

# Los Angeles and Long Beach Harbor TMDL and Ongoing Special Studies

CMANC Winter Meeting  
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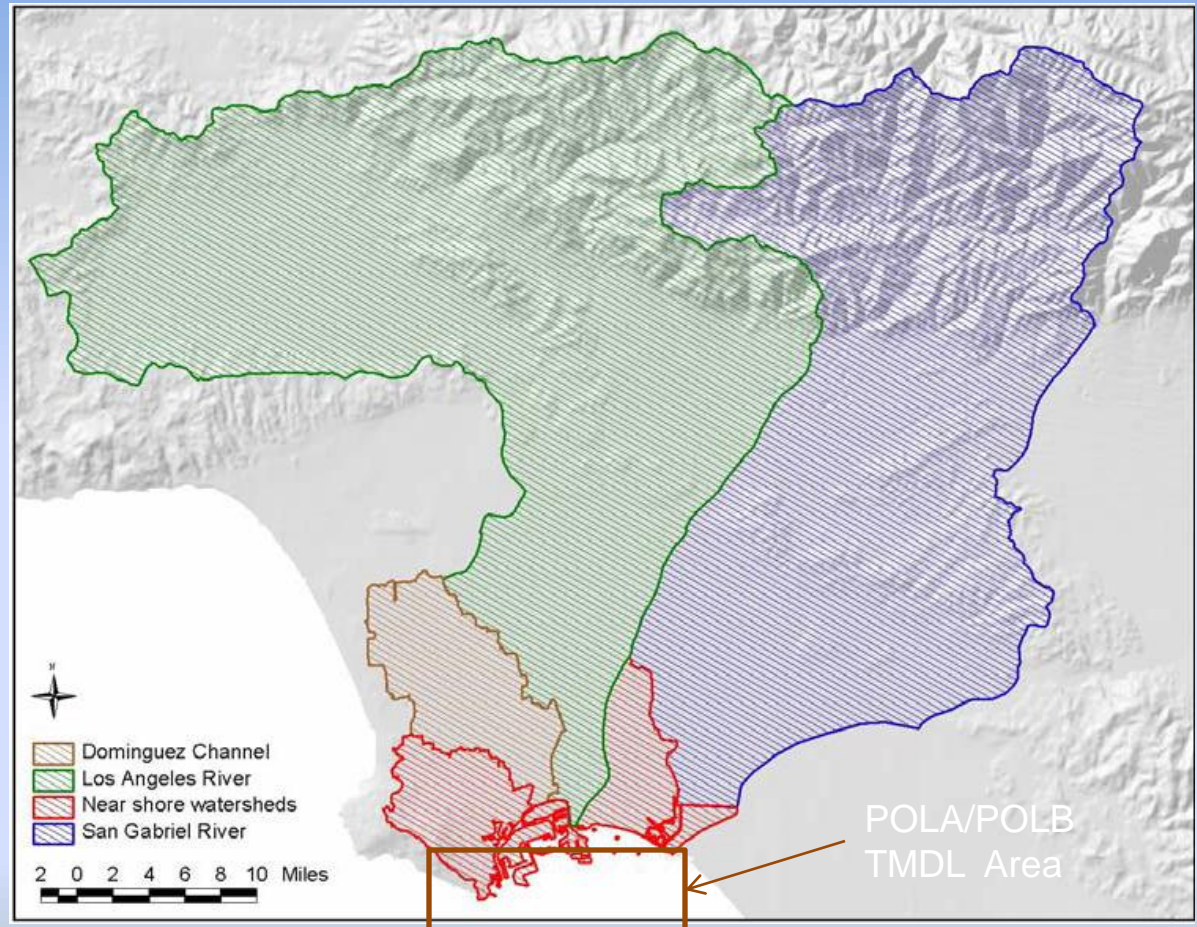
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# Background

- Historic Contamination in the Harbor
  - Industry (DDT production), Oil and Gas, Municipal dischargers (Storm water and Urban Runoff),...
- Consent Decree (1999)
- Listed for:
  - Water and/or Sediment: Cadmium, chromium, copper, mercury, lead, zinc, chlordane, dieldrin, toxaphene, DDT, PCBs, PAHs
  - Benthic community effects and toxicity
  - Fish Tissue: DDT, PCBs, toxaphene, chlordane and dieldrin
- Required to develop and adopt TMDL by 2012
- Numerous Stakeholders

# Environmental Setting

- Dominguez Channel (133 mi<sup>2</sup>)
- LA River (834 mi<sup>2</sup>)
- San Gabriel River (689 mi<sup>2</sup>)
- All drain to “Greater Los Angeles and Long Beach Harbors”
- Harbor Area=10,500 acres (16 mi<sup>2</sup>)



(Tetra Tech, May 5, 2009 Technical Loading Approach Memo)

# TMDL Overview

- Final TMDL Adopted by State Board 7 February 2012
  - Water, Sediment & Tissue
    - DDT, PCBs, Chlordane and Dieldrin (tissue)
    - DDT, PCBs, Metals (sediment)
    - Toxicity, benthic community effects
  - Numeric Targets (ER-Ls, OEHHA), 20 year time line, re-opener after 6 years
  - Allows for SQOs in lieu of numeric targets (Part I and Part II) mandates completion of Part II by February 2014
  - Special Studies
    - Fish Tracking, sediment fish tissue linkage studies, Fish Consumption, air deposition studies, sediment transport, stressor ID studies, contribution of LA and San Gabriel River loadings

# Challenges

- Gaps in TMDL modeling assumptions leading to high level of uncertainty in predictions (assumes sediment is largest source)
- Quantification/understanding of source inputs
  - Detection limits for organics in water column
  - Inadequate air deposition data
  - Other sources
- Understanding contribution/linkage of sediment to fish tissue concentrations
- Coordination of multiple stakeholders:
  - Majority of stakeholders upstream
  - POLA/POLB in the receiving water

# Implications

- Potential to require dredging of entire harbor complex (interim targets set at ER-Ls);
- Based on current bioaccumulation model sediment-associated PCBs would need to be below quantification limits;
- Large swaths previously developed for shallow water habitat could require clean-up;
- Material currently deemed suitable for ocean disposal under Federal OTM guidance might be subject to clean-up.

# Current Activities

- Implementing special studies;
- Development of SQO part II;
- Development/improvement of bioaccumulation modeling
- On going clean-up investigations of known hotspots (Consolidated Slip, SW Marine, Fish Harbor,..)
- Development of Monitoring plan for TMDL implementation (Fish tissue sampling every 2 years and sediment & WQ monitoring every 5 years).



# 2011 Field Effort

## Sample Collection

- 14 Trawl locations (targeting 4 species; 7 individuals/species/site)
- 5 sediment sampling locations/trawl location
- 1 high volume near bottom water sample/trawl location

## Fish Tracking

- 11 Acoustic Receivers range tested and deployed
- 50 Croakers collected from 4 locations, tagged & released





# 2011 Sampling Effort

## Sampling Summary:

- Sediment Samples – 70 + 4 dups
- Water Samples – 14 + 1 dup
- Fish Tissue – 266 individuals
  - 98 White Croaker = 100%
  - 76 Queenfish = 78%
  - 29 California Halibut = 30%
  - 63 Topsmelt = 64%
- Fish Gut Analysis

# 2011 Fish Sampling Success

Station	No. of Trawls		Croaker	Queenfish	Halibut	Topsmelt/ Topsmelt Gut
	Otter	Lampara				
CB1	3	1	7	7	3	7/6
CM1	2	1	7	7	1	7/7
CS1	3	1	7	4	1	2/0
FH1	2	1	7	7	1	0/0
IH1	3	1	7	7	0	0/0
IH2	2	1	7	3	0	4/0
IH3	3	1	7	7	3	2/0
IH4	3	2	7	7	7	7/0
IH5	2	2	7	2	1	5/0
IH6	2	3	7	7	0	5/0
OH1	3	2	7	7	5	5/0
OH2	3	2	7	4	1	5/0
OH3	3	1	7	7	5	7/3
OH4	2	2	7	0	1	7/7

Seven Individuals per Species Collected for Chemistry and Gut Content Analysis

Seven Individuals per Species Collected for Chemistry but Insufficient T'smelt for Gut Content Analysis

Trawl Collection for Chemistry

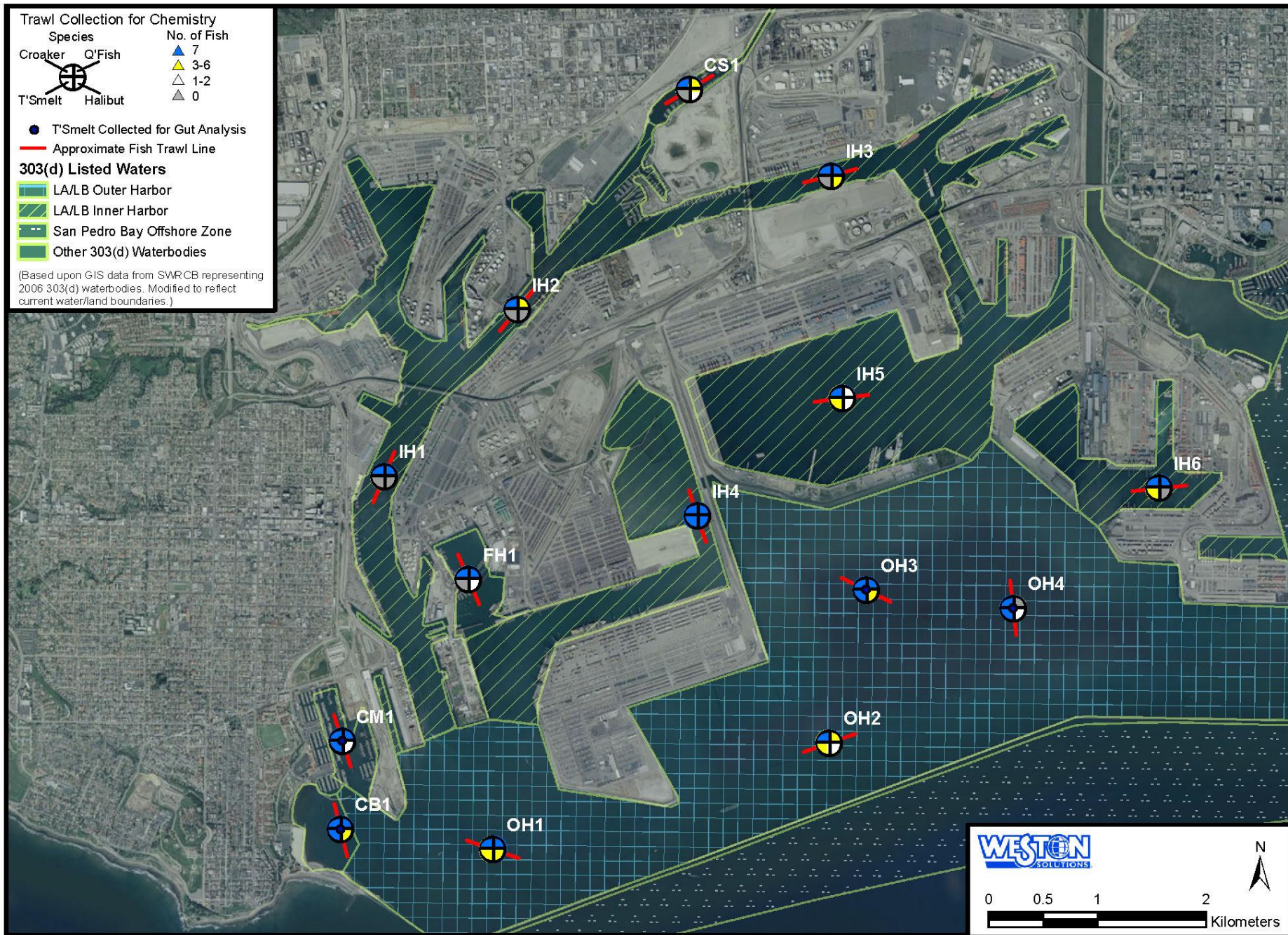
Species	No. of Fish
Croaker	7
Q'Fish	3-6
T'Smelt	1-2
Halibut	0

● T'Smelt Collected for Gut Analysis  
 — Approximate Fish Trawl Line

### 303(d) Listed Waters

- LA/LB Outer Harbor
- LA/LB Inner Harbor
- San Pedro Bay Offshore Zone
- Other 303(d) Waterbodies

(Based upon GIS data from SWRCB representing 2006 303(d) waterbodies. Modified to reflect current water/land boundaries.)



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0 0.5 1 2 Kilometers



# Tissue Summary

- All Dieldrin Non-Detect or below FCG
  - (IH-1 Queen Fish detected)
- Total Chlordane 2 results above FCG (5.6 ng/g)
  - Consolidated Slip White Croaker
  - Inner Harbor-2 Queenfish
- Total DDTs
  - Majority of results above FCG (21 ng/g)
  - One result above ATL (8oz) (1,000 ng/g) (IH1-white croaker)
- Total PCBs
  - Above FCG at all but 6 stations
  - Highest at Consolidated Slip and Fish Harbor (White Croaker)

# Sediment Summary

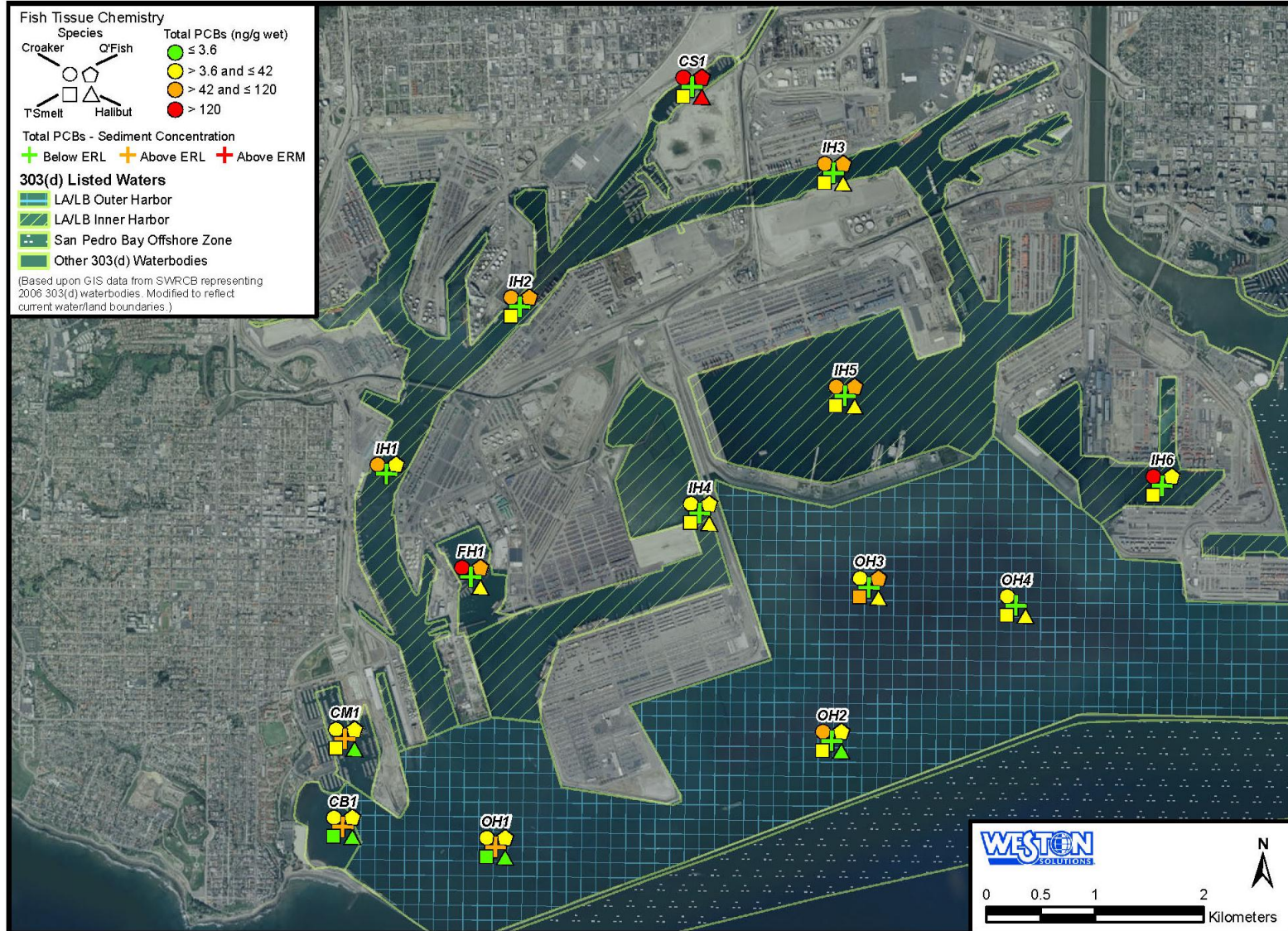
- Dieldrin below detection levels all stations
- Total Chlordane above ERL at 3 stations
  - Cabrillo Marina, Consolidated Slip, Outer Harbor 1
- Total PCBs above ERL at 3 stations
  - Cabrillo Beach, Cabrillo Marina, Outer Harbor 1
- Total DDTs above ERL at all stations
  - Consolidated Slip highest, then Cabrillo Beach/Marina

# Water Summary

- Dieldrin – all ND
- Total Chlordane – all ND
- Total PCBs – all ND
- Total DDTs – Detected at all but 4 stations, all above Ocean plan but not TMDL Targets (CTR)

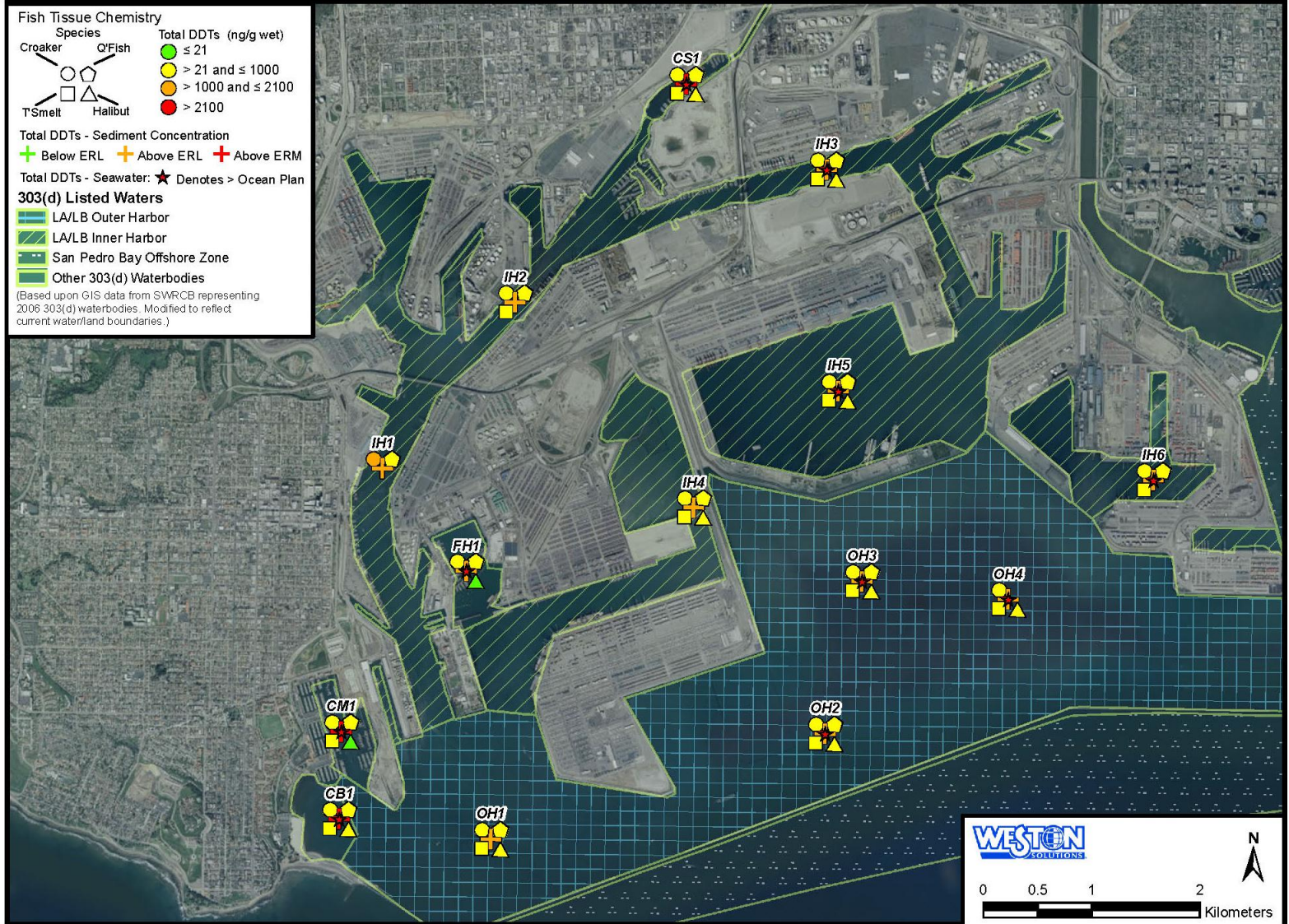


# Total PCBs



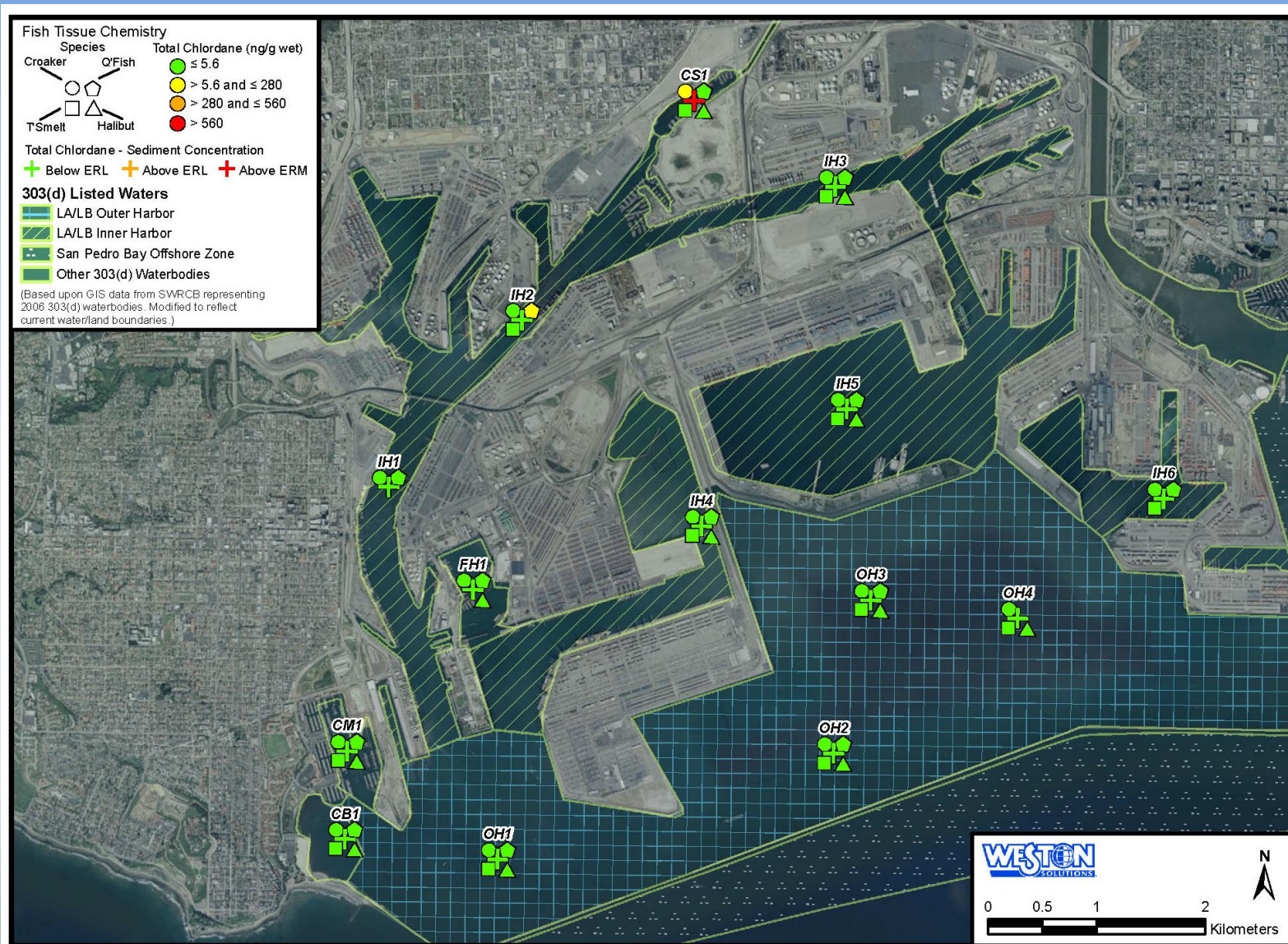


# Total DDTs





# Chlordane



# Gut Analysis

Group	C. Halibut		White Croaker		Queenfish		Topsmelt	
	Result	Model	Result	Model	Result	Model	Result	Model
Algae			X		X		X	X
Zooplankton			X		X		X	X
Polycheates			X	X	X	X	X	X
Amphipods/ Isopods			X	X	X	X	X	X
Mysids	X	X	X	X	X	X		X
Decapod Shrimp	X	X	X	X	X			
Decapod Crab			X		X			
Gastropods			X					
Bivalves			X	X				
Fish	X	X	X		X	X		
Miscellaneous			X	X	X		X	X



# Fish Tracking



# Fish Tracking Results

## Passive Tracking (Aug-Oct 2011):

- Outer LA Harbor- 12 fish tagged, 11 detected, Main channel as far as Vincent Thomas Bridge to Angels Gate with 1 fish going out to Palos Verdes Shelf
- Inner LA Harbor-13 fish tagged, 12 detected, Consolidated slip to Main Channel with 1 fish going out to Palos Verdes Shelf



# Fish Tracking Results

- Outer LB Harbor- 12 fish tagged, 10 detected, in Outer Harbor only.
- Inner LB Harbor- 12 fish tagged, 12 detected, moved throughout inner LB and LA harbor into Consolidated Slip.
- Palos Verdes Shelf- concurrent study using same technology 3 fish detected in inside Harbor traveling up main ship channel as far as Vincent Thomas Bridge.

# Fish Tracking Results

## Active Tracking:

- 4 Fish tagged for active tracking (2 Outer LA, 1 Outer LB, and 1 Inner LA) 24 hour continuous tracks.
- Shift in behavior between day and night, spend night time in shallows, migrate to deeper water during day usually same location as prior day.

# Current Status

- Analysis of second round of sampling (May); smaller number of stations focused more on methods development.
  - Analysis of gut contents (species and tissue concentration of prey items)
  - Collection of otoliths
  - Use of C.L.A.M. samplers to improve on detection limits
- Additional tracking data

