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Water Quality along the North Central Coast

Dominic Gregorio
Senior Environmental Scientist, Ocean Unit
Division of Water Quality
State Water Resources Control Board
www.waterboards.ca.gov



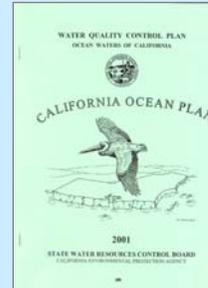
Water Quality Laws, Policies and Standards

- Clean Water Act
- California Water Code and Public Resources Code
- California Ocean Plan: near coastal ocean
- State Implementation Policy for CTR: bays and inland waters
- Enclosed Bays and Estuaries Plan – Sediment Quality Objectives
- Thermal Plan
- Regional Board Basin Plans
 - North Coast Region
 - San Francisco Bay Region
- NPDES Permits written to enforce standards



California Ocean Plan (COP)

- EPA-approved Water Quality Control Plan
 - Near coastal ocean waters to 3 mile limit
 - Discharges outside are regulated to ensure “no violation” within state waters
 - Beneficial uses of ocean waters – human health and marine life receptors
 - Water quality objectives
 - Program of implementation
 - Areas of Special Biological Significance (ASBS)
- Triennial reviews
- Amendments in progress



COP Table B Objectives

- Marine Life Protection
 - metals
 - acute and chronic toxicity
 - ammonia, radioactivity, chlorine, others
- Human Health (bioaccumulation)
 - carcinogens
 - non-carcinogens
- Unfortunately does not include many new pesticides (e.g., pyrethroids) and other emerging pollutants (e.g., PBDEs, pharmaceuticals).

Clean Water Act 303d List

- 303d list for impaired waters that do not meet standards, reported to EPA by State
- Last list is for 2006
- Each impaired water body is listed for pollutants and sources
- TMDLs being developed/implemented to eliminate impairments
- More info:
http://www.waterboards.ca.gov/tmdl/303d_lists2006approved.html

State Water Quality Protection Areas (SWQPAs)

- One of six types of marine managed areas
- ASBS, designated by the SWRCB*, are a subset of SWQPAs requiring special protections
- Waste discharge is prohibited
- In 2003, 1658 discharges identified statewide
- COP exception process, e.g. Bodega Marine Laboratory (2007)
- Ten ASBSs in study region, seven co-located with existing MPAs

* Refer to handout for reason why designated in 1974-75

MLPA North Central Coast Study Region

SWQPAs

MPAs (current)

Saunders Reef ASBS	
Del Mar Landing ASBS	SMP
Gerstle Cove ASBS	SMCA
Bodega ASBS	SMR
Bird Rock ASBS	
Point Reyes ASBS	SMCA
Double Point ASBS	
Duxbury Reef ASBS	SMCA
Farallon Islands ASBS	SMCA
James V. Fitzgerald ASBS	SMP

Northern
Subregions

Alder Creek to
Horseshoe Point

Horseshoe Point to
Bodega

Bodega to Double
Point



Northern Sub-regions Impaired Waters in Regional Water Board 1 Area

- Garcia River – temperature, sediment
- Gualala River – temperature, sediment
- Russian River (lower) - temperature, sediment, pH, pathogens
- Salmon Creek Park – indicator bacteria
- Bodega Harbor – exotic species
- Campbell Cove and Doran Beach - indicator bacteria
- Estero Americano Creek – nutrients and sediment

Mendocino County #2 Wastewater Plant

- Anchor Bay, small population (86)
- Only discharges during the rainy season
- Flow is approximately 0.012 million gallons per day (Feb. 2007)
- Discharge on shoreline
- History of violations from 2000-2004
- Regional board staff considers compliance good since 2005

Russian River Watershed

- Santa Rosa and other neighboring communities
- Laguna treatment plant serves 202,000 people
 - 21.3 million gallons per day in dry weather
 - Limited to 5% of Russian River flow during wet weather
- Phase I Municipal Storm Water Discharges

Bodega Mussel Watch Stations Elevated Pollutant Levels

- Bodega Head: Cd, Cr, Cu, Ni
- Bodega Harbor: Al, Cd, Cr, PCBs
- Bodega Bay: Al, Cr, Cu, Hg, PCBs

From SWRCB Mussel Watch 1995-97 Report

Impaired Coastal Waters in Regional Water Board 2 Area

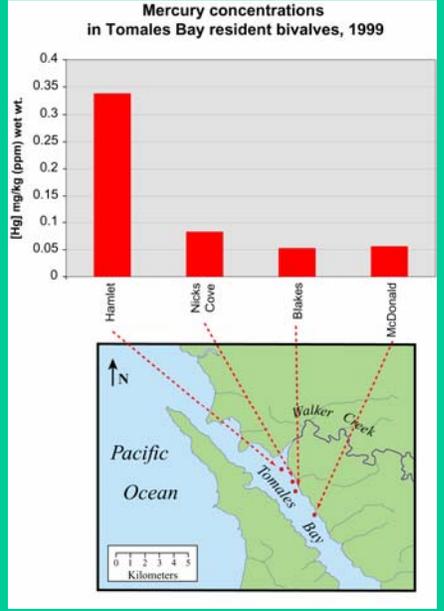
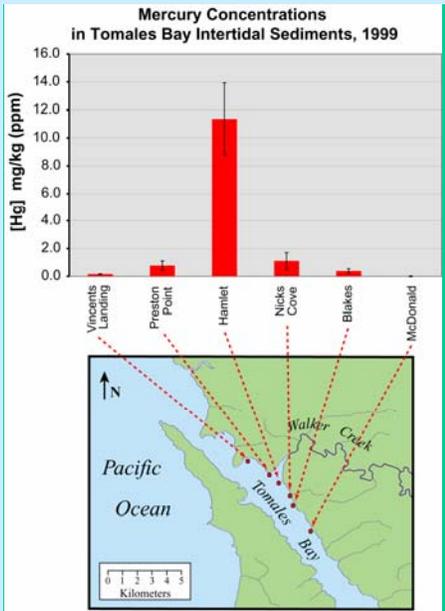
- Lagunitas Creek – nutrients, sediment
- Walker Creek – mercury, nutrients, sediment, pathogens
- Tomales Bay - mercury, nutrients, sediment, pathogens
- Bolinas Beach - indicator bacteria
- Muir Beach - indicator bacteria

Tomales Bay Area Mussel Watch Elevated Pollutant Levels

- Tomales Bay: Al, Cr, Mn
- Walker Creek: Hg
- Lagunitas Creek: Hg

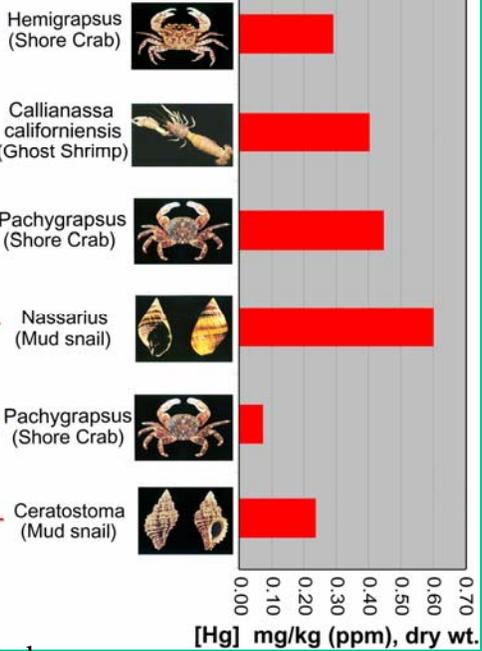
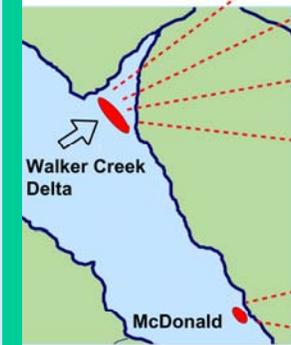
From SWRCB Mussel Watch 1995-97 Report

Hg concentrations in resident bivalves follow trends in sediment concentrations



Courtesy SF Bay Regional Board

Mercury concentrations are lower in invertebrates collected south of the Walker Creek Delta



Courtesy SF Bay Regional Board

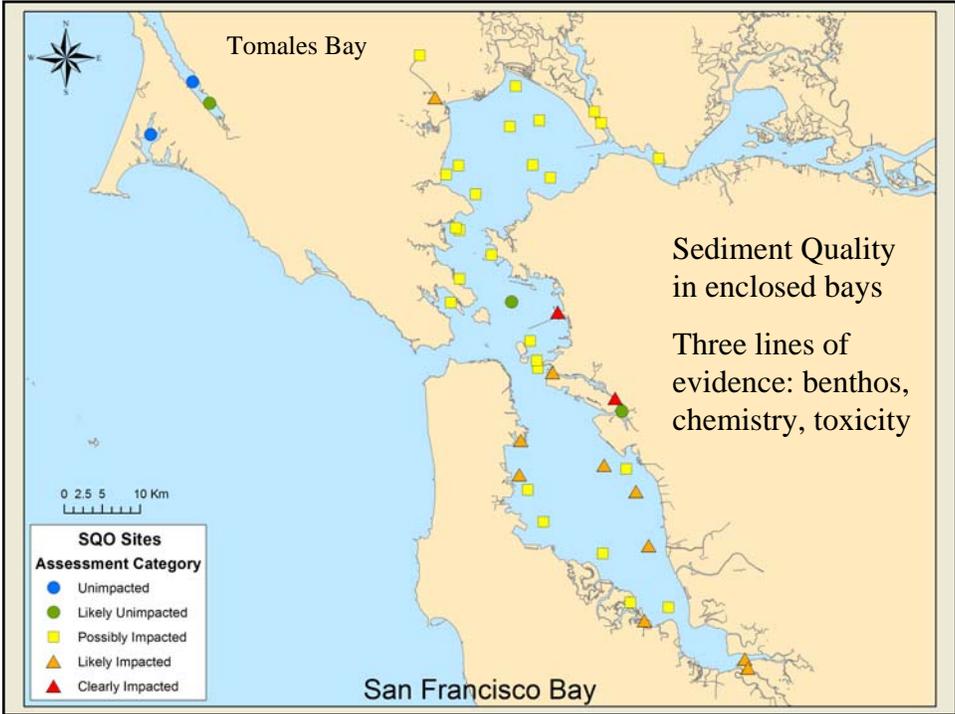
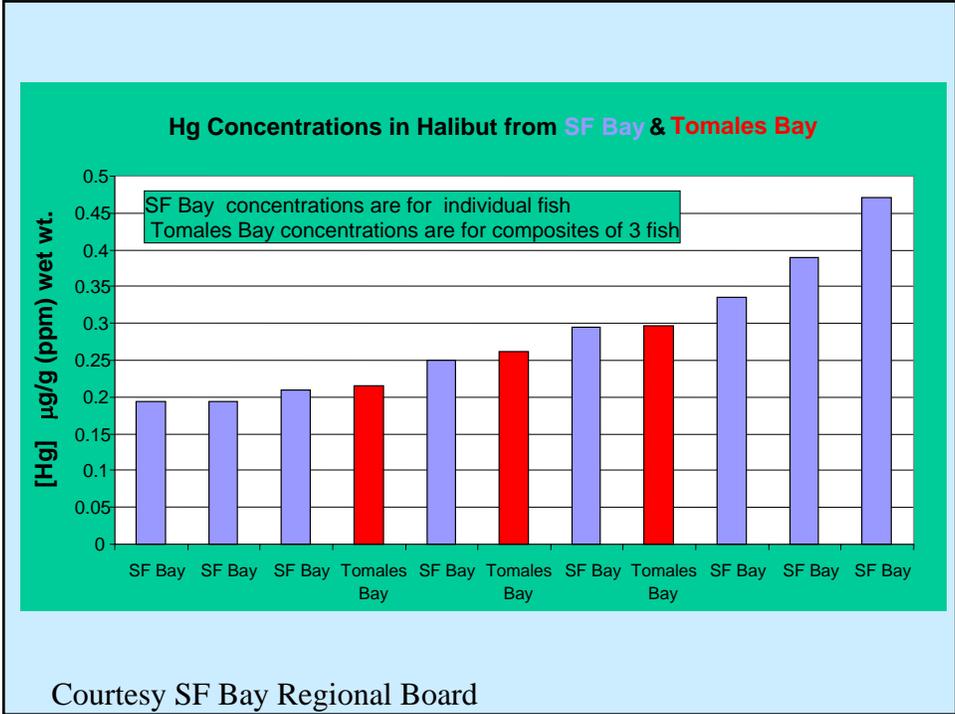
Impaired Coastal Waters in Regional Water Board 2 Area (continued)

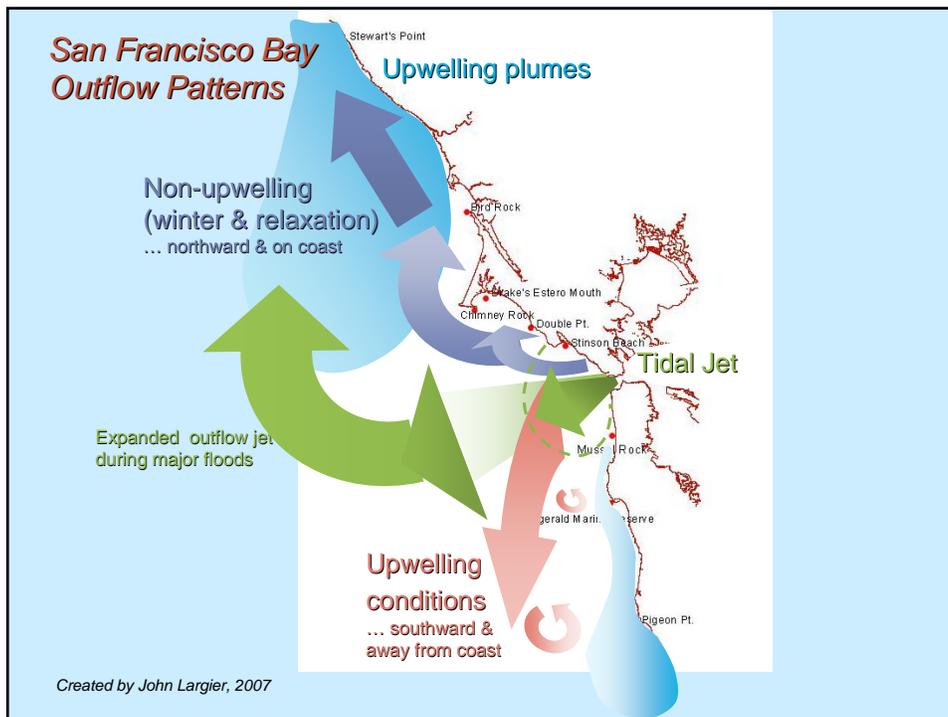
- San Francisco Bay and tributaries – numerous listings
- Beaches for indicator bacteria:
Baker, Pacifica/Linda Mar, Fitzgerald Marine Reserve, Pillar Point, Rockaway, Venice
- San Pedro Creek - bacteria
- San Vicente Creek - bacteria
- Pillar Point – mercury
- San Gregorio Creek – sediment, bacteria
- Pescadero Creek - sediment

Gulf of the Farallones

- Oil spills a constant danger
- Radioactivity – dump site south of SE Farallon
- Sanctuary prohibits sewage discharges
- Success story at SE Farallon Island – human waste discharge (to the ASBS) eliminated!
- San Francisco Bay outflows up to 52.6 million acre feet per year (1998)*
 - numerous waste sources in San Francisco Bay
 - oil spills within the bay
 - drains entire San Joaquin and Sacramento watersheds

*21.7 MAF in 2000 and 9.5 MAF in 2001





San Francisco Southwest Ocean Outfall

- Outfall is 3.75 miles from mainland, in the Sanctuary “donut hole”
- Combined sewer overflow system
- Secondary treatment:
 - Dry weather flows average 18 million gallons per day
 - Wet weather flows up to 43 million gallons per day
- Primary treatment – wet weather 43-175 million gallons per day
- Flows in excess of 175 million gallons per day discharged to shoreline

San Francisco Southwest Ocean Outfall

- Extensive monitoring program – bacteria, chemistry, benthic and fish communities, bioaccumulation
- Reference envelope approach
- Sediment elevated (ERLs) for As, Cr, Cd, Hg, Ni, PCB, DDT, at reference and outfall stations
- PAH elevated in sediment (sporadically) at reference and outfall stations
- Elevated pollutants in tissue: As, PCBs and PAHs – likely Bay influence
 - English Sole
 - Dungeness Crab

North San Mateo Wastewater Treatment Plant

- Daly City and Colma areas, population 120,000
- Secondary treatment
 - Dry weather flow limits 8 million gallons per day
 - Wet weather flow limits 25 million gallons per day
- Near-shore outfall
 - 2500 feet from shore
 - depth 32 feet

Sewer Authority Mid-Coastside Treatment Plant

- Halfmoon Bay, Montara, Granada, population 20,500
- Secondary Treatment
 - Dry weather flows average 4 million gallons per day
 - Wet weather flows up to 15 million gallons per day
- Nearshore outfall
 - 1900 ft from shore
 - 37' depth

Southern Sea Otters and Pollution

- Confirmed mortalities for pathogens, including *Toxoplasma gondii*
 - from cat feces
 - applicability of human health indicator bacteria
- Confirmed mortalities for microcystin
 - From blue-green algae blooms in watersheds, due to eutrophic conditions
- High body burdens of chemical pollution

So far sea otter pollution issues are limited to central coast sources. However, if there is a significant northern extension of the range these issues should be considered.