Sustainable Construction for the Cargo Handling Terminal of the Future

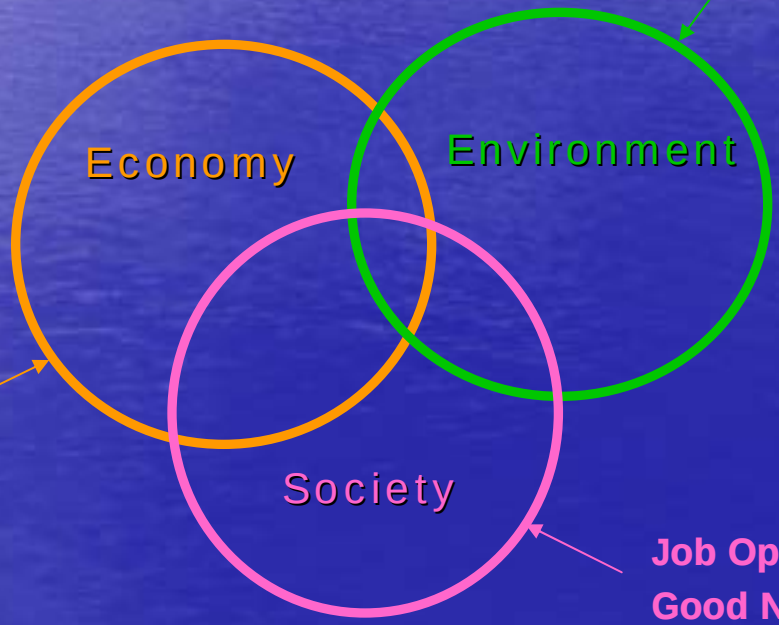
June 6, 2006

AAPA Harbors, Navigation, and Environment Seminar 2006

Road to Sustainable Construction

- 1970 NEPA
  - Short term Impacts
  - Mitigation Measures
- 1990 Environmental Management Systems
  - SE & SC
  - HTRW Demolition Wastes
  - In-water construction
- Culture of Sustainability
  - 20 of 69 LEED Rating Points from construction
  - Role in additional 21 points

Role of Construction Practices in Project Sustainability



Material Conservation
Natural Resource Enhancement
Environmental Permit Conditions

Management Systems
Schedule Efficiency
Waste Reduction

Job Opportunity
Good Neighbor/First Impression
Security

A Contractor's View---

- Unknown + Fear = $
- Understanding + Culture of Sustainability

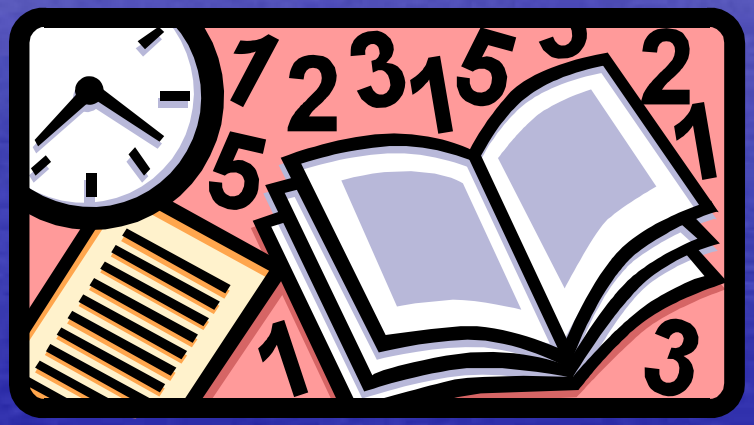
= Profits

Management Systems

- Contracting Mechanisms
  - Design-Bid-Build
  - IDIQ
  - Design Build
  - Public Bidding Rules
  - Construction Manager
- Bring Contractor into Project Team Early
- Integrated Design/Construction Action Plan
- Worker/Subcontractor Training
- Continuous Monitoring and Reporting
- Documentation

Schedule Efficiency-

- Coordinate multiple projects/contracts
- Reduce time of open surface
- Reduce active equipment time
- Better for the environment
- Better for the bank book



Schedule -

Use technology to expedite –

Waste Reduction

- 75% of building construction raw materials end up as waste
- Waste management as part of the integrative design process
  - Direct reuse and recycling
  - Source separated materials
  - Goal of 75% Reuse/Recycle
- Clear direction in specifications
- Jobsite orientation and monitoring

Materials Management

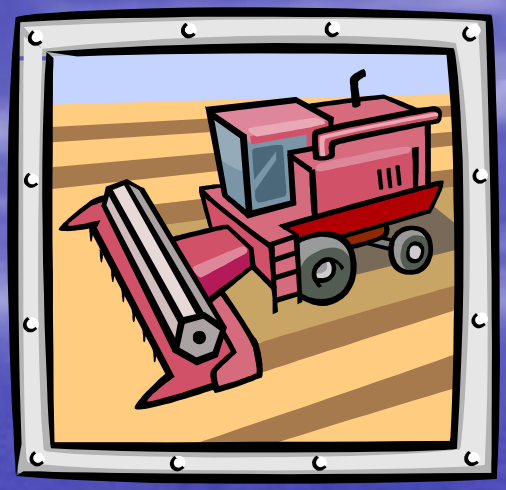
- Contaminated soils/groundwater
  - Treatment
  - Transport/dispose
  - Cap onsite
- Soils
  - Onsite reuse of borrow
  - Regional plan for reuse

Paving – Environmental Considerations

- Water based asphalt
- Oil based asphalt
- Partial paving; unpaved
- Air Quality Issues
- Water Quality Issues

- Structural and Maintenance Requirements
- Make a proactive choice with involvement of designer, contractor, and O&M personnel

Construction Impacts



- Reduce Air Emissions
  - Technology
  - Scheduling
  - Credits
- Early Implementation of Storm Water BMPs
  - Reinforced grass surface instead of impervious areas
  - Green roofs for warehouse structures
  - Reduce curb and gutter construction by using sheet flow
  - End of pipe treatment using hydrodynamics separators to control trash, oil, grease, sand, and metals
  - Underground sand filter or water quality treatment system
  - Roof disconnection by conveyance to grass areas

Natural Resource Enhancement
Storm Water Management

Permit Compliance

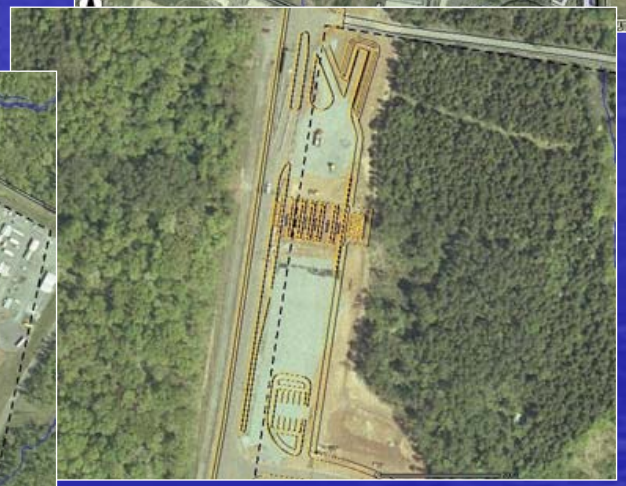
- Multi-agency permit conditions
- Multiple contractors responsible for compliance
- Create a compliance program that simplifies steps for reporting
- Unify system for multiple contractors

Society

- First Impressions are lasting
- Actively plan construction infrastructure
- For example: Dulles Airport Capital Development Program includes formal infrastructure development process-

Construction Infrastructure

- Contractor Staging areas
- Batch plants
- Access and traffic routing
- Increased gate capacity
- Material Storage



Construction Infrastructure

- Consciously site these facilities to contribute to finished project/not conflict
- Avoid incidental infractions of environmental regulations
- Avoid offsite traffic issues
- Avoid interference with ongoing operations

Security

- DoD Antiterrorism Standards and Whole Building Design Guide Conflicts
  - Standoff Distance
  - Unobstructed Space
  - Structured Parking
  - Materials Reuse/Recycled

LEED® Credit		Antiterrorism Standard													
Sustainable Sites		1	2	3	4	5	6	7	8	9	10	11	12	13	14
SS-P1	Erosion & Sedimentation Control														
SS-1	Site Selection														
SS-2	Development Density														
SS-3	Brownfield Redevelopment														
SS-4.1	Alternative Transportation, Public Transportation Access														
SS-4.2	Alternative Transportation, Bicycle Storage & Changing Rooms														
SS-4.3	Alternative Transportation, Alternative Fuel Vehicles														
SS-4.4	Alternative Transportation, Parking Capacity														
SS-5.1	Reduced Site Disturbance, Protect or Restore Open Space														
SS-5.2	Reduced Site Disturbance, Development Footprint														
SS-6.1	Stormwater Management, Rate and Quantity														

- Busy Port Specific Standards More Appropriate

Understanding

+

Culture of Sustainability =

Productivity and Security

Water Side Sustainable Construction Practices: Long Term Sustainable Dredging Strategies

Water Quality: Sustainable Maintenance of Navigable Waterways are achieved through:

a. Holistic and Life Cycle Understanding of the Watershed/Ecosystem that has created the sediments and is now going to be Impacted by Removing the Sediments

Sustainable Dredging Strategies: Green Dredging Equipment

- High efficiency dredge or slurry pumps
- High accuracy (metered) winch systems with high holding power and anchor systems
- De-gassing equipment
- Hopper overflow controls
- Special dragheads with cutters, visors and turbidity control
- Swell compensators
- Dredging & production computers with nuclear density and flow measurement

  gauges for concentration monitoring

Environmental Dredging Equipment:

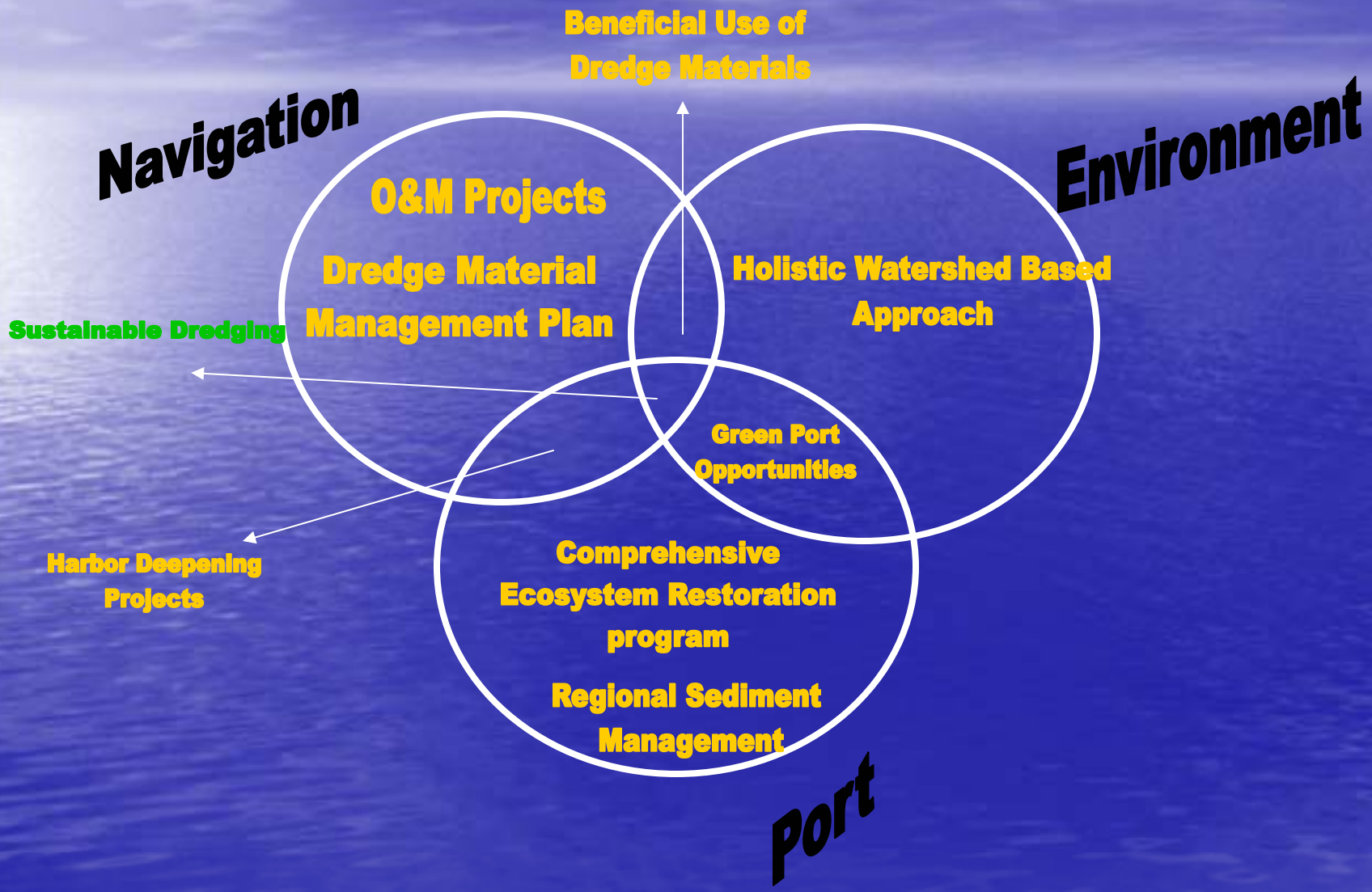

Kettelmeer in Holland

- Is highly efficient in terms of dredging, containment & transport (eg. cutting & pumping or excavating, containing & disposal)
- Has the ability to reduce the amount of dilution by maintaining dredged density and limiting water content
- Has the means to position itself very accurately and remove material in a controlled & precise manner
- Is fitted with sophisticated Kinematic DGPS positioning, dredging computers, production & other data logging equipment often radio linked to a shore station.
- Limits or reduces turbidity significantly

Sustainable Dredge Materials Management Strategies

- Consider Developing Holistic Dredge Materials Management Plans
- Look beyond the Project Scope and Needs
- Consider beneficial Upland use of Suitable Sediments
- Consider Developing RSM partnerships & arrangements with Corp, etc

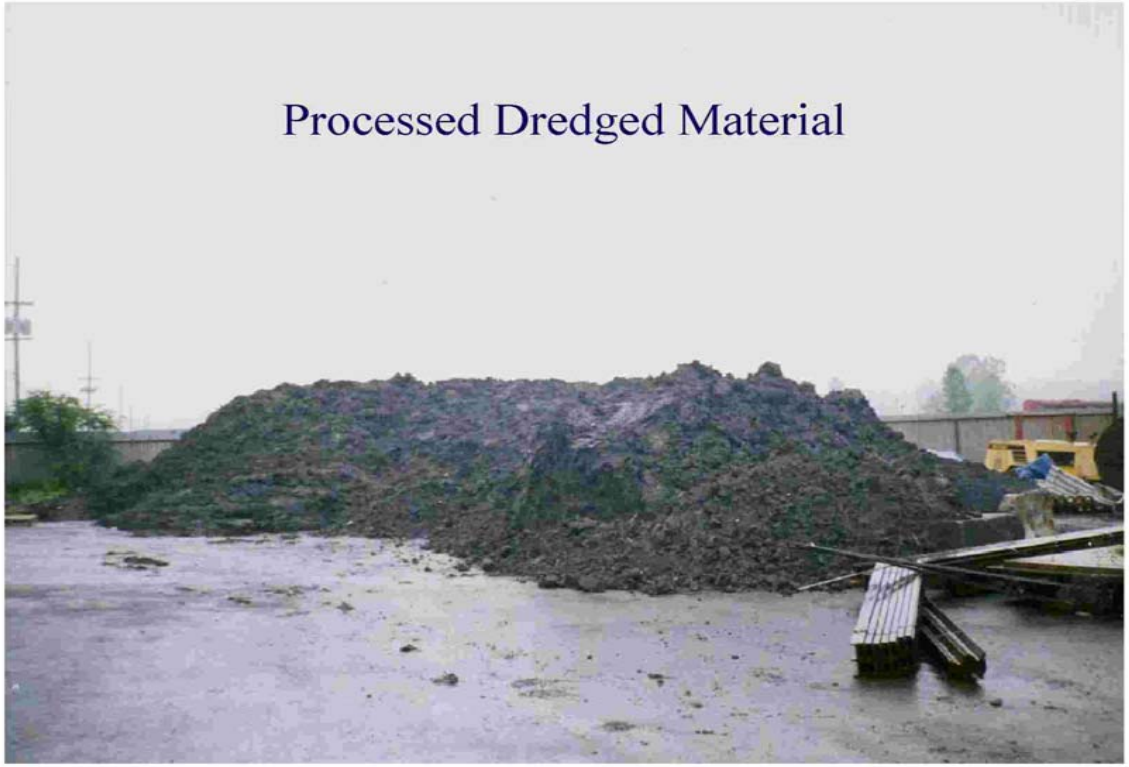
Finding Sustainability in Dredging



Sustainable Dredge Materials Management Strategies

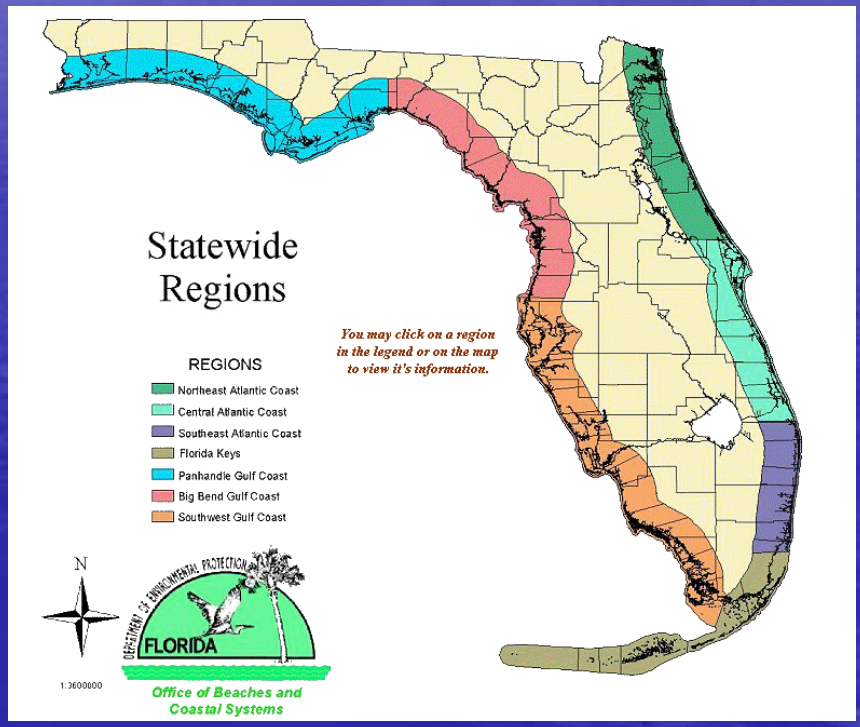
- Sustainable Use of Different Sediments:
- Rock Materials: Create Fishing Reefs
- Suitable Materials: Beach Nourishment (Sand Only)
- Wetlands and Sub aquatic habitat creation (restricted to certain types of materials)
- Unsuitable Materials: Processed to Cap Brownfields/Portfields as well as Regional landfills.

Processing Dredge Materials: Stabilization/Solidification, ETC



Sustainable Regional Sediment Management: RSM

- Partner with the USACE in pursuing RSM by collaborating with local and state governments to manage sediments over regions encompassing multiple projects.



Sustainable Dredging

- Air Quality:
- In order to reduce emissions of N0x and PM from Dredging Operations/Equipment:
  - Consider clean diesel fuel dredges in the contract; or
  - Consider electric dredges in contract
  - In Non-Attainment areas, it may be required as a mitigation measures regardless

Sustainable Water Side Construction

- Social Equity:
- Consider wetlands creation, and wildlife habitats via beneficial Use of suitable sediments in areas of the port neighboring socio-economically challenged areas of the community.
- Require minority contract participation in dredging contracts.