

Sediment is a Resource, not a Waste!

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Environmental
Solutions



Property
Redevelopment



Design/Build
Construction



Green
Buildings



Clean
Energy



The Trusted Integrator for Sustainable Solutions

Current Dredged Material Management Challenges

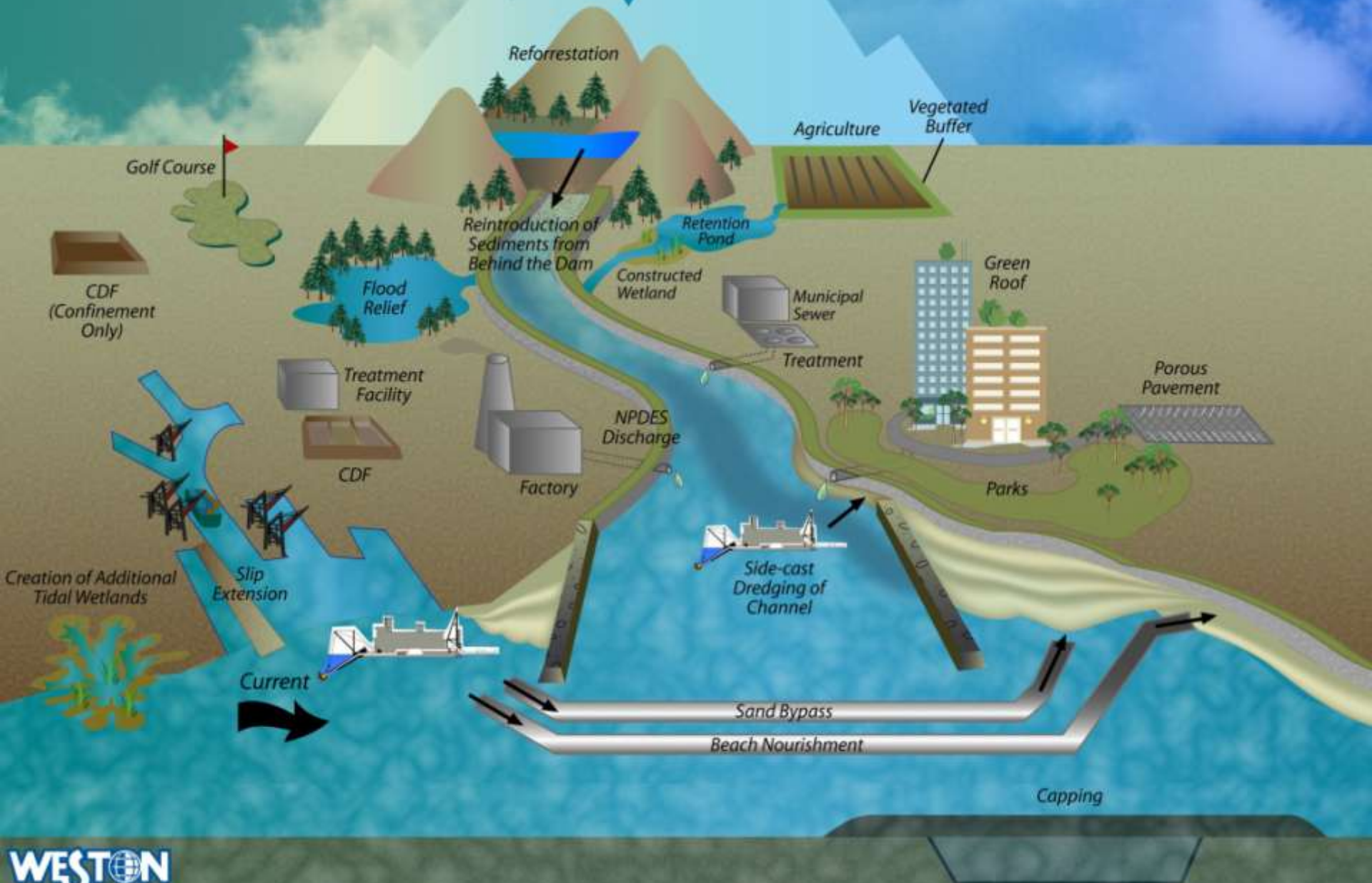
- Not enough sediment where we want it (e.g., ecosystems, beaches, wetlands, etc.)
- Too much sediment where we don't want it (e.g., harbors, ports, marinas, etc.)
- 250 M-yd³ of sediment dredged annually to support US navigation program (\$\$)
- Uncoordinated regulatory programs resulting in undeveloped/unrefined watershed goals and objectives
- Insufficient science and engineering to develop “sustainable” management strategies and technologies for contaminated sediment management

Overview

- Integrated Sustainable Sediment Management
- Case studies – Beneficial Use of Dredge Material
 - 1) An-Shun Remediation Site, Taiwan
 - 2) Port of Oakland, California
 - Hamilton Army Airfield Wetland Restoration
 - Montezuma Wetlands Restoration

***Sediment management projects
conducted in isolation of watershed
objectives are not typically sustainable***

Integrated Sustainable Sediment Management



Sustainable Sediment Management

A comprehensive approach

*to addressing long-term management and
conservation of sediments*

within a watershed

to maintain current and future beneficial uses

*while addressing regional environmental,
economic, and social objectives.*

Beneficial Uses of Dredged Material

- Habitat Restoration/ Enhancement
- Aquaculture
- Parks and Recreation
- Agriculture/ Horticulture/Forestry
- Mine and Quarry Reclamation
- Landfill Cover for Solid Waste Management
- Beach Nourishment/ Shoreline Stabilization
- Industrial and Commercial Use
- Material Transfer
- Construction Material
- Multipurpose/ Sequential/Innovative Land-Use Concepts

Case Studies

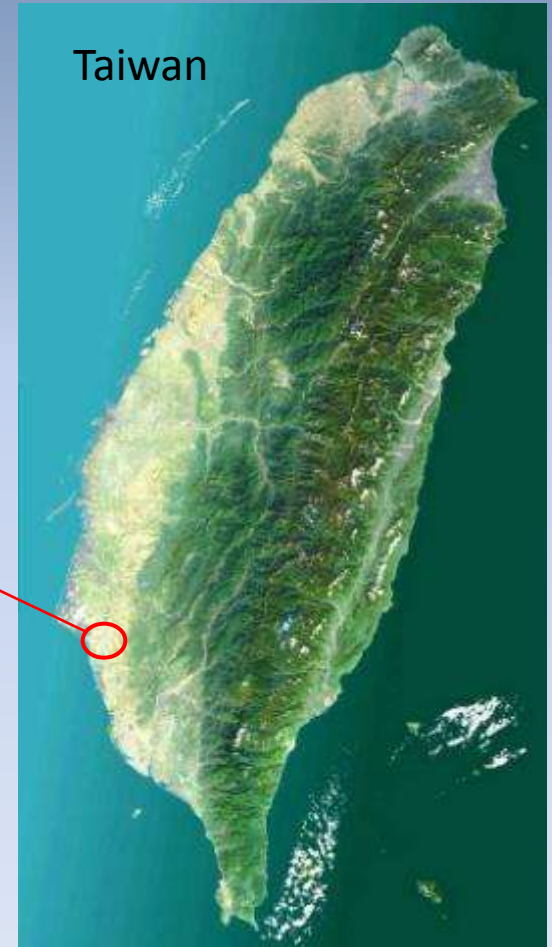


An-Shun Remediation Project, Tainan City, Taiwan

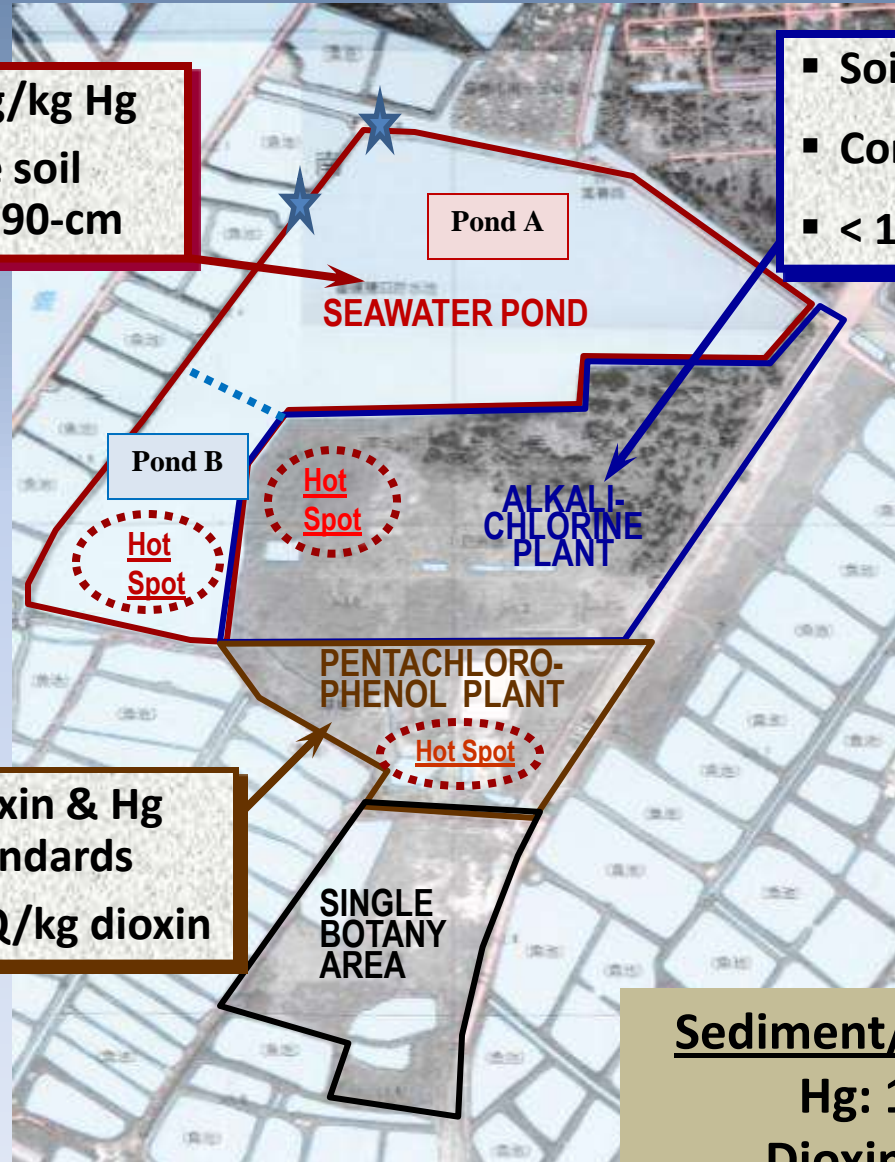


Port of Oakland, California Montezuma & Hamilton Wetlands Restoration Projects

An-Shun Project Site



Preliminary Site Investigation



- Sediment: < 1,400 mg/kg Hg
- Contamination above soil control standard to > 90-cm

- Soil: < 3,370 mg/kg Hg
- Contamination to > 90-cm
- < 10,000 ng-I-TEQ/kg dioxin

- Contamination of dioxin & Hg above soil control standards
- < 17,000,000 ng-I-TEQ/kg dioxin

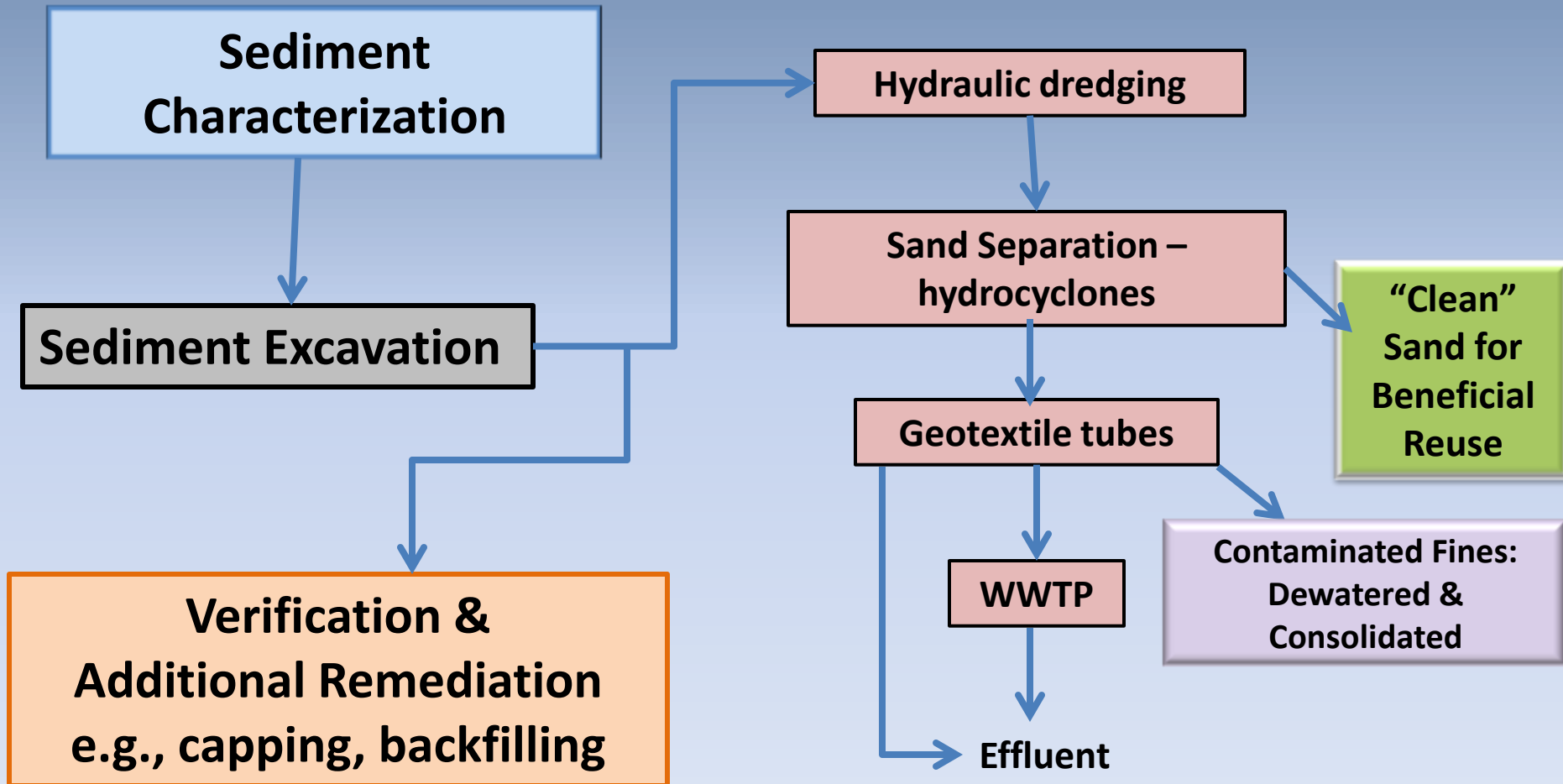
★ Weirs/Outfalls

Sediment/soil control standards
Hg: 1 mg/kg Total Hg
Dioxin: 150 ng-I-TEQ/kg

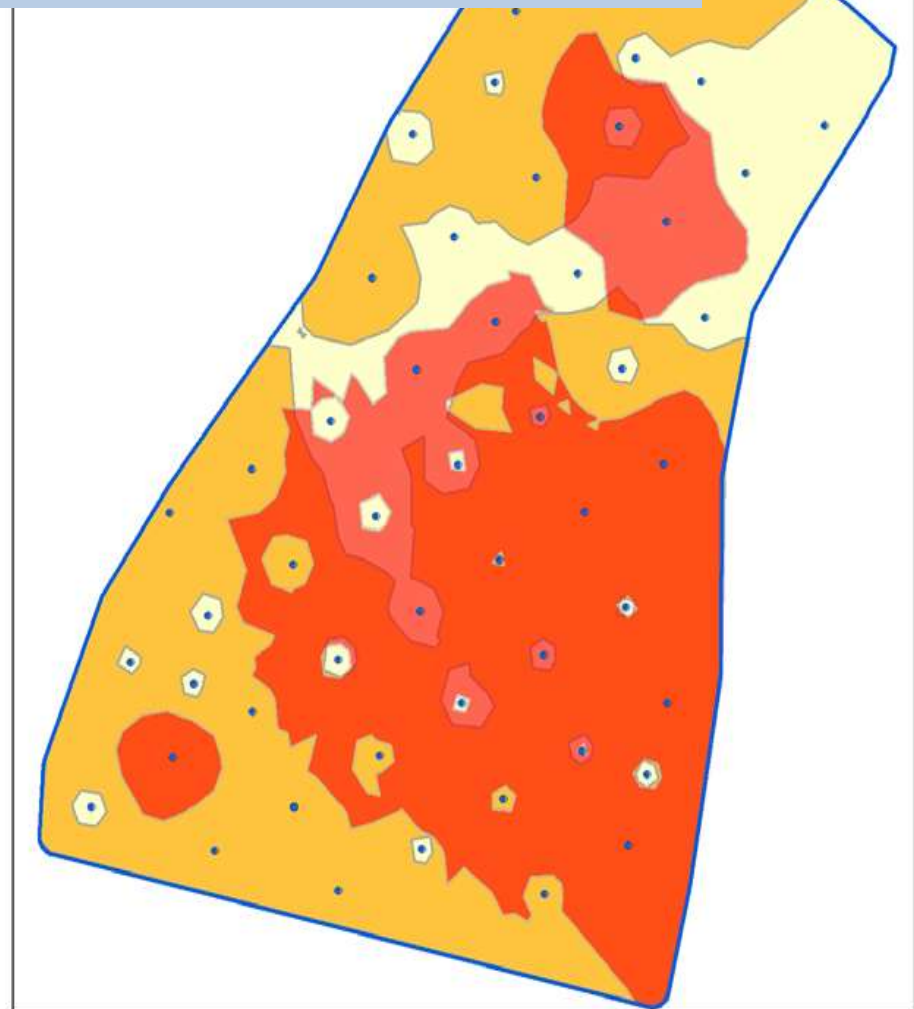
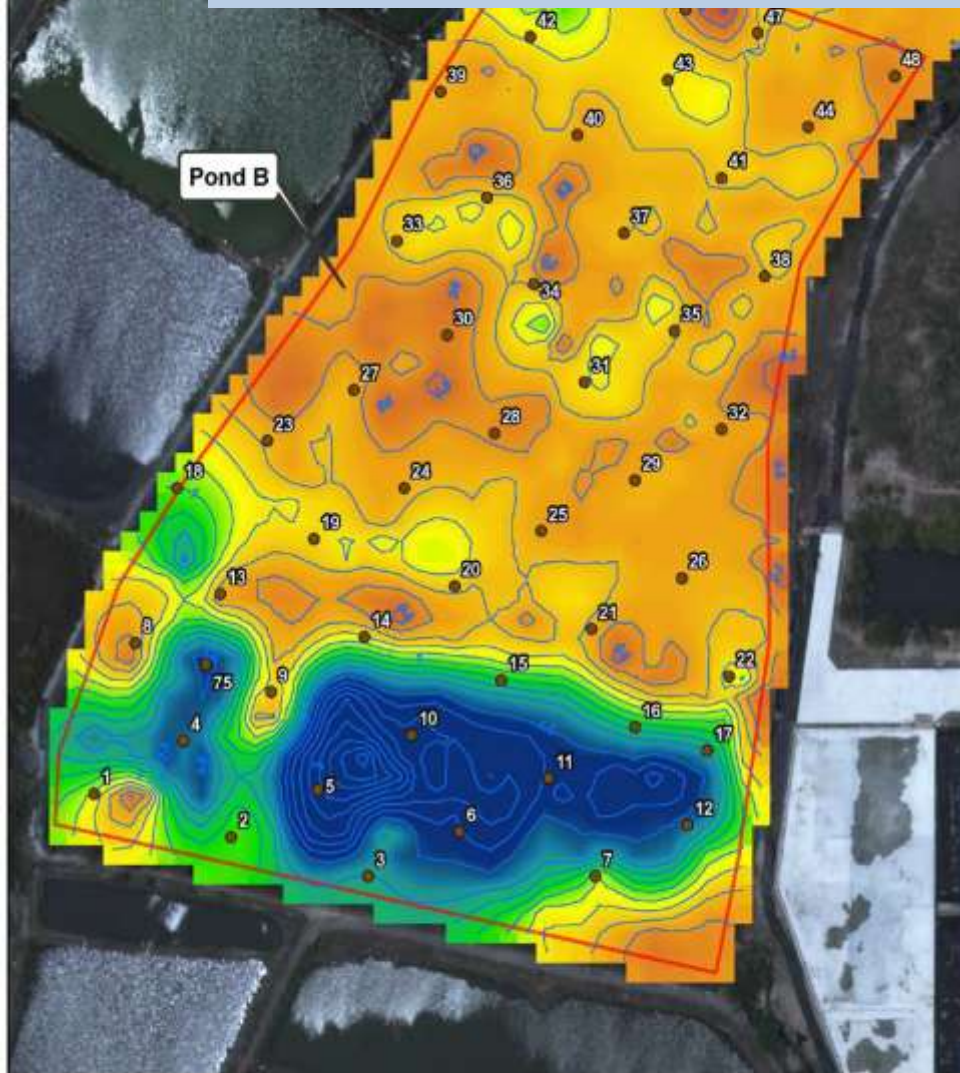
Objectives

- 1) Turn-key remediation of mercury (Hg) and dioxin contaminated soil and sediment in Ponds A and B sediment.**
- 2) Incorporate separation of “clean” sand for beneficial reuse on site.**

Sediment Management Plan



Remedial Investigation Results



Sample Core Locations
 Contour (1-dm interval)*
 Pond B

Water Depth (m)*
 2.35
 0.38

0 20 40
 Meters

N
 E
 S
 W

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*Depth raster and contours generated using raw point depth data from bathymetric survey (Oct 2011). Pond B is tidally muted, and tides influence depth

Sample Locations
 Pond B Dredge Footprint
 Dredge area to Depth of 90 cm (99% of Pond B Dredge Footprint Area)
 Dredge area to Depth of 180 cm
 Dredge area to depth of 300 cm

0 15 30 60 Meters

N
 E
 S
 W

WESTON SOLUTIONS
Note: Mercury criteria of 1.0 mg/kg was used to calculate dredge areas.



Case Studies

An aerial photograph of the Port of Oakland, California. The image shows a dense urban area with a complex network of highways and roads. The city is situated along the edge of a large body of water, the San Francisco Bay. The water is a dark greenish-blue color. In the foreground, there are several large, rectangular structures, likely part of the port's infrastructure. The overall scene is a mix of urban development and natural water bodies.

Port of Oakland, California Montezuma & Hamilton Wetlands Restoration Projects

The -50 Foot Dredging Project - Purpose

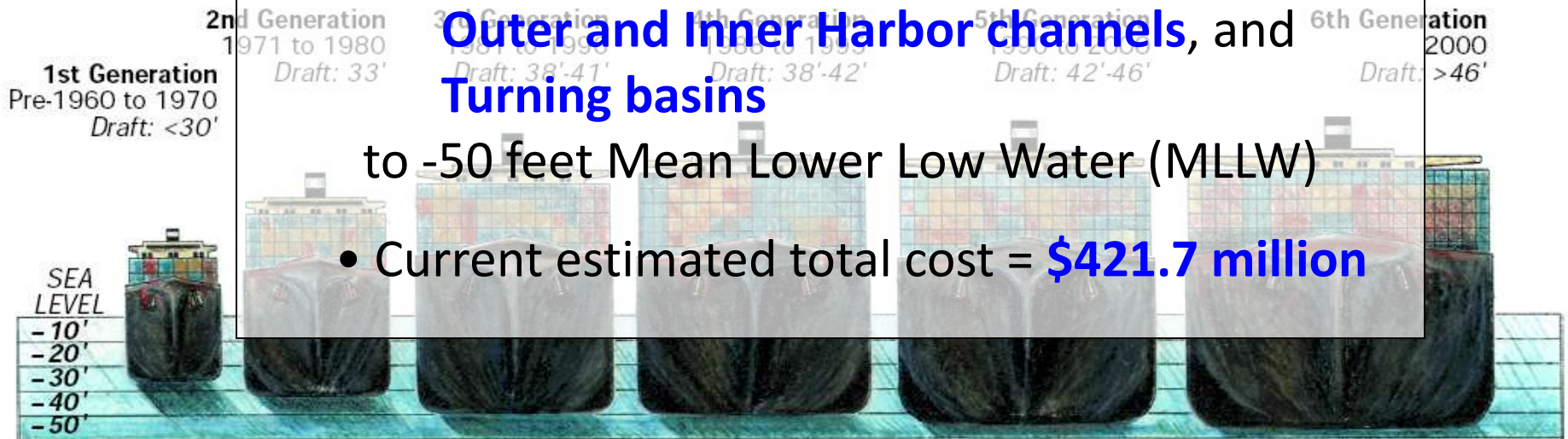
Overview

- Accommodate the Latest Generation of Container Vessels
- Transports over 6,500 twenty-ft equivalent units (TEU's) of containers
- 46-ft design draft
- Deep draft navigation
- Widening and deepening
- Beneficial Reuse of Dredge Material within the Watershed

Harbor Entrance, Outer and Inner Harbor channels, and Turning basins

to -50 feet Mean Lower Low Water (MLLW)

- Current estimated total cost = **\$421.7 million**

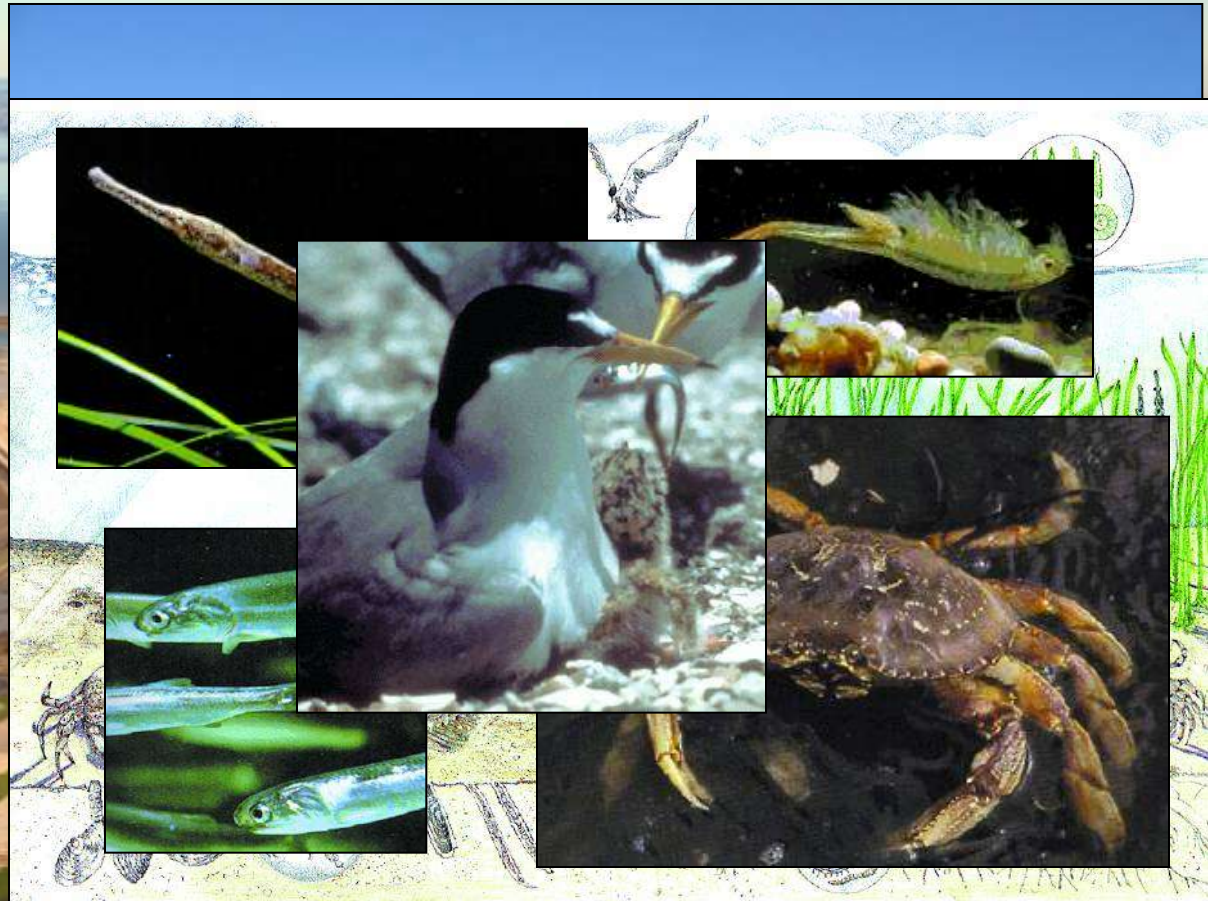


Project Components - Overview



Outer Harbor Dredging

Hamilton and Montezuma Wetlands Restoration



Dredged material delivery pipe at Montezuma Wetlands

Conclusions

*Weston's domestic and international experience tells us that **beneficial reuse of dredge material is the trend**. However, we believe it's important to focus on **watershed-scale decision-making and coordination** as well as continued research on technologies and applications for contaminated sediment.*

Thank you!!



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