Advancing Sustainability and the Blue Economy: San Diego Bay



California Marine Affairs and Navigation Conference – Morro Bay, CA

Port of San Diego Granted Lands

34 miles of waterfront

3,677
acres of
Submerged

Approximately

Tidelands

8,300

acres of new Submerged
Tidelands
(subject to survey) as of
January 1, 2020

2,404
acres of Port
Tidelands





Wide-Ranging Operations





Environmental Champions for San Diego Bay and Beyond





Plans and Policies at the Port of San Diego Advancing Sustainability and the Blue Economy





Coastal Resiliency for Port Tidelands

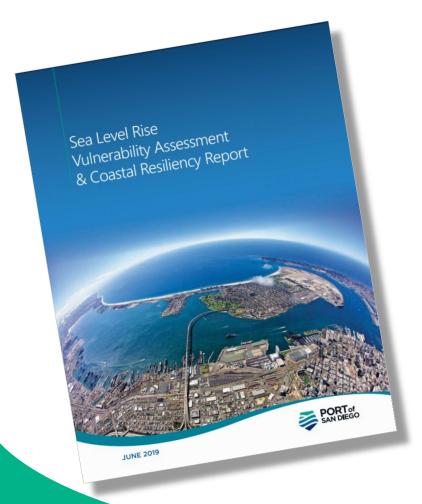
- Existing flooding
- Coastal-dependent uses, critical infrastructure, and coastal access
- Legislative Framework:
 - Port Act
 - Coastal Act
 - Public Trust Doctrine

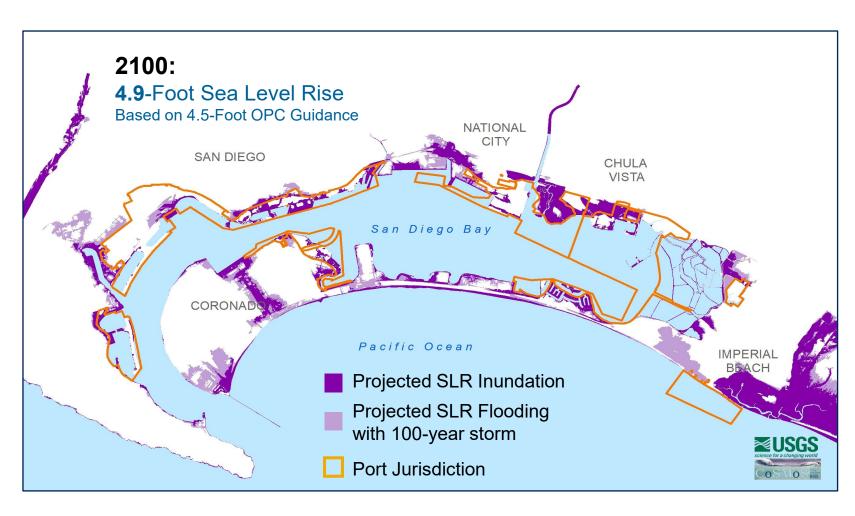




Tomorrow's Flood on Today's Landscape

Vulnerability Assessment and Coastal Resiliency Report (2019)







Green Infrastructure and Living Shorelines







Building a Portfolio of Nature-Based Solutions



Building a Portfolio via the Port of San Diego's Blue Economy Incubator





ESTABLISHED INDUSTRIES

Cargo/Cruise





Coastal Development

Shipbuilding/Boatyards



Port's Blue **Economy**



Commercial Fishing Recreation/Tourism

Mitigation Banking



Marine Bio-Technology

Renewable Energy



Marine Cleantech

Aquaculture



Monitoring & Safety

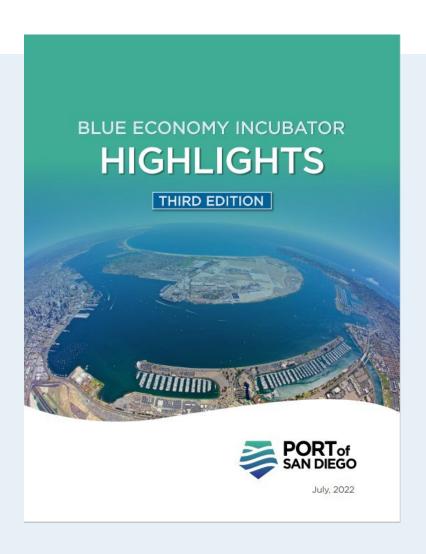
EMERGING INDUSTRIES



Blue Economy Incubator

Value Proposition

- Port-based testbed and pilot sites
- Pilot project facilitation services
- Regulatory and permitting assistance
- Subject matter expertise
- Strategic stakeholder collaboration
- Marketing and outreach
- Port Funding
- Leverage outside funding





Our impact in Numbers

\$160,000

in royalty payments that can be re-invested in supporting new pilot projects through the Port's Blue Economy Incubator

Over 25
PARTNERSHIPS
created through
the work of the BEI

\$1.7
MILLION

in funding to support the launch of sustainable aquaculture and blue technology pilot projects

250+

INQUIRIES

received from organizations seeking partnerships and pilot project opportunities

\$1.2 MILLION

additional research and development funds leveraged by Blue Economy Incubator pilot projects

9 innovative pilot projects launched through a port-wide collaboration process





In-Situ Soil Remediation | ecoSPEARS









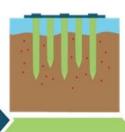
In-Situ Soil Remediation | ecoSPEARS

SPEARS: How it Works

Sorbent Polymer Extraction and Remediation System



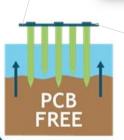
SPEARS are filled with proprietary solvent and inserted into mat



SPEARS mats are deployed into sediment



PCBs are absorbed into SPEARS



SPEARS are retrieved from sediment once site goals are met



SPEARS mats enter the destruction process









Bio-Enhancing Concrete | ECOncrete









Bio-Enhancing Concrete | ECOncrete

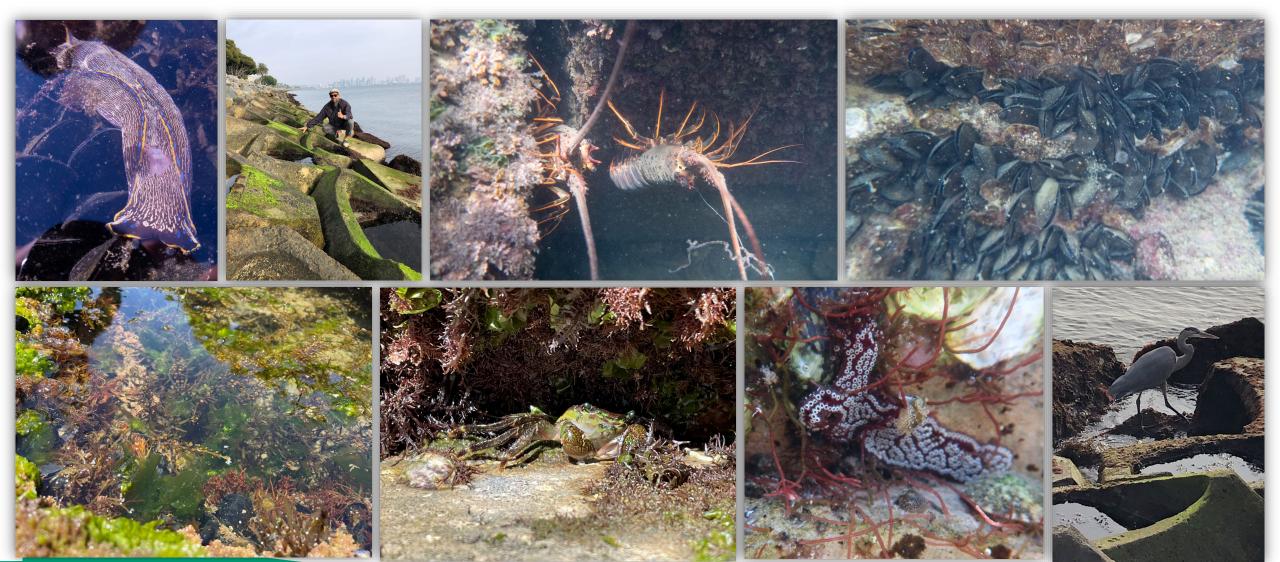








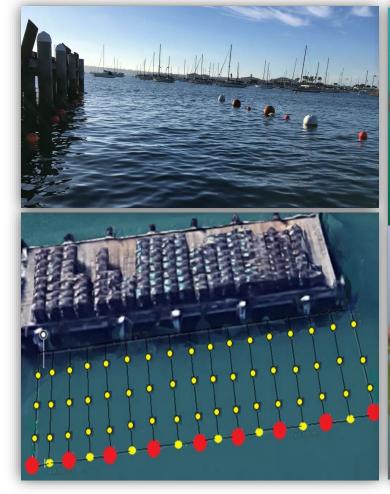
Bio-Enhancing Concrete | ECOncrete





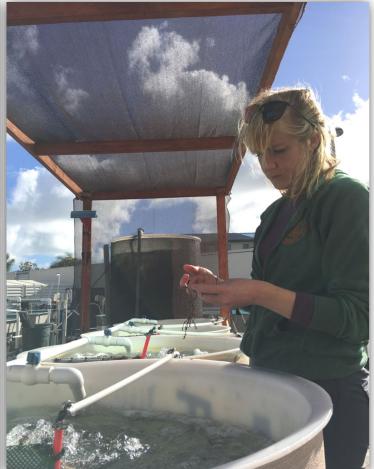


Seaweed Aquaculture | Sunken Seaweed













Seaweed Aquaculture | Sunken Seaweed







Research supported by ARPA-E

Hatchery at SDSU Marine Lab

Pilot Farm at Port Grape St Pier





Blue Carbon Sequestration & Storage

Previous Studies

- The Port and Navy map eelgrass ~3 years.
- As of 2020, San Diego Bay currently has 2,600 acres of eelgrass, which represents:
 - 50% of all eelgrass in Southern California.
 - 17% of all eelgrass in the state.





2021 Merkel & Associates. Inc.







San Diego Bay Eelgrass Blue Carbon Study

Bay-wide Carbon Storage Results (Above & Below Ground)

TOTAL EELGRASS CARBON IN SAN DIEGO BAY

Ecoregion	Carbon (tonnes CO₂ equiv.)	Percentage of Total
Outer Bay	1,100	0.7%
North	11,850	6.9%
North Central	2,530	1.5%
South Central	30,740	18.0%
South	124,700	73.0%
Total	170,900	100%

Key findings:

- Carbon storage increases from north to south. <u>Most</u> <u>carbon storage is in South</u> <u>Bay</u>.
 - The bay's total estimated carbon pool is 170,900 Mt of CO² equivalent but could be as high as 245,000 Mt CO²e.



Mitigation Banking – Pond 20





Mitigation Banking – Pond 20





Regional Collaboration

Environmental Advisory Committee and Wildlife Advisory Group















State and Regional Partners























Federal and Technical Specialists





US Army Corps of Engineers.















California Marine Affairs and Navigation Conference – Morro Bay, CA



TMDL Overview



Copper levels in Shelter Island exceed 3.1 µg/L water quality standard



TMDL adopted in 2005; 17-year timeline



Per TMDL copper-based antifouling paint is primary source (98%) via

- Passive leaching
- In-Water Hull Cleaning



76% reduction required by 2022



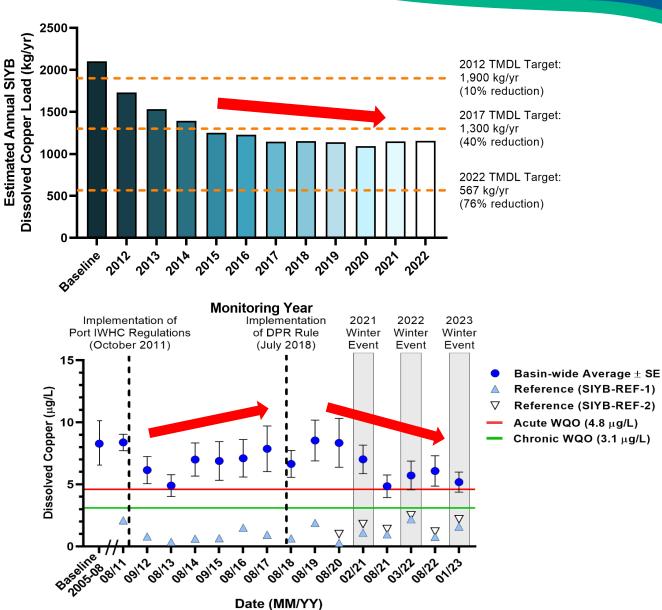
District, marinas & yacht clubs, hull cleaners, and boaters are named dischargers

Water Quality and Loading in SIYB





Source: 2022 SIYB Annual Monitoring & Progress Report, WSP, May 2023





Hull Cleaning Pause

How does a pause in IWHC affect dissolved copper concentrations in SIYB?

- Implemented a temporary pause in hull cleaning from December 19, 2021 February 9, 2022
- Conducted weekly water quality measurements
- Performed daily dock-walks for a total of 217 inspections



Port Staff performing dock walks



Water quality sample collection

Key Takeaways



- Inspection program verified that cleaning did not occur
- Despite slight decreases, dissolved copper concentrations at the end of the Pause still did not meet water quality standards at a majority of stations (19 of 20).
- Changes in dissolved copper concentrations due to elimination of hull cleaning appear to be minor compared to passive leaching.
- The complete data set & figures are in the Hull Cleaning Pause Water Quality Monitoring Technical Report, June 2022 (www.sandiegobaycopperreduction.org)



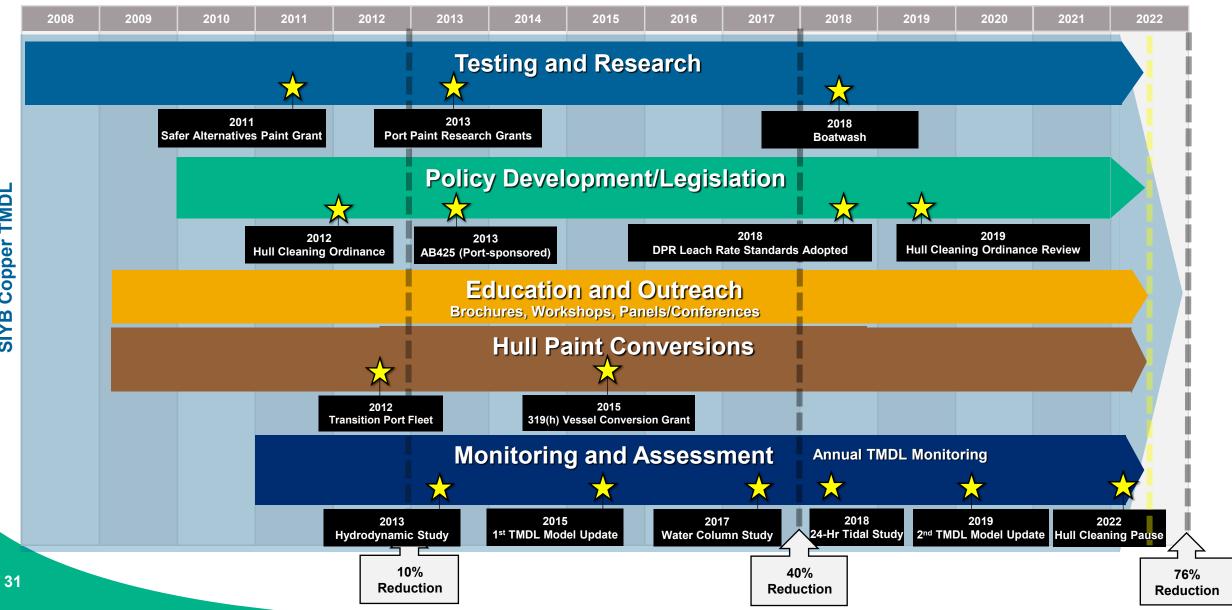




Copper TMDL

TMDL Accomplishments & Milestones

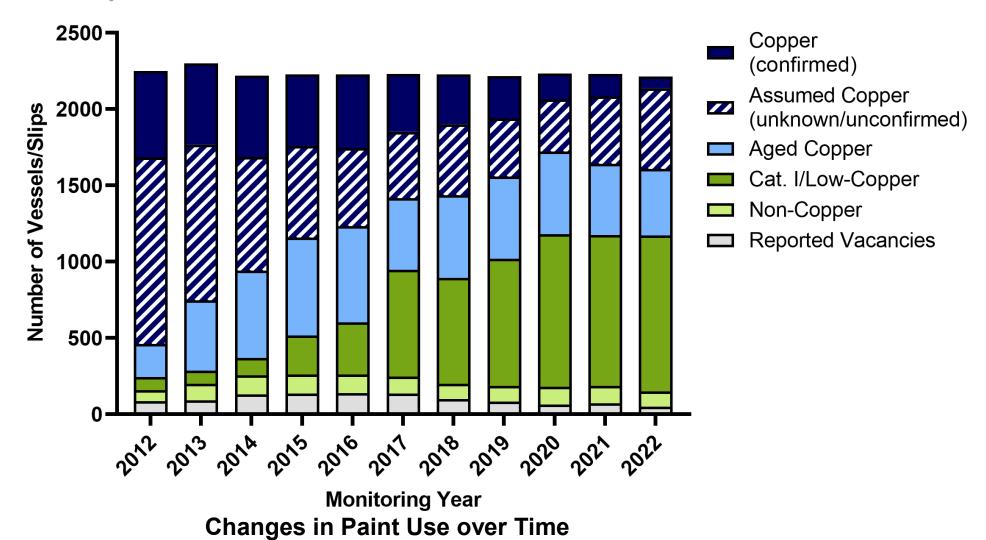








Copper paint source analysis





Summary & Next Steps

Moving Beyond the SIYB TMDL

Lessons Learned During TMDL

- Final TMDL Report was submitted in April 2023
- Basin Water Quality knowledge has improved
- Copper Paint is greatest loading source
- Challenges exist because copper paint remains legally available
- Non-copper paint use remains limited

Next Steps

- Work collaboratively with Regional Board and stakeholders to discuss future of TMDL, options, and expectations
- Develop a holistic approach to assess the ecological conditions in SIYB



Questions and Discussion

