



# Freshwater Bioassays

(Modifications and Clarifications)

SMARM 2015

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# Background

Sediment Management Standards (SMS) standards (chemical and biological)

- Marine standards adopted in 1995
- Freshwater standards adopted in 2013

Bioassays (marine and freshwater): bioassay test results **always trump** chemistry SL comparisons

# Background

## Marine bioassays:

- Implemented in 1988 for DMMP **before** the SMS rule was adopted in 1995
- DMMP guidance is more protective than rule in some cases.

## Freshwater Bioassays:

- Developed side-by-side with the SMS rule.
- Freshwater bioassay and benthic numeric standards were promulgated as rule in February 2013; adopted **afterward** by DMMP in May 2014.
- One and two hit adopted into FW for consistency with marine guidance.

# Background (marine bioassays)

In the DMMP's marine bioassay guidance:

A “one hit” designation results in a determination that the sediments fail for in-water placement.

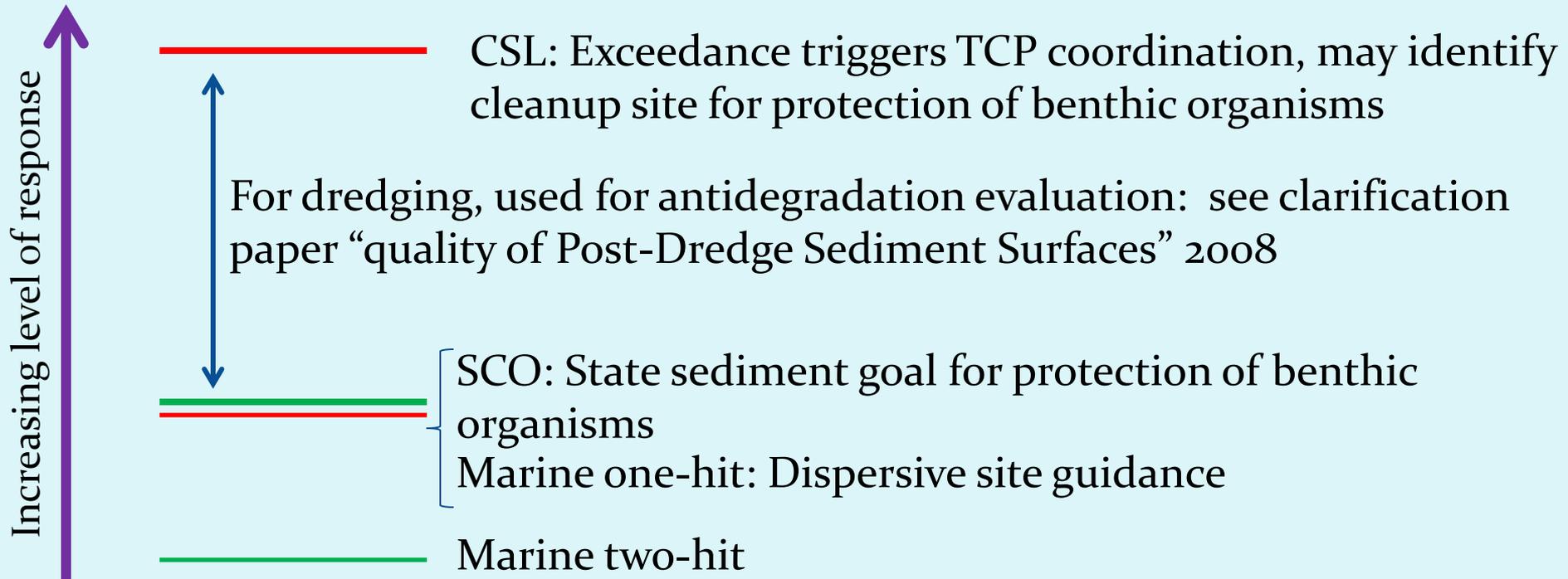
- “one hit failure” is when test sediment results do not pass the bioassay-specific one-hit guidelines relative to negative control and reference for any bioassay

Sediments meeting the lesser “two hit” impact level require a second confirmatory “hit” in order to fail for open-water disposal.

- “two hit failure” is when test sediment results do not pass the bioassay-specific two-hit guidelines relative to negative control and reference for at least two separate endpoints

# Background (marine bioassays)

## *Marine (DMMP guidance 1988; SMS 1995)*



# Background (freshwater bioassays)

In the DMMP's current freshwater bioassay guidance:

A “one hit failure” is when test sediment results do not pass the bioassay-specific one-hit guidelines (CSL/SL<sub>2</sub>) relative to negative control\* for any bioassay

A “two hit failure” is when test sediment results do not pass the bioassay-specific two-hit guidelines (SCO/SL<sub>1</sub>) relative to negative control\* for at least two separate endpoints

The 2014 adoption of the bioassays left it unclear how hits related to non-dispersive and dispersive disposal sites

\*a reference sediment, if run, would be substituted for the control

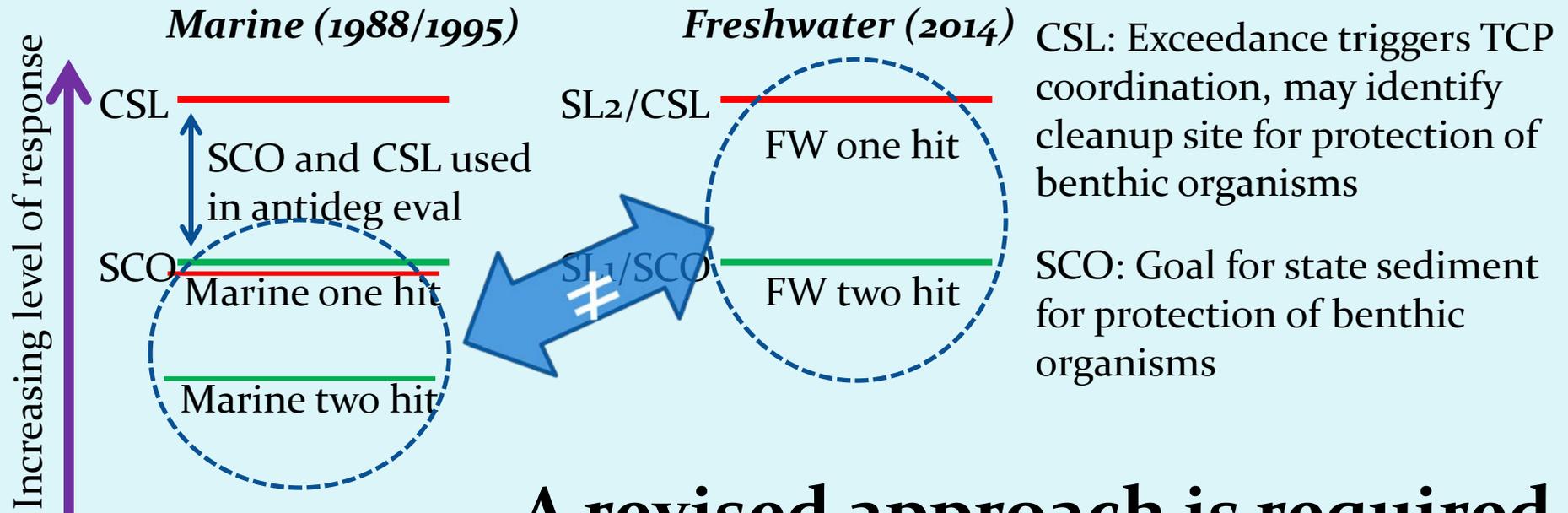
# Background (freshwater bioassays)

*Freshwater (SMS 2013; DMMP/RSET 2014)*

CSL=SL <sub>2</sub> (one hit)	—	CSL: Exceedance triggers TCP coordination, may be used to identify cleanup site
SCO= SL <sub>1</sub> (two hit)	—	SCO: Goal for state sediment for protection of benthic organisms

# Problem Statement

Due to different origins of the SLs, DMMP marine hit definitions are not ecologically or functionally the same as freshwater SL hit definitions



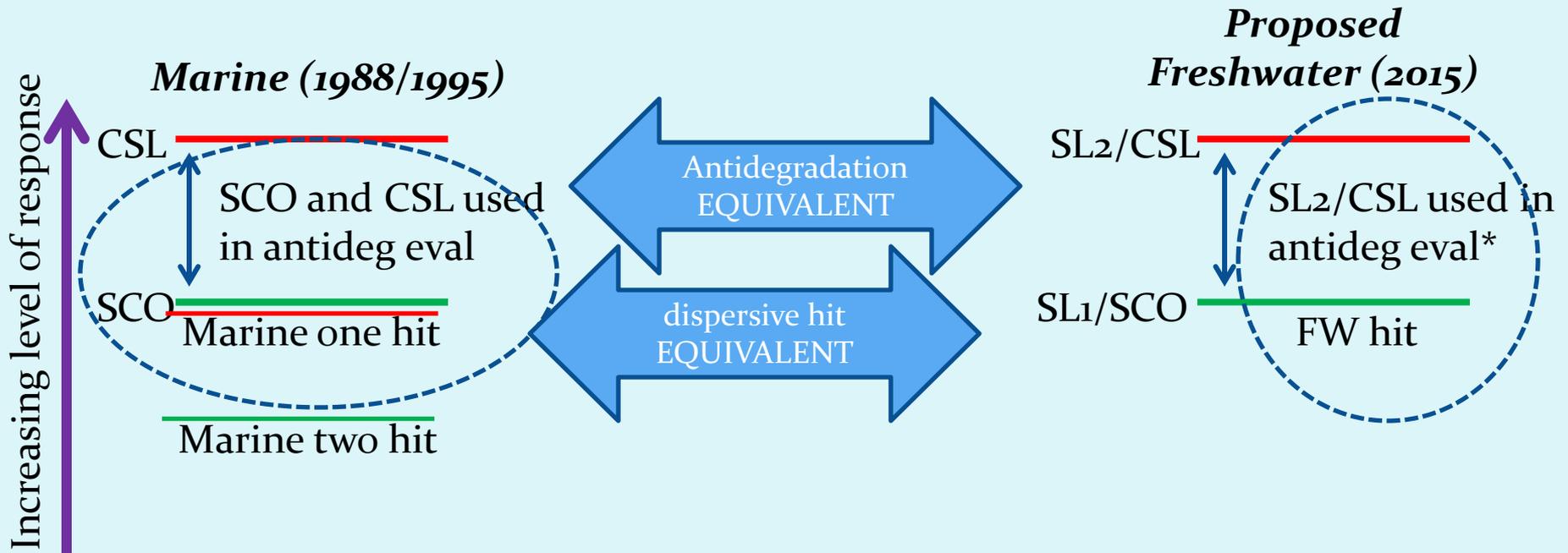
**A revised approach is required to be protective in FW systems**

CSL = cleanup screening level

SCO = sediment cleanup objective

TCP = Ecology Toxics Cleanup Program

# Proposed FW Bioassay Revision



CSL = cleanup screening level  
SCO = sediment cleanup objective

\* Freshwater virtually always dispersive. If non-dispersive were available, potentially sediments between SCO and CSL could be placed in-water in a managed disposal site

# FW Bioassay Modifications

To keep freshwater bioassay information in one place, this clarification paper includes information from the previous paper:

NO CHANGES to bioassay species and endpoints.

- 2 species
- 3 endpoints
- at least one chronic endpoint
- SL<sub>1</sub>/SL<sub>2</sub> (SCO/CSL) definitions remain the same

# FW Bioassay Modifications

CHANGES to freshwater interpretive criteria.

- For freshwater, any hit will fail material
- “one hit/two hit” will no longer apply in freshwater sediments (unless disposal site is non-dispersive).
- Previously named “one hit” will become SL<sub>2</sub>/CSL
- Previously named “two hit” will become SL<sub>1</sub>/SCO

# FW Bioassay Modifications

CLARIFICATION to freshwater interpretive criteria for comparison to control and/or reference.

When reference, control, and test sediments have similar physical characteristics, a hit occurs when:

- a test sediment response relative to the negative control and reference sediment exceeds the bioassay specific response guidelines, **AND**
- the difference from both the reference and negative control responses is statistically significant



# QUESTIONS?

And thanks to the DMMP and RSET members who helped work out the details of the proposed changes!