Workshop on the Reuse of (Contaminated) Sediments

Developments in the United States

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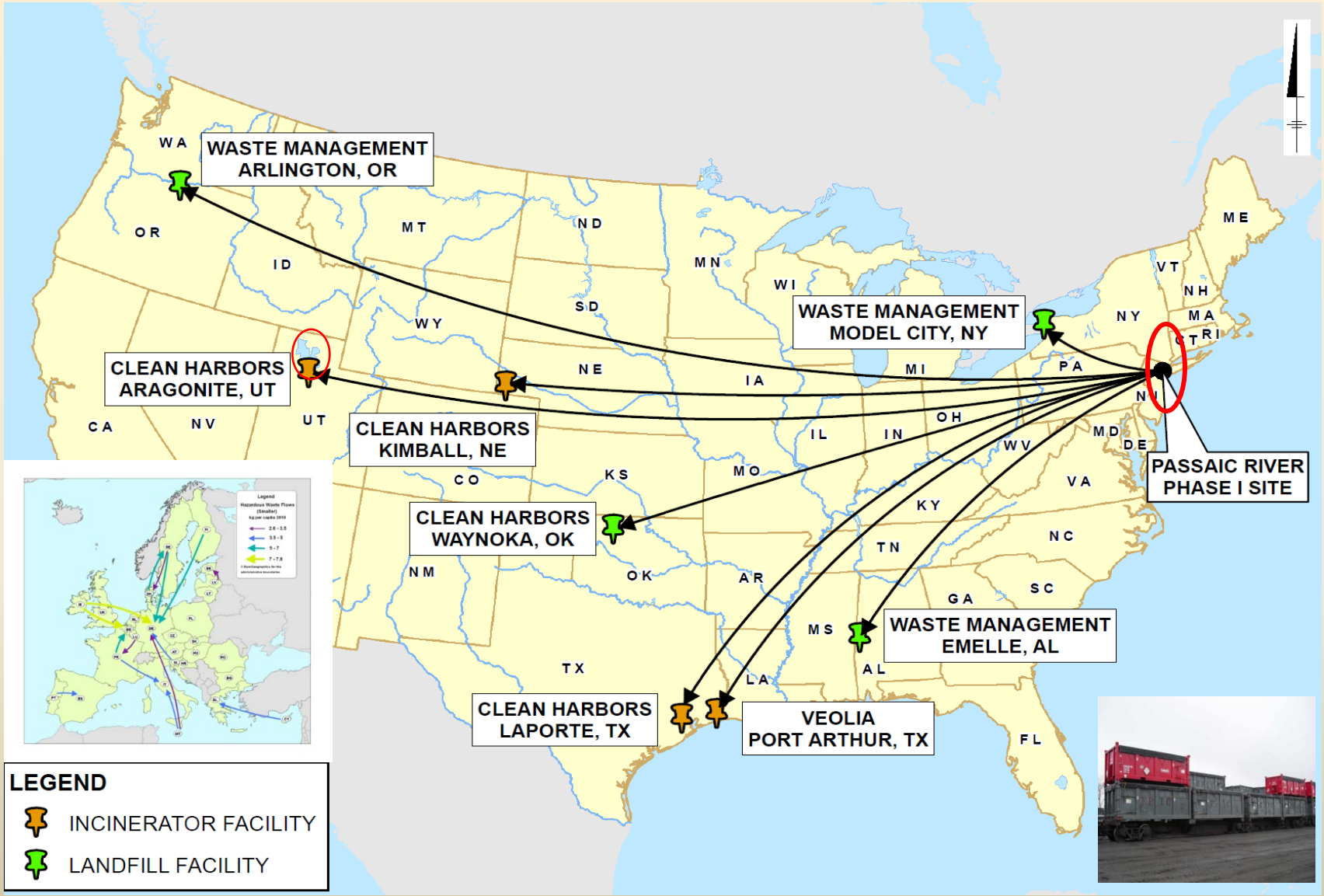
9th International Sednet Conference
23-26 September 2015
Krakow Poland

Beneficial Use

- Clean Sediments – Coastal processes
- Dredged Materials
- Contaminated Sediments

Sediment Disposal Sites (landfills/incineration)



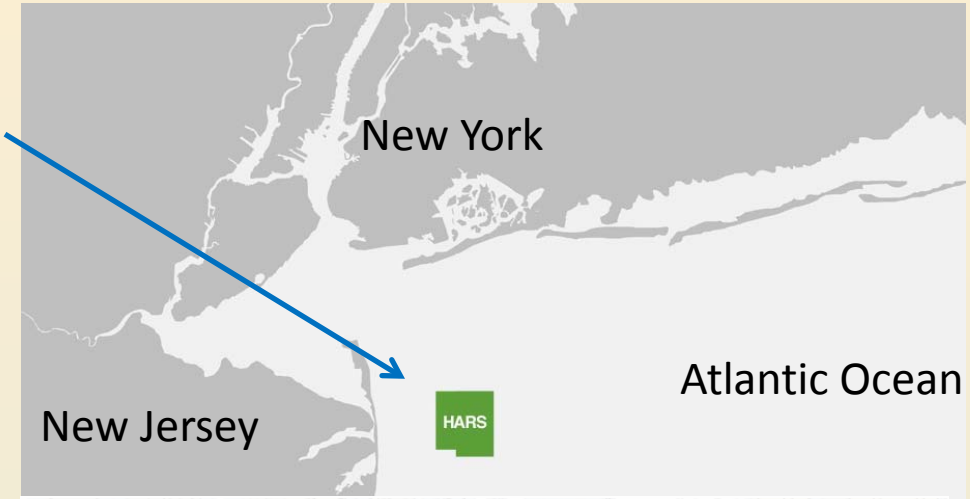
Regulatory Mindset

Contaminated Sediments and Restoration are SEPARATE Programs

- London Convention
- Clean Water Act
  - Prohibits placement of *Processed Dredged Material* back into waters of the US
- Marine Protection, Research, and Sanctuaries Act of 1972 -USEPA Ocean Dumping Regulations
  - Quality standards, biotoxicity, bioaccumulation, numerical criteria
- State Regulations
  - "Clean" varies state to state
- Federal Standard (USACE)
  - Restricts allowable construction costs (lowest cost)

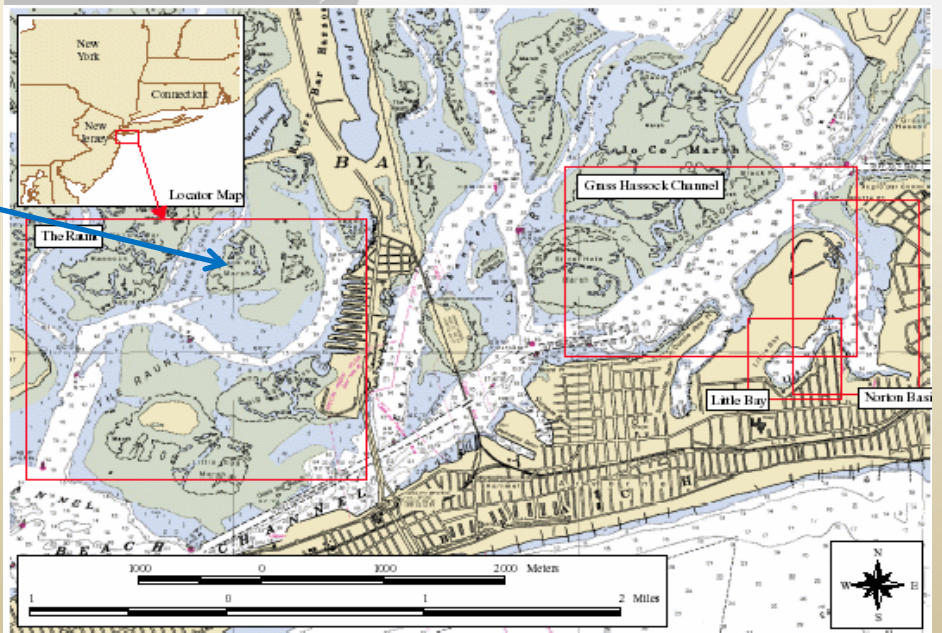
Offshore Sites

HARS – (Historic Area Remediation Site) offshore New York Harbor – very clean material (PCB< 113 ppb) used to cap former dumping area of contaminated sediments



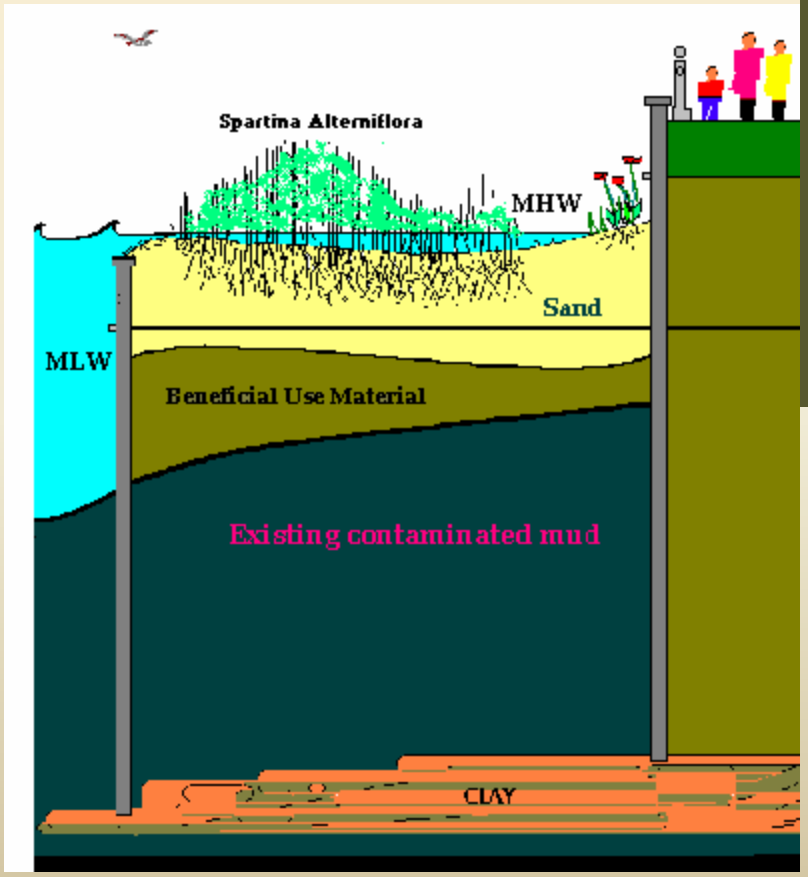
Jamaica Bay Borrow Pits – Depressions in seafloor from former sand mining

- Stratification causing hypoxia during warm months
- Certain fish use for overwintering
- Proposal to fill rejected …Fishermen like fish



Confined Disposal

CDF shoreline



Regulatory concerns:

- Habitat trade-off
- Mitigation fees
- Leakage
- Wildlife use
- Long-term maintenance

Upland Restoration

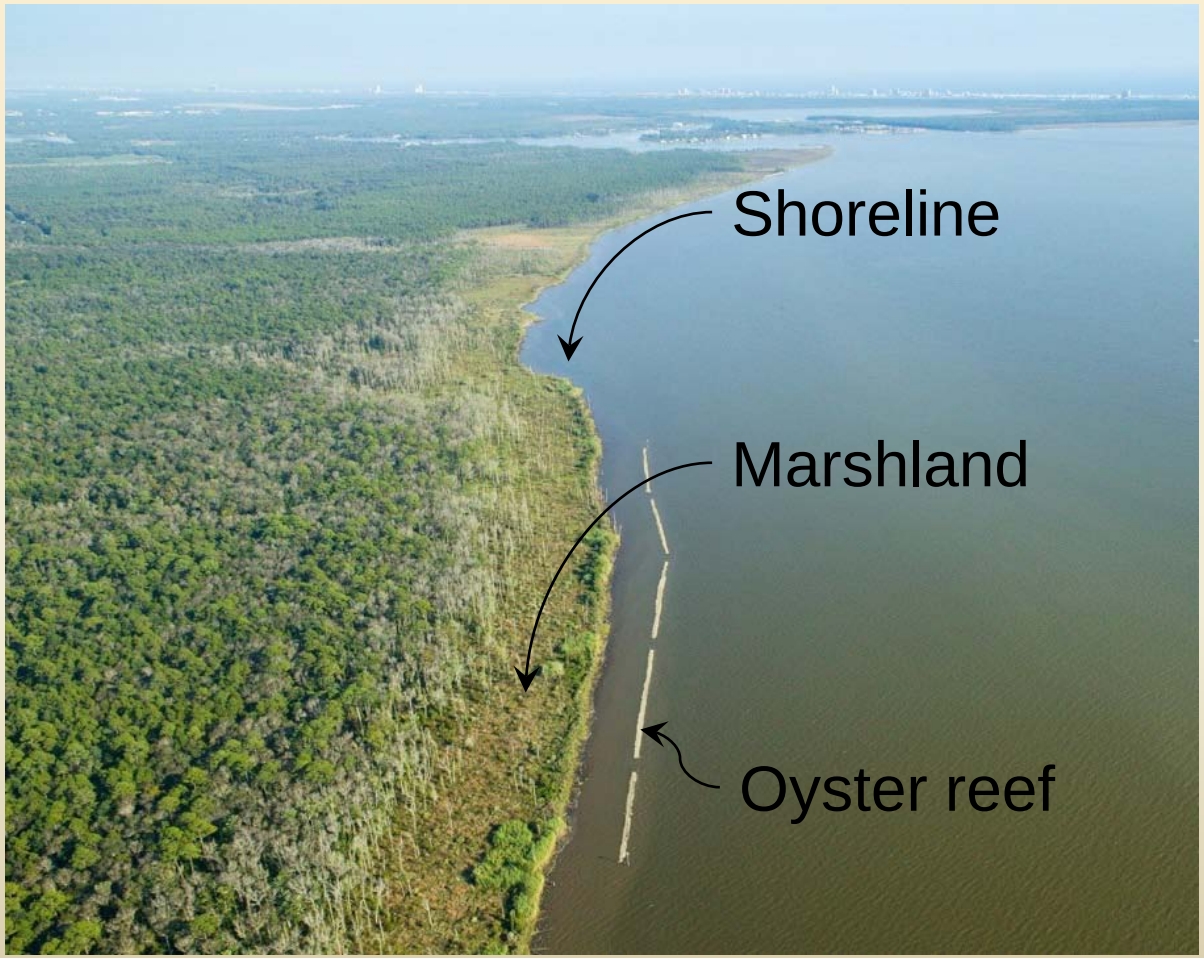
Weanack, Charles City, VA

Source: Wick, A. F., Daniels, W. L., & Carter III, C. H. Soil Development and Vegetation Establishment on Amended Saline Dredged Materials. Presented at the 2011 National Meeting of the American Society of Mining and Reclamation, Bismarck, ND, Reclamation: Sciences Leading to Success,, June 12-16. R.I. Barnhisel (Ed.).

Living Shorelines

December 2009 Installation

June 2010 Living shoreline

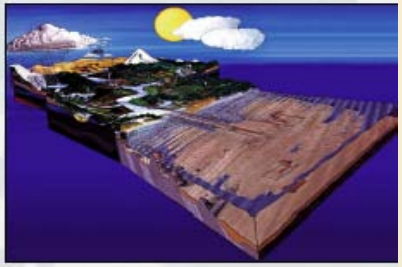


Engineering W Nature

EWN, A Natural Extension of RSM

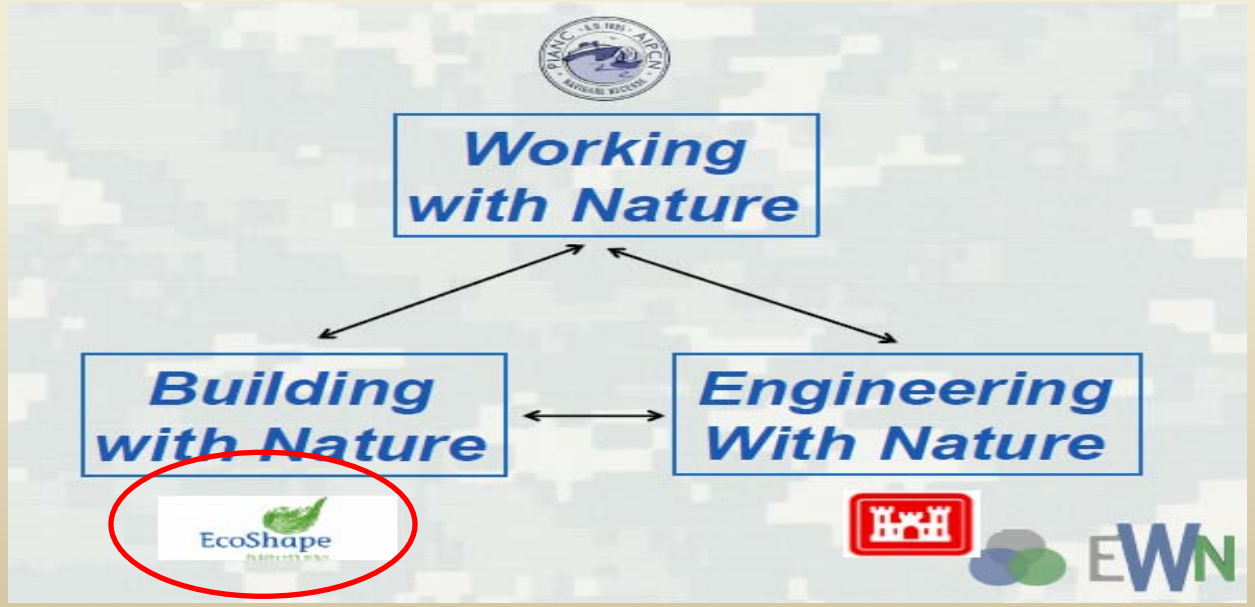
EWN- An *ecosystem approach* to infrastructure development and operations

- Applied across missions and business lines
- Expanding environmental benefits and services provided by infrastructure



Engineering With Nature is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.

Todd Bridges, 2012
USACE ERDC
EWN presentation



Trends

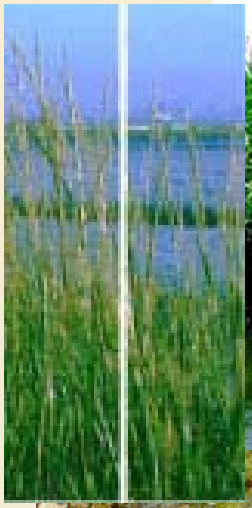
- Price of Sand Increasing
  - Demand for construction
  - Demand for beach protection
  - Mining/transport
- Many CDFs at capacity –Mine for Reuse?
- Increased interest in integration and beneficial use
- Offsets
  - Jobs - Local economies
  - Corporate reputation
  - “Blue carbon”

Trends

- It's Not about Sediment
- It is about:
  - Economics - local revitalization
  - Jobs
  - Climate adaptation – restoring interrupted supply
  - Drinking water supply
  - Biodiversity/ Food security
  - Ecosystem services
  - Sustainable use of energy and resources

Sediment Stabilization

Encap Golf Holdings



- **3.5 mcm ADM**
- **Eliminate leachate**
- **Restore and preserve 150 hectares of wetlands**
- **4 - 18 hole golf courses**
- **1.5 million square feet of office, retail, and recreational space**
- **2000 housing units**
- **$20 million annual tax revenue**
- **7,000 jobs**

Bark Camp. PA Mine Reclamation
320,000 m^3 Demonstration

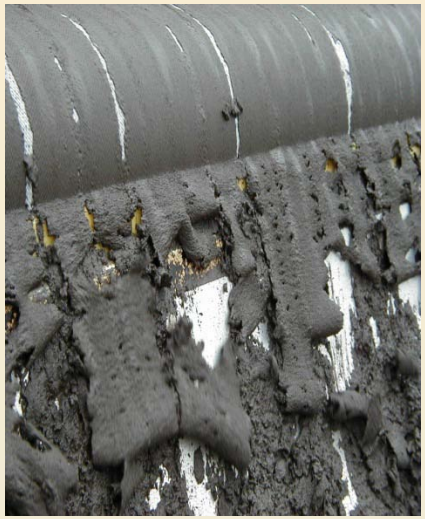
Landfill Closure

Hart - Miller Island
Chesapeake Bay, Maryland

Geotubes

Rock – Artificial Reef Habitat

Sediment Decontamination



New York/New Jersey Estuary Superfund Program Perfect Storm

Site	USEPA Volume Estimate (1,000 Yards^3)	Record of Decision Date	Anticipated Construction Start
Gowanus Canal, NY	588	2013	2016
Passaic River, NJ			
- Lower 8 miles	4,300	2014	2018
- Upper 9 miles	TBD	TBD	TBD
Newtown Creek, NY	1,000 to 2,000	2016	2020
Berry's Creek, NJ	500 – 1,000	2017	2018
Newark Bay, NJ	TBD	TBD	2018
Pierson's Creek	TBD	TBD	TBD

Regional Sediment Processing Facility?

The NY/NJ Harbor Sediment Perfect Storm:

2014 - 2022

(1) Remediation +

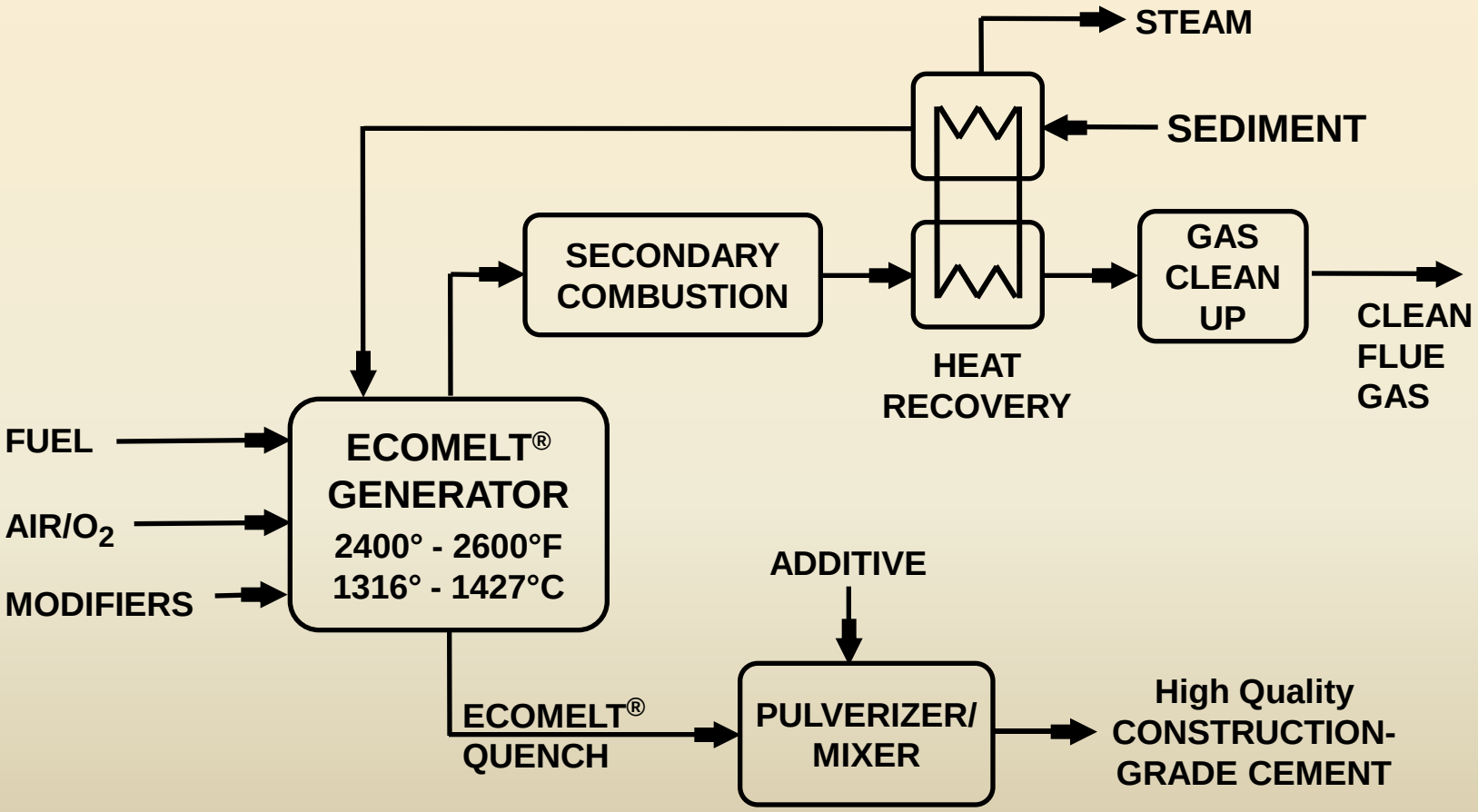
(2) Restoration

(3) US Army Corps of Engineers navigational maintenance dredging (non-ocean disposal)

(2.0M + yd^3/yr)

Cement-Lock^{tm} – Volcano Partners Thermo-Chemical Sediment Treatment Demonstration Plant

Cement-Lock® Technology



EcoMelt^{tm}

Ecomelt Replaces up to 40% of Portland Cement in Concrete

Milled Ecomelt

Exceeds ASTM Standards

Montclair State Pour

- Ecomelt is a high quality pozzolan
- Regulated as manufacturing process
- Potential stabilizer for sediment at upland disposal sites

Identified Use of Cement Produced by Cement-Lock^{tm}

- **General construction for sediment processing stakeholders (e.g., state road construction, federal construction projects, port authorities, USACE, etc.)**
- **Filling / grouting of underground tanks at DOE / DOD sites**
- **Soil conditioning at landfills operated for stakeholders**
- **Sediment stabilization processes that currently use portland cement**
- **Construction of retention walls in Pennsylvania mines**

Sediment Washing

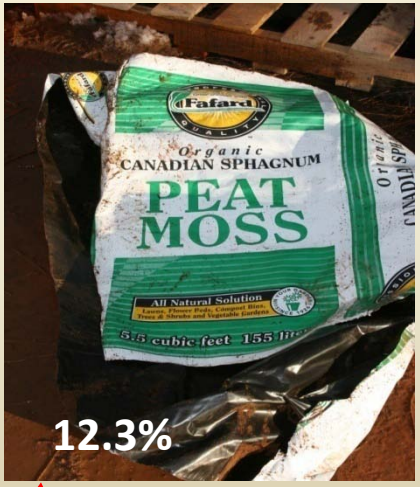
BioGenesis
Pilot Demonstration
Venice, Italy Port Authority

January 2004

Autorità Portuale di Venezia

BioGenesis^{tm} Sediment Washing – Passaic River Superfund Commercial Demonstration (2006)

Montclair State University, NJ Manufactured Soil and EcoMelt™ Sustainable Landscape Demonstration (2010) – Passaic River, NJ



Manufactured soil compared against residential/non-residential soil criteria

Treated Manufactured Soil / Construction-grade Cement: MSU/Fall 2011

Meets NJ Residential Soil Criteria

30-40% replacement for Portland cement

Upcycle Associates

Light-Weight Aggregate

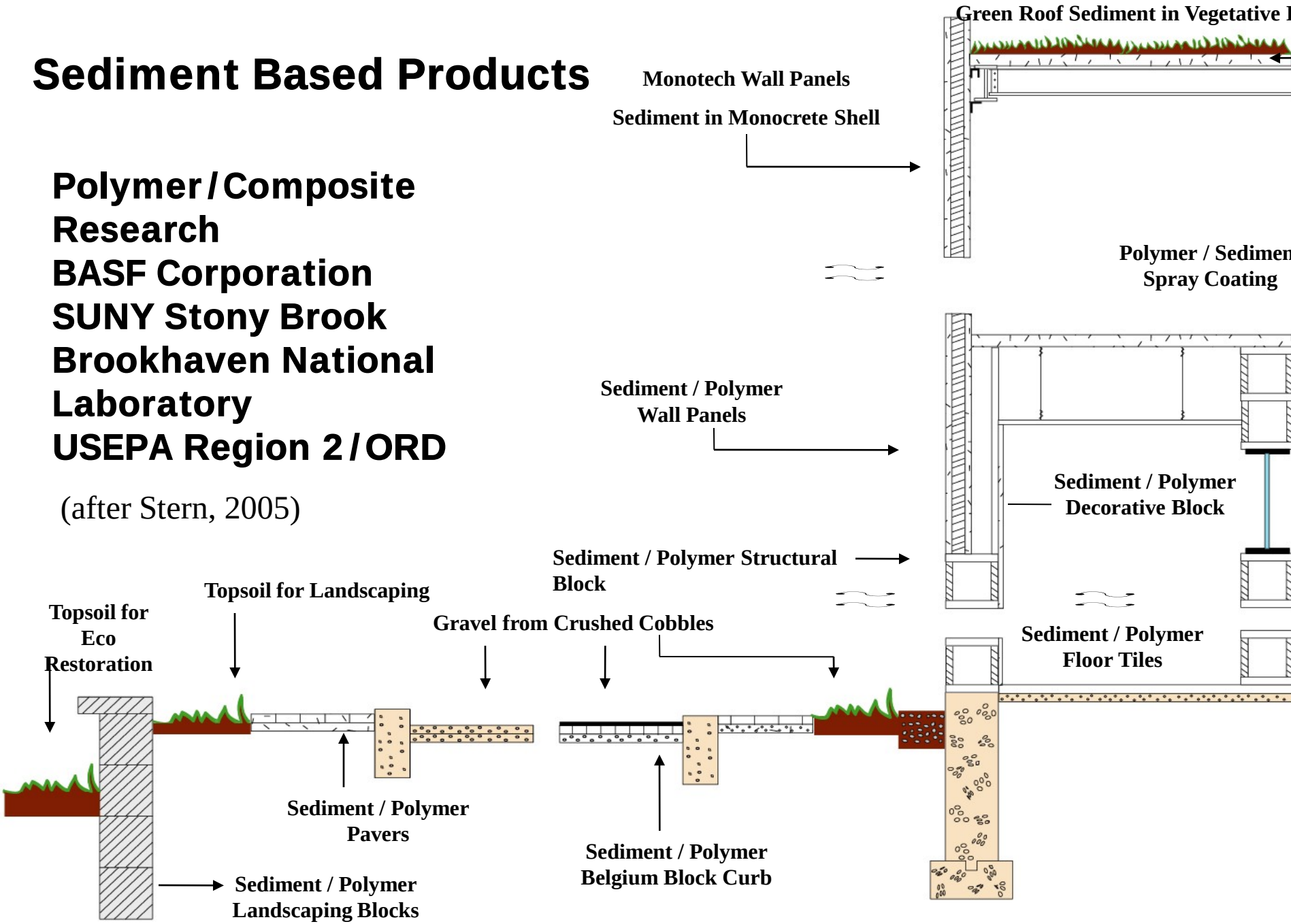
Plasma-Arc Vitrification
ARCHITECTURAL GLASS TILE

Westinghouse Research – Pittsburgh, PA

Sediment Based Products

Polymer / Composite Research
BASF Corporation
SUNY Stony Brook
Brookhaven National Laboratory
USEPA Region 2 / ORD

(after Stern, 2005)



Doug Reid Green - BASF

Envisan France – Jan du Nul Environmental Group

Extension of SEDIMED research program/ Focus: reduce the administrative and regulatory barriers for allowing recycled sediments to be used in the construction works industry: roads, concrete structures, maritime works and landscaping

Soil and sediment Treatment Center - 2015
La Seyne su Mer, France

- Biological treatment
- Physicochemical treatment
- Desanding through hydrocycloning
- Immobilization/stabilization

Recovery of Dredged **SEDI**ments of the **PORT** of Ravenna and **SIL**icon Extraction (Italy)

Sediment Washing Wet-Ox (Italy)

TREVI · 3V GREEN EAGLE
ENVIRONMENTAL REMEDIATION
WWW.6V-ITALY.COM - INFO@6V-ITALY.COM

1. Dredged Material (S/S)
2. Contaminated sediments (Ox)

6V's first soil-washing plan is currently under *construction. It can process up to 60 tons of soil* per hour, contaminated sediments (special attention is paid to the hydrocarbon contamination) or residues from drill spoils, in order to re-use the recoverable sand and aggregates for other production processes or environmental restoration activities. **The plant will be ready and certified as a mobile plant for waste treatment at the beginning of 2015, pursuant to Italian regulations.**

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