PRESENTATION TO THE

UPPER MISSISSIPPI RIVER BASIN ENVIRONMENTAL MANAGEMENT PROGRAM WORKSHOP

BY



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Engineering Design Handbook

Dredging & Dredged Material Placement







- Resource Problem
- Sedimentation Rates
- Dredging Equipment
- Dredge Cuts
- Dredged Material Placement Sites
- Questions?



Resource Problem



- Backwater areas support diverse habitats.
- Sedimentation primary source of degradation.
- Dredging addresses degradation and may support other project features.



Dredging Goals & Objectives



GOALS

of Engineers*

- Enhance aquatic habitat
- Enhance fisheries habitat



OBJECTIVES

- Increase backwater depth diversity
- Provide over wintering habitat for fish





Sedimentation Rates



 Based on Best Available Data and Sound Judgment

Projects Providing Additional Data





Mechanical



VS.

Hydraulic





Mechanical Dredges



Include:

Clamshell





Backhoe

Dragline





Mechanical Dredges



US Army Corps of Engineers*

Advantages:

- Rugged & Reliable
- Debris removal
- Efficient for some applications
- No return water





Disadvantages:

- Lower production rates vs. hydraulic
- Inefficient over short transport distances
- May require nonconventional buckets



Hydraulic Dredges



- Include:
 - Cutterhead Pipeline









Hydraulic Dredges



US Army Corps of Engineers*

Advantages:

- High production rates
- Cost effective for some applications
- Readily available in varying sizes
- Capable of dredging most types of material





Disadvantages:

- Debris & cohesive material may reduce efficiency
- Slurry is 80% 90% water
- Return water must be managed



Dredging Equipment



Selection Criteria:

- Volume of material
- Type(s) of material
- Consolidation
- Debris
- Access



- Cut dimensions
- Placement site
- Beneficial use
- Return water
- Production rates





New Technology

- Dredge Wheel
- High Density Slurry
- Belt Press
- ???









Dredge Cuts



Depth of cut:

- Typical water level elevations
- Low-flow winter regulations
- Desired water depth
- Sedimentation rates





Alignment and width of cut:

- Existing channel conditions
- Placement site capacity
- Funding



Dredged Material Placement Sites



Bankline



Upland

- CDF



Island Creation







Dredged Material Placement Sites



Design factors:

- Access
- Material characteristics
- Volume to be dredged
- Insitu density
- Type of dredging equipment
- Dredge discharge rates (hydraulic dredge)
- Consolidation requirements
- Return water (hydraulic dredge)
- Potential Beneficial uses







Dredged Material Placement Sites



Potential issues/concerns:

- Impacts to wetlands, endangered species, water quality
- Impacts to floodway conveyance, flood heights, flood storage
- Existing land use
- HTRW
- Beneficial uses





Dredged Material Placement Sites



CDF (Confined Disposal Facility)

- An engineered structure designed to enclose dredged material, isolating it from adjacent waters and/or lands.
- EM 1110-2-5027 for CDF design guidelines







Dredging & Dredged Material Placement







Questions for YOU



- How can sedimentation rate estimates be improved?
- What have you done that would improve dredging equipment selection?
- What new technologies have you investigated and/or tried?
- What have you done that improves the dredge cut and/or placement site design?
- Lessons Learned?