# Dredged Material Management in the USACE Navigation Channel Operations and Maintenance (O&M) Mission

## An Interactive Seminar

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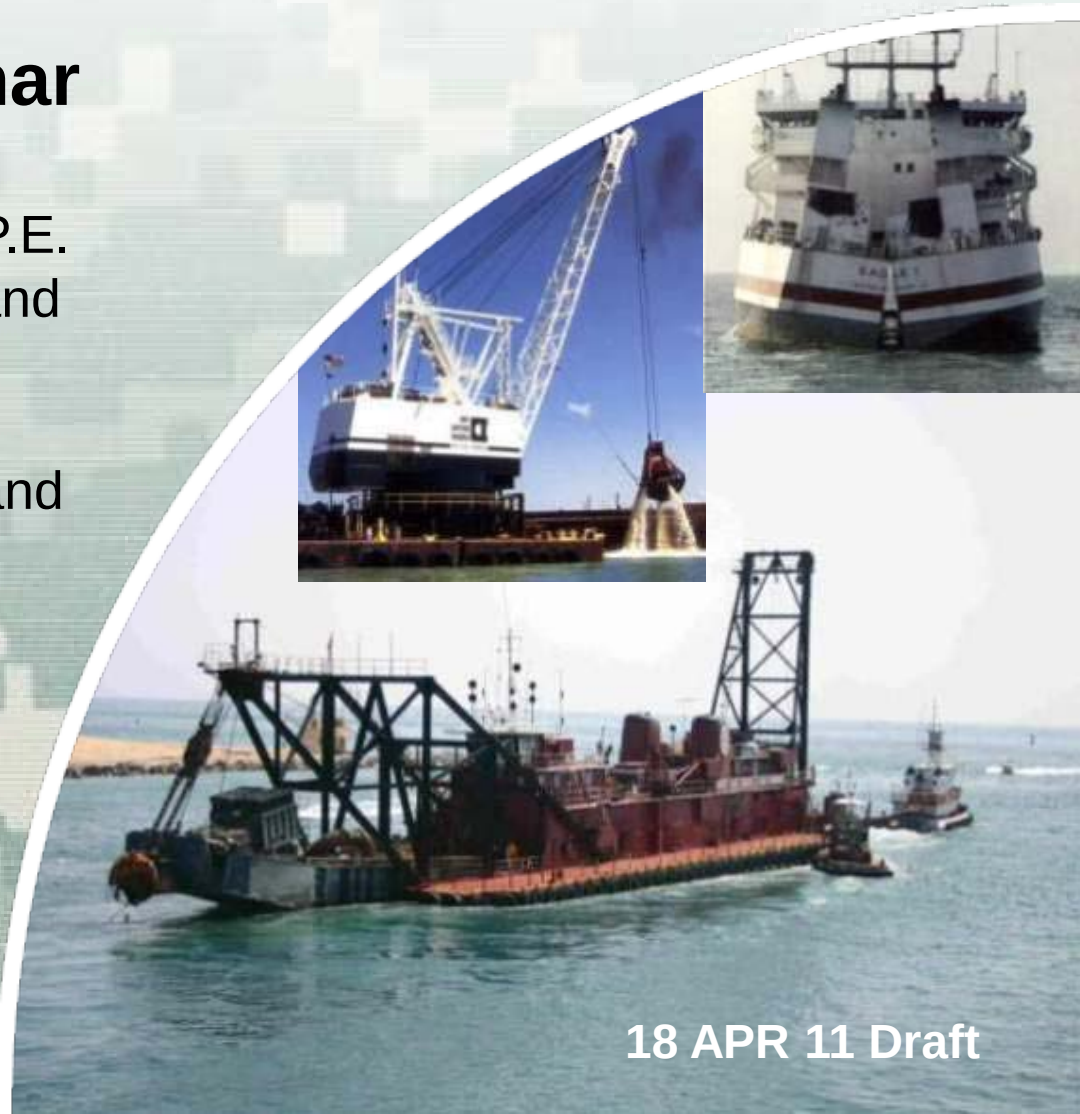

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# Workshop Objectives

- Provide an opportunity for participants to learn from other districts on their Dredged Materials Management Plan (DMMP) experiences and lessons learned

- Enhance understanding and communication between district organizations (esp. Planning and Operations) on roles and responsibilities with respect to developing DMMPs for existing and future channel improvements

- Gather information in order to create a “District Operational DMMP Standard Operating Procedure” document to standardize study processes and schedule development.

# Overview

- Operations context of DMMPs
- Policies, laws, and regulations
- Historical data management and analysis
- Triggers for need of a preliminary assessment and DMMP

# Operations Context of DMMPs

# Channel Maintenance Challenges

- Large and growing prioritized maintenance needs (i.e. “backlog”)
- Uncertainties on annual locations, magnitudes, and frequencies of channel shoaling events
- Deficient annual budgets to monitor, plan, and execute channel maintenance
- Escalating dredging costs and limited dredge plant resources
- Provision of minimal navigation levels of service required
- Competing expectations of navigation interests on channel maintenance and environmental stakeholders on beneficial use

# Channel Maintenance Challenges (cont)

- Significant demands on district capabilities and capacities to plan and execute work with limited resources
- Short schedules for decisions to be made on maintenance scopes
- Complex and sometimes conflicting O&M planning and environmental compliance requirements
- Other technical considerations (e.g., E&D, LEERDS, non-Fed sponsor obligations, contracting, construction QA/QC, etc.)
- Timely and effective external and internal communications

# DMMP Development & Implementation Issues

- Effectively, resiliently, and sustainably addressing the challenges of continuing O&M due to:
  - Aging physical conditions of projects, e.g.:
    - Life cycle disposal capacity depletion issues
    - Functional loss of navigation structures
  - Physical stressors
    - E.g., tide, wave, and current regimes, riverine inputs, bank/shoreline erosion, shoaling, etc.
    - Potentially changing patterns:
      - Long-term trends, e.g., sea level rise, flow changes due to watershed development
      - Increased seasonal variability and greater frequency of extreme events, e.g., river floods and coastal storms

# DMMP Development & Implementation Issues (cont)

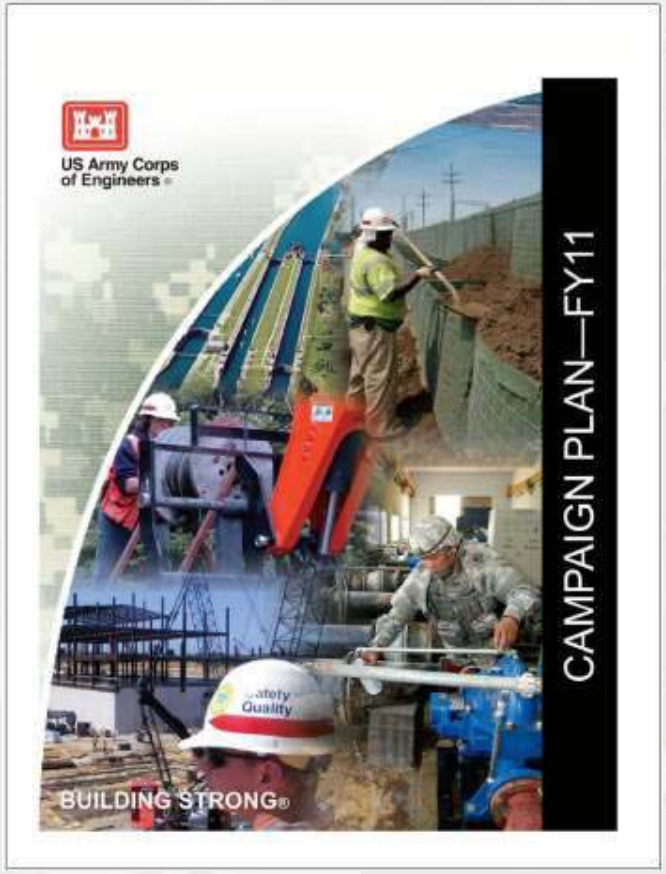
- Lack of adequate Federal and non-Fed program funding to address escalating O&M costs

- Matching O&M Program annual budget to fund the plans of comprehensive life cycle system DMMP planning processes and associated concepts, e.g.:
  - Regional sediment management
  - Beneficial use of dredged materials

- DMMP development/implementation funding requirements compete directly with O&M dredging funding needs at project and program levels

# Responding to the Commander's Intent

- USACE Campaign Plan
  - Ready for all contingencies
  - Engineering sustainable water resources
  - Delivering effective, resilient, and sustainable solutions
  - Recruit and retain strong teams
- MSC Implementation Plan
- District Operations Plan



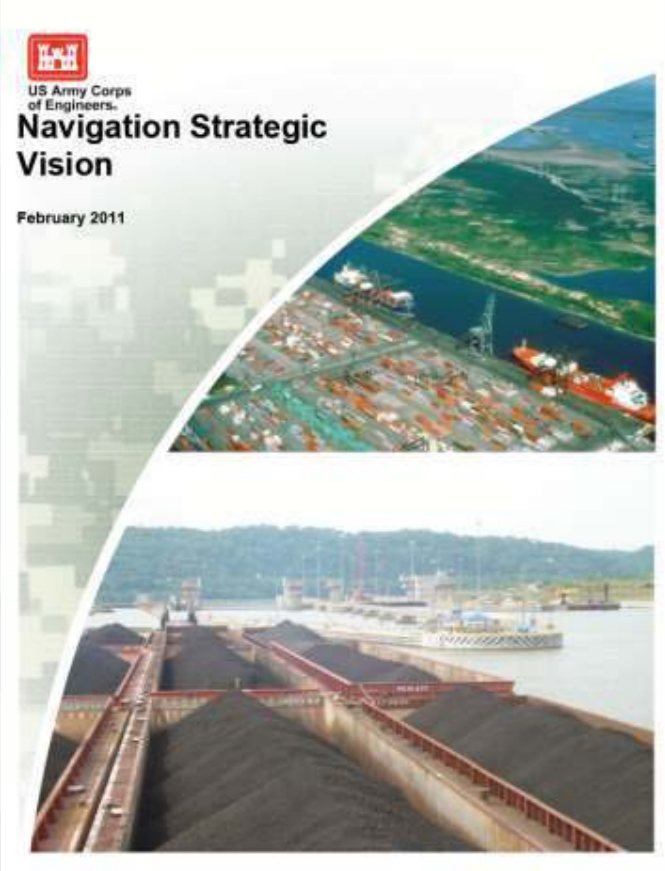

Line of sight #1 to Commander's Intent for crafting a district Standard Operating Procedure (SOP) for Dredged Materials Management Plans (DMMPs)

# FEB 11 HQUSACE Navigation Strategic Vision

- **USACE Navigation Mission:** To provide safe, reliable, efficient, effective and environmentally sustainable waterborne transportation systems for movement of commerce, national security needs, and recreation

- USACE must recognize changing parameters that affect the navigation program and make adjustments to minimize risk and maximize effectiveness to maintain safe, reliable marine transportation system

- Document provides framework to guide short and long-term objectives and identifies actions necessary for continued success of the USACE navigation program



# FEB 11 HQUSACE Navigation Strategic Vision

## Area 2 Improve Business Processes

- **Activity 2.1 Establish Action Team to Prioritize and Develop Recommendations for Improvement of Business Processes and Implementation of Asset Management**
  - Action 2.1.2 Evaluate the efficiency of existing system processes within the Navigation Program (including budgetary/funding, technical, decision-making, communication, contracting and environmental/regulatory actions, operations).
  - Action 2.1.3 Develop process improvements that result in a consistent, risk-based approach to maximize system safety, reliability, efficiency, and environmental sustainability for navigation projects.

Line of sight #2 to Commander's Intent for crafting a district Standard Operating Procedure (SOP) for Dredged Materials Management Plans (DMMPs)

# Policies, Laws, and Regulations

# Purpose and Requirements of DMMPs

- Purpose
  - Supports identification of:
    - USACE Navigation Mission Federal interest based on National Economic Development (NED) plan for:
      - Modifications to sustain on going O&M projects, and
      - Capital improvements to on going O&M projects
    - Non-Federal cost sharing requirements
  - Provides a basis for:
    - Annual O&M budget formulation and funds execution
    - Planning channel maintenance actions for provision of navigation Levels of Service required

- Must follow applicable policies, laws, and regulations

# Applicable Federal Laws

- Rivers and Harbors Act of 1899
  - Section 10 – navigable waterways
  - Section 13 – “refuse act” (as amended)
- 33 USC 335
  - Federal Navigation Channel “Federal Standard”
- 33 USC 336
  - USACE must comply with CWA and CZMA
- Clean Water Act (CWA) of 1972
  - Section 404 – Dredge/fill regulatory permits – USACE
  - Section 401 – Water quality certification – States
- Coastal Zone Management Act (CZMA) of 1972
  - Coastal Zone Management Plans – NOAA
  - Coastal Zone Consistency – States

# Applicable Federal Laws

- Clean Air Act 0f 1963, last amended 1990
  - EPA
- Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), Section 103
  - EPA
- Fish and Wildlife Coordination Act of 1958
  - USFWS
- National Historic Preservation Act of 1966, last amended in 2000
  - State Historic Preservation Officers (SHPOs)
- National Environmental Policy Act (NEPA) of 1969
  - EPA

# Applicable Federal Laws

- Magnuson-Stevens Fishery Conservation and Management Act of 1976 and 1996 (amended)
  - NOAA Fisheries
- Endangered Species Act of 1973
  - USFWS and NOAA Fisheries
- Migratory Bird Treaty Act of 1918
  - USFWS
- Farmland Protection Policy Act of 1984

# Applicable Federal Laws

- WRDAs
  - 1986 – Cost sharing for planning, engineering, and construction
  - 1996 – Cost sharing of dredged material disposal areas
- Jones Act
- Industry Capability Program of 1978, PL95-269 (Minimum Fleet Study)
- Many others, to include those for addressing environmental contaminants in the dredging process
- Consult district planning and environmental specialists to ensure environmental compliance is scoped and secured in a timely manner to meet mission execution needs

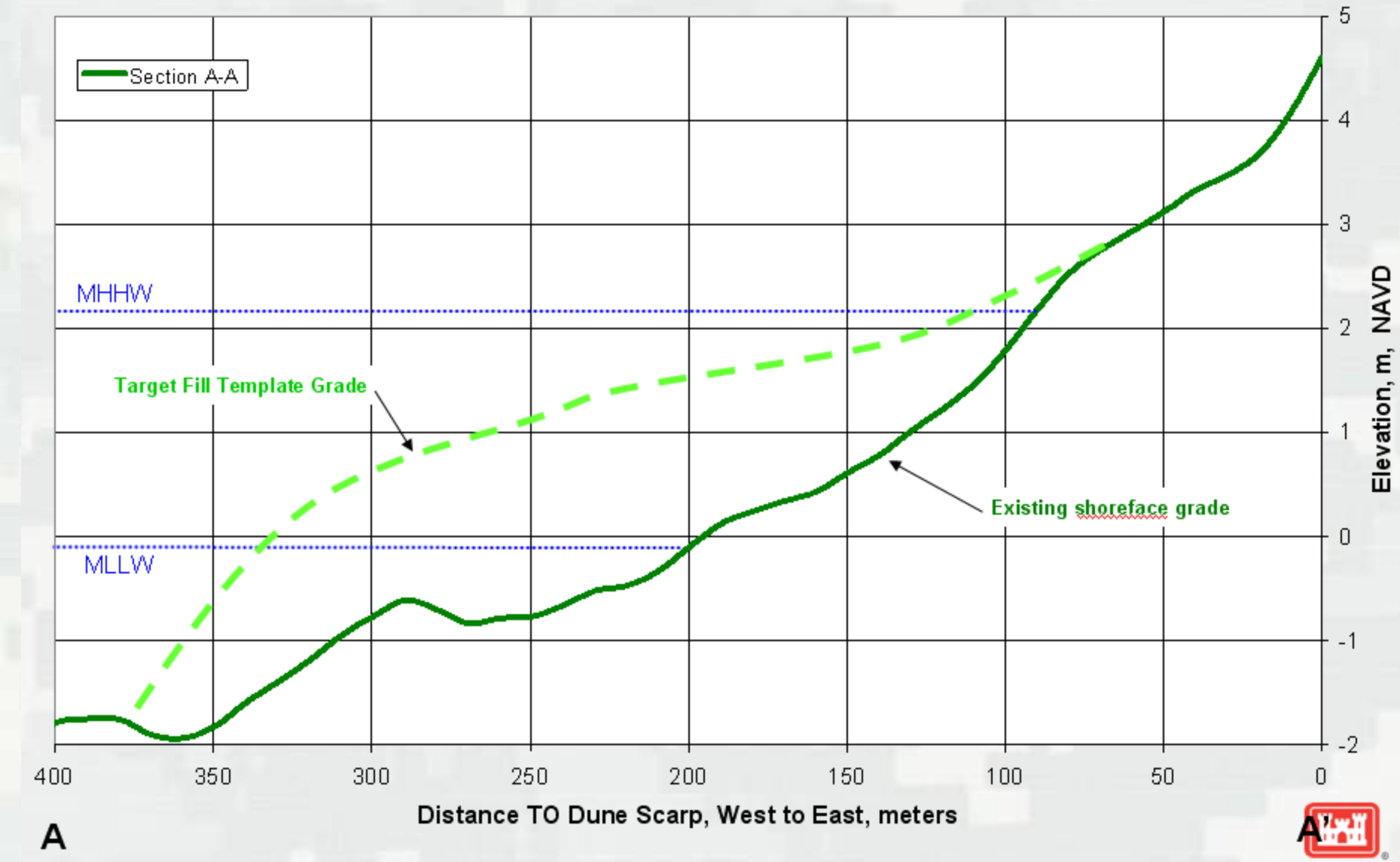
# Applicable USACE Regulations

- ER 5-1-11, Program and Project Management Business Process (PMBP)
- ER 1105-2-100, Planning Guidance Notebook
  - Appendix E, Section II – Navigation
- ER 1130-2-520, Project Operations - Navigation and Dredging Operations and Maintenance Policies
- EC 1165-2-209, Civil Works Review Policy
- PGL 47, Cost Sharing for Dredged Material Disposal Facilities and Dredged Material Disposal Facility Partnerships

# Federal Standard (FS) – Base Plan (BP) 33 USC 335

The disposal alternative or alternatives identified by the Corps which represents the least costly alternative consistent with sound engineering practices and meeting the environmental standards established by the Section 404 evaluation process of the Clean Water Act of 1972 or ocean dumping criteria, pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended.

# Historical Data Management and Analysis



# O&M Navigation Channel Maintenance Planning and Execution Process

- Managed in cyclical phases:
  - Project asset condition and performance assessment
  - Channel reach O&M event plan scoping
  - Technical development of plan
  - Plan execution and monitoring (Construction)

# O&M Navigation Channel Maintenance Planning and Execution Process

- Ideal vs. Real World
  - Ideally, project O&M would proceed in orderly sequence according to a plan
  - Unplanned situations/events often arise during planning and execution
    - Time and resources are often constraints even in “normal” conditions
    - Things go wrong, e.g.:
      - Vessel collisions/sinkings
      - Dredging contracts don’t go as intended
      - Extreme shoaling events change project and district annual plans
  - Governing processes change as project evolves and impact plans
- O&M Program criteria/priorities constantly change in a limited resource environment
- Highest priority is ensuring channel safety and reliability

# O&M Assessment and Management Considerations

- What data is needed and why?
- How do you acquire the required data?
- How do you manipulate the data to create information?
- How do you use the information?
- How do you communicate the information?

# Typical O&M Management Data Collection Techniques

- Hydrographic / bathymetric
  - Depth soundings: continuous profiles and cross sections at different frequencies for penetrating suspended material strata to top of consolidated water bottom material
  - Lead lines: point estimates to top of consolidated water bottom material
  - Densitune: mapping of suspended material strata to top of consolidated water bottom material with correlation to material density
  - Rheometer: mapping of suspended material strata to top of consolidated water bottom material with correlation to material density and shear stress
- Topo / bathy / landform / land cover / land use
  - Remote sensing
    - LiDAR surveys
    - Hyperspectral surveys
    - Aerial imagery
  - Land elevation surveys
  - Vegetative cover / fish and wildlife community habitat surveys

# O&M Feature Survey and Assessment Applications

- Channel condition assessment
  - Harbor, inland, bay, and bar channels
  - Available bottom width by channel reach at levels of service required
  - Spot shoals/obstructions
- Dredged material placement area assessment
  - Upland, nearshore, and ODMDS
  - Capacity assessments and environmental requirements compliance documentation
  - Retaining dikes and appurtenant, bank/shoreline stability condition assessments
- Navigation structure condition assessment
  - Bank/shoreline movement and channel exposure to open water
  - Bank protection structures, channel training structures, and jetties
- Condition assessment of special features (PRIP) under project responsibility, e.g.,
  - Landings, piers, and slips
  - Floating plant

# Information Development Techniques

- Databases and spatial analyses
  - O&M feature condition assessment
  - Delineation of beneficial use of dredged materials, habitat types created/restored/protected, and associated changes over time
- Modeling and assessment tools
  - Sediment transport, shoaling predictions, and dredging volume estimates
  - Placed dredged material fate and effects predictions
  - Engineering stability analyses (e.g., retaining dikes and navigation structures)
  - Engineering functional analyses (e.g., breakwaters, jetties)
- O&M planning and design uses across range of plausible annual / periodic scenarios
  - Channel maintenance/restoration
  - Dredged materials placement area operations, maintenance, repair, and rehabilitation
  - Structures maintenance, repair, and rehabilitation

# Permit Application Management in Vicinity of Navigation Project Features

- Potential Federal permit types
  - Pipeline crossings (under channel and through placement areas)
  - Oil and gas exploration canals and platforms
  - Well heads, equipment, and distribution lines
  - Landings, piers, slips, and wharfs
  - Commercial/residential developments
  - Roads and bridges
  - Non-Federal disposal

Can adversely impact your O&M plans if not actively managed

- Must assess minimum distances for placement
  - Navigation channel fairway and anchorages
  - Dredged material placement areas
  - Ingress/egress routes for O&M activities
- Non-Federal permit impacts
  - Oyster bed water bottom leases

# Dredging Operations Monitoring and Assessment

- Pre-construction meeting – contract requirements review
- Construction inspector daily reports
  - Daily/weekly/monthly performance analysis
  - Cumulative progress assessment
  - Troubleshooting
  - Course correction
- Operations site visits (dredging operations and placement areas)
- Communication with interested and affected parties
  - Navigation industry
  - Dredging industry
  - Federal and state regulatory agencies
  - NGOs
  - Affected landowners / businesses / tribes
  - Elected officials
  - USACE district PDT and vertical team

# Contract Completion Review and Placement Site Performance Monitoring and Assessment

- Narrative completion report and “as-built” drawings
  - Detailed account of contract completion of requirements
  - States summary cost and performance data
  - Explains contract discrepancies and remedies
  - Details dredged materials placement and beneficial use details
- Evaluate dredging operations and dredge materials placement techniques for:
  - Lessons learned
  - Continual process improvement / best practices
  - Enhancement of future beneficial use potential
- Exploit available tools and technologies to frequently analyze project performance benchmarked to the DMMP
  - Provides opportunity for interim course corrections
  - Supports periodic preliminary assessment

# Triggers for Need of a Preliminary Assessment and DMMP

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- Substantially different seasonal trends, variability, and extremes of shoaling by reach than predicted in DMMP
- More physically challenging channel maintenance operations than estimated
- Greater environmental compliance difficulties during dredging operations than described in DMMP
- Longer dredged materials conveyance distances and dredging durations than planned

# Triggers for Need of a Preliminary Assessment and DMMP (cont)

- More difficulty in sustaining dredged material placement area features, bank/shoreline protection, channel training structures, and jetties
- Faster exhaustion of placement area capacities over several-year averages than anticipated in DMMP
- Inability to acquire LEERDS and/or non-Federal cost shares as required in DMMP for execution
- Development of backlog in project feature O&M that compromises ability to deliver levels of service required with available funds

# Thank you for your participation!

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