



"Mussel Watch"

A Sentinel for Safe, Healthy & Productive Coasts

Mussel Watch California Pilot Project Prioritizing Contaminants of Emerging Concern for Coastal Monitoring

Southern California Coastal Water Research Project (SCWRP)

Tuesday, January 12th, 2010

John D. Christensen, Deputy Director

NOAA | National Ocean Service | National Centers for Coastal Ocean Science



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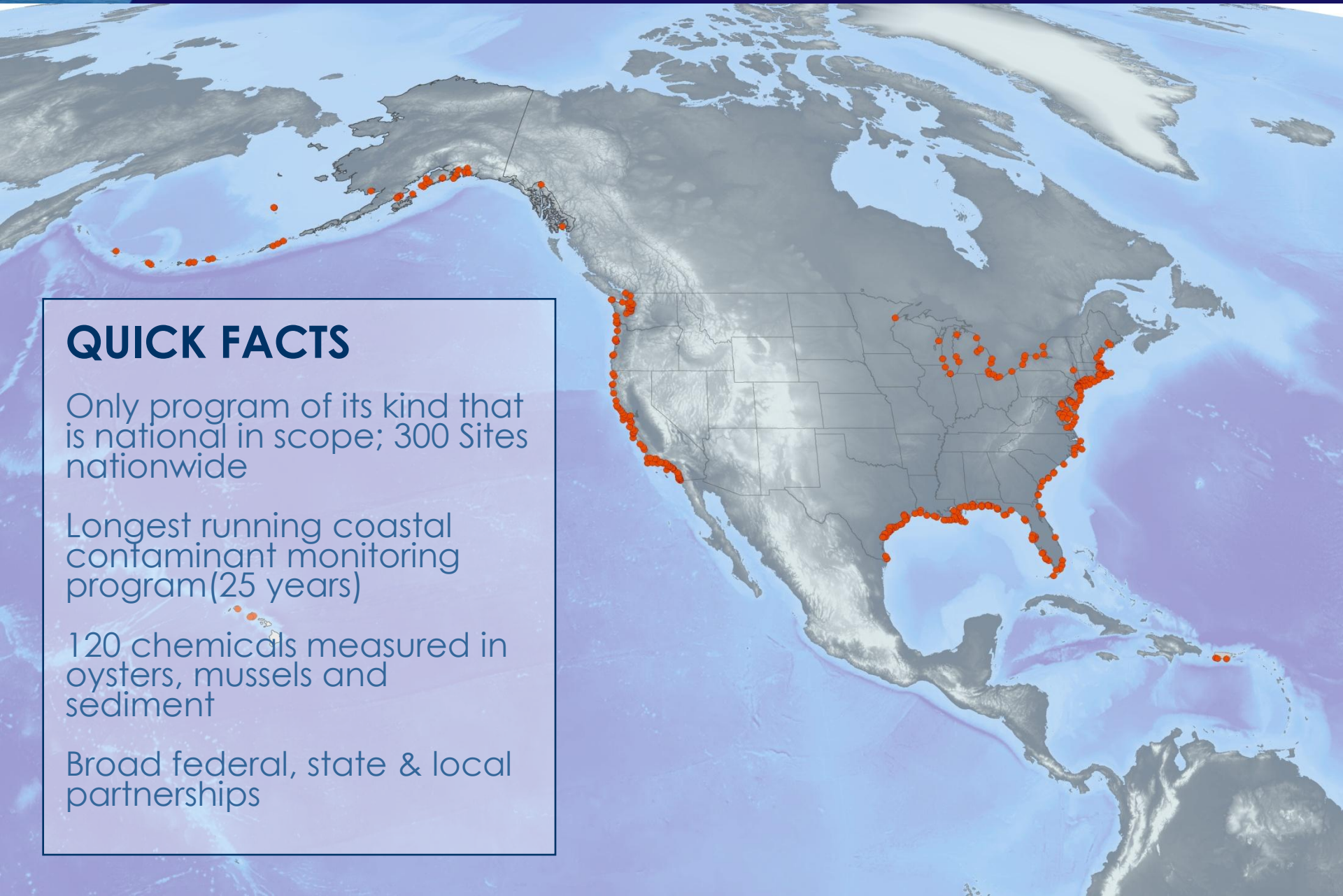
QUICK FACTS

Only program of its kind that is national in scope; 300 Sites nationwide

Longest running coastal contaminant monitoring program (25 years)

120 chemicals measured in oysters, mussels and sediment

Broad federal, state & local partnerships





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The Standard Mussel Watch Contaminant* List

(120 chemicals)

✓ Organics

Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDTs and isomers), DDE, DDD, Chlordanes, Dieldrins

✓ Major & Trace Elements

Cadmium, Lead, Chromium, Arsenic, Mercury, Selenium, etc.

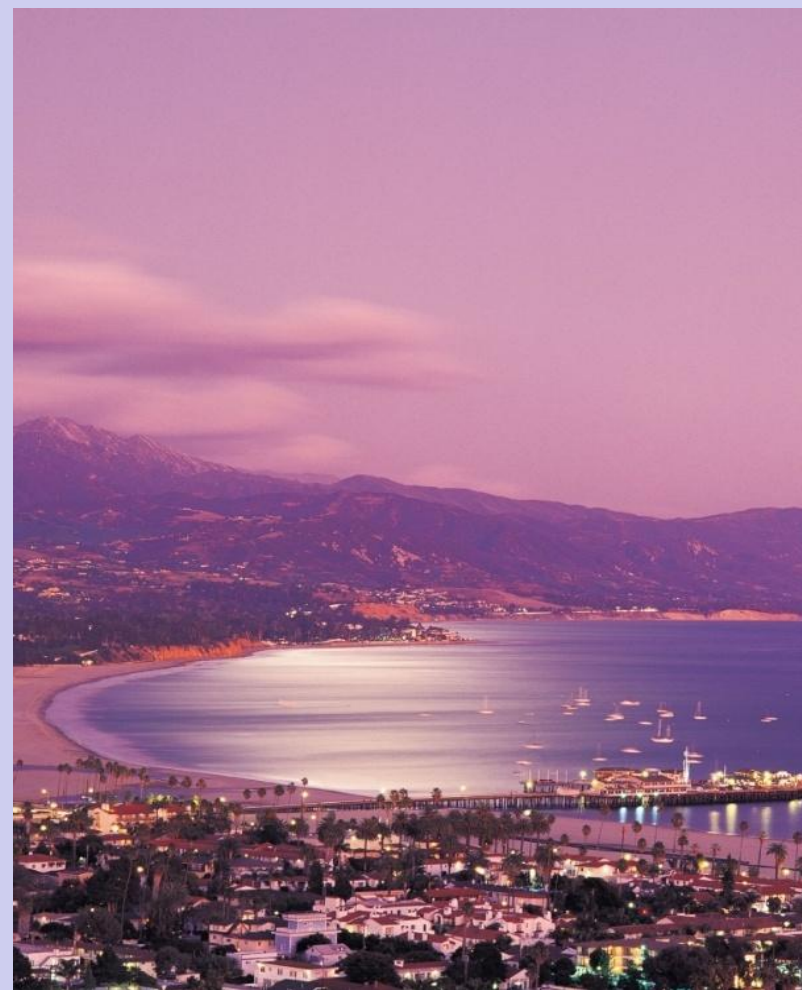
✓ Organometallic Compounds

Mono-, Di-, Tri- and Tetra-butyltin

✓ Histopathology & Gonad Condition*

✓ Brominated Flame Retardants

Polybrominated diphenyl ethers (PBDEs), Polybrominated biphenyls (PBBs)



Santa Barbara, CA – 25 Years of NOAA Mussel Watch Contaminant Monitoring



An Assessment of Two Decades of Change

- ✓ Highlights 20 years of pollution monitoring
- ✓ 27 Coastal & Great Lakes states evaluated
- ✓ Overall, "legacy" contamination is declining
- ✓ Many urban areas still contaminated
- ✓ Improvements credited to environmental laws
- ✓ Fossil fuel compounds continue to affect coastal waters



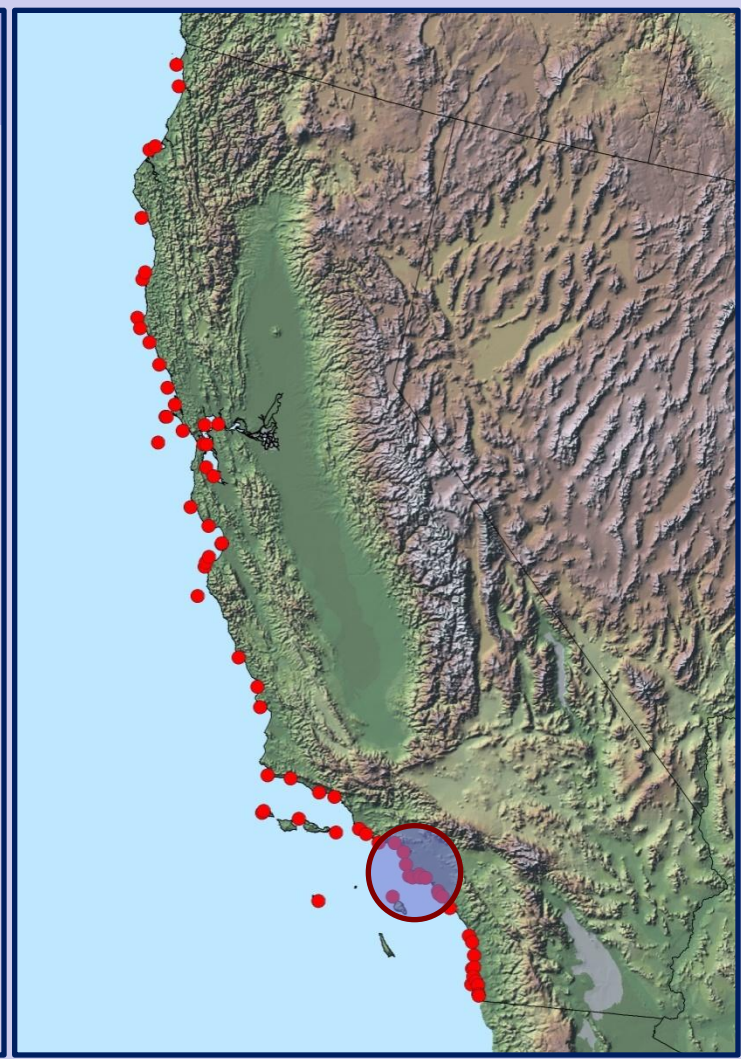
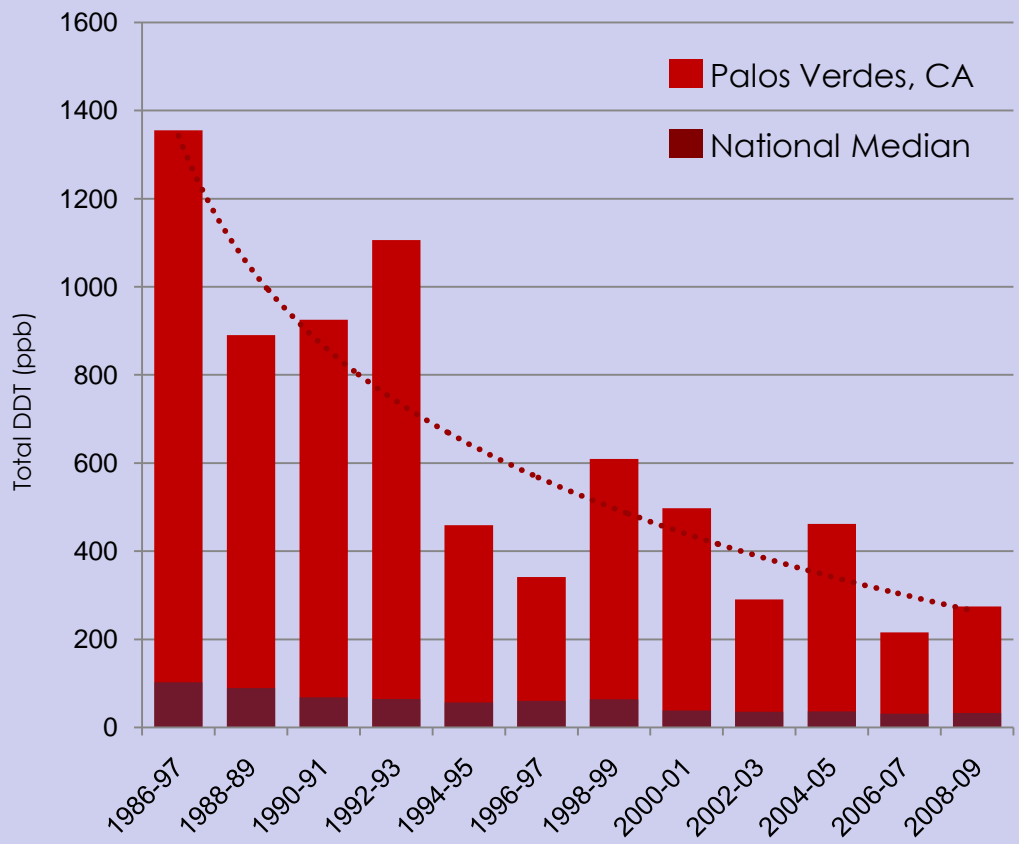
Released in 2008

<http://ccma.nos.noaa.gov/publications/MWTwoDecades.pdf>



An Assessment of Two Decades of Change

DDT – Regional Highlight





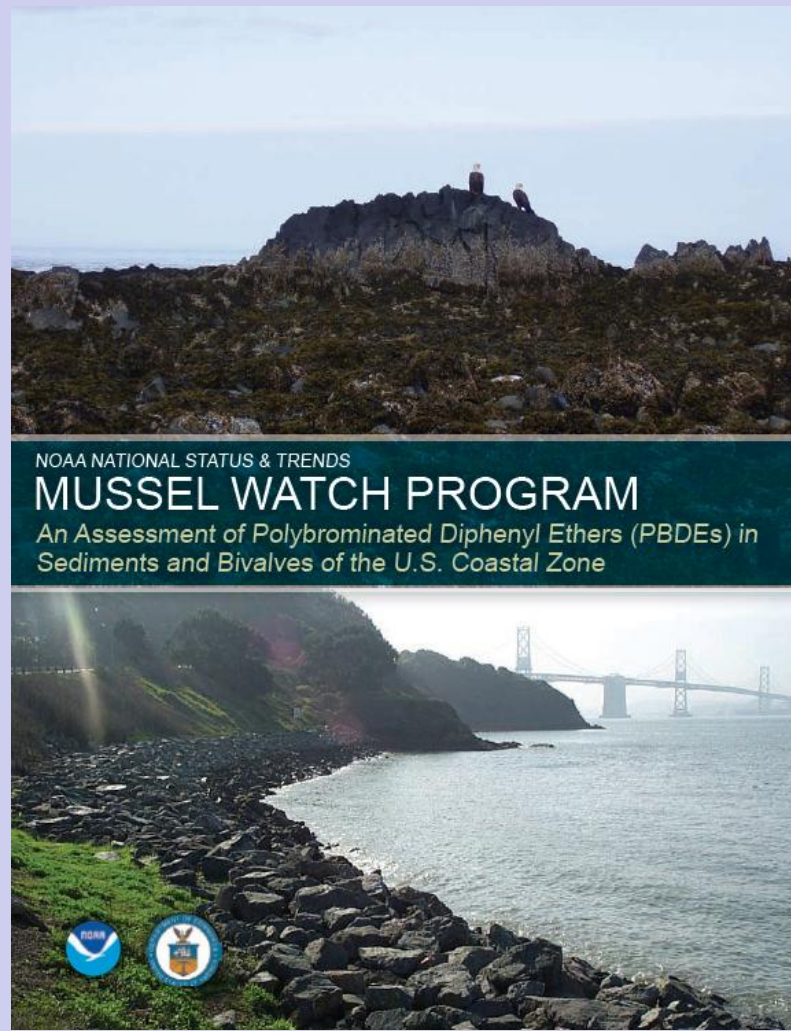
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Moving Forward

A National Assessment of Polybrominated Diphenyl Ethers (PBDEs)

- ✓ Highest levels measured at industrial & urban locations
- ✓ Concentrations correlated with coastal population
- ✓ New York City had highest average levels
- ✓ Southern California Bight, Central & Eastern Gulf of Mexico, and Puget Sound also high



Released in 2009

<http://ccma.nos.noaa.gov/about/coast/nsandt/PBDEreport.html>



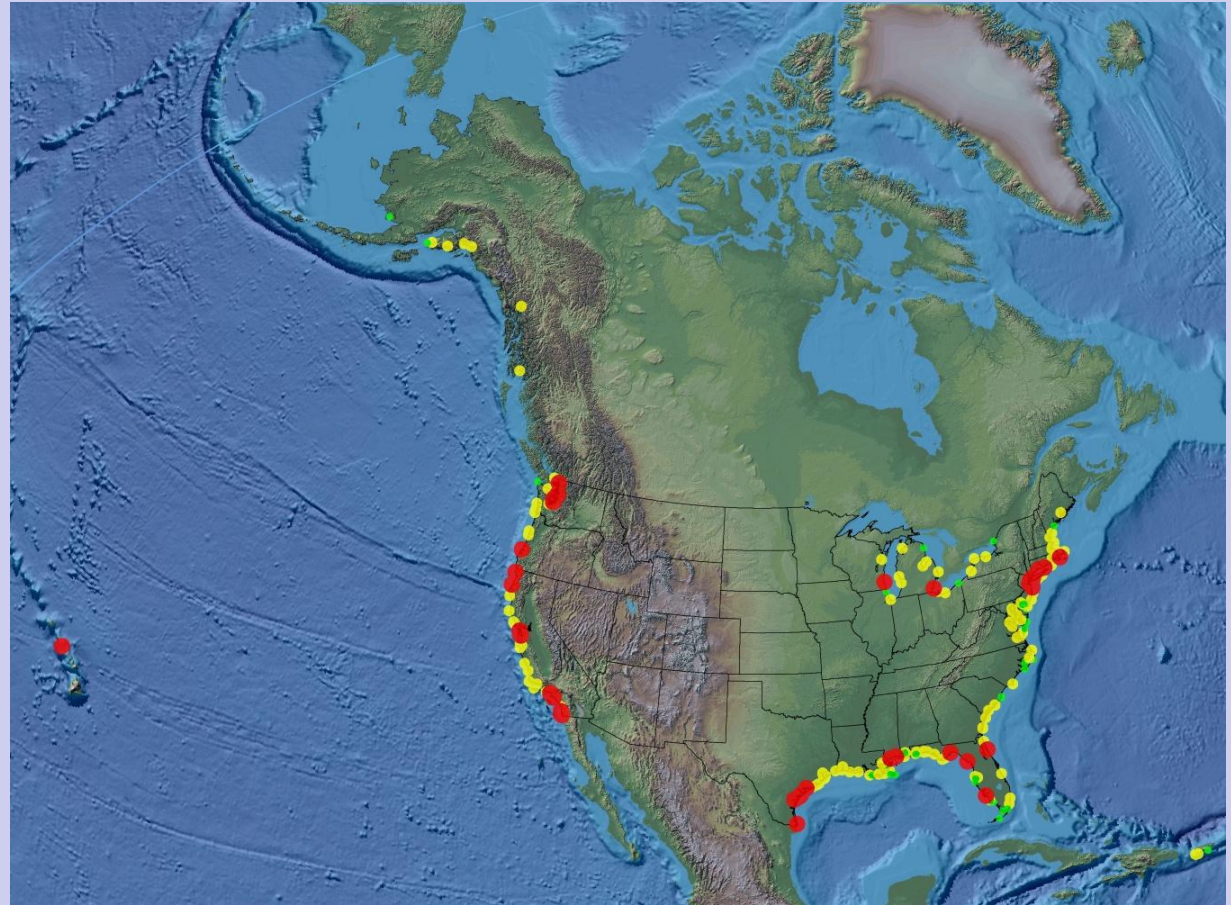
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Moving Forward

A National Assessment of Polybrominated Diphenyl Ethers (PBDEs)

- ✓ Highest individual measurement found in Southern California (>8,000 ppb)
- ✓ Banked tissue samples analyzed(1996)
- ✓ Most of the nation exhibited marked increases
- ✓ A CATALYST FOR THE SCCWRP/NOAA PARTNERSHIP

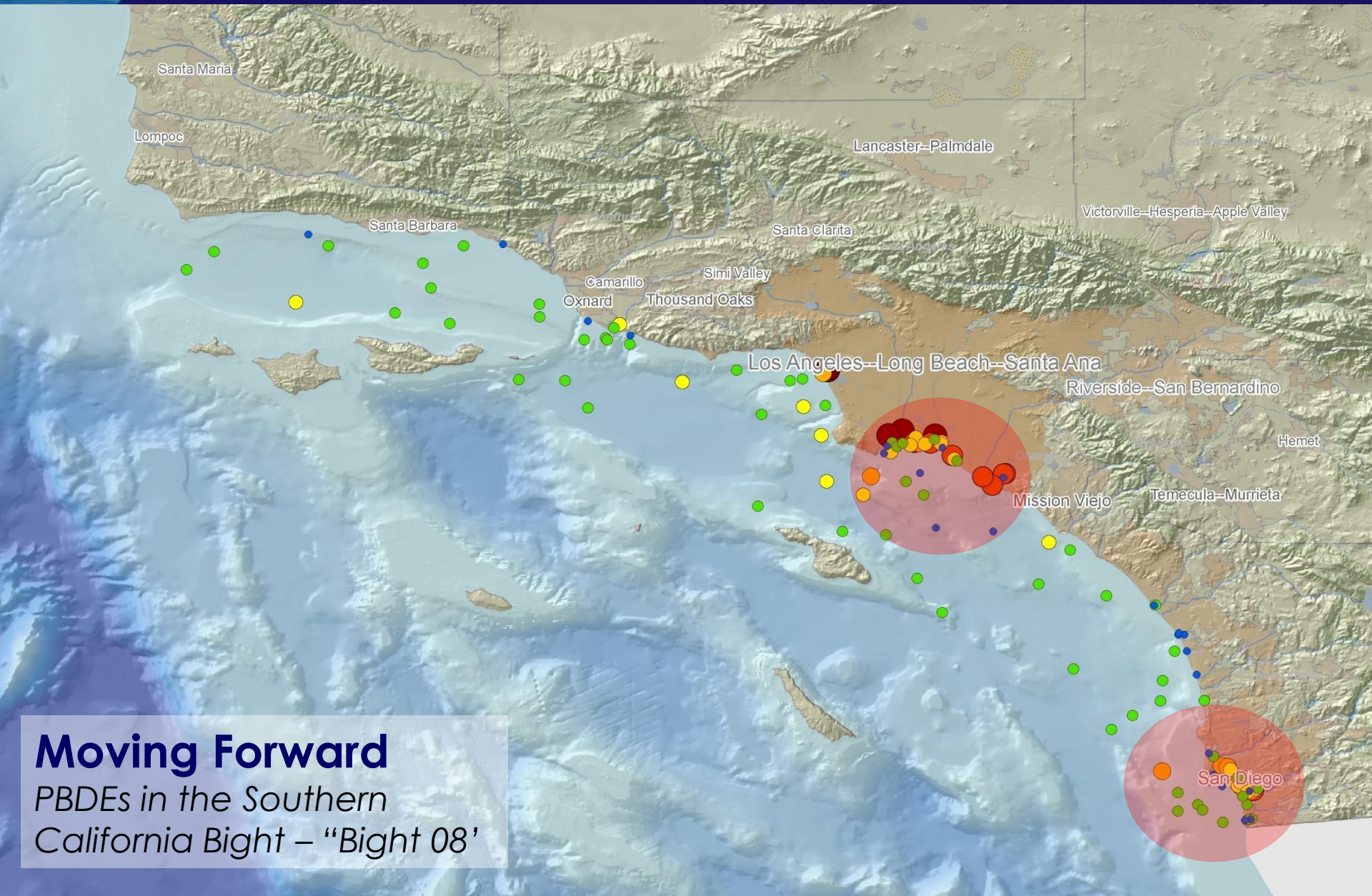


PBDEs found in all reaches of the U.S. coastal zone



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Moving Forward
PBDEs in the Southern
California Bight – "Bight 08"



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Moving Forward

Re-engineering Mussel Watch

- ✓ Held a NOAA-wide meeting at the SCCWRP campus in March 2009
- ✓ Brought together NOAA's Principle research (NMFS) and monitoring (NOS) capabilities
- ✓ Invited EPA, USGS, NIST and state (CA) representation & input
- ✓ Purpose
 - *Re-engineer Mussel Watch to monitor more CECs*
 - *Integrate NOAA's CEC research and monitoring portfolios*
 - *Improve federal interaction*
 - *Strengthen service to stakeholders*
- ✓ Outcome – "Conduct a California Pilot"



Eastern oyster
(*Crassostrea virginica*)



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Moving Forward

Re-engineering Mussel Watch

- ✓ Held a follow-up meeting in October 2009 at the San Francisco Estuarine Institute (SFEI)
- ✓ Brought together the same group of participants, plus SFEI and CA Waterboard
- ✓ Purpose
 - *Develop priority list of CECs to monitor in coastal California starting in 2009/10*
 - *Determine the "team" of collaborators and their contributions*
 - *Design the "California Pilot", including sampling locations, frequency, and methods*
- ✓ **Outcome – California pilot initiated !!!!**



California Pilot in "Action"
CA Waterboard conducts initial sampling



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Moving Forward

Prioritizing the CEC List

- ✓ Analytical methods established
- ✓ Represent a diverse group of threats to the environment, fate & transport mechanisms, and modes of action
- ✓ Potential impacts to ecosystem condition and human health
- ✓ Production scale
- ✓ Regional and National significance
- ✓ Logistics (field & contracts)
- ✓ COST
 - NOAA Mussel Watch brought \$360,000 to the project
 - Partners leveraging funds and providing field support





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The New Mussel Watch Contaminant List

- ✓ Replacement Flame Retardants:
PBDEs, TBBPA, TDCPP, HBCD, PBEB, TPP, DBDPE, BTBPE, Dechlorane Plus (DP)
- ✓ Phenolics
Bisphenol A, Alkylphenols, Triclosan
- ✓ Perfluorinated Compounds
PFOS, PFOA
- ✓ Current use Pesticides:
Pyrethroids, atrazine, organo-phosphates, Fipronil
- ✓ Hormones
17-alpha-ethinylestradiol, 17-beta-estradiol, musks
- ✓ Pharmaceuticals
Carbamazepine, Erythromycin, Diazepam, Acetaminophen
- ✓ Nanoparticles:
Nano-silver, carbon-nano tubes





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The California Pilot Design

- ✓ Up to 80 sites will be collected; of which 25 are to be selected from the historical Mussel Watch sites
- ✓ Remaining sites to be selected by SCCWRP, SFEI, CA Waterboard and NOAA
- ✓ Sites to be representative of POTWs, agricultural, urban, non-urban, storm water discharges and protected areas such as "Areas of Special Biological Significance"
 - 25 Standard MW analyte list
 - 80 PBDEs
 - 80 PFCs
 - 80 Pharmaceuticals
 - 20 New flame retardants
 - 80 Phenolics
 - 80 New use pesticides
 - 10 Nanoparticles
 - 20 Pharm/phen/pest/horm - POCIS (passive sampler)

