

Application of Sediment Quality Objectives in TMDLs

State Water Board – Division of Water Quality

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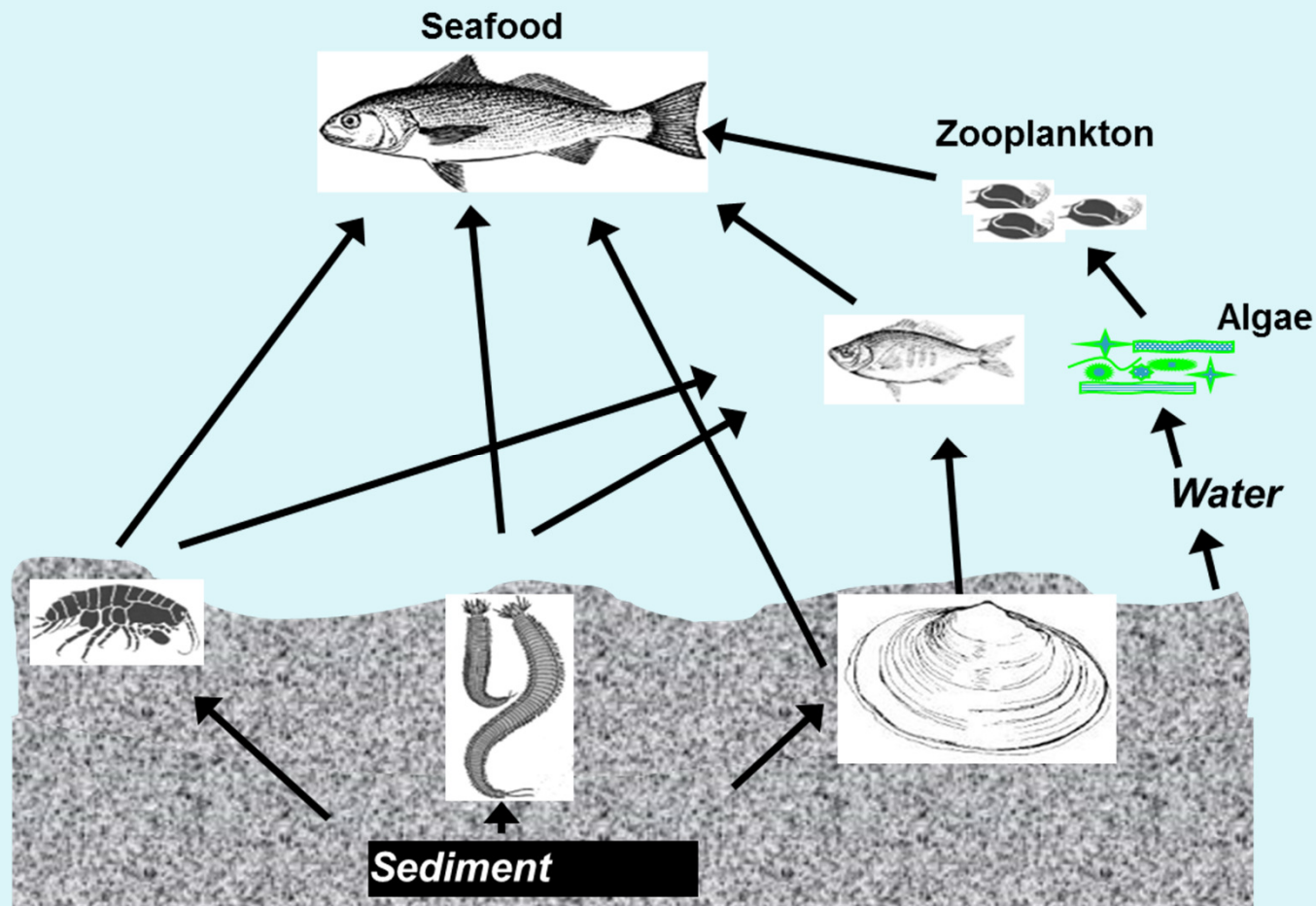
Overview

- Sediment Quality Objectives
 - Direct effects assessment to assess contaminant impacts to benthic communities
 - Indirect effects assessment to assess risk from contaminants in sediments to human consumers of fish

Sediment Quality Objectives and TMDL Compliance

- Sediment Quality Objectives are important for assessing TMDL compliance
 - The relevant water quality standard to assess impacts related to contaminated sediments
 - Stronger scientific basis than concentration-based sediment quality guidelines
 - Uses multiple indicators for greater accuracy and reliability

Conceptual Model for Exposure to Contaminants in Sediment



Overview of Sediment Quality Objectives

- Are similar to water quality objectives
 - Numeric or narrative
 - Required by California Water Code
- Used to differentiate bedded sediments that support beneficial uses from those that do not
- Multiple sediment quality objectives needed because of different exposure types and receptors
 - Direct exposure to benthic organisms
 - Indirect exposure to human consumers of sport fish
 - Each requires unique assessment and suite of indicators
- SQOs apply only to enclosed bays and estuaries

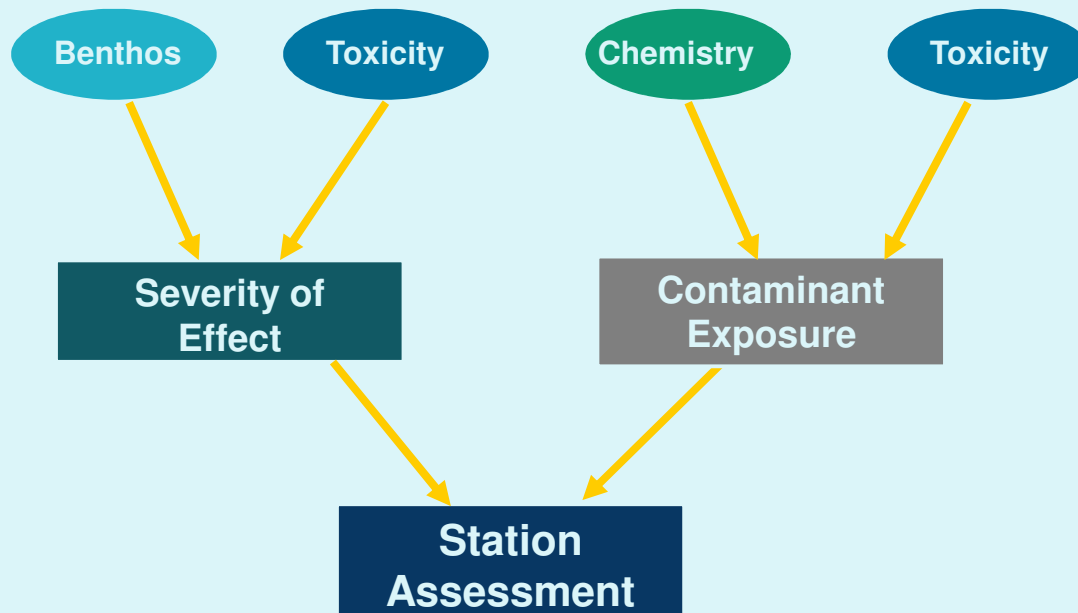
SQOs Applied in this TMDL

- Benthic Communities – direct effects
 - *Pollutants in sediments shall not be present in quantities that, alone or in combination, are toxic to benthic communities in bays and estuaries of California.*
- Human Health – indirect effects
 - *Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health*
- Different assessment framework required for each

SQO Assessment Framework

- Direct Effects

- Three lines of evidence (LOE) required to assess contamination effects
 - Multiple indicators measured for each line of evidence
 - Benthic community effects given more weight
 - Toxicity is a measure of both chemical exposure and effects



SQO Assessment Framework

- Direct Effects

- Results for all lines of evidence are compared to determine the level of chemical contaminations impact
- Principal outcomes by station:
 - Unimpacted – Chemical contamination is not causing adverse impacts to benthic community.
 - Impacted – Chemical contamination is causing adverse impacts to benthic community
- Subcategories have been developed to better describe condition

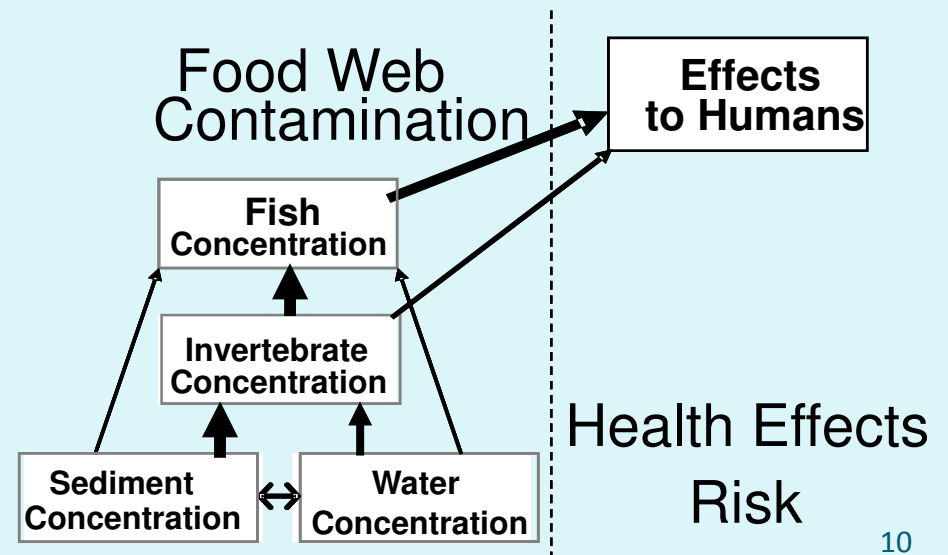
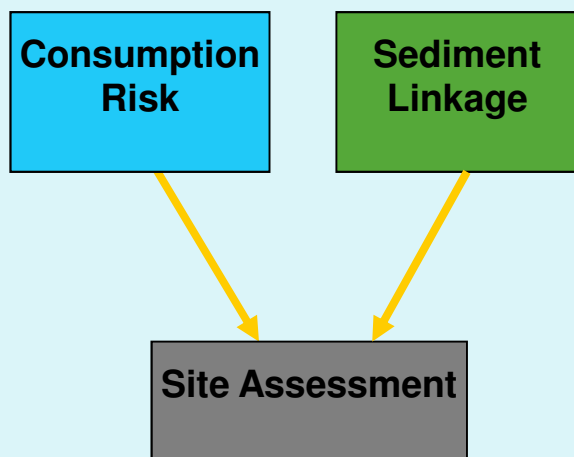
Direct Effects Station Assessment

- Outcome of direct effects framework is that each station is categorized
 - Unimpacted
 - Likely Unimpacted
 - Possibly Impacted
 - Likely Impacted
 - Clearly Impacted

SQO Assessment Framework

- Indirect Effects (draft)

- Conceptual framework based on two key assessment questions:
 - Seafood consumption risk: Do pollutant concentrations in seafood (fish and shellfish) pose unacceptable health risks to human consumers?
 - Sediment Linkage: Does sediment contamination at the site have a substantial influence on seafood contamination?
- Performed on a site rather than on station



SQO Assessment Framework - Indirect Effects (draft)

- Multiple tiers
 - Data requirements and complexity relate to situation
 - Reduced effort/cost for sites of low concern



Tier 1: Screening
Low Data Requirements
Conservative Assumptions



Tier 2: Site Assessment
More Data Required
Site Specific Conditions



Tier 3: Refined Assessment
More Complex Situations
Evaluate Management Options

SQO Assessment Framework

- Indirect Effects (draft)

- Results for each indicator are compared to determine the level of chemical contamination impact
- Principal outcomes by site:
 - Unimpacted – Chemical contamination of sediment is not causing unacceptable health risk due to seafood consumption
 - Impacted – Chemical contamination of sediment is causing unacceptable health risk due to seafood consumption
- Subcategories have been developed to better describe condition

Indirect Effects Site Assessment (draft)

- Outcome of indirect effects framework is that each site is categorized
 - Unimpacted
 - Likely Unimpacted
 - Possibly Impacted
 - Likely Impacted
 - Clearly Impacted

SQOs for TMDL Compliance

- A better option to evaluate TMDL compliance
 - Stronger connection to beneficial uses
 - Benthic community health and sediment bioassays
 - Health risk for seafood consumers
 - Uses site-specific monitoring and multiple indicators to improve accuracy
 - Provides flexibility for different sites (unique area and site conditions)

Email Subscriptions (waterboards.ca.gov)

The screenshot shows the homepage of the California Water Boards website. At the top left, there is a header for the Office of Governor Edmund G. Brown Jr. with a "Visit his Website" button. Below that is the Board Chair Felicia Marcus with a "Visit the Water Board Members Page" button. The main navigation menu on the left includes links to Cal/EPA, State and Regional Water Boards' Map, Board Priorities, Laws/Regulations, Plans/Policies, Programs, and Decisions Pending and Opportunities for Public Participation. There is also a "CONNECT WITH US" section with a Twitter icon and buttons for "Agendas English/Español", "My Water Quality", and "Performance Report". A "RESOURCES" section highlights "Email Subscriptions" in a red box, along with links for Data & Databases, Business Help, Public Records Center, Grants & Loans, and Fees. The main content area features a large banner with the text "California Water Boards Protecting California's Water" and a list of 15 topics: Agriculture, Bay-Delta / Delta Watermaster, Clean Beaches & Ocean Standards, Drinking Water, Drought Year Info, Enforcement, Financial Assistance, Groundwater, Operator Certification, Permit / Licensing, Petitions, Septic Systems (OWTS), Storage Tanks, Storm Water, Strategic Plan, Water Quality Assessment, Water Rights, and More... Below this is an "Emergency Water Conservation Regulations Portal" link. The "ANNOUNCEMENTS" section lists several recent news items with dates, such as "Urban Water Conservation Improves in April Ahead of June 25 Percent Conservation Mandate (06/02/15)". At the bottom, there is an "IMPORTANT INFORMATION..." section with a "SHOW CAROUSEL" button and a row of six thumbnail images for "Regional Water Quality Control Boards'", "Water Boards' Data Maps", "DROUGHT INFORMATION", "Save Our Waters", "Aborre Nuestra Agua", "Oil & Gas Monitoring", and "Water Boards' Delta Watermaster".

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- Beach Water Quality Workgroup - Northern California
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- Biological Objectives

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