

# Dec 2, 2009 Sediment Workgroup Freshwater Standards

- Interest in promulgation for both biological and chemical standards.
- Would like to explore other endpoints, wildlife (bioaccumulation).
- Need to analyze the “hit” versus “no hit” decisions.
- Need to work through reference area failures, comparison to controls decisions.
- Standards should apply to the entire rule, not limited to cleanup standards.

# Revisions to Sediment Management Standards Human Health and Background

## Discussion of options

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MTCA/SMS Advisory Group  
December 18, 2009

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# For Today...

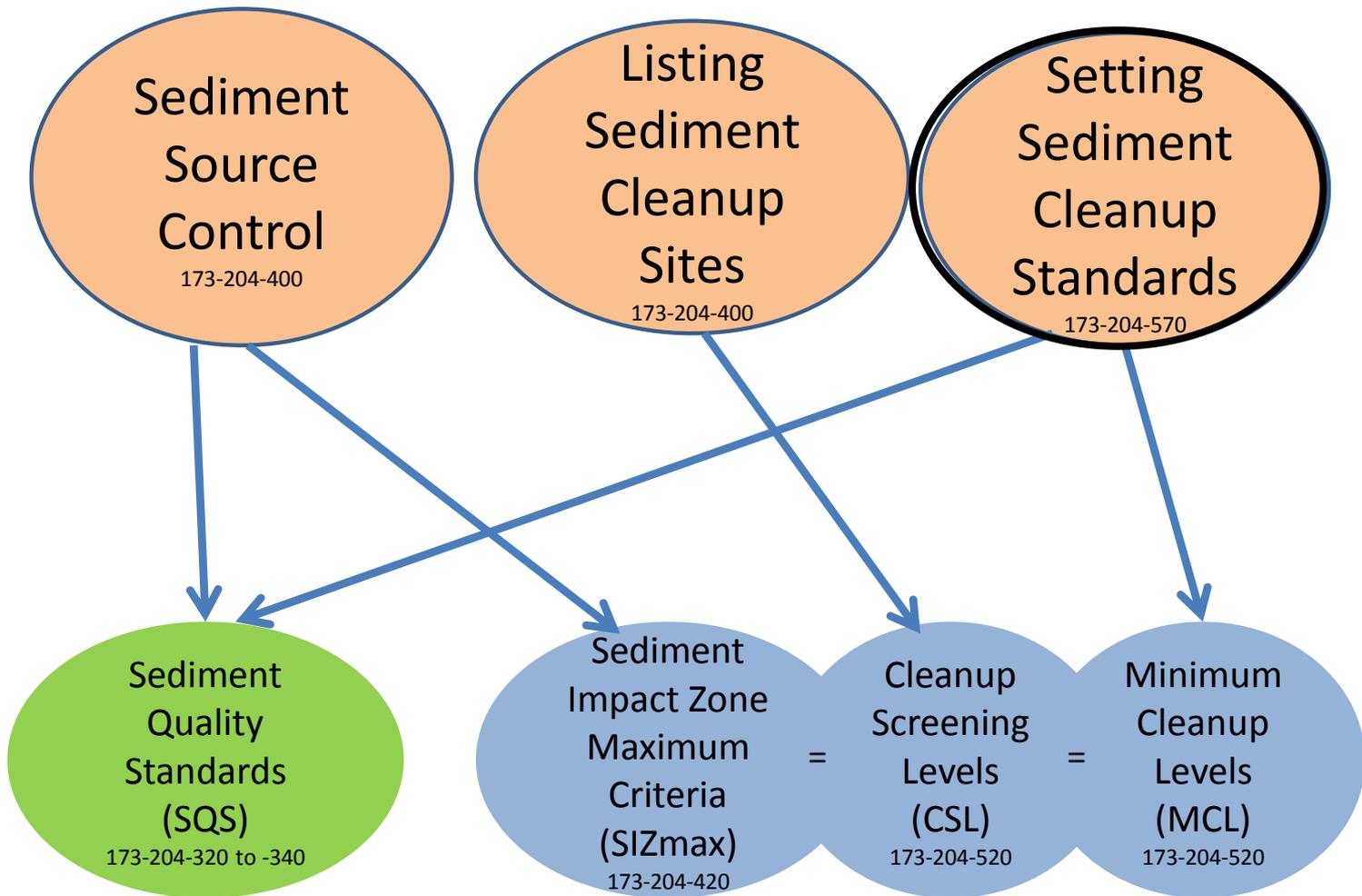
- Context and Problem statement
- Differences between SMS and MTCA
- Ecology's internal deliberative process
- Options description
- Discussion

# Objectives for Presentation/Discussion

- Explain Ecology thinking and details of identified options.
- We're not finished. We need your technical, scientific, regulatory and policy expertise.
- Identify fatal flaws.
- Identify areas for further work.
- Other options we haven't considered.

# Short Description of Sediment Management Standards Structure

Three  
SMS  
Purposes



Two  
levels of  
criteria

In the Sediment Management Standards, two different levels of criteria are used for three different purposes.

# Human Health & Background

## Two intertwined issues

- What rule revisions are needed to provide clear and predictable sediment cleanup standards that protect *human health* at contaminated sediment sites?
- How are contaminant *background* concentrations considered in setting sediment cleanup standards?

# Differences between SMS and MTCA

- SMS: Cost and feasibility in setting cleanup standards.
- SMS: Human health narrative “no significant human health threats”.
- MTCA: Natural contaminant background consideration for setting cleanup standards.
- SMS & MTCA: Cost considered when analyzing alternatives.

# Current framework for a single contaminant

## MTCA

MTCA has a single cleanup level, but land-use restrictions or compliance points allow some flexibility.

Remediation Level or  
Area Background  
*Interim Action*

Method C Cleanup Level

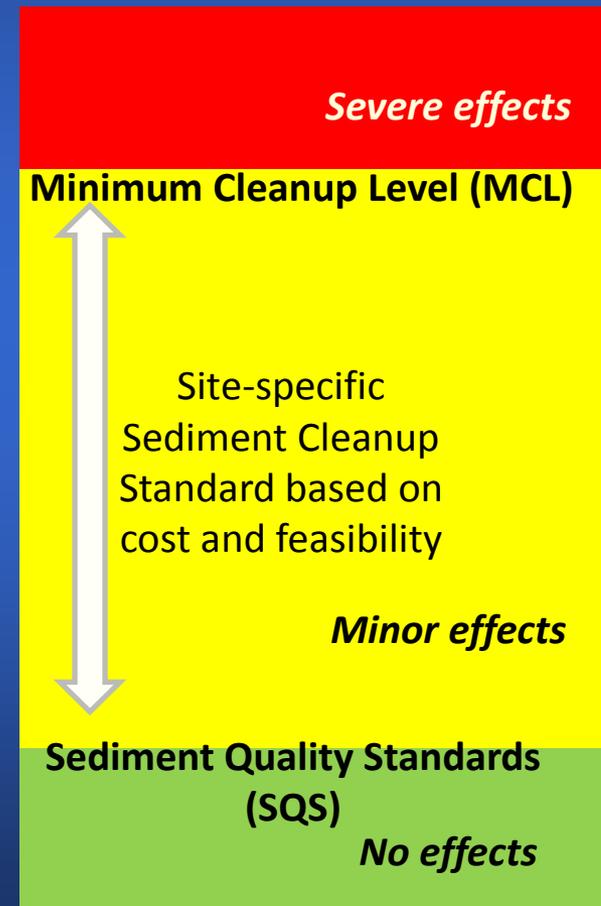
Method A or B  
Cleanup Level

*Highest of:*

- 1) *Human health risk of  $10^{-6}$  and Hazard Quotient =1*
- 2) *Natural Background*
- 3) *Practical Quantitation Limit*

## SMS

SMS uses a range for **benthic toxicity**. A site-specific cleanup standard is determined, allowing some minor effects.



# Background Concentrations

## What To Keep In Mind

- Acceptable risk concentrations for some contaminants are below background levels.
- Background (natural or regional) is contamination that is widespread and not feasible to remediate.
- Sediment background is more difficult to determine than soil background.
- SMS and MTCA are different in how they handle background.

# Ecology's internal deliberative process

- Define issue
- Workgroup considered many options – brought 5 options forward for further discussion.
- Narrowed down to two options in order to focus the discussion.
  
- Participants in discussion:
  - Ecology workgroup (8 people)
  - Sediment & Upland Site Managers
  - Toxics Cleanup Program Managers

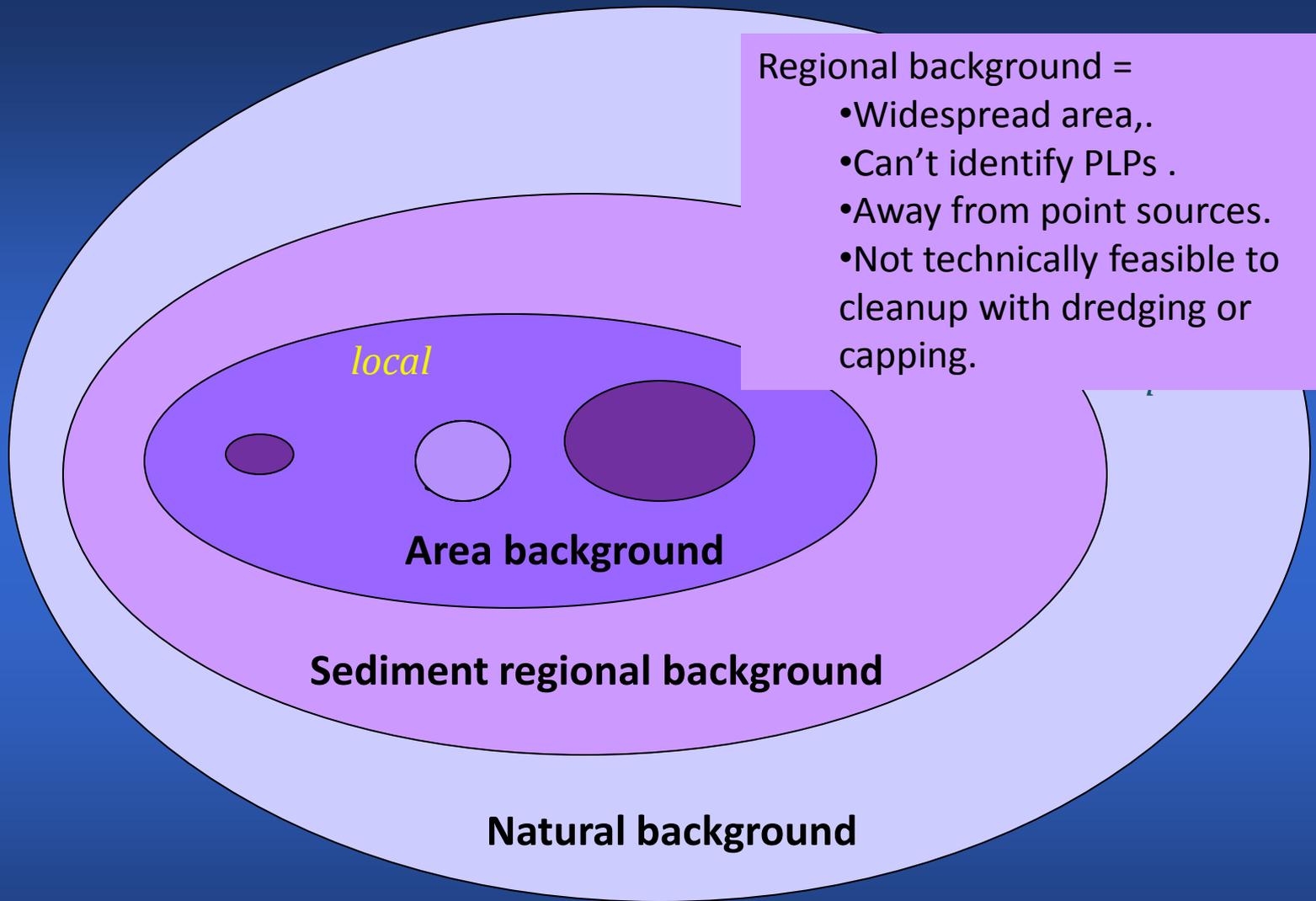
# Proposed Approach

- Figure out how to determine human health protection and incorporate background to set cleanup levels at sediment cleanup sites.
- Some parts will be guidance, links to references.
- Some parts rule revision.
  - Decision making framework
  - Level of protection
  - Background definition

# Level of Protection Possibilities (?)

- MTCA Risk Levels and Hazard Quotient
- USEPA Risk Levels
- Reasonable Maximum Exposure
- PQL
- Nonanthropogenic background
- **Natural background\***
- Regional background
- **Area background\***
- Habitat stratified
- AKART background

\* Currently defined in MTCA



Regional background =

- Widespread area,.
- Can't identify PLPs .
- Away from point sources.
- Not technically feasible to cleanup with dredging or capping.

**Nonanthropogenic background**

# 5 Options

Highest of:  
•  $1 \times 10^{-6}$  Risk  
• Natural Bkgd  
• PQL

**Regional Bkgd**

Highest of:  
•  $1 \times 10^{-6}$  Risk  
• Natural Bkgd  
• PQL

**80 % of Regional Bkgd**

Highest of:  
•  $1 \times 10^{-6}$  Risk  
• Natural Bkgd  
• PQL

**Highest of:  
•  $1 \times 10^{-5}$  Risk  
• Regional Bkgd**

Highest of:  
•  $1 \times 10^{-6}$  Risk  
• Natural Bkgd  
• PQL

**Area Bkgd**

Highest of:  
•  $1 \times 10^{-6}$  Risk  
• Natural Bkgd  
• PQL



# Option 1 - MTCA Rule Approach

- Cleanup Standard is the highest of:
  - Human health risk-based concentration of  $10^{-6}$  (single carcinogen) and Hazard Quotient = 1
  - Natural background
  - Practical Quantitation Limit
- Includes alternative MTCA Method C

# Option 1: includes alternative $\approx$ MTCA Method C\*

Can go up to  $1 \times 10^{-5}$  risk level for single carcinogen if:

- Still at or below area background.
- If greater overall threat to achieve lower level.
- Not technically possible to meet cleanup standard.

\* WAC 173-340-706 (1)(a) applies to surface water, ground water and air.

# Cleanup Standards Decision Making – Option 1

**MTCA**

Soil  
Water

Remediation Level or  
Area Background

*Interim Action*

Method C Cleanup Level

Method A or B  
Cleanup Level

*Human health risk of  $10^{-6}$   
and Hazard Quotient =1,  
or Natural Background  
or Practical Quantitation Limit*

Sediment  
Human Health

Method C Cleanup Level

**Human Health Cleanup Standard**

Highest of:

- $1 \times 10^{-6}$  Risk
- Natural Background
- Practical Quantitation Limit

**SMS**

Sediment  
Benthic toxicity

**Cleanup Screening Level (CSL)**

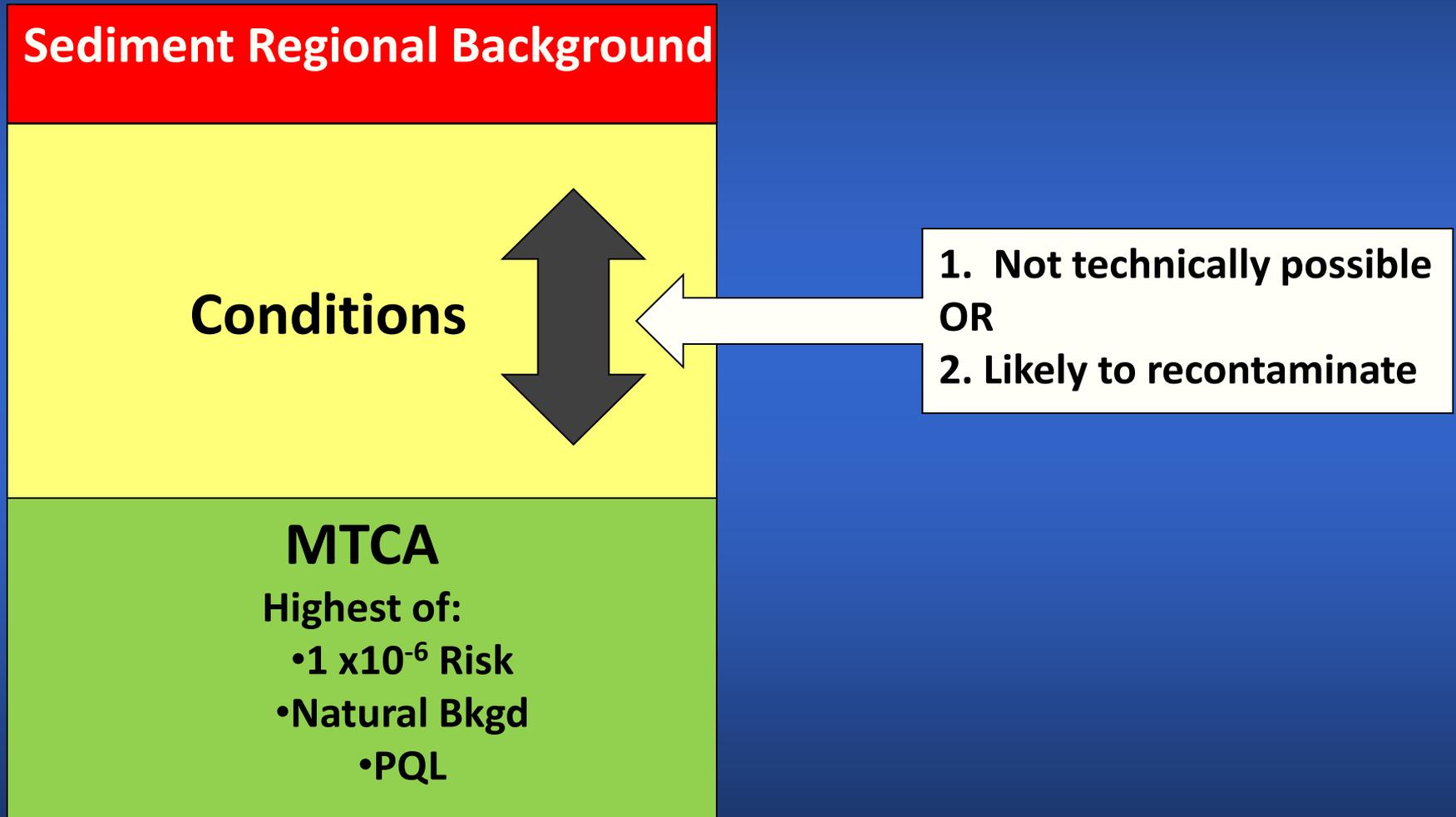
**Cost and feasibility**

*Minor effects*

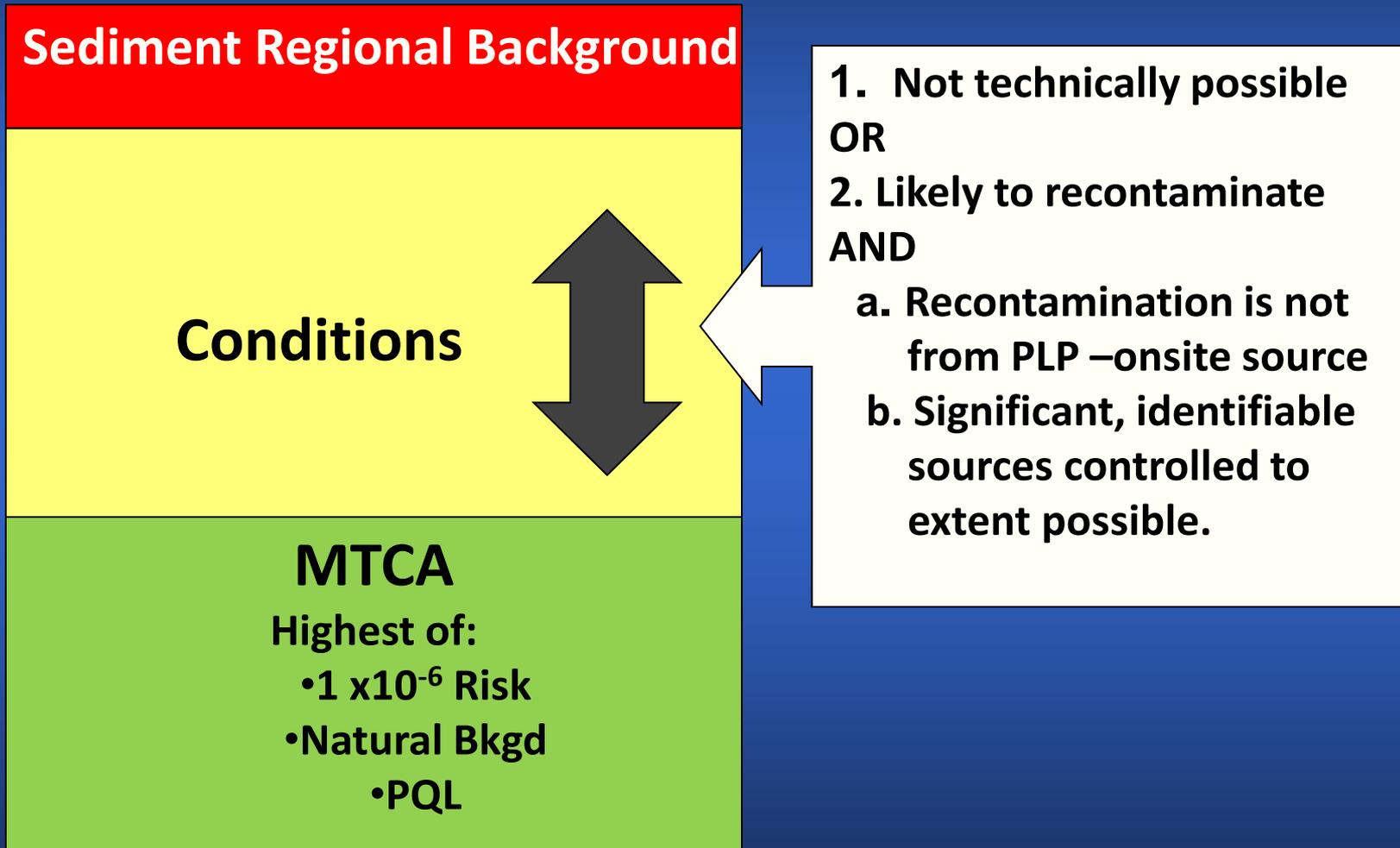
**Sediment Quality Standards (SQS)**

*No effects*

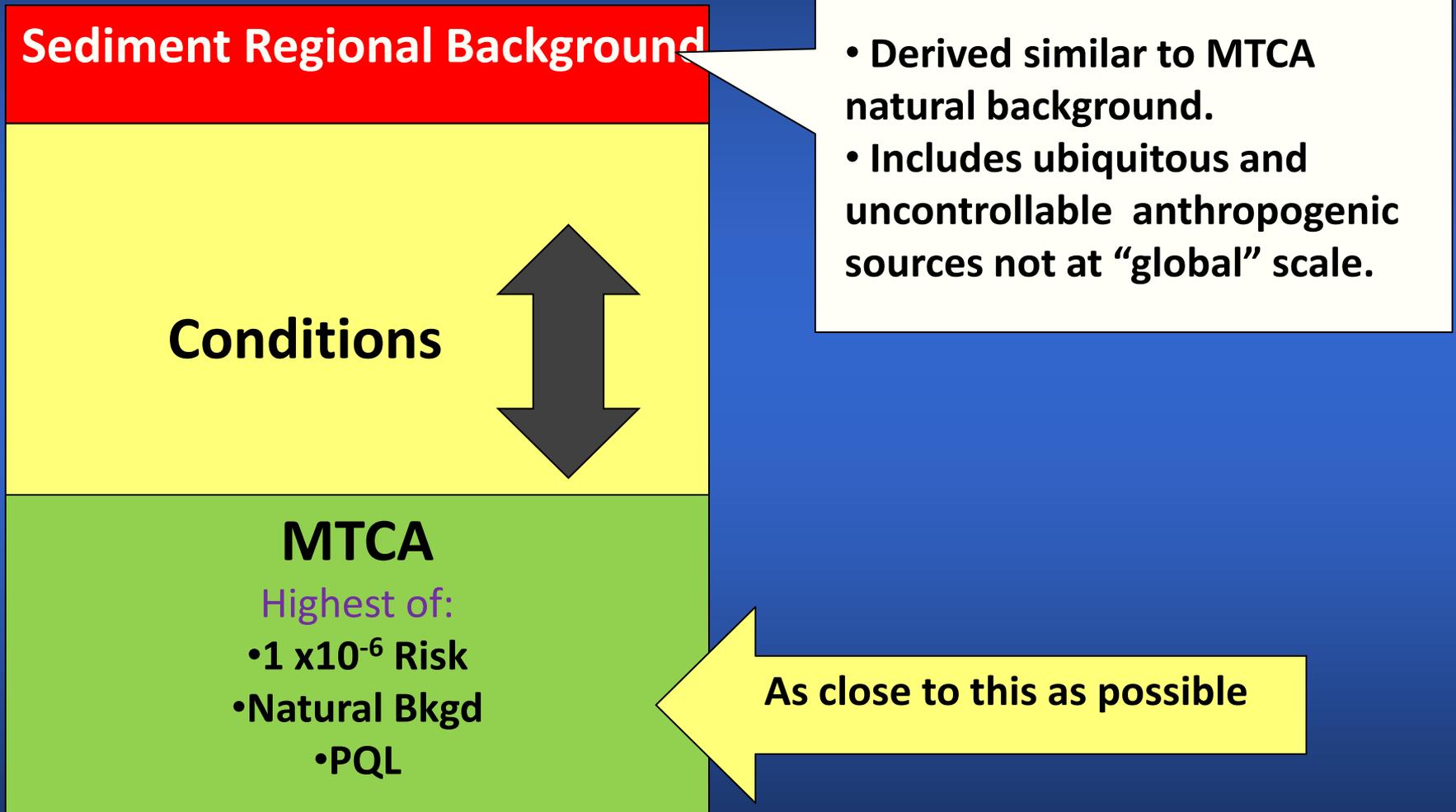
# Option 2 - Conditional Range



# Option 2 - Conditional Range



# Option 2 - Conditional Range



# Sediment Regional Background

- *Definition = Hydrodynamically defined area based on mechanisms of contribution and distribution of persistent, ubiquitous and uncontrollable contaminants.*
- Location – allow some urban bay data, away from point sources and hotspots.
- Statistical comparison of background and site datasets.
- Not applicable in all areas or for all chemicals.

# Cleanup Standards Decision Making – Option 2

## MTCA

Soil  
Water

Remediation Level or  
Area Background

*Interim Action*

Method C Cleanup Level

Method A or B  
Cleanup Level

*Human health risk of  $10^{-6}$   
and Hazard Quotient =1,  
or Natural Background  
or Practical Quantitation Limit*

Sediment  
Human Health

**Sediment  
Regional  
Background**



**Technical  
possibility &  
Recontamination**

**Highest of:**  
•  $1 \times 10^{-6}$  Risk  
• Natural Bkgd  
• PQL

## SMS

Sediment  
Benthic toxicity

**Cleanup Screening Level  
(CSL)**



**Cost and  
feasibility**

*Minor effects*

**Sediment Quality  
Standards (SQS)**

*No effects*

# Framework – Simple Comparison

## Option 1

### MTCA Rule Approach

- Current MTCA framework.
- Less flexible, less complex.
- May be more protective, but less technically feasible.
- May result in fewer completed cleanups.
- Higher risk of recontamination.
- More interim actions.

## Option 2

### Conditional Range

- Similar to SMS approach.
- More flexible, more complex.
- May be less protective, but more technically feasible.
- May result in more completed cleanups reducing overall risk.
- Less risk of recontamination.
- Incentive for source control.

# Dec 2, 2009 Sediment Workgroup

## Human Health and Background

- “Natural” or “regional” background as a cleanup standard:
  - Technically infeasible
  - Recontamination
- Concern raised about any type of increase in a cleanup standard.
- Definition of background is a key issue.
- Statistical methods are important tools to explore.
- Need for predictability and timeliness in cleanups.
- Difficulty in defining “significant sources” for Option 2.
- Interest in linking source control and cleanup efforts.

**Whew!**

**Anyone not yet confused??**

# Discussion

- Identify fatal flaws.
- Identify areas for further work.
- Other options we haven't considered.
- Ideas – especially good ones!

# Potential frameworks for human health

*Single cleanup  
standard*

or

*Range*

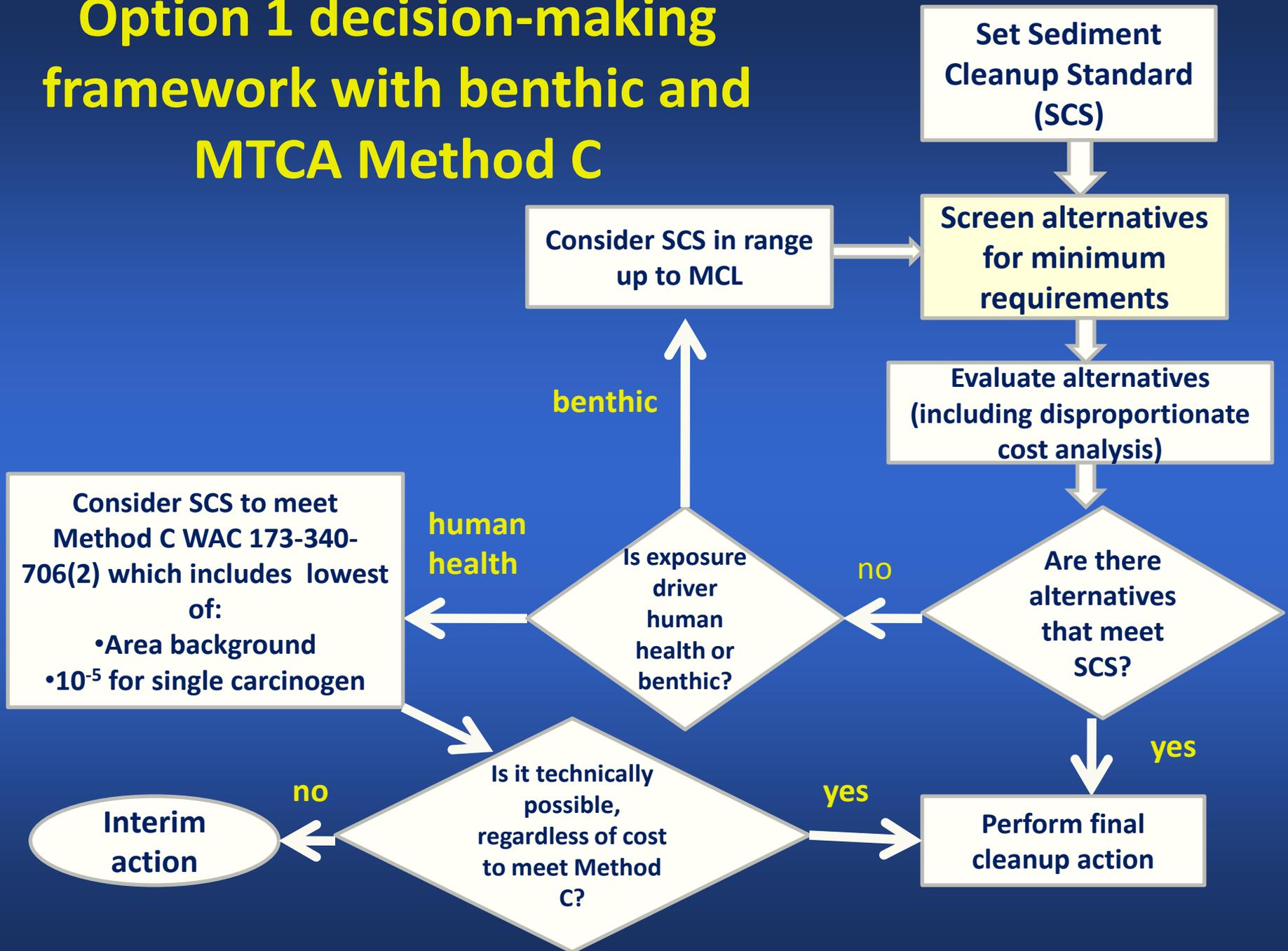
Human health  
upper level

Site-specific  
**Sediment Cleanup Standard**  
within an allowable range.

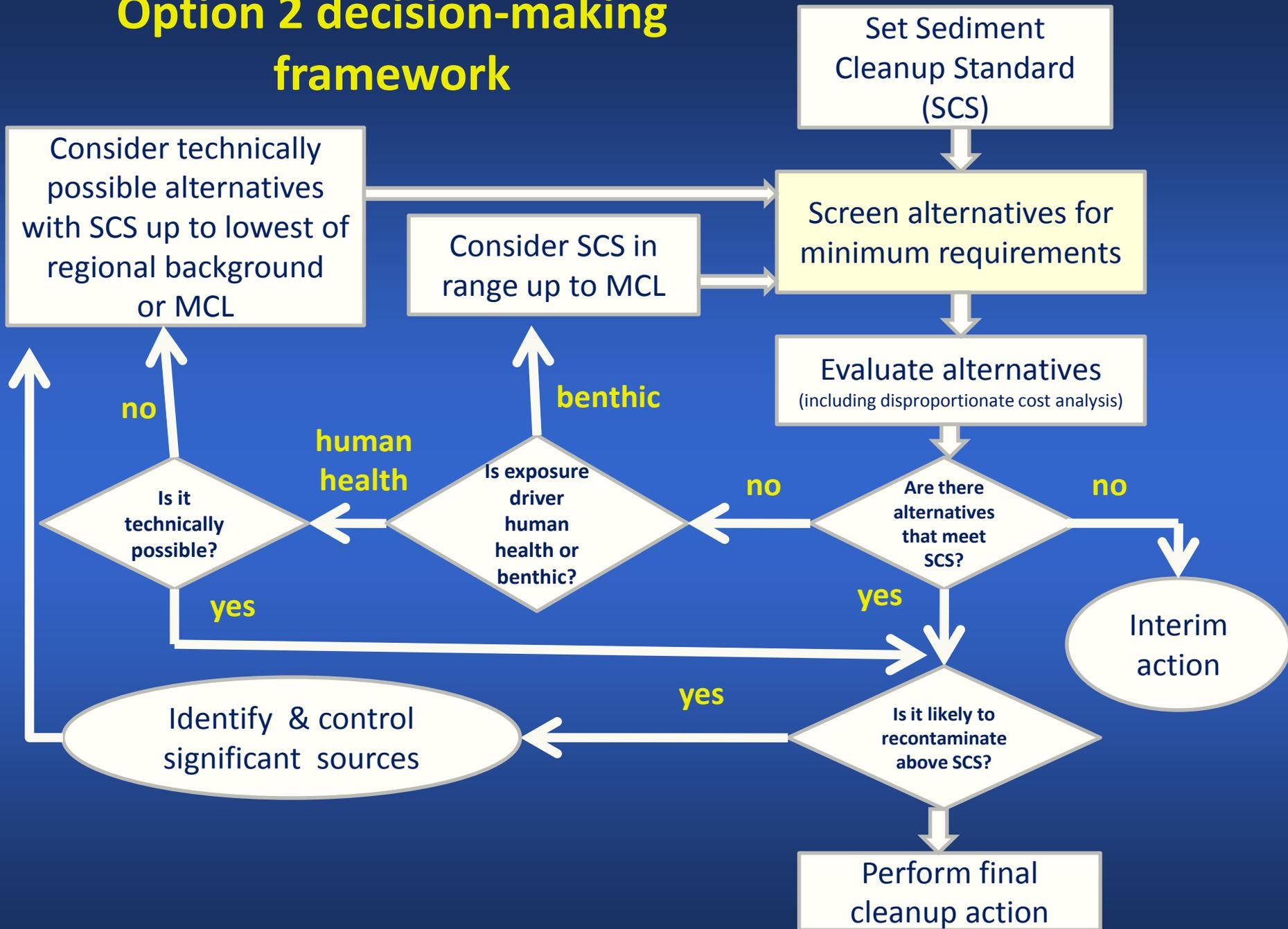
Sediment Cleanup Standard

Human health  
lower level

# Option 1 decision-making framework with benthic and MTCA Method C



# Option 2 decision-making framework



# Option 1: includes alternative $\approx$ MTCA Method C\*

Can go up to  $1 \times 10^{-5}$  risk level for single carcinogen if:

- Still at or below area background.
- If greater overall threat to achieve lower level.
- Not technically possible to meet cleanup standard.

\* WAC 173-340-706 (1)(a) applies to surface water, ground water and air.

# Option 1: MTCA Rule Approach

Lowest concentration based on  
risk level or hazard quotient  
for reasonable maximum exposure  
of most sensitive population.

$1 \times 10^{-6}$

single carcinogen  
single exposure pathway

$1 \times 10^{-5}$

all carcinogen chemicals combined  
multiple exposure pathways

Hazard quotient of 1  
single non-carcinogens  
single exposure pathways

Hazard index of 1  
multiple non-carcinogens  
multiple exposure pathways

# Option 1 – (MTCA) Advantages

- How we do it now. Consistent with MTCA approach.
- Media at site treated in same manner except benthic toxicity in sediment.
- Simplified process relative to other options.
- May be able to achieve low cleanup levels with dredging and capping.
- May result in lower cleanup standards.

# Option 1 (MTCA) Disadvantages

- Will not be technically possible to achieve at some sites, may be very expensive, may recontaminate.
- May result in many interim actions where final cleanup levels are not achieved. Reduces incentive for PLP, creates more workload for staff.
- Risk reduction is “on paper” only if cleanup is delayed, is only an interim action, or the area recontaminates. Raises false expectations with stakeholders.

# Option 2 – Conditional Range Advantages

- Flexibility and more feasible cleanup standards.
- Simplified process for some sites – more complex for sites that want higher standard.
- Won't spend money to get a site “really clean” then have recontaminated.
- Can resolve liability if PLP's have done everything technically possible to cleanup a site.
- Provides incentive to identify and control sources of recontamination.

# Option 2 – Conditional Range Disadvantages

- Cleanup standards will be higher at some sites.
- Approach not completely consistent with either MTCA or the SMS benthic toxicity.
- Complexity – more data and analysis, harder to understand.
- Cost and workload to identify and control sources of contamination.
- Complexity of some of the conditions, terms.