Best Management Practices
Applied to Dredging Projects for
Environmental Protection

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• **Management Practice** – A practice intended to improve the environmental performance of a dredging project, inclusive of excavation, transport, and placement of dredged material.

• **Best Management Practice** – A management practice, or combination of management practices, that is determined after impact assessment, examination of alternative practices, and appropriate stakeholder participation to be the most effective, practical, and sustainable means of achieving an environmental protection objective.
RISK FRAMEWORK

RISK ASSESSMENT PARADIGM

Problem Formulation

Exposure Assessment

Risk Characterization

Effects Assessment

Risk = f (Exposure + Effect)

Risk Management

Economic Analysis, Socio-Political, Engineering Feasibility

Best Management Practices
MP Evaluation and Selection

FINAL PROJECT DESIGN

RISK ACCEPTABLE?

YES

PROJECT REQUIREMENTS

PROJECT CONSTRUCTION

MONITOR

MP EFFECTIVE?

YES

SELECT MP

RECONSIDER PROJECT

NO

NO, BUT

SELECT MP

PROJECT CONSTRUCTION

MONITOR

NO

SELECT MP
“BEST” or “BAD” Management Practice?

- DEPLOY SILT CURTAIN
- SLOW HOIST SPEED
- USE CLOSED BUCKET
- ENVIRONMENTAL WINDOW

PERCEIVED RISK
Management Practice Evaluation

- PREFERRED
- REQUIRED LEVEL OF PROTECTION
- MARGINALLY ACCEPTABLE
- LAST RESORT
- LEAST UNDESIRABLE
- UNDESIRABLE
- MOST UNDESIRABLE

EFFORT OR COST

- REASONABLE/AFFORDABLE
- UNREASONABLE/UNAFFORDABLE
Management Practice Evaluation

- Closed Bucket
- Open Bucket
- Silt Curtain
- Slow Hoist Speed

- Environment Window

- Preferred
- Least Undesirable
- Most Undesirable

- Last Resort
- Reasonable/Affordable
- Unreasonable/Unaffordable

- Effort or Cost
Equipment-Related MPs

• Select appropriate dredge type and size
  – mechanical or hydraulic

• Apply appropriate modifications
  – hopper dredge degassing system
  – hopper dredge green valve
  – hopper odor controls
  – turtle deflectors and/or observers
  – aerial noise controls
  – bucket type

• Equipment maintenance
  – inspections
  – maintenance of seals, winches, etc.
Dredging Process-Related MPs

• Modify rate of operations
  – bucket ascent or descent speed
  – reduce over-dredging by bed leveling

• Limit or prevent hopper/barge overflow

• Limit fill of barges

• Restrict temporal aspects of operations
  – season, tide, day/night

• Provide spatial buffer zone
Placement-Process MPs

• Pipeline discharge controls
  – baffle plates, diffusers, tremie tubes, spreaders
  – optimize discharge rate and solids density

• Optimize CDF operations
  – use additives or flocculants
  – settling basin weir layout

• Spill controls for off-loading
Control-Related MPs

• Use silt curtains, sheet piling, or bubble curtains
• Use surface booms
• Provide emissions controls
• Control ballast water
• Provide spill prevention/response plans
• Provide debris, waste, ordnance, cultural resource management plan
Inserting Science

REFINE
WINDOW

DREDGE

ADAPTIVE MONITORING
Recommendations

• Seek science-based, adaptive alternatives to windows
• Obtain commitments to resolve major concerns and knowledge gaps
• Explore ecological risk-based methods to setting windows
• Increase understanding of the dredging process
• Increase awareness of conservation needs among dredgers