify additional dredging as part of the proposed project and does not account for the additional 28,100 cy of dredge identified in the cost estimate. If a total of 171,500 cy of sediment will be dredged (as identified in the cost estimate), rather than 143,400 cy of sediment (as identified in the Draft EIR), the Draft EIR should be revised to reflect this additional dredging in the Project Description, Transportation and Circulation, and Air Quality sections. In the Transportation and Circulation analysis, the removal of sediment during additional dredging activities would increase truck trips (and associated air emissions) and would likely result in greater Transportation and Circulation impacts than accounted for in the Draft EIR. Additional construction equipment may also be required for the additional dredging, or equipment already identified may be used for longer periods of time, which would increase construction-related emissions and cause impacts to Air Quality to be greater than accounted for in the Draft EIR. A-2-23

5. **Quarry Run Rock.** The cost estimate identifies the placement of 21,887 tons of quarry run rock for the protection of marine structures. The Draft EIR does not account for the importation or placement of quarry run rock. If 21,877 tons of rock is required to be placed within the proposed project site, the Draft EIR should be revised to reflect this change in the Project Description, Air Quality, and Transportation and Circulation sections. The import of the quarry run rock would result in increased truck trips (and associated air emissions) and would result in potentially greater impacts to Transportation and Circulation than analyzed in the Draft EIR. Additional construction equipment may also be required for the placement of quarry run rock, or equipment already identified may be used for longer periods of time, which would further increase construction related emissions and cause impacts to Air Quality to be greater than accounted for in the Draft EIR. A-2-24

SEDIMENT SAMPLING AND DISPOSAL A-2-25

The following comments are provided for sediment sampling and disposal information described in the Draft EIR. The comments are organized by chapter, section and page number.

A-2-25

<u>Chapter 3 Project Description</u>

A. Page 3-9, Section 3.6.2, Onshore Dewatering and Treatment.

EIR: *"After drying, soil sampling will be conducted, and all dredged material will be loaded directly onto trucks for disposal at an approved upland landfill."*

Comment: Please include a description of the contaminants that would be tested, the protocol that would be followed, the criteria upon which this protocol is based, and the thresholds that would be used to determine what material would require disposal at Kettleman Hills landfill rather than Otay landfill.

B. Page 3-9, Section 3.6.3, Transportation and Disposal.

A-2-26

EIR: *"For purposes of this project, it is assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, which is approximately 15 miles southeast of the Shipyard Sediment Site. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal. It is assumed for the purposes of this PEIR that up to 15 percent of the material will require transport to a hazardous waste facility (a Class I facility), which will most likely be the Kettleman Hills Landfill in Kings County, California, near Bakersfield."*

Comment: Please include a description of the basis for the determination that 85 percent of the dredged material would be disposed of at Otay landfill, while 15 percent would be disposed of at the Kettleman Hills landfill. What is the assurance that only 15 percent of the dredged material would be disposed of at the Kettleman Hills landfill? Please also note that the Kettleman Hills landfill is near Hanford, not Bakersfield.

A-2-27

<u>Chapter 4.1 Transportation and Traffic</u>

A. Page 4.1-12, Section 4.1.4.2, Potentially Significant Impacts.

EIR: *"Once the dredge materials have been dried and tested, they will be loaded onto trucks for disposal at an approved landfill. For purposes of this project, it is assumed that 85 percent of the material will be transported from the staging area to Otay Landfill, approximately 15 miles southeast of the Shipyard Sediment Site. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal. It is assumed for the purposes of this PEIR that up to 15 percent of the material will require transport to a hazardous waste facility (a Class I facility), which will most likely be the Kettleman Hills Landfill in Kings County, California, near Bakersfield. Based on the excavation quantity of 143,400 cubic yards (cy) and accounting for an additional 15 percent of bulk material due to the dewatering and treatment process, it is estimated that up to 250 truck trips per week could be required over an approximately 12.5-month period to remove the material. These estimates are a worst-case scenario and will be finalized during the design phase."*

Comment: Please describe the traffic scenario that would occur in the event less or more than 15 percent of sediment would require disposal at the Kettleman Hills landfill and how it would affect the analysis of the project in the EIR. Please also note that the Kettleman Hills landfill is near Hanford, not Bakersfield.

A-2-28

B. Page 4.1-12, Section 4.1.4.2, Potentially Significant Impacts.

EIR: *"The most direct route to Otay Landfill is via I-5 south to State Route 54 (SR-54) east, to I-805 south. The most direct truck route to I-5 south, assumed for the proposed project condition, from potential Staging Areas 1 through 4 would be via East Harbor Drive and 28th Street. Trucks departing from Staging Area 5 would access I-5 south either directly from 24th Street-Bay Marina Drive or from West 32nd Street to 24th Street-Marina Way to Bay Marina Drive. Although the sediment is not known to be classified as California hazardous material, it will be tested upon removal and prior to disposal."* A-2-28

Comment: Please describe the most direct route to the Kettleman Hills landfill.

Chapter 4.3 Hazards

A. Page 4.3-20, Section 4.3.4.1, Potentially Significant Impacts.

EIR: *"Once a sediment stockpile meets the analytical and strength requirements, the material would be certified for disposal, manifested, loaded into on-road trucks (typically using a largewheeled front-end loader), weighed to document compliance with U.S. DOT regulations, transported, and deposited at the selected disposal facility."* A-2-29

Comment: Please provide a detailed description of the analytical and strength requirements that will be used to determine the appropriate landfill disposal location, including the protocol that would be followed, the criteria upon which this protocol is based, and the thresholds that would require disposal at the Kettleman Hills landfill rather than Otay landfill. Please also provide a reference for the U.S DOT weighting regulation.

AIR QUALITY AND GREENHOUSE GAS EMISSION ANALYSIS

The following comments are provided for the air quality and greenhouse gas sections of the Draft EIR. The comments are organized by section and page number.

Chapter 4.6 Air Quality

A. Section 4.6.3.1, Thresholds for Construction Emissions, Page 4.6-8; Section 4.6.3.2, Thresholds for Operational Emissions, Page 4.6-8; and Section 4.6.4.1, Less Than Significant Impacts, Fugitive Dust, Page 4.6-11. A-2-30

Comment: Thresholds for construction and operational emissions in Sections 4.6.3.1 and 4.6.3.2 do not include a threshold for emissions of fine particulate matter ($PM_{2.5}$). However, the discussion of fugitive dust impacts on page 4.6-11 states that emissions of $PM_{2.5}$ are less than significant because emissions are relatively small and do not exceed the significance threshold for $PM_{2.5}$. How was it determined that $PM_{2.5}$ emissions do not exceed a significance threshold, when no threshold is identified? We suggest revising this section to include a quantitative threshold for $PM_{2.5}$, particularly because the San Diego Air Basin is a state non-attainment area for $PM_{2.5}$. Furthermore, we would suggest using the U.S. Environmental Protection Agency's "Proposed Rule to Implement the Fine Particle National Ambient Air Quality Standards" threshold of 55 pounds per day (published September 2005).

B. Section 4.6.4.1, Less than Significant Impacts, Regional Air Quality Strategy, Page 4.6-10. A-2-31

EIR: *"Although the proposed project would exceed the construction threshold for NOX, the proposed project does not obstruct implementation of the RAQS."*

Comment: Please explain the rationale for the conclusion quoted above, which appears to be internally inconsistent. A-2-31

C. Section 4.6.4.1, Less than Significant Impacts, Fugitive Dust, Page 4.6-11.

Comment: This EIR section does not include a summary of the methodology for the analysis, including construction assumptions, the source of the emissions factors, and any models used in the analysis. The methodology for the analysis, construction assumptions, and model descriptions are provided in the air quality technical report in Appendix G. It would helpful for the reader to have a description of this information provided in this section of the EIR. In addition, neither the Draft EIR nor the air quality technical report provides the source for the emissions factors used to determine criteria pollutant emissions, which should be included. A-2-32

Comment: Please identify why CO_2 emissions are included in Table 4.6-3, Daily Construction Emissions by Phase (lbs/day), and Table 4.6-4, Peak Daily Construction Emissions (lbs/day). This section of the EIR does not include any analysis related to emissions of CO_2. It may be appropriate to delete this information from this section of the EIR. A-2-33

Comment: In Table 4.6-3, a list of construction equipment is only provided for the 'Covering of Sediment Near Structure Phase.' Please provide the equipment assumptions for all construction phases. A-2-34

Comment: The construction phases listed in Table 4.6-4, Peak Daily Construction Emissions (lbs/day) and Table 4.6-3, Daily Construction Emissions by Phase (lbs/day), are inconsistent. Table 4.6-4, Peak Daily Construction Emissions (lbs/day), includes a Dredging Operations phase that is not included in Table 4.6-3, Daily Construction Emissions by Phase (lbs/day). It is unclear which construction activities would occur during the Dredging Operations phase and are contributing to the peak daily construction emissions. We suggest identifying construction phases listed in Table 4.6-3 that are included in the Dredging Operations phase. A-2-35

D. Section 4.6.4.1, Less than Significant Impacts, Health Risk Assessment, Pages 4.6-11 through 4.6-15.

Comment: We would suggest including a figure that identifies the truck routes and location of the residences included in the HRA to clarify the analysis. A-2-36

EIR: *"Perkins Elementary School is located within 0.25 mile of Staging Areas 1 and 2. Significant health risks are not expected to result from the operation of equipment at the staging areas. Assuming the peak daily emissions shown in Table 4.6-4 occur continuously for 2.5 years (a conservative assumption) results in lifetime cancer risk levels below 1.5 in a million at Perkins Elementary School."*

Comment: The text prior to the EIR text quoted above includes an analysis and methodology that only discusses truck trips and therefore it appears as though the operation of construction equipment at the staging areas was not included in the HRA. Please clarify, and if the analysis only includes truck trips, explain the basis for determining that construction equipment would not contribute to an exceedence of the lifetime cancer risk threshold. We would suggest including the construction equipment operation in the HRA analysis, if it is not included already. A-2-37

E. Section 4.6.4.2, Potentially Significant Impacts, Equipment Exhaust and Related Construction Activities, Pages 4.6-16.

EIR: *"In addition, Mitigation Measures 4.6.8 through 4.6.14 would also reduce the generation of NOX emissions in the area through the use of retrofitted diesel powered equipment, low-NOX diesel fuel, and alternative fuel sources. However, there is no reasonable way to ensure that that retrofitted diesel-powered equipment, low-NOX diesel fuel, and alternative fuel sources would be available during the construction period; therefore, it is not possible to quantify reductions in NOX emissions that would result from implementation of Mitigation Measures 4.6.8 through 4.6.14."* A-2-38

Comment: An emissions reduction estimate can be made for some of the mitigation measures as written. The URBEMIS 2007 model and South Coast Air Quality Management District's CEQA Air Quality Handbook provide emission reduction estimates for construction mitigation measures. We suggest providing estimates for the listed mitigation measures, assuming that they would be implemented. Include any additional feasible mitigation measures from these sources that may apply to the proposed project. Furthermore, please explain why there is no reasonable way to ensure that the required equipment and technology would be available, and include this as a reason why this impact is significant and unavoidable. Please also explain why the EIR cannot require the use of retrofitted diesel powered equipment, low-NOX diesel fuel, and alternative fuel sources as mitigation measures, since these measures ordinarily are feasible and available. A-2-39

F. Section 4.6.4.2, Potentially Significant Impacts, Odors, Pages 4.6-16.

EIR: *"Adherence to the mitigation measures identified for equipment would reduce impacts associated with objectionable odors from the operation of diesel-powered construction equipment."*

Comment: Please explain why the mitigation measures proposed to reduce emissions of criteria pollutants would also reduce odors related to construction equipment to a less than significant level. Additionally, the discussion of impacts for criteria pollutants determined that it cannot be ensured that these mitigation measures would be fully implemented; therefore, impacts related to NOx emissions are significant and unavoidable. If these measures cannot be fully implemented, why wouldn't odor emissions also be significant and unavoidable? A-2-40

G. Section 4.6.4.2, Potentially Significant Impacts, Odors, Pages 4.6-16 and 4.6-17.

EIR: *"With implementation of this measure, and given the distance between the active areas within the potential Staging Areas and the nearest sensitive receptors, it is anticipated that odor impacts would be reduced to less than significant with the adherence to identified mitigation measures (Threshold 4.6.5)."* A-2-41

Comment: Please identify the nearby sensitive receptors and the distance between these receptors and the staging areas. Also, please identify the evidence that supports this conclusion.

H. Section 4.6.4.3, Mitigation Measures, Pages 4.6-17 through 4.6-21.

Comment: Mitigation measures are included for fugitive dust emissions because of San Diego Air Pollution Control District requirements. However, the analysis identifies no significant impacts. Generally, it is inappropriate to identify mitigation measures for non-significant impacts. We would suggest moving these mitigation measures to the impact analysis and stating that compliance with these measures would occur, rather than listing them as mitigation. A-2-42

I. Section 4.6.5, Cumulative Impacts, Pages 4.6-21 and 4.6-22. A-2-43

Comment: The cumulative analysis discusses ozone and ozone precursors. However, the SDAB is also in non-attainment for PM_{10} and $PM_{2.5}$. Even though the proposed project would not result in direct impacts related to these pollutants, a cumulative impact may still occur. Therefore, we suggest revising this analysis to address cumulative impacts related to PM_{10} and $PM_{2.5}$. This revision would potentially result in the identification of a new significant cumulative impact. A-2-43

Chapter 4.7 Climate Change and Greenhouse Gas Emissions

A. Section 4.7.4.1, Less than Significant Impacts, GHG Emissions, Page 4.7-11.

EIR: *"To date there is insufficient information to establish formal, permanent thresholds by which to classify projects with relatively small, incremental contributions to the State's total GHG emissions as cumulatively considerable or not."*

Comment: The Bay Area Air Quality Management District has adopted a quantitative threshold for annual project-level GHG emissions, and several other districts and jurisdictions have proposed interim quantitative thresholds, including the County of San Diego and South Coast Air Quality Management District. In addition, in August 2010, the City of San Diego issued a memorandum to the Environmental Analysis Section titled "Updated – Addressing Greenhouse Gas Emissions from Projects Subject to CEQA." This memorandum proposes a 900 metric ton CO_2 equivalent screening level threshold for determining when potential project-level GHG impacts may occur. The GHG significance threshold discussion should be revised to identify a significance threshold for GHG project emissions. An Air Resources Board (ARB) threshold is discussed, but it is stated on Page 4.7-13 that the significance conclusions of the analysis do not rely upon the ARB's proposed draft guidance. We suggest that the analysis use the County of San Diego's screening level threshold for annual emissions of 900 metric tons CO_2 equivalent published in the Interim Approach to Addressing Climate Change in CEQA Documents, consistent with the approach used for determining potential impacts related to the Convair Lagoon Confined Disposal Facility Alternative found in Section 5.10.7, Greenhouse Gas Emissions/Climate Change of the EIR. Please also note that the assertion that "insufficient information to establish formal, permanent thresholds by which to classify projects with relatively small, incremental contributions to the State's total GHG emissions as cumulatively considerable or not" is inconsistent with recent judicial decisions, which identify satisfactory thresholds of significance and methodologies for analyzing and mitigating potential impacts associated with GHG emissions. See, e.g., *Citizens for Responsible Equitable Environmental Development v. City of Chula Vista* (2011) __ Cal.App.4th __, 2011 DJDAR 10267 (July 12, 2011); *Santa Clarita Organization for Planning the Environment v. City of Santa Clarita* (2011) __ Cal.App.4th __, 2011 DJDAR 11239 (July 28, 2011). A-2-44

B. Section 4.7.4.1, Less than Significant Impacts, GHG Emissions, Pages 4.7-11 through 4.7-13.

Comment: We disagree with the conclusion that because construction emission are a single-event contribution limited to a short period of time, these emissions are not considered to impede or interfere with achieving the state's emission reduction objectives in AB 32 and are inherently less than significant. As stated on Page 4.17-12 of the EIR, CO_2 emissions persist in the atmosphere for a substantially longer period of time than criteria pollutant emissions. Therefore, CO_2 emissions from construction emissions would not settle out following the completion of construction. These emissions would contribute to the state and global GHG inventory. Therefore, additional analysis is required in order to provide substantial evidence of a less than significant related to construction emissions. We suggest amortizing the construction emissions over a given time period to determine the contribution of construction emissions to annual GHG emissions, and comparing annual GHG emissions to a quantitative threshold. This approach is consistent with the recommendations of the County of San Diego, the South Coast Air A-2-45

Pollution Control District, and the County of San Luis Obispo Air Pollution Control District. We suggest amortizing construction emissions over a 30-year time period, consistent with the guidance of the County of San Diego and the approach used for determining potential impacts related to the Convair Lagoon Confined Disposal Facility Alternative found in Section 5.10.7, Greenhouse Gas Emissions/Climate Change of the EIR. A-2-45

C. Section 4.7.4.1, Less than Significant Impacts, GHG Emissions, Pages 4.7-11 through 4.7-13. A-2-46

Comment: Please explain why only CO_2 emissions are quantified for the proposed project. Emissions from construction equipment would also result in emissions of methane (CH_4) and nitrogen dioxide (N_2O).

Appendix G Air Quality Analysis

A. Section 2.6.1, Dredging and Capping Operations, Page 14.

EIR: *"Contaminated areas under piers and pilings will be remediated through subaqueous, or in-situ, capping. In-situ capping is the placement of clean material on top of the contaminated sediment."* A-2-47

Comment: The importation of clean material would require truck trips. Were these truck trips included in the calculation of construction emissions? They are not identified in the Total Construction Emissions tables provided in Appendix A of the Draft EIR. If they were not included, please revise the analysis to include them. Additional truck trips would result in increased emissions of criteria pollutants.

B. Section 4.2, Greenhouse Gas Emissions/Global Climate Change, Pages 41 and 42.

EIR: *"Therefore, for this analysis, CO2, CH4, and N2O are considered due to the relatively large contribution of these gases in comparison to other GHGs produced during the project construction and operation phases."* A-2-48

Comment: Only CO_2 emissions are provided in Table F. Please revise the analysis to include the projected emissions of CH_4 and N_2O. Identifying emissions of CH_4 and N_2O would result in additional emissions of CO_2 equivalent.

C. Section 4.2, Greenhouse Gas Emissions/Global Climate Change, Page 42.

EIR: *"The GHG emissions resulting from increased electricity demand are modeled using GHG emissions factors from the United States Energy Information Administration. The GHG emissions resulting from the energy used for water delivery, treatment, and use are modeled using GHG emissions factors from the California Energy Commission (CEC). The GHG emissions resulting from solid waste disposal are modeled using GHG emissions factors from the California Integrated Waste Management Board, recently renamed the Department of Resources Recycling and Recovery, or CalRecycle."* A-2-49

Comment: Only quantified construction emission are provided in the report. We suggest deleting this statement or providing the calculated emissions related to electricity, water, and solid waste. These GHG sources would result in additional emissions of CO_2 equivalent.

MITIGATION MEASURE REVISIONS FOR THE CONVAIR LAGOON ALTERNATIVE

The following comments are provided for the mitigation measures identified within Section 5.7, Convair Lagoon Alternative to ensure that the mitigation language for this alternative is consistent with the proposed project. The comments are organized by section and page number and shown in strikeout/underline. A-2-49

Section 5.10.3 Air Quality, Page 5-94

Threshold 5.10.3.2: Conformance to Federal and State Ambient Air Quality Standards. Mitigation Measure 4.6.1 through Mitigation Measure ~~9~~ 4.6.15 described in section 4.6, Air Quality, of this EIR ~~the Air Quality Analysis for the Shipyard Sediment Project (Appendix G)~~ would ~~also~~ be required for the Convair Lagoon Alternative. Under this alternative, these mitigation measures would apply to all construction activities associated with the Convair Lagoon Alternative and would not be limited to dredging and dewatering activities at the Shipyard Sediment Project Site. Additionally, mitigation measure 5.10.3.1 would reduce impacts related to emissions of nitrogen oxides during the barge transfer of shipyard sediment to the CDF. The Convair Lagoon Alternative would not exceed the significant thresholds during any other phase of construction, or during operation; therefore, no mitigation measures are required for the other phases of construction or operational emissions.

Mitigation Measure 5.10.3.1: **Prohibit Tug Boat Idling**. The ~~applicant~~ contractor responsible for the tug boat operation shall ensure that tug boats not be allowed to idle during any barge loading and unloading activities, unless the tug boat is actively engaged in operations. Contract specifications shall be included in the construction documents, which shall be reviewed by the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) prior to issuance of a construction permit. The San Diego Water board shall verify implementation of this measure. A-2-50

Threshold 5.10.3.4: Objectionable Odors. Implementation of Shipyard Sediment Site Mitigation Measure 4.6.15 ~~10~~ described in ~~the~~ section 4.6, Air Quality, of this EIR ~~Analysis for the Shipyard Sediment Project (Appendix G)~~ would require the application of a mixture of Simple Green and water (a ratio of 10:1) to the excavated sediment as part of odor management to accelerate the decomposition process and shorten the duration of odor emissions. Dewatering would take place in the same location as the Proposed Project; therefore, potential odor impacts as a result of the Convair Lagoon Alternative are also expected to be less than significant due to the distance between the proposed dewatering pad areas from the nearest sensitive receptors (see Section 4.6, Air Quality for information about the proposed project). However, similar to the Proposed Project, this impact would remain a temporary significant and unavoidable impact because it is difficult to predict the nature and duration of odor emissions from decomposition.

Section 5.10.4 Biological Resources, Pages 5-119 through 5-123

Mitigation Measures

The following mitigation measures are required to reduce significant direct and indirect impacts to the California least tern, eelgrass habitats, jurisdictional waters and San Diego Bay surface water to a level below significance. The measures are organized to correlate to the various significant impacts identified above by issue area. In addition to the mitigation measures identified below, the Convair Lagoon Alternative would be required to implement mitigation measures 4.5.1 through 4.5.11, listed in section 4.5, Biological Resources, listed in the Shipyard Sediment Site EIR. Under this alternative, mitigation measures 4.5.2 through 4.5.9 would be applied to all construction activities associated with the Convair Lagoon Alternative and would not be limited to the dredging and dewatering activities at the Shipyard Sediment Project Site.

Mitigation Measure 5.10.4.2: Prior to the start of any phase of construction, a pre-construction survey for the invasive alga, *Caulerpa taxifolia*, shall be performed by a ~~qualified biologist~~ certified Caulerpa surveyor, retained by the construction contractor. The survey shall be completed during the high growth period of *Caulerpa taxifolia* , March 1st though October 31st. Surveys outside the high growth period shall be allowed on a case-by-case basis by the appropriate regulatory agency in consultation with NMFS and CDFG. ~~This~~ The survey shall be conducted in conformance with the Caulerpa Control Protocol version 3 (National Marine Fisheries Service 2007), prior to any bottom disturbing events, and shall be submitted to the National Oceanic and Atmospheric Administration (NOAA) Fisheries/CDFG Contacts within 15 days of survey completion. The following survey conditions shall be followed, but not limited to:

a) Prior to initiation of any permitted Disturbing Activity , a pre-construction survey of the project Area of Potential Effect (APE) shall be conducted to determine the presence or absence of *Caulerpa*. Survey work shall be completed not earlier than 90 days prior to construction and not later than 30 days prior to construction.

b) In the event that *Caulerpa* is detected, construction shall not be conducted until such time as the infestation has been isolated, treated or the risk of spread from the proposed construction is eliminated in accordance with *Caulerpa* Control Protocol version 3 (National Marine Fisheries Service 2007).

If *Caulerpa taxifolia* is not found during the above survey, then construction can proceed, as approved by NOAA Fisheries/CDFG Contacts. If *Caulerpa taxifolia* is found during the survey, the following measures shall be followed:

a) NOAA Fisheries/CDFG Contacts shall be notified within 24 hours of the discovery.

b) All *Caulerpa taxifolia* assessment and treatment shall be conducted under the auspices of the CDFG and NOAA Fisheries as the state and federal lead agencies for implementation of *Caulerpa* eradication in California.

c) Within 96 hours of NOAA Fisheries/CDFG Contact notification, the extent of the *Caulerpa* infestation within the project site shall be fully documented. *Caulerpa taxifolia* eradication activities shall be

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undertaken using the best available technologies at the time and will depend upon the specific circumstances of the infestation. Eradication activities may include in situ treatment using contained chlorine applications, and may also incorporate mechanical removal methods. The eradication technique is subject to change at the discretion of NOAA Fisheries and CDFG and as technologies are refined.

d) The efficacy of treatment shall be determined prior to proceeding with permitted activities. To determine effectiveness of the treatment efforts, a written Sampling and Analysis Plan (SAP) shall be prepared. The plan shall be developed in conjunction with the CDFG and NOAA Fisheries and shall be approved by these agencies prior to implementation.

The San Diego Water Board shall verify implementation of this mitigation measure.

~~If Caulerpa taxifolia is not found, then construction can proceed. If it is found, then the following shall be undertaken by the project applicant to eradicate this species in the construction area prior to beginning any bottom disturbing activities, including but not limited to:~~

~~a) The disturbing activity shall not be conducted until such time as the infestation has been isolated, treated or the risk of spread from the proposed disturbing activity is eliminated;~~

~~b) National Oceanic and Atmospheric Administration (NOAA) Fisheries/CDFG Contacts shall be notified within 24 hours of the discovery;~~

~~c) Within 96 hours of notification, the extent of the Caulerpa infestation within the site APE shall be fully documented. Caulerpa eradication activities shall be undertaken using the best available technologies at the time and will depend upon the specific circumstances ofthe infestation. This activity may include in situ treatment using contained chlorine applications, and may also incorporate mechanical removal methods. The eradication technique is subject to change at the discretion of NOAA Fisheries and CDFG and as technologies are refined.~~

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Mitigation Measure 5.10.4.3: **Eelgrass and Local Policy Conflicts.** For direct and indirect eelgrass impacts at Convair Lagoon, and in ~~In~~ accordance with the current Southern California Eelgrass Mitigation Policy (SCEMP), approximately 7.22 acres of eelgrass shall be replaced by the construction contractor and a qualified biologist through a transplant method to achieve a 1.2:1 replacement ratio for the loss of 6.01 acres of existing eelgrass, through the following methods. Prior to implementation of these methods, a pre- and post-construction survey shall be conducted by a qualified biologist, retained by the construction contractor~~, within 30 days of project commencement and completion~~. The pre-construction eelgrass habitat mapping survey for the Convair Lagoon Site shall be completed by the applicant within 120 days of the proposed start dates of each construction phase in accordance with the SCEMP to document the amount of eelgrass that will likely be affected by construction activity. The post-construction survey shall be completed by the applicant within 30 days of the completion of construction. These surveys shall be used to determine specific mitigation:

a) A final eelgrass mitigation plan shall be prepared and approved by the ACOE, acting in conjunction with the resource agencies, including the San Diego Water Board, NMFS, USFWS, EPA, and the CDFG. The results of the pre-construction survey shall be integrated into a final Eelgrass Mitigation Plan for the project and used to calculate the amount of eelgrass to be mitigated. The plan shall include details and descriptions regarding the chosen mitigation site, transplant methods, program schedule, 5-year monitoring program, success criteria, and actions to undertake for failed mitigation goals, consistent with the SCEMP. Transplantation of eelgrass shall occur only with the written approval of the CDFG.

b) Mitigation methods for eelgrass shall include creating eelgrass habitat at one or more locations within the San Diego Bay by raising the bay floor elevation to approximately -5 ft MLLW with dredged materials and planting eelgrass on the elevated plateau. Replacement mitigation for eelgrass may occur in one or more of the following locations, as approved by the resource agencies NMFS, USFWS, EPA, CDFG and ACOE: 1) Naval Training Center (NTC) channel; 2) Harbor Island – West Basin; 3) Adjacent to Convair Lagoon; 4) A-8 Anchorage; 4) South Bay Borrow Site; 5) South Bay Power Plant Channel; 6) South Bay Power Plant; and 7) Emory Cove Channel. Brief descriptions of these potential mitigation sites are described in Table 5-25 below. A-2-50

c) The post-construction eelgrass survey shall be submitted to the NMFS, USFWS, CDFG, and the Executive Director of the CCC, as well as the San Diego Water Board. ~~An eelgrass mitigation plan shall be prepared and approved by the ACOE, acting in conjunction with the resource agencies, including NMFS, USFWS, EPA, and the CDFG. The plan shall include details and descriptions regarding the chosen mitigation site, transplant methods, program schedule, 5-year monitoring program, success criteria, and actions to undertake for failed mitigation goals, consistent with the Southern California Eelgrass Mitigation Policy. Transplantation of eelgrass shall occur only with the written approval of the CDFG.~~

d) Criteria for determination of transplant success at the selected mitigation site shall be based upon a comparison of vegetation coverage (area) and density (turions[1] per square meter) between the adjusted impact area (original impact area multiplied by 1.2 or the amount of eelgrass habitat to be successfully mitigated at the end of 5 years) and the mitigation site(s). The extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than 1 meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed. Specific criteria are as follows:

[1] A turion is a specialized overwintering bud produced by aquatic herbs.

- The mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.
- The mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.
- The mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth, and fifth years.
- The final determined amount of eelgrass to be transplanted shall be based upon the guidelines in the SCEMP. If remedial transplants at the project site are unsuccessful, then eelgrass mitigation shall be pursued at the secondary eelgrass transplant location.

The San Diego Water Board shall verify implementation of this mitigation measure.

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Mitigation Measure 5.10.4.4: **Jurisdictional Waters and San Diego Bay Surface Loss.** New bay habitat shall be created within an alternative location of the San Diego Bay via excavation of shoreline and creation of tidal influence in previously non-tidal areas. The mitigation ratio for the loss of 8.5 acres of intertidal and subtidal habitats would occur at a 1:1 ratio. The coastal salt marsh habitat shall be mitigated at a 4:1 ratio (i.e., creation of 0.44 acres of salt marsh habitat for 0.11 acres impact). This shall include:

a). The removal and disposal or reuse of historic fills;

b). Grading the site to a desired hydrologic condition of channels, subtidal basins, and intertidal flats in order to support desired compensatory habitat; and

c). Planting pilot vegetation plots to allow for natural expansion of marshland vegetation.

The creation of new bay surface water habitat may occur in one or more of the following locations, as approved by the resource agencies NMFS, USFWS, EPA, CDFG and ACOE: 1) Grand Caribe Isle in the Coronado Cays; 2) D Street Fill just across the Sweetwater Channel from the National City Marine Terminal; 3) the South Bay Power Plant; 4) the Salt Works; and/or; 5) Pond 20 adjacent to the Salt Works. The approved mitigation site shall be lowered from upland elevations to create intertidal and subtidal habitats, except for the South Bay Power Plant, which would require filling the existing intake and discharge channels of the power plant to create tidal lands. The mitigation ratio for intertidal and subtidal habitats would occur at a 1:1 ratio; however, the coastal salt marsh habitat would have to be mitigated at a 4:1 ratio. These ratios would require the replacement of approximately 3.9 acres of intertidal habitat, 4.49 acres of shallow subtidal habitat, 0.31 acres of moderately deep and deep subtidal habitat (which would most likely be replaced as intertidal habitat due to habitat value) and 0.44 acres of coastal salt marsh habitat. Brief descriptions of the potential mitigation locations for jurisdictional and San Diego Bay surface loss impacts are described Table 5-26. The San Diego Water Board shall verify implementation of this measure.

Section 5.10.6 Geology and Soils, pages 5-167 and 5-168

Mitigation Measure 5.10.6.1: **Detailed Site-specific Geotechnical Investigation.** Prior to construction of the Convair Lagoon Alternative, a detailed site-specific geotechnical investigation will be conducted by a qualified geologist retained by the applicant to determine specific geologic recommendations for the development of the containment barrier and storm drains. Areas of hydro-collapse, soft ground, expansive soils, compressible soils, liquefaction, shallow groundwater, and corrosive soils will be identified as part of the geotechnical investigation. The investigation will specifically address the proposed containment barrier, storm drains, and asphalt improvement stability in these identified geologic hazard areas. The geotechnical investigation shall be submitted to the San Diego Water Board for review and approval, prior to the issuance of a construction permit. The geotechnical investigation will comply with the specifications provided in the Naval Facilities Engineering Command (NAVFAC), DM-7.2, Foundations and Earth Structures, dated September, as well as the City of San Diego Building Division plans and the City of San Diego Engineering Department local grading ordinances. Recommendations made in conjunction with the geotechnical investigations will be implemented during construction. The qualified geologist shall periodically confirm that these measures are being implemented, including (as appropriate) but not necessarily limited to the following actions: A-2-50

1. Over-excavate unsuitable materials associated with the confinement structure and replace them with imported engineered fill.
2. Confine unstable soils to deeper fill areas of the site.
3. Perform densification of soils in the area beneath the proposed containment structure through geotechnical engineering methods such as stone columns, compaction grouting, or deep dynamic compaction.
4. Select an engineering foundation design to accommodate the expected effects of liquefaction. Examples of types of foundation design that might be appropriate given the soil conditions include gravel bedding for the storm drain pipes and a pipe bell with flexibility to accommodate differential settlement.
5. Consider potential corrosion issues related to storm drain pipe degradation in the design of this improvement where it would contact corrosive soils or be subject to other corrosive forces.
6. Establish and implement a long-term monitoring and repair program to monitor the integrity of the asphalt, containment barrier and storm drains. Key features of the program include determination of the periodic review, the type of review, identification of potential

problems that may occur in the future, and the methods that would be used to rectify any problems discovered.

The San Diego Water Board shall verify implementation of this mitigation measure.

Section 5.10.8 Hazards and Hazardous Materials, Page 5-212

Mitigation Measures

The Convair Lagoon Alternative is required to implement Mitigation Measures 4.3.1 through 4.3.8, listed in the Shipyard Sediment Site EIR, Section 4.3, Hazards and Hazardous Materials. These measures require the implementation of: secondary containment, a dredging management plan, a contingency plan, a health and safety plan, a communication plan, a sediment management plan, and a hazardous materials transportation plan and traffic control plan. Under this alternative, mitigation measures 4.3.1 through 4.3.8 would be applied to all construction activities associated with the Convair Lagoon Alternative and would not be limited to dredging and dewatering activities at the Shipyard Sediment Project Site.

Section 5.10.9 Hydrology and Water Quality. Pages 5-227 to 5-230

Mitigation Measures

In addition to the following mitigation measures, the Convair Lagoon Alternative is required to implement mitigation measures 4.2.1 through 4.2.13, listed in the Shipyard Sediment Site EIR, Section 4.2, Water Quality. Under this alternative, mitigation measures 4.2.1 through 4.2.9 would apply to all construction activities associated with the Convair Lagoon Alternative and would not be limited to dredging and dewatering activities at the Shipyard Sediment Project Site. A-2-50

Threshold 5.10.9.1: Water Quality, All Phases Construction

Mitigation Measure 5.7.9.1: **Construction Equipment Spills/Leaks.** Prior to construction, tThe ~~contractor/operator for~~ construction contractor ~~of the Convair Lagoon Alternative~~ shall create and implement a Spill Prevention, Control and Countermeasure Plan, which shall apply to oil and hazardous material spills into waters of the U.S., in quantities that may be harmful. The contractor/operator shall submit the Spill Prevention, Control and Countermeasure Plan to the San Diego Water Board for review. The Spill Prevention, Control and Countermeasure Plan shall identify the contractor's responsible parties, precautionary measures to reduce the likelihood of spills, and the spill response and reporting procedures in case a spill occurs, in compliance with the requirements of the Clean Water Act.

~~During operations, personnel shall perform visual monitoring of equipment for spills or leaks.~~ If a spill/leak is observed, the equipment shall be immediately shut down, the source of the spill/leak shall be identified, and the spill/leak shall be contained, in accordance with the measures identified in the Spill Prevention, Control and Countermeasure Plan.

In the event of a spill of materials from a barge, an oil boom shall be deployed in the vicinity of the barge to facilitate the containment of the spill/leaks. An oil boom shall be located on site during all construction activities so that it is readily available in the event of a spill. Oil retrieval and disposal shall be conducted in accordance with the alternative's Spill

Prevention, Control and Countermeasure Plan. The San Diego Water Board shall be responsible for ensuring adherence to the requirements of this measure.

~~The following BMPs shall be implemented to minimize the potential for accidental spills/leaks to occur and to minimize fluids entering the bay:~~
~~Oils and fuels shall be housed in secondary containment structures.~~
~~Spill cleanup kits shall be available at various locations on site.~~
~~Personnel shall be trained on the locations of the kits and their proper use and disposal.~~
~~Personnel shall be trained on the potential hazards from accidental spills and leaks to increase awareness of the materials being handled and the potential impacts.~~
~~Routine maintenance and inspections of equipment containing oil, fuel, or other hazardous fluids shall be performed to identify worn or faulty parts and needed repairs.~~
~~The contractor/operator for construction of the Convair Lagoon Alternative shall create and implement a Spill Prevention, Control and Countermeasure Plan, which shall apply to oil and hazardous material spills into waters of the U.S., in quantities that may be harmful. The Spill Prevention, Control and Countermeasure Plan shall identify the contractor's responsible parties, precautionary measures to reduce the likelihood of spills, and the spill response and reporting procedures in case a spill occurs, in compliance with the requirements of the Clean Water Act.~~
~~During operations, personnel shall perform visual monitoring of equipment for spills or leaks. If a spill/leak is observed, the equipment shall be immediately shut down, the source of the spill/leak shall be identified, and the spill/leak shall be contained, in accordance with the measures identified in the Spill Prevention, Control and Countermeasure Plan.~~
~~In the event of a spill of materials from a barge, an oil boom shall be deployed in the vicinity of the barge to facilitate the containment of the spill/leaks. An oil boom shall be located on site during all construction activities so that it is readily available in the event of a spill. Oil retrieval and disposal shall be conducted in accordance with the alternative's Spill Prevention, Control and Countermeasure Plan.~~

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Mitigation Measure 5.10.9.2: **Water Quality Monitoring**. Water quality monitoring shall be performed during in-water activities (e.g., demolition, dredging, rock placement, dredge placement) to obtain real-time data so that potential impacts to water quality can be quickly detected and activities modified to avoid impairing or degrading water quality. A system for monitoring of turbidity in the water column in the vicinity of dredging and excavation activities shall be used to assist the operator in adjusting or modifying operations to reduce temporary water quality impacts. Prior to commencement of demolition activities on the project site, the construction contractor shall prepare ~~and implement~~ a water quality monitoring plan which shall include the evaluation of turbidity levels. The construction contractor shall submit the water quality monitoring plan to the San Diego Water Board for review and approval. Upon approval by the San Diego Water Board, the construction contractor shall implement the water quality monitoring plan. Monitoring shall be performed in at least three locations. The monitoring stations shall be located: 1) approximately 500 feet upstream of the work area, 2) immediately inside the work area, 3) approximately 250 feet downstream from the work area. The station immediately inside the work area shall be visually monitored. If a turbidity plume is observed, then monitoring of the 250-foot and 500-foot stations shall begin. Samples collected at the 250-foot station are intended to be a screening tool to warn of potential impacts that may reach the 500-foot station. If the water quality samples downstream from the work area are 20 percent greater than the upstream samples, then work shall be halted, the cause of the exceedance shall be identified and additional BMPs, depending on the particular activity (demolition, rock placement or sediment placement) shall be implemented and monitored for effectiveness. Additional BMPs may require modifications to the activity (duration, frequency, location, equipment, and sequencing). The San Diego Water Board shall be responsible for ensuring adherence to the requirements of this measure.

Threshold 5.10.9.1: Water Quality, Phase 1 Construction
Mitigation Measure 5.10.9.3: **Low Tide Demolition.** Demolition activities for submerged structures during Phase 1 of construction shall be scheduled during low tides to expose as much of the submerged structures as possible and to reduce disturbance of sediments or a silt curtain shall be used to control turbidity. The San Diego Water Board shall be responsible for ensuring adherence to the requirements of this measure.

Threshold 5.10.9.1: Water Quality, Phase 4 Construction
Mitigation Measure 5.10.9.4: **Dredging Equipment Selection.** The dredge bucket shall be enclosed to reduce re-suspension caused by dredge spoils falling back into the bay. The San Diego Water Board shall be responsible for ensuring adherence to the requirements of this measure.

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Mitigation Measure 5.10.9.5: **Dredging Placement BMPs.** The following BMPs shall be implemented to minimize the re-suspension or spillage of sediments during the placement of dredged materials:

~~1. Dredged soils shall not be stockpiled on the floor of the San Diego Bay;~~

~~2. The dredge bucket shall be fully closed before withdrawing from loading activities;~~

~~3. The dredge bucket and barge shall not be overfilled. This shall occur by visual monitoring and visual markings on the barge to indicate limits of fill;~~

~~4. A spill plate shall be placed between the barge and the landside to prevent spillage from falling into the bay water;~~

1~~5~~. A weir shall be constructed on or near the containment jetty to provide a method to release site water displaced during the placement of fill in CDF. The weir may consist of a low crest in the containment jetty or a pipe in the structural fill of the barrier. The weir outflow will be monitored as described in mitigation measure 5.10.9.2. If an exceedance occurs, a filter fabric barrier or floating silt curtain shall be installed across or just outside of the weir outflow to minimize the potential for suspended sediments to enter the water outside of the CDF. A-2-50

2~~6~~. Multiple bites with the dredge bucket shall be prohibited;

3~~7~~. Dredged material shall be placed carefully and the bucket drop height shall be limited to minimize splashing or sloshing, based on crane operator observations and water quality turbidity;

4~~8~~. Barge movement and speed shall be in conformance with safe practices.

The San Diego Water Board shall be responsible for ensuring adherence to the requirements of this measure.

Table 1. Cost Estimate Project Assumptions and Draft EIR Project Assumptions Consistency Analysis
(Revised Tentative Cleanup and Abatement Order and Draft Technical Report: Table A32-26, Supporting Calculations for Section 32.7.1 Technological and Economical Feasibility)

ID No.	Cost Estimate Item	Cost Estimate Project Assumption	Draft EIR Project Description Inconsistency	Applicable Environmental Issues
Construction Preparation				
C1	Mobilizations and Demobilizations	Estimate assumes work is completed in 3 construction seasons.	Construction schedule identified in the Draft EIR Project Description on page 3-5. Page 3-5 states: *"There are two scheduling options for completion of the remedial action. The first scheduling option is expected to take 2 to 2.5 years to complete. Under this option, the dredging operations would occur for 7 months of the year and would cease from April through August during the endangered California least tern breeding season.* *The second option is to implement the remedial plan with continuous dredging operations, which would be expected to take approximately 12.5 months to complete. This scenario assumes that the dewatering, solidification, and stockpiling of the materials would occur simultaneously and continuously with the dredging. Also assumed under this compressed schedule option is that dredging operations could proceed year-round, including during the breeding season of the endangered California least tern (April through August)."*	Air Quality
C2	Demolition	Includes demolition of dormant BAE pier.	Demolition of the BAE pier is not included in Chapter 3, Project Description, of the Draft EIR.	Air Quality / Transportation and Circulation
Dredging				
D1	Dredging Surface/Subsurface debris	Unknown quantity. Estimates assume 5% of dredge volume. Pricing includes landfill disposal.	Chapter 3, Project Description, of the Draft EIR states landfill disposal will occur at Kettleman Hills Landfill in Kings County (15%) and Otay Landfill in San Diego County (85%).	Air Quality / Transportation and Circulation
D2	Engineering controls (silt curtain, oil boom)	Estimate assumes work is completed in 3 construction seasons.	Three construction seasons is not consistent with construction schedule identified in the Draft EIR Project Description on page 3-5.	Air Quality
D3	Additional dredging	28,100 cy from two feet of dredging over one half of the remedial area. Same unit costs as for constrained dredging from inner shipyard.	Chapter 3, Project Description, of the Draft EIR does not include two feet of additional dredging. Total dredge volume is identified as 143,400 cy on page 3-6.	Air Quality / Transportation and Circulation

A-2-51

ID No.	Cost Estimate Item	Cost Estimate Project Assumption	Draft EIR Project Description Inconsistency	Applicable Environmental Issues
Marine Structures				
M1	Placement of quarry run rock for protection of marine structures	21,887 tons. No structural retrofit of structures is assumed to be necessary. Estimated costs assume setback of dredging from marine structures and revetments, and placement of quarry run blankets or berms to reinstate lateral resistance.	Chapter 3, Project Description, has no mention of quarry run rock for protection of marine structures.	Air Quality / Transportation and Circulation
Sediment Offloading and Disposal				
S1	Acquisition/lease of sediment offloading area	An off-site sediment staging area will be needed in the vicinity of the project area. Location is unknown at this time. Costs assume a three year construction period.	Three year construction period is not consistent with construction schedule identified in the Draft EIR Project Description on page 3-5.	Air Quality
S2	Rehandling and Dewatering	Assumes stockpiling of sediments prior to transport to landfill and addition of lime or cement mixture to facilitate dewatering. Based on 171,500 CY estimate.	Chapter 3, Project Description, states 164,910 CY, including cement-based reagent for dewatering quantity.	Air Quality / Transportation and Circulation
S3	Transportation and Disposal at Landfill	Assumes disposal at regional hazardous waste landfill outside of San Diego County (Copper Mountain in Nevada). Assuming 257,250 tons.	Landfill disposal will occur at Kettleman Hills Landfill in Kings County (15%) and Otay Landfill in San Diego County (85%). 39,579 tons disposed of at Kettleman Hills Landfill & 224,278 tons disposed of at Otay landfill (page 3-9).	Air Quality / Transportation and Circulation
Underpier Remediation				
U1	Placement of clean sand cover	Assumes ½ of dredged area receives 1-3 feet of sand.	Chapter 3, Project Description, assumes only contaminated soils under the pier and pilings will receive sand cover.	Air Quality / Transportation and Circulation
U2	Construction Management	Estimate assumes work is completed in 3 construction seasons.	Three construction seasons is not consistent with construction schedule identified in the Draft EIR Project Description on page 3-5.	Air Quality

A-2-51

GW

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

A-3

July 1, 2011 2011 JUL -5 P 2:58

Mr. Vincente Rodriguez
California Water Quality Control Board – San Diego Region
9174 Sky Park Ct., Suite 100
San Diego, CA 92123

Re: SCH#2009111098; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the **"Shipyard Sediment Remediation Project"** located in San Diego Bay; San Diego County, California

Dear Mr. Rodriguez:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources. The NAHC wishes to comment on the above-referenced proposed Project.

This letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC Sacred Lands File (SLF) search resulted in; **Native American cultural resources were not identified** within the 'area of potential effect (APE), based on the USGS coordinates of the project location provided. The absence of archaeological items at the surface level does not preclude their existence at the subsurface level once ground-breaking activity is underway. A-3-1

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254.10.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural A-3-2

A-3-2

significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to C"A Public Resources Code § 5097.95, the NAHC requests that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and Section 2183.2 that requires documentation, data recovery of cultural resources.

A-3-3

Furthermore we recommend, also, that you contact the California Historic Resources Information System (CHRIS) California Office of Historic Preservation for pertinent archaeological data within or near the APE, at (916) 445-7000 for the nearest Information Center in order to learn what archaeological fixtures may have been recorded in the APE.

A-3-4

Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation.

A-3-5

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'.

A-3-6

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

A-3-7

The response to this search for Native American cultural resources is conducted in the NAHC Sacred Lands Inventory, established by the California Legislature (CA Public Resources Code 5097.94(a) and is exempt from the CA Public Records Act (c.f. California Government Code 6254.10) although Native Americans on the attached contact list may wish to reveal the nature of identified cultural resources/historic properties. Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places and there may be sites within the APE eligible for listing on the California Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity. A-3-7

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251. A-3-8

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

California Native American Contact List
San Diego County
July 1, 2011

A-3

Barona Group of the Capitan Grande
Edwin Romero, Chairperson
1095 Barona Road — Diegueno
Lakeside , CA 92040
sue@barona-nsn.gov
(619) 443-6612
619-443-0681

Sycuan Band of the Kumeyaay Nation
Danny Tucker, Chairperson
5459 Sycuan Road — Diegueno/Kumeyaay
El Cajon , CA 92021
ssilva@sycuan-nsn.gov
619 445-2613
619 445-1927 Fax

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
PO Box 1120 — Diegueno/Kumeyaay
Boulevard , CA 91905
gparada@lapostacasino.
(619) 478-2113
619-478-2125

Viejas Band of Kumeyaay Indians
Anthony R. Pico, Chairperson
PO Box 908 — Diegueno/Kumeyaay
Alpine , CA 91903
jrothauff@viejas-nsn.gov
(619) 445-3810
(619) 445-5337 Fax

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
PO Box 365 — Diegueno
Valley Center, CA 92082
allenl@sanpasqualband.com
(760) 749-3200
(760) 749-3876 Fax

Kumeyaay Cultural Historic Committee
Ron Christman
56 Viejas Grade Road — Diegueno/Kumeyaay
Alpine , CA 92001
(619) 445-0385

Iipay Nation of Santa Ysabel
Virgil Perez, Spokesman
PO Box 130 — Diegueno
Santa Ysabel, CA 92070
brandietaylor@yahoo.com
(760) 765-0845
(760) 765-0320 Fax

Campo Kumeyaay Nation
Monique LaChappa, Chairperson
36190 Church Road, Suite 1 — Diegueno/Kumeyaay
Campo , CA 91906
(619) 478-9046
miachappa@campo-nsn.gov
(619) 478-5818 Fax

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2009111098; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the Shipyard Sediment Remediation Project; located on San Diego Bay; San Diego County, California.

Jamul Indian Village
Kenneth Meza, Chairperson
P.O. Box 612 — Dieguено/Kumeyaay
Jamul , CA 91935
jamulrez@sctdv.net
(619) 669-4785
(619) 669-48178 - Fax

Inaja Band of Mission Indians
Rebecca Osuna, Spokesperson
2005 S. Escondido Blvd. — Dieguено
Escondido , CA 92025
(760) 737-7628
(760) 747-8568 Fax

Mesa Grande Band of Mission Indians
Mark Romero, Chairperson
P.O Box 270 — Dieguено
Santa Ysabel, CA 92070
mesagrandeband@msn.com
(760) 782-3818
(760) 782-9092 Fax

Kumeyaay Cultural Repatriation Committee
Steve Banegas, Spokesperson
1095 Barona Road — Dieguено/Kumeyaay
Lakeside , CA 92040
(619) 742-5587 - cell
(619) 742-5587
(619) 443-0681 FAX

Kumeyaay Cultural Heritage Preservation
Paul Cuero
36190 Church Road, Suite 5 — Dieguено/ Kumeyaay
Campo , CA 91906
(619) 478-9046
(619) 478-9505
(619) 478-5818 Fax

Ewiiaapaayp Tribal Office
Will Micklin, Executive Director
4054 Willows Road — Dieguено/Kumeyaay
Alpine , CA 91901
wmicklin@leaningrock.net
(619) 445-6315 - voice
(619) 445-9126 - fax

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas
P.O. Box 775 — Dieguено -
Pine Valley , CA 91962
(619) 709-4207

Ewiiaapaayp Tribal Office
Michael Garcia, Vice Chairperson
4054 Willows Road — Dieguено/Kumeyaay
Alpine , CA 91901
michaelg@leaningrock.net
(619) 445-6315 - voice
(619) 445-9126 - fax

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This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2009111098; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the Shipyard Sediment Remediation Project; located on San Diego Bay; San Diego County, California.

Ipai Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507 Dieguenno/Kumeyaay
Santa Ysabel, CA 92070
cjlinton73@aol.com
(760) 803-5694
cjlinton73@aol.com

Kumeyaay Cultural Repatriation Committee
Bernice Paipa, Vice Spokesperson
P.O. Box 1120 Dieguenno/Kumeyaay
Boulevard , CA 91905
(619) 478-2113

Manzanita Band of the Kumeyaay Nation
Leroy J. Elliott, Chairperson
P.O. Box 1302 Dieguenno/Kumeyaay
Boulevard , CA 91905
(619) 766-4930
(619) 766-4957 - FAX

Kumeyaay Diegueno Land Conservancy
M. Louis Guassac, Executive Director
P.O. Box 1992 Dieguenno/Kumeyaay
Alpine , CA 91903
guassacl@onebox.com
(619) 952-8430

Viejas Kumeyaay Indian Reservation
Frank Brown
240 Brown Road Dieguenno/Kumeyaay
Alpine , CA 91901
FIREFIGHTER69TFF@AOL.
619) 884-6437

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2009111098; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the Shipyard Sediment Remediation Project; located on San Diego Bay; San Diego County, California.

Department of Toxic Substances Control

SAN DIEGO REGIONAL
CONTROL BOARD

Linda S. Adams
Acting Secretary for
Environmental Protection

Deborah O. Raphael, Director
5796 Corporate Avenue
Cypress, California 90630

2011 JUL 29 P 4: 09

Edmund G. Brown Jr.
Governor

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A-4

July 28, 2011

Mr. Vicente Rodriguez
9174 Sky Park Court., Suite 100
San Diego, California 92123

NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE SHIPYARD SEDIMENT REMEDIATION PROJECT, (SCH #2009111098), SAN DIEGO COUNTY

Dear Mr. Rodriguez:

The Department of Toxic Substances Control (DTSC) has received your submitted draft Environmental Impact Report (EIR) for the above-mentioned project. The following project description is stated in your document: "The proposed Shipyard Sediment Remediation Project (proposed project) is the dredging of sediment adjacent to shipyards in the San Diego Bay; the dewatering, solidification of the dredged material (onshore or on a barge); the potential treatment of decanted water (anticipated disposal to the sanitary sewer system); and the transport of the removed material to an appropriate landfill for disposal. The project consists of marine sediments in the bottom bay waters that contain elevated levels of pollutants above San Diego bay background conditions. The purpose of the project is to implement a Tentative Cleanup and Abatement Order (CAO) issued by the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board). The sediment removal site is located along the eastern shore of central San Diego Bay, extending approximately from the Sampson Street Extension on the northwest to Chollas Creek on the southeast, and from the shoreline out to the San Diego Bay main shipping channel to the west. The Shipyard Sediment Site is more specifically bounded by the waters of R.E. Staite facility on the north, the 28th Street Pier on the south, the open waters and shipways of San Diego Bay on the west, and the shoreline of three leaseholds on the east". A-4-1

Based on the review of the submitted document DTSC has the following comments:

1) DTSC provided comments on the project Notice of Preparation (NOP) on December 22, 2009; some of those comments have been addressed in the A-4-2

1102718

submitted draft Environmental Impact Report. Please ensure that all those comments will be addressed in the final EIR. A-4-2

2) If it is determined that hazardous wastes are, or will be, generated by the proposed operations, the wastes must be managed in accordance with the California Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (California Code of Regulations, Title 22, Division 4.5). Certain hazardous waste treatment processes or hazardous materials, handling, storage or uses may require authorization from the local Certified Unified Program Agency (CUPA), or DTSC. A-4-3

3) The Navy identified areas where munitions and ordnances have been found and areas with high potential of having munitions and ordnances in more than a hundred locations along the channels. There are at least two areas where munitions have been found at the project location referenced in the EIR and a few more such areas are located in close proximity to the project (see attached map). A-4-4

4) The Navy is currently conducting sonar and electromagnetic scans of the channel focused on the areas containing and potentially containing munitions, for possible response actions. This project is undertaken by the NAVFAC Southwest Division under the project reference: MRP Site 100 San Diego Bay Primary Ship Channels. Any projects within the San Diego Bay Ship Channels must be coordinated with the Navy NAVFAC Southwest Division in San Diego for munitions clearance. A-4-5

If you have any questions regarding this letter, please contact Rafiq Ahmed, Project Manager, at rahmed@dtsc.ca.gov, or by phone at (714) 484-5491. A-4-6

Sincerely,

Greg Holmes
Unit Chief
Brownfields and Environmental Restoration Program

Enclosure

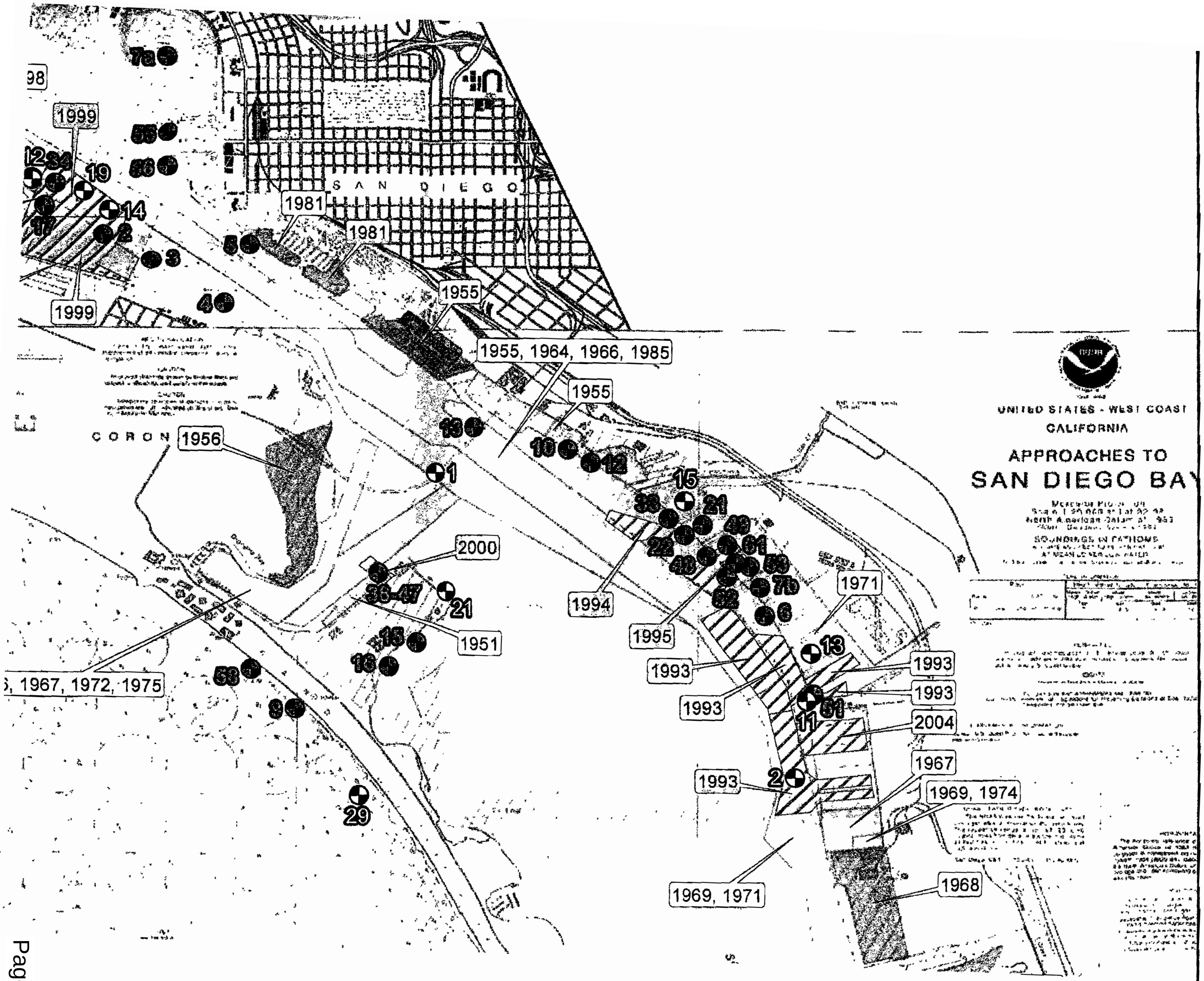
cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044
state.clearinghouse@opr.ca.gov

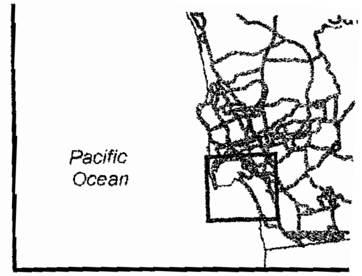
cc: CEQA Tracking Center
Department of Toxic Substances Control
Office of Environmental Planning and Analysis
P.O. Box 806
Sacramento, California 95812
Attn: Nancy Ritter
nritter@dtsc.ca.gov

Brian McDaniel, Engineering Geologist, M.S., PG 7272
California Environmental Protection Agency
California Water Quality Control Board - San Diego Region
9174 Sky Park Court, Ste 100
San Diego, CA 92123-4340

Terry Martin
EV Business Line Team Lead
Coastal Integrated Product Team
2730 McKean St. Bldg 291
San Diego, CA 92136

CEQA # 3253





LEGEND

- Munitions AOPC
- Munitions Found '
- Compiled Dredge
- Dredging Areas -
- Fill Areas - Post1
- Dredging Area, 1
- Landfill Area,191
- Restricted Areas

Notes:
1. AOPC - Area of Potentia
2. SI - Site Inspection

References:
Bechtel National, Inc (Bec
Assessment of Munitions
Channels and U.S.S. Ste
October.

Peeling, T.J. 1974. A Pro

GW
V. Rodriguez

STATE OF CALIFORNIA EDMUND G. BROWN JR., *Governor*

CALIFORNIA STATE LANDS COMMISSION
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

CURTIS L. FOSSUM, *Executive Officer*
(916) 574-1800 FAX (916) 574-1810
California Relay Service From TDD Phone **1-800-735-2929**
from Voice Phone **1-800-735-2922**

Contact Phone: **(916) 574-1890**
Contact FAX: **(916) 574-1885**

August 1, 2011

A-5

File Ref: **SCH# 2009111098**

California Regional Water Quality Control Board, San Diego Region
Attention: Vicente Rodriguez
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Subject: Draft Program Environmental Impact Report (PEIR) for the Shipyard Sediment Remediation Project, San Diego, San Diego County

Dear Mr. Rodriguez:

Staff of the California State Lands Commission (CSLC) has reviewed the subject draft PEIR for the Shipyard Sediment Remediation Project (Project) prepared by the California Regional Water Quality Control Board, San Diego Region (RWQCB) as the state lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] § 21000 et seq.). The CSLC has prepared these comments as a trustee and responsible agency because of its trust responsibility for projects that could directly or indirectly affect sovereign lands, their accompanying Public Trust resources or uses, and the public easement in navigable waters. A-5-1

Background

CSLC Jurisdiction

The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The CSLC also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (PRC §6301 and §6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust. A-5-2

As general background, the State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion or where the boundary has been fixed by agreement or a court. On navigable non-tidal waterways, including lakes, the State holds fee ownership of the bed of the waterway A-5-3 landward to the ordinary low water mark and a Public Trust easement landward to the ordinary high water mark, except where the boundary has been fixed by agreement or a court. Such boundaries may not be readily apparent from present day site inspections. A-5-3

Proposed Project and Project Location

On September 15, 2010, the RWQCB released Tentative Cleanup and Abatement Order (TCAO) No. 2011-0001 and its associated draft technical report for discharges of metals and other pollutant wastes to San Diego Bay marine sediment and waters located within and adjacent to BAE Systems San Diego Ship Repair and National Steel and Shipbuilding Company leaseholds (the "Shipyard Sediment Site"). The Shipyard Sediment Site is located in San Diego Bay generally between Sampson Street extension and the mouth of Chollas Creek in the city of San Diego. A-5-4

Under the terms of the TCAO over 140,000 cubic yards of contaminated sediments will be removed from approximately 15.2 acres of the Shipyard Sediment Site with dredge buckets. Dredged materials will be disposed of at appropriate landfill facilities. In addition to the 15.2 acres targeted for dredging, approximately 2.3 acres of the Project site are inaccessible or under-pier areas that would be remediated by one or more methods other than dredging, most likely by sand cover. Removal of the marine sediments will require upland areas for dewatering, solidification, and stockpiling of the materials and potential treatment of decanted waters prior to off-site disposal. Therefore, in addition to the open waters of the Shipyard Sediment Site, five upland areas are identified by the RWQCB as potential sediment staging areas. A-5-5

Staging Area	Location	Potentially Usable Acres
1	10th Avenue Marine Terminal and Adjacent Parking	49.66
2	Commercial Berthing Pier and Parking Lots Adjacent to Coronado Bridge	11.66
3	SDG&E Leasehold/BAE Systems Leasehold/BAE Systems and NASSCO Parking Lots	7.27
4	NASSCO/NASSCO Parking and Parking Lot North of Harbor Drive (Staging Area 4 is not located adjacent to the waterfront; therefore, sediment transport from the barge to the staging area would be required)	3.85
5	24th Street Marine Terminal and Adjacent Parking Lots in the city of National City	145.31

Comments on the Draft PEIR

Agency Jurisdiction

1. Based on the information provided in the PEIR and a review of in-house records, the Project will involve: (1) ungranted sovereign lands under the leasing jurisdiction of the CSLC; and (2) sovereign lands legislatively granted originally to the city of San Diego and subsequently transferred to the San Diego Port District A-5-6

(District) pursuant to Chapter 67, Statutes of 1962, and as amended, minerals reserved. Dredging and remediation work on ungranted and granted sovereign lands, as specified in the proposed Project, will require a lease by the CSLC (please refer to www.slc.ca.gov for a lease application). Accordingly, please add the CSLC as a responsible and trustee agency in Table 3-1 of the PEIR. Specific information on the CSLC's jurisdiction is provided above. A-5-6

Program Environmental Review and Mitigation

2. Section 2.1.3 (Level of Review) discusses the "program-level" of review in the PEIR and states that CEQA permits the "Lead Agency" to use "tiering" to "defer analysis of certain details of later phases of long-term linked or complex projects until those phases are up for approval." However, to avoid the improper deferral of mitigation, a common flaw in program-level environmental documents, mitigation measures should either be presented as specific, feasible, enforceable obligations, or should be presented as formulas containing "performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way" (State CEQA Guidelines § 15126.4, subd. (b)).[1] A-5-7

3. Section 2.1.4 (Intended Uses of the PEIR) states "Future decisions and implementing actions following certification of the PEIR and approval of the Project will be subject to subsequent environmental review pursuant to CEQA." The PEIR should make an effort to distinguish what activities and their mitigation measures are being analyzed in sufficient detail to be covered under the PEIR without additional project specific environmental review, and what activities will trigger the need for additional environmental analysis (see State CEQA Guidelines § 15168, subd. (c)). A-5-8

4. For example, Mitigation Measure (MM) 4.5.11 on page 4.5-60, related to sensitive biological resources in the vicinity of Staging Area 5, does not appear to prescribe specific, enforceable measures that would avoid or lessen the potential impact. Instead, MM 4.5.11 defers the formulation and analysis of specific measures to future consultation with the California Department of Fish and Game. The PEIR should either provide specific, stand-alone measures and analyze their effectiveness in reducing potential effects, or should clearly state that those impacts and any required mitigation would be disclosed and analyzed in a subsequent tiered document. A-5-9

Cultural Resources

The Initial Study (IS) for the Project (1) found no impact to cultural resources because the Project does not entail grading undisturbed areas on the site, and the area proposed for dredging consists of recently deposited material and undisturbed subtidal material A-5-10

[1] The "State CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

below the depth that would include cultural resources, and (2) states that standard Best Management Practices (BMPs) will be employed as part of the Project in the event that an archaeological or paleontological resource is found during implementation. A-5-10

5. The latter statement provides for the possibility of an unanticipated cultural resource find. Therefore, the PEIR should discuss and evaluate potential impacts to submerged cultural resources in the Project area. The CSLC maintains a shipwrecks database that can assist with this analysis (see http://shipwrecks.slc.ca.gov); please contact Pam Griggs of this office (contact information below) to obtain results from a search of the shipwrecks database that may contain confidential archaeological site information. The database includes known and potential vessels located on the State's tide and submerged lands; however, the locations of many shipwrecks remain unknown. Please note that any submerged archaeological site or submerged historic resource that has remained in state waters for more than 50 years is presumed to be significant. A-5-11

6. To address any potential impacts to submerged cultural resources and any unanticipated discoveries during the Project's construction, the BMPs should be developed into mitigation measures in the PEIR and included in the Mitigation Monitoring and Reporting Program (MMRP). A-5-12

7. The PEIR should also clearly state that the title to all abandoned shipwrecks, archaeological sites, and historic or cultural resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC. The CSLC requests that the RWQCB consult with CSLC staff, should any cultural resources be discovered during construction of the proposed Project. A-5-13

Climate Change and Greenhouse Gas (GHG) Emissions

Section 4.7 of the PEIR provides a lengthy discussion of the existing setting, regulatory setting and thresholds of significance. In Section 4.7.4, the PEIR estimates that the proposed Project would generate up to 7,750 metric tons of carbon dioxide (CO_2) per year. However, the PEIR then concludes that the proposed Project's contribution to Global Climate Change (GCC) in the form of GHG emissions is less than significant (individually and cumulatively) because the emissions generated are short-term versus ongoing (permanent). The PEIR also notes that the air quality mitigation measures that would reduce emissions from construction-related vehicles and equipment would also reduce CO_2 emissions. A-5-14

8. The PEIR does not present substantial evidence to support the "less than significant impact" conclusion for GHGs. CSLC staff suggests that 7,750 metric tons of CO_2 emissions per year be considered a significant impact that requires mitigation (see California Air Resources Board, "Preliminary Draft Staff Proposal, Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act," Attachment A, Preliminary Draft Proposal for Industrial Projects; see http://www.arb.ca.gov/cc/localgov/ceqa/ceqa.htm). Alternatively, CSLC staff A-5-15

requests that more information be added in the PEIR justifying that 7,750 metric tons of CO_2 emissions per year is less than significant, when the presumption is that emissions of over 7,000 metric tons per year for industrial projects are a significant impact to climate change. A-5-15

9. Similarly, CSLC staff requests that the PEIR reanalyze the appropriateness of the PEIR's conclusion that the cumulative impacts to GCC are less than significant with mitigation incorporation or potentially significant with mitigation incorporation. A-5-16

Thank you for the opportunity to comment on the Draft PEIR. It is anticipated that the CSLC will need to rely on this CEQA document for issuance of a dredging lease; therefore, we request that you consider our comments prior to adoption of the Final PEIR.

A-5-17

Please send copies of future Project-related CEQA documents or refer questions concerning environmental review to Sarah Mongano, Staff Environmental Scientist, at (916) 574-1889 or via e-mail at Sarah.Mongano@slc.ca.gov. Please contact Michelle Andersen at (916) 574-0200 (e-mail: Michelle.Andersen@slc.ca.gov) if you have questions concerning CSLC jurisdiction or leases, or Senior Staff Counsel Pam Griggs at (916) 574-1854 (e-mail: Pamela.Griggs@slc.ca.gov) if you have questions concerning archaeological or historic resources under CSLC jurisdiction.

Sincerely,

Cy R. Oggins, Chief
Division of Environmental Planning
and Management

cc: Office of Planning and Research
M. Andersen, LMD, CSLC
S. Mongano, DEPM, CSLC
P. Griggs, Legal, CSLC

ENVIRON

August 1, 2011

Via Electronic Mail (in PDF)

Ms. Jill Tracy
Senior Environmental Counsel
San Diego Gas & Electric
101 Ash Street, HQ13
San Diego, CA 92101

Re: Draft EIR for the San Diego Shipyard Sediment Site Proposed Remediation

Dear Ms. Tracy:

At the request of San Diego Gas & Electric (SDG&E), ENVIRON International Corporation (ENVIRON) has prepared this letter to highlight potential critical issues associated with draft documents supporting the Environmental Impact Report (EIR) for the proposed San Diego Shipyard Sediment Site (Site) remediation. Although four documents were reviewed[1], the primary focus of ENVIRON's comments concerns the March 31, 2011 *Draft Water Quality Technical Report, Shipyards Sediment Site, San Diego Bay, San Diego, CA* by Geosyntec Consultants (Geosyntec, 2011). O-1-1

ENVIRON notes the following critical issues:

1. **The proposed water column turbidity monitoring plan is insufficient to characterize the potential migration of contaminated sediment to areas adjacent to the Site remedial footprint.** On page 19 of Geosyntec (2011), it is noted that turbidity samples will be collected from the water column at locations 250 and 500 feet from active dredging operations. This monitoring will be conducted to evaluate the effects on water quality due to contaminated sediment suspended during dredging. However, this data will be insufficient for characterizing the deposition of contaminated footprint sediment to areas directly adjacent to the footprint. O-1-2

   For example, at the northwestern end of the footprint, the nearest turbidity monitoring station is located 100 feet beyond the boundary of the non-footprint polygon SW29. There will be no data available to evaluate potential contamination with suspended footprint sediments that deposit to SW29. Although the CRWQCB found in the September 15, 2010 version of the DTR that SW29 did not exhibit Beneficial Use Impairment and did not warrant remedial action, SW29 may be investigated in future CRWQCB action, as noted by David Barker (Chief of the Water Resource Protection Branch of San Diego Regional Water Quality Control Board) during his March 3, 2011 deposition (Barker, 2011 – statements starting at 11:49 AM [2]). Additionally, data will

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[1] 1) *Draft Water Quality Technical Report, Shipyards Sediment Site, San Diego Bay, San Diego, CA*; 2) *Draft Marine Biological Resources Assessment Technical Report, Shipyard Sediment Site, National Steel and Shipbuilding Company (NASSCO), BAE Systems San Diego Ship Repair, Inc.*; 3) *Draft Hazards and Hazardous Materials Technical Report, Shipyards Sediment Site, San Diego Bay, San Diego, CA*; and 4) *Draft Traffic Impact Analysis, Shipyard Sediment Project.*

[2] Barker, D. 2011. Deposition of David Barker, March 3, 2011, San Diego, California.

be unavailable for the area 100 feet to the northwest of SW29, which may be included in a potential SW29 investigation. O-1-2

As the area to the northwest of the footprint may incur future sediment investigations by CRWQCB, ENVIRON recommends that the potential contamination of surface sediments in these areas by the proposed Site dredging activities be better characterized by relocating the turbidity monitoring locations proposed by Geosyntec (2011) to stations closer to the immediate vicinity of the footprint boundary. Further safeguards may include the use of additional turbidity monitoring locations. Either option should include placement of a monitoring station not more than 50 feet from the northwest boundary of the footprint (approximately in the middle of polygon SW29). Additionally, ENVIRON recommends a pre- and post-dredging survey of concentrations of chemicals in surface sediment in SW29 and potentially-relevant areas to the northwest of SW29. Although the currently-proposed turbidity monitoring is a useful line of evidence, it is flawed as proposed and a comparison of pre- and post-dredging concentrations of COCs in surface sediment would serve as a much stronger line of evidence for evaluating the deposition of suspended footprint sediments to this area. O-1-3

2. **Stated post-remedy sediment action levels are incorrect.** On page 20, Geosyntec (2011) notes:

   "*Sediment concentrations in a horizon that represents the first undisturbed depth beneath the dredge depth will be measured. COCs that will be monitored and compared to background sediment chemistry levels include copper, mercury, HPAHs, TBT, and PCBs. The background sediment chemistry levels are presented in Table 1.*"

   This passage is incorrect. Concentrations of the COCs in surface sediment sampled immediately following dredging are to be compared to values corresponding to 120% of the concentrations in background sediment, as discussed on page 34-3 of the CRWQCB's September 15, 2010 version of the DTR. This passage and Table 1 of Geosyntec (2011) should be revised to reflect the approach detailed on page 34-3 of the DTR. O-1-4

3. **Recent investigations by BAE Systems do not appear to have been considered.** Recent Site investigations conducted by BAE Systems (BAE) in support of their late 2010/early 2011 dry dock dredging project do not appear to have been incorporated into the draft EIR materials. During this time period, BAE conducted an investigation of surface and subsurface sediment chemistry in and adjacent to the proposed footprint area. This data is useful for multiple technical aspects of the EIR, including evaluating the likelihood that the dredged materials would be classified as hazardous waste and predicting potential impacts to water quality as a result of chemical releases from sediment. Waste characterization is a key factor in remedial cost allocation, and it is necessary to obtain a clear accounting of this remedial cost element (as well as the remainder of the remedial cost assumptions). Additionally, updated bathymetry in the BAE portion of the Site would likely improve engineering plans for the various remedial approaches. Turbidity and water quality data collected during BAE's dry dock dredging events should also be incorporated in the monitoring and mitigation plans, as they may offer a better understanding of the Site-specific performance of silt curtains and other efforts related to controlling the migration of suspended sediments. O-1-5

4. **Additional engineering and feasibility detail is needed regarding the proposed remedial activity.** There is a paucity of supporting information regarding technical engineering information used to derive the proposed remediation plan. For example, on page 12 of Geosyntec (2011), Geosyntec states that "Under pier capping operations will likely be performed after sediment removal operations are fully completed". Due to the creation of slopes adjacent to the piers (due to dredging), under-pier sediment may slough off into the adjacent dredged areas, causing a potential persistent recontamination of these areas. This likelihood should be evaluated via modeling or other engineering information, and results should be incorporated into the overall project planning and made available for review. Additionally, supporting material is needed to fully understand why hydraulic dredging of under-pier sediment was excluded as a remedial option (currently, only capping of under-pier sediment is proposed). It is possible that hydraulic dredging may address under-pier contamination issues and protect against sloughing of under-pier sediment to adjacent areas. However, these options can only be fully explored by a thorough engineering feasibility evaluation. O-1-6

Please let us know if you have any concerns or questions regarding the above comments. We look forward to reviewing future drafts of the EIR materials and continuing to provide technical assistance as needed. O-1-7

Sincerely,

Jason Conder

Jason M. Conder, PhD
Manager

CERTIFICATION

STATE OF CALIFORNIA)
)
COUNTY OF SAN DIEGO)

I, the undersigned, declare:

That I am Senior Counsel for San Diego Gas & Electric Company, a Designated Party in the within action.

I hereby certify that true and accurate copies of the following documents were electronically submitted to all Designated Parties in this matter: O-1-8

1. Comments to the Draft EIR for the San Diego Shipyard Sediment Site Proposed Remediation.

Executed on this 1st day of August, 2011, at San Diego, California.

Jill A. Tracy
Senior Counsel
San Diego Gas & Electric Company

255347

O-2

SAN DIEGO COASTKEEPER

ENVIRONMENTAL HEALTH COALITION
EMPOWERING PEOPLE. ORGANIZING COMMUNITIES. ACHIEVING JUSTICE.

July 27, 2011

Mr. Vincente Rodriguez
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
vrodriguez@waterboards.ca.gov

RE: San Diego Coastkeeper's and Environmental Health Coalition's Comments on the Shipyard Sediment Cleanup Draft Environmental Impact Report

Dear Mr. Rodriquez:

San Diego Coastkeeper and Environmental Health Coalition ("Environmental Parties") have reviewed the Draft EIR for the Shipyard Sediment Cleanup. The Environmental Parties remain concerned about the inadequacies of the remedial and post-remedial monitoring plans, detailed in our comments submitted on May 26, 2011. Notwithstanding these comments, with a few additions and clarifications, the Draft Environmental Impact Report will be adequate. It is imperative that the toxic sediments—too toxic for the Ocean Dump site—be removed from the Bay as soon as possible. O-2-1

The Environmental Parties submit the following comments and recommendations to ensure that the Draft EIR fully reflects the conditions and measures needed to reduce environmental impacts from the project. The Environmental Parties reserve the right to rely on other comments submitted. O-2-2

I. The Draft EIR should include and adopt a new, environmentally preferable sediment barging option.

The current proposal involves two legs of truck traffic related to the project: (1) to truck the dredge spoils to the treatment staging area and (2) to haul the treated sediment to the appropriate landfill. Any remedial option that achieves the cleanup goals while also (1) reducing the number of trucks and truck trips, (2) reducing greenhouse gas emissions, and (3) avoiding from parking impacts on local communities, should be viewed as environmentally preferable. O-2-3

The Environmental Parties request that the Draft EIR include and adopt a new option of barging the sediments bound for Otay Landfill to Staging Area 5 on the National City Marine Terminal for treatment. This option could reduce the number of trucks and truck trips, reduce greenhouse gas emissions, and avoid additional parking impacts on local communities. Northern areas of the proposed Staging Area 5 would reduce or eliminate potential impacts on the Sweetwater Marsh wildlife refuge and should be identified. No areas on the National City Marine Terminal near the parks or commercial areas should be considered for staging. O-2-3

Similarly, the Naval Station should be evaluated as an additional staging area because it has many piers that are easily accessible by water and the Navy is a potentially responsible party. Further, Naval Station areas north of the National City Marine Terminal are good potential locations that would also support use of barges. O-2-4

II. New relevant studies should be included in the Draft EIR.

The State Water Resources Control Board Surface Water Ambient Monitoring Program's (SWAMP) 2009 Coast Survey, "Contaminants in Fish from the California Coast," (Attached as Exhibit A) should be included in the Draft EIR. The Coast Survey is California's largest-ever statewide survey of contaminants in sport fish from coastal locations, and it evaluates the extent of chemical contamination in sport fish from California's coastal waters. Results from the first year of the two-year survey reveal that San Diego Bay stands out as having elevated concentrations of mercury and PCBs.[1] The survey sets further data collection and analysis of contamination levels in San Diego Bay as a high priority.[2] O-2-5

Likewise, the recent "Final Report to the Port of San Diego Chemical Analysis of threatened and Endangered Species in San Diego: The San Diego Bay Trophic Transfer Project," by Dr. Rebecca Lewison (Attached as Exhibit B) should be included in the Draft EIR. This study demonstrated that turtles, a long-lived species in the Bay, have had both chronic and acute exposures to toxic chemicals linked to bay sediment contamination through their food sources.[3] O-2-6

These studies should be included in the Draft EIR because they further demonstrate the adverse effects of sediment contamination on wildlife in the bay.

III. The Draft EIR fails to assess and address impacts of filling the Convair Lagoon, which should not be considered a viable alternative.

The Draft EIR fails to adequately address the impacts of filling Convair Lagoon. When originally conceived and permitted, the existing underwater cap was to be replanted with eelgrass and restored as a habitat. If the lagoon is filled, the loss of habitat area and of open water would need to be mitigated. However, two projects listed as potentials (intake/discharge channels of the power plant and fixing a failed previous mitigation) would not be appropriate and would, in fact, constitute 'double-dipping.' Thus, these two projects should not be considered as mitigation options. The Port is very limited on mitigation options in the bay, so a major effort must be made to find adequate and appropriate mitigation for this option. O-2-7

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[1] J.A. Davis et al., Contaminants in Fish from the California Coast, 2009: Summary Report on Year One of a Two-Year Screening Survey, A Report of the Surface Water Ambient Monitoring Program (SWAMP), California State Water Resources Control Board, Sacramento, CA (2011).
[2] *Id.*
[3] Lewison et al., Chemical Analysis of Threatened and Endangered Species in San Diego (2011).

IV. New mitigation measures must be added to the Draft EIR, and current measures must be strengthened.

Mitigation measures must be added to the Draft EIR. As written, the Draft EIR fails to provide adequate and appropriate mitigation with respect to impacts on the community, air quality, and on endangered species and habitats. O-2-8

a. The staging areas will adversely affect the community and must be mitigated.

Displaced parking is already a major issue in the community, thus any parking impacts must be mitigated. Staging Areas 1-4, if used, will have significant impacts on the entire community, and Staging Area 5, if used, will have impacts on areas of west Old Town National City. Mitigation fees to offset impacts should be paid to the Port's Capital Improvement Fund for projects in Barrio Logan and Old Town National city in proportion to the amount of traffic and impacts that accrue in those neighborhoods.

Further, trucks parked in neighborhoods while waiting for pick-ups and drop-offs would negatively impact the community. The Draft EIR should designate a truck staging area to address this issue. O-2-9

b. Current mitigation measures for air quality impacts must be strengthened to ensure that the cleanup protects the environment and does not contribute to existing air pollution.

Mitigation Measures 4.6.8 and 4.6.9 should be strengthened to require all that trucks used be hybrid or cleaner alternative fuel trucks and tugs. Further, electric powered dredging equipment should be required for all dredging. For a project of this magnitude and duration, it will be cost-effective to utilize this new technology. O-2-10

The Environmental Parties suggest that Mitigation Measure 4.6.10 should be required without limitation or, at a minimum, the Draft EIR should define what "cost-effective" means. Without this requirement, the dischargers will not use hybrid or cleaner alternative fuel trucks and tugs. Further, for air emissions that cannot be eliminated, the dischargers must acquire NOx and ozone offsets for the emissions from the project, as the area is currently in "non-attainment" for these air pollutants. O-2-11

In addition to reducing air pollution in local communities, a requirement for hybrid tugs and trucks would also help reduce the impacts on global climate change. This option is clearly feasible, as the Ports of Los Angeles and Long Beach are using a zero-emission heavy-duty rig that runs on electric batteries powered by a hydrogen fuel cell to transport cargo between the ports and Inland Empire warehouses and distribution centers. *See* Los Angeles Times, "Seaport complex takes delivery of zero-emission hauling truck," July 23, 2011, Attached as Exhibit C. O-2-12

c. The Draft EIR must adopt more stringent measures to mitigate impacts on endangered species and of habitat loss in the bay.

The Draft EIR should recommend that dredging should not be allowed to occur during the California Least Tern nesting season. The Tern colonies in the region are already suffering under existing pressures, such as the Big Bay fireworks show and budget cuts reducing predator management. The Cleanup would place additional pressure on the already strained Tern population. Thus, if dredging is allowed during nesting season, mitigation of impacts to the Terns must be required. O-2-13

The economic analyses included in the Draft Technical Report assume that dredging will not occur during the California Least Tern nesting season. If this limitation is not required, the Cleanup Team must re-calculate dredging costs to reflect this changed assumption. O-2-14

Further, the Draft EIR should require mitigation if any open water or bay bottom is permanently lost to fills or confined disposal facilities. O-2-15

Thank you for the opportunity to comment on this document. We look forward to the hearing on the CEQA analysis and the merits of the cleanup by the end of the year. O-2-16

Sincerely,

Jill Witkowski
Staff Attorney, San Diego Coastkeeper

On behalf of San Diego Coastkeeper and
Environmental Health Coalition

O-2
Exhibit A

SWAMP
Surface Water Ambient Monitoring Program

CONTAMINANTS IN SPORT FISH FROM THE CALIFORNIA COAST, 2009: SUMMARY REPORT ON YEAR ONE OF A TWO-YEAR SCREENING SURVEY

J.A. Davis
K. Schiff
A.R. Melwani
S.N. Bezalel
J.A. Hunt
R.M. Allen
G. Ichikawa
A. Bonnema
W.A. Heim
D. Crane
S. Swenson
C. Lamerdin
M. Stephenson

Prepared for the Surface Water Ambient Monitoring Program

May 25, 2011

California Water Boards

www.waterboards.ca.gov/swamp

THIS REPORT SHOULD BE CITED AS:

Davis, J.A., K. Schiff, A.R. Melwani, S.N. Bezalel, J.A. Hunt, R.M. Allen, G. Ichikawa, A. Bonnema, W.A. Heim, D. Crane, S. Swenson, C. Lamerdin, and M. Stephenson. 2011. Contaminants in Fish from the California Coast, 2009: Summary Report on Year One of a Two-Year Screening Survey. A Report of the Surface Water Ambient Monitoring Program (SWAMP). California State Water Resources Control Board, Sacramento, CA.

ACKNOWLEDGEMENTS

This report and the SWAMP bioaccumulation monitoring element are the result of a very large team effort. The contributions of all of the following colleagues are very gratefully acknowledged.

The Bioaccumulation Oversight Group (BOG)

Terry Fleming, USEPA
Bob Brodberg, OEHHA
Michael Lyons, Region 4 Water Board
Karen Taberski, Region 2 Water Board
Chris Foe, Region 5 Water Board
Michelle Wood, Region 5 Water Board
Patrick Morris, Region 5 Water Board
Mary Adams, Region 3 Water Board
Rich Fadness, Region 1 Water Board
Jennifer Doherty, State Water Board
Jon Marshack, State Water Board
Jay Davis, SFEI
Aroon Melwani, SFEI
Mark Stephenson, CDFG
Autumn Bonnema, CDFG
Cassandra Lamerdin, MLML
Dave Crane, CDFG
Gail Cho, CDFG
Gary Ichikawa, CDFG
Marco Sigala, MLML
Ken Schiff, SCCWRP

SWAMP Bioaccumulation Peer Review Panel

Jim Wiener, Distinguished Professor, University of Wisconsin, La Crosse
Chris Schmitt, USGS, Columbia, Missouri
Ross Norstrom, Canadian Wildlife Service (retired); Carleton University, Ottawa, Canada

RMP Sport Fish Workgroup

Karen Taberski, Region 2 Water Board
Margy Gassel, OEHHA
Rusty Fairey, MLML
Marco Sigala, MLML
Jon Konnan, EOA
Eric Dunlavy, City of San Jose
John Toll, Windward Environmental
John Prall, Port of Oakland
Trish Mulvey, SFEI Board of Directors
Robert Brodberg, OEHHA
Peter LaCivita, USACE
Jen Hunt, SFEI
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Southern California Bight Regional Monitoring Program

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Scott Johnson, ABC Laboratories
Michael Lyons, Region 4 Water Board
Jeff Armstrong, Orange County Sanitation District

San Francisco Estuary Institute

Project Management Support: Lawrence Leung, Rainer Hoenicke, Frank Leung, Linda Russio, and Stephanie Seto

Moss Landing Marine Laboratories

Contract Management: Rusty Fairey
Fish Collection: Gary Ichikawa, Billy Jakl, Dylan Service, Bryan Frueh, Sean Mundell, John Negrey

Dissection: Stephen Martenuk, Kelsey James, Duncan Fry, Jason Whitney, Brynn Hooton, Kim Smelker, Chandler Ichikawa, and Sean Goetzl
Mercury and Selenium Analysis: Adam Newman and Jon Goetzl
SWAMP Data Management Team: Cassandra Lamerdin, Mark Pranger, Stacey Swenson, Susan Mason, Marco Sigala, George Radojevic, Brian Thompson, Kyle Reynolds
SWAMP Quality Assurance Team: Beverly van Buuren, Eric von der Geest

California Department of Fish and Game Water Pollution Control Laboratory

Sample prep: Laurie Smith, David Gilman, Rafia Mohammed
Sample analysis: Kathleen Regalado, Gary Munoz
Data entry and QA: Loc Nguyen

SWAMP Staff

Karen Larsen, Jennifer Doherty, Adam Ballard, and Dawit Tadesse of the State Water Resources Control Board guided the project on behalf of SWAMP.

A draft of this document was reviewed and much improved thanks to comments received from Ross Norstrom, Chris Schmitt, Jim Wiener, Terry Fleming, Bob Brodberg, Margy Gassel, Jennifer Doherty, and Susan Monheit.

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The layout and design of the report was done by Doralynn Co of Greenhouse Marketing & Design, Inc.

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Appendices

EXECUTIVE SUMMARY E

This summary report presents results from the first year of a coordinated two-year screening survey of contaminants in sport fish in California coastal waters. This survey was performed as part of the State Water Resources Control Board's Surface Water Ambient Monitoring Program (SWAMP), in close collaboration with the Southern California Bight Regional Monitoring Program (Bight Program) and the Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP). This statewide screening study is an initial step in an effort to evaluate the extent of chemical contamination in sport fish from California's coastal waters. This Coast Survey is one element of a new, long-term, statewide, comprehensive bioaccumulation monitoring program for California surface waters. This report provides a concise technical summary of the findings from the first year of the Coast Survey. This report is intended for agency staff charged with managing water quality issues related to bioaccumulation of contaminants in California coastal waters.

The array of species selected for sampling included the species known to accumulate high concentrations of contaminants and therefore serve as informative indicators of potential contamination problems. Contaminant concentrations in fish tissue were compared to thresholds developed by the California Office of Environmental Health Hazard Assessment (OEHHA) for methylmercury, polychlorinated biphenyls (PCBs), dieldrin, dichlorodiphenyltrichloroethanes (DDTs), chlordanes, and selenium, and a State Water Resources Control Board threshold for methylmercury in tissue that is being used for identification of impaired water bodies. Total Maximum Daily Load (TMDL) targets developed by the San Francisco Bay Regional Water Quality Control Board for San Francisco Bay also provided a basis for assessment.

The Coast Survey is a preliminary screening of contamination in sport fish. This screening study did not provide enough information for consumption guidelines – this would require a larger and more focused monitoring effort that would include a broader array of species and larger numbers of fish. Sampling in year one focused on the most urbanized regions on the coast near Los Angeles and San Francisco. Sources of contamination are generally more prevalent in urban regions, so the preliminary results from year one reflect a bias toward higher contaminant concentrations.

The Coast Survey represents a major step forward in understanding the extent of chemical contamination in sport fish in California coastal waters, and the impact of this contamination on the fishing beneficial use. In the first year of this statewide screening study, 2291 fish from 36 species were collected from 42 locations on the California coast. The survey identified high concentrations of contaminants in a few areas, and widespread moderate contamination throughout the urban coastal regions sampled. Methylmercury and PCBs are the pollutants that pose the most widespread potential health concerns to consumers of fish caught on the California coast. None of the locations had all sampled fish species below all the OEHHA thresholds. The high degree of variation observed among species within locations indicates that fish consumers can significantly reduce their exposure, and still attain the substantial nutritional benefits that fish provide, by selectively targeting species with lower concentrations of methylmercury.

At several locations, methylmercury reached concentrations high enough that OEHHA would consider recommending no consumption of the contaminated species (0.44 ppm wet weight). Overall, eight of the 42 locations surveyed had a species with an average concentration exceeding 0.44 ppm. At all but one of the locations these were sharks, which have a tendency to accumulate high levels of methylmercury worldwide. Striped bass, a very popular species sampled in San Francisco Bay, was the one other species that had an average methylmercury concentration (0.45 ppm) above 0.44 ppm. Most of the locations sampled (33 of 42) were in the moderate contamination categories (above the lowest threshold of 0.07 ppm and below 0.44 ppm). Several species had average methylmercury concentrations below all thresholds, most notably chub mackerel, which is one of the most popular sport fish species on the southern California coast.

PCB contamination was moderate but widespread. Six of the 42 locations surveyed had a species with an average concentration exceeding OEHHA's no consumption threshold of 120 ppb. San Francisco Bay and San Diego Bay stood out as having elevated concentrations. Most of the locations sampled (74%) fell in the moderate contamination categories between the lowest threshold of 3.6 ppb and the 120 ppb no consumption threshold. Only five locations from more remote areas had concentrations lower than the lowest threshold. Eleven species, including all of the rockfish species sampled, had average PCB concentrations below all thresholds. Safe eating guidelines have been in place for many years in San Francisco Bay, but guidelines for San Diego Bay have not been developed.

OEHHA has developed thresholds for four other pollutants that were analyzed in this survey: dieldrin, DDT, chlordane, and selenium. Concentrations of these contaminants in fish tissue sampled rarely exceeded any of the OEHHA Advisory Tissue Levels. The legacy pesticides, however, did frequently exceed the Fish Contaminant Goals established by OEHHA.

San Francisco Bay samples were also analyzed for dioxins, polybrominated diphenyl ethers (PBDEs), and perfluorinated chemicals (PFCs). Dioxin toxic equivalent concentrations in the Bay are several times higher than a San Francisco Bay Regional Water Board screening value and do not show obvious signs of decline. A lack of accepted thresholds constrains assessment of the concerns posed by PFCs for consumers of Bay sport fish. Only four samples had detectable perfluorooctanesulfonate (PFOS) concentrations. PBDEs were well below the newly established FCG and ATLs for PBDEs. A study performed with white croaker from San Francisco Bay found that removal of skin reduced concentrations of organic contaminants such as PCBs by 65%.

Chapter 3 of this report provides more information on the statewide results. Chapters 4 and 5 provide detailed presentations of the results from Southern California and San Francisco Bay.

SECTION 1 INTRODUCTION

This summary report presents results from the first year of a two-year statewide screening survey of contaminants in sport fish on the California coast. The survey is being performed as part of the State Water Resources Control Board's Surface Water Ambient Monitoring Program (SWAMP). This effort marks the beginning of a new long-term, statewide, comprehensive bioaccumulation monitoring program for California surface waters.

This report provides a concise technical summary of the findings of the survey. It is intended for agency scientists that are charged with managing water quality issues related to bioaccumulation of contaminants in California surface waters.

Oversight for this project is being provided by the SWAMP Roundtable. The Roundtable is composed of State and Regional Board staff and representatives from other agencies and organizations including US Environmental Protection Agency (USEPA), the California Department of Fish and Game, and the California Office of Environmental Health Hazard Assessment (OEHHA). Interested parties, including members of other agencies, consultants, or other stakeholders also participate.

The Roundtable has formed a subcommittee, the Bioaccumulation Oversight Group (BOG) that specifically guides SWAMP bioaccumulation monitoring. The BOG is composed of representatives from each of the Roundtable groups, and in addition the Southern California Coastal Waters Research Project, and the San Francisco Estuary Institute. The members of the BOG possess extensive experience with bioaccumulation monitoring.

The BOG has also convened a Bioaccumulation Peer Review Panel that is providing evaluation and review of the bioaccumulation program. The members of the Panel are internationally-recognized authorities on bioaccumulation monitoring.

The BOG has developed and begun implementing a plan to evaluate bioaccumulation impacts on the fishing beneficial use in all California water bodies. Sampling of sport fish in lakes and reservoirs was conducted in the first two years of monitoring (2007 and 2008). In 2009 and 2010, sport fish from the California coast, including bays and estuaries were sampled. Sport fish from rivers and streams will be sampled in 2011.

THE COAST SURVEY

Management Questions for This Survey

Three management questions were articulated to guide the design of the Coast Survey. These management questions are specific to this initial screening survey; different sets of management questions will be established to guide later efforts.

Management Question 1 (MQ1)

Status of the Fishing Beneficial Use

For popular fish species, what percentage of popular fishing areas have low enough concentrations of contaminants that fish can be safely consumed?

Answering this question is critical to determining the degree of impairment of the fishing beneficial use across the state due to bioaccumulation. This question places emphasis on characterizing the status of the fishing beneficial use through monitoring of the predominant pathways of exposure – ingestion of popular fish species from popular fishing areas. This focus is also anticipated to enhance public and political support of the program by assessing the resources that people care most about. The determination of percentages mentioned in the question captures the need to perform a statewide assessment of the entire California coast. Past monitoring of contamination in sport fish on the California coast has been patchy (reviewed in Davis et al. [2007]), and a systematic statewide survey has never been performed. The emphasis on safe consumption calls for an accurate message on the status of the fishing beneficial use and evaluation of the data using thresholds for safe consumption.

The data needed to answer this question are average concentrations in popular fish species from popular fishing locations. Inclusion of as many popular species as possible is important to understanding the nature of impairment in any areas with concentrations above thresholds. In some areas, some fish may be safe for consumption while others are not, and this is valuable information for anglers. Monitoring species that accumulate high concentrations of contaminants ("indicator species") is valuable in answering this question: if concentrations in these species are below thresholds, this is a strong indication that an area has low concentrations.

Management Question 2 (MQ2)

Regional Distribution

What is the spatial distribution of contaminant concentrations in fish within regions?

Answering this question will provide information that is valuable in formulating management strategies for observed contamination problems. This information will allow managers to prioritize their efforts and focus attention on the areas with the most severe problems. Information on spatial distribution within regions will also provide information on sources and fate of contaminants of concern that will be useful to managers.

This question can be answered with different levels of certainty. For a higher and quantified level of certainty, a statistical approach is needed that includes replicate observations in the spatial units to be compared. In some cases, managers can attain an adequate level of understanding for their needs with a non-statistical, non-replicated approach. With either approach, reliable estimates of average concentrations within each spatial unit are needed.

Management Question 3 (MQ3)

Need for Further Sampling

Should additional sampling of contaminants in sport fish (e.g., more species or larger sample size) in specific areas be conducted for the purpose of developing comprehensive consumption guidelines?

This screening survey of the entire California coast will provide a preliminary indication as to whether many areas that have not been sampled thoroughly to date may require consumption guidelines. Consumption guidelines provide a mechanism for reducing human exposure in the near-term. The California Office of Environmental Health Hazard Assessment (OEHHA), the agency responsible for issuing consumption guidelines, considers a sample of 9 or more fish from a variety of species abundant in a water body to be the minimum needed in order to issue guidance. It is valuable to have information not only on the species with high concentrations, but also the species with low concentrations so anglers can be encouraged to target the less-contaminated species. The diversity of species on the coast demands a relatively large effort to characterize interspecific variation. Answering this question is essential as a first step in determining the need for more thorough sampling in support of developing consumption guidelines.

Overall Approach

The overall approach to be taken to answer these three questions is to perform a statewide screening study of bioaccumulation in sport fish on the California coast. Answering these questions will provide a basis for decision-makers to understand the scope of the bioaccumulation problem and will provide regulators with information needed to establish priorities for both cleanup actions and development of consumption guidelines.

It is anticipated that the screening study may lead to more detailed followup investigations of areas where the need for consumption guidelines and cleanup actions is indicated.

Through coordination with other programs, SWAMP funds for this survey were highly leveraged to achieve a much more thorough statewide assessment than could be achieved by SWAMP alone.

First, this effort was closely coordinated with bioaccumulation monitoring for the Southern California Bight Regional Monitoring Program. Every five years, dischargers in the Bight collaborate to perform this regional monitoring. Bioaccumulation monitoring is one element of the Bight Program. Before the present survey, however, the Bight Program had not performed regional monitoring of contaminants in sport fish. Most of the work for this most recent round of Bight monitoring was performed in 2008. The bioaccumulation element, however, was delayed to 2009 in order to allow coordination with the SWAMP survey. The Bight group wanted to conduct sport fish sampling, but lacks the infrastructure to perform sample collection. The Bight group therefore contributed approximately $240,000 worth of analytical work (analysis of PCBs and organochlorine pesticides in 225 samples) to the joint effort. This allowed more intensive sampling of the Bight region than either program could achieve independently.

The SWAMP survey was also coordinated with intensive sampling in San Francisco Bay by the Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP). The RMP conducts thorough sampling of contaminants in sport fish in the Bay on a triennial basis (see Hunt et al. [2008] for the latest results). This sampling has been conducted since 1994. To coordinate with the SWAMP effort, the RMP analyzed additional species to allow for more extensive comparisons of the Bay with coastal areas and bays in other parts of the state. The RMP benefitted from this collaboration by SWAMP contributing: 1) a statewide dataset that will help in interpretation of RMP data and 2) the present statewide report that includes an assessment and reporting of Bay data and makes production of a separate report by the RMP unnecessary. The RMP effort represents $215,000 of sampling and analysis.

In addition, the Region 4 Water Board supplemented the statewide survey with another $110,000 to provide for more thorough coverage of the Southern California Bight.

In all, these collaborations more than doubled the total amount of SWAMP funding available for sampling and analysis in year 1 of the coastal waters survey. Each of the collaborating programs will benefit from the consistent statewide assessment, increased information due to sharing of resources, and efforts to ensure consistency in the data generated by the programs (e.g., analytical intercalibration).

SECTION 2 METHODS

SAMPLING DESIGN

The sampling plan was developed to address the three management questions for the project (Bioaccumulation Oversight Group 2009). In 2009, sampling was conducted at 42 locations in the San Francisco Bay region and in the Southern California Bight (Figures 2-1, 2-2, 2-3). Fish were collected from June through November. Cruise reports with detailed information on locations are available at www.waterboards.ca.gov/water_issues/programs/swamp/coast_study.shtml.

California has over 3000 miles of coastline that spans a diversity of habitats and fish populations, and dense human population centers with a multitude of popular fishing locations. Sampling this vast area with a limited budget is a challenge. The approach employed to sample this vast area was to divide the coast into 69 spatial units called "zones". The use of this zone concept is consistent with the direction that OEHHA will take in the future in development of consumption guidelines for coastal areas. Advice has been issued on a pier-by-pier basis in the past in Southern California, and this approach has proven to be unsatisfactory. All of these zones were sampled (in other words, a complete census was performed), making a probabilistic sampling design unnecessary. The sampling focused on nearshore areas, including bays and estuaries, in waters not exceeding 200 m in depth, and mostly less than 60 m deep. These are the coastal waters where most of the sport fishing occurs. Popular fishing locations were identified from Jones (2004) and discussions with stakeholders. Zones were developed in consultation with Water Board staff from each of the nine regions, Bight Group stakeholders, and the BOG. Within each zone, sample collection was directed toward the most popular fishing locations. Locations shown in the map figures indicate the weighted polygon centroids to represent the latitudes and longitudes where the fish were actually collected (see cruise reports for details on each location).

The Sampling Plan (Bioaccumulation Oversight Group 2009) provides more details on the design (www.waterboards.ca.gov/water_issues/programs/swamp/coast_study.shtml).

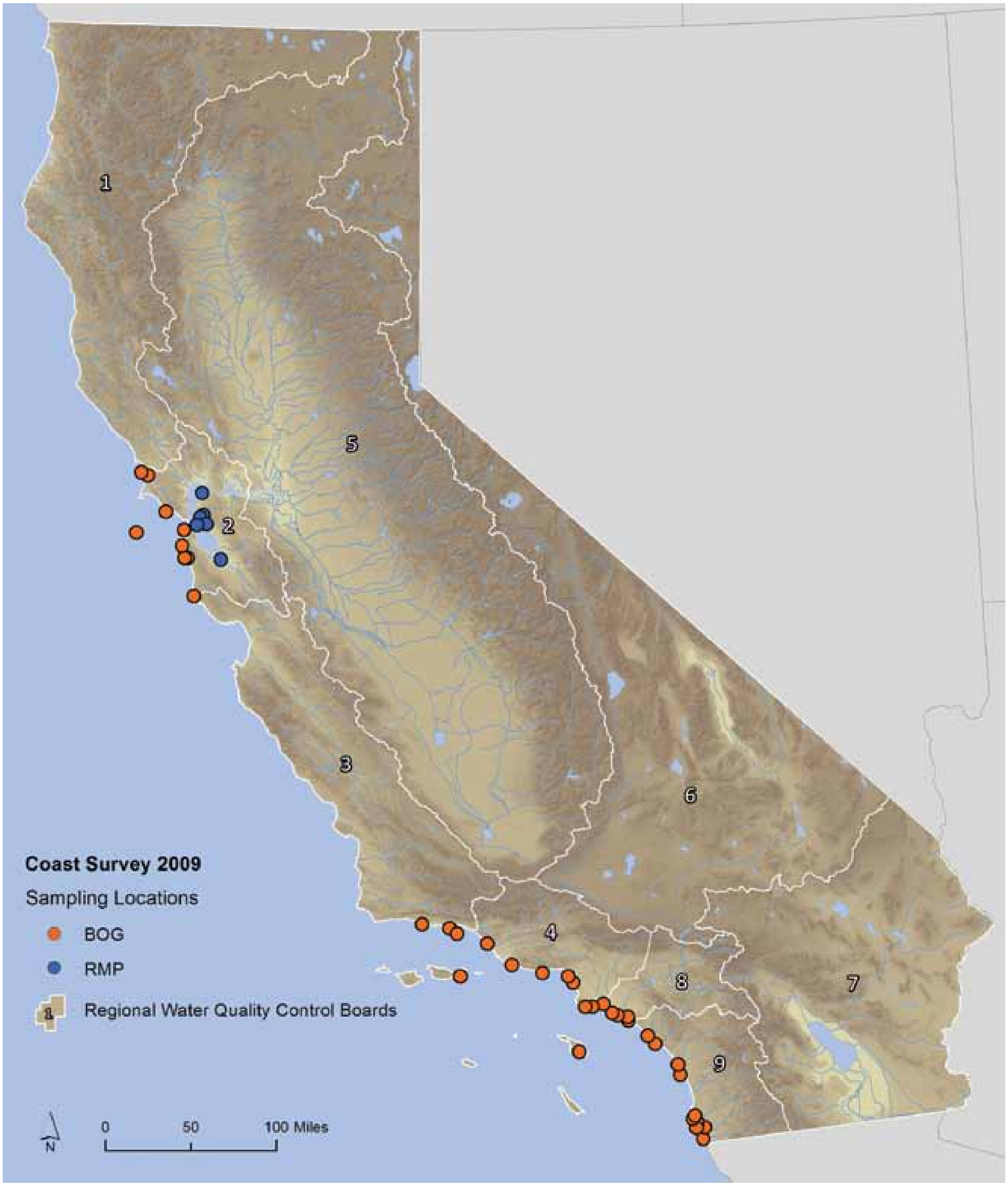


Figure 2-1. Locations sampled in 2009, the first year of the Coast Survey.

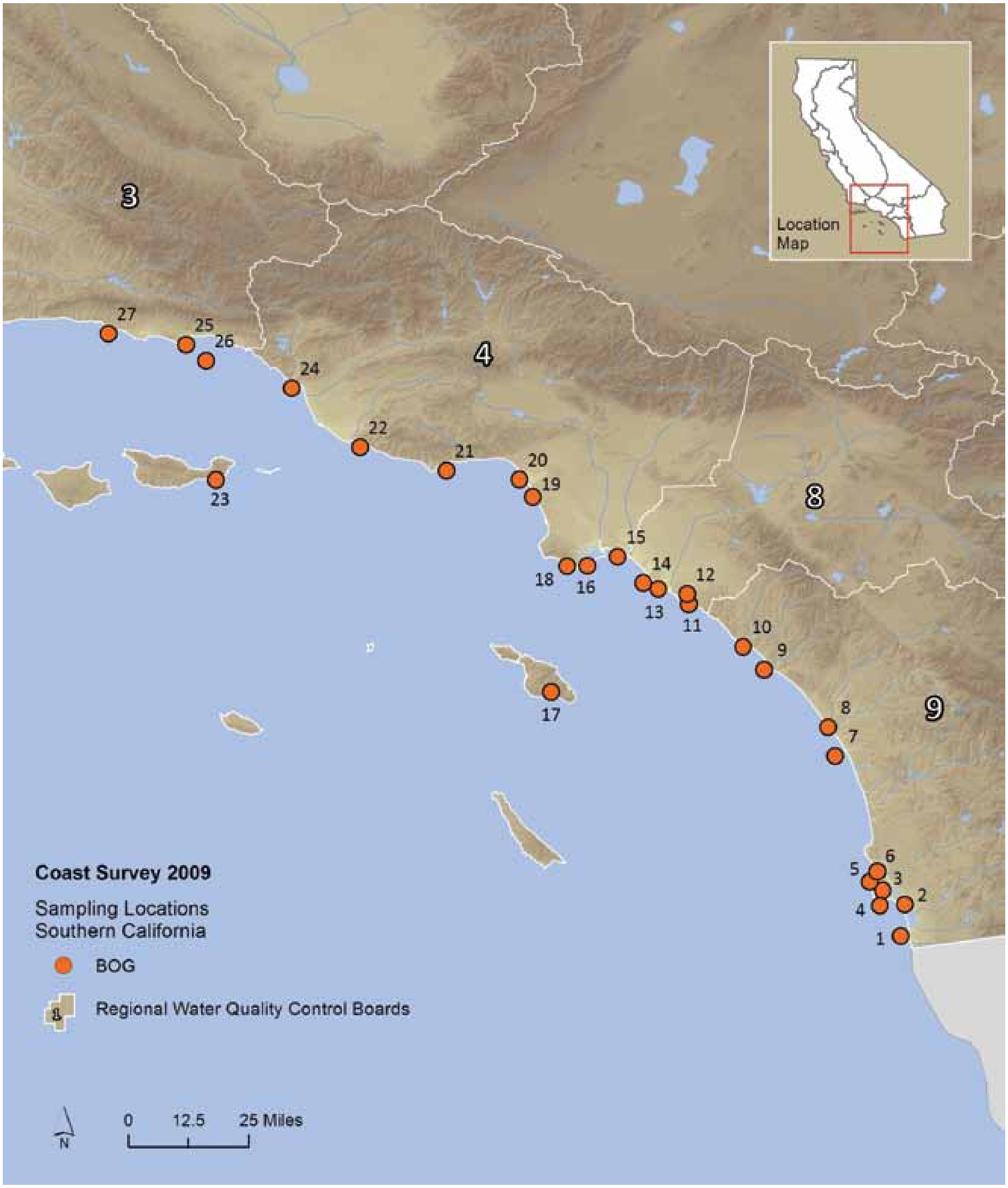


Figure 2-2. Locations sampled in 2009, the first year of the Coast Survey: Southern California. Location names are provided in Appendix 2.

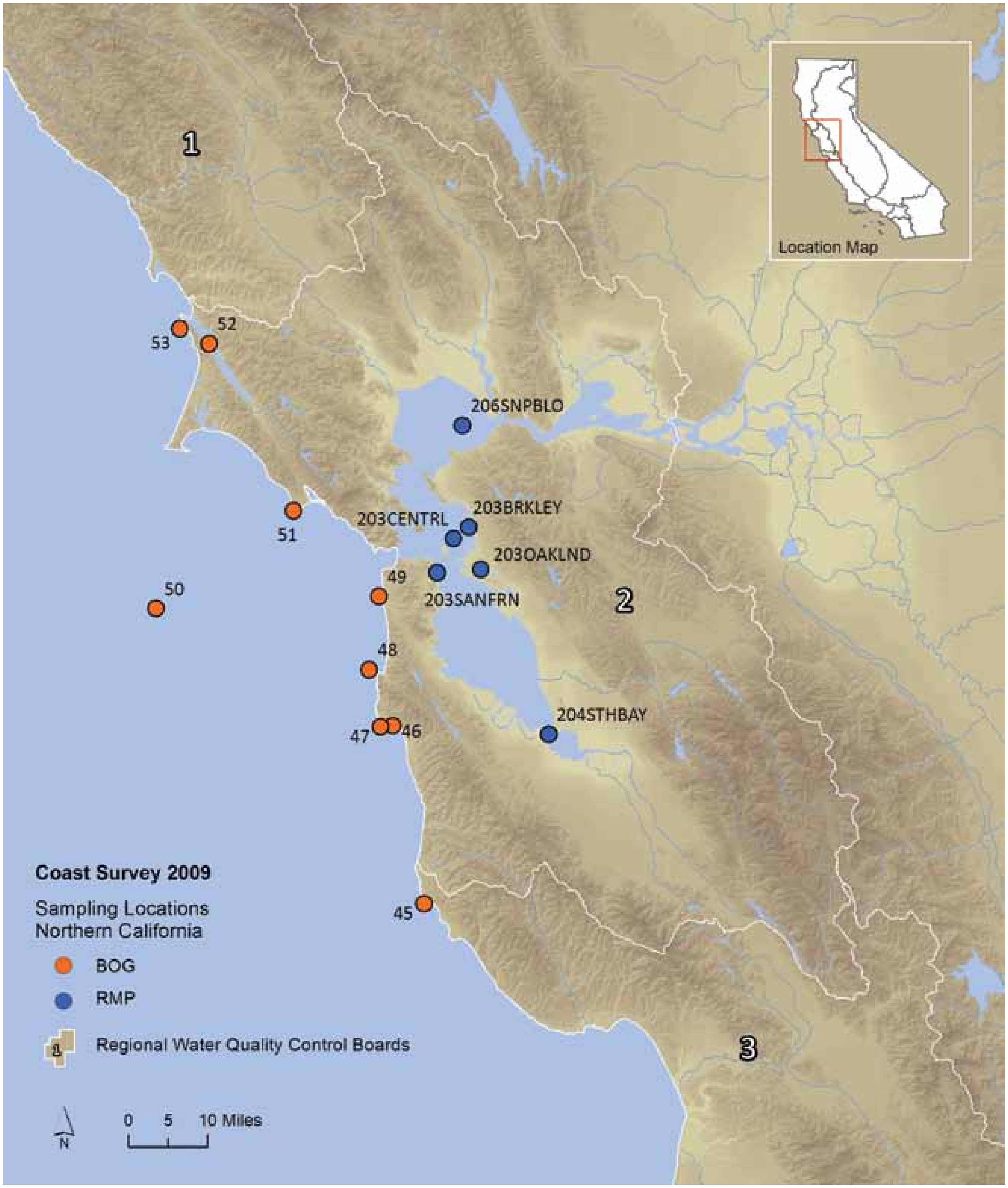


Figure 2-3. Locations sampled in 2009, the first year of the Coast Survey: Northern California. Location names are provided in Appendix 2.

TARGET SPECIES

Selecting fish species to monitor on the California coast is a complicated task due to the high diversity of species, regional variation over the considerable expanse of the state from north to south, variation in habitat and contamination between coastal waters and enclosed bays and harbors, and the varying ecological attributes of potential indicator species. The list of possibilities was narrowed down by considering the following criteria, listed in order of importance.

1. Popular for consumption
2. Sensitive indicators of problems (accumulating relatively high concentrations of contaminants)
3. Widely distributed
4. Species that accumulate relatively low concentrations of contaminants
5. Represent different exposure pathways (benthic vs pelagic)
6. Continuity with past sampling

Information relating to these criteria was presented in the Sampling Plan.

The BOG elected not to include shellfish in this survey due to the limited budget available for the survey and the lower consumption rate and concern for human health. Shellfish sampling may occur in the future if the SWAMP bioaccumulation budget is sufficient.

As recommended by USEPA (2000) in their document "Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories," the primary factor considered in selecting species to monitor was a high rate of human consumption. Fortunately, good information on recreational fish catch is available from the Recreational Fisheries Information Network (RecFIN), a product of the Pacific States Marine Fisheries Commission (PSMFC). Many different taxonomic groups of fish are found on the coast (e.g., rockfish, surfperch, or sharks) and some of these groups consist of quite a diversity of species. The sampling design was based on coverage of a representative of selected groups within each zone. The popular groups varied among the three regions of the state (south, central, and north) and between coastal waters and bays and harbors.

While catch data were the primary determinant of the list of target species, some adjustments were made to ensure an appropriate degree of emphasis on sensitive indicators of contamination. Including these species is useful in assessing the issue of safe consumption (contained in MQ1) – if the sensitive indicator species in an area are below thresholds of concern then this provides an indication that all species in that area are likely to be below thresholds. Consequently, target species in this study included both high lipid species such as croaker and surfperch that are strong accumulators of organics, and predators that accumulate mercury such as sharks. A summary of basic ecological attributes of the target species was provided in the Sampling Plan.

Table 2-1
Scientific and common names of fish species collected, the number of locations in which they were sampled, their minimum, median, and maximum total lengths (mm), and whether they were analyzed as composites or individuals. Species marked as "analyzed for individuals" were analyzed as individuals for mercury only.

Family	Species Name	Common Name	Number of Fish	Number of Samples	Number of Locations Sampled	Min Length (mm)	Median Length (mm)	Max Length (mm)	Analyzed As Composite	Analyzed As Individual
Anchovies (Engraulidae)	*Engraulis mordax*	Northern Anchovy	337	9	2	65	89	126	X	
Barracudas (Sphyraenidae)	*Sphyraena argentea*	Pacific Barracuda	4	1	1	450	479	590	X	
Basses (Serranidae)	*Paralabrax nebulifer*	Barred Sand Bass	113	21	14	257	346	590	X	X
Basses (Serranidae)	*Paralabrax clathratus*	Kelp Bass	261	49	18	185	316	512	X	X
Basses (Serranidae)	*Paralabrax maculatofasciatus*	Spotted Sand Bass	63	12	4	195	327	430	X	X
Croaker (Sciaenidae)	*Cheilotrema saturnum*	Black Croaker	3	1	1	234	242	261	X	
Croaker (Sciaenidae)	*Seriphus politus*	Queenfish	4	1	1	156	165	174	X	
Croaker (Sciaenidae)	*Roncador stearnsii*	Spotfin Croaker	15	3	3	138	221	372	X	
Croaker (Sciaenidae)	*Genyonemus lineatus*	White Croaker	283	69	22	164	218	300	X	
Croaker (Sciaenidae)	*Umbrina roncador*	Yellowfin Croaker	50	10	4	121	195	376	X	
Dogfish Sharks (Squalidae)	*Squalus acanthias*	Spiny dogfish	3	1	1	995	1011	1140	X	
Hound Sharks (Triakidae)	*Mustelus henlei*	Brown Smooth-hound Shark	12	4	4	826	978	1144	X	
Hound Sharks (Triakidae)	*Mustelus californicus*	Gray Smoothhound Shark	6	2	2	616	630	685	X	
Hound Sharks (Triakidae)	*Triakis semifasciata*	Leopard shark	12	5	4	930	1153	1230	X	X
Lingcod (Hexagrammidae)	*Ophiodon elongatus*	Lingcod	7	2	2	610	671	822	X	
Mackerels (Scombridae)	*Scomber japonicus*	Chub Mackerel	290	58	20	199	240	335	X	

Family	Species Name	Common Name	Number of Fish	Number of Samples	Number of Locations Sampled	Min Length (mm)	Median Length (mm)	Max Length (mm)	Analyzed As Composite	Analyzed As Individual
New World Silversides (Atherinopsidae)	*Atherinops affinis*	Topsmelt	135	6	6	101	136	377	X	
Rockfish (Scorpaenidae)	*Sebastes melanops*	Black Rockfish	5	2	1	302	325	368	X	X
Rockfish (Scorpaenidae)	*Sebastes mystinus*	Blue Rockfish	23	6	5	215	270	395	X	X
Rockfish (Scorpaenidae)	*Sebastes auriculatus*	Brown Rockfish	28	6	6	205	287	392	X	
Rockfish (Scorpaenidae)	*Sebastes carnatus*	Gopher Rockfish	49	10	10	147	239	323	X	
Rockfish (Scorpaenidae)	*Sebastes atrovirens*	Kelp Rockfish	5	1	1	281	291	294	X	
Rockfish (Scorpaenidae)	*Sebastes serranoides*	Olive Rockfish	24	5	4	208	305	405	X	X
Rockfish (Scorpaenidae)	*Sebastes rosaceus*	Rosy Rockfish	5	1	1	175	196	202	X	
Rockfish (Scorpaenidae)	*Scorpaena plumieri*	Spotted Scorpionfish	10	2	2	200	290	322	X	
Rockfish (Scorpaenidae)	*Sebastes flavidus*	Yellowtail Rockfish	3	1	1	296	311	323	X	
Sand Flounder (Paralichthyidae)	*Paralichthys californicus*	California Halibut	9	3	3	580	680	730	X	
Sea Chubs (Kyphosidae)	*Girella nigricans*	Opaleye	5	1	1	194	221	230	X	
Sturgeons (Acipenseridae)	*Acipenser transmontanus*	White Sturgeon	12	5	2	1170	1270	1560	X	X
Surfperch (Embiotocidae)	*Amphistichus argenteus*	Barred Surfperch	51	8	7	122	193	363	X	X
Surfperch (Embiotocidae)	*Embiotoca jacksoni*	Black Perch	85	11	10	152	232	316	X	X
Surfperch (Embiotocidae)	*Cymatogaster aggregata*	Shiner Surfperch	478	25	15	51	111	199	X	X
Surfperch (Embiotocidae)	*Phanerodon furcatus*	White Surfperch	69	8	7	99	202	345	X	X
Temperate Basses (Moronidae)	*Morone saxatilis*	Striped Bass	18	7	2	460	600	790	X	X
Tilefishes (Malacanthidae)	*Caulolatilus princeps*	Ocean Whitefish	5	1	1	270	279	286	X	

A list of the species collected in year one of the Coast Survey is provided in Table 2-1. Table 2-1 also includes information on the number of locations sampled, fish sizes, and how the fish were processed. Statewide maps showing the locations sampled (as well as the concentrations measured) for each species can be obtained from the My Water Quality portal (www.swrcb.ca.gov/mywaterquality/safe_to_eat/data_and_trends/).

SAMPLE PROCESSING

Dissection and compositing of muscle tissue samples were performed following USEPA guidance (USEPA 2000). In general, fish were dissected skin-off, and only the fillet muscle tissue was used for analysis. Some species (e.g., shiner surfperch) were too small to be filleted and were processed whole but with head, tail, and viscera removed. Other exceptions are noted in the discussion of results in Sections 3 through 5.

CHEMICAL ANALYSIS

Mercury and Selenium

Nearly all (>95%) of the mercury present in fish is methylmercury (Wiener et al. 2007). Consequently, monitoring programs usually analyze total mercury as a proxy for methylmercury, as was done in this study. USEPA (2000) recommends this approach, and the conservative assumption be made that all mercury is present as methylmercury to be most protective of human health. Total mercury and selenium in all samples were measured by Moss Landing Marine Laboratory (Moss Landing, CA). Detection limits for total mercury and all of the other analytes are presented in Table 2-2. Analytical methods for mercury and the other contaminants were described in the Sampling Plan (Bioaccumulation Oversight Group 2009). Mercury was analyzed according to EPA 7473, "Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry" using a Direct Mercury Analyzer. Selenium was digested according to EPA 3052M, "Microwave Assisted Acid Digestion of Siliceous and Organically Based Matrices", modified, and analyzed according to EPA 200.8, "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry." Mercury and selenium results were reportable for 99% of the samples analyzed.

Organics

PCBs and legacy pesticides in the Bay were analyzed by the California Department of Fish and Game Water Pollution Control Laboratory (Rancho Cordova, CA). Organochlorine pesticides were analyzed according to EPA 8081AM, "Organochlorine Pesticides by Gas Chromatography." PCBs were analyzed according to EPA 8082M, "Polychlorinated Biphenyls (PCBs) by Gas Chromatography".

PCBs are reported as the sum of 55 congeners (Table 2-2). Concentrations in many locations were near or

Table 2-2
Analytes included in the study, detection limits, number of observations, and frequencies of detection and reporting. Frequency of detection includes all results above detection limits. Frequency of reporting includes all results that were reportable (above the detection limit and passing all QA review). Units for the MDLs are ppm for mercury and selenium, parts per trillion for dioxins and furans, and ppb for the other organics.

Laboratory	Class	Analyte	Method Detection Limit	Number of Observations	Frequency of Detection (%)	Frequency of Reporting (%)
MPSL-DFG	MERCURY	Mercury	0.01	905	99%	99%
MPSL-DFG	SELENIUM	Selenium	0.15	343	99%	99%
DFG-WPCL	CHLORDANE	Chlordane, trans-	0.45	235	34%	29%
DFG-WPCL	CHLORDANE	Oxychlordane	0.47	235	6%	6%
DFG-WPCL	CHLORDANE	Chlordane, cis-	0.40	235	41%	41%
DFG-WPCL	CHLORDANE	Nonachlor, cis-	0.31	235	39%	39%
DFG-WPCL	CHLORDANE	Nonachlor, trans-	0.19	235	77%	77%
DFG-WPCL	DDT	DDT(p,p')	0.15	235	50%	50%
DFG-WPCL	DDT	DDT(o,p')	0.21	235	4%	4%
DFG-WPCL	DDT	DDE(p,p')	0.60	235	100%	99%
DFG-WPCL	DDT	DDE(o,p')	0.18	235	30%	30%
DFG-WPCL	DDT	DDD(o,p')	0.10	235	30%	30%
DFG-WPCL	DDT	DDD(p,p')	0.12	235	78%	78%
DFG-WPCL	DIELDRIN	Dieldrin	0.43	235	31%	25%
DFG-WPCL	PCB	PCB 008	0.20	235	0%	0%
DFG-WPCL	PCB	PCB 018	0.20	235	6%	6%
DFG-WPCL	PCB	PCB 027	0.20	235	0%	0%
DFG-WPCL	PCB	PCB 028	0.20	235	37%	37%
DFG-WPCL	PCB	PCB 029	0.20	235	0%	0%
DFG-WPCL	PCB	PCB 031	0.20	235	16%	16%
DFG-WPCL	PCB	PCB 033	0.20	235	2%	2%
DFG-WPCL	PCB	PCB 044	0.20	235	41%	41%
DFG-WPCL	PCB	PCB 049	0.20	235	52%	52%
DFG-WPCL	PCB	PCB 052	0.20	235	70%	70%
DFG-WPCL	PCB	PCB 056	0.20	235	6%	6%
DFG-WPCL	PCB	PCB 060	0.20	235	9%	9%
DFG-WPCL	PCB	PCB 064	0.20	235	10%	10%

Laboratory	Class	Analyte	Method Detection Limit	Number of Observations	Frequency of Detection (%)	Frequency of Reporting (%)
DFG-WPCL	PCB	PCB 066	0.20	235	61%	61%
DFG-WPCL	PCB	PCB 070	0.30	235	40%	40%
DFG-WPCL	PCB	PCB 074	0.20	235	44%	44%
DFG-WPCL	PCB	PCB 077	0.20	235	3%	3%
DFG-WPCL	PCB	PCB 087	0.30	235	43%	43%
DFG-WPCL	PCB	PCB 095	0.30	235	58%	58%
DFG-WPCL	PCB	PCB 097	0.20	235	50%	50%
DFG-WPCL	PCB	PCB 099	0.20	235	82%	81%
DFG-WPCL	PCB	PCB 101	0.34	235	82%	81%
DFG-WPCL	PCB	PCB 105	0.20	235	71%	71%
DFG-WPCL	PCB	PCB 110	0.30	235	71%	71%
DFG-WPCL	PCB	PCB 114	0.20	235	2%	2%
DFG-WPCL	PCB	PCB 118	0.32	235	82%	80%
DFG-WPCL	PCB	PCB 126	0.20	235	0%	0%
DFG-WPCL	PCB	PCB 128	0.20	235	59%	59%
DFG-WPCL	PCB	PCB 132	0.20	68	97%	97%
DFG-WPCL	PCB	PCB 137	0.20	235	20%	20%
DFG-WPCL	PCB	PCB 138	0.24	235	91%	90%
DFG-WPCL	PCB	PCB 141	0.20	235	40%	40%
DFG-WPCL	PCB	PCB 146	0.20	235	54%	54%
DFG-WPCL	PCB	PCB 149	0.20	235	77%	76%
DFG-WPCL	PCB	PCB 151	0.20	235	53%	53%
DFG-WPCL	PCB	PCB 153	0.38	235	94%	94%
DFG-WPCL	PCB	PCB 156	0.20	235	39%	39%
DFG-WPCL	PCB	PCB 157	0.20	235	9%	9%
DFG-WPCL	PCB	PCB 158	0.20	235	41%	41%
DFG-WPCL	PCB	PCB 169	0.20	235	0%	0%
DFG-WPCL	PCB	PCB 170	0.20	235	59%	59%
DFG-WPCL	PCB	PCB 174	0.20	235	40%	40%
DFG-WPCL	PCB	PCB 177	0.20	235	49%	49%
DFG-WPCL	PCB	PCB 180	0.20	235	77%	77%
DFG-WPCL	PCB	PCB 183	0.20	235	57%	57%
DFG-WPCL	PCB	PCB 187	0.20	235	76%	75%
DFG-WPCL	PCB	PCB 189	0.20	235	2%	2%

Laboratory	Class	Analyte	Method Detection Limit	Number of Observations	Frequency of Detection (%)	Frequency of Reporting (%)
DFG-WPCL	PCB	PCB 194	0.20	235	46%	46%
DFG-WPCL	PCB	PCB 195	0.20	235	19%	19%
DFG-WPCL	PCB	PCB 198	0.20	68	100%	100%
DFG-WPCL	PCB	PCB 198/199	0.20	167	1%	1%
DFG-WPCL	PCB	PCB 199	0.20	68	3%	3%
DFG-WPCL	PCB	PCB 200	0.20	235	19%	19%
DFG-WPCL	PCB	PCB 201	0.20	235	54%	54%
DFG-WPCL	PCB	PCB 203	0.20	235	41%	41%
DFG-WPCL	PCB	PCB 206	0.20	235	33%	33%
DFG-WPCL	PCB	PCB 209	0.20	235	16%	16%
AXYS	DIOXIN	TCDD, 2,3,7,8-	0.05	34	100%	100%
AXYS	DIOXIN	TCDF, 2,3,7,8-	0.06	34	100%	100%
AXYS	DIOXIN	PeCDD, 1,2,3,7,8-	0.05	34	100%	100%
AXYS	DIOXIN	PeCDF, 1,2,3,7,8-	0.05	34	91%	91%
AXYS	DIOXIN	PeCDF, 2,3,4,7,8-	0.05	34	97%	97%
AXYS	DIOXIN	HxCDD, 1,2,3,4,7,8-	0.05	34	50%	50%
AXYS	DIOXIN	HxCDD, 1,2,3,6,7,8-	0.05	34	91%	91%
AXYS	DIOXIN	HxCDD, 1,2,3,7,8,9-	0.05	34	32%	32%
AXYS	DIOXIN	HxCDF, 1,2,3,4,7,8-	0.05	34	21%	21%
AXYS	DIOXIN	HxCDF, 1,2,3,6,7,8-	0.05	34	26%	26%
AXYS	DIOXIN	HxCDF, 1,2,3,7,8,9-	0.05	34	6%	6%
AXYS	DIOXIN	HxCDF, 2,3,4,6,7,8-	0.05	34	21%	21%
AXYS	DIOXIN	HpCDD, 1,2,3,4,6,7,8-	0.05	34	94%	94%
AXYS	DIOXIN	HpCDF, 1,2,3,4,6,7,8-	0.05	34	32%	32%
AXYS	DIOXIN	HpCDF, 1,2,3,4,7,8,9-	0.05	34	3%	3%
AXYS	DIOXIN	OCDD, 1,2,3,4,6,7,8,9-	0.05	34	97%	9%
AXYS	DIOXIN	OCDF, 1,2,3,4,6,7,8,9-	0.05	34	21%	21%
AXYS	PFC	Perfluorooctanesulfonamide	2.47	21	10%	10%
AXYS	PFC	Perfluorononanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorooctanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorohexanoate	2.47	21	0%	0%
AXYS	PFC	Perfluoropentanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorohexanesulfonate	4.93	21	0%	0%

Laboratory	Class	Analyte	Method Detection Limit	Number of Observations	Frequency of Detection (%)	Frequency of Reporting (%)
AXYS	PFC	Perfluoroheptanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorooctanesulfonate	4.93	21	19%	19%
AXYS	PFC	Perfluorobutanesulfonate	4.93	21	0%	0%
AXYS	PFC	Perfluoroundecanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorododecanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorodecanoate	2.47	21	0%	0%
AXYS	PFC	Perfluorobutanoate	2.47	21	0%	0%

below limits of detection (Table 2-2). The congeners contributing most to sum of PCBs were detected in 70-94% of the 235 samples analyzed for PCBs. Frequencies of detection and reporting were lower for the less abundant PCB congeners that have a smaller influence on sum of PCBs. For PCBs and all of the organics presented as “sums,” the sums were calculated with values for samples with concentrations below the limit of detection set to zero.

DDTs are reported as the sum of six isomers (Table 2-2). Chlordanes are reported as the sum of five compounds (Table 2-2).

Dioxins and perfluorinated chemicals (PFCs) in muscle tissue were measured by AXYS Analytical (Sidney, British Columbia, Canada). Dioxins and furans were analyzed using EPA method 1613B Mod using a high-resolution mass spectrometer coupled to a high-resolution gas chromatograph. Perfluorinated compounds were analyzed using MLA-043 Revision 07 on a high performance liquid chromatograph coupled to a triple quadrupole mass spectrometer. Dioxins are reported as dioxin toxic equivalents (TEQs) based on analysis of 17 dioxin and furan congeners (Table 2-2). Derivation of toxic equivalents is described in Section 5. The congeners contributing most to TEQs were detected in 90-100% of the 34 samples analyzed for dioxins. Frequencies of detection and reporting were lower for the less abundant congeners.

Frequencies of detection for the PFCs were low, with only one compound (perfluorooctanesulfonate) detected, and this compound was detected in only four of the 21 samples analyzed.

QUALITY ASSURANCE

The samples were analyzed in multiple batches. QAQC analyses for SWAMP Data Quality Objectives (DQOs) (precision, accuracy, recovery, completeness, and sensitivity) were performed for each batch as required by the SWAMP BOG QAPP (Bonnema 2009).

Data that meet all measurement quality objectives (MQOs) as specified in the QAPP are classified as "compliant" and considered usable without further evaluation. Data that fail to meet all program MQOs specified in the Coastal QAPP were classified as qualified but considered usable for the intended purpose. Data that are >2X MQO requirements or the result of blank contamination were classified as "rejected" and considered unusable. Data batches where results were not reported and therefore not validated were classified as not applicable.

For the SWAMP labs (Moss Landing Marine Laboratory and the Water Pollution Control Laboratory), there were 20,946 sample results for individual constituents including tissue composites and laboratory QA/QC samples. Of these:

- 20,448 (98%) were classified as "compliant"
- 346 (1.6%) were classified as "qualified"
- 22 (0.1%) were classified as "rejected"; and
- 130 (0.6%) were classified as "NA", since the results were not reported due to high native concentrations greater than spike concentrations and could not be validated.

Classification of this dataset is summarized as follows:

- 4 results were classified as "rejected" and 10 results were classified as "qualified" due to blank contamination values.
- 6 results were classified as "qualified" due to surrogate recovery exceedances presented in Table 2 (Appendix 1).
- All results were classified as "qualified" due to recovery exceedances presented in Tables 3 and 4 (Appendix 1).
- 324 results were classified as "qualified" and 18 results were classified as "rejected" due to the precision (RPD) exceedances presented in Tables 3 and 5 (Appendix 1).
- 6 results were classified as "qualified" due to holding time exceedances.

Overall, all data with the exception of the 22 rejected results were considered usable for the intended purpose. A 99% completeness level was attained which met the 90% project completeness goal specified in the Coastal QAPP. Additional details are provided in Appendix 1.

ASSESSMENT THRESHOLDS

This report compares fish tissue concentrations to two types of thresholds for concern for pollutants in sport fish that were developed by OEHHA (Klasing and Brodberg 2008): Fish Contaminant Goals (FCGs) and Advisory Tissue Levels (ATLs) (Table 2-3).

FCGs, as described by Klasing and Brodberg (2008), are "estimates of contaminant levels in fish that pose no significant health risk to humans consuming sport fish at a standard consumption rate of one serving per

Table 2-3
Thresholds for concern based on an assessment of human health risk from these pollutants by OEHHA (Klasing and Brodberg, 2008). All values given in ng/g (ppb) wet weight. The lowest available threshold for each pollutant is in bold font. One serving is defined as 8 ounces (227 g) prior to cooking. The FCG and ATLs for mercury are for the most sensitive population (i.e., women aged 18 to 45 years and children aged 1 to 17 years).

Pollutant	Fish Contaminant Goal	Advisory Tissue Level (3 servings/week)	Advisory Tissue Level (2 servings/week)	Advisory Tissue Level (No Consumption)
Chlordanes	**5.6**	190	280	560
DDTs	**21**	520	1000	2100
Dieldrin	**0.46**	15	23	46
Mercury	220	**70**	150	440
PCBs	**3.6**	21	42	120
Selenium	7400	**2500**	4900	15000
PBDEs	310	100	210	630

week (or eight ounces [before cooking] per week, or 32 g/day), prior to cooking, over a lifetime and can provide a starting point for OEHHA to assist other agencies that wish to develop fish tissue-based criteria with a goal toward pollution mitigation or elimination. FCGs prevent consumers from being exposed to more than the daily reference dose for non-carcinogens or to a risk level greater than $1x10^{-6}$ for carcinogens (not more than one additional cancer case in a population of 1,000,000 people consuming fish at the given consumption rate over a lifetime). FCGs are based solely on public health considerations without regard to economic considerations, technical feasibility, or the counterbalancing benefits of fish consumption." For organic pollutants, FCGs are lower than ATLs.

ATLs, as described by Klasing and Brodberg (2008), "while still conferring no significant health risk to individuals consuming sport fish in the quantities shown over a lifetime, were developed with the recognition that there are unique health benefits associated with fish consumption and that the advisory process should be expanded beyond a simple risk paradigm in order to best promote the overall health of the fish consumer. ATLs provide numbers of recommended fish servings that correspond to the range of contaminant concentrations found in fish and are used to provide consumption advice to prevent consumers from being exposed to more than the average daily reference dose for non-carcinogens or to a risk level greater than $1x10^{-4}$ for carcinogens (not more than one additional cancer case in a population of 10,000 people consuming fish at the given consumption rate over a lifetime). ATLs are designed to encourage consumption of fish that can be eaten in quantities likely to provide significant health benefits, while discouraging consumption of fish that, because of contaminant concentrations, should not be eaten or cannot be eaten in amounts recommended for improving overall health (eight ounces total, prior to cooking, per week). ATLs are but one component of a complex process of data evaluation and interpretation used by OEHHA in the assessment and communication of fish consumption risks. The nature of the contaminant data or omega-3 fatty acid concentrations in a given species in a water body, as well as risk communication needs, may alter strict application of ATLs when developing site-specific advisories. For example, OEHHA may recommend that consumers eat fish containing low levels of omega-3 fatty acids less often than the ATL table would suggest based solely on contaminant concentrations. OEHHA uses ATLs as a framework, along with best professional judgment, to provide fish consumption guidance on an ad hoc basis that best combines the needs for health protection and ease of communication for each site." For methylmercury and selenium, the 3 serving and 2 serving ATLs are lower than the FCGs.

Consistent with the description of ATLs above, the assessments presented in this report are not intended to represent consumption advice.

For methylmercury, results were also compared to a 0.3 ppm threshold that was used by the State and Regional Water Boards in the most recent round of 303(d) listing.

The results for San Francisco Bay were also compared to thresholds developed for the Bay by the San Francisco Bay Regional Water Quality Control Board. These thresholds are described in Section 5.

SECTION 3
STATEWIDE ASSESSMENT

In 2009, the first year of this statewide screening study, 2291 fish from 36 species were collected from 42 locations on the California coast (Figures 2-1, 2-2, 2-3, Table 2-1). A concise tabulated summary of the data for each location is provided in Appendix 2. Data in an untabulated format are provided in Appendices 3-5. Excel files containing these tables are available from SFEI (contact Jay Davis, jay@sfei.org). All data collected for this study are maintained in the SWAMP database, which is managed by the data management team at Moss Landing Marine Laboratories (http://swamp.mpsl.mlml.calstate.edu/). The complete dataset includes QA data (quality control samples and blind duplicates) and additional ancillary information (specific location information, fish sex, weights, etc). The complete dataset from this study will also be available on the web at http://www.ceden.org/. Finally, data from this study are available on the web through the California Water Quality Monitoring Council's "My Water Quality" portal (http://www.waterboards.ca.gov/mywaterquality/). This site is designed to present data on contaminants in fish and shellfish from SWAMP and other programs to the public in a nontechnical manner, and allows mapping and viewing of summary data from each fishing location.

This section presents a preliminary statewide assessment of the year one results, which represent the most urbanized portions of the California coast. A more thorough analysis and discussion of results for the entire coast will be presented in the report on the complete dataset, including the less urbanized stretches of coast sampled in 2010, which will be available in spring of 2012.

METHYLMERCURY

Comparison to Thresholds

Based on results from the first year of the statewide survey, methylmercury and PCBs are the pollutants that pose the most widespread potential health concerns to consumers of fish caught in urbanized regions of the California coast.

Considering the complete dataset (including shark species) for the year one sampling, methylmercury occasionally reached concentrations high enough that OEHHA would consider recommending no consumption of the contaminated species (0.44 ppm wet weight). Overall, eight of the 42 locations surveyed (19%) had a species with an average concentration exceeding 0.44 ppm (Figures 3-1 and 3-2). The 95% confidence interval for this estimate was 7 – 31% (Figure 3-2). Most of the locations sampled (33 of 42, or 79%) were in the moderate contamination categories (above 0.07 ppm and below 0.44 ppm). Thirteen of 42 locations had a species with an average above the State Board's 0.30 ppm 303(d) listing threshold.

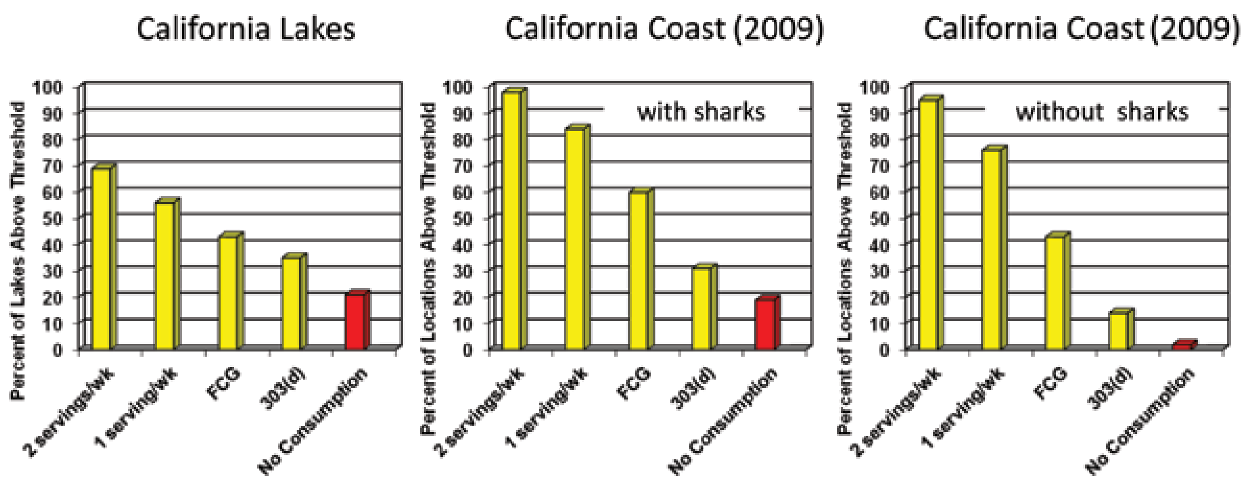


Figure 3-1. Percentages of lakes or coastal sampling locations above various methylmercury thresholds. Based on the highest species average concentration for each lake or location.

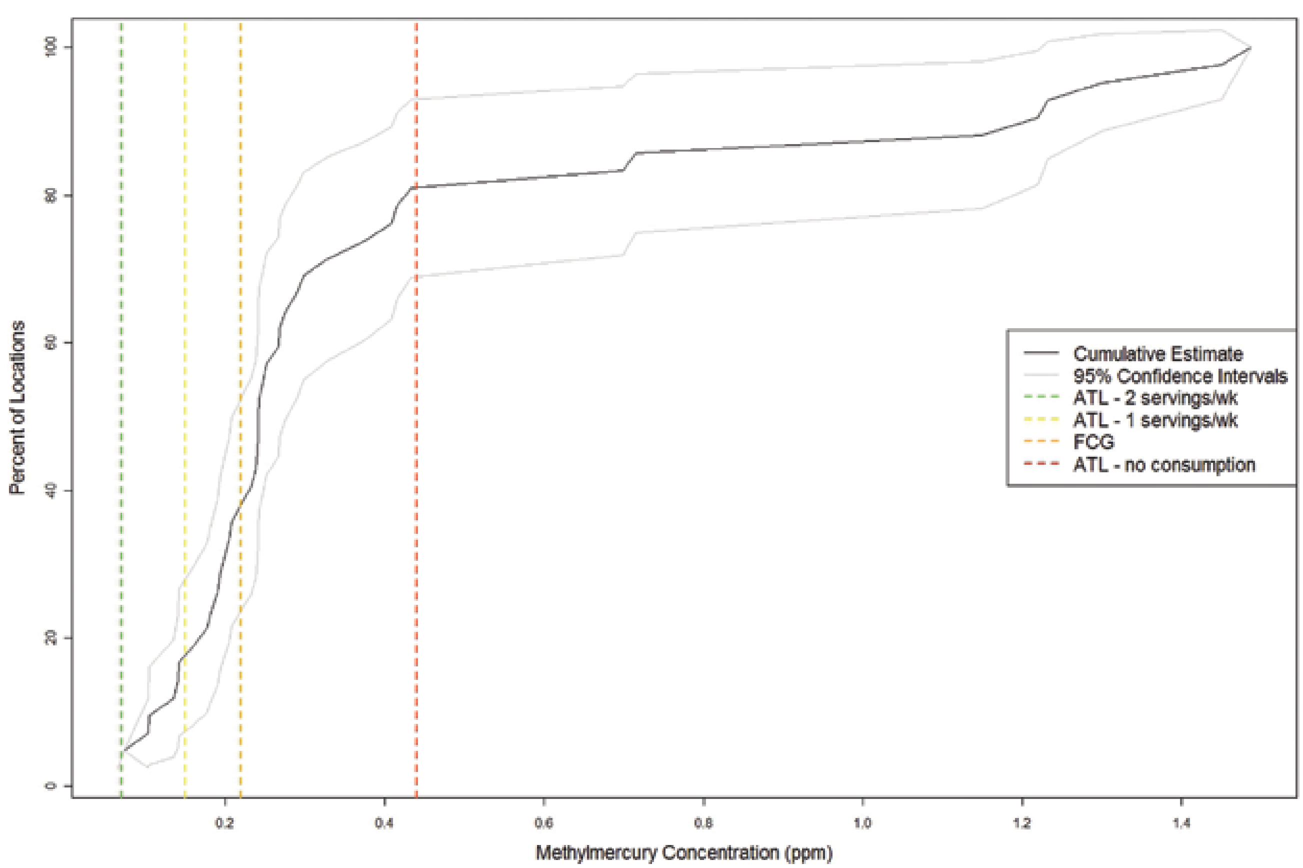


Figure 3-2. Cumulative distribution function (CDF) plot for mercury at locations sampled in 2009, shown as percent of locations sampled. Based on the highest species average concentration (ppm) for each location. Vertical lines are threshold values.

The degree of methylmercury contamination observed in the urban coastal areas sampled in 2009 was comparable to that observed in the two-year Lakes Survey (Davis et al. 2010) (Figure 3-1). Relative to the lakes results, the year one coast sampling found higher proportions of locations exceeding the lower OEHHA thresholds (the FCG of 0.22 ppm, the 1 serving per week ATL of 0.15 ppm, and the 2 serving per week ATL of 0.07 ppm). Another way of expressing this is that there was a higher proportion of water bodies below all thresholds for lakes (32%) than for the year one coast locations (2%).

One major factor behind this difference between the lakes results and the year one coast results is the focus of the initial coastal sampling on urban areas. Another important factor is the significant proportion of lakes where trout were the most abundant predator species. Trout generally occupy a lower trophic position than predatory fish species in other California water bodies (such as the coastal locations sampled in this survey), and also tend to have lower methylmercury concentrations due to the widespread presence of hatchery transplants that have been shown to have lower concentrations in previous studies (Grenier et al. 2007). Another factor was the broader spectrum of species present in coastal waters and sampled in this survey, which made it more likely to include a higher trophic level representative with higher concentrations. Finally, the urban focus of the 2009 sampling may have also been a factor.

Shark species in California and in other parts of the world often accumulate exceptionally high concentrations of methylmercury (Davis et al. 2006) (Figure 3-3). The reason for the unusually high concentrations observed in some shark species is not known. Trophic position is an important factor explaining variation among some shark species, but trophic position does not explain why some shark species have much higher concentrations than other co-located species with a similar or higher trophic position. A prime example of this is with leopard shark and striped bass in San Francisco Bay (discussed further in Section 5). Most of the year one locations with methylmercury concentrations above 0.44 ppm fell in that category because of a shark species. If the shark data are excluded, the apparent severity of methylmercury problem on the coast is considerably less (Figure 3-1), with only 2% (one of 42 locations) exceeding 0.44 ppm. Excluding shark species did not greatly affect the percentages in the lower concentration categories.

Variation Among Species

Several shark species accumulated higher methylmercury concentrations than other species sampled in year one of the survey (Figure 3-3). Average concentrations above 0.44 ppm were observed for three shark species: spiny dogfish (1.30 ppm), leopard shark (1.28 ppm), and brown smoothhound shark (0.92 ppm). The fourth shark species sampled, gray smoothhound, had a lower average of 0.29 ppm.

Striped bass, collected only in San Francisco Bay, was the one other species that had an average methylmercury concentration (0.45 ppm) above 0.44 ppm. Other species with relatively high methylmercury concentrations included black croaker (0.41 ppm), California halibut (0.22 ppm), gopher rockfish (0.25

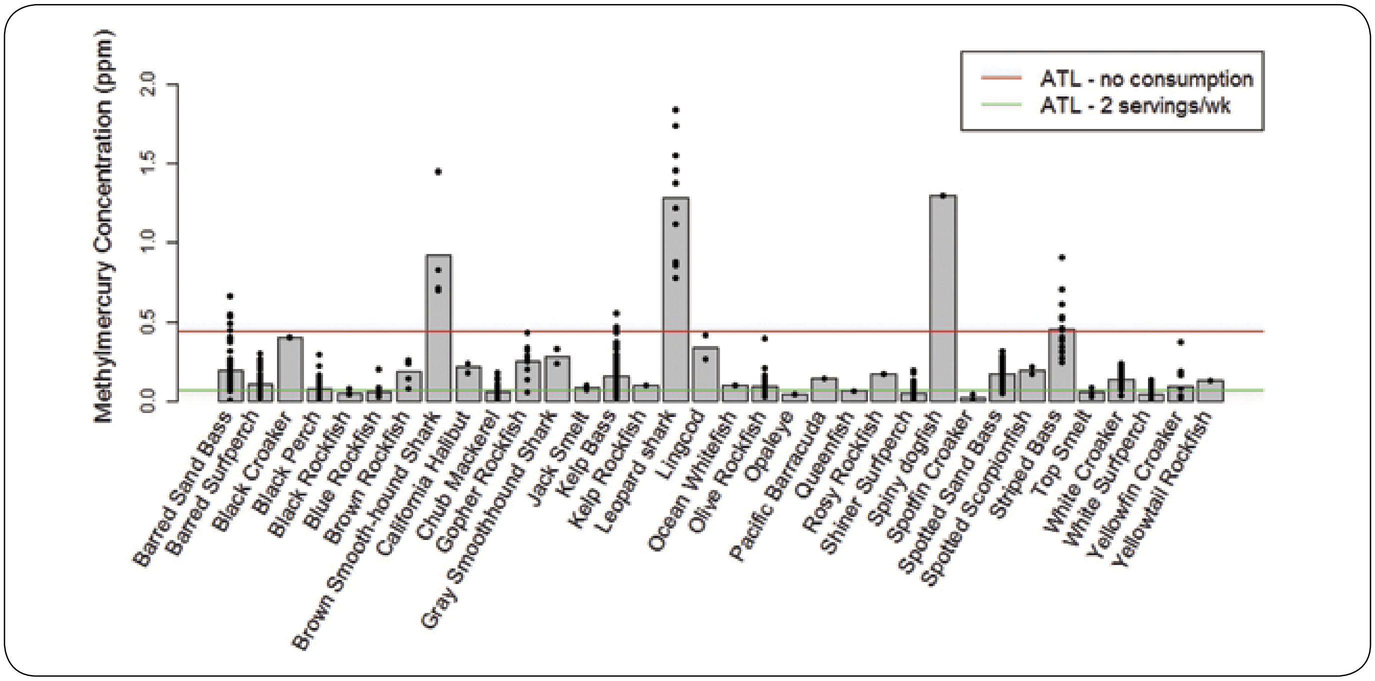


Figure 3-3. Methylmercury concentrations (ppm) in sport fish species on the California coast, 2009. Bars indicate average concentration. Points represent individual samples (either composites or individual fish). Note that the averages for some species (e.g., spiny dogfish) are based on only one sample.

ppm), and lingcod (0.34 ppm). However, the number of samples analyzed for these species was small, except for gopher rockfish (n = 10 composites).

Several species had average methylmercury concentrations below all thresholds, including black rockfish (0.05 ppm), blue rockfish (0.06 ppm), chub mackerel (0.06 ppm), opaleye (0.05 ppm), queenfish (0.07 ppm), shiner surfperch (0.05 ppm), spotfin croaker (0.02 ppm), topsmelt (0.05 ppm), and white surfperch (0.04 ppm). The estimate for chub mackerel is particularly robust, based on measurements in 58 composite samples. This is a positive outcome as chub mackerel is one of the most popular sport fish species on the southern California coast.

Spatial Patterns

Methylmercury concentrations at locations sampled in year one did not exhibit distinct variation on a regional scale (Figure 3-4). For the complete dataset (including sharks), the distribution of locations in the highest concentration category (above 0.44 ppm) was primarily a function of whether sharks were obtained. Seven of the locations in this category had a shark species with an average concentration above 0.44 ppm.

Excluding the shark species highlights spatial patterns among the other species (Figure 3-5). The one location with a species average above 0.44 ppm was San Pablo Bay in northern San Francisco Bay (striped bass at 0.47 ppm). Five locations had a species average between 0.30 ppm and 0.44 ppm, including (from

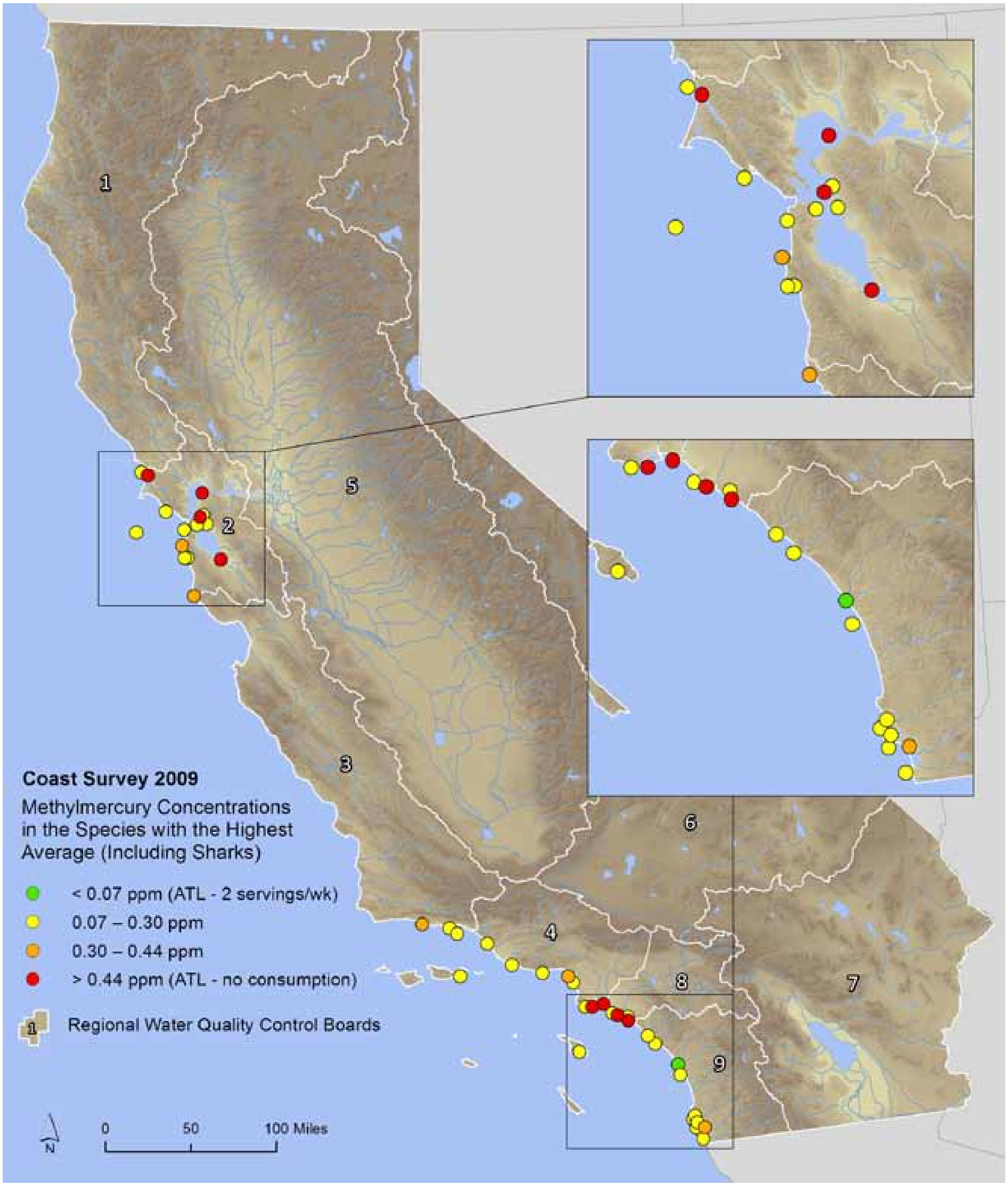


Figure 3-4. Spatial patterns in methylmercury concentrations (ng/g wet weight) among locations sampled in the Coast Survey, 2009. Each point represents the highest average methylmercury concentration among the species sampled at each location (including sharks). Concentrations based on location composites and individual fish.

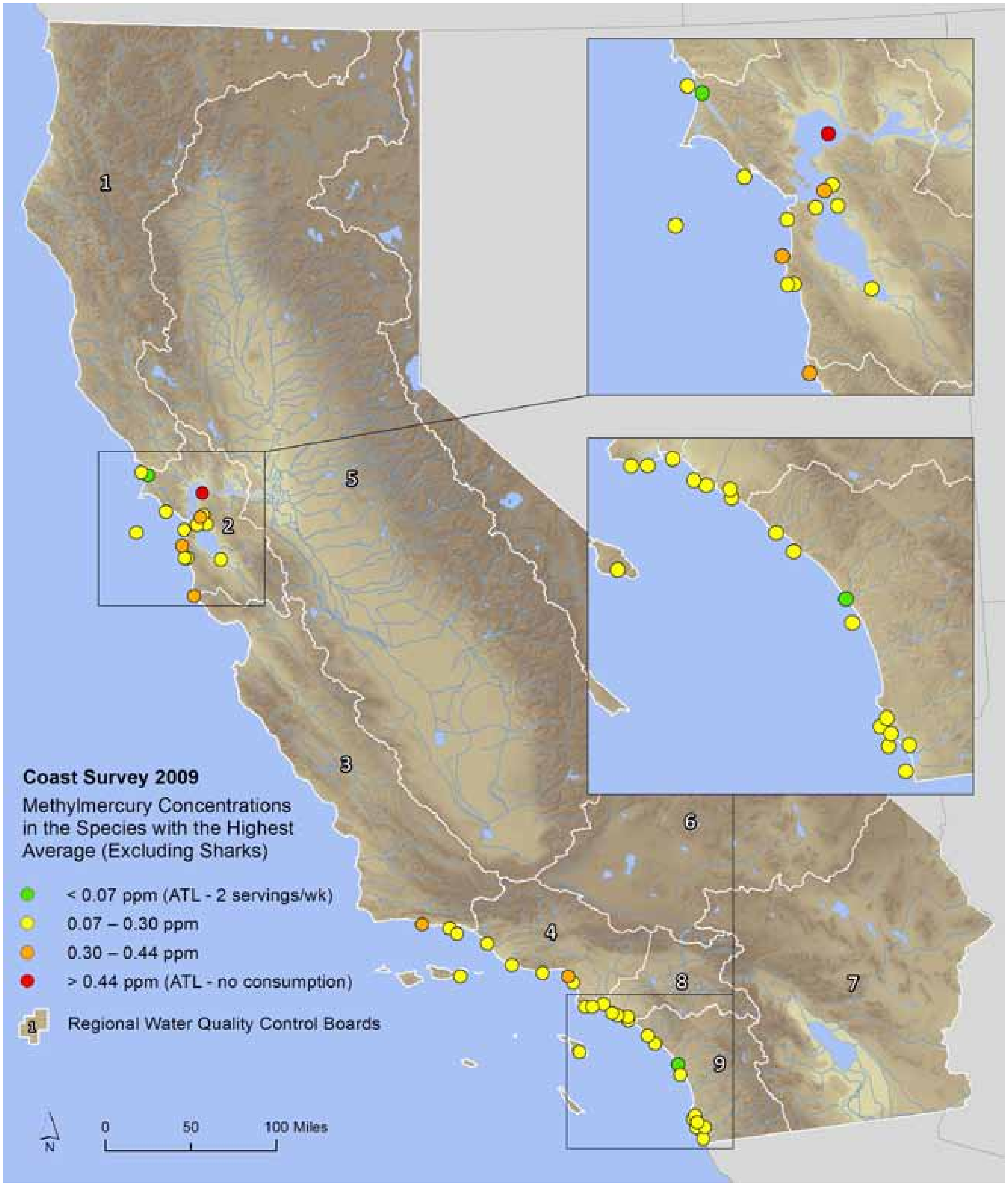


Figure 3-5. Spatial patterns in methylmercury concentrations (ng/g wet weight) in locations sampled in the Coast Survey, 2009. Each point represents the highest average methylmercury concentration among the species sampled at each location (excluding sharks). Concentrations based on location composites and individual fish.

north to south) Central Bay in San Francisco Bay (striped bass at 0.43 ppm), Pacifica Coast on the west side of the San Francisco Peninsula (lingcod at 0.42 ppm and gopher rockfish at 0.34 ppm), San Mateo Coast at the boundary between Water Board regions 2 and 3 (gopher rockfish at 0.43 ppm), near Goleta in the southern end of Region 3 (gopher rockfish at 0.33 ppm), and Middle Santa Monica Bay in Region 4 (black croaker at 0.41 ppm). Only two locations had average mercury concentrations below all thresholds: Tomales Bay, where the highest non-shark species had an average of 0.068 ppm (shiner surfperch), and Oceanside Harbor in Region 9, where the highest species (queenfish) had an average of 0.065 ppm. It should be noted that when sharks were included Tomales Bay fell into the greater than 0.44 ppm category due to concentrations of 1.22 ppm in leopard shark and 0.83 ppm in brown smoothhound shark.

Overall, whether the sharks are included or not, the magnitude of contamination was similar in the northern and southern regions sampled in year one of the Survey. In both regions, concentrations in fish from most locations were between 0.07 ppm and 0.30 ppm. Both regions had a few locations above 0.44 ppm (with sharks included), a few locations between 0.30 and 0.44 pppm, and only one location below 0.07 ppm.

Priorities for Further Assessment

One location, San Francisco Bay, stands out as having high concentrations that are not driven by the apparently anomalous high values observed in sharks. However, San Francisco Bay is being routinely and thoroughly assessed every three years under the Regional Monitoring Program, and the consumption guidelines for the Bay are being updated in 2011. This situation is in contrast to that observed for lakes, where many water bodies were found to have concentrations above 0.44 ppm and advisories are not currently in place. This highlights the need for sufficient monitoring of methylmercury in lakes to support development of safe eating guidelines and cleanup plans.

PCBs

Comparison to Thresholds

PCBs (measured as the sum of 55 congeners – Table 2-2) were comparable to methylmercury in reaching fish tissue concentrations posing potential health concerns to consumers of fish caught from the locations sampled in year one of the Coast Survey.

Similar to methylmercury, PCBs at several locations reached concentrations high enough that OEHHA would consider recommending no consumption of the contaminated species (120 ppb wet weight). Overall, six of the 42 locations surveyed (14%) had a species with an average concentration exceeding 120 ppb (Figures 3-6 and 3-7). The 95% confidence interval for this estimate was 2 – 24% (Figure 3-7). Another nine locations (21%) were between the 1 serving ATL of 42 ppb and 120 ppb. Most of the locations sampled (53%) fell in the moderate contamination categories between the FCG of 3.6 ppb and the 1 serving ATL of 42 ppb.

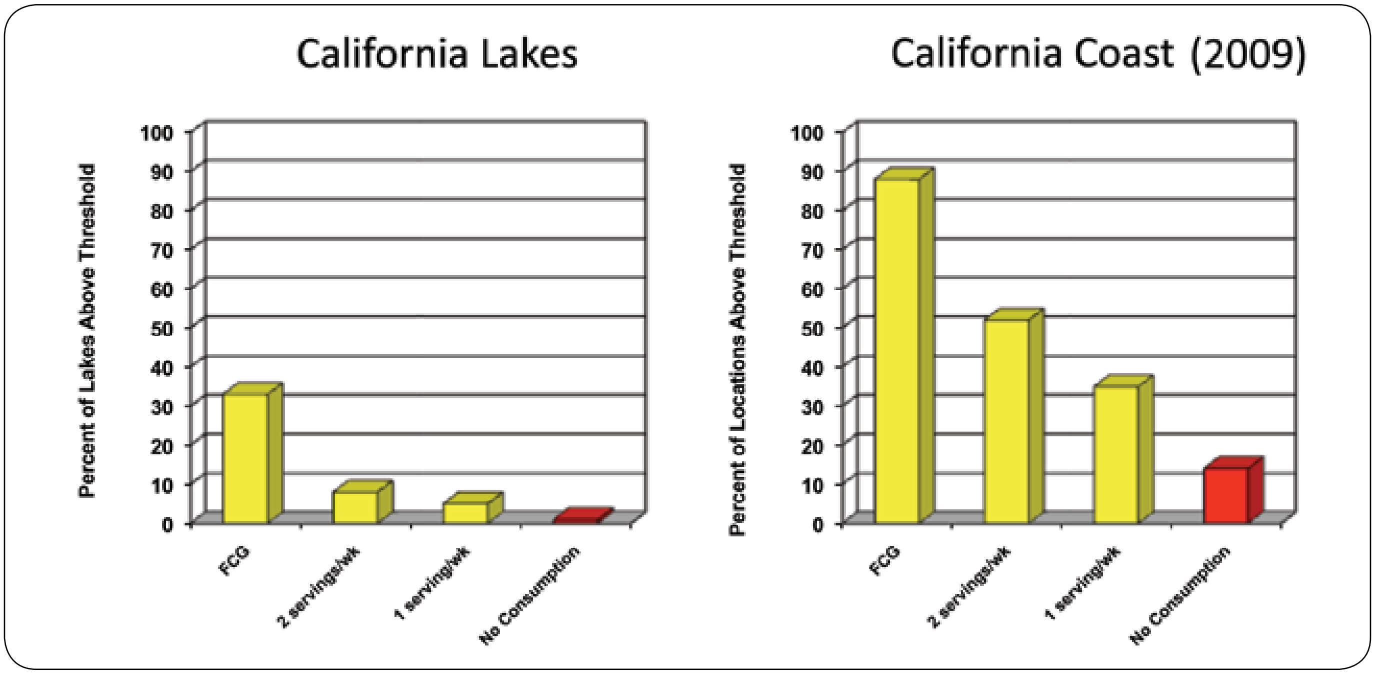


Figure 3-6. Percentages of lakes or coastal sampling locations above various PCB thresholds. Based on the highest species average concentration for each lake or location.

The degree of PCB contamination at the locations sampled in year one of the Coast Survey was substantially greater than that observed in the two-year Lakes Survey (Davis et al. 2010) (Figure 3-6). Much higher proportions of the year one coastal locations fell into each threshold category. For example, 37 of 42 locations (88%) were above the lowest PCB threshold (the 3.6 ppb FCG), in contrast to only 33% of the 272 lakes found to be above this value. One primary cause of this difference is likely the geographic focus on the major urban areas of the state in the year one coast sampling. The lakes survey concluded that PCB concentrations were higher around the urbanized regions in Los Angeles and the San Francisco Bay Area (Davis et al. 2010). Another factor contributing to this difference, as for methylmercury, is the prevalence of lakes where trout species were the primary bioaccumulation indicators. The generally lower trophic position of trout and the possibly the abundance of hatchery fish are factors that could lead to lower PCB concentrations as seems likely for methylmercury. It will be interesting to reevaluate the PCB frequency distribution when the complete two-year coastal dataset is available.

Variation Among Species

Spiny dogfish was the only species in the year one sampling that had an average PCB concentration (296 ppb) above the 120 ppb no consumption ATL (Figure 3-8). Only one sample was collected for this species though (from San Pedro Bay), so this value may not be representative for the species more generally.

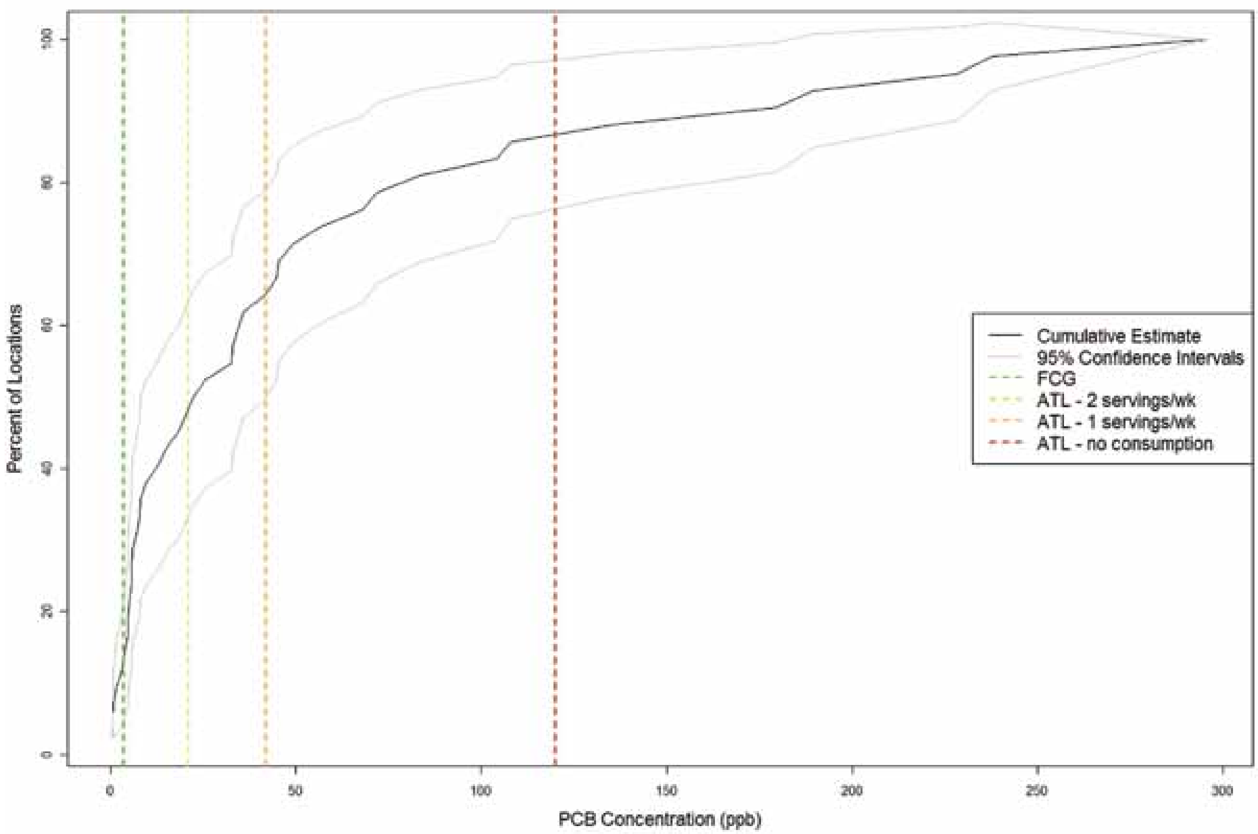


Figure 3-7. Cumulative distribution function (CDF) plot for PCBs at locations sampled in 2009, shown as percent of locations sampled. Based on the highest species average concentration (ppb) for each location. Vertical lines are threshold values.

Overall, 24 of 36 species (66%) had an average PCB concentration between the FCG of 3.6 ppb and the no consumption ATL of 120 ppb.

San Francisco Bay suffers from a relatively high degree of PCB contamination. Two species sampled extensively in the Bay, northern anchovy and shiner surfperch, had average concentrations approaching 120 ppb. Northern anchovy are a species sampled by the RMP that are not a target for human consumption, but they are collected in the sport fish trawls and analyzed as an indicator of wildlife exposure. They accumulate high concentrations of PCBs and other organic contaminants in spite of their small size (9 cm, or 3.5 in) and low trophic position. Their high lipid content and their analysis as whole body samples (including high lipid internal organs) are factors contributing to the high accumulation. The nine composite samples of northern anchovy (all from the Bay) averaged 118 ppb.

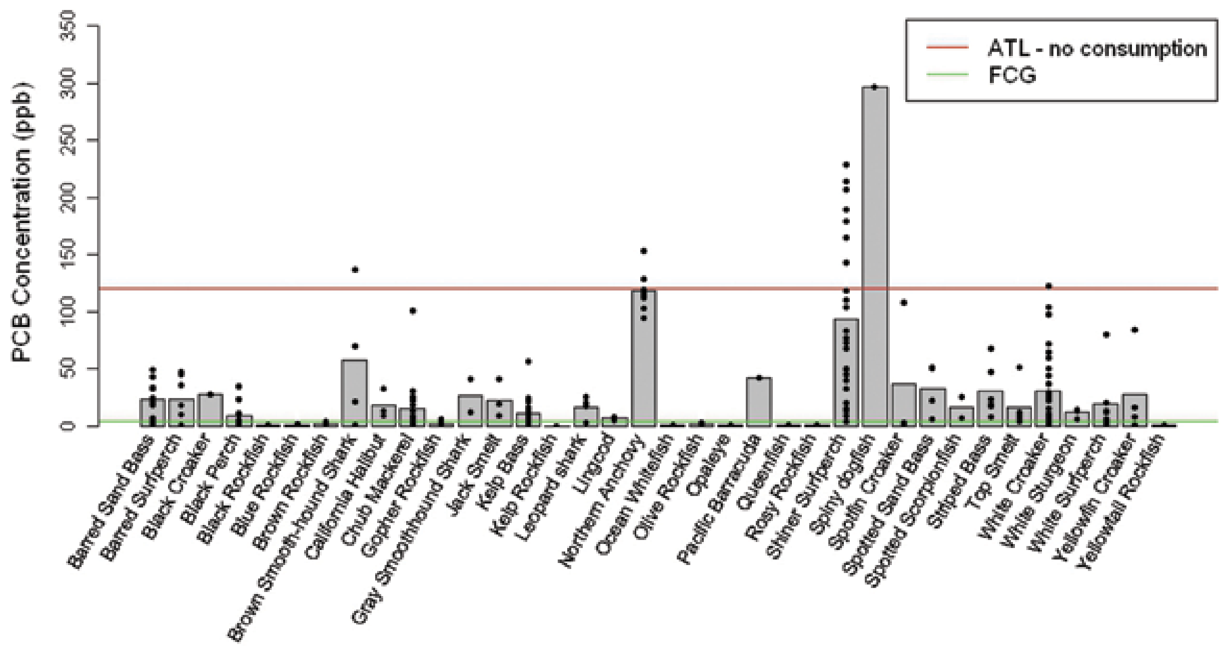


Figure 3-8. PCB concentrations (ppb) in sport fish species on the California coast, 2009. Bars indicate average concentration. Points represent individual samples (either composites or individual fish). Note that the averages for some species (e.g., spiny dogfish) are based on only one sample. Also note that northern anchovy are not a sport fish species – they are an important wildlife prey species that is collected in the surveys in San Francisco Bay and analyzed as whole fish.

Shiner surfperch are a species that are also not processed as fillets (they are processed whole with head, viscera, and tail removed due to their small size - typically 11 cm, or 4.3 in), but these fish are caught and consumed by anglers. Shiner surfperch had a year one statewide average PCB concentration of 93 ppb. Three locations (two in San Francisco Bay and one in San Diego Bay) had average concentrations in shiner that were above 120 ppb (discussed further below). Shiner surfperch have high site fidelity and are an excellent indicator of spatial patterns. Their sensitivity as a spatial indicator is evident from the 70-fold range in average concentrations observed – from a high of 216 ppb in Oakland Harbor to a low of 3 ppb in Tomales Bay.

Average PCB concentrations in other species were considerably lower. The only other species with an average concentration above the 42 ppb 1 serving ATL was brown smoothhound (57 ppb).

Eleven species had average PCB concentrations below all thresholds, including black rockfish (0.3 ppb), blue rockfish (0.3 ppb), brown rockfish (1.4 ppb), gopher rockfish (1.2 ppb), kelp rockfish (not detected), ocean whitefish (0.7 ppb), olive rockfish (1.4 ppb), opaleye (0.2 ppb), queenfish (0.8 ppb), rosy rockfish (0.7 ppb), and yellowtail rockfish (0.5 ppb). All of the rockfish species sampled were below all thresholds; however, these averages were generally based on very small sample sizes (Table 2-1).

Spatial Patterns

PCB concentrations at locations sampled in year one had a similar spatial distribution in the north and south (Figure 3-9). Five locations had a species averaging greater than 120 ppb. Three of these locations were in urban embayments with the average observed in shiner surfperch (San Francisco – 162 ppb, Oakland – 216 ppb, and San Diego South – 190 ppb) (Figure 3-10). This species has high site fidelity and is a reliable indicator of the degree of contamination at these locations. Two of the five locations fell into the greater than 120 ppb category due to concentrations measured in shark species: the spiny dogfish sample from San Pedro Bay (296 ppb) and a brown smoothhound sample from the area between Crystal Cove and the Santa Ana River (136 ppb). These shark species are mobile and may not be representative of the precise locations where they were collected.

Five locations had average PCB concentrations lower than the lowest PCB threshold – the 3.6 ppb FCG. These five locations were all in more remote, less urbanized areas, including three offshore locations.

The remaining 32 locations had concentrations between the FCG and the no consumption ATL. Overall, PCB contamination at the year one sampling locations was moderate but widespread, and this pattern was observed both in the north and the south.

A clearer picture of spatial variation can be obtained by examining spatial patterns in two species that accumulate high PCB concentrations and that were collected across multiple locations in the north and south. As mentioned above, shiner surfperch can accumulate high PCB concentrations and is a reliable indicator of spatial patterns. This species was collected at 14 locations, from Tomales Bay in the north to San Diego Bay in the south (Figure 3-10), with concentrations ranging from 216 ppb at Oakland to 3 ppb in Tomales Bay. The shiner surfperch results highlight the relatively high degree of PCB contamination in San Francisco Bay and San Diego Bay, as well as other locations with moderate contamination at San Pedro Bay (50 ppb) and Dana Point Harbor (49 ppb). On the other hand, the shiner surfperch data indicate that Tomales Bay was quite low in PCBs.

White croaker is another species that accumulates relatively high PCB concentrations and that was collected across much of the area sampled in 2009. Concentrations in white croaker were not as high as in shiner surfperch, but spatial variation in this species was also quite distinct (Figure 3-11). Long Beach had the highest average concentration in white croaker (104 ppb). Other species collected at this location also had relatively high concentrations, including topsmelt (51 ppb) and barred sand bass (49 ppb). White croaker from Oakland (63 ppb) and South Bay (36 ppb) in San Francisco Bay had the second and third highest average concentrations. Other areas with moderately elevated concentrations included three other locations near Long Beach (South Santa Monica Bay – 29 ppb; Palos Verdes – 22 ppb; and San Pedro Bay – 29 ppb) and two locations in the San Diego region (Point Loma – 25 ppb, and near Tijuana – 23 ppb). The white croaker results indicate that many other locations (Southern Marin Coast, Pillar Point Harbor, Santa Barbara Channel Oil Platform, Point Dume to Oxnard, Dana Point Harbor, and Oceanside Harbor) were quite low in PCBs (all below the 3.6 ppb FCG).

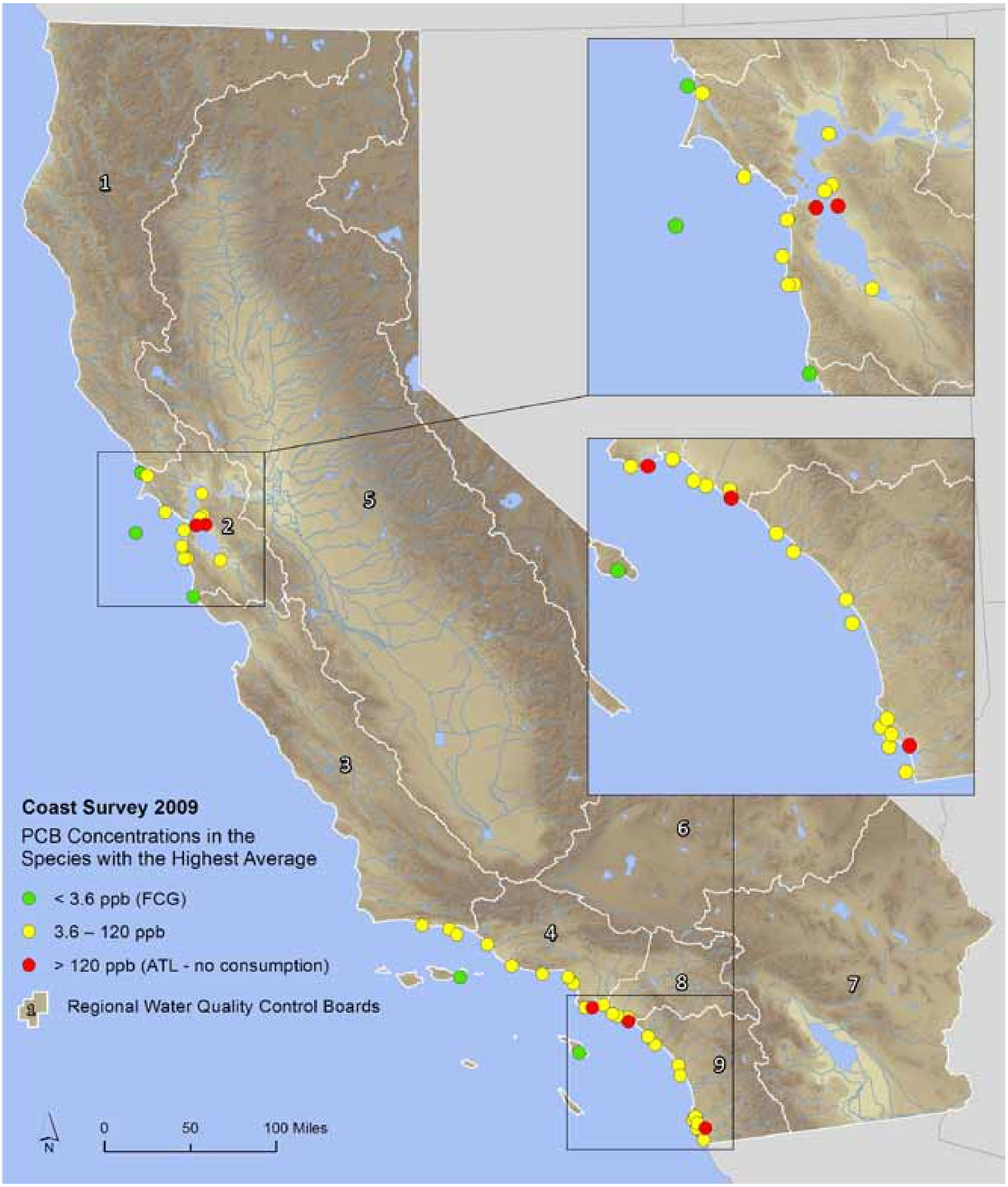


Figure 3-9. Spatial patterns in PCB concentrations (ppb) among locations sampled in the Coast Survey, 2009. Each point represents the highest average PCB concentration among the species sampled at each location. Concentrations were measured in composite samples.

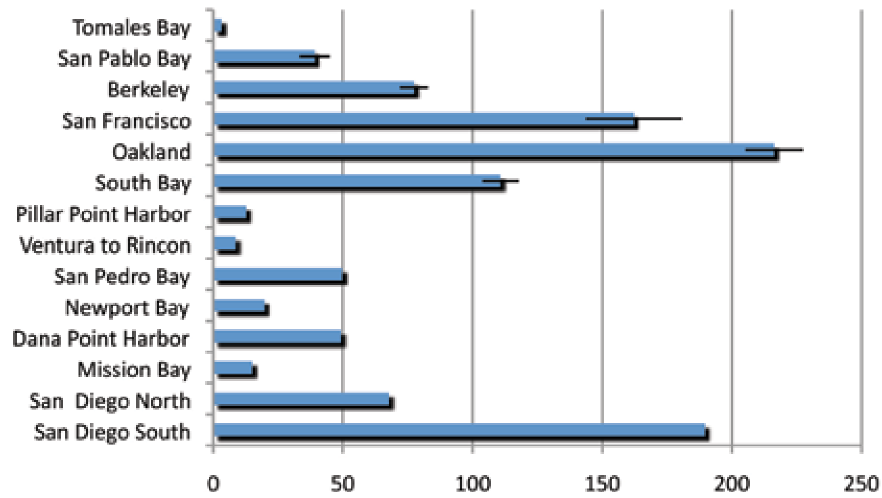


Figure 3-10. Average PCB concentrations in shiner surfperch samples on the California coast, 2009. Standard error is shown where replicate samples were analyzed.

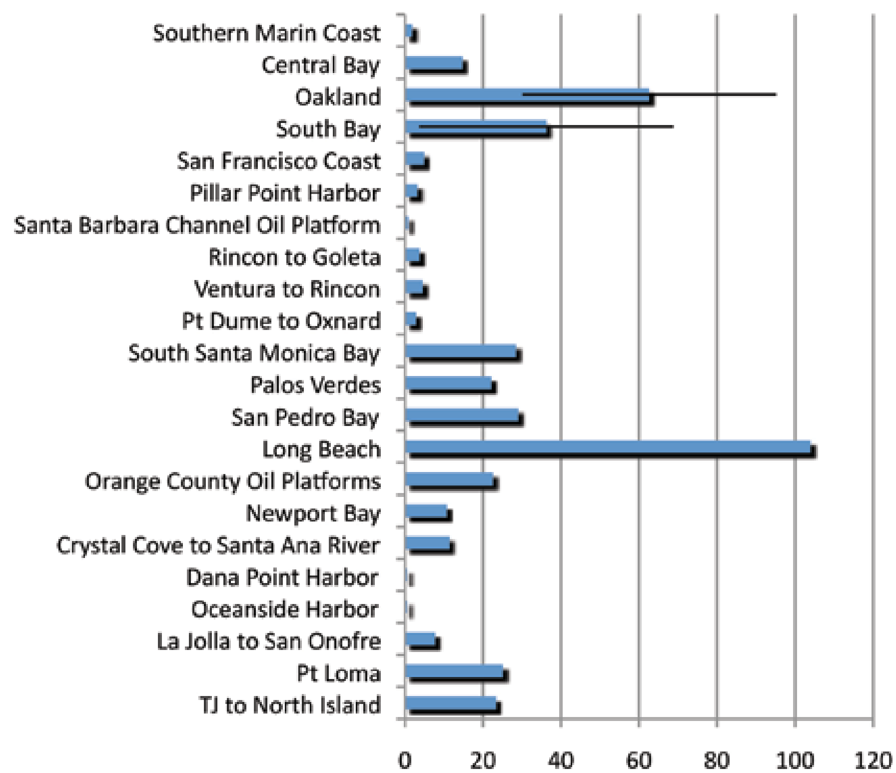


Figure 3-11. PCB concentrations in white croaker samples on the California coast, 2009. Standard error is shown where replicate samples were analyzed.

Priorities for Further Assessment

San Francisco Bay and San Diego Bay stand out as having high PCB concentrations. As mentioned above in the methylmercury section, San Francisco Bay is being routinely and thoroughly assessed every three years under the Regional Monitoring Program, and the consumption guidelines for the Bay are being updated in 2011. Consumption guidelines are in place for the region with moderately elevated PCB concentrations around Long Beach. Consumption guidelines for San Diego Bay have not been developed. Acquiring the data needed to support development of consumption guidelines for San Diego Bay appears to be a high priority.

OTHER POLLUTANTS WITH THRESHOLDS

OEHHA (Klasing and Brodberg 2008) has developed thresholds for four other pollutants that were analyzed in this survey: dieldrin, DDT, chlordane, and selenium. Concentrations of these pollutants did not exceed any of the no consumption ATLs, and rarely exceeded any ATL. The organic pollutants, however, did frequently exceed the FCGs.

Results for these pollutants are briefly summarized below.

DDTs

The maximum species averages for DDTs were below the lowest threshold (the 21 ppb FCG) in 50% of the 42 locations sampled (Figure 3-12). Twenty of the locations fell between the FCG and the next lowest threshold (the 520 ppb 2 serving ATL). One location was above 520 ppb: San Pedro Bay with the spiny dogfish sample at 1077 ppb. The highest concentrations were found primarily in three regions: San Francisco Bay, near the Palos Verdes Peninsula, and near San Diego and the Mexican border.

Dieldrin

The maximum species averages for dieldrin were below the lowest threshold (the 0.46 ppb FCG) in 63% of the 42 locations sampled (Figure 3-13). Fifteen of the locations fell between the FCG and the next lowest threshold (the 15 ppb 2 serving ATL). The highest concentration measured was 3.0 ppb in a shiner surfperch sample from Dana Point Harbor. As for DDTs, the highest concentrations were found primarily in three regions: San Francisco Bay, near the Palos Verdes Peninsula, and near San Diego and the Mexican border.

Chlordanes

The maximum species averages for chlordanes were below the lowest threshold (the 5.6 ppb FCG) in 76% of the 42 locations sampled (Figure 3-14). Ten of the locations fell between the FCG and the next lowest threshold (the 190 ppb 3 serving ATL). The highest concentration measured was 42 ppb in the spiny dogfish sample from San Pedro Bay. The highest concentrations were found in San Francisco Bay and near the Palos Verdes Peninsula.

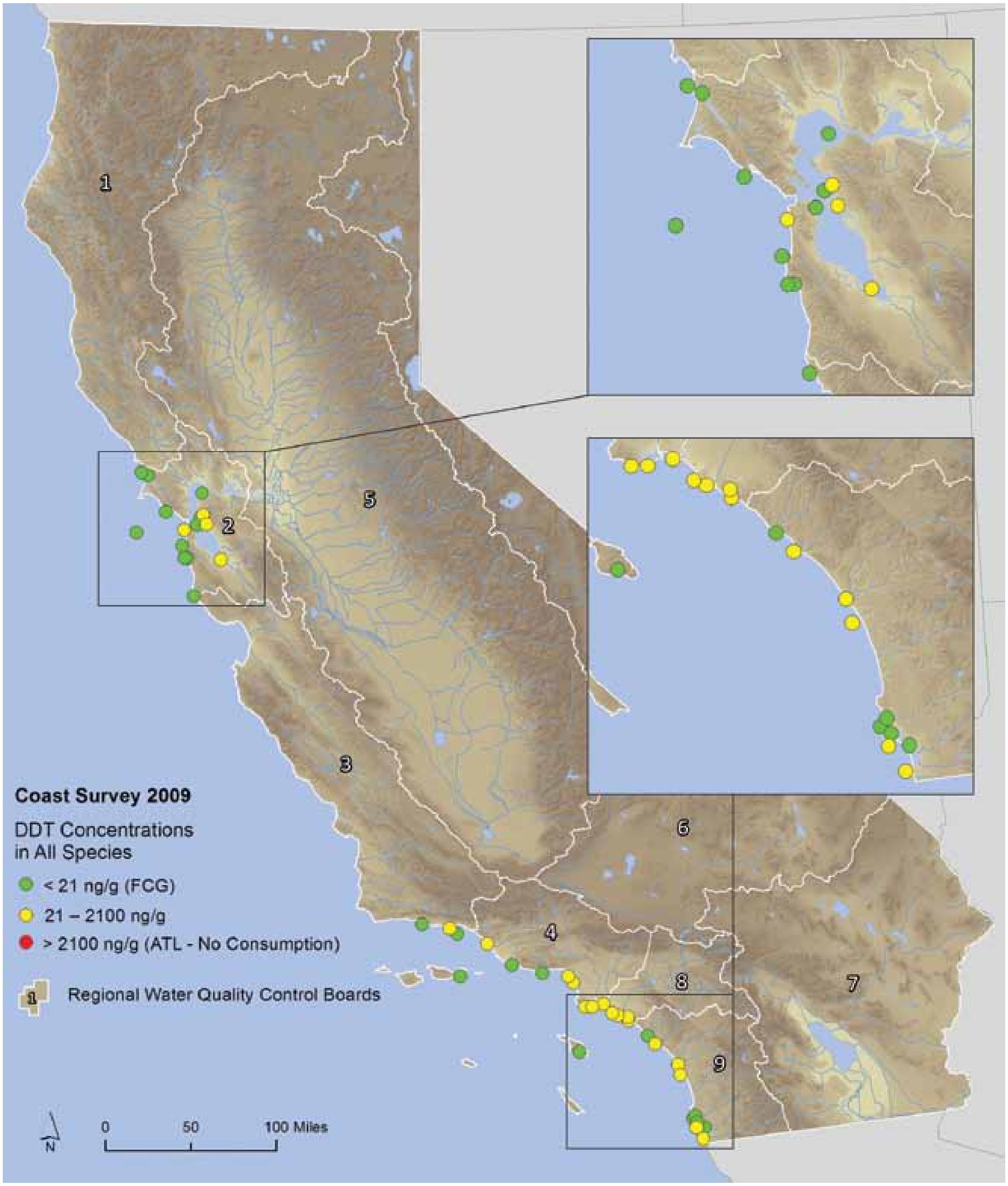


Figure 3-12. Spatial patterns in DDT concentrations (ppb) among locations sampled in the Coast Survey, 2009. Each point represents the highest average DDT concentration among the species sampled at each location. Concentrations were measured in composite samples.

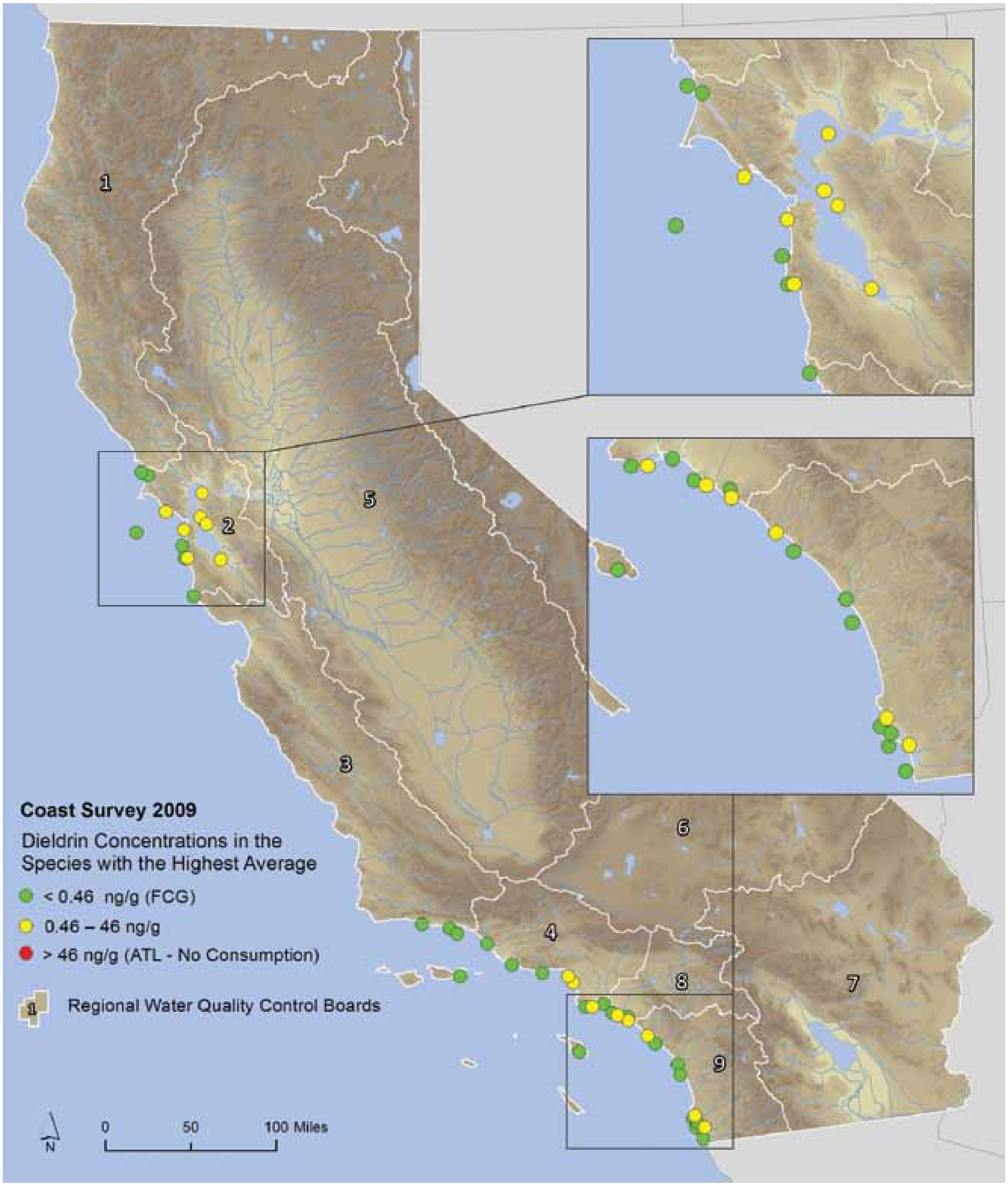


Figure 3-13. Spatial patterns in dieldrin concentrations (ppb) among locations sampled in the Coast Survey, 2009. Each point represents the highest average dieldrin concentration among the species sampled at each location. Concentrations were measured in composite samples.

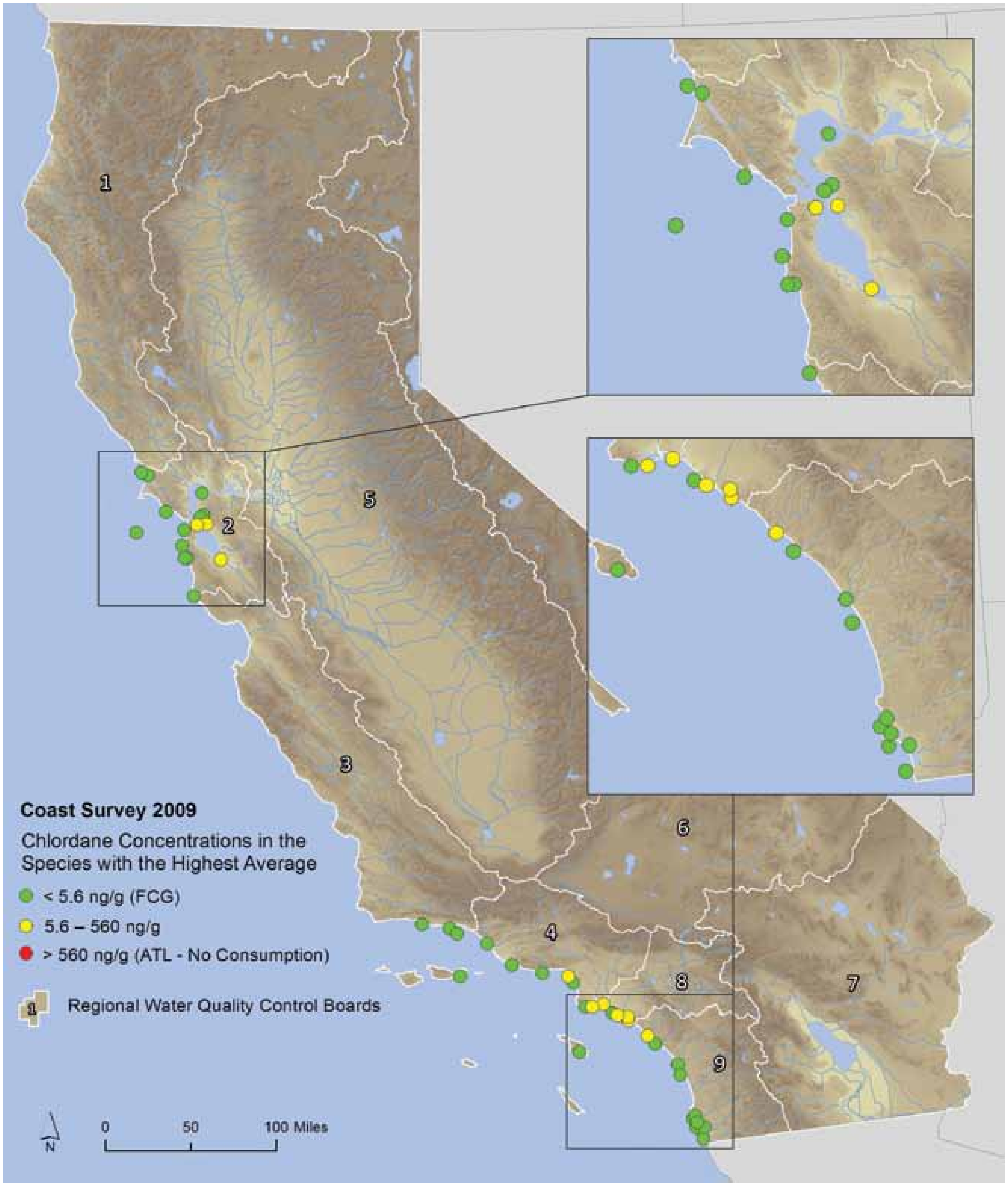


Figure 3-14. Spatial patterns in chlordane concentrations (ppb) among locations sampled in the Coast Survey, 2009. Each point represents the highest average chlordane concentration among the species sampled at each location. Concentrations were measured in composite samples.

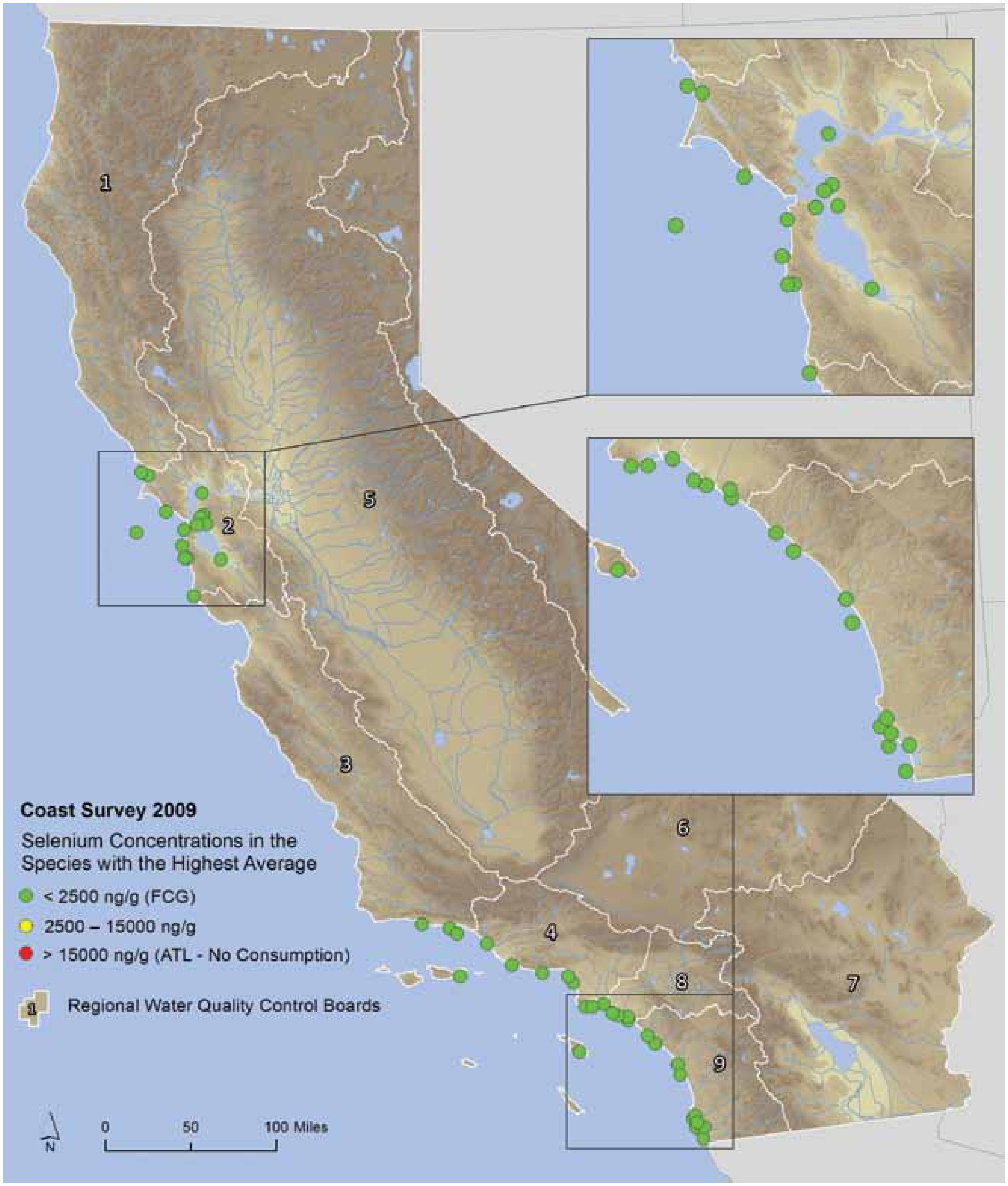


Figure 3-15. Spatial patterns in selenium concentrations (ppb) among locations sampled in the Coast Survey, 2009. Each point represents the highest average selenium concentration among the species sampled at each location. Concentrations were measured in composite samples.

Selenium

The maximum species averages for selenium were below the lowest threshold (the 2.5 ppm 3 serving ATL) in 100% of the 42 locations sampled (Figure 3-15). The highest average or composite concentration measured was 2.4 ppm in a barred sand bass sample from San Pedro Bay.

SECTION 4
THE SOUTHERN CALIFORNIA BIGHT

INTRODUCTION

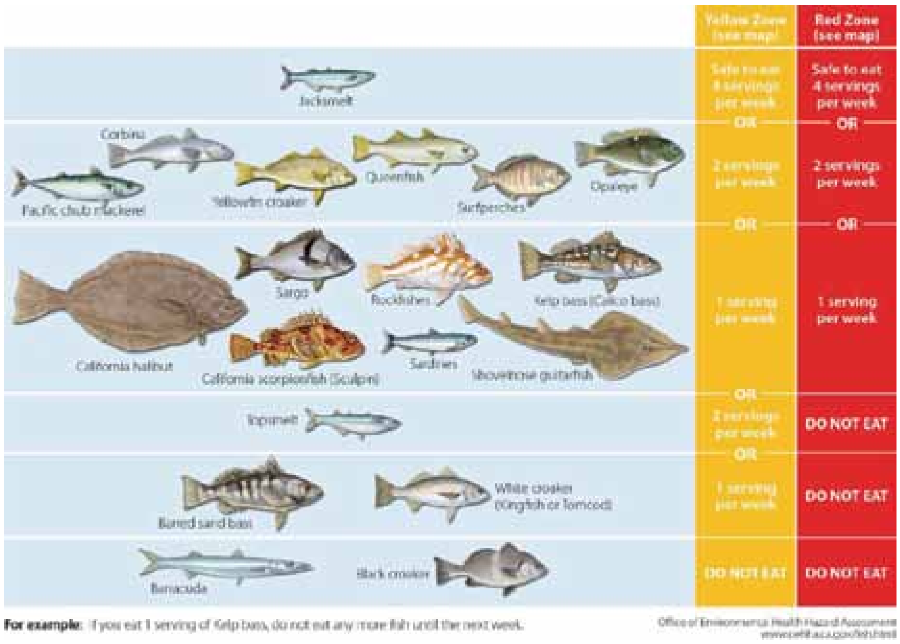
The Office of Environmental Health and Hazard Assessment (OEHHA) has developed a health advisory and safe eating guidelines for fish from the Southern California Bight (Figure 4-1) (Klasing et al. 2009). The advisory, which extends from Ventura Harbor to San Mateo Point, warns fishers against eating specific species from some or all locations. OEHHA's safe eating guidelines also identifies fish species with low contaminant levels that are safe to eat frequently (once a week or more). Sufficient numbers of fish were collected to provide consumption advice for barracuda, barred sand bass, black croaker, corbina, California halibut, California scorpionfish (also known as "sculpin"), jacksmelt, kelp bass, opaleye, Pacific chub mackerel, queenfish, rockfishes, sardines, sargo, shovelnose guitarfish, surfperches, topsmelt, white croaker, and yellowfin croaker. Because sport fish were collected from such a large geographic area, OEHHA divided the advisory and safe eating guidelines into regions based on highly variable contaminant levels found in some species: 1) Ventura Harbor to Santa Monica Pier, 2) Santa Monica Beach south of Santa Monica Pier to Seal Beach Pier, and 3) South of Seal Beach Pier to San Mateo Point.

This chapter on the Southern California Bight has a regional focus on a subset of species collected in the statewide survey. These species include kelp bass, Pacific chub mackerel, white croaker, yellowfin croaker, barred sand bass, and spotted sand bass. These species were most frequently caught in the Bight and provide our best opportunity to illustrate spatial comparisons across the region.

The five species selected for this region are all secondary or tertiary carnivores in the Southern California marine food web structure (Allen et al. 2006). Yellowfin and white croaker are benthic secondary carnivores, feeding largely on invertebrates (i.e., clams, worms, crustaceans) living in or on sea bottom sediments. The primary difference between the croakers is their preferred benthic habitats; yellowfin croaker prefers embayment habitats, while white croaker can be found in large bays and near coastal open ocean habitats. Kelp bass are secondary carnivores that prefer rocky reef habitats, feeding on smaller kelp bed fishes (i.e., perch and wrasses). Pacific chub mackerel are pelagic secondary carnivores, meaning they prefer water column habitats either near or far from the coast, feeding on smaller midwater fishes (i.e., anchovy and sardine). Spotted sand bass are tertiary benthopelagivores. That is, spotted sand bass are near the top of the food web, preferring bay/estuarine habitats, feeding on a large variety of prey including flatfish (e.g., diamond turbot), baitfish (e.g., slough anchovy), perches (e.g., shiner surfperch), and other assorted benthic fishes (longjaw mudsuckers, Pacific staghorn sculpin, bay pipefish). Therefore, the combination of target species sampled during this study covers a wide variety of habitats ranging from bays to offshore, from the sea bottom to the surface, and focuses largely on the upper end of the food web.

A Guide to Eating Fish Caught from Vetura Harbor to San Mateo Point

Women 18-45, especially those who are pregnant or breastfeeding, and children 1-17



Map of Yellow and Red Zones for fish caught from Ventura Harbor to San Mateo Point

Figure 4-1. Current health advisories for fish consumption in the southern California Bight (OEHHA 2009).

METHYLMERCURY

Comparison to Thresholds

In the Southern California Bight, more samples exceeded fish contaminant thresholds for methylmercury than any other contaminant for the six species examined in this study (Figure 4-2). Average concentrations of fish caught in embayments, open coastal areas, and the Channel Islands all exceeded OEHHA's 1 serving ATL (0.15 ppm). Six samples (5%) exceeded OEHHA's no consumption ATL of 0.44 ppm.

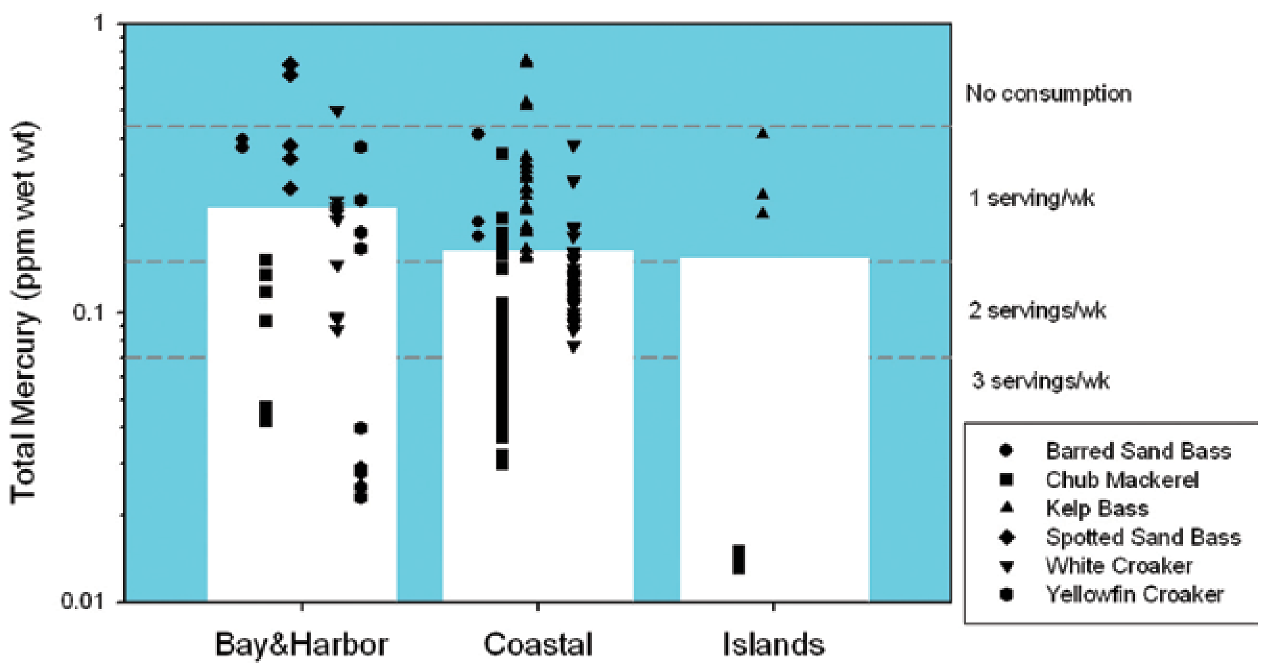


Figure 4-2. Concentrations of methylmercury (ppm) in fish composites from three different habitats in the Southern California Bight. Bars represent the average of all species for each habitat. Symbols represent the concentration of each composite sample arranged by species.

Variation Within and Among Species

The average concentration of methylmercury was greater in spotted sand bass (0.16 ± 0.04 ppm) than any other species from the Southern California Bight (Figure 4-2). This was followed by kelp bass (0.15 ± 0.05 ppm), white croaker (0.13 ± 0.05 ppm), yellowfin croaker (0.10 ± 0.10 ppm), and Pacific chub mackerel (0.06 ± 0.03 ppm). Spotted sand bass are the highest trophic position predator sampled in the Bight. In addition, spotted sand bass prefer embayment habitats known to have greater mercury concentrations in sediment than offshore habitats (Maruya and Schiff 2009). Kelp bass, which prefer open coastal habitats, are perhaps the longest-lived of the six species sampled (up to 30 yrs). The combination of high trophic position and long lifespan are known to contribute to methylmercury accumulation in fish (Wiener et al. 2007). This likely contributes to the increased average methylmercury concentrations in these species.

Spatial Patterns

There was no clear spatial trend in average methylmercury tissue concentrations along the open coast of the Southern California Bight (Figure 4-3). Average methylmercury concentrations exceeded OEHHA's 2 serving ATL (0.07 ppm) in every one of the 19 fishing locations for kelp bass. Five of the 19 fishing locations also exceeded OEHHA's 1 serving ATL (0.15 ppm) for kelp bass, but these were not the locations typically known

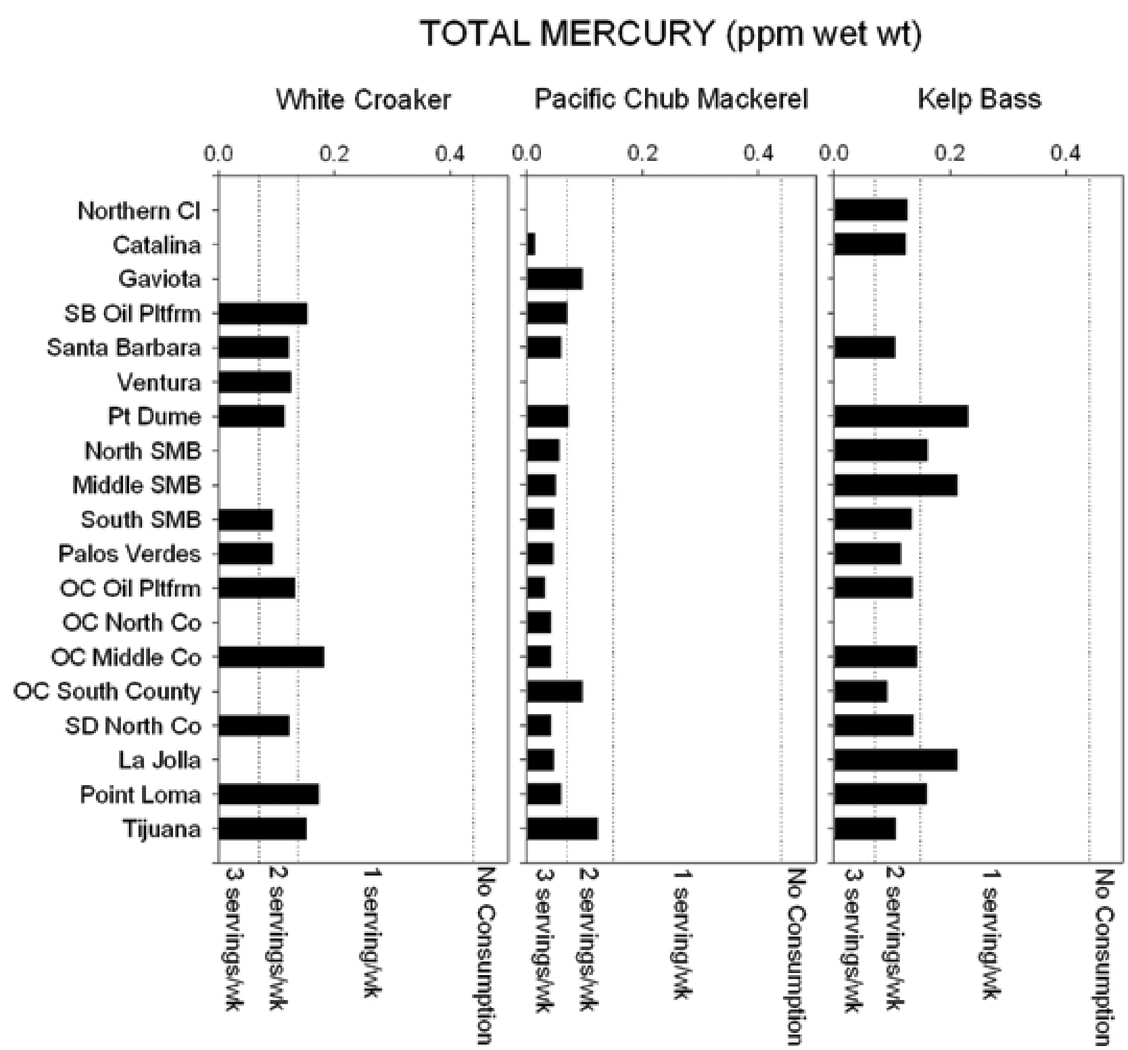


Figure 4-3. Average methylmercury concentrations (ppm) by fishing zone for three commonly occurring species in the Southern California Bight.

for mercury contamination sources. These five locations, which include Point Dume and Point La Jolla, are headlands with relatively robust kelp bass populations (Pondella et al. in press).

Pacific chub mackerel was the species with the lowest average methylmercury tissue concentrations in this study. In contrast to kelp bass, Pacific chub mackerel exceeded OEHHA's lowest threshold, the 2 serving ATL, in only four of the 19 fishing locations. Like the observations for kelp bass, the fishing locations with the highest Pacific chub mackerel tissue methylmercury concentrations, places like Gaviota and south Orange County, are not associated with known sources of mercury.

Temporal Trends

There have been few studies of methylmercury concentrations in recreationally-caught fishes from the Southern California Bight. The most prominent study available for comparison was conducted in 2002 and used for the existing fish advisory in the Los Angeles area (NOAA 2007). After constraining the samples from this study to the same geographic area as NOAA (2007), the ranges of methylmercury tissue concentrations between the two surveys were similar (Table 4-1). This implies that tissue concentrations have remained steady, at least on the Los Angeles margin, between 2002 and 2009.

Table 4-1
Comparison of methylmercury concentration ranges (ppm) among species from the Los Angeles margin.

Species	Methylmercury (range, ppm wet weight)	
	2009 (This Study)	2002 (NOAA 2007)
Kelp Bass	0.115-0.231	0.118-0.321
White Croaker	0.093-0.131	0.027-0.196
Pacific chub Mackerel	0.031-0.056	0.080-0.086

Management Implications

This is the first regional scale assessment of methylmercury in edible tissues of marine sport fishes of the entire Southern California Bight. The widespread exceedance of OEHHA's lowest 2 serving ATL for open coastal fish species such as kelp bass is new information. Less than a half-dozen composite kelp bass samples exceeded OEHHA's no consumption threshold of 0.44 ppm and no fishing location exceeded 0.44 ppm on average.

Local land-based sources of mercury appeared to have little impact on fish tissue concentrations in the Southern California Bight. For example, kelp bass tissue concentrations had no strong spatial gradient and did not peak near large urban centers where land-based inputs of mercury have historically been the greatest. The tissue concentrations of methylmercury were greater in embayments than open coastal habitats. This may be a reflection of localized land-based sources and in-situ biogeochemical cycling of mercury, but sample sizes were too limited to compare embayments for different levels of tissue contamination. Instead of spatial relationships, the fish species highest in the food web and with the longest life span appeared to have the greatest tissue concentrations of total mercury.

Priorities for Further Assessment

Fishing locations with samples greater than OEHHA's no consumption ATL should be prioritized for further assessment because many of these locations were not included in OEHHA's current fish tissue advisory. These investigations should focus on species higher in the food web and with the longest life spans, since these species tended to accumulate the greatest concentrations within a habitat.

A second consideration for further investigation would be deciphering sources of mercury that contribute to tissue contamination. There have been a number of studies documenting total mercury in sediments of the Southern California Bight (Maruya and Schiff 2009, Schiff 2000). However, two data gaps remain. First, too few tissue samples were collected in embayments where sediment processes might play a role in bioaccumulation. Embayments are particularly important since these habitats support some of the most intensive fishing pressure in the Southern California Bight. The second data gap is the role of additional mercury sources where sediments are not the primary source. These locations would include open coastal and offshore island habitats. Especially for heavily-fished species such as kelp bass that live in rocky habitat, non-sediment sources including atmospheric deposition may be implicated.

PCBs

Comparison to Thresholds

Approximately one-third (36%) of the samples from the Southern California Bight exceeded OEHHA's 2 serving ATL (21 ppb) for PCBs in this study (Figure 4-4). Average PCB concentrations of fish caught from embayments exceeded OEHHA's 1 serving ATL (42 ppb). Average PCB concentrations of fish caught from open coastal areas exceeded OEHHA's 2 serving ATL (21 ppb). Average PCB concentrations of fish caught from the Channel Islands were below the 1 serving ATL. Five samples (3%) exceeded OEHHA's no consumption ATL (120 ppb), all of which came from embayment habitats. No samples from the Channel Islands exceeded the 2 serving ATL (21 ppb).

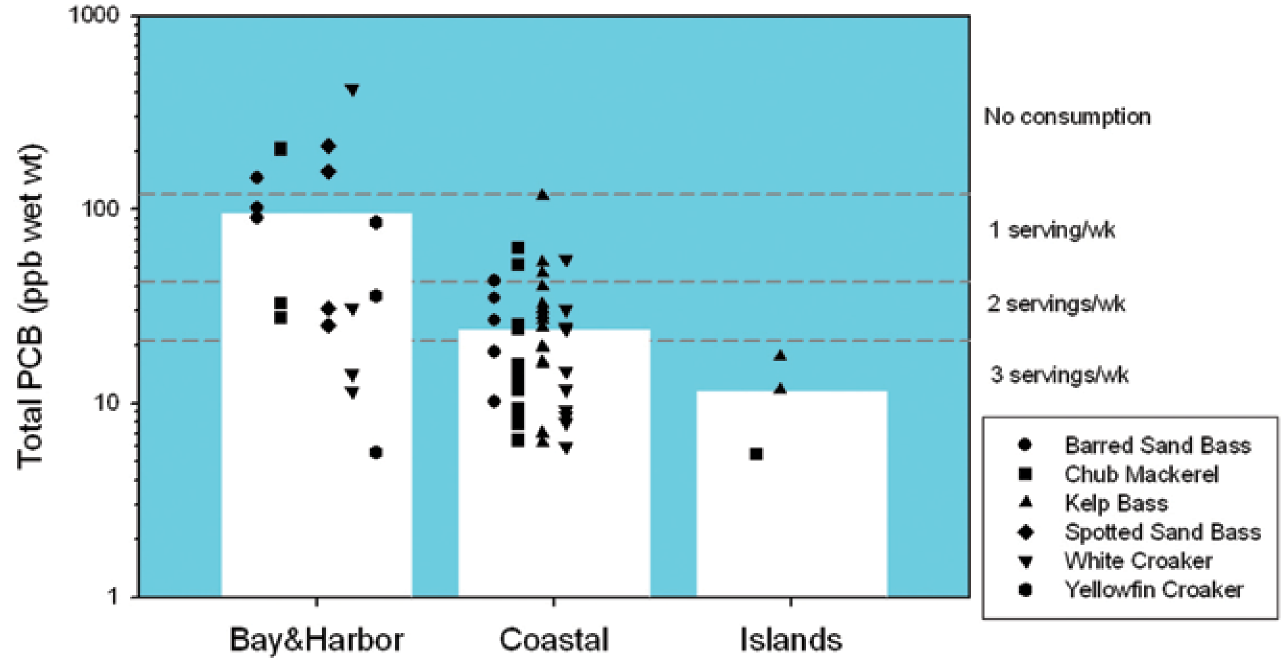


Figure 4-4. Concentrations of PCBs (ppb) in fish composites from three different habitats in the Southern California Bight. Bars represent the average of all species for each habitat. Symbols represent the concentration of each composite sample arranged by species.

Variation Among Species

The average concentration of PCBs was similar among species. Average concentrations varied by less than a factor of three among the five species sampled. The greatest average PCB concentration was measured in spotted sand bass (35 ± 21 ppb). The lowest average PCB concentration was measured in kelp bass (15 ± 13 ppb). Species that feed on or near sediments, especially those located in embayments (white croaker, yellowfin croaker, spotted sand bass), had greater concentrations than those species that feed in the water column along the open coast (kelp bass and Pacific chub mackerel).

Spatial Patterns

There was a clear spatial trend in PCB concentrations along the open coast of the Southern California Bight (Figure 4-5). Peak concentrations occurred in fishing locations near the urban centers of Los Angeles and San Diego. Minimum concentrations occurred in fishing locations distant from urban centers such as Santa Barbara/Gaviota or south Orange/north San Diego Counties. Four of the 18 fishing locations with kelp bass samples exceeded OEHHA's 2 serving ATL (21 ppb); a single location located just north of the US-Mexico international border exceeded the 1 serving ATL (42 ppb). Five of the 11 fishing locations with white croaker samples exceeded the 2 serving ATL (21 ppb). Again, samples generally nearest the urban centers of Los

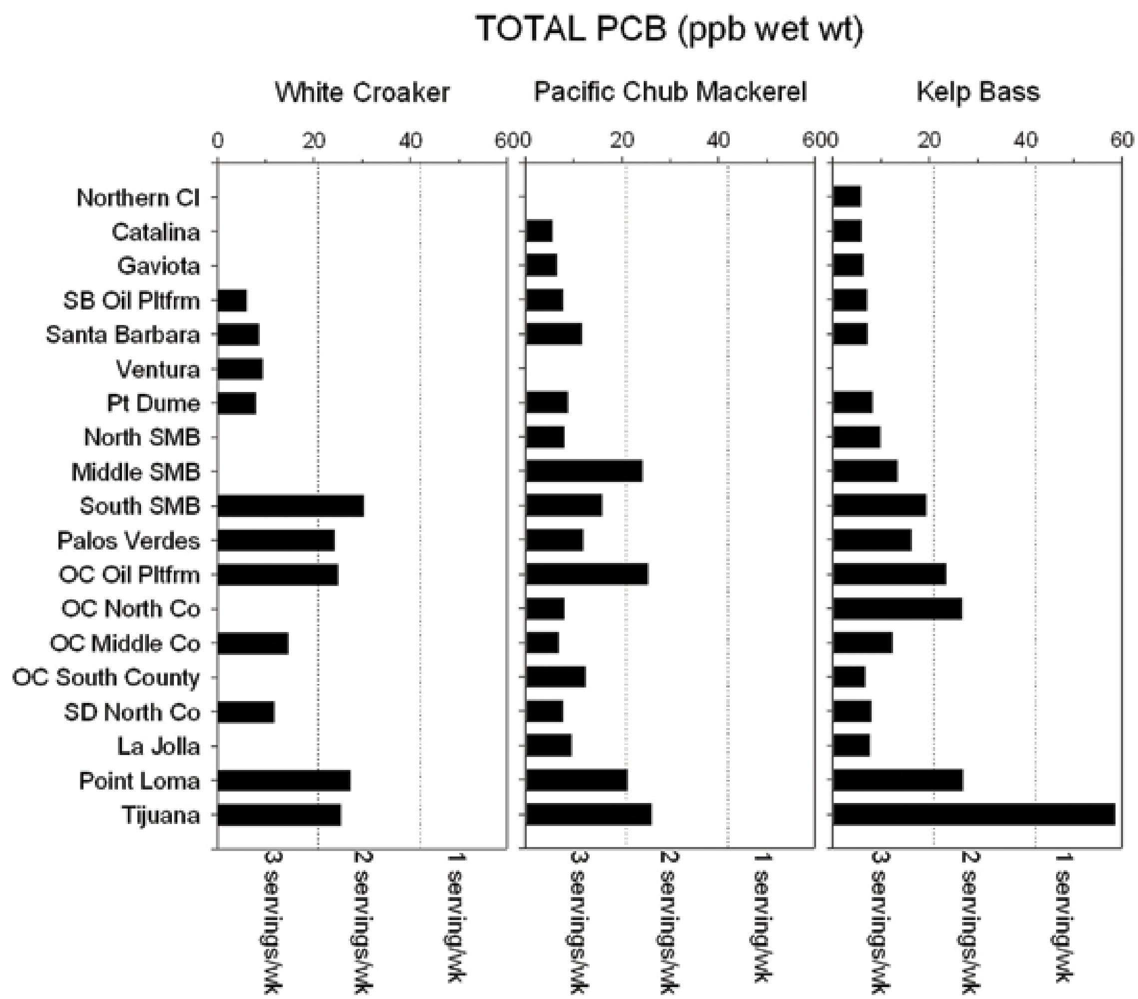


Figure 4-5. Average PCBs (ppb) by fishing zone for three commonly occurring species in the Southern California Bight.

Angeles and San Diego had the greatest PCB concentrations. Three of the 17 fishing locations with Pacific chub mackerel samples exceeded 21 ppb. Yet again, samples generally nearest the urban centers of Los Angeles and San Diego had the greatest PCB concentrations. Samples furthest from Los Angeles and San Diego had the lowest average PCB concentrations in Pacific chub mackerel.

The urban centers near Los Angeles and San Diego have the greatest sediment concentrations of PCBs found in the Southern California Bight (Maruya and Schiff 2009, Schiff 2000). PCBs are a known persistent bioaccumulative organic contaminant. Food web transfer of PCBs has been well-documented in the Southern California Bight (Young et al. 1976, 1977) and elsewhere (Suedel et al. 1994). In fact, sediment concentrations have been well correlated with tissue levels in sediment-associated fishes (Schiff and Allen 2001). Even pelagic (water column) forage fishes have been shown to contain higher concentrations of PCBs near to, compared to distant from, urban centers in the Southern California Bight (Jarvis et al. 2007).

Temporal Trends

No long-term studies of PCBs in sport fish have been conducted in the Southern California Bight.

Management Implications

While regional scale assessments of PCBs in marine fishes have been conducted previously in the Southern California Bight, they were focused on either liver or whole-body tissues rather than edible fillets consumed by most anglers. Livers, which typically have PCB concentrations 10-fold greater than muscle tissue, are good for projects addressing trends because higher concentrations enhance detection of differences over time. However, livers are not typically consumed by anglers. Similarly, whole-body samples may have greater concentrations than muscle tissue, but do not provide the best index of human exposure. Whole-body samples are valuable for studies focused on environmental risk since most predators consume their prey whole. Therefore, comparing studies that measure different tissue types (livers, whole-body, and muscle fillets) is problematic.

PCBs appear to be a problem nearest urban centers in the Southern California Bight. The inputs of PCBs near urban centers of the Southern California Bight have been well-studied (Schiff et al. 2001). The historical inputs of PCBs have been greatest (up to 98% of total emissions) from treated wastewater discharges. These inputs, estimated to be 9 metric tons/yr in 1971, have been below detection limits for the last two decades. However, large quantities still exist in sediments near outfalls and in embayments of the Southern California Bight, and it is this reservoir of historical residues that is thought to continually impact biota.

Priorities for Further Assessment

Fishing locations with samples greater than OEHHA's no consumption threshold should be prioritized for further assessment. These investigations should focus on sediment-associated species, since these species tended to accumulate the greatest concentrations within a habitat. While further work in the Los Angeles region is justified, the largest data gap would be for fishes in embayments of the San Diego region. Los Angeles already has a fish advisory in place; hence some protection of anglers currently exists. No such advisory has been developed for San Diego embayments and potentially harmful exposures may be occurring.

DDTs

Comparison to Thresholds

None of the samples from the Southern California Bight exceeded any of OEHHA's ATLs for DDTs in this study (Figure 4-6). Average DDT concentrations in fish caught from embayments, open coastal, and channel island habitats were at least five-fold below OEHHA's lowest, 2 serving ATL (520 ppb).

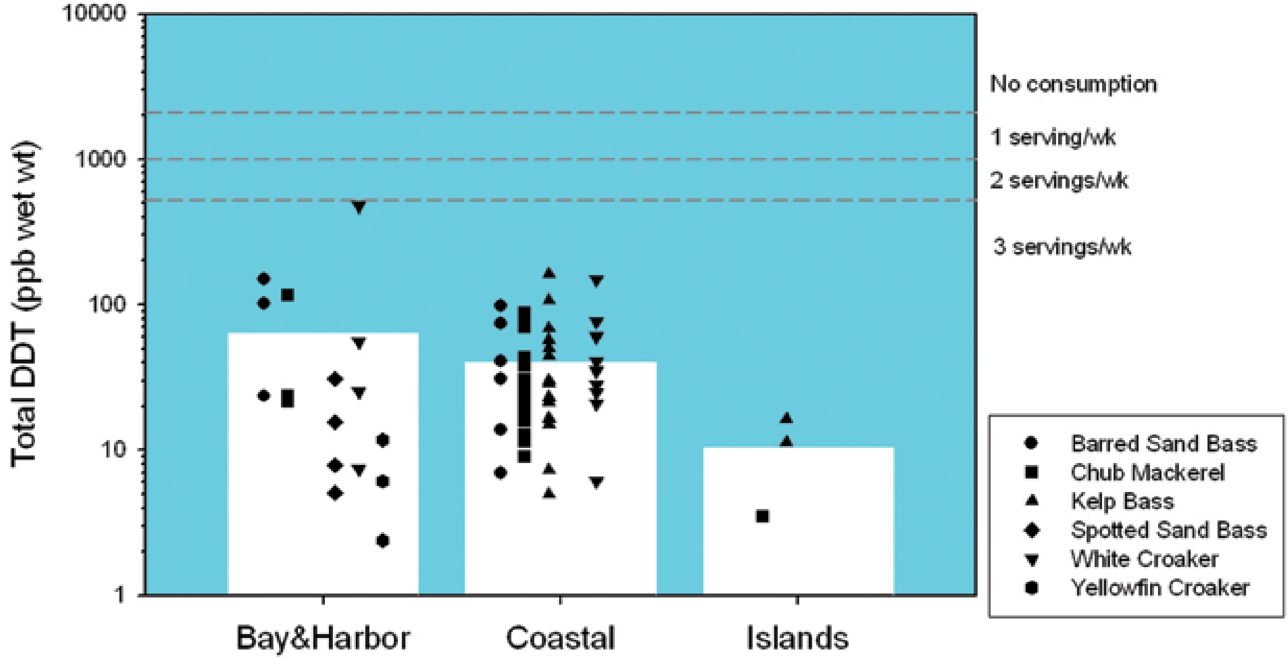


Figure 4-6. Concentrations of DDTs (ppb) in fish composites from three different habitats in the Southern California Bight. Bars represent the average of all species for each habitat. Symbols represent the concentration of each composite sample arranged by species.

Variation Among Species

Average DDT concentrations varied by a factor of four among species sampled. The greatest average DDT concentration was measured in white croaker (42 ± 42 ppb). The lowest average DDT concentration was measured in yellowfin croaker (10 ± 14 ppb) and spotted sand bass (10 ± 14 ppb). It is likely that the differences among species were driven, at least in part, by sampling location. Some samples of white croaker, Pacific chub mackerel, and kelp bass were collected from the Los Angeles margin. In contrast, no yellowfin croaker or spotted sand bass were collected near the Los Angeles margin. The yellowfin croaker and spotted sand bass were collected mostly south of Los Angeles.

Spatial Patterns

There was a clear spatial trend in DDT concentrations along the open coast of the Southern California Bight (Figure 4-7). Regardless of species, the greatest DDT concentrations occurred in fishing locations near the Los Angeles margin, peaking at Palos Verdes. Despite the tissue concentration maxima located near Los Angeles, none of the 19 fishing locations exceeded the 2 serving ATL. Like PCBs, minimum tissue concentrations of DDTs occurred in fishing locations furthest from Los Angeles such as Santa Barbara/Gaviota or south Orange/north San Diego counties.

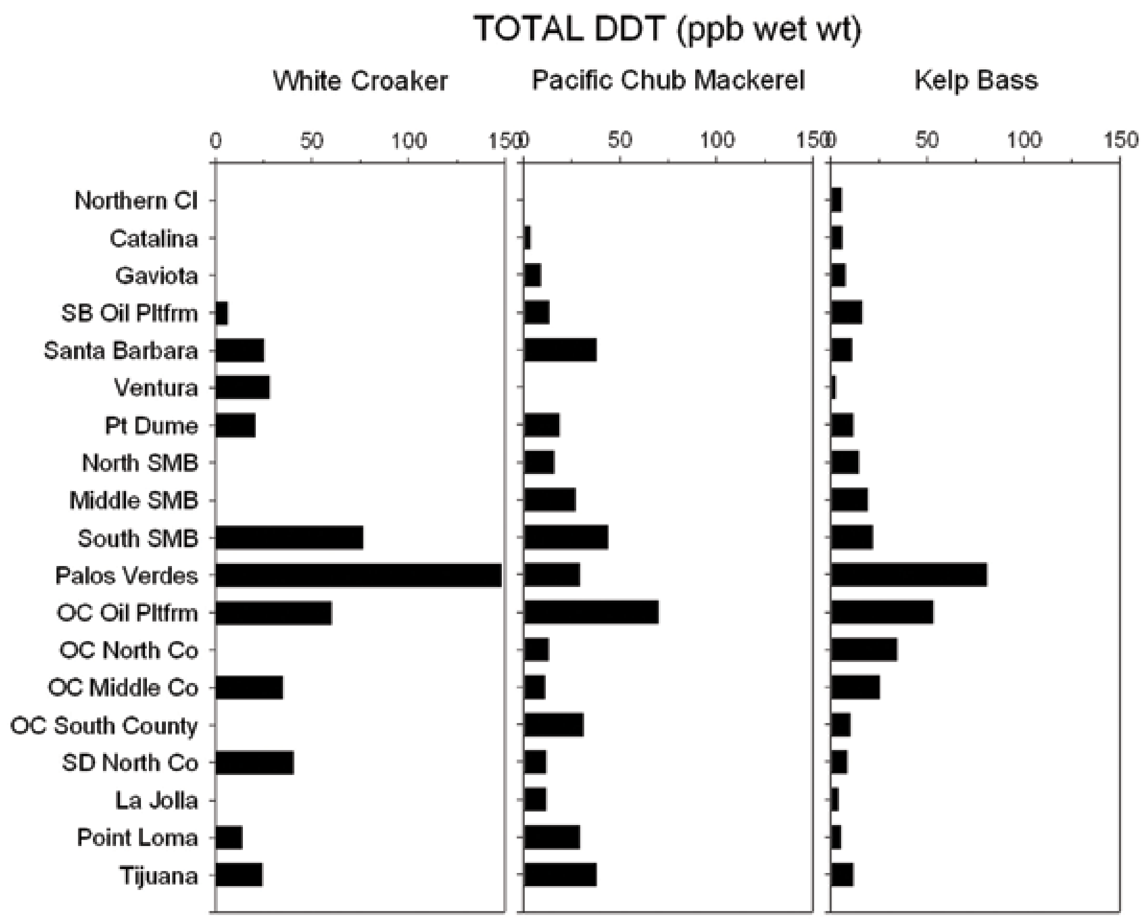


Figure 4-7. Average DDT concentrations (ppb) by fishing zone for three commonly occurring species in the Southern California Bight. The lowest ATL is 520 ppb, well above the highest average concentration measured in any zone for these three species during this study.

The sediments near Los Angeles have the greatest concentrations of DDTs found in the Southern California Bight (Maruya and Schiff 2009, Schiff 2000). In fact, Palos Verdes in the Los Angeles area is the location of a Superfund site, where up to 100 metric tons of DDTs are still found in offshore sediments (Lee et al. 2002). DDTs are a known persistent bioaccumulative organic contaminant. Food web transfer of DDTs has been well-documented in the Southern California Bight (Young et al. 1976, 1977) and elsewhere (Suedel et al. 1994). In fact, sediment concentrations have been well correlated with tissue levels in sediment-associated fishes (Schiff and Allen 2001). Even pelagic (water column) forage fishes have been shown to contain higher concentrations of DDTs near urban centers in the Southern California Bight (Jarvis et al. 2007).

Temporal Trends

Ongoing monitoring of DDTs in edible fish tissues is conducted by the Los Angeles County Sanitation Districts (LACSD). The LACSD has sampled white croaker and kelp bass fillets at several locations along Palos Verdes (Figure 4-8). Concentrations have declined in tissue composites from both species since

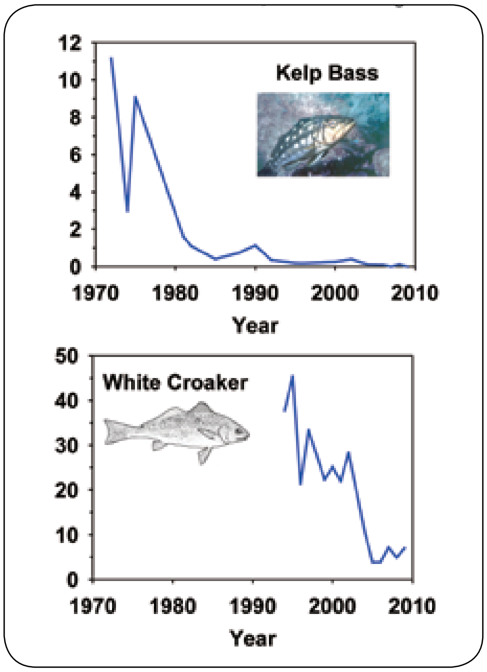


Figure 4-8. Median concentrations of DDTs (ppm) over time in muscle tissue from kelp bass and white croaker from Palos Verdes, California.

monitoring began in the 1970s. For kelp bass, DDT concentrations nearest the Superfund site have declined from 10 ppm in 1972 to below detection limits in 2009. For white croaker, DDT concentrations declined from 45 to 5 ppm between 1995 and 2009. This order-of-magnitude reduction now appears to have leveled off, with concentrations holding steady for the last four years. The NPDES monitoring data for kelp bass are consistent with the findings observed in the current study. The white croaker results from the NPDES monitoring, however, were much greater than the concentrations observed during the current study. Several explanations are available for this discontinuity, but the primary difference is presumed to be fishing location. The NPDES monitoring program collects white croaker at the Superfund site. The white croaker from the current study, while still collected from Palos Verdes, was collected kilometers away from the Superfund site.

Concentrations of DDTs, except for those fish on the Los Angeles margin, appear to be below OEHHA's ATLs. A fish advisory already exists along the Los Angeles margin. As a result, the primary management concerns are already being addressed. This includes ensuring public notification and education (http://www.pvsfish.org/; http://www.oehha.ca.gov/fish/so_cal/pdf_zip/SoCalFactsheet61809.pdf) as well as remediation activities to clean up the sediments responsible for the increased tissue levels (http://www.epa.gov/region9/superfund/pvshelf/index.html).

Priorities for Further Assessment

Since the Superfund site was subject to Natural Resource Damage Assessment (NRDA) actions, priorities and further assessments have been planned and are underway. Please visit the NRDA website for up to date information on these activities http://www.darrp.noaa.gov/southwest/montrose/msrphome.html

SECTION 5
SAN FRANCISCO BAY AND THE REGION 2 COAST

INTRODUCTION

Fish from San Francisco Bay contain concentrations of mercury, PCBs, and other chemical contaminants that are above thresholds of concern for human health. This problem was first documented in 1994 when the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) performed a pilot study to measure contaminant concentrations in Bay sport fish (Fairey et al. 1997). As a result of this pilot study the California Office of Environmental Health Hazard Assessment (OEHHA) issued an interim health advisory for consumption of fish from San Francisco Bay.

OEHHA issued an updated health advisory and safe eating guidelines for fish and shellfish caught from San Francisco Bay in 2011 (Gassel et al. 2011). The guidelines recommend avoiding shiner perch and other surfperch species from San Francisco Bay. Women ages 18-45 and children 1-17, who are most sensitive to mercury, should also avoid eating San Francisco Bay sharks, striped bass, or white sturgeon.

All segments of San Francisco Bay appear on the 303(d) List because the fish consumption advisory represents an impairment of the beneficial use of the Bay for sport fishing. The Clean Water Act also requires that Total Maximum Daily Load (TMDL), cleanup plans based on evaluation and reduction of contaminant loads, be developed in response to inclusion of a water body on the 303(d) List. Bay TMDLs for mercury and PCBs have been completed and Basin Plan Amendments adopted. In these TMDLs the emphasis has shifted away from enforcement of water quality objectives and toward enforcement of targets that are more directly linked with impairment, particularly methylmercury and PCB concentrations in sport fish and wildlife prey. Concentrations of mercury, PCBs, and other contaminants in sport fish are, therefore, fundamentally important indices of Bay water quality.

Sport fish monitoring in the Bay has been conducted on a three-year cycle since 1994 (Fairey et al. 1997). This section presents findings from the sixth round of sport fish sampling conducted in 2009 under the Regional Monitoring Program for Water Quality in the San Francisco Estuary (RMP) (Davis et al. 1999, Davis et al. 2002, Greenfield et al. 2003, Greenfield et al. 2005, Davis et al. 2006, Hunt et al. 2008). The monitoring program targets species that are frequently caught and consumed by Bay anglers at five popular fishing areas. This monitoring provides updates on the status of and long-term trends in contaminants of concern in Bay sport fish.

The objectives of the RMP fish contamination monitoring element are:

1. to produce the information needed for updating human health advisories and conducting human health risk assessments;
2. to measure contaminant levels in fish species over time to track temporal trends and to evaluate the effectiveness of management efforts;
3. to evaluate spatial patterns in contamination of sport fish and the Bay food web; and
4. to understand factors that influence contaminant accumulation in sport fish in order to better resolve signals of temporal and spatial trends.

The 2009 RMP sampling effort was supplemented substantially by coordination with SWAMP's statewide survey of contaminants in sport fish on the California coast. Coordination with SWAMP made it possible to sample a broader array of species and to generally invest more in sampling and analysis through savings achieved through joint reporting of the results. Coordination with SWAMP also made it possible to obtain data from coastal waters adjacent to the Bay, providing a much-needed update on the status of sport fish contamination in these areas, many of which had not been sampled since the Coastal Fish Contamination Program (CFCP) ended in 2003. The systematic and consistent statewide dataset being generated by SWAMP is also providing extremely valuable context for interpretation of coastal sport fish contamination.

This section also summarizes results for the Region 2 coast, including two sites of particular interest: Tomales Bay and Pillar Point Harbor. The CFCP and followup monitoring led to a consumption advisory and consideration of a TMDL for Tomales Bay due to methylmercury contamination, and to inclusion of Pillar Point Harbor on the 303(d) List due to methylmercury contamination.

SAN FRANCISCO BAY

Methylmercury

Methylmercury exposure is one of the primary concerns behind the sport fish consumption advisory for the Bay. The San Francisco Bay TMDL for mercury was approved by the U.S. EPA in February 2008. Continuing to monitor methylmercury in Bay sport fish will be crucial in assessing the effectiveness of the TMDL and tracking the additional reductions required to meet the target of 0.2 ppm that was established in the TMDL as the cleanup goal for protection of human health (SFBRWQCB 2006). The TMDL also established a 0.03 ppm target for small prey fish to protect piscivorous wildlife.

Comparison to Thresholds and Variation Among Species

Consistent with previous rounds of RMP sampling, methylmercury concentrations in Bay sport fish continue to exceed thresholds of concern (Figure 5-1, Tables 5-1 and 5-2). Two species, leopard shark and striped bass, had average concentrations (1.29 and 0.46 ppm, respectively) exceeding the no consumption ATL of

0.44 ppm. All leopard shark samples, ranging in concentration from a minimum of 0.78 ppm to a maximum of 1.84 ppm, exceeded 0.44 ppm. Concentrations in striped bass ranged from 0.25 ppm to 0.91 ppm. No samples of the other species approached 0.44 ppm.

The Mercury TMDL specifies that attainment of the target of 0.2 ppm is to be assessed using a grand mean of five popular species: striped bass, California halibut, white sturgeon, jacksmelt, and white croaker. Methylmercury was only analyzed in three of these species in 2009, precluding a precise assessment of status relative to the target. Average concentrations for the three species that were analyzed were 0.46 ppm for striped bass, 0.22 ppm for California halibut, and 0.08 ppm for jacksmelt.

None of the species sampled in the Bay had an average concentration, or even a single sample, below the lowest methylmercury threshold (the 2 serving ATL of 0.07 ppm). Jacksmelt had the lowest average (0.08 ppm). Shiner surfperch had the second lowest average concentration (0.12 ppm).

Spatial Patterns

Significant variation among the five Bay sampling locations for most of the species collected was not expected, due primarily to their wide movements, especially striped bass which are known to move throughout the entire Bay-Delta Estuary (Davis et al. 2003). Shiner surfperch, however, have proven to be a useful indicator of spatial variation in past sampling, and the collection of replicate samples in this sampling round allowed for examination of spatial patterns. This information is valuable in guiding efforts to identify and reduce the sources and pathways of methylmercury contamination. The high site fidelity of this species, coupled with the large numbers of fish going into each composite sample (typically 15-20 fish), yields a surprising degree of statistical power to detect spatial patterns even with only three composites per location.

Three replicate composite shiner surfperch samples were collected at each of the five Bay sampling locations. The observed variance within each location was very low (coefficients of variation for each site ranged between 2% and 10%), allowing detection of statistically significant differences among multiple locations (Figure 5-2). Oakland had the highest average concentration (0.19 ppm), significantly higher than all of the other locations. South Bay was second highest (0.13 ppm), and also significantly higher than Berkeley (0.10 ppm), San Francisco (0.09 ppm), and San Pablo Bay (0.08 ppm). The highest average at Oakland was 2.4 times higher than the lowest average at San Pablo Bay.

Temporal Trends

Methylmercury in striped bass is perhaps the most important indicator of mercury contamination in the Bay and Delta from a human health perspective. This is due to a combination of the high mercury concentrations that sometimes occur in their tissue, their abundance, and their popularity among anglers. Striped bass are high trophic level predators and therefore highly susceptible to accumulating high concentrations of methylmercury. Striped bass are also good integrative indicators of mercury contamination in the Bay-Delta

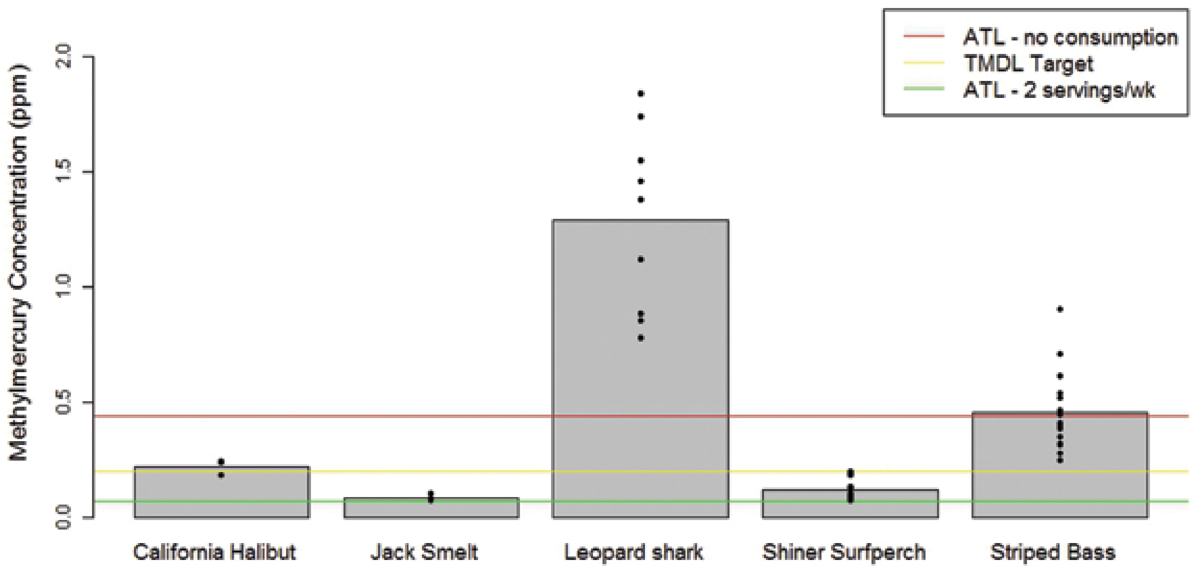


Figure 5-1. Methylmercury concentrations (ppm) in sport fish species in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent individual samples (either composites or individual fish).

Estuary because of their use of the entire ecosystem, including both fresh and saline waters. Striped bass spend most of their lives in San Francisco Bay, but also move into freshwater and the coastal ocean. Recent data have shown that individual striped bass are quite variable in their use of Bay, freshwater, and ocean habitats (Ostrach, D. unpublished data). While this extensive movement makes striped bass good integrative indicators of the estuarine ecosystem, it makes them poor indicators of small-scale spatial variation within the Bay-Delta and also may confound attempts to discern long-term trends.

A relatively extensive historical dataset exists for striped bass in the Bay, allowing evaluation of trends over 39 years from 1971-2009 (Figure 5-3). The data are presented as estimated concentrations of each striped bass at a standard length of 60 cm in order to remove any bias that might occur from sampling different-sized fish in different years. Greenfield et al. (2005) used this technique previously for Bay-Delta striped bass. Striped bass generally show a correlation with size, as seen for the 2009 data ($p = .07$) in Figure 5-4. The 0.44 ppm no consumption ATL provides a useful point of reference for examining fluctuations in annual average concentrations (Figure 5-3). Overall, intra-annual variance has been high and average concentrations in recent years are not significantly different from those measured in the early 1970s. A more rigorous analysis of this dataset is in preparation as a manuscript by Melwani and coauthors. Note that due to length-correction the average shown in Figure 5-3 is slightly different from that discussed previously.

Table 5-1
Summary statistics by species.

Common Name (Sample Type)		Average Number of Fish in Composites	Average Total Length (mm)	Average Percent Lipid	Average Mercury (ppm)	Average Selenium (ppm)	Average Sum of PCBs (ppb)	Average Sum of Dioxin TEQs (pptr)	Average Dieldrin (ppb)	Average Sum of DDTs (ppb)	Average Sum of Chlordanes (ppb)	Average Sum of PBDEs (ppb)	Average PFOS (ppb)
California Halibut (Composite)	average	3	663	0.23	0.22	0.40	18		0.0	3.1	0.3	1.8	0.0
	count		3	3	3	3	3		1	3	3	3	3
Jack Smelt (Composite)	average	5	263	0.69	0.08	0.32	22		0.5	12.5	1.8	1.5	
	count		4	4	4	4	4		2	4	4	4	
Leopard shark (Composite)	average	3	1095	0.38		0.30	21		0.2	7.3	1.1	4.9	6.0
	count		3	3		3	3		2	3	3	3	3
Leopard shark (Individual)	average	1	1095		1.29								
	count		9		9								
Northern Anchovy (Composite)	average	38	88	1.49		0.47	118		0.9	18.9	5.5	7.9	4.4
	count		9	9		9	9		9	9	9	9	3
Shiner Surfperch (Composite)	average	18	115	1.52	0.12	0.42	121	0.89	1.1	21.8	7.1	8.3	0.0
	count		15	15	15	15	15	10	7	15	15	15	3
Striped Bass (Composite)	average	3	609	0.60		0.46	30		0.3	11.1	1.5	5.0	0.0
	count		6	6		6	6		4	6	6	6	3
Striped Bass (Individual)	average	1	609		0.46								
	count		18		18								
White Croaker - skin off (Composite)	average	5	256	1.22		0.39	52	0.44	0.5	8.7	2.2	4.3	0.0
	count		12	12		12	12	12	11	12	12	12	3
White Croaker - skin on (Composite)	average	5	256	3.01			144		1.0	23.3	5.6	11.4	
	count		12	12			12		9	12	12	12	
White Sturgeon (Composite)	average	3	1322	0.50			11		0.2	5.5	1.2	2.8	3.2
	count		4	4			4		4	4	4	4	3
White Sturgeon (Individual)	average	1	1322			1.47							
	count		12			12							

Lipid percentages (and counts) for dioxin batches were 1.8 (10) and 1.19 (12) for shiner surfperch and white croaker (skin off), respectively.

Table 5-2
Counts of samples exceeding Regional Water Board TMDL targets (number of samples above target/total number of samples analyzed) for mercury and PCBs and calculated targets for other contaminants. Calculated targets were derived using the same assumptions that were used in deriving the TMDL targets: one extra cancer case for an exposed population of 100,000 over a 70-year lifetime, a mean body weight of 70 kg, and a mean daily consumption rate of 0.032 kg/day (the 95th percentile upper bound estimate of fish intake reported by all Bay fish-consuming anglers).

Common Name	Sample Type	Mercury (0.2 ppm)	Sum of PCBs (10 ppb)	Sum of Dioxin TEQs (0.14 pptr)	Dieldrin (1.4 ppb)	Sum of DDTs (64 ppb)	Sum of Chlordanes (17 ppb)
California Halibut	Composite	2/3	2/3		0/1	0/3	0/3
Jacksmelt	Composite	0/4	3/4		0/2	0/4	0/4
Leopard shark	Composite		3/3		0/2	0/3	0/3
Leopard shark	Individual	9/9					
Shiner Surfperch	Composite	0/15	15/15	10/10	0/7	0/15	0/15
Striped Bass	Composite		5/6		0/4	0/6	0/6
Striped Bass	Individual	18/18					
White Croaker - skin off	Composite		11/12	12/12	0/11	0/12	0/12
White Croaker - skin on	Composite		12/12		0/9	0/12	0/12
White Sturgeon	Composite		3/4		0/4	0/4	0/4

Management Implications and Priorities for Further Assessment

The 2009 data indicate that high methylmercury concentrations in the Bay persist and do not show obvious signs of decline. Striped bass and California halibut had average concentrations above the TMDL target of 0.2 ppm, while jacksmelt had an average lower than the target. The shiner surfperch data suggest that some locations, such as Oakland Harbor and South Bay, contribute more to methylmercury accumulation in the food web and may be a higher priority for efforts to reduce sources and pathways.

Future rounds of sampling should include all five species that are specified as targets in the Mercury TMDL. Measuring methylmercury in northern anchovy would also provide valuable information on wildlife exposure from this important prey species.

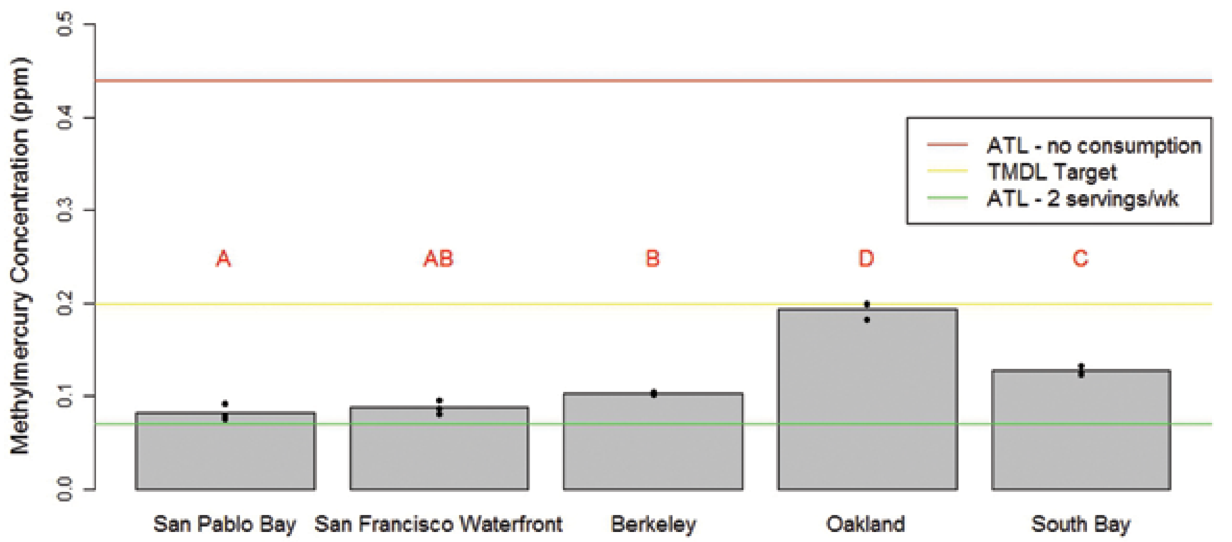


Figure 5-2. Methylmercury concentrations (ppm) in shiner surfperch in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent composite samples with 13-20 fish in each composite. Locations with the same letter were not significantly different from each other (p = .05).

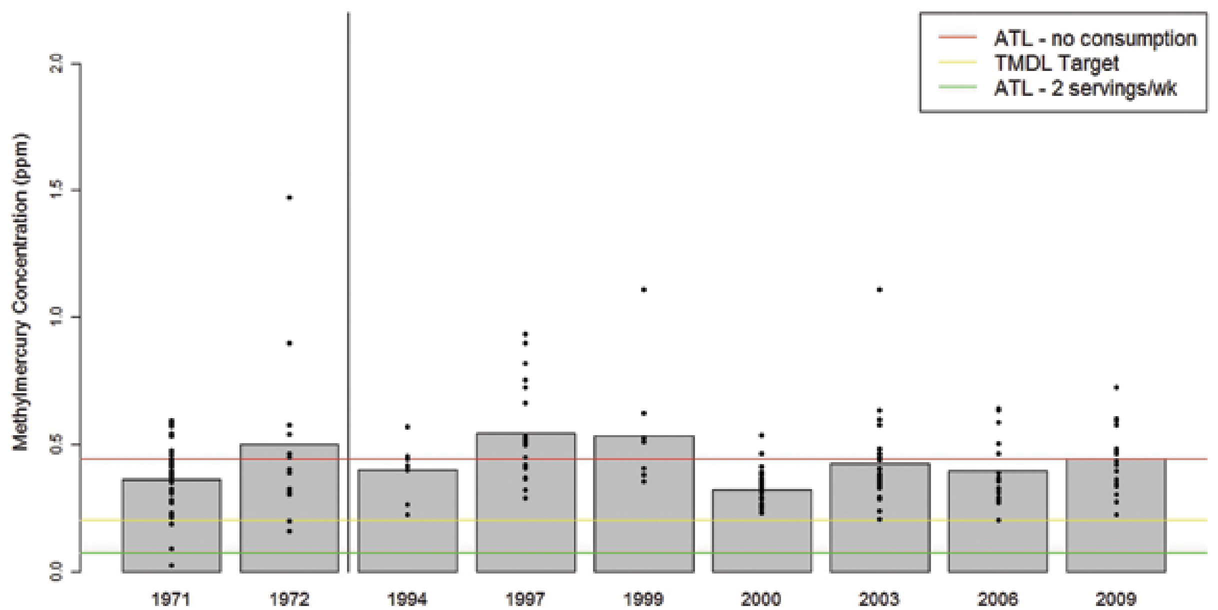


Figure 5-3. Methylmercury concentrations (ppm) in striped bass from San Francisco Bay, 1971-2009. Bars indicate average concentrations. Points represent individual fish. To correct for variation in fish length, all plotted data have been calculated for a 60-cm fish using the residuals of a length vs. log(Hg) relationship. Data were obtained from CDFG historical records (1971 – 1972), the Bay Protection and Toxic Cleanup Program (1994), a CalFed-funded collaborative study (1999 and 2000), and the Regional Monitoring Program (1997, 2000, 2003, 2006, and 2009).

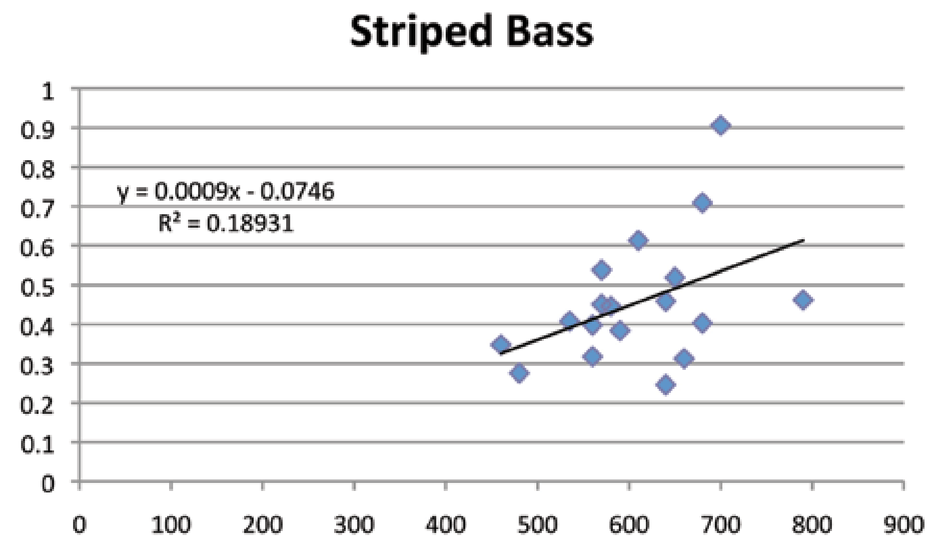


Figure 5-4. Methylmercury (ppm - vertical axis) versus length (mm - horizontal axis) in striped bass samples collected by the RMP in 2009. Each point represents an individual fish.

PCBs

PCB exposure is another primary concern behind the sport fish consumption advisory for the Bay. The San Francisco Bay TMDL for PCBs was approved by the U.S. EPA in February 2010. Continuing to monitor PCBs in Bay sport fish will be crucial in assessing the effectiveness of the TMDL and tracking the additional reductions required to meet the target of 10 ppb that was established as a cleanup goal for protection of human health in the TMDL (SFBRWQCB 2008). Attaining this target will require a substantial reduction in PCBs in the Bay food web that is anticipated to also result in protection of wildlife from risks due to PCB exposure.

White croaker and shiner surfperch are the two species identified in the PCBs TMDL as indicators for comparison to the 10 ppb TMDL target. White croaker traditionally have been analyzed as fillets with skin in the RMP, as some anglers consume these fish with skin and this represents a conservative approach for estimating exposure. On the other hand, drawbacks in using this approach are that it is inconsistent with the advice provided by OEHHA for preparation of fish fillets; it is inconsistent with how white croaker samples are processed in other parts of the state; and skin is difficult to homogenize, leading to higher variance in the results. In 2009 the RMP began a switch to using fillets without skin. To provide more information in support of this transition, white croaker fillets were analyzed for organics in both fillets with and without skin. Removing the skin was found to result in substantially lower concentrations (Figure 5-5). For PCBs, the average reduction was 65%. The reduction in PCBs and other organic contaminants was driven by a 60% average reduction in lipid in the fillets without skin (Table 5-1). Preparing white croaker fillets without skin is a very effective way to reduce exposure to organic contaminants. The graphs presented for PCBs and the other organics display the results for white croaker without skin.

Comparison to Thresholds and Variation Among Species

Consistent with past RMP sampling, PCB concentrations in Bay sport fish continue to exceed thresholds of concern (Figure 5-6, Tables 5-1 and 5-2). The degree of PCB contamination in the Bay was similar to that observed for methylmercury, with one key indicator species (shiner surfperch) having a Baywide average (121 ppb) just above the no consumption ATL (120 ppb), and other species exhibiting moderate levels of contamination.

Shiner surfperch are a species that are also not processed as fillets (they are processed whole with head, viscera, and tail removed due to their small size - typically 11 cm, or 4.3 in), but these fish are caught and consumed by anglers. Two locations in the Bay had average concentrations that were above 120 ppb (discussed further below).

Northern anchovy also had an average concentration (118 ppb) approaching 120 ppb (Figure 5-6). Northern anchovy are not a target species for human consumption, but they are collected in the RMP sport fish trawls and analyzed as an indicator of wildlife exposure. They accumulate high concentrations of PCBs and other organic contaminants in spite of their small size (9 cm, or 3.5 in) and low trophic position. Their analysis as whole body samples and consequent relatively high lipid content (averaging 1.5%) are factors contributing to the high accumulation.

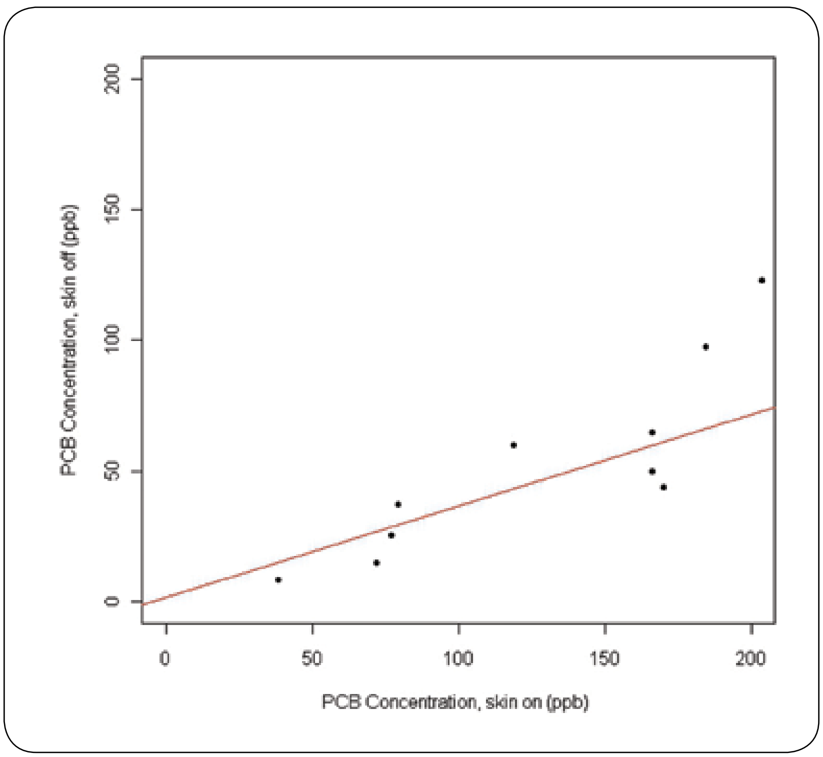


Figure 5-5. PCB concentrations (ppb) in paired samples of white croaker fillets with and without skin. The slope of the line is 0.35 (p = 0.02), indicating a 65% average reduction in concentration in the samples without skin.

White croaker had the third highest average PCB concentration (52 ppb – well below the no consumption ATL, but well above the 10 ppb TMDL target) (Figure 5-6). One white croaker sample (from Oakland) exceeded 120 ppb. PCB concentrations in the white croaker fillets with skin were much higher, averaging 144 ppb (Table 5-1).

Average PCB concentrations in other species were lower, ranging from 30 ppb in striped bass to the lowest average of 11 ppb in white sturgeon. All of the species sampled had an average above the 10 ppb TMDL target. Every Bay sample analyzed was higher than the FCG of 3.6 ppb.

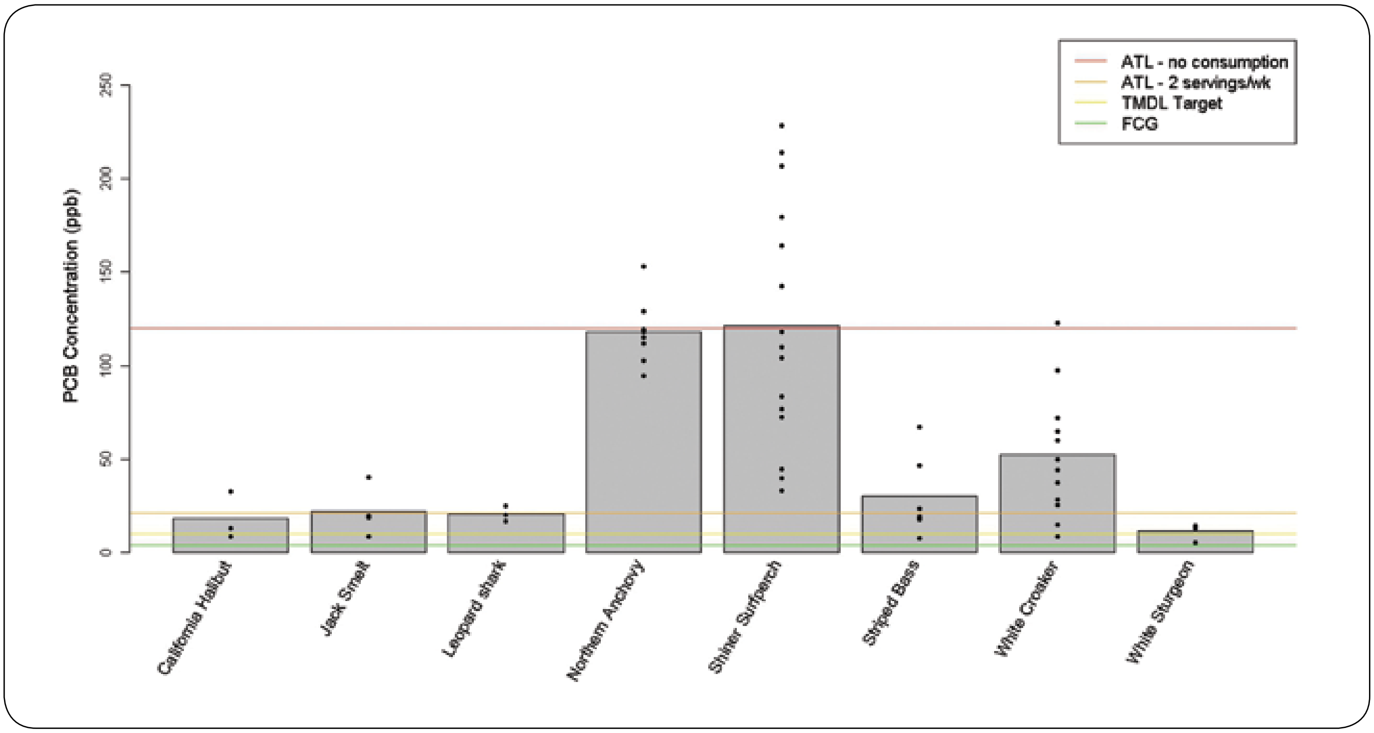


Figure 5-6. PCB concentrations (ppb) in sport fish species in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent composite samples. White croaker data are for the samples without skin. Note that northern anchovy are not a sport fish species – they are an important wildlife prey species that is collected in the surveys in San Francisco Bay and analyzed as whole fish.

Spatial Patterns

As described above, shiner surfperch have high site fidelity and are an excellent indicator of spatial patterns. Their sensitivity as a spatial indicator was particularly evident in the 2009 PCB results (Figure 5-7). As seen for methylmercury, the observed variance within each location was very low: coefficients of variation for each site ranged between 5% and 15%. For PCBs, this allowed for the unusual result that every sampling location was significantly different from every other sampling location. Two locations had average concentrations exceeding the no consumption ATL of 120 ppb: Oakland (216 ppb) and San Francisco (162 ppb). Average concentrations for the other locations were 111 ppb in South Bay, 77 ppb at Berkeley, and 39 ppb in San Pablo Bay. These data indicate the presence of strong spatial gradients in PCB concentrations in the Bay, which spanned over a five-fold difference between Oakland and San Pablo Bay. The availability of shiner surfperch data from other parts of the state (Section 3, Figure 3-10) provide additional context for interpreting these Bay data. The average concentration observed in San Pablo Bay was actually higher than many other coastal locations. The shiner surfperch data clearly illustrate that PCB concentrations in San Francisco Bay are generally elevated throughout the ecosystem, with distinct spatial gradients.

Temporal Trends

Shiner surfperch and white croaker are the key indicator species identified in the PCBs TMDL, and have been the focus of efforts to establish long-term time series in the RMP.

Examining time series of wet weight PCB concentrations provides information on trends in human exposure and in progress toward achieving the 10 ppb TMDL target (Figures 5-8 and 5-9). The Baywide average shiner surfperch concentration was lower in 2009 than in 1997, but not significantly different from 2000, 2003, or 2006. The spatial coherence observed in 2009 has also been evident in past sampling, with Oakland, San Francisco, and South Bay consistently higher than the other two locations. The high average concentration in 1997 was driven by exceptionally high concentrations measured at Oakland (over 500 ppb). Concentrations at Oakland appear to have declined markedly since 1997, although this pattern is largely due to variation in lipid and may also be partially due to small-scale spatial variation and fine-scale changes in sampling location within the Port of Oakland and San Leandro Bay. Overall, the wet weight shiner data indicate no decline over the last four rounds of sampling from 2000 to 2009.

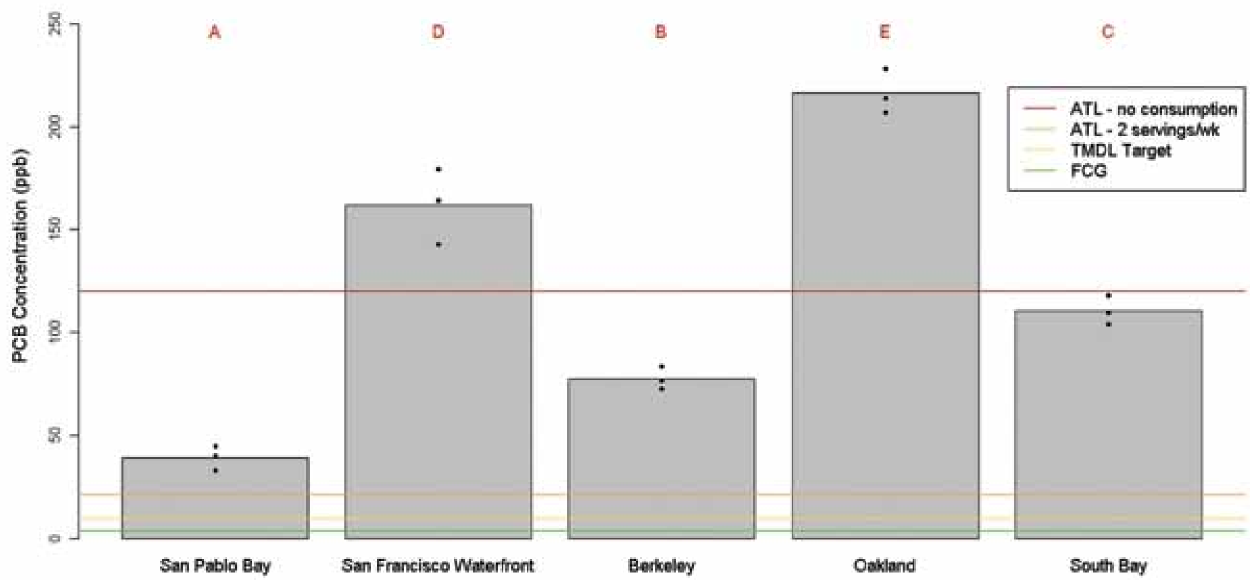


Figure 5-7. PCB concentrations (ppb wet weight) in shiner surfperch in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent composite samples with 13-20 fish in each composite. Locations with the same letter were not significantly different from each other ($p = .05$).

Wet weight PCB concentrations in white croaker were considerably lower in 2009 due primarily to the switch to fillets without skin (Figure 5-9). The switch to fillets without skin presents a significantly different picture of concerns due to consumption of white croaker. The average concentration in 2009 for fillets with skin (144 ppb) was also low relative to past years, though this difference was driven largely by lower lipid in the 2009 samples.

The long-term time series for shiner surfperch and white croaker can also be examined on a lipid weight basis to provide a better index of trends in ambient concentrations of PCBs in the Bay (Figures 5-10 and 5-11). The lipid-normalized trends are quite different from the wet weight trends. For shiner surfperch, no significant differences among years were detected, and the average concentration in 2009 was quite similar to averages observed in 1997 and 2000. The time series for Oakland is also quite different on a lipid weight basis, with the highest average concentration occurring in 2006, in contrast to the elevated wet weight concentrations occurring there in 1997 (Figure 5-8). The lipid weight data for white croaker (Figure 5-11) also do not suggest any long-term trend. It is noteworthy that when the PCB concentrations are expressed on a lipid weight basis, the skin off fillets are directly comparable to the skin on fillets from previous rounds, and the 2009 concentrations are very consistent with the earlier results (Figure 5-11). Overall, the lipid weight PCB data for shiner surfperch and white croaker suggest that ambient PCB concentrations in the Bay did not decline appreciably from 1997-2009.

Management Implications and Priorities for Further Assessment

The 2009 results indicate that high PCB concentrations in the Bay persist and do not show obvious signs of decline. The shiner surfperch data indicate that some locations, such as Oakland Harbor and San Francisco, contribute more to PCB accumulation in the food web and may be a higher priority for efforts to reduce sources and pathways. The spatial variation in shiner surfperch also has implications for human exposure, with two locations clearly exceeding the 120 ppb no consumption ATL. Removal of skin from white croaker fillets is a very effective way of reducing PCB exposure. Consistently high PCB concentrations in northern anchovy, an important prey species, pose a concern for piscivorous Bay wildlife.

DIOXINS

Polychlorinated dibenzodioxins and dibenzofurans (in this report the term “dioxins” will be used to refer collectively to all dioxins and furans) are classes of contaminants that are ubiquitous in the environment and are classified as human carcinogens. As part of the PCB TMDL, the SFBRWQCB has calculated a fish tissue target of 0.14 pptr (parts per trillion) for the assessment of risk to human health due to dioxins (SFBRWQCB 2008). This dioxin tissue target is not regulatory. The SFBRWQCB is in the early stages of developing a TMDL for dioxins. OEHHA has not developed ATLs or a FCG for dioxins.

Dioxin data are presented as toxic equivalents (TEQs). In calculating dioxin TEQs, the relative toxicity of a dioxin-like compound compared to dioxin (toxic equivalency factors, or TEF) is multiplied by the measured concentration of the chemical to derive a dioxin TEQ. For example, 2,3,7,8-tetrachorodibenzofuran (2,3,7,8-TCDF) is one-tenth as potent as dioxin and has a TEF of 0.1. If a sample contains 50 pptr of 2,3,7,8-TCDF, the dioxin TEQ attributable to 2,3,7,8-TCDF in that sample is 5 pptr. Dioxin TEQs for measured dioxin-like compounds with established TEFs can be added to calculate the total dioxin TEQs in a sample. The TEFs used in this report were from WHO (2005) (Appendix 6). The dioxin TEQs presented in this report are based

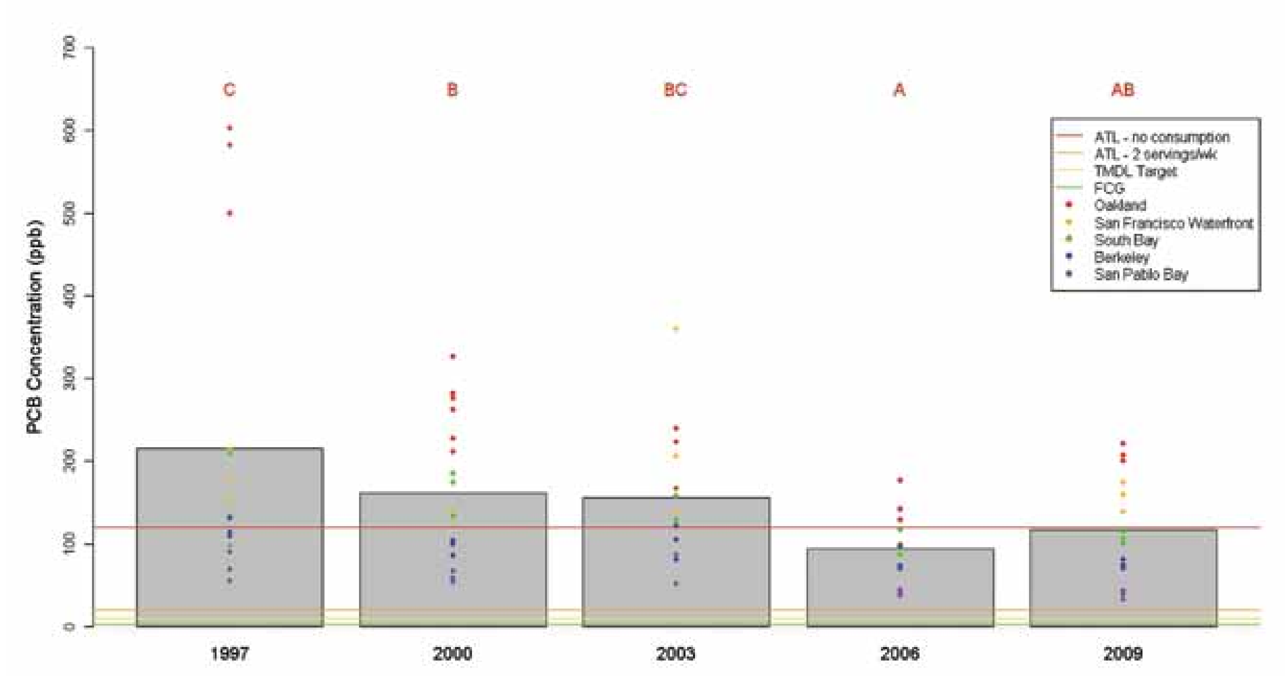


Figure 5-8. PCB concentrations (ppb wet weight) in shiner surfperch in San Francisco Bay, 1997-2009. Bars indicate average concentrations. Points represent composite samples. Years with the same letter were not significantly different from each other ($p = .05$).

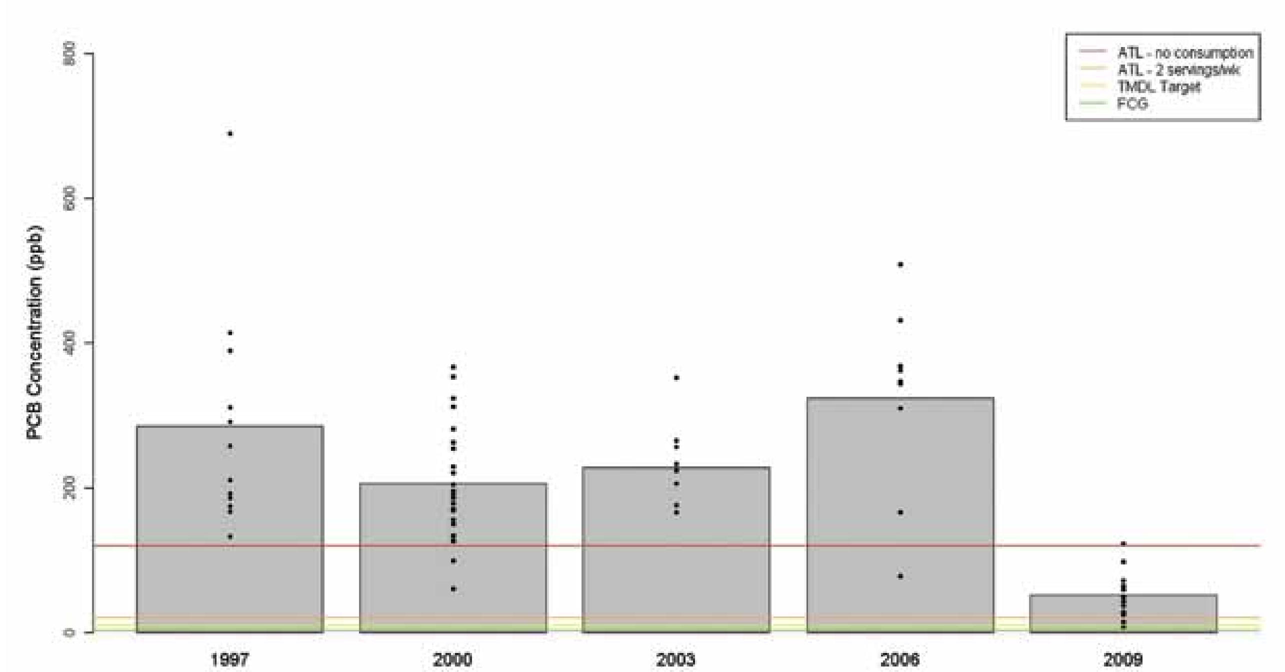


Figure 5-9. PCB concentrations (ppb wet weight) in white croaker in San Francisco Bay, 1997-2009. Bars indicate average concentrations. Points represent composite samples. Data from 2000-2006 are for fillets with skin, data from 2009 are for fillets without skin.

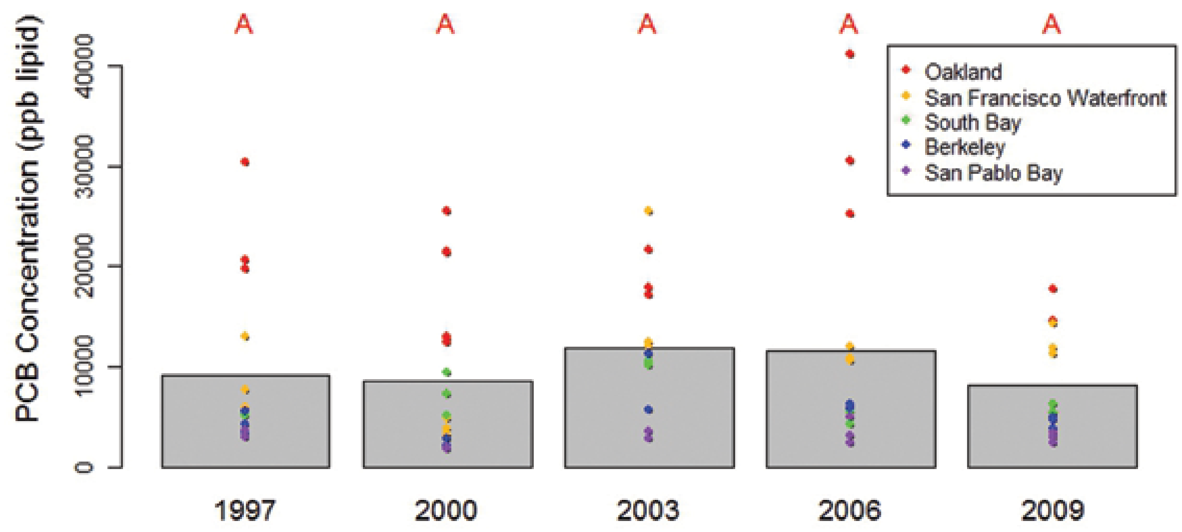


Figure 5-10.PCB concentrations (ppb lipid weight) in shiner surfperch in San Francisco Bay, 1997-2009. Bars indicate average concentrations. Points represent composite samples. Years with the same letter were not significantly different from each other (p = .05). Data for 2009 are expressed as the sum of 40 congeners that were also analyzed in earlier rounds of sampling (rather than a sum of the 55 congeners analyzed in the 2009 samples).

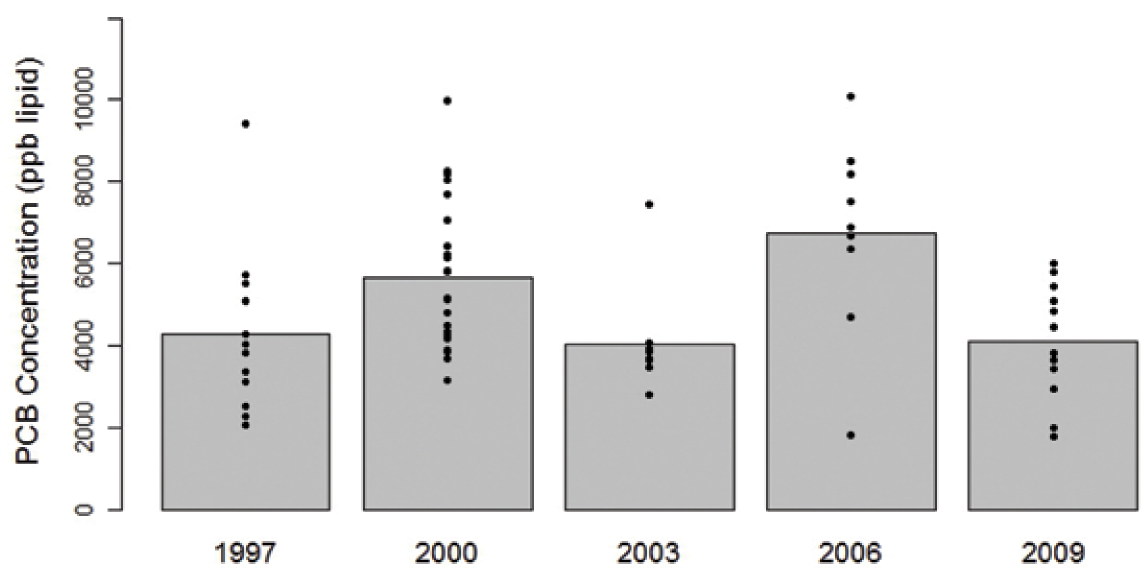


Figure 5-11. PCB concentrations (ppb lipid weight) in white croaker in San Francisco Bay, 1997-2009. Bars indicate average concentrations. Points represent composite samples. Data from 2000-2006 are for fillets with skin, data from 2009 are for fillets without skin. Data for 2009 are expressed as the sum of 40 congeners that were also analyzed in earlier rounds of sampling (rather than a sum of the 55 congeners analyzed in the 2009 samples).

on measurements of six dioxins and 10 dibenzofurans (Appendix 7); the notation TEQPCDD/PCDF is used to clearly indicate this distinction.

It should be noted that many other contaminants also have dioxin-like potency, most prominently the PCBs. Specifically, several coplanar PCBs (especially PCB 126) have significant dioxin-like potency that results in PCB TEQs that actually often exceed TEQPCDD/PCDF. The most potent coplanar PCBs are usually not quantified using analytical methods for PCBs (as was the case in this study) because they are present at concentrations that are much lower than the abundant congeners and require a more sensitive method. Past work that did measure the coplanar PCBs in Bay fish found that PCB TEQs were actually about five times greater than TEQPCDD/PCDF (Davis et al. 1999). The San Francisco Bay Water Board has chosen to regulate PCBs in the Bay on the basis of the sum of all PCBs, rather than on the basis of their dioxin-like potency. Achieving the 10 ppb target for sum of PCBs is anticipated to also reduce to dioxin-like PCBs to an acceptable level (SFBRWQCB 2008). It is important to recognize that, even though there are other significant sources of dioxin TEQs that contribute to the overall dioxin-like potency of residues in fish tissue, the TEQs attributable to dioxins and furans on their own exceed the existing threshold for concern by a considerable margin.

Dioxin analyses are relatively expensive, and therefore dioxin monitoring was limited in 2009, as in previous monitoring, to the high lipid species that accumulate the greatest concentrations of organic contaminants: shiner surfperch and white croaker.

Comparison to Thresholds and Variation Among Species

Consistent with past RMP sampling, TEQPCDD/PCDF concentrations in shiner surfperch and white croaker from the Bay continue to exceed the 0.14 pptr threshold of concern (Figure 5-12, Tables 5-1 and 5-2). The average TEQPCDD/PCDF concentration in shiner surfperch was 0.89 pptr, six times higher than the Water Board target. The average in white croaker was 0.44 pptr, three times higher than the target. All of the samples analyzed had concentrations greater than 0.14 pptr. The overall range of TEQPCDD/PCDF concentrations was from 0.20 to 1.59 pptr.

Spatial Patterns

Due to budget limitations, only two replicates of shiner surfperch were analyzed at each location. This limited the statistical power to detect spatial patterns. Nevertheless, the shiner surfperch data do suggest spatial variation that resembles the pattern seen for methylmercury and PCBs. Oakland had the highest average TEQPCDD/PCDF concentration (1.42 pptr) and San Pablo Bay had the lowest (0.53 pptr), a 2.7-fold difference. Other locations had similar concentrations of approximately 0.80 pptr.

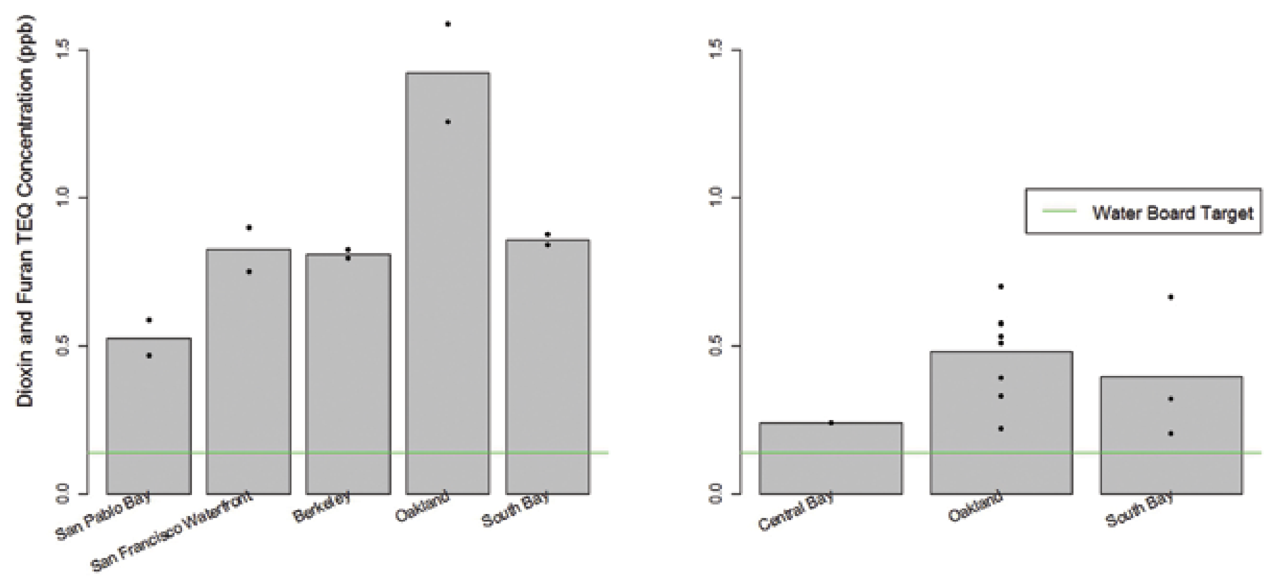


Figure 5-12. Dioxin TEQ concentrations (ppb) in shiner surfperch (left) and white croaker (right, without skin) in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent composite samples.

Temporal Trends

RMP assessment of long-term trends in dioxins has focused on white croaker. Examining time series of wet weight TEQPCDD/PCDF concentrations provides information on temporal variation in human exposure and in progress toward achieving the 0.14 pptr target (Figure 5-13). Wet weight TEQPCDD/PCDF concentrations in white croaker were considerably lower in 2009 due primarily to the switch to fillets without skin. The switch to fillets without skin presents a significantly different estimate of concern due to consumption of white croaker. TEQPCDD/PCDF were not measured in fillets with skin, but the lipid reduction observed in the fillets without skin certainly had a large influence on the lower concentrations observed in 2009.

The long-term time series for white croaker can also be examined on a lipid weight basis to provide a better index of trends in ambient concentrations of TEQPCDD/PCDF in the Bay (Figure 5-14). The lipid-normalized time series suggests that ambient concentrations were higher in 2000 than in 2003-2009. The average concentration in white croaker in 2009 was similar to those observed in 2003 and 2006. The cause of the higher concentrations observed in 2000 is unknown. Since 2003, concentrations appear to be holding relatively constant.

Management Implications and Priorities for Further Assessment

TEQPCDD/PCDF concentrations in the Bay are higher than the Water Board target and do not show obvious signs of decline. The shiner surfperch data indicate that Oakland Harbor has particularly high

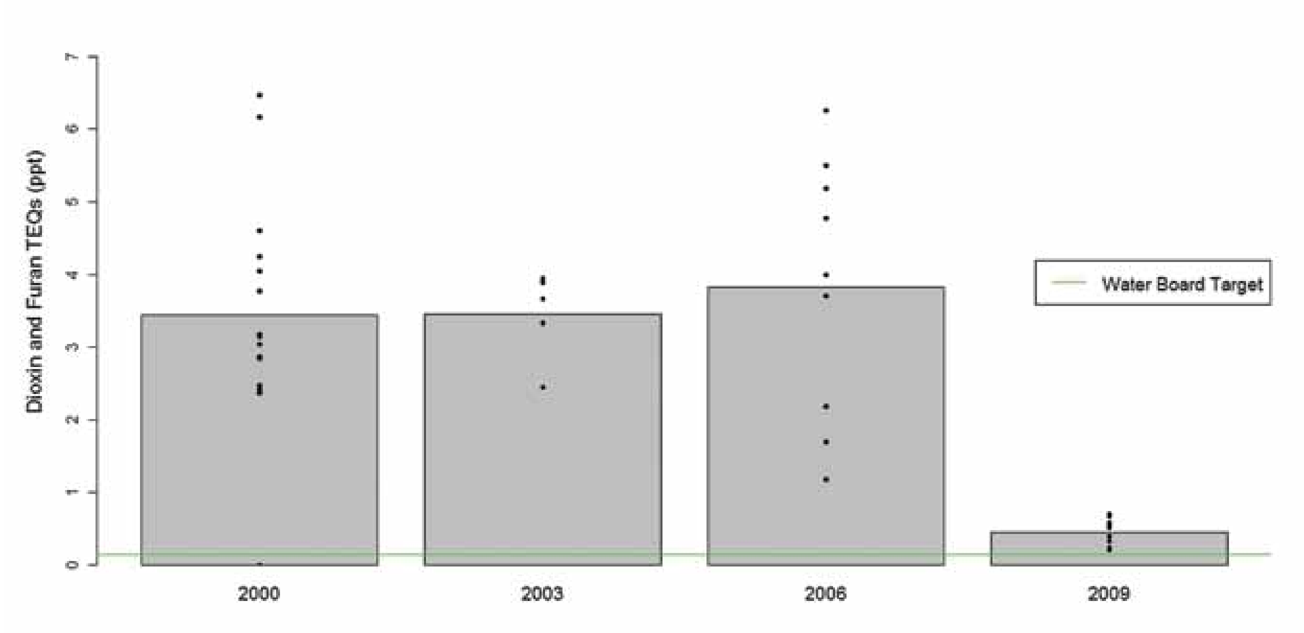


Figure 5-13. Dioxin TEQ concentrations (pptr wet weight) in white croaker in San Francisco Bay, 2000-2009. Bars indicate average concentrations. Points represent composite samples. Data from 2000-2006 are for fillets with skin, data from 2009 are for fillets without skin.

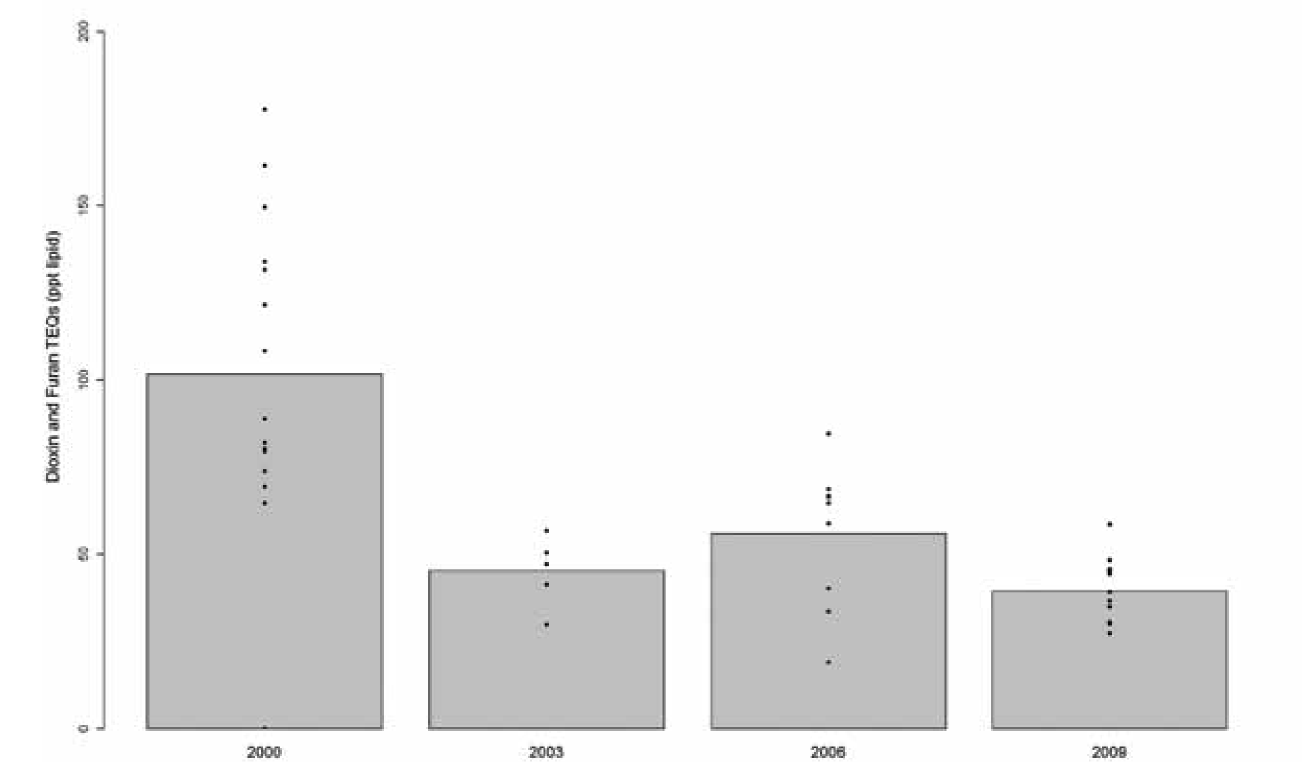


Figure 5-14. Dioxin TEQ concentrations (pptr lipid weight) in white croaker in San Francisco Bay, 2000-2009. Bars indicate average concentrations. Points represent composite samples. Data from 2000-2006 are for fillets with skin, data from 2009 are for fillets without skin.

concentrations. Removal of skin from white croaker fillets greatly reduced wet weight concentrations compared to past measurements of fillets with skin. Measuring TEQPCDD/PCDF in northern anchovy would also provide valuable information on wildlife exposure from this important prey species.

LEGACY PESTICIDES

San Francisco Bay is included on the 303(d) List due to impairment from the legacy pesticides DDTs, dieldrin, and chlordanes. A TMDL for these chemicals is in the early stage of development. These chemicals have occasionally exceeded applicable thresholds over the past several rounds of RMP fish sampling, but generally concentrations and concern for human health have been consistently low.

DDTs

All of the samples analyzed had DDT concentrations below the Water Board target of 64 ppb. The maximum concentration observed was 34 ppb in a shiner surfperch composite from Oakland. Shiner surfperch had the highest average concentration (22 ppb), just above the FCG of 21 ppb. Jacksmelt had the second highest average concentration (13 ppb), striped bass was third (11 ppb), and white croaker was fourth (9 ppb). Skin removal yielded a 61% reduction in DDT concentrations in white croaker fillets. DDT concentrations in white croaker in 2009 were lower than in past years (Figure 5-15) due to the switch to fillets without skin. Concentrations in shiner surfperch in 2009 were similar to past years, though concentrations were significantly higher in 1997 and 2000 than in other years (Figure 5-16).

Dieldrin

All of the samples analyzed had dieldrin concentrations below the Water Board target of 1.4 ppb. The maximum concentration observed was 1.3 ppb in a shiner surfperch composite from Oakland. Shiner surfperch had the highest average concentration (1.1 ppb), higher than the FCG of 0.46 ppb. Jacksmelt and white croaker also had average concentrations (both at 0.5 ppb) higher than the FCG. Skin removal yielded a 50% reduction in dieldrin concentrations in white croaker fillets. Dieldrin concentrations in white croaker in 2009 were lower than in past years (Figure 5-17) due to the switch to fillets without skin. Concentrations in shiner surfperch in 2009 were similar to past years (Figure 5-18).

Chlordanes

All samples analyzed had chlordane concentrations below the Water Board target of 17 ppb. The maximum concentration observed was 16 ppb in a shiner surfperch composite from Oakland. Shiner surfperch had the highest average concentration (7.1 ppb), higher than the FCG of 5.6 ppb. No other species had an average concentration higher than the FCG. Skin removal yielded a 61% reduction in chlordane concentrations in white croaker fillets.

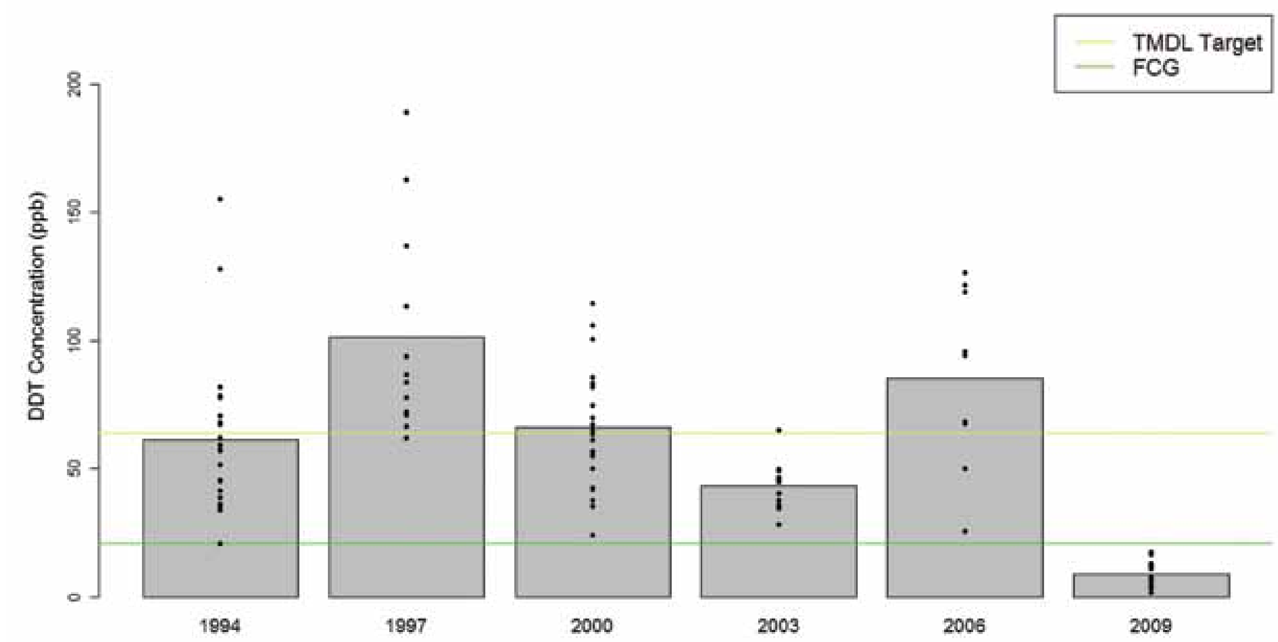


Figure 5-15. DDT concentrations (ppb wet weight) in white croaker in San Francisco Bay, 1994-2009. Bars indicate average concentrations. Points represent composite samples. Data from 2000-2006 are for fillets with skin, data from 2009 are for fillets without skin.

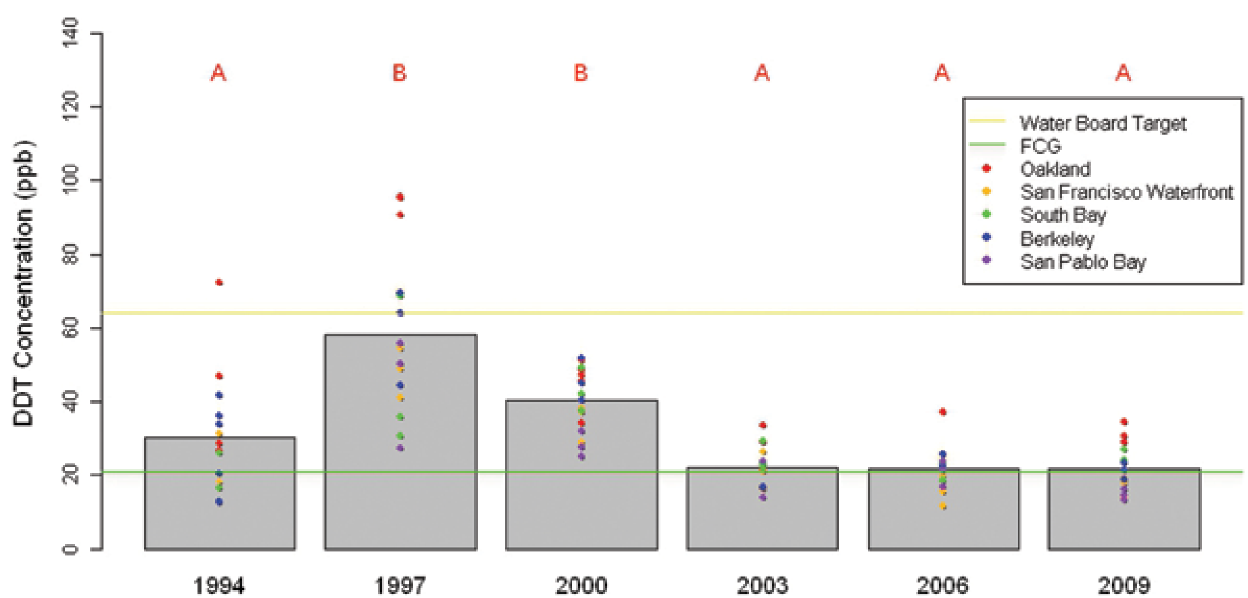


Figure 5-16. DDT concentrations (ppb wet weight) in shiner surfperch in San Francisco Bay, 1994-2009. Bars indicate average concentrations. Points represent composite samples. Years with the same letter were not significantly different from each other (p = .05).

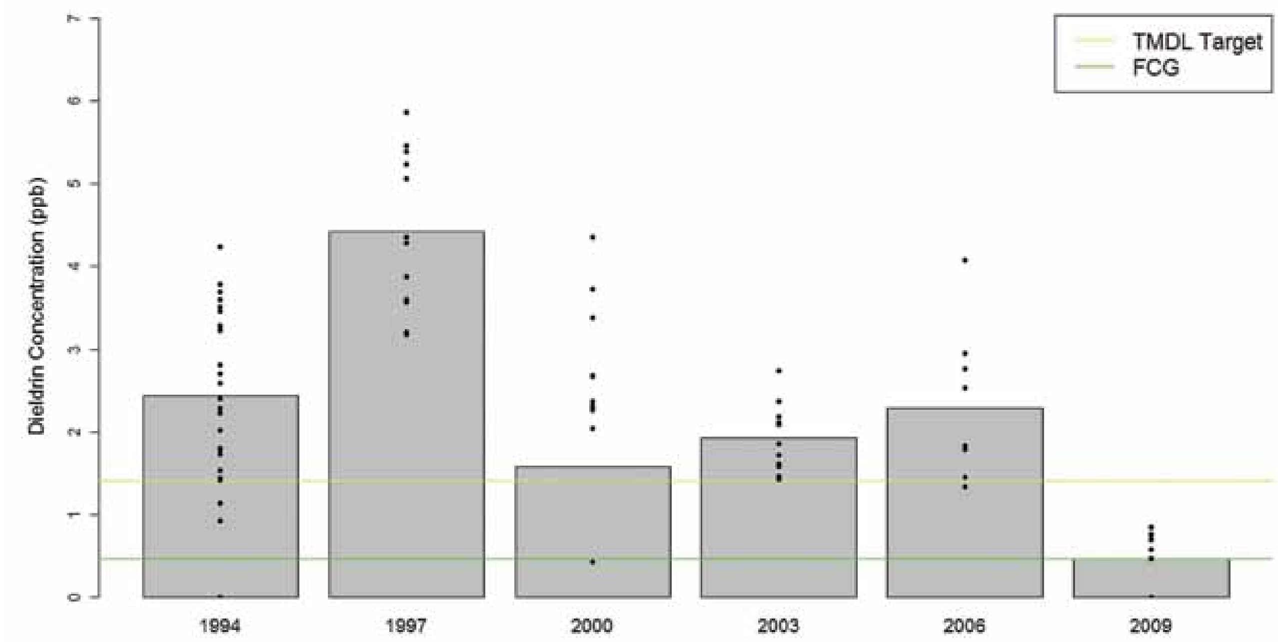


Figure 5-17. Dieldrin concentrations (ppb wet weight) in white croaker in San Francisco Bay, 1994-2009. Bars indicate average concentrations. Points represent composite samples. Data from 2000-2006 are for fillets with skin, data from 2009 are for fillets without skin.

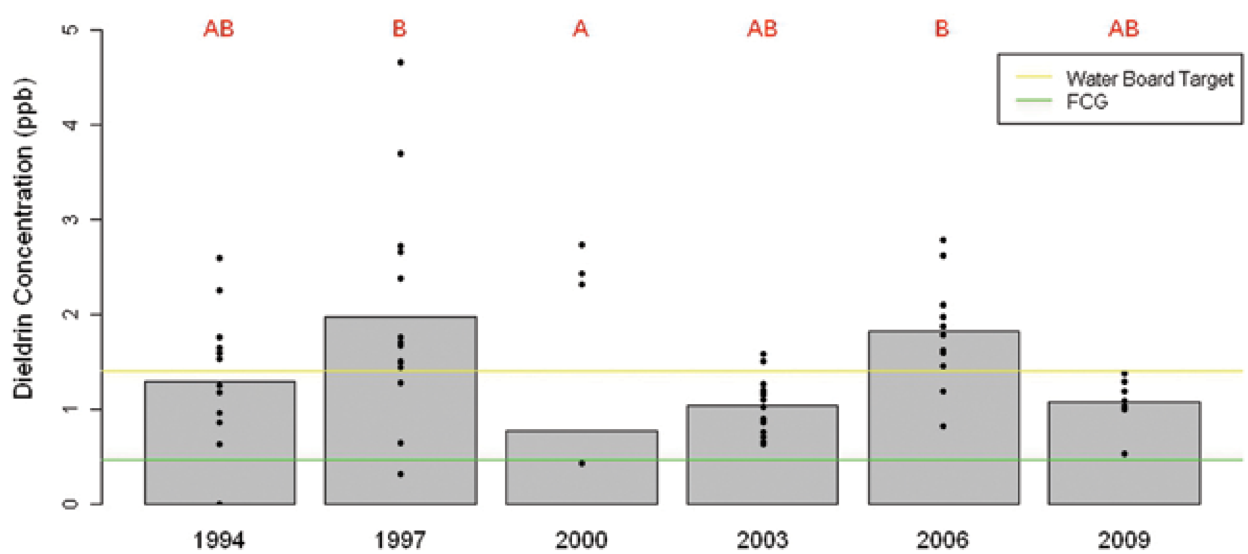


Figure 5-18. Dieldrin concentrations (ppb wet weight) in shiner surfperch in San Francisco Bay, 1994-2009. Bars indicate average concentrations. Points represent composite samples. Years with the same letter were not significantly different from each other (p = .05).

SELENIUM

San Francisco Bay has been on the 303(d) List since 1998 for selenium because bioaccumulation of this element has led to recurring health advisories for local hunters against consumption of diving ducks. Moreover, elevated selenium concentrations found in biota often exceed levels that can cause potential reproductive impacts in white sturgeon and are often higher than levels considered safe for fish and other wildlife species in the Estuary. Sources and pathways leading to the possible impairment in northern and southern segments of the Bay differ significantly and therefore a separate approach to addressing the problem in these segments is being followed. Thus, a TMDL is being developed for the North San Francisco Bay segments only, which include a portion of the Sacramento/San Joaquin Delta, Suisun Bay, Carquinez Strait, San Pablo Bay, and Central Bay. This TMDL project was initiated in 2007 to assess the current state of impairment in the North Bay, identify pathways for bioaccumulation, enhance understanding of the relationship between sources of selenium and fish and wildlife exposure, and establish site-specific water quality targets protective of aquatic biota. In developing the TMDL, the Water Board, with support from stakeholders, is conducting a series of analysis to refine understanding of the behavior of selenium in the Estuary that will help formulate a strategy for attaining water quality standards. A Preliminary TMDL Project Report was published in January 2011 (SFBRWQCB 2011). As part of this information gathering effort, the RMP measured selenium concentrations in all eight species sampled in 2009.

The Preliminary TMDL Project Report compared selenium concentrations in Bay sport fish to the FCG of 7.4 ppm developed by OEHHA (Klasing and Brodberg 2008). OEHHA also developed a series of ATLs for selenium, the lowest being the 2 serving ATL of 2.5 ppm.

White sturgeon, the key sport fish selenium indicator species for the Bay, is the largest freshwater fish species in North America. It can live to be over 100 yr old and up to 6 m in length. The white sturgeon size range targeted for RMP is between 1170 mm (the legal minimum) and 1500 mm, which corresponds to an age of approximately 12-14 yr. Sacrificing these fish in the early phases of such a potentially long lifespan is clearly undesirable, especially since the population has been in decline in recent years. In 2009 a pilot study of a non-lethal sampling method using biopsies was performed to investigate whether lethal sampling can be discontinued.

Comparison to Thresholds and Variation Among Species

The latest round of RMP sampling indicated that average selenium concentrations in Bay sport fish remain well below thresholds for human health concern (Figure 5-19). White sturgeon had the highest average concentration by far (1.47 ppm), well below the 2 serving ATL of 2.5 ppm, and even further below the FCG of 7.4 ppm. Average concentrations for other species were all between 0.30 and 0.47 ppm). Only one white sturgeon sample was above the 2 serving ATL.

Plug Study

Selenium concentrations in 12 paired samples of muscle plugs and traditional fillets in white sturgeon showed reasonable agreement (Figure 5-20). A linear regression was highly significant ($p < .001$). The slope of the regression line indicated that the plugs were an average of 25% higher than the fillets. If these results are an accurate reflection of a true bias, this would imply that selenium is not homogeneously distributed in sturgeon muscle tissue. The regression was also highly influenced by two points with higher plug and fillet concentrations than the other samples. This dataset is not entirely definitive, with a small sample size, an apparent bias toward higher concentrations in the plugs, and a sparse distribution in the higher end of the concentration range. However, the results do indicate that plug concentrations provide reasonably accurate estimates of fillet concentrations. Furthermore, since selenium concentrations in white sturgeon are generally well below thresholds of concern for human health and given the unusual impact of sampling on the white sturgeon population, a switch to exclusive sampling of plugs is recommended for future sampling.

Temporal Trends

Long-term trend monitoring has focused on white sturgeon. The average concentration of 1.47 ppm in 2009 was very similar to average concentrations observed from 1997-2006 (Figure 5-21). There is no indication of an increase or decrease in these concentrations.

Management Implications and Priorities for Further Assessment

The 2009 selenium analyses documented the concentrations were similar to previous years and below human health thresholds, and that concentrations in other species were much lower still. Given these data, the focus of the North Bay Selenium TMDL on impacts on aquatic life is appropriate. A valuable time series of concentrations in white sturgeon has been established, indicating that concentrations in the North Bay food web have not declined since 1997. If extending this time series is a priority, consideration should be given to switching to non-lethal sampling using muscle plugs.

PBDEs

Polybrominated diphenyl ethers (PBDEs), a class of bromine-containing flame retardants that was practically unheard of in the early 1990s, increased rapidly in the Bay food web through the 1990s and are now pollutants of concern. They have not been placed on the 303(d) List, but information on them is lacking and they are being studied through the RMP to better understand their spatial distribution, temporal trends, and the concerns they pose to wildlife and humans. The California Legislature has banned the use of two types of PBDE mixtures (“penta” and “octa”) in 2006, but one mixture remains in use (“deca”). Tracking the trends in these chemicals is critical to determining the effect of the ban and if further management actions are necessary. In 2011, OEHHA published a FCG and ATLs for PBDEs (Klasing and Brodberg 2011).

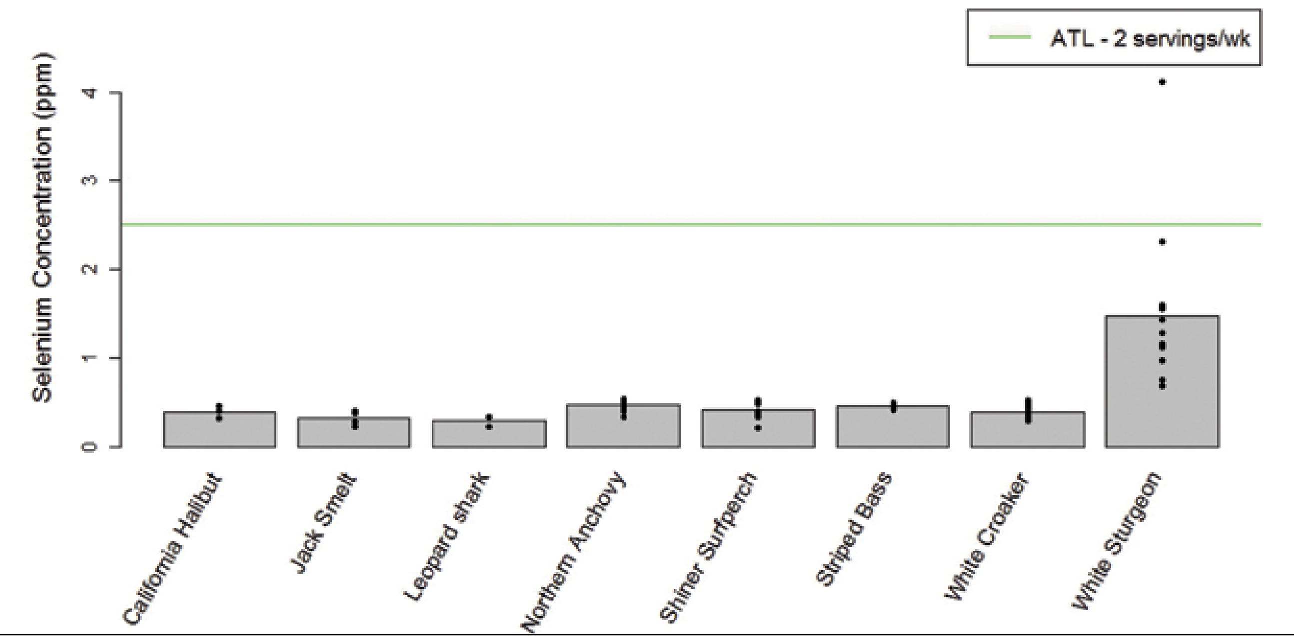


Figure 5-19. Selenium concentrations (ppm) in sport fish species in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent individual samples (either composites or individual fish). Note that northern anchovy are not a sport fish species – they are an important wildlife prey species that is collected in the surveys in San Francisco Bay and analyzed as whole fish.

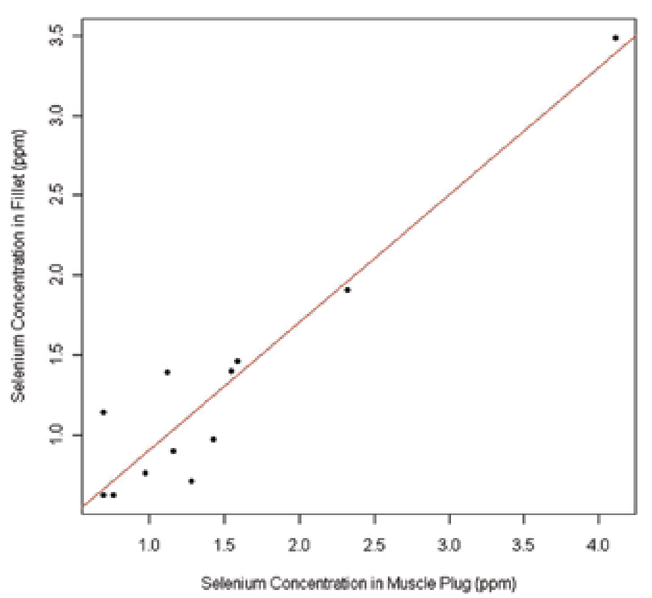


Figure 5-20. Selenium concentrations in paired samples of muscle plugs and fillets in white sturgeon from San Francisco Bay, 2009. Regression was significant ($p < .001$, Fillet = 0.80*plug + 0.10), but not when two highest points were excluded.

Variation Among Species

Like the other organic contaminants, average PBDE concentrations were highest in shiner surfperch and northern anchovy (both at 8 ppb) (Figure 5-22, Table 5-1). The highest concentration measured was 14 ppb in a shiner surfperch sample. Other species all averaged 5 ppb or less. Unlike PCBs, leopard shark and striped bass had slightly higher average concentrations than white croaker.

Spatial Patterns

Significant spatial variation was detected in shiner surfperch (Figure 5-23). As for all other contaminants, Oakland had the highest average concentration (13 ppb), significantly higher than Berkeley (8 ppb), San Francisco (6 ppb), and San Pablo Bay (5 ppb). South Bay had the second highest average (10 ppb), and

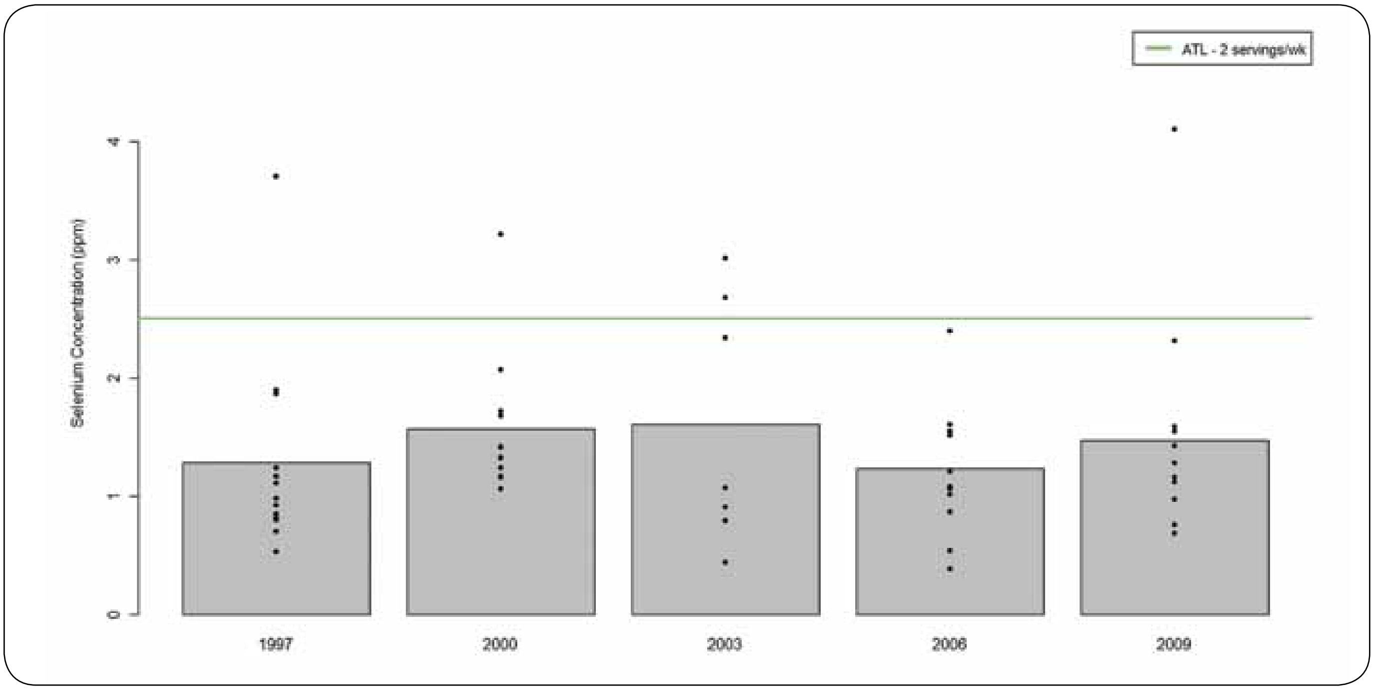


Figure 5-21. Selenium concentrations (ppm) in white sturgeon from San Francisco Bay, 1997-2009. Bars indicate average concentrations. Points represent individual fish. No significant differences among years were observed.

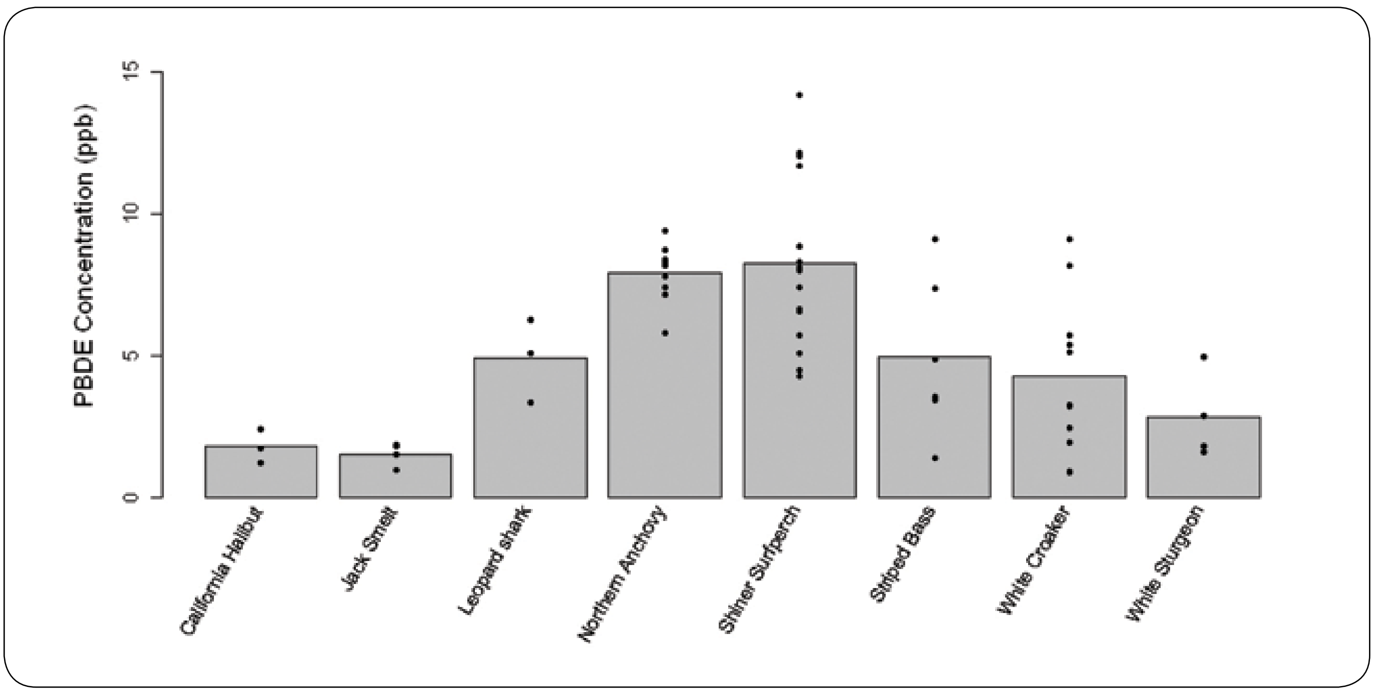


Figure 5-22. PBDE concentrations (ppb) in sport fish species in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent individual samples (either composites or individual fish). White croaker data are for fillets without skin. All samples were well below the lowest OEHHA threshold (the 100 ppb 2 serving ATL).

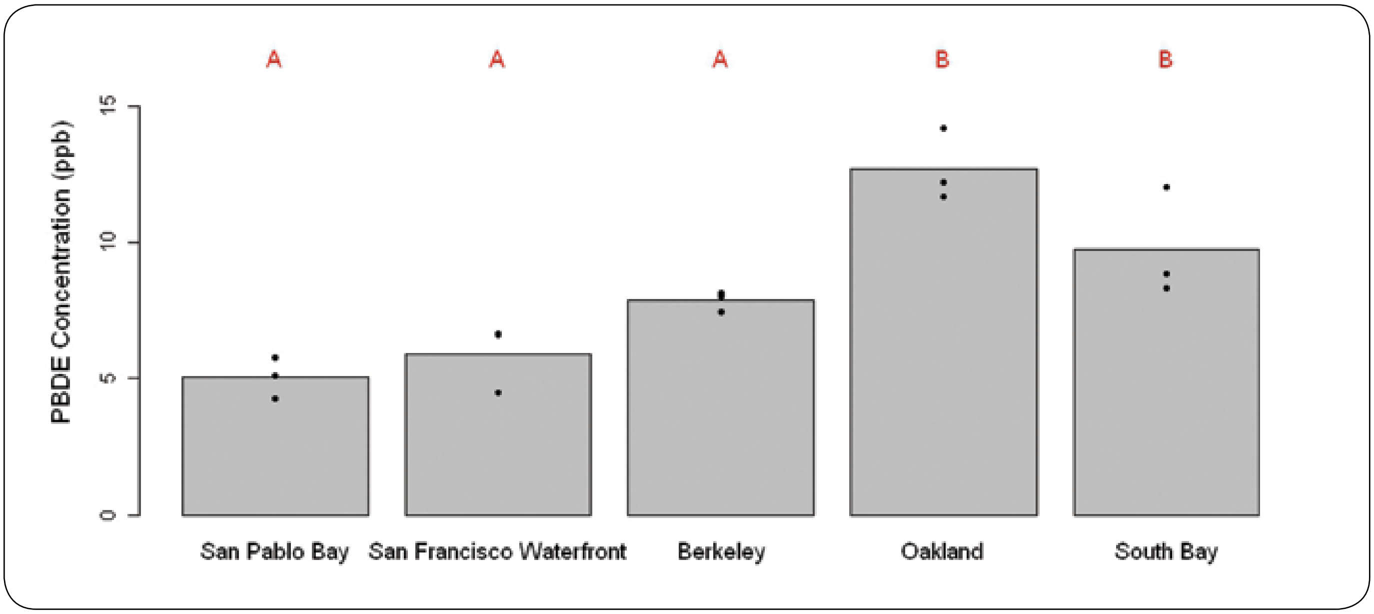


Figure 5-23. PBDE concentrations (ppb) in shiner surfperch in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent composite samples. Locations with the same letter were not significantly different from each other (p = .05).

was also significantly greater than Berkeley, San Francisco, and San Pablo Bay, but not significantly different from Oakland. Overall, these averages spanned a 2.6 fold range from Oakland to San Pablo Bay.

Temporal Trends

Measurement of PBDEs in Bay sport fish has been performed by the RMP and other groups for samples collected in 1997, 2000, 2002, 2003, and 2006. However, the early analyses of PBDEs (1997-2002) are not completely reliable or comparable to recent data due to issues with sample storage, quality assurance documentation, and the early analytical methods (Klosterhaus et al. 2010). Analysis of the 2003 and 2006 samples was performed with electron capture detection (GC-ECD), external standard calibration, and p,p-DDD as a surrogate recovery standard – these procedures are typically not recommended for the analysis of PBDEs in tissue. In spite of these issues, the 2003 and 2006 data are still considered reliable. The 2009 data were generated using a GC-MS method and isotopically-labelled PBDEs as internal standards – these data are considered highly reliable.

PBDE concentrations in white croaker were much lower in 2009 due to the analysis of fillets without skin. The combination of this switch in processing of the white croaker, and better spatial coherence and higher concentrations in shiner surfperch makes the latter a better indicator of trends through time. The Baywide average for shiner surfperch (8 ppb) was lower than the averages observed in 2003 and 2006 (Figure 5-24). A decline might be anticipated in response to the bans on the penta and octa mixes, but how quickly the decline would occur as the overall inventory in the watersheds is reduced is unknown. Given the short time series available and a potential lack of comparability due to the switch to a new method in 2009, it is unclear

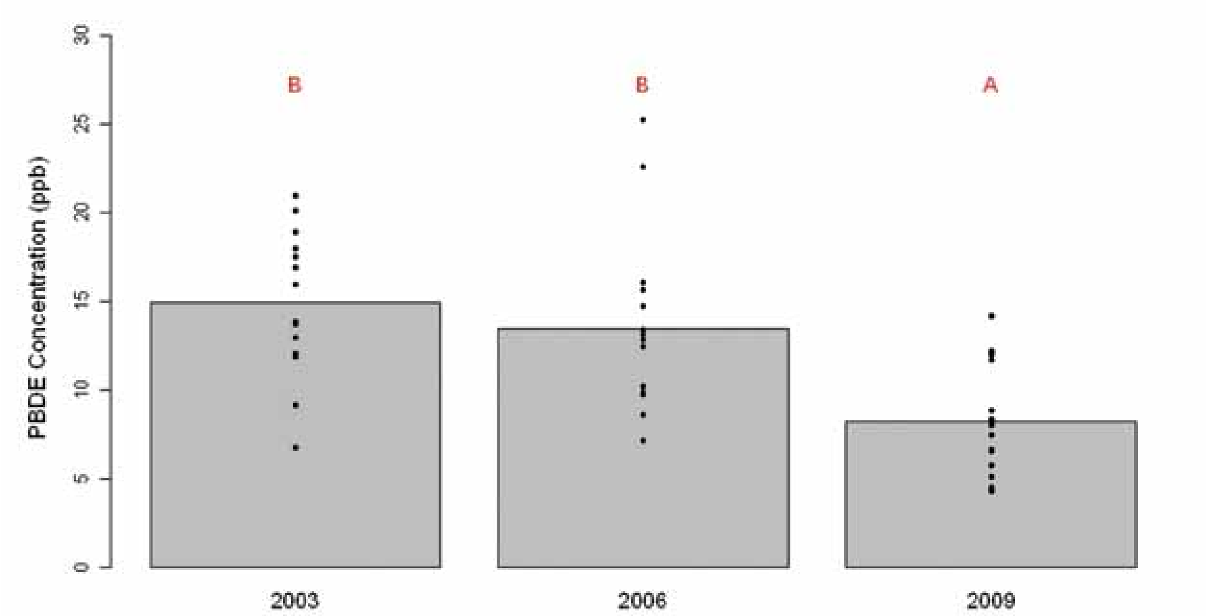


Figure 5-24. PBDE concentrations (ppb wet weight) in shiner surfperch in San Francisco Bay, 2003-2009. Bars indicate average concentrations. Points represent composite samples. Years with the same letter were not significantly different from each other (p = .05).

whether the lower concentrations in 2009 are a sign of a real decline or not. Continued monitoring of sport fish and other matrices in the Bay will be needed to determine whether the bans are indeed reducing PBDE concentrations in the Bay food web.

Management Implications and Priorities for Further Assessment

PBDE concentrations in all samples were far below the lowest OEHHA threshold (the 100 ppb 2 serving ATL), indicating that PBDE concentrations in Bay sport fish are not a concern with regard to human health. Continued monitoring of sport fish and other matrices in the Bay will be needed to determine whether the bans of the penta and octa mixtures are indeed reducing PBDE concentrations in the Bay food web.

PFCs

Perfluorinated chemicals (PFCs) have been used extensively over the last 50 years in a variety of products including textiles treated with stain-repellents, fire-fighting foams, refrigerants, and coatings for paper used in contact with food products. As a result of their chemical stability and widespread use, PFCs such as perfluorooctane sulfonate (PFOS) have been detected in the environment. PFOS and related PFCs have been associated with a variety of toxic effects including carcinogenity and abnormal development.

In 2006, the RMP began analyzing bird eggs for PFCs. PFOS concentrations in Double-crested Cormorant eggs were found to approach a published effect threshold. Consistent with studies elsewhere, PFOS was the dominant PFC detected in cormorant eggs. Concentrations of PFOS were highest in the South Bay, and higher than concentrations reported in other regions. PFCs have been detected in sport fish fillets in other studies. Sampling has been fairly extensive in Minnesota, where concentrations have been high enough that the state has established thresholds for issuing consumption guidelines (Delinsky et al. 2010). Neither OEHHA or the Water Board have developed thresholds for evaluating the risks to humans from consumption of contaminated sport fish from San Francisco Bay.

The 2009 results for PFCs were mostly below detection limits (Figure 5-25, Table 5-1). The only PFC detected was PFOS, and only four samples had detectable PFOS concentrations. The highest concentration was 18 ppb in a leopard shark composite. The other samples with reportable concentrations were from northern anchovy and white sturgeon. The available data are insufficient for assessing variation among species, over time, or among locations in the Bay. The state of Minnesota has established a threshold of 40 ppb associated with a consumption rate of 1 meal/wk. If higher rates of consumption are considered, as OEHHA has done for other chemicals, the highest concentration observed may be approaching a level where a low degree of concern is indicated.

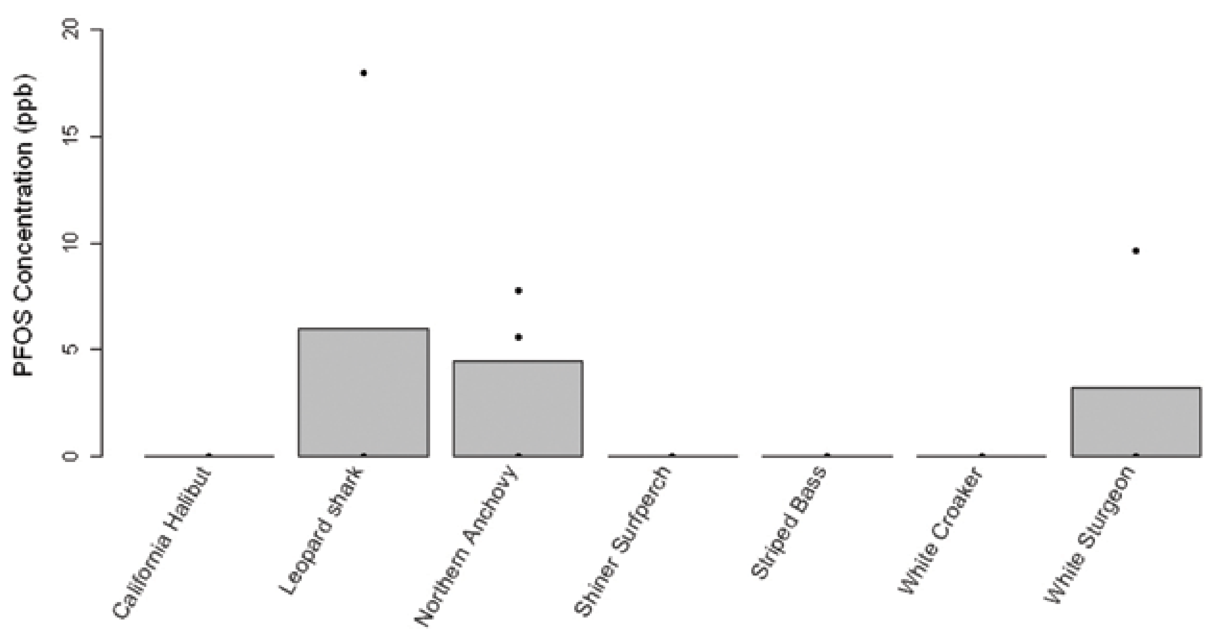


Figure 5-25. PFOS concentrations (ppb) in sport fish species in San Francisco Bay, 2009. Bars indicate average concentrations. Points represent individual samples (either composites or individual fish). White croaker data are for fillets without skin. Concentrations were below the detection limit in most samples.

THE REGION 2 COAST

General Assessment

Contaminant concentrations in sport fish from coastal locations in Region 2 were lower than in San Francisco Bay and were frequently below OEHHA thresholds (Figures 5-26 and 5-27).

Methylmercury concentrations in most species were at or below 0.07 ppm. Concentrations were above 0.44 ppm in the two shark samples (both from Tomales Bay). Other species with moderately elevated concentrations were lingcod (measuring 0.42 ppm at Pacifica and 0.27 ppm at Half Moon Bay) and gopher rockfish (ranging from 0.26 at Half Moon Bay to 0.43 off the San Mateo Coast). Gopher rockfish even accumulated 0.29 ppm at the Farallon Islands.

PCB concentrations were below the ATLs in all samples, and most were also below the FCG of 3.6 ppb. Even shiner surfperch were quite low. The highest concentration was 36 ppb in a barred surfperch sample offshore of San Francisco.

Concentrations of other contaminants in samples from the Region 2 coast were all low.

Specific Locations of Interest

Tomales Bay

The mouth of Walker Creek in Tomales Bay was subject to a considerable amount of mercury contamination from historic mining in the Walker Creek watershed. Past sport fish sampling under the CFCP and SWAMP regional monitoring found elevated concentrations, resulting in a consumption advisory (Gassel et al. 2004). The Water Board has established a TMDL for the Walker Creek watershed and a TMDL for Tomales Bay is underway. However, the Water Board considers that no further implementation actions are required for methylmercury – the actions needed are already completed or underway and the primary focus is now on monitoring the outcome. Results from this sampling support that conclusion. Methylmercury concentrations in the three non-shark species sampled (shiner surfperch, topsmelt, and white surfperch) were all below 0.07 ppm. Tomales Bay was actually one of the cleanest locations sampled in the state – it was one of only seven locations sampled in 2009 with fish samples that were below thresholds for all contaminants (shiner surfperch and white surfperch). While sport fish in Tomales Bay appear to be below thresholds for concern, recent sampling of small fish and crabs in Tomales Bay marshes indicates that concern for wildlife exposure in these habitats may be warranted.

Pillar Point Harbor

Pillar Point Harbor was placed on the 303(d) List as a result of methylmercury measurements in the CFCP. Pillar Point Harbor exhibited a low degree of contamination in this Survey. The highest methylmercury concentration was in the one white croaker sample analyzed (0.10 ppm). Four other species (shiner

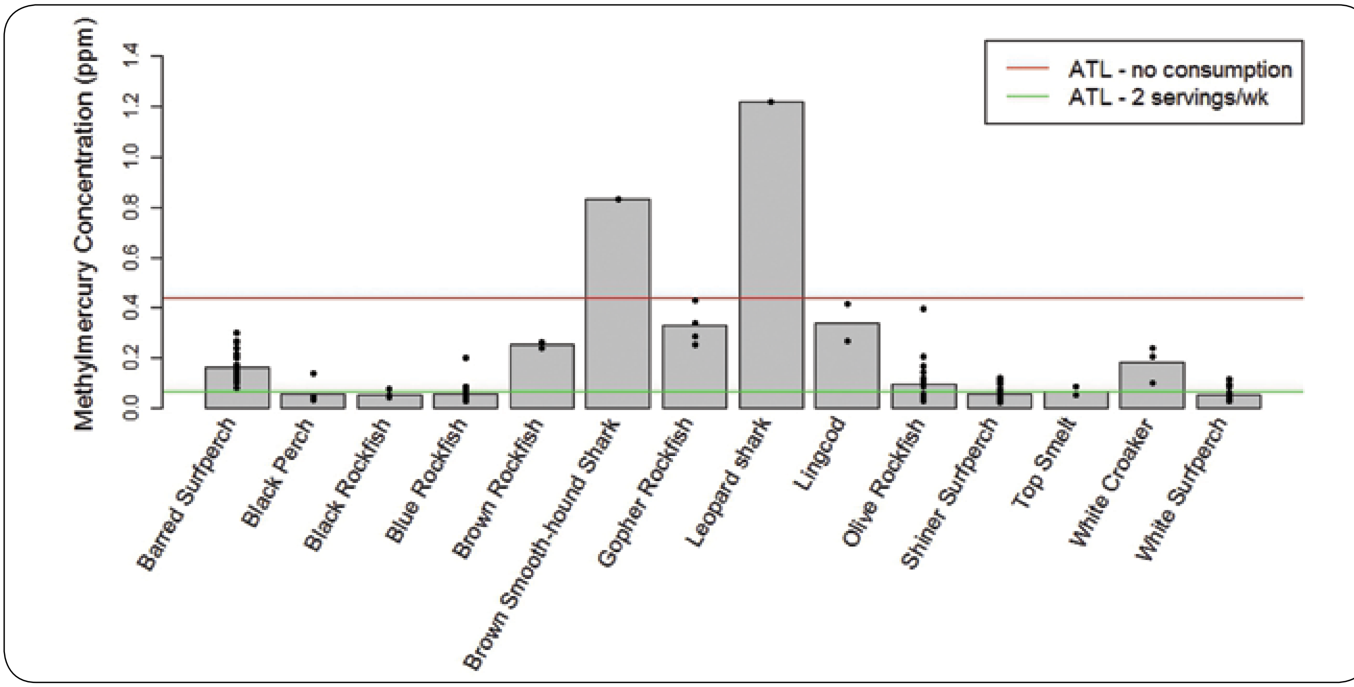


Figure 5-26. Methylmercury concentrations (ppm) in sport fish species on the Region 2 coast, 2009. Bars indicate average concentrations. Points represent individual samples (either composites or individual fish).

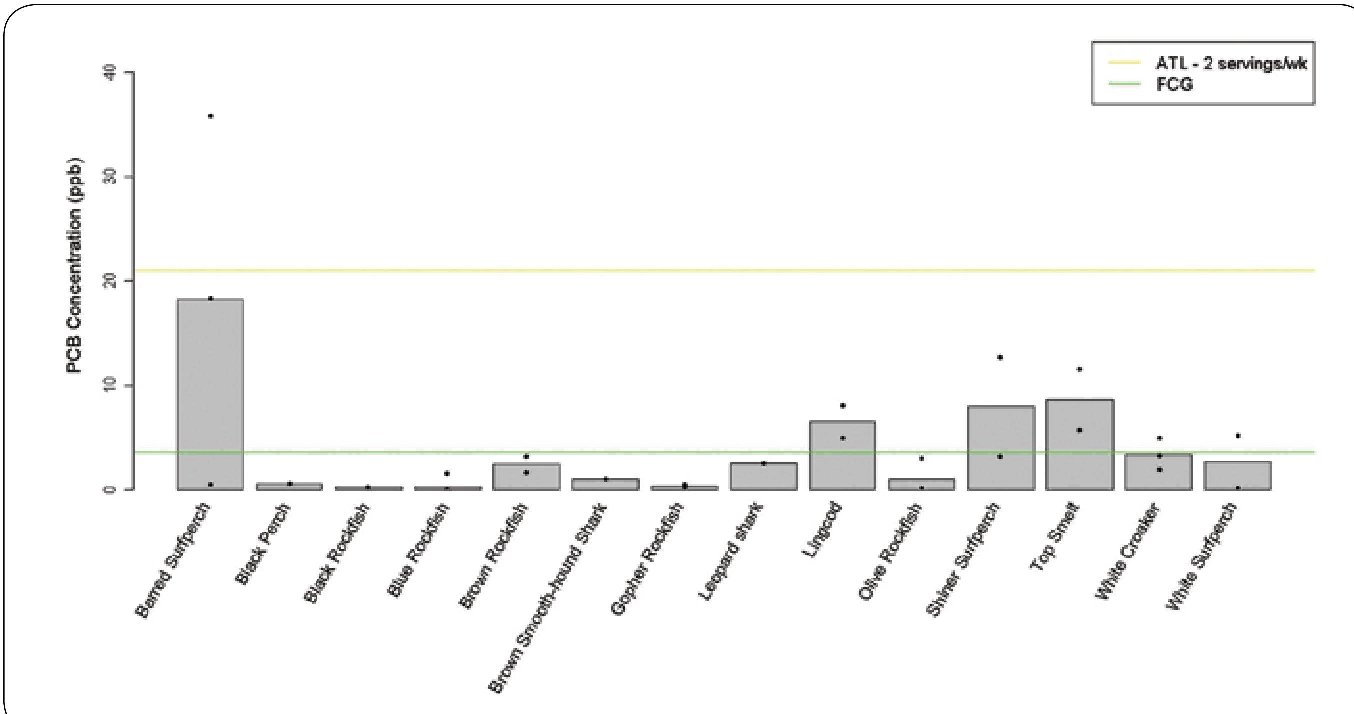


Figure 5-27. PCB concentrations (ppb) in sport fish species on the Region 2 coast, 2009. Bars indicate average concentrations. Points represent composite samples.

surfperch, white surfperch, black perch, and topsmelt) all had average concentrations below 0.07 ppm. PCBs reached a maximum of 13 ppb in shiner surfperch. Topsmelt was second at 12 ppb. White croaker, white surfperch, and black perch were at or below the FCG of 3.6 ppb.

Management Implications and Priorities for Further Assessment

Data from this Survey indicate that contaminant concentrations in sport fish on the Region 2 coast were generally low. A moderate degree of contamination observed for methylmercury in some species (lingcod and gopher rockfish) may warrant further investigation.

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FINAL REPORT TO THE PORT OF SAN DIEGO

CHEMICAL ANALYSIS OF THREATENED AND ENDANGERED SPECIES IN SAN DIEGO:

THE SAN DIEGO BAY TROPHIC TRANSFER PROJECT

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FINAL REPORT, JANUARY 31, 2011

Citation: Lewison et al. 2011. Chemical analysis of threatened and endangered species in San Diego

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EXECUTIVE SUMMARY

- The objective of this grant was to use isotope and element analysis to understand trophic structure, map isotopic variability (i.e. the isoscape) in San Diego Bay and to evaluate contaminant exposure and load in species of conservation concern in San Diego Bay, focusing specifically on East Pacific green turtle (EPGT) and California least terns (CLT). Led by Dr. Rebecca Lewison, the research team was composed of a SDSU faculty member (Dr. Lai), a senior NOAA scientist (Dr. Seminoff), a senior Scripps Institute scientist (Dr. Deheyn) and several SDSU graduate and undergraduate students.
- One key result from this project was the resolution of the diet composition of the endangered EPGT. This information is fundamental to effective protection of this species within San Diego Bay. Diet identification can also inform the identification of sources of contamination in this population. We applied two leading multisource stable isotope mixing models (Isosource and Stable Isotope Analysis in R, SIAR) to determine the main contributors to, and annual variation in, green turtle diet based on comparisons of isotope values of turtles and putative prey species.
- Isotope model outputs indicated that green turtles are omnivores, with mobile invertebrates having the greatest dietary input (62% with Isosource; 42% with SIAR) and seagrasses constituting the second most important diet item (16% with Isosource; 6% with SIAR). Green algae and sessile invertebrates were also identified as feasible prey species, although at reduced levels. Local seagrass pastures appear to be of high value to green turtles, serving both as a major food resource and by providing habitat for other green turtle prey.
- Based on significant inter-annual differences in the isotopic signal from discarded eggs across multiple CLT colonies, we found clear evidence of diet shifts in CLTs among years. These diet shifts may be linked to differences in prey species availability, spatial shifts in foraging areas or a combination of both factors. These shifts in food resources may be tied to observed variability in reproductive output.
- We had limited success in resolving CLT diet. Although we are able to differentiate isotopic signatures among prey items, limited information on the discrimination factor (also called fractionation factor), which determines how nutrients from the food sources are incorporated into the birds and their eggs, may explain why diet composition could not be resolved.
- Using isotope data from the most widely distributed species across the Bay *(Zostera marina*, *Gracilaria sp*. and *Ulva sp*.), we generated isoscapes for San Diego Bay, identifying locations of nitrogen enrichment in the South Bay. Nitrogen enrichment is likely the result of increased nutrient loading, likely anthropogenic in nature, in the Bay and is an indicator of degraded water quality. Nutrient inputs

in the Bay are probably driven by non-point sources (e.g., surface runoff, groundwater, atmospheric deposition and shoreline erosion).

- We focused contaminant analyses on two classes of compounds, metals and organics in a wide range of sample types. Some turtle blood was re-screened for organic compounds with more sensitive instruments because of low detection limits. For turtle blood, we also completed a more in-depth exploration of the metal analyses to identify the potential cellular pathway by which toxic compounds may be impacting this species.
- A range of different metals were detected in the samples we analyzed. In EPGT, silver, cadmium, copper, manganese, selenium, strontium, vanadium, and zinc were the most prevalent bioaccumulating metals. Strong spatial trends of copper and manganese drove spatial differentiation in EGPT food items, while a different suite of metals were found to influence accumulation patterns in sediment across regions within the Bay. These results indicate that metal levels in biota (all plants and invertebrates) and sediment are highly dissimilar. This suggests that toxicity reference values based on localized sediment testing are likely to be less accurate for risk assessments of higher organisms like EPGT.
- In the CLT forage fish sampled, cadmium, copper, manganese, lead, selenium and vanadium were the most prevalent metals detected although there were some spatial variation in levels. Cadmium was detected at greater concentrations in topsmelt at Imperial Pier compared to all other sites. Copper, manganese and selenium were all detected at higher concentrations in topsmelt in the central part of the Bay. The majority of contaminant levels detected in the forage fish species did not exceed identified risk levels identified for birds, although the accumulation patterns and levels of these compounds in CLTs is unknown. However, levels of selenium detected may exceed threat thresholds.
- We focused organic analyses on EPGT samples. There were a number of organic compounds that were commonly detected in the EPGT samples analyzed: γ benzene hexachloride (BHC) was present in all plasma samples, and p'p'- DDE and γ chlordane were frequently detected. Using a more sensitive instrument array, PCBs were found at the highest level in all the blood and plasma samples among all organic compounds tested. These more sensitive analyses highlight the clear presence of PCBs and PBDEs in the San Diego Bay food web.
- The chemical analyses conducted during this project provide a robust baseline for future study of nitrogen enrichment and contaminant levels in sediment and a wide range of species in San Diego Bay.

INTRODUCTION

San Diego Bay is a highly urbanized estuary that ranks as one of the most polluted coastal bodies of water in the United States (Long et al. 1996), but it also provides critical habitat for many sensitive species. Its shores are prime nesting ground for the Endangered California Least Tern (CLT) (*Sternula antillarum browni*), marshes and mudflats support thousands of shorebirds, and extensive eelgrass beds *(Zostera marina)* serve as nursery habitat for many fish species and key foraging grounds for the Endangered East Pacific green turtle (EPGT) *(Chelonia mydas)* (Zeeman 2004). Degradation of coastal habitats due to anthropogenic activities have been found to severely negatively affect species' health and success (Vitousek et al. 1997, Jackson et al. 2001b) and point and non-point pollution in the Bay from historical and contemporary sources has long been a standing issue of concern (USDoN 1999). San Diego Bay has experienced a long history of intense industrial and recreational use. Much of the Bay is impacted by industrial development, including numerous shipyards, two military bases, a major cruise ship terminal, and the South Bay Power Plant (SBPP), a once-through cooling power generating facility located in the extreme southern portion of this bay.

The widespread effects of pollution on sensitive wildlife and overall ecosystem health is a major issue of concern in San Diego Bay and similarly urbanized coastal ecosystems (Bryan and Langston 1992, USDoN 1999). To better understand how these pollutants enter and are transferred through the food web in the San Diego Bay, we compared isotopes, trace metal loads and contaminants in two of the sensitive species, EPGT and CLT, as well as a suite of forage species for both of these organisms throughout San Diego Bay. Here, we use isotopes to identify key food resources for EPGT and CLTs and also use these data to develop an isoscape for the Bay. Isoscapes provide data on resident organisms and environmental condition using their isotopic signatures. This project also directly analyzed bioaccumulation and spatial variability of contaminants in San Diego Bay food webs and in EPGT. This analytical approach provides fundamental information needed for more effective species management and more accurate risk assessments of habitats and higher-order species in the biodiverse, urbanized coastal environment of San Diego Bay.

METHODS

Field data collection

Over the course of this project, comprehensive field data collection occurred and representative samples were taken from multiple trophic levels for both isotope and contaminant analysis. Sampling began in June 2008 at nine permanent sampling sites and one reference site outside the Bay (Figure 1) that reflect the stratified ecoregions from the State of the Bay report (2007). Sampling was repeated in the spring/summer and fall/winter for all sites to allow for seasonal comparisons. For these analyses, we evaluated habitat, prey species as well as the two target species to understand the impact of trophic structure and contaminants on threatened and endangered species in San Diego Bay, specifically focusing on EPGT and CLT.

Scientific name	*Common Name*
Zostera marina	Eelgrass
Gracillaria spp	-
Ulva spp.	-
Zoobotryon verticillatum	-
Navanax inermis	California aglaja
Bulla gouldiana	California bubble snail
Ascidian spp.	Sponge/Tunicates
Aplysia californica	Sea hare
Ptilosarcus spp.	Sea pen
Antherinops affinis	Topsmelt
Engraulis mordax	Calif. anchovy
Cymatogaster aggregata	Surfperch

Table 1. Species sampled across sampling stations

To sample potential contaminant sources for EPGTs and CLTs, we collected at least five water, sediment, and eelgrass samples via SCUBA or with a light-weight grab at each site. For isotope analysis, potential prey items for EPGTs were collected at the identified sampling locations across San Diego Bay. Tissue from putative prey species (hereafter referred to as habitat samples) were collected during SCUBA line-transects at areas of interest throughout the Bay, as well as opportunistically during field efforts. We collected entire organisms (i.e. whole body) for all but eelgrass, for which only the blades were gathered. These habitat samples were cleaned with distilled water and frozen at −10°C. We collected samples of (*Zostera marina)*, red and green algae, and numerous invertebrates including sponges, bryozoans, tunicates and mollusks (Table 1). Less common species (*Navanax* and *B. gouldiana*) were collected opportunistically, as these species have variable spatial and temporal distributions. To resolve the key prey items in the CLT diet, we collected four species of fish prey from each sampling site with a surface purse seine net. These samples also were used to examine the potential heavy metal contaminant pathways for CLTs. Topsmelt (*Antherinops affinis*), California anchovy (*Engraulis mordax*), and surfperch (*Cymatogaster aggregata)* were among the species sampled and run through both trace metal and isotope analysis.

Database construction

All data have been organized into a comprehensive database that integrates the data collected from this project, related projects at SDSU, and data from the Southwest Fisheries Science Center. We have used this database to compare the results of our study to the findings from other investigations of contaminants in the Bay, such as those by SWFSC and the Department of Fish and Game.

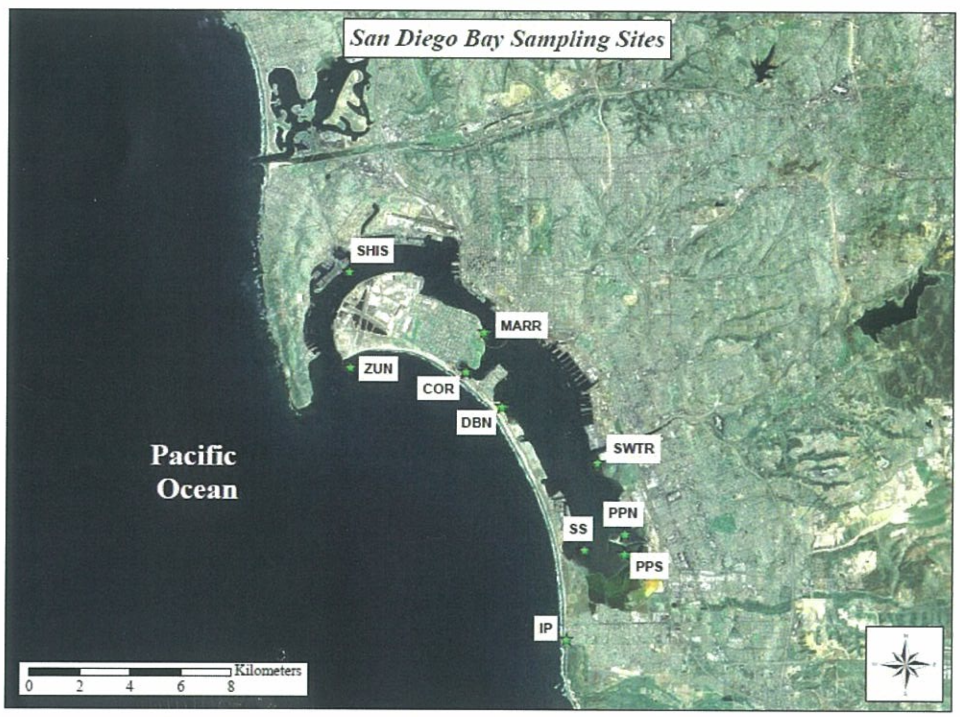

Figure 1. San Diego Bay Trophic Transfer Project Sampling Sites

Citation: Lewison et al. 2011. Chemical analysis of threatened and endangered species in San Diego

Stable Isotopes

Over 500 samples were for analyzed for isotope composition. These samples include eelgrass and two other types of algae, invertebrates, fish, and EPGT blood and tissue as well as CLT egg shells. Prior to analysis, samples were thawed, weighed (wet weight), and dried at 60°C until sample weight remained constant (i.e. dry weight), then were homogenized into a fine powder using a mortar and pestle. Lipids were removed from skin samples and a portion of each habitat sample using a Soxhlet apparatus with a 1:1 solvent mixture of petroleum ether and ethyl ether for at least two 10-h cycles. Samples then were dried at 60ºC for 24 h to remove any residual solvent. For the EPGT samples, approximately 0.60 mg of diet and tissue samples were loaded into sterilized tin capsules and analyzed by a continuous-flow isotope-ratio mass spectrometer in the Stable Isotope Laboratory at the University of Florida, Gainesville USA. We used a Costech ECS 4010 elemental combustion system interfaced via a ConFlo III device (Finnigan MAT, Bremen, Germany) to a Deltaplus gas isotope-ratio mass spectrometer (Finnigan MAT, Bremen, Germany). Analysis of forage fish and CLT eggs was conducted at the San Diego State University Ecology Analytical Facility with a CarboErba NCS 2500 elemental analyzer to obtain relative concentrations of carbon and nitrogen. The resulting CO_2 and N_2 from combustion were then run through a Thermo Finnigan Delta Plus mass spectrometer to obtain isotopic ratios of each element. We also ran samples at the University of Florida Light Stable Isotope Mass Spec Laboratory because of equipment repair needs at SDSU.

Contaminants: Metals and Organic Compounds

We conducted trace metal analyses at Scripps Institution of Oceanography (University of California at San Diego), using nitric acid and hydrogen peroxide digestion followed by simultaneous quantification of 15 trace metals with an Inductively Coupled Plasma Optical Emission Spectrum (ICP-OES) spectrometer. These analyses were used to compare trace metal levels across samples. For the fish sampled, whole fish were tested to establish concentration levels and point to metal sources across the sampled species.

Together with colleagues as CSU, Long Beach, we completed a second component to the trace metal termed metal speciation analyses. Metal speciation is a process by which the specific form of an element can be determined and can be used to identify particular cellular pathways a trace metal may be affecting and helps identify the potential mechanism by which toxic compounds may be impacting turtles in the Bay.

EPGT blood plasma was analyzed for persistent organic pollutants (POPs) by Mississippi State Chemical Laboratory (Mississippi State, MS). We analyzed samples using these methods for a panel of 28 POPs including polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDTs), polybrominated diphenyl ethers (PBDEs), and other common pesticides. As many samples fell below detectable levels, blood and plasma from 22 individuals were run through testing with a new equipment array in the analytical laboratory of SDSUs School of Public Health's Division of Environmental Health using an Agilent GC/MS in Electron Capture Negative Ion (ECNI) mode, which is more sensitive equipment that has a higher probability of detection.

Data analyses

$\delta^{13}C$ and $\delta^{15}N$ isotope values for all habitat and prey species were averaged by site. We then used these values to create an isoscape map of San Diego Bay for the most widely distributed species: *Zostera marina*, *Gracilaria* spp. and *Ulva* spp. Isoscapes were developed in GIS through kriging interpolation. The $\delta^{13}C$ and $\delta^{15}N$ values for green turtle tissues were compared among all years using ANOVA to gauge the consistency in isotopic values through time. To establish the probable dietary groups consumed and assimilated by green turtles in San Diego Bay, we used the isotope mixing model programs Isosource (Phillips et. al., 2003) and SIAR (Inger et al., 2010b). We used both programs to take advantage their respective strengths and to examine the variation in output values of two leading mixing models. Using Isosource, we created a mixing polygon that produced an intuitive graphical relationship among $\delta^{13}C$ and $\delta^{15}N$ of green turtle skin and potential diet items. With SIAR we generated a series of prey contribution distributions, which 11 integrated the variance of green turtle and habitat isotope values, and represented the probability distributions for each potential group's feasible contribution to green turtle diet.

For CLTs, we used abandoned eggs from multiple colonies in and around San Diego Bay from 2003-2009. We specifically targeted the egg membrane as our sample tissue because this tissue represents most recent diet choices, i.e. approx. 2 weeks. We analyzed for $\delta^{15}N$ and $\delta^{13}C$ values after verifying there was no significant difference between $\delta^{15}N$ and $\delta^{13}C$ values of hatched and unhatched eggs. We used a general linear model with year and site as predictors to test for significant temporal or spatial variation in $\delta^{15}N$ levels. We also used SIAR to identify diet composition for CLTs based on values from egg membranes and the documented CLT prey items.

EPGT habitat and prey species sample replicates for metal analysis were averaged by sample, and we calculated means and medians for each sample type per sampling event. We calculated enrichment and bioaccumulation factors to evaluate patterns among sites and used paired t-tests to detect overall bioaccumulation patterns for each forage type. Subsequently, to examine regional patterns of accumulation within and between each forage type, we calculated bioconcentration factors (BCF) defined as:

$$\frac{\textit{metal concentration}_{biota}}{\textit{metal concentration}_{sediment}}$$

To distinguish spatial relationships, we employed main effects Analysis of Variance (ANOVA) models by forage type for each metal and deconstructed the variance to determine the percentage of variability explained by each predictor. We compared the Bayesian Information Criterion (BIC) between fine (i.e. site and season) and coarse (i.e. region and season) models to identify if spatial differences were dependant on local "hotspot" site metal levels, or exhibited larger scale regional patterns. Principal Components Analysis was used to describe overall correlation patterns for sediment and biota and to create multivariate metal factors. In EPGT plasma samples tested for organic compounds, concentration values were averaged and the number of independent samples above level of detection for the instruments (LOD) was calculated.

Tissue concentrations in parts per million (ppm) of all metals tested for forage fish in the CLT food web were averaged by species, site and metal tested. Kruskal-Wallis one-way analysis of variance tests were used to determine if concentrations of arsenic, cadmium, copper, manganese, lead, selenium or vanadium differed between sites in topsmelt samples, the species with representative samples at the most sites. Metals that displayed significant differences in concentrations across sites were then utilized for kriging interpolation to determine if there were regional patterns of metal concentrations.

RESULTS

Stable Isotopes

The examination of our isotope data point to some interesting patterns, as can be seen in an isoscape map of $\delta^{15}N$ values for *Zostera marina*, *Gracilaria* spp. and *Ulva* spp. (Figure 2). Although some of the other sampled species showed little variability among sites, data from these species point to important geographic differences in isotope signatures, with higher nitrogen levels detected at several sites in the South Bay. However, the specific locations of high nitrogen hotspots were different among species.

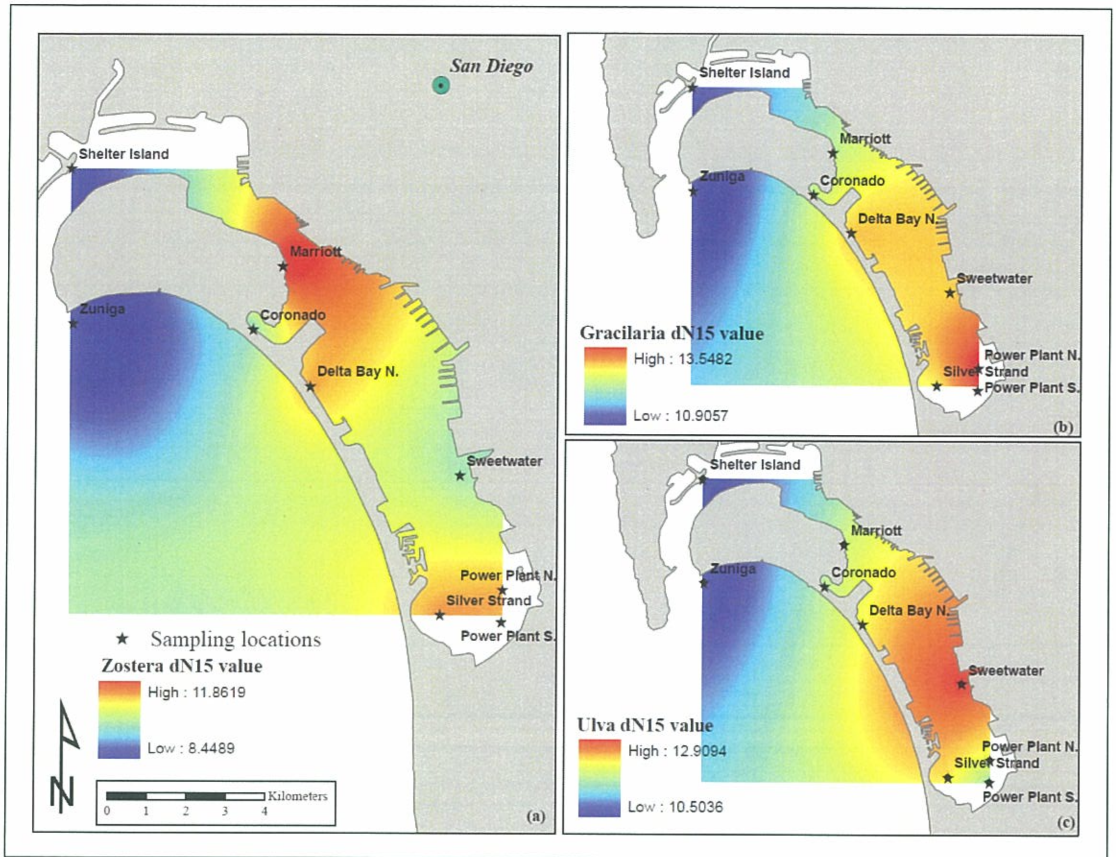

Figure 2. Bay isoscape of δ [15]N for (a) *Zostera marina*; (b) *Gracilaria* spp.; and (c) *Ulva* spp.

All EPGT prey items sampled had varying isotopic signatures compared to each other with the exception of the two types of algae whose nitrogen signature similarities can be attributed to their similar composition and life histories (Figure 3). Our two mobile invertebrates revealed an interesting correlation as they not only had the highest nitrogen value of all our prey items (15.83 ± 1.04) but also a nitrogen value that by simple observation has a similar signature to that of the green turtles nitrogen value. Furthermore, the mobile invertebrates produced carbon isotopic signature (-16.56 ± 1.21) very similar to our turtle carbon signature (-16.03 ± 1.52). When these data were incorporated into the multisource isotope mixing model (Isosource and SIAR) for EPGTs, they revealed an omnivorous diet, with invertebrates constituting up to 65% (isosource) and

80% (SIAR) of the green turtle diet (Figure 4). We determined the relative importance of eelgrass to the green turtle's diet while also showing the highest level of invertebrate consumption yet reported.

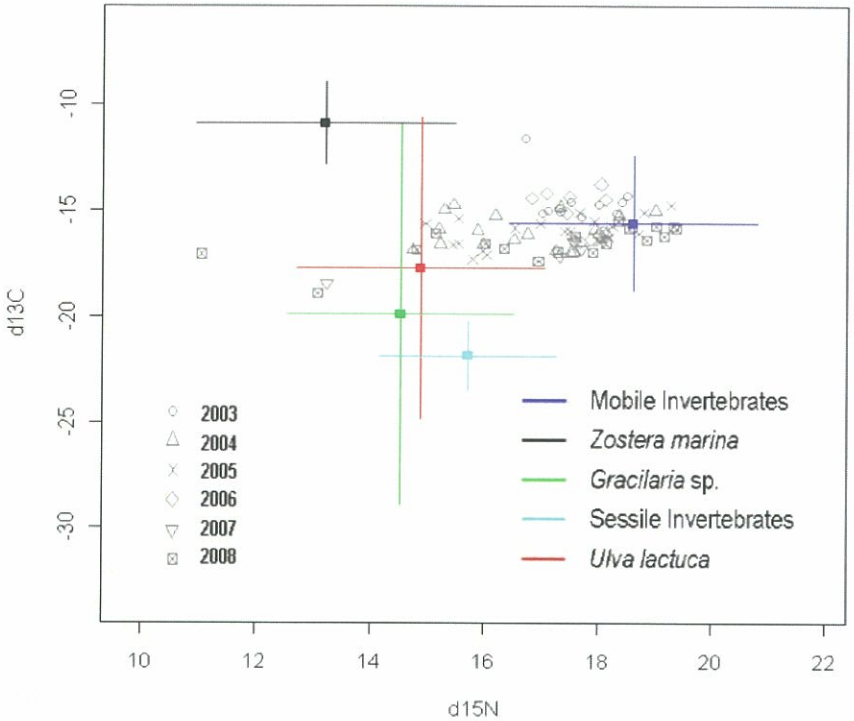

Figure 3. Isotopic signatures for EPGT prey items sampled between 2003 and 2008.

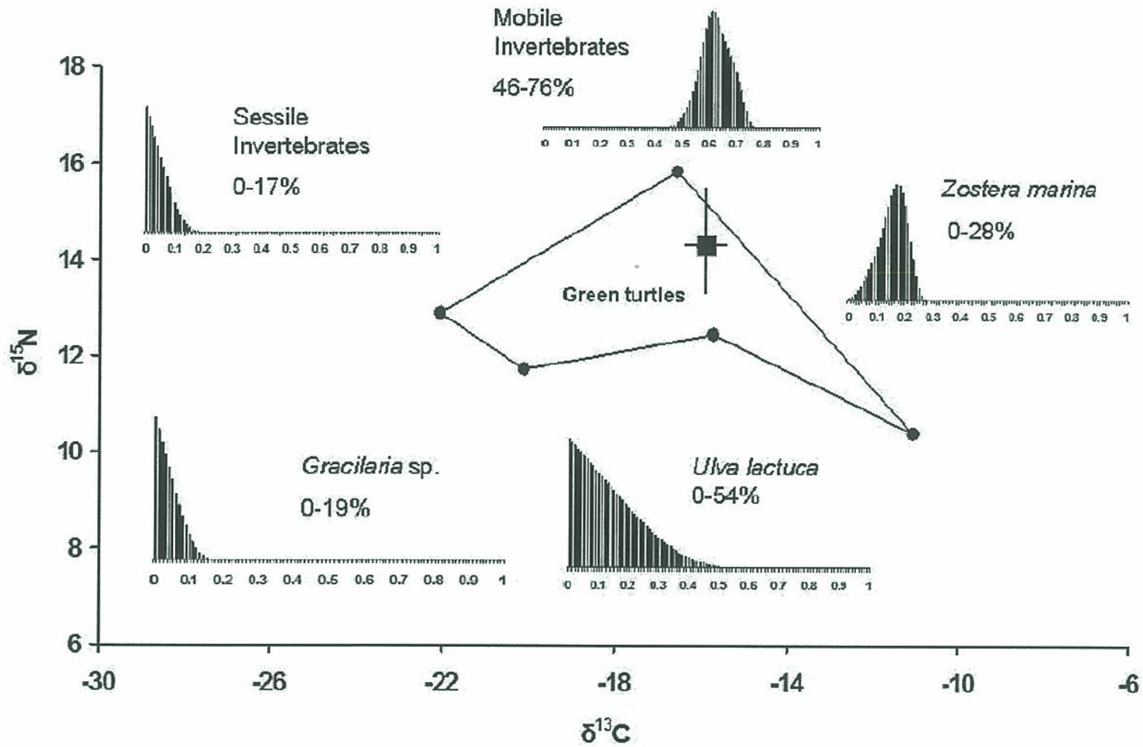

Figure 4. Isosource polygon with 5 aggregated groups. (Phillips et.al. 2005). Histograms next to each food item show distribution curves of the percent contribution to the turtle's diet.

For CLT egg membranes samples, student's t-test showed that there were no significant differences in average $\delta^{15}N$ measurements between the hatched (14.697 ‰) and unhatched (14.592 ‰) membranes ($t = 1.001$, $p = 0.323$) or average $\delta^{13}C$ values ($t = 1.600$, $p = 0.118$) between hatch (-18.370‰) and unhatched (-18.216‰) membranes. We did find clear evidence of significant inter-annual differences in $\delta^{15}N$ (Figure 5), with year as the most influential predictor variable ($r^2 = 30.4$, $F_{df,5} = 20.68$, < 0.001, BIC = 597.3).

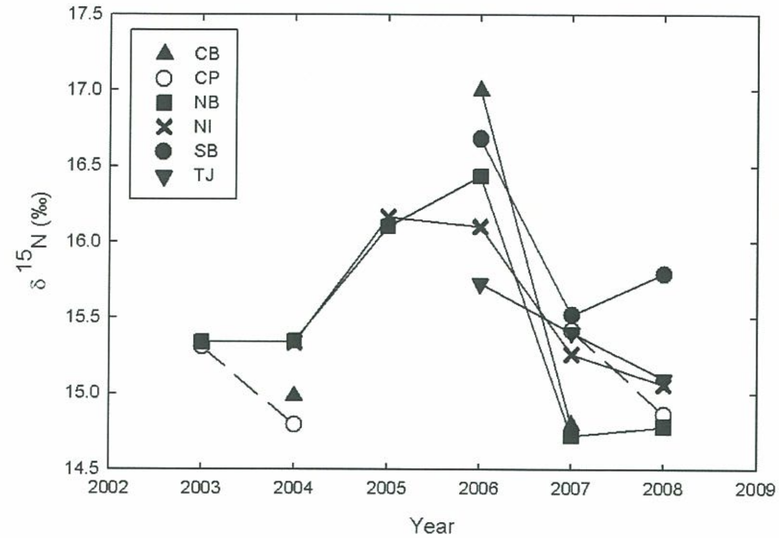

Figure 5. $\delta^{15}N$ measurements from abandoned CLT eggs from 2003-2008 at six sites in and around San Diego Bay. CB= Central Bay, CP= Camp Pendleton, NB= Naval Amphib. Base, NI=North Island, SB=South bay, TJ= Tijuana River.

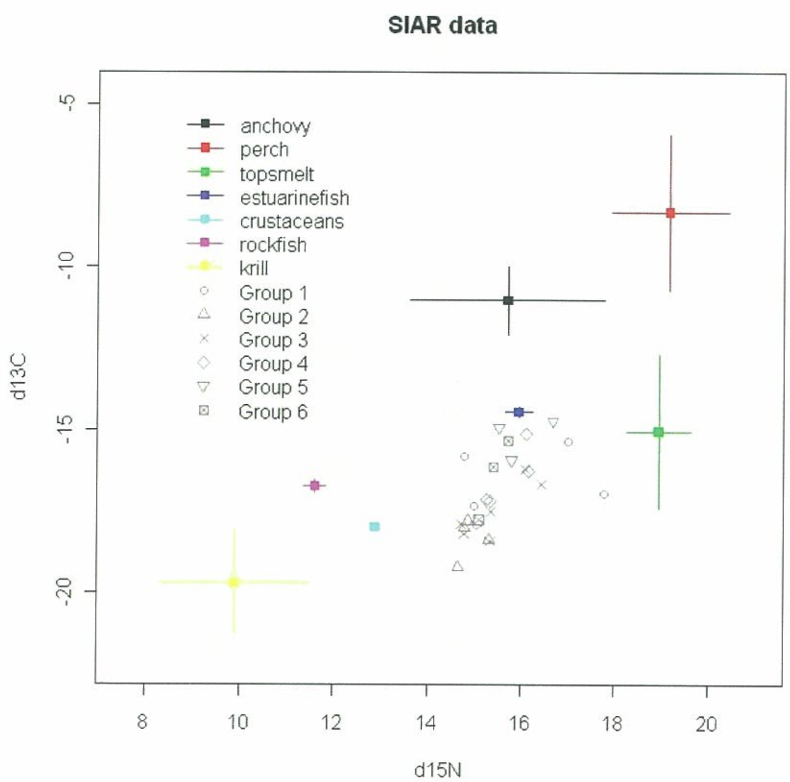

Figure 6. Isotopic signatures for CLT and their prey items.

Using the egg membrane data and all known prey CLT prey items, we were unable to definitively identify the species that contributed to the CLT diet. As seen in Figure 6, the bird values (shown as Group 1-6) are not closely linked to the food items we analyzed. This lack of resolution may be due to limited data on how prey nutrients are integrated into CLT tissue (termed the discrimination factor). It also may point to a missing prey item, although no other prey item has been documented for this species to date.

Metal Contaminants

Bioaccumulation patterns varied spatially and among samples representing the EPGT food web, with silver, cadmium, copper, manganese, selenium, strontium, vanadium, and zinc being the strongest bioaccumulating metals (Figure 7). Strong spatial trends of copper and manganese drove spatial differentiation in EGPT food items, while a different suite of metals were found to influence accumulation patterns in sediment across regions within the Bay. These results indicate that metal levels in biota and sediment are highly dissimilar. This suggests that toxicity reference values based on localized sediment and invertebrate testing ex-situ are likely to be less accurate for risk assessments of higher organisms like EPGT. Beyond looking at site specific differences, we also considered whether there were accumulation patterns among the different regions of the Bay. Regional bioaccumulation patterns varied among trace metals. Certain metals exhibited BCF differences between forage types, but were generally consistent across regions. In contrast, other metals showed little BCF variation between forage type and Bay regions, while some were influenced by a combination of both factors.

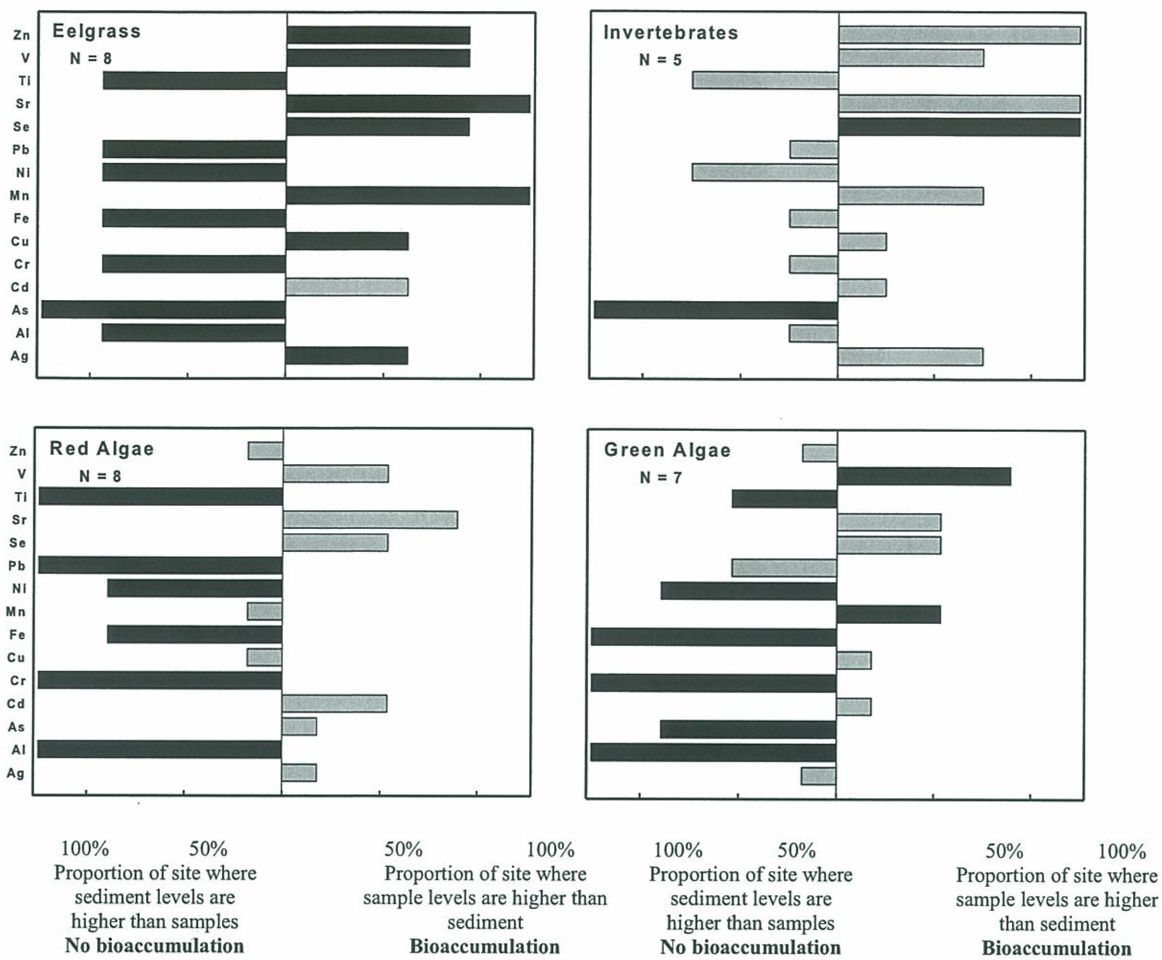

Figure 7. Percentage of sites exhibiting bioaccumulation in eelgrass, invertebrates, red algae, green algae relative to sediment. Values are averaged across seasons. Metals are listed on the Y axis. Bars to the right of the central X axis line indicate the proportion of sites at which metals were higher in biota samples than sediment. Bars to the left of the central X-axes indicate the proportion of sites at which sediment values were higher than biota, indicating no accumulation. Metals with significant relationships (α=0.05, paired t-tests) are indicated by black bar coloration.

The metal speciation work on EPGT plasma detected evidence of numerous metals and the coincident presence of distinct absorption peaks. These absorption peaks suggest that most of the metal binding species probably represent native metalloenzymes and other metal-binding proteins. This evidence of coincident absorption peaks points to co-eluting elements, i.e. elements that have similar profiles. This is indicative of competitive binding of multiple metals to a common ligand. In the case of non-essential metals, such as cadmium, the likelihood of competitive binding may represent a pathway of molecular toxicity, whereby non-essential metals at high levels, such as cadmium or lead are more likely to bind with cellular proteins.

Metal concentrations in the fish sampled showed both spatial and seasonal variation that differed by metal and fish species analyzed. Kruskal-Wallis tests of tissue concentration of cadmium, copper, manganese, lead, selenium and vanadium by site in topsmelt all showed significant (α=0.05) variation by site (Figure 8). Through kriging interpolation, regional patterns of some metal concentrations were detected for cadmium, copper, manganese and selenium (Figure 9). Cadmium was detected at greater concentrations in topsmelt at Imperial Pier compared to all other sites. In comparison, copper, manganese and selenium were all detected at higher concentrations in topsmelt in the central part of the bay based on samples at the Coronado and Delta Bay North sites.

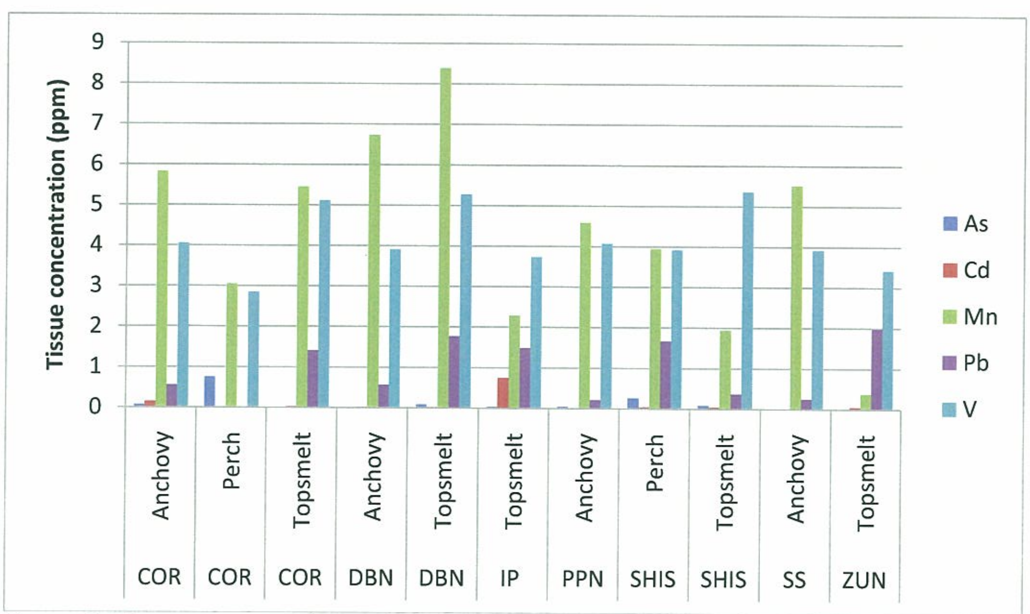

Figure 8. Tissue concentrations of select metals show differentiation by site and species.

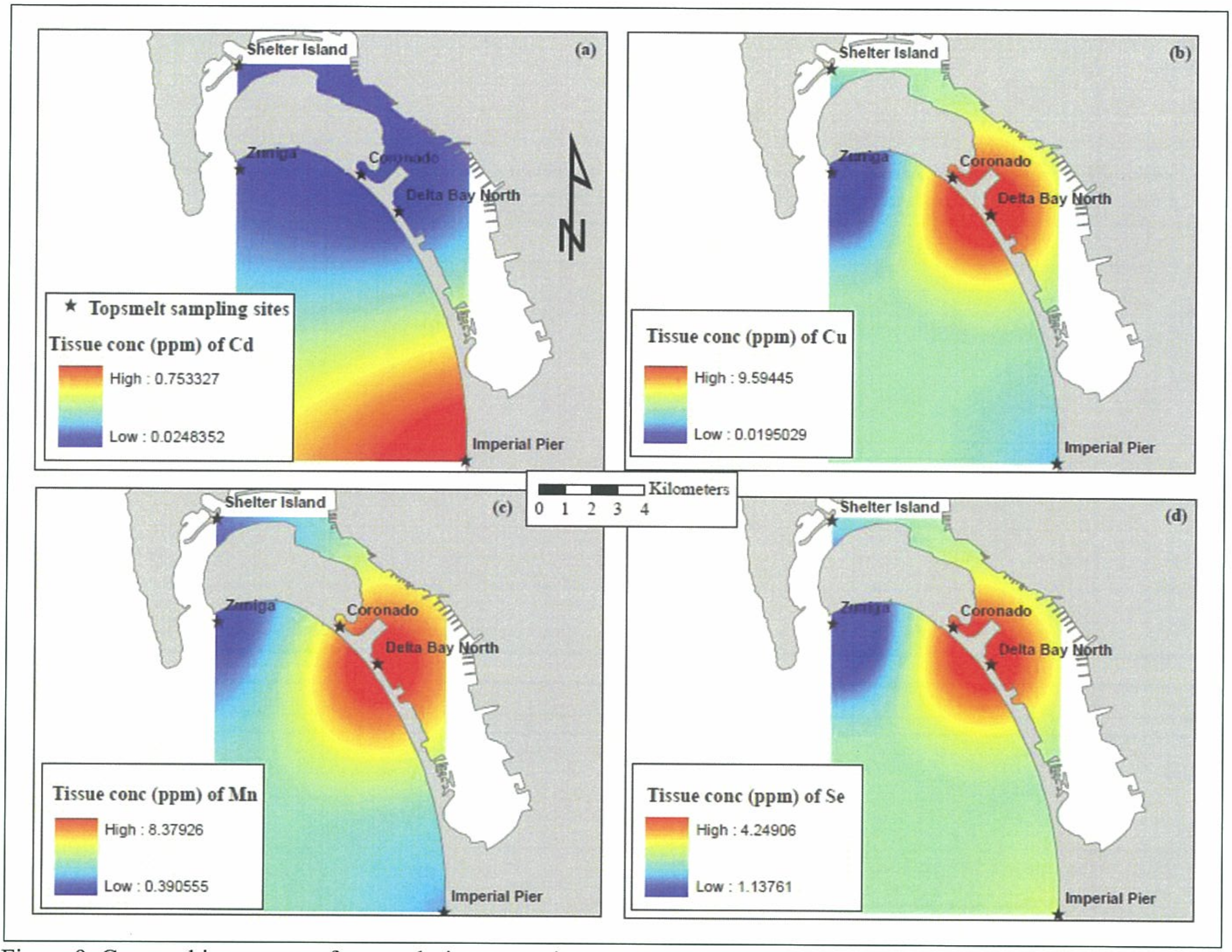

Figure 9. Geographic patterns of topsmelt tissue metal concentrations in ppm for (a) Cadmium; (b) Copper; (c) Manganese; (d) Selenium, based on kriging interpolation.

Organic compounds

There were a number of organic compounds that were commonly detected in the EPGT samples analyzed. γ benzene hexachloride (BHC) was present in all plasma samples, and p'p'- DDE and γ chlordane were frequently detected. Several other chemicals were detected in only a few individuals, including four congeners of polybrominated diphenylethers (PBDEs) detected in two individuals (Table 2). When blood and plasma were run through SDSU's new equipment array to validate results and establish values for samples that had been below the limit of detection for the equipment (Table 3), PCBs were found at the highest level in all the blood and plasma samples among all POPs tested. These more sensitive analyses highlight the clear presence of PCBs and PBDEs in the San Diego Bay food web.

		Blood Plasma			
Contaminant	*N> LOD*	*Mean SE*			*Range*
γ BHC	20	0.915	±	0.092	0.460 - 2.45
Heptachlor epoxide	1	0.516	±	n/a	< LOD - 0.516
α Chlordane	1	0.620	±	n/a	< LOD - 0.620
γ Chlordane	12	0.790	±	0.051	< LOD - 1.16
p'p'-DDE	14	0.965	±	0.078	< LOD - 1.56
PBDE #47	2	0.565	±	n/a	< LOD - 0.760
PBDE #99	2	0.480	±	n/a	< LOD - 0.730
PBDE #153	1	0.220	±	n/a	< LOD - 0.220
PBDE #154	1	0.230	±	n/a	< LOD - 0.230
Moisture (%)	20	92.5	±	0.425	86.3 - 94.6
Lipid (%)	20	0.462	±	0.135	0.126 - 2.77

Table 2. Organic compounds concentration values in EPGT (mean ± SE) rounded to three significant digits (ng•g^{-1} wet weight). N represents number of independent samples above level of detection for the instruments (LOD).

Citation: Lewison et al. 2011. Chemical analysis of threatened and endangered species in San Diego

Sample (Turtle)	Collection date	blood wt. (g)	Chlordanes	p,p'-DDE	PCBs	PBDE
X105	1/8/2009	4.13	0.017	0.000	0.897	0.171
X110	3/25/2009	4.53	0.030	0.054	1.723	0.058
	3/25/2009	5.5	0.044	0.000	2.240	0.596
X143	12/17/2007	6.71	0.091	0.045	2.965	0.009
	12/17/2007	6.71	0.111	0.072	4.058	0.144
	2/27/2008	4.35	0.039	0.025	1.231	0.039
	2/27/2008	5.34	0.190	0.056	5.388	0.071
	3/27/2008	2.73	0.064	0.000	2.134	0.000
	4/3/2008	2.5	0.156	0.103	4.217	0.224
	4/3/2008	2.63	0.144	0.060	3.598	0.042
	4/3/2008	4.9	0.192	0.054	4.731	0.075
X161	1/30/2008	3.46	0.076	0.042	1.952	0.035
X169	12/17/2007	5.25	0.025	0.037	0.875	0.032
LB315	2/26/2009	3.65	0.016	0.135	1.908	0.063
	2/26/2009	5	0.028	0.091	1.336	0.081
LB319	2/15/2008	3.98	0.017	0.088	0.920	0.057
LB325	4/25/2008	4.05	0.015	0.054	0.527	0.159
	12/17/2007	5.93	0.011	0.141	0.521	0.174
	12/17/2007	5.94	0.018	0.120	0.678	0.252
LB326	3/27/2008	2.36	0.030	0.000	2.727	0.052
LB332	12/18/2008	3.48	0.010	0.000	0.569	0.073
LB342	2/15/2008	3.8	0.161	0.096	2.837	0.132
LB362	1/8/2009	5.16	0.011	0.095	0.574	0.105
	2/26/2008	3.32	0.028	0.096	0.967	0.105
76R	2/26/2009	4.3	0.006	0.132	0.773	0.050
	2/26/2009	3.42	0.014	0.000	0.773	0.064
	3/25/2009	3.99	0.018	0.130	0.800	0.107
126277750A	12/17/2007	5.48	0.006	0.000	0.082	0.029
132129225A	12/18/2008	4.56	0.012	0.095	0.472	0.157
132211311A	12/18/2008	2.64	0.019	0.051	0.459	0.124
26618298	3/12/2008	3.31	0.061	0.073	3.758	0.561
*O266182298	3/27/2008	3.83	0.067	0.039	4.118	0.466
126479146A	3/12/2008	6.64	0.014	0.055	0.262	0.028
126331466A	3/12/2008	4.1	0.005	0.054	0.120	0.083
HJ529	12/18/2008	4.45	0.036	0.073	2.971	0.166
Pappy	2/27/2008	2.43	0.040	0.141	1.083	0.702

Table 3. Results of more sensitive testing for organic compounds in EPGT conducted at SDSU. Concentration values (mean $\pm$ SE) rounded to three significant digits ($ng \cdot g^{-1}$ wet weight). Chlordanes represents sum of α- and γ- chlordanes and *trans*- and *cis*-nonachlors. *p,p'*-DDE is a main metabolite of DDT. PCBs represents sum of 35 PCB congeners. PBDEs represents sum of PBDE-47, 99, 100, 154, and 153. * indicates plasma.

CONCLUSIONS

Stable Isotopes

In light of the highly urbanized nature of San Diego Bay, the elevated $\delta^{15}N$ of green turtle skin and habitat values depicted in the isoscape mapping suggest that this system is experience nitrogen enrichment, particularly in the southern portion of the bay. Indeed commercial shipyards, naval shipyards and storm drain runoffs have been documented to contain high levels of pollutants for this system (Fairey et al., 1998), and presuming these point sources of pollution are linked with sewage runoff, this could lead to an enrichment of ^{15}N in affected habitats. These suspected sources can be compared with the results of our isoscape mapping of nitrogen enrichment in eelgrass and algae species to inform potential management options for these sources.

Despite the spatial variation in ^{15}N, temporally, values appear to have remained stable. Kwak and Zedler (1997) profiled isotopic signatures of numerous marine species in the San Diego watershed, including most of the putative EPGT prey species included in this study, and in these instances, the 20 values reported therein were highly similar to our results, an encouraging similarity considering the decade between the two studies. With respect to $\delta^{13}C$, the results of Kwak and Zedler (1997) also indicate low isotopic variability. This consistency supports the temporal stability in isotope signatures of EPGT individuals over the past eight years.

This research effort yielded some surprising results regarding EPGT diet in San Diego Bay. While Hatase (2006) used SIA to show that green turtle in oceanic environments also consume an omnivorous diet, ours is the first study using SIA to show high levels of omnivory in a coastal neritic habitat. In addition to highlighting the importance of specific prey groups, our results underscore the need for eelgrass conservation in San Diego Bay, particularly in light of the nitrogen loading in this system. Seagrass beds in coastal waters provide habitat and shelter for invertebrates and fish including variety of marine snails (Orth, 1984; Kharlamenko et al., 2001), and it is likely that conservation of this habitat type would have broader value for many different species, including green turtles, in San Diego Bay.

Metal Contaminants

We detected several metals that are anthropogenically enriched in sediments of San Diego Bay eelgrass ecosystems, a finding that supports results from previous studies that attribute contamination to both historical and contemporary sources (Katz and Kaplan 1981, MacDonald 1994, Fairey et al. 1998, USDoN 1999). However, presence of anthropogenically enriched sediments did not uniformly correspond to bioaccumulation of trace metals in local biota, perhaps due to complex processes of bioavailability and physiological functions. Eelgrass was the strongest accumulator of metals across sites, likely because eelgrass accumulates metals via roots and blades, reflecting trace metals in the water column as well as in sediment (Coelho et al. 2009). Red and green algae exhibited weaker accumulation trends, which may be related to their lack of root systems. Soft-bodied invertebrates displayed the fewest accumulation trends although this may be the result of small sample sizes due to their patchy distributions. Given the differences in metal sources among sampled species, specific diet choice and foraging sites may be driving factors of metal exposure and bioaccumulation for EPGT. Thus, while sediment toxicity reference values are very useful for species in which bioaccumulation and toxicity are well documented and understood, they may not be representative or indicative of metal risks for higher order organisms that feed on multiple trophic levels, such as EPGT and CLT.

A review of metal concentrations in the CLT forage fish sampled revealed that the maximum concentrations of most metals tested fell below established risk levels for avian species (references in Zeeman 2004) with a few exceptions. However, maximum concentrations of lead, cadmium, selenium, vanadium and zinc exceeded levels associated with adverse effects in some bird species. Selenium in particular, has been associated with negative effects to bird fecundity (Beyer et al. 1996). Most interestingly, when compared with a previous seabird study conducted in the Salt Works region of the Bay (Zeeman et al. 2008), results from our study differed somewhat from tissue concentrations of iron, nickel and strontium and were very different for arsenic, cadmium, manganese, lead and vanadium. The differences observed in these values may be explained by the variability we detected per site and Bay region and likely point towards more localized sources of these elements in the San Diego Bay ecosystem. Similar to what was observed in the EPGT food web, bioaccumulation in the CLT food sources may be location-dependent and may also be influenced by shifts in prey availability. We expect that for many species at higher trophic levels in the Bay food web, bioaccumulation is driven by both spatial and species forage preferences. However, because metal accumulation was not studied directly in CLTs, this assertion is untested. Direct testing of CLT tissue is necessary to confirm that metals are accumulating in this species of conservation concern.

Organic Compounds

The presence of POPs serves as a clear signal of anthropogenic contamination because they are derived exclusively from manufactured man-made chemicals, while trace metals occur naturally but are toxic above certain thresholds (Bryan 1984). These pollutants can exert lethal and sublethal toxic effects in wildlife, including alteration of neurological and immune function, growth, and reproduction (Beyer et al. 1996). Compared to existing literature (Keller et al. 2004; Carlson 2006; Hermanussen et al. 2008; Swarthout et al. 2010; van de Merwe et al. 2010a,b), San Diego turtles had higher mean levels of chlordanes and p'p' DDE relative to all previous studies examined except for Kemp's Ridley's on the US Southeastern coast and one study of loggerheads in North Carolina (only the latter study was higher than San Diego for p'p' DDE). San Diego PBDEs were also higher than all other studies while PCBs fell within the range of values found in previous studies. The majority of these pollutants have already been identified as contaminants of concern for wildlife in San Diego Bay (Fairey et al. 1998), with DDT and possibly PBDEs linked to seabird reproductive failures (Zeeman et al. 2004). Many compounds detected in San Diego turtles have been banned in the United States for several decades, but remain as legacy pollutants in Bay sediments (Fairey et al. 1998; Deheyn and

Citation: Lewison et al. 2011. Chemical analysis of threatened and endangered species in San Diego

Latz 2006). Of particular concern are PDBEs because they are still used prevalently in the U.S. as flame-retardants, despite a growing body of evidence that they have toxic and bioaccumulative effects (Hites 2004). Within this context, our results highlight the need for future monitoring of both contemporary and legacy pollutants in San Diego Bay wildlife.

The chemical analyses conducted during this project provide a robust baseline for future study of nitrogen enrichment and contaminant levels in sediment and a wide range of species in San Diego Bay. The isotope data was also a powerful technique to identify diet contributions and can be used to identify annual diet shifts. For EPGT, the data collected on this project provides the most accurate diet study for this species, to date. For CLTs, observed shifts in diet or foraging location may explain some of the variability in annual reproductive output. The contaminant analyses point to a level of impairment in many locations and for many species that exceeds established risk levels. However, testing to directly measure these compounds in CLTs and other at-risk seabird populations is needed to confirm the contaminant accumulation patterns observed in forage fish species.

One emerging message from this work is the need to account for spatial variability in isotope and contaminant analyses. We found clear differences in accumulation levels among sediment, plant species, invertebrates and higher-order animals. The spatial variability we detected points to differential risks of pollution and enrichment across the regions of the Bay. The difference in accumulation levels among samples highlights the potential limitations of contaminant risk assessments that are based on sediment or a single plant or invertebrate species at a single location. The dissimilarity among potential food items (prey species) and the long-lived species that consume them, such as the EPGT, points to the need for direct measurement of potential contamination risks in species of conservation concern.

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latimes.com/business/la-fi-0723-hydrogen-truck-20110723,0,7944791.story

O-2
Exhibit C

latimes.com

Seaport complex takes delivery of zero-emission hauling truck

The heavy-duty rig, which will transport cargo between the ports of L.A. and Long Beach and Inland Empire warehouses and distribution centers, runs on electric batteries powered by a hydrogen fuel cell.

By Ronald D. White, Los Angeles Times

July 23, 2011

An El Segundo company aims to help the nation's busiest seaport complex advance its green technology efforts by providing zero-emission trucks for heavy-duty hauling.

Executives from Vision Motor Corp. delivered a heavy-duty hauling truck Friday to one of the port complex's most important cargo haulers, Total Transportation Services Inc. of Rancho Dominguez.

The Tyrano class 8 rig looks like any other big rig, but a hydrogen fuel cell powers an electric drive, emitting only water from the tailpipe. The ports of Los Angeles and Long Beach are billing it as the world's first zero-emission heavy-duty hydrogen rig. If it performs to expectations during an 18-month test, Total Transportation plans to order at least 100 more.

Experts said the venture could set the stage for a new era in green cargo movement.

Fleets of zero-emission trucks with the range to deliver cargo to the Inland Empire's warehouses and distribution centers would "eliminate one of the principal objections neighbors and governments have when freight and logistics are a major part of the local economy — that's the problem of diesel emissions," said economist John Husing, whose firm, Economics & Politics Inc., tracks international trade.

The Tyrano uses a combination of technologies to operate with an expected range of 200 miles, said Rudy Tapia, vice president for business development for Vision Motor. The power flows through electric batteries, which are kept charged by a hydrogen fuel cell. No fossil fuels are used in the truck.

"Up and above the benefit of zero emissions, we at TTSI feel that this fuel format is the only true way to break our dependence on imported fuel. Hydrogen is the most abundant resource on the planet," said Vic La Rosa, president of Total Transportation , a hauling and logistics company that moves freight and provides warehousing and rail service and handles shipments through seaports in Los Angeles, Long Beach, San Diego, Seattle, Tacoma, Wash., and Norfolk, Va.

Getting Total Transportation onboard for the test was a big boost, said Martin Schuermann, chief executive of Vision Motor.

"It underlines our assumptions that there are multiple commercial applications for our hydrogen powered zero-emission big rigs in today's trucking industry," Schuermann said.

Officials at the ports of Los Angeles and Long Beach have a lot riding on the outcome. The nation's largest and second largest cargo container ports, respectively, put up $425,000 in seed money for the development of the Vision Motor truck through their joint Technology Assistance Program, which has an annual budget of $1.5 million. The program has funded several projects, including a hybrid diesel tugboat from Seattle-based Foss Maritime Co.

"We really want to see the truck put through the paces to see how durable the fuel cell system is," said Heather Tomley, director of environmental planning for the Port of Long Beach. "We're hoping that it works as well as they think it will."

In addition to the on-road Tyrano, Total Transportation will test a Vision Motor truck more like the common terminal tractor, designed to move containers inside the ports.

Kevin Maggay, air quality supervisor for the Port of Los Angeles, said its green technology efforts so far, including the introduction of fuels that pollute less than earlier versions, were just the beginning.

"We have made great strides in reducing emissions, but we need to go further and we have to find new technologies to get us there," Maggay said. "Clean diesel does not get us there."

Vision Motor's business plan may have tapped into a way to avoid the problem all small start-ups face — the inability to rapidly scale up to major factory production levels. It's not building the trucks. It's using Freightliner to provide the chassis and cab. It's not building the electric motor, which is made by Siemens. The fuel cell is made by Hydrogenics Canada. Vision Motor will deliver the proprietary software to make the systems work together, Tapia said.

"We go with best of breed for the components for the best performance and durability and for the lowest costs," Tapia said. "It's the most capital efficient way to go."

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O-3-154

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

IN THE MATTER OF TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001 (SHIPYARD SEDIMENT CLEANUP)	**DECLARATION OF SERVICE**

PROOF OF SERVICE

I am employed in the County of San Diego, State of California. I am over the age of 18 years and not a party to this action. My business address is Latham & Watkins LLP, 600 West Broadway, Suite 1800, San Diego, CA 92101-3375.

On **August 1, 2011**, I served the following document described as:

1. **NASSCO'S COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE SHIPYARD SEDIMENT REMEDIATION PROJECT (SCH # 2009111098)**

2. **ANCHOR QEA'S MEMORANDUM REGARDING COST IMPLICATIONS OF MITIGATION MEASURES DESCRIBED IN THE DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE SAN DIEGO SHIPYARDS SEDIMENT CLEANUP PROJECT, SAN DIEGO, CALIFORNIA**

3. **EXPONENT, INC.'S COMMENTS ON DRAFT PRELIMINARY ENVIRONMENTAL IMPACT REPORT FOR THE SHIPYARD SEDIMENT REMEDIATION PROJECT, DATED JUNE 16, 2011**

O-3-154

by serving a true copy of the above-described documents in the following manner:

BY ELECTRONIC MAIL

Upon written agreement by the parties, the above-described documents were transmitted via electronic mail to the parties noted below on **August 1, 2011**.

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O-3-154

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O-3-154

BY ELECTRONIC MAIL

Upon written agreement by the parties, the above-described documents were transmitted via electronic mail to the parties noted below on **August 1, 2011**.

BY OVERNIGHT MAIL DELIVERY

I am familiar with the office practice of Latham & Watkins LLP for collecting and processing documents for overnight mail delivery by Express Mail or other express service carrier. Under that practice, documents are deposited with the Latham & Watkins LLP personnel responsible for depositing documents in a post office, mailbox, subpost office, substation, mail chute, or other like facility regularly maintained for receipt of overnight mail by Express Mail or other express service carrier; such documents are delivered for overnight mail delivery by Express Mail or other express service carrier on that same day in the ordinary course of business, with delivery fees thereon fully prepaid and/or provided for. I deposited in Latham & Watkins LLP' interoffice mail a sealed envelope or package containing the above-described document and addressed as set forth below in accordance with the office practice of Latham & Watkins LLP for collecting and processing documents for overnight mail delivery by Express Mail or other express service carrier:

O-3-154

Vincente Rodriguez Frank Melbourn Catherine Hagan California Regional Water Quality Control Board San Diego Region 9174 Sky Park Court, Suite 100 San Diego, CA 92123-4340 fmelbourn@waterboards.ca.gov chagan@waterboards.ca.gov Telephone: (858) 467-2958 Fax: (858) 571-6972	(12 copies of each document)

I declare that I am employed in the office of a member of the Bar of, or permitted to practice before, this Court at whose direction the service was made and declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on **August 1, 2011**, at San Diego, California.

Diane Griffin

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LATHAM & WATKINS LLP

August 1, 2011

VIA EMAIL AND OVERNIGHT MAIL

Mr. Vicente Rodriguez
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
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Re: NASSCO's Comments on the Draft Environmental Impact Report for the Shipyard Sediment Remediation Project (SCH # 2009111098)

Dear Mr. Rodriguez:

O-3-155

Designated Party National Steel and Shipbuilding Company ("NASSCO") submits the enclosed comments regarding the Draft Environmental Impact Report ("DEIR") for the Shipyard Sediment Remediation Project ("Project"), State Clearing House Number 2009111098, publicly released by the California Regional Water Quality Control Board, San Diego Region ("Regional Board") on June 16, 2011. The enclosed comments were prepared by Michael Whelan and David Templeton of Anchor QEA, and supplement the comment letter prepared by my office that is being submitted concurrently.

Very truly yours,

Jeffrey P. Carlin
of LATHAM & WATKINS LLP

cc: Frank Melbourn, on behalf of the Advisory Team
Designated Parties (per attached proof of service)

SD\798823.1

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O-3

MEMORANDUM

To:	Kelly Richardson and Jeff Carlin, Latham & Watkins	**Date:**	August 1, 2011
From:	Michael Whelan, P.E., and David Templeton, Anchor QEA, L.P.		
Cc:	Mike Chee, NASSCO		
Re:	Cost Implications of Mitigation Measures Described in the Draft Environmental Impact Report for the San Diego Shipyards Sediment Cleanup Project, San Diego, California		

This memorandum presents a detailed discussion and tabulation of estimated costs that could result from the imposition of certain mitigation measures described in the San Diego Shipyard Project's Draft Environmental Impact Report (EIR), dated June 16, 2011. If imposed in combination and as described in the Mitigation and Monitoring Reporting Program (MMRP; Section 7 of the Draft EIR), the various mitigation measures are estimated to potentially add $11.8 to $18.3 million to the total project cost estimate, which is currently estimated at up to $60 million. O-3-156

Many of the mitigation measures described in the MMRP are typical for environmental sediment cleanup projects of this type and, therefore, have been included in Anchor QEA, L.P.'s most recent cost model for the site sediment cleanup. "Typical" environmental mitigation measures for sediment remediation projects include those required for the 2005/2006 cleanup of Campbell Shipyard, the most recent sediment cleanup project in San Diego Bay as well as the ongoing cleanup of the Rhine Channel in Newport Beach (for which a Water Quality Certification [WQC] was issued by the Santa Ana Regional Water Quality Control Board). However, a number of mitigation measures are not typical, do not provide substantive increases in environmental protection, and/or significantly increase construction costs. Such measures have typically not been in effect for Campbell Shipyard, Rhine Channel, or many other similar projects. O-3-157

The impacts to construction costs are compounded when various measures are implemented in combination. Practices that decrease the contractor's productivity while failing to increase environmental protectiveness are particularly problematic and likely to result in O-3-158 escalated total costs. Table 1 presents a summary of these compounding factors and estimated costs as they relate to MMRP mitigation elements. Costs are presented as a range of probable minimum, most probable, and probable maximum, reflecting the early stage of the project and the conceptual nature of its current definition. Cost elements will be refined as the project design process proceeds. The following sections discuss the mitigation measures in greater detail and focus on their effectiveness based on our experience with similar sediment cleanup projects. O-3-158

A key consideration in this analysis is whether these mitigation measures are "required" or if the Draft EIR is recommending that they be considered during design and permitting (e.g., development of the Construction Quality Assurance Plan [CQAP] and the Section 401 WQC), with further consideration of environmental protectiveness and cost implications. O-3-159

MITIGATION ELEMENTS RELATED TO HYDROLOGY, WATER, AND AIR QUALITY

Mitigation Measure 4.2.1: Hydrology and Water Quality

This mitigation measure requires that "automatic systems" be used to monitor turbidity outside of the construction area. While automatic monitoring of dredging position and progress is a standard and beneficial industry practice (and a key monitoring element of the Section 401 WQC), the automated monitoring of *turbidity* is not, aside from a select few instances known nationally. In fact, requiring automated monitoring is likely to have significant adverse effects on operations owing to the difficulty of discerning meaningful turbidity results from ambient conditions and statistical "noise." Turbidity is a complex phenomenon and subject to a host of environmental variables as well as to the ever-changing conditions of construction. Successful monitoring of turbidity effects, and interpretation of the monitoring data, requires the judgment of a skilled operating team so that external variables can be properly taken into account. Automating the monitoring is likely to lead to significant uncertainty and false positives (unwarranted indications of exceedances) resulting from external factors such as currents, weather, and vessel traffic as well as a frequent need to refine or clarify what the automatic monitors are indicating, which is likely to lead to confusion and loss of time on the project. O-3-160

Potential slowdowns to the dredging process, even if limited in duration, will result in considerable extra costs, because dredging effectiveness is primarily driven by production O-3-161 rate. Working in these active shipyards is already subject to a number of scheduling challenges. We expect that adding the uncertainty of an automated turbidity monitoring system could add as much as $500,000 to $1 million to total project costs, simply through the occasions of unnecessary work slowdown and uncertainty. O-3-161

Alternatively, implementation of a water quality monitoring program that employs the manual collection of turbidity values allows for appropriate adjustments for tidal exchanges, wind, and vessel traffic. This flexibility will allow the contractor to adjust dredging and barge-loading methodologies (e.g., speed and bucket type) based on visual assessment at both the early warning and compliance distances from the construction area. In turn, manual collection of water quality results in better production rates and lower costs while providing better environmental protectiveness. O-3-162

Mitigation Measure 4.2.2: Hydrology and Water Quality

This mitigation measure lists a number of best management practices (BMPs) intended to meet water quality objectives during the dredging work. Some of these BMPs are standard and would customarily be included in the project specifications, such as prohibitions against stockpiling, spillage, and splashing; bucket closure; and debris grid management. Other listed BMPs, however, are not representative standard practice. While there have been limited instances known nationally where they have been applied to highly toxic cleanup events, at this project they will add significantly to construction costs (and potentially slowing down the rate of progress) without a commensurate gain in environmental protectiveness. Examples of such BMPs include: O-3-163

- **Double silt curtain enclosure.** Although double silt curtains were used for the Campbell Shipyard project in San Diego, they are not a standard practice. Single silt curtains, for instance, have been required and successfully used for recent and ongoing sediment cleanup projects in Newport Beach and at the Port of Long Beach. Employing double silt curtains adds considerable cost and management time without any demonstrated environmental benefit. We estimate that this measure could add $250,000 to $500,000 to project costs, owing not only to the increased cost of material purchase but also to the greater effort required to manage and move the double silt curtain. O-3-164

- **Specialized bucket additions and controls (e.g., closure switches and Clam Vision TM).** These additions and controls would add cost due to their purchase, installation, upkeep, calibration, and management and would pose the risk of complicating the contractor's work by providing ambiguous or misleading data owing to the many variables that are in effect during dredging. We envision this measure adding as much as $250,000 to $500,000 to project costs. Alternatively, a practical water quality control and monitoring plan (as was used used successfully for the Campbell Shipyard project in 2005/2006) will ensure compliance with the Section 401 WQC and allow the contractor to use the right equipment for the conditions while keeping production efficient. O-3-165
- **Air curtains.** The MMRP suggests these as a supplement to silt curtains for better controlling loss of suspended sediment and enhancing worker safety. We are not aware of any regional precedent for using air curtains for these reasons, and their effectiveness in this regard appears highly doubtful. Air curtains would add considerable cost and would be time-consuming to install, maintain, and continually relocate as the dredging proceeds. We estimate that this measure could add as much as $300,000 to $500,000 to project costs, owing not only to the increased cost of material purchase but also to the greater effort required to manage and move the air curtain assembly. O-3-166

Mitigation Measure 4.2.3: Hydrology and Water Quality

This mitigation measure stipulates that double silt curtains (previously discussed) are to "fully encircle the dredging equipment and the scow barge being loaded with sediment." Although a silt curtain enclosure around the dredging barge is a typical requirement, including the scow barge in the enclosure would have a significant impact on operations. Each time the scow barge is loaded, it would have to wait within the silt curtain enclosure until water quality within the curtains can be documented as meeting water quality criteria and then for the curtain enclosure to be opened. This delay on the contractor's work efforts will increase dredging cycle times and, therefore, significantly slow down the necessary progress of the cleanup work. We also anticipate an increase to the dredging unit cost that could add as much as $1.5 to $2 million to project costs, with little to no resulting environmental benefit. With the appropriate controls on scow leakage and overflow, it O-3-167 would be unnecessary and counterintuitive to require that the scows also be situated within the silt curtains. O-3-167

Mitigation Measure 4.2.7: Hydrology and Water Quality

This mitigation measure anticipates a fundamentally different concept for the underpier remediation aspect of the project work. Prior discussions envisioned that a cover layer of sand or a sand-gravel mixture would be placed below piers, as a means of lessening the incidence of exposed contaminants and augmenting the ongoing process of sedimentation. Installing the cover to be a permanent feature that is fully protected against erosion requires the addition of a surficial armoring layer, generally comprised of a rock product, separated from the underlying sand by an intervening "filter layer" of gravel, and potentially a layer of filter fabric. The resulting sequence of aggregrate material layers would in fact be 5 to 7 feet thick, comprised of layers of sand, gravel, and rock. Not only is such a sediment cover a far more complex element to design and construct, it also raises the risk of imposing stresses on the foundations and soils that underlie the overwater marine structures. Clearly, this measure has tremendous impacts on the project's cost and timeframe. We estimate that the cost impact would be as much as $5 to $7 million, which makes it the most costly of all the mitigation measures described in the MMRP, because the material and placement costs increase so substantially. O-3-168

Mitigation Measure 4.2.8: Hydrology and Water Quality

Hydraulic placement of sand cover material might in fact be a feasible and cost-effective option for some contractors, but including hydraulic placement as a project requirement will unnecessarily disrupt the ability of otherwise qualified contractors to submit competitively priced bids. Other feasible methods are also available for placement of sand and gravel materials below overwater structures, including long-reach conveyors and reticulated bucket arms. Rather than making hydraulic placement a project requirement, we recommend instead to let individual contractors determine whether they will use mechanical or hydraulic methods to place sand cover materials. In other words, we recommend approaching the project requirements in much the same way as was done for the successful Campbell Shipyard project. Otherwise, the cost difference could be substantial, as much as $1.5 to $2 million for this relatively high-cost element of the project. O-3-169

Mitigation Measure 4.4.1: Noise

This mitigation measure anticipates a restriction on haul times to the hours between 7 am and 7 pm only. While these construction times are consistent with the San Diego Municipal Code, imposition of this ordinance will delay the critical transport of sediment off site. The common and recommended practice for critical environmental cleanups, such as this one, is to obtain a temporary variance from the City Ordinance so that the work can be completed in as timely a fashion as possible. Because sediment disposal is a high-cost item on the project, any change will result in a proportionately high impact. We estimate that restricting truck haul times could add as much as $2 to $4 million is cost by significantly complicating the sediment transport operations and hindering the rate and progress of the cleanup action. O-3-170

Mitigation Measures 4.5.7-4.5.9: Biological Resources

It is expected that the proper application of operational controls and BMPs, as will be detailed in the Section 401 WQC, in combination with effective construction quality assurance will be successfully able to limit impacts to biological resources. Further, water quality impacts that might result from the work are expected to be short-term in duration. Nevertheless, the use of biological monitors on such projects is not without precedent and can be completed without incurring significant project delays, although it does add cost to the work effort. We estimate that the net cost could be as much as $250,000 to $500,000. O-3-171

Mitigation Measures 4.6.8-4.6.10: Air Quality

This set of mitigation measures discusses the use of various technologies for reducing air emissions from construction equipment engines to the extent that they are readily available and cost effective in the San Diego Air Basin (ADAB). Specifically identified measures include the use of engine catalysts, low-NOx fuels, and alternative fuels. Because of the clause regarding their use only when available and cost effective, the imposition of these measures on construction costs is restricted. In the case of low-NOx fuels, the MMRP defines cost effective as up to 125 percent of the cost of diesel. We anticipate that these requirements will increase overall costs by approximately $100,000 to $200,000. O-3-172

Mitigation Measure 4.6.15: Air Quality

The MMRP describes the application of a sanitizing solution (Simple Green and water mixed in a 10:1 ratio) as a means of controlling potential odors from sediment stockpiles. This mitigation measure would require purchase of the chemical agent in industrial-size quantities and applying and mixing the solution into sediment stockpiles using earthmoving equipment. The method would slow down the dewatering and drying process, because water would be added to the sediment and would add weight to sediment loads being hauled off for disposal. If this measure were applied consistently to all sediment stockpiles, it would have a significant impact on construction progress, delaying the processing and disposal of dredged sediments and would have a similar affect on cost, increasing costs by as much as $1 million. The cost impacts can be managed by using this measure only on an as-needed basis, in cases where significant odors are present, thus bringing the estimated net costs down to an estimated $50,000 to $100,000. This as-needed approach appears to be consistent with the Regional Water Quality Control Board's intentions. Note that such measures were not used for the Campbell Shipyard project, which occurred immediately adjacent to the San Diego Convention Center, and no odor-related problems were reported. O-3-173

O-3-174

TABLE

O-3

Table 1
Summary of Cost Impacts from Potential Environmental Mitigation Elements

Mitigation Measure(s)	Probable Minimum Cost	Most Probable Cost	Probable Maximum Cost	Summary of Key Considerations (as discussed in accompanying memo)
Automatic turbidity monitoring systems (MMRP 4.2.1)	$ 500,000	$ 800,000	$ 1,000,000	Increased potential for excessive work stoppages and 'false positive' readings.
Double silt curtain enclosure (MMRP 4.2.2)	$ 250,000	$ 400,000	$ 500,000	Has precedent in San Diego but not elsewhere Doubles the cost of silt curtain materials and deployment efforts.
Bucket additions and controls (closure switches, Clam Vision TM) (MMRP 4.2.2)	$ 250,000	$ 400,000	$ 500,000	Requires up-front capital expenditure with potential to slow down dredging operations, without commensurate gain in environmental protection.
Air Curtains (MMRP 4.2.2)	$ 300,000	$ 400,000	$ 500,000	Unorthodox (except in isolated instances nationally) and of questionable merit. Expensive to install and relocate as the dredging proceeds.
Complete enclosure of dredge AND barge (MMRP 4.2.3)	$ 1,500,000	$ 1,750,000	$ 2,000,000	Will cause regular and systemic delays in hauling of sediment to offloading site. Other BMPs will allow sufficient protection of water quality.
Design and construction of permanent cap instead of sand cover (MMRP 4.2.7)	$ 5,000,000	$ 6,000,000	$ 7,000,000	Significantly changes approach to design and construction of sand cover in dredged and underpier areas. A surficial layer of protective armor rock would likely be needed, along with, potentially, an intervening layer of filter gravel and fabric.
Hydraulic placement of cap material (MMRP 4.2.8)	$ 1,500,000	$ 1,750,000	$ 2,000,000	Should be given as an option for contractors, but not as a requirement. Other legitimate (and potentially more cost-effective) techniques exist.
Restriction on haul times (MMRP 4.4.1)	$ 2,000,000	$ 3,200,000	$ 4,000,000	Will have significant effect on sediment haul-out rates (needed on a 24-hour cycle). Recommendation is obtain temporary City variance.
Biological monitoring for sea turtles, terns, etc. (MMRP 4.5.7 -4.5.9)	$ 250,000	$ 400,000	$ 500,000	Additional monitoring effort. Best management practices(BMPs) likely to be sufficiently protective of biological resources.
Use of engine catalysts, low-NOx, and alternative fuels (MMRP 4.6.8 - 4.6.10)	$ 100,000	$ 180,000	$ 200,000	Cost effect is countered by implementing this as a contractor option, subject to equipment availability.
Use of special deodorizing additives (such as Simple Green) (MMRP 4.6.15)	$ 50,000	$ 80,000	$ 100,000	Best if done only on an as-needed basis.
Total Estimated Cost Increase from Mitigation Measures	$ 11,700,000	$ 15,360,000	$ 18,300,000	

O-3-174

Certification of Authenticity of Electronic Submittal

I, Jeffrey P. Carlin, declare:

I am an associate at Latham & Watkins LLP, counsel of record for National Steel and Shipbuilding Company ("NASSCO") in the Matter of Tentative Cleanup and Abatement Order R9-2011-0001 before the San Diego Regional Water Quality Control Board ("Water Board"). I am licensed to practice law in the State of California and make this declaration as an authorized representative for NASSCO. I declare under penalty of perjury under the laws of the State of California that the electronic version of Anchor QEA's Memorandum Regarding Cost Implications of Mitigation Measures Described in the Draft Environmental Impact Report for the San Diego Shipyards Sediment Cleanup Project, San Diego, California, submitted to the Water Board and served on the Designated Parties by e-mail on August 1, 2011, is a true and accurate copy of the submitted hard copy. Executed this 1st day of August 2011, in San Diego, California. O-3-175

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O-3
Attachment 3

LATHAM & WATKINS LLP

August 1, 2011

VIA EMAIL AND OVERNIGHT MAIL

Mr. Vicente Rodriguez
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123
vrodriguez@waterboards.ca.gov

Re: NASSCO's Comments on the Draft Environmental Impact Report for the Shipyard Sediment Remediation Project (SCH # 2009111098)

Dear Mr. Rodriguez:

Designated Party National Steel and Shipbuilding Company ("NASSCO") submits the enclosed comments regarding the Draft Environmental Impact Report ("DEIR") for the Shipyard Sediment Remediation Project ("Project"), State Clearing House Number 2009111098, publicly released by the California Regional Water Quality Control Board, San Diego Region ("Regional Board") on June 16, 2011. The enclosed comments were prepared by Rick Bodishbaugh, Tom Ginn and Gary Brugger of Exponent, and supplement the comment letter prepared by my office that is being submitted concurrently. O-3-176

Very truly yours,

Jeffrey P. Carlin
of LATHAM & WATKINS LLP

cc: Frank Melbourn, on behalf of the Advisory Team
Designated Parties (per attached proof of service)

E X T E R N A L   M E M O R A N D U M

TO: Jeff Carlin and Kelly Richardson, Latham & Watkins

FROM: Rick Bodishbaugh, Tom Ginn, and Gary Brugger, Exponent

DATE: August 1, 2011

PROJECT: PH10719.001

SUBJECT: Comments on Draft Preliminary Environmental Impact Report for the Shipyard Sediment Remediation Project, Dated June 16, 2011

O-3-177

At your request, Exponent has provided technical comments on the subject document (the PEIR), as viewed on the San Diego Regional Water Quality Control Board (RWQCB) website. These comments are restricted to the PEIR sections concerning environmental setting, impacts and mitigation, water quality, and biological resources, both for the existing conditions and for the remedial alternatives under consideration, as well as the engineering recommendations and design details of the preferred and alternative projects, to the extent they are presented. We have not reviewed in detail nor commented on PEIR sections dealing with transportation and circulation, noise, air quality, or greenhouse gas emissions.

Description of Current Environmental Conditions

O-3-178

The PEIR includes several brief qualitative descriptions of the current environmental conditions and characterizes possible beneficial use impairment at the Shipyard Sediment Site. These include descriptions of water quality (Section 4.2), sediment quality (Section 4.3), and biological resources (Section 4.5) at the Site. In general, these statements are drawn from and are consistent with findings set forth in the Tentative Cleanup and Abatement Order (TCAO, RWQCB 2010a) and the accompanying Draft Technical Report (DTR, RWQCB 2010b). However, as noted in comments we have previously submitted on the general lack of beneficial use impairment at the NASSCO Shipyard (see attached memorandum, dated May 25, 2011), and in the expert report we prepared critiquing the DTR (Ginn 2011), the conclusions of Site-wide beneficial use impairment in the TCAO are flawed, and do not accurately reflect current environmental conditions. The analyses relied upon in the TCAO and DTR to reach a conclusion of beneficial use impairment are completely dependent on unrealistic and scientifically unsupportable assumptions and hypotheticals, including: O-3-178

- Fractional intakes of 100 percent for recreational and subsistence anglers. In other words, the exposure estimate upon which the DTR human risk calculations are based assumes that all fish and lobster consumed by humans over a period of 30 years (non-carcinogens) to 70 years (carcinogens) are caught within the boundaries of the Shipyard Site. These calculations disregard both the limited fish populations at the Site and the access restrictions that preclude the use of the Site for fishing. O-3-179

- Area use factor of 100 percent for all modeled aquatic-dependent wildlife receptors. All wildlife are presumed to derive their entire sustenance by foraging within the boundaries of the Shipyard Site, even though all have known forage ranges much larger than the Site, and suitable foraging habitat at the Site is extremely limited in size, of poor quality, or unattractive because of human activity. O-3-180

- Inappropriately derived avian and reptilian toxicity reference values for lead, which drive an erroneous conclusion that sediment lead levels are a significant risk to wildlife. O-3-181

- A highly biased evaluation approach for aquatic life (i.e., benthic) impairment that ignores direct evidence of the lack of toxicity or benthic community impacts at many Shipyard stations with elevated sediment chemistry. O-3-182

In addition, the PEIR fails to acknowledge the existence or significance of non-Site related sources of water and sediment contamination in the characterization of current conditions, future impacts, or possible mitigation required. In particular, while Chollas Creek is described as a major freshwater source for central San Diego Bay, the significance of Chollas Creek as a known historical and current contaminant source for the portion of the Bay surrounding the shipyards is ignored, as is the potential for recontamination of the Shipyard Site if this source is not adequately controlled prior to remediation. The importance of Chollas Creek and municipal storm drain outfalls as both historic and ongoing contaminant sources to the Shipyard Site has O-3-183 been recognized since the early stages of the sediment investigation (Exponent 2003), and is explicitly recognized and described in the DTR (RWQCB 2010b). O-3-183

Discussion of Project Alternatives

The PEIR discusses and contrasts 4 alternatives to the proposed project, both from the perspective of impacts and mitigation required at the Shipyard Site and impacts and mitigation created by the various disposal alternatives, including transportation and ultimate disposition of dredged materials. These options are: O-3-184

- No project (no action alternative)
- Confined aquatic disposal (CAD alternative)
- Convair Lagoon confined disposal facility (Convair Lagoon CDF alternative)
- Nearshore confined disposal facility (Nearshore CDF alternative)

Because the dredging method and dredged footprint is the same for all alternatives, the on-Site benefits and direct remediation-related impacts are essentially the same, with the exception of the no action alternative. Therefore the discussion primarily concerns differences driven by the alternative dredge spoil disposal method and location. O-3-185

A notable omission of the PEIR assessment of alternatives is a failure to consider natural recovery through monitored natural attenuation (MNA) of contamination. Contrary to the hypothetical scenario evaluated in the PEIR under the "No Project" alternative, sediment contamination at the Shipyard Site is not static. Mitigation of any putative existing impacts or impairment would increase over time by natural attenuation from chemical degradation and sedimentation that is currently taking place at the Shipyards. The MNA remedial alternative has been discussed as a possible option at the Shipyard Site since the beginning of the sediment investigation, and was the alternative judged most likely to result in the highest net benefits with respect to beneficial uses in the feasibility assessment contained in the Phase I/II sediment investigation report (Exponent 2003). Given this history and the existing analyses, the complete omission of an MNA alternative from the PEIR evaluation is egregious. O-3-186

Alternative 1: No Action Alternative

Under this hypothetical scenario, no dredging is conducted and contamination is assumed to be static and unchanged into the future. This is in fact an unrealistic scenario, and is apparently only included in the PEIR because of a statutory requirement to include a no-action alternative. Based on the unrealistic assumptions and dismissive treatment of the no-dredging scenario, Alternative 1 does not appear to be under serious consideration by the RWQCB. O-3-187

Alternative 2: CAD Alternative

While the discussion of this alternative correctly identifies the primary benefits of this option (elimination of land-based staging and transport of dredged materials and associated impacts and mitigation), few details are provided. Without a specific location and project design for a CAD, it is impossible to fully describe, let alone quantify impacts or mitigation that would be required for this alternative. The discussion of net environmental costs and benefits is therefore incomplete, and this alternative cannot properly be compared with the proposed project or other alternatives. Also, since the sediments do not qualify for off-shore/deep water disposal due to contamination, near shore confined disposal carries a significant risk from both a physical and a regulatory perspective. It would be more realistic to include the removal, dewatering, and upland disposal of the most contaminated sediments in this alternative, as proposed under Alternative 3. However, this modification would eliminate many of the advantages of a CAD over the proposed project (i.e., some dewatering, transportation and upland disposal would be required). The likelihood and impacts of containment failure from an accident or natural disaster, such as a seismic event, should be evaluated. O-3-188

Alternative 3: Convair Lagoon CDF Alternative

The majority of the PEIR is concerned with the description and discussion of this alternative (including more than 200 pages in Section 5.10 and several appendices). This starkly contrasts with the minimal detail and much more qualitative evaluation presented for the other three evaluated alternatives. Although Alternative 3 is not recommended by the PEIR, the vastly greater level of detail and analysis presented for Alternative 3 could imply to the reader that this O-3-189 is a preferred or leading alternative to the proposed project. This inconsistency should be explained. O-3-189

One obvious negative aspect of Alternative 3 is the dramatically greater loss of aquatic habitat and associated required mitigation due to the destruction of existing habitat in the CDF area, which is diverse and of relatively high quality. A detailed description of the various habitat types that would be destroyed or impacted by the Convair Lagoon CDF project is included in the PEIR, and would result in the complete loss of nearly 10 acres of jurisdictional waters (see Appendix J, Table 1). This total includes 1 acre of upland habitat, 4 acres of intertidal habitat, 4.5 acres of shallow subtidal habitat, and 0.3 acres of deep subtidal habitat. Notably, more than six acres of eelgrass loss is identified at the Convair Lagoon CDF site (eelgrass being the only designated Habitat Area of Particular Concern for the entire project), including more than 4 acres of eelgrass beds that were established as mitigation for prior remediation of this former industrial site. This compares with a small fraction of an acre of eelgrass loss due to dredging at the Shipyard Site. In other words, the critical habitat loss due to disposal is vastly greater than that associated with dredging for this alternative. Eelgrass beds must be replaced at a rate of 120 percent of the loss, as stipulated by the Southern California Eelgrass Mitigation Policy. The PEIR also notes that there is the potential for impacts to a nesting colony of endangered California least terns, located approximately one quarter mile from the Convair Lagoon site. The U.S. Fish and Wildlife Service, which exercises federal natural resource trusteeship over this area, has recognized and commented on the local importance of the site and surrounding intertidal area as a resting and foraging habitat for migrating shorebirds in the Pacific flyway, including the threatened western snowy plover (USFWS 2011, attached). O-3-190

The PEIR includes a preliminary analysis of required habitat mitigation due to construction of the CDF, but this analysis is incomplete, since no specific mitigation projects or locations are proposed. Without a complete description of the off-Site disposal locations for Alternatives 2 and 4, it is not possible to fully place impacts or required mitigation of the alternatives into a comparative context, but Alternative 3 certainly results in a significant destruction of aquatic and shoreline habitat - much higher than the proposed project. O-3-191

The PEIR analysis of Alternative 3 has several significant engineering/technical flaws and omissions:

- The design is a short fill located within an active fault zone, leading to a significant risk of failure and recontamination due to a seismic event. It is stated that the earthquake risks at the Convair Lagoon site are acceptable after mitigation (based on a preliminary study by Ninyo Moore), without any real engineering evaluation to confirm that the conditions and mitigation will work. Furthermore, the EIR does not address the risks should an earthquake occur during the placement of the contaminated sediments. O-3-192
- The EIR does not address the risk of leakage or failure of the existing storm drains and the deposition of additional contaminants from the storm drains outside of Convair Lagoon. These structures are likely leaking, and would also be susceptible to failure during earthquake events. Additionally, the age of these structures and condition is not addressed. Even if the storm drains remain intact, there is a risk of contamination from releases of fuels and other hazardous contaminants from their respective drainage basins. O-3-193
- The EIR fails to qualitatively note, let alone quantify the contaminants already present in the lagoon under the existing sand cap. The fact that the existing cap has been recontaminated due to failed source control is noted in Section 10, but not in any of the sections that parallel evaluation of the proposed project and the other alternatives. The fact that an ongoing source of PCBs is believed to be present is therefore acknowledged in the PEIR, but not factored into the impact and mitigation assessment. Convair Lagoon should not be used as a CDF until the PCB source has been identified and removed. Then cleanup or recapping must be completed before the lagoon can be used as a repository for shipyard sediments. There is no indication that the source area has as yet been controlled, let alone defined. O-3-194
- The master plan table shows a 3” asphalt cap. This is inadequate. A 4” asphalt concrete cap would be required to get sampling vehicles and other light vehicles such as pickup trucks across the asphalt. Additionally, placing the cap on sand over an unconsolidated fill is likely to create substantial problems caused by differential settlement, resulting in failure of the asphalt and a need for substantial and on-going maintenance. Even a more substantial design such as the use of 4” of ¾ crushed rock, 4” of asphalt treated base and 2 lifts of asphalt 2” thick is likely to fail under differential settlement, requiring frequent O-3-195

repair. Finally, this cap design is not impervious, and storm water will leak through the asphalt. At least 3 seal coats will be necessary to prevent infiltration through this cap. Also required would be a storm drain system to address surface water on the 10 acres. O-3-195

- Extension of 2 large storm sewer pipes through the containment barrier is proposed. This would create a likely conduit for placed contaminants due to sewer pipe leakage and flow around the pipe through the bedding material. This flow can also put hydraulic pressure on any holes in the filter fabric allowing more fine sediment to escape the filter barrier at the rock anchor. The new storm sewer outfall will also be discharging further into the bay, adding contaminants to new areas. O-3-196
- Alternative 3 makes no effort to prevent return of water from the dredged material to the lagoon as required by the project specific mitigation requirement described for the proposed project and Alternatives 2 and 4. The Alternative 3 design proposes silt curtain and weir/pipe discharge from the fill area back to the lagoon without treatment, contrary to the stated objectives for the other alternatives. O-3-197
- The conceptual design for the containment barrier may be inadequate as the materials specified are likely not to hold, risking destruction of the filter fabric during placement of the anchor rock. The details provided are insufficient to verify that quantities are adequate. O-3-198
- The energy dissipater design is not sufficiently detailed to evaluate. Additional information should be provided. O-3-199
- The assessment fails to evaluate placement of hard shoreline out into the Bay. This will reflect waves to other parts of the lagoon, possibly creating substantial erosion in other areas. O-3-200
- The assessment fails to account for the increased weight of the pozzolonic treated material. There may be only a 15% increase in volume but the weight increase will be greater, because the pozzolonic material is substantially denser than the dredged sediments. Since disposal costs are usually calculated by weight, the increased weight must be calculated and used to estimate disposal fees. O-3-201
- The summary of Alternative 3 as presented on page 5-17 states that no dewatering of contaminated sediments would be required, but the PEIR contradicts this statement on O-3-202

page 5-42, where it is noted that the contaminated sediments (assumed to be 15% of the total sediments) will be dewatered. O-3-202

- No information is provided on any intended future use of the Convair Lagoon parcel, beyond serving as a CDF. The fill and cap design is unlikely to be capable of supporting any structure or redevelopment without significant compromise or risk of containment failure. Any anticipated future use or development of the CDF area should be described in the PEIR, and potential impacts and mitigation required should be assessed. O-3-203

Alternative 4: Nearshore CDF Alternative

The discussion of this alternative correctly identifies the primary associated benefits and problems, including the requirement for staging and offsite transport of most of the dredged material. However, like Alternative 2, it is not possible to quantify most impacts or required mitigation without a specific off-Site disposal location and more details about the design of the CDF. As such, this discussion and evaluation are incomplete. The alternative cannot be properly compared with the proposed project. As with Alternatives 2 and 3, there are significant risks of containment failure and subsequent recontamination of the Bay due to disturbance, accident, or seismic events that do not exist for land based disposal. O-3-204

Summary of Project Alternative Discussion

As noted above, the discussion of alternatives fails to evaluate the net benefits of MNA, which should be considered a legitimate option to dredging, and evaluated fairly and realistically. The discussion presented in the PEIR cannot even be taken as a complete or fair comparison of the four selected alternatives. O-3-205 Alternative 1 is completely unrealistic and appears to be a "throw away" alternative included to meet the statutory requirement for inclusion of a no-action alternative. O-3-206 Alternatives 2 and 4 are qualitatively described, but little detail about possible locations or design is provided, making quantitative comparison of benefits or associated impacts and mitigation impossible. O-3-207 Alternative 3, the Convair Lagoon CDF is presented with so much disproportionate detail and volume of information that the discussion takes on a persuasive tone favoring this alternative. O-3-208 Also absent from the comparison is an assessment of any potential for inadvertent re-release of contaminants back into San Diego Bay through CAD or CDF O-3-209 containment failure in the future. In fact, none of the risks of failure are adequately evaluated by the PEIR. Any aquatic disposal alternative clearly has a much higher potential for re-release of contaminants than upland disposal options. O-3-209

Several conclusions about the net benefits and risks of the alternatives are apparent from the information presented, but are missing or inadequately stated in the PEIR: O-3-210

- Alternative 3, the Convair Lagoon CDF will have the highest associated ecological impacts, due to the extent and quality of the habitat destruction that will result from filling the CDF area.
- All three of the evaluated alternatives that include dredging will result in significantly more aquatic and shoreline habitat impacts than the proposed project, and all carry significant additional risk of future failure and re-release of contamination. O-3-211

References

O-3-212

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ATTACHMENT: MEMORANDUM DATED MAY 25, 2011

Exponent®

EXTERNAL MEMORANDUM

TO: T. Michael Chee

FROM: Rick Bodishbaugh

DATE: May 25, 2011

PROJECT: PH10719.001

SUBJECT: Summary of Need to Remediate NASSCO Stations

At your request, Exponent has reviewed the findings of the September 15, 2010 Tentative Cleanup and Abatement Order, as well as all lines of evidence presented therein for the proposed cleanup project. Our technical opinion remains unchanged from the one we reached in our 2003 Detailed Sediment Investigation Report. There is presently no evidence of significant impairment of beneficial uses due to NASSCO sediment contamination, and active remediation would not produce any clear long-term improvement in beneficial uses relative to current conditions. Current impacts to the benthic community are extremely limited in extent and severity, and are more likely the result of physical disturbance than chemical toxicity. There is presently no significant risk to aquatic dependent wildlife or human receptors, under realistic and reasonable exposure scenarios. Monitored natural recovery is therefore equivalent to or better than all other alternatives, and should be the preferred alternative of any remedial decision-making process. O-3-213

A station-by-station summary for NASSCO stations of the primary lines of evidence concerning risk, beneficial use impairment, and the need for remediation follows.

Glossary of Key Terms in Summary

Primary COCs – The five principle contaminants of concern addressed in the Tentative Cleanup and Abatement Order, including copper, mercury, High Molecular Weight Polynuclear Aromatic Hydrocarbons (HPAHs), polychlorinated biphenyls (PCBs), and tributyltin (TBT).

Composite SWAC – The spatially weighted average concentration (SWAC) in sediments, calculated using Thiessen polygon areas. Theissen polygons are areas whose boundaries define the area that is closest to each sample station relative to all other stations, and are mathematically defined by the perpendicular bisectors of the lines between adjacent points. Each Thiessen polygons is interpreted to be the area represented by a single sediment sample.

60% LAET – The lowest adverse effects threshold (LAET) is the lowest concentration of any of the seven apparent effect thresholds (AETs) developed from the Triad study. An AET is the concentration above which adverse effects to benthic invertebrates always occur. AETs were developed for the three toxicity tests and four benthic community parameters assessed in the DTR Triad analysis. The 60% LAET was selected as a highly protective site-specific benchmark of potential benthic community impairment. O-3-214

SS-MEQ – Site-Specific Median Effects Quotient (SS-MEQ) is a multiple chemical benchmark calculated from the median sediment concentration of the five primary chemicals of concern (COCs) at six stations that were scored as "likely impaired" in the DTR Triad analysis. These stations are NA19, NA22, SW04, SW13, SW22 and SW23. For each station, the effects quotients (the ratio of measured concentration to the median "likely impaired" concentration) were calculated for each of the primary COCs, and these were averaged to yield the multi-chemical SS-MEQ. A benchmark of 90% of the SS-MEQ was used as a protective site-specific benchmark of benthic community impairment.

Triad Station – Of the 66 stations in the Shipyard Site, 30 Triad station were established where all three lines of evidence were collected, including benthic community conditions data, sediment chemistry data, and sediment toxicity data.

DTR – Draft Technical Report. The technical document supporting the conclusions reached in the Tentative Cleanup and Abatement Order.

SQGQ1 – Sediment Quality Guideline Quotient 1 (SQGQ1) as defined in Fairey et al. (2001). The SQGQ1 is the mean sediment quality guideline quotient chemical combination using the effects median probable effects level and other individual sediment quality guideline values. The chemicals included in the SQGQ1 mean calculation are cadmium, copper, lead, silver, zinc, total chlordane, dieldrin, total PCBs and total PAHs.

BRI – Benthic Response Index (BRI) is a metric developed by scientists at the Southern California Coastal Water Research Project (SCCWRP) to measure the relative likelihood of benthic community degradation in coastal marine environments in California.

Shannon-Weiner Diversity Index – Shannon-Weiner Diversity Index (Diversity Index) is a measure of both the number of species and the distribution of individuals among species; higher values indicate that more species are present or that individuals are more evenly distributed among species.

Reference LPL and UPL – the reference lower prediction limit (LPL) and upper prediction limit (UPL) are the one-tailed 95% prediction limits of the reference pool of stations. Site biological indicators outside the prediction limits (below LPL or above UPL) are judged to be significantly different from the reference condition.

SPI – sediment profile imaging (SPI) is a photographic method of assessing benthic community structure. Photographs are taken with a probe-mounted camera mounted above a prism that penetrates into the sediment and photographs a vertical cross-section of the sediment. The resulting photographs provide information on physical conditions in the sediment as well as a direct assessment of the presence condition of the benthic fauna. O-3-214

Stage 1 - refers to the succession of benthic colonization and interaction with sediment soon after disturbance or defaunation of the soft-bottom marine sediment. Stage 1 represents the first stage at which small tube-dwelling polychaetes that feed at the sediment surface colonize the sediment soon after disturbance in the sediment.

Stage 2 – refers to the benthic colonization phase after Stage 1, in which the succession is characterized by organisms that burrow shallowly into the sediment but nevertheless feed at or near the sediment surface. Burrowing activity loosens and aerates the sediment, a process that makes it more suitable for further colonization.

Stage 3 – refers to the climax phase of benthic colonization, which is characterized by organisms that burrow well into the anaerobic sediment and feed at depth off of organic matter and microbial decomposers. These deep burrowing organisms typically irrigate their burrows with oxygenated surface water. This community is regarded as the mature stage of a fully developed benthic community.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA01

O-3-215

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 28 of 66 polygons
   - Copper ranking = 26 of 66 polygons
   - Mercury ranking = 19 of 66 polygons
   - HPAH ranking = 25 of 66 polygons
   - PCB ranking = 30 of 66 polygons
   - TBT ranking = 31 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.69 (less than 0.90 benchmark)

3. **No impacts to benthic community:**
   - **Triad Station: "Unlikely" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 2 chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI data indicate Stage I and III successional stages present**

CONCLUSION

Based on relatively low chemistry, and the absence of benthic impacts, NA01 was properly excluded from the proposed remedial footprint in the DTR

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA02

SUMMARY OF STATION CONDITIONS

1. Primary COCs are relatively low:
- Composite SWAC ranking = 46 of 66 polygons
- Copper ranking = 44 of 66 polygons
- Mercury ranking = 46 of 66 polygons
- HPAH ranking = 44 of 66 polygons
- PCB ranking = 41 of 66 polygons
- TBT ranking = 46 of 66 polygons

O-3-215

2. Chemistry is below conservative biological benchmarks:
- No exceedances of 60% LAETs
- SS-MEQ = 0.41 (less than 0.90 benchmark)

3. No direct evidence of impacts to benthic community:
- **Non-Triad Station**
- **SPI data indicate Stage I and III successional stages present**

CONCLUSION

Based on relatively low chemistry, and a lack of evidence for benthic impacts, NA02 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA03

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 32 of 66 polygons
   - Copper ranking = 36 of 66 polygons
   - Mercury ranking = 13 of 66 polygons
   - HPAH ranking = 26 of 66 polygons
   - PCB ranking = 31 of 66 polygons
   - TBT ranking = 24 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.67 (less than 0.90 benchmark)

O-3-215

3. **No impacts to benthic community:**
   - **Triad Station: "Unlikely" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 2 chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

Based on relatively low chemistry, and the absence of benthic impacts, NA03 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA04

O-3-215

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 34 of 66 polygons
   - Copper ranking = 22 of 66 polygons
   - Mercury ranking = 13 of 66 polygons
   - HPAH ranking = 34 of 66 polygons
   - PCB ranking = 39 of 66 polygons
   - TBT ranking = 13 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.69 (less than 0.90 benchmark)

3. **No impacts to benthic community:**
   - **Triad Station: "Unlikely" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 1 chemical exceeds both DTR SQG and UPL.
   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

Based on relatively low chemistry, and the absence of benthic impacts, NA04 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER
NO. R9-2011-0001

STATION NA05

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 47 of 66 polygons
   - Copper ranking = 44 of 66 polygons
   - Mercury ranking = 50 of 66 polygons
   - HPAH ranking = 44 of 66 polygons
   - PCB ranking = 47 of 66 polygons
   - TBT ranking = 40 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.40 (less than 0.90 benchmark)

O-3-215

3. **No impacts to benthic community:**

   - **Triad Station: "Unlikely" benthic impacts**

   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. No chemicals exceed both DTR SQG and UPL.

   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.

   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.

   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

Based on relatively low chemistry, and the absence of benthic impacts, NA05 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA06

SUMMARY OF STATION CONDITIONS

1. **Only mercury and copper are relatively high:**
   - Composite SWAC ranking = 19 of 66 polygons
   - Copper ranking = 9 of 66 polygons
   - Mercury ranking = 2 of 66 polygons
   - HPAH ranking = 31 of 66 polygons
   - PCB ranking = 15 of 66 polygons
   - TBT ranking = 18 of 66 polygons

2. **Chemistry is below or slightly exceeds conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 1.11 (greater than 0.90 benchmark)

O-3-215

3. **No impacts to benthic community:**

   - **Triad Station: "Unlikely" benthic impacts**

   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 3 chemicals exceed both DTR SQG and UPL.

   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL

   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.

   - **SPI data indicate Stage I and III successional stages present**

CONCLUSION

There are no impacts to the benthic community at this station. NA06 was included in the DTR proposed remedial footprint because of relatively high mercury and copper, which are potential food web risk drivers. However, a realistic analysis of food web risks to wildlife and human receptors shows that there are no significant risks. Therefore, no risk-based justification for remediating NA06 exists.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA07

SUMMARY OF STATION CONDITIONS

1. **Only mercury and HPAH are relatively high:**
   - Composite SWAC ranking = 17 of 66 polygons
   - Copper ranking = 35 of 66 polygons
   - Mercury ranking = 7 of 66 polygons
   - HPAH ranking = 6 of 66 polygons
   - PCB ranking = 21 of 66 polygons
   - TBT ranking = 39 of 66 polygons

2. **Chemistry is below or slightly exceeds conservative biological benchmarks:**
   - Only slight exceedance of 60% HPAH LAET (63%)
   - SS-MEQ = 0.91 (slightly more than 0.90 benchmark)

3. **No impacts to benthic community:**
   - Triad Station: "Unlikely" benthic impacts
   - DTR chemistry score = moderate
     SQGQ1 is less than 1.0. Only 2 chemicals exceed both DTR SQG and UPL. O-3-215
   - DTR toxicity score = low
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - DTR benthic disturbance score = low
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - SPI data indicate Stage III successional stage present.

CONCLUSION

HPAH and mercury are relatively elevated at this station. HPAH is a potential benthic and food web risk driver, while mercury is a potential food web risk driver. There are no impacts to the benthic community at this station, and a realistic analysis of food web risks to wildlife and human receptors shows that there are no significant risks. Therefore, no risk-based justification for remediating NA07 exists, and NA07 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA08

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 40 of 66 polygons
   - Copper ranking = 18 of 66 polygons
   - Mercury ranking = 36 of 66 polygons
   - HPAH ranking = 34 of 66 polygons
   - PCB ranking = 35 of 66 polygons
   - TBT ranking = 40 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.56 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and a lack of evidence for benthic impacts, NA08 was properly excluded from the proposed remedial footprint in the DTR.

O-3-215

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA09

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 38 of 66 polygons
   - Copper ranking = 22 of 66 polygons
   - Mercury ranking = 10 of 66 polygons
   - HPAH ranking = 44 of 66 polygons
   - PCB ranking = 37 of 66 polygons
   - TBT ranking = 36 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.62 (less than 0.90 benchmark)

O-3-215

3. **No clear indication of impacts to benthic community:**
   - **Triad Station: "Possible" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 2 chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = moderate**
     Bivalve test scored below reference LPL. Amphipod and urchin tests scored above reference LPLs.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI data indicated Stage I and III present.**

CONCLUSION

There are no clear impacts to the benthic community at this station. NA09 was included in the DTR proposed remedial footprint because of a "possible impacts" score in the DTR Triad analysis and relatively high mercury levels. However, none of the four benthic community indicators evaluated is significantly different from reference conditions. Only one of the three toxicity tests (bivalve larval development) was different from reference, and this is the least reliable of the three tests performed. Mercury is a potential food web risk driver. However, a realistic analysis of food web risks to wildlife and human receptors shows that there are no significant risks. Therefore, no risk-based justification for remediating NA09 exists.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA10

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 54 of 66 polygons
   - Copper ranking = 48 of 66 polygons
   - Mercury ranking = 51 of 66 polygons
   - HPAH ranking = 54 of 66 polygons
   - PCB ranking = 54 of 66 polygons
   - TBT ranking = 44 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.35 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **SPI data indicate Stage III successional stage present.**

O-3-215

CONCLUSION

Based on relatively low chemistry, and a lack of evidence for benthic impacts, NA10 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER
NO. R9-2011-0001

STATION NA11

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 49 of 66 polygons
   - Copper ranking = 43 of 66 polygons
   - Mercury ranking = 34 of 66 polygons
   - HPAH ranking = 44 of 66 polygons
   - PCB ranking = 45 of 66 polygons
   - TBT ranking = 56 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.42 (less than 0.90 benchmark)

O-3-215

3. **No clear indication of impacts to benthic community:**

   - **Triad Station: "Possible" benthic impacts**

   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 1 chemical exceeds both DTR SQG and UPL.

   - **DTR toxicity score = moderate**
     Amphipod test scored slightly below reference LPL. Bivalve and urchin tests scored above reference LPLs.

   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.

   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

There are no highly elevated COPC levels at this station. There are no clear impacts to the benthic community. None of the four benthic community indicators evaluated is significantly different from reference conditions. Only one of the three toxicity tests (amphipod survival) was lower than reference. Due to a lack of high chemistry and no clear indication of benthic impacts, NA11 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER
NO. R9-2011-0001

STATION NA12

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 55 of 66 polygons
   - Copper ranking = 50 of 66 polygons
   - Mercury ranking = 49 of 66 polygons
   - HPAH ranking = 52 of 66 polygons
   - PCB ranking = 57 of 66 polygons
   - TBT ranking = 47 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.35 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Triad Station: "Possible" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. No chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = moderate**
     Bivalve test scored below reference LPL. Amphipod and urchin tests scored above reference LPLs.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI indeterminate, due to poor probe penetration.**

O-3-215

CONCLUSION

There are no highly elevated COPC levels at this station. There are no clear impacts to the benthic community. None of the four benthic community indicators evaluated is significantly different from reference conditions. Only one of the three toxicity tests (bivalve larval development) was lower than reference, and this is the least reliable of the three tests performed. Due to a lack of high chemistry and no clear indication of benthic impacts, NA12 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA13

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 53 of 66 polygons
   - Copper ranking = 42 of 66 polygons
   - Mercury ranking = 48 of 66 polygons
   - HPAH ranking = 54 of 66 polygons
   - PCB ranking = 52 of 66 polygons
   - TBT ranking = 48 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.38 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA13 was properly excluded from the proposed remedial footprint in the DTR.

O-3-215

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA14

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
    - Composite SWAC ranking = 60 of 66 polygons
    - Copper ranking = 55 of 66 polygons
    - Mercury ranking = 53 of 66 polygons
    - HPAH ranking = 59 of 66 polygons
    - PCB ranking = 59 of 66 polygons
    - TBT ranking = 54 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
    - No exceedances of 60% LAETs
    - SS-MEQ = 0.28 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
    - **Non-Triad Station**
    - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA14 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA15

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 22 of 66 polygons
   - Copper ranking = 28 of 66 polygons
   - Mercury ranking = 24 of 66 polygons
   - HPAH ranking = 38 of 66 polygons
   - PCB ranking = 34 of 66 polygons
   - TBT ranking = 7 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.87 (less than 0.90 benchmark)

3. **No impacts to benthic community:**
   - **Triad Station: "Unlikely" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 2 chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI data indicate Stage I and III successional stages present.**

O-3-215

CONCLUSION

There are no impacts to the benthic community at this station. NA15 was included in the DTR proposed remedial footprint because of relatively TBT, which can potentially impact gastropods and pose a food web risk. However, a realistic analysis of food web risks to wildlife and human receptors shows that there are no significant risks, and there is no evidence of an impacted gastropod population at the shipyard. Therefore, no risk-based justification for remediating NA15 exists.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA16

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 30 of 66 polygons
   - Copper ranking = 26 of 66 polygons
   - Mercury ranking = 18 of 66 polygons
   - HPAH ranking = 39 of 66 polygons
   - PCB ranking = 17 of 66 polygons
   - TBT ranking = 25 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.69 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Triad Station: "Possible" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. Only 2 chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = moderate**
     Bivalve test scored below reference LPL. Amphipod and urchin tests scored above reference LPLs.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.

CONCLUSION

There are no highly elevated COPC levels at this station. There are no clear impacts to the benthic community. None of the four benthic community indicators evaluated is significantly different from reference conditions. Only one of the three toxicity tests (bivalve larval development) was lower than reference, and this is the least reliable of the three tests performed. Due to a lack of high chemistry and no clear indication of benthic impacts, NA16 was properly excluded from the proposed remedial footprint in the DTR.

O-3-215

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA17

SUMMARY OF STATION CONDITIONS

1. **Only copper and TBT were relatively high:**
   - Composite SWAC ranking = 10 of 66 polygons
   - Copper ranking = 7 of 66 polygons
   - Mercury ranking = 35 of 66 polygons
   - HPAH ranking = 42 of 66 polygons
   - PCB ranking = 18 of 66 polygons
   - TBT ranking = 3 of 66 polygons
2. **Chemistry is below or slightly exceeds conservative biological benchmarks:**
   - Only TBT exceeds the 60% LAET
   - SS-MEQ = 1.41 (greater than 0.90 benchmark)
3. **No direct evidence of impacts to benthic community:**
   - **Triad Station: "Possible" benthic impacts**
   - **DTR chemistry score = high**
     SQGQ1 is greater than 1.0 and 4 chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = low**
     No evidence of toxicity. Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - **DTR benthic disturbance score = low**
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

There are no clear impacts to the benthic community at this station. NA17 was included in the DTR proposed remedial footprint because of a "possible impacts" score in the DTR Triad analysis and relatively high TBT and copper levels. However, none of the four benthic community indicators evaluated is significantly different from reference conditions, and none of the three toxicity tests was different from reference. In other words, the "possible" disturbance score was due solely to high chemistry, not to any biological indicator. TBT can potentially impact gastropods and pose a food web risk. However, a realistic analysis of food web risks to wildlife and human receptors shows that there are no significant risks, and there is no evidence of an impacted gastropod population at the shipyard. Copper is primarily a benthic risk driver, and can pose a food web risk. Again, there is no evidence of either benthic impacts or food web risk from copper, based on a realistic analysis of risk to wildlife and human receptors. Therefore, no risk-based justification for remediating NA17 exists.

O-3-215

TENTATIVE CLEANUP AND ABATEMENT ORDER
NO. R9-2011-0001

STATION NA18

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 39 of 66 polygons
   - Copper ranking = 31 of 66 polygons
   - Mercury ranking = 37 of 66 polygons
   - HPAH ranking = 49 of 66 polygons
   - PCB ranking = 32 of 66 polygons
   - TBT ranking = 19 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.56 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA18 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA19

SUMMARY OF STATION CONDITIONS

1. **Only PCB and TBT are relatively high:**
   - Composite SWAC ranking = 18 of 66 polygons
   - Copper ranking = 18 of 66 polygons
   - Mercury ranking = 38 of 66 polygons
   - HPAH ranking = 40 of 66 polygons
   - PCB ranking = 10 of 66 polygons
   - TBT ranking = 8 of 66 polygons
2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.92 (slightly greater than 0.90 benchmark)
3. **No direct evidence of impacts to benthic community:**
   - Triad Station: "Likely" benthic impacts
   - DTR chemistry score = high
     SQGQ1 is greater than 1.0 and 4 chemicals exceed both DTR SQG and UPL.
   - DTR toxicity score = moderate
     Bivalve test scored below reference LPL.
   - DTR benthic disturbance score = low
     No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
   - SPI data indicate Stage I and III successional stages present.

O-3-215

CONCLUSION

NA19 was included in the DTR proposed remedial footprint because of a "likely" impacted score in the DTR Triad analysis and relatively high TBT and PCB levels. However, none of the four benthic community indicators evaluated is significantly different from reference conditions, and only one of the three toxicity tests (bivalve larval development, the least reliable of the three tests) was different from reference. In other words, the "likely" disturbance score was due solely to high chemistry, and one of seven biological indicators being different from reference conditions. TBT can potentially impact gastropods and pose a food web risk. However, a realistic analysis of food web risks to wildlife and human receptors shows that there are no significant risks, and there is no evidence of an impacted gastropod population at the shipyard. PCBs are a potential food web risk driver, and again, there is no evidence of food web risk from PCBs, based on a realistic analysis of risk to wildlife and human receptors. Therefore, no risk-based justification for remediating NA19 exists.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA20

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 50 of 66 polygons
   - Copper ranking = 61 of 66 polygons
   - Mercury ranking = 65 of 66 polygons
   - HPAH ranking = 43 of 66 polygons
   - PCB ranking = 60 of 66 polygons
   - TBT ranking = 14 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.34 (less than 0.90 benchmark)

O-3-215

3. **No impacts to benthic community:**
   - **Triad Station: "Unlikely" benthic impacts**
   - **DTR chemistry score = low**
     SQGQ1 is less than 1.0. No chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = low**
     Amphipod, urchin, and bivalve tests all scored above reference LPL.
   - **DTR benthic disturbance score = moderate**
     The number of taxa present is below that found in the reference condition. However, the other three indicators show no sign of disturbance. BRI is below the reference UPL. Abundance and diversity index are above reference LPL. The relatively low number of taxa present is likely the result of physical disturbance in this area.
   - **SPI data indicate Stage I and III successional stages present.**

CONCLUSION

Based on relatively low chemistry, and the absence of clear evidence of benthic impacts, NA20 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA21

SUMMARY OF STATION CONDITIONS

1. **Only TBT is relatively high:**
   - Composite SWAC ranking = 41 of 66 polygons
   - Copper ranking = 50 of 66 polygons
   - Mercury ranking = 58 of 66 polygons
   - HPAH ranking = 50 of 66 polygons
   - PCB ranking = 51 of 66 polygons
   - TBT ranking = 12 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.50 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA21 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA22

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 51 of 66 polygons
   - Copper ranking = 50 of 66 polygons
   - Mercury ranking = 63 of 66 polygons
   - HPAH ranking = 33 of 66 polygons
   - PCB ranking = 47 of 66 polygons
   - TBT ranking = 36 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.35 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Triad Station: "Likely" benthic impacts**
   - **DTR chemistry score = moderate**
     SQGQ1 is less than 1.0. No chemicals exceed both DTR SQG and UPL.
   - **DTR toxicity score = moderate**
     Bivalve test scored below reference LPL.
   - **DTR benthic disturbance score = moderate**
     No evidence of disturbance. BRI is below reference UPL. Abundance and number of taxa are above reference LPL. Diversity index is above reference LPL.
   - **SPI data indicate Stage I and III successional stages present.**

O-3-215

CONCLUSION

Station NA22 has relatively low COPC levels. This station received a "likely" impacted score in the DTR Triad analysis. However, none of the four benthic community indicators evaluated is significantly different from reference conditions, and only one of the three toxicity tests (bivalve larval development, the least reliable of the three tests) was different from reference. In other words, the "likely" disturbance score was due solely to high chemistry, and one of seven biological indicators being different from reference conditions. Furthermore, this area is under the influence of deposition from Chollas Creek, and will be assessed as part of the Chollas Creek Mouth TMDL process. For this reason, NA22 was not included and the DTR proposed remedial footprint, and no risk-based justification for remediation exists.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA23

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 31 of 66 polygons
   - Copper ranking = 11 of 66 polygons
   - Mercury ranking = 13 of 66 polygons
   - HPAH ranking = 36 of 66 polygons
   - PCB ranking = 20 of 66 polygons
   - TBT ranking = 36 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.72 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA23 was properly excluded from the proposed remedial footprint in the DTR.

O-3-215

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA24

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 45 of 66 polygons
   - Copper ranking = 40 of 66 polygons
   - Mercury ranking = 29 of 66 polygons
   - HPAH ranking = 50 of 66 polygons
   - PCB ranking = 37 of 66 polygons
   - TBT ranking = 49 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.47 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA24 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER
NO. R9-2011-0001

STATION NA25

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 64 of 66 polygons
   - Copper ranking = 63 of 66 polygons
   - Mercury ranking = 62 of 66 polygons
   - HPAH ranking = 59 of 66 polygons
   - PCB ranking = 64 of 66 polygons
   - TBT ranking = 63 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.20 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA25 was properly excluded from the proposed remedial footprint in the DTR.

O-3-215

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA26

SUMMARY OF STATION CONDITIONS

O-3-215

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 61 of 66 polygons
   - Copper ranking = 64 of 66 polygons
   - Mercury ranking = 60 of 66 polygons
   - HPAH ranking = 64 of 66 polygons
   - PCB ranking = 47 of 66 polygons
   - TBT ranking = 58 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.23 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA26 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA27

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
    - Composite SWAC ranking = 36 of 66 polygons
    - Copper ranking = 10 of 66 polygons
    - Mercury ranking = 10 of 66 polygons
    - HPAH ranking = 44of 66 polygons
    - PCB ranking = 40 of 66 polygons
    - TBT ranking = 42 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
    - No exceedances of 60% LAETs
    - SS-MEQ = 0.69 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
    - **Non-Triad Station**
    - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA27 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA28

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 42 of 66 polygons
   - Copper ranking = 14 of 66 polygons
   - Mercury ranking = 31 of 66 polygons
   - HPAH ranking = 36 of 66 polygons
   - PCB ranking = 47 of 66 polygons
   - TBT ranking = 45 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.55 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA28 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA29

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 58 of 66 polygons
   - Copper ranking = 58 of 66 polygons
   - Mercury ranking = 53 of 66 polygons
   - HPAH ranking = 53 of 66 polygons
   - PCB ranking = 45 of 66 polygons
   - TBT ranking = 50 of 66 polygons

O-3-215

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.30 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA29 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA30

SUMMARY OF STATION CONDITIONS

O-3-215

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 59 of 66 polygons
   - Copper ranking = 54 of 66 polygons
   - Mercury ranking = 45 of 66 polygons
   - HPAH ranking = 62 of 66 polygons
   - PCB ranking = 61 of 66 polygons
   - TBT ranking = 64 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.30 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI Data**

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA30 was properly excluded from the proposed remedial footprint in the DTR.

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

STATION NA31

SUMMARY OF STATION CONDITIONS

1. **Primary COCs are relatively low:**
   - Composite SWAC ranking = 66 of 66 polygons
   - Copper ranking = 65 of 66 polygons
   - Mercury ranking = 64 of 66 polygons
   - HPAH ranking = 66 of 66 polygons
   - PCB ranking = 65 of 66 polygons
   - TBT ranking = 65 of 66 polygons

2. **Chemistry is below conservative biological benchmarks:**
   - No exceedances of 60% LAETs
   - SS-MEQ = 0.16 (less than 0.90 benchmark)

3. **No direct evidence of impacts to benthic community:**
   - **Non-Triad Station**
   - **No SPI data**

O-3-215

CONCLUSION

Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA31 was properly excluded from the proposed remedial footprint in the DTR.

ATTACHMENT: USFWS, 2011

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Suite 101
Carlsbad, California 92011

O-3

In Reply Refer To:
FWS-EC-LET-11-01

JAN 13 2011

Mr. Tom Alo
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123

Subject: Draft Addendum No. 4 to Cleanup and Abatement Order No. R9-2004-0258 Former Teledyne Ryan Aeronautical Site, 2701 N. Harbor Drive, San Diego, California

Dear Mr. Alo:

Thank you for the opportunity to comment on the subject document. As indicated in the public notice and the addendum, the cleanup and abatement is for wastes discharged to land at the former Teledyne Ryan Aeronautical (TDY) site. Elevated levels of contaminants that were released to land have been found in groundwater beneath the site and in conveyance systems that transported contaminated media from the site to Convair Lagoon and San Diego Bay. The addendum, once executed, should result in cleanup of onsite soils such that remaining contaminant levels will pose no known unacceptable risk to human health, under the commercial/industrial future use conditions proposed for the site. In addition, the addendum, once executed, is expected to prevent waste discharges from the TDY site to Convair Lagoon and San Diego Bay. A subsequent enforcement order will be issued to assess and cleanup wastes discharged from landside sources to the marine sediments of Convair Lagoon and San Diego Bay. O-3-216

The U.S. Fish and Wildlife Service (Service) has an interest in remedial actions at the site because of the potential for trust resources to be exposed to and impacted by site-related contaminants. Resources of concern at the TDY site are primarily avian species that feed and/or nest in or near intertidal and shallow water habitats, and the aquatic biota that constitute their diet. These include numerous species of seabirds that nest in dense colonies and feed on fish from San Diego Bay. One such species is the Federal and State-endangered California least tern (*Sternula (Sterna) antilarium browni*), which has a nesting colony at Lindbergh Field bordering the TDY site. When exposed, mudflats, such as those that occur in Convair Lagoon provide feeding habitat for small shorebirds including the federally threatened western snowy plover (*Charadrius alexandrinus nivosus*). Other species of interest include waterfowl, shorebirds, seabirds and marsh birds that occur in great numbers as they stop to feed and/or overwinter in San Diego Bay as part of migrations along the Pacific Flyway. Many of the latter rely heavily on aquatic and/or semi-aquatic invertebrates for their nutrition. Service concerns about biota upon which trust resources rely for food include O-3-217 preservation of populations sufficient to support the nutritional needs of listed and migratory species and to ensure that site-related contaminants are not present at unsafe levels in the diet of trust resources. O-3-217

The former TDY site is a vacant industrial facility that provides little if any habitat for use by wildlife species. The property is to be redeveloped for future commercial/industrial uses that preclude the creation of habitat for wildlife species. Consequently, concerns about risks posed to wildlife by cleanup actions outlined in Addendum No. 4 are very limited, and apply only if soils are considered for uses other than commercial/industrial development, and if means for preventing migration of soil into Convair Lagoon are unsuccessful. At this time, the following comments are offered for the record. O-3-218

1. While the proposed cleanup levels for contaminants in soil may be protective of human health under commercial/industrial exposure conditions, they would not be considered protective of terrestrial wildlife without further consideration. Risks to terrestrial species should be evaluated if any uses for soils other than those identified in Addendum No. 4 are considered in the future. O-3-219

2. In the event that soils migrate off site and become sediment in Convair Lagoon, the proposed cleanup levels for contaminants in soils would not be considered protective of aquatic life or aquatic-dependent wildlife. O-3-220

Again, the Service's concerns about cleanup and abatement planned for this industrial site are very limited, and are contingent upon changes in plans for the soils at the site, or the ability to prevent migration of contaminated site-related particles into Convair Lagoon. Unlike the upland portion of the former TDY site, Convair Lagoon and San Diego Bay provide habitat for many fish and wildlife species. Consequently, the Service looks forward to working extensively with the San Diego Regional Water Quality Control Board (Regional Board), other State and Federal Trustees, and Teledyne Ryan, Inc. as you move into the assessment and cleanup of wastes discharged from landside sources to the marine sediments of Convair Lagoon and San Diego Bay. The Service appreciates the Regional Board staff's efforts in working with us toward our mutual goal of protecting and restoring San Diego Bay and the Nation's wildlife resources. If you have any questions about comments provided in this letter, please contact Catherine Zeeman of my staff at (760) 431-9440 extension 291. O-3-221

Sincerely,

Scott A. Sobiech
Deputy Field Supervisor

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D. Frederick Bodishbaugh, Ph.D.
Managing Ecotoxicologist

Professional Profile

Dr. Rick Bodishbaugh is a Managing Ecotoxicologist in Exponent's EcoSciences practice. He has 19 years of diverse experience in aquatic toxicology research, chemical and site assessment, ecological risk assessment (ERA) in aquatic and terrestrial systems, and natural resource damage assessment (NRDA). His specific areas of technical expertise include fish and wildlife toxicity assessment, resource/habitat equivalency analysis (REA/HEA), bioavailability of chemical contaminants in aquatic and terrestrial ecosystems, and chemical structure-activity relationships. Dr. Bodishbaugh's graduate research focused on the aquatic toxicology of synthetic surfactant and other organic pollutants. Originally trained as a chemical engineer, he also has 4 years of experience as a geophysical and geochemical engineer in the international offshore oil and gas industry, and is trained and experienced in geophysical surveying and reservoir geology. Dr. Bodishbaugh also has formal training in marine biochemistry, molecular biology, and bioremediation principles.

O-3-222

Dr. Bodishbaugh is experienced in evaluating the effects of contaminated soil, groundwater, surface water, and sediments on ecological receptors. He has conducted assessments of chemical risk at dozens of sites for energy, petrochemical, pulp and paper, manufacturing, and mining industry clients. He is intimately familiar with federal, regional, and various state guidance and standards or practice for ERA under common regulatory frameworks, and has extensive face-to-face negotiation experience with federal and state regulatory agency technical staff across the U.S. He is also experienced in evaluating and interpreting field bioaccumulation and laboratory toxicity bioassay data for use in assessing ecological risk. He is well versed in the environmental toxicology and assessment of metals and persistent organic pollutants, especially PCBs and PAHs.

Dr. Bodishbaugh is experienced in providing technical support in a litigation context. He has extensive NRDA experience, and has helped clients develop defensive and settlement strategies for NRDA claims by federal, state, and tribal trustees at sites in Alaska, California, Indiana, Missouri, New Jersey, New York, Texas, and Washington. He is an expert in the application of REA and HEA, including applications for assessment of groundwater injury. He has worked closely with client legal teams to assess and critically evaluate the technical merits and costs of natural resource liability and settlement options, and has represented industry clients in both formal and informal trustee negotiations to arrive at rational injury assessments and cost effective, restoration-based compensation options. He has provided deposition testimony on NRD liability for east and west coast clients, and has contributed to numerous expert reports for NRD cases.

Academic Credentials and Professional Honors

Ph.D., Aquatic Toxicology, Duke University, 1995
B.S., Chemical Engineering, University of Tulsa (*cum laude*), 1985

Publications

Pastorok RA, Noftsker C, Iannuzzi TJ, Ludwig DF, Barrick RC, Ruby MV, Bodishbaugh DF. Natural remediation of polynuclear aromatic hydrocarbons and other petroleum hydrocarbons. In: Natural Remediation of Environmental Contaminants: Its Role in Ecological Risk Assessment and Management. Swindoll M, Stahl Jr RG, Ells SJ (eds), SETAC General Publications Series, Society of Environmental Toxicology and Chemistry, SETAC Press, Pensacola, FL, pp. 159–198, 2000.

Bodishbaugh DF. Acute toxicity mechanisms and quantitative structure-activity relationships of alkylphenol polyethoxylate surfactants in fish. Dissertation. Duke University, Durham, NC, 1995.

O-3-222

Bonaventura C, Bonaventura J, Bodishbaugh DF. Environmental bioremediation: Approaches and processes. In: Ecotoxicity and Human Health: A Biological Approach to Environmental Remediation. Bloom AD and de Serres FJ (eds) CRC Press, Boca Raton, FL, 1995.

Bonaventura C, Bonaventura J, Bodishbaugh DF. Environmental bioremediation: Applications and new horizons. In: Ecotoxicity and Human Health: A Biological Approach to Environmental Remediation. Bloom AD and de Serres FJ (eds) CRC Press, Boca Raton, FL, 1995.

Selected Presentations

Ginn T, Bodishbaugh DF. Key issues for use of habitat equivalency analysis in scaling compensatory restoration projects. Presentation at SETAC Annual Meeting, Portland, OR, November 2004.

Bodishbaugh DF, Moore ML, Godtfredsen KL. Congener composition of environmental PCB mixtures: An empirical analysis. Presentation at SETAC Annual Meeting, Austin, TX, November 2003.

Bodishbaugh DF. Toxicity endpoint extrapolation for characterization of ecological risk: Which method is right? Invited presentation at SETAC Annual Meeting, San Francisco, CA, November 1997.

Bodishbaugh DF. Toxicity assessment for calculation of ecological risk: The deterministic vs. probabilistic approaches to endpoint extrapolation. Presentation at SETAC Annual Meeting, Washington, DC, November 1996.

Bodishbaugh DF. *In vitro* studies of acute toxicity mechanisms and structure-activity relationships of nonionic surfactants in fish. Presentation at SETAC Annual Meeting, Denver, CO, November 1994.

Project Experience

Natural Resource Damage Assessment

Performed injury assessments and developed restoration alternatives for more than a dozen NRDA sites, involving PCBs, mining wastes, pulp mill effluent, chemical plant discharges and other hazardous releases. Habitats assessed include freshwater rivers and lakes, estuaries, and marine systems, as well as terrestrial habitats.

Familiar with NOAA, DOI, and various state trustee guidance and standard NRDA methods. Experienced in emerging NRDA issues, such as evaluation of groundwater resource damages, resource scaling in sensitive habitats, allocation at complex industrial sites, and allegations involving wood waste.

Developed client-customizable HEA computational tools for real-time evaluation of injury and restoration alternatives. Provided technical support and strategy in preparation for and during legal negotiations between industry clients and trustees on NRD settlements. O-3-222

Developed and provided scientific rationale for cost-effective HEA-based restoration alternatives to avoid an expensive and arbitrary cash settlement. Presented and defended NRDA alternatives and technical justifications to trustees during face-to-face settlement negotiations.

Ecological Risk Assessment

Conducted or supervised ERAs for numerous industrial facilities where a combination of organic and inorganic contaminants were risk drivers. Sites have included pipelines, foundries, refineries, petrochemical plants, wood preservative sites, manufactured gas plant sites, shooting ranges, pulp mills, landfills, shipyards, mining sites, research facilities, and munitions plants. State-of-the-art approaches for ecological screening assessments, receptor exposure modeling, toxicity assessment, and chemical hazard characterization were integrated to form rational, science-based site assessments.

Conducted extensive bioavailability and bioaccumulation assessments for organic and inorganic contaminants in aquatic systems to provide higher tiers of assessment at complex sites where conventional bulk sediment assessment failed to produce feasible remedial alternatives. Successfully implemented habitat assessment and bioavailability analysis as tools to focus the scope of ecological risk assessments and make site assessment manageable.

Conducted ERAs of PCB contamination for numerous industrial clients. Contamination scenarios evaluated include direct product discharges and indirect transport of product to soil, groundwater, and surface water, including sensitive habitats. Industrial sites evaluated include pipeline facilities, heavy manufacturing facilities, and landfills. Developed site-specific food web modeling approaches to the assessment of risk from PCBs, and negotiated technical approaches to assessment with state and federal regulatory agencies. Reviewed and critiqued recent research developments and helped design original research into environmental toxicity of PCBs.

Developed, supported, and negotiated site-specific approaches to the assessment of metals toxicity at mining sites where natural mineralization and physical disturbance make bulk concentration a poor indicator of exposure and risk from site activities.

Litigation Support

Testified in deposition on general and site-specific NRDA issues on liability insurance case for a pulp and paper industry client in Alaska.

Testified in deposition on potential groundwater injuries at an industrial facility in New Jersey.

Authored and contributed to expert reports on NRDA issues submitted to state and federal courts on several NRD cases across the country. O-3-222

Reviewed literature and served as an expert technical consultant for client legal teams, and authored affidavits on aquatic toxicity and biodegradation issues in support of active litigation concerning client product liability.

Conducted ERA and NRDA training for client legal staff.

Aquatic Toxicology Research and Consulting

Designed and conducted aquatic toxicity investigations using a variety of *in vivo* and *in vitro* techniques and test species, including studies on the toxicity mechanisms and structure-activity relationships of surfactant chemicals, detergents, and oil spill dispersants to fish.

Provided oversight for client-supported independent research used to establish the value of potential restoration projects.

Participated in the design of chronic dietary exposure studies to assess risk of endangered salmon species to PCBs and PAHs in estuarine sediments.

Served as technical consultant on potential endocrine disruptor effects of chemicals and client operations. Conducted training for client technical staff.

Professional Affiliations

- American Chemical Society
- Society of Environmental Toxicology and Chemistry

Exponent

Thomas C. Ginn, Ph.D.
Principal

Professional Profile

Dr. Thomas Ginn is a Principal Scientist in Exponent's EcoSciences practice. He specializes in natural resource damage assessment and ecological risk assessment. He has conducted studies of the effects of inorganic and organic chemicals on aquatic and terrestrial organisms at sites nationwide. Dr. Ginn has specialized expertise in assessing the fate, exposure, and effects of substances such as PCBs, PAHs, dioxins, arsenic, cadmium, copper, lead, and mercury. He has provided scientific consultation regarding the design of remedial investigations and development of overall strategy, and he has provided technical support during negotiations with state and federal agencies. Dr. Ginn has provided support to industrial clients for natural resource damage assessments in Alaska, Arizona, California, Idaho, Indiana, Missouri, Montana, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Oklahoma, South Carolina, Texas, Washington and West Virginia. In these projects, he has worked closely with legal counsel during strategy development and settlement negotiations with state, federal, and tribal trustees. Dr. Ginn has performed detailed technical assessments of injuries to terrestrial and aquatic resources, including fishes, birds, and mammals, and has also developed innovative and cost-effective restoration alternatives. He has provided deposition and trial testimony concerning injury to aquatic and terrestrial resources. Dr. Ginn has evaluated remedial alternative at contaminated sediment sites and has conducted state-of-the-art studies of the sources and distribution of trace metals. He has also developed site-specific sediment quality values based on the empirical relationships of chemical concentrations to biological effects. O-3-223

Dr. Ginn has authored many publications in the area of applied ecology. He has given numerous presentations and CLE seminars on risk assessment and natural resource damage assessment. Since 1983, he has co-authored the annual literature review of marine pollution studies published by the Research Journal of the Water Environment Federation. Dr. Ginn has served as an expert witness concerning the effects of waste discharges and chemicals in sediments on aquatic organisms. He has also served on scientific advisory committees concerning management of contaminated sediments for Puget Sound, San Francisco Bay, and New York/New Jersey Harbor. Dr. Ginn testified to the U.S. House of Representatives, Commerce Committee, concerning the natural resource damage provision of Superfund reauthorization.

Academic Credentials and Professional Honors

Ph.D., Biology, New York University, 1977
M.S., Biological Sciences, Oregon State University, 1971
B.S., Fisheries Science, Oregon State University, 1968

Licenses and Certifications

Certified Fisheries Professional, American Fisheries Society, Certificate No. 2844

Publications

Mearns AJ, Reish DJ, Oshida PS, Buchman M, Ginn T, Donnelly R. Effects of pollution on marine organisms. Water Environ Res 2009; 81(10):2070–2125.

Gala W, Lipton J, Cernera P, Ginn TC, Haddad R, Henning MH, Jahn K, Landis WG, Mancini E, Nicoll J, Peters V, Peterson J. Ecological Risk Assessment (ERA) and Natural Resource Damage Assessment (NRDA): Synthesis of assessment procedures. Integrated Environ Assess Manage 2009; 5(4):515–522.

Mearns AJ, Reish DJ, Oshida PS, Buchman M, Ginn T, Donnelly R. Effects of pollution on marine organisms. Water Environ Res 2008; 80(10):1918–1979.

Becker DS, Ginn TC. Critical evaluation of the sediment effect concentrations for polychlorinated biphenyls. Integrated Environ Assess Manage 2008; 4(2):156–170. O-3-223

Mearns AJ, Reish DJ, Oshida PS, Buchman M, Ginn TC, Donnelly R. Effects of pollution on marine organisms. Water Environ Res 2007; 79(10):2102–2160.

Becker DS, Long ER, Proctor DM, Ginn TC. Evaluation of potential toxicity and bioavailability of chromium in sediments associated with Chromite ore processing residue. Environ Toxicol Chem 2006; 25(10):2576–2583.

Mearns AJ, Reish DJ, Oshida PS, Buchman M, Ginn TC. Effects of pollution on marine organisms. Water Environ Res 2006; 78(10):2033–2086.

Sampson JR, Sexton JE, Ginn TC, Pastorok RA, Spielman A, Young DR, Taganov I. Content of metals and some organic contaminants in environmental media of Lake Baikal. Proc Russ Geogr Soc 2006; 1:52–58 (in Russian).

Nielsen D, Ginn T, Ziccardi L, Boehm P. Study: Proposed offshore gulf LNG terminals will have minor effects on fish populations. Oil Gas J 2006; 104(28), July 28.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Buchman M. Effects of pollution on marine organisms. Water Environ Res 2005; 77(7):2733–2919.

Dunford RW, Ginn TC, Desvousges WH. The use of habitat equivalency analysis in natural resource damage assessments. Ecol Econ 2004; 48(1):49–70.

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Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Buchman M. Effects of pollution on marine organisms. Water Environ Res 2002; 74, 78 pp.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Buchman M. Effects of pollution on marine organisms. Water Environ Res 2001; 73, 77 pp.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Buchman M. Effects of pollution on marine organisms. Water Environ Res 2000; 72, 59 pp.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Buchman M. Effects of pollution on marine organisms. Water Environ Res 1999; 71(5):1100–1115. O-3-223

Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Buchman M. Effects of pollution on saltwater organisms. Water Environ Res 1998; 70(4):931–949.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC, Godwin-Saad EM, Buchman M. Effects of pollution on saltwater organisms. Water Environ Res 1997; 69(4):877–892.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects of pollution on saltwater organisms. Water Environ Res 1996; 68(4):784–796.

Becker DS, Ginn TC. Effects of storage time on toxicity of sediments from Puget Sound, Washington. Environ Toxicol Chem 1995; 14(5):829–835.

La Tier AJ, Mulligan PI, Pastorok RA, Ginn TC. Bioaccumulation of trace elements and reproductive effects in deer mice *(Peromyscus maniculatus)*. Proceedings, 12th Annual National Meeting of the American Society for Surface Mining and Reclamation, Gillette, WY, pp. 3–14, 1995.

Pastorok RA, La Tier AJ, Butcher MK, Ginn TC. Mining-related trace elements in riparian food webs of the Upper Clark Fork River Basin. Proceedings, 12th Annual National Meeting of the American Society for Surface Mining and Reclamation, Gillette, WY, pp. 31–51, 1995.

Pastorok RA, Butcher MK, Ginn TC. 1995. Thresholds for potential effects of mining-related trace elements on riparian plant communities. Proceedings, 12th Annual National Meeting of the American Society for Surface Mining and Reclamation, Gillette, WY, pp. 15–30, 1995.

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Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects of pollution on saltwater organisms. Res J Water Pollut Control Fed 1992; 64(4):599–610.

Ginn TC, Pastorok RA. Assessment and management of contaminated sediments in Puget Sound. In: Sediment Toxicity Assessment. Burton GA (ed), Lewis Publishers, Inc., Boca Raton, FL, 1992.

Johns DM, Pastorok RA, Ginn TC. A sublethal sediment toxicity test using juvenile Neanthes sp. (Polychaeta: Nereidae). In: Aquatic Toxicology and Risk Assessment: Fourteenth Volume. Mays MA, Barron MG (eds), ASTM STP 1124, American Society for Testing and Materials, Philadelphia, PA, pp. 280–283, 1992. O-3-223

Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Fate and effects of pollutants: Effects on saltwater organisms. Res J Water Pollut Control Fed 1992; 62(4):577–593.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects on saltwater organisms. Res J Water Pollut Control Fed 1991; 63(4):696–709.

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Becker DS, Bilyard GR, Ginn TC. Comparisons between sediment bioassays and alterations of benthic macroinvertebrate assemblages at a marine Superfund site: Commencement Bay, Washington. Environ Toxicol Chem 1990; 9(5):669–685.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects on saltwater organisms. J Water Pollut Control Fed 1989; 61(6):1042–1054.

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Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects on saltwater organisms. J Water Pollut Control Fed 1988; 60(6):1065–1077.

Ginn TC, Barrick RC. Bioaccumulation of toxic substances in Puget Sound organisms. In: Oceanic Processes in Marine Pollution, Volume 5. Wolfe DA and O'Connor TP (eds). Robert E. Krieger Pub. Co, Malabar, FL, pp. 157–168, 1988.

Barrick RC, Pastorok R, Beller H, Ginn T. Use of sediment quality values to assess sediment contamination and potential remedial actions in Puget Sound. Proceedings, 1st Annual Meeting on Puget Sound Research, Volume 2. Puget Sound Water Quality Authority, Seattle, WA, pp. 667–675, 1988.

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Jacobs LA, Barrick R, Ginn T. Application of a mathematical model (SEDCAM) to evaluate the effects of source control or sediment coordination in Commencement Bay. Proceedings, 1st Annual Meeting on Puget Sound Research, Puget Sound Water Quality Authority, Seattle, WA, pp. 677–684, 1988.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects on saltwater organisms. J Water Pollut Control Fed 1987; 59(6):572–586.

Becker DS, Ginn TC, Landolt ML. Powell DB. Hepatic lesions in English sole (*Parophrys vetulus*) from Commencement Bay, Washington (USA). Mar Env Res 1987; 23:153–173.

Reish DJ, Oshida PS, Mearns AJ, Ginn TC. Effects on saltwater organisms. J Water Pollut Control Fed 1986; 58(6):671–680.

Williams LG, Chapman PM, Ginn TC. A comparative evaluation of marine sediment toxicity using bacterial luminescence, oyster embryo and amphipod sediment bioassays. Mar Env Res 1986; 19:225–249.

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Grieb TM, Porcella DB, Ginn TC, Lorenzen MW. Classification and analysis of cooling impoundments: an assessment methodology using fish standing crop data. Proceedings, Symposium on Surface Water Impoundments. American Society of Civil Engineering, Washington, DC, pp. 482–494, 1981.

Pastorok RA, Lorenzen MW, Ginn TC. Aeration/circulation as a control of algal production. Proceedings, Workshop on Algal Management and Control. Technical Report E-817. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS, pp. 57–97, 1981.

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Ginn TC, O'Connor JM. Response of the estuarine amphipod *Gammarus daiberi* to chlorinated power plant effluent. Estuarine Coastal Mar Sci 1978; 6(5):459–469.

Haven KF, Ginn TC. A mathematical model of the interactions of an aquatic ecosystem and a thermal power station cooling system. Proceedings, 4th National Workshop on Entrainment and Impingement. Jensen LD (ed). E.A. Communications, Melville, NY, pp. 321–344, 1978.

Poje GV, Ginn TC, O'Connor JM. Responses of ichthyoplankton to stresses simulating passage through a power plant condenser tube. In: Energy and Environmental Stress in Aquatic Systems. J.H. Thorp and J.W. Gibbons (eds.). U.S. Department of Energy, Technical Information Center, Washington, DC, pp. 794–808, 1978.

Ginn TC, Waller WT, Lauer GL. Survival and reproduction of *Gammarus* spp. (Amphipoda) following short-term exposure to elevated temperature. Chesapeake Sci 1976; 17(1):8–14.

Ginn TC, Waller WT, Lauer GL. The effects of power plant condenser cooling water entrainment on the amphipod, *Gammarus* sp. Water Res 1974; 8(11):937–945.

Ginn TC, Bond CE. Occurrence of the cutfin poacher, *Xeneretmus leiops*, on the continental shelf off the Columbia River mouth. Copeia 1973; 4:814–815.

Selected Project Experience

Natural Resource Damage Assessments

Illinois River and Lake Tenkiller (Oklahoma). Assessment of the status of benthic macroinvertebrates and fishes in the aquatic environment and relationships of biotic characteristics to habitat factors and potential effects of poultry operations. Expert witness in the case.

Bayway and Bayonne Refineries (New Jersey). Evaluation of marine, wetland, and terrestrial communities at the refinery sites. Expert witness in the case.

Tittabawassee and Saginaw River/Bay (Michigan). Assessment of potential injuries to aquatic and terrestrial resources caused by releases of dioxins/furans and other substances. Negotiations with state, tribal, and federal trustees.

Pine Bend Refinery (Minnesota). Key issues involve injuries to groundwater, surface water, and wetland resources resulting from releases of petroleum products. Negotiations with state and federal trustees.

FAG Bearing site (Missouri). The claim focused on potential injuries to groundwater resources and federally-listed aquatic species resulting from releases of trichloroethene. Negotiation with trustees and successful settlement.

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Ohio River (Ohio and West Virginia). Claim related to alleged releases of carbamate-metal complexes from a manganese smelter at Marrietta. Key issues involve the causes of mortalities in populations of freshwater mussels and fishes and restoration alternatives for important species. Negotiations with state and federal trustees and deposition.

Ashtabula River/Harbor site (Ohio). Key issues include potential effects of PCBs and PAH on fishes and invertebrates in the harbor ecosystem.

White River (Indiana). Alleged injuries included a major fish kill associated with releases of carbamate-metal complexes from an industrial facility. Participant in technical negotiations with state and federal trustees.

Koppers site in Charleston Harbor (South Carolina). Assessment of PAH and metals in the estuarine environment and development of restoration alternatives. Negotiations with state and federal trustees.

Coeur d'Alene River (Idaho). Provided expert testimony concerning potential injuries caused by metals at deposition and trial (U.S. v. Asarco et al).

Saginaw River/Bay (Michigan). Key issues involve bioaccumulation and effects of PCBs in fishes, aquatic birds, and terrestrial wildlife. Participated in settlement negotiations with state and federal trustees.

Three industrial sites on the St. Lawrence River (New York). Negotiations with federal, state, and tribal trustees on injuries related to PCBs and PAH and identification of restoration alternatives.

Duwamish River (Washington). Claim related to releases of PCBs in the estuarine environment and potential injuries to fish, benthic, and bird resources. Participated in settlement negotiations with state, federal, and tribal trustees.

Clark Fork Basin Superfund complex (Montana). Served as technical lead for PRP negotiations with the trustee and developed supporting scientific reports. Provided testimony at trial in areas of water quality, sediments, and ecosystem-level effects of metals for terrestrial environments.

SMC Cambridge site (Ohio). Technical review and response to a natural resource damage claim associated with metals injuries to wetland resources. Participated in settlement negotiations with state and federal trustees.

Pools Prairie Superfund site (Missouri). Key issues include groundwater injuries and potential effects on a federally listed species.

Koppers site in Texarkana (Texas). Assessment of aquatic injuries and developed restoration settlement package for client. Leader of technical negotiations with state and federal trustees.

SMC Newfield site (New Jersey). Conducted technical review and response to a natural resource damage claim for groundwater resources at the. Participated in settlement negotiations with the state trustee.

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Ecological Risk Assessments

NASSCO Shipyard (California). Expert and mediation support to resolve sediment remediation issues in response to a cleanup and abatement order. Issues involved the amount of dredging and other remediation required to reduce aquatic and human health risks at the site and the scope of post-remedial monitoring.

San Diego Bay Shipyard sites (California). Studies of sediment contamination and ecological risks of metals (e.g., copper, zinc, and butyltins) and organic substances (PAH and PCBs) at two major shipyards. Site-specific studies included sediment triad assessment and sampling of resident biota for bioaccumulation and histopathology analyses.

Hudson River (New York). Studies and agency presentations to support ecological risk assessment for the upper Hudson River. Technical leader for studies of the effects of PCBs on fishes, invertebrates, mammals, and birds of the upper Hudson River.

National Zinc site (Oklahoma). Participated in agency negotiations on RI/FS implementation. Assessed effects of metals on aquatic and terrestrial biota.

Lake Apopka (Florida). Ecotoxicological investigation of large-scale avian mortality at restored wetland habitats near the lake. The specific objective is to determine whether organochlorine pesticides or some other environmental factor was the causal agent of the mortalities.

Shelter Island Boatyard (California). Principal investigator for field and laboratory studies and an assessment of sediment cleanup levels for copper, mercury, and butyltin near a commercial marine maintenance operation in San Diego Bay, California.

PCB sites in Southeast. Principal-in-charge for ecological risk assessments conducted at several natural gas pipeline compressor stations located throughout the southeastern U.S. Led technical negotiations with EPA concerning the scope and interpretation of studies assessing risk of PCBs to aquatic and terrestrial biota.

Clark Fork River (Montana). Managed integrated ecological risk assessment studies at the Clark Fork River, Montana, Superfund site. Assessed the bioavailability and effects of metals in aquatic and terrestrial food chains.

Chikaskia River (Oklahoma). Managed field and laboratory studies of the effects of cadmium and the development of site-specific water quality criteria using the water effect ratio approach.

Campbell Shipyard (California). Directed an investigation of sediment chemical levels, biological effects, and human health risks at a major shipyard facility in San Diego Bay, California.

Commencement Bay Superfund Site (Washington). Managed RI/FS that included extensive field sampling of sediments and biota, assessing effects of toxic substances, assessing health risks, and identifying pollutant sources.

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Puget Sound Estuary Program (Washington). Managed a multiyear, comprehensive field and laboratory investigation of the effects of chemicals in various sub-areas of Puget Sound. The study included numerous projects involving field and laboratory analyses, assessment of pollutant sources, assessments of human health and ecological risks, and development of sampling and analytical protocols.

Sewage Discharges (Alaska). Managed field and laboratory studies of benthic macroinvertebrates, bioaccumulation, and water quality at three sewage outfalls in southeastern Alaska.

Bering Sea (Alaska). Conducted study design, statistical analysis, and interpretation of results for a field study investigating the effects of commercial harvesting operations on surf clams and other invertebrates.

Poplar River (Montana). Managed a risk assessment for water quality, air quality, and socioeconomic impacts of a coal-fired power plant in the Poplar River basin in Montana. Managed an EIS for river flow apportionment alternatives and atmospheric emissions from the plant.

Klamath Lake (Oregon). Managed a project to evaluate water quality effects on fish populations in the Klamath River basin and to develop a modeling approach to assess the effects of flow apportionment alternatives on water quality and fish habitat.

Puget Sound (Washington). Project manager for an assessment of potential biological effects caused by the release of dichloromethane from an industrial facility. Prepared expert report for use in litigation.

Regulatory Programs

Project manager for technical support activities for EPA's Office of Marine and Estuarine Protection. Supervised data management, development of technical guidance, estuarine program support, monitoring program design, bioaccumulation analyses, and quality assurance reviews.

Served as one member of the five-member Technical Review Panel for the Long-Term Management Strategy for San Francisco Bay. The panel provided critical outside technical review of the program's conceptual approach, scientific rigor, and technical findings. Specifically assigned to sediment toxicology aspects.

Manager for a comprehensive review by EPA of sediment toxicity test methods and development of a resource document that is used to select appropriate test methods for use in NPDES monitoring programs at industrial facilities.

Served as a member of a six-member Biological Resource Assessment Group for New York Harbor. Specifically assigned as an expert in chemical contaminants in sediments and bioaccumulation. O-3-223

For EPA multi-year project, served as chief biologist for technical evaluation of Clean Water Act Section 301(h) applications for permit modifications at marine sewage discharge sites throughout the United States.

Provided technical support to the Oklahoma Water Resources Board for the development of site-specific water quality criteria for metals.

For the Army Corps of Engineers, served as principal-in-charge for Puget Sound Dredged Disposal Analysis Phase I and II baseline biological surveys at dredged material disposal sites in Puget Sound, Washington.

Served on the Technical Advisory Committee for the Puget Sound Estuary Program. The committee provided technical review and program guidance to the various sponsoring agencies.

Other Water Quality Studies

Served as principal investigator and expert witness for an assessment of benthic biological effects and sediment chemical levels near the Pt. Loma, California, sewage discharge.

Assessment of the effects of offshore LNG terminals in the Gulf of Mexico on fish populations. Evaluated effects of fish egg and larvae entrainment of key species in proposed facilities at various locations.

Conducted a comprehensive assessment of bioaccumulation of inorganic and organic substances in marine organisms in the Southern California Bight.

Directed a comprehensive review and evaluation of the biological impacts of oil spill cleanup operations on marine ecosystems.

Conducted an evaluation of the role of soil and water bioassays for assessing biological effects of hazardous waste sites.

Principal investigator to evaluate the biological impacts of ocean disposal of manganese nodule processing wastes.

Managed a project to evaluate available cause and effect data and models to predict water quality and biological impacts for Puget Sound, Washington.

Developed the biological components of an ecosystem model to evaluate effects of multiple power plant discharges on a single water body.

Managed statistical analyses of benthic infauna data collected near the Waterflood Causeway in the Beaufort Sea.

Project co-manager and principal investigator for a review and analysis of biological impact data for all currently operating coastal power plants in the United States.

Principal scientist to evaluate responses of benthic invertebrates and fishes to lake aeration and circulation projects.

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Principal scientist for a comprehensive limnological evaluation of the Lafayette Reservoir in California.

Evaluated the responses of benthic invertebrates and fishes to lake aeration and circulation programs and developed recommendations for applicable lake restoration techniques.

Principal investigator in analyzing water quality conditions at a hypereutrophic lake and conducting public workshops on alternative restoration measures.

Developed a method of predicting biological responses of new cooling lakes based on a deterministic ecosystem model and empirical fish production models.

Conducted field and laboratory investigations of the effects of power plant entrainment on macroinvertebrates in the Hudson River estuary. Determined relationship of entrainment effects to populations in the lower estuary.

Managed laboratory bioassay studies evaluating the combined effects of temperature, chlorine, and physical stress on estuarine ichthyoplankton and zooplankton.

Professional Affiliations

- Society of Environmental Toxicology and Chemistry
- American Chemical Society
- American Institute of Fishery Research Biologists

Depositions

The Quapaw Tribe of Oklahoma et al. v. Blue Tee Corp, et al., United States District Court, Northern District of Oklahoma, Case No. 03-CV-0846-CVE-PJC, deposition 2010.

Moraine Properties, LLC v. Ethyl Corporation, United States District Court, Southern District of Ohio, Civil Action No. 3:07-cv-00229, deposition 2010.

State of Oklahoma et al. v. Tyson Foods, Inc, et al., United States District Court for the Northern District of Oklahoma, Civil Action Number 4:05-CV-00329-TCK-SAJ, deposition 2009.

New Jersey Department of Environmental Protection and Administrator, New Jersey Spill Compensation Fund v. Exxon Mobil Corporation, Superior Court of New Jersey, Law Division/Union County, DOCKET NO. L-3026-04, deposition 2008.

United States of America, The State of West Virginia, and The State of Ohio v. Elkem Metals Co. L.P., Ferro Invest III Inc., Ferro Invest II Inc., and Eramet Marietta Inc, United States District Court, Southern District of Ohio, Eastern Division, Case No. 2:03 CV 528, deposition 2005.

United States of America v. Asarco Incorporated et al., United States District Court for the District of Idaho, Case No. CV-96-0122-N-EVL, deposition, 2000.

State of Montana v. Atlantic Richfield Company, United States District Court for the District of Montana, Case No. CV-83-317-HLN-PGH, deposition, 1996.

Aluminum Company of America and Northwest Alloys, Inc. v. Accident and Casualty Insurance Company, et al, Superior Court of the State of Washington, King County, Case No. 92-2-28065-5, depositions 1995, 1996.

Asarco v. American Home Insurance Company, et al., Superior Court of the State of Washington, King County, Case No. 90-2-23560-2, deposition 1993.

U.S. v. City of San Diego, United States District Court, Southern District of California, Case No. 88-1101-B, depositions 1991, 1993.

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Trials and Arbitrations

United States of America v. Asarco Incorporated et al., United States District Court for the District of Idaho, Case No. CV-96-0122-N-EVL, testimony at trial, 2001.

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State of Montana v. Atlantic Richfield Company, United States District Court for the District of Montana, Case No. CV-83-317-HLN-PGH, testimony at trial 1997 (aquatic and terrestrial phases of the trial).

U.S. v. City of San Diego, United States District Court, Southern District of California, Case No. 88-1101-B, deposition, testimony at trial 1991, testimony at motion hearing 1994.

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Gary L. Brugger, P.E.
Senior Managing Engineer

Professional Profile

Mr. Gary Brugger is a Senior Managing Engineer in Exponent's Environmental Sciences practice. He has more than 30 years of experience in civil and environmental engineering. His project experience includes "environmental forensics"; environmental insurance technical support; litigation technical support; product stewardship; site investigation, remediation, and closure; water resources and water quality management, including industrial, municipal, and wastewater treatment and management; contaminated site redevelopment; waste management; landfill closure; remedial performance evaluation; and lead paint investigation and abatement. Specific assignments have included compliance auditing; TSCA registration; regulatory affairs and compliance management; CERCLA and RCRA investigations; remedial design and closure plan preparation; hazardous waste cleanup management; emergency response management, planning, and assessment; construction management and monitoring; ecological restoration; and wastewater treatment technology assessment, including failure analysis and prevention. He has also conducted and managed lead-based paint investigations, prepared management and abatement plans, and developed proprietary methods for use of a portable x-ray fluorescence (XRF) analyzer for field screening soils to segregate lead-based paint from other sources of lead. In addition, he has directed the investigation and/or review of numerous NRDAs. Mr. Brugger also has testified as an expert in the areas of environmental compliance (RCRA, CERCLA, TSCA, and CWA), remediation and remedial requirements, environmental forensics, emergency response management, and cost allocation. O-3-224

At Exponent, Mr. Brugger specializes in solving complex and diverse environmental and related problems for which his broad engineering and environmental background are invaluable. Mr. Brugger frequently works with other engineers and scientists at Exponent to evaluate environmental contributions to process or materials failures, to conduct product and due-diligence evaluations, and to work with clients to improve their product's reliability and limit or eliminate the risk to the environment from the product.

Mr. Brugger's experience as a design engineer, regulator, and consultant allows him to apply a broad approach derived from his understanding of science, engineering, and regulations. With this approach, Mr. Brugger has been able to anticipate environmental issues and integrate their solutions into his clients' routine practices. Since 1988, he has helped to integrate environmental programs into the company cultures of clients in the manufacturing, fabrication, plating, mining, agriculture, pulp and paper, and food processing industries. More recently, he is helping clients assess their greenhouse gas footprint and develop innovative solutions to reducing the footprint or recovering energy. He has developed innovative investigation techniques, remedial measures, and disposal practices that have provided documented cost savings for clients. Where confidentiality has allowed, Mr. Brugger has presented or published the results. Recent presentations have included such diverse topics as innovative investigations, environmental forensics, and redevelopment value analysis.

Academic Credentials and Professional Honors

B.S., Civil Engineering, University of California at Davis, 1970

Association of Washington Businesses: AWB Waste Management Committee, AWB Superfund Committee, and AWB Environmental Executive Committee

Licenses and Certifications

Registered Professional Civil Engineer, Alaska, # 7910
Registered Professional Civil Engineer, Idaho, # 5966
Registered Professional Civil Engineer, Oregon, # 14111PE
Registered Professional Civil Engineer, Washington, # 15170
Registered Professional Engineer, Montana#9770
Registered Professional Engineer, Oklahoma, #24438
Registered Professional Engineer, Michigan, #6201057384
Registered Professional Engineer, Tennessee, #00114829

Presentations

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Shields WJ, Ruby MV, Benton L, Sun B, Brugger G. Identification of the sources of lead contamination in surface soils in the vicinity of mines and smelters. Invited presentation, Local Solutions Smart Future Conference and Celebration. Working and Living with Lead, Port Pirie, South Australia, September 28–October 1, 2003.

Brugger G, Lehmicke L. Environmental forensics applied to voluntary restoration. Presentation, AEHS Conference, San Diego, CA, March 19, 2002.

Yost L, Brugger G. Use of conceptual site models for risk communication and remediation. AEHS Conference, San Diego, CA, March 19, 2002.

Brugger G. Guilty by association, innocent by forensics. AEHS Conference, San Diego, CA, March 2001.

Brugger GL, Lehmicke L. Dating a chlorinated solvent release: 1982 or 1994. Platform presentation, Environmental Forensics Session, 10th West Coast Conference of AEHS, San Diego CA, March 22, 2000.

Brugger GL, Perry M, Clem E. RCRA Corrective Action an asset in redeveloping a solvent recycling facility. Poster presentation, 10th West Coast Conference of AEHS, San Diego CA, March 21–23, 2000.

Brugger GL, Murphy S, Rohr W. Use of portable XRF to screen former Inert Target Range for heavy metals, allowing rapid assessment and remediation. Platform presentation, Investigations Section, 9th West Coast Conference of AEHS Oxnard, CA, March 29, 1999.

Brugger GL, Ivers L. Innovative recovery of waste oil by using subfreezing temperatures to allow removal of contaminated water as clean ice. Presentation to the BP Arctic Remediation Conference, Anchorage, AK, and U.S. Air Force Conference, Honolulu, HI, 1995.

Ivers L, Brugger GL. Restoration and recycling of abandoned asphalt plant. Presentation to the BP Arctic Remediation Conference, Anchorage, AK, and U.S. Air Force PACAF Remediation, Recycling and Restoration Conference, Honolulu, HI, March 1995.

Konen B, Brugger GL, Ghofani TG. *Ex situ* bioremediation in interior Alaska. Presentation to the BP Environmental Conference, Anchorage, AK, 1993.

Brugger GL, McKay E. RCRA soil treatment by generators, a study of soil treatment within a "RCRA tank." Presentation, Hazamacon, Spring 1991.

Brugger GL, McKay E, et al. RCRA incineration ash transfer, methodology and control for transfer of incinerator ash to remote sites for disposal. Presentation at the 2nd Annual Northwest Conference for Hazardous Materials Management and Recycling, 1991.

Brugger GL. Impact of MTCA standards on cleanups of sites with chlordane, DDT, and lindane contamination. White paper presented to the AWB Environmental Committee, Seattle, WA, 1990.

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Brugger GL. Impact of the Washington State Waste Minimization Regulations on selected industries. White paper presented to the AWB Environmental Committee, Seattle, WA, 1990.

Brugger GL. Design of carbon treatment systems for treatment of groundwater. Presentation to the Kleinfelder Environmental Conference, Sacramento, CA, 1989.

Brugger GL, Hubbard TR. The action team approach to expedited restoration of urban bays. A presentation of the use and success of the interagency action team approach to improved water quality in urban bays. Presentation to the Second Annual National Urban Bay Conference, Seattle, WA. Sponsored by EPA, 1987.

Project Experience

Solid and Hazardous Waste

Landfills

Responsible for engineering controls for landfill cap and stormwater controls for landfill closure and development as a golf course.

Responsible for RCRA Subtitle D audits and needs studies for more than 40 landfills. Studies covered identification of non-complying landfills and preliminary assessment of requirements to close or bring the landfills into compliance, including cost estimates.

Responsible for approval of design and issuance of permit for time-critical landfill expansion. Working in partnership with the landfill consultant, developed the design for the first self-sealing double liner system.

Responsible for approval of design and issuance of permit for time-critical closure of three major landfills. Working in partnership with the City's engineers, developed the first multi-layer closure cap implemented on the West Coast.

Landfill closure plan for Eielson AFB (Alaska) was integrated with the need to treat fuel-contaminated soils excavated during major expansion of base housing and mission support buildings. Land-farming cells were constructed on top of the former landfill using a compacted soil liner. Over the course of the next five summers, the excavated soils were bioremediated on top of the former landfill. Each spring, the soils cleaned during the previous summer were incorporated into the soil liner. At the end of the land-farming project, the treated soils were sufficiently clean to qualify as a RCRA Subtitle D landfill cap. The combining of the two projects saved the USAF over $7,000,000 budgeted for the landfill cap.

<u>RCRA Subpart X</u> O-3-224

Responsible engineer for development of the RCRA closure plan for the open-burning, open-detonation facility at Eielson AFB. Tasks included site investigation, closure report, and agency negotiations.

Acted as engineering consultant and technical reviewer of the RCRA closure plan for Egland AFB.

Acted as technical consultant to Eielson AFB's Civil Engineering Squadron audit of Elmendorf OBOD permit.

Acted as consultant to range manager to address RCRA Subpart X monitoring, compliance, environmental controls, and closure issues.

RCRA Permitting and Compliance

Acted as consultant to project manager addressing numerous compliance issues, including RCRA tank certifications and emergency response planning.

Conducted audits of facilities in Washington, Oregon, and Hawaii for major bank client financing expansion of manufacturing and warehouse facilities. Included RCRA and stormwater permitting compliance assessment.

Acted as RCRA compliance consultant regarding waste management, waste segregation, SARA reporting, and emergency response planning.

RCRA compliance and closure consultant to project manager for resolution of environmental issues associated with AST leaks and spills at a chemical manufacturing and repackaging facility.

Retained as a compliance consultant for a restoration project involving land that had previously received heavy-metal sludge from an industrial wastewater treatment facility. Provided research and documentation to establish that the sludge was not currently a regulated waste nor a regulated waste at the time it was placed. Furthermore, removal of the waste would have compromised the planned wetland restoration project.

Retained as a consultant to assess potential RCRA compliance issues associated with the release of chlorinated solvents from an electronics manufacturing facility. Initial assessment indicated that the contaminant plume was the result of historical operations and not related to current operations.

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Retained to assess source of groundwater contamination from wood preservatives. Tasks included evaluating RCRA compliance and management practices, as well as stormwater impacts. Assessment concluded that stormwater was mixing with contaminated groundwater from a historical accident. Remediation system modifications were recommended to intercept contaminated groundwater plume.

Retained as a consultant and possible testifying expert to assess whether USTs and ASTs operated by the client were regulated under RCRA. Initial evaluation indicated that these tanks were not regulated under RCRA.

Retained to assist with remediation and disposal of mercury-contaminated rocks from a former industrial trickling filter. Innovations included novel removal and cleaning process that recovered most of the mercury and allowed the majority of the rocks to be disposed as non-hazardous waste.

Environmental Engineering

Remedial Performance Evaluation

Retained to assess the design of, and to install and operate, a bio-pile system for *ex situ* bioremediation of fuels and non-chlorinated solvents. The original design, prepared by a national laboratory, was found to be unnecessarily complex and difficult to construct. Revised the system from vacuum to blower, simplified the monitoring system, and modified the construction plan, resulting in a savings of $250,000—over half the construction cost. Subsequently, developed and tested a non-mechanical system for use on remote sites, resulting in a savings of 75 percent over the original design estimate.

Retained to assess contractor's proposal to recover oil and hazardous materials from drummed liquids using a gravity separator. Initial review indicated that the process was unreliable, expensive, too time consuming, and would require a RCRA permit. An alternative treatment approach was developed using subfreezing air temperatures to freeze the water in the drums then remove it as uncontaminated ice. The remaining liquid was field screened for solvents. Solvents were segregated for RCRA disposal, and waste oils were recovered for use as fuel in portable heaters. Cost savings from proposed treatment was more than $500,000.

Retained by manufacturer to provide technical advice and permitting assistance for onsite micro-encapsulation of arsenic-contaminated soils. Review of competitive proposals and test results from three vendors indicated that tight process controls were necessary if the encapsulated soils were to pass the RCRA hazardous waste designation. Innovations included permitting the treatment process under the "treatment by generators" provisions in RCRA, and designing the treatment-area "tank" to be left in place as a RCRA cap.

Reviewed plans to use an in-well stripping process to remove chlorinated solvents released from a small metal-plating facility. Our analysis indicated that the system was inadequately characterized and too small to meet remedial goals within the project schedule. Additionally, we raised concerns that the proposed system would introduce oxygen to the aquifer, ending the natural biodegradation of the plume. Recommended two-phase in-well stripping approach that used nitrogen in the initial phase to maintain anaerobic conditions in the aquifer, thus supporting natural biodegradation. O-3-224

Retained to review and comment on proposed remedial technologies to be applied at two locations at the site. Initial review of the steam extraction technology proposed by the regulator indicated that it was nearly six times the cost of containment through conventional means. Furthermore, no studies had been conducted to ensure that the contaminants could be recovered once the steam had mobilized them. Also saved the client substantial costs for soil removal. A soil removal program had been proposed based on two soil samples. Close scrutiny of the data suggested that the contamination was extremely localized and associated with creosote-treated railroad ties left in place when a rail spur was abandoned. Confirmation sampling supported this assumption, saving the client more than $100,000.

Retained to review a proposed remedial system for a dry cleaner site. The ROD proposed use of Fenton's Reagent to remove residual PCE from former cesspools suspected to be the current source of contamination, but ignored piping and other potential issues, including the amount of organic carbon present in the system that would react violently with the Fenton's Reagent. Additional work on this Long Island site includes a natural attenuation assessment, regulatory strategy development, vapor intrusion assessment, and identification of prior investigations conducted by others that breached the natural containment at the site, releasing chlorinated compounds to offsite groundwater.

Wastewater Treatment

Evaluated causes of the digester failure at the City of Spokane wastewater treatment plant, prepared expert report and presented expert testimony regarding the causes of failure and the standard of care associated with a "back-of-the-envelope" engineering design prepared by a professional engineer working a consulting assignment for the City.

Assessed design and operational problems associated with anaerobic digesters being operated for digestion and methane production. Work included assessment, preparation of training materials, and presentation at a seminar. Within 2 months, digesters were not only stable, but performing consistently above the design efficiencies. Problems encountered included highly variable waste stream, limited controls, inconsistent/conflicting direction and advice, equipment not performing as designed, inadequate (or never provided) operation manuals, and inadequate training.

Retained by City of Spokane to conduct forensic analysis of unusual grease problem, to provide suggestions for management, identify source if possible, and provide recommendations for treatment. Work included successful identification of the material, recommendations for inspection and communication with industries that were possible sources, and strategy for identification and appropriate actions should the problem re-occur. Industry communication strategy was successful, and no reoccurrences have been observed.

Retained by Fortune 200 company as an expert and consultant regarding claims of damage to POTW pump stations and sewers from clients' discharges. Multiple projects in multiple states. Provided client with engineering and cost documents to allow negotiation of reasonable settlement of legitimate claims and rejection of excessive charges. Also evaluated pretreatment systems and made recommendations.

Retained by confidential client to assess efficacy of physical chemical system to remove trace contaminants, including pharmaceuticals, from drinking water.

O-3-224

Retained by internationally recognized museum and research facility to solve odor and pretreatment issues. Helped client conduct investigations, assess treatment technologies, and implement solutions.

Conducted blind efficacy testing of chemical treatment technology to enhance and expedite treatment of conventional and other pollutants at existing industrial and municipal treatment facilities. Tests were designed and conducted to verify that the product was, in fact, achieving treatment and not fooling the tests.

Retained by Phoslock International to assess applications of Phoslock technology for phosphorus removal in the United States. Work also included submittal of pre-manufacturing notices and regulatory support for applications.

Retained to determine the operational conditions that led to the failure of the #3 Digester at the Spokane Wastewaster Reclamation plant. Personally responsible for operations analyses and interviews of plant and other personnel with knowledge of the digester and/or the event. Interviewed 30 people and resolved conflicts between initially reported observations and recorded and preserved data. All significant observations were verified and accounted for within the data and failure mode.

Retained to develop innovative approach for water and wastewater treatment for the Polar Ice Coring Research facility located in Alaska. Work included development of innovative water treatment and wastewater treatment technologies that would supply the facility during the summer research season and could be easily protected during the harsh winter months.

Retained by international client to evaluate off-the-shelf integrated treatment plants for potential use at resort facilities in areas with limited power. The proposed technology did not have the flexibility to address weekly fluctuations in flow and loading, because most facilities were occupied from noon on Sunday to noon on Friday, with significant cleaning activities occurring in between. Developed two approaches—one used a lagoon system where land was available, and the other used aerated equalization basis followed by extended aeration activated sludge package plant.

Retained by confidential client to provide efficacy testing of physical chemical treatment system to remove trace contaminants, including trace pharmaceuticals, from drinking water. Work includes identifying a range of parameters for testing, locating representative water supplies, and conducting tests to verify the effectiveness of the process.

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Highlights of wastewater projects as a state review and grants engineer:

- Wastewater construction grants for state of Washington – Managed more than $200,000,000 in projects from 1974 through 1979.
- Technical plan review of nearly $0.5 billion in wastewater treatment and pretreatment facilities. Review included reliability, operability, and adequacy.
- Expertise in conventional, tertiary, and innovative chemical treatment for industrial wastewater, stormwater, and municipal wastewater.
- Expertise in permitting issues that included nearly 1,000 industrial pretreatment facilities, hundreds of POTWs, and dozens of stormwater treatment facilities.
- Drafted first municipal stormwater permit and first water quality–based permit for major POTW in EPA Region X.

Mining, Smelting, and Finishing

Served as senior engineer for multimillion-dollar demonstration projects to conduct full-scale testing of remedial measures for several major CERCLA sites involving surface mines and smelting operations.

Retained as a consultant to assist client who had purchased a site with metal finishing waste. Assignment included remedial technology assessment and permitting. Permitting strategy included the first use of the RCRA provisions allowing generators to treat their own waste streams under their waste generator permits. These demonstration projects developed cost-effective techniques for remediating soils with various concentrations of heavy metals.

Developed and implemented a recycling plan for flue dust and sandblast wastes contaminated by heavy metals, and conducted a preliminary assessment of long-term impact from the use of this material. Also evaluated heavy metal contribution to adjacent waterway sediments from coal and mercury mine drainage. Conducted an evaluation, up-river remedial design, and implementation plan for the smelter slag sandblast waste.

Organized PRP group, developed plans, and directed an environmental evaluation and expedited remedial measures for a lead smelter and processor. Contaminated sediments and soils were recovered and recycled, avoiding substantial remediation costs associated with planned disposal.

Conducted preliminary site assessments, including wetlands evaluations of a former industrial site in the Northwest. During the wetlands assessment, found evidence of smelter slag. Discovered that the property had been developed for smelting operations that had ceased nearly 100 years ago. Knowledge of the magnitude of potential liabilities and uncertainties associated with developing a former smelter site allowed the client to assess risks rapidly and make timely business decisions.

Served as project manager and designer for a survey of metals fabrication, handling, and storage facilities. Evaluated potential for recycling surplus metals and qualitatively assessing environmental concerns associated with the operations. Innovations included beta-testing a Niton XRF analyzer that provided real-time analysis of metal alloys to determine approximate salvage value.

O-3-224

Served as project and client manager for site investigation, and as client manager for ecological and toxicological risk assessment of industrial sites. Innovations included the use of field screening techniques and inclusion of an ecologist and a toxicologist on the sampling team, which allowed adjustment of the sampling plan in the field, facilitating collection of the data needed to prepare the risk assessments.

Served as project manager and responsible engineer for series of remedial demonstration projects that included the first large-scale soil incinerator, first large-scale biological treatment system, and also included bioventing, use of power plant boilers to incinerate waste, and landfill closures. Major challenges included reluctant regulators, temperatures to –30°F, management of ultrafine dusts from the incinerator and the power plant ash, and biological hazards (mosquitoes and moose). Innovations included conducting *ex situ* biological treatment on top of a landfill, which saved the client more than $5,000,000 in soil treatment costs.

Responsible for the design and restoration of the gravel pit and batch plant sites at Elmendorf AFB. Sites covered nearly 10 acres and contained over 100,000 yd^3 of soil potentially contaminated with asphalts and heavy metals. Innovations included the recovery and recycling of 100,000 gal of asphalt, 30,000 tons of rock used for roadway ballast, and 15,000 tons of asphalt-coated rock and soil incorporated in roadway and parking lot subgrades. Innovations saved the client nearly $6,000,000 vs. the cost of a planned and budgeted disposal option.

Manufactured Gas Plants and Other Related Projects

Served as project manager and consultant for RCRA investigation and proposed closure of major wood treatment facility. Contaminants included creosotes and other wood treating chemicals. Work included cost analysis, cost allocation evaluation, and evaluations of prior investigations, interim removal actions, and treatment systems.

Site manager for Washington State Department of Ecology. Accomplishments included site investigations, interim removal, and disposal plan development (asbestos contaminated with PAH. Demonstrated to EPA that the site should not be listed on the NPL.

Served as project manager for Washington State Department of Ecology for environmental issues associated with the original MGP for the City of Seattle. Although the site had originally been built on a pier, the structure had been torn down and the area filled. Challenges included identification of historical disposal areas, and development of sampling plans and special controls for installation of building piling supports to minimize disturbance of PAHs.

Acted as senior remediation consultant on several restoration and redevelopment projects at MGP sites. Tasks included review of innovative research proposals and results, remedial technology analysis, regulatory analysis, storm water management planning, redevelopment analysis, cost analysis, and senior technical review.

Pesticides O-3-224

Retained to investigate, remediate, and resolve environmental issues associated with an agricultural chemical warehouse fire. Challenges included addressing contamination and risks from the 181 chemicals in the warehouse at the time of the fire. A risk-based investigation approach was developed, and the project focused on chemicals that were in the warehouse in sufficient quantity to present an environmental or toxicological risk. Laboratory cost savings from this approach was in excess of $500,000. This was one of the first RI/FS projects accepted and closed by the Oregon Department of Environmental Quality. The project went from work plan preparation through investigation and remedial implementation within 11 months.

Retained to investigate, evaluate, remediate, and resolve environmental issues associated with a fire at a pesticide applicator's warehouse in eastern Oregon. The warehouse had contained nearly 80 tons of aluminum phosphide pellets used for fumigation of grain elevators and ships. Worked with the client to arrange first-responder training for employees and developed an emergency response plan to stabilize the unburned pellets. Worked with the manufacturer to expand the FIFRA registration and licensing for the product to allow use for control of burrowing rodents as an alternative to disposal.

Retained to evaluate contamination and risks associated with fertilizer distribution facility that had also handled some pesticides. The RI/FS had been completed, and the client wished to assess potential remedial measures. Review of the RI/FS indicated that pesticide issues were limited, and although soil concentrations exceeded Washington State MTCA standards, they did not exceed EPA standards, thereby allowing disposal as non-RCRA waste in Idaho. Groundwater contaminated with nitrates and phosphates above drinking-water standards was used for irrigation where the contaminants would be removed as a beneficial component of the water.

Retained as a consultant to assess compliance issues associated with corrosion inhibitors included in products used in large hydraulic systems. Because the corrosion inhibitors included compounds that were biocides, the client needed to know if the products and the manufacturing process were regulated under FIFRA, TSCA, or both. Because the active ingredients in some of the inhibitors are formulated for pesticides, this became a complex assessment to verify that the actual raw materials used in our client's products were manufactured as corrosion inhibitors and were approved for such use under both FIFRA and TSCA.

PCBs

Acted as Washington State Department of Ecology engineering manager for emergency response for recovery and treatment of PCBs from a transformer spill that occurred when a transformer being loaded on a barge broke free and fell into the river. Responsibilities included review and approval of recovered PCBs/water treatment system and disposal.

Served as principal investigator and enforcement officer for a mysterious oil spill containing PCBs. Careful investigation determined that the employees of a machine shop had dumped waste oils without PCBs into a former power plant flume that contained PCB-contaminated sediments. During the brief contact period, the waste oil mobilized the PCBs. A case was developed, and substantial monetary penalties were assessed against the dumpers, including allocation of cleanup costs.

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Retained to determine the cause of transformer recontamination of five PCB transformers at a major industrial facility. Transformers had been cleaned and certified to be <50 ppm PCBs, but resampling during an EPA inspection found PCBs in the 500- to 800-ppm range. Thorough investigation of the methods used by the transformer cleaning contractor, and interviews of the client's employees who observed the contractor, enabled us to determine that the cleaning contractor had problems with its oil removal unit and did not remove and recycle the transformer oil either under load or with heated oil as required. Furthermore, the verification sampling was done with the transformer cold and prior to use. Consequently, a relatively substantial amount of PCBs remained trapped within the coils.

Served as project manager for contract to support USAF initiative to remove PCBs from USAF facilities. Project assignments included development of an investigation and management plan, investigation and testing of electrical components, and auditing of prior work involving PCB removal and/or recycling projects. Challenges included differing state standards for PCBs and poorly documented prior work. Two California bases (Vandenberg and Mather) and Williams AFB in Arizona required resampling, because prior contractors had not used the 1-ppm threshold used in California. Consequently, these transformers had to be resampled and re-cleaned or disposed as PCB waste.

Retained as a consultant in a litigation case to investigate the probable source of PCBs found in a storm water retention pond and sediments of an adjacent waterway. Although cutting fluids in the client's machine shop were suspected and alleged by the regulators, the contamination was not consistent with the client's source (location). The investigation focused on a nearby facility with documented spills of hydraulic fluids in the late 1940s though the late 1950s. Investigation of library and company records indicated that the nearby facility had used surplus aircraft hydraulic oil in their hydraulic systems. Research of the records of the Commemorative Air Force (CAF) and interviews with CAF volunteers produced documentation that the surplus aircraft hydraulic oil used by the nearby facility contained substantial quantities of PCBs.

Product Stewardship

Initially retained in 1987 to address regulatory compliance issues associated with solvent use and disposal. Scope subsequently expanded to include integration of environmental issues within the development, use, and ultimate disposal of products. Within 18 months, the implementation of ideas developed by the Tempress team reduced the defective parts rate to less than 0.001 percent, (from greater than 5 percent). Solvent use was reduced by 98 percent, while product quality, customer satisfaction, and profit margin increased dramatically.

Retained to observe, document, and recover for testing piping components used in fuel dispensing. Additional activities included assessment of the installation, notation of any failures causing environmental impact, and documentation of any near-term potential failures or impacts.

Retained to file Toxic Substances Control Act (TSCA) applications and verify efficacy of proprietary product used in the treatment of waste water and lake restoration. Application was complete and EPA approval to begin manufacturing was received within 60 days.

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Retained to review electronic device and associated materials to verify California Prop. 65 compliance, and to certify product stewardship program for client's customers. Work included assessment of device and the extent and nature of subcontractors' stewardship programs, and evaluation of printing and materials used for instructions and CD.

Retained to address environmental hazards and risks associated with green energy systems. Although the systems are completely recyclable, the client needed to assess any potential environmental impacts associated with abandonment, vandalism, landfill disposal, and incineration. Subsequently retained to address other environmental stewardship issues and integrate them with manufacturing and marketing.

Environmental Forensics

TIC v. Quemetco, et al. Case No. BC 012529 in the Superior Court of the State of California, County of Los Angeles. Subject: Release of lead from a secondary smelter with regard to insurance coverage matters. Technical consultant and principal investigator. Client: RSR Corporation (represented by Latham & Watkins).

RSR Corporation et al. v. AIU Insurance Company et al. Cause No. 93-0217 in the 71st Judicial District Court, Harrison County, Texas. Principal investigator and consultant for recovering records and calculating emissions from historical smelter operations at sites in Texas, Washington, and Indiana. Work included identification and documentation of process upsets documented (but not previously identified) during routine ambient monitoring by state and local air agencies and the recovery and use of other agency documents to validate air dispersion models and expert opinions.

Retained as expert in the practice of automotive recycling, including the nature, extent, and management of waste streams resulting from this process. Provided analysis and documentation that facilitated settlement.

Retained to identify timing of disposal of battery manufacturing wastes found in the crawl space of a large commercial building. Because of multiple ownership of the battery manufacturing operation, it was necessary to ascertain the timing of the release(s) in order to establish responsibility. Innovations included the dating of construction materials and building remodels, dating battery casings, and dating the plates based on alloy content.

Retained to prepare cost allocation of investigation, remediation, and restoration costs for a major industrial facility. Before cost allocation could be prepared, contaminant sources had to be identified, segregated, and dated.

Retained to ascertain the source of mercury contamination found in an industrial wastewater treatment facility. Research of the client's records produced the original design drawings from the 1950s. The design showed a floating mercury bearing. From prior experience with these bearings, we estimated that the original floating bearing would likely have contained approximately 40 pounds of mercury. Having identified the probable source, our client was allowed to proceed with environmental closure of this site, allowing for planned redevelopment.

Served as project manager and principal investigator for drum disposal site for feasibility study and record of decision preparation project. Although four prior consultants and two Navy investigations had failed to produce evidence that the drums placed at the site were in fact "RCRA Clean," convinced the Navy to try once more. Investigation demonstrated the total quantity of materials released was consistent with washed drums and found documents and managers not previously found who confirmed that the drums had in fact been cleaned in accordance with RCRA. Site closed under MTCA (state standards) at a savings of more than $500,000 in disposal costs. Project team received a Navy commendation for outstanding performance for actions on this project.

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Litigation Technical Support

David Michael v Denbeste Transportation. Case Number VC038131. Retained to assess the environmental controls, site management, and regulatory compliance and non-compliance with EPA and California laws and guidance regarding decontamination and site safety at a state Superfund site. Additionally asked to assess how such compliance or non-compliance would have contributed to the injury of Mr. Michael, who was working at the site.

Angel Good, et al. v. Fluor Daniel Corporation, et al. U.S. District Court, Eastern District of Washington Case No. CT-00-5021-EFS. Retained as expert to evaluate the emergency response to an event at the plutonium finishing plant at Hanford, including expert report. Also retained to assist with preparation of a technical report evaluating the improper use of ISO 9000 and ISO

14000 (Gap Analysis) processes to evaluate emergency response activities. The same issues were addressed in a separate case, *Arthur Aylsworth, et al. v. Fluor Daniel Corporation, et al.* U.S. District Court, Eastern District of Washington Case No. CY-00-3038-EFS.

Grove Investment Company v. United States Testing Company and Grove Investment Company vs. Collins Radio Company, et. al. Case Number SA CV 00-1076 DOC (EEx) (Lead Case) Consolidated with Case Number SA CV 01-646 DOC (EEx). Retained as expert to assess process solvent usage by the electronics and metal finishing industries in the 1960s and 1970s. Deposition has not been scheduled. Client: Weston Benshoof.

Union Station Associates, LLC v. Puget Sound Energy, Inc. Case No. C01-289P in the U.S. District Court, Western District of Washington at Seattle. Subject: Sources of polycyclic aromatic hydrocarbons at a site of former iron foundry, railroad terminal, manufactured gas plant, wood treatment facility, and power plant. Deposition: 2002. Client: Riddell Williams (representing Travelers Insurance, insurance carrier for Puget Sound Energy).

Seattle City Light v. Lloyds et al. Review of claims and assessment of costs related to water transport of contaminants; assessment of claims and costs prepared by opposition experts. Case dismissed prior to deposition. Client: Lane Powell Spears Lubersky for Lloyds.

Massoud v. Sparky's Towing et al. Retained by defendant for evaluation of contaminant sources at site owned by plaintiff. Developed scientific evidence presented at deposition and trial to demonstrate that automotive fluids from vehicles handled at Sparky's could not have produced the contamination found at the plaintiff's site. Evidence developed included a forensic analysis of automotive wastes and fluids, including analysis of trace metals and alloys used in automobiles. The jury did not award the plaintiff any environmental damages. Client: Phil Welshman of Friese and Welshman representing Sparky's. O-3-224

Andalex v. D.A. Stuart et al. Retained to address Toxic Substances Control Act compliance issues associated with products manufactured by D.A. Stuart regarding product liability claims and allocation of responsibilities. Deposition: 2002. Client: Richards, Brandt, Miller, Nelson representing D.A. Stuart on behalf of AIG.

City of Ridgefield v. SAFECO, AIG, et al. Retained to analyze and document the City of Ridgefield's contributions related to impacts from the lease of City property to Pacific Wood Treating. Initial assignments have included evaluation of remedial technologies, property acquisition, and redevelopment opportunities. Deposition: Not yet scheduled. Client: Merrick, Hofstedt & Lindsey, representing the City of Ridgefield's interests on behalf of its insurers AIG and SAFECO.

Todd Shipyards v. Lloyds. Retained by counsel for Todd Shipyards as an expert on shipyard best-management practices, environmental compliance, and waste management practices. Deposition: 2001. Client: Corr Cronin representing Todd Shipyards.

Fentron Building v. American Motorist et al. Evaluation of remedial technologies, facility compliance issues, and cost assessment and allocation for site restoration related to third-party claims. Clients held not liable; case dismissed prior to deposition. Clients: Merrick, Hofstedt & Lindsey, representing Westport Insurance Company; Soha & Lang, representing Central National of Omaha and Highlands Insurance; Forsberg & Umlauf, representing First State and INSCO insurance companies.

Lilyblad Petroleum et al. v. Industrial Indemnity et al. Evaluated remedial technology, facility compliance issues, cost assessment, and cost allocation for site restoration related to third-party claims. Deposition: March and April 1999. Client: Forsberg & Umlauf, representing Old Republic.

J.I. Case & Co. v. Jones Stevedoring. Assessed level of environmental controls required and processing equipment and associated costs necessary to bring the facility into compliance; also evaluated appropriateness of actions by regulators. Deposition: May 1998. Settled out of court. Client: Williams, Kastner & Gibbs, representing Jones Stevedoring.

Esterline Technologies Corporation and Midcon Cable v. Highland Insurance Company et al. Evaluated remedial technology and cost assessment for site restoration related to RCRA compliance issues and to third-party claims. Case dismissed before deposition (October 1998). Client: Merrick, Hofstedt & Lindsey, representing Highlands Insurance.

King County v. Sunset Demolition. Subject: Improper handling and disposal of solid waste and the associated impacts on public health and the environment. Deposition and expert witness testimony: 1985. Client: King County (Washington) Prosecutor's Office.

U.S. EPA v. Western Processing. Subject: Presentation of investigation methods and results demonstrating that the actions by the owner and operator of the facility presented a substantial risk to public health and environment. Depositions: 1982, 1983. Client: U.S. Environmental Protection Agency.

O-3-224

Insurance Technical Support

Retained to assess and document the state of RCRA compliance requirements that were related to and may have contributed to the release of hazardous materials. Initial review identified that first responders, who did not follow emergency response plans provided by the insured industry, contributed to the extent of property damage from the event.

Retained to evaluate plans, costs, and schedule for remediation of a major Superfund site. Responsible for remedial technology assessment, including the risk of failure, schedule for performance, and associated costs. Work was completed within a 10-day period to allow client to prepare a proposal to the site owner for cost cap insurance.

Retained to assess nature and cause of contamination at a school district maintenance facility. An accident involving the fuel dispensers, a turbine failure, and a leaking vent pipe were thought to be the cause of the majority of the contamination. However, an environmental forensic evaluation of the nature and extent of the contamination and the precise location of the failed equipment suggested that overfilling of the UST was the primary source of contamination. Research of maintenance records produced memos documenting two significant incidents when the tank was overfilled. Client: AIG Environmental Claims.

Retained by the insurance company funding cleanup of a contaminated property to provide technical support for review and approval of investigation plans, remedial technology assessments, treatability studies, remediation plans, and associated schedules and budgets. Saved client $300,000 by eliminating unnecessary studies and sampling costs.

Retained by insurance company to assess interim remedial measures (IRMs) and remedial technology to contain cost for which the insured was potentially responsible. Project successes included scoping of the IRMs to reduce costs and eliminate future liability, and termination of a plan to use expensive and risky IRMs that could have cost the insured and the client millions of dollars.

Retained to assess remedial failure of a soil-vapor extraction (SVE) and groundwater recovery system and develop closure strategy for a large service station complex in central Washington. Initial review of the site plans identified two large cisterns (that were part of the storm water control measures) located upgradient and laterally from the original spill site. Surface spills during fuel dispensing were being released to these cisterns, and heavy rainfall events would flood the cisterns, initially changing the direction of near-surface groundwater flow and resulting in recontamination of the site. Client was advised that the site would never reach cleanup goals without revising the storm water management.

O-3-224

Remedial Cost Analysis

Prepared expert analysis and testified at trial regarding past and future remediation costs that Raybestos had incurred as the result of a breach of agreement with the State of Indiana. Trial held in Indiana Superior Court September 2006. Cost projection analysis used proprietary cost model developed with Mark Johns of Exponent. The model and results were presented at trial, and the judge accepted the model, calculations, and analysis, and subsequently awarded our client 100% of claimed prior and future costs.

Prepared cost analysis for remediation/removal of lead-contaminated soil at the Roberts' Ranch in San Diego County as part of negotiating a purchase and sale agreement. This assignment included not only the remedial cost analysis but also working closely with our client (counsel to the seller) to draft technical requirements, and to establish conditions of the purchase and sale agreement that would allow the seller reasonable control of the removal process, to protect their liabilities and cost.

Redevelopment, Closure, and Brownfields

Served as project manager to address environmental issues associated with former 40-acre waste disposal site being redeveloped for residential use. Environmental issues included metals and nitrates. Used simple hydraulic models and natural attenuation analysis to demonstrate that the site could be safely redeveloped without requiring further measures to protect nearby water supplies. This information was communicated via a simple site model used to facilitate the regulatory understanding of the miniscule risks that the site presented. Client savings from avoiding additional investigation and long-term monitoring were estimated at more than $300,000.

Served as project manager for closure of site and resolution of environmental issues necessary to facilitate sale and redevelopment of a large shopping center in suburban Maryland. Contaminants included multiple solvents (chlorinated and non-chlorinated) and heavy metals. Potentially affected areas included residential areas, schools, and a major wetland. Used available data and conceptual site models to demonstrate that ecological and health risks associated with the site would be eliminated by the natural attenuation processes already at work at the site. Evaluation also included an assessment of remedial failure that could be caused by changes in site conditions, and addressed concerns that the natural bioremediation would halt before reaching acceptable levels. Although solvent and metals concentrations in groundwater exceeded MCLs, client received a no-further-action letter based on our analysis. Net client savings included $200,000 in additional investigation costs and potentially $1,000,000 in long-term monitoring costs.

Served as project manager and consultant for restoration and proposed redevelopment of a portion of a major wood treatment facility that was on City property, located between residential areas and the national wildlife refuge. Contaminants included creosotes and other wood-treating chemicals. Work included cost analysis, EDA and EPA grant application support, interim removal action evaluation, and remedial failure analysis. Analysis allowed site re-development to proceed, with limited risk to the City. In turn, the lead PRP at the site was able to use more than $2,500,000 in remedial action from the City's redevelopment project to obtain matching cleanup grants.

O-3-224

Served as project manager for large solvent and fuel distribution facility and former solvent recycling facility. Tasks included failure analysis of various remedial actions proposed by site owner's consultant. Also conducted risk failure analysis of existing operations and liabilities associated with the site that could affect future redevelopment or sale. Analyses demonstrated that current operations were susceptible to routine failures that could prevent the site from ever achieving agency cleanup goals. Conversely, the near-surface geology and hydrogeology, along with the existing monitoring system, actually were an asset if the site were to be used for any operations that could accidentally release solvents, because natural containment, biological remediation equipment, and monitoring systems were in place and operational.

Retained by counsel for secondary insurers to evaluate site conditions and potential failure of proposed remedial measures. Initial evaluation indicated that the environmental issues associated with the site could be resolved within the limits of the underlying policies, and that further action or evaluation was not necessary.

Retained by major re-insurer to evaluate remedial actions and costs associated with a major Superfund site. Evaluated proposed remedial actions with regard to adequacy, cost, and failure potential, as well as proposed budgets and schedules. Project was initiated and completed within 2 weeks.

Retained by USAF ACC to conduct audits and assessments of Superfund sites at all 22 USAF ACC bases in the United States. Evaluated both the implemented and planned remediation for potential failures leading to unacceptable environmental or health risks. Project encompassed more than 50 Superfund sites with more than 200 remediation systems. Identified sites where remediation was no longer necessary as well, and reduced proposed sampling and extent of long-term monitoring.

Retained as a regulatory, closure, and remedial technology evaluator to address environmental engineering challenges associated with the closure or expansion of military installations in the three rounds of BRAC. Specific assignments included evaluation of risks of remediation failure or inadequacy to protect future uses of facilities. Such uses included schools and residential facilities, as well as commercial and industrial complexes. Evaluated remedial technology and schedule to ensure that remedial requirements would not interfere with the expansion of base facilities (industrial repair complexes) as well as support services such as child development centers and schools. Work was performed for USAF, U.S. Army, U.S. Navy, and Marines. California bases included Castle, Mather, Fort Ord, Twenty-Nine Palms, China Lake, Vandenberg, Davis Well Field, Stockton Army Depot, Sharp Army Depot, and Travis.

Supported an economic stability and redevelopment project in South Stockton, California. Provided an analysis and preliminary plan for required facilities, utilities, and zoning changes needed to develop undeveloped and underutilized properties for business purposes in support of economic growth and stability of the South Stockton neighborhood. 1970 graduate-level class and community support project through University of California at Davis.

O-3-224

Lead-Based Paint Investigation and Management

Retained as a technical expert to assess the nature, extent, and significance of lead paint investigations conducted at six school districts in Texas. Also retained to investigate and evaluate the restoration plans and costs associated with lead-based paint at these facilities.

Served as project manager for a study that included lead-based paint surveys of base schools, child development centers, hospital, recreational facilities, day care centers, day care homes, and representative military family housing. Survey data were analyzed and used to develop a lead-based paint management program plan. Project challenges included the need to manage lead-based paint on and in buildings listed on the national historic register that required maintenance of the original look and color of the buildings.

Acted as program and project manager for $4,000,000 lead-based paint investigation and management planning/consulting project that covered 200,000 military family housing units worldwide, as well as more than 4,000 schools, hospitals, child development centers, day care facilities, and other Air Force facilities used by military families. Recommended abatement procedures, revision of existing military housing renovation guidance to reduce potential releases of lead-based paint, in-place lead-paint management planning, evaluation of lead-based paint renovation debris, and options for disposal.

Served as project manager for investigation of lead-based paint and asbestos at historical command and aide residences. Showed staff how to interpret existing management plans and prior reports, eliminating the need for further investigation and management.

Served as project manager for lead investigation project. Developed screening methods to allow U.S. Army staff to segregate soil contaminated with lead-based paint from soil contaminated with bullet lead containing arsenic, using proprietary XRF soil screening methods. Soil in an area between an indoor shooting range and Post support buildings painted with lead-based paint had become contaminated with lead. However, because the bullet lead contained potentially leachable arsenic, the areas contaminated with bullet lead needed to be segregated from the areas contaminated with lead-based paint. XRF screening methods were employed, and the Army successfully segregated and remediated the soils contaminated by the different sources of lead.

O-3-224

Water Resources and Water Quality Management

Retained as project manager to support appeal of proposed permit requirements for NPDES permit. Although the proposed permit limits appeared to be required to meet Great Lakes Water Quality Standards for discharges, the analyses (by the regulator who drafted the permit) were flawed. Although the analyses' flaws were minor in nature, cumulatively they resulted in proposed permit effluent limits that would be expensive to meet, could not be met under routine adverse conditions, and provided no measurable benefit to water quality. Exponent prepared a rebuttal report pointing out the flaws—which included failure to address natural groundwater discharges with elevated contaminant concentrations, calculation errors, and use of unreliable sample data—and also provided documented studies showing that the minimal effects level for the contaminants was well above the proposed limit.

Served as project manager for design of restoration project to restore former disposal site on Hood Canal. Developed innovative design that provided nesting and perching structures for eagles and osprey, improved shoreline habitat for surf smelt, protected the small boat launch, and used native plants to revegetate the 3-acre site. The native plants specified provided much-needed food and cover, eliminated the need to provide nutrients and water during the first summer, and were less costly than traditional regrading and reseeding. U.S. Navy received regional recognition for use of native plants.

Served as project manager for restoration of a gravel pit, as required by Section 404, under direction of the U.S. Army Corps of Engineers. Innovations included the construction of nesting habitat, forage areas, and safety islands to attract geese away from the runways. Eielson AFB natural resources manager received USAF award for the success of this project.

Served as project manager and principle designer for expansion of storm water treatment facility to accommodate revised mission for Fairchild AFB. Innovations included expansion and re-configuration of the ponds to increase contact with vegetation and thereby improve metals removal, long-term maintenance plan to ensure continued compliance with permits, and revised vegetation to eliminate use by ducks and other water fowl that were accessing the current ponds located near the flight lines.

Acted as design engineer for vegetation restoration to improve spawning habitat for salmon. Innovations included use of limestone to improve water chemistry and introduction of plants formerly native to the area, to provide summer shading and reduce water temperatures.

Served as an internal consultant for implementation and limitation issues for water quality testing to detect water contamination from terrorist activities. Using experience and knowledge of water collection, treatment, and distribution facilities, identified sampling locations, assessed analytical methods, and evaluated the effectiveness of certain compounds. O-3-224

Developed an innovative process to recycle 1,000,000 gal per day of the process wastewater that was being discharged to the POTW, while advising a client on process management of an industrial pre-treatment system. The payback from savings on water and sewer bills would be met within 8 years. However, the development of nearby properties was being delayed because of inadequate sewer capacity and water supplies. The right to the unneeded water and sewer capacity could be sold to the developers for more than the cost of recycling.

Professional Affiliations

- Sponsor Member, Washington State Defense Trial Lawyers Association

Deposition and Trial Testimony

Available on request.

Certification of Authenticity of Electronic Submittal

I, Jeffrey P. Carlin, declare:

I am an associate at Latham & Watkins LLP, counsel of record for National Steel and Shipbuilding Company ("NASSCO") in the Matter of Tentative Cleanup and Abatement Order R9-2011-0001 before the San Diego Regional Water Quality Control Board ("Water Board"). I am licensed to practice law in the State of California and make this declaration as an authorized representative for NASSCO. I declare under penalty of perjury under the laws of the State of California that the electronic version of Exponent Inc.'s Comments on the Draft Preliminary Environmental Impact Report for the Shipyard Sediment Remediation Project, Dated June 16, 2011, submitted to the Water Board and served on the Designated Parties by e-mail on August 1, 2011, is a true and accurate copy of the submitted hard copy. Executed this 1st day of August 2011, in San Diego, California. O-3-225

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LATHAM & WATKINS LLP

File No. 048876-0011

August 1, 2011

VIA EMAIL AND OVERNIGHT MAIL

Mr. Vicente Rodriguez
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123
vrodriguez@waterboards.ca.gov

Re: NASSCO's Comments on the Draft Environmental Impact Report for the Shipyard Sediment Remediation Project (SCH # 2009111098)

Dear Mr. Rodriguez:

Designated Party National Steel and Shipbuilding Company ("NASSCO") submits the following comments regarding the Draft Environmental Impact Report ("DEIR") for the Shipyard Sediment Remediation Project ("Project"), State Clearing House Number 2009111098, publicly released by the California Regional Water Quality Control Board, San Diego Region ("Regional Board") on June 16, 2011. NASSCO is also concurrently submitting under separate cover additional comments on the DEIR prepared by Rick Bodishbaugh, Tom Ginn and Gary Brugger of Exponent, and Michael Whelan and David Templeton of Anchor QEA, which are intended to supplement this letter. O-3-1

Although we have numerous concerns with the analysis in the DEIR, NASSCO's key concerns are summarized as follows:

- **Monitored Natural Attenuation**: The DEIR fails to mention (much less evaluate) a monitored natural attenuation alternative to the Project, even though such an alternative was selected as the preferred remedy in the Detailed Sediment Investigation underlying Tentative Cleanup and Abatement Order R9-2011-0001 ("TCAO") and the associated Draft Technical Report ("DTR"), and notwithstanding that substantial evidence demonstrates that the monitored natural attenuation alternative will avoid all of the proposed Project's significant and potentially significant environmental impacts, obviate the need for the Project's detailed, costly and uncertain mitigation measures, and feasibly accomplish the Project Objectives in a reasonable period of time. O-3-2

- **Recontamination from Stormwater**: The DEIR does not disclose the past and continuing discharges of urban runoff from Chollas Creek and other sources to the Shipyard O-3-3

Sediment Site ("Site"), even though the TCAO and DTR make clear that these discharges have contributed pollutants to sediments at the Site. This omission is compounded by the DEIR's failure to evaluate reasonably foreseeable impacts to the Site from recontamination, which would likely occur after the Project's contemplated dredging is completed given that stormwater discharges to the Site (unrelated to NASSCO) are uncontrolled. O-3-3

- **Hypothetical Baseline**: The DEIR states without analysis that existing sediment quality at the Site adversely impacts beneficial uses to aquatic life, aquatic-dependent wildlife and human health. But these statements are based on extremely conservative theoretical assumptions used to support the DTR's analysis, and have no relationship to the actual, *existing* conditions at the Site, as is mandatory for the "baseline" under the California Environmental Quality Act ("CEQA"). O-3-4

- **Bias In Favor of Convair Lagoon CDF Alternative**: More than 30% of the DEIR is devoted to consideration of the Convair Lagoon alternative (in addition to six appendices), while each of the other alternatives is evaluated in less than seven pages. The DEIR does not explain why the analysis is stacked in favor of the Convair Lagoon alternative, it does not disclose that the alternative is being championed by the San Diego Unified Port District ("Port District"), and it does not indicate why the Port District was allowed to submit a detailed analysis in support of its preferred alternative (which would create ten acres of waterfront property for the Port District with substantial corresponding financial benefits to it and substantial corresponding costs to the other Designated Parties). O-3-5

- **Proposed Mitigation Is Infeasible:** The DEIR introduces new mitigation requirements that were not evaluated in the TCAO/DTR's economic feasibility analysis, and which will add an estimated $11.8 to $18.3 million to the costs of remediating the Site. Because these measures were not evaluated under State Water Resources Control Board Resolution No. 92-49, Polices and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code section 13304 ("Resolution 92-49"), or California Water Code sections 13267 and 13307, and in any event will not pass muster under such analysis to the extent that it is conducted, the Regional Board lacks authority to impose these measures under the Porter Cologne Act and they are thus "legally infeasible" under CEQA. The additional costs also render certain of the measures, and implementation of the proposed Project as a whole, economically infeasible under CEQA. O-3-6

- **The Regional Board Cannot Mandate Cleanup Methods:** The proposed Project and alternatives (aside from the "no project" alternative) each purport to dictate the method by which cleanup levels at the Site are to be achieved. However, because the Regional Board's authority under the Porter Cologne Act is limited to prescribing cleanup levels rather than selecting methods to achieve those cleanup levels, (Water Code § 13360), the Project and the alternatives proposing remediation each are "legally infeasible" under CEQA because they cannot be adopted under the Porter Cologne Act. O-3-7

NASSCO's specific and detailed comments on the DEIR are set forth below.

I. THE DEIR'S ALTERNATIVES ANALYSIS IMPROPERLY OMITS CONSIDERATION OF MONITORED NATURAL ATTENUATION

A. CEQA Requires Evaluation of Potentially Feasible Alternatives That Will Reduce Environmental Impacts

In order to be legally valid and fulfill the EIR's purpose to "foster informed decisionmaking and public participation," an EIR "**must** consider a reasonable range of potentially feasible alternatives" that would "avoid or substantially lessen any of the significant effects of the project." 14 Cal. Code Regs. ("CEQA Guidelines") § 15126.6(a) (emphasis added); *Center for Biological Diversity v. County of San Bernardino*, 185 Cal. App. 4th 866, 885 (2010) ("The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making."). The purpose of the alternatives discussion is to identify ways to reduce or avoid significant environmental effects, (*Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.*, 47 Cal. 3d 376, 403 (1988)), and proposed alternatives must be discussed to the extent that they are able to implement most although not all of the identified project objectives. *See Mira Mar Mobile Community v. City of Oceanside*, 119 Cal. App. 4th 477 (2004). Further, "an in-depth discussion is required" of any alternative that is "at least potentially feasible." *Center for Biological Diversity*, 185 Cal. App. 4th at 883. O-3-8

An agency's selection of alternatives for evaluation in an EIR must be supported by a "reasonable basis," and an EIR is legally defective if it fails to include a reasonable explanation for excluding consideration of an alternative that would reduce environmental impacts and achieve most project objectives. *Center for Biological Diversity*, 185 Cal. App. 4th at 883. Moreover, the scope of the alternatives analysis is not subject to a "categorical legal imperative," rather "[e]ach case must be evaluated on its facts . . ." *Watsonville Pilots Ass'n v. City of Watsonville*, 183 Cal. App. 4th 1059, 1086 (2010).

B. The DEIR Was Required to Evaluate Monitored Natural Attenuation As an Alternative To The Project

1. Overview of The Monitored Natural Attenuation Alternative

Monitored Natural Attenuation ("MNA") refers to the reliance on natural processes to achieve site-specific remedial objectives. As explained in the DTR, MNA:

> [i]s a contaminated sediment remedy that depends on un-enhanced natural processes to reduce risk to human and environmental receptors to acceptable levels. [MNA] involves leaving the contaminated sediment in place and allowing the ongoing aquatic processes to contain, destroy, or otherwise reduce the bioavailability of the sediment pollutants in order to achieve site specific remedial action objectives. Underlying MN[A] processes may include biodegradation, biotransformation, bioturbation, diffusion, dilution, adsorption, volatilization, chemical reaction or destruction, resuspension, and burial by clean sediment. O-3-9

DTR, at 30-2.[1]

"Monitoring is fundamental to the remedy in order to assess whether risk reduction and ecological recovery by natural processes are occurring as expected." *Id.* Thus, while dependent upon natural processes, MNA is not a "no-action" remedy, as it must be used within the context of a carefully controlled and monitored cleanup approach.

Although MNA is completely ignored in the DEIR, it was selected as the preferred alternative remedy out of the three studied in detail in the expert-prepared Detailed Sediment Investigation underlying the TCAO/DTR.[2] NASSCO and Southwest Marine Detailed Sediment Investigation ("Shipyard Report"), at 1-2 – 1-4. The Shipyard Report also provided the data underlying the TCAO and DTR. TCAO, at ¶ 13. The Shipyard Report concluded that "natural recovery of benthic macroinvertebrate communities would be expected to occur within a 3-5 year period" if off-site sources were to be controlled, and that MNA "is the only alternative that provides acceptable effects on beneficial uses and is technically and economically feasible." Shipyard Report, at 15-3 and 19-12, 19-13. The Shipyard Report and its associated sediment investigation was "detailed" and conducted with substantial oversight and input from Regional Board staff, stakeholders, and the public. Shipyard Report, at 1-2 – 1-4 (summarizing the directives and guidance provided by Regional Board staff throughout the planning and execution of the sediment investigation and Shipyard Report); Deposition of David Barker ("Barker Depo."), at 80:2 – 80:22, 82:3 – 82:4, 82:14 – 82:23 (discussing the scope, quality, and extent of Regional Board staff involvement in the sediment investigation); Deposition of Tom Alo ("Alo Depo."), at 402:21 – 403:18 (acknowledging that the Regional Board had significant oversight and involvement in the process of developing and conducting the sediment investigation and Shipyard Report); DTR, at 13-2 – 13-3 (summarizing Regional Board staff and stakeholder involvement in the sediment investigation). O-3-10

The MNA alternative includes "sampling to assess naturally occurring changes in sediment conditions and biological communities," consisting of long-term monitoring, with periodic surveys and sample collection throughout areas of the Site not otherwise subject to disturbance, in order "to track sediment quality and benthic community conditions over time." Shipyard Report, at 17-1. More specifically, the alternative requires monitoring of physical, chemical, and biological parameters in four separate sampling events during years 1, 2, 5, and 10, and additional monitoring beyond year 10, if necessary, depending upon the degree to which natural recovery has occurred after 10 years. Shipyard Report, at 16-1. Monitoring stations would be located every 2 to 5 acres throughout the Site, depending on the chemical concentrations currently existing in the sediments (i.e., within the specified range, monitoring O-3-11

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1 Unless otherwise indicated, all documents or information cited in this letter are already contained within the Shipyard Administrative Record ("Administrative Record"). Accordingly, NASSCO incorporates herein those documents and information by this reference, and is not resubmitting them with this letter.

2 The "MNA alternative" discussed in this letter refers to the monitored natural attenuation alternative evaluated in and recommended by the Shipyard Report.

stations would be more closely spaced in areas with higher chemical concentrations.). *Id.*, at 16-1 - 16-2. Each monitoring event would include bathymetry and core sampling for sediment thickness and physical properties (including particle size distribution, total solids, and TOC); monitoring of a selected set of metals, as well as butyltins, PCBs, and PAHs; and amphipod toxicity tests and benthic macroinvertebrate community assessments. *Id.* Reports would be prepared and submitted to the Regional Board after each monitoring event. *Id.* O-3-11

The DEIR fails to offer *any* explanation, much less a "reasoned" explanation, for completely omitting discussion or consideration of the MNA alternative. Because substantial evidence from multiple sources demonstrates that MNA can achieve the Project Objectives while avoiding the proposed Project's significant environmental impacts (and the need to rely on detailed, costly and uncertain mitigation measures), as discussed below, CEQA requires evaluation of MNA as an alternative remedy. Exclusion of MNA from the DEIR frustrates CEQA's goal of informed decision making and meaningful public participation, because it precludes the public from commenting on, and the Regional Board from considering and potentially adopting, a remedy that will avoid the Project's significant environmental impacts while achieving its objectives in a timely and cost-effective manner. Any doubt by Regional Board staff about whether MNA should have been considered is put to rest conclusively by the fact that it was the Shipyard Report's preferred remedy, mandating its inclusion in any "reasonable range" of alternatives based on the specific facts of this proceeding. *Watsonville Pilots Ass'n,* 183 Cal. App. 4th at 1086. O-3-12

2. The Monitored Natural Attenuation Alternative Will Feasibly Attain Project Objectives

Pursuant to the Regional Board's mandate, the primary purpose of the Project is to protect beneficial uses in San Diego Bay for human health, aquatic life, and aquatic-dependent wildlife, and to ensure the best water quality that is "reasonable." DEIR, at 3-3 and 3-4. Project Objectives also include the implementation of a sediment cleanup that is consistent with the TCAO, including the attainment of cleanup levels set forth in the TCAO, which will have long-term effectiveness while minimizing environmental impacts and disruptions on the use of shipyard and other San Diego Bay-dependent facilities. DEIR, at 3-4 and 3-5. As discussed below, substantial evidence demonstrates that natural recovery is already occurring at the Site, and that the MNA alternative is capable of fully satisfying Project Objectives in a feasible manner. O-3-13

The DTR acknowledges that "a range of natural recovery processes are active at the Shipyard Sediment Site." DTR, at 30-3. As detailed in NASSCO's May 26, 2011 comments on the TCAO and DTR,[3] record evidence shows that natural attenuation is already occurring at the O-3-14

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[3] For the sake of brevity, and because NASSCO has already submitted detailed comments on the TCAO/DTR that are included within the Administrative Record, NASSCO will reference its prior comments in this letter rather than re-stating those comments in full. All of NASSCO's prior comments pertaining to the issues addressed in this letter are incorporated herein by this reference.

Site for all five primary contaminants of concern ("primary COCs") identified in the TCAO,[4] and that, if allowed to continue in lieu of dredging, will achieve the Regional Board's cleanup goals within a reasonable period of time. *See* Comments On The San Diego Regional Water Quality Control Board Cleanup Team's September 15, 2010 Tentative Cleanup And Abatement Order No. R9-2011-0001, Draft Technical Report, And Shipyard Administrative Record ("NASSCO's May 26 Comments"), at 40-41. Sampling conducted in 2009 indicates that the surface-weighted average concentrations ("SWACs")[5] for the five primary COCs decreased substantially in the monitored locations during the seven years since the data for the Shipyard Report was collected in 2002, and, in many cases, are now only slightly higher than post-remedial (i.e., dredging) SWACs in the TCAO. This suggests that the cleanup goals articulated in the TCAO can be achieved in a reasonable time through the MNA alternative, without incurring the significant environmental, economic, and social impacts that are certain to result from dredging. Barker Depo. Exhibit No. 1228. In fact, among the locations sampled in 2009, which were selected because they are considered representative of site-wide conditions, ***three of the five SWACs for primary contaminants of concern already have attained the post-remedial SWACs that would be required by the TCAO***, and the remaining two are only slightly higher. *Id.*; *see also* Barker Depo., at 335:22 – 337:13 (confirming same); *see also* Barker Depo., at 303:5 – 304:4 (acknowledging that MNA could eliminate risks to benthic organisms, and improve protection for all beneficial uses within five years). O-3-14

Regarding the efficacy of natural attenuation, evidence within the Administrative Record demonstrates that sediments buried below approximately 10 cm are not "biologically available,"[6] and thus do not impact the water or marine environment. Evidence also shows that new O-3-15

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[4] The primary COCs are copper, mercury, HPAHs, PCBs, and TBT. DEIR, at 4.3-3 and 4.3-4.

[5] A "SWAC" approach, which refers to calculating the average concentration of a contaminant in the sediment at the surface, was used to assess potential impacts to human health and aquatic-dependent wildlife at the Site. DTR, at 32-7. The TCAO and DTR require that sediments be remediated to meet specified cleanup levels, articulated as post-remedial SWACs for the primary COCs, which levels have been determined by Regional Board staff not to pose an unreasonable health risk to humans or aquatic dependent wildlife. *Id.* Under the DTR's approach, once these extremely conservative target SWACs are met, through MNA or otherwise, the sediments will be considered fully protective of beneficial uses.

[6] The term "biologically available" refers to the potential for a chemical to enter into ecological or human receptors. Importance of Bioavailablity for Risk Assessment of Sediment Contaminants at the NASSCO Site – San Diego Bay, Herbert E. Allen, Ph. D., March 11, 2011 ("Allen Report"), at 2. Sediments below the "biologically active zone"—which refers to the surface layer of sediment in which bioturbation and mixing occurs, and where the exposure potential is greatest for invertebrates and fish—are not "bioavailable." The biologically active zone comprises approximately the top 10 cm of sediment; however, the most biologically active zone typically occurs within the top 0-2 cm. Deposition of David Gibson, at 156:3 – 157:12; Shipyard Report, at 15-3.

sediments are deposited at a rate of 2 cm per year, suggesting that new sediments will bury any residual contamination within a reasonable period of time. Deposition of David Gibson ("Gibson Depo."), at 156:3 – 157:12 (agreeing that sediments buried below approximately 10 cm are below the "biologically active zones," and therefore are not biologically available); Regional Board Cleanup Team's Response to NASSCO's Requests For Admission, at RFA No. 57 (agreeing that new sediments are deposited at a rate of 2 cm/year at the Shipyard Sediment Site); Barker Depo., at 292:6 – 292:22 (agreeing that Site characteristics, including active deposition of sediments at 1-2 cm per year, limited elevated concentrations of chemicals in certain areas of the shipyard, and that the limited bioavailability of the chemicals to benthic organisms favors the potential effectiveness of natural recovery). O-3-15

Additionally, "chemical biodegradation;[7] sediment accumulation, mixing, and burial; and [concomitant] benthic fauna recolonization" are other natural processes that are expected to "lead to changes in aquatic life conditions" at the Site. Shipyard Report, at 18-4 ("Natural recovery will occur through breakdown of organic chemicals and through burial and dilution of chemical concentrations by newly deposited sediment."). O-3-16

3. The Monitored Natural Attenuation Alternative Will Avoid All Of the Proposed Project's Significant and Potentially Significant Impacts

The DEIR recognizes that each of the Project's potential environmental impacts results from "construction or dredging activity," and that, in the absence of construction or dredging, no temporary construction traffic or noise would occur, and there would be no air quality impacts, contribution to global warming, objectionable odors, risk of accidental spills during cleanup activities, impacts to marine species or communities, or increased potential impacts related to hazards or marine biological resources. DEIR, at 5-10, 5-25. The same is true with respect to all alternatives considered except for the "no-project" alternative. O-3-17

Because it involves no construction or dredging, it is undisputed that implementing the MNA alternative will avoid all of the Project's significant environmental impacts to air quality, as well as its potentially significant effects to biological resources, water quality, hazardous materials and traffic, all of which are tied specifically to dredging. The MNA alternative would also avoid the Project's proposed destruction of highly sensitive eelgrass and mature benthic communities, and obviate the Project's mandatory reliance on numerous mitigation measures which are costly and uncertain, and which will cause their own environmental impacts requiring O-3-18

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7 Site constituents and primary COCs such as TBT and PAHs are known to naturally degrade relatively quickly in the marine environment. *See* Barker Depo, at 335:22 – 336:10 (testifying that TBT undergoes rapid natural degradation in the environment, and confirming that the 2009 testing results are consistent with previous findings concerning the rapid biodegradation of TBT); Shipyard Report, at 15-3 ("Petroleum hydrocarbons . . . weather relatively quickly. The most toxic components of petroleum hydrocarbons are broken down in weeks to months in the marine environment. As a result, remediation of subtidal sediments is ordinarily not required even after a major oil spill. A relatively short period of natural recovery is therefore expected to address any effects of petroleum hydrocarbons.").

mitigation (NASSCO also believes that many of these mitigation requirements are infeasible or otherwise inappropriate, and may not be imposed by the Regional Board, as detailed below, such that certain of the impacts deemed potentially significant would need to be treated as significant if the proposed Project is adopted). In this way, the environmental impacts associated with the MNA alternative would be equivalent to those of the "no project/no development alternative" (Alternative 1) studied in the DEIR, which was found to be the "environmentally superior" alternative "because the direct physical effects of the proposed project **would not occur**." DEIR, at 5-25 (emphasis added). O-3-18

A wealth of evidence elsewhere in the Administrative Record likewise shows that the MNA alternative will not implicate the environmental and other costs associated with dredging. *See, e.g.,* Shipyard Report, at § 19 (comparing a variety of alternatives and concluding that dredging alternatives "provide little or no incremental benefit over baseline conditions but impose significant impacts on shipyard operations and on the local community, and do so at a high cost"); *see also* Barker Depo., at 306:22 – 307:21 (acknowledging the existence of healthy benthic communities at the Site, agreeing that MNA would preserve those communities and avoid the possible risk of colonization by invasive species, and recognizing that these factors weigh in favor of selecting MNA over dredging), 916:22 - 917:2 (avoiding destruction of the mature benthic communities and eelgrass beds located at the Site would be one benefit of selecting the MNA alternative). O-3-19

By contrast to natural recovery, the DTR confirms that dredging "destroys the benthic community," with no guarantee that it will be recolonized successfully. DTR, at 34-11; *see also* Barker Depo., at 306:22 – 307:21. Dredging destroys other biota as well, such as eelgrass, which may require more than five years to become reestablished and mature to the point that they can sustain the original community. Shipyard Report, at 15-10, 18-9 – 18-10. Moreover, "eelgrass is currently found primarily in areas with water depths less than 10 ft and may not be able to reestablish itself in the deeper water that would exist in the dredged areas" regardless of any mitigation that is imposed. Shipyard Report, at 18-12. Critically, the MNA alternative also avoids the very real possibility that the Project will be implemented and substantial amounts of sediment dredged, only to have the dredged areas recontaminated by ongoing and uncontrolled stormwater discharges to the Site from Chollas Creek and elsewhere. As noted, natural recovery is already occurring at the Site even in the presence of continuing sources of stormwater discharges to the Site. The TCAO and DTR recognize that these stormwater discharges continue to affect sediments at the Site, (TCAO, at ¶¶ 4, 11, 30, 32, 33; DTR, at §§ 4.7, 11.6, 30, 32, 33), although the DEIR failed to evaluate this reasonably foreseeable significant impact. O-3-20

Given that source control is a critical component of any remedy that is selected,[8] it certainly makes more sense to ensure that source control is achieved before incurring the significant costs associated with dredging, since recontamination may obviate any beneficial O-3-21

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[8] According to EPA Guidance, "[i]dentifying and controlling contaminant sources typically is critical to the effectiveness of any [ ] sediment cleanup." Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, EPA-540-R5-05-012 (Dec. 2005), at 2-20.

results of the dredging, and since natural recovery is already occurring at the Site even in the presence of ongoing stormwater contamination. The MNA alternative would allow source control to be implemented, and continued monitoring could determine whether the TCAO's cleanup levels are achieved through natural recovery and without the need for dredging. If dredging ultimately is required, which NASSCO does not believe it will be, that dredging would be more effectively implemented after stormwater discharges to the Site are controlled. O-3-21

4. Monitored Natural Attenuation is Not a "No Action" Remedy

As the Cleanup Team acknowledges, *"[m]onitored natural recovery is not a passive, no-action, or no-cost remedy*:

> While it does not require active construction, effective remediation via MN[A] relies on a fundamental understanding of the underlying natural processes that are occurring at the site. <u>MN[A] remedies require extensive risk assessment, site characterization, predictive modeling and monitoring to verify source control, identify natural processes, set expectations for recovery, and confirm that natural processes continue to reduce risk over time as predicted</u>.

O-3-22

DTR, at 30-2 (emphasis added); *see also* Shipyard Report, at 17-1 (describing detailed monitoring requirements associated with MNA). Indeed, the DEIR recognizes that "[r]emedial actions may include . . . natural recovery." DEIR, at 3-5.

In addition to detailed monitoring requirements, the MNA alternative also contemplates active remediation (or other action) *if necessary* based on the monitoring results. *E.g.*, Barker Depo., at 916:16 – 917:17 (testifying that if MNA is selected and does not work as expected, the Regional Board could impose dredging or another remedy). Thus, the "no project/no development" alternative, which "would not implement the Tentative CAO," (DEIR, at 5-9), and would not include any monitoring or associated requirements, plainly is distinguishable from implementing the MNA alternative. O-3-23

By way of analogy, in *Watsonville Pilots Association v. City of Watsonville*, the court rejected an agency's claim that the EIR's analysis of a no project alternative in the context of a general plan approval constituted sufficient consideration of a reduced development alternative, because "the environmental impacts of the project were primarily due to the impacts of growth itself" and "the alternatives analysis should have included an assessment of a reduced growth alternative that would meet most of the objectives of the project but would avoid or lessen these significant environmental impacts." 183 Cal. App. 4th at 1089-90. Instead, "[b]ecause . . . the 'no project' alternative would not create *any* plan for the future . . . it did not serve the purpose that a reduced development alternative should have served . . . Analysis of such an alternative would have provided the decision makers with information about how most of the project's objectives could be satisfied without the level of environmental impacts that would flow from the project." *Id.* at 1090. Accordingly, the city's certification of the EIR was set aside. O-3-24

Here, because taking "no action" would not implement the TCAO or serve the purposes of the MNA alternative, an "in-depth discussion" of the MNA alternative is required. *Center for Biological Diversity*, 185 Cal. App. 4th at 883. O-3-24

C. The Monitored Natural Attenuation Alternative Should Be Adopted

As explained, NASSCO believes that CEQA compels the DEIR to evaluate the MNA alternative before the Regional Board may approve the proposed Project. More importantly, however, the Regional Board should adopt the MNA alternative instead of the Project because MNA provides the opportunity to feasibly accomplish Project Objectives, in a reasonable period of time, without the environmental impacts, costs and economic and social disruptions that will result from the contemplated dredging of 143,000 cubic yards of sediment. Indeed, the Regional Board is prohibited from adopting the proposed Project instead of the MNA alternative, due to CEQA's "substantive mandate" that agencies refrain from approving projects with significant environmental effects if there are feasible alternatives that can avoid those effects. *Mountain Lion Foundation v. Fish & Game Comm.*, 16 Cal. 4th 105, 134 (1997). O-3-25

Upon request, NASSCO will be pleased to provide the Regional Board with any further information regarding the MNA alternative that it may wish to consider, in addition to the large volume of supporting evidence already included within the Administrative Record; and, as explained below, NASSCO will also provide a detailed analysis of the MNA alternative for inclusion in a recirculated DEIR. O-3-26

II. THE DEIR FAILS TO DISCUSS STORMWATER DISCHARGES TO THE SITE OR REASONABLY FORESEEABLE IMPACTS FROM RECONTAMINATION

A. An Accurate Description of the Project's Environmental Setting Is Critical to An Accurate Assessment of Impacts and Alternatives

An EIR is not required unless a proposed activity may result in a "significant effect on the environment." CEQA § 21100(a). Significant environmental effects are defined as substantial or potentially substantial adverse changes in the environment. CEQA §§ 21068, 21100(d); CEQA Guidelines § 15382. The "environment" for the purposes of CEQA analysis refers to the "the physical environmental conditions in the vicinity of the project" – normally "as they *exist* at the time the notice of preparation [for the EIR] is published" – and this environmental setting is referred to as the "baseline" against which the potential impacts of a proposed project are measured. CEQA Guidelines § 15125(a). In order to assess whether a project will have a potentially significant impact, the potential effects of a proposed activity are measured against this existing conditions "baseline." CEQA Guidelines § 15126.2(a) ("In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the *existing* physical conditions in the affected area as they *exist* at the time the notice of preparation is published . . .") (emphasis added). O-3-27

Because an EIR "must demonstrate that the significant environmental impacts of the proposed project were adequately investigated and discussed . . . in the full environmental context," (CEQA Guidelines § 15125(c)), an EIR is invalid if its description of the environmental setting is in any way deficient. *Cadiz Land Co. v. Rail Cycle, L.P.*, 83 Cal. App. 4th 74, 87 (2000) ("If the description of the environmental setting of the project site and surrounding area is inaccurate, incomplete or misleading, the EIR does not comply with CEQA."). This is because an "inadequate description of the environmental setting for the project" makes "a proper analysis of project impacts [] impossible." *Galante Vineyards v. Monterey Peninsula Water Management Distr.*, 60 Cal. App. 4th 1109, 1122 (1997). O-3-27

B. The DEIR Ignores Ongoing Sources of Contamination to the Site and Associated Impacts From Recontamination

The DEIR's description of the environmental setting completely ignores discharges of urban runoff to the Site from Chollas Creek, as well as stormwater discharges to the Site via storm drains SW4 and SW9, all of which are continuing and uncontrolled.[9] Because substantial evidence makes clear that these on-going discharges contribute pollutants to the sediments at the Site, and thus present a reasonable likelihood that the Site could be recontaminated after the Project's contemplated dredging, the DEIR's decision to exclude them from the environmental setting is improper as a matter of law and also precludes a legally adequate consideration of environmental impacts and alternatives. *See, e.g., San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus*, 27 Cal. App. 4th 713, 725-29 (1994) (environmental setting invalid as a matter of law, and rendered inadequate the impact analysis and mitigation findings, where the EIR failed to discuss a nearby wildlife preserve). O-3-28

As discussed in NASSCO's May 26 Comments, and stated clearly in the TCAO and DTR (and the supporting technical studies cited in the DTR),[10] substantial evidence shows that Chollas Creek discharges have contributed (and will continue to contribute) to the accumulation of pollutants observed in marine sediments at the Site; and, further, that the discharge of contaminants from Chollas Creek is not expected to be fully controlled for decades. May 26 Comments, at 35-39; *see also* TCAO, at ¶¶ 4 and 10 ("during storm events, storm water plumes toxic to marine life emanate from Chollas Creek up to 1.2 kilometers into San Diego Bay, and contribute to pollutant levels at the Shipyard Sediment Site."); DTR, at 4-1, 4-14 – 4-15 (confirming that the toxic plume of contaminated stormwater from Chollas Creek during rain events has been shown to extend more than a kilometer into San Diego Bay, including the area within NASSCO's leasehold, and contributes an array of pollutants to the Site); Deposition of Craig Carlisle ("Carlisle Depo."), at 200:5-200:13 (confirming that Chollas Creek releases contributed to sediment contamination at the Site); Barker Depo., at 921:14 – 922:15 (confirming that storm water outflows from Chollas Creek have contributed to the accumulation of pollution O-3-29

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[9] Pollutants in these discharges include metals, such as arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc; TSS; sediment; petroleum products; and synthetic organics, such as pesticides, herbicides, and PCBs. DTR, at 4-6.

[10] DTR, at § 4.7.1.3 (collecting studies concluding that toxic storm water flows from Chollas Creek impact the sediments at the Site, including Schiff (2003); Katz (2003); and Chadwick, *et al.* 1999. Sediment Quality Characterization - Naval Station San Diego Final Summary Report. U.S. Navy Technical Report 1777.

in marine sediment at the Site, and that these outflows reach the inner portion of NASSCO's leasehold), 923:8 – 923:15 (confirming that Stations NA19, NA06, NA15 and NA17 within the Site are potentially subject to influence from Chollas Creek); Carlisle Depo., at 104:5 – 105:3 (same). The TCAO and DTR also specifically identify urban runoff from SW4 and SW9 as sources contributing to sediment contamination at the Site. TCAO, at ¶¶ 4 and 10; DTR, at § 4; *see also, e.g.,* Carlisle Depo., at 102:23 – 103:21 (concluding that chemicals discharged from SW9 impact the area to be addressed in the TCAO); 207:2 – 207:7. O-3-29

Because these sources are continuing, logic dictates against dredging sediments at the Site until the sources are controlled, given the potential for subsequent recontamination. Indeed, the Shipyard Report concluded that "remediation of shipyard sediments prior to control of contaminant sources would be premature. Remediation would be ineffective because the shipyard leaseholds would be recontaminated by Chollas Creek and storm drain effluent." Shipyard Report, at 13-3. O-3-30

Moreover, members of the Cleanup Team have acknowledged it is "probable" that discharges from Chollas Creek will remain uncontrolled for the foreseeable future. Deposition of Benjamin Tobler ("Tobler Depo."), at 90:6 – 92:5. No reductions are required under the Chollas Creek TMDL for metals[11] until **2018**, and full compliance is not required until October **2028**. RWQCB Resolution No. R9-2007-0043, at ¶ 13; Barker Depo., 925:19-927:25. And it is unlikely that full compliance with the TMDL will be achieved even within the twenty-year timeframe set forth in the TMDL, because existing technology is simply insufficient and cost-prohibitive. Tobler Depo., at 90:6 – 92:5 ("[W]ithout getting into space-age technology, which is extremely cost-prohibitive, the only possible fix for the problem is a system of sand filters. Sand filters do filter out metals, but even sand filters only get you into the general ballpark for meeting compliance. In other words, the best sand filters right now only just barely get you to the ballpark of compliance. There's no margin of safety with it."). Thus, according to Regional O-3-31

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[11] Since 1994, Chollas Creek storm water samples have frequently exceeded Basin Plan narrative water quality objectives for toxicity, and California Toxics Rule criteria for copper, lead, and zinc. DTR, at 4-12. As a result, Chollas Creek was placed on the Clean Water Act section 303(d) List of Water Quality Limited Segments in 1996 for cadmium, copper, lead, zinc and toxicity, with zinc, copper, and diazinon subsequently identified as causes of the observed toxicity. Chollas Creek TMDL for Metals, Background, (available at http://www.waterboards.ca.gov/sandiego/water_issues/programs/tmdls/chollascreekmetals.shtml). Chollas Creek was also designated as a priority hot spot due to the presence of copper, DDT, chlordane and diazinon in the sediments, and the presence of impacts to aquatic life. RWQCB, Proposed Regional Toxic Hot Spot Cleanup Plan (Dec. 1997), at 1-16; Shipyard Report, at 1-16 – 1-17. To address these problems, TMDLs were adopted for diazinon and metals in Chollas Creek, and the Regional Board is currently in the process of developing a TMDL for PCBs, PAHs, and chlordane at the mouth of Chollas Creek. *Id.* The Chollas Creek TMDL for metals allocates quantitative limits for point and nonpoint discharges of copper, lead, and zinc, with the goal of ensuring that the capacity of the waterbody to assimilate pollutant loading is not exceeded.

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Board staff, it is "probable" that full compliance will not be achieved, even after 20 years and significant infrastructure improvements, "unless technology comes to the rescue." O-3-31

While it is undisputed that stormwater discharges are reaching the Site and have contributed to sediment contamination at the Site, and that Regional Board staff are well aware of same, the DEIR fails even to mention these sources of pollution, much less address the potential for recontamination. This oversight is particularly egregious given that EPA and Regional Board policies concerning sediment remediation each call for source control prior to any active remediation. Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, EPA-540-R5-05-012 (Dec. 2005) ("Contaminated Sediment Remediation Guidance"), at 2-21 ("Generally, significant continuing upland sources … should be controlled to the greatest extent possible before sediment cleanup."); State Water Resources Control Board Resolution No. 92-49, at III. E.; EPA's Contaminated Sediment Management Strategy, EPA-823-R-98-001 (Apr. 1998), at 54 (recognizing pollution prevention and source control as methods that will allow contaminated sediments to recover naturally without unacceptable impacts to beneficial uses). In fact, EPA Guidance specifically provides that "project managers should consider the potential for recontamination and factor that potential into the remedy selection process" "***before any sediment action is taken***." Contaminated Sediment Remediation Guidance, at 2-21 (emphasis added). O-3-32

This Regional Board and its staff are certainly aware of the need for source control prior to active remediation, given, among other things, the experience at the Convair Lagoon site in San Diego Bay, where significant funds were expended to construct a cap to remediate PCBs, only to subsequently find PCBs on top of the cap, apparently due to incomplete source control (among other potential causes). *E.g.*, Barker Depo., at 183:22 – 183:25. Ironically, the DEIR recognizes the potential for recontamination in its analysis of the Convair Lagoon alternative, noting the prior history at Convair Lagoon and explaining that the current Convair Lagoon CAO requires discharges to be abated, to the satisfaction of the State Board, before any further remedial actions may be conducted at Convair Lagoon. DEIR, at 5-35, 5-208, 5-211, 5-225 ("The CAO states that soil and groundwater must be cleaned up and waste discharges abated prior to conducting remedial actions in Convair Lagoon and San Diego Bay to prevent potential recontamination of the marine sediments in the bay."). Inexplicably, however, the DEIR simultaneously fails even to mention potential recontamination in relation to the proposed Project. *See also* Deposition of Cynthia Gorham, at 62:4 – 62:23 (acknowledging that dredging prior to source control may lead to recontamination). O-3-33

The DEIR also ignores other potential sources of recontamination that could occur after the Project's contemplated dredging. For example, while the DEIR concedes that resuspension of sediment caused by dredging related ship/barge movements is a potentially significant impact, (DEIR, at 4.3-15), it wholly fails to consider resuspension from non-dredging related ship movements. *See also* DEIR, at 4.3-15 (discussing potential for resuspended sediment to be introduced into the water column during placement of silt curtains). O-3-34

The DEIR's failure to discuss urban runoff/stormwater discharges to the Site and the potential for Site recontamination precludes a proper consideration of the Project's potential environmental impacts or comparison of alternatives, and renders the DEIR invalid. O-3-35

C. The Proposed Project May Not Feasibly Attain Project Objectives Due to the Likelihood That The Site Will Be Recontaminated After Dredging

Among others, the Project includes an objective of implementing a cleanup plan "that will have long-term effectiveness." DEIR, at 3-5. Even setting aside the proposed Project's significant environmental effects and questions regarding the necessity of the contemplated dredging or the efficacy of related mitigation measures, the proposed dredging may not ultimately be effective, or have "long-term effectiveness," if the dredged areas are subsequently recontaminated by ongoing sources of contamination to the Site. This is another reason why the DEIR must describe those sources and analyze the reasonably foreseeable and potentially significant impacts from recontamination, and identify any mitigation measures or alternatives to address this impact. O-3-36

Potential recontamination of the Site also weighs in favor of adopting the MNA alternative, which would allow source control to be addressed prior to any dredging, while confirming whether natural recovery is achieving the cleanup levels in the TCAO. O-3-37

III. THE BASELINE DOES NOT REFLECT EXISTING CONDITIONS

A. The Baseline Must Be Premised On *Existing* Physical Conditions

As noted, potentially significant impacts are assessed in an EIR by measuring the potential effects of a proposed activity against a "baseline." CEQA Guidelines § 15126.2(a) ("In assessing the impact of a proposed project on the environment, the lead agency should normally limit its examination to changes in the *existing* physical conditions in the affected area as they *exist* at the time the notice of preparation is published . . .") (emphasis added). Regarding the selection of a "baseline," the California Supreme Court recently confirmed that the lead agency must use "existing physical conditions." *Communities for a Better Env't v. South Coast Air Quality Mgmt. Dist.*, 48 Cal. 4th 310, 316, 319, 321 n. 7 (2010) (proper baseline for determining whether there would be significant environmental effects from emissions caused by proposed modifications to an oil refinery was the refinery's current existing operations, rather than its maximum permitted operations); *see also Eureka Citizens for Responsible Government v. City of Eureka*, 147 Cal. App. 4th 357, 370 (2007) ("environmental impacts should be examined in light of the environment as it exists when a project is approved"). O-3-38

"Case law makes clear that '[a]n EIR must focus on impacts to the existing environment, *not hypothetical situations*.'" *Sunnyvale West Neighborhood Ass'n v. City of Sunnyvale*, 190 Cal. App. 4th 1351, 1373 (2010) (emphasis added). This is because "[a]n approach using hypothetical . . . conditions as the baseline results in 'illusory' comparisons that 'can only mislead the public as to the reality of the impacts and subvert full consideration of the actual environmental impacts,' a result at direct odds with CEQA's intent." *Id.* at 1374. "It is only against [a proper] baseline that any significant environmental effects can be determined." *Id.* at 1373. O-3-39

Agencies possesses discretion to decide how the existing physical conditions can most realistically be measured, so long as that determination is supported by substantial evidence. O-3-40

Communities for a Better Environment, 48 Cal. 4th at 328. "[T]he date for establishing a baseline cannot be a rigid one. Environmental conditions may vary from year to year and in some cases it is necessary to consider conditions over a range of time periods." *Id.* at 327-28. O-3-40

B. The DEIR's Description of Sediment Quality at the Site Is Based On Hypothetical Assumptions Used In the TCAO and DTR

Based on the most cursory purported description of sediment quality at the Site, (DEIR, at 4.3-2; 3-3), the DEIR assumes (without providing any factual or analytical support) that Site sediments present risks to aquatic life, aquatic-dependent wildlife and human health beneficial uses. These assumptions color the entire CEQA review, including the Project Objectives and the analysis of alternatives and mitigation measures, and go to the heart of the decision whether the proposed Project should be pursued notwithstanding its undisputed significant and potentially significant environmental impacts. It is clear that the DEIR premises its statements regarding sediment quality on the TCAO and DTR, which the Project is designed to implement. But the TCAO's conclusions of risk to beneficial uses at the Site are predicated on assumptions that are overly conservative and unrealistic—by design and as admitted by the Cleanup Team, with an intent of being overly protective. Regardless of whether or not the Regional Board's highly conservative assumptions are appropriate in the context of the Project's evaluation under the Porter Cologne Act (NASSCO believes they are not), such assumptions cannot form a proper baseline under CEQA, as a matter of law, because CEQA mandates that the baseline reflect actual, existing conditions rather than hypothetical or theoretical scenarios. *Sunnyvale*, 190 Cal. App. 4th at 1373. O-3-41

A wealth of information in the Administrative Record shows that existing conditions at the Site present no risk to aquatic life, aquatic-dependent wildlife or human health beneficial uses. Rather, actual conditions are protective of beneficial uses, and the "risks" identified in the DTR were manufactured by compounding a series of overly conservative and unrealistic assumptions. *See* NASSCO's May 26 Comments, at 7-34. In fact, the Shipyard Report concluded that Site conditions were protective of beneficial uses based on sampling conducted in 2002-03;[12] and, as explained above, supplemental 2009 sampling (the most recent data available) demonstrates that natural attenuation has since reduced further the SWACs for primary COCs at the Site, and that for three of the five primary COCs the SWACs are already below the post-remediation levels required by the TCAO at the locations monitored in 2009. Shipyard Report, at 18-4; Barker Depo., Ex. 1228. O-3-42

The hypothetical assumptions in the DTR and TCAO that are the foundation of the DEIR's environmental setting and baseline regarding sediment quality and alleged risks to beneficial uses are summarized below. O-3-43

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12 Because the data underlying the TCAO and DTR was collected in 2002-2003, and because that data is the most recent comprehensive data set for the Site, it may appropriately be used to establish the baseline. It is also appropriate to consider the data collected in 2009. *Communities for a Better Environment*, 48 Cal. 4th at 328.

1. Aquatic-Dependent Wildlife

In assessing risks to aquatic-dependent wildlife, Regional Board staff assumed that each of the six species of concern that were evaluated[13] derived 100% of their diet from prey obtained within the Site. DTR, at § 24.2.2, Table 24-6. This assumption is entirely unrealistic for all six receptors—and was in no way predicated on the actual foraging activities of the receptors or any studies, guidelines or other agency documents. *E.g.*, Alo Depo., at 333:11-334:2; 345:8-346:13. The home range for each receptor is substantially greater than the 43 acre shipyard area, demonstrating that the receptors will travel well beyond (and consume prey outside) the confines of the shipyards. It also is unrealistic to assume that any receptor would choose to forage exclusively in an active industrial shipyard where the habitat quality is low for all species. Expert Report, of Thomas C. Ginn, Ph.D. ("Ginn Report"), at 59-61. By contrast, using a realistic assumption of each receptor's foraging area, alone, demonstrates that there is no risk to any of the receptors at the NASSCO shipyard. *Id*. Thus, the DTR's finding of risk to aquatic-dependent wildlife is entirely dependent upon Regional Board staff's policy decision to assume receptors would consume 100% of their diet at the shipyards; is not reflective of existing conditions at the Site; and cannot be used to inform the DEIR's baseline under CEQA. O-3-44

It is notable that in assessing the Project's impacts to the California Least Tern (one of the six receptors evaluated in the DTR's aquatic-dependent wildlife analysis), the DEIR states that the Site is only a "very small area of San Diego Bay" and that there are other open water areas available for foraging. DEIR, at 4.5-51. The DEIR also notes that "the majority of the sediment remediation site is in an area with relatively low abundance of prey species" for the least tern, and that "[t]here is no shallow water foraging habitat at the project site, limiting feeding opportunities." DEIR, at 4.5-51, 52. In other words, the DEIR's biological analysis emphatically refutes the DTR's assumption that a least tern would consume 100% of its diet from the Site, and precludes any reliance on such an assumption in selecting the environmental baseline relative to the effect of Site sediments on aquatic-dependent wildlife beneficial uses. O-3-45

The DEIR should be revised to reflect accurately the estimated foraging behavior of the six species of concern evaluated in the DTR's aquatic-dependent wildlife analysis, and analyze how that data affects the DTR's conclusions regarding risks to aquatic-dependent wildlife from sediments at the Site and the determination of an appropriate baseline. The DEIR's baseline should also be revised to reflect existing conditions. O-3-46

2. Human Health Impairment

Likewise, in the human health risk analysis, Regional Board staff assumed not only that fishing *could* occur at the Site—a facially erroneous assumption because strict security measures resulting from the shipyards' work for the U.S. Navy prevent *any* fishing at the shipyards—but also that each hypothetical subsistence angler at the shipyards would derive his or her entire O-3-47

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[13] The DTR's aquatic-dependent wildlife analysis evaluated the California Least Tern, the California Brown Pelican, the Western Grebe, the Surf Scoter, the California Sea Lion, and the East Pacific Green Turtle. DTR, at Table 24-4.

daily protein source from fish caught within the shipyard (161 g/day), **every day for 70 years (for carcinogens)**,[14] and would always eat the entire fish or shellfish (including skin/shell, organs, eyes, etc.), containing the maximum measured pollutant concentrations. Ginn Report, at 80-81; Expert Report of Brent L. Finley, Prepared in Regards to the California Regional Water Quality Control Board's Draft Technical Report for Tentative Cleanup and Abatement Order No. R9-2011-0001 (San Diego Bay) (March 11, 2011) ("Finley Report"), at 9, 22. O-3-47

Given that absolutely no fishing occurs at the shipyards, and since the Administrative Record is devoid of evidence that there has *ever* been *any* fishing at the shipyards (*see* Alo Depo., at 88:4-93:18), it is highly conservative (to put it mildly) to assume that anglers will fish at the shipyards, much less that any angler would do so every day for 70 years and derive all of his or her protein requirements from fish caught at the shipyards. Because this hypothetical assumption bears no relationship to existing conditions at the Site, it cannot be used to inform the DEIR's environmental baseline relative to the effect of Site sediments on human health beneficial uses. O-3-48

The DEIR should be revised to accurately describe the extent of fishing currently taking place at the Site, and analyze how that information affects the DTR's conclusions regarding risks to human health from sediments at the Site and the determination of an appropriate baseline. The DEIR's baseline should also be revised to reflect existing conditions. O-3-49

3. Aquatic Life

The DTR contends that aquatic life beneficial uses at the Site are impaired "due to the elevated levels of pollutants present in the marine sediment at the Shipyard Sediment Site." TCAO, at ¶ 14, DTR, at 14-1. But the results of the sediment investigation indicate that, although contaminants of concern and other pollutants are present in Site sediments in elevated concentrations relative to reference, they do not pose significant risks to aquatic life because they are not "bioavailable" and many constituents do not "bioaccumulate."[15] NASSCO's May 26 Comments, at 8. O-3-50

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[14] The DEIR uses an assumption of 30 years for non-carcinogens.

[15] As explained above, "bioavailability" is a measure of the potential for a chemical to enter into ecological or human receptors. Similarly, "bioaccumulation" refers to the accumulation of substances, such as pesticides or COCs, in an organism. Bioaccumulation occurs when an organism absorbs a toxic substance at a rate greater than that at which the substance is lost.

The DTR cites a finding that "bioaccumulation is occurring at the shipyard" as one basis for concluding that aquatic life at the Site is impacted. DTR, at 14-1, 19-1. But the DTR's conclusion that Site sediments impact aquatic life is overly-conservative, since substances may bioaccumulate in laboratory tests (such as those underlying the DTR's bioaccumulation finding), but not adversely affect the benthic community, and because not all shipyard chemicals were found to bioaccumulate. DTR, at 19-1; Barker Depo, at 98:19 – 98:22. For many COCs, including all primary COCs, the laboratory bioaccumulation test was the only test showing any

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Risks to aquatic life were evaluated by sampling and assessing both benthic macroinvertebrates and fish. Ginn Report, at 12. Effects on benthic macroinvertebrates were assessed using a triad approach, involving the synoptic collection of data on sediment chemistry, toxicity, and benthic community structure, and effects on fish were assessed by comparing fish living at the Site to fish caught in reference areas in San Diego Bay. The results of these analyses showed little or no effects on aquatic life; in particular, the results of the sediment investigation confirmed that (1) amphipod toxicity is absent from all but one station at the NASSCO Shipyard (out of 15 monitored), with only one station showing any significant difference from reference conditions, and even then the station was only 3% below the statistical reference range equal to one of the reference stations; (2) measurements of four indices of the health of benthic macroinvertebrate communities are not different from reference conditions[16]; (3) fish show no elevation in significant liver lesions or other abnormalities related to chemical exposures at the Site; and (4) predicted exposures of aquatic-dependent wildlife fall below the thresholds for which adverse effects are expected. Ginn Report, at 15-16. Likewise, the direct measurements of biological conditions, which Regional Board staff acknowledge "are the most important since they are direct measures of what is being protected," reveal that only a minimal fraction of stations at NASSCO do not meet reference conditions. Alo Depo., at 228:23 – 229:3; Ginn Report, at 49. Put another way, of 42 total toxicity tests conducted (excluding NA22, which is not being addressed under the Project), 37 tests showed conditions at NASSCO were as protective as background, with respect to toxicity. O-3-51

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statistical relationship between the chemicals at the Site and a biological response to a particular chemical, suggesting that the concentrations observed in the *Macoma* laboratory testing did not accurately predict adverse responses in consumer organisms at the Site. Barker Depo, at 95:22 – 98:16. Moreover, other COCs, including cadmium, chromium, nickel, selenium, silver, and PPT showed no statistical relationship with biological effects and also did not bioaccumulate in laboratory tests. DTR, at Table 20-1. Similarly, bioaccumulation relationships for arsenic and zinc, although statistically significant, were each controlled by only a single data point. DTR, at 19-1.

16 The health of benthic macroinvertebrate communities at the Site was measured by comparing four benthic macroinvertebrate metrics at the NASSCO Site with the 95% prediction limits for the reference pool selected by Regional Board staff. The four metrics evaluated were (1) the benthic response index for Southern California embayments (BRI-E), which is a quantitative index that measures the conditions of marine and estuarine benthic communities by reducing complex biological data to single values; (2) total abundance, which measures the total number of individuals identified in each replicate sample; (3) total taxa richness, which measures the number of taxa identified in each replicate sample; and (4) Shannon-Weiner Diversity, which is a measure of both the number of species and the distribution of individuals among species, with higher values indicating that more species are present or that individuals are more evenly distributed among species. DTR, at 18-20. Of the 60 individual comparisons between Site conditions and reference conditions (15 stations and 4 metrics), there were only three significant differences from the reference pool. Ginn Report, at 31.

Remarkably, even the DTR's overly conservative analysis[17] acknowledges that (1) benthic communities are equivalent to reference conditions at 14 of 15 stations in the NASSCO leasehold, with the only "moderately" impacted station located at the mouth of Chollas Creek; (2) amphipod toxicity was found at only 1 of 15 stations at NASSCO, and for that station the survival rate, at 70%, was still only 3% below the statistical reference range **and equal to one of the reference stations**; (3) toxicity to sea urchins was not found at any of the 15 stations at NASSCO; and (4) toxicity to bivalves was found at only 5 of 15 stations at NASSCO. DTR, at Tables 18-8 and 18-13. Yet, despite these favorable toxicity results and contrary to current regulatory guidance, the DTR simply assumed "possible" or "likely" effects whenever chemical and biological indicators disagreed, resulting in seven stations at NASSCO being incorrectly characterized as having either "possible" or "likely" impacts on benthic macroinvertebrates. For example, NA19 was characterized as "likely" impaired, even though six of the seven lines of direct biological evidence showed no significant differences from reference conditions. Alo Depo., at 263:22 – 265:17. The DTR's conclusions of adverse effects to aquatic life beneficial uses does not accurately reflect existing conditions and cannot be used to form the DEIR's baseline. O-3-52

C. The Environmental Setting Fails to Account For Pre-1960 Activities Contributing to Existing Conditions at the Site

In the description of Project Site Conditions for the Hazards and Hazardous Materials analysis, the DEIR describes wastes allegedly generated as a result of shipyard operations conducted by NASSCO since at least 1960, and BAE Systems (and its predecessor) since 1979. DEIR, at 4.3-1, 2. But the DEIR completely ignores pre-1960 activities that caused releases of hazardous materials to the Site, even though the DTR and the Administrative Record include detailed information regarding a variety of industrial operations conducted at the Site going back to the turn of the century, by a multitude of entities. O-3-53

It is well-documented that the City of San Diego leased properties at or in the vicinity of the Site to numerous industrial and commercial tenants beginning in approximately 1900—well before NASSCO existed or operated at the Site. San Diego Unified Port District Report, Historical Study San Diego Bay Waterfront Sampson Street to 28th Street (2004) (SAR159392 – 94); City of San Diego, Report for the Investigation of Exceedances of the Sediment Quality O-3-54

[17] The DTR framework is overly conservative and fundamentally flawed because it concludes that adverse effects on benthic macroinvertebrates are "likely" or "possible" whenever sediment chemistry is characterized as "high"—regardless of whether significant sediment toxicity or adverse effects on benthic communities are also observed. DTR, at Table 18-4. As a result, the chemistry line of evidence unilaterally trumps the others, causing the TCAO and DTR to reach conclusions that are not technically justified. Ginn Report, at 48. Regional Board staff's framework is further biased by its lack of a "no" effects category—meaning that stations will be characterized as having at least "low" levels of effects, even where the results are indistinguishable from reference conditions—contrary to methods published by others, including the State Water Resources Control Board. *Id.*

Objectives at National Steel and Shipbuilding Company Shipyard (2004) (SAR157095 – 167). These former tenants included operators in heavy industries such as tire manufacturing, lumbering, fish-packing and shipbuilding, and operated at times when environmental regulations were minimal or non-existent. There is ample record evidence that these entities contributed significant contamination to the Site. *See e.g.*, *id.*; Letter from City Port Director to Anthony Martinolich (1951) (SAR175155) ("[a]pparently your sandblasters are dumping the used sand in the bay in your water area."); Documents Evidencing Transformer Spill/PCB discharge by Lynch Shipbuilding at foot of 28th Street (1943) (PORT05994 -06007) ("hot oil from the transformer was sprayed over many square feet of deck"). O-3-54

Accordingly, the DEIR must be revised to reflect the waste discharges to the Site that resulted from pre-1960s activities. O-3-55

D. The DEIR Provides No Support For Its Assumption That 15% of the Sediment Will Be Classified as "Hazardous" Material

The DEIR assumes that 15% of the sediment to be dredged under the proposed Project will be classified as "hazardous" and require transport to a Class I hazardous waste facility. *E.g.*, DEIR, at 4.1-12. This is presented as a "worst-case" scenario. *Id.* The DEIR does not provide any support for this assumption, however, and therefore must be revised to inform the public as to the basis of the assumption. If none of the dredged sediment is "hazardous," that would upset the stated rationale for incurring the environmental impacts and other costs associated with the proposed plan to dredge 143,000 cubic yards of sediment from the Bay. If, after dredging, more than 15% of the material is determined to be "hazardous," this would disturb the remaining environmental impact analyses for a variety of impact areas, including but not limited to impacts associated with truck trips required to transport the material to a hazardous waste facility. O-3-56

The DEIR's assumption regarding the amount of sediment that will qualify as "hazardous" is relied upon and affects all environmental impact areas that were assessed, so it is particularly important that the DEIR provide support for that assumption; or, if there is no support, explain how each impact area will be affected if the assumption proves to be incorrect. O-3-57

IV. THE DEIR'S DESCRIPTION OF THE PROJECT'S PROPOSED SAND COVER REMEDY MUST BE REVISED TO CLARIFY THAT AN ENGINEERED SAND CAP IS NOT REQUIRED

While the proposed Project calls for dredging as the primary remedial tool, the Project Description indicates that "[d]ue to the presence of infrastructure, such as piers and pilings, dredging is constrained in several locations within the project site. Therefore, contaminated areas under piers and pilings will be remedied through subaqueous, or in situ, clean sand cover. In situ clean sand cover is the placement of clean material on top of the contaminated sediment." DEIR, at 3-7. Elsewhere, the DEIR indicates that approximately 2.4 acres of the remedial areas "will be covered with a layer of clean sand to contain contaminated sediments." DEIR, at 4.2-14. NASSCO recognizes that clean sand cover is part of the TCAO proposed by the Cleanup Team and evaluated in the DTR; however, certain language in the DEIR and its proposed mitigation measures must be clarified in order to ensure that the proposed remedy is not O-3-58

O-3

confused with the separate and significantly more costly and technologically challenging (and likely infeasible) remedy of an engineered sand cap. Such clarification is necessary in order to ensure that the Project Description in the DEIR accurately reflects the remediation that is being proposed by the TCAO and DTR.[18] *See San Joaquin Raptor*, 27 Cal. App. 4th at 730 ("an accurate project description is necessary for an intelligent evaluation of the potential environmental effects of a proposed activity."); CEQA Guidelines § 15124 (EIR must include "description of the project's technical . . . characteristics, considering the principal engineering proposals if any . . ."). O-3-58

Although the DEIR correctly refers to a "clean sand cover" rather than an engineered sand "cap," certain language in the DEIR could be misconstrued to refer to an engineered cap, and Mitigation Measure 4.2.7 includes requirements commensurate with an engineered cap. For example, the DEIR refers to the "design and install[ation]" of the sand cover, in contrast to the DTR's description of the "placement of a sand layer" in under-structure remedial areas. *Compare* DEIR, at 4.2-14 *with* DTR, at 30-4. In addition, Mitigation Measure 4.2.7 proposes detailed requirements regarding the "design" of the sand cover, including requirements that it "prevent substantial perturbation . . . of underlying contaminated sediments," "physically isolate the sediments from benthic or epigenetic organisms," "stabilize the contaminated sediments," and include "final engineering plans." DEIR, at 4.2-20. This measure includes the likely requirement for a surficial layer of protective armor rock, along with, potentially, an intervening layer of filter gravel and brick, among other things that would be required in an engineered cap. O-3-59

In light of the above, the DEIR should be revised to make clear that the TCAO contemplates a sand cover rather than an engineered sand cap in the under-pier remedial areas, and Mitigation Measure 4.2.7 should be modified accordingly. The distinction is significant with respect to the proposed Project's economic and technological feasibility analysis. As explained below, Mitigation Measure 4.2.7 is estimated to add approximately **$7,000,000** in additional costs relative to the clean sand cover remedy contemplated by the parties in the TCAO/DTR process. Memorandum Regarding Cost Implication of Mitigation Measures Described in the Draft Environmental Impact Report for the San Diego Shipyards Sediment Cleanup Project, San Diego California, submitted concurrently herewith (the "Anchor Comments"). O-3-60

V. THE DEIR PROPOSES INFEASIBLE MITIGATION MEASURES

A. CEQA Mitigation May Not Be Adopted Unless It Is "Feasible"

Mitigation may not be adopted under CEQA unless it is "feasible," which CEQA defines as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." CEQA Guidelines § 15364. Mitigation is "legally infeasible" if its adoption is beyond the powers conferred by law on the agency, or prohibited by statutes governing the agency. *Kenneth* O-3-61

[18] The sand cover is described as a mitigation measure (number 4.2.7), but it is more than that, as it is a critical component of the Project's proposed remediation strategy and thus must be detailed as part of the Project description in the DEIR.

Mebane Ranches v Superior Court, 10 Cal. App. 4th 276, 291 (1992); *Sequoyah Hills Homeowners Ass'n v City of Oakland*, 23 Cal. App. 4th 704, 715-16 (1993). O-3-61

CEQA does not provide agencies with independent authority to mitigate environmental impacts. Rather, "[i]n mitigating or avoiding a significant effect of a project on the environment, a public agency may exercise only those express or implied powers provided by law other than this division." CEQA § 21004; *see also* CEQA Guidelines § 15040. Accordingly, the Regional Board may not adopt any mitigation measures for the proposed Project unless those measures are authorized by the Porter Cologne Act or other applicable statutory authority beyond CEQA. To the extent mitigation contemplated by the DEIR does not satisfy the Porter Cologne Act, it is legally infeasible under CEQA and may not be adopted. O-3-62

B. New Mitigation Proposed In The DEIR Does Not Satisfy Resolution 92-49; Therefore It May Not Be Adopted

1. The TCAO's Cleanup Levels Must Be Evaluated For Economic Feasibility Under Resolution 92-49

The Regional Board's authority to issue cleanup and abatement orders is supplied by Water Code section 13304, (*see* DEIR, at 3-3), which is part of the Porter Cologne Act, Water Code sections 13000, *et seq.,* which sets forth California's water quality control laws. Regarding implementation of Water Code section 13304, the State Board issued Resolution 92-49.. Among other things, Resolution 92-49 requires an analysis of cost-effectiveness and technological and economic feasibility in determining cleanup levels. Resolution 92-49, at 6-8 ("The Regional Water Board shall . . . ensure that dischargers shall have the opportunity to select cost-effective methods for . . . cleaning up or abating the effects [of wastes discharged and] . . . require the discharger to consider the effectiveness, feasibility, and relative costs of applicable alternative methods for investigation, cleanup and abatement."). The Regional Board is also required to evaluate costs pursuant to Water Code section 13307. O-3-63

The DTR explains that the "economic feasibility" requirement under Resolution 92-49 "refers to the objective balancing of the incremental benefit of attaining more stringent cleanup levels compared with the incremental cost of achieving those levels," and "does not refer to the discharger's ability to pay the costs of a cleanup." DTR, at 31-1. In assessing economic feasibility under Resolution 92-49, the benefits of remediation are best expressed as the reduction in exposure of human, aquatic wildlife and benthic receptors to site-related contaminants of concern. *Id.* O-3-64

Resolution 92-49 cites Water Code section 13307 as authorizing the State Board to adopt policies for Regional Boards to follow for the oversight of cleanup and abatement activities. Section 13307, in turn, mandates that the State Board's policies "*shall* include … [p]rocedures for identifying and utilizing the *most cost-effective* methods … for cleaning up *or abating the effects* of contamination or pollution." Water Code § 13307(a)(3) (emphasis added). Water Code section 13267 likewise requires a costs-benefits analysis with regard to any "technical or monitoring program reports" required by the Regional Board, providing specifically that "[t]he burden, including costs, of these reports shall bear a reasonable relationship to the need for the O-3-65 report and the benefits to be obtained from the reports." This provides further confirmation that the cost of any measures imposed on dischargers by the Regional Board must have a reasonable relationship to the anticipated benefits to be obtained. O-3-65

2. New Mitigation Requirements In The DEIR Would Increase Site-Wide Remediation Costs By Approximately $11.8 to $18.3 Million

As set forth in the concurrently submitted Anchor Comments, an expert assessment of the mitigation proposed in the DEIR indicates that new measures or requirements not discussed in the TCAO/DTR will increase Site-wide remediation costs by an estimated $11.8 to $18.3 million. The critical changes or additions to the cleanup requirements that are proposed in the DEIR, and associated increases in remediation costs, are summarized in the chart below, and detailed further in the Anchor Comments.[19] These measures were not evaluated in the TCAO/DTR, and were not included in the DTR's economic feasibility analysis for the TCAO. O-3-66

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19 NASSCO takes issue with the necessity or feasibility of many of these measures, as set forth in the Anchor Comments and elsewhere in this letter. NASSCO also seeks clarification as to the scope or application of certain of these measures, as also reflected elsewhere in NASSCO's comments. Such clarification (and corresponding revision to the DEIR and its discussion of mitigation measures), or the removal of certain mitigation, could alter the above cost estimates.

Mitigation Measure(s)	Probable Minimum Cost	Most Probable Cost	Probable Maximum Cost
Automatic turbidity monitoring systems (MMRP 4.2.1)	$ 500,000	$ 800,000	$ 1,000,000
Double silt curtain enclosure (MMRP 4.2.2)	$ 250,000	$ 400,000	$ 500,000
Bucket additions and controls (closure switches, Clam Vision TM) (MMRP 4.2.2)	$ 250,000	$ 400,000	$ 500,000
Air Curtains (MMRP 4.2.2)	$ 300,000	$ 400,000	$ 500,000
Complete enclosure of dredge AND barge (MMRP 4.2.3)	$ 1,500,000	$ 1,750,000	$ 2,000,000
Design and construction of permanent cap instead of sand cover (MMRP 4.2.7)	$ 5,000,000	$ 6,000,000	$ 7,000,000
Hydraulic placement of cap material (MMRP 4.2.8)	$ 1,500,000	$ 1,750,000	$ 2,000,000
Restriction on haul times (MMRP 4.4.1)	$ 2,000,000	$ 3,200,000	$ 4,000,000
Biological monitoring for sea turtles, terns, etc. (MMRP 4.5.7 -4.5.9)	$ 250,000	$ 400,000	$ 500,000
Use of engine catalysts, low-NOx, and alternative fuels (MMRP 4.6.8 - 4.6.10)	$ 100,000	$ 180,000	$ 200,000
Use of special deodorizing additives (such as Simple Green) (MMRP 4.6.15)	$ 50,000	$ 80,000	$ 100,000
Total Estimated Cost Increase from Mitigation Measures	$ 11,700,000	$ 15,360,000	$ 18,300,000

O-3-66

3. The New Mitigation Has Not Been Evaluated Under Resolution 92-49, And Is Not Economically Feasible Under Resolution 92-49

The aforementioned mitigation requirements have not been assessed for economic feasibility under Resolution 92-49 or Water Code sections 13267 and 13307, and the TCAO and DTR's economic feasibility determinations did not incorporate the additional $11.8 to $18.3 million in estimated remedial expenses. Because these costs have not been assessed for compliance under Resolution 92-49 or Water Code sections 13267 and 13307, they may not be imposed under the Porter Cologne Act. As a result, the Regional Board lacks authority to impose them under CEQA because they are "legally infeasible," and they may not be adopted by the Regional Board. *Sequoyah Hills*, 23 Cal. App. 4th at 715-16; *Kenneth Mebane Ranches*, 10 Cal. App. 4th at 291; CEQA Guidelines § 15364; CEQA § 21004. O-3-67

Nor could these mitigation measures pass muster under Resolution 92-49 had they been evaluated. The DTR's economic feasibility analysis compared incremental benefits of further cleanup, expressed in terms of exposure reduction to target receptors, with the incremental cost of achieving those benefits, and determined that the degree of exposure reduction does not justify the incremental cost of such reductions beyond approximately $33 million in total cleanup costs. DTR, at 31-2 - 31-3. Even before the mitigation requirements proposed in the DEIR, the maximum estimated cleanup costs totaled approximately $60,345,500, well beyond the point at which the DTR concluded any incremental benefit is not supported by the additional costs. Resolution 92-49 certainly will not permit an additional $11.8 to $18.3 million in remediation O-3-68 costs, given that the additional, significant costs would have such a minimal degree of environmental benefit. Accordingly, the additional mitigation requirements proposed in the DEIR may not permissibly be adopted by the Regional Board under Resolution 92-49. Stated differently, to the extent that the Regional Board determines that the additional mitigation requirements are necessary to achieve the TCAO's cleanup levels (which NASSCO disputes), then those cleanup levels are economically infeasible and must be revised. Accordingly, Resolution 92-49 precludes adoption of the above measures, as does Water Code section 13307. O-3-68

It is also worth noting that the costs of the mitigation requirements proposed in the DEIR, which increase the total Project cleanup costs to an estimated $72,145,500 to 78,645,500, also render implementation of the Project economically infeasible under CEQA. Given their estimated cost, many of the proposed individual mitigation measures, including each of those set forth in the chart above, are also economically infeasible under CEQA. *See* CEQA Guidelines § 15364 (feasibility analysis under CEQA includes consideration of "economic factors"). O-3-69

VI. SIMILAR SITES MUST BE TREATED SIMILARLY, BUT OTHER SEDIMENT REMEDIATION PROJECTS HAVE NOT BEEN SUBJECTED TO CEQA REVIEW AND MITIGATION

Resolution 92-49 also provides that the "Regional Water Board *shall* . . . prescribe cleanup levels which are *consistent* with appropriate levels set by the Regional Water Board for analogous discharges that involve similar wastes, site characteristics, and water quality considerations." (emphasis added). *See also* Barker Depo., at 345:12-345:17 (recognizing that one goal of Resolution 92-49 is to ensure that the Regional Boards treat similar sites similarly). Constitutional principles of due process and equal protection likewise require both fundamental fairness and similar treatment of similarly situated persons subject to the same legislation or regulation. U.S. Const. amend. XIV, §1; Cal. Const. art. I, §§ 7, 15. O-3-70

Contravening these principles, the Project appears to be the first sediment remediation project in San Diego Bay that the Regional Board has subjected to CEQA review and mitigation. The Regional Board imposed CEQA review notwithstanding that the Project is "categorically exempt" from CEQA, as explained below, and despite the DEIR's concession that an average of 245,000 cubic yards of sediment are dredged annually from San Diego Bay, which nullifies the Cleanup Team's prior position that "unusual circumstances" required CEQA review because the Project called for the dredging of 143,000 cubic yards of sediment. Because the Regional Board's unprecedented imposition of CEQA review is not consistent with the Regional Board's treatment of similarly situated sites in San Diego Bay, and because, among other things, the DEIR is proposing mitigation that would add approximately $11.8 to $18.3 million to the cost of cleanup, the Regional Board's review of the Project under CEQA violates Resolution of 92-49 and the constitutional mandates of due process and equal protection. Notably, most of these measures have not been required for other cleanups in San Diego Bay (or elsewhere), including for the Campbell Shipyard cleanup, the most recent environmental sediment remediation project in San Diego Bay. O-3-71

VII. THE IMPOSITION OF NEW MITIGATION THROUGH THE DEIR WOULD VIOLATE DUE PROCESS BECAUSE THE PARTIES HAVE NOT HAD THE OPPORTUNITY TO TAKE DISCOVERY ON THOSE REQUIREMENTS

The DEIR's new mitigation requirements (if adopted) violate due process for the additional reason that they purport to alter the cleanup required under the TCAO and DTR, but were first imposed after the close of discovery in the TCAO proceeding, precluding the opportunity for the parties to take discovery regarding the new requirements. There is no question that due process mandates that discovery may be taken regarding the parameters of the TCAO and DTR; the Presiding Officer's February 18, 2010 Discovery Plan specifically states that the "Designated Parties are entitled to the procedural and due process safeguards" provided by the state and federal constitutions, the California Administrative Procedure Act, and the California Code of Regulations. O-3-72

NASSCO, along with the City of San Diego, United States Navy, SDG&E, BAE Systems and Campbell Industries, previously made this very point in connection with their combined request for the discovery period to be extended to coincide with the CEQA process, so that the parties would retain the right to take discovery on any components of the TCAO/DTR (or their implementation) that might be affected by the CEQA review.[20] The Cleanup Team agreed. SAR381340 ("Because the CEQA process must determine the timing of the San Diego Water Board's consideration of the tentative CAO and DTR . . . the Cleanup Team does not believe there is any good reason not to integrate the timing of the remaining discovery deadlines with the CEQA process."). But this request was denied by former Presiding Officer David King. O-3-73

Accordingly, to the extent the Regional Board desires to impose additional mitigation requirements introduced in the DEIR, it must reopen the discovery period to allow the Designated Parties to take discovery regarding same, and extend the comment period so that the parties may use the results of discovery to inform their comments. O-3-74

VIII. THE CUMULATIVE IMPACTS ANALYSIS FAILS TO IDENTIFY REASONABLY FORESEEABLE DREDGING PROJECTS IN SAN DIEGO BAY

As noted, the DEIR indicates that between 1994-2005, "an average of approximately 245,000 cubic yards of sediment was dredged from San Diego Bay each year," including maintenance and environmental dredging, with an annual total as high as 763,000 cubic yards. O-3-75

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20 The parties' request stated: "Tying discovery deadlines to the CEQA process is logical because the "project" will be better defined and explained through the CEQA process and in the resulting Environmental Impact Report ('EIR"). The Parties will not know whether or to what extent they are agreeable to the final CAO (and therefore, can waive discovery) until after the CEQA process has been completed, including the submission of public comments and responses by the Regional Board and an analysis of proposed mitigation measures. It therefore makes sense for the discovery period to coincide with the CEQA process, so that the parties may take any discovery they believe is necessary as a result of the CEQA process, or waive discovery entirely." SAR381342.

DEIR, at 4-2. The DEIR further makes the "**conservative assumption** that two similar-sized dredging projects occur during the dredging operations at the project site." DEIR, at 4.3-30 (emphasis added). The DEIR also "anticipates that **regularly scheduled** maintenance dredging projects may occur in San Diego Bay over the next several years." DEIR, at 4.2-25. These statements raise several concerns regarding the DEIR's cumulative impacts analysis, which applies across all environmental impact areas considered in the DEIR. O-3-75

First, given (i) that approximately 245,000 cubic yards of sediment are dredged from the Bay each year; (ii) that we can conservatively assume that two dredging projects of approximately 143,000 cubic yards each will occur during Project implementation; and (iii) that maintenance dredging in the Bay is "regularly scheduled," the DEIR's failure to identify a single anticipated dredging project is unsupportable. The DEIR should identify *any* dredging projects currently underway or scheduled to take place in the next ten years, regardless of whether they are maintenance *or* environmental dredging projects, as well as any specific dredging projects that are reasonably foreseeable or probable at this time. The DEIR's statement that no "specific environmental dredging projects have been identified" suggests that maintenance dredging projects have been identified, but were simply not disclosed. DEIR, at 4.3-30. This is improper. O-3-76

The DEIR also should explain the steps that were taken to identify "probable" future dredging projects; and, if a "schedule" of "regularly scheduled" maintenance dredging exists, it should be made publicly available. CEQA Guidelines § 15065(a)(3) (cumulative impacts analysis must consider "the effects of probable future projects."). Among other things, the DEIR should indicate the extent to which the proposed or probable dredging projects may involve contaminated rather than "pristine" sediment,[21] and whether eelgrass or other sensitive biological communities may be located in the dredged areas. Similarly, the DEIR should clarify the grounds supporting its statements that "the location and timing of future dredging and staging activity is not known," and that "[m]aintenance dredging projects in the San Diego Bay do not typically occur simultaneously." DEIR, at 4.1-31. The last assertion is curious given the DEIR's above-stated point that the Regional Board conservatively is assuming that two other dredging projects of approximately 143,000 cubic yards will occur while the Project is being implemented, so that approximately 420,000 cubic yards of sediment will be dredged concurrently from the Bay. O-3-77

Second, the DEIR should explain whether the Regional Board has conducted CEQA review for any of the dredging projects in San Diego Bay that its record reflect occurred during 1994-2005, and whether it intends to conduct CEQA review for any of the anticipated future dredging projects in the Bay. The DEIR indicates that future projects would require NPDES permitting, but does not mention CEQA review. DEIR, at 4.2-25. O-3-78

Third, the DEIR should include a thorough analysis of any specific or reasonably anticipated dredging projects (maintenance or environmental) that will occur during the next ten O-3-79

[21] There are no "pristine" sediment conditions that exist in San Diego Bay (or any other water body), such that any dredging will involve the removal of sediments contaminated to some degree.

years. Based on the DEIR's historical analysis, the EIR could analyze the Project's impacts in the context of an additional 24,500,000 cubic yards of sediment that may reasonably be expected to be dredged from the Bay over the next ten years, in light of past averages. Given CEQA's mandate to conduct environmental review at the earliest time feasible, (*Laurel Heights.*, 47 Cal. 3d at 394-96), and given that these other dredging projects are unlikely to be reviewed under CEQA, it is important for the Regional Board to conduct this cumulative impacts analysis now, rather than deferring it to the future in the context of other dredging projects (if subsequent CEQA analysis is done at all). O-3-79

Fourth, although the cumulative impacts analysis implicates all impact areas, the DEIR should pay particular attention to the anticipated combined effects of dredging on sensitive eelgrass communities in the Bay, and the resultant effects to marine life that are reliant upon eelgrass as habitat. At a minimum, the DEIR should assess the location of sensitive eelgrass throughout the Bay, the extent to which foreseeable dredging projects will impact eelgrass, the effect of the combined eelgrass losses when measured in tandem with the Project, and the extent to which all of those losses may or may not be mitigated feasibly and in a reasonable amount of time. O-3-80

Finally, Mitigation Measure 4.2.14 provides that the Regional Board shall "coordinate" water quality monitoring efforts and data with other dredging projects in the Bay for the duration of the Project, and take other actions intended to address potential cumulative impacts. DEIR, at 4.2-25. However, it is not clear that other dredging projects will be under the jurisdiction of the Regional Board. If they are not, this mitigation measure is unenforceable and illusory, and thus infeasible. If they are under the jurisdiction of the Regional Board, then the Board should be able to provide more specific information regarding all reasonably anticipated future dredging projects, and whether or not the Regional Board intends to review those dredging projects under CEQA. As a start, the Regional Board could indicate any applications it has received for dredging-related permits. If future CEQA review is not conducted, this may be the only opportunity to assess the cumulative environmental effects of dredging significant quantities of sediment from San Diego Bay. O-3-81

IX. THE ENVIRONMENTAL IMPACT ANALYSES, MITIGATION MEASURES AND ALTERNATIVES CONTAIN ADDITIONAL DEFICIENCIES

Set forth below are additional comments on various environmental impact analyses, mitigation measures and alternatives in the DEIR, to the extent these issues are not separately addressed.[22] For the sake of brevity, comments pertaining to specific impact areas or mitigations addressed elsewhere in this letter generally are not reasserted here. O-3-82

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[22] Please note, however, that additional, detailed analyses of certain mitigation measures included in chapters 4.2, 4.4, 4.5, 4.6 and 4.7 of the DEIR are provided in the Anchor Comments. In addition, further discussion of DEIR Sections 4.2, 4.3 and 4.5, and the DEIR's alternatives analysis, is included in the concurrently submitted memorandum by Rick Bodishbaugh, Tom Ginn and Gary Brugger ("Exponent Comments").

Sections 3 and 4—Project Description and Environmental Analyses

- Water Code section 13360 provides in relevant part that "[n]o waste discharge requirement or other order of a regional board . . . shall specify the design, location, type of construction, or particular manner in which compliance may be had with that requirement, order, or decree, and the person so ordered shall be permitted to comply with the order in any lawful manner." Contradicting Water Code section 13360, the proposed Project purports to dictate how the Site should be remediated to achieve the TCAO's cleanup levels. Because the Regional Board lacks authority to dictate how the cleanup levels are to be achieved, it may not adopt the proposed Project, which therefore is legally infeasible under CEQA. *Kenneth Mebane Ranches,* 10 Cal. App. 4th at 291; *Sequoyah Hills Homeowners Ass'n*, 23 Cal. App. 4th at 715-16; CEQA § 21004; CEQA Guidelines § 15040. O-3-83

Section 4.1—Transportation and Circulation

- The DEIR indicates that vessel traffic in San Diego Bay for maintenance dredging is similar to that required for the proposed Project. DEIR, at 4.1-9. To better assess cumulative impacts, the DEIR should provide a discussion of the vessel traffic typically encountered during recent maintenance dredging projects in the Bay, based on the volume of dredging that occurs. O-3-84

- The DEIR indicates that an alternative traffic mitigation measure is the diversion of 15 percent of the dredged sediment to an ocean disposal site, but that "ocean disposal has not been approved by the San Diego Water Board at this time." DEIR, at 4.1-24. Given that no form of remediation or disposal has yet to be approved by the Regional Board, the purpose of this statement should be explained. O-3-85

- The DEIR uses the 2000 Highway Capacity Manual ("HCM") published by the Transportation Research Board, even though an updated edition was published in 2010. The Regional Board should explain its decision to use the 2000 manual, despite the availability of an updated version, and explain whether use of the 2010 HCM would affect the results of the DEIR's traffic analysis in any way. O-3-86

- The DEIR states that the I-5 Southbound Ramp/Boston Avenue intersection currently operates at LOS E during the p.m. peak hour, but the Draft Barrio Logan /Harbor 101 Community Plan Update acknowledges that this intersection currently operates at LOS F. The Regional Board should explain this discrepancy, as well as whether the results of the DEIR's traffic analysis would be affected in any way if this intersection is properly categorized as operating at LOS F. O-3-87

- The DEIR repeatedly refers to "the City's performance criteria" or "the City's significance criteria" without specifying which city is referred to (San Diego or National City), or which particular guidance document contains the referenced criteria. *See e.g.*, DEIR, at 4.1-16, 4.1-25, Appx. B, at 39. The Regional Board should clarify which city's criteria is implicated, and cite to the particular document containing the criteria that were relied upon. O-3-88

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- The DEIR recognizes that the National City General Plan is currently in the process of being updated; however, it appears that the revised General Plan was adopted on June 7, 2011, and a revised zoning map is expected to be adopted on August 16, 2011, well before the Regional Board will take action on the Project. The Regional Board should explain whether the results of the DEIR's traffic analysis will be affected in any way by the revisions to these plans. O-3-89

Section 4.2—Hydrology and Water Quality

- At page 4.2-12, the DEIR correctly acknowledges that cleanup to "background sediment quality level" is economically infeasible. The DEIR should be revised to indicate that cleanup to background also is technologically infeasible, as conceded in the Cleanup Team's written discovery responses. Cleanup Team's Response to NASSCO's RFA No. 18. O-3-90

- Mitigation Measure 4.2.1 requires automatic rather than manual turbidity monitoring during dredging. The requirement for automatic dredging should be deleted and replaced by manual monitoring. Given possible disturbances in San Diego Bay, such as ship movements or storm events, the likelihood of false positives from automatic monitoring is high, and the associated dredging interruptions will significantly impair the ability to implement the proposed remedy in a timely and cost-effective manner. O-3-91

- Mitigation Measure 4.2.2, as described on pages 1-10 and 4.2-17 of the DEIR, indicates that the contractor "may" use air curtains in conjunction with silt curtains. In the Mitigation Monitoring and Reporting Program ("MMRP"), however, Mitigation Measure 4.2.2 provides that the contractor "shall" use air curtains. DEIR, at 7-5. We understand that the use of air curtains is not intended to be mandatory, and that the "shall" included in the MMRP is inadvertent. Accordingly, we request revision of the MMRP so that the requirements of Mitigation Measure 4.2.2 relative to the use of air curtains are consistent throughout the document. O-3-92

- Mitigation Measure 4.2.2 includes a requirement for a double silt curtain enclosure, which adds considerable cost without any demonstrated environmental benefit. This requirement therefore should be eliminated. O-3-93

- Mitigation Measure 4.2.2 also would require certain customized features on the dredge buckets, such as closure switches and Clam Vision TM. These features would add considerable cost, and pose the risk of complicating the contractor's work by providing ambiguous or misleading data during dredging. These features should not be required. O-3-94

- Mitigation Measure 4.2.3 requires that double silt curtains are to "fully encircle the dredging equipment and the scow barge being loaded with sediment." Including the scow barge in the enclosure would significantly impact (and slow down) operations, increasing costs without measurable environmental benefit. This requirement should be removed. O-3-95

- In addition to concerns raised elsewhere in this letter, Mitigation Measure 4.2.14 constitutes improper "deferred" mitigation because it defers an assessment of reasonably O-3-96

O-3

anticipated cumulative impacts from other dredging projects in concert with the proposed Project. O-3-96

Section 4.4—Noise

- Mitigation Measure 4.4.1 prohibits certain treatment and haul activities between the hours of 7:00 p.m. and 7:00 a.m., to the extent the activities would cause "disturbing, excessive, or offensive noise," unless a permit has been obtained from the City of San Diego's Noise Abatement and Control Administrator in conformance with San Diego Municipal Code section 59.5.0404. DEIR, at 4.4-10. NASSCO understands that this measure is intended to allow work to be performed continuously at all hours of the day, so long as a variance or other appropriate permit has been obtained from the City of San Diego, or so long as any noise generated is not "disturbing, excessive, or offensive." Please confirm that this is the Regional Board's understanding as well. The ability to work continuously throughout the day is critical to accomplishing the proposed remediation in a timely and cost-effective manner. O-3-97

- Mitigation Measure 4.4.2 is generally similar to Mitigation Measure 4.4.1, except that it applies to activities in National City rather than the City of San Diego. Mitigation Measure 4.4.2 should be modified to correspond to Measure 4.4.1, and allow activities to occur continuously throughout the day, in National City, so long as any noise generated is not "disturbing, excessive, or offensive," or if a variance or other appropriate permit has been obtained from National City. O-3-98

Section 4.6—Air Quality

- Mitigation Measure 4.6.15 provides that the contractor "shall apply a mixture of Simple Green and water (a ration of 10:1) to the dredged material." DEIR, at 4.6-21. We understand that this measure is not intended to apply to every load of dredged material, and instead should apply only to the extent that an odor issue arises. As such, we request that the language of Mitigation Measure 4.6.15 be revised to clarify that liquids need only be applied to the extent odor issues arise with respect to particular portions of the dredged material. O-3-99

Section 5.5—Alternative 1: No Project/No Development Alternative

- The DEIR states that the "no project" alternative would not reduce or minimize adverse effects to aquatic life, aquatic-dependent wildlife and human health beneficial uses "because the contaminated sediments would remain in place." DEIR, at 5-10. This statement is conclusionary, and is not supported by the requisite "facts and analysis." *Citizens of Goleta Valley v. Board of Supervisors*, 52 Cal. 3d 553, 568 (1990) ("the EIR must contain facts and analysis, not just the agency's bare conclusions or opinions."). As set forth above and in NASSCO's May 26 Comments, substantial evidence does not support the contention that current sediment conditions adversely effect any of these beneficial uses, rather, such contentions are premised on assumptions which are clearly erroneous and not reflective of existing conditions at the Site. *See* CEQA Guidelines § 15384 ("Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly erroneous or inaccurate . . . does not constitute substantial evidence."). O-3-100

O-3

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- The DEIR's conclusion that the no project alternative would result in the Site continuing to be "injurious to human health," and "a public nuisance" is similarly unsupported by "facts and analysis" or any substantial evidence. DEIR, at 5-10. O-3-101

Section 5.6—Alternative 2: Confined Aquatic Disposal (CAD) Site

- Alternative 2 consists of dredging and constructing a CAD facility "at a yet to be determined location." DEIR, at 5-11. Given that a location for the facility has not been identified, the feasibility of this alternative cannot properly be evaluated. O-3-102

- Alternative 2 assumes that a majority of dredged sediments would be "barged to an ocean disposal location." DEIR, at 5-11. But elsewhere the DEIR rejects consideration of ocean disposal. If the Regional Board believes ocean disposal is a feasible option, the DEIR should explain the basis for that decision. If not, the DEIR should state clearly that Alternative 2 is not feasible and may not be adopted. O-3-103

- The DEIR indicates that "Alternative 2 could have greater impacts [to marine biological resources] if the CAD facility did not effectively sequester underlying contaminants . . ." DEIR, at 5-15; *see also id.* at 5-13. But the DEIR provides no analysis of whether this may or may not happen, and concludes only that the potential marine biological impacts from Alternative 2 "would be slightly increased as compared to the proposed project" but remain less than significant with mitigation. *Id.* Without any analysis of whether or not the CAD cap will maintain its integrity, Alternative 2 should be considered to have a significant effect on marine biological resources and water quality, and should be treated as environmentally inferior to the proposed Project. This is certainly a critical area that would warrant detailed evaluation before Alternative 2 could be approved by the Regional Board. O-3-104

- The Regional Board lacks authority to adopt Alternative 2 because the Regional Board's authority under the Porter Cologne Act is limited to setting cleanup levels, rather than selecting methods to achieve cleanup levels. Water Code § 13360. Accordingly, Alternative 2 is legally infeasible under CEQA. *Kenneth Mebane Ranches*, 10 Cal. App. 4th at 291; *Sequoyah Hills Homeowners Ass'n*, 23 Cal. App. 4th at 715-16; CEQA § 21004; CEQA Guidelines § 15040. O-3-105

Section 5.7—Alternative 3: Convair Lagoon Confined Disposal Facility

- The DEIR indicates that "[a] complete analysis of the potential impacts related to Alternative 3, the Convair Lagoon CDF, was completed by Atkins and is included in Section 5.10 of this chapter. Technical appendices in support of the Convair Lagoon CDF Alternative Analysis are included as Appendices I through O of this PEIR." DEIR, at 5-18. But the DEIR fails to explain why a "complete analysis" of this alternative was prepared by separate consultants, or why technical appendices were included for this alternative. The DEIR also fails to explain why a "complete analysis" and technical appendices were not provided for Alternatives 1, 3 or 4. O-3-106

- The DEIR must explain the basis for this discrepancy. If Regional Board staff believe the cursory analysis in Section 5.7 is insufficient for a proper assessment of Alternative 3, then it must explain why it believes the same cursory analysis is sufficient for consideration of the remaining alternatives. If Regional Board staff believes that the analysis included for Alternatives 1, 3 and 4 is insufficient to allow the Regional Board to adopt one of those alternatives, or fairly compare these alternatives to the proposed Project, the DEIR should also make that point clear. O-3-107

- The Regional Board lacks authority to adopt Alternative 3 because the Regional Board's authority under the Porter Cologne Act is limited to setting cleanup levels, rather than selecting methods to achieve cleanup levels. Water Code § 13360. Accordingly, Alternative 3 is legally infeasible under CEQA. *Kenneth Mebane Ranches*, 10 Cal. App. 4th at 291; *Sequoyah Hills Homeowners Ass'n*, 23 Cal. App. 4th at 715-16; CEQA § 21004; CEQA Guidelines § 15040. O-3-108

Section 5.8—Alternative 4: Nearshore CDF With Beneficial Use of Sediments

- The DEIR indicates that "the location of the CDF for Alternative 4 is unknown at this time; therefore, it is unknown whether this alternative would result in any short-term or long-term loss of use of shipyard or other San Diego Bay-dependent facilities." DEIR, at 5-20. But this is only one reason why the feasibility of Alternative 4 cannot be assessed without identification of where the CDF would be located. The DEIR fails to demonstrate that Alternative 4 is a feasible alternative that could attain most of the Project Objectives, and it may not be adopted by the Regional Board. O-3-109

- The DEIR indicates that Alternative 4 "could have greater impacts if the covering did not effectively sequester underlying contaminants . . ." DEIR, at 5-23, *see also id.* at 5-21. But the DEIR provides no analysis of whether this may or may not happen, and concludes only that the potential marine biological impacts from Alternative 4 "would be slightly increased as compared to the proposed project" but remain less than significant with mitigation. *Id.* Without any analysis of whether or not the CDF covering will maintain its integrity, Alternative 4 should be considered to have a significant effect on marine biological resources and hydrology and water quality, and should be treated as environmentally inferior to the proposed Project. This is certainly a critical area that would warrant detailed evaluation before Alternative 4 could be approved by the Regional Board. O-3-110

- The Regional Board lacks authority to adopt Alternative 4 because the Regional Board's authority under the Porter Cologne Act is limited to setting cleanup levels, rather than selecting methods to achieve cleanup levels. Water Code § 13360. Accordingly, Alternative 4 is legally infeasible under CEQA. *Kenneth Mebane Ranches*, 10 Cal. App. 4th at 291; *Sequoyah Hills Homeowners Ass'n*, 23 Cal. App. 4th at 715-16; CEQA § 21004; CEQA Guidelines § 15040. O-3-111

Section 5.9—Identification of Environmentally Superior Alternative O-3-112

- The DEIR's conclusion that the no project alternative "would cause [the alleged] environmental impacts related to the existing conditions to be perpetuated," is not supported by any "facts and analysis." *Citizens of Goleta Valley,* 52 Cal. 3d at 568. This is a fatal omission, as it is the sole justification provided by the DEIR for foregoing the "environmentally superior" no project alternative, which would avoid all of the proposed Project's significant and potentially significant impacts. O-3-113

X. THE ALTERNATIVES ANALYSIS IS BIASED IN FAVOR OF THE CONVAIR LAGOON ALTERNATIVE FAVORED BY THE PORT DISTRICT

The DEIR selected four alternatives for consideration: (1) the No Project/No Development Alternative (Alternative 1), (2) Confined Aquatic Disposal Site (Alternative 2), (3) Convair Lagoon Confined Disposal Facility (CDF) (Alternative 3), and (4) CDF with Beneficial Use of Sediments (Alternative 4). DEIR, at 5-9. While the alternatives analysis (and the DEIR as a whole) is deficient for its failure to study the MNA alternative, as detailed above, it also is facially biased in favor of Alternative 3; which, unlike the other Alternatives, received its own, detailed supplemental evaluation consisting of roughly 239 pages, or approximately **31% of the entire DEIR**, not including six Alternative-specific appendices totaling approximately 247 additional pages. DEIR, at 5-32. By contrast, the other three alternatives each received between 2 and 6.5 pages of analysis in the DEIR, with no appendices. O-3-114

We understand that Alternative 3 is favored by the San Diego Unified Port District ("Port District"), which makes sense given that this alternative would create ten acres of shoreline property that would likely be leased by the Port District to third parties. DEIR, at 5-117. We also understand that the detailed supplemental analysis of Alternative 3 was submitted on behalf of the Port District, and at the Port District's request, and note that the analysis was prepared by different consultants than those that prepared the remainder of the DEIR, including the analysis of the other alternatives. DEIR, at 9-1 and 9-2. The DEIR should clearly explain to the public the circumstances associated with the Regional Board's decision to include more than 200 pages of analysis (plus appendices) for one alternative prepared by separate consultants for a party that will benefit from that alternative (if implemented), while the other alternatives each received less than seven pages of analysis. O-3-115

The Regional Board should make publicly available any contract or other agreement that has been entered into between the Regional Board and the Port District (or the Port District's consultants) regarding the preparation of the expanded analysis for Alternative 3, as well as any other documentation associated with the decision to include the expanded analysis of Alternative 3 in the DEIR. The Regional Board should also make clear if Alternative 3 is the politically preferred alternative, or is otherwise receiving special treatment because it is being advanced by the Port District, and explain why the Port District is being allowed to submit its own self-serving alternatives analysis for inclusion in the DEIR, an offer that has not (to NASSCO's knowledge) been extended to other Designated Parties or members of the public. CEQA's emphasis on public participation and open decisionmaking demands that the public be fully apprised of the circumstances associated with the inclusion of the expanded analysis regarding Alternative 3. O-3-116

To this end, NASSCO requests the opportunity to prepare a detailed analysis of the MNA alternative for incorporation into a recirculated DEIR. To the extent the Regional Board is unwilling to allow NASSCO to prepare an analysis of the MNA alternative for inclusion into the DEIR, it should explain the basis for treating NASSCO differently than the Port District. O-3-117

Biasing an EIR in favor of one entity or alternative is grounds for invalidation under CEQA. For example, CEQA's implementing regulations specifically provide that "[t]he lead agency is responsible for the adequacy and objectivity of the draft EIR," and the draft EIR "must reflect the independent judgment of the lead agency." CEQA Guidelines § 15084(e); *see also* CEQA § 21082.1 (EIR "shall be prepared directly by, or under contract to" the lead agency). Although a lead agency may enlist the initial drafting and analytical skills of an applicant's consultant, the agency must apply its "independent review and judgment to the work product before adopting and utilizing it." *Eureka Citizens*, 147 Cal. App. 4th at 369-371 (quotations omitted); *People v. County of Kern*, 62 Cal. App. 3d 761, 775 (1976) (lead agency "may not use a draft EIR as its own without independent evaluation and analysis."); CEQA Guidelines § 15084(e) ("Before using a draft prepared by another person, the lead agency shall subject the draft to the agency's own review and analysis."). Thus, the Regional Board may not simply adopt the Port District's submittal verbatim, and the DEIR must include a reasoned basis for its extensive analysis of Alternative 3 relative to the other alternatives. O-3-118

Moreover, as noted above, the Port District was the only entity that was permitted to directly draft sections of the EIR, improperly biasing the alternatives analysis in its favor. This is particularly troubling given the circumstances of the instant proceeding. Unlike a typical development project subject to CEQA, where approvals are sought by a single project applicant, here, multiple parties are required to implement the Project and currently are involved in federal court litigation regarding the proper allocation of costs required for Project implementation. There is no basis for allowing the Port District to prepare a self-serving analysis of an alternative that would provide it with financial and other benefits associated with the creation of an additional ten acres of shoreline property while imposing additional costs on other Designated Parties and additional (but largely undisclosed) impacts on the environment. O-3-119

XI. THE CONVAIR LAGOON ALTERNATIVE WILL CAUSE ADDITIONAL ENVIRONMENTAL IMPACTS AND SHOULD NOT BE ADOPTED

Alternative 3, which the DEIR acknowledges has greater impacts than the proposed Project, (DEIR, at 5-19), should not be adopted for a variety of reasons, but primarily because it would take contaminated sediment from one location in the Bay and transport it for burial in another location of the Bay, creating the very real possibility that contaminants from the sediment will escape from the CDF and recontaminate another portion of the Bay. As a threshold matter, the DEIR simply fails to analyze this risk in sufficient detail to provide the decisionmakers with an accurate assessment of the likelihood that the Convair site may be recontaminated due to CDF failure. This alone mandates that the DEIR treat Alternative 3 as causing a significant impact to water quality, hazards and hazardous materials, and marine biological resources, and dictates that the Regional Board may not adopt Alternative 3 because it is environmentally inferior to the proposed Project. CEQA § 21002 (project may not be approved if feasible alternatives exist that would substantially lessen environmental impacts). O-3-120

A variety of additional inadequacies regarding Alternative 3 and the DEIR's analysis of same are set forth below (and also are discussed in the concurrently submitted Exponent Comments):

- As noted above, the DEIR indicates that Alternative 3 cannot be commenced until continuing discharges of PCBs to the Convair Lagoon site are abated to the satisfaction of the State Board, in order to "prevent potential recontamination of the marine sediments in the bay." DEIR, at 5-35, 5-208. But the DEIR does not provide any indication of how long it will take to achieve source control at Convair Lagoon, and thus fails to provide any information as to how soon Alternative 3 could be implemented in relationship to the Project or other alternatives. This clouds the viability of Alternative 3, given the Regional Board's desire to implement the TCAO as soon as reasonably possible. It also clouds the feasibility of the alternative under CEQA, which requires that an alternative be "capable of being accomplished in a successful manner *within a reasonable period of time* . . ." CEQA Guidelines § 15364 (emphasis added). O-3-121

- The DEIR states the source of continuing PCB contamination to the Convair site "presumably" is a 60-inch storm drain, reflecting uncertainty as to the source and highlighting the difficulty that may be required to ultimately address the issue. DEIR, at 5-224. It also suggests that cap failure may, in part, be the cause of the recontamination, a cautionary point in relationship to Alternative 3's contemplated CDF. O-3-122

- Alternative 3 is premised on the assumption that 15%, or 21,510 cubic yards, of the material dredged from the Shipyard Sediment Site will be classified as "hazardous" and thus would not qualify for placement in the CDF, due to high contamination levels. Conversely, the DEIR assumes that 85%, or 121,890 cubic yards, would be placed within the CDF. DEIR, at 5-42. But the DEIR fails to provide any support for these assumptions, which are critical to the feasibility of Alternative 3. If these assumptions are incorrect, and substantially more of the dredged sediment does not qualify for placement into a CDF, the ability to feasibly implement Alternative 3 will be jeopardized. O-3-123

- The DEIR indicates that the thresholds of significance used to assess Alternative 3 are "primarily" based on Appendix G to the CEQA Guidelines. DEIR, at 5-62. The DEIR should explain which thresholds of significance are not based on Appendix G, and the reason for departing from these thresholds in certain circumstances. O-3-124

- Table 5-8 purports to provide a list of past, present and probable future projects within the vicinity of the Convair Lagoon Alternative site. DEIR, at 5-63-67. But the table fails to include a list of past, present and probable future (or indeed any other) dredging projects in San Diego Bay, which necessarily precludes an accurate evaluation of the cumulative impacts from Alternative 3's proposed dredging of 143,000 cubic yards of sediment from the Bay. O-3-125

- The DEIR acknowledges that "[e]xtensive eelgrass beds are present on the Convair Lagoon Alternative site." DEIR, at 5-101. The DEIR indicates that Alternative 3 would destroy 5.64 acres of eelgrass, with 6.01 acres significantly impacted. DEIR, at 5-113, 114. Given the DEIR's acknowledgment of the importance of eelgrasss as habitat for a variety of marine life, and the extensive (and uncertain) mitigation that would be required to address O-3-126

Alternative 3's substantial eelgrass destruction, this weighs strongly against adoption of Alternative 3, in which eelgrass impacts from disposal of sediment would substantially outweigh eelgrass impacts caused by dredging at the Shipyard Site. O-3-126

- Alternative 3 indicates that the Southern California Eelgrass Mitigation Policy requires pre and post construction surveys within 30 days of project commencement and completion. DEIR, at 5-109. But elsewhere the DEIR indicates that such surveys are required 120 days before proposed start dates. DEIR, at 4.5-56. This discrepancy should be clarified. O-3-127

- Alternative 3 would result in the direct loss of 4 acres of intertidal habitat; another significant impact weighing heavily against adoption of Alternative 3. DEIR, at 5-114. O-3-128

- The DEIR contends that Alternative 3 satisfies a Port Master Plan ("PMP") goal that "Bay fills, dredging and the granting of long-term leases will be taken only when substantial public benefit is derived." DEIR, at 5-117. According to the DEIR, a substantial public benefit would be satisfied because the Alternative "would protect the quality of the waters of San Diego Bay for use and enjoyment by the people of the state" by implementing the TCAO. This is inaccurate, because, rather than "protecting" the waters of the state, Alternative 3 would actually eliminate 10 acres of water by converting it to upland habitat. Accordingly, Alternative 3 would cause a significant impact regarding consistency with local policies and ordinances, by virtue of its conflict with the PMP's Goals. This is particularly critical given that Alternative 3 is the only alternative that would require the elimination of state waters in order to implement the TCAO. O-3-129

- The DEIR also contends that Alternative 3 satisfies PMP Goal X, requiring that the "quality of water in San Diego Bay will be maintained at such a level as will permit human water contact activities." DEIR, at 5-118. Rather than "maintaining" water quality, however, Alternative 3 calls for the elimination of 10 acres of water by converting it to upland habitat. While the DEIR claims that Alternative 3 satisfies this goal by virtue of implementing the TCAO, Alternative 3 is the only alternative that proposes eliminating water in the Bay in order to accomplish TCAO objectives. Alternative 3 therefore would cause a significant impact by conflicting with local policies and ordinances. O-3-130

- The DEIR asserts that Alternative 3 satisfies PMP Goal XI, which provides that "[t]he District will protect, preserve and enhance natural resources, including natural plant and animal life in the Bay as a desirable amenity, and ecological necessity, and a valuable and usable resource." DEIR, at 5-118. But since Alternative 3 will destroy up to six acres of eelgrass at the Convair site, and destroy the benthic community, on its face the alternative is incapable of "preserving" same. While mitigation measures propose "creating similar habitat in an alternative location," (DEIR, at 5-118), this certainly is not equivalent to "preserving" the eelgrass present at the Convair site in the first instance. Alternative 3 therefore would cause a significant impact by conflicting with local policies and ordinances. Alternative 3 conflicts with Goal XI for the additional reason that it proposes off-site creation of eelgrass habitat in locations outside of the PMP area, insufficient to comply with the PMP's mandate. O-3-131

- Alternative 3's proposed Mitigation Measure 5.10.4.3 constitutes improper "deferred" mitigation because it defers a determination of the "success criteria" and "actions to O-3-132

O-3

undertake for failed mitigation goals" until after Project approval. It also does not provide for a final Regional Board determination as to the adequacy of the mitigation measure. O-3-132

- Alternative 3's proposed Mitigation Measure 5.10.4.4 also constitutes improper deferred mitigation because it does not provide success criteria or performance standards, and does not provide for a final Regional Board determination as to the adequacy of the mitigation measure. O-3-133

- Not only will Alternative 3 cause greater environmental impacts than the proposed Project, but its significant impacts to 6 acres of eelgrass and 4 acres of intertidal habitat at the Convair site (among other impacts) would require the imposition of substantial mitigation measures. While these measures are uncertain regarding their potential for success, they also will cause significant environmental impacts of their own requiring even further mitigation. DEIR, at 5-125. This weighs heavily against adoption of Alternative 3, and there is simply no reason to rely on mitigation measures to protect against the additional impacts from Alternative 3, only to be required to rely on even more mitigation measures to address the environmental impacts caused by the initial mitigation, when other less environmentally harmful alternatives are available. O-3-134

XII. THE DEIR MUST BE "RECIRCULATED"

Recirculation of an EIR is required if "significant new information" is added to the EIR after notice of public review has been given but before final certification. CEQA Guidelines § 15088.5(a). Recirculation is generally required when the addition of new information deprives the public of a meaningful opportunity to comment on substantial adverse project impacts or feasible mitigation measures or alternatives that are not adopted. *Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.*, 6 Cal. 4th 1112 (1993); CEQA Guidelines §15088.5(a). The CEQA Guidelines specify that the new information requiring recirculation may include changes in the project or the environmental setting. CEQA Guidelines §15088.5(a). Recirculation is also required if information added to the EIR shows a new potentially significant impact that was not previously addressed. *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal. 4th 412, 447 (2007). "A decision not to recirculate must be supported by substantial evidence in the administrative record." CEQA Guidelines § 15088.5(e). O-3-135

Here, recirculation of a revised DEIR is required for at least the following reasons, among others:

- A revised DEIR must evaluate the MNA alternative. As explained above, the MNA alternative will avoid all of the Project's significant and potentially significant impacts and obviate the need for mitigation measures, and substantial evidence shows that it can feasibly attain Project Objectives in a reasonable period of time. O-3-136

- A revised DEIR must include an updated description of the environmental setting, including a disclosure of past and ongoing sources of contamination to the Site via stormwater from Chollas Creeks and SW4 and SW9, as well as an accurate O-3-137 description of baseline conditions regarding sediment quality at the Site, in relationship to the potential impairment of aquatic life, aquatic-dependent wildlife and human health beneficial uses. This baseline must be premised on actual conditions rather than hypothetical (and erroneous) assumptions. O-3-137

- A revised DEIR must evaluate the reasonably foreseeable potentially significant impact of recontamination of the Site, after Project implementation, from ongoing and uncontrolled stromwater discharges from Chollas Creek and SW4 and SW9. Mitigation measures and alternatives to address this potentially significant impact must also be evaluated. O-3-138

- A revised DEIR must include an updated cumulative impacts analysis accounting for scheduled and reasonably anticipated probable future dredging projects in San Diego Bay. O-3-139

- A revised DEIR must treat as "significant" impacts previously found to be less than significant based on mitigation measures that are infeasible or otherwise impermissible, including mitigation that may not be adopted by the Regional Board under the Porter Cologne Act, and which therefore is legally infeasible under CEQA. O-3-140

XIII. THERE ARE NO "UNUSUAL CIRCUMSTANCES" REQUIRING AN EIR

A. The Project is Categorically Exempt From CEQA

O-3-141

Finally, NASSCO reasserts its objection to the Regional Board's decision to require preparation of an EIR for the Project, on the grounds that the Project is "categorically exempt" from CEQA review. While NASSCO's preceding comments are based on its assumption that the Regional Board and its staff will continue with the Project's CEQA review notwithstanding that the Project should be found exempt, the preceding comments should in no way be interpreted as a waiver of NASSCO's position that an EIR is not required.

O-3-142

CEQA section 21084(a) requires the Secretary of the Natural Resources Agency to prepare and adopt "a list of classes of projects which have been determined not to have a significant effect on the environment," and which are therefore "categorically exempt" from CEQA. Thirty-three such categorical exemptions are currently authorized, (CEQA Guidelines sections 15301-333), and each exempted class of project "embodies a 'finding by the Resources Agency that the project will not have a significant environmental impact.'" *San Lorenzo Valley Community Advocates For Responsible Education v. San Lorenzo Valley Unified School District*, 139 Cal. App. 4th 1356, 1381 (2006); CEQA Guidelines § 15300. If a project is categorically exempt, it "may be implemented without any CEQA compliance whatsoever." *Ass'n for Prot. of Envt'l Values in Ukiah v. City of Ukiah*, 2 Cal. App. 4th 720, 726 (1991).

O-3-143

As explained in the motion filed by NASSCO on July 23, 2010, the TCAO is "categorically exempt" from CEQA under at least the three exemptions set forth in CEQA Guidelines sections 15307, 15308 and 15321, which apply to actions by regulatory agencies to protect natural resources or the environment, as well as regulatory enforcement actions. More specifically, the referenced classes of exempted projects include (i) "actions taken by regulatory agencies as authorized by state law or local ordinance to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for protection of the environment" (Class 7); (ii) "actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment" (Class 8); and (iii) actions by agencies related to "enforcement of a law, general rule, standard, or objective, administered or adopted by the regulatory agency" (Class 21). CEQA Guidelines §§ 15307, 15308 and 15321. Because the proposed Project is to be overseen by a regulatory agency, the Regional Board, and is designed to protect water quality and beneficial uses in the San Diego Bay, it clearly falls within the scope of each of these exemptions. O-3-143

In fact, the above-referenced categorical exemptions were cited in the first three iterations of the TCAO, released between 2005–2008, to support the Cleanup Team's then-position that the TCAO was exempt from CEQA review. Cleanup Team's California Environmental Quality Act Analysis for Shipyard Sediment Project; Tentative Cleanup and Abatement Order R9-2010-002, dated July 9, 2011 ("CUT's CEQA Analysis"); Tentative Cleanup and Abatement Order R9-2005-0126, released April 29, 2005; Tentative Cleanup and Abatement Order R9-2005-0126, released August 24, 2007; Tentative Cleanup and Abatement Order R9-2005-0126, released April 4, 2008. It was not until the fourth iteration of the TCAO, released on December 22, 2009, that the Cleanup Team dramatically reversed course and alleged that CEQA review was required because the Project "presents unusual circumstances both with respect to its scope and unique characteristics." CUT's CEQA Analysis, at 2, Section II(A). O-3-144

An exemption finding would be consistent with statewide practice and this Regional Board's prior practice of exempting cleanup and abatement orders, including orders for sediment remediation and dredging projects in San Diego Bay, and, as NASSCO repeatedly has asserted, also would avoid any unnecessary delay in the cleanup associated with the preparation and certification of an EIR. O-3-145

B. The DEIR Refutes the Regional Board's Determination That Unusual Circumstances Differentiate The Project From Other Dredging in the Bay

NASSCO recognizes that a categorical exemption to CEQA may not apply where a project includes "unusual circumstances" ***and*** those unusual circumstances present a "reasonable possibility of a significant effect on the environment." *Banker's Hill, Hillcrest, Park West Community Preservation Group v. City Of San Diego*, 139 Cal. App. 4th 249, 278 (2006). Both of these prongs must be satisfied, however, as "[a] negative answer to either question means the exception does not apply." *Id.* (quoting *Santa Monica Chamber of Commerce v. City of Santa Monica*, 101 Cal. App. 4th 786, 800 (2002)). Further, "unusual circumstances" will not be found unless some feature distinguishes the project from other typical projects in the exempt class, such that the type of environmental impacts that may result are different than the type of environmental impacts likely to result from other typical projects within the class. *E.g., Santa Monica Chamber of Commerce*, 101 Cal. App. 4th at 801-803. O-3-146

In opposition to NASSCO's motion, the Cleanup Team argued that an EIR is required because the TCAO "**is the largest sediment remediation project *in the history San Diego Bay***" and thus is distinguishable from "garden variety" Class 7, Class 8, and Class 21 projects because it is expected to require dredging of over 140,000 cubic yards of sediment. *See* Cleanup Team's Comments On The Applicability of a CEQA Categorical Exemption For Tentative Cleanup And Abatement Order R9-2010-0002, at 2 (emphasis added). The Cleanup Team further relied on a statement by David Gibson that the Project "**will result in more dredging and removal of sediments from San Diego Bay than all previous Cleanup and Abatement Orders combined**." *Id.* at n.1 (emphasis added). In addition, the Cleanup Team asserted that NASSCO's argument for an exemption was based on an improper supposition that "large-scale dredging projects do not usually have a potential for significant adverse environmental impacts," while, according to the Cleanup Team, the volume of this dredging project differentiated it from other dredging in San Diego Bay. *Id.*; *see also* CUT's CEQA Analysis, at 3, Section III(A) (citing the alleged unprecedented scope of the project, and referencing as factors supporting a finding of unusual circumstances its associated "physical disturbance to the environment, including but not limited to, sediment movement, air quality impacts from diesel emissions from dredging equipment, and potential impacts to traffic patterns and noise from equipment operations in the area where the sediments will be dewatered and from which they will be transported."); *see also* DTR, at 37-3. O-3-147

Finally, the Cleanup Team contended that the above-referenced categorical exemptions contain exclusions where "construction activities" are undertaken in the context of an otherwise exempt project, and that dredging of sediment constitutes a "construction activit[y]" such that dredging cannot qualify for a categorical exemption under CEQA Guidelines sections 15307, 15308 or 15321. Cleanup Team's Comments On The Applicability of a CEQA Categorical Exemption For Tentative Cleanup And Abatement Order R9-2010-0002, at 4. The Cleanup Team further opined that "large-scale modifications" to the environment caused by the volume of dredging required for the Project precluded application of a categorical exemption, including the destruction of eelgrass habitat. O-3-148

But the DEIR disproves the Regional Board's finding that "unusual circumstances" required an EIR for this particular sediment remediation project, which calls for the dredging of approximately 143,000 cubic yards of sediment. The DEIR indicates that during an 11-year period between 1994-2005, "an average of approximately 245,000 cubic yards of sediment was dredged from the Bay each year," including maintenance and environmental dredging, with an annual total as high as 763,000 cubic yards. The DEIR further indicates that the project dredge volume "**falls within the historic ranges for the yearly overall volume of dredging activity in San Diego Bay**." DEIR, at 4-2 (emphasis added). O-3-149

Because the DEIR confirms that the volume of dredging for this Project is consistent with the normal amount of dredging conducted in San Diego Bay each year (albeit the Project is a larger sediment remediation CAO than other sediment dredging in San Diego Bay), there are no "unusual circumstances" warranting CEQA review for this but not other dredging projects. Accordingly, NASSCO reasserts its objection to the preparation of the EIR, and requests that the Regional Board refrain from further CEQA review of the Project and elect not to prepare or certify a Final EIR. O-3-150

In addition, so that the public may better understand the type and scope of dredging typically conducted in San Diego Bay, NASSCO requests that the Regional Board make publicly available and include in the Administrative Record the records of dredging in San Diego Bay between 1994-2005, referenced at page 4-2 of the DEIR, as well as any additional records reflecting past dredging in San Diego Bay or reasonably anticipated future dredging. The Regional Board should also explain the extent to which it does or does not regularly analyze sediment dredging projects in San Diego Bay under CEQA, and indicate each dredging project in San Diego Bay that has undergone CEQA review. O-3-151

Thank you for your consideration of these comments. We look forward to your responses. O-3-152

Very truly yours,

Jeffrey P. Carlin
of LATHAM & WATKINS LLP

cc: Frank Melbourn, on behalf of the Advisory Team
Designated Parties (per attached proof of service)

Certification of Authenticity of Electronic Submittal

I, Jeffrey P. Carlin, declare:

I am an associate at Latham & Watkins LLP, counsel of record for National Steel and Shipbuilding Company ("NASSCO") in the Matter of Tentative Cleanup and Abatement Order R9-2011-0001 before the San Diego Regional Water Quality Control Board ("Water Board"). I am licensed to practice law in the State of California and make this declaration as an authorized representative for NASSCO. I declare under penalty of perjury under the laws of the State of California that the electronic version of NASSCO's Comments on the Draft Environmental Impact Report for the Shipyard Sediment Remediation Project (SCH # 2009111098), submitted to the Water Board and served on the Designated Parties by e-mail on August 1, 2011, is a true and accurate copy of the submitted signed original. Executed this 1st day of August 2011, in San Diego, California. O-3-153

Jeffrey P. Carlin

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File No. 048876-0009

August 1, 2011

VIA EMAIL

Mr. Vicente Rodriguez
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123
vrodriguez@waterboards.ca.gov

Re: General Dynamics' Comments on the Draft Environmental Impact Report for the Shipyard Sediment Remediation Project (SCH # 2009111098)

Dear Mr. Rodriguez:

General Dynamics Company ("General Dynamics") submits the following comments regarding the Draft Environmental Impact Report for the Shipyard Sediment Remediation Project ("DEIR"), State Clearing House Number 2009111098, which was publicly released by the Regional Board Cleanup Team ("Cleanup Team") on June 16, 2011. Because the DEIR includes multiple references to the General Dynamics' Convair Division Lindbergh Field Plant ("General Dynamics Lindbergh Field Facility"), General Dynamics, as the former lessee of that property, has a substantial interest in this proceeding, as well as a general interest in the development of reasonable and scientifically sound cleanup plans for contaminated sites in San Diego, including the Shipyard Sediment Remediation Project and Convair Lagoon.

As discussed below, General Dynamics has a number of significant concerns regarding the DEIR's proposed Convair Lagoon Confined Disposal Facility ("CDF"). Specifically, General Dynamics is concerned that the Cleanup Team concludes in the DEIR that spending millions of dollars to place contaminated sediments from the Shipyard Sediment Site back into the Bay, creating the Convair Lagoon CDF, is a potentially viable alternative for the Shipyard Sediment Site, particularly considering that the risk of recontamination cannot be eliminated. O-4-1

Despite significant risks and challenges associated with the construction and maintenance of a CDF, the DEIR unduly emphasizes this alternative by including extensive discussion of Convair Lagoon, as well as unnecessary documentation pertaining to the demolition of General Dynamics' former Lindbergh Field Facility. In particular, Appendix A to Appendix K consists largely of dozens of forms from the Department of Parks and Recreation describing buildings O-4-2 formerly located at the General Dynamics Lindbergh Field Facility. These documents appear to have been included without any discernable or legitimate purpose, as they do not relate to the Shipyard Sediment Site cleanup, or to the pier and seaplane ramp proposed for demolition as part of the Convair Lagoon CDF. O-4-2

For the reasons discussed herein, General Dynamics objects to the Convair Lagoon CDF as a potential means for disposing of Shipyard Sediment Site sediments, and respectfully requests that all references to General Dynamics' former Lindbergh Field facility within the DEIR be stricken.

I. THE DEIR MUST FOCUS ON THE SHIPYARD SEDIMENT SITE, NOT CONVAIR LAGOON

The Cleanup Team's purpose in issuing the DEIR is to "analyze the [Shipyard Remediation Project's] potential impacts on the environment, to discuss alternatives, and to propose mitigation measures for identified potentially significant impacts that will minimize, offset, or otherwise reduce or avoid those environmental impacts." DEIR, at 1-1 (emphasis added). While the DEIR discusses four alternatives to the proposed project, including (1) the No Project/No Development Alternative, (2) the Confined Aquatic Disposal Site, (3) the Convair Lagoon CDF, and (4) CDF with Beneficial Use of Sediments, a disproportionate share of the DEIR was devoted to the Convair Lagoon CDF—including over 200 pages and six appendices drafted by the San Diego Unified Port District's ("Port District") consultant. DEIR, at 5-9 (setting forth the four project alternatives); 5-32 - 5-271 (discussing the Convair Lagoon CDF). By contrast, the other alternatives set forth in the DEIR each received only between 2 and 6 ½ pages of analysis. Moreover, no other party interested in the Shipyard Sediment Remediation Project, or the Convair Lagoon remediation was permitted to make a similar contribution. To avoid the appearance of bias, the San Diego Regional Water Quality Control Board ("Regional Board") staff should explain to the public why it included more than 200 pages of analysis (plus appendices) for one alternative prepared by the Port District's consultants, while the other alternatives received a much less detailed analysis. Although the Convair Lagoon CDF was not ultimately selected as the environmentally superior alternative, General Dynamics is concerned that the extensive discussion and special treatment of this alternative compared to the other alternatives may lead to confusion as to the preferred course of action, and as discussed below, General Dynamics does not view the Convair Lagoon CDF as a viable long-term solution for the remediation of the Shipyard Sediment Site or Convair Lagoon. O-4-3

In addition to the disproportionate consideration afforded to the Convair Lagoon CDF, General Dynamics is also concerned that much of the information contained in the Convair Lagoon CDF analysis does not relate to the Shipyard Sediment Remediation Project and should not have been included. For example, the DEIR's Appendix K, which purports to be an "Architectural Resources Evaluation" of the pier and seaplane ramp that would be demolished if the Convair Lagoon CDF were adopted, contains descriptions of a number of buildings previously located at General Dynamics' former Lindbergh Field Facility that were demolished over a decade ago. These documents are wholly irrelevant to the Shipyard Sediment Site, and O-4-4

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there is no legitimate purpose for including them in the DEIR as part of an evaluation of architectural resources, especially when they no longer exist.[1] Likewise, the DEIR also discusses a closed leaking underground storage tank case at the former General Dynamics facility, with no explanation of how this tank relates to the Shipyard Sediment Remediation Project, or any of the alternatives under consideration. DEIR, at 5-191. While this type of information might be appropriate with regard to an EIR for Convair Lagoon, it is plainly irrelevant to the Shipyard Sediment Remediation Project. Thus, the Cleanup Team should make clear that independent CEQA review will be required for the Convair Lagoon CDF, if selected, and strike the references to the closed underground storage tank and the demolished buildings that were previously located at the former General Dynamics' Lindbergh Field Facility. O-4-4

II. SPENDING MILLIONS OF DOLLARS TO DREDGE CONTAMINATED SEDIMENT, ONLY TO DISPOSE OF IT ELSEWHERE IN THE BAY, IS NOT A VIABLE REMEDY FOR THE SHIPYARD SEDIMENT SITE

Notwithstanding General Dynamics' above-listed concerns regarding the preparation of the DEIR, it would be patently unreasonable for dischargers to spend millions of dollars to dredge over 140,000 cubic yards of contaminated sediment, only to dispose of it in a CDF elsewhere in the Bay—particularly when consideration of the specific design details of the CDF have been deferred. O-4-5

As drafted, the DEIR contemplates that existing sediment at Convair Lagoon would be dredged and contained in a CDF, along with spoils from the Shipyard Sediment Site, and that BMPs and long-term monitoring measures would be implemented to protect water quality. DEIR, at 5-17 – 5-19; DEIR, at Table 5-1. However, even if the proposed BMPs and monitoring measures are implemented as discussed in the DEIR, there is no guarantee that the CDF will be successful, or that sediments contained in the CDF will never be released. In fact, Convair Lagoon is already a prime example of the dangers associated with confined disposal: After significant funds were expended constructing a cap to remediate PCBs, and cleaning storm drain lines that discharge to the lagoon, PCBs were subsequently found on top of the cap. While the Cleanup Team has suggested that the contamination, "presumably c[ame] from the 60-inch storm drain" (which drains sources upland from Convair Lagoon), the cause of the contamination has O-4-6

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1 While it is true that the issue of source control is relevant to any alternative, including the Convair Lagoon CDF, the cleanup and abatement order for the former Teledyne Ryan site already requires source control to be achieved before further cleanup of Convair Lagoon is implemented (DEIR, at 5-35 (citing R9-2004-0258)); accordingly, the DEIR may simply note that the CDF alternative could not be adopted until source control is achieved in accordance with R9-2004-0258. Any further detail concerning potential upland sources at Convair Lagoon is not required, and is inappropriate given that the DEIR is supposed to analyze the Shipyard Sediment Remediation Project, not Convair Lagoon. This is particularly true considering that interested parties with respect to the Convair Lagoon cleanup were not afforded the opportunity to assist in the development of the DEIR, as was the Port District.

not been established, and it remains possible that the contamination resulted from a breach of the cap. DEIR, at 5-35 ("Subsequent to installation of the sand cap over the PCB contaminated sediments in Convair Lagoon, monitoring has been conducted that has discovered PCB contamination above the cap, presumably coming from the 60-inch storm drain.") (emphasis added). O-4-6

The Regional Board should not risk a similar outcome with respect to a CDF at Convair Lagoon. If the proposed CDF were to be adopted and fail, causing impacts to the environment, the commingling of sediments in the CDF would likely result in complex, multi-party litigation—at great cost to all parties involved.[2] Since the Port District would be the sole beneficiary of such an alternative, due to its acquisition of the 10 additional acres of land that would be created by constructing the CDF, any alternative involving the commingling and confinement of sediments at Convair Lagoon should be contingent upon the Port District's agreement to fully fund such an approach, including accepting any and all future liability, obligations and costs, and indemnifying other parties for monitoring and remediation costs if the CDF fails. O-4-7

III. CONCLUSION

For the foregoing reasons, General Dynamics strongly objects to the Convair Lagoon CDF alternative, and requests that pages 20 to 90 of Appendix A to Appendix K, and all similar references to the former Lindbergh Field Facility, be stricken from the DEIR. O-4-8

Respectfully submitted,

Jennifer Casler-Goncalves
of LATHAM & WATKINS LLP

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2 As it stands, the Shipyard Sediment Site now involves 13 Designated Parties. To General Dynamics' knowledge, of the numerous parties involved, the Port District is the only party in favor of the Convair Lagoon CDF alternative.