

Navigating TMDLs: A Perspective on Science & Management

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Agenda

1. Port Overview
2. TMDLs & Pollutants of Concern
3. Science to Inform Management Actions
4. Exploring Innovation
5. Q & A

Port of San Diego Jurisdiction

34

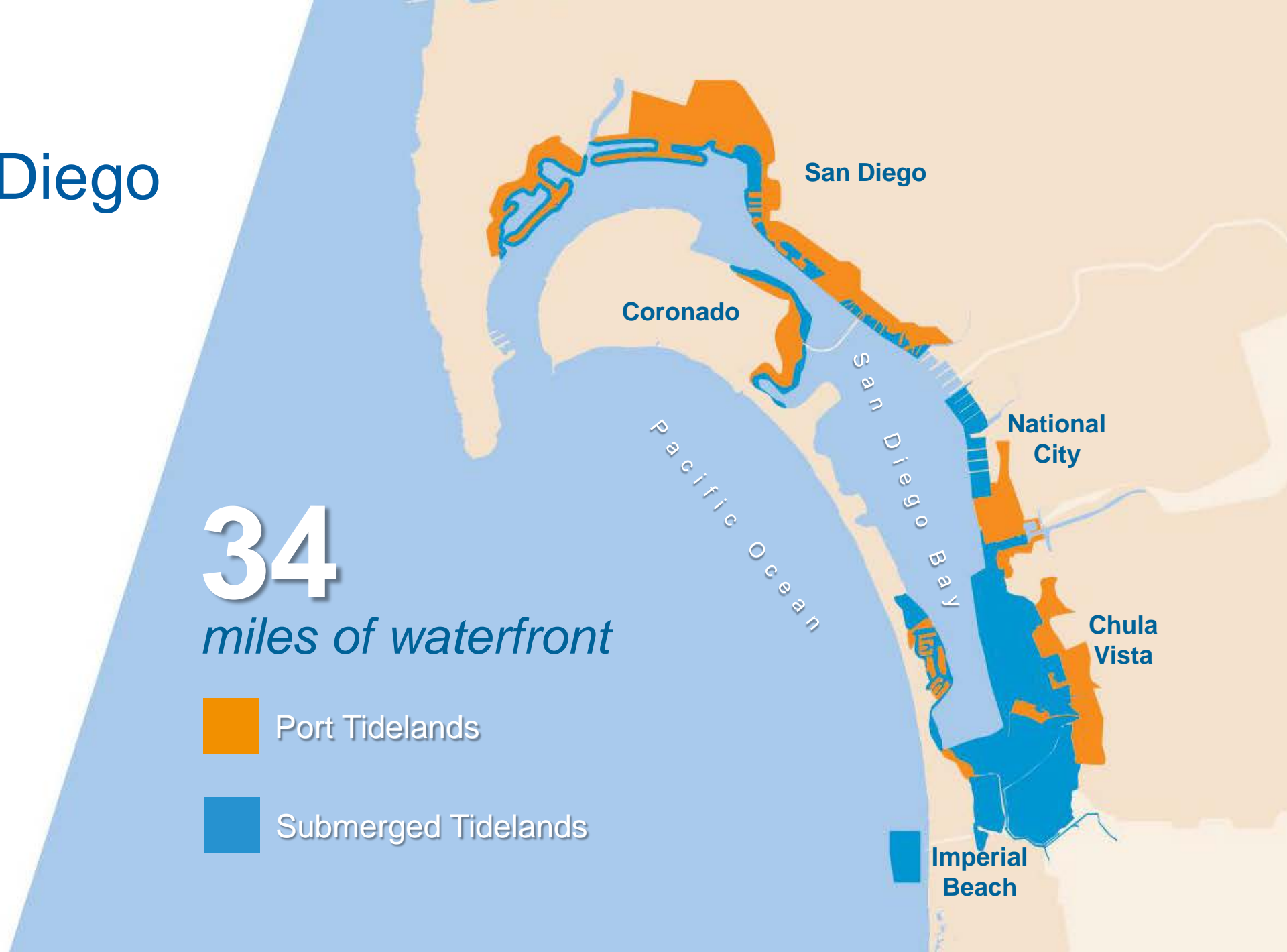
miles of waterfront



Port Tidelands



Submerged Tidelands



The Port of San Diego



Public Benefit Corporation

- Port Act of 1962
- Public agency operating as a regulator and a market participant / development entity
- Serve as a trustee for State Tidelands (Public Trust)

Unique Funding Mechanisms

- No traditional tax levy
- Cannot sell land – only lease, license, and permit

Revenues Generated From:

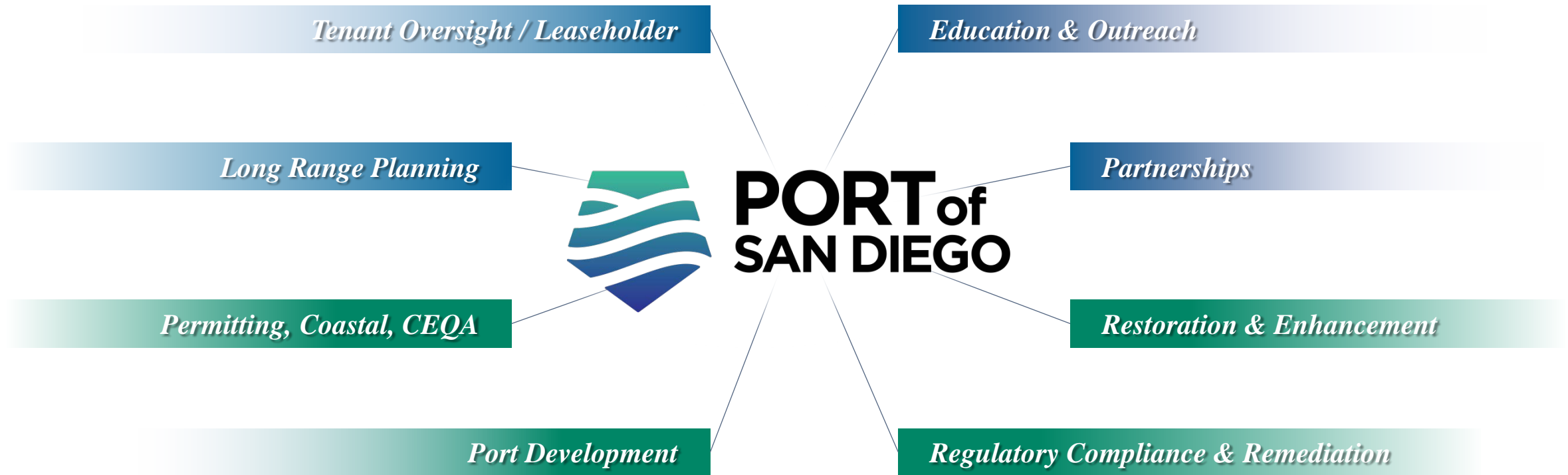
- Lease payments from commercial tenants
- Maritime trade, industrial, and cruise business
- Harbor Police (through services to the Airport)
- Other Lines of Business
- Grants

The Port's Trustee Role

- Created to benefit the public
- Core purposes
 - Commerce
 - Navigation
 - Fisheries
 - Recreation
 - Protect & Enhance Natural Resources
- Steward of the Bay

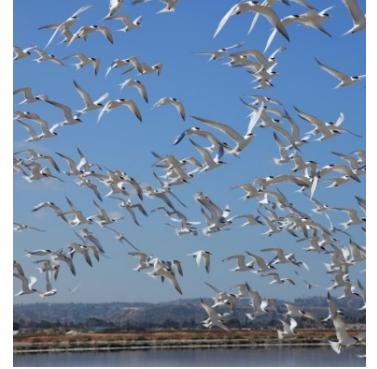
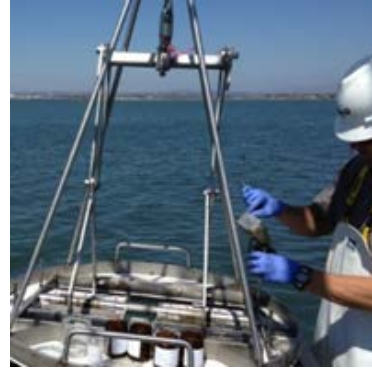
The Port's Various Roles

Trustee, Landlord, Regulator, Environmental Steward



Environmental Stewardship:

Port's Value to the Bay



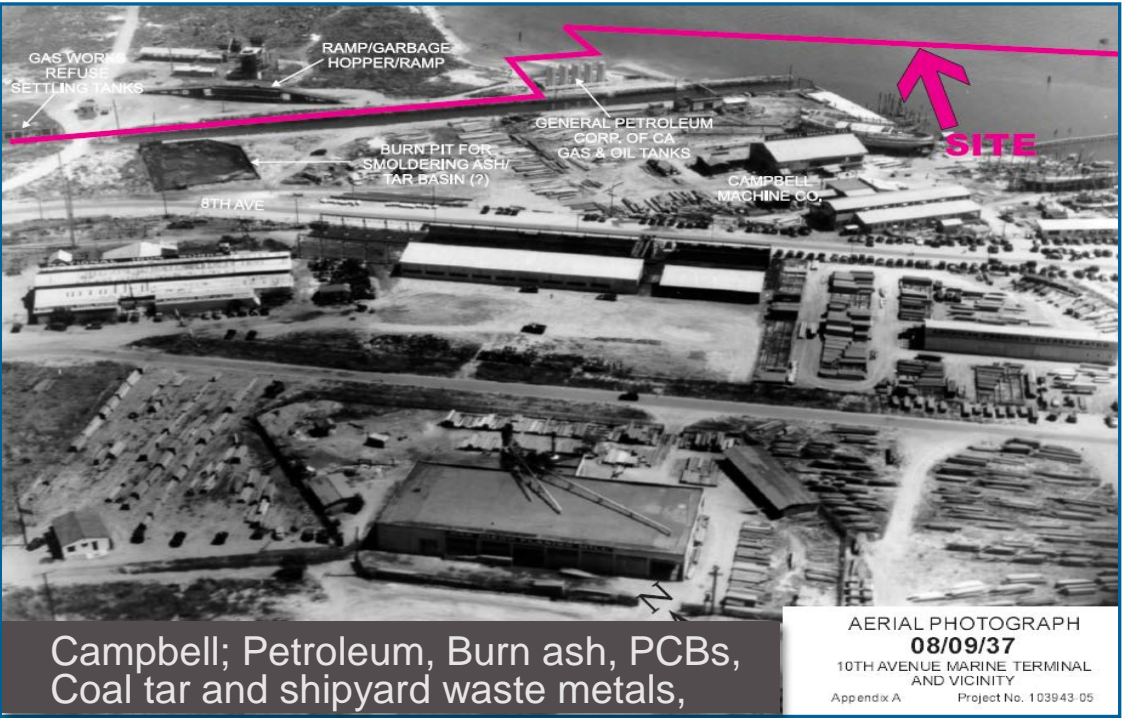
- Environmental Conservation
- Environmental Protection
- Climate Action Plan
- Resiliency

- Long-term sustainability of bay communities
 - Sediment quality
 - Water quality
 - Biodiversity

Pollutants of Concern

Common pollutants around San Diego Bay

Legacy Pollutants / PCBs

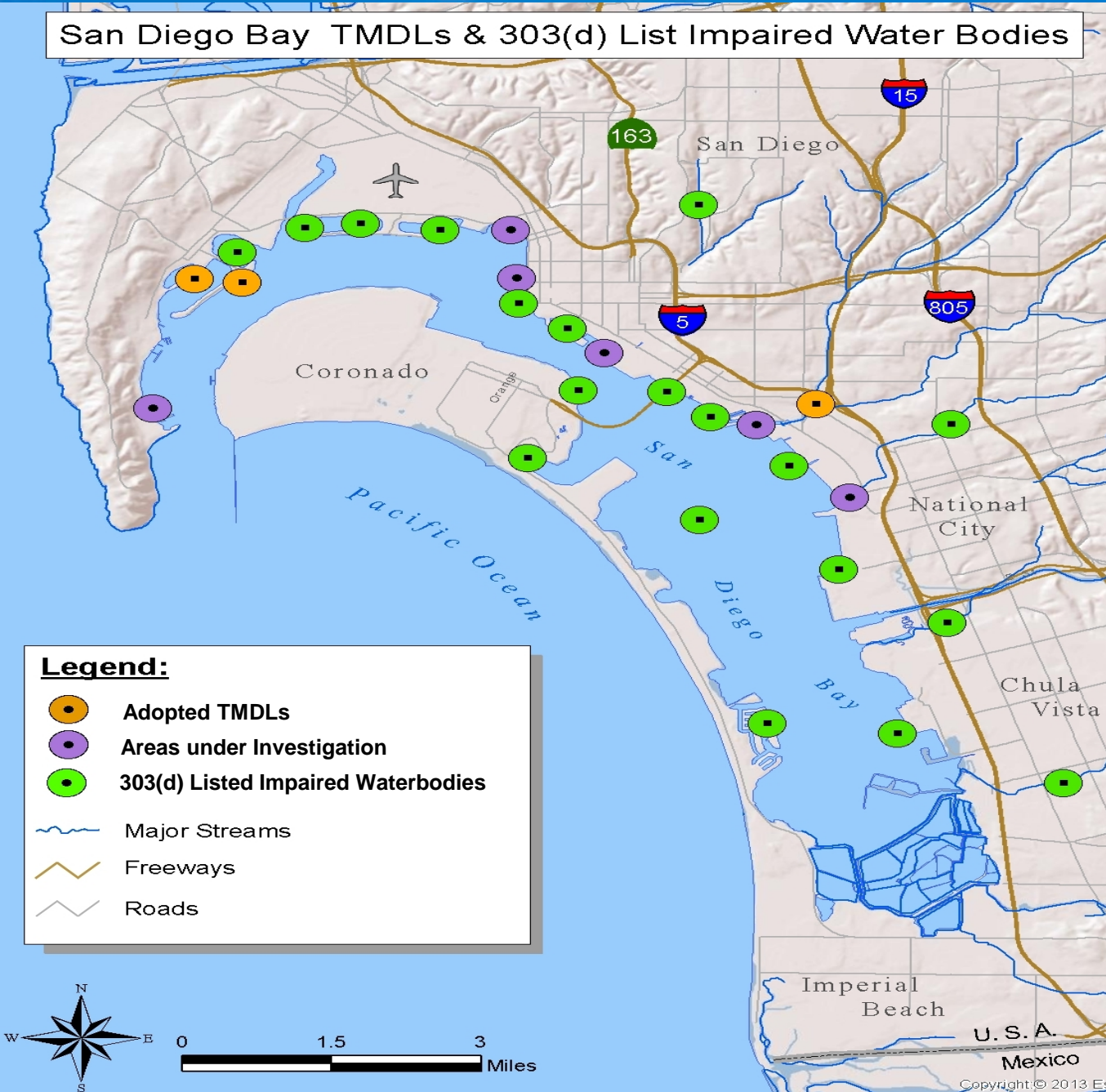


Copper



Bacteria / Trash





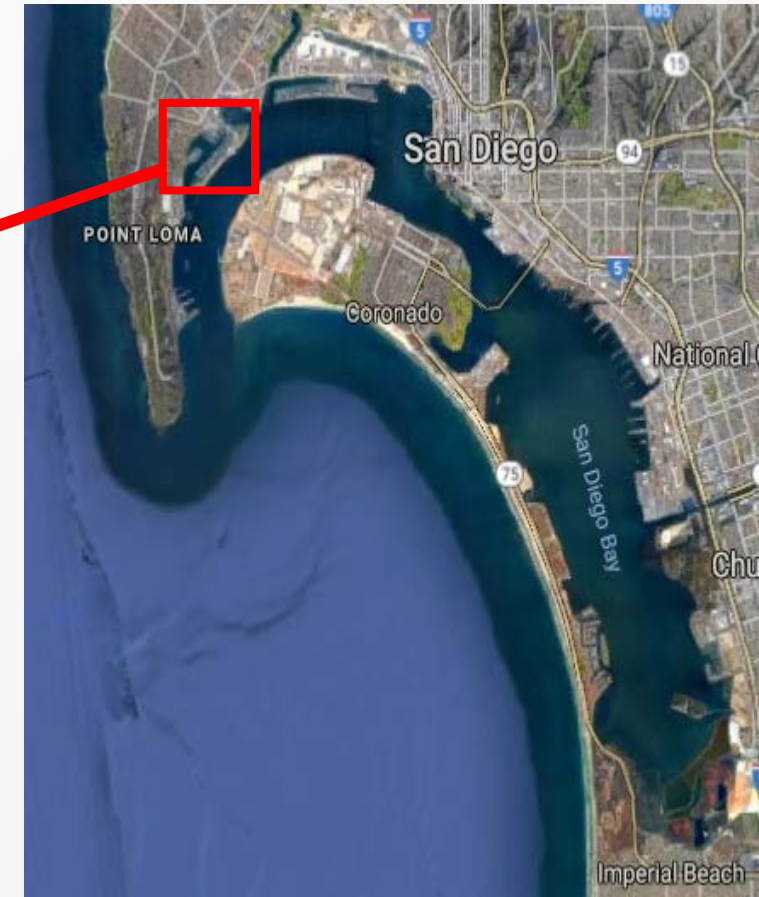
San Diego Bay TMDLs and 303(d) Impairments

- 3 TMDLs Adopted
 - Shelter Island Yacht Basin (Copper)
 - Shelter Island Shoreline Park (Bacteria)
 - Chollas Creek (Metals, Bacteria)
- Other 303(d) Impairments for
 - Dissolved Copper
 - Fecal Indicator Bacteria
 - Sediment Toxicity
 - Degraded Benthic Community

Copper Reduction

Regulatory Overview: Shelter Island Copper TMDL

- Water in Shelter Island exceeds $3.1\mu\text{g/L}$ regulatory standard
- TMDL adopted in 2005
- Requires reductions in copper loading
- Main source identified as copper anti-fouling hull paints
- Annual assessments on progress

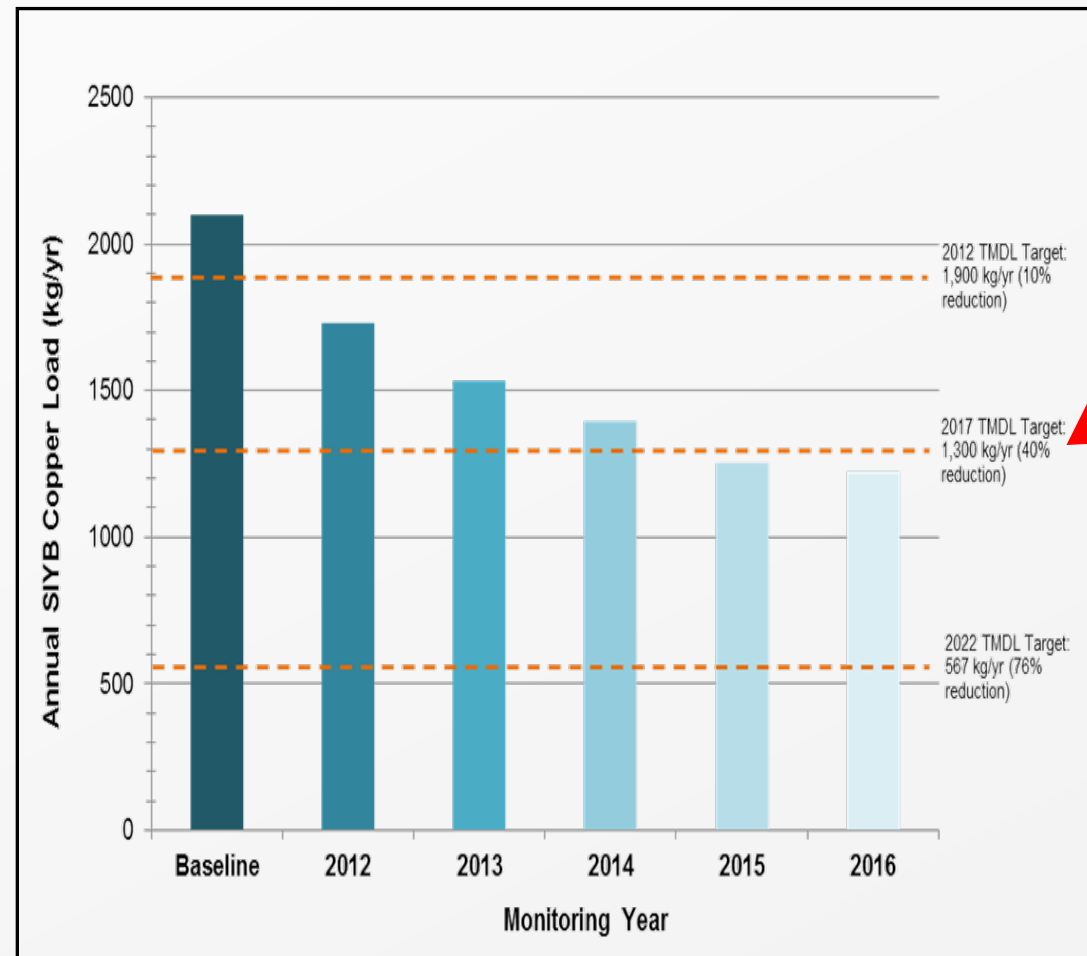


Shelter Island Copper TMDL: Reducing Copper Loading

- Annually identify load reductions from paint conversions and hull cleaning BMPs
- Track conversion of vessels from copper to non-copper paints.
- Compare results to TMDL load targets.

TMDL Compliance Schedule

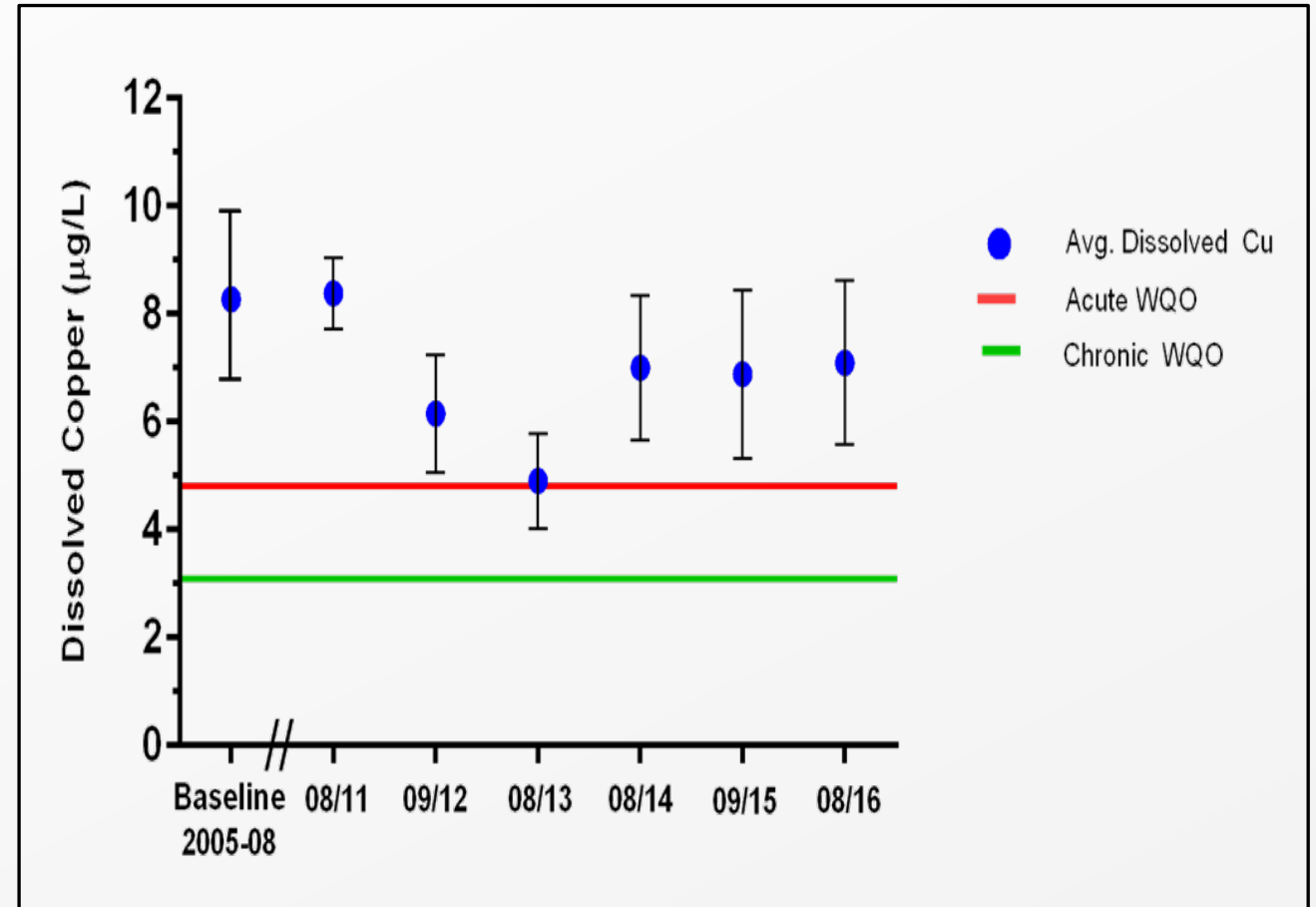
Stage	Years	Loading Reduction	Load Target (kg/yr)
1	2007	0%	2,163
2	2012	10%	1,900
3	2017	40%	1,300
4	2022	76%	567



Source: 2016 SIYB Annual Monitoring & Progress Report, Amec Foster Wheeler, March 2016

Shelter Island Copper TMDL: Water Quality Objectives

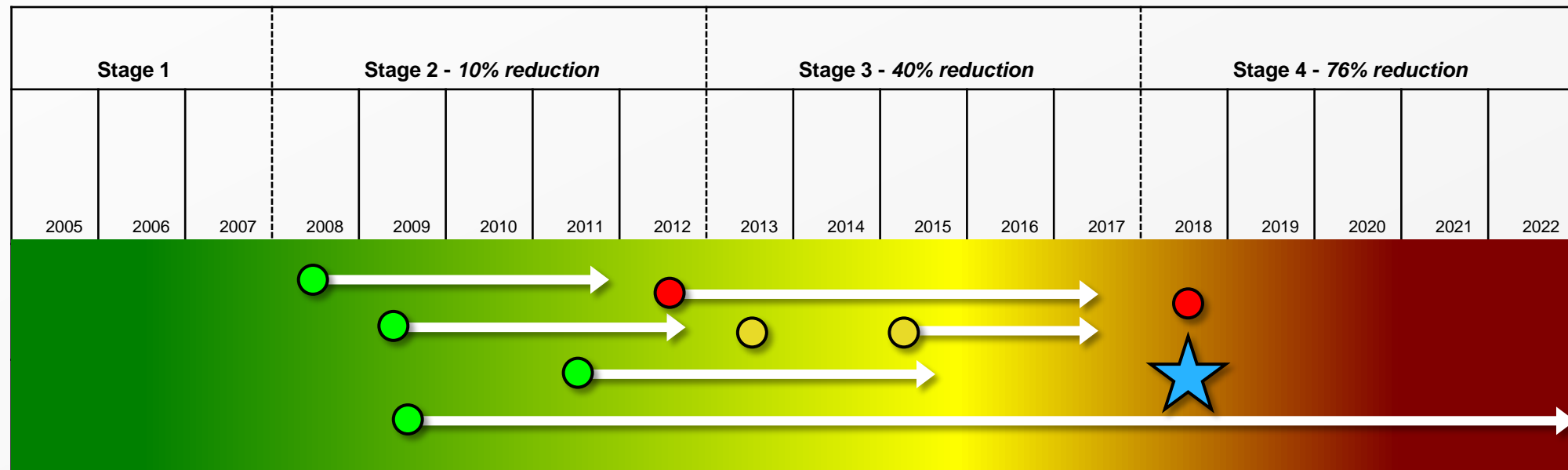
- Water quality testing to determine average basin concentrations and changes over time
- Visual observations, physical metrics, chemistry and toxicity
- Currently ~14% improvement from baseline



Source: 2016 SIYB Annual Monitoring & Progress Report, Amec Foster Wheeler, March 2016

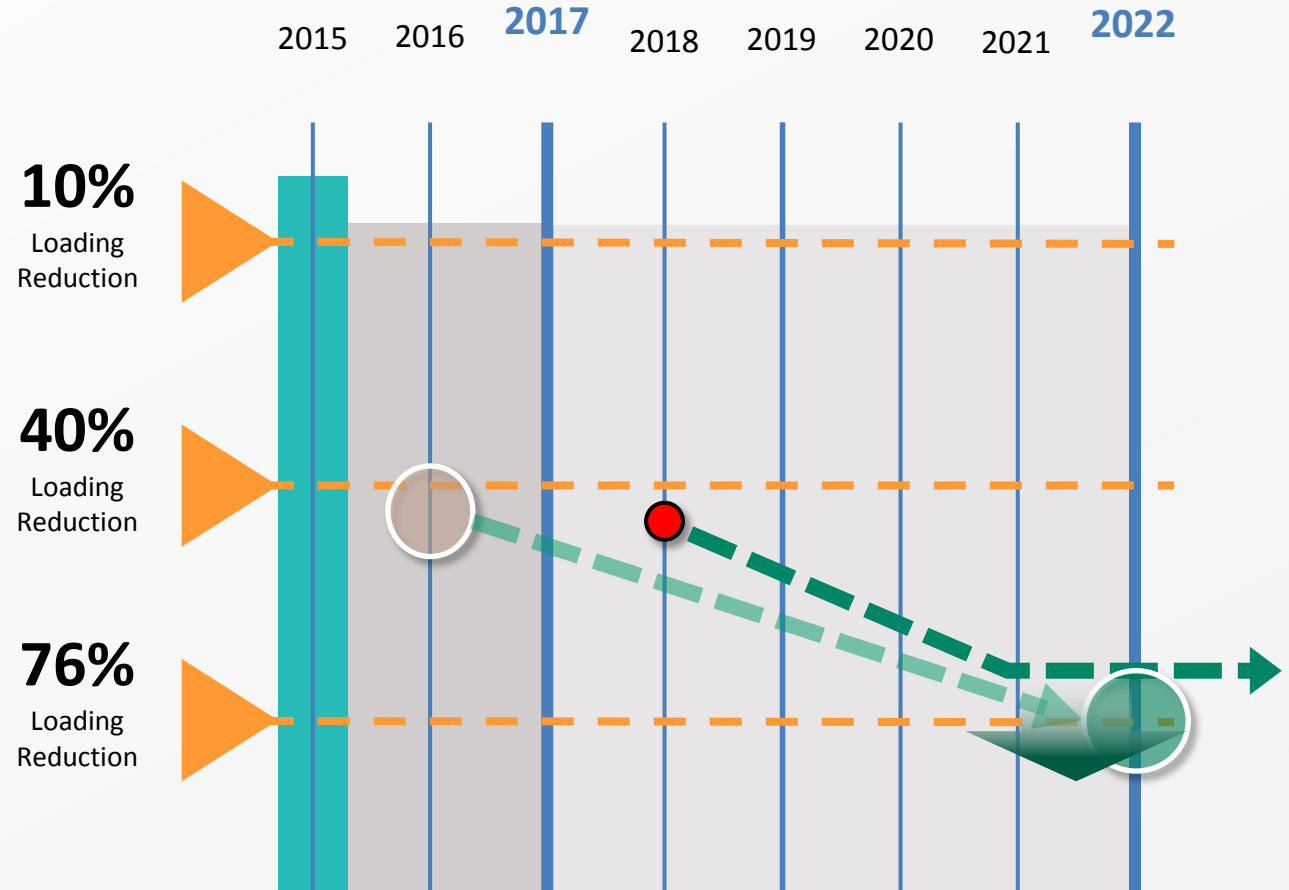
Strategic Adaptive Management

- Data driven approach; learn as we go
- Focus on long-term, permanent solutions
- Shift from voluntary to mandatory initiatives over time



Looking Ahead

- **Statewide Regulation starting July 1, 2018 (DPR Rule)**
 - Potential to reduce copper load by 464 kg/yr by 2021 (62%)
- **Additional Efforts**
 - Paint Use Strategies
 - In-Water Hull Cleaning Strategies



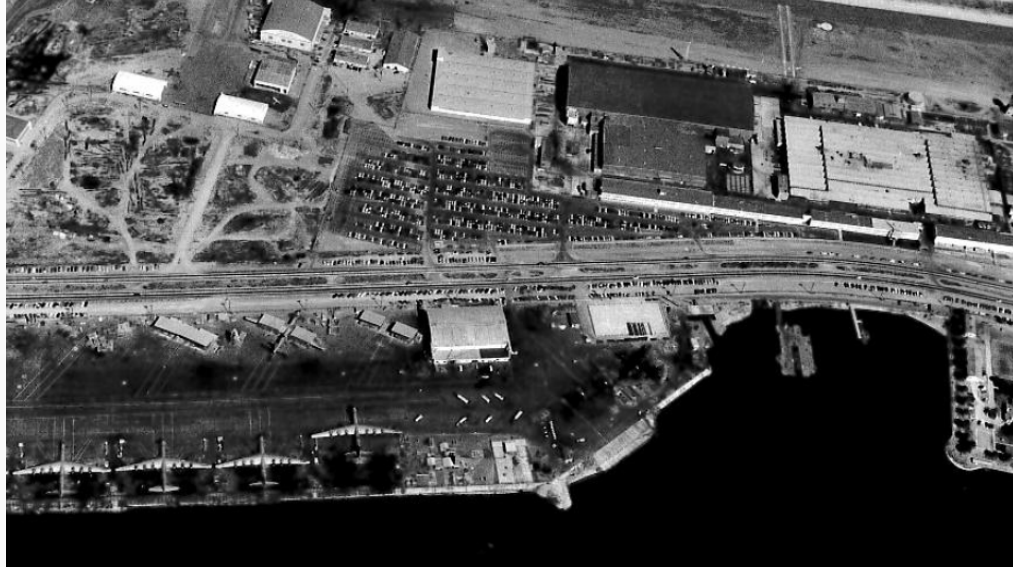


Legacy Contamination

The Problem

Long history of waterfront industrial uses

- Shipbuilding
- Aerospace facilities
- Fishing / Canneries
- Machine Shops (iron works)
- Fueling / Refinery
- Refuse dump

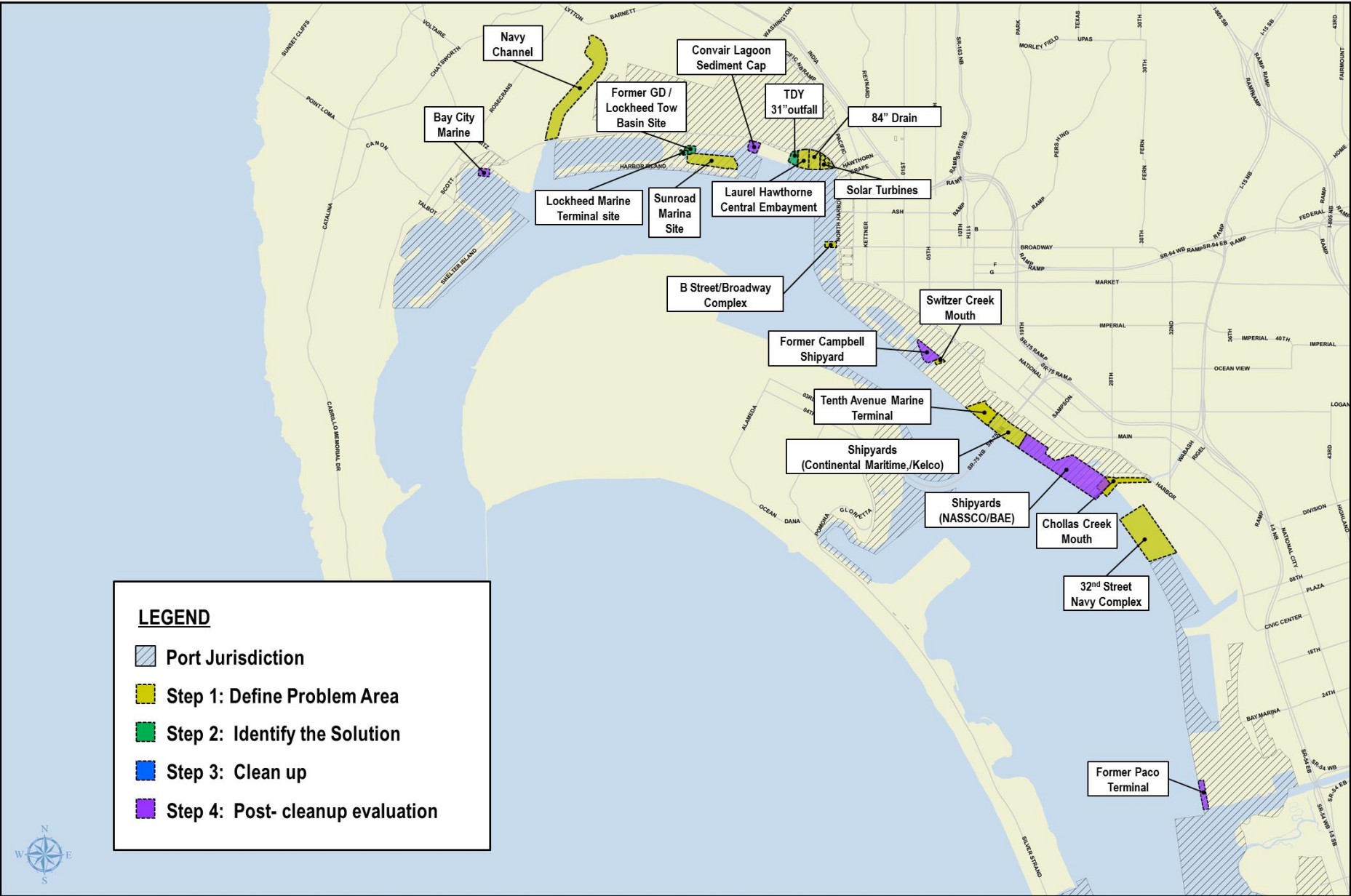


Historic pollutants still exist upstream

- Unearthed during redevelopment
- Transfer via stormdrains



Overview of Bay Waterside Cleanup Areas

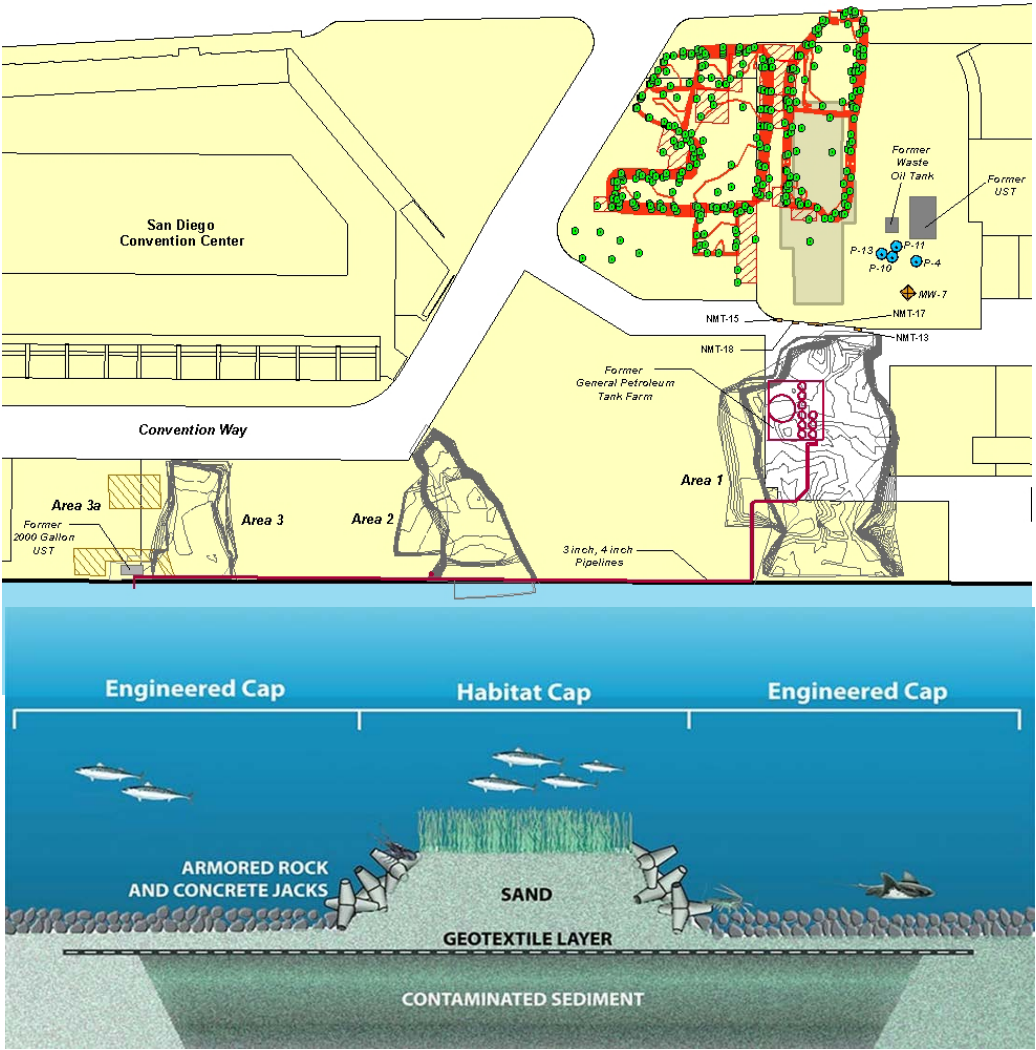
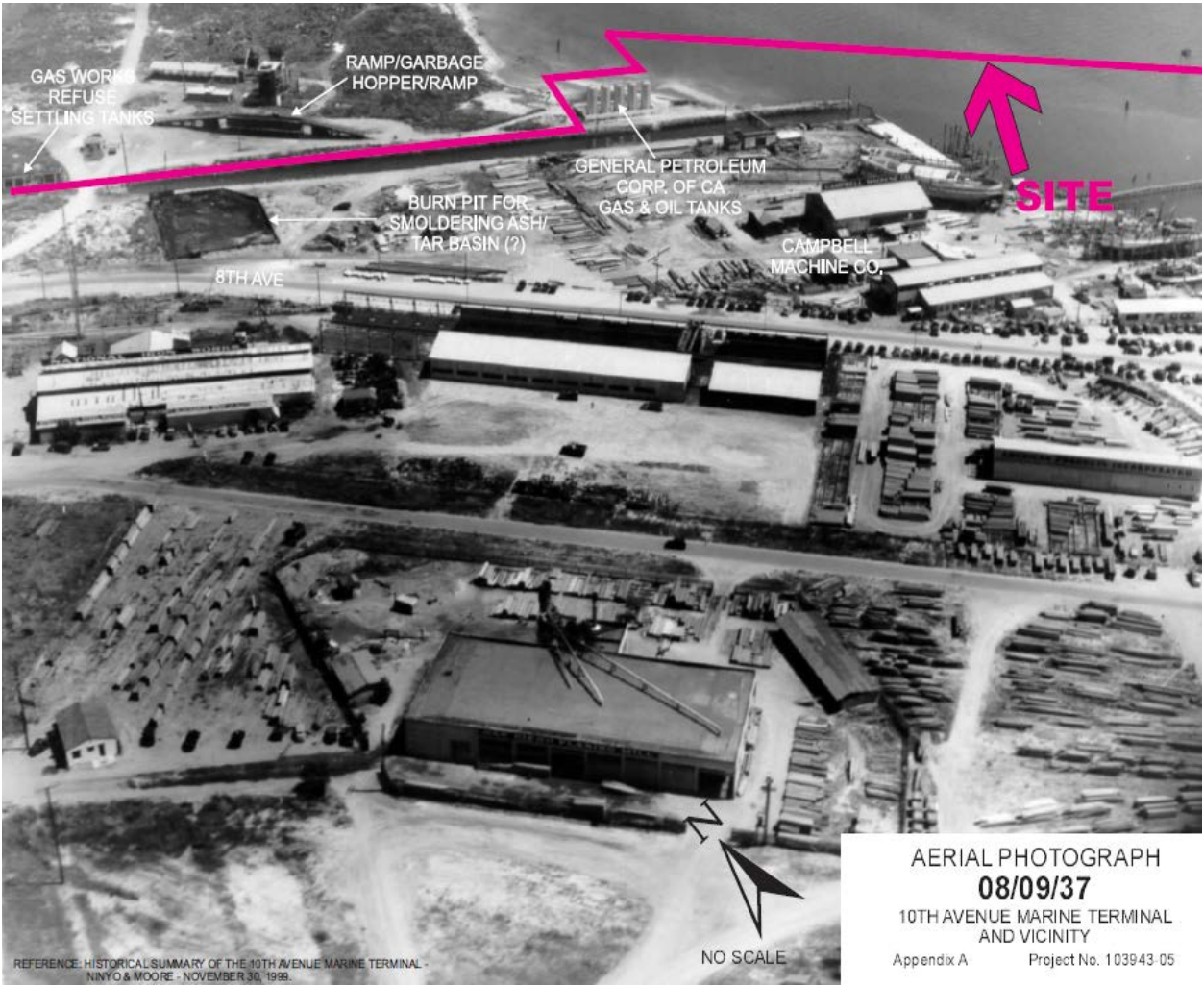


Clean-up Projects

- Shipyard Cleanup
- Campbell Cap
- South Bay Power Plant
- A-8 Anchorage

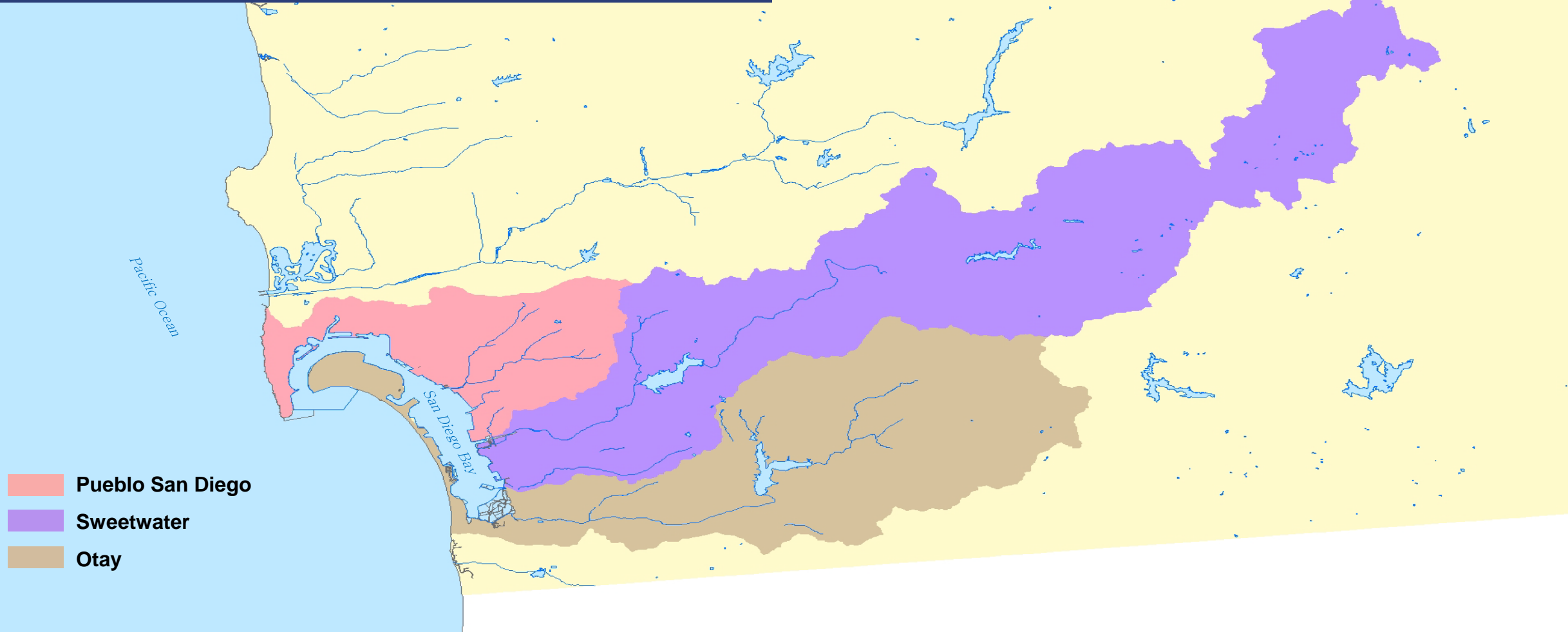


Campbell Shipyard Area – Then & Now



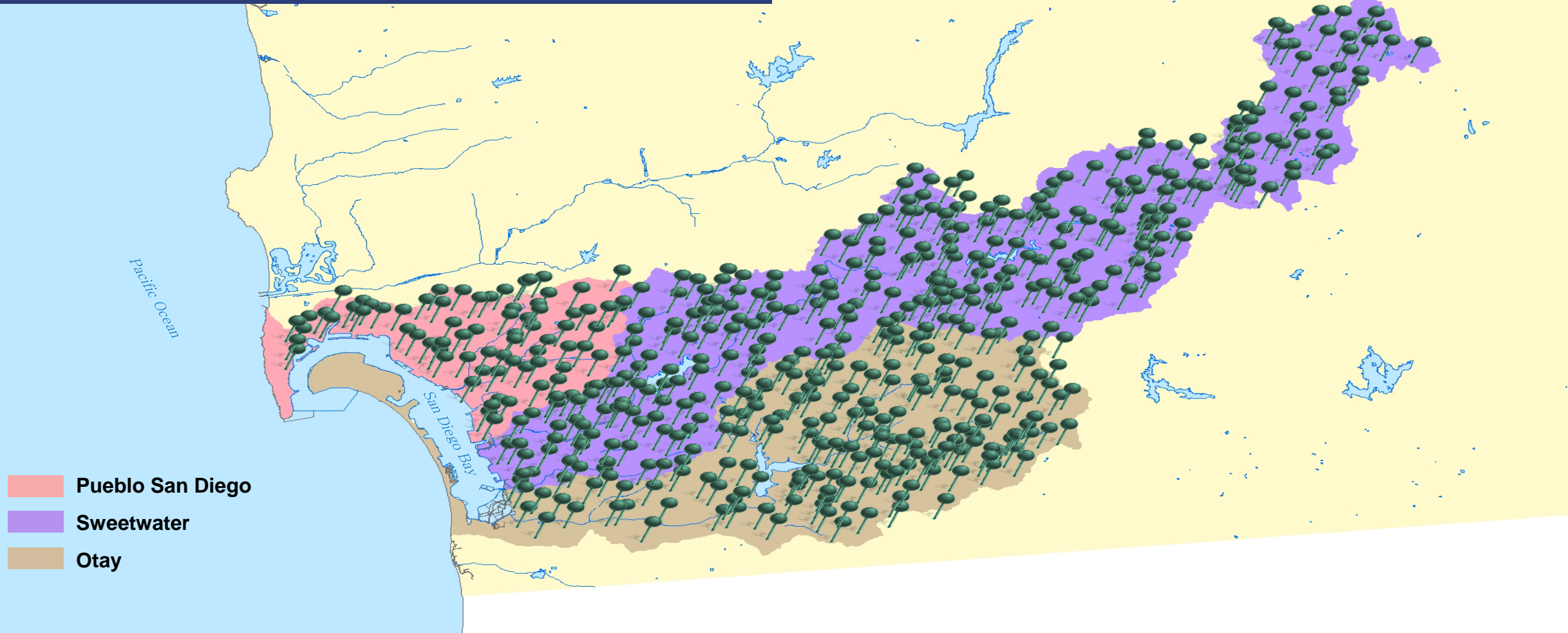
San Diego Bay Watershed:

Extends 50 miles from Laguna Mountains to San Diego Bay and includes 10 jurisdictions



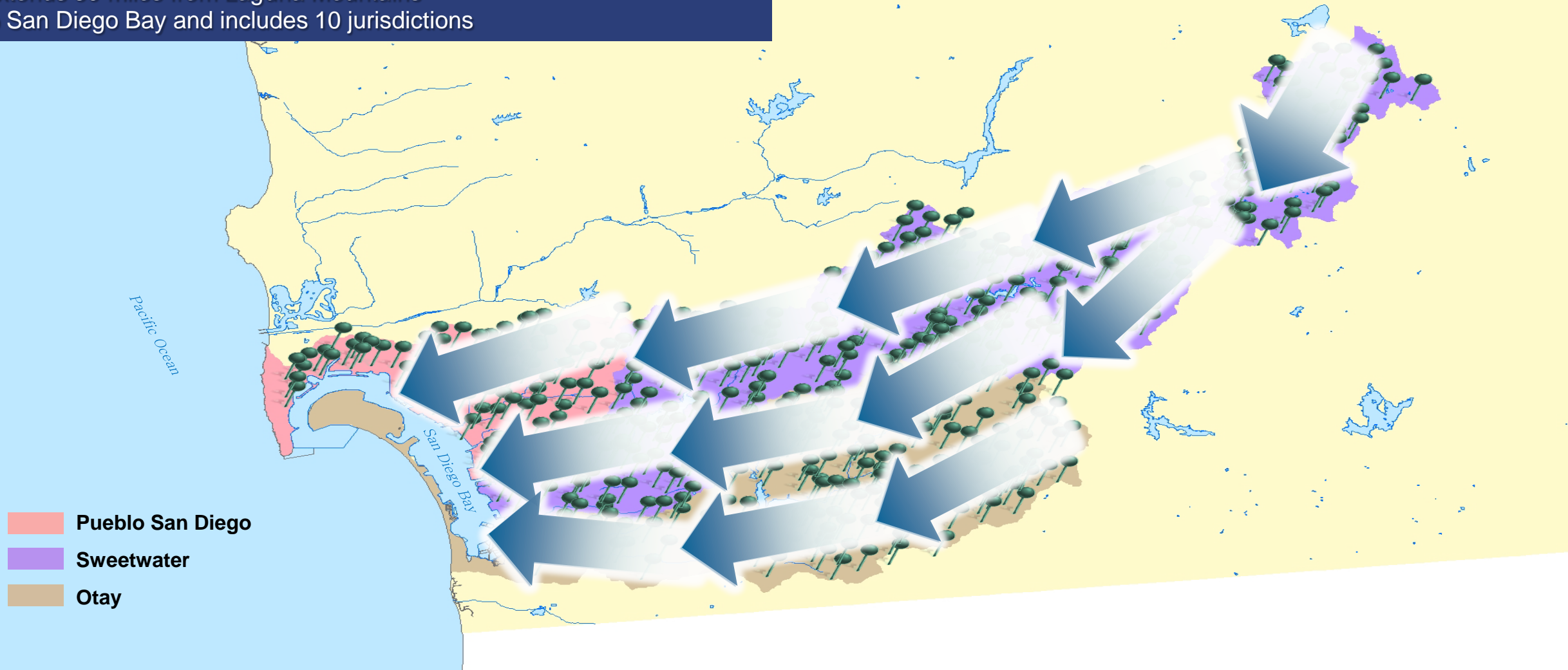
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Strategy

- Minimize risk to ecosystems and people
 - Stop transfer of pollutants up the food chain
- Watershed and Baywide approaches
 - Eliminate Bayside legacy areas
 - Eliminate ongoing upstream pollution

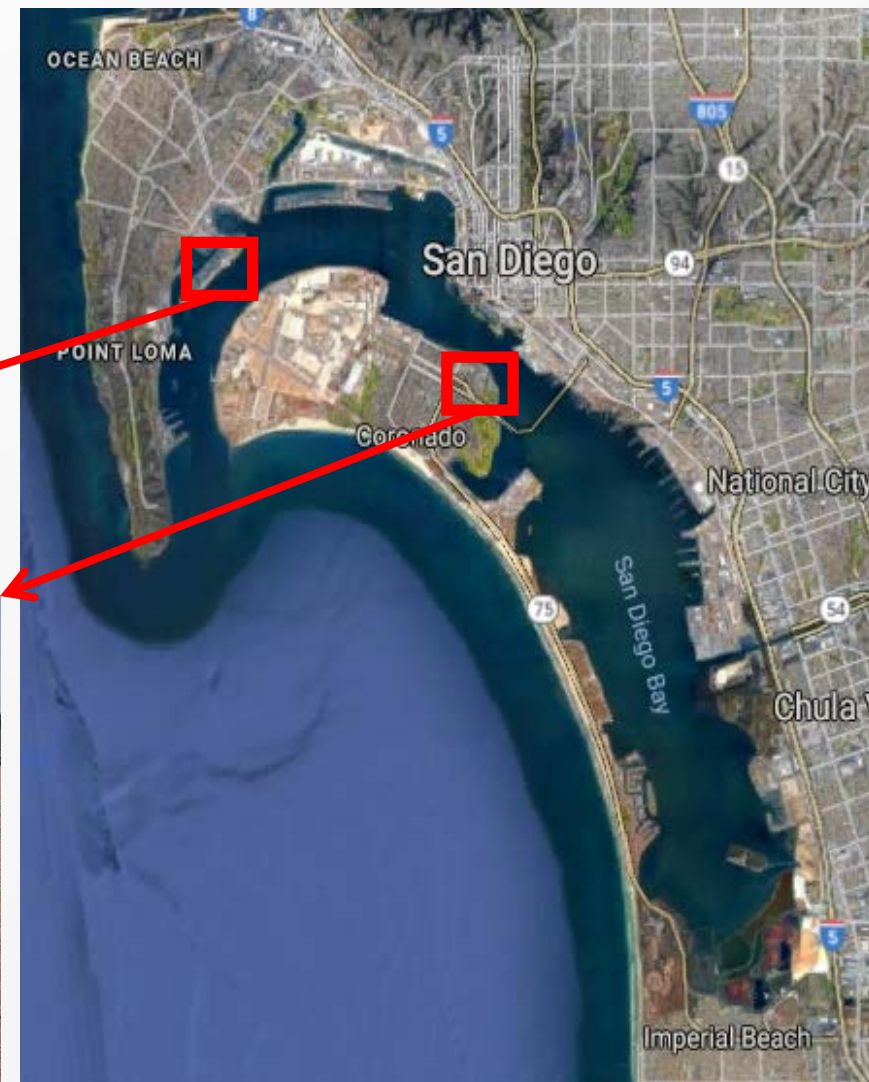
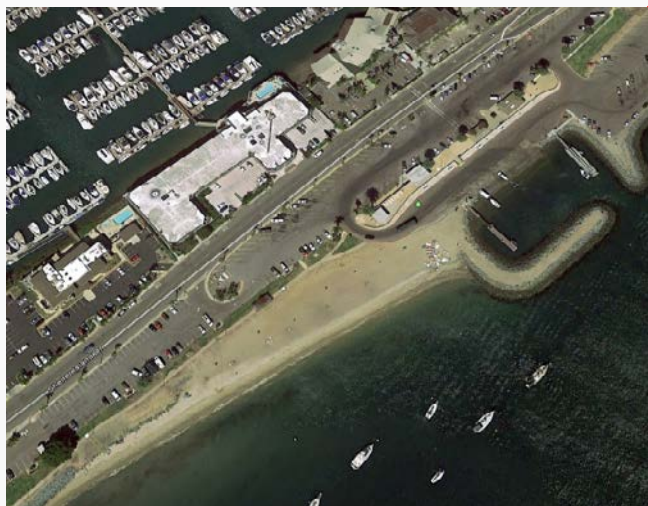
Healthy Beaches

Reducing Bacteria at Beaches

Bacteria is a San Diego Bay Watershed priority

TMDL: Shelter Island Shoreline Park

303(d) Impairment: Tidelands Park



Reducing Bacteria at Beaches

Implementation Efforts

- Frequent Trash Pickup
- Pet Waste Bag Dispensers
- “No Feeding” Signage
- Public outreach & Community Engagement
- Reducing loading from stormdrains



Monitoring

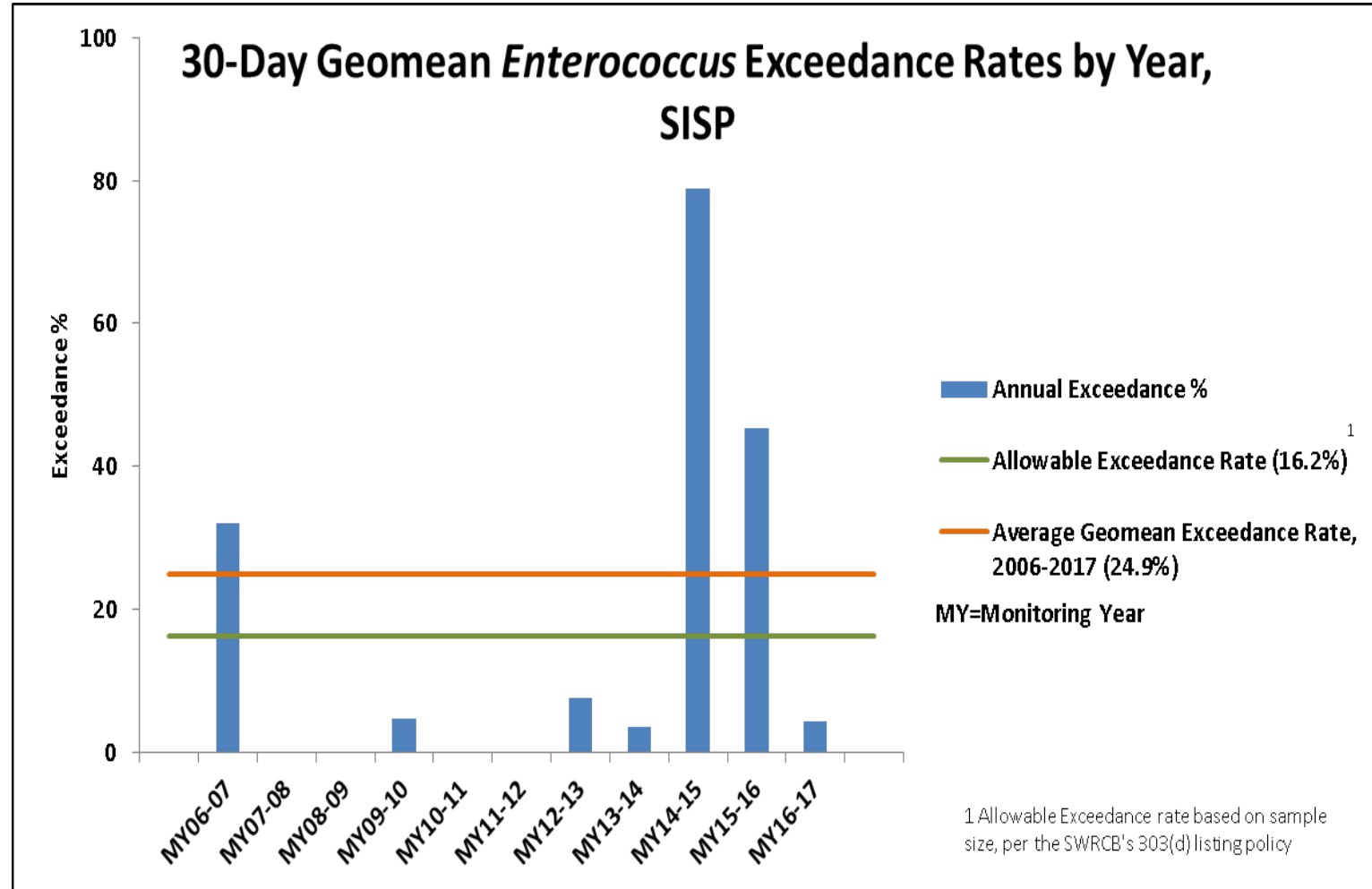
Monitoring

- Central to the decision making process
- Long-term data sets inform about ambient ecosystem health and may help identify changes over time
- Science-based management decisions to ensure long-term ecosystem health



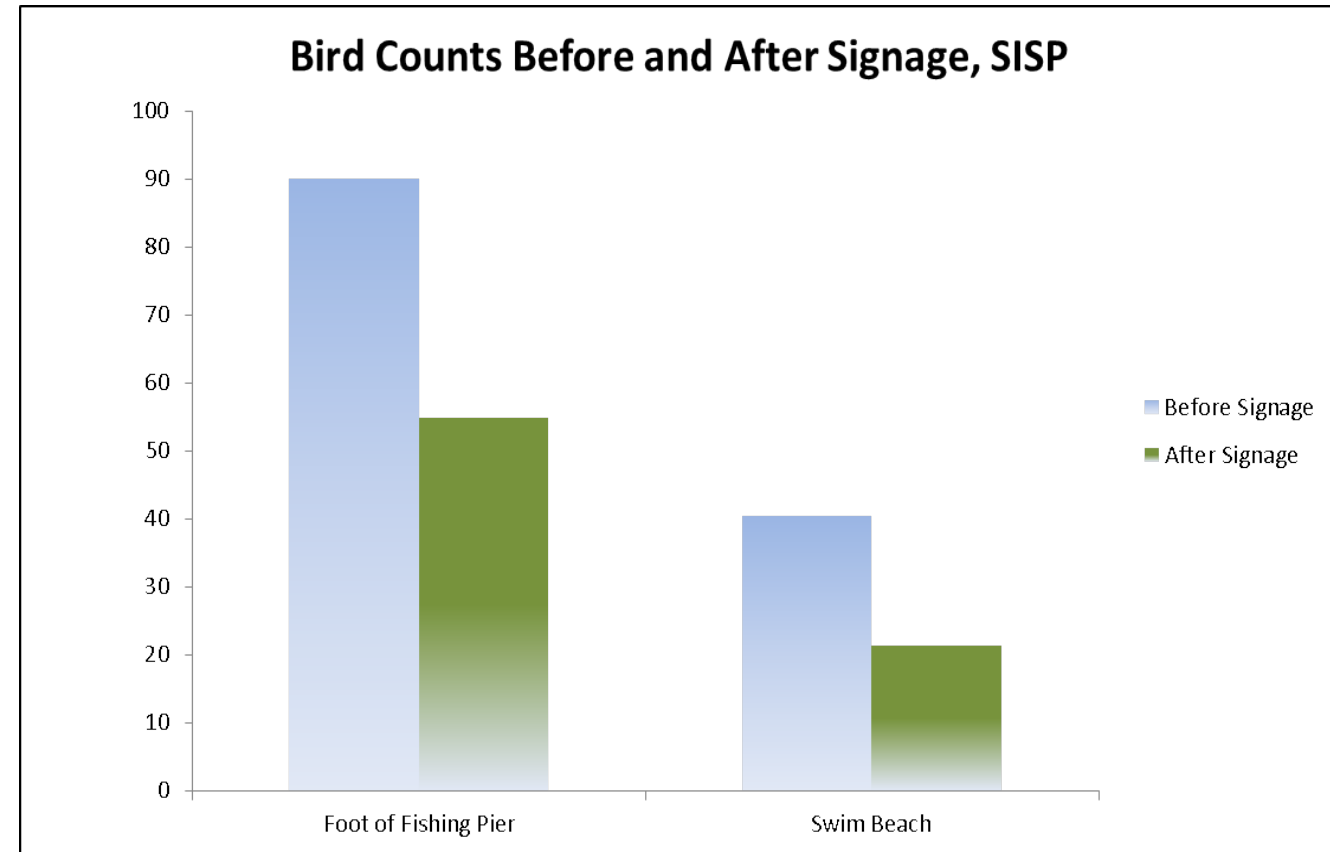
Long Term Bacteria Monitoring

- Monitor weekly during both dry and wet seasons, and immediately after rain events
- Data varies
- Higher concentrations may be cyclical, may be the result of an environmental problem needing addressing



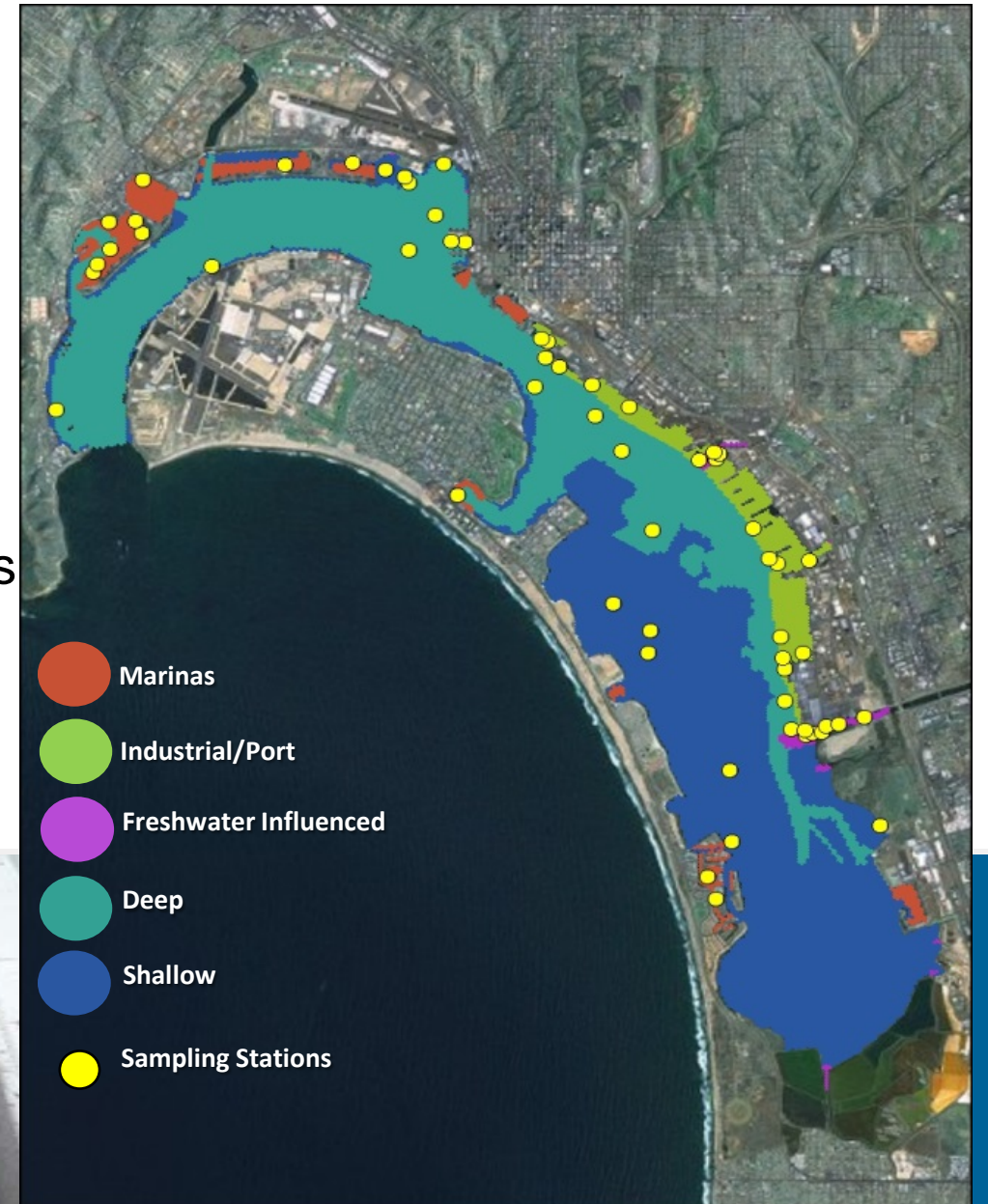
The Curious Case of Bird Feeding

- Monitoring data indicated continually elevated bacteria concentrations at one location, source tracking suggested avian origin
- Monthly bird counts from Oct 2016-Jul 2017 revealed chronic feedings by people, large gatherings of birds
- Signs to discourage feeding installed
- Counted weekly after



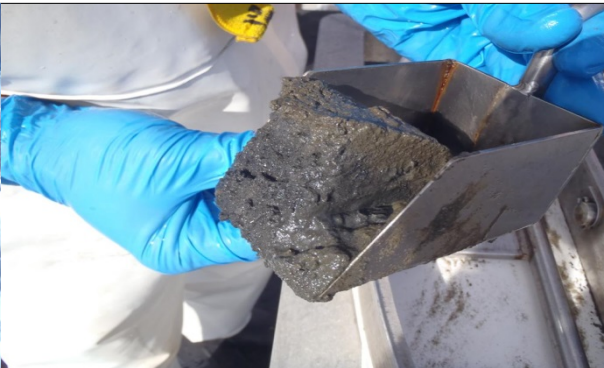
Regional Harbor Monitoring Program

- Regional coalition
- Surveys every 5 years
 - Water and Sediment Quality
 - Aquatic Life
- Weight-of-evidence approach to answer key questions
 - Chemistry and toxicity
 - Benthic infauna and demersal communities



Regional Harbor Monitoring Program

- Question-driven approach
 1. *What are the contributions and spatial distributions of inputs of pollutants to harbors?*
 2. *Do the waters and sediments in the harbors sustain healthy biota?*
 3. *What are the long-term trends in each harbor?*

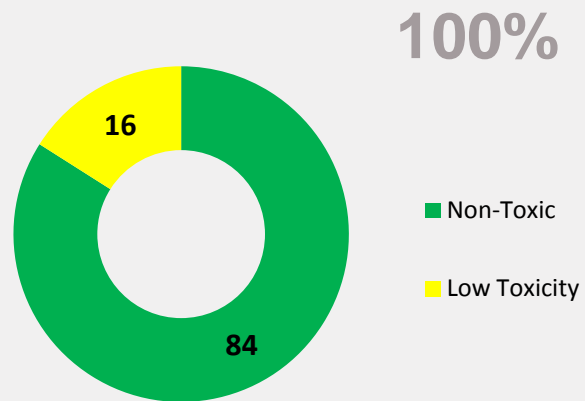


Regional Harbor Monitoring Program

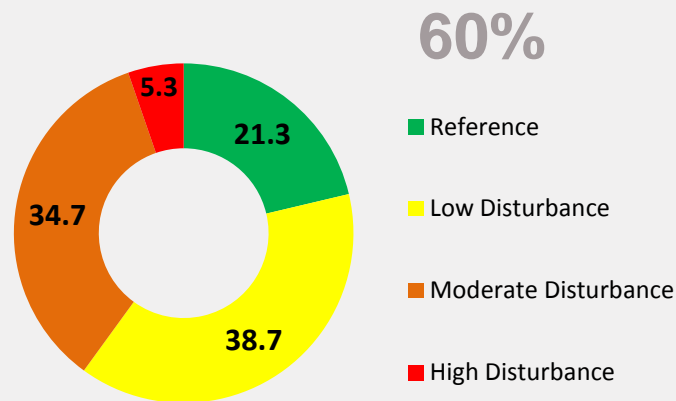
Example: RHMP 2013 Sediment Data

Do the waters and sediments sustain healthy biota?

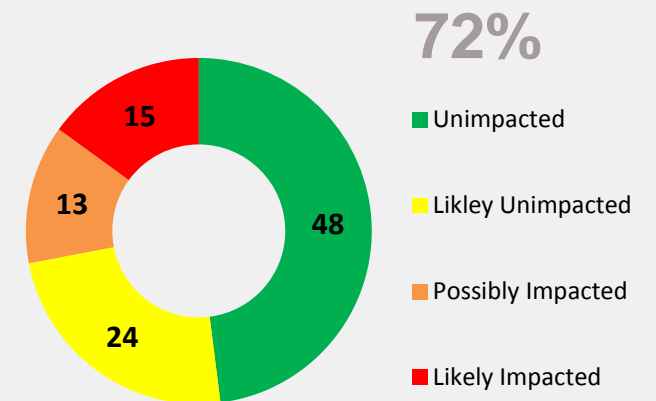
Toxicity



Benthic Community



Sediment Quality



Percentage of stations

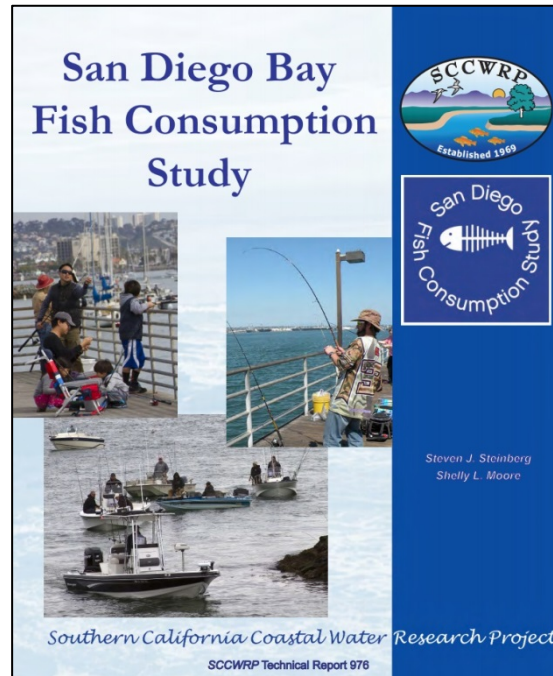
Regional Harbor Monitoring Program

- Assists in facilitating collaboration and partnerships
- 59 of the 75 sampling sites from 2013 were coordinated with the Bight Regional Monitoring Program and data utilized in both Bight and RHMP reports
- Facilitated further special studies with partner agencies
 - Bioaccumulation Study
 - San Diego Bay Debris Study



Collaboration & Partnerships

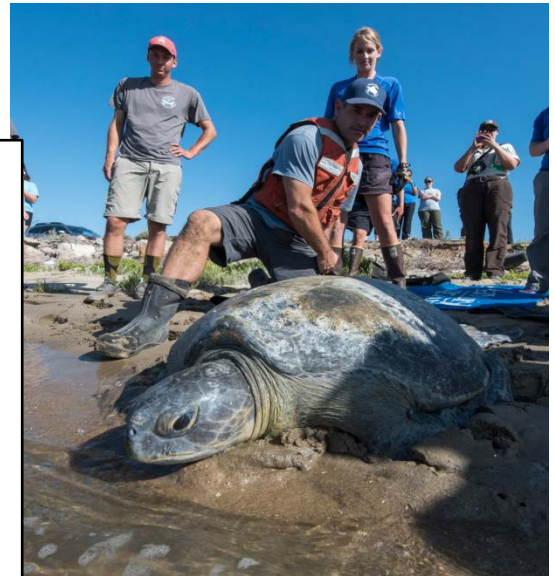
- Regional Water Quality Control Board
- Southern California Coastal Waters Research Project (SCCWRP)
 - Trash & Debris (2016)
 - Fish Consumption (2017)
 - Bioaccumulation (2016)
 - Passive Sampler Studies (starting 2018)



San Diego Bay Debris Study Special Study Plastic Debris Monitoring Report

Prepared by:
San Diego Bay Debris Study Workgroup


Prepared for:
Surface Water Ambient Monitoring Program of the
State Water Resources Control Board
and
Southern California Bight 2013 Regional Marine Monitoring Survey
Bight '13 Debris Planning Committee



The background is split diagonally from the top-left to the bottom-right. The upper-left portion is a solid teal color, while the lower-right portion is white.

Exploring Innovation

Exploring Innovation: The Blue Economy Incubator

- 
- An aerial photograph of San Diego, California, showing the city, the harbor, and the ocean. A semi-transparent yellow box is overlaid on the left side of the image, containing a list of bullet points.
- Pilot Project Facilitation
 - Permit-ready infrastructure
 - Land and water entitlements
 - Market access
 - Strategic Funding

Enabling innovation by removing barriers to entrepreneurs and encouraging investment

Blue Economy Portfolio

Oyster Nursery (FLUPSY)



San Diego Bay Aquaculture

Copper Remediation



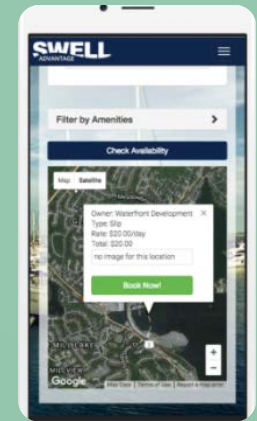
Red Lion Chem Tech

Drive-in Boatwash



Rentunder

Smart Marina App



Swell Advantage

Resolution 2017-085 (June 20, 2017)

A wide-angle photograph of the San Diego skyline as seen from across San Diego Bay. The water is a deep blue with gentle ripples. The skyline features several prominent skyscrapers, including the San Diego-Coronado Bridge Tower and the Marriott Marquis. The sky is a clear, vibrant blue with a few wispy white clouds.

Innovative Opportunities

Dissolved Copper:

- Media Filtration
- Enclosed Boat Wash

Bacteria:

- Trash Skimmers
- Microbial Source Tracking
- New Bacteria “Bust” Techniques
- Falconry

Legacy Pollution / PCBs:

- Hold polluters accountable
- Agency Partnerships

Conceptual Model: Achieving a Healthy Bay



A Healthy Bay & Ecosystems



- Mutually shared vision – clean water
- Tracking Progress
 - Long-term Monitoring
- Effective Program Implementation
 - Goal-driven programs
- Innovative Thinking
- Public Engagement
 - Education / Outreach
 - Collaboration & Partnerships

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PORT of
SAN DIEGO



January 18, 2018

Other Paint Use Strategies

- **Continue transition to non-copper paints**
- **Explore copper loading standards for redevelopment of marina properties**
- **Explore copper paint credits, differential pricing or other paint use initiatives**



In-water Hull Cleaning Strategies

Cleaning may contribute up to 40% of copper load into the Basin

- Impacts to water & sediment

Assess alternatives to cleaning boats in slips

- Cleaning out of waters
- Designated cleaning areas

Evaluate modifications to current District regulations

- Effectiveness of alternative cleaning methods or frequencies
- Economic impacts

