Assessment of Indirect Effects

January 23, 2006

This document provides a description of the key elements involved in assessing sediment for indirect effects as part of the SQO program.

> **Narrative Objective:** *Pollutants in sediments shall not bioaccumulate in shellfish or fish tissue at a level that poses an unacceptable risk to human or wildlife health. To implement this narrative objective, multiple lines of evidence must be applied as described in Section XXX of the policy. The term unacceptable risk would be defined specifically for this policy.*

Process: To determine if the narrative objective is met, three key questions must be addressed using the sequential approach described below. The process is applied separately to evaluate impacts to humans or to wildlife.

I. Are fish and/or shellfish a risk to consumers?

Available Information:

- 303(d) Listing
- OEHHA Advisory
- Local Data

Evaluate data quality and need for greater information:

- Appropriate species
- Sampling strategy
- Reporting limits

Evaluate fish and shellfish tissue LOE at waterbody scale. Compare mean tissue concentrations to low and high thresholds.

Possible Outcome

1. ***Risk to consumers low.*** *Sediment meets narrative objective. No additional action required*
2. ***Risk to consumers moderate or high***. *Sediment may not meet the narrative objective. Additional work is required, must evaluate next LOE*

II. Are the pollutants in the sediment entering the food web?

Evaluate the bioaccumulation potential

- Laboratory bioaccumulation tests
- Field invertebrate tissue data

Evaluate the bioaccumulation potential LOE at waterbody scale.

Possible Outcome

1. ***Waterbody sediments are unlikely source of pollutants observed in local fish/shelfish tissue.*** *Sediment meets narrative objective. No additional action required*
2. ***Waterbody sediments may be a source of pollutants observed in local fish/shelfish tissue.*** *Sediment may not meet the narrative objective. Additional work is required, must evaluate next LOE*

III. Are the pollutants in sediments causing or contributing to tissue contamination observed in local fish/shelfish?

Evaluate sediment concentrations relative to tissue concentrations using either of two modeling approaches

- Empirical model; Tissue Thresholds/BAF = sediment threshold; where BAF = ([fish]/[sed.])
- Mechanistic model; Gobas Model.

Evaluate sediment LOE at the station scale. Compare sediment concentrations to low and high thresholds.

Possible Outcomes

1. ***Pollutants in waterbody sediments are unlikely to be causing or contributing to contamination observed in local fish and shellfish tissue.*** *Sediment meets narrative objective. No additional action required*
2. ***Pollutants in waterbody sediments are likely to be causing or contributing to contamination observed in local fish and shellfish tissue.*** *Sediment does not meet the narrative objective.*