

**LONG-TERM SEDIMENT MANAGEMENT PLANNING AT NORTH AMERICA'S LARGEST PORT COMPLEX: BALANCING THE NEED TO ACCOMMODATE THE LARGEST SHIPS WHILE COMPLYING WITH COMPLEX ENVIRONMENTAL REQUIREMENTS**

by

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**ABSTRACT**

Port growth is an important economic investment and ports are performing infrastructure improvements that include larger cranes, higher capacity backlands for quicker through port transfer, greater inland infrastructure, and deeper drafts. The dimensions of the world-wide fleet of container vessels have increased significantly in the last ten years, and it is anticipated that this trend will continue into the future as shipping companies continue to consolidate. As a result, ports throughout the United States have been actively positioning themselves to accommodate larger vessels to maintain or grow trade opportunities. While market pressures are driving the Ports of Long Beach and Los Angeles to deepen/redevelop their berths, tightening regulations that limit cost effective sediment management options like ocean disposal have created new challenges for Port staff.

Planning for large dredging/redevelopment projects frequently entails unique engineering and environmental challenges. The financial and environmental feasibility of these projects is often dependent on the management of contaminated sediments or large quantities of clean sediment that must be undertaken within region-specific regulatory requirements. In California, several regulatory authorities oversee the movement and disposal of sediment. They make up the Los Angeles Regional Contaminated Sediments Task Force and include: U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, National Marine Fisheries Service, U. S. Fish and Wildlife Service, California Coastal Commission, Los Angeles Regional Water Quality Control Board, and California Department of Fish and Wildlife. Dredging and disposal activities are also watched closely by local non-governmental organizations to ensure that regional initiatives like the promotion of beneficial reuse opportunities are being met. In the Los Angeles region, the preferred management strategy for clean sediments is beach nourishment and port fills. Management strategies for contaminated sediments, in order of preference, include beneficial reuse of sediments in construction fill (e.g., nearshore confined disposal facility), temporary storage in an approved upland area (until a fill project becomes available), treatment and reuse as a marketable product (e.g., cement-stabilized fill), or for other beneficial upland placement

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areas. The ports do not necessarily have planned fill opportunities to align with maintenance and capital dredging projects; therefore, the ports have been helping the regulators recognize the need for regional opportunities to manage both clean and contaminated sediments effectively and efficiently. Both ports have developed sediment management guidance documents and contaminated sediment management plans to provide clarity in the ports' decision processes, and to prioritize management strategies that are feasible for implementation within a working port. Through frequent communication with the regulators, the ports have been able to generate renewed interest in confined aquatic disposal facilities and shallow water habitat enhancement opportunities because of the need to identify economical and logistically feasible management alternatives for clean and contaminated sediments beyond use as port fill material. Creation of biologically valuable habitat with dredged material has the added value of providing mitigation credit for port development projects.

This talk focuses on the Ports' sediment management challenges and discusses the research conducted over the last few years to identify suitable sediment management alternatives at the nation's largest ports, Port of Los Angeles and Port of Long Beach.

# Long-term Sediment Management Planning at North America's Largest Port Complex

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# Ports of Los Angeles and Long Beach





## Global Trade Leaders

- Container, breakbulk, liquid bulk, dry bulk terminals
- Connectivity to all US markets and gateway to Pacific Rim
- 2017 container volumes
  - POLA – 9.3 TEUs
  - POLB -



## Deepening Navigation Depths

- Deepen/maintain channels and berths for increasingly larger ships
- Funding/coordination with US Army Corps of Engineers on deepening federal channels
- Balance need to accommodate the largest ships while complying with complex environmental requirements





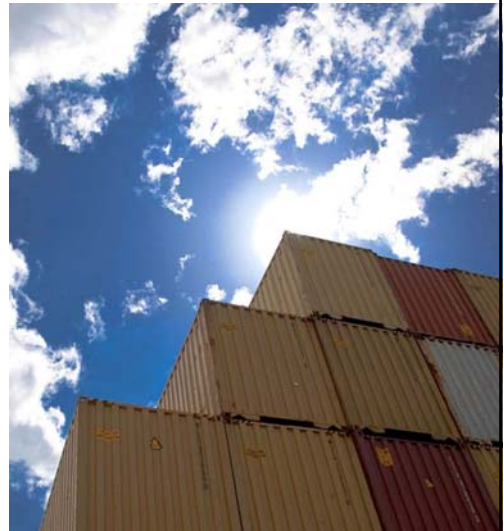
## Dredged Material Management

- Strong environmental regulations/standards
- Contaminated Sediments Task Force – multiple regulatory agencies oversee dredge projects
- Emphasis on beneficial reuse of dredged material
- Valuable biological resources in harbor – mitigation requirements for fills
- Challenges with dredged material disposal




## Port-Specific Projects Overview



- Each port has its own approach, resources, and obstacles
- Sediment management challenges
- Environmental challenges
- Engineering challenges
- Long-term planning
- Lessons learned








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# Port of Los Angeles





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**Port of Los Angeles  
Channel Deepening Project**



# Port of Los Angeles Channel Deepening Project

- 2002 - 2013
- -53 feet depth
- 15,000,000 cy dredged
- 100% beneficial use
- \$370 million
- Cost sharing with ACOE from WRDA 2000



## Sediment Management Challenges

- Issue with native material not going to ocean disposal site due to naturally occurring metals
- Poor quality material necessitated mining sand for fills
- Project delays
  - Permits
  - Legal challenge
  - Remediation dredging project added
  - Additional in-harbor disposal capacity needed



## Sediment Management Solutions

- Habitat improvement
  - 104 acres of Shallow Water Habitat
  - 15-ac Eelgrass Restoration Site
- 96 acres of new land fills, including two Confined Disposal Facilities
- Surcharge for new fill – eventually disposed in Shallow Water Habitat
- Creation of 200 acre in-harbor Submerged Material Storage Site





## Environmental Challenges

- Regulatory
  - COE was lead on project
  - Port/COE coordination with other agencies early and throughout project
- Biological mitigation requirements
  - Created Shallow Water Habitat and Eelgrass Restoration Site to partially compensate for impacts from new fills
  - Also used banked mitigation credits



## Engineering Challenges

- Removing surcharge and building a conveyor bridge over a working terminal
- Maintaining line and grade with bottom dumps at shallow water habitat area
- Equipment and key personnel availability over a 10-year project







## Lessons Learned

- Maximizing dredged material disposal in-harbor allows for beneficial creation of new land fills for Port uses and enhanced biological habitat, and also reduces disposal costs
- Shorter projects are better than longer projects



## Port of Long Beach



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### Deepening Project

- 3-3-3 USACE process
- 8 million cy
- -55' + 2 ft overdepth
- -73' approach

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### Solution: Long-Term Management Planning

- Promote 100% beneficial use by aligning dredging programs with port fills and habitat improvement projects
- Knockdown dredging to minimize sediment to be managed
- Maintain ocean disposal site use as a viable sediment management option if needed



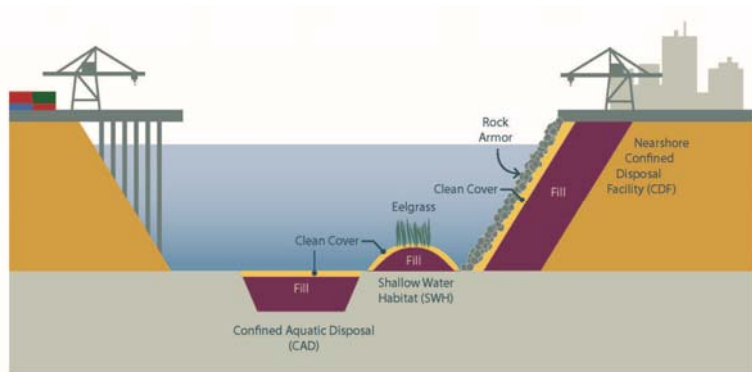
### New Management Alternatives to Be Explored

- Conversion of temporary aquatic sediment storage sites to confined aquatic disposal sites
- Evaluation of feasibility of new shallow water habitat enhancement areas
- Evaluation of new temporary sediment storage site areas



### Outer Harbor Sediment Placement Site

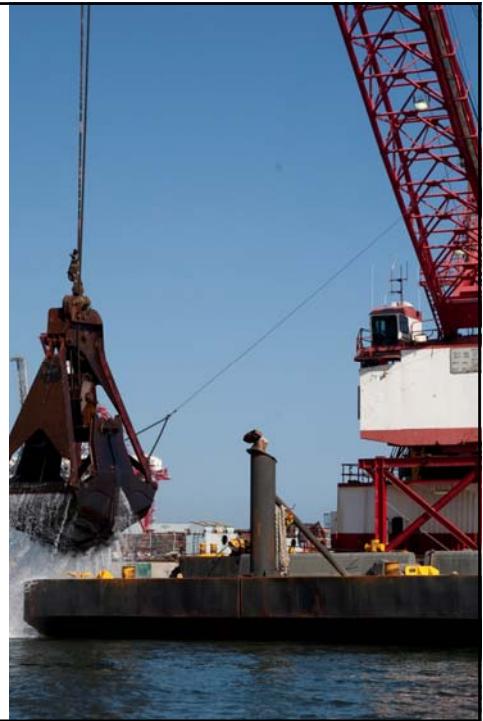
- South area = 1.4 million cy capacity for clean material
- North area = 1.3 million cy capacity for non-open ocean suitable material





## New Engineering Challenges

- Electric dredges for air quality
- Reduced competition on west coast for dredge contractors
- New limits for post-dredge surface concentrations



## Lessons Learned

- Develop as many beneficial use opportunities as possible
- Work to provide flexibility of sediment management options in permits
- Provide opportunities for region to benefit from sediment management strategy







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