

# Planning for Sustainable Dredging And Sediment Management



**Harbors, Navigation & Environment Seminar  
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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

<b>Component of Sediment Management</b>	<b>Traditional Approach</b>	<b>Sustainable Approach</b>
Scoping/Goal Development	<ul style="list-style-type: none"> <li>• Relatively small geographic scope</li> <li>• Relatively short temporal scope</li> <li>• Based primarily on regulatory requirements</li> <li>• Goals focused on fixing specific problems</li> </ul>	<ul style="list-style-type: none"> <li>• Watershed or basin-level</li> <li>• Long-term perspective</li> <li>• Based upon the needs of a broad range of stakeholders</li> <li>• Goals developed through interactive process with stakeholders</li> <li>• Goals reflect balance of social, environmental and economic objectives</li> </ul>
Stakeholder Engagement/Communication	<ul style="list-style-type: none"> <li>• Limited, public-hearing style engagement</li> <li>• Primarily one-way flow of information</li> <li>• Focused on presentation of results</li> <li>• Relatively narrow set of stakeholders</li> <li>• Communication limited to certain stages of process</li> </ul>	<ul style="list-style-type: none"> <li>• Starts very early in process; continues throughout process</li> <li>• Designed to generate collaboration and buy-in</li> <li>• Two-way flow of information encouraged</li> <li>• Broad range of stakeholders sought for engagement</li> <li>• Communication occurs throughout process</li> </ul>
Alternatives Identification	<ul style="list-style-type: none"> <li>• Driven by regulatory requirements</li> <li>• Relatively narrow set of alternatives considered</li> <li>• Alternatives generated by “experts”</li> </ul>	<ul style="list-style-type: none"> <li>• Driven by stakeholder feedback</li> <li>• All ideas considered valid initially to consider broad range of alternatives</li> <li>• Considered within long-term, large-scale context</li> <li>• Consider options that represent “geo-mimicry” <ul style="list-style-type: none"> <li>○ Working with nature</li> <li>○ Building with nature</li> <li>○ Operating with nature</li> </ul> </li> </ul>

<b>Component of Sediment Management</b>	<b>Traditional Approach</b>	<b>Sustainable Approach</b>
<b>Analytical Approach</b>	<ul style="list-style-type: none"> <li>Limited to environmental and economic issues that can be quantified</li> <li>Designed to inform experts who will make decisions</li> <li>Impacts considered in a “stovepiped” fashion – driven by regulations</li> <li>Limited consideration of uncertainties</li> </ul>	<ul style="list-style-type: none"> <li>Starts with foundation of sediment budget</li> <li>Driven by issues of concern to stakeholders</li> <li>Considers social and environmental issues that may be difficult to quantify</li> <li>Integrates consideration of ecosystem services</li> <li>Based upon system-wide considerations, including synergies and interactions</li> <li>Considers uncertainties</li> <li>Designed to help range of stakeholders understand the implications of alternatives</li> </ul>
<b>Decision-Making</b>	<ul style="list-style-type: none"> <li>Decisions made by small group of decision-makers</li> <li>Decision-making occurs “behind closed doors”</li> </ul>	<ul style="list-style-type: none"> <li>Broad-based decision-making process</li> <li>Significant stakeholder engagement and communication during decision-making</li> <li>Connection to sustainability drivers explored during decision-making</li> </ul>
<b>Implementation</b>	<ul style="list-style-type: none"> <li>Driven by schedule and budget</li> <li>Impacts of implementation processes not considered</li> </ul>	<ul style="list-style-type: none"> <li>Considers social and environmental impacts of implementation processes</li> <li>Customized approaches to reflect local needs</li> <li>Flexible approaches to allow for adaptation as implementation proceeds</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>Limited</li> <li>Focused on functioning of engineered systems</li> </ul>	<ul style="list-style-type: none"> <li>Wide range of impacts monitored</li> <li>Metrics reflect goals established at outset</li> <li>Designed to keep stakeholders informed and provide basis for adjusting approaches as implementation proceeds</li> </ul>

# *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*

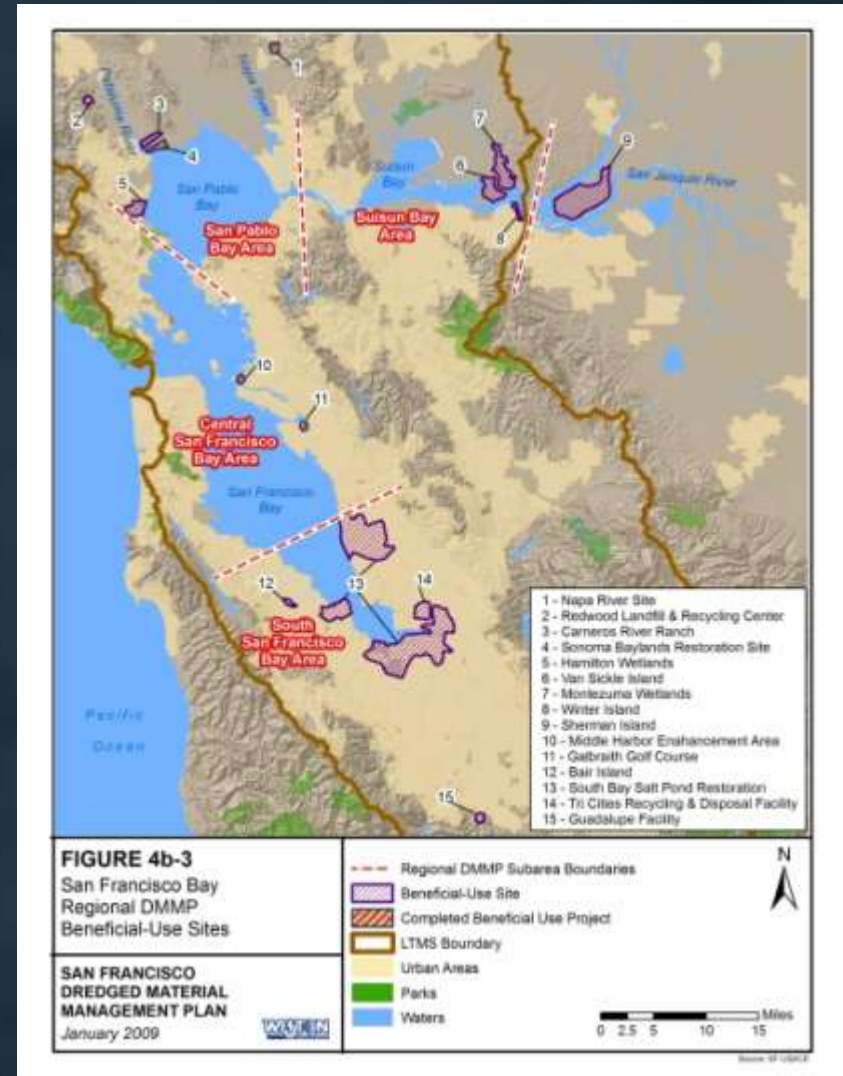
- Regional approach
- Identify sediment budget for region
- Identify and inventory dredging requirements
  - Projected new work and maintenance
  - Federal
  - State
  - Local
  - Industrial/Private
- Identify and inventory material placement capabilities and capacities of existing sites
- Active management/monitoring 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.

## Reclamation



## Beach Nourishment



## Shoreline Stabilization



## Habitat creation



# *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*

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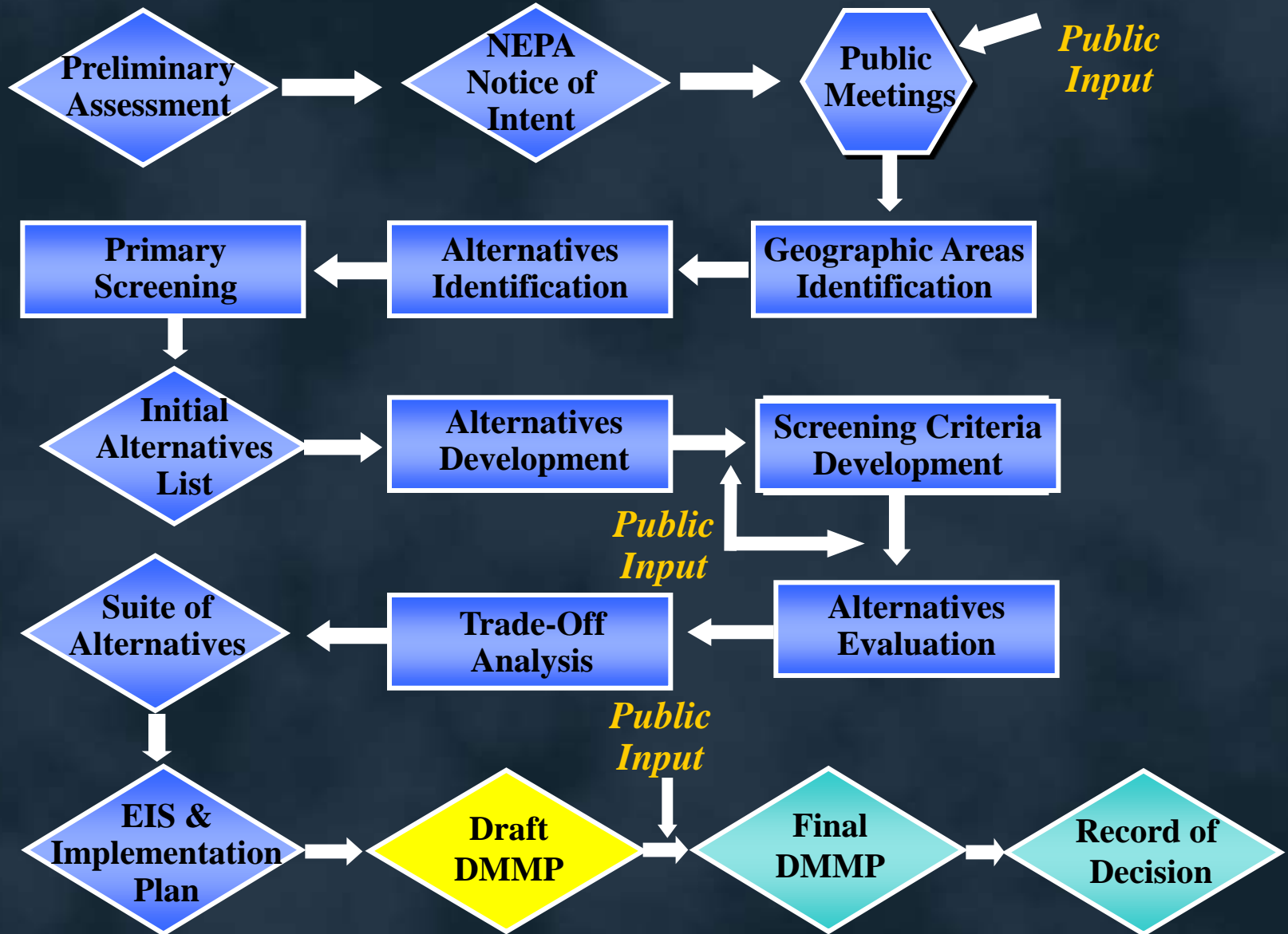
- Lack of funding for dredging, placement, and beneficial use projects
- Limited federal cost-sharing available
- Conflicting agendas (sometimes even between Federal agencies)
- Many users often competing for limited placement capacity
- Federal channels, state/local & private terminals create complex 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?*

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- 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

# DMMP Study Flow Chart



# ***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



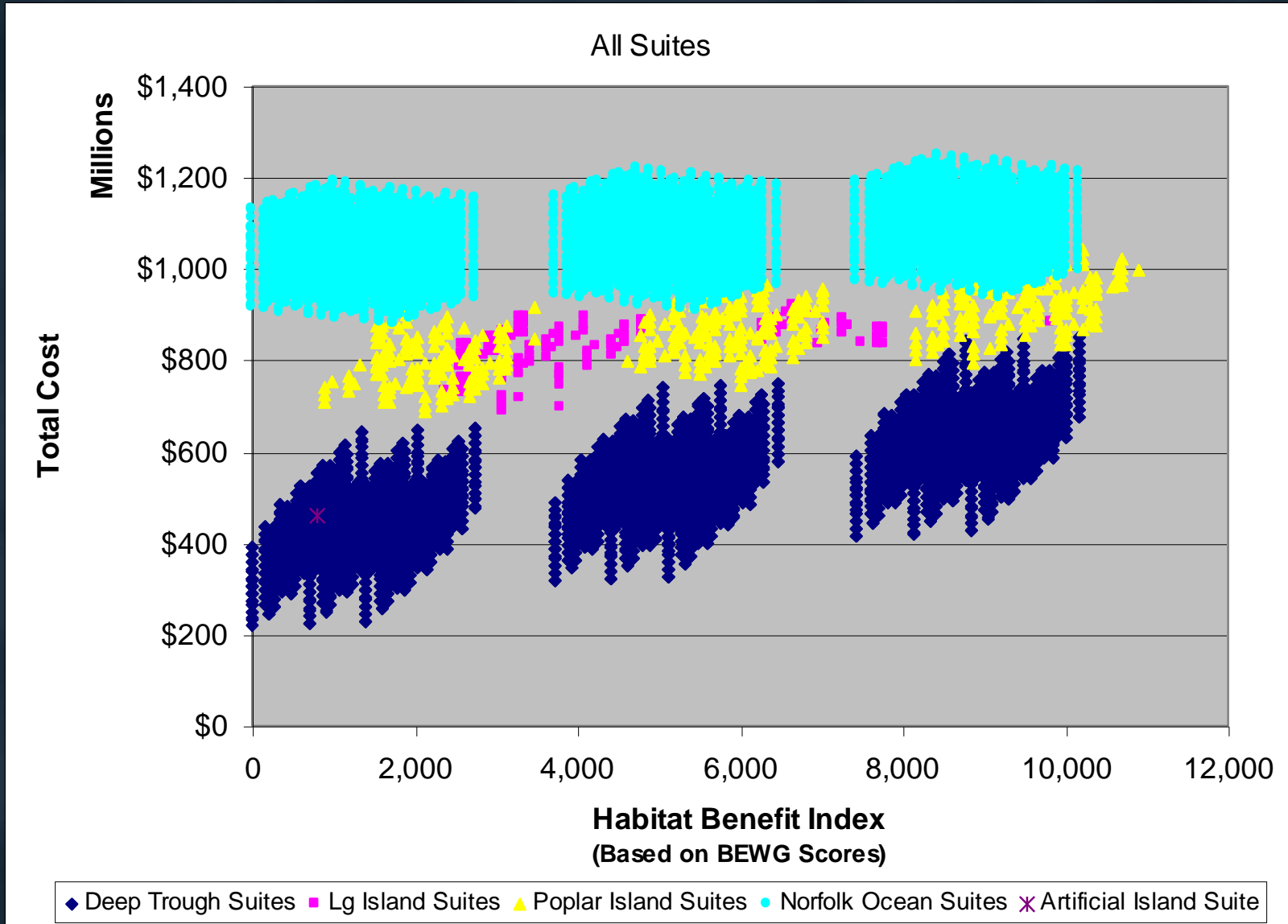


# ***CENAB DMMP – Tradeoff Analysis***

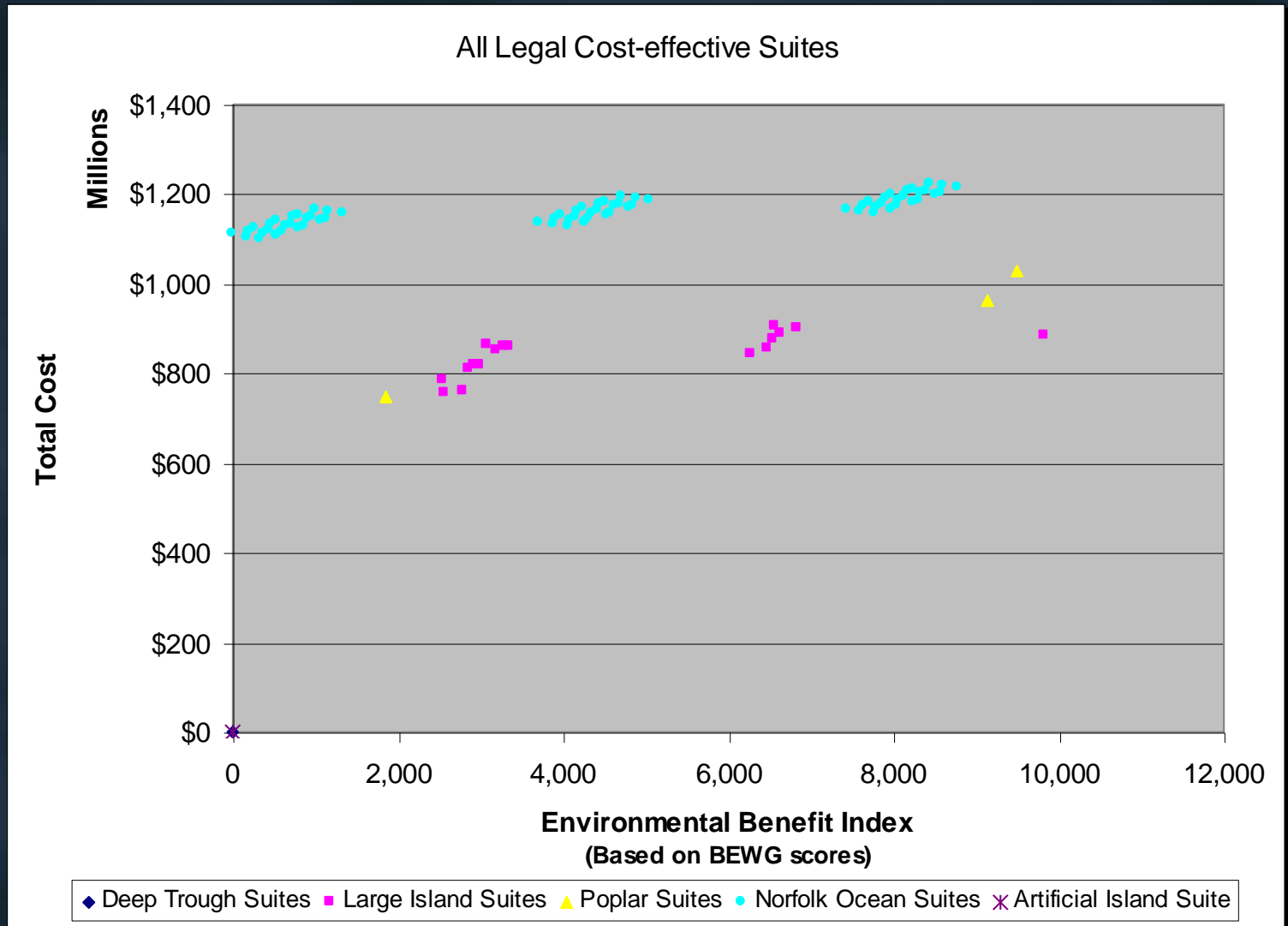
- 14,000 combinations – Optimal curve established to select recommended plan
- Once suites developed meeting sufficient capacity, comparison between cost & environmental benefit
- Selected most cost efficient means to achieve environmental benefit
- Applied theory of acceptable legal/political risk, eliminating those too risky



# Alternative Suites Development – All suites for C&D and Chesapeake Bay (MD)



# Alternative Suites Development –C&D and Chesapeake Bay (MD) Legal/Acceptable Suites



# ***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*

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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.