Dredging Operations and Environmental Research Program
(DOER)
2005 – 2009
WWW.WES.army.mil/el/dots/doer

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Basis for DOER

- Pressure to end Aquatic Placement will grow
- Costs of project maintenance and placement alternatives will increase
- Environmental standards for all alternatives are more restrictive and grow in number
- Future engineering and environmental innovation will be essential to keep costs within budget constraints

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Basis for DOER

- Risk-based assessment and management will dominate
- Corporate technology base is diminishing and must be maintained
- Beneficial uses of dredged material will be a priority
- Technology innovation and enhancement will be a key to success
- Technology transfer and application to stakeholders must be effective
- GI R&D Program does not have resources for focused dredging and navigation R&D

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DOER

Objective: Ensure a successful navigation program by resolving complex economic, engineering, and ecological challenges through continued excellence in operational and environmental applications

DOER
- Focus Areas -

- Innovative Technologies
- Environmental Resource Protection
- Dredged Material Management
- Risk

(Finite term work units, e.g. 1-3 years in length, will be structured by ERDC and Field Review Groups and approved by HDQ USACE to meet program goals)

DOER
Innovative Technologies

Identify, evaluate and develop tools, databases and software, equipment, and techniques to improve the design, operation, and management of Corps maintained navigation projects

Work Units

- Evaluations and Cooperative Demonstration
- Dredging Project Management
- Dredging (Operations) Decision Support System
- Fluid Mud Measurement and the Definition of Navigable Depth

Innovative Technologies

Work Unit

Evaluations and Cooperative Demonstrations

Thrust Areas

- Technology Evaluation-Cooperative Demonstrations-Workshop
- Demonstrate Innovative Dredges and Dredging Techniques
- Demonstrate Innovative Placements-Rehandling-Beneficial Uses of Dredged Material
- Demonstrate Innovative Tools, Techniques, and Management Practices

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Innovative Technologies

Work Unit

Streamlining Dredging Data Flow and SI Evaluation

Thrust Areas

- Improved Data Integration
- SI Demonstrations
- Uncertainties in Dredged Material Masses/Volumes, In Situ and as Placed in Disposal Sites

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Innovative TechnoIogies

Work Unit

Dredging Operations Decision Support System

Thrust Areas:

- Design/Data Integration/Application
- Environmental Databases and Numerical Model Assimilation
- Scheduling and Economics
- Technical Transfer

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Innovative TechnoIogies

Work Unit

Fluid Mud Measurement and the Definition of Navigable Depth

Thrust Areas

- Identify District and European Fluid Mud Measurement Practices.
- Demonstrate and Evaluate Most Promising Technologies and Develop Navigable Depth Criteria
- Engineering Recommendations for Implementing Corps Navigable Depth

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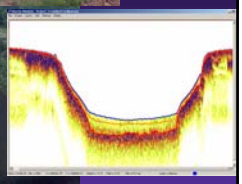
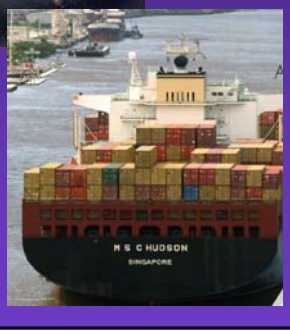
Innovative Technologies
Top Five Products for FY04

- Corps/EPA fluid mud survey demo
- Beneficial and re-handling technologies demos
  -Crushed glass/fine grained material mixtures
  -Air conveyance method
- SI for Pipeline dredge demo
- Updated SI specs and mechanism for Corps-wide implementation
- DODSS
  - Development Scenario

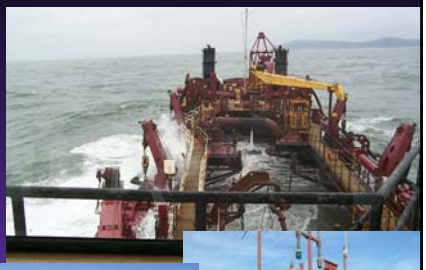
Savannah Turning Basin



Innovative Technologies
Top Five Products for FY05

- Contract payment by hopper measure demos
- Fluid mud survey systems' evaluations
- Mechanical Dredge SI Demo
- TN – Web Services for SI data; standard methods for SI implementation
- TN - DOSSS project implementation



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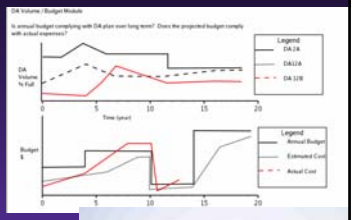
Innovative Technologies Top Five Products for FY06

- Updated SI specs and mechanism for Corps-wide implementation
- SI for pipeline dredge demo
- Decision support application for Savannah King Island Turning Basin
- Evaluations on fluid mud survey systems
- Guidance on dredging in unexploded ordnance contaminated sediment



DOER

Environmental Resource Protection

Address problematic environmental resource issues using a combination of innovative engineering and scientific approaches

Work Units

- Threatened and Endangered Species Protection
- Habitat Protection
- Environmental Windows

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Environmental Resource Protection

Work Units

Threatened and Endangered Species Protection

Thrust Areas:

- High Priority Target Species
- Tools and Technologies Development

Habitat Protection

Thrust Areas:

- High Priority Habitat Issues
- Beneficial Use of Dredged Material for Habitat Enhancement

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Environmental Resource Protection

Work Unit

Environmental Windows

Thrust Areas:

- New Initiatives and Continued Work
  - Suspended sediments
  - T&D Windows
  - Best Management Practices
  - Risk
  - Modeling
  - Plume Tracking

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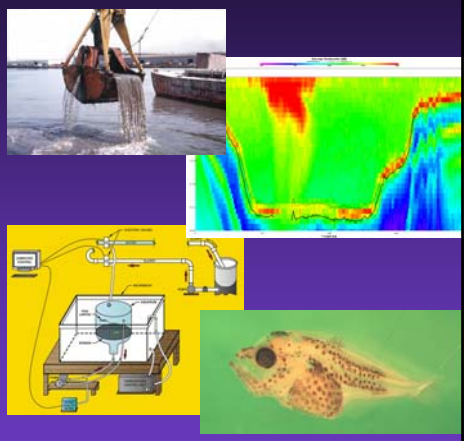
Environmental Resource Protection Top Five Products for FY04

- SSFATE numerical modeling tool field verification
- Improved hydroacoustic methods for assessing dredging effects on fish movements
- New T&E Species initiatives
- Improved sediment plume characterization methods
- Lab protocols for determining effects of sediments on fish eggs and larvae



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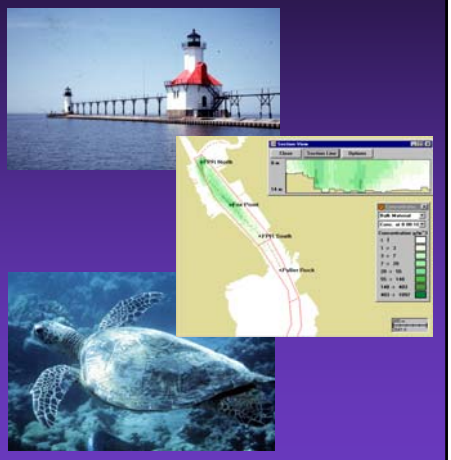
Environmental Resource Protection Top Five Products for FY05

- Collaborative studies with Great Lakes Dredging Team and SF LTMS interagency teams
- Model tool validations
- Address technical issues related to dredging effects on seagrasses and SAV
- Continue sturgeon, shad, tern and piping plover studies
- Expansion of T&E species protection management system



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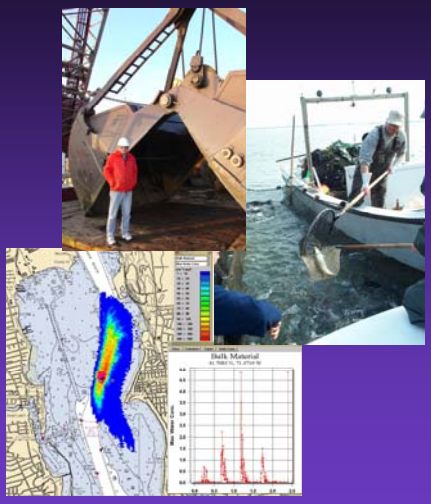
Environmental Resource Protection Top Five Products for FY 06

- **Continue collaborative studies with Great Lakes Dredging Team, SF LTMS, and Providence River interagency teams**
- **Deploy on-line T&E species protection management system**
- **Publish validation of SSFATE far-field plume model**
- **Complete assessments of dredging effects on seagrasses and SAV**
- **New guidance on effective T&E bird protection measures**



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DOER

Dredged Material Management

To develop dredged material handling, transport, and placement options which are operationally efficient, environmentally sound, and cost-effective

Work Units

- Dredging Model, Data, and Project Interfaces
- Dredging and Aquatic Placement Operations and Management
- Confined Disposal Facility Placement, Management, and Reclamation
- Beneficial Uses of Dredged Material

Dredged Material Management

Work Units

Dredging Model, Data, and Project Interfaces

Thrust Areas:

- Data and Project Management
- Model Interfaces

Dredging and Aquatic Placement Operations and Management

Thrust Areas:

- Dredging Operations and Dredged Material Placement Models.
- Aquatic Placement Options
- Dredging Controls

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Dredged Material Management

Work Units

Confined Disposal Facility Placement, Management, and Reclamation

Thrust Areas:

- CDF Operation and Management
- CDF Reclamation

Beneficial Uses of Dredged Material

Thrust Areas:

- Functional Suitability of DM for Specific Beneficial Uses
- Implementation Guidance
- Performance Monitoring

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Dredged Material Management

Work Unit

Beneficial Uses of Dredged Material

Thrust Areas:

- Functional Suitability of DM for Specific Beneficial Uses
- Implementation Guidance
- Performance Monitoring

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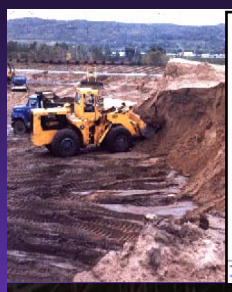
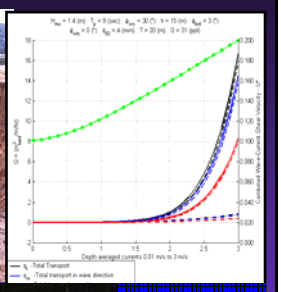
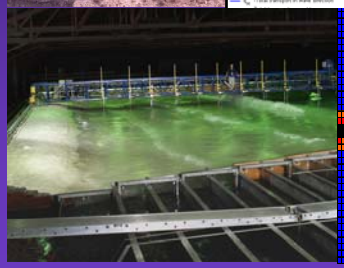
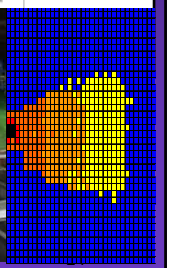
Dredged Material Management
Top Five Products for FY04

- Upgrade SS, ST, and LTFATE models
- Version 1 of SMS Dredging Tools
- Coastal dredging tools implementation at Mobile
- Performance monitoring of CDF placement operations (collaboration with the Detroit District)
- ETS sediment tracer SOP/ laboratory validation



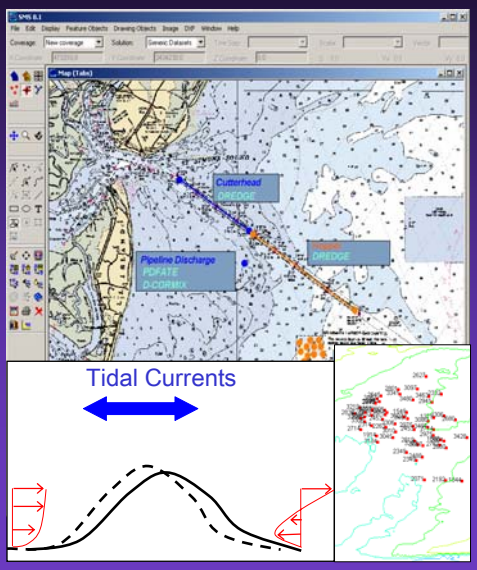






Dredged Material Management
Top Five Products for FY05

- Version 2.0 of SMS dredging tools
- Protocols for monitoring dredging operations
- Monitoring nearshore placement at Savannah
- Upgrade MDFATE, DCORMIX and PDFATE
- Connect SMS dredging toolbox and eCoastal



Dredged Material Management
Top Five Products for FY06

- **PTM: Three-dimensional particle tracking model for dredge-induced suspended solids**
- **SMS Version 2 for near- and far-field dredging FATE models**
- **Mobile SEAWOLF flume for sediment suspension in wave-current environments**
- **Assessment tools for dredged material beneficial use suitability**
- **Guidance for improved phyto-engineering using soil amendments**

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DOER

Risk

To apply a comparative risk-based framework in the assessment and management of contaminated or non-contaminated dredged material and to develop logical decision support tools that quantify uncertainty and facilitate efficient decision-making

Work Units

- Exposure Assessment Methods and Approaches
- Effects Assessment Procedures and Tools
- Risk Characterization Approaches and Methods Development
- Risk Management in the Dredging Program

Risk

Work Unit

Exposure Assessment Methods and Approaches

Thrust Areas:

- Contaminant Bioavailability
- Experimental and Analytical Procedures for Assessing Exposure
- Contaminant Fate and Transport
- Exposure Modeling and Software Development

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Risk

Work Unit

Effects Assessment Procedures and Tools

Thrust Areas:

- Toxicity Test Development
- Contaminant- and Species-Specific Toxicology Studies
- Rapid, Low-Cost Methods for Conducting Screening-Level Effects Assessments

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Risk

Work Unit

Risk Characterization Approaches and Methods Development

Thrust Areas:

- Risk Modeling
- Comparative Risk Assessment

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Risk

Work Unit

Risk Management in the Dredging Program

Thrust Areas:

- Engineering Approaches for Managing Exposure and Risks
- Remediation Technology
- Environmental Decision Making

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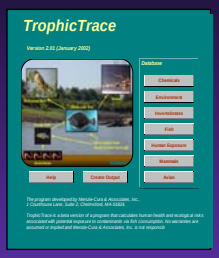
Risk
Top Five Products for FY04

- **Quantitative screening procedures for CDF contaminant pathway evaluations**
- **Publish risk assessment guidance for UTM**
- **Publish version 2.0 of *TrophicTrace* bioaccumulation modeling software**
- **Integration of dredging modeling tools and management scenarios into the Army Risk Assessment Modeling System (ARAMS)**
- **Framework for applying multi-criteria decision analysis in dredged material management**



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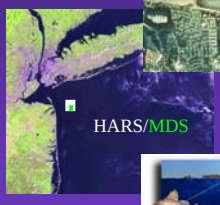
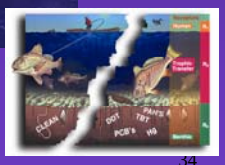
Risk
Top Five Products for FY05

- Field and laboratory validation of chronic sublethal toxicity tests
- Micro-analytical methods for contaminant tissue analysis
- Guidance for costing contaminated sediment management technologies
- Improved capping design models and guidance

Risk
Top Five Products for FY06

- Quantitative screening procedures for CDF contaminant pathway evaluations
- Volatile emissions assessment and modeling guidance
- FishRand-Migration bioaccumulation modeling software
- Costing guidance for evaluating contaminated sediment treatment technologies
- Framework for applying multi-criteria decision analysis in dredged material management





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DOER
Benefits

- Increase navigation dredging efficiency and production
- Improve competition among dredging contractors
- Successful project management and contracting strategies
- Minimize risk to biological resources and their habitats
- Maintain viable aquatic placement alternatives
- Improved information management

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DOER
Benefits

- Maintain efficient and cost-effective confined placement alternatives
- Improved predictive technology
- Expanded beneficial use alternatives
- Risk-based decision-making
- Cost effective contaminated sediment management strategies

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