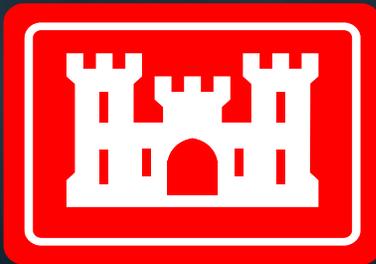


U.S. Army Corps of Engineers, Baltimore District Dredged Material Management Plan for the Port of Baltimore



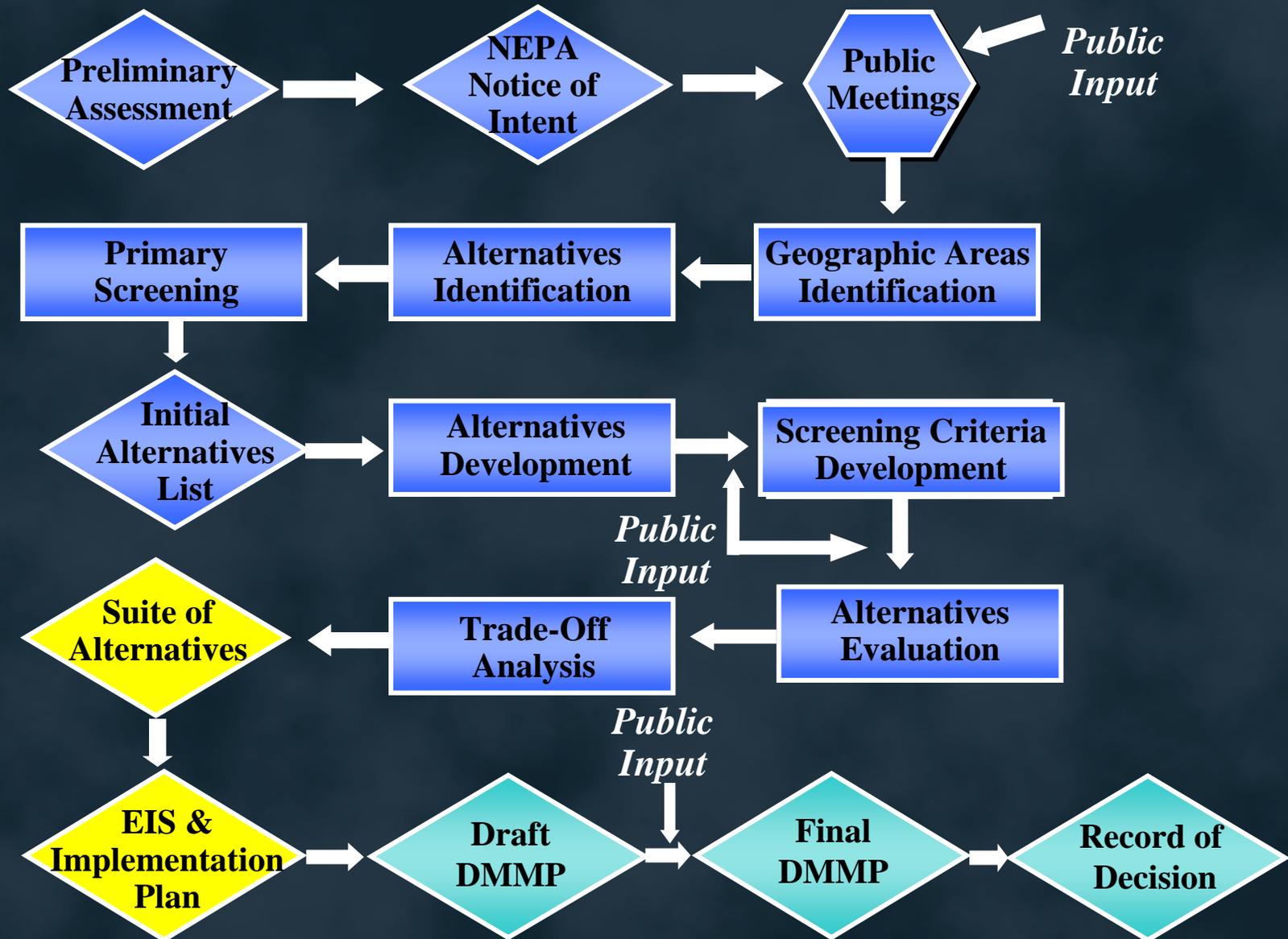
July 6, 2004 Presentation to the BEWG



Goals for July 6th Meeting

- Review Assumptions from last meeting
- Review Quantitative Analysis Results
- Present Qualitative Risk Analysis
- Discuss Alternative Suites Development Process
- Selection of Recommended Plan
- Update Schedule

DMMP Study Flow Chart



Environmental Benefit Assumptions

- Total Environmental Benefits derived by multiplying BEWG score by acres of habitat created.
 - Assumption that BEWG score is measure that may be used to reflect environmental gains/loss per unit area (e.g., per acre of fish habitat lost or wetland habitat gained).
 - An alternative must create, restore, or enhance some type of habitat to generate environmental benefits.
 - Alternatives such as building products, agricultural placement, and ocean placement that do not enhance bay habitat generate zero environmental benefits.

DMMP Alternatives Analysis - DRAFT

	ALTERNATIVE	Approach				Overall Capacity (cy)	BEWG score
		Harbor	C&D	MD Bay	VA Bay		
1	Agricultural Placement- Maryland	\$51	\$51	\$50		500,000	2.409
2	Agricultural Placement- Virginia				\$43	500,000	2.409
3	Artificial Island Creation- Lower Bay				\$18	34,600,000	0.601
4	Artificial Island Creation- Upper Bay	\$12	\$11	\$12		48,400,000	0.962
5	Beach Nourishment- Virginia				\$12	5,600,000	2.118
6	Building Products	\$117	\$120	\$118	\$124	500,000	3.364
7	C&D Canal Pierce Creek Upland Sites Expansion	\$20	\$16	\$19		4,400,000	1.199
8	Capping- Landfill	\$37	\$39	\$38	\$36	500,000	2.869
9	Capping- Brownfields	\$68	\$70	\$69	\$68	500,000	2.869
10	Capping- Elizabeth River, VA				\$28	97,000	2.804
11	Capping- Patapsco River, MD		\$12	\$11		810,000	2.804
12	Confined Aquatic Disposal Pit- Patapsco River, MD	\$5				3,700,000	2.146
13	Confined Disposal Facility- Lower Bay				\$11	10,000,000	0.723
14	Confined Disposal Shoreline Facility- Patapsco River	\$16				3,600,000	1.681
15	Cox Creek Expansion	\$19				1,900,000	1.631
16	Hart-Miller Island Expansion	\$12	\$11	\$12		25,000,000	1.002
17	Large Island Restoration- Lower Bay				\$16	4,600,000	1.692
18	Large Island Restoration- Mid Bay	\$20	\$20	\$18		34,600,000	2.387
19	Mine Placement- Cecil County, MD ^a	\$52	\$49	\$52		10,700,000	3.576
20	Mine Placement- Western Maryland ^b	\$65	\$72	\$66		2,000,000	3.576
21	Norfolk Ocean Open Water Placement (Existing)		\$28	\$27	\$11	sufficient	1.909
22	Pooles Island Open Water Site Expansion		\$5	\$6		5,000,000	0.909
23	Poplar Island Modification		\$19	\$18		24,000,000	1.211
24	Rappahannock Shoal Open Water Site Expansion		\$20	\$19	\$8	5,000,000	0
25	Shoreline Restoration- Lower Bay				\$41	790,000	1.409
26	Shoreline Restoration- Mid Bay	\$41	\$41	\$39		1,260,000	1.528
27	Shoreline Restoration- Upper Bay	\$42	\$40	\$40		790,000	1.839
28	Small Island Restoration- Lower Bay				\$26	2,300,000	1.696
29	Small Island Restoration- Mid Bay	\$28	\$26	\$25		2,300,000	1.689
30	Wetland Restoration- Dorchester County, MD	\$38	\$38	\$35		3,200,000	3.719
31	Dam Neck Ocean Open Water Placement (Existing)				\$9	sufficient	1.909
32	Hart-Miller Island (Existing)	\$9	\$8	\$9		10,000,000	2.295
33	New Open Water (Deep Trough)		\$6	\$5		sufficient	1.167
34	Pooles Island Open Water Site (Existing)		\$5			6,000,000	1.121
35	Rappahannock Shoal Open Water Site (Existing)				\$7	sufficient	0.875
36	Wolf Trap Open Water Placement (Existing)		\$22	\$20	\$8	sufficient	0.642

Qualitative Risk Analysis

- Management Roundtable on 16 and 29 June 2004
 - Representatives from MPA and CENAB
 - Considered subject matter experts
- Evaluated Technical/Logistical Risk
- Evaluated Political/Legal Risk
- Scored alternatives from 1-5
- Identified alternatives with unacceptable levels of risk

Qualitative Risk Analysis – Technical / Logistical Risk

- Likelihood that the alternative may not be implementable or may not perform as expected, in terms of placement capacity and/or environmental benefits
 - 1 – Routine / cost-effective applications
 - 2 – Development of specialized techniques and materials
 - 3 – Standardization of methods
 - 4 – Initial Implementation
 - 5 – Basic science, engineering and experimentation
- Risk unacceptable when scored > 3
- Alternatives too risky – Agricultural Placement, Building Products, Mine Placement in Western MD

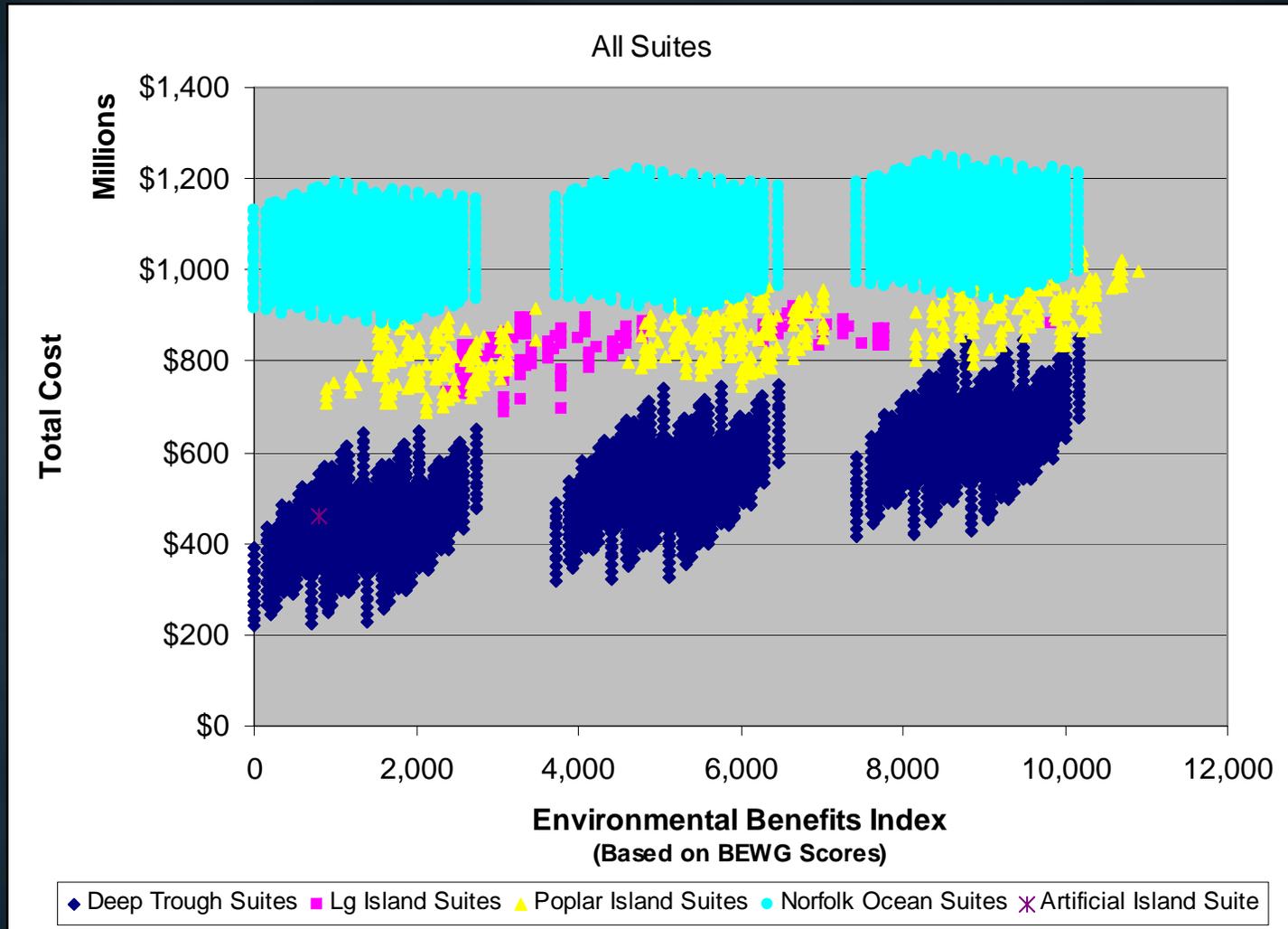
Qualitative Risk Analysis – Political / Legal Risk

- Likelihood that the alternative will be prevented or significantly delayed within 20 year planning window because of public opinion or legal and regulatory challenges
 - 1 – No law to prohibit/minor public or regulatory issues
 - 2 – No law to prohibit/moderate public or regulatory issues
 - 3 – No law to prohibit/significant public or regulatory issues
 - 4 – Law prohibiting/minor public or regulatory issues
 - 5 – Law prohibiting/significant public or regulatory issues
- Risk unacceptable when scored > 2
- Alternatives too risky – Artificial Island Creation, CAD-Patapsco, CDF Lower Bay, Cox Creek Expansion, Hart-Miller Island Expansion, Pooles Island Expansion, New Open Water (Deep Trough)

Alternative Suites Development Process – Step 1

- Algorithm developed to create all suites which meet net capacity need (total need – existing capacity) using technically/logistically acceptable alternatives
 - Costs for each suite are sum of costs for individual alternatives
 - Total Environmental Benefits for each suite is the sum of the environmental benefits for each alternative times the acreage of habitat created by each alternative
- Established Anchor Alternatives (large capacity)
 - Example Anchors: Large Island-Mid Bay, Poplar Island Expansion, Norfolk Ocean, etc.
- Combined with small capacity alternatives
 - Example Small Alternatives: Wetlands Restoration, Shoreline Restoration, etc.
- Over **14,000** possible combinations for the C&D Canal Approach and Chesapeake Bay Approach (MD)

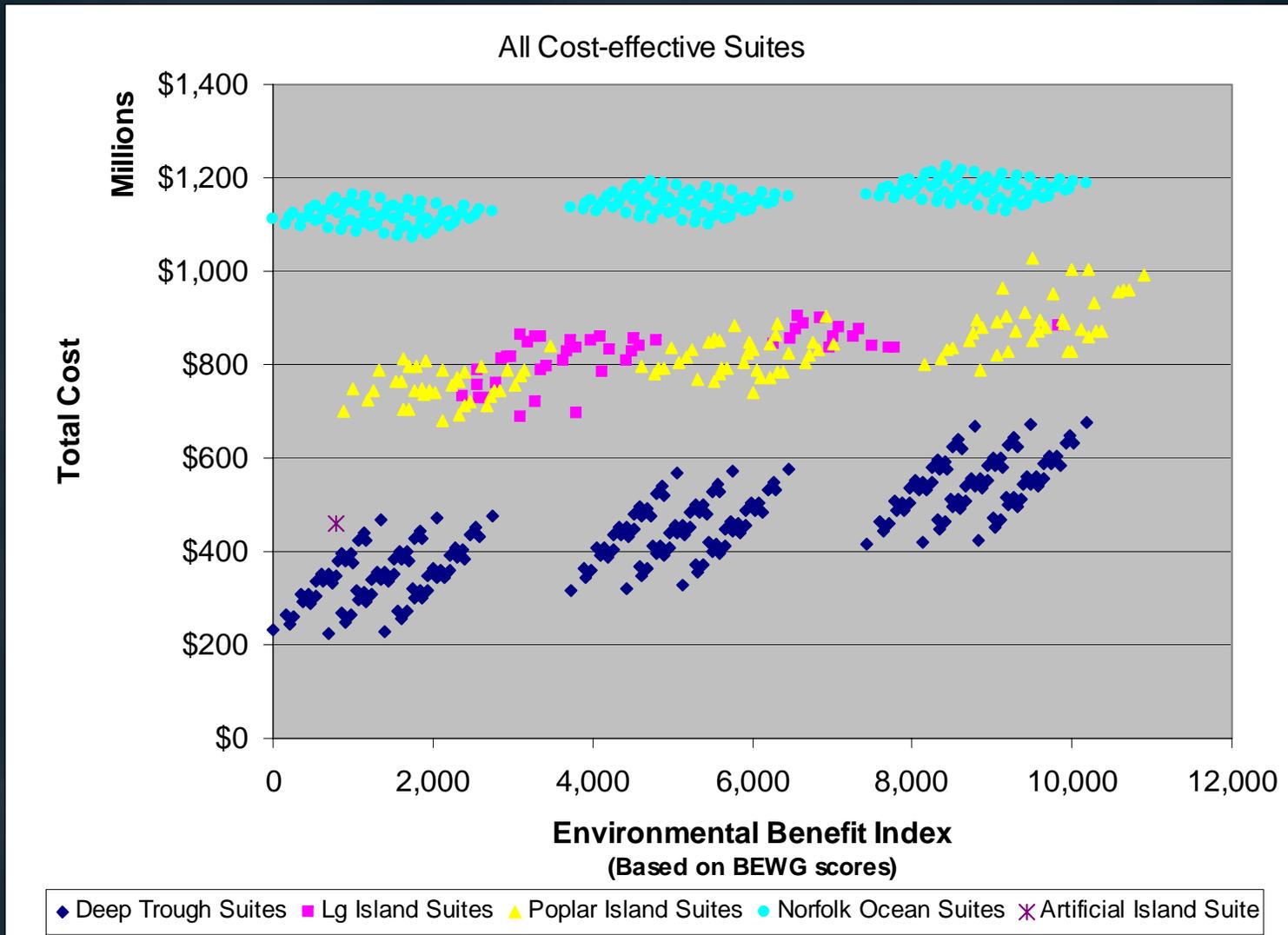
Alternative Suites Development – All suites for C&D and Chesapeake Bay (MD)



Alternative Suites Development Process – Step 2

- Reduce the number of suites by eliminating those suites that were clearly inferior to other possible suites.
 - Rule 1: If Suite A has lower costs and higher environmental benefits than Suite B, eliminate B
 - Rule 2: If Suite A has lower costs and the same environmental benefits as Suite B, eliminate Suite B
 - Rule 3: If Suite A has higher environmental benefits and the same costs as Suite B, eliminate Suite B.
- Resulting Suites: **590 Suites** for C&D Approach and Chesapeake Bay (MD) Approach

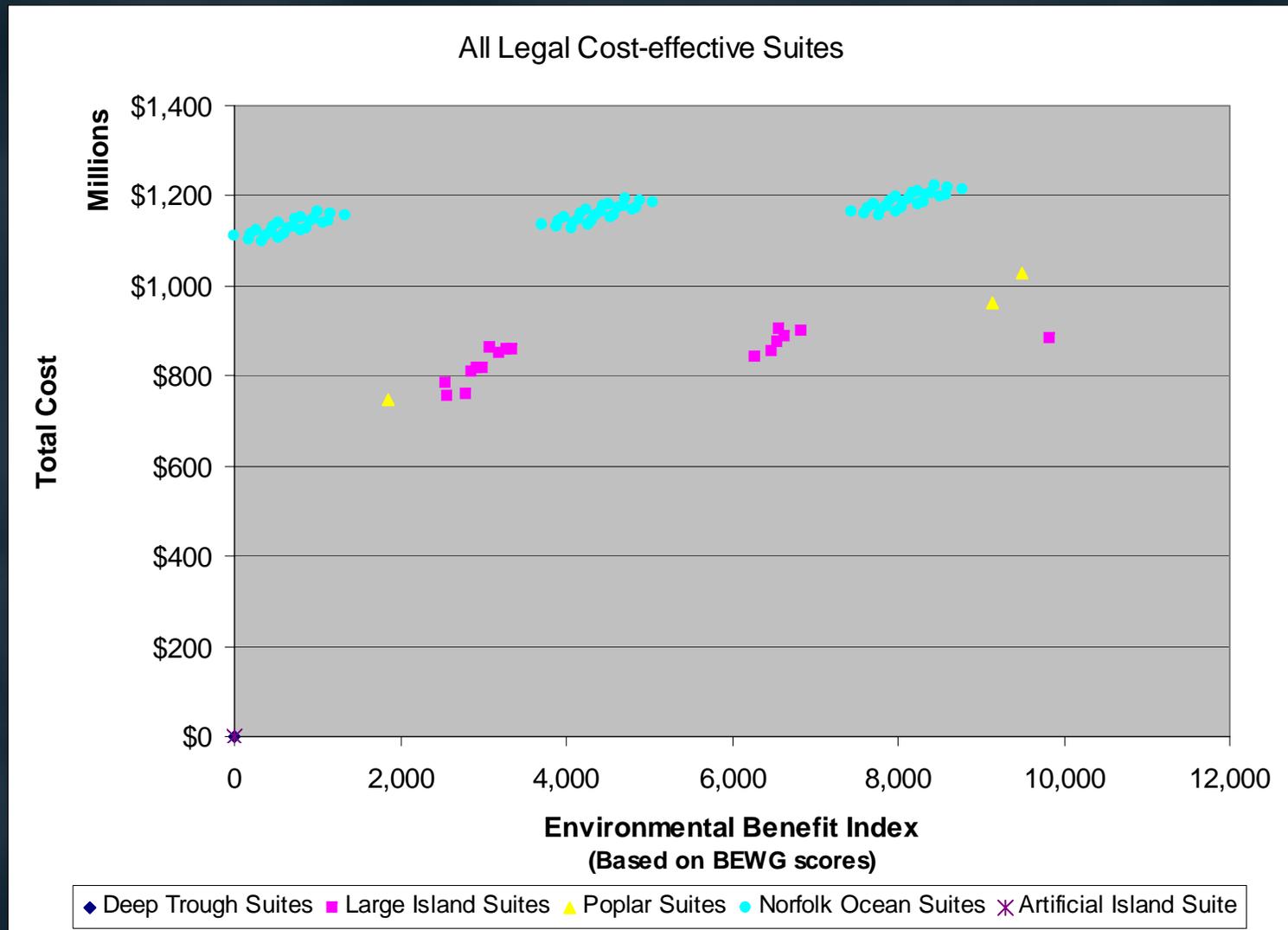
Alternative Suites Development – C&D and Chesapeake Bay (MD) Cost Effective Suites



Alternative Suites Development – Step 3

- Eliminated additional suites due to legal and political considerations
 - Alternatives with risk analysis scores of >2
 - Alternatives against state law
 - Alternatives with significant public opposition
- Resulting Suites : **92 Suites** for C&D Approach and Chesapeake Bay (MD) Approach

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

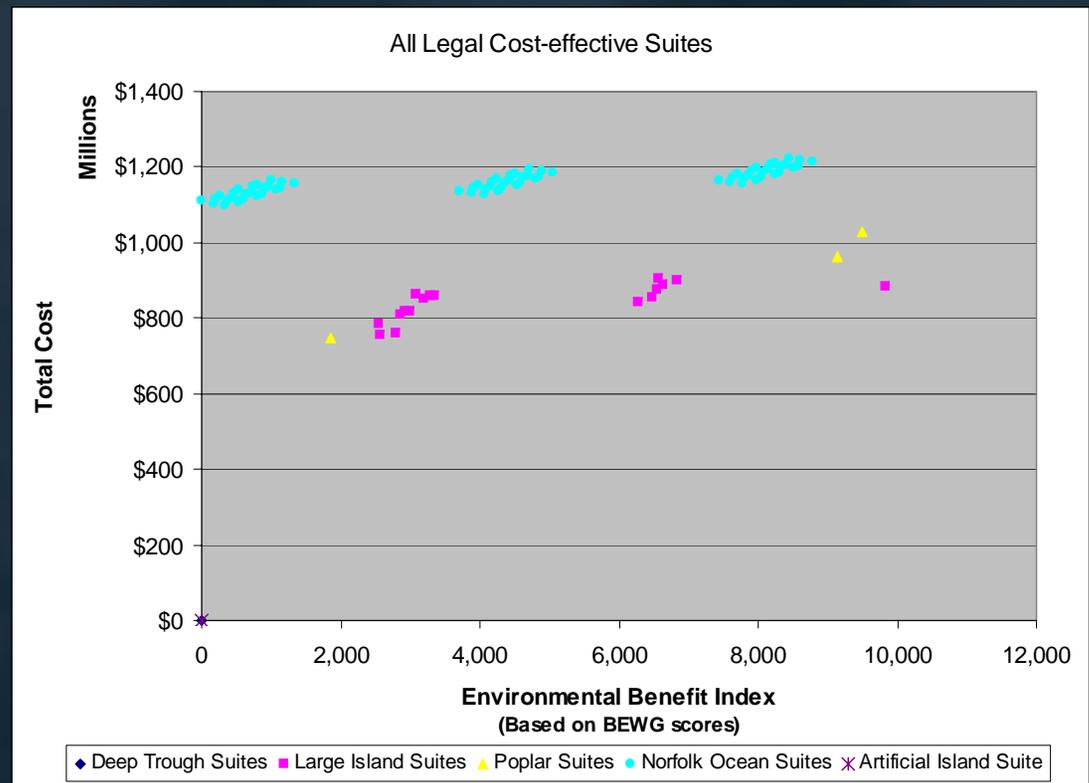


Recommended Plan Selection

- Chesapeake Bay Approach (VA) Channels
 - All options legal
 - Current capacity sufficient – zero net need
 - **Recommendation:** Existing Condition (Dam Neck Open Water Placement; Rappahannock Shoal Deep Alternate Open Water Placement; Wolf Trap Alternate Open Water Placement)
- Harbor Channels
 - Contaminated material capacity requirement
 - CDF-Patapsco only alternative with acceptable technical/logistical and political/legal risk
 - **Recommendation:** Multiple CDF's in Patapsco

Recommended Plan Selection (con't)

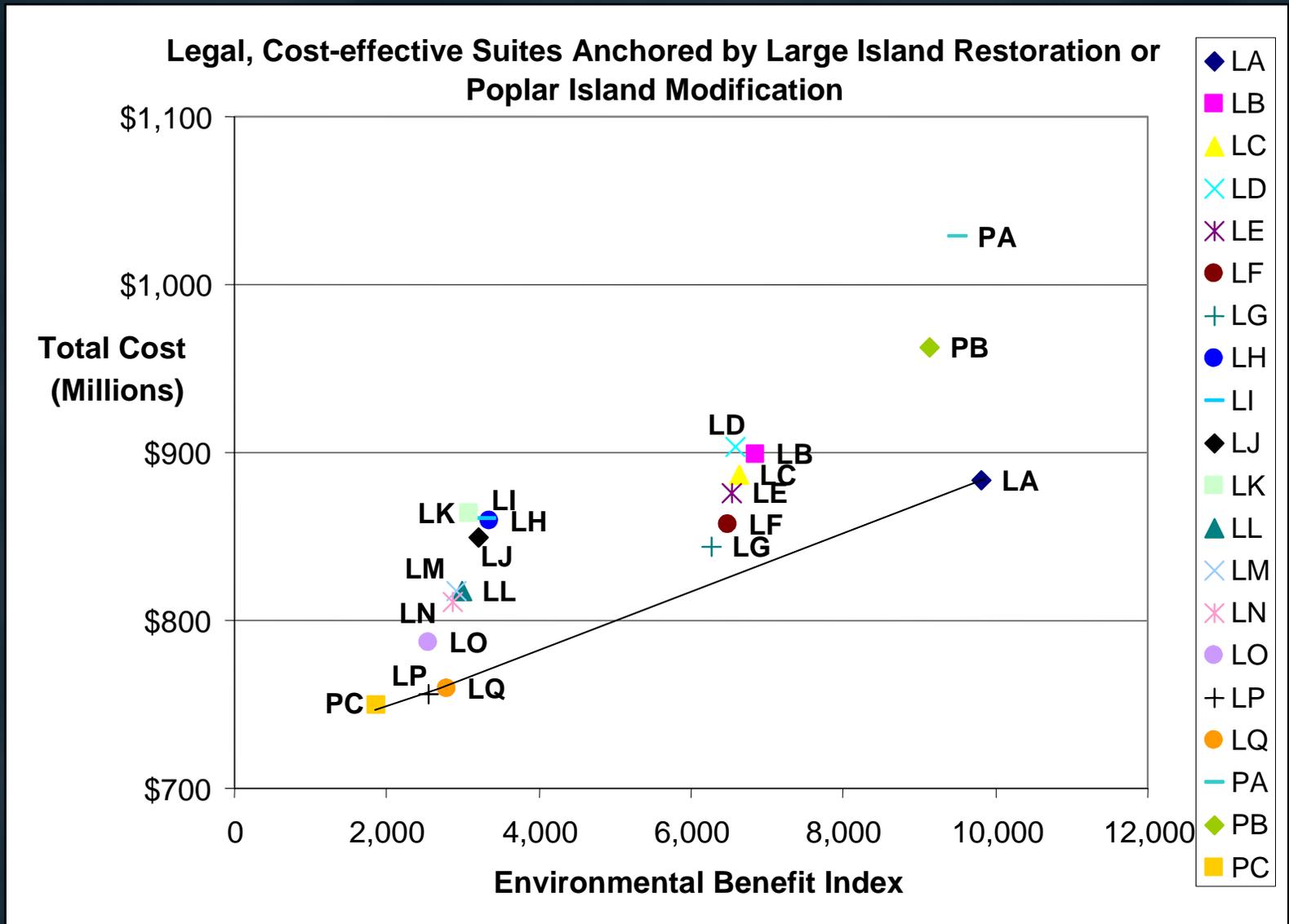
- C&D Approach and Chesapeake Bay Approach (MD) Channels
 - Eliminate alternatives which cost more to attain same or lower level of environmental benefit – Norfolk Ocean
 - 20 Suites remain



C&D and Chesapeake Bay (MD) Suites

Suite	Alternatives
LA	Large Island Restoration - Mid; 2 Wetland Restoration
LB	Large Island Restoration - Mid; 2 Shoreline Restoration - Mid; Shoreline Restoration - Upper; Wetland
LC	Large Island Restoration - Mid; Capping - Landfill; 2 Shoreline Restoration - Mid; Wetland Restoration
LD	Large Island Restoration - Mid; Capping - Landfill; Capping - Brownfield; Shoreline Restoration - Mid; Shoreline Restoration - Upper; Wetland Restoration
LE	Large Island Restoration - Mid; Shoreline Restoration - Mid; Small Island Restoration; Wetland
LF	Large Island Restoration - Mid; Shoreline Restoration - Upper; Small Island Restoration; Wetland
LG	Large Island Restoration - Mid; Capping - Landfill; Small Island Restoration; Wetland Restoration
LH	Large Island Restoration - Mid; 3 Shoreline Restoration - Mid; Small Island Restoration
LI	Large Island Restoration - Mid; Capping Landfill; 2 Shoreline Restoration - Mid; Shoreline Restoration - Upper; Small Island Restoration
LJ	Large Island Restoration - Mid; Shoreline Restoration - Mid; Shoreline Restoration - Upper; 2 Small
LK	Large Island Restoration - Mid; Capping - Landfill; Capping - Brownfield; 2 Shoreline Restoration - Mid; Small Island Restoration
LL	Large Island Restoration - Mid; Shoreline Restoration - Mid; 2 Small Island Restoration
LM	Large Island Restoration - Mid; Capping Landfill; Shoreline Restoration - Upper; 2 Small Island
LN	Large Island Restoration - Mid; C&D Upland Expansion; Shoreline Restoration - Mid; Shoreline
LO	Large Island Restoration - Mid; C&D Upland Expansion; Small Island Restoration
LP	Large Island Restoration - Mid; Poplar Island Modification
LQ	Large Island Restoration - Mid; Large Island Restoration - Mid
PA	Poplar Island Modification; Capping - Landfill; Capping - Brownfield; 3 Shoreline Restoration - Mid; Shoreline Restoration - Upper; 2 Small Island Restoration; 2 Wetland Restoration
PB	Poplar Island Modification; C&D Upland Expansion; 3 Shoreline Restoration - Mid; Small Island Restoration; 2 Wetland Restoration
PC	Poplar Island Modification, Large Island Restoration - Mid

C&D and Chesapeake Bay (MD) Approach – Cost Effective & Legal Suites



Recommended Plan Selection - C&D and Chesapeake Bay Approach (MD) Channels

- Least Cost/Least Environmental Benefit: Poplar Island Expansion with Large Island Restoration-Mid Bay
- Most Environmental Benefit: Large Island Restoration with Wetland Restoration
- **Recommendation:** Poplar Island Expansion, Large Island Restoration-Mid Bay, Wetland Restoration
 - Plan achieves capacity in cost effective manner with large capacity alternatives while gaining significant environmental benefit through wetland restoration
 - Provides reasonable amount of remaining capacity beyond 20-year window reducing risk in out-years
 - Large Island and Wetland Restoration without Poplar Expansion carries too high a risk of capacity shortfalls should development of Wetland Restoration techniques be delayed
 - Poplar Island Expansion as anchor has higher chance of federal funding success as existing authority (no new starts)

Recommended Plan Selection Summary

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

Schedule

- Comments on Recommended Plan from BEWG 21 Jul 04
- Recommended Plan to CAC 11 Aug 04
- Draft DMMP & Tiered EIS Oct 04
- Final DMMP & Tiered EIS Apr 05
- Record of Decision May/Jun 05