Planning for Sustainable Dredging And Sediment Management

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Sustainable Sediment Management (SSM)

What is it?

Comprehensive approach for addressing the long-term management/conservation of sediments within a watershed to maintain current (and future?) beneficial uses while addressing regional Environmental, Economic, and Social concerns.
Sustainable Sediment Management

Key Features:

- Sediment is a resource not a waste
- Emphasis on conservation and beneficial use
- Requires integrated, cross-programmatic coordination
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<th>Component of Sediment Management</th>
<th>Traditional Approach</th>
<th>Sustainable Approach</th>
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</table>
| **Scoping/Goal Development**     | Relatively small geographic scope  
Relatively short temporal scope  
Based primarily on regulatory requirements  
Goals focused on fixing specific problems | Watershed or basin-level  
Long-term perspective  
Based upon the needs of a broad range of stakeholders  
Goals developed through interactive process with stakeholders  
Goals reflect balance of social, environmental and economic objectives |
| **Stakeholder Engagement/Communication** | Limited, public-hearing style engagement  
Primarily one-way flow of information  
Focused on presentation of results  
Relatively narrow set of stakeholders  
Communication limited to certain stages of process | Starts very early in process; continues throughout process  
Designed to generate collaboration and buy-in  
Two-way flow of information encouraged  
Broad range of stakeholders sought for engagement  
Communication occurs throughout process |
| **Alternatives Identification**   | Driven by regulatory requirements  
Relatively narrow set of alternatives considered  
Alternatives generated by “experts” | Driven by stakeholder feedback  
All ideas considered valid initially to consider broad range of alternatives  
Considered within long-term, large-scale context  
Consider options that represent “geo-mimicry”  
○ Working with nature  
○ Building with nature  
○ Operating with nature |
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<td>Analytical Approach</td>
<td>• Limited to environmental and economic issues that can be quantified&lt;br&gt;• Designed to inform experts who will make decisions&lt;br&gt;• Impacts considered in a “stovepiped” fashion – driven by regulations&lt;br&gt;• Limited consideration of uncertainties</td>
<td>• Starts with foundation of sediment budget&lt;br&gt;• Driven by issues of concern to stakeholders&lt;br&gt;• Considers social and environmental issues that may be difficult to quantify&lt;br&gt;• Integrates consideration of ecosystem services&lt;br&gt;• Based upon system-wide considerations, including synergies and interactions&lt;br&gt;• Considers uncertainties&lt;br&gt;• Designed to help range of stakeholders understand the implications of alternatives</td>
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<td>Decision-Making</td>
<td>• Decisions made by small group of decision-makers&lt;br&gt;• Decision-making occurs “behind closed doors”</td>
<td>• Broad-based decision-making process&lt;br&gt;• Significant stakeholder engagement and communication during decision-making&lt;br&gt;• Connection to sustainability drivers explored during decision-making</td>
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<td>Implementation</td>
<td>• Driven by schedule and budget&lt;br&gt;• Impacts of implementation processes not considered</td>
<td>• Considers social and environmental impacts of implementation processes&lt;br&gt;• Customized approaches to reflect local needs&lt;br&gt;• Flexible approaches to allow for adaptation as implementation proceeds</td>
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<td>Monitoring</td>
<td>• Limited&lt;br&gt;• Focused on functioning of engineered systems</td>
<td>• Wide range of impacts monitored&lt;br&gt;• Metrics reflect goals established at outset&lt;br&gt;• Designed to keep stakeholders informed and provide basis for adjusting approaches as implementation proceeds</td>
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Sustainable Sediment Management Strategies

- “System-based approach”
- Integrated management of littoral, estuarine, and riverine sediments
- Consider climate change
- Local project decisions based on effects to system
- Engages many stakeholders
- Potential economic and environmental impacts beyond project site
Historical Present
Sustainable Sediment Management Components (examples)

- Dredging and dredged material placement
- Building structures that divert or trap sediment
- Erosion protection for shorelines
- Sand and gravel mining
Sustainable Dredged Material Management (SDMM) Objectives

- Regional approach
- Identify sediment budget for region
- Identify and inventory dredging requirements
  - Projected new work and maintenance
  - Federal
  - State
  - Local
  - Industrial/Private
- Identify and inventory material placement capabilities and capacities of existing sites
- Active management/monitoring is essential to optimize capacity at existing sites
**SDMM Objectives** (continued)

- Identify potential beneficial use projects
- Identify potential beneficial use products/markets
- Develop ranking criteria to prioritize dredging and placement/beneficial use options
- Establish (or utilize existing) stakeholder groups (Regulators, environmental groups, citizen groups, trade/business groups, etc.)
**Beneficial Uses**

- Habitat restoration/enhancement (wetland, upland, island, and aquatic);
- Aquaculture;
- Parks and recreation (commercial and non-commercial);
- Agriculture/horticulture/forestry;
- Mine and quarry reclamation;
- Landfill cover for solid waste management;
- Beach Nourishment/Shoreline stabilization;
- Industrial and commercial use;
- Material transfer (fill, dikes, roads, etc.);
- Construction material; and
- Multipurpose/innovative land-use concepts.
SDMM Objectives (continued)

- Thorough evaluation of alternatives & trade-off analysis
  - Environmental benefit
  - Capacity
  - Cost
  - Regulatory acceptability
  - Technical risk
- Develop and maintain a public outreach campaign
SDMM Historic Challenges

- Lack of funding for dredging, placement, and beneficial use projects
- Limited federal cost-sharing available
- Conflicting agendas (sometimes even between Federal agencies)
- Many users often competing for limited placement capacity
- Federal channels, state/local & private terminals create complex dredging & placement needs
- Trend is larger and deeper draft ships – many channels need to be deepened
- High environmental benefit options can be very expensive
What is a USACE DMMP?

- DMMP Addresses:
  - Dredging needs
  - Disposal capabilities
  - Capacities of placement areas
  - Environmental compliance requirements
  - Potential for beneficial usage of dredged materials
  - Indicators of continued economic justification
  - Regional Sediment Management

- Normally 100% federally-funded
- Contains an integrated NEPA document
- Justifies follow-on, site-specific FS Studies
CENAB DMMP Process – Alternatives? Sustainable?

- Maximize Use of Existing Placement Sites
  - HMI, PIERP, Open Water placement, etc.

- New Placement Sites
  - CAD/CDF, Island Creation/Restoration, etc.

- Innovative Use
  - Building Products, Mines/ Quarries, Agricultural Placement, Shoreline & Wetland Restoration

Poplar Island
Web-based GIS
CENAB DMMP – Tradeoff Analysis

- 14,000 combinations – Optimal curve established to select recommended plan
- Once suites developed meeting sufficient capacity, comparison between cost & environmental benefit
- Selected most cost efficient means to achieve environmental benefit
- Applied theory of acceptable legal/political risk, eliminating those too risky
Alternative Suites Development – All suites for C&D and Chesapeake Bay (MD)

Habitat Benefit Index (Based on BEWG Scores)

Total Cost

Millions

Deep Trough Suites
Lg Island Suites
Poplar Island Suites
Norfolk Ocean Suites
Artificial Island Suite
Alternative Suites Development – C&D and Chesapeake Bay (MD) Legal/Acceptable Suites

Environmental Benefit Index (Based on BEWG scores)

Total Cost

Millions

Deep Trough Suites
Large Island Suites
Poplar Suites
Norfolk Ocean Suites
Artificial Island Suite
CENAB DMMP – Recommended Plan

- Chesapeake Bay Approach (VA) Channels
  - Existing Open Water Placement
- Harbor Channels
  - Multiple Confined Disposal Facilities along Patapsco
- C&D Canal Approach and Chesapeake Bay Approach (MD) Channels
  - Poplar Island Expansion
  - Large Island Restoration-Mid Bay
  - Wetland Restoration
SUMMARY

A DMMP is a valuable tool for a region’s plan for the sustainable management of dredged material. Maintaining a watershed focus, applying sediment management principles, and prioritizing beneficial use will ensure a cost effective, environmentally sound approach that can easily respond to the changing needs of the region in the future.