Effective Communication With Stakeholders Concerning Remedial Options For Sediment Sites

Steven C. Nadeau

Coordinating Director,

Sediment Management Work Group

Chair, Environmental Law Department,

Honigman Miller Schwartz and Cohn LLP

Megan C. McCulloch

Sediment Management Work Group

Honigman Miller Schwartz and Cohn LLP

6th International Conference on Remediation of Contaminated Sediments, New Orleans, Louisiana

February 9, 2011

Stakeholder Engagement

- U.S. EPA's Risk Management Principle #2: Involve the Community Early and Often
  - Obtain site information
  - Understand impact on community
  - Provide technical information to facilitate informed participation by community
- U.S. EPA's New Community Engagement Initiative
- Community Acceptance – 1 of 9 NCP Remedy Selection Criteria

Meaningful Community Participation

- Many contaminated sediment sites involve complex technical challenges
- To facilitate meaningful participation, a common understanding of the 3 major remedial options is useful
- Addressing common misperceptions upfront is critical in order to increase the chances of acceptance of the viability of a variety of solutions by stakeholders down the road

Presentation

- Title: Remedial Options for Sediment Sites – Overview of Advantages, Disadvantages and Applicability
- To educate stakeholders about the benefits and limitations of the three major remedies
- To foster realistic expectations as early as possible in the life of a contaminated sediment site
- Available to RPMs (both federal and state), and industry project managers for customization and use at their contaminated sediment sites

Content of Presentation

- For each major remedial option:
  - Remedy Description
  - Case Studies
  - Advantages
  - Limitations
  - Conditions Conducive to Conducting Each Remedy
  - FAQs
- Take Home Messages
- Links to Additional Information

Presentation Excerpt

- Portion of dredging segment of presentation
- Take home messages

Remedial Options for Sediment Sites – Overview of Advantages, Disadvantages and Applicability

Hudson River


Fox River

Contaminated Sediment Remediation

- When is a contaminated sediment remedy needed?
  - Unacceptable risks to human health or the environment
- What is the goal?
  - Implement a cost effective remedy that:
    - Achieves long-term protection
    - Minimizes short-term impacts
- http://www.epa.gov/superfund/health/conmedia/sediment/index.htm

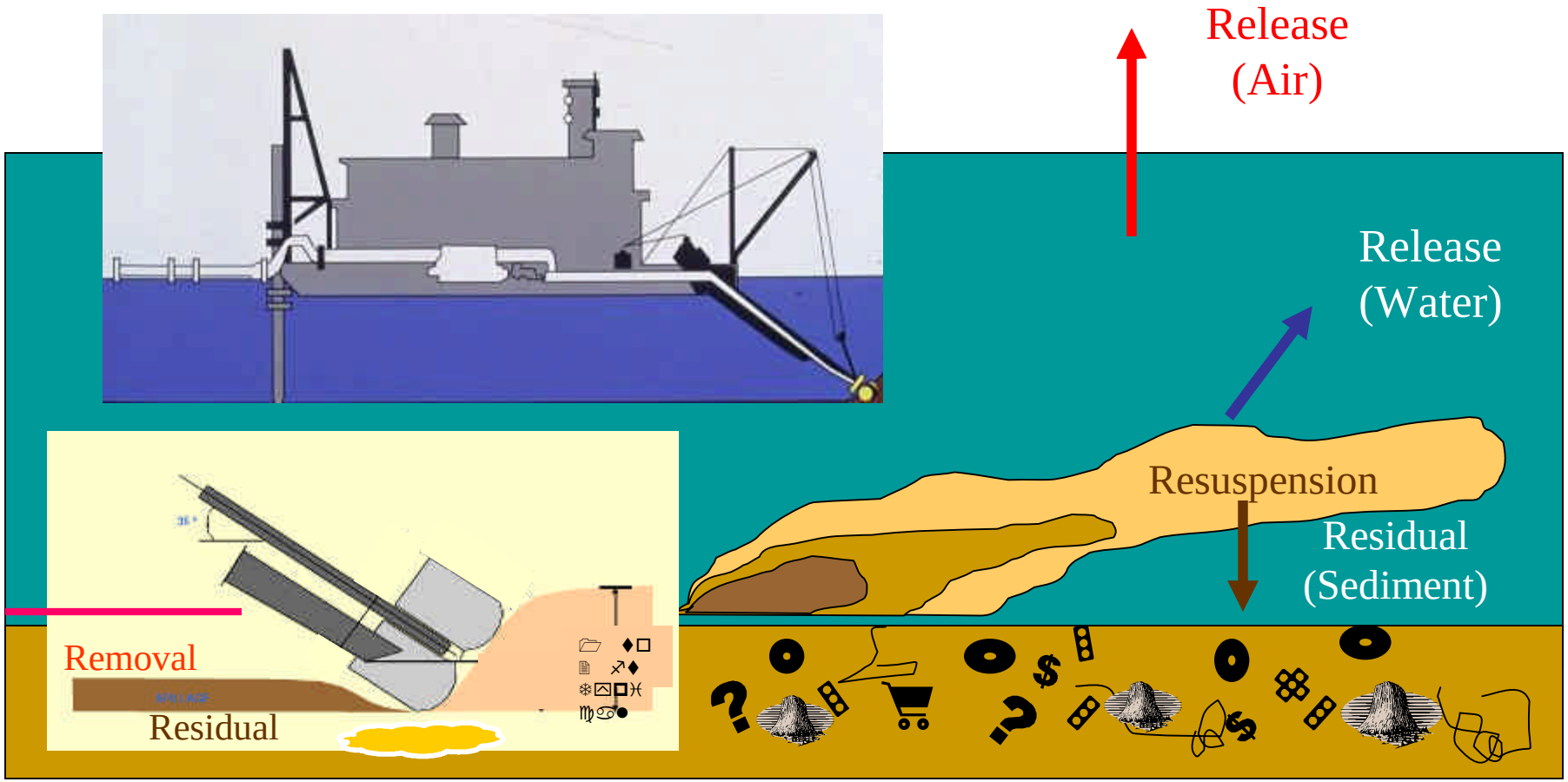
Three Major Remedies

- Dredging
- In-situ capping
- Monitored natural recovery

Dredging


Caution
Please do not approach the water's edge during dredging.
This is an active construction area.
Thank you.

Conceptual Illustration Of Environmental Dredging And Processes



From D. Reible, 2007

Head of Hylebos, WA

- Project
  - Dredged 404,000 cy from 2004 – 2006
- Contaminants
  - PCBs, PAHs, Arsenic
- Project Goals
  - PCBs: 300 ppb (0.3 ppm) PAHs: 17,000 ppb (17 ppm)
- Results
  - Average surficial PCB concentrations decreased from 0.69 ppm to 0.07 ppm
  - One area had to be capped

Note: A semi-tractor trailer 40’ long can hold ~90 cy of material.

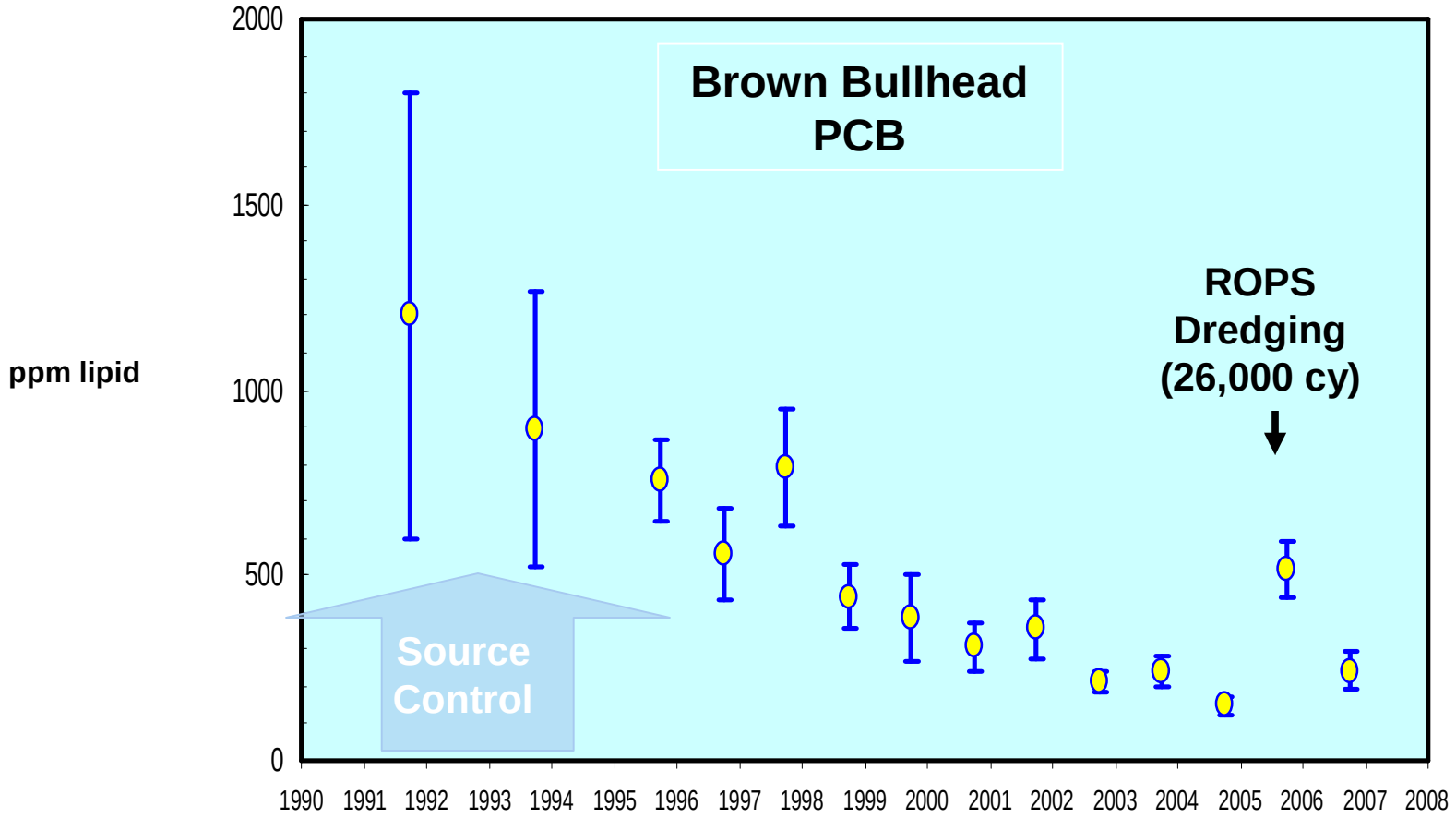
Head of Hylebos, WA

- Lessons Learned
  - Source control prior to dredging was critical
  - Soft black muck over clean sand provided clear visual differentiation between impacted and clean sediment
  - Overdredging feasible
  - Relatively little debris
  - Site conditions conducive to dredging

Case Study: Grasse River, NY – 2005 ROPS (Pilot)

- Project
  - Remedial Options Pilot Study
  - 20,600 cy dredged over 4 months
- Contaminants
  - PCBs
- Project Goals
  - Goal: Dredge 64,000 cy in 3 areas to test dredging's potential effectiveness under site-specific conditions
- Results
  - Dredged only 1/3 of desired volume
  - Average surficial concentrations increased from 4.1 ppm to 150 ppm
  - 3% of PCBs lost downstream dissolved in the water column
  - Concentrations of PCBs in fish increased

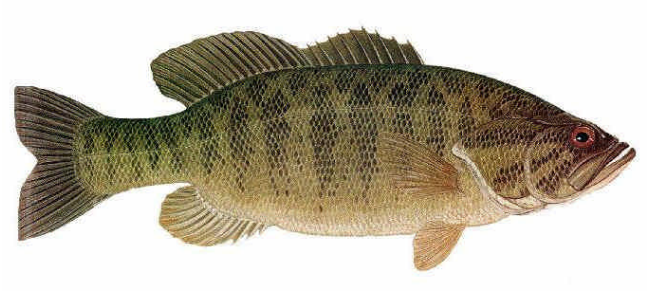
Case Study: Grasse River, NY – 2005 ROPS (Pilot)

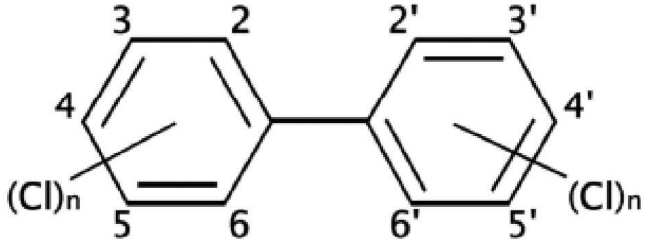


Data Source: Alcoa (2007)

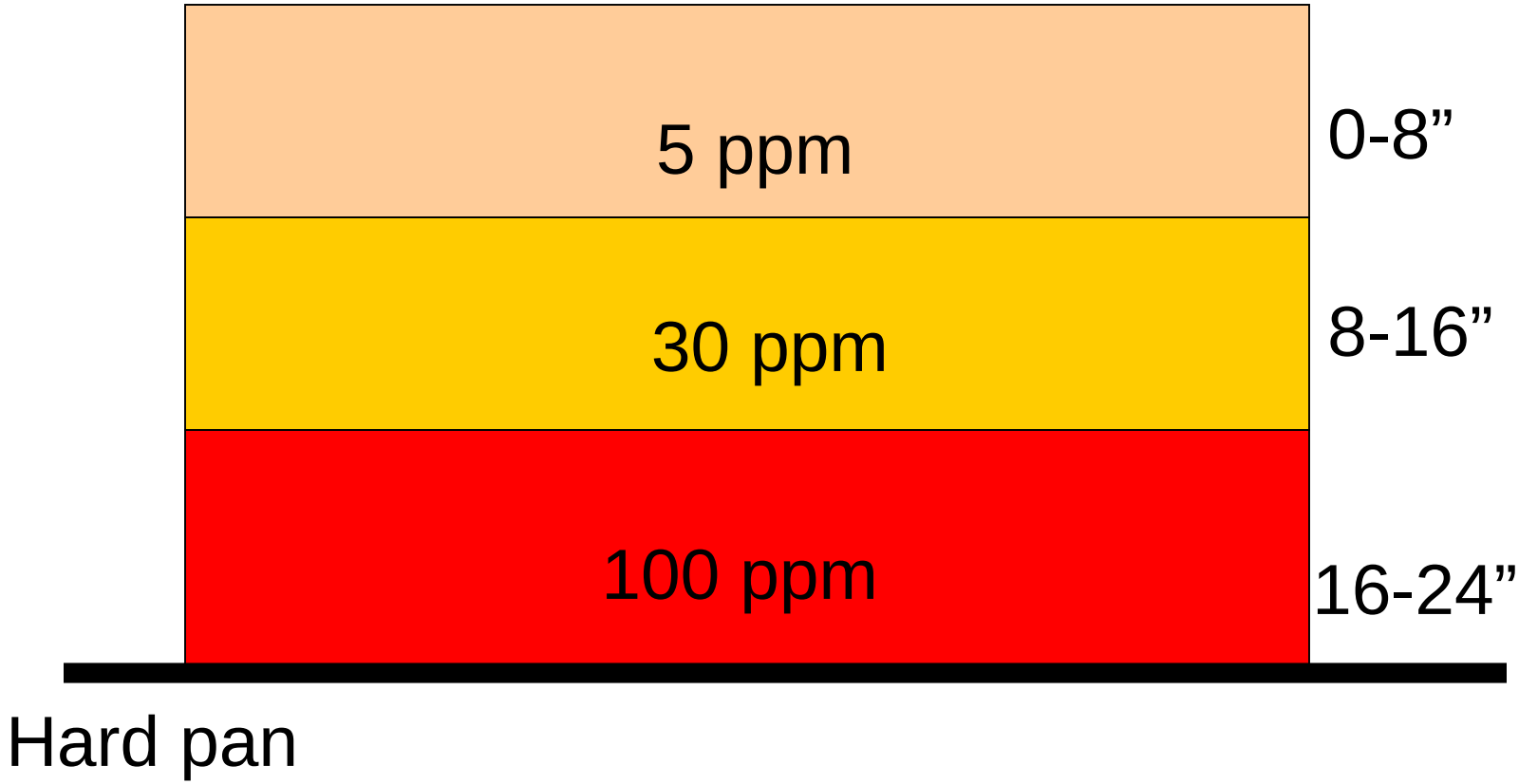
Grasse River, NY - 2005 ROPS (Pilot)

- Lessons Learned
  - Risk reduction not achieved despite significant dredging efforts
    - ~100 dredge cuts in each 25 ft x 25 ft unit
  - Complex and hard bottom conditions hampered ability to remove all targeted sediments
  - Unable to characterize site sub-bottom conditions despite state-of-the-art technology
  - Significant release of PCBs to downstream
  - PCB concentrations in fish increased



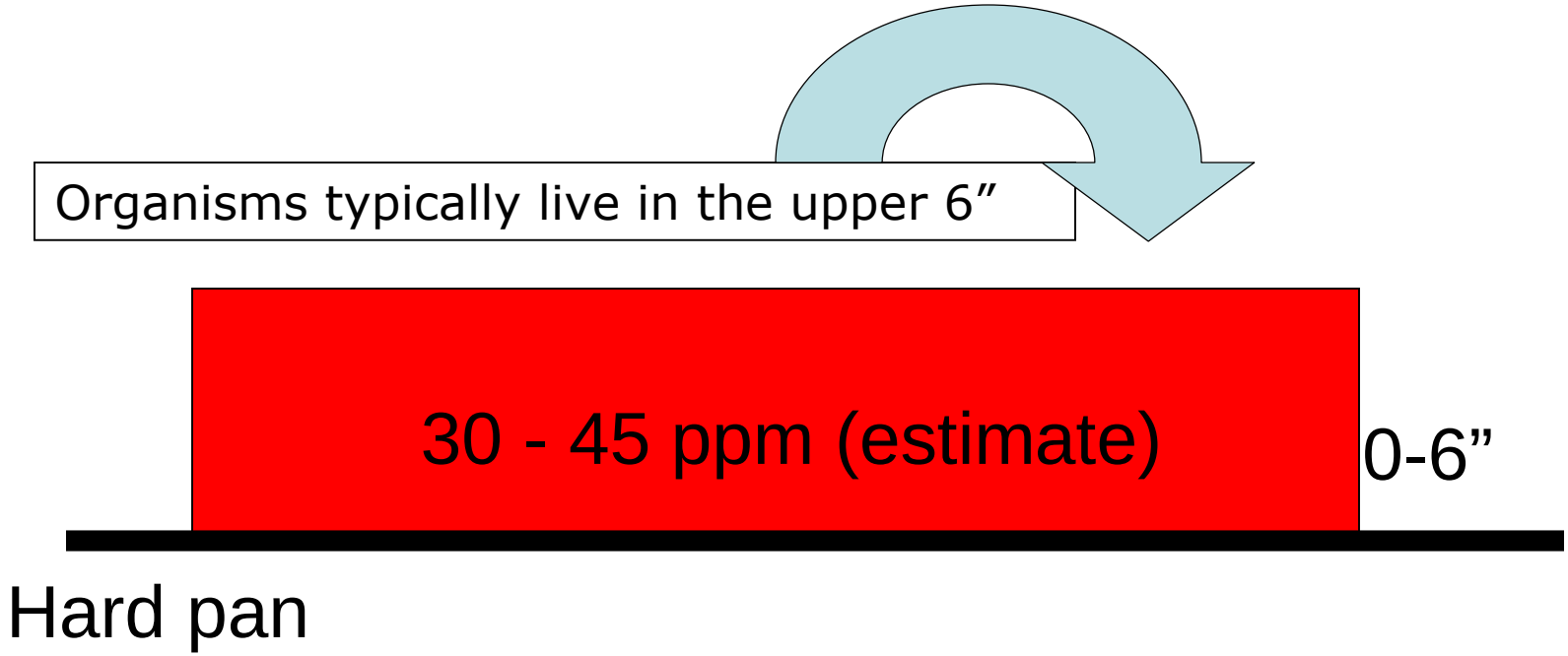


Example: Pre-Dredge Contaminant Concentration In Sediment Column



Example: Post-Dredge Surficial (0-6”) Sediment Contaminant Concentrations

Result is approximately the average of the original concentration in the last bucketful.



Dredging Advantages

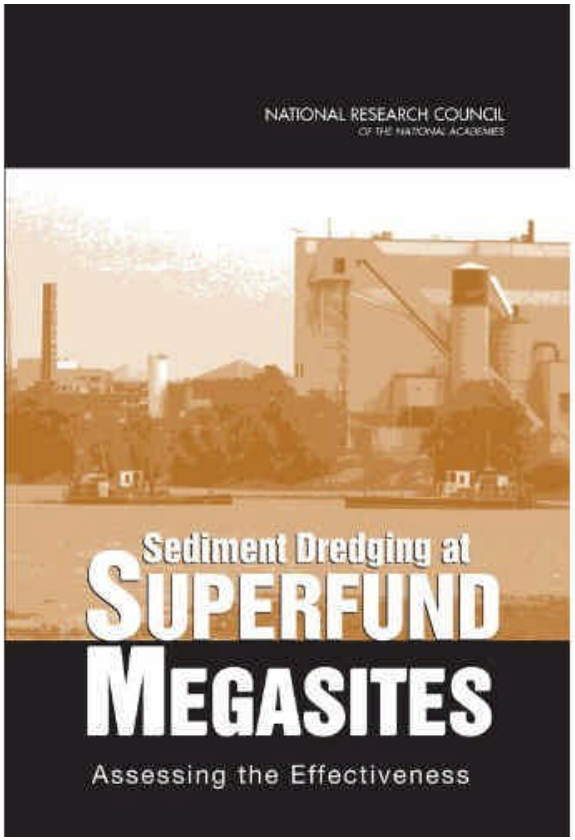
- Moves contaminants from the aquatic environment where they might be mobile to a landfill or to a CDF or CAD
- Does not limit future water body uses
- Does not reduce flood control capacity

Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, U.S. EPA (December 2005).

Limitations Of Dredging

- Complex and time-consuming to design and implement
- Lack of capacity in disposal facilities
- Resuspension and transport of contaminants
- Release of contaminants to water, leading to an increase in bioavailability
- Residual contamination affects ability to achieve risk reduction goals

"[R]esuspension, release, and residuals occur to some extent with all dredging projects." *Sediment Dredging At Superfund Megasites: Assessing The Effectiveness. 2007 National Research Council,* p. 63.



Dredging – Elements Potentially Continuing Or Increasing Risk

- Contaminant releases during sediment removal, transport, and disposal
- Community impacts (e.g., accidents, noise, odor, residential and/or commercial disruption)
- Worker risk during sediment removal, handling, and transportation

Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, U.S. EPA (December 2005).

Dredging – Elements Potentially Continuing Or Increasing Risk

- Residual contamination following sediment removal
- Continued exposure to contaminants currently in food chain
- Releases from contaminants remaining outside of dredged/excavated area
- Disruption of bottom dwelling organisms

Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, U.S. EPA (December 2005).

Conditions Especially Conducive To Dredging

- ☐ Contaminated sediment is underlain by clean sediment
- ☐ Low incidence of hardpan, bedrock, and/or rocks
- ☐ Low incidence of debris
- ☐ Low incidence of low dry density sediment ("fluff")
- ☐ Discrete areas of higher contaminant concentrations
- ☐ Water diversion is practical or current velocity is low or can be minimized to reduce resuspension and downstream transport during dredging

Debris is not conducive to dredging.

Note: Not all of the listed conditions must be present to select dredging.

Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, U.S. EPA (December 2005).

Conditions Especially Conducive To Dredging

- ☐ Existing shoreline areas and infrastructure can accommodate dredging
- ☐ Navigational dredging is scheduled or planned
- ☐ Suitable work area is available
- ☐ Suitable disposal sites are available
- ☐ Contaminants can be properly treated for transport and disposal
- ☐ Overall, long-term risk reduction outweighs sediment disturbance and habitat disruption

Constructing staging area for sediment.

Note: Not all of the listed conditions must be present to select dredging.

Contaminated Sediment Remediation Guidance for Hazardous Waste Sites, U.S. EPA (December 2005).

Dredging Frequently Asked Questions

Won't removing contaminated sediments immediately and permanently reduce risk?

- According to a review by the National Research Council "Simple mass removal … may not reduce risk."
- After dredging, surface sediment contaminant concentrations may still be higher than target clean up levels.

Sediment Dredging At Superfund Megasites: Assessing The Effectiveness. 2007 National Research Council.

Dredging Frequently Asked Questions

Will I be able to eat the fish after dredging is completed?

- Affecting the food chain can take a long time – from several years if all sources are controlled, to many decades if not.
- Fish consumption advisories typically continue for a number of years following dredging.
- For example, Fox River OU4 walleye fish consumption advisory anticipated to continue for 20 years following completion of dredging.

Take Home Messages

Take Home Message - Dredging

- Dredging can be an effective remedy if conditions are conducive (e.g., low debris or underlain by clean sediment)
- Important to identify and characterize site conditions that reduce dredging effectiveness
- Debris, rocks and hard pan significantly affect residuals and decrease the risk reduction potential of this remedy

Take Home Message - Dredging

- All dredges require skilled operators, but:
  - All dredges re-suspend sediment
  - All dredges leave residuals
- At sites with conditions not favorable for dredging, dredging alone is unlikely to be effective in achieving both short-term and long-term cleanup levels
- Dredging is a highly complex and costly integrated train of processes (e.g., removal, transport, rehandling, treatment, disposal)

Take Home Message - Capping

- Caps have been placed as the final remedy or pilot at over 100 sites worldwide
- Capping provides immediate exposure control
- Capping can be an effective remedy
- Conventional sand caps are easy to place
- Methods are available to address key cap design issues
  - Long-term physical stability
  - Contaminant movement

Take Home Message - MNR

- Can be an effective remedy either as a stand alone remedy or as part of a combination remedy
- Can provide long-term exposure control
- Can be integrated with other remedies: MNR is a component of virtually every remedy
- Monitoring is an integral component of MNR to measure long-term protectiveness
- Enhanced MNR, such as adding sand, also may be used to accelerate achievement of risk reduction goals

Take Home Message – Combination Remedies

- At large or complex sites, there is no one-size fits all remedy
- A combination of remedies, each targeted to specific areas based on area conditions, may be appropriate

Questions?

Steven C. Nadeau

Coordinating Director, Sediment Management Work Group

Chair, Environmental Law Department

Honigman Miller Schwartz and Cohn LLP

Phone: (313) 465-7492

Fax: (313) 465-7493

E-mail: snadeau@honigman.com

Megan C. McCulloch

Sediment Management Work Group

Honigman Miller Schwartz and Cohn LLP

Phone: (313) 465-7444

Fax: (313) 465-7445

E-mail: mmcculloch@honigman.com

Visit the Honigman website: www.honigman.com

Visit the SMWG website: www.smwg.org