

# Advantages and Disadvantages of In-Situ Subaqueous Capping

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# In-Situ Capping

- ISC – placement of a subaqueous covering or cap of clean isolating material over an in-situ deposit of contaminated sediment.
- Potentially economical and effective remedy approach.
- Should be considered equally with other remedy options such as MNR or Environmental Dredging.
- Successfully implemented at a number of sites.

# In-Situ Capping

- Advantages
  - Containment in place
  - Easy to implement
  - Quick and cost effective
  - Provides opportunities for habitat enhancement
- Disadvantages
  - Containment in place
  - Emerging technology
  - Water depths reduced
  - Subject to erosive forces
  - Long term monitoring/ maintenance required

# Advantage – Containment in Place

- Does not require removal
- Quickly reduces exposure to contaminants and thereby quickly reduces risks
- Less infrastructure for materials handling, dewatering, treatment, and disposal
- No disposal site required
- No transfer of risks to other media
- Only viable remedy for some site conditions

# Advantage – Easy to Implement

- Placement of granular cap materials involves conventional technologies
- Short term risks during implementation (resuspension and volatilization) are less than for dredging
- Less disruptive for nearby communities (no trucking of contaminated materials, etc).

# Advantage – Quick and Cost Effective

- Can be implemented quicker than removal for most sites and conditions
- Comparison of cost per acre capped vs. cost per cubic yard removed often shows a significant cost advantage

# Advantage – Provides Opportunities for Habitat Enhancement

- Cap material and armor materials may be selected to meet substrate requirements for target fish species or aquatic vegetation

# Disadvantage – Containment In-Situ

- Sediments remain in the aquatic environment
- Containment by cap does not totally eliminate low-level releases
- Contaminants may be exposed if cap is disturbed
- Perception of just burying the problem
- Conventional caps do not meet the CERCLA preference for treatment
- Institutional controls may be required
- Future site uses may be constrained



# Disadvantage – Emerging Technology

- Implemented at a number of sites, but not as commonly selected as removal
- A range of processes and drivers must be taken into account in determining effectiveness and implementability
- Acceptance by environmental agencies requires a convincing case

# Disadvantage – Water Depths Reduced

- Changes to habitat type, flood-carrying capacity, or circulation must be evaluated
- May require partial dredging to mitigate potential effects

# Disadvantage – Subject to Erosive Forces

- Episodic events must be considered
- Return periods an issue
- A range of drivers must be considered
  - Storm-generated waves
  - Flood-generated currents
  - Prop wash from vessels
  - Ice Scour and Ice-Induced Currents
- Armor layers may be required

# Disadvantage – Long Term Monitoring/ Maintenance Required

- Provisions for routine maintenance for some components may be needed
- Long term monitoring programs must be designed for site specific conditions
- Long term funding mechanisms must be established

# In-Situ Capping – Take Home Message

- ISC –one tool in the toolbox
- Potentially economical and effective remedy approach.
- Should be considered equally with other remedy options such as MNR or Environmental Dredging.
- Requires a site-specific, sediment-specific, and project-specific engineered design

# Any Questions?

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