

# Sediment Quality Objectives for Enclosed Bays and Estuaries and Implementation

USEPA Standards Academy

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# Presentation

- Sediment Quality Objectives
- Conceptual Approach
- Contents of the Water Quality Control Plan for Enclosed Bays and Estuaries Part 1 Sediment Quality
- Implementation
  - Dredging
  - NPDES Permits
  - 303(d) Listing
  - Stressor Identification
- Outreach/Phases/Information and Contacts

# Sediment Quality Objectives

- A Standard for Sediment Quality...*that is a means to differentiate sediment impacted by bioavailable toxic pollutants from those that are not*
- Legally no different than a Water Quality Objective
- But.....very difficult to develop
  - There are no state wide sediment quality objectives in the Country
- Applicable to enclosed bays and estuaries only
  - Not applicable to ocean waters
  - Not applicable to inland surface waters

# Conceptual Approach

- No single tool can reliably predict whether pollutants in sediment may pose a risk or not
- Applying multiple tools can reliably predict sediment quality
  - *Multiple Lines of Evidence Approach or Sediment Quality Triad.*
  - Rarely applied within a regulatory framework. Typically applied using best professional judgment

# Conceptual Approach

- Two principal modes of contaminant exposure and effects
  - Direct exposure through sediment contact and ingestion
    - Aquatic life – benthic communities
  - Indirect exposure through feeding on contaminated organisms
    - Human health
    - Wildlife risk
- Each mode requires a separate assessment method
- Focus has been on assessing effects from direct exposure
  - Assessment methods are better developed
  - Large amount of California data available for validation

# Contents of Part 1 Sediment Quality

## I. Intent and Summary

A. Intent of Part 1 of the Water Quality Control Plan for Enclosed Bays and Estuaries (Part 1)

B. Summary of Part 1

## II. Use and Applicability of SQOs

A. Ambient Sediment Quality

B. Relationship to other narrative objectives

C. Applicable Waters

D. Applicable Sediments

E. Applicable Discharges

## III. Beneficial Uses

## IV. Sediment Quality Objectives - Narratives

A. Aquatic Life – Benthic Community Protection

B. Human Health

# Contents Continued

## V. BENTHIC COMMUNITY PROTECTION

- A. MLOE Approach to Interpret the Narrative Objective
- B. Limitations
- C. Water Bodies
- D. Field Procedures
- E. Laboratory Testing
- F. Sediment Toxicity
- G. Benthic Community Condition
- H. Sediment Chemistry
- I. Interpretation and Integration of MLOE
- J. MLOE Approach to Interpret the Narrative Objective in Other Bays and Estuaries

## VI. HUMAN HEALTH

# Contents Continued

## VII. PROGRAM OF IMPLEMENTATION

- A. Dredge Materials
- B. NPDES Receiving Water and Effluent Limits
- C. Exceedance of Receiving Water Limit
- D. Receiving Water Limits Monitoring Frequency
- E. Sediment Monitoring
- F. Stressor Identification
- G. Development of Site-Specific Management Guidelines

## VIII. GLOSSARY

# SQOs and Interpretation

## Narrative SQOs

- 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\*
- Pollutants shall not be present in sediments at levels that will bioaccumulate in aquatic life to levels that are harmful to human health

# SQOs and Interpretation

To protect benthic communities the plan describes:

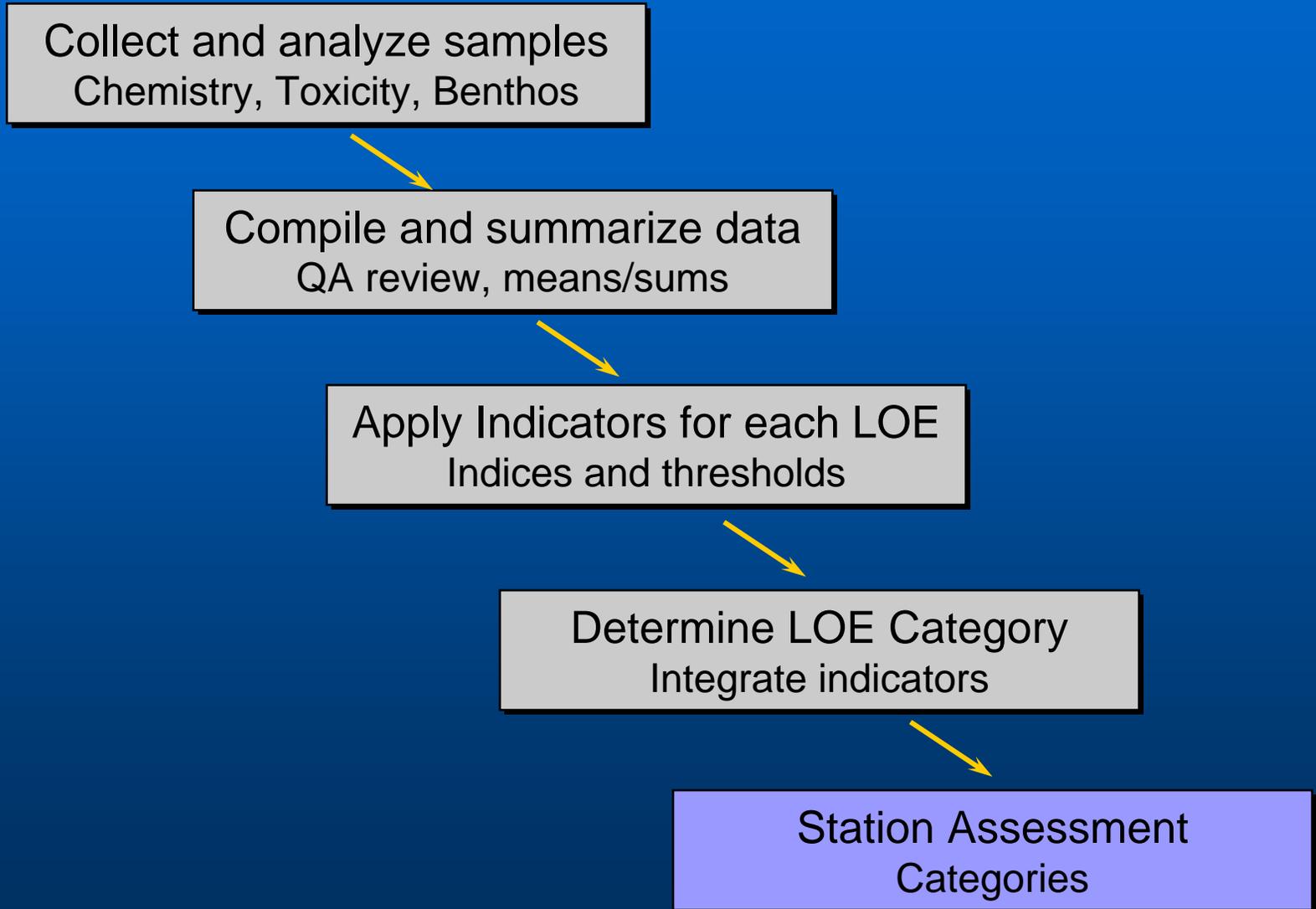
- MLOE Approach
  - Sediment Toxicity
  - Sediment Chemistry
  - Benthic Community Analysis
- Approach to integrate the MLOE into a station level assessment
- Appendix C Example Problem in Staff Report

# SQOs and Interpretation

## Three Levels of Assessment:

- Individual LOE
  - Merging multiple indicators to characterize sediment chemistry, toxicity, and benthic community condition
- Sampling station level
  - Merging MLOE to determine attainment of SQO at a site
- Water body scale
  - Merging multiple sampling stations to identify impairment

# SQOs and Interpretation



# SQOs and Interpretation

LOE CATEGORY COMBINATION	SEDIMENT CHEMISTRY EXPOSURE	BENTHIC COMMUNITY CONDITION	SEDIMENT TOXICITY	STATION ASSESSMENT
1	Minimal	Reference	Nontoxic	Unimpacted
14	Minimal	High	Low	Inconclusive
29	Low	High	Nontoxic	Likely Unimpacted
38	Moderate	Low	Low	Possibly Impacted
58	High	Moderate	Low	Likely Impacted
59	High	Moderate	Moderate	Clearly Impacted

# SQOs and Interpretation

## Station Assessment categories

- Unimpacted U
- Likely Unimpacted LU

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- Possibly Impacted PI
- Likely Impacted LI
- Clearly Impacted CI
- Inconclusive

# Implementation

# Dredging

- Do not apply to dredge materials characterization
  - CWA 404 EPA/USACE Suitability Determination
  - CWA 401 Regional Boards Water Quality Certification consider act and impacts associated with action
- For sediments that failed the SQO in the past, must take precautions (See CWC Section 13396).....
  - Removed in a manner that prevents or minimizes water quality degradation.
  - Not deposited in a location that may cause significant adverse effects to aquatic life wildlife or harm beneficial uses or does not create maximum benefit to the people of the State.
  - The activity will not cause significant adverse impacts upon a federal sanctuary, recreational area, or other waters of significant national importance.

# Traditional NPDES Permits

- Encourage Regional Monitoring
- Specifies minimum monitoring frequency
- Use only as Receiving Water Limits
  - Cannot translate the MLOE into reliable measures of effluent
- Exceedence of Receiving Water Limits
  - Total number of stations and number of stations assessed as PI, LI or CI would be applied to binomial statistic
  - If sediment quality fails the binomial statistic initiate SI
- Violation would only occur if Permittee is causing or contributing
- Final Step is development of biological based limits

# Stormwater Permits

- Much like the previous slide, encourage regional monitoring
- Not required to monitor sediments in the vicinity of every discharge

# 303(d) Listings

- 303(d) Listing Policy Factors
  - Sediment toxicity only
  - Benthic community degradation
  - Sediment toxicity and associated SQG exceedence
  - Benthic community degradation and associated SQG exceedence
- SQO related listing would require that the MLOE be applied
  - Total number of stations and the number of stations assessed as PI, LI or CI would be applied to binomial statistic
  - If sediment quality fails the binomial statistic a listing would occur
  - As before initiate SI
- Will be amending the sediment quality related portions of the 303(d) Listing policy

# Stressor Identification

- Important Component of Plan
  - Listings based upon SQG exceedance coupled with biological effect
  - Does not equate to cause
- Complex, not always successful
- Only focus on those pollutants causing toxicity or benthic community degradation
  - Why spend the limited time and resources on pollutants that are not bioavailable or contributing to cause?

# Site-Specific Management Guidelines

- Plan incorporates Resolution 92-49 for the development of sediment cleanup actions
- Establish relationship between concentration of stressors and biological effect or endpoint.
- Use the site specific data to develop targets
- Would be used to guide the development more stringent point source controls and cleanup targets
- However final cleanup levels may take into account other factors not discussed in plan
  - Other receptors may drive cleanup (birds, fish, marine mammals)
  - Feasibility
  - Risk associated with remedial action and overall benefit within waterbody

# Groups Committees Outreach

- State Water Board: Chris Beegan and Dominic Gregorio DWQ, Sheila Vassey OCC,
- Technical Team: Steve Bay Principal Scientist SCCWRP/SFEI/Granite Canyon and others
- Scientific Steering Committee: Peter Landrum, Todd Bridges, Robert Burgess, Tom Gries, Bruce Hope and Jim Shine
  - Next Meeting July 1 and 2 at SCCWRP (Costa Mesa)
- SQO Advisory Committee: stakeholder interested parties, regulators
- SQO Agency Coordination Committee: Regional Boards, DFG, OEHHA, DTSC, EPA, USF&W

# Phased Approach to SQO Development

- Phase I: 2003-2008 Focused on direct effects to benthic communities in enclosed bays
- Phase II: 2008-2010 Focused on direct effects to benthic communities in estuaries and indirect effects to human health from consumption of fish tissue within enclosed bays and estuaries
- Phase III: Develop SQOs and framework that would protect fish and/or wildlife. Preliminary planning underway currently unfunded.

# More Information

- Web page
  - [www.swrcb.ca.gov/water\\_issues/programs/bptcp/sediment.shtml](http://www.swrcb.ca.gov/water_issues/programs/bptcp/sediment.shtml)
- Final Documents
  - [www.swrcb.ca.gov/board\\_decisions/adopted\\_orders/resolutions/res08.shtml](http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/res08.shtml)
  - Resolution 2008-0014
- Technical Tools
  - <http://www.sccwrp.org/sqo/index.html>
- Email Subscriptions
  - From web page at [www.swrcb.ca.gov/](http://www.swrcb.ca.gov/)
  - Resources (lower left column) click email subscriptions, then select sediment quality
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