Los Angeles and Long Beach Harbor Toxics TMDL Program Overview

Presented by
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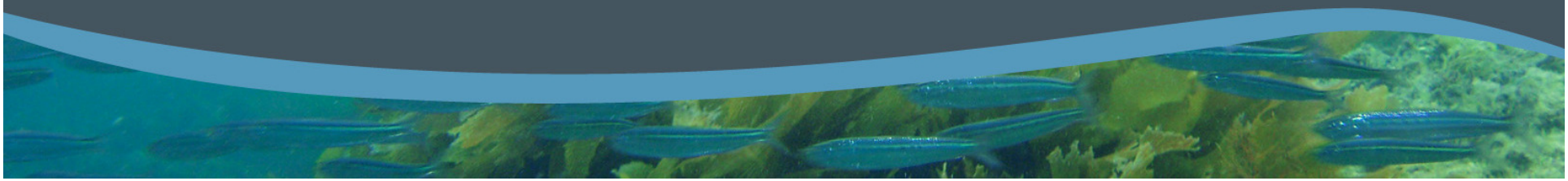
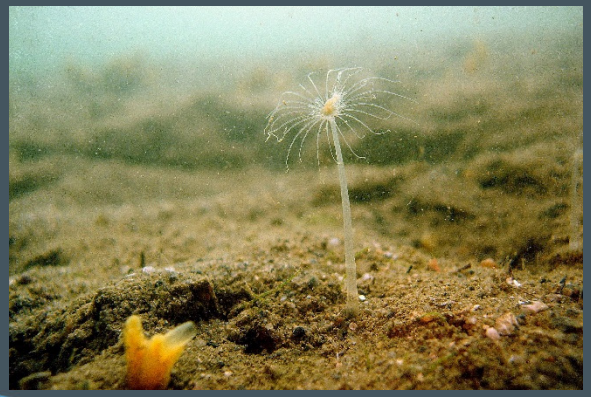
Key Topics

- Brief Overview
- Ports TMDL Program Goals
- Key TMDL Program Elements
  - Phase 1 Implementation Plan (2012 to 2018)
  - SQO Indirect Effects Implementation and Support
- Modeling in Support of Sediment Quality Objective (SQO) Assessment
  - Conceptual site model development
  - Data gaps analysis
  - Special studies to fill data gaps
  - Quantitative model development
- Next Steps



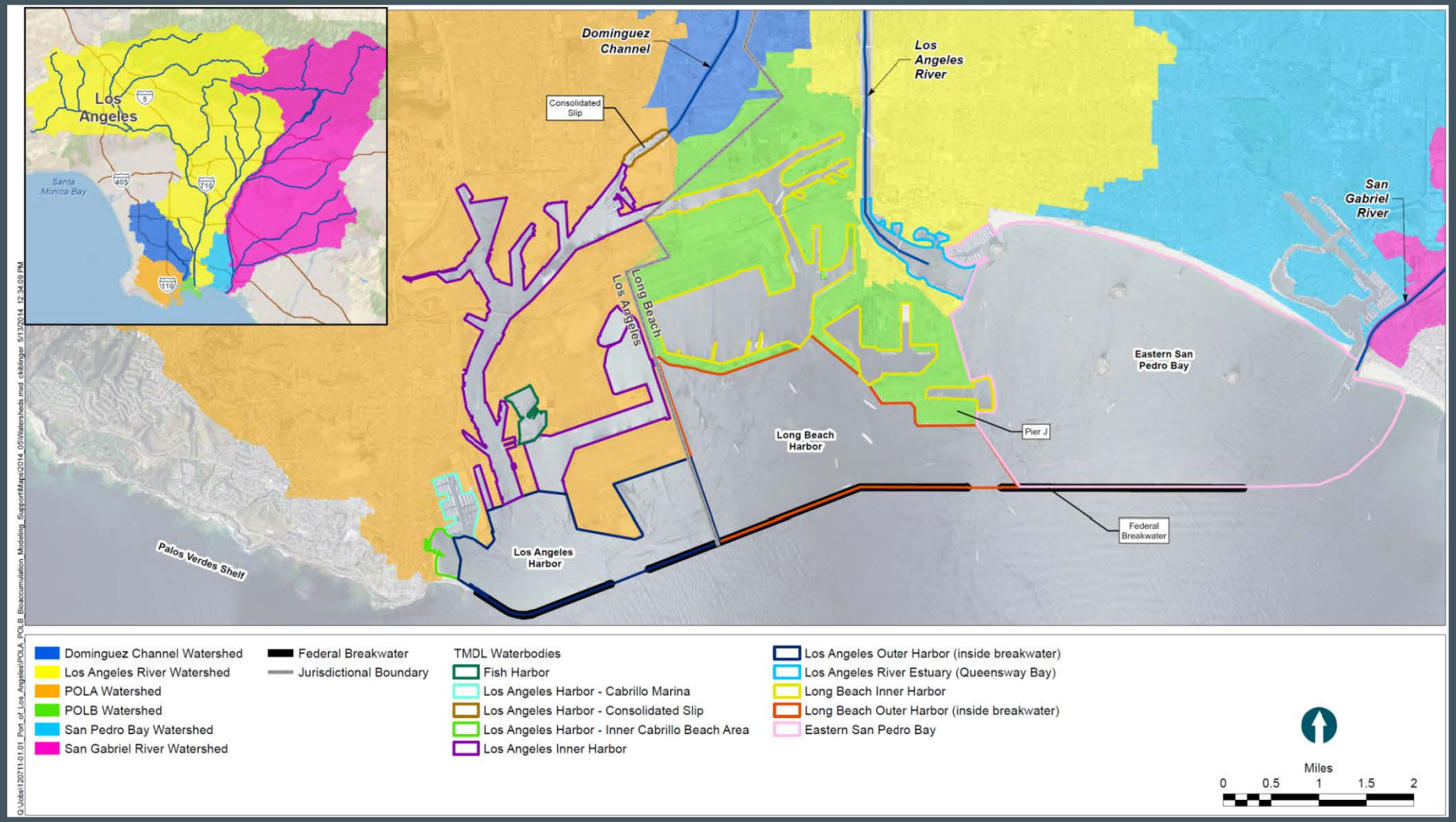


Dominguez Channel and Greater LA/LB Harbor Waters Toxics TMDL

- Impairments due to multiple constituents in sediment and fish
  - Water quality targets — California Toxics Rule criteria
  - Fish tissue targets — fish contaminant goals (OEHHA*)
  - Associated sediment targets based on San Francisco Bay (PCBs) and Newport Bay (DDTs) studies

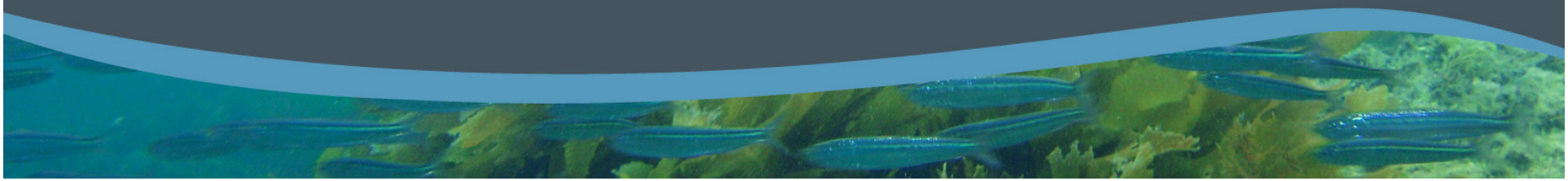
* OEHHA = Office of Environmental Health Hazard Assessment, State of California

TMDL Waterbodies and Other Boundaries



Ports TMDL Program Goals

- Implement source reduction measures and remove contaminated sediments
- Conduct required TMDL monitoring
- Develop the necessary science and tools
  - To understand linkages between sources and fish tissue impairments
  - To identify the most effective management actions for reducing fish tissue impairments
  - To provide the technical basis for modifications to the TMDL at the reopener



Steps Toward TMDL Compliance

Ongoing Activities

- Reduction of known ongoing sources
- Determine causes and extent of fish tissue impairment
- Develop effective sediment management options
- Compliance monitoring and reporting

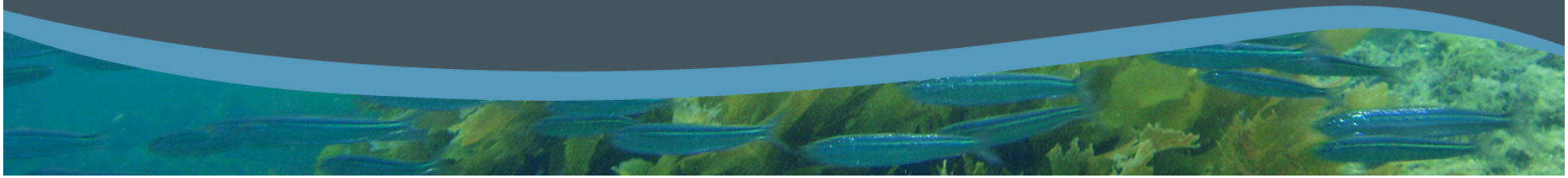
TMDL Reopener

Future Activities

- Continue reduction of ongoing sources
- Implement management actions
- Compliance monitoring and reporting

Annual reporting on progress toward water quality goals

Before Reopener → After Reopener



Key TMDL Program Elements

- Comply with Phase 1 implementation plan (2012 to 2018)
- Implement SQO Indirect Effects Assessment of LA/LB Harbor (site-specific model)
  - Vet plans and findings through Harbor Technical Working Group

* WRAP = Water Resources Action Plan; SCCWRP = Southern California Coastal Water Research Project

Comply with Phase 1 Implementation

Development of Regional Monitoring Coalition (RMC) for Greater Harbor Waters

- Harbor Toxics TMDL encouraged coordination
- Includes Ports, 11 cities, Los Angeles County Flood Control District, and California Department of Transportation
- Monitoring to date:
  - Bight ’13* (sediment)
  - Fish tissue and dry weather receiving water (September 2014)
  - Wet weather receiving water (November 2014 and February 2015)

* RMC initiated sediment monitoring early so it would coincide with Bight ‘13

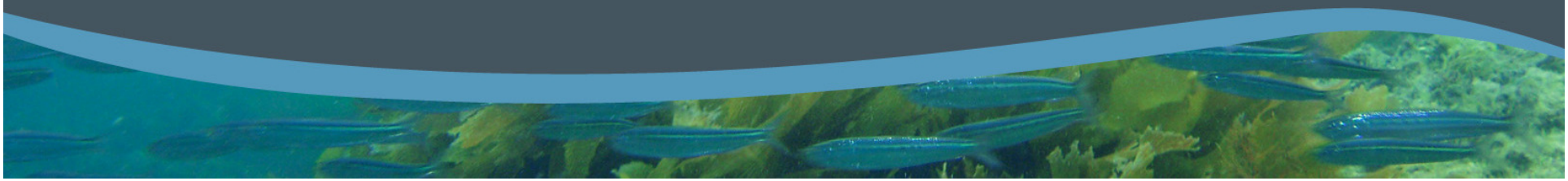
Comply with Phase 1 Implementation
Implementation Plan (WMPs, EWMPs, and WRAP)

- Water Resources Action Plan (WRAP) Implementation
  - Source control BMPs
  - Installation of structural BMPs through Industrial Stormwater Program
  - Installation of structural BMPs and LID enhancements in redevelopment projects
  - Sediment Management Plans
- EWMPs and WMPs
  - Enhanced minimum BMPs and inspection/enforcement of construction
  - Increased LID implementation
  - Incentivizes multi-benefit development projects

- WRAP = Water Resources Action Plan; WMP = Watershed Management Plan; EWMP = Enhanced Watershed Management Plan; BMP = Best Management Practices; LID = Low Impact Development

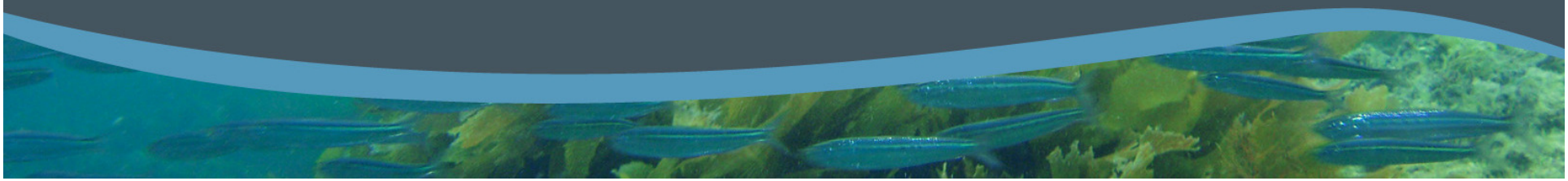
Comply with Phase 1 Implementation
Contaminated Sediment Management Plans

- Address benthic community direct effects and human health indirect effects (fish consumption)
- Prioritize using a risk-based approach
- Focus on sites demonstrating greatest impacts to the benthic community and/or human health



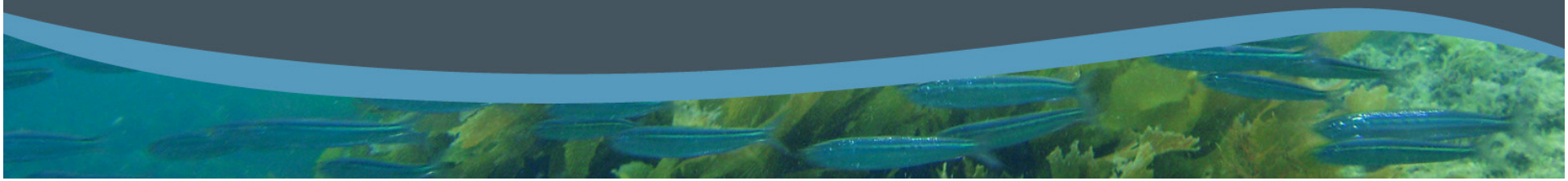
Implement SQO Indirect Effects Assessment (Model)

- For fish tissue, TMDL allows for compliance through the SQO for Indirect Effects (in development)
  - Greater Harbor waters: complex site and numerous potential sources
  - Ports are developing site-specific quantitative models for linking sources to fish tissue impairments and for sediment management purposes

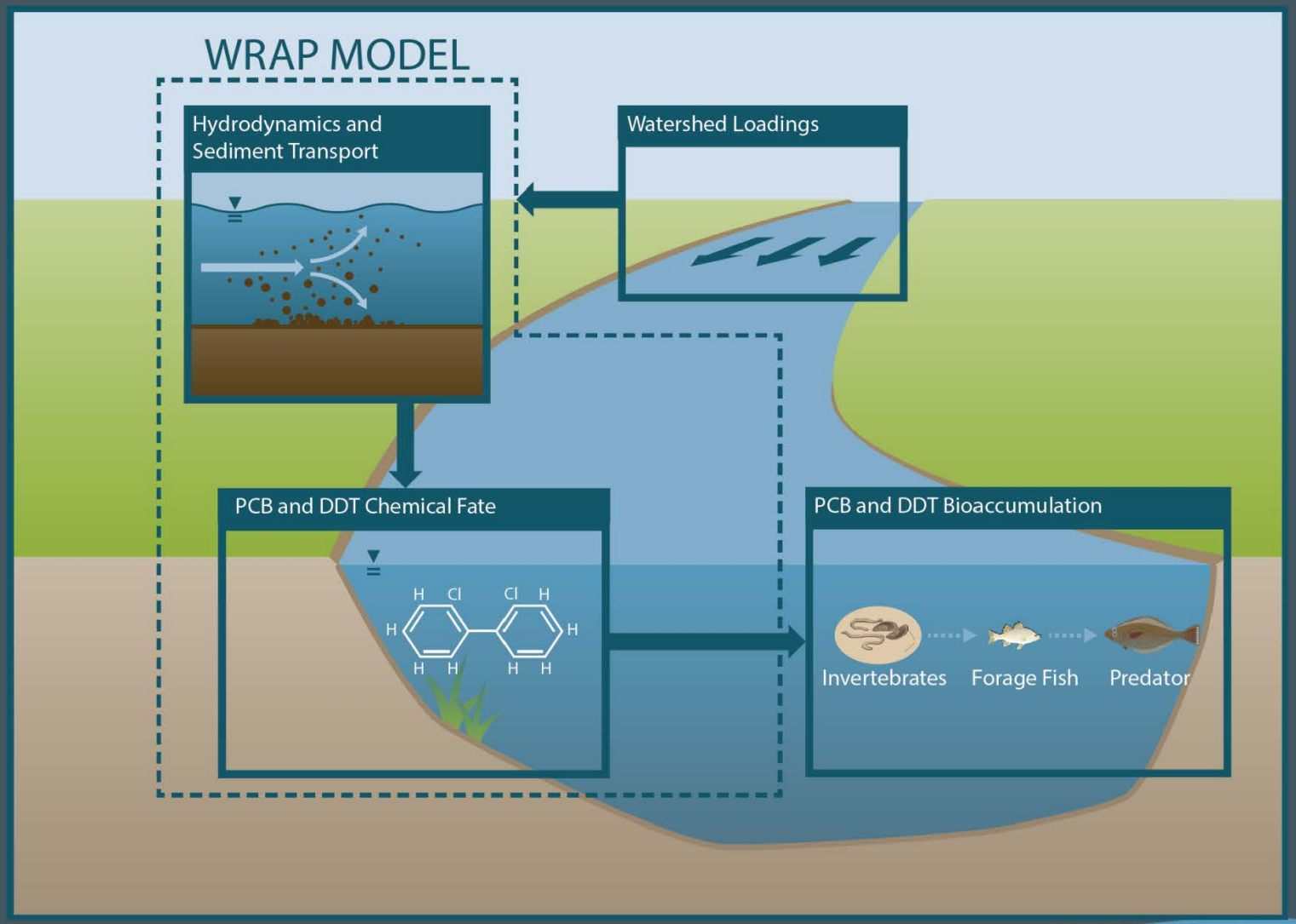


Implement SQO Indirect Effects Assessment (Model) (cont.)

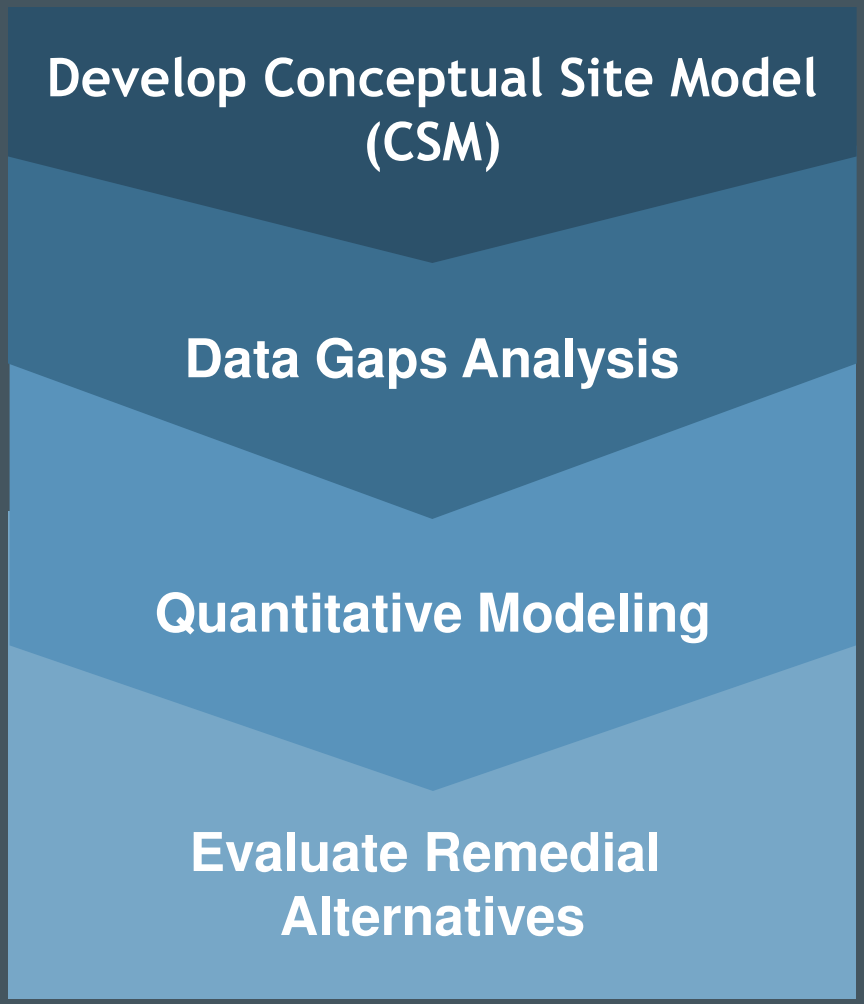
- First SQO indirect effects case study supports updates to the State's Water Quality Control Plan
- Special studies conducted to fill data gaps in support of model calibration and validation
- Model results will provide links from sources to fish tissue and a tool for evaluating effectiveness of management options



Overview of Modeling Approach



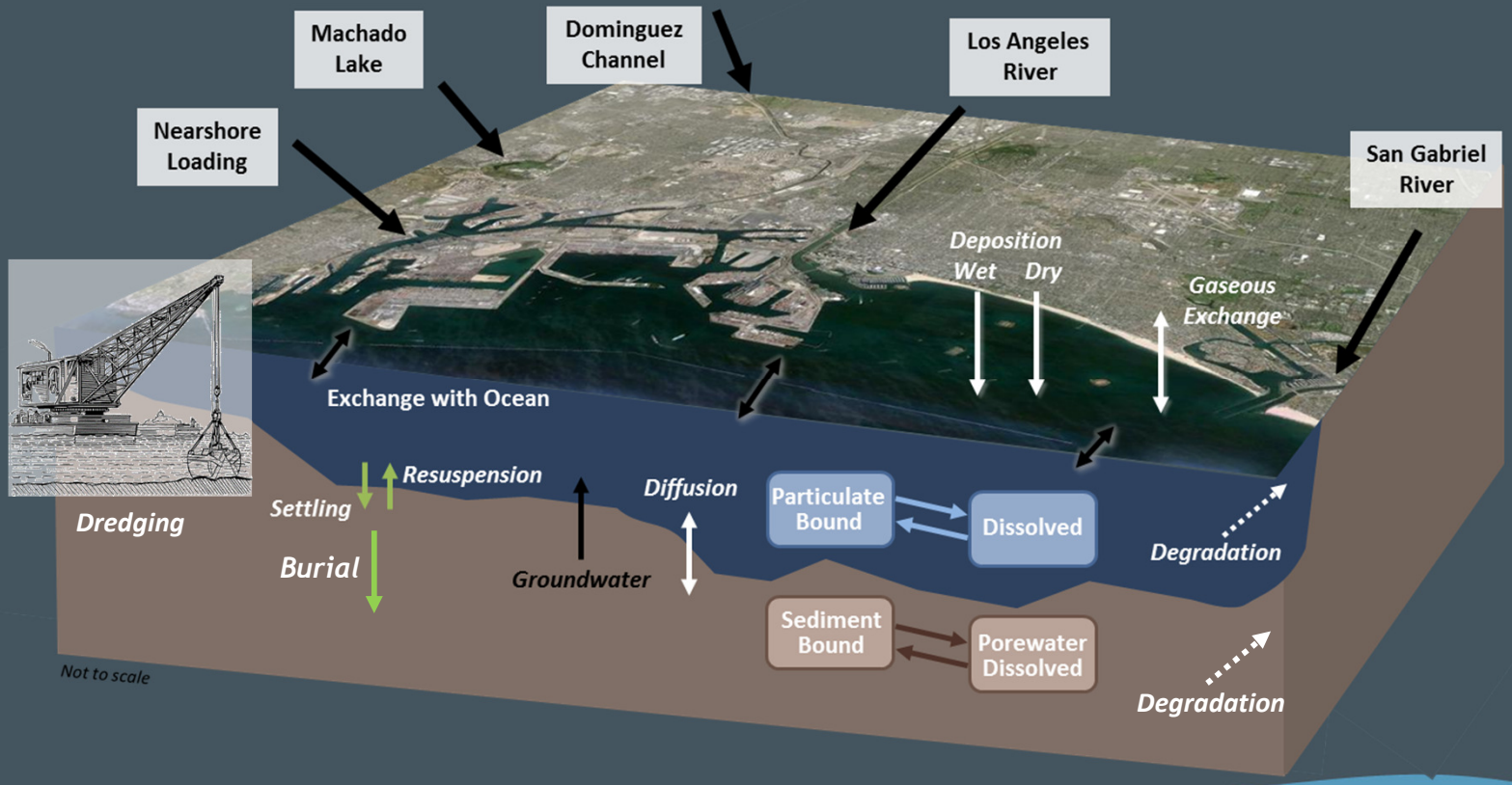
Modeling Approach



- Process regularly followed during Superfund and RCRA investigations

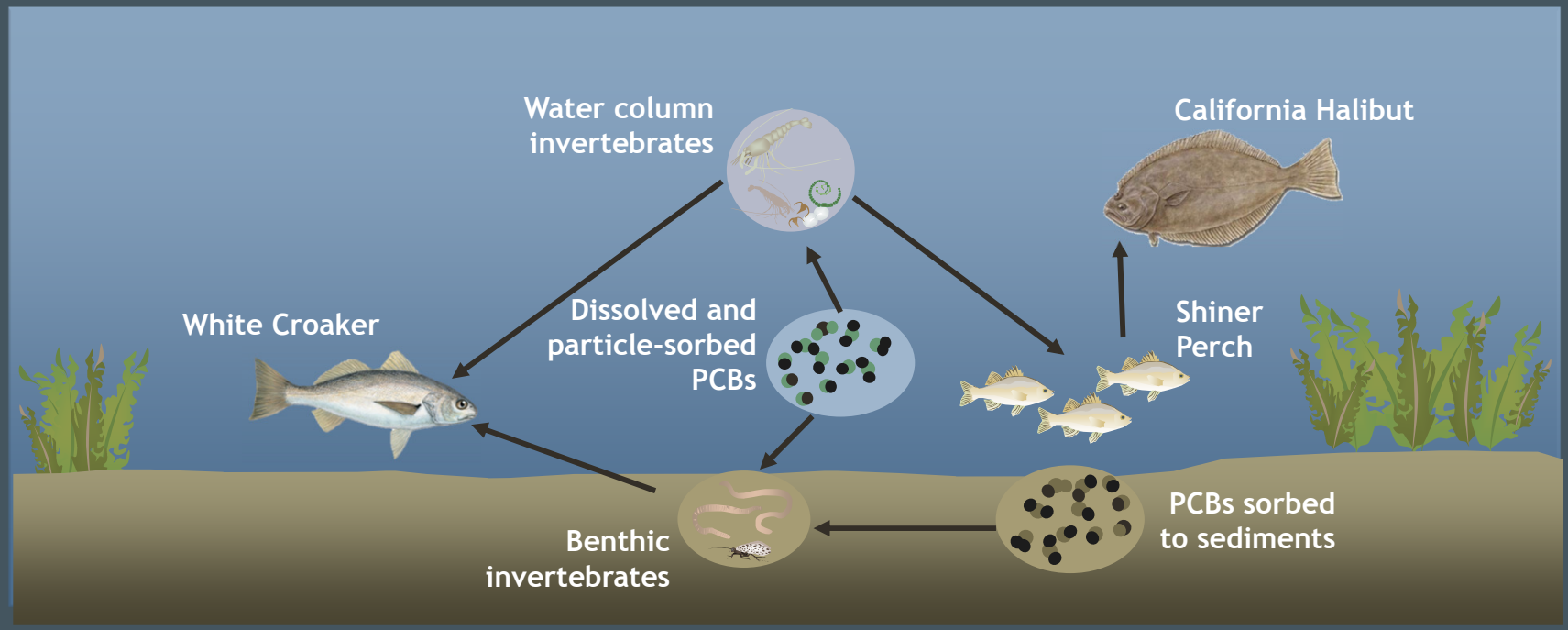
CSM for Chemical Fate

- Shows key processes affecting chemicals in Harbor water column and sediment



CSM for Bioaccumulation

- Shows receptors of concern and key sources
- Fish accumulate PCBs and DDTs from water column and sediment sources



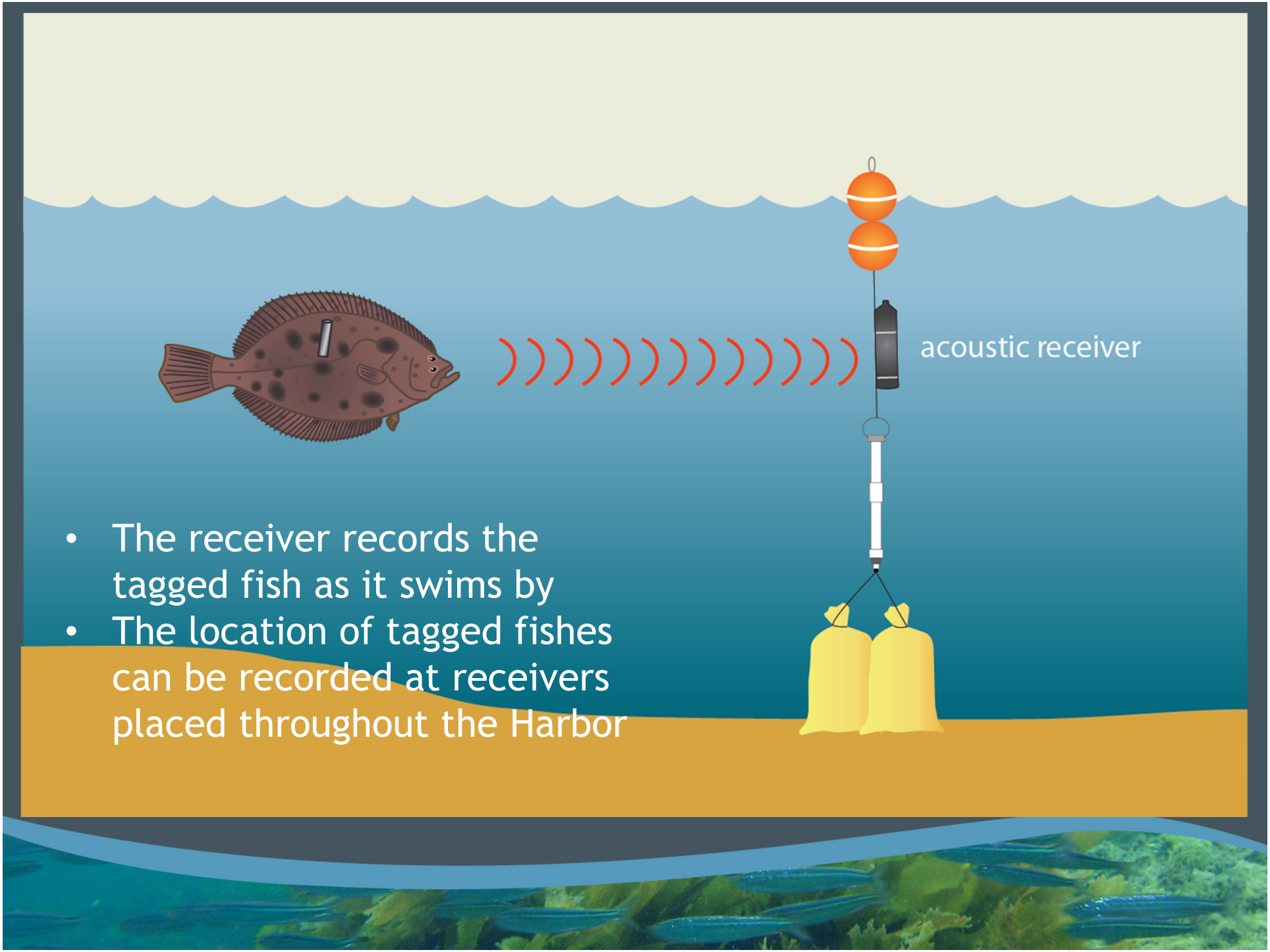
Special Studies Necessary for Model Development

- Hydrodynamic/sediment transport
  - Bathymetry, watershed loading, velocity (ADCP*), and propwash analysis
- Chemical fate
  - Gaps in surface sediment PCBs/DDTs and water column PCBs/DDTs
- Bioaccumulation
  - PCBs/DDTs in food web, food web structure, and fish movement (more data needed)
- Natural recovery rate estimation
- Regional background concentrations evaluation

* ADCP = Acoustic Doppler Current Profiler

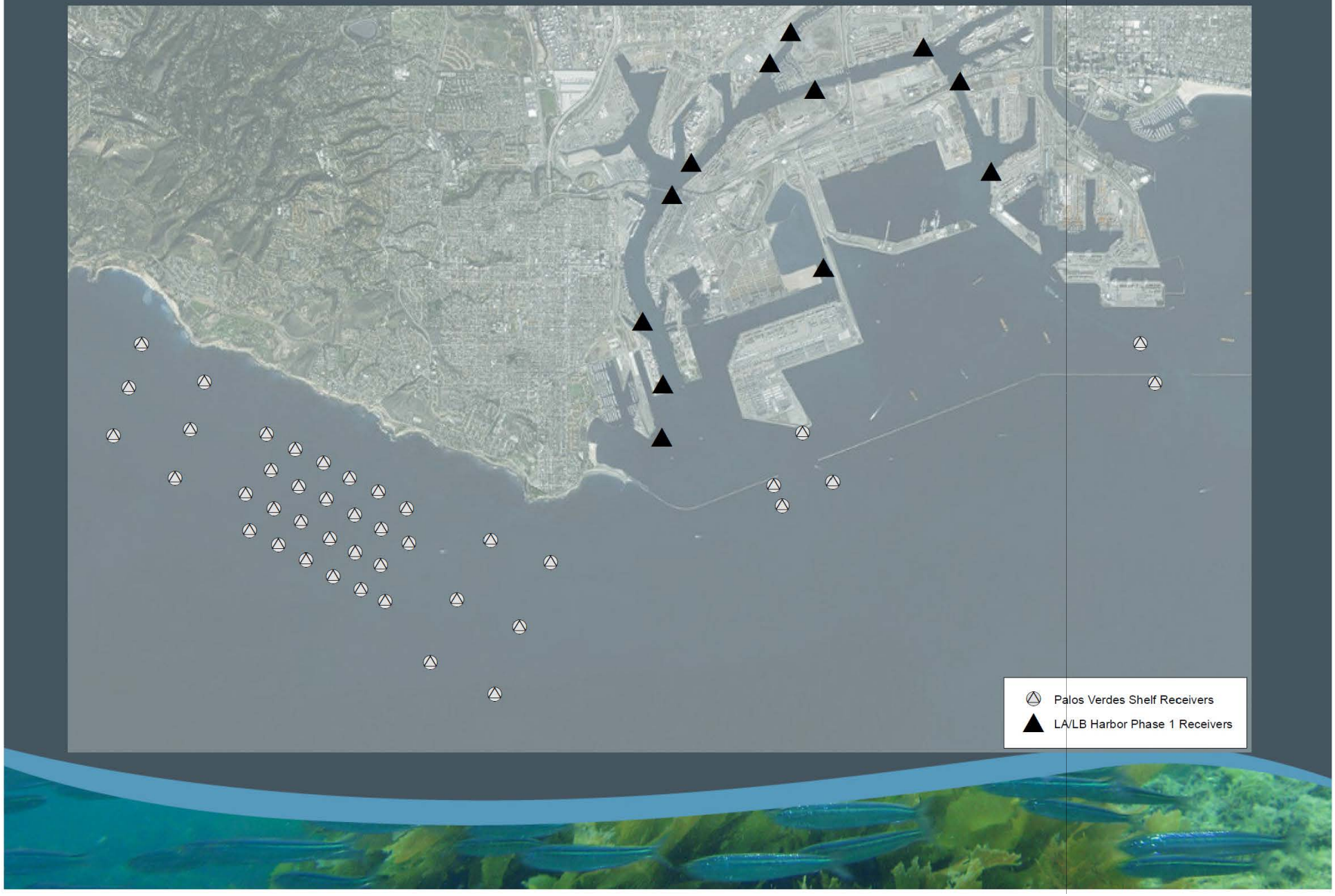
Fish Movement Study

- CSU Long Beach passive tracking study in Harbor
- Study overlapped with passive tracking study on Palos Verdes (PV) Shelf
- Used acoustic telemetry
  - Surgically placed coded tag in fish (white croaker)
  - Underwater receivers detect fish as they swim by
- CSU Long Beach also conducted an active tracking study



- The receiver records the tagged fish as it swims by
- The location of tagged fishes can be recorded at receivers placed throughout the Harbor

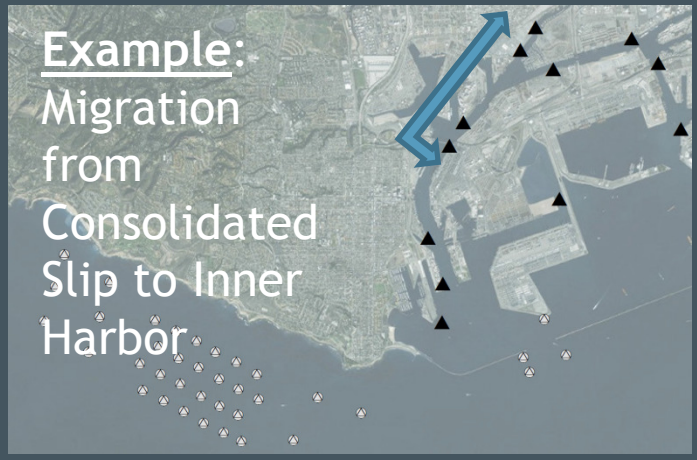
Receivers in Harbor and PV Shelf

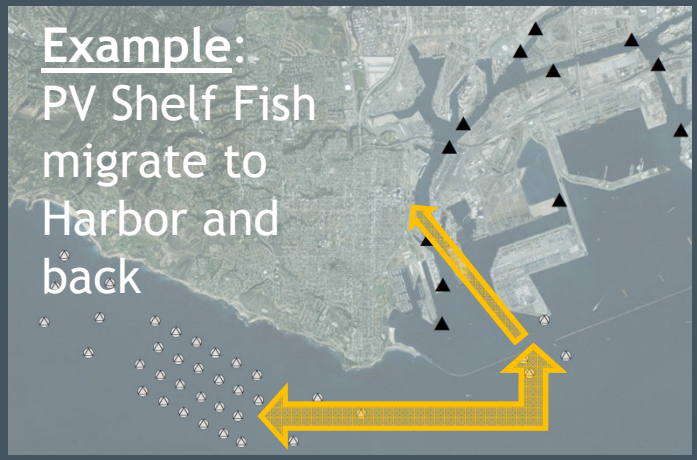


Major Movement Patterns –
Harbor and Palos Verdes Shelf

- In the Harbor, fish tend to stay in the area where they were tagged or move to a nearby area.

- A large proportion of Croaker from PV Shelf were detected at Harbor entrance; a smaller proportion were detected in Main Channel





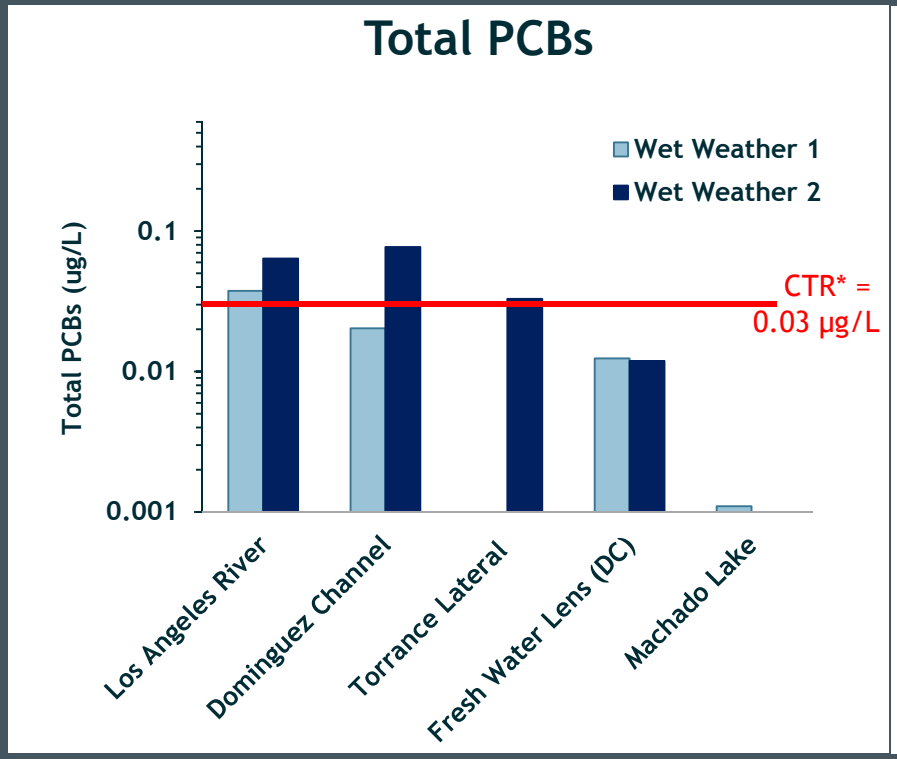
Data Source: CSU-Long Beach

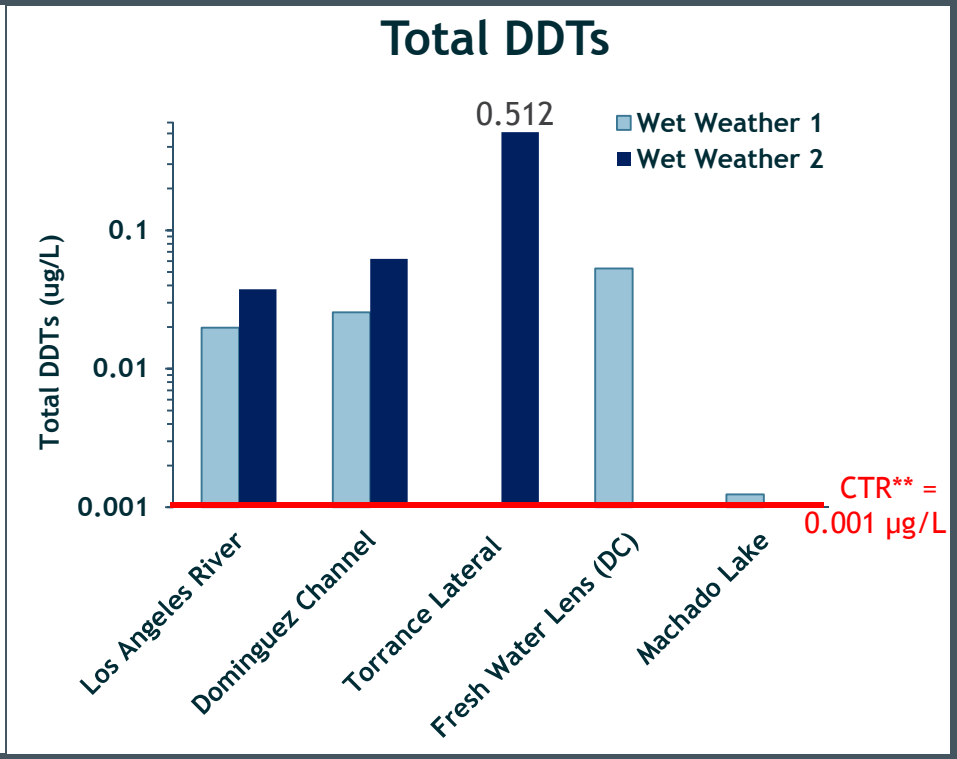
Watershed Loading Special Study

- Numerous sites sampled in the watersheds
- Numerous sampling events (2014 to 2015)
- High volume sampling
- Best analytical methods available

Watershed Loading Results

Preliminary Stormwater PCBs and DDTs





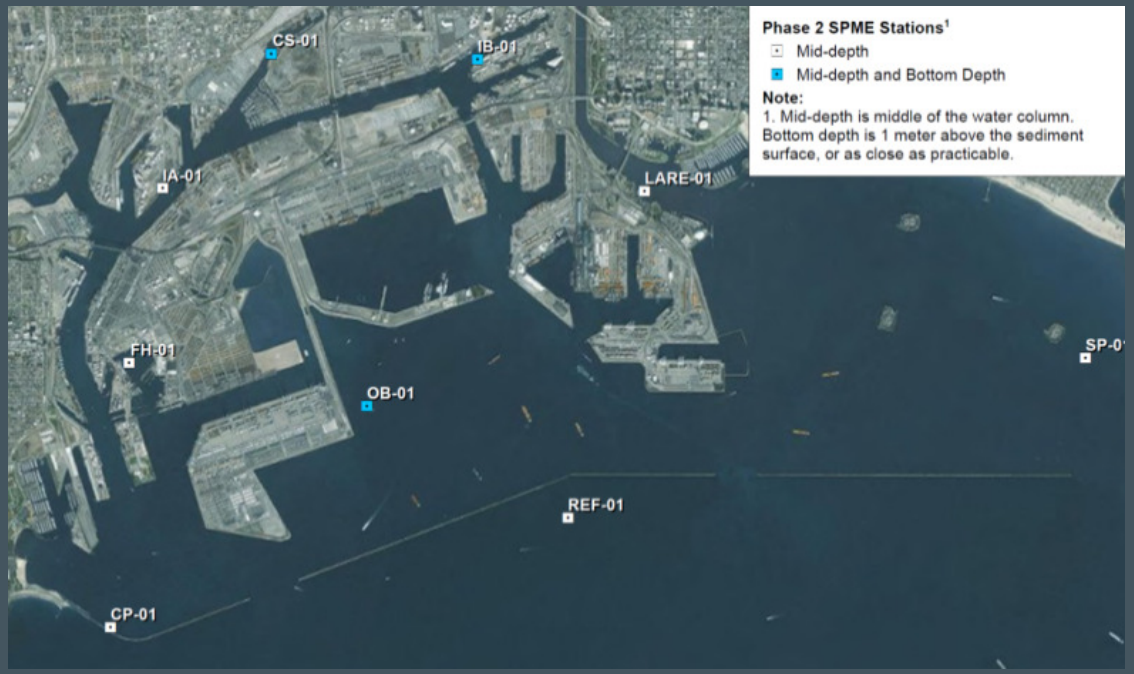
* California Toxics Rule (CTR) for Aquatic Life, Criterion Continuous Concentration
µg/L = microgram per liter

** CTR for 4,4'-DDT

Summary: During rain events, PCBs and DDTs in stormwater from Dominguez Channel and LA River are flowing into LA/LB Harbor at concentrations above CTR

Low Detection Limit Water Column Study

- Goal: Fill data gaps on detectable water column PCBs/DDTs
- Test 3 methods and use best method to evaluate water column PCBs and DDTs



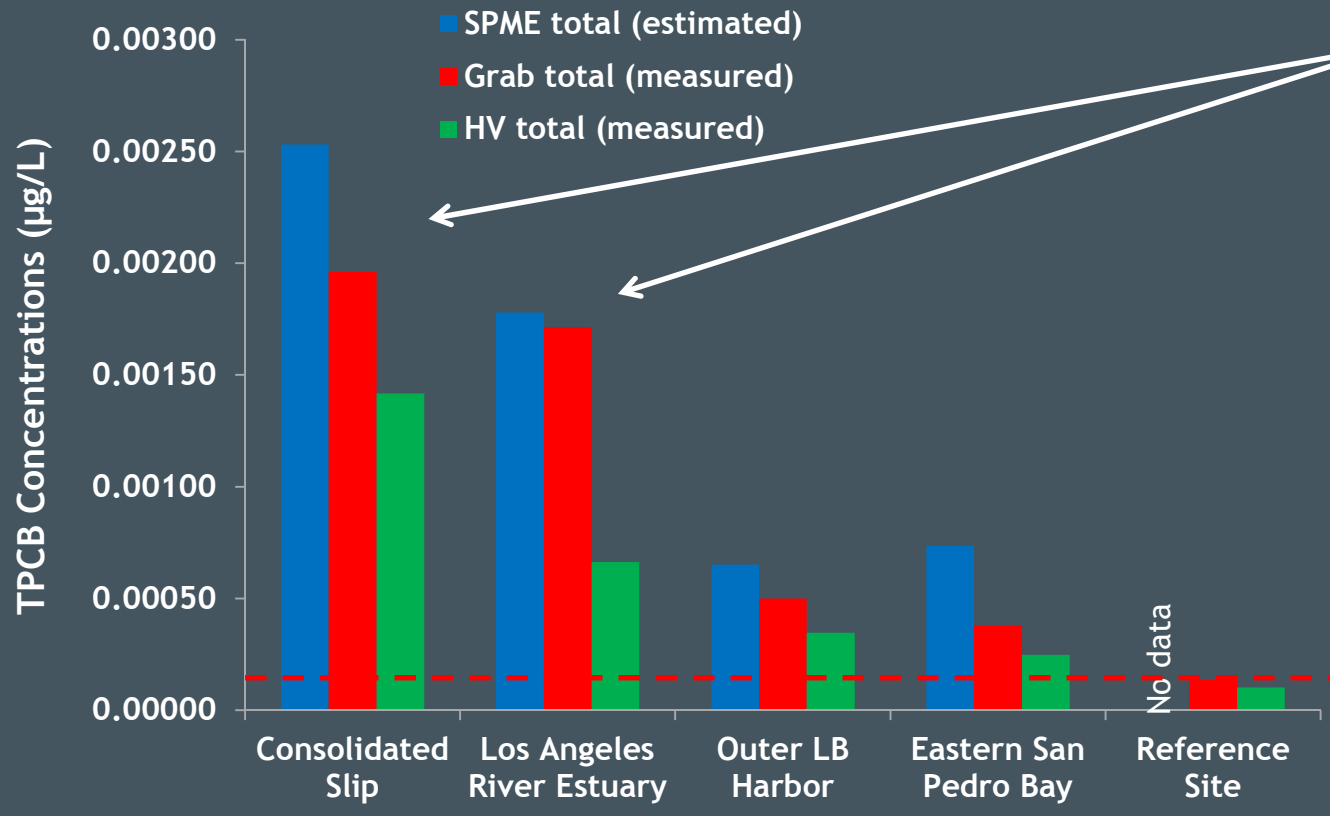
Sampling Methods

SPME Sampling

High Volume Sampling

Van Dorn (Grab) Sampling

Total PCBs Detected in Harbor Waters Using Three Methods



HV = High Volume
SPME = solid-phase microextraction
TPCBs = Total PCBs

Summary:

- Highest concentrations measured were near the major stormwater inputs
- All concentrations are at or above the CTR Human Health criterion (0.00017 µg/L)

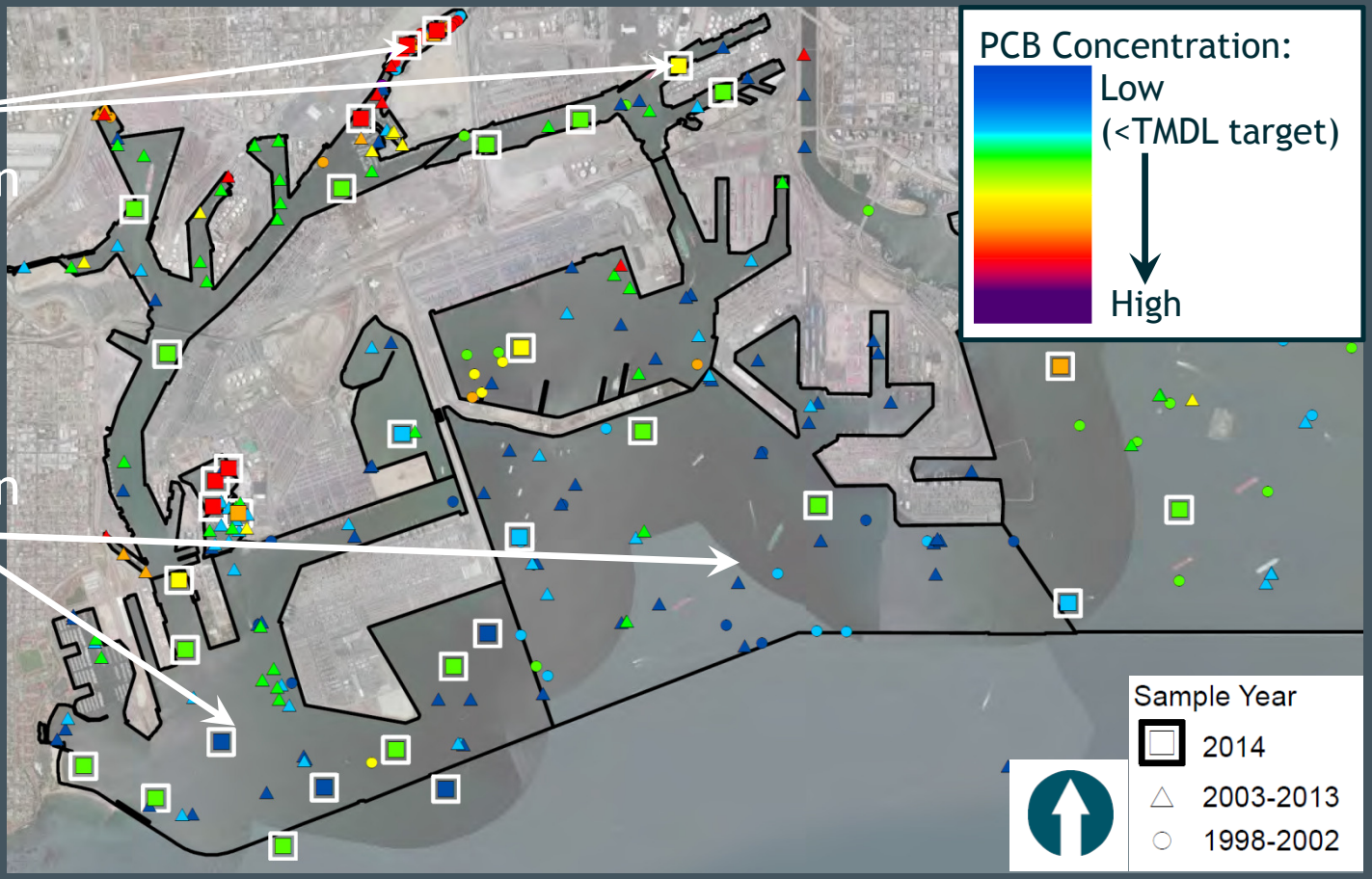
Surface Sediment Study

- Goals:
  - Supplement current surface sediment dataset
  - Fill spatial and temporal data gaps
  - Sample bioactive layer (top 5 cm)

Surface Sediment Special Study
Preliminary Results

Summary:

- Higher PCB concentrations in Inner Harbor areas
- Lower PCB concentrations in Outer Harbor
- Data consistent with previous studies



Food Web Study

- Fill tissue chemistry data gaps
  - Target fish species
  - Organisms in Harbor food web
- Food web structure determination

Polychaete

Pacific Oyster

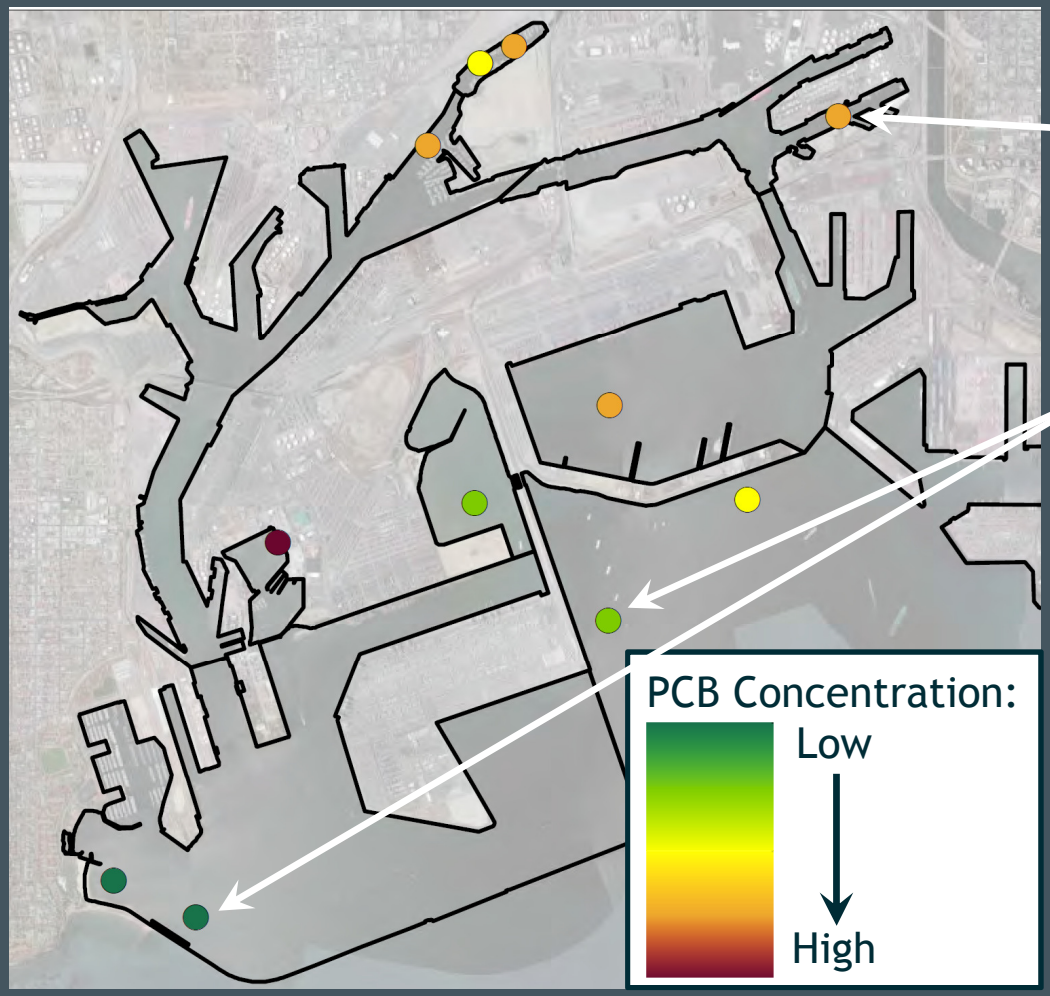
White Croaker

California Halibut

Shiner Surfperch

Food Web Special Study

Preliminary Results: Benthic Organism PCBs



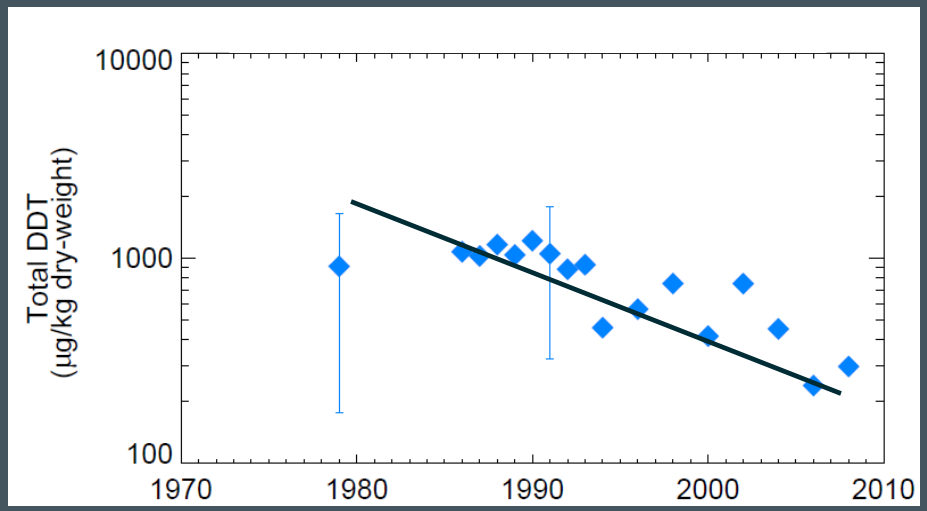
Summary:

- Higher PCB concentrations in Inner Harbor areas
- Lower PCB concentrations in Outer Harbor
- Pattern consistent with sediment PCB concentrations

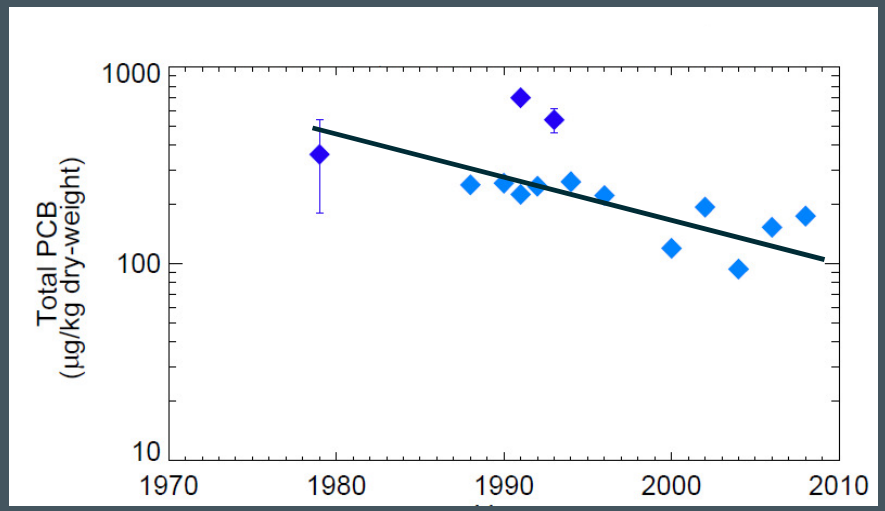
Recovery

DDTs and PCBs are Declining in Mussels from Outer LA/LB Harbor

Total PCBs in Mussels



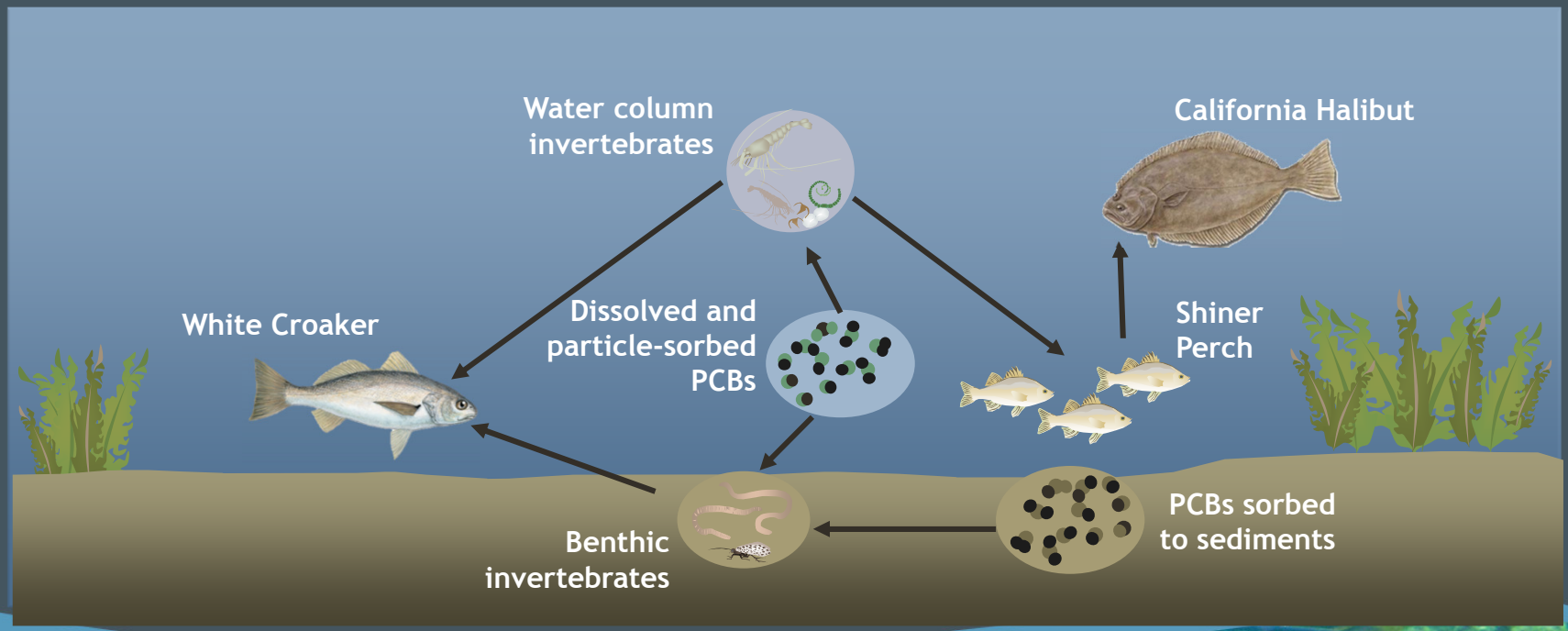
Total DDTs in Mussels



Additional data collected in 2014 will provide additional support

Bioaccumulation Model Development

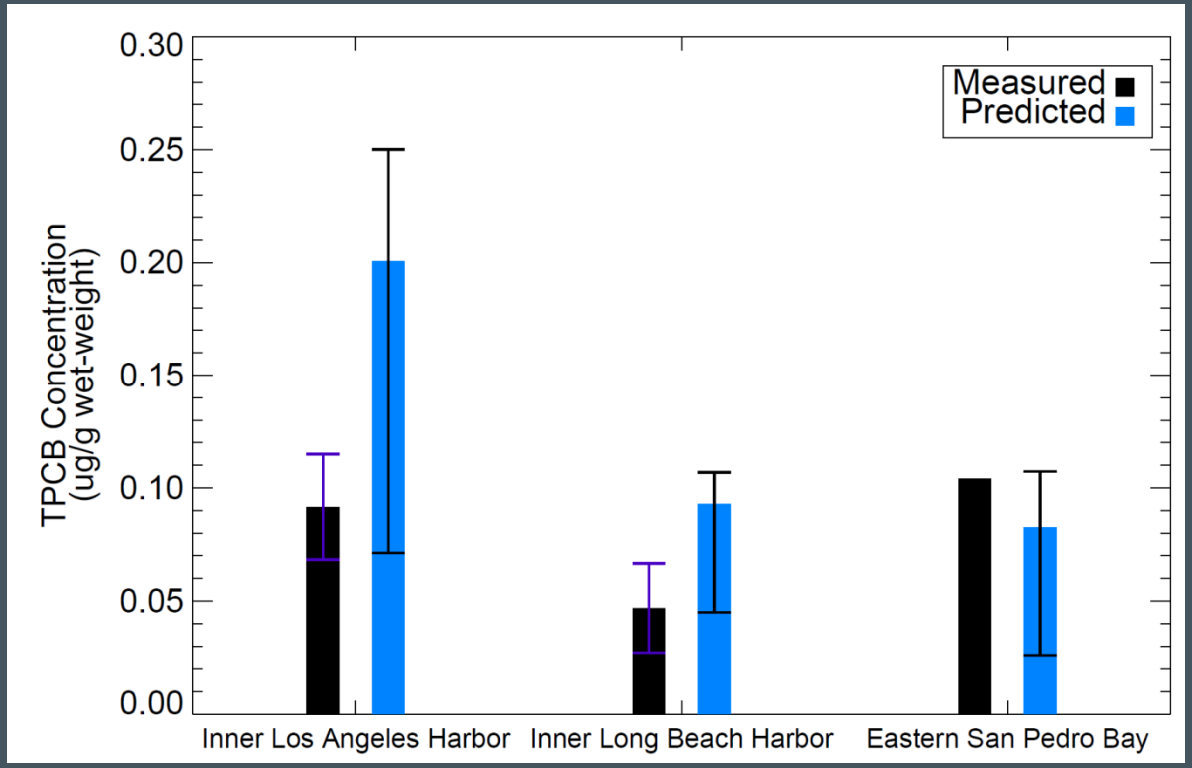
- Determine links from contaminant sources to fish tissues
- Use model to assess the effectiveness of various management options



Bioaccumulation Model Key Processes

Initial Model Performance

Steady-state Simulation of White Croaker PCBs

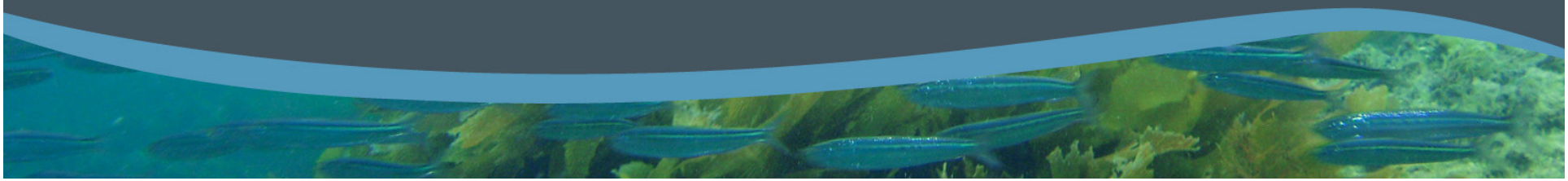


Summary:

- Good model performance to date
- Model-predicted concentrations are similar to measured concentrations in fish

Next Steps

- Finalize model of Harbor
  - Complete analyses of special study data
  - Revise bioaccumulation and WRAP models
  - Link models and calibrate
  - Complete SQO indirect effects assessment
- Use model to determine most effective management actions on reduction of fish tissue PCBs and DDTs
- Continue to adhere to Phase 1 Implementation Plan



Thank You!