Strategies to Reduce Copper Pollution in San Diego Bay

Environmental Solutions | Property Redevelopment | Design/Build Construction | Green Buildings | Clean Energy

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The Trusted Integrator for Sustainable Solutions

Agenda

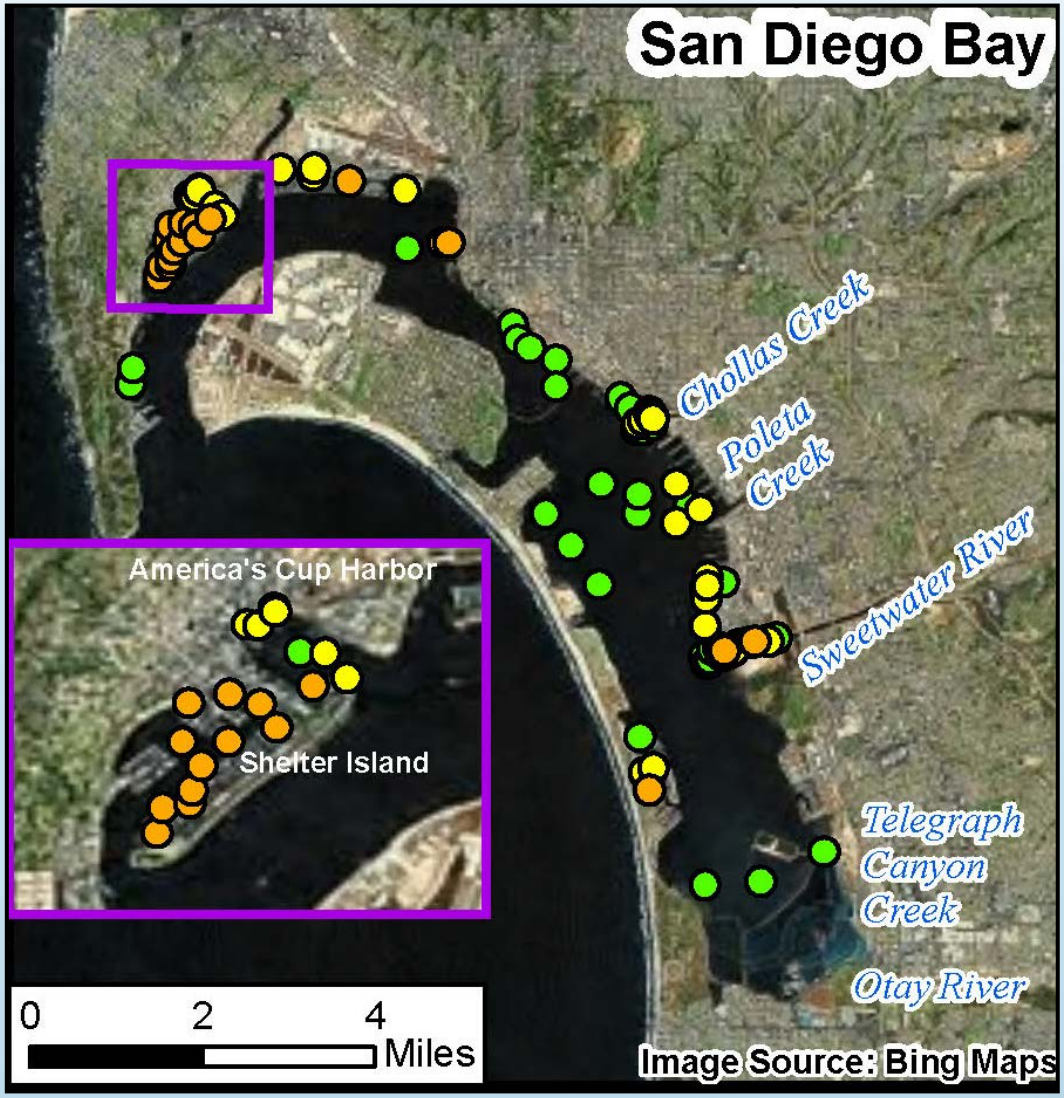
- Define the Problem
  - Magnitude of the Copper Issue in San Diego Bay
  - Shelter Island Yacht Basin TMDL
- Copper Reduction Approach
- Solutions-Oriented Assessment

Copper – Why is it a problem?

- Accumulates in sediments and marine biota
- Results in toxicity
- Causes environmental degradation
- Results in regulatory actions


San Diego Bay 303(d) Listings

Dissolved Copper Distribution



- Elevated Concentrations associated with Marinas and Industrial Areas

- Exceed California Toxics Rule Standards
  - Chronic: 3.1 µg/L
  - Acute: 4.8 µg/L

Legend

Dissolved Copper (ug/L)

- 0 to <0.01
- 0.01 to <3.10
- 3.10 to <4.80
- 4.80 to <25.00
- ≥25

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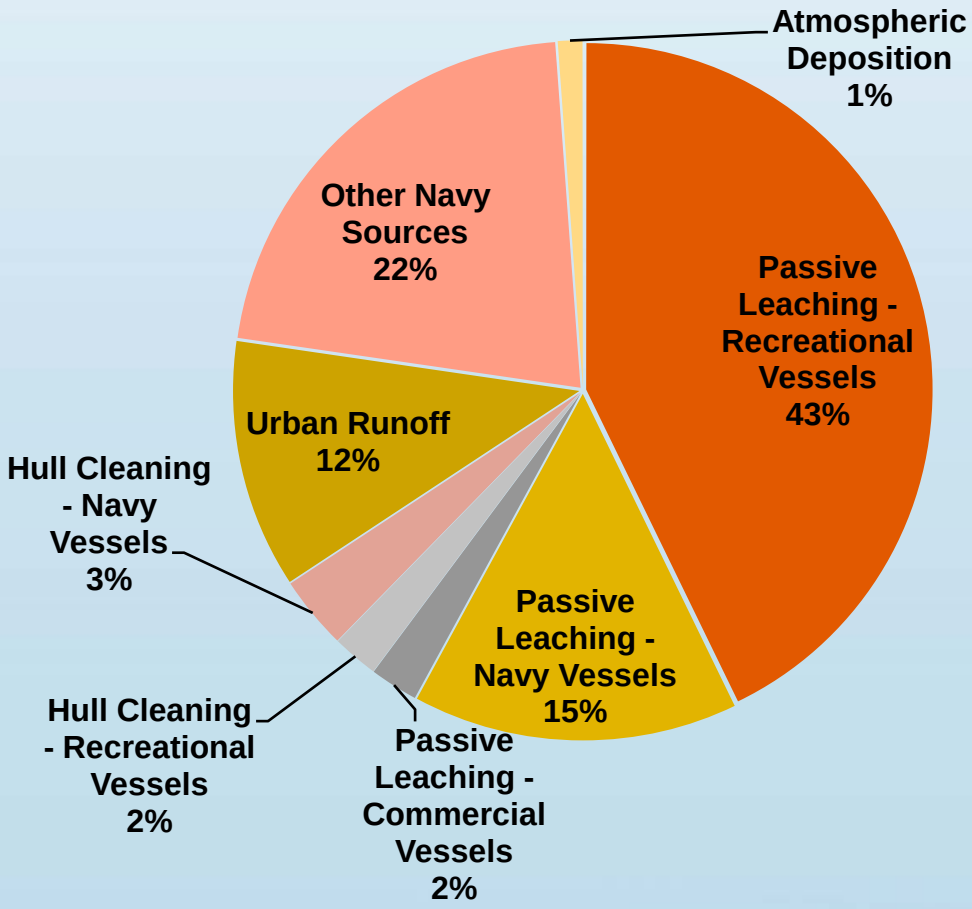
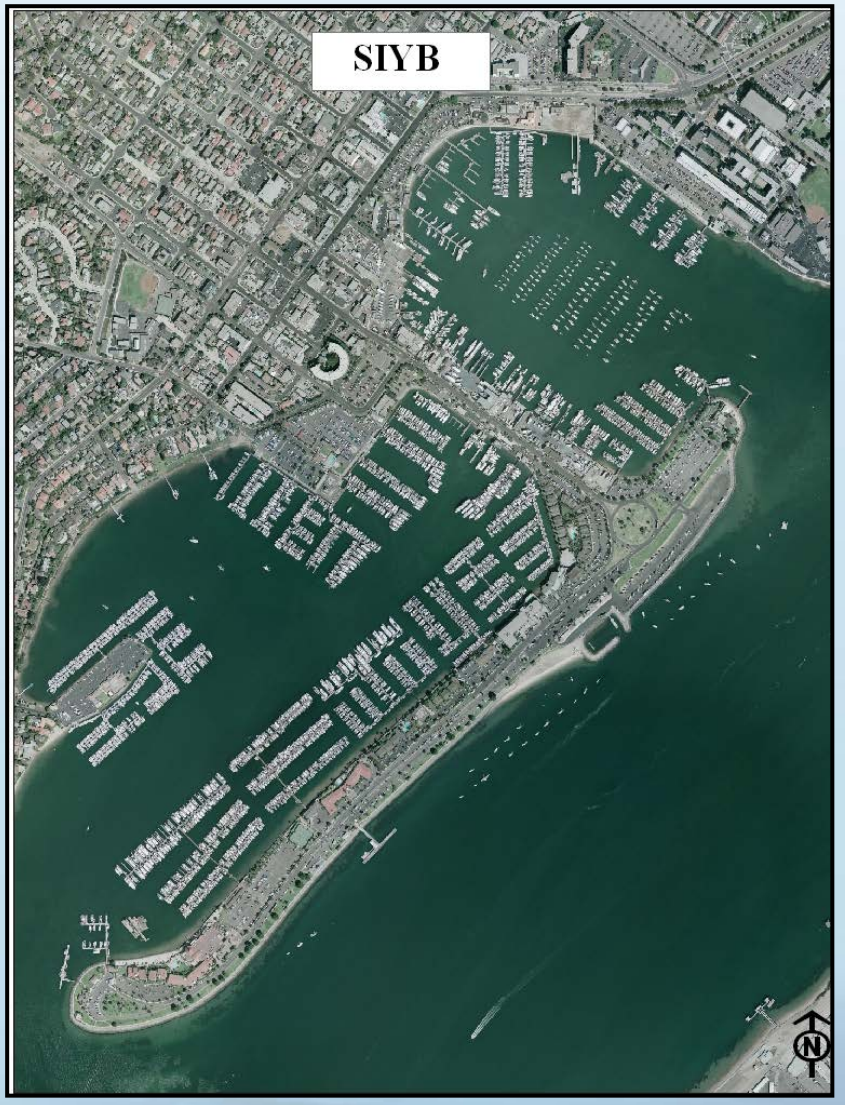
Sources of Copper to SD Bay

- Antifouling Hull Paints (87%)
- Urban Runoff (12%)
- Atmospheric Deposition (1%)



SIYB Copper TMDL

- High levels of dissolved copper in SIYB water column (>4.8 µg/L)
- Impairment of Beneficial Uses due to toxicity
  - Marine Life (MAR)
  - Wildlife Habitat (WILD)
  -
- 93% of loading from passive leaching (2,000 kg or 4,400 lbs/year)
- 5% of loading from hull cleaning (100-116 kg or 220-255 lbs/year)
- 1% Urban runoff
- 1% Inputs from the Bay



SIYB Copper TMDL

- Requires 76% reduction in annual copper loading by 2022
- Attainment of 3.1 µg/L dissolved copper level by 2022

Stage	Years	Reduction	Target Date
1	0-2	0%	2007
2	2-7	10%	2012
3	7-12	40%	2017
4	12-17	76%	2022

Copper Reduction Program

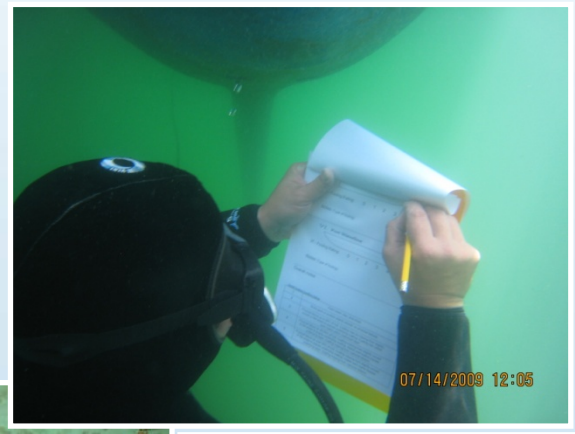
- Education & Outreach
- Alternative Hull Paint Testing and Research
- Hull Paint Transition
- Policy Development / Legislation
- Solutions-Based Assessment

Education and Outreach

- Inform Boaters of Water Quality Problems and Non-copper Hull Paint Alternatives
  - Community Outreach & Workshops
  - Brochures, Mailers, etc.
  - Booths at Local Boating/Community Events
- Engage all stakeholders in developing solutions
  - TMDL Discharger Workgroups
  - Stakeholder Collaboration
  - Regional Board Support

Hull Paint Testing & Research

- Goal: Find effective hull paint alternatives
- Evaluate performance of alternative test coatings
  - Panel Testing
    - Fouling
    - Maintenance needs
    - Longevity
  - Boat Hull Testing



Hull Paint Transition

- Focus on most important sources of copper to reduce loading
- Transition to non-copper alternatives
  - Lead by example by converting Port fleet by 2012
  - Provide incentives for voluntary transition
    - Offset cost of transition through 319(h) grant funds
    - Lower slip fees for vessels with non-copper hull paints
  - Institute Policies and Regulations

Issues & Concerns

Boaters

- Why do I need to change?
- Copper hull paints are legal.
- There are no alternatives that work as well.
- Alternatives cost more to apply and maintain.

Dischargers

- The TMDL has gaps / is not based on sound science.
- Vessels aren't the problem…it's runoff, sediments, hull cleaners.
- Vessel conversion requirements will cause boaters to move to other marinas and result in lost revenue.

How to Encourage a Successful Transition away from Copper

- ***EDUCATION:*** Help boaters understand the problem and become aware of viable alternatives
- ***RESEARCH & DEVELOPMENT:*** Develop wider selection of effective alternatives to copper paints.
- ***PRODUCT AVAILABILITY:*** Boatyards must be willing to carry alternative paints and apply them correctly.
- ***INCENTIVES:*** Use funds, lease agreements, and "Green Boater" program to encourage transitions.
- ***REGULATION:*** State mandates on copper hull paints to limit availability. Establish timelines for phasing out use of copper paints.
- ***ASSESSMENT:*** Use cost-effective and solutions-based monitoring to determine progress.

Policy Development / Legislation

- Goal: Seek Regulatory Change
  - State wide changes to hull paints
    - Dept. Pesticide Regulation Paint Re-evaluation
    - Provide Leadership on Statewide Marina Permit
  - POSD Board Resolution
  - POSD Policies / Permits
    - Hull Cleaning Permit
    - Hull Paint Restrictions

Solutions-Based Assessment

- Tracking Vessel Conversion
- Water Quality Monitoring
- Testing TMDL Assumptions

Vessel Conversion Tracking

- Goal: Determine basin-wide loading reduction
- Focus on vessel conversion
  - Reduces both passive leaching & hull cleaning contributions (0.9 kg/yr per vessel)
  - Most direct mechanism to compare with TMDL interim and final targets
- Used to Assess Compliance with TMDL

Vessel Conversion

- Annually track conversion of vessels from copper to non-copper paints
- TMDL load allocations used to determine reduction numbers
- Set and compare to TMDL-based conversion targets

Stage	Years	Loading Reduction	Interim Loading Target	Reduction in Vessels w/ Copper Paints to Achieve Loading Target
1	2005-2007	0%	2,163	N/A
2	2007-2012	10%	1,900	292
3	2012-2017	40%	1,300	959
4	2017-2022	76%	567	1,773

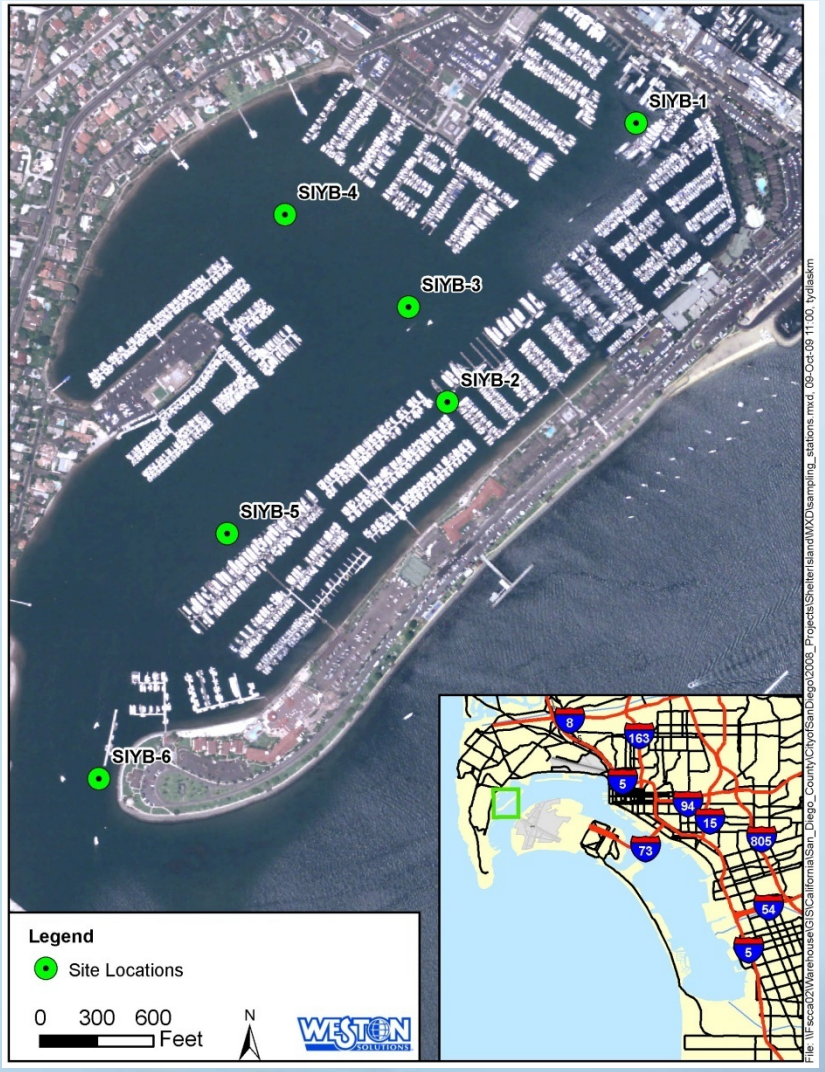
Assessing TMDL Assumptions

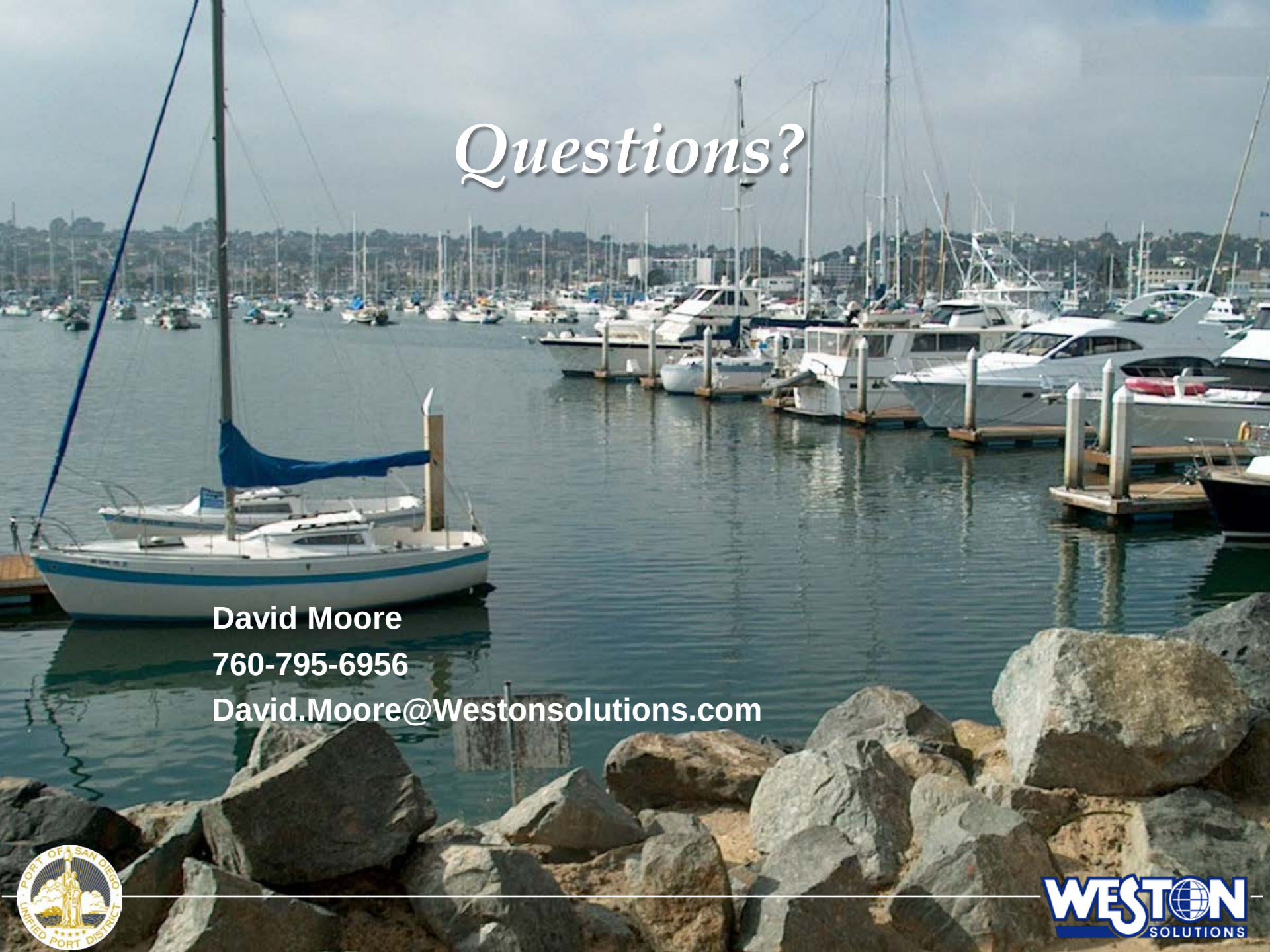
Goal: Improve scientific foundation of TMDL

- Investigate physical and chemical conditions that affect impacts of copper at SIYB
  - Toxicity Identification Evaluations (water, pore water, and sediments)
  - Biotic Ligand Modeling & Water Effects Ratio Studies for Site-Specific Objective
  - Sediment Flux of copper between sediments and water column

Water Quality Monitoring

- Assess long-term improvements in water quality
- Not used for Interim TMDL Compliance
- Determine compliance with final TMDL threshold (3.1 µg/L)
- Sampling performed at same stations monitored by Regional Board
- Assess Copper Concentrations and Toxicity




Questions?
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