2005 Tri-Service Infrastructure Systems Conference & Exhibition

St. Louis, MO
"Re-Energizing Engineering Excellence"

2-4 August 2005

Agenda

Panel: The Future of Engineering and Construction

- LTG Carl A. Strock, Commander, USACE
- Dr. James Wright, Chief Engineer, NAVFAC

Panel: USACE Engineering and Construction

- Dr. Michael J. O'Connor, Director, R&D

Panel: Navy General Session

- Mr. Steve Geusic, Engineering Criteria & Programs NAVFAC Atlantic

Introduction to Multi-Disciplinary Tracks, by Mr. Gregory W. Hughes
Engineering Circular: Engineering Reliability Guidance for Existing USACE Civil Works Infrastructure, by Mr. David M. Schaaf, PE, LRD Regional Technical Specialist, Navigation Engineering Louisville District
MILCON S&A Account Study, by Mr. J. Joseph Tyler, PE, Chief, Programs Integration Division, Directorate of Military Programs HQUSACE
Financial Justification on Bentley Enterprise License Agreement (ELA)

Track 1

- The Chicago Shoreline Storm Damage Reduction Project, by Andrew Benziger
- Protecting the NJ Coast Using Large Stone Seawalls, by Cameron Chasten
- Cascade: An Integrated Coastal Regional Model for Decision Support and Engineering Design, by Nicholas C. Kraus and Kenneth J. Connell
- Modeling Sediment Transport Along the Upper Texas Coast, by David B. King Jr., Jeffery P. Waters and William R. Curtis
- Sediment Compatibility for Beach Nourishment in North Carolina, by Gregory L. Williams
- Evaluating Beachfill Project Performance in the USACE Philadelphia District, by Monica Chasten and Harry Friebel
- US Army Corps of Engineers' National Coastal Mapping Program, by Jennifer Wozencraft
- Flood Damage Reduction Project Using Structural and Non-Structural Measures, by Stacey Underwood
- Shore Protection Project Performance Improvement Initiative (S3P2I), by Susan Durden
- Hurricane Isabel Post-Storm Assessment, by Jane Jablonski
- US Army Corps of Engineers Response to the Hurricanes of 2004, by Rick McMillen and Daniel R. Haubner
- Increased Bed Erosion Due to Increased Bed Erosion Due to Ice, by Decker B. Hains, John I. Remus, and Leonard J. Zabilansky
- Mississippi Valley Division, by James D. Gutshall
- Impacts to Ice Regime Resulting from Removal of Milltown Dam, Clark Fork River, Montana, by Andrew M. Tuthill and Kathleen D. White, and Lynn A. Daniels
- Carroll Island Micromodel Study: River Miles 273.0-263.0, by Jasen Brown
- Monitoring the Effects of Sedimentation from Mount St. Helens, by Alan Donner, Patrick O'Brien and David Biedenharn
  Watershed Approach to Stream Stability and Benefits Related to the Reduction of Nutrients, by John B. Smith
- A Lake Tap for Water Temperature Control Tower Construction at Cougar Dam, Oregon, by Stephen Schlenker, Nathan Higa and Brad Bird
- San Francisco Bay Mercury TMDL – Implications for Constructed Wetlands, by Herbert Fredrickson, Elly Best and Dave Soballe
- Abandoned Mine Lands: Eastern and Western Perspectives, by Kate White and Kim Mulhern
  Translating the Hydrologic Tower of Babel, byDan Crawford
- Demonstrating Innovative River Restoration Technologies: Truckee River, Nevada, by Chris Dunn
- System-Wide Water Resource Management – Tools of the Trade

Track 2

- Ecological and Engineering Considerations for Dam Decommissioning, Retrofits, and Reoperations, by Jock Conyngham
- Hydraulic Design of tidegates and other Water Control structures for Ecosystem Restoration projects on the Columbia River estuary, by Patrick S. O'Brien
- Surface Bypass & Removable Spillway Weirs, by Lynn Reese
- Impacts of using a spillway for juvenile fish passage on typical design criteria, by Bob Buchholz
- Howard Hanson Dam: Hydraulic Design of Juvenile Fish Passage Facility in Reservoir with Wide Pool Fluctuation, by Dennis Mekkers and Daniel M. Katz
- Current Research in Fate Current Research in Fate & Transport of Chemical and Biological Contaminants in Water Distribution Systems, by Vincent F. Hock
- Regional Modeling Requirements, by Maged Hussein
- Tools for Wetlands Permit Evaluation: Modeling Groundwater and Surface Water Interaction, by Cary Talbot
- Ecosystem Restoration for Fish and Wildlife Habitat on the UMRS, by Jon Hendrickson
- Missouri River Shallow Water Habitat Creation, by Dan Pridal
- Aquatic Habitat Restoration in the Lower Missouri River, by Chance Bitner
- Transition to an Oracle Based Data System (Corps Water Management System, CWMS), by Joel Asunskis
- RiverGages.com: The Mississippi Valley Division Water Control Website, by Rich Engstrom
- HEC-ResSim 3.0: Enhancements and New Capabilities, by Fauwaz Hanbali
- Hurricane Season 2004 – Not to Be Forgotten, by Jacob Davis
- Re-Evaluation of a Flood Control Project, by Ferris W. Chamberlin
- Helmand Valley Water Management Plan, by Jason Needham
- A New Approach to Water Management Decision Making, by James D. Barton
- Developing Reservoir Operational Plans to Manage Erosion and Sedimentation during Construction – Willamette Temperature
- Control, Cougar Reservoir 2002-2005, by Patrick S. O'Brien
- Improved Water Supply Forecasts for the Kootenay Basin, by Randal T. Wortman
- ResSIM Model Development for Columbia River System, by Arun Mylvahanan
- Prescriptive Reservoir Modeling and the ROPE, by Jason Needham
- Missouri River Basin Water Management, by Larry Murphy

Track 3

- Corps Involvement in FEMA's Map Modernization Program, by Kate White, John Hunter and Mark Flick
- Innovative Approximate Study Method for FEMA Map Moderniation Program , by John Hunter
- Flood Fighting Structures Demonstration and Evaluation Program (FFSD), by Fred Pinkard
- Integrating Climate Dynamics Into Water Resources Planning and Management, by Kate White
- Hydrologic and Hydraulic Contributions to Risk and Uncertainty Propagation Studies, by Robert Moyer
- Uncertainty Analysis: Parameter Estimation, by Jackie P. Hallberg
- Geomorphology Study of the Middle Mississippi River, by Eddie Brauer
- Bank Erosion and Morphology of the Kaskaskia River, by Michael T. Rodgers
- Degradation of the Kansas City Reach of the Missouri River, by Alan Tool
- Sediment Impact Assessment Model (SIAM), by David S. Biedenharn and Meg Jonas
- Mississippi River Sedimentation Study, by Basil Arthur
- Sediment Model of Rivers, by Charlie Berger
- East Grand Forks, MN and Grand Forks, ND Local Flood Damage Reduction Project, by Michael Lesher
- Hydrologic and Hydraulic Analyses, by Thomas R. Brown
- Hydrologic and Hydraulic Modeling of the Mccook and Thornton Tunnel and Reservoir Plans, by David Kiel
- Ala Wai Canal Project, by Lynnette F. Schaper
- Missouri River Geospatial Decision Support Framework, by Bryan Baker and Martha Bullock
- Systemic Analysis of the Mississippi & Illinois Rivers Upper Mississippi River Comprehensive Plan, by Dennis L. Stephens

Section 227: National Shoreline Erosion Control Demonstration and Development Program Annual Workshop

- Workshop Objectives
- Section 227: Oil Piers, Ventura County, CA, by Heather Schlosser
- An Evaluation of Performance Measures for Prefabricated Submerged Concrete Breakwaters: Section 227 Cape May Point, New Jersey Demonstration Project, by Donald K Stauble, J.B. Smith and Randall A. Wise
- Bluff Stabilization along Lake Michigan, using Active and Passive Dewatering Techniques, by Rennie Kaunda, Eileen Glynn, Ron Chase, Alan Kehew, Amanda Brotz and Jim Selegean
- Storm Damage at Cape Lookout
- Branchbox Breakwater Design at Pickleweed Trail, Martinez, CA
- Section 227: Miami, FL
- Section 227: Sheldon Marsh Nature Preserve
- Section 227: Seabrook, New Hampshire
- Jefferson County, TX – Low Volume Beach Fill
- Sacred Falls, Oahsacred Falls, Oahu Section 227 Demonstration Project

Track 4

- Fern Ridge LakFern Ridge Lake Hydrologic Aspects of Operation during Failure, by Bruce J Duffe
- A Dam Safety Study Involving Cascading Dam Failures, by Gordon Lance
- Spillway Adequacy Analysis of Rough River Lake Louisville District, by Richard Pruitt
- Water Management in Iraq: Capability and Marsh Restoration, by Fauwaz Hanbali
- Iraq Ministry of Water Resources Capacity Building, by Michael J. Bishop, John W. Hunter, Jeffrey D. Jorgeson, Matthew M. McPherson, Edwin A. Theriot, Jerry W. Webb, Kathleen D. White, and Steven C. Wilhelms

- HEC Support of the CMEP Program, by Mark Jensen
- Geospatial Integration of Hydrology & Hydraulics Tools for Multi-Purpose, Multi-Agency Decision Support, by Timothy Pangburn, Joel Schlagel, Martha Bullock, Michael Smith, and Bryan Baker
- GIS & Surveying to Support FEMA Map Modernization and Example Bridge Report, by Mark Flick
- High Resolution Bathymetry and Fly-Through Visualization, by Paul Clouse
- Using GIS and HEC-RAS for Flood Emergency Plans, by Stephen Stello
- High Resolution Visualizations of Multibeam Data of the Lower Mississippi River, by Tom Tobin and Heath Jones
- System Wide Water Resources Program Unifying Technologies Geospatial Applications, by Andrew J. Bruzewicz
- Raystown Plate Locations
- Hydrologic Engineering Center: HEC–HMS Version 3.0 New Features, by Jeff Harris
- SEEP2D & GMS: Simple Tools for Solving a Variety of Seepage Problems, by Clarissa Hansen, Fred Tracy, Eileen Glynn, Cary Talbot and Earl Edris
- Sediment and Water Quality in HEC-RAS, by Mark Jensen
- Advances to the GSSHA Model, by Aaron Byrd and Cary Talbot
- Watershed Analysis Tool: HEC-WAT Program, by Chris Dunn
- Little Calumet River UnsteadLittle Calumet River Unsteady Flow Model Conversion UNET to HEC-RAS, by Rick D. Ackerson
  Kansas River Basin Model, by Edward Parker
- Design Guidance for Breakup Ice Control Structures, by Andrew M. Tuthill
- Computational Hydraulic Model of the Lower Monumental Dam Forebay, by Richard Stockstill, Charlie Berger, John Hite, Alex Carrillo, and Jane Vaughan
- Use of Regularization as a Method for Watershed Model Calibration, by Brian Skahill
- Demonstration Program Urban Flooding and Channel Restoration in Arid and Semi-Arid Regions (UFDP), by Joan Pope, Jack Davis, Ed Sing, John Warwick, Meg Jonas

Track 5

- Walla Walla District Northwestern Division, by Robert Berger
- Best Practices for Conduits through Embankment Dams, by Chuck R. Cooper
- Design, Construction Design, Construction and Seepage at Prado Dam, by Douglas E. Chitwood
- 2-D Liquefaction Evaluation with Q4Mesh, by David C. Serafini
- Unlined Spillway Erosion Risk Assessment, by Johannes Wibowo, Don Yule, Evelyn Villanueva and Darrel Temple
- Seismic Remediation of the Clemson Upper and Lower Diversion Dams; Evaluation, Conceptual Design and Design, by Lee Wooten and Ben Foreman
- Seismic Remediation of the Clemson Upper and Lower Diversion Dams; Deep Soil Mix Construction, by Lee Wooten and Ben Foreman
- Historical Changes in the State of the Art of Seismic Engineering and Effects of those changes on the Seismic Response Studies of Large Embankment Dams, by Sam Stacy
- Iwakuni Runway Relocation Project, by Vincent R. Donnally
- Internal Erosion & Piping at Fern Ridge Dam, by Jeremy Britton
- Rough River Dam Safety Assurance Project, by Timothy M. O'Leary
- Seepage Collection & Control Systems: The Devil is in the Details , by John W. France
- Dewey Dam Seismic Assessment, by Greg Yankey
- Seismic Stability Evaluation for Ute Dam, New Mexico, by John W. France
- An Overview of Criteria Used by Various Organizations for Assessment and Seismic Remediation of Earth Dams, by Jeffrey S. Dingrando
- A Review of Corps of Engineers Levee Seepage Practices and Proposed Future Changes, by George Sills
- Ground-Penetrating Radar Applications for the Assessment of Pavements, by Lulu Edwards and Don R. Alexander
- Peru Road Upgrade Project, by Michael P. Wielputz
- Slope Stability Evaluation of the Baldhill Dam Right Abutment, by Neil T. Schwanz
- Design and Construction of Anchored Bulkheads with Synthetic Sheet Piles Seabrook, New Hampshire, by Siamac Vaghar and Francis Fung
- Characterization of Soft Claya Case Study at Craney Island, by Aaron L. Zdinak
- Dispersive ClayDispersive Clays – Experience andHistory of the NRCS (Formerly SCS), by Danny McCook
- Post-Tensioning Institute, by Michael McCray
- Demonstration Program Urban Flooding and Channel Restoration in Arid and Semi-Arid Regions (UFDP), by Joan Pope, Jack Davis, Ed Sing, John Warwick, Meg Jonas

Track 6

- State of the Art in Grouting: Dams on Solution Susceptible or Fractured Rock Foundations, by Arthur H. Walz
- Specialty Drilling, Testing, and Grouting Techniques for Remediation of Embankment Dams, by Douglas M. Heenan
- Composite Cut-Offs for Dams, by Dr. Donald A. Bruce and Trent L. Dreese
- State of the Art in Grout Mixes, by James A. Davies
- State of the Art in Computer Monitoring and Analysis of Grouting, by Trent L. Dreese and David B. Wilson
- Quantitatively Engineered Grout Curtains, by David B. Wilson and Trent L. Dreese
- Grout Curtains at Arkabutla Dam: Outlet Monolith Joints and Cracks using Chemical Grout, Arkabutla Lake, MS, by Dale A. Goss
- Chicago Underflow Plan – CUP: McCook Reservoir Test Grout Program, by Joseph A. Kissane
- Clearwater Dam: Sinkhole Repair Foundation Investigation and Grouting Project, by Mark Harris
- Update on the Investigation of the Effects of Boring Sample Size (3" vs 5") on Measured Cohesion in Soft Clays, by Richard Pinner and Chad M. Rachel
- Soil-Bentonite Cutoff Wall Through Free-Product at Indiana Harbor CDF, by Joe Schulenberg and John Breslin
- Soil-Bentonite Cutoff Wall Through Dense Alluvium with Boulders into Bedrock, McCook Reservoir, by William A. Rochford
- Small Project, Big Stability Problem the Block Church Road Experience, by Jonathan E. Kolber
- Determination of Foundation Rock Properties Beneath Folsom Dam, by Michael K. Sharp, José L. Llopis and Enrique E. Matheu
  Waterbury Dam Mitigation, by Bethany Bearmore
- Armor Stone Durability in the Great Lakes Environment, by Joseph A. Kissane
- Mill Creek - An Urban Flood Control Challenge, by Monica B. Greenwell
- Next Stop, The Twilight Zone, by Troy S. O'Neal
- Limitations in the Back Analysis of Shear Strength from Failures, by Rick Deschamps and Greg Yankey
- Reconstruction of Deteriorated Concrete Lock Walls After Blasting and Other Demolition Removal Techniques, by Stephen G. O'Connor

- Flood Fighting Structures Demonstration and Evaluation Program (FFSD), by George Sills
- Innovative Design Concepts Incorporated into a Landfill Closure and Reuse Design Portsmouth Naval Shipyard, Kittery, Maine, by Dave Ray and Kevin Pavlik
- Laboratory Testing of Flood Fighting Structures, by Johannes L. Wibowo, Donald L. Ward and Perry A. Taylor
- Bluff Stabilization Along Lake Michigan, Using Active and Passive Dewatering Techniques, Allegan Co. Michigan, by Rennie Kaunda, Eileen Glynn, Ron Chase, Alan Kehew and Jim Selegean

Track 7

- Case History: Multiple Axial Statnamic Tests on a Drilled Shaft Embedded in Shale, by Paul J. Axtell, J. Erik Loehr, Daniel L. Jones
- The Sliding Failure of Austin Dam Pennsylvania - Revisited, by Brian H. Greene
- M3 –Modeling, Monitoring and Managing: A Comprehensive Approach to Controlling Ground Movements for Protection of Existing Structures and Facilities, by Francis D. Leathers and Michael P. Walker
- Time-Dependent Reliability Modeling for Use in Major Rehabilitation of Embankment Dams and Foundation, by Robert C. Patev
- Lateral Pile Load Test Results Within a Soft Cohesive Foundation, by Richard J. Varuso
- Engineering Geology Challenge Engineering Geology Challenges During Design and Construction of the Marmet Lock Project, by Ron Adams and Mike Nield
- Mill Creek Deep Tunnel Geologic Conditions and Potential Impacts on Design/Construction, by Kenneth E. Henn III
- McAlpine Lock Replacement Instrumentation: Design, Construction, Monitoring, and Interpretation, by Troy S. O'Neal
- Geosynthetics and Construction of the Second Powerhouse Corner Collector Surface Flow Bypass Project, Bonneville Lock and Dam Project, Oregon and Washington, by Art Fong
- McAlpine Lock Replacement Project Foundation Characteristics and Excavation, by Kenneth E. Henn III
- Structural and Geotechnical Issues Impacting The Dalles Spillwall Construction and Bay 1 Erosion Repair, by Jeffrey M. Ament
  Rock Anchor Design and Construction: The Dalles Dam Spillwalls, by Kristie M. Hartfeil
- The Future of the Discrete Element Method in Infrastructure Analysis, by Raju Kala, Johannes L. Wibowo and John F. Peters
- Sensitive Infrastructure Sites - Sonic Drilling Offers Quality Control and Non-Destructive Advantages to Geotechnical Construction Drilling, by John P. Davis

Track 8

- Evaluation of The Use of LithiuEvaluation of The Use of Lithium Compounds in Controlling ASR in Concrete Pavement, by Mike Kelly
- Roller Compacted Concrete for McAlpine Lock Replacement, by David E. Kiefer
- Soil-Cement for Stream Bank Stabilization, by Wayne Adaska
- Using Cement to Reclaim Asphalt Pavements, by David R. Luhr
- Valley Park 100-Yr Flood Protection Project: Use of 'Engineered Fill' in the Item IV-B Levee Core, by Patrick J. Conroy
- Bluestone Dam: AAR –A Case Study, by Greg Yankey
- USDA Forest Service: Unpaved Road Stabilization with Chlorides, by Michael R. Mitchell
- Use of Ultra-Fine Amorphous Colloidal Silica to Produce a High-Density, High-Strength Grout, by Brian H. Green
- Modular Gabion Systems, by George Ragazzo
- Addressing Cold Regions Issues in Pavement Engineering, by Edel R. Cortez and Lynette Barna
- Geology of New York Harbor: Geological and Geophysical Methods of Characterizing the Stratigraphy for Dredging Contracts, by Ben Baker, Kristen Van Horn and Marty Goff
- Rubblization of Airfield Concrete Pavements, by Eileen M. Vélez-Vega
- US Army Airfield Pavement Assessment Program, by Haley Parsons, Lulu Edwards, Eileen Velez-Vega and Chad Gartrell
- Critical State for Probabilistic Analysis of Levee Underseepage, by Douglas Crum,
- Curing Practices for Modern Concrete Production, by Toy Poole
- AAR at Carters Dam: Different Approaches, by James Sanders
- Concrete Damage at Carters Dam, by Toy Poole
  Damaging Interactions Among Concrete Materials, by Toy Poole
- Economic Effects on Construction of Uncertainty in Test Methods, by Toy Poole
- Trends in Concrete Materials Specifications, by Toy Poole
- Spall and Intermediate-Sized Repairs for PCC Pavements, by Reed Freeman and Travis Mann
- Acceptance Criteria Acceptance Criteria for Unbonded Aggregate Road Surfacing Materials, by Reed Freeman, Toy Poole, Joe Tom and Dale Goss
- Effective Partnering to Overcome an Interruption In the Supply of Portland Cement During Construction at Marmet Lock and Dam, by Billy D. Neeley, Toy S. Poole and Anthony A. Bombich

Track 10

- Marmet Lock &Dam: Automated Instrumentation Assessment, Summer/Fall 2004, by Jeff Rakes and Ron Adams
  Success Dam Seismic Remediation

Track 9

- Fern Ridge Dam, Oregon: Seepage and Piping Concerns (Internal Erosion)

Track 11

- Canton Dam Spillway Stability: Is a Test Anchor Program Necessary?, by Randy Mead
- Dynamic Testing and Numerical Correlation Studies for Folsom Dam, by Ziyad Duron, Enrique E. Matheu, Vincent P. Chiarito, Michael K. Sharp and Rick L. Poeppelman

Status of Portfolio Risk Assessment, by Eric Halpin
- Mississinewa Dam Foundation Rehabilitation, by Jeff Schaefer
- Wolf Creek Dam Seepage Major Rehabilitation Evaluation, by Michael F. Zoccola
- Bluestone Dam DSA Anchor Challenges, by Michael McCray
- Clearwater Dam Major Rehab Project, by Bobby Van Cleave
- Design, Construction and Seepage at Prado Dam, by Douglas E. Chitwood
- Seven Oaks Dam: Outlet Tunnel Invert Damage, by Robert Kwan
- An Overview of An Overview of the Dam Safety ProgramManagement Tools (DSPMT), by Tommy Schmidt

Track 12

- Greenup L&D Miter Gate Repair and Instrumentation, by Joseph Padula, Bruce Barker and Doug Kish
- Marmet Locks and Dam Lock Replacement Project, by Jeffrey S. Maynard,
- Status of HSS Inspections in The Portland District, by Travis Adams
- Kansas City District: Perry Lake Project Gate Repair, by Marvin Parks
- Mel Price – Auxiliary Lock Downstream Miter Gate Repair, by Thomas J. Quigley, Brian K. Kleber and Thomas R. Ruf
- J.T. Myers Lock Improvements Project Infrastructure Conference, by David Schaaf and Greg Werncke
- J.T. Myers Dam Major Rehab, by David Schaaf, Greg Werncke and Randy James
- Greenup L&D, by Rodney Cremeans
- McAlpine Lock Replacement Project, by Kathy Feger
- Roller Compacted Concrete Placement at McAlpine Lock, by Larry Dalton
- Kentucky Lock Addition Downstream Middle Wall Monolith Design, by Scott A. Wheeler
- London Locks and Dam Major Rehabilitation Project, by David P. Sullivan
- Replacing Existing Lock 4: Innovative Designs for Charleroi Lock, by Lisa R. Pierce, Dave A. Stensby and Steve R. Stoltz
- Olmsted L&D, Dam In-the-wet Construction, by Byron McClellan, Dale Berner and Kenneth Burg
- Olmsted Floating Approach Walls, by Terry Sullivan
- John Day Navigation Lock Monolith Repair, by Matthew D. Hanson
- Inner Harbor Navigation Canal (IHNC) Lock Replacement, by Mark Gonski
- Comite River Diversion Project, by Christopher Dunn
- Waterline Support Failure: A Case Study, by Angela DeSoto Duncan
- Public Appeal of Major Civil Projects: The Good, the Bad and the Ugly, by Kevin Holden and Kirk Sunderman
- Chickamauga Lock and Dam Lock Addition Cofferdam Height Optimization Study, by Leon A. Schieber
- Des Moines Riverwalk, by Thomas D. Heinold

Track 13

- Folsom Dam Evaluation of Stilling Basin Performance for Uplift Loading for Historic Flows and Modification of Folsom Dam
- Stilling Basin for Hydrodynamic Loading, by Rick L. Poeppelman, Yunjing (Vicky) Zhang, and Peter J. Hradilek
- Seismic Stress Analysis of Folsom Dam, by Enrique E. Matheu
- Barge Impact Analysis for Rigid Lock Walls ETL 1110-2-563, by John D. Clarkson and Robert C. Patev
- Belleville Locks & Dam Barge Accident on 6 Jan 05, by John Clarkson
- Portugues Dam Project Update, by Alberto Gonzalez, Jim Mangold and Dave Dollar
- Portugues Dam: RCC Materials Investigation, by Jim Hinds
- Nonlinear Incremental Thermal Stress Strain Analysis Portugues Dam, by David Dollar, Ahmed Nisar, Paul Jacob and Charles Logie
- Seismic Isolation of Mission-Critical Infrastructure to Resist Earthquake Ground Shaking or Explosion Effects, by Harold O. Sprague, Andrew Whitaker and Michael Constantino
- Obermeyer Gated Spillway S381, by Michael Rannie
- Design of High Pressure Vertical Steel Gates Chicago Land Underflow Plan McCook Reservoir, by Henry W. Stewart, Hassan Tondravi, Lue Tekola,
- Development of Design Criteria for the Rio Puerto Nuevo Contract 2D/2E Channel Walls, by Janna Tanner, David Shiver, and Daniel Russell
- Indianapolis NortIndianapolis North Phase 3A Warfleigh Section
- Design of Concrete Lined Tunnels in Rock CUP McCook Reservoir Distribution Tunnels Contract, by David Force

Track 14

- GSA Progressive Collapse Design Guidelines Applied to Concrete Moment-Resisting Frame Buildings, by David N. Bilow and Mahmoud E. Kamara,
- UFC 4-023-02 Retrofit of Existing Buildings to Resist Explosive Effects, by Jim Caulder
- Summit Bridge Fatigue Study, by Jim Chu
- Quality Assurance for Seismic Resisting Systems, by John Connor
- Seismic Requirements for Arch, Mech, and Elec. Components, by John Connor
- SBEDS - (Single degree of freedom Blast Effects Design Spreadsheets), by Dale Nebuda,
- Design of Buildings to Resist Progressive Collapse UFC 4-023-03, by Bernie Deneke,
- Fatigue and Fracture Assessment, by Jesse Stuart
- Unified Facilities Criteria: Seismic Design for Buildings, by Jack Hayes
- Evaluation and Repair Of Blast Damaged Reinforced Concrete Beams, by MAJ John L. Hudson
- Building an In-house Bridge Inspection Program
- United Facilities CriteriUnited Facilities Criteria Masonry Design for Buildings, by Tom Wright
- USACE Homeland Security Portal, by Michael Pace
- Databse Tools for Civil Works Projects

- Standard Procedure for Fatigue Evaluation of Bridges, by Phil Sauser
- Consolidation of Structural Criteria for Military Construction, by Steven Sweeney
- Cathodic Protectionfor the South Power Plant Reinforcing Steel, Diego Garcia, BIOT, by Thomas Tehada and Miki Funahashi

Track 15

- Engineering Analysis of Airfield Lighting System Lightning Protection, by Dr. Vladimir A. Rakov and Dr. Martin A. Uman
- Dr. Martin A. Uman
- Charleston AFB Airfield Lighting Vault
- UNIFIED FACILITIES CRITERIA (UFC) UFC 3-530-01 Design: Interior, Exterior Lighting and Controls, by Nancy Clanton and Richard Cofer
- Electronic Keycard Access Locks, by Fred A Crum
- Unified Facilities Criteria (UFC) 3-560-02, Electrical Safety, by John Peltz and Eddie Davis
- Electronic Security SystemElectronic Security Systems Process Overview
- Lightning Protection Standards
- Electrical Military Workshop
- Information Technology Systems Criteria, by Fred Skroban and John Peltz
- Electrical Military Workshop
- Electrical Infrastructure in Iraq- Restore Iraqi Electricity, by Joseph Swiniarski

Track 16

- BACnet® Technology Update, by Dave Schwenk
- The Infrastructur Conference 2005, by Steven M. Carter Sr. and Mitch Duke
- Design Consideration for the Prvention of Mold, by K. Quinn Hart
- COMMISSIONING, by Jim Snyder
- New Building Commissioning , by Gary Bauer
- Ventilation and IAQ TheNew ASHRAE Std 62.1, by Davor Novosel
- Basic Design Considerations for Geothermal Heat Pump Systems, by Gary Phetteplace
- Packaged Central Plants
- Effective Use Of Evaporative Cooling For Industrial And Institutional/Office Facilities, by Leon E. Shapiro
- Seismic Protection For Mechanical Equipment
- Non Hazardous Chemical Treatments for Heating and Cooling Systems, by Vincent F. Hock and Susan A. Drozdz
- Trane Government Systems & Services
- LONWORKS Technology Update, by Dave Schwenk
- Implementation of Lon-Based Specifications by Will White and Chris Newman

Track 17

- Utility System Security and Fort Future, by Vicki Van Blaricum, Tom Bozada, Tim Perkins, and Vince Hock
- Festus/Crystal City Levee and Pump Station
- Chicago Underflow Plan McCook Reservoir (CUP) Construction of Distribution Tunnel and Pumps Installation
- Technological Advances in Lock Control Systems, by Andy Schimpf and Mike Maher
- Corps of Engineers in Iraq Rebuilding Electrical Infrastructure, by Hugh Lowe
- Red River of the North at East Grand Forks, MN & Grand Forks, ND: Flood Control Project – Armada of Pump Stations Protect Both Cities, by Timothy Paulus
- Lessons Learned for Axial/Mixed Flow Propeller Pumps, by Mark A. Robertson
- Creek Automated Gate Considerations, by Mark A. Robertson
- HydroAMP: Hydropower Asset Management, by Lori Rux
- Acoustic Leak Detection for Water Distribution Systems, by Sean Morefield, Vincent F. Hock and John Carlyle
- Remote Operation System, Kaskaskia Dam Design, Certification, & Accreditation, by Shane M. Nieukirk
- Lock Gate Replacement System, by Shaun A. Sipe and Will Smith

Track 20

- “Re-Energizing Medical Facility Excellence”, by COL Rick Bond
- Rebuilding and Renovating The Pentagon , by Brian T. Dziekonski,
- Resident Management System
- Design-Build and Army Military Construction, by Mark Grammer
- Defense Acquisition Workforce Improvements Act - Update, by Mark Grammer
- Construction Management @ Risk: Incentive Price Revision – Successive Targets, by Christine Hendzlik
- Construction Reserve Matrix, by Christine Hendzlik
- Award contingent on several factors..., by Christine Hendzlik
- 52.216-17 Incentive Price Revision--Successive Targets (Oct 1997) - Alt I (Apr 1984), by Christine Hendzlik
- Preconstruction Services, by Christine Hendzlik
- Proposal Evaluation Factors, by Christine Hendzlik
- MILCON Transformation in Support of Army Transformation, by Claude Matsui
- Construction Practices in Russia, by Lance T. Lawton

- Partnering as a Best Practice, by Ray Dupont
- USACE Tsunami Reconstruction for USAID, by Andy Constantaras

Track 21

- Dredging Worldwide, by Don Carmen
- SpecsIntact Editor, by Steven Freitas
- SpecsIntact Explorer, by Steven Freitas
- American River Watershed Project, by Steven Freitas
- Unified Facilities Guide Specifications (UFGS) Conversion To MasterFormat 2004, by Carl Kersten
- Unified Facilities Guide Specifications (UFGS) Status and Direction , by Jim Quinn

Workshops

- Design of Buildings to Resist Progressive Collapse UFC 4-023-03, by Bernie Deneke
- Security Engineering and at Unified Facility Criteria (UFC), by Bernie Deneke, Richard Cofer, John Lynch and Rudy Perkey
- Packaged Central Plants, by Trey Austin

NATIONAL DEFENSE INDUSTRIAL ASSOCIATION

STRENGTH THROUGH INDUSTRY & TECHNOLOGY

2005 Tri-Service Infrastructure Systems Conference & Exhibition

"Re-Energizing Engineering Excellence"

ON-SITE AGENDA

The America's Center
St. Louis Convention Center
St. Louis, MO
August 2-4, 2005
Event # 5150

Tri-Service Infrastructure Systems Conference & Exposition 2005

AGENDA

Monday, August 1, 2005

8:00 AM-9:00 PM — Exhibit Move-In

12 Noon-5:00 PM — Registration

Tuesday, August 2, 2005

7:00 AM-8:00 AM — Registration and Continental Breakfast

8:00 AM-8:15 AM — Welcome and Introduction
Ferrara Theatre

8:15 AM-9:00 AM — The Future of Engineering and Construction Panel
Ferrara Theatre
Moderator:
Mr. Don Basham, Chief, Engineering & Construction, USACE
Panelists:
LTG Carl A. Strock, Commander, USACE
Dr. James Wright, Chief Engineer NAVFAC

9:00 AM-9:45 AM — Keynote Address
Ferrara Theater
The Lord of the Things: The Future of Infrastructure Technologies
Mr. Paul Doherty, AIA, Managing Director,
General Land Corporation

9:45 AM-10:15 AM — Break

10:15 AM-11:15 AM — USACE Engineering and Construction Panel
Ferrara Theatre
Moderator:
Mr. Don Basham, Chief, Engineering & Construction, USACE
Panelists:
MG Donald T. Riley, Director, Civil Works, USACE
BG Bo M. Temple, Director, Military Programs, USACE
Dr. Michael J. O'Connor, Director, R&D

10:15 AM-11:15 AM — Navy General Session
Room 225

11:00 AM - 7:00 PM — Exhibits Open

11:15 AM-1:00 PM — Lunch in Exhibit Hall (on your own)

11:15 AM-1:00 PM — Women's Career Lunch Session (Bring your lunch from Exhibit Hall)
Washington G
Moderator:
Ms. Demi Syriopoulou, HQ USACE
Opening Remarks:
LTG Carl A. Strock, Commander, USACE
Presentations & Discussion:
Dwight Beranek, Kristine Allaman, Donald Basham, HQ USACE

1:00 PM-1:55 PM — Introduction to Multi-Disciplinary Tracks
Ferrara Theatre

Tuesday, August 2, 2005

2:00 PM-2:50 PM — 1st Round of Multi-Disciplinary Concurrent Sessions (Continued)

Track 1: Acquisition Strategies for Civil Works
Room 230
Walt Norko

Track 2: Risk and Reliability Engineering
Room 231
Anjana Chudgar
David Schaaf

Track 3: Portfolio Risk Assessment
Room 232
Eric Halpin

Track 4: Hydrology, Hydraulics and Coastal Engineering Support for USACE
Room 240
Jerry Webb
Darryl Davis

Track 5: Civil Works R&D Forum
Room 241
Joan Pope

Track 6: Civil Works Security Engineering
Room 242
Joe Hartman
Bryan Cisar

Track 7: Building Information Model Applications
Room 226
Brian Huston
Daniel Hawk

Track 8: Design Build for Military Projects
Room 220
Mark Grammer

Track 9: Army Transformation/Global Posture Initiative/ Force Modernization
Room 221
Al Young
Claude Matsui

Track 10: Force Protection - Army Access Control Points
Room 222
John Trout

Track 11: Cost Engineering Forum on Government Estimates vs. Actual Costs
Room 227
Ray Lynn *Jack Shelton* *Kim Callan*
Miguel Jumilla *Ami Ghosh* *Joe Bonaparte*

Track 12: Engineering & Construction Information Technology
Room 228
MK Miles

Track 13: Sustainable Design
Room 223
Harry Goradia

Track 14: ACASS/CCASS/CPARS
Room 224
Ed Marceau
Marilyn Nedell

Track 15: Whole Building Design Guide
Room 229
Earle Kennett

Tuesday, August 2, 2005

2:50 PM-3:30 PM	Break in Exhibit Hall
3:30 PM-4:20 PM	2nd Round of Multi-Disciplinary Sessions
4:30 PM-5:20 PM	3rd Round of Multi-Disciplinary Sessions
5:30 PM-7:00 PM	Ice Breaker Reception in Exhibit Hall

Wednesday, August 3, 2005

7:00 AM-8:00 AM	Registration and Continental Breakfast
8:00 AM-9:30 AM	Concurrent Sessions (Please Refer to Concurrent Session Schedule on the Following Pages)
9:00 AM	Exhibit Hall Opens
9:30 AM-10:30 AM	Break in Exhibit Hall
10:30 AM-12:00 Noon	Concurrent Sessions (Please Refer to Concurrent Session Schedule on the Following Pages)
12:00 Noon-1:30 PM	Lunch in Exhibit Hall
1:30 PM-3:00 PM	Concurrent Sessions (Please Refer to Concurrent Session Schedule on the Following Pages)
3:00 PM-4:00 PM	Break in Exhibit Hall
4:00 PM-5:30 PM	Concurrent Sessions
5:00 PM	Exhibit Hall Closes

Thursday, August 4, 2005

7:00 AM-8:00 AM	Registration and Continental Breakfast
8:00 AM-9:30 AM	Concurrent Sessions (Please Refer to Concurrent Session Schedule on Following Pages)
9:30 AM-10:30 AM	Break in Exhibit Hall (Last Chance to view Exhibits)
10:30 AM-12:00 Noon	Concurrent Sessions (Please Refer to Concurrent Session Schedule on Following Pages)
12:00 Noon-1:30 PM	Lunch (On your own)
12:00 Noon-6:00 PM	Exhibits Move-Out
1:30 PM-3:00 PM	Concurrent Sessions (Please Refer to Concurrent Session Schedule on Following Pages)
3:00 PM-3:30 PM	Break
3:30 PM-5:00 PM	Concurrent Sessions (Please Refer to Concurrent Session Schedule on following pages)

Wednesday, August 3, 2005 Concurrent Sessions

HH&C Track

Room	Track	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track	10:30 AM	11:00 AM	11:30 AM
Room 220	**TRACK 1** Coastal Structures — Session 1A	Protecting the NJ Coast using large stone seawalls — *Cameron Chasten*	Chicago shoreline storm damage reduction project — *Andrew Bezinger*	Risk and reliability in coastal structure design — *Jeffrey Melby*	Break in Exhibit Hall	**TRACK 1** Coastal Regional Manangement Session 1B	Cascade: An integrated regional model for decision support — *Nicholas Kraus*	Upper Texas coast sediment transport modeling & sediment budgets — *David King*	Sediment compatibility for beach nourishment in North Carolina — *Gregory Williams*
Room 221	**TRACK 2** Ecological Engineering & Design — Session 2A	Ecological and engineering considerations for dam decommissioning, retrofits and operations — *Jock Conyngham*	Hydraulic design of tidegates and other water control structures for ecosystem restoration on the Columbia Estuary — *Patrick O'Brien*	Innovative Integration of engineering and biological tools aids hydraulic structure design for restoring T&E fis — *Andrew Goodwin*	Break in Exhibit Hall	**TRACK 2** Ecological Engineering & Design — Session 2B	Innovative hydraulic structure design at Lower Granite Dam: design that saves water and salmon — *Lynn Reese*	Impacts of using a spillway for juvenile fish passage on typical design criteria — *Robert Buchholz*	Hydraulic design of juvenile fish passage facility for reservoir with wide range of pool elevation - Hanson Dam — *Dennis Mekkers*
Room 222	**TRACK 3** Modeling — Session 3A	Corps involvement in the FEMA map modernization program — *Kete White*	Innovative approximate study method for FEMA map modernization program — *John Hunter*	Flood fight structures demonstration evaluation program — *Fred Pinkard*	Break in Exhibit Hall	**TRACK 3** Modeling — Session 3B	Integrating climate dynamics into water resources planning and management — *Kate White*	Risk and uncertainty in flood damage reduction studies — *Rob Moyer*	Uncertainty analysis and stochastic simulation — *Jacke Hallberg*
Room 223	**TRACK 4** H&H Aspects of Dam Safety — Session4A	Hydrologic aspects of operating in failure mode: Fern Lake — *Bruce Duffe*	Dam safety study with cascading failures — *Gordon Lance*	Rough river spillway capacity — *Richard Pruitt*	Break in Exhibit Hall	**TRACK 4** International / Military H&H — Session 4B	Capability restoration and historic marsh restoration — *Fauwaz Hanbali*	USACE capacity building effort for Iraq MoWR — *Steven Wilhelms*	USACE support of CMEP in 2004 — *Mark Jensen*

12 Noon — **Lunch in Exhibit Hall**

Room	Track	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track	4:00 PM	4:30 PM	5:00 PM
Room 220	**TRACK 1** Coastal Sediments — Session 1C	Evaluating beachfill project performance in the NAP — *Monica Chasten*	USACE's regional coastal mapping program — *Jennifer Wozencraft*	US Naval Academy flood damage reduction project using structural and non-structural measures — *Stacey Underwood*	Break in Exhibit Hall	**TRACK 1** Shore Protection Projects — Session 1D	Hurricane Isabel effects on communities — *Jane Jablonski*	Repair of the shore protection projects adversly affected by the hurricanes of 2004 — *Rick McMillen*	Shore protection project performance assessmet — *Sharon Haggett*
Room 221	**TRACK 2** Modeling Ecological Restoration / Systems Assessment — Session 2C	Regional modeling requirements for ecosystem restoration — *Maged Hussein*	Tools for wetlands permit evaluation: Modeling groundwater and surface water distribution systems — *Cary Talbot*	Current research in fate and transport of chemical and biological contaminants in water distribution systems — *Mark Ginsberg*	Break in Exhibit Hall	**TRACK 2** Ecosystem Habitat Restoration — Session 2D	Aquatic habitat restoration in the lower Missouri River — *Chance Bittner*	Missouri River restoration: shallow water habitat creation — *Daniel Pridal*	Ecosystem restoration for fish and wildlife habitat on the upper Mississippi River — *Jon Hendrickson*
Room 222	**TRACK 3** River Morphology — Session 3C	Geomorphology study of the Mississippi river — *Edward Braurer*	Bank erosion and morphology of the Kaskaskia river — *Michael Rodgers*	Sediment movement at Kansas City from water years 1920 to 2004 — *Alan Tool*	Break in Exhibit Hall	**TRACK 3** Modeling River Sedimentation — Session 3D	Sediment impact assessment model (SIAM) — *David Biedenharn*	Sediment modeling of MS River, Cairo to Gulf — *Basil Arthur*	Sediment modeling of rivers — *Charlie Berger*
Room 223	**TRACK 4** GIS and Surveying — Session 4C	GIS tools available now to support HHC — *Timothy Pangburn*	High resolution bathymetry and fly-through visualization — *Paul Clouse*	GIS & surveying to support national FEMA — *Mark Flick*	Break in Exhibit Hall	**TRACK 4** GIS and Surveying — Session 4D	Update flood eme gency plans with GIS and HEC-RAS — *Stephen Stello*	High resolution visualizations of multibeam data: lower Mississippi River — *Thomas Tobin*	GIS in SWWRP — *Andrew Bruzewicz*

Wednesday, August 3, 2005 Concurrent Sessions

Geotechnical Track

Room	Track / Session	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track / Session	10:30 AM	11:00 AM	11:30 AM
Room 226	TRACK 5 Session 5A	Levee lowering for the Lewis & Clark bi-centennial celebration *Robert Berger*	Conduits through embankment dams - best practices for design, construction, problem id and evaluation, inspection, maintenance, renovation & repair *Dave Pezza*	Design, construction and seepage at Prado Dam, CA *Douglas Chitwood*	Break in Exhibit Hall	TRACK 5 Session 5B	2-D liquefaction evaluation with q4MESH *David Serafini*	Unlined spillway erosion risk assessment *Johannes Wibowo*	Seismic remediation of the Clemson upper and lower diversion dams: evaluation, conceptal design and design (P1) *Ben Foreman*
Room 227	TRACK 6 Session 6A	USACE dams on solution susceptible or highly fractured rock foundations *Art Walz*	Special drilling and grouting techniques for remedial work in embankment dams *Doug Heenan*	Composite grouting & cutoff wall solutions *Donald Bruce*	Break in Exhibit Hall	TRACK 6 Session 6B	State of the art in grout mixes *James Davies*	State of the art in computer monitoring, control, and analysis of grouting *Trent Dreese*	Quantitatively engineered grout courtains *David Wilson*
Room 228	TRACK 7 Session 7A	Case history: multiple axial statnamic test on a drilled shaft embedded in shale *Paul Axtell*	Austin Dam, Pennsylvania: the sliding failure of a concrete gravity dam revisited *Brian Greene*	M^3 (Modeling, Monitoring and Manufacturing) - a comprehensive approach to controlling ground movements for protecting existing structures and facilities *Michael Walker*	Break in Exhibit Hall	TRACK 7 Session 7B	Controlled modulus columns: A ground improvement technique *Martin Taube*	Time-dependent reliability models for use in major rehabilitation of embankment dams and foundations *Robert Patev*	Engineering geology design challenges at the Soo Lock replacement project *Mike Nield*
Room 229	TRACK 8 Session 8A	Evaluation of the use of lithium nitrate in controlling alkali-silica reactivity in an existing concrete pavement *Mike Kelly*	Use of self-consolidating concrete in the installation of bulhead slots - Lessons learned in the use of this innovative concrete material *Darrell Morey*	Roller compacted concrete for McAlpine lock walls *David Kiefer*	Break in Exhibit Hall	TRACK 8 Session 8B	Soil-cement for stream bank stabilization *Wayne Adaska*	Using cement to reclaim asphalt pavements *David Luhr*	Valley park 100-year flood protection project: use of "engineered fill" in item 4b levee core *Patrick Conroy*

12 Noon

Lunch in Exhibit Hall

Room	Track / Session	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track / Session	4:00 PM	4:30 PM	5:00 PM
Room 226	TRACK 5 Session 5C	Seismic remediation of the Clemson upper and lower diversion dams: deep soil mix construction *Ben Foreman*	Historical changes in the state-of-the-art of seismic engineering & effects of those changes on the seismic response studies of large embankement dams *Samuel Stacy*	New Iwakuni runway *Vincent Donnally*	Break in Exhibit Hall	TRACK 5 Session 5D	Internal erosion and piping at Fern Ridge dam: Problems and solutions *Jeremy Britton, Ph.D.*	Rough river dam safety assurance project *Timothy O'Leary*	Seepage collection and control systems: The devil is in the details *John France*
Room 227	TRACK 6 Session 6C	Grout courtains at Arkabutla Dam outlet monolith joints using chemical grout to seal joints, Arkabutla, MS *Dale Goss*	Results from a large-scale grout test program, Chicago underflow plan (CUP) McCook Reservoir *Joseph Kissane*	Clearwater Dam - foundation drilling and grouting for repair of sinkholes *Mark Harris*	Break in Exhibit Hall	TRACK 6 Session 6D	Update on the investigation of the effects of boring sample size (3' vs 5") on measured cohesion in soft clays *Richard Pinner*	Soil-bentonite cutoff wall through free-product at Indiana Harbor CDF *Joseph Schulenberg*	Soil-bentonite cutoff wall through dense alluvium with boulders into bedrock, McCook Reservoir *William Rochford*
Room 228	TRACK 7 Session 7C	Engineering geology during design and construction of the Marmet lock project *Michael Nield*	Mill Creek deep tunnel - Geological affects on proposed structures and construction techniques *Tres Henn*	Earth pressure loads behind the new McAlpine Lock replacement project *Troy O'Neal*	Break in Exhibit Hall	TRACK 7 Session 7D	Geosynthetics and construction of the Bonneville lock and dam second powerhouse corner collector surface flow bypass project *Art Fong*	McAlpine lock replacement - foundation characteristics and excavation *Kenneth Henn*	
Room 229	TRACK 8 Session 8C	What to do if your dam is expanding: a case study *Greg Yankey*	Unpaved road stabilization with chlorides *Michael Mitchell*	Use of ultra-fine amorphous colloidal silica to produce a high-density, high-strength rock-matching grout for instrumentation grouting *Brian Green*	Break in Exhibit Hall	TRACK 8 Session 8D	Innovative techniques in the Gabion system *George Ragazzo*	Addressing cold regions issues in pavement engineering *Lynette Barna*	Geology of New York Harbor - geological and geophysical methods of characterizing the stratigraphy for dredging contracts *Ben Baker*

Wednesday, August 3, 2005 Concurrent Sessions

Structural Engineering Track

Room	Track	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track	10:30 AM	11:00 AM	11:30 AM
Room 240	**TRACK 12** Civil Works Structural **Session 12A**	Recent changes to Corps guidance on steel hydraulic structures *Joe Padula*	Crack repairs and instrumentation of Greenup L&D miter gate *Doug Kish*	Recent hydraulic steel structures findings in the Portland distric *Travis Adams*	Break in Exhibit Hall	**TRACK 12** Civil Works Structural **Session 12B**	Perry Lake gate repair *Marvin Parks*	Mel Price auxiliary lock gate repair *Andrew Schimpf*	Mel Price auxiliary lock gate repair (Continued) *Andrew Schimpf*
Room 241	**TRACK 13** Civil Works Structural **Session 13A**	Folsom Dam evaluation of stilling basin performance for uplift loading for historic flow *Rick Poeppelman*	Rehabilitation of Folsom Dam stilling basin *Rick Poeppelman*	Seismic stability evaluation of Folson Dam *Enrique Matheu*	Break in Exhibit Hall	**TRACK 13** Civil Works Structural **Session 13B**	Seismic stress analysis of Folsom Dam *Enrique Matheu*	Barge impact guidance for rigid lock walls, ETL 110-2-563 and probalistic barge impact analysis *John Clarkson*	Belleville barge accident *John Clarkson*
Room 242	**TRACK 14** Bridges/ Buildings **Session 14A**	The USACE bridge management system *Phil Sauser*	Standard procedures for fatigue evaluation of bridges *Phil Sauser*	Fatigue and fracture assessment of Jesse Stuart Highway Bridge *John Jaeger*	Break in Exhibit Hall	**TRACK 14** Bridges/ Buildings **Session 14B**	Building an in-house bridge inspection program *Jennifer Laning*	Fatigue analysis of Summit bridge *Jim Chu*	Consolidation of Structural criteria for military construction *Steve Sweeney*

12 Noon **Lunch in Exhibit Hall**

Room	Track	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track	4:00 PM	4:30 PM	5:00 PM
Room 240	**TRACK 12** Civil Works Structural **Session 12C**	Overview of John T. Myers locks improvements project *Greg Werncke*	John T. Myers rehabilitation study *Greg Werncke*	Ohio River Greenup Lock extension *Rodney Cremeans*	Break in Exhibit Hall	**TRACK 12** Civil Works Structural **Session 12D**	McAlpine lock replacement project, project summary and status of construction *Kathleen Feger*	Results of Roller Compacted concrete placement at the McAlpine lock replacement project *Larry Dalton*	Tennessee Valley authority Kentucky lock addition downstream middle wall monoliths *Scott Wheeler*
Room 241	**TRACK 13** Civil Works Structural **Session 13C**	Portugues Dam, Ponce, Puerto Rico project update *Jim Mangold*	Portugues Dam, Ponce, Puerto Rico, RCC design and testing program *Jim Hinds*	Portugues Dam, Ponce, Puerto Rico, Thermal analysis of hydration and subsequent cooling of RCC *Ahmed Nisar*	Break in Exhibit Hall	**TRACK 13** Civil Works Structural **Session 13D**	Miter gate anchorage design *Andy Harkness*	Obermeyer gated spillway project - S381 *Michael Rannie*	McCook Reservoir design of high pressure steel gates *Luelseged Tekola*
Room 242	**TRACK 14** Brigdes/ Buildings **Session 14C**	Unified facilities criteria seismic design for buildings *Jack Hayes*	Seismic requirements for architectural, mechanical and electrical components *John Connor*	Quality assurance for seismic resisting systems *John Connor*	Break in Exhibit Hall	**TRACK 14** Bridges/ Buildings **Session 14D**	Unified facilities criteria masonry structural design for buildings *Tom Wright*	Cathodic protection of building reinforcing steel (in Diego Garcia) *Thomas Tehada*	USACE Homeland security web portal *Mike Pace*

Wednesday, August 3, 2005 Concurrent Sessions

Dam Safety Track & Construction Track

Room	Track / Session	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track / Session	10:30 AM	11:00 AM	11:30 AM
Room 224	**TRACK 10** Dam Safety **Session 10A**	Tuttle Creek warning and alert systems *Bill Empson*	Lessons from the dam failure warning system exercise - Tuttle Creek *Bill Empson*	Tuttle Creek ground modification treatability program *Bill Empson*	Break in Exhibit Hall	**TRACK 10** Dam Safety **Session 10B**	Dam safety analysis of Cannelton Dam *Terry Sullivan*	John Martin Dam, CO - Dam safety structural upgrades *George Diewald*	Vesuvius Lake Dam rehabilitation *Susan Peterson*
Room 225	**TRACK 11** Dam Safety **Session 11A**	Canton lake spillway stabilization project: IS a test anchor program NECESSARY? *Randy Mead*	Dynamic testing and numerical correlation studies for Folsom dam *Ziyad Duron*	Status of portfolio risk assessment *Eric Halpin*	Break in Exhibit Hall	**TRACK 11** Dam Safety **Session 11B**	Mississinewa Dam remediation *Jeff Schaefer*	Wolf creek seepage history *Michael Zoccola*	Blue dam major rehabilitation *Michael McCray*
Room 230	**TRACK 19** Construction **Session 19A**	RMS Update *Haskell Barker*	RMS Update (Continued) *Haskell Barker*	Updated CQM for Contractors Course *Walt Norko*	Break in Exhibit Hall	**TRACK 19** Construction **Session 19B**	Lessons learned on major construction projects *Jim Cox*	Update on safety issues - Safety manual 385-1-1 *Charles Ray Waits*	Update on safety issues - safety manual 385-1-1 (continued) *Charles Ray Waits*
Room 231	**TRACK 20** Construction **Session 20A**	Construction methods in Russia *Lance Lawton*	Construction methods in Russia (Continued) *Lance Lawton*	Renovating the Pentagon using Design/Build delivery *Brian Dziekonski*	Break in Exhibit Hall	**TRACK 20** Construction **Session 20B**	Completion of the Olmsted approach walls *Dale Miller*	Completion of the Olmsted approach walls (Continued) *Dale Miller*	Construction management at risk *Christopher Prinslow*

12 Noon **Lunch in Exhibit Hall**

Room	Track / Session	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track / Session	4:00 PM	4:30 PM	5:00 PM
Room 224	**TRACK 10** Dam Safety **Session 10C**	Project specific ris analysis - Success Dam *Ronn Ross*	Dam safety lessons learned, Winter storm 2005, Muskingum & Scioto Basins *Charles Barry*	Dam security and Dams Government Coordinating Council *Roy Braden*	Break in Exhibit Hall	**TRACK 10** Dam Safety **Session 10D**	Prompton Dam hydrologic deficiency and spillway modificatio *Troy Cosgrove*	"Well, that's water over the dam" - Rough River spillway adequacy design *Richard Pruitt*	Roller-compacted concrete for dam spillways and overtopping protection *Fares Abdo*
Room 225	**TRACK 11** Dam Safety **Session 11C**	Clearwater Dam major rehabilitation *Bobby Van Cleave*	Success dam seismic dam safety modificatio *Norbert Suter*	Problems on the Santa Ana River - Prado Dam *Douglas Chitwood*	Break in Exhibit Hall	**TRACK 11** Dam Safety **Session 11D**	Problems on the Santa Ana River - Seven Oaks Dam *Robert Kwan*	Dam safety program management tools *Tommy Schmidt*	
Room 230	**TRACK 19** Construction **Session 19C**	3D Modeling and impact on constructability *Gary Cough*	3D Modeling and impact on constructability (Continued) *Gary Cough*	Construction in Iraq & Afganistan *Walt Norko*	Break in Exhibit Hall	**TRACK 19** Construction **Session 19D**	Air Force streamlining Design/Build *Joel Hoffman*	Air Force streamlining Design/Build (Continued) *Joel Hoffman*	Sustainable design requirements & construction implementation *Harry Goradia*
Room 231	**TRACK 20** Construction **Session 20C**	Tsunami reconstruction *Andy Constantaras*	Tsunami reconstruction (Continued) *Andy Constantaras*	Military construction transformation in support of Army transformation *Sally Parsons*	Break in Exhibit Hall	**TRACK 20** Construction **Session 20D**	MEDCOM Construction Issues *Rick Bond*	MEDCOM Construction Issues (Continued) *Rick Bond*	*TBA*

Wednesday, August 3, 2005 Concurrent Sessions

Electrical & Mechanical Engineering Track

Room	Track / Session	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track / Session	10:30 AM	11:00 AM	11:30 AM
Room A	**TRACK 15** Military Electrical, **Session 15A**	Tri-Service Electrical Criteria Overview - *Tri-Service Panel*	Tri-Service Electrical Criteria Overview - (Continued) *Tri-Service Panel*	Tri-Service Electrical Criteria Overview -(Continued) *Tri-Service Panel*	Break in Exhibit Hall	**TRACK 15** Military Electrical, **Session 15B**	Interior/Exterior and security lighting criteria *Tri-Service Panel*	Information technology systems criteria *Tri-Service Panel*	Information technology systems criteria (Continued) *Tri-Service Panel*
Room B	**TRACK 16** Military Mechanical, **Session 16A**	Building Commissioning *Dale Herron*	HVAC Commissioning *Dale Herron*	Ventilation and indoor air quality *Davor Novosel*	Break in Exhibit Hall	**TRACK 16** Military Mechanical, **Session 16B**	Ventilation and indoor air quality (Continued) *Davor Novosel*	Refrigerant implications for HVAC specifications, selection, and o&m - now and future *Mike Thompson*	Refrigerant implications for HVAC specifications, selection, and o&m - now and future (Continued) *Mike Thompson*
Room D	**TRACK 17** Military Mechanical / Electrical, **Session 17A**	Sustainable design update *Harry Goradia*			Break in Exhibit Hall	**TRACK 17** Military Mechanical / Electrical, **Session 17B**	Utility systems security and fort future *Vicki L. Van Blaricum*	Acoustic leak detection for utilities distribution systems *Sean Morefield*	Acoustic leak detection for utilities distribution systems (Continued) *Sean Morefield*
Room E	**TRACK 18** Civil Mechanical, **Session 18A**	Emsworth Dam vertical lift gate hoist replacement *John Nites*	Hydraulic drive for Braddock Dam *Janine Krempa*	John Day navigation lock upstream lift gate wire rope failure *Ronald Wridge*	Break in Exhibit Hall	**TRACK 18** Civil Mechanical, **Session 18B**	Overhead bulkhead at Olmstead Lock *Rick Schultz*	Replacement of gate # 5 intermediate gear and pinion at RC Byrd Lock and Dam *Brenden McKinley*	Mechanical design issues during construction of McAlpine Lock *Richard Nichols*

12 Noon — **Lunch in Exhibit Hall**

Room	Track / Session	2:00 PM	2:30 PM	3:00 PM	3:30 PM	Track / Session	4:00 PM	4:30 PM	5:00 PM
Room A	**TRACK 15** Military Electrical, **Session 15C**	Mass notification syste *Tri-Service Panel*	Mass notification system (Continued) *Tri-Service Panel*	Electronic card access locks *Fred Crum*	Break in Exhibit Hall	**TRACK 15** Military Electrical, **Session 15D**	Lightning protection standards *Richard Bouchard*	Lightning and surge protection *Tri-Service Panel*	Lightning and surge protection (Continued) *Tri-Service Panel*
Room B	**TRACK 16** Military Mechanical, **Session 16C**	Basic design considerations for geothermal heat pump systems *Gary Phetteplace*	Basic design considerations for geothermal heat pump systems (Continued) *Gary Phetteplace*	Pentagon renovation *Mitch Duke*	Break in Exhibit Hall	**TRACK 16** Military Electrical, **Session 16D**	Effective use of evaporative cooling for industrial and institutional/office facilitie *Leon Shapiro*	Efective use of evaporative cooling for industrial and institutional/office facilities (Continued) *Leon Shapiro*	Non-hazardous chemical treatments for heating and cooling systems *Vincent Hock*
Room D	**TRACK 17** Civil Mechanical / Electrical, **Session 17C**	Hydropower asset management partnership (hydroAMP) *Lori Rux*	New gas fueled/diesel fueled turbine powered electrical generating station in Iraq *Lester Lowe*	The construction of distribution tunnels and pump installation for the metropolitan Chicago sewer systems *Ernesto Go*	Break in Exhibit Hall	**TRACK 17** Civil Mechanical / Electrical, **Session 17D**	The Festus/Crystal City levee and pump station project *Stephen Farkas*	Remote operations for Kaskaskia Dam *Shane Nieukirk*	Technological advances in lock control systems *Andy Schimpf*
Room E	**TRACK 18** Civil Mechanical, **Session 18C**	New coating products for civil works structures *Al Beitelman*	New guide specification for procurement of turbine oils *John Micetic*	Synchronous condensing with large Kaplan turbine - A case study *Brian Moentenich*	Break in Exhibit Hall	**TRACK 18** Civil Mechanical, **Session 18D**	Acquifer storage and recovery (ASR) system *Gerald Deloach*	Wastewater infrastructure improvements in Appalachia *James Sadler*	Storm water pumps *Thomas Jamieson*

Thursday, August 4, 2005 Concurrent Sessions

HH&C Track

Room	Track / Session	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track / Session	10:30 AM	11:00 AM	11:30 AM
Room 220	**TRACK 1 Sedimentation & New Concepts** Session 1E	Ice jams, contaminated sediment and structures Clark Fork River, MT *Andrew Tuthill*	Increased bed erosion due to ice *John Hains*	Monitoring the Mississippi River using GPS coordinated video *James Gutshall*	Break in Exhibit Hall	**TRACK 1 Sedimentation, Case Examples** Session 1F	Watershed approach to stream stability the reduction of nutrients *John B. Smith*	Monitoring the effects of sedimentation from Mount St. Helen *Alan Donner*	Navigation and environmental interests in alleviating repetitive dredging *Jason Brown*
Room 221	**TRACK 2 Water Management** Session 2E	Enhancements and new capabilities of HEC-ResSim 3.0 *Fauwaz Hanbali*	Transition to Oracle based data system *Joel Asunskis*	Accessing real time Mississippi Valley water level data *Rich Engstrom*	Break in Exhibit Hall	**TRACK 2 Water Management** Session 2F	Hurricane Season 2004 *Susan Sylvester*	Reevaluation of a project's flood control benefi *Ferris Chamberlin*	Helmand Valley water management plan *Jason Needham*
Room 222	**TRACK 3 Case Studies** Session 2E	Red River of the north flood protection projec *Michael Lesher*	Southeast Arkansas flood control & water supply feasibility study *Thomas Brown*	McCook and Thorton tunnel and reservoir modeling *David Kiel*	Break in Exhibit Hall	**TRACK 3 Case Studies** Session 3F	Ala Wai Canal Project, Honolulu, Oahu, Hawaii *Lynnette Schapers*	Missouri River geospatial decision support framework *Brian Baker*	Systemic analysis of the Mississippi & Illinois Rivers *Dennis Stephens*
Room 223	**TRACK 4 Modeling** Session 4E	Hydrologic models supported by ERDC *Robert Wallace*	HEC-HMS Version 3.0 new features *Jeff Harris*	SEEP2D & GMS: Simple tools for solving a variety of seepage problems *Clarissa Hansen*	Break in Exhibit Hall	**TRACK 4 Modeling** Session 4F	Water quality and sediment transport in HEC-RAS *Mark Jensen*	Advances to the GSSHA program *Aaron Byrd*	Software integration for watershed studies HEC-WAT *Chris Dunn*

12 Noon **Lunch**

Room	Track / Session	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track / Session	3:30 PM	4:00 PM	4:30 PM
Room 220	**TRACK 1 Water Quality Management** Session 1G	San Francisco Bay Mercury TMDL-Implications for constructed wetlands *Herb Fredrickson*	Abandoned mine land: Eastern and Western perspectives *Kate White*	A lake tap for temperature control tower construction at Cougar Dam *Steve Schlenker*	Break	**TRACK 1 Watershed Management** Session 1H	Demonstrating innovative river restoration technologies: Truckee River, NV *Chris Dunn*	Comprehensive watershed restoration in the Buffalo district *Anthony Friona*	Translating the hydrologic tower of Babel *Dan Crawford*
Room 221	**TRACK 2 Water Management** Session 2G	Developing reservoir operation plans to manage erosion *Patrick O'Brien*	New approaches to water management decision making *James Barton*	Improved water supply forecasts for Kooteny basin using principal components regression *Randal Wortman*	Break	**TRACK 2 Water Management** Session 2H	Prescriptive reservoir modeling and ROPE study *Jason Needham*	Missouri River mainstem operations *Larry Murphy*	Res-Sim model for the Columbia River *Arun Mylvahanan*
Room 222	**TRACK 3 Section 227** Session 3G	Section 227 Workshop/ Program Review *William Curtis*	Section 227 Workshop/ Program Review (Continued) *William Curtis*	Section 227 Workshop/ Program Review (Continued) *William Curtis*	Break	**TRACK 3 Section 227** Session 3H	Section 227 Workshop/ Program Review *William Curtis*	Section 227 Workshop/ Program Review (Continued) *William Curtis*	Section 227 Workshop/ Program Review (Continued) *William Curtis*
Room 223	**TRACK 4 Modeling** Session 4G	Little Calumet River unsteady flow model conversion *Rick Ackerson*	Kansas City River basin model *Edward Parker*	Design guidance for breakup ice control *Andrew Tuthill*	Break	**TRACK 4 Modeling** Session 4H	Forebay flow simulations using Navier-Stokes code *Charlie Berger*	Use of regularizatino as a method for watershed model calibration *Brian Skahill*	Demonstration program in the arid southwest *Margaret Jonas*

Thursday, August 4, 2005 Concurrent Sessions

Geotechnical Track

Room	Track / Session	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track / Session	10:30 AM	11:00 AM	11:30 AM
Room 226	TRACK 5 / Session 5E	Dynamic deformation analyses Dewey Dam Huntintong District Corps of Engineers *Greg Yankey*	Seismic stability evaluation for Ute Dam, NM *John France*	An overview of criteria used by various organizations for assessments and seismic remediation of earth dams *Sean Carter*	Break in Exhibit Hall	TRACK 5 / Session 5F	USACE seepage berm design criteria and district practices *George Sills*	Ground penetrating radar applications for the assessment of airfield pavement *Lulu Edwards*	Challenges of the Fernando Belaunde Terry road upgrade Campanillia to Pizana - Peru road project *Michael Wielputz*
Room 227	TRACK 6 / Session 6E	Small geotechnical project, big stability problem - The Block Church Road experience *Jonathan Kolber*	Geophysical investigation of foundation conditions beneath Folsom Dam *Jose Llopis*	Bioengineering slope stabilization techniques coupled with traditional engineering applications - The result a stable slope *Bethany Bearmore*	Break in Exhibit Hall	TRACK 6 / Session 6F	Shoreline armor stone quality issues *Joseph Kissane*	Mill Creek - An urban flood control challenge *Monica Greenwell*	Next stop, The Twilight Zone *Troy O'Neal*
Room 228	TRACK 7 / Session 7E	The geotechnical and structural issues impacting the Dalles spillway construction *Kristie Hartfeil*	The Dalles spillway engineering and design *Kristie Hartfeil*	The future of the discrete element method in infrastructure analysis *Raju Kala*	Break in Exhibit Hall	TRACK 7 / Session 7F	Evaluating the portable falling weight deflectometer as a low-cost technique for posting seasonal load restrictions on low volume payments *Maureen Kestler*	Soil structure interaction effects in the seismic evaluation of success dam control tower *Michael Sharp*	Olmsted locks and Dam project geotechnical/construction issues *Jeff Schaefer*
Room 229	TRACK 8 / Session 8E	Rubblization of airfield concrete pavement *Eileen Velez-Vega*	US Army airfield pavement assessment program *Haley Parsons*	Critical state for probabilistic analysis of levee underseepage *Douglas Crum*	Break in Exhibit Hall	TRACK 8 / Session 8F	Curing practices for modern concrete construction *Toy Poole*	AAR at Carters Dam, a different approach *James Sanders*	Concrete damage at Carters Dam, GA *Toy Poole*

12 Noon — **Lunch**

Room	Track / Session	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track / Session	3:30 PM	4:00 PM	4:30 PM
Room 226	TRACK 5 / Session 5G	Slope stability evaluation of the Baldhill Dam right abutment *Neil Schwanz*	Lateral pile load test results within a soft cohesive foundation *Richard Varuso*	Design and construction of anchored bulheads for river diversion, Seabrook, NH *Siamac Vaghar*	Break	TRACK 5 / Session 5H	Characterization of soft marine clays - A case study at Craney Island *Aaron Zdinak*	50 years of NRSC experience with engineering problems caused by dispersive clays *Danny McCook*	Changes in the post-tensioning institutes new (4th Ed. 2004) "Recommendations for prestressed rock and soil anchors" *Michael McCray*
Room 227	TRACK 6 / Session 6G	Perils in back analysis failures *Greg Yankey*	Reconstruction of deteriorated lock walls concrete after blasting and other demolition removal techniques *Steve O'Connor*	Flood fighting structures demo - strations and evaluation program *George Sills*	Break	TRACK 6 / Session 6H	Innovative design concepts incorporated into a landfill closure and reuse design *Dave Ray*	Laboratory testing of flood fighting structure *Johannes Wibowo*	Bluff stabilization along Lake Michigan using active and passive dewatering techniques *Eileen Glynn*
Room 228	TRACK 7 / Session 7G	Geotechnical instrumentation and foundation re-evaluation of John Day lock and Dam, Columbia River, Oregon-Washington *David Scofield*	A study of the long term performance of seepage cutoff barriers in dams *John Rice*	Design, construction, and performance of seepage barriers for Guanella Dam, near Empire, CO *John France*	Break	TRACK 7 / Session 7H	Sensitive infrastructure sites and structures - Sonic drilling offers quality control and non-destructive advantages to geotechnical construction drilling *John Davis*	Subgrade failure criteria according to soil type and moisture condition *Edel Cortez*	The automated stability monitoring of the Mississippi River levees using the range scan system *Robert Jolissian*
Room 229	TRACK 8 / Session 8G	Damaging interactions among concrete materials *Toy Poole*	Economic effects on construction of uncertainty in test methods *Toy Poole*	Major issues in materials specification *Toy Poole*	Break	TRACK 8 / Session 8H	Spall and intermediate-sized repairs for PCC pavements *Reed Freeman*	Acceptance criteria for unbonded aggregate road surfacing materials *Reed Freeman*	Effective partnering to overcome an interruption in the supply of Portland cement during construction of Marmet lock and Dam *Billy Neeley*

Thursday, August 4, 2005 Concurrent Sessions

Geotechnical, Specifications, Electrical & Mechanical Engineering & Construction Tracks

Room	Track	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track	10:30 AM	11:00 AM	11:30 AM
Room 225	**TRACK 9** Geotechnical **Session 9E**	Seepage Committee Meeting *GROUP DISCUSSION*	Seepage Committee Meeting (Continued) *GROUP DISCUSSION*	Seepage Committee Meeting (Continued) *GROUP DISCUSSION*	Break in Exhibit Hall	**TRACK 9** Geotechnical **Session 9F**	GMCoP Forum *GROUP DISCUSSION*	GMCoP Forum (Continued) *GROUP DISCUSSION*	GMCoP Forum (Continued) *GROUP DISCUSSION*
Room 232	**TRACK 21** Specifications **Session 21E**	SpecsIntact-Demonstration of the SI explorer, publishing to PDF and Word *Patricia Robinson*	SpecsIntact - Demonstration of the SI editor, UMRL and reference wizard *Patricia Robinson*	UFGS status and direction *Jim Quinn*	Break in Exhibit Hall	**TRACK 21** Specifica-tions **Session 21F**	UFGS transitin to Master-Format 2004 *Carl Kersten*	Project specifications for the upper tier Folsom outlet works modification *Steve Freitas*	UFGS dredging *Don Carmen*
Room A	**TRACK 15** Military Electrical **Session 15E**	Electronic Security *Tri-Service Panel*	Electronic Security (Continued) *Tri-Service Panel*	AIRFIELD lightning protection & grounding and lighting *Tri-Service Panel*	Break in Exhibit Hall	**TRACK 15** Military Electrical **Session 15F**	Electrical safety and arc flash UF *Tri-Service Panel*	Electrical safety and arc flash UFC (Continued *Tri-Service Panel*	Electrical infrastructure in Iraq - Restore Iraqi electricity *Joseph Swiniarski*
Room B	**TRACK 16** Military Mechanical **Session 16E**	Lon works technology update *David Schwenk*	BACnet Technology Update *David Schwenk*	Implementation of Lon-based specification *Will White*	Break in Exhibit Hall	**TRACK 16** Military Mechanical **Session 16F**	Prefabricated Chiller Plants *Trey Austin*	Seismic for ME systems *Greg Stutts*	Design considerations for the prevention of mold *Quinn Hart*
Room D	**TRACK 17** Civil Mechanical **Session 17E**	Lessons learned on flood water pump stations *Mark Robertson*	Armada of pump stations, Grand Forks and East Grand Forks *Timothy Paulus*	Various screen equipment selection guide *Sara Benier*	Break in Exhibit Hall	**TRACK 17** Civil Mechanical **Session 17F**	Lock gate replacement system *Will Smith*	Lock gate replacement system (Continued) *Will Smith*	Automated closure gate design for Duck creek flood contro *Mark Robertson*
Room 230	**TRACK 19** Construction **Session 19E**	NAVFAC Construction scheduling *Glenn Saito*	NAVFAC Construction scheduling (Continued) *Glenn Saito*	ACASS/CASS - CPARS *Ed Marceau*	Break in Exhibit Hall	**TRACK 19** Construction **Session 19F**	Self-consolidating concrete *Beatrix Kerhoff*	Self-consolidating concrete (Continued) *Beatrix Kerhoff*	
Room 231	**TRACK 20** Construction **Session 20E**	Update on DAWIA and Facilities Engineering *Mark Grammer*	Update on DAWIA and Facilities Engineering (Continued) *Mark Grammer*	Partnering as a best practice *Ray DuPont*	Break in Exhibit Hall	**TRACK 20** Construction **Session 20F**	S&A Update *Harry Jones*	Construction Issues Open Forum (Q&A) *Don Basham*	Construction Issues Open Forum (Q&A) (Continued) *Don Basham*

12 Noon — **Lunch**

Room	Track	1:30 PM	2:00 PM	2:30 PM	3:00 PM	3:30 PM	4:00 PM	4:30 PM
Room 225	**TRACK 9** Geotechnical **Session 9G**	Seismic Manual *GROUP DISCUSSION*	Seismic Manual (Continued) *GROUP DISCUSSION*	Seismic Manual (Continued) *GROUP DISCUSSION*				

Thursday, August 4, 2005 Concurrent Sessions

Dam Safety Track & Structural Engineering Track

Room	Track / Session	8:00 AM	8:30 AM	9:00 AM	9:30 AM	Track / Session	10:30 AM	11:00 AM	11:30 AM
Room 224	**TRACK 10** Dam Safety, Session 10E	Seepage and stability, final evaluation for reservoir pool raising project, Terminus Dam, Kaweah River, CA — *Michael Ramsbotham*	Initial filling plan, Terminus dam spillway enlargement, Terminus Dam, Kaweah River, CA — *Michael Ramsbotham*	Hydrologic aspects of operating in a "failure mode" - Fern Ridge Lake, OR — *Bruce Duffe*	Break in Exhibit Hall	**TRACK 10** Dam Safety, Session 10F	A dam safety study involving cascading dam failures — *Gordon Lance*		The relationship of seismic velocity to the erodibility index — *Joseph Topi*
Room 240	**TRACK 12** Civil Works Structural, Session 12E	London lock and dam, West Virginia major rehabilitation project — *David Sullivan*	Replacing existing lock 4-Innovative designs for Charleroi lock — *Steveb Stoltz*	Use of non-linear incremental structural analysis in the design of the Charleroi lock — *Randy James*	Break in Exhibit Hall	**TRACK 12** Civil Works Structural, Session 12F	Olmsted dam in-the-wet construction methods — *Lynn Raque*	Completion of the Olmstead approach walls — *Terry Sullivan*	John Day lock monolith repair — *Mathew Hanson*
Room 241	**TRACK 13** Civil Works Structural, Session 13E	Chicago shoreline project — *Jan Plachta*	Structural assessment of Bluestone Dam — *Robert Reed*	Duck Creek, OH local flood protection projection phase III Culvert damage — *Jeremy Nichols*	Break in Exhibit Hall	**TRACK 13** Civil Works Structural, Session 13F	Development of design criteria for the Rio Puerto Nuevo contract 2D/2E channel wall — *Jana Tanner*	Design of concrete lined tunnels in rock — *David Force*	Indianapolis north phase IIIA project — *Gene Hoard*
Room 242	**TRACK 14** Bridges/ Buildings, Session 14E	Urban search & rescue program overview — *Tom Niedernhofer*	Evaluation and repair of blast damaged reinforced concrete beams — *John Hudson*	Single degree of freedom blast effects spreadsheets — *Dale Nebuda*	Break in Exhibit Hall	**TRACK 14** Bridges/ Buildings, Session 14F	UFC 4-023-02 Structural design to resist explosive effects for existing buildings — *Jim Caulder*	Progressive collapse UFC requirements — *Brian Crowder*	U.S. general services admnistrative progressive collapse design guidelines applied to concrete moment-resisting frame buildings — *David Billow*

12 Noon **Lunch**

Room	Track / Session	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Track / Session	3:30 PM	4:00 PM	4:30 PM
Room 224	**TRACK 10** Dam Safety, Session 10G	Dam safety instrumentation data management utilizing WinIDP to aid data collection and evaluation — *Travis Tutka*	Automated instrumentation assessments at Marmet lock & Dam — *Ronald Rakes*	Potential failure mode analysis of Eau Galle Dam — *David Rydeen*	Break	**TRACK 10** Dam Safety, Session 10H	Dam safety officers panel - The Good — *Bruce Murray*	Dam safety officers panel - The Bad — *Bruce Murray*	Dam safety officers panel - The Ugly — *Bruce Murray*
Room 240	**TRACK 12** Civil Works Structural, Session 12G	Inner Harbor navigation canal and lock structure — *Mark Gonski*	Design features and challenges of the Comite River diversion project — *Christopher Dunn*	Waterline support failure on the Harvey canal: A case study — *Angela DeSoto Duncan*	Break	**TRACK 12** Civil Works Structural, Session 12H	Public appeal of major civil projects- The good, the bad and the ugly — *Kevin Holden*	Des Moines Riverwalk — *Thomas Heinold*	Chickamauga lock and Dam height optimization study using Monte Carlo simulation — *Leon Schieber*

Thursday, August 4, 2005 Concurrent Workshops

Room	Workshop	1:30 PM	2:00 PM	2:30 PM	3:00 PM	Workshop	3:30 PM	4:00 PM	4:30 PM
Room 241	**Workshop 1** DoD Security Engineering **Session 1A**	Security planning & minimum standards *Curt Betts*	Security planning & minimum standards (Continued) *Curt Betts*	Security planning & minimum standards (Continued) *Curt Betts*	Break	**Workshop 1** DoD Security Engineering **Session 1B**	Security design manuals *Bernie Deneke*	Security design manuals (Continued) *Bernie Deneke*	Security design manuals (Continued) *Bernie Deneke*
Room 231	**Workshop 2** Electrical Workshop **Session 2A**	National Electrical Code 2005 Changes *Mark McNamara*	National Electrical Code 2005 Changes (Continued) *Mark McNamara*	National Electrical Code 2005 Changes (Continued) *Mark McNamara*	Break	**Workshop 2** Electrical Workshop **Session 2B**	National Electrical Code 2005 Changes (Continued) *Mark McNamara*	National Electrical Code 2005 Changes (Continued) *Mark McNamara*	National Electrical Code 2005 Changes (Continued) *Mark McNamara*
Room 242	**Workshop 3** Mechanical Engineering **Session 3A**	Design and application of packaged central cooling plants *The Trane Company*	Design and application of packaged central cooling plants (Continued) *The Trane Company*	Design and application of packaged central cooling plants (Continued) *The Trane Company*	Break	**Workshop 3** Mechanical Engineering **Session 3B**	Improving dehumidification in HVAC systems *The Trane Company*	Improving dehumidification in HVAC systems (Continued) *The Trane Company*	Improving dehumidification in HVAC systems (Continued) *The Trane Company*
Room 230	**Workshop 4** Construction **Session 4A**	Construction Community of Practice Forum *Walt Norko*	Construction Community of Practice Forum (Continued) *Walt Norko*	Construction Community of Practice Forum (Continued) *Walt Norko*	Break				
Room 232	**Workshop 5** Specifications **Session 5A**	Open Meeting of Corps Specifications Steering Committee *Robert Iseli, et al.*	Open Meeting of Corps Specifications Steering Committee (Continued) *Robert Iseli, et al.*	Open Meeting of Corps Specifications Steering Committee (Continued) *Robert Iseli, et al.*	Break	**Workshop 5** Specifications **Session 5B**	Open Meeting of Corps Specifications Steering Committee (Continued) *Robert Iseli, et al.*	Open Meeting of Corps Specifications Steering Committee (Continued) *Robert Iseli, et al.*	Open Meeting of Corps Specifications Steering Committee (Continued) *Robert Iseli, et al.*

NOTES

NDIA
NATIONAL DEFENSE INDUSTRIAL ASSOCIATION
STRENGTH THROUGH INDUSTRY & TECHNOLOGY

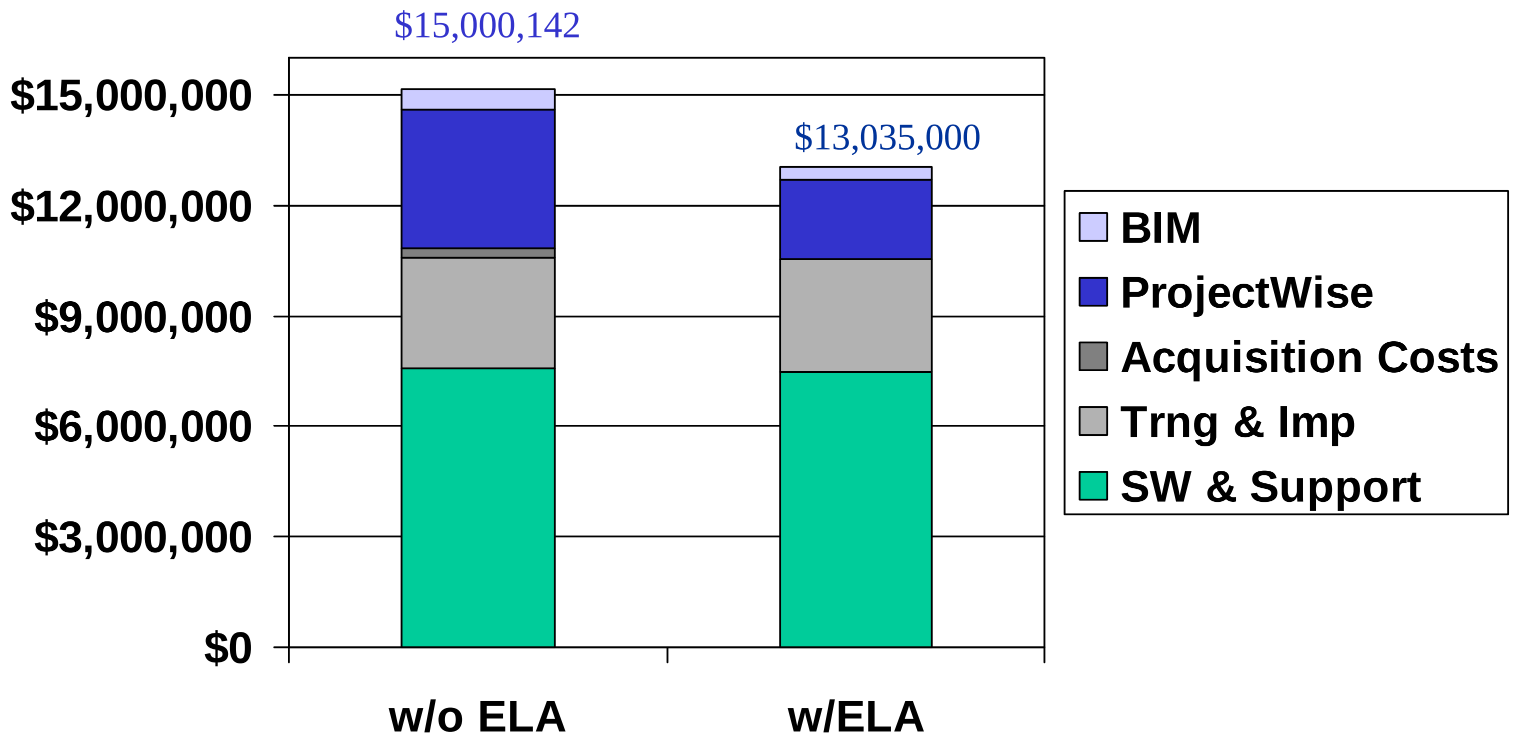
2005 Tri-Service Infrastructure Systems Conference & Exhibition
"Re-Energizing Engineering Excellence"
August 2-4, 2005
St. Louis, MO

Financial Justification on Bentley Enterprise License Agreement (ELA)

US Army Corps
of Engineers®

Benefit Summary

- With ELA
  - $2 million total saving during 3 year Contract



US Army Corps of Engineers®

Benefit Summary (con't)

- With ELA
  - Reduction in acquisition costs (contract administration by individual districts)
  - Access to Bentley's entire application suite
  - Free Bentley Conference Registrations
  - Access to open slots at regularly scheduled Bentley Training

Expenditure Assumptions Without ELA

- BIM Implementation Costs:
  - $60K per District with 3 Districts implementing per year

- ProjectWise Implementation:
  - 27 Districts with Full Implementation – 9/Year @ $115,000
  - 13 Districts with Partial Implementation – 4/Year) @ $50,000

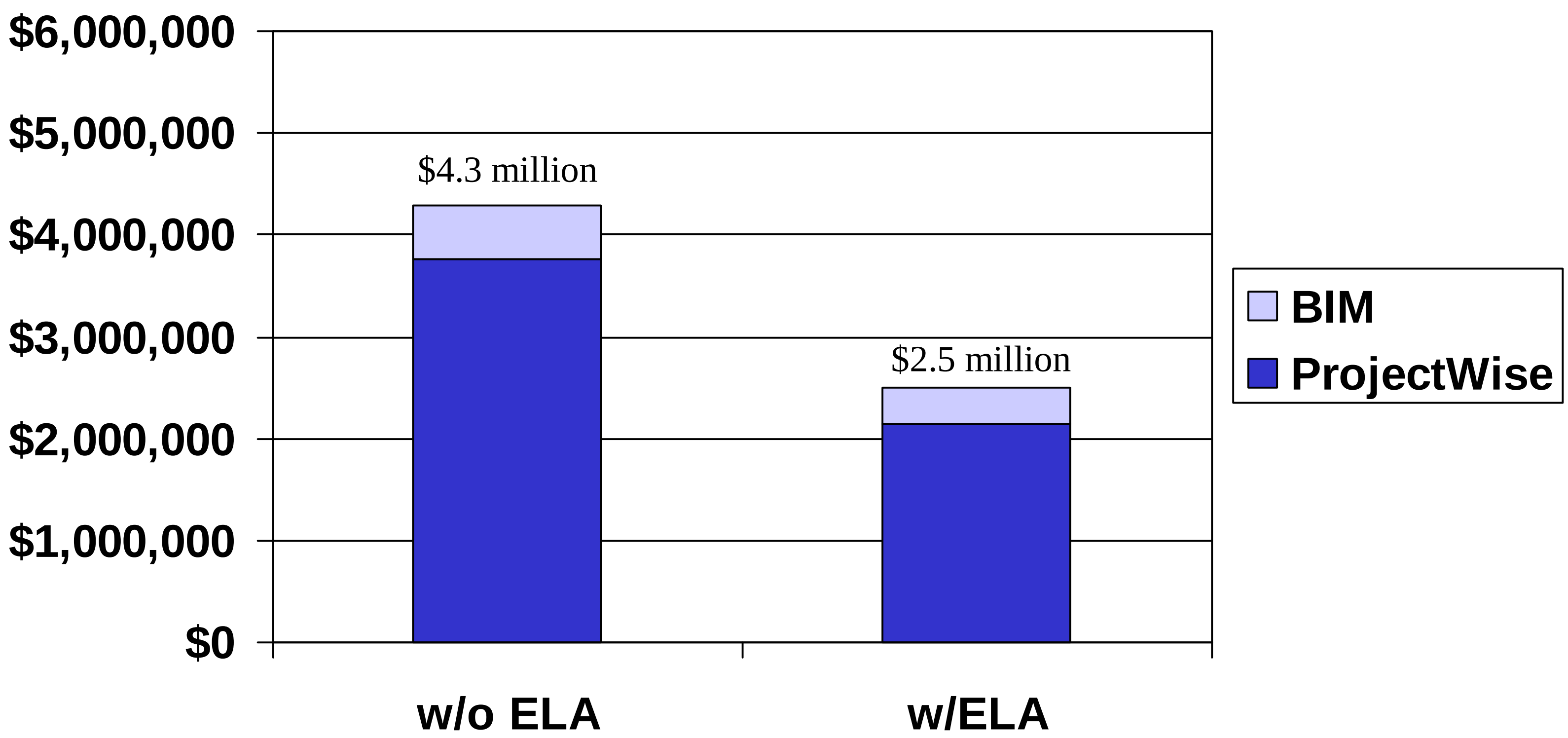
- Training & Implementation Services from CADD Survey: (Projected annual increased of 5% from FY06-FY08)

- Software & Software Support from CADD Survey: (Projected increase of 5% for FY06-FY08)

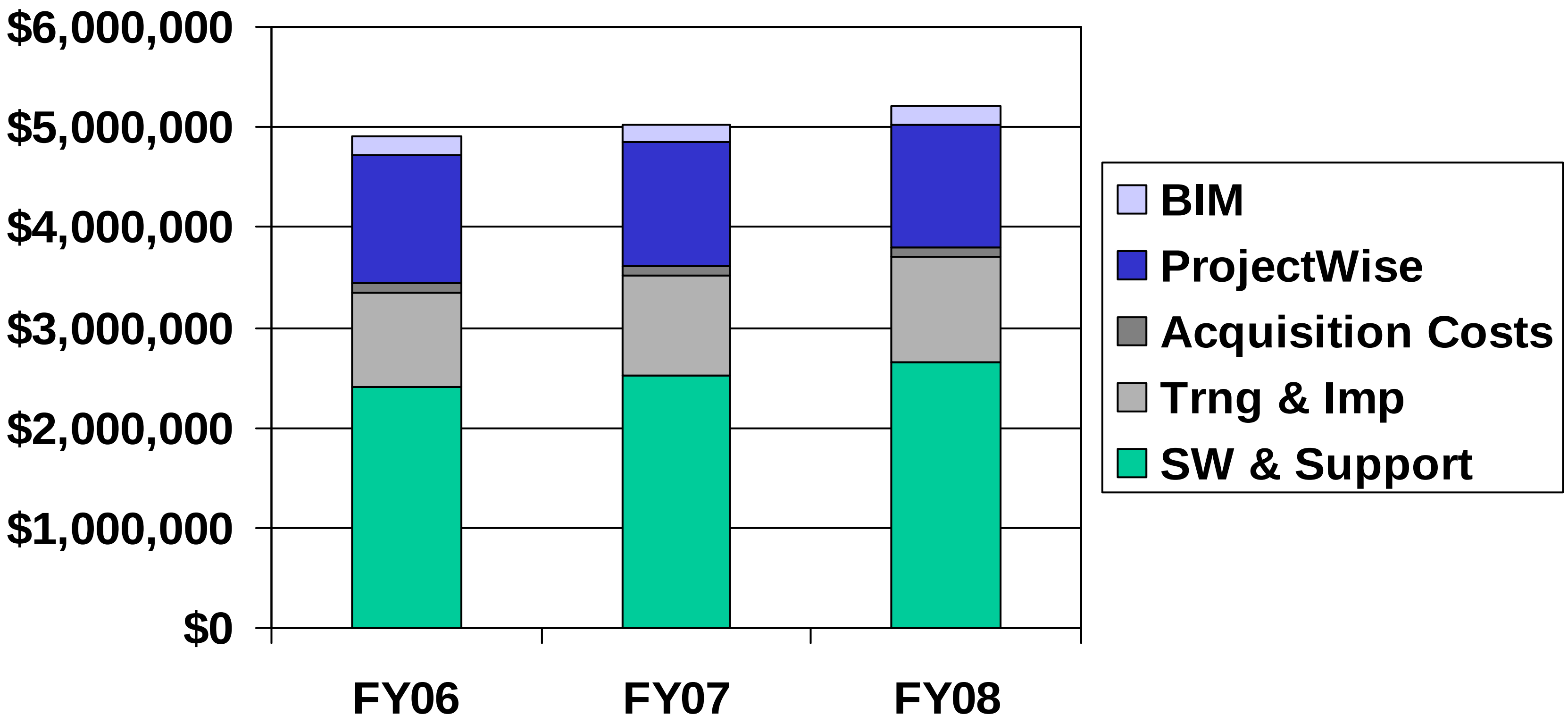
- Acquisition Costs: From CADD Survey

BIM & ProjectWise Comparison

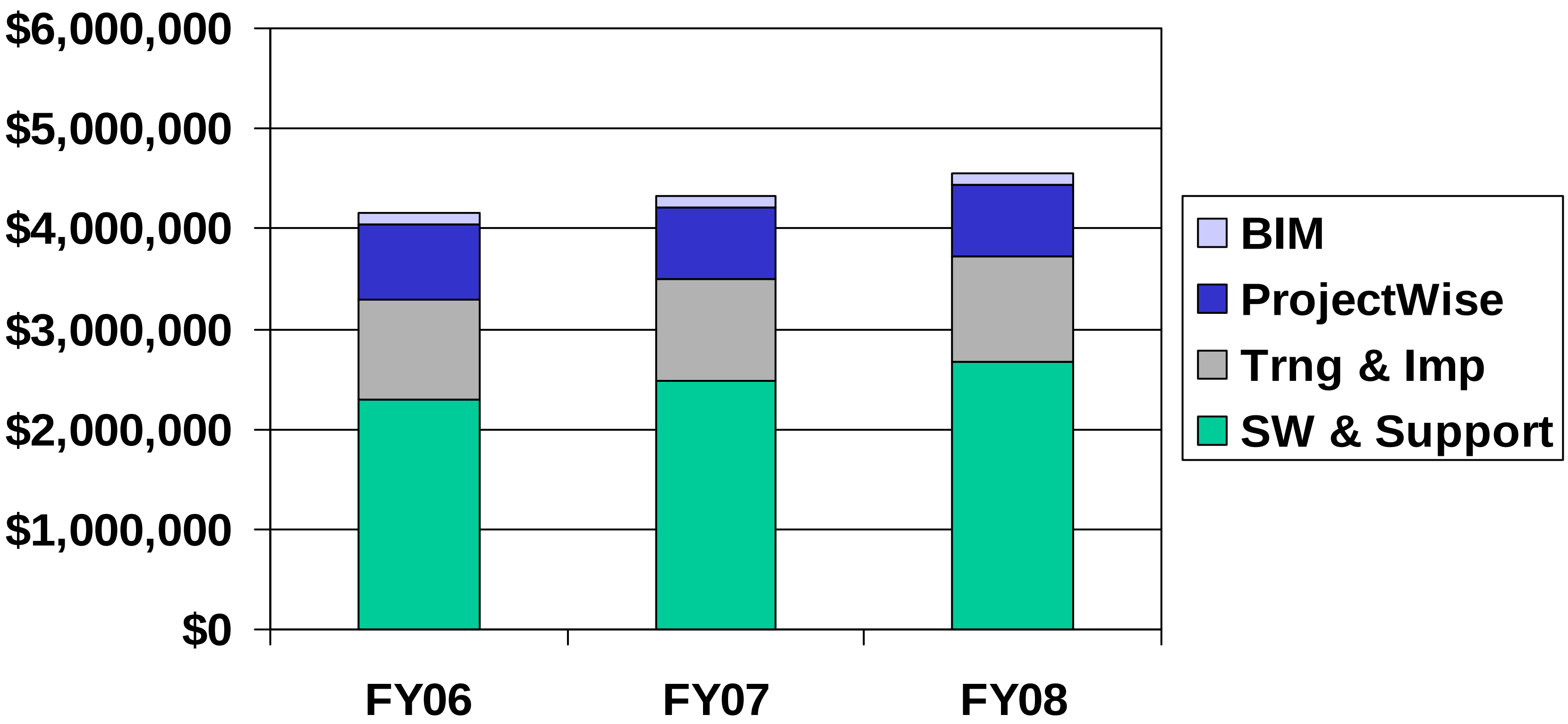
COE Expenditures With and Without ELA
(3 Years Combined - Savings of $1.8 million)



Corps Expenditures – Without ELA



Corps Expenditures - Under ELA



Facility Quality Evaluation

Providing the NAVY & DoD with Higher Quality Facilities

INFRASTRUCTURE CONFERENCE BRIEF

August 2, 2005

Steve Geusic - Engineering Criteria & Programs NAVFAC Atlantic

Robbie Wiksell – Programs & Operations EFD South

Mark Kraynak – Client Liaison NAVFAC HQ

Facility Quality Evaluation (FQE)

Facility Quality Evaluation (FQE)

Web-based questionnaire and evaluation process used to assess performance and quality of newly constructed facilities based on Client feedback

Facility Quality Evaluation (FQE)

Facility Quality Evaluation (FQE)

Web-based questionnaire and evaluation process used to assess performance and quality of newly constructed facilities based on Client feedback

- *Measures the quality of the specific facility*
- *Does not measure project delivery (eClient & Client FACT's Survey)*
- *One part of an effective commissioning process*

FACQUAL

Web application integrated with NAVFAC Projects Database (eProjects)

FQE Program Manager- Chris Wilkins
NAVFAC Atlantic CI
(757) 322-4307
mark.wilkins@navy.mil

FQE Requirements

- ***FQE required on:***

  All Military Construction Projects (MILCON)

  All Sustainment, Restoration, & Modernization Projects > $5M

- ***Administered 6 to 9 months after Client occupancy (BOD)***

- ***Initiated and Evaluated by the NAVFAC Project Manager (with support from the NAVFAC/Client project team)***

"Cradle to grave project management"

FQE Benefits

Primary Benefits

•Use Client feedback to improve quality of **future facilities**

(Improved Engineering Requirements, Criteria, & Business Processes)

•Client after delivery follow-up

Other Benefits

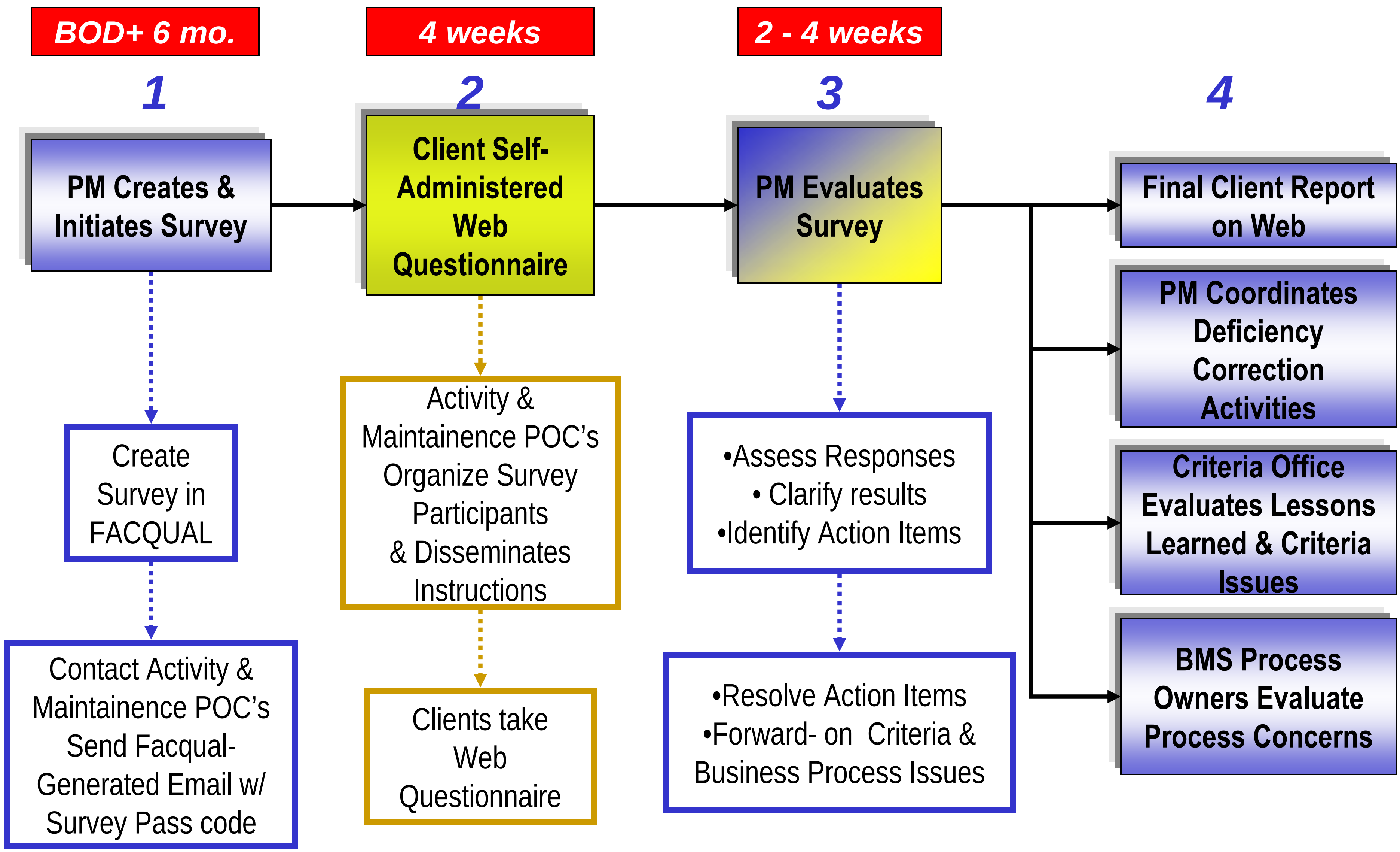
• Identify and fix if possible, deficiencies that have slipped through the building commissioning process in the **current facility**

•Metrics

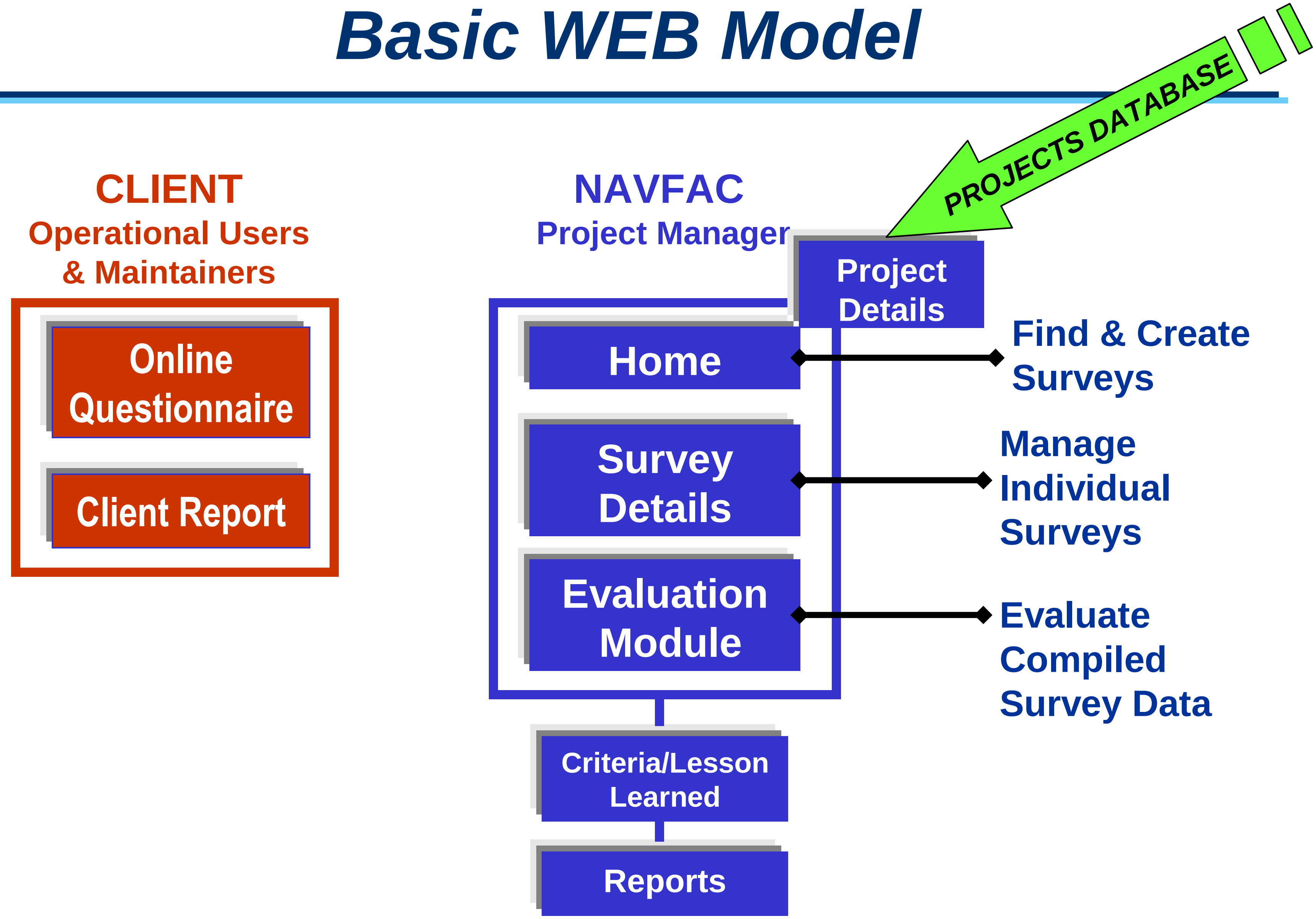
FQE in the Bigger Picture

- **NAVFAC Strategic Plan,** “Client” Section
  - **“Post-Delivery” feedback from Clients = FQE**
- **NAVFAC Con Ops -** Section 4 – Client
  - **Accountability & communication**
- **NAVFAC Performance Management System**
  - **FQE part of 3 pronged approach to Client feedback**
- **Strong Support from CIBL Leaders**
  - **CIBL Performance Metric D4**
  - **CIBL Business Line Plan**
- **DoD Interest**
  - **Army Corps of Engineers: No equivalent**
  - **Air Force - Lots of metrics but none measure “Facility Quality”**
    - NAVFAC/AF signed Program Management Plan commits to pursuing FQE

Process


BOD+ 6 mo.
4 weeks
2 - 4 weeks
1
2
3
4
PM Creates & Initiates Survey
Client Self-Administered Web Questionnaire
PM Evaluates Survey
Final Client Report on Web
PM Coordinates Deficiency Correction Activities
Criteria Office Evaluates Lessons Learned & Criteria Issues
BMS Process Owners Evaluate Process Concerns
Create Survey in FACQUAL
Contact Activity & Maintainence POC's Send Facqual-Generated Email w/ Survey Pass code
Activity & Maintainence POC's Organize Survey Participants & Disseminates Instructions
Clients take Web Questionnaire
•Assess Responses
• Clarify results
•Identify Action Items
•Resolve Action Items
•Forward- on Criteria & Business Process Issues

Basic WEB Model



eProjects

1. **Business Line** **CIBL**

2. **Program** **ANY MILCON**
   or
   Construction CWE **> $5M**

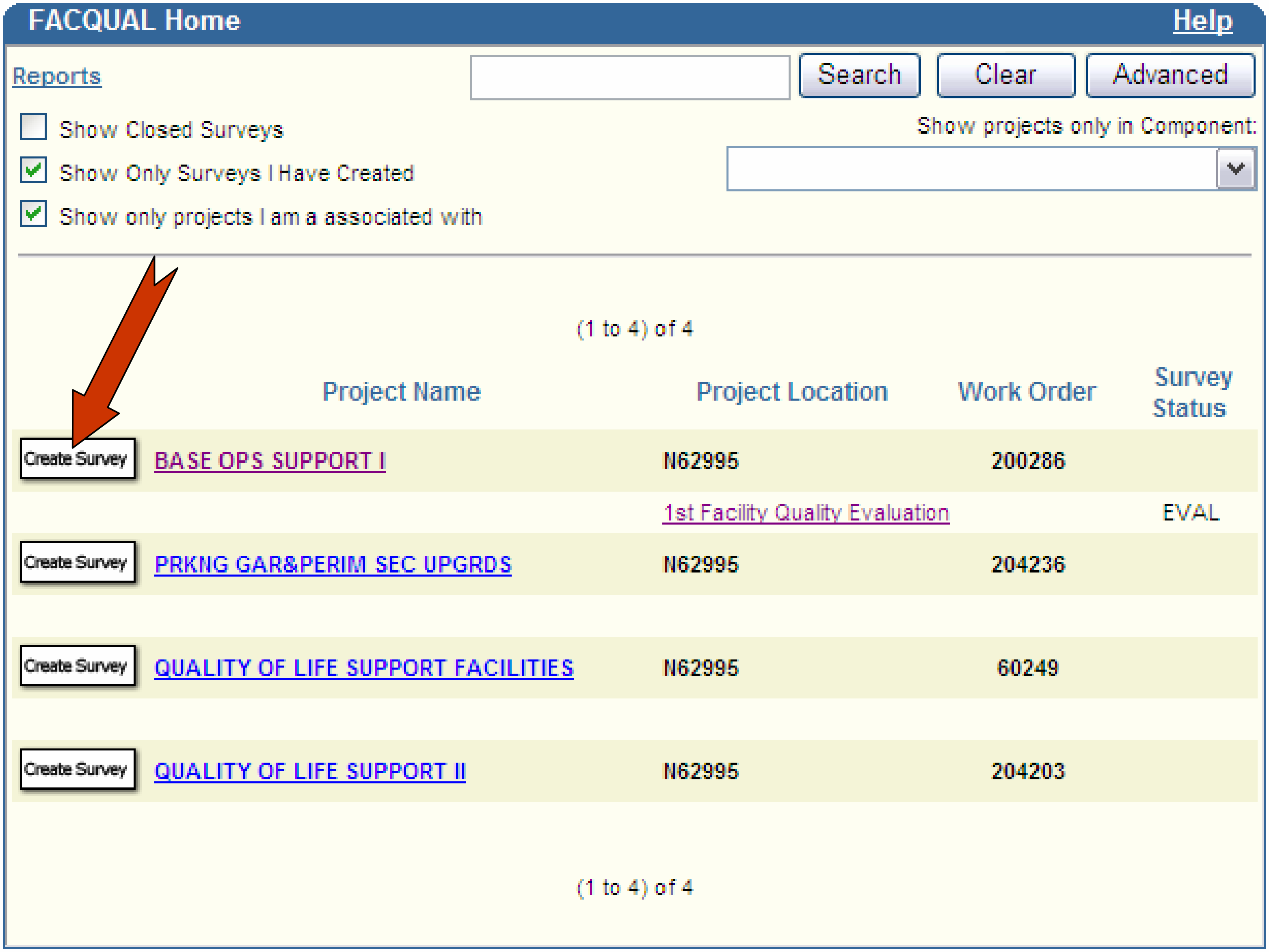
3. **Primary BOD** **Date + 6mo.**

eProjects Alert

Project Manager, Alno, Former Project Manager

"Project requires a Facility Quality Evaluation (FQE) 6 months after Client Occupancy. Confirm occupancy requirements and initiate FQE via the FQE link"

Create Survey on Home Screen



Create Survey Screen

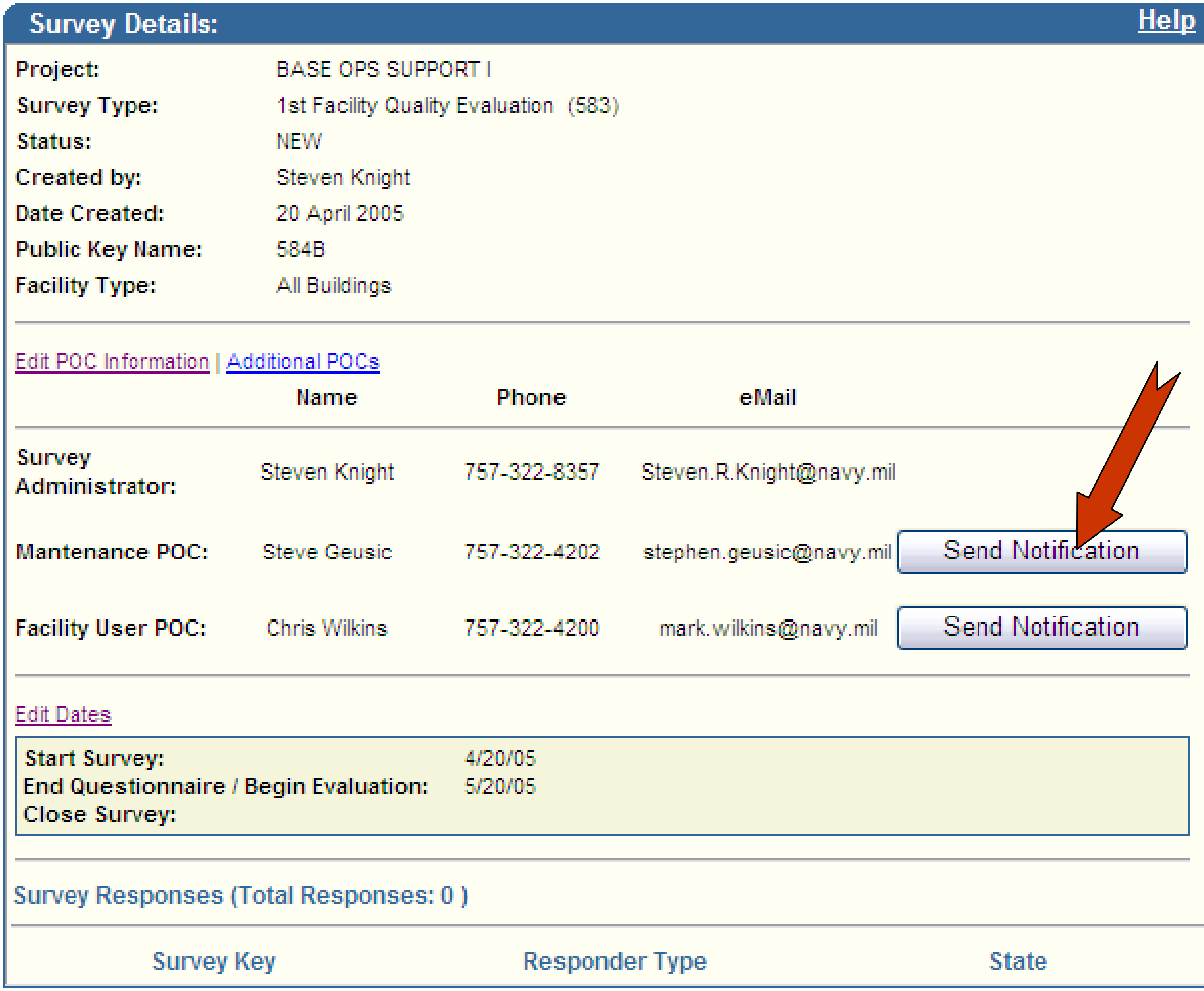
Create Survey | Help

Project:	BASE OPS SUPPORT I
Location:	N62995
Work Order:	200286
Status:	ACCEPTED
Survey Type:	1st Facility Quality Evaluation
Public Key Name:	584B
Start Survey:	04/20/2005
End Questionnaire / Begin Evaluation:	05/20/2005 * Typically 30 Days
Facility Type:	All Buildings
Survey Admin:	Steven Knight
EMail:	Steven.R.Knight@navy.mi
Phone:	757-322-8357
Maintance POC:	Steve Geusic
EMail:	stephen.geusic@navy.mil
Phone:	757-322-4202
Facility User POC:	Chris Wilkins
Email:	mark.wilkins@navy.mil
Phone:	757-322-4200

Create Survey | Cancel

Select survey for buildings or non-buildings

Send Notification to POC's



Notification Email

Subject: Facility Quality: BASE OPS SUPPORT I

The Naval Facilities Engineering Command (NAVFAC) wants to constantly improve the quality of facilities that we deliver to you. We need project-specific feedback from Clients so that improvements we make are consistent with your needs. We are contacting lead facility users and lead maintenance personnel to help with this evaluation. You have been identified as a key point-of-contact (POC) for the following facility:

BASE OPS SUPPORT I
N62995

Steve Geusic, as a lead POC, we are asking you to identify facility users or staff personnel who might be willing to complete a 20 minute on-line questionnaire about the quality of this facility. We would like to get as many completed questionnaires as possible so please distribute the survey as widely as you can comfortably do so within the facility.

The survey will remain open until **May 20, 2005**. After that date NAVFAC will begin evaluating the results. Responses will be used to improve criteria and business processes, capture lessons learned, help enforce contract warranty requirements, and resolve as many of your facility issues as we possibly can. In the long run, we expect the Navy and DoD to benefit from facilities that are better designed and constructed. Once the results for your facility are in and evaluated, we will advise you on the recommended course of action for major concerns expressed.

If you can help with this evaluation, please forward this email including the following website link and password to people asking them to fill out the questionnaire. The questionnaire is accessed at http://192.168.128.153/FACQUAL_SURVEY_MX/1000.cfm using the password/public key **584B**.

Upon logging in to the website using the public key, users will automatically be issued sa private key/password for their individual survey. If you cannot help with this evaluation, please contact **Steven Knight at Steven.R.Knight@navy.mil**, **757-322-8357** and if possible, suggest an alternate POC to serve in your place.

Thank you! – Team NAVFAC

Take Survey Logon

Take Survey Greeting

Logon Successful Help

FACILITY QUALITY EVALUATION

Project Title:BASE OPS SUPPORT I
Location:N62995

The Naval Facilities Engineering Command wants to constantly improve the quality of facilities that we deliver to our Clients. But we need project-specific feedback from our Clients so that the improvements we make are consistent with your needs.

Please take a few minutes from your busy day to tell us how well the facility listed above meets your requirements. The questionnaire takes about 20 minutes to complete, more if you have time to provide narrative comments. Your responses are anonymous unless you choose to list your name. Responses will only be used to improve criteria and business processes while capturing lessons learned associated with this project and others that we build for you. In the long run, we expect you will benefit from facilities that are better designed and better constructed.

You do not have to complete the survey all at one time, nor will it time-out. With your specific passcode, **584B-1**, you will be able to access, modify and complete your survey at any time prior to the end date of **20 May 2005**.

If you need assistance or have any questions, please contact the survey administrator: **Steven Knight**.

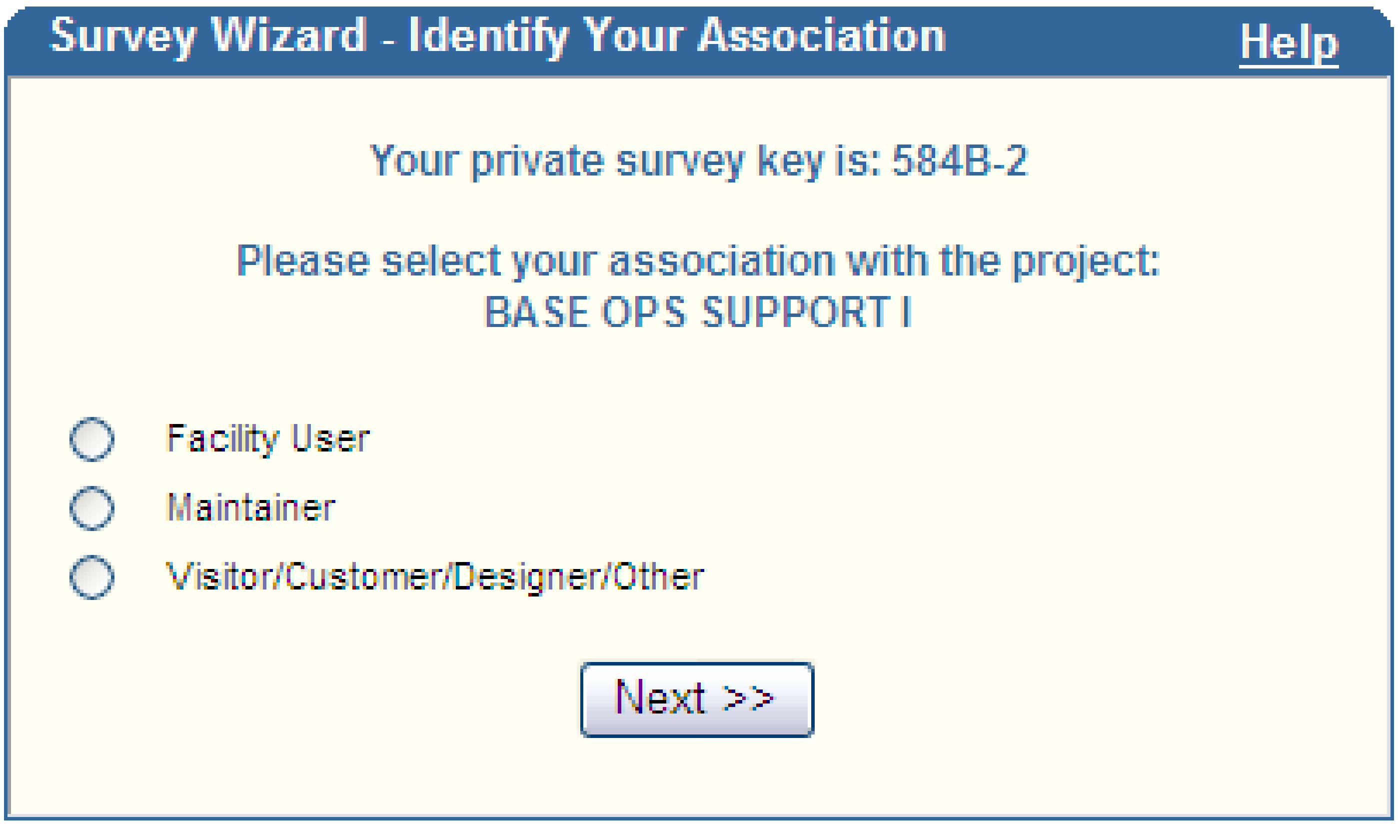
Thank you very much for your participation!

- Team NAVFAC -

Print this Page

Continue

User Profile



On-line Questionnaire

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know or N/A
13 It is easy to find my way around in this facility. Comment:	(5)	(4)	(3)	(2)	(1)	(N/A)
14 Facility layout (floor plan) is compatible with our operation. Comment:	(5)	(4)	(3)	(2)	(1)	(N/A)

Facility Quality Index (FQI) - *Metric*

A numerical index between 1 & 5 representing overall facility quality

(the mean or average of all question results)

On-line Questionnaire

Question Tags

24-66 Questions

Number depends on

Facility Type
- *Building*
- *Non-Building*

Responder Profile
- *Operational User*
- *Maintainer*
- *Other*

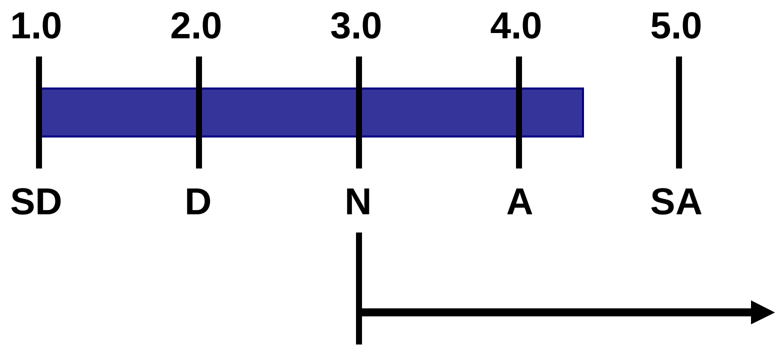
Quality Objectives (5)
- Functionality
- Health & Environ
- Safety & Security
- Aesthetics
- Maintainability

Facility Features (21)
- Size & Layout
- Operating Reqmts
- Landscaping
- Parking
- Noise
- HVAC
- Accessibility (ADA)
- Lighting
- Building Envelope
- Electrical
- Plumbing
- Installed Equipment

"Exterior lighting is appropriate for operational requirements"

FQI Metric

4.42 **Mean**

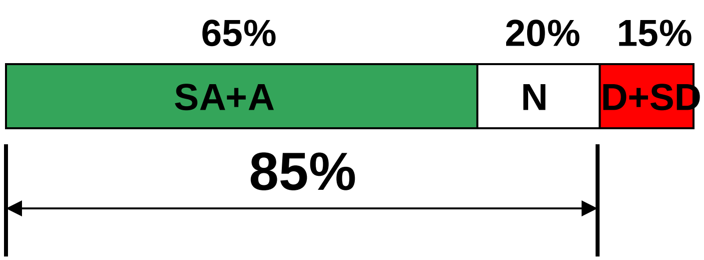


Overall

By Facility Quality Objective (5)

By Facility Feature (21)

> 3.0 Met or Exceeded Client Expectations



85% - Met or Exceeded Client Expectations

Navigate To Evaluation Module

Home | Project Details | Evaluation Module | Reports |

3. Navigate to Evaluation Module

Survey Details: Help

Project:	BASE OPS SUPPORT I
Survey Type:	1st Facility Quality Evaluation (583)
Status:	OPEN
Created by:	Steven Knight
Date Created:	20 April 2005
Public Key Name:	584B
Facility Type:	All Buildings

Edit POC Information | Additional POCs

	Name	Phone	eMail	
Survey Administrator:	Steven Knight	757-322-8357	Steven.R.Knight@navy.mil	
Mantenance POC:	Steve Geusic	757-322-4202	stephen.geusic@navy.mil	Send Notification
Facility User POC:	Chris Wilkins	757-322-4200	mark.wilkins@navy.mil	Send Notification

Edit Dates

Start Survey:	4/20/05	
End Questionnaire / Begin Evaluation:	5/20/05	MARK SURVEY UNDER EVALUATION
Close Survey:		

2. Mark for Evaluation

Survey Responses (Total Responses: 2)

Survey Key	Responder Type	State
584B-1	Maintainer	CLOSED
584B-2	Facility User	IN USE

1. Monitor Survey Progress

Evaluation Module Screen

4 –Step Evaluation Process

Evaluation For 1st Post-Occupancy Survey Help

Project Name:	CONSOLIDATED ARMORY	**Survey Start Date:**	Jul 29, 2004
Project Location:	M67001 -- MCB CAMP LEJEUNE NC	**Survey End Date:**	Nov 4, 2004

Surveys Completed:	10	**Facility Users:**	7	**Facility Maintainers:**	1	**Others:**	2
Surveys Unfinished:	1	**Facility Users:**	1	**Facility Maintainers:**	0	**Others:**	0

Overall Facility Quality Index: (Completed Surveys)	3.80	**Number of High Mean Results:**	37
NAVFAC Average:	3.78	**Number of Low Mean Results:**	18
Location / UIC Average:	3.93	**Number of Comments:**	0

Step 1 - Review Facility Quality Objectives

Step 3 - Evaluate Items Exceeding Expectation

Step 2 - Review Facility Features

Step 4 - Resolve Client Concerns

4-step evaluation process

Review (5) Facility Quality Objectives

Step 1 - Review Facility Quality Objectives

Step 3 - Evaluate Items Exceeding Expectation

Step 2 - Review Facility Features

Step 4 - Resolve Client Concerns

STEP 1 - REVIEW FACILITY QUALITY OBJECTIVES

	MEAN (1.0 – 5.0)	PERCENT (Agree / Neutral / Disagree)	PERCENT SA A N D SD	STD. DEV
Aesthetics	3.56 / 2.31 / 3.86	55% / 34% / 11%	11 44 33 11 0	0.8819
Environment & Health	3.80 / 2.37 / 4.06	57% / 34% / 9%	31 26 34 9 0	0.9941
Functionality	3.89 / 2.33 / 3.87	72% / 19% / 9%	27 45 18 7 2	0.9559
Maintainability	4.03 / 2.35 / 3.97	71% / 24% / 5%	37 34 24 5 0	0.9149
Safety & Security	3.89 / 2.30 / 3.88	61% / 33% / 6%	33 28 33 6 0	0.9634

Current Project Avg.

NAVFAC Avg.

Location / UIC Avg.

Review (21) Facility Features

Step 1 - Review Facility Quality Objectives

Step 2 - Review Facility Features

Step 3 - Evaluate Items Exceeding Expectation

Step 4 - Resolve Client Concerns

STEP 2 - REVIEW FACILITY FEATURES

	MEAN (1.0 – 5.0)	PERCENT (Agree / Neutral / Disagree)	PERCENT SA A N D SD	STD. DEV
ADA Accessibility	3.67 / 2.36 / 3.67	50% / 50%	17 33 50 0 0	0.8165
Access	3.64 / 2.27 / 3.64	63% / 19% / 18%	18 45 18 18 0	1.002
Building Envelope	4.39 / 2.50 / 4.39	92% / 8%	46 46 8 0 0	0.6504
Electrical	3.67 / 2.22 / 3.67	67% / 16% / 17%	17 50 17 17 0	1.033
Exterior Aesthetics	3.50 / 2.34 / 3.50	50% / 33% / 17%	17 33 33 17 0	1.049

Current Project Avg.

NAVFAC Avg.

Location / UIC Avg.

Evaluate Items Exceeding Expectations

Step 1 - Review Facility Quality Objectives

Step 3 - Evaluate Items Exceeding Expectation

Step 2 - Review Facility Features

Step 4 - Resolve Client Concerns

STEP 3 - EVALUATE ITEMS EXCEEDING EXPECTATION (High Mean Review)

QUESTION	PERCENT (Agree / Neutral / Disagree)	SA	A	N	D	SD
(38) Spaces provide appropriate privacy to accomplish work.	86% / 14%	3	3	1	0	0
Mean: 4.29	**Std. Dev.** 0.7559					
View Comments Recommendations						
(40) Noise from outside the facility is not a problem.	86% / 14%	3	3	1	0	0
Mean: 4.29	**Std. Dev.** 0.7559					
View Comments Recommendations						
(1) Facility meets our mission & operational requirements.	100%	1	4	0	0	0
Mean: 4.20	**Std. Dev.** 0.4472					
View Comments Recommendations						

FILTER

Mean > 4.0

% Agree > 75%

Resolve Client Concerns

Step 1 - Review Facility Quality Objectives

Step 2 - Review Facility Features

Step 3 - Evaluate Items Exceeding Expectation

Step 4 - Resolve Client Concerns

STEP 4 - RESOLVE CLIENT CONCERNS

QUESTION	MEAN	CURRENT STATUS
27 Facility is free of mold and mildew.	3.00	OPEN (ACTION REQUIRED!)

View Comments PM Notes

*

PERCENT (Agree / Neutral / Disagree)	SA	A	N	D	SD
100%	0	0	1	0	0

Problem Statement: Interior side of exterior walls have some water staining and mildew. Specifically in the locker areas

Proposed Solution (Help): Design team will investigate problem on site and recommend a solution

Not Complete

Client Concern Addressed

Optional - Submit as a Criteria Issue or Lesson Learned

Send

(Report not sent)

Optional - Link to BMS website to report Business Process concern

Link to BMS

FILTER

Mean < 3.0

% Disagree > 25%

All responder comments for that question

Seen by Client – Printed on website and report

How to Respond to Customer Requests

1. **Is it a already a contract requirement (construction or warranty) or is it a new requirement?**

2. **Is it within scope? Is it a need or a desire?**

3. **Is it within budget?**
   - Escalation required?
   - Reprogramming required?

4. **Do we have the cash flow to fund it?**
   NAVFAC is authorized to spend every available dollar
   Any savings will be rescinded by FMB

5. **Do we have a contract vehicle to deliver it?**

Resources

Project Manager

•Contact Facility User and Maintenance POC's to initiate Questionnaire	1 to 3 hours
•Create Survey in FACQUAL	5 minutes
•Periodically Monitor Response Rate in FACQUAL	5 minutes
•Evaluate Results	3 to 5 hours
•Resolve Action items	8 to 16 hours
	12 to 24 hours per project

At 1 to 3 projects per year per PM

NAVFAC Midlant - 15 projects/yr < $50k

FQE Training and Deployment

Site Administrator Workshop	April 27, 2005
Test Project each FEC	August 2005
Publish NAVFAC Instruction- Deploy	October 2005

REPORTS

- Current Survey

    -Client Report – web view & printable

- FQI Comparison Report
- Trends Report
- Lessons Learned
- Criteria

Final Client Report Posted

FACLITY QUALITY EVALUATION

Thank you for participating in the facility quality evaluation for
P635 BASE OPS SUPPORT I at N62995
The survey period has ended and the initial results are presented below. NAVFAC will be taking steps to evaluate the results and recommend an appropriate course of action that we will share with you in the near future. If you have any questions about the initial results please call **Knight, Steven R at 7573228357**.

Thank you! – Team NAVFAC

Please select from one of the following reports:

Results Summary
Items Exceeding Expectation
Client Concerns
Facility Qualility Objectives - Summary
Facility Quality Objectives - Details
Facility Features - Summary
Facility Features - Details
Entire Facility Quality Evaluation Report
How to Print Reports
Guide to Interpeting Reports

Results Summary Graphics

Results Summary

Surveys Completed: 1 **Facility Users:** 0 **Facility Maintainers:** 0 **Others:** 1

Facility Quality index (FQI)

	FQI (scale 1.0 – 5.0)
Overall	3.26
Aesthetics	2.80
Environment & Health	3.50
Functionality	3.36
Maintainability	3.64
Safety & Security	3.25

Facility Quality index (FQI) is the mean value where 5 represents strongly agree and 1 represents strongly disagree. An FQI greater that 3.0 indicates that expectations have been met or exceeded.

Response Distribution by Quality Objective

	PERCENT Agree	PERCENT Neutral	PERCENT Disagree	SA	A	N	D	SD	STD. DEV
Aesthetics		80%	20%	0	0	80	20	0	0.4472
Environment & Health	50%	44%	6%	6	44	44	6	0	0.7071
Functionality	46%	40%	14%	5	41	41	14	0	0.7895
Maintainability	54%	37%	9%	18	36	36	9	0	0.9244
Safety & Security	51%	11%	38%	13	38	13	38	0	1.165

Facility Features Summary

FACILITY QUALITY EVALUATION

Project Name: P635 BASE OPS SUPPORT I

Project Location/UIC: N62995

FY: 2004 **P Number:** 635

Client Project No: P635 N62995 **Survey Date:** 4/22/2005

FACILITY FEATURES SUMMARY

Percent key: Agree, Neutral, Disagree

	MEAN (1.0 – 5.0)	PERCENT	PERCENT SA A N D SD	STD. DEV
ADA Accessibility	2.33	33% 67%	0 0 33 67 0	0.5774
Access	3.11	11% 89%	0 11 89 0 0	0.3333
Building Envelope	3.67	50% 50%	17 33 50 0 0	0.8165
Electrical	3.50	50% 50%	0 50 50 0 0	0.7071
Exterior Aesthetics	2.67	67% 33%	0 0 67 33 0	0.5774
HVAC	3.75	75% 25%	0 75 25 0 0	0.5

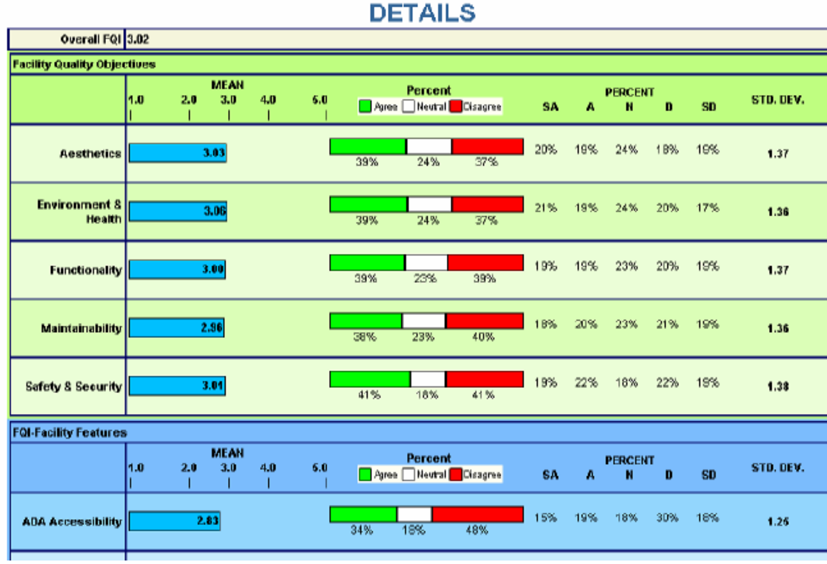
FQI Comparison Report

Project Name	Location	Survey Date	Overall FQI	Facility Quality Objectives: Aesthetics	Environment & Health	Functionality	Maintainability	Safety & Security
CRANE/WGHT HNDLG EQP SHOP	N00181 -- NSY NORFOLK VA	06/17/2004	2.98	3.16	2.98	3.03	2.79	3.00
US JOINT MARITIME INST FAC	M67001 -- MCB CAMP LEJEUNE NC	03/08/2004	2.99	3.28	3.06	2.88	2.81	3.26
		Average:	3.02	3.03	3.06	3.00	2.96	3.01

Project Name	FQI-Facility Features: ADA Accessibility	Access	Building Envelope	Electrical	Exterior Aesthetics	HVAC	Installed Equipment	Interior Design	Interior Finishes	Landscaping	Lighting	Location	Noise	Operating Requirements	Parking	Plumbing	Privacy	Safety	Security	Siting	Space (size & layout)
CRANE/WGHT HNDLG EQP SHOP	2.93	2.94	2.49	3.60	3.40	3.24	2.80	3.37	3.28	2.67	3.00	4.60	2.60	3.05	3.13	3.20	3.00	2.85	3.27	2.73	3.15
US JOINT MARITIME INST FAC	2.53	3.18	3.00	3.05	3.13	3.02	2.77	2.77	2.64	3.47	3.05	3.20	3.33	2.63	4.07	2.55	2.60	3.25	3.20	3.53	2.82
Average:	2.83	3.03	3.00	3.13	3.16	3.11	2.87	3.04	3.10	2.96	3.03	3.10	3.07	3.07	3.17	3.09	3.05	2.98	3.08	3.14	3.07

Displayed & Filtered by:

- ***Component***
- ***Location***
- ***CATCODE***
- ***Program/Fund Type***
- ***ACQ Strategy***
- ***Date query***



Value of FQE

- **Understand client's perception of the completed facility**
- **Improve NAVFAC's future capability to perform**
  - Project team gets feedback on completed work
- **Leave the client with a *<u>lasting impression</u>* that NAVFAC is doing it's best to help**
  - *Client: "They cared enough to ask"*
    "They cared enough to listen"

"The quality of a facility will be remembered long after everyone forgets we brought the project in on schedule and under budget."

PRESENTATION
TO THE

2005 TRI-SERVICE INFRASTRUCTURE SYSTEMS CONFERENCE & EXHIBITION

DES MOINES RIVERWALK

BY

THOMAS D. HEINOLD, P.E.

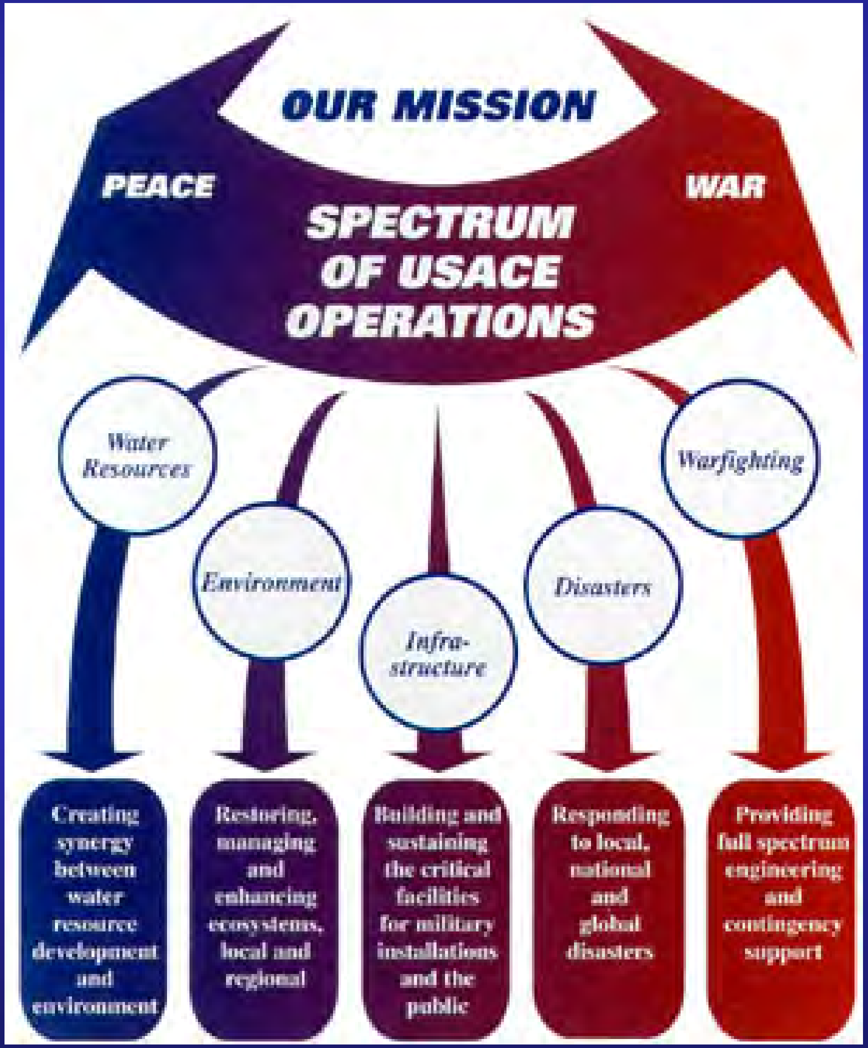
PROJECT ENGINEER AND ACTING CHIEF OF SPECIFICATIONS
ROCK ISLAND DISTRICT, U.S. ARMY CORPS OF ENGINEERS

AUGUST 4, 2005

U.S. Army Corps of Engineers

US Army Corps of Engineers®

- The Corps' mission:
  - Water Resources Development
  - Environment
  - Infrastructure
  - Disasters
  - Warfighting



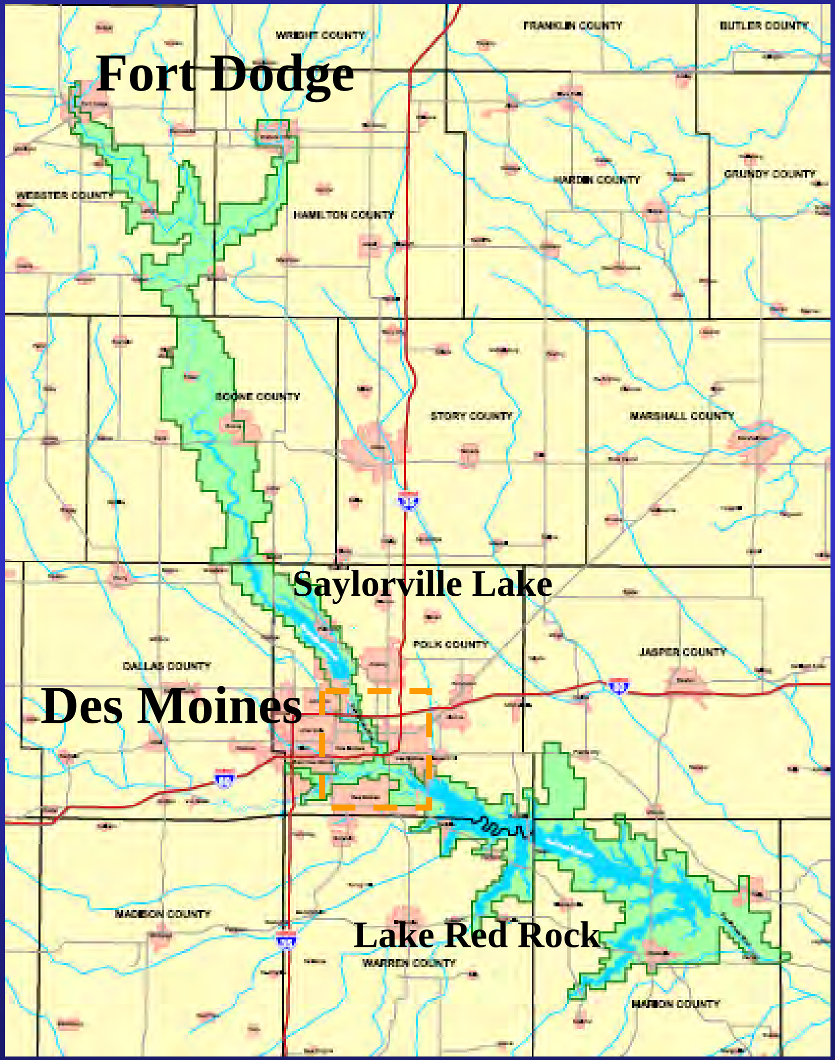
Rock Island District

US Army Corps of Engineers®

- Navigation
- Flood Control
- Recreation
- Environmental Restoration
- Emergency Management
- Disaster Relief

Des Moines Riverwalk

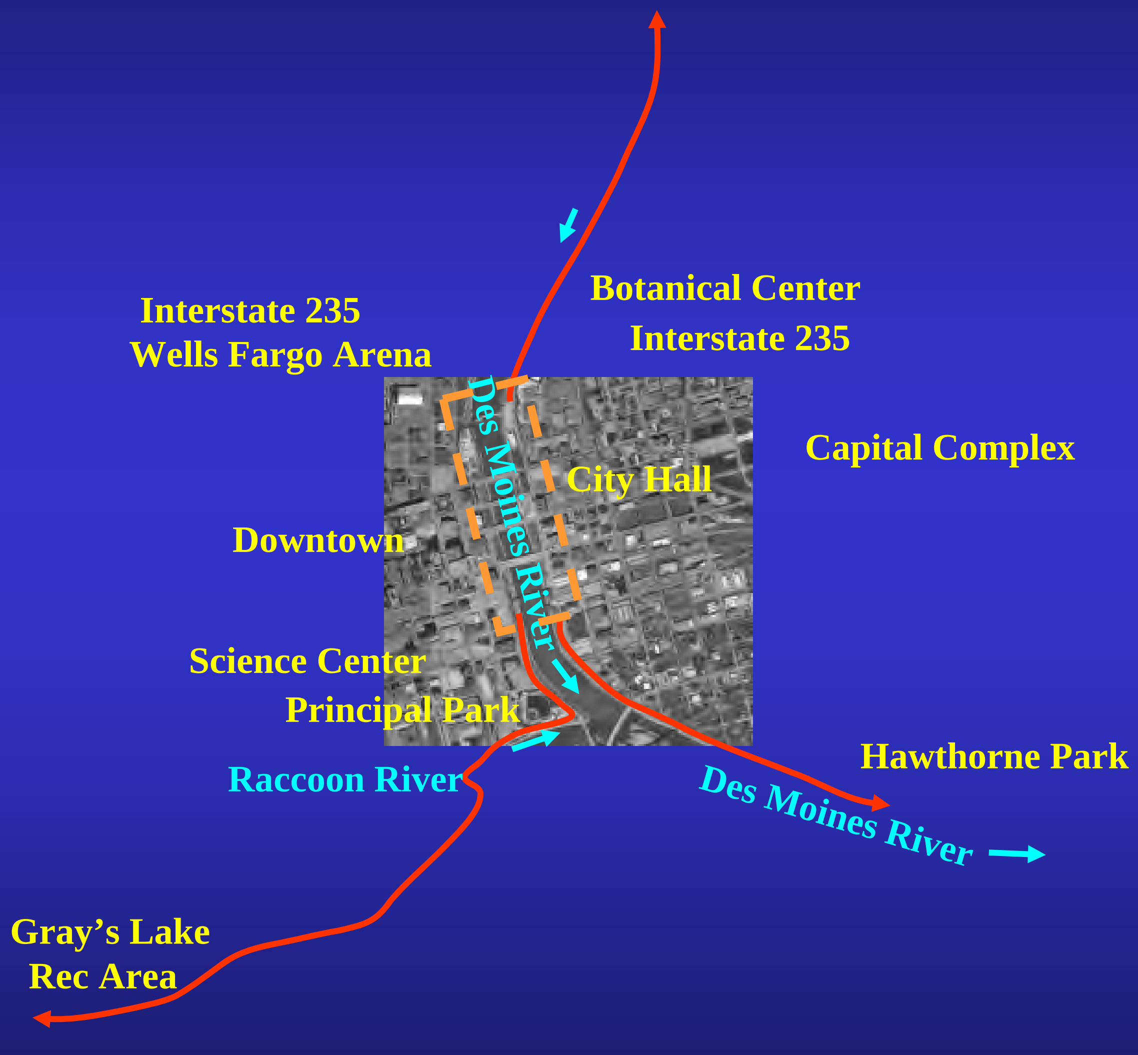
- The Recreational River and Greenbelt Authority
- Trail System from Fort Dodge, Iowa to the Lake Red Rock Dam on the Des Moines River.
- City of Des Moines is the Federal Sponsor



US Army Corps of Engineers

Des Moines Riverwalk

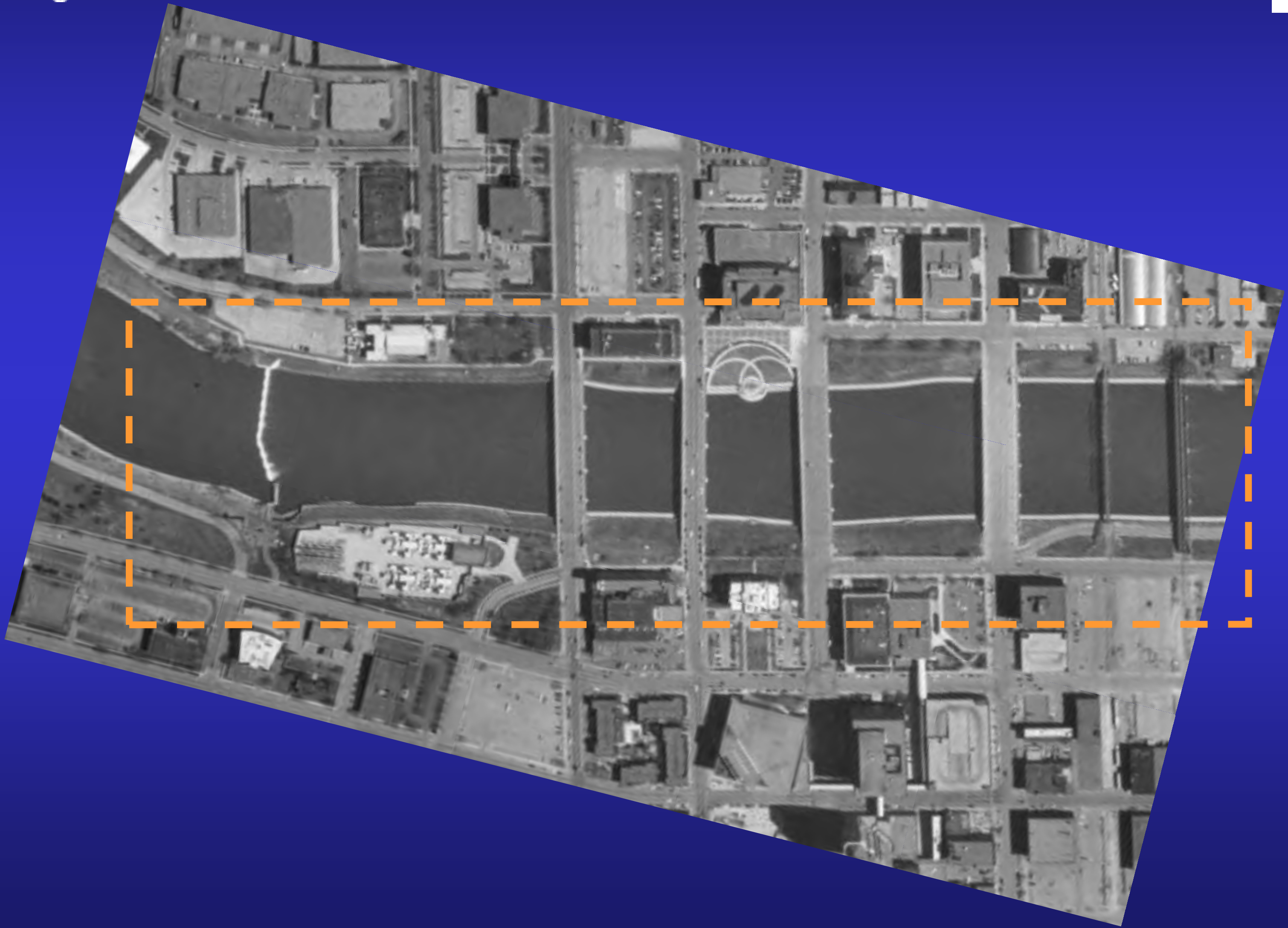
CITY OF DES MOINES



Des Moines Riverwalk

US Army Corps of Engineers®

CITY OF DES MOINES



One Team: Relevant, Ready, Responsive and Reliable

Des Moines Riverwalk

One Team: Relevant, Ready, Responsive and Reliable

US Army Corps of Engineers

Des Moines Riverwalk

- Court Avenue Plaza

CITY OF DES MOINES

A Return to the River
(a.k.a. Re-Energizing Engineering Excellence)

US Army Corps of Engineers

Des Moines Riverwalk

- **Court Avenue Plaza**

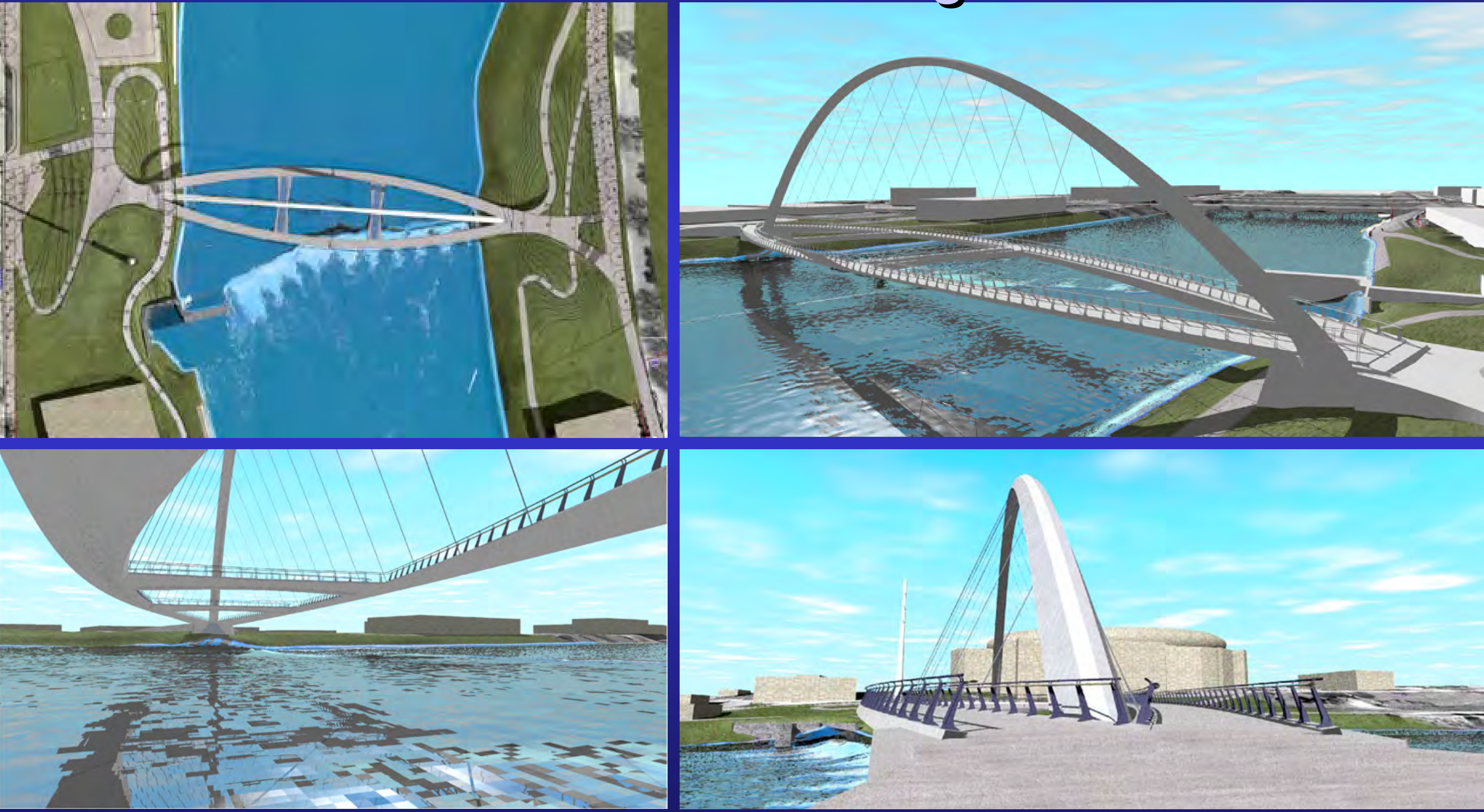
CITY OF DES MOINES

Des Moines Riverwalk

- Court Avenue Plaza

Des Moines Riverwalk

- Center Street Bridge



US Army Corps of Engineers

Des Moines Riverwalk

- Union Railway Bridge

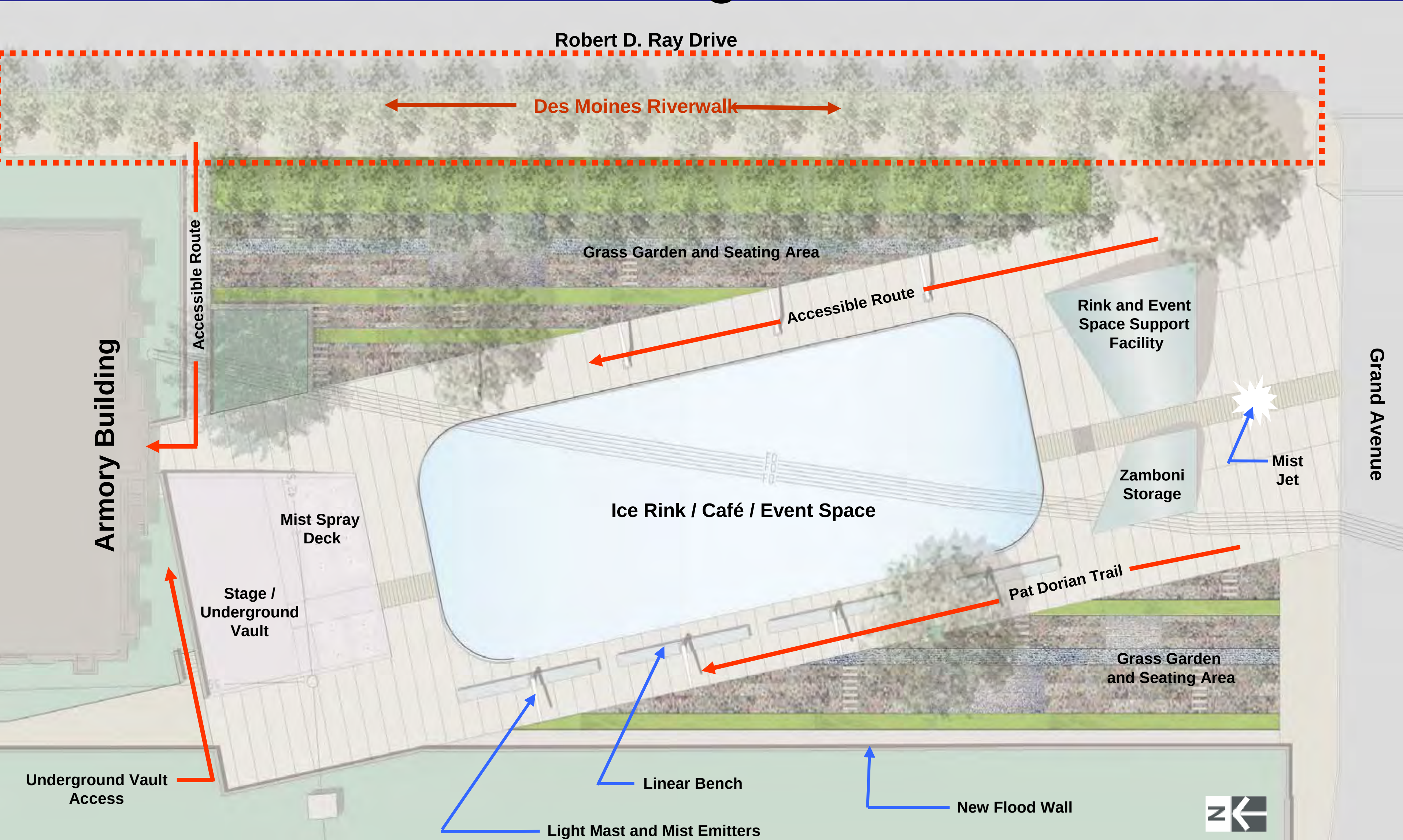
CITY OF DES MOINES

Des Moines Riverwalk

- Union Railway Bridge

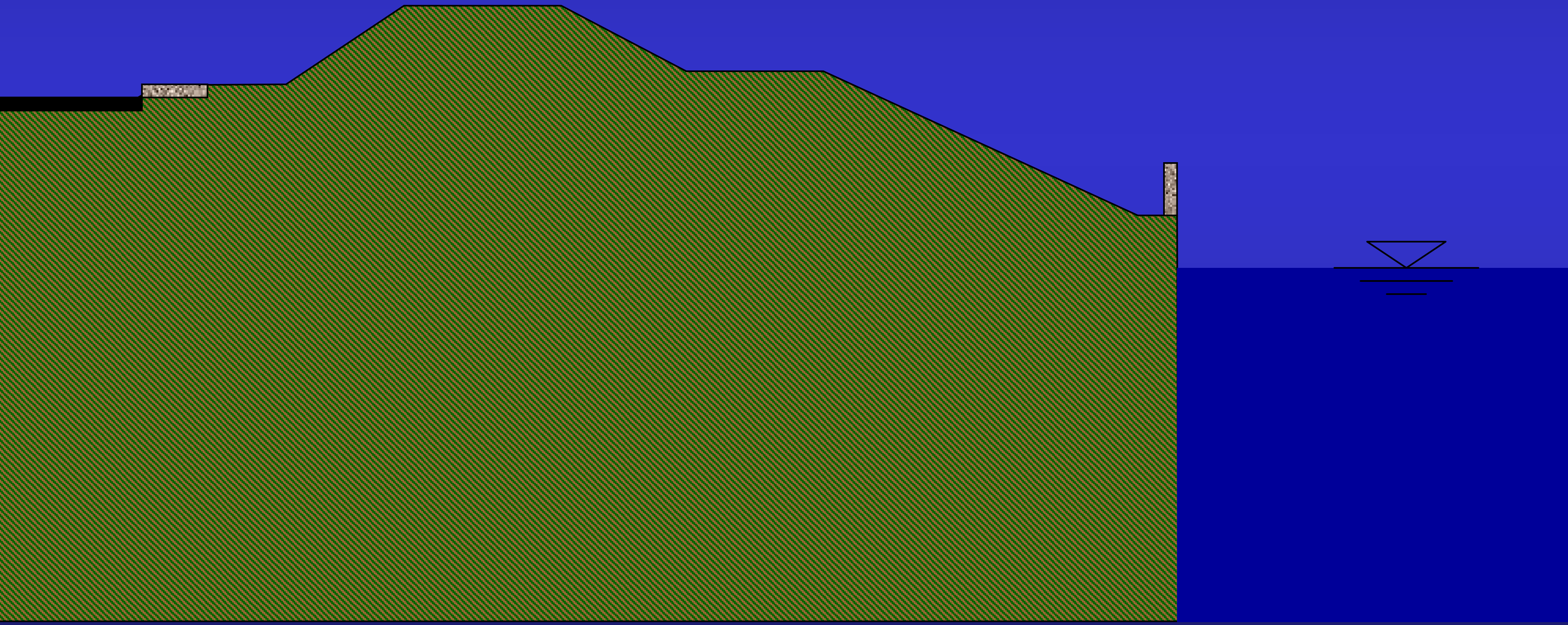
Des Moines Riverwalk

▪ Ice Skating Plaza



Des Moines Riverwalk

- Coordination with a CSO project



Des Moines Riverwalk

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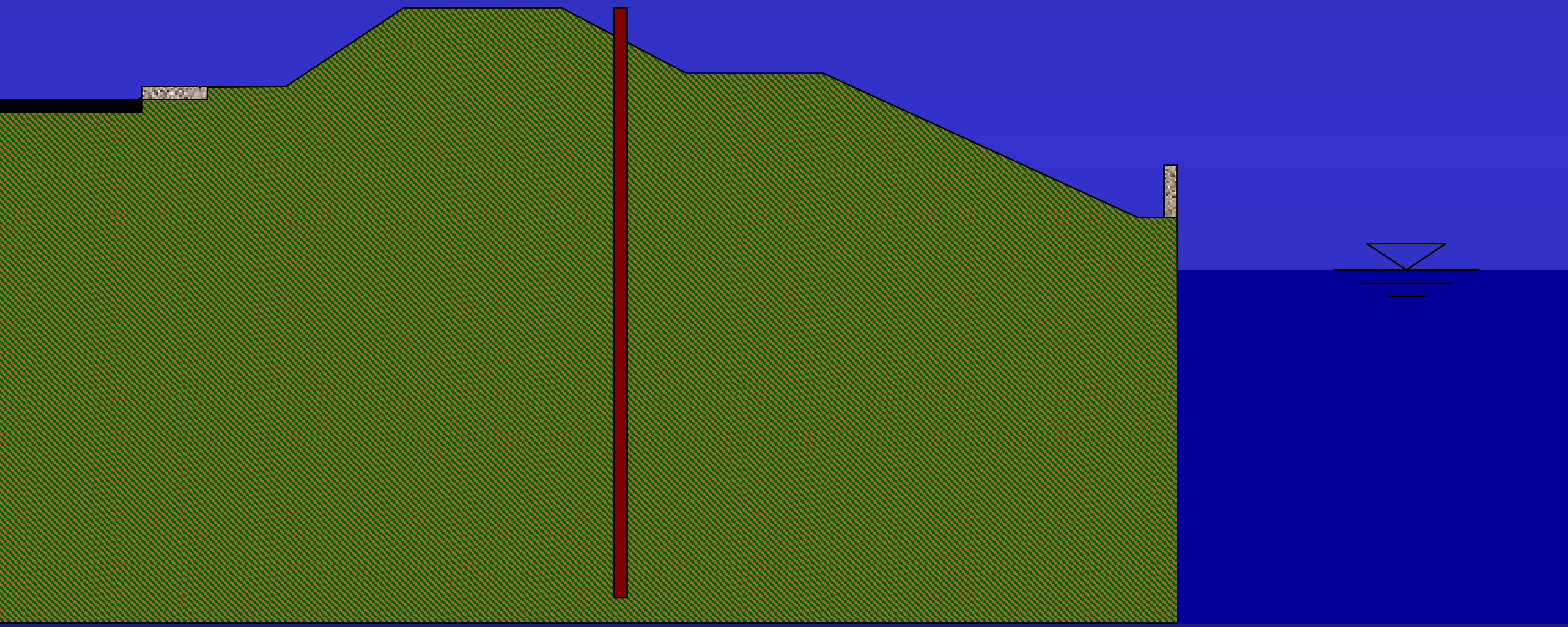

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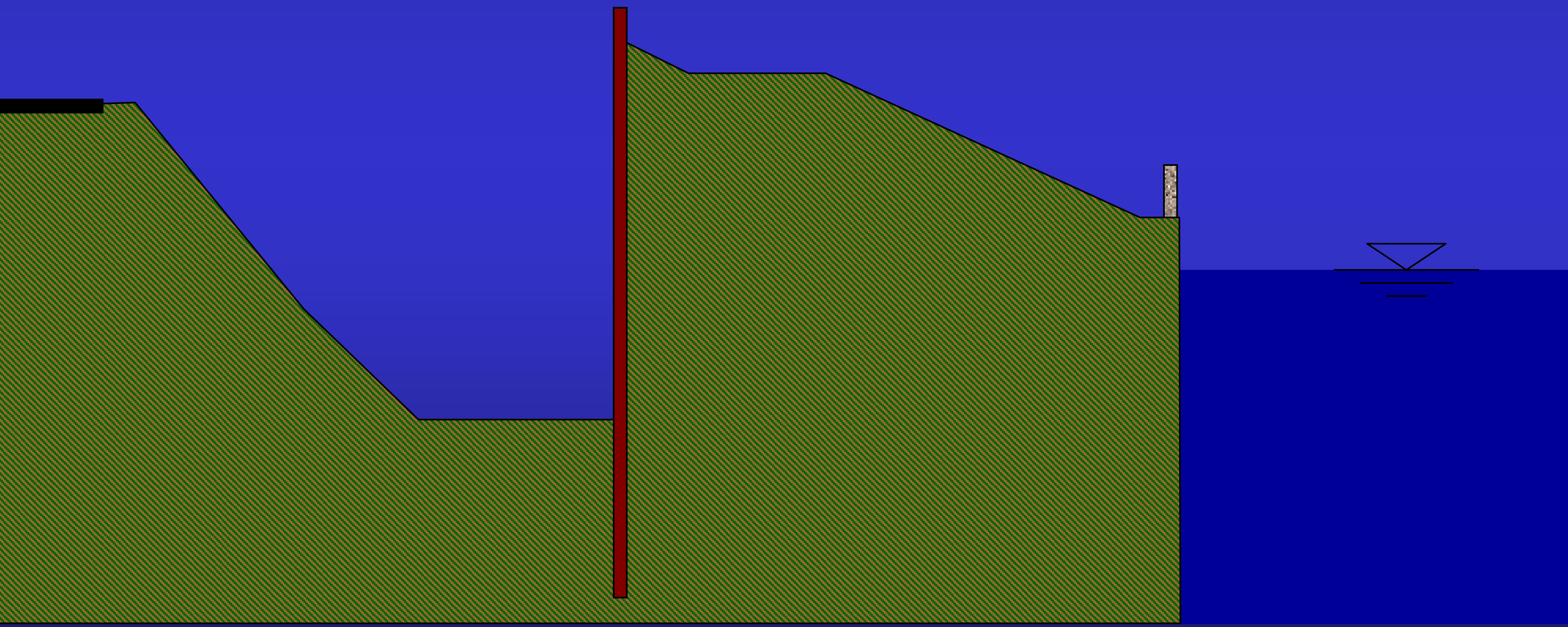

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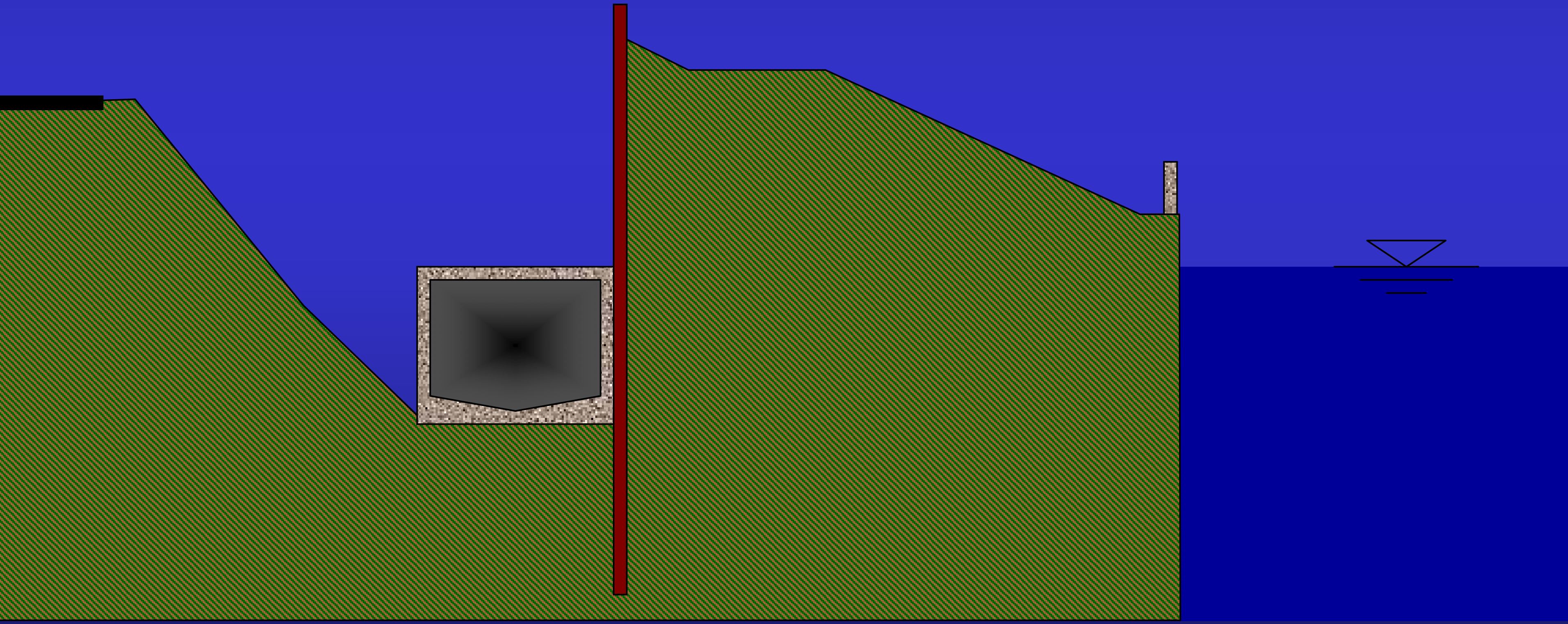

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Des Moines Riverwalk

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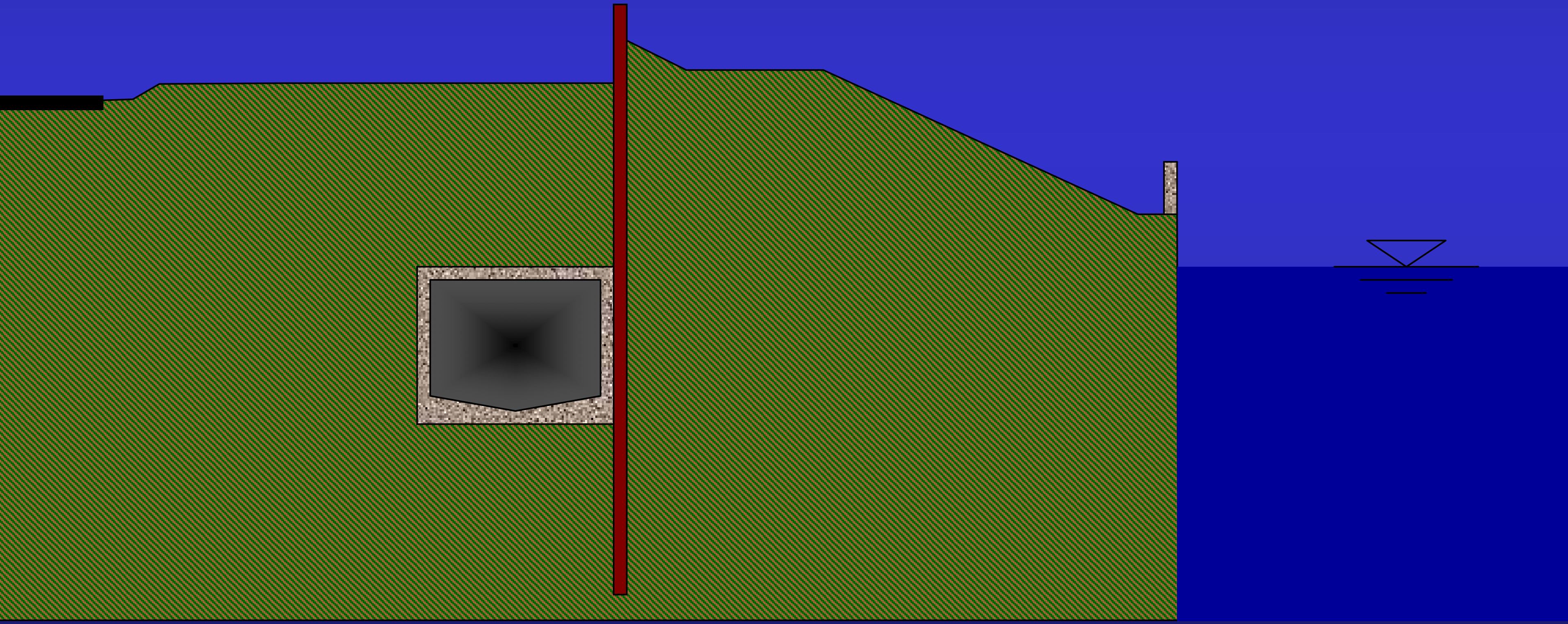

Des Moines Riverwalk

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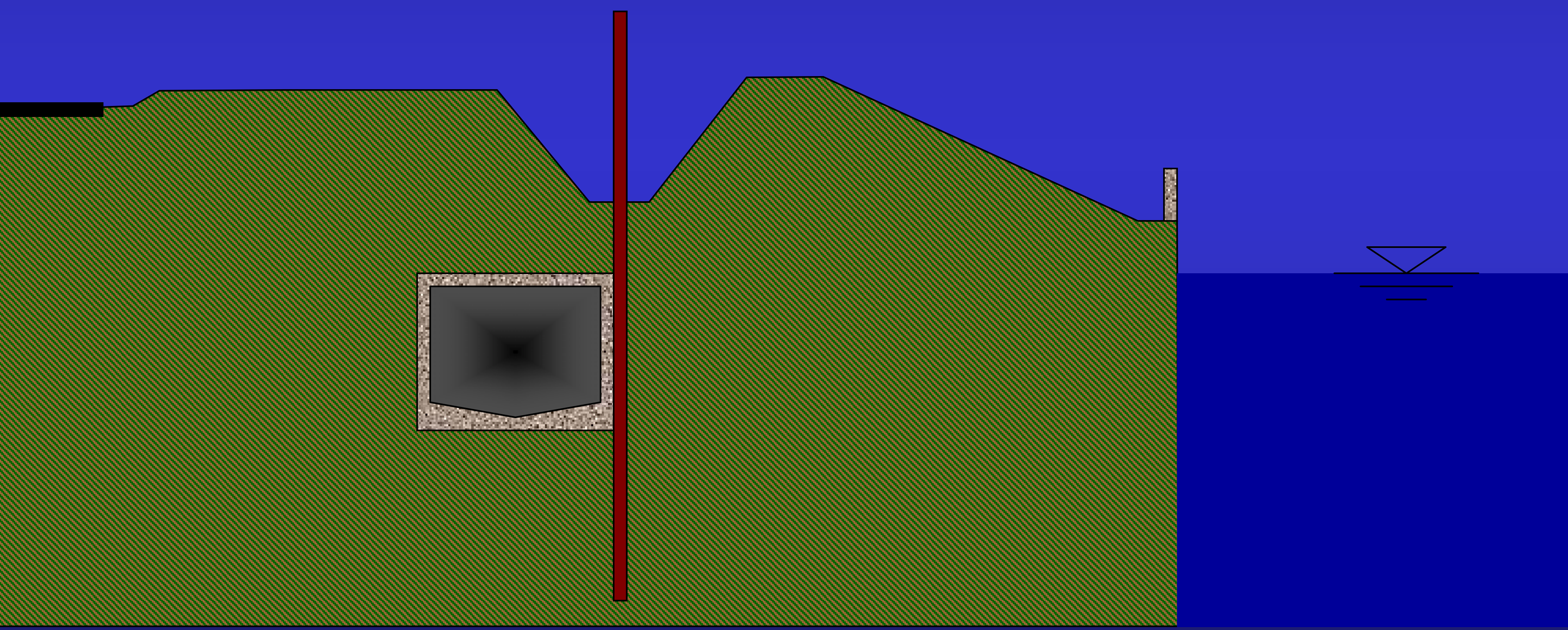

Des Moines Riverwalk

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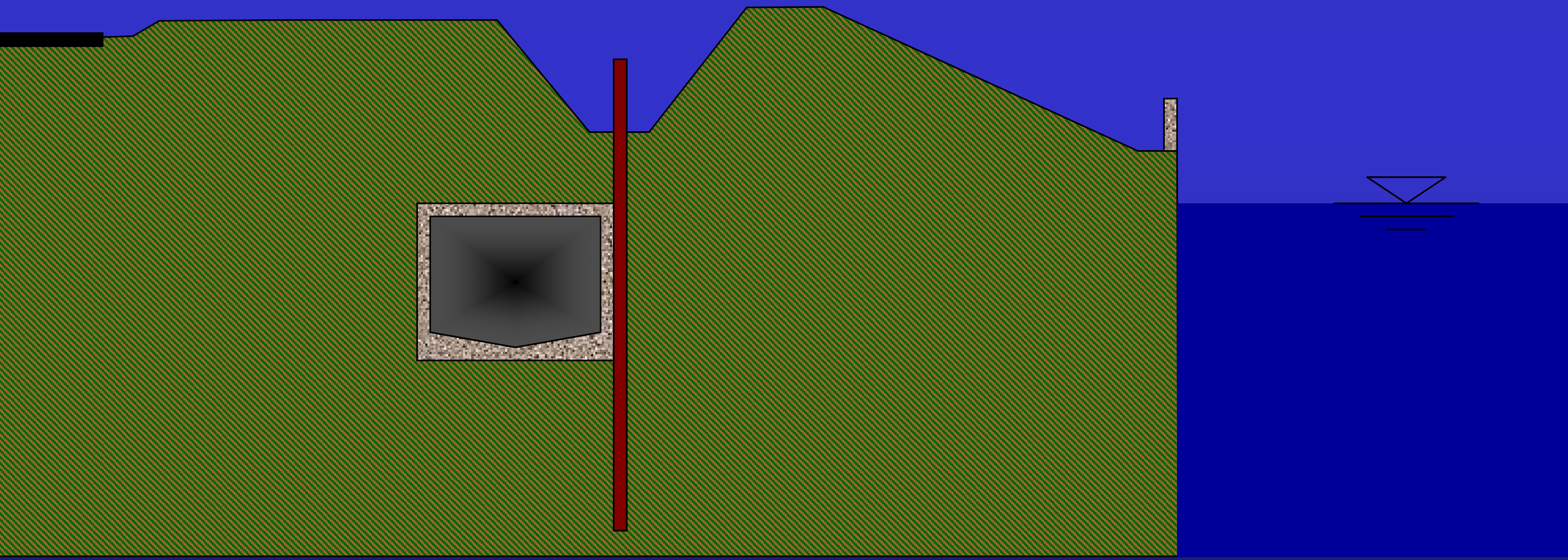

Des Moines Riverwalk

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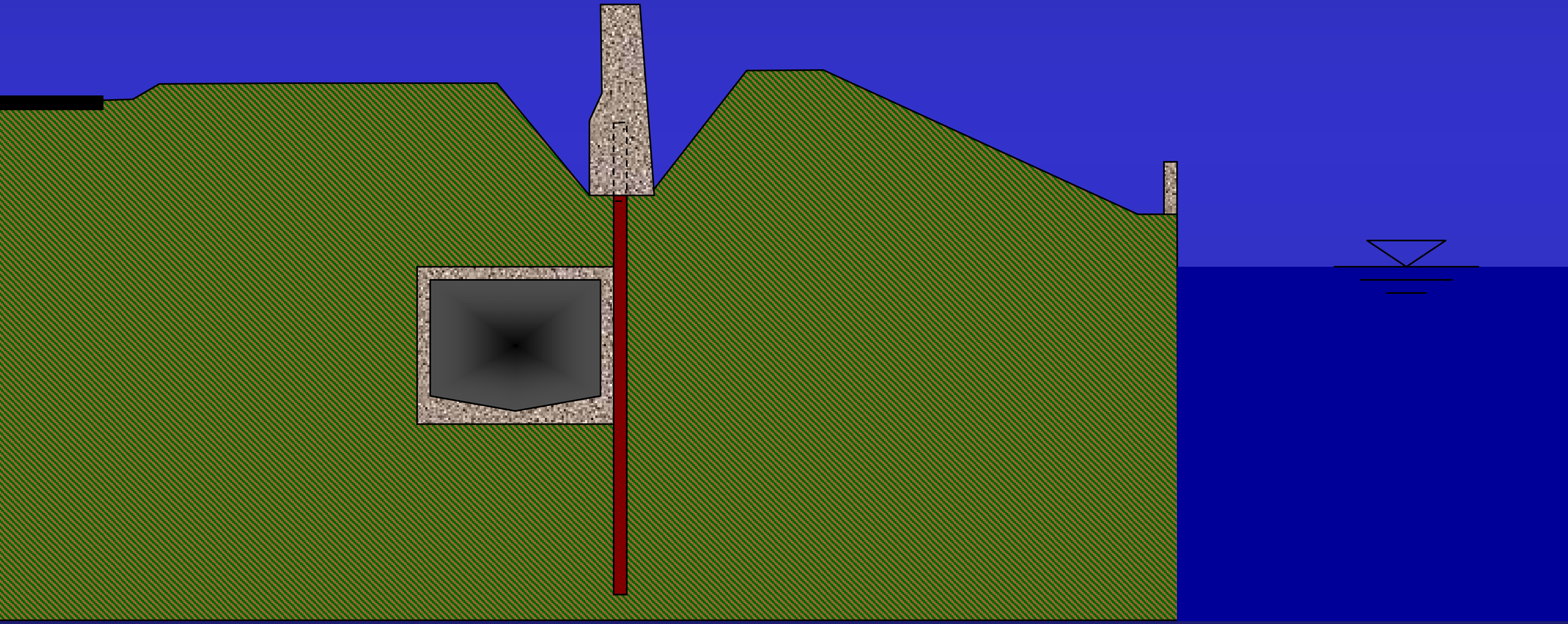

Des Moines Riverwalk

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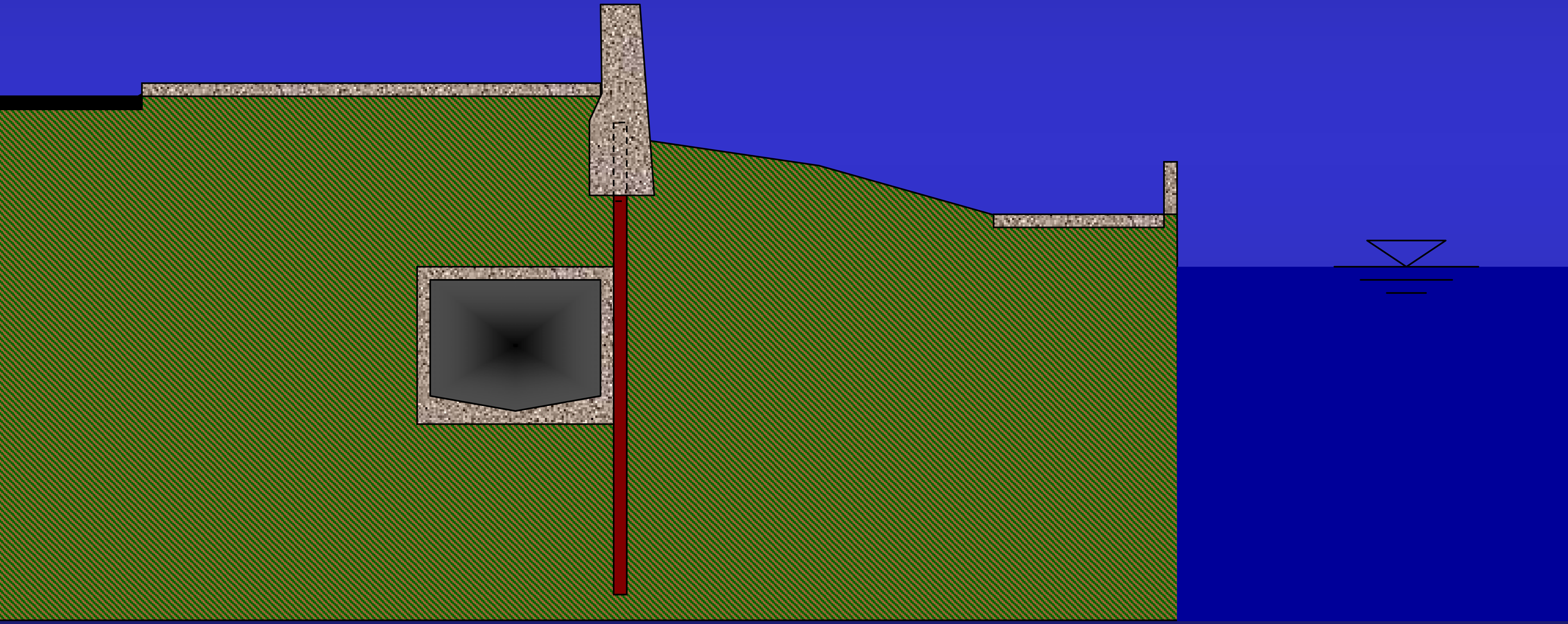
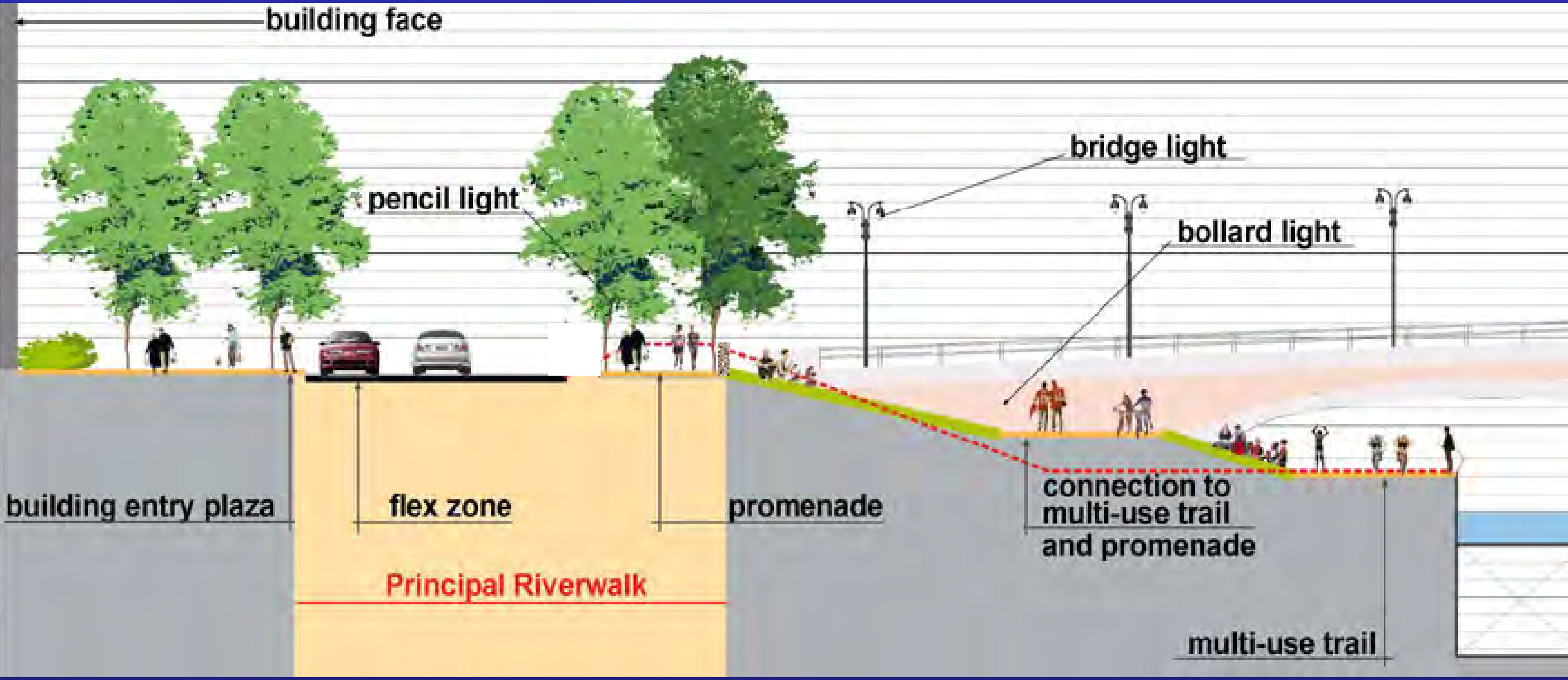
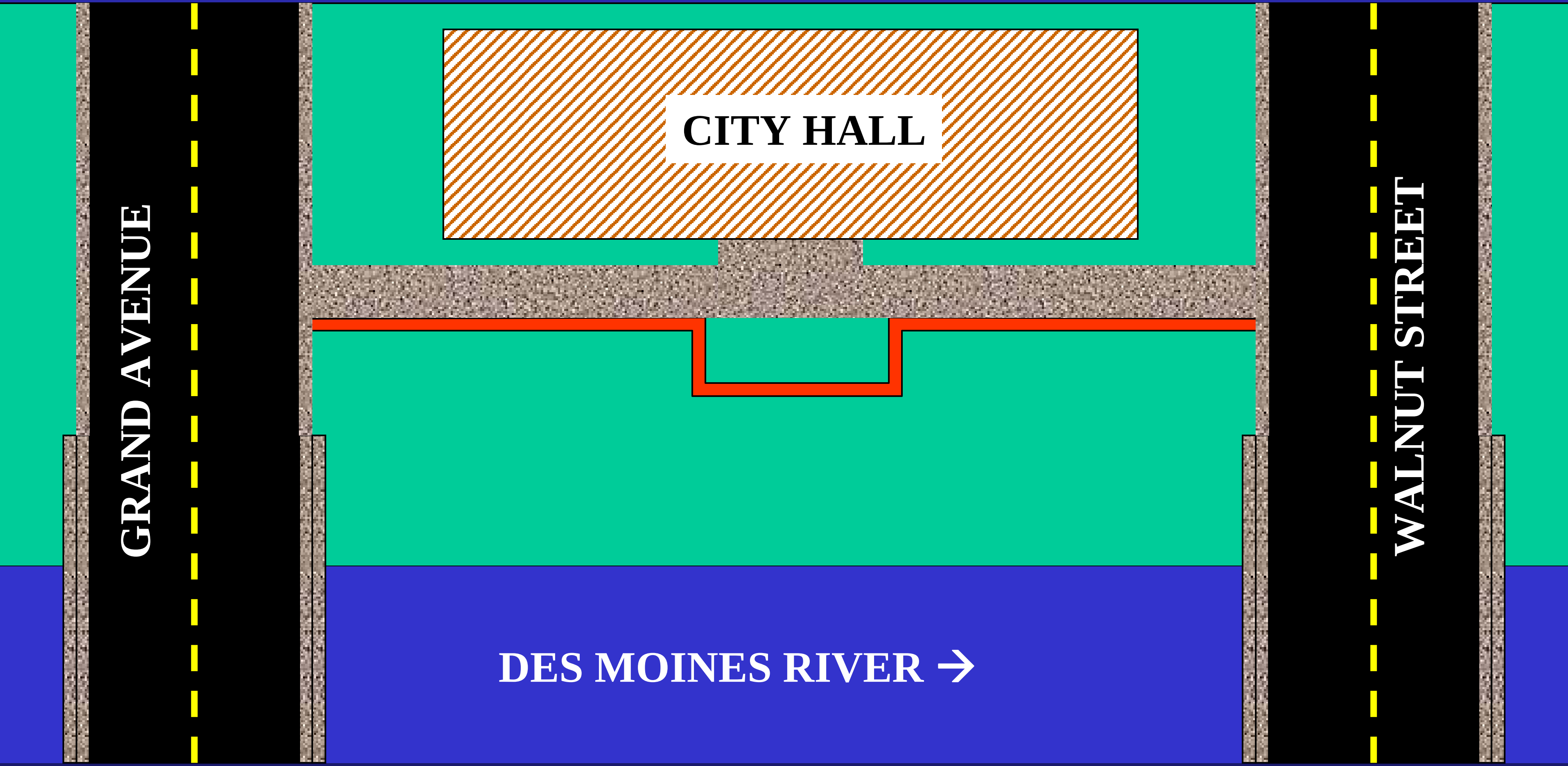


Des Moines Riverwalk



Des Moines Riverwalk

- Layout of new floodwalls & gates at City Hall



Des Moines Riverwalk

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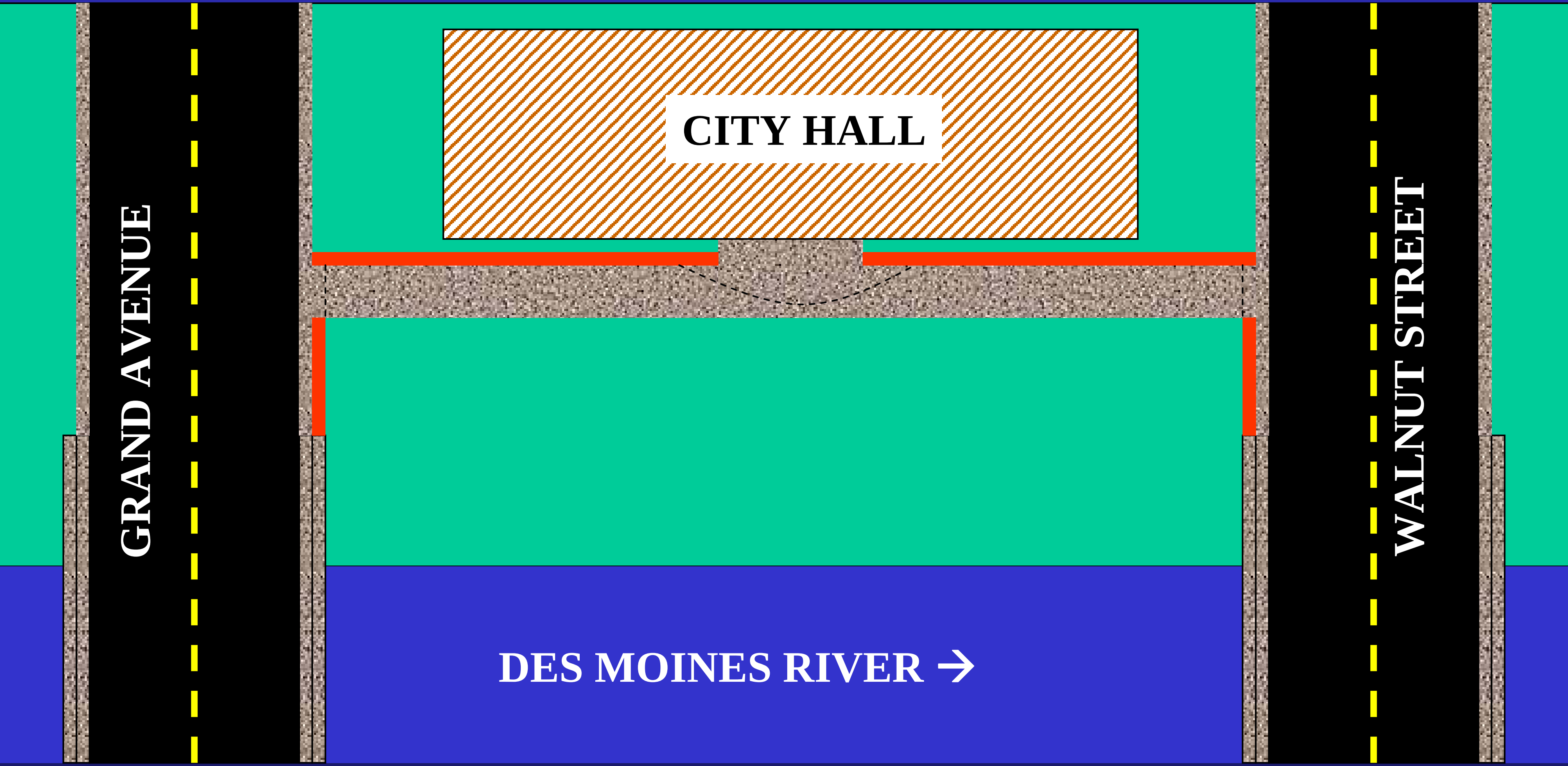

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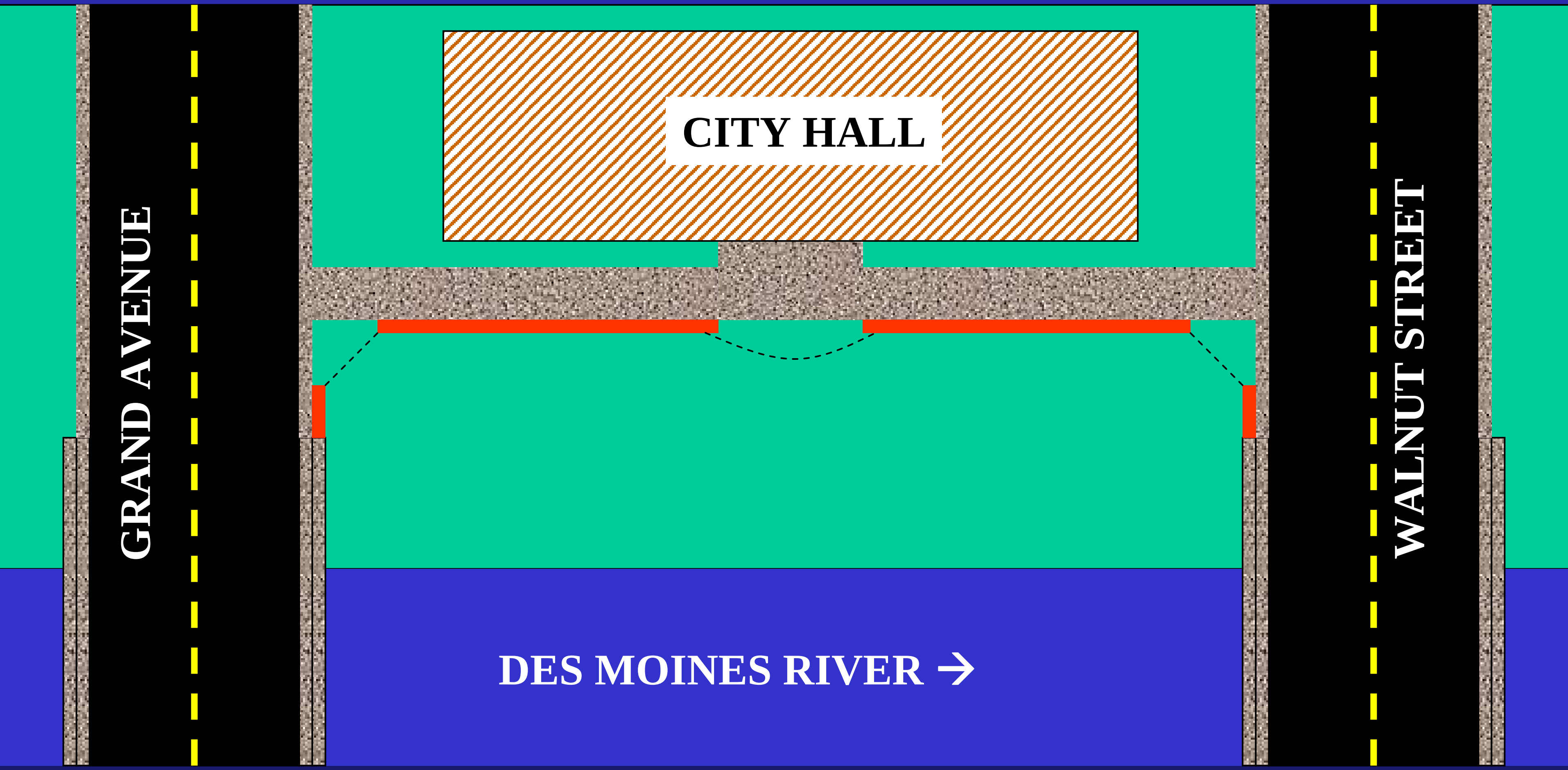

Des Moines Riverwalk

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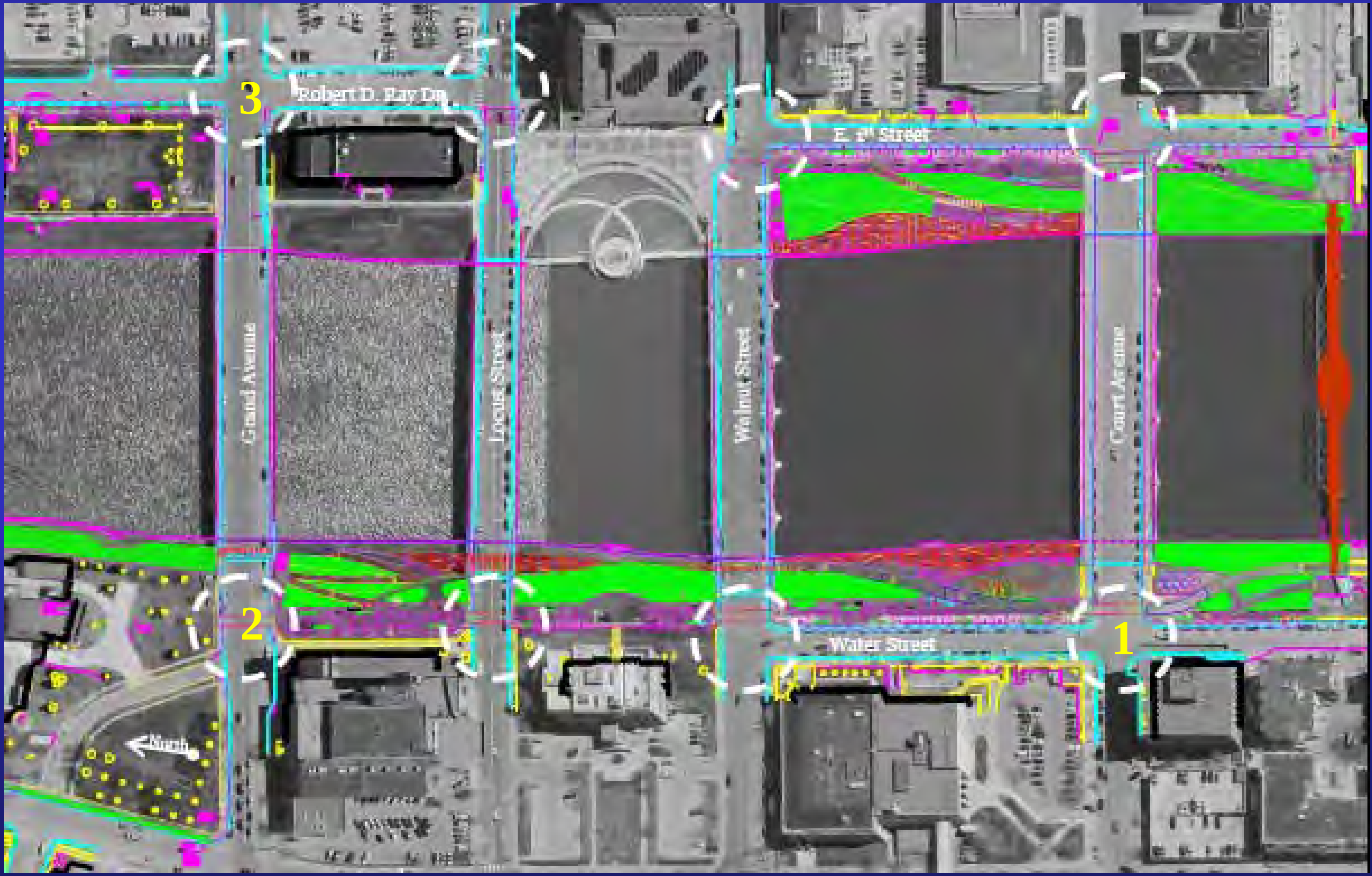
- Layout of new floodwalls & gates at City Hall

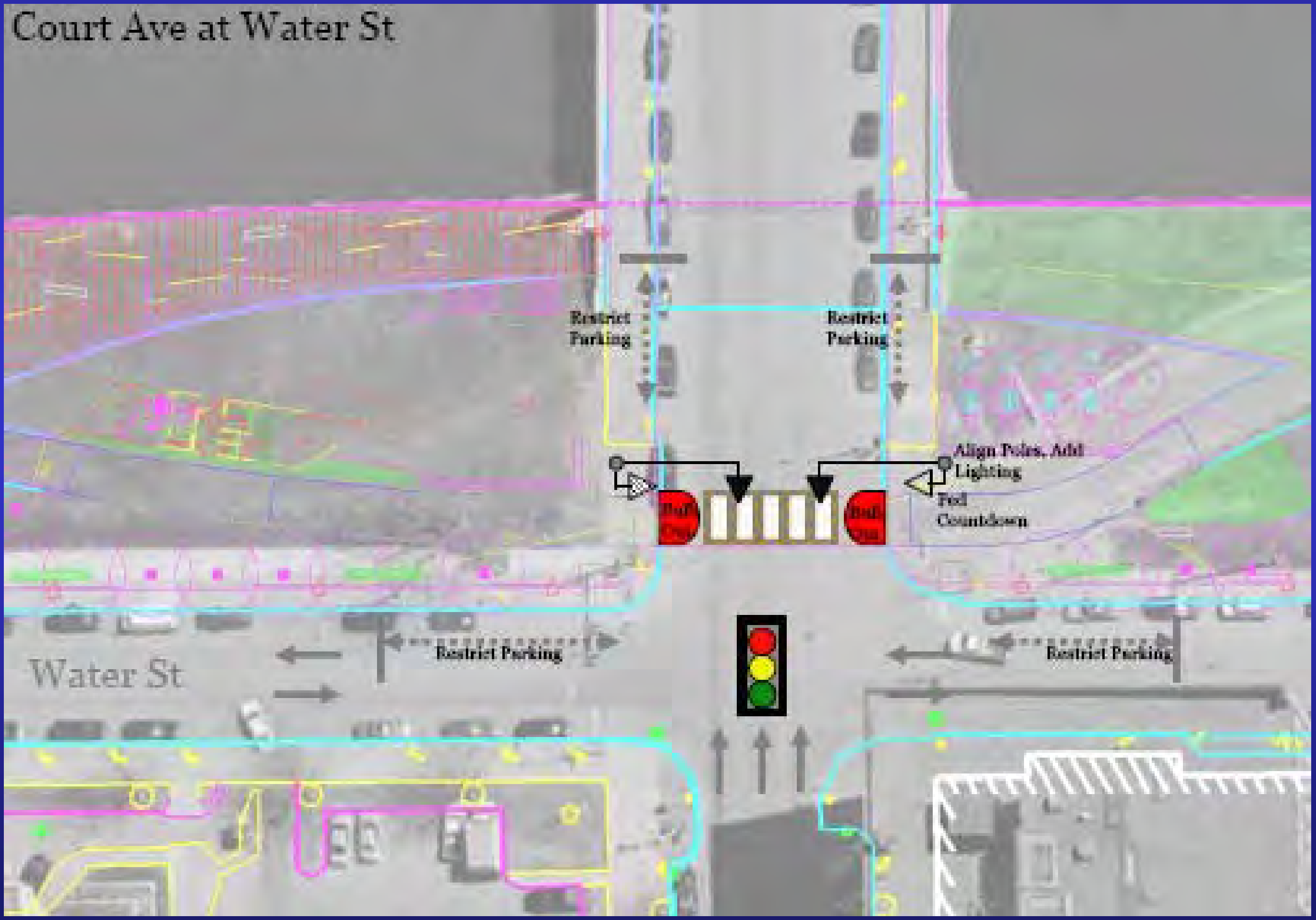
Des Moines Riverwalk

- Pedestrian / Vehicular Traffic Concerns



Des Moines Riverwalk

- Pedestrian / Vehicular Traffic Concerns



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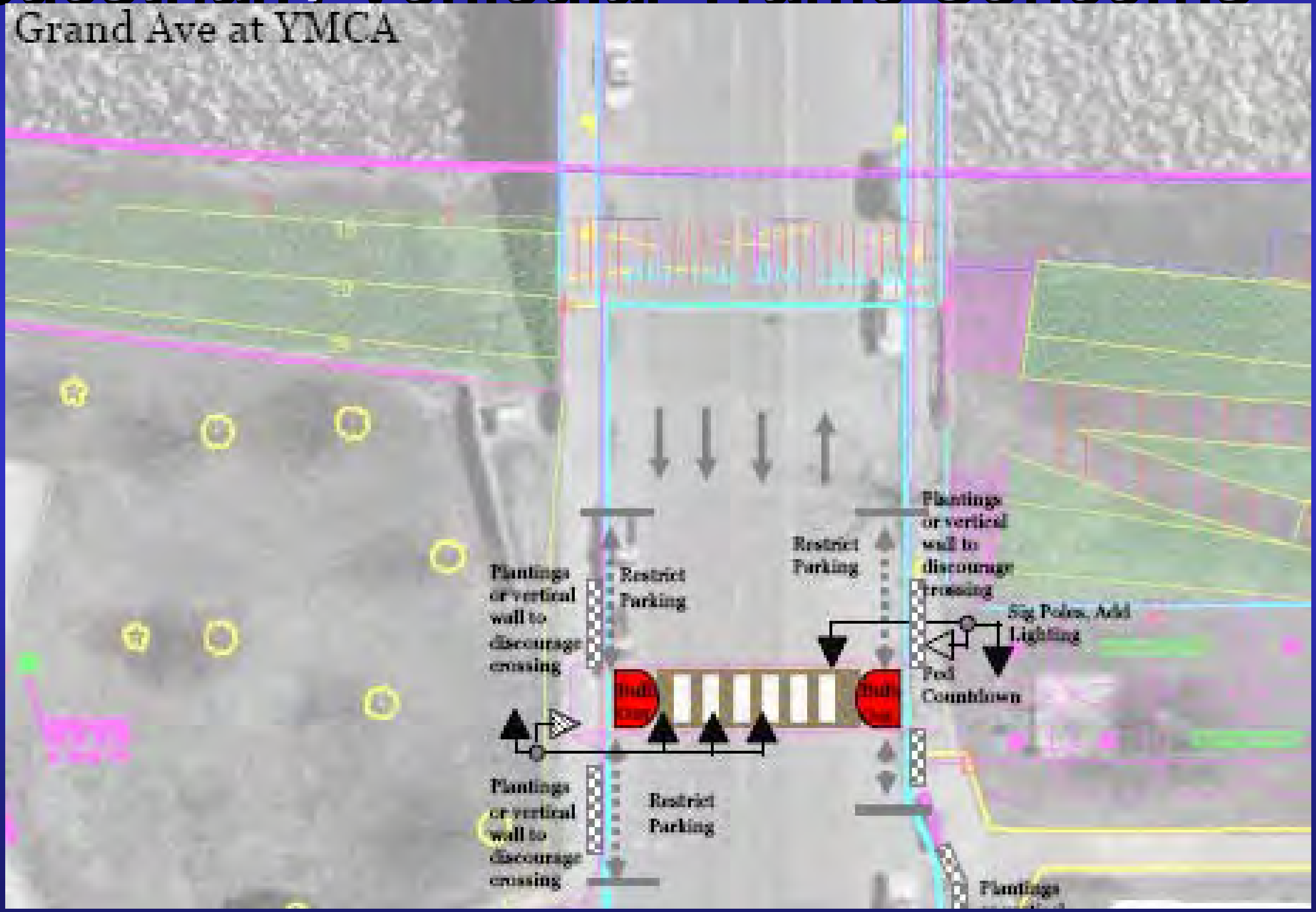
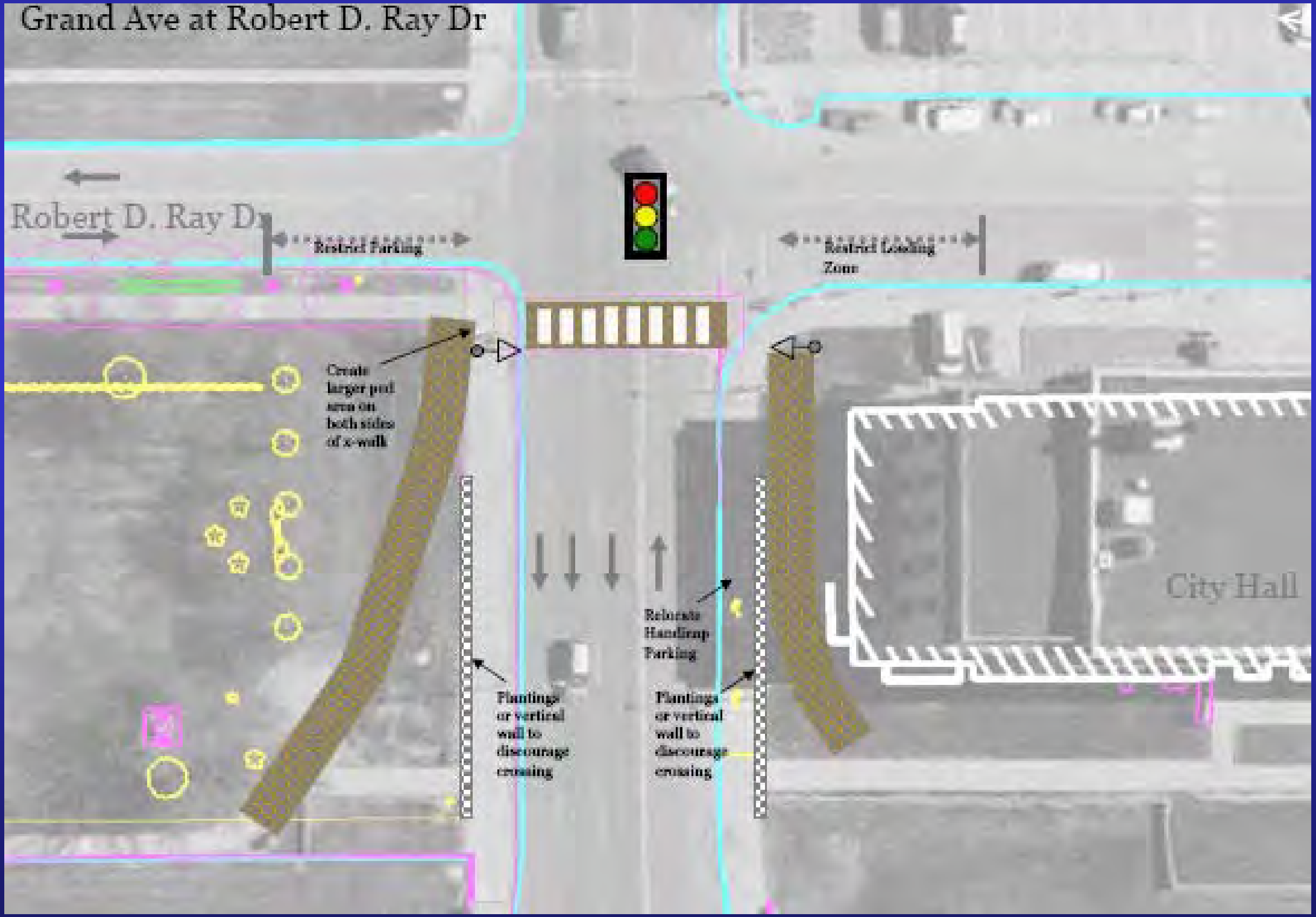
- **Pedestrian / Vehicular Traffic Concerns**



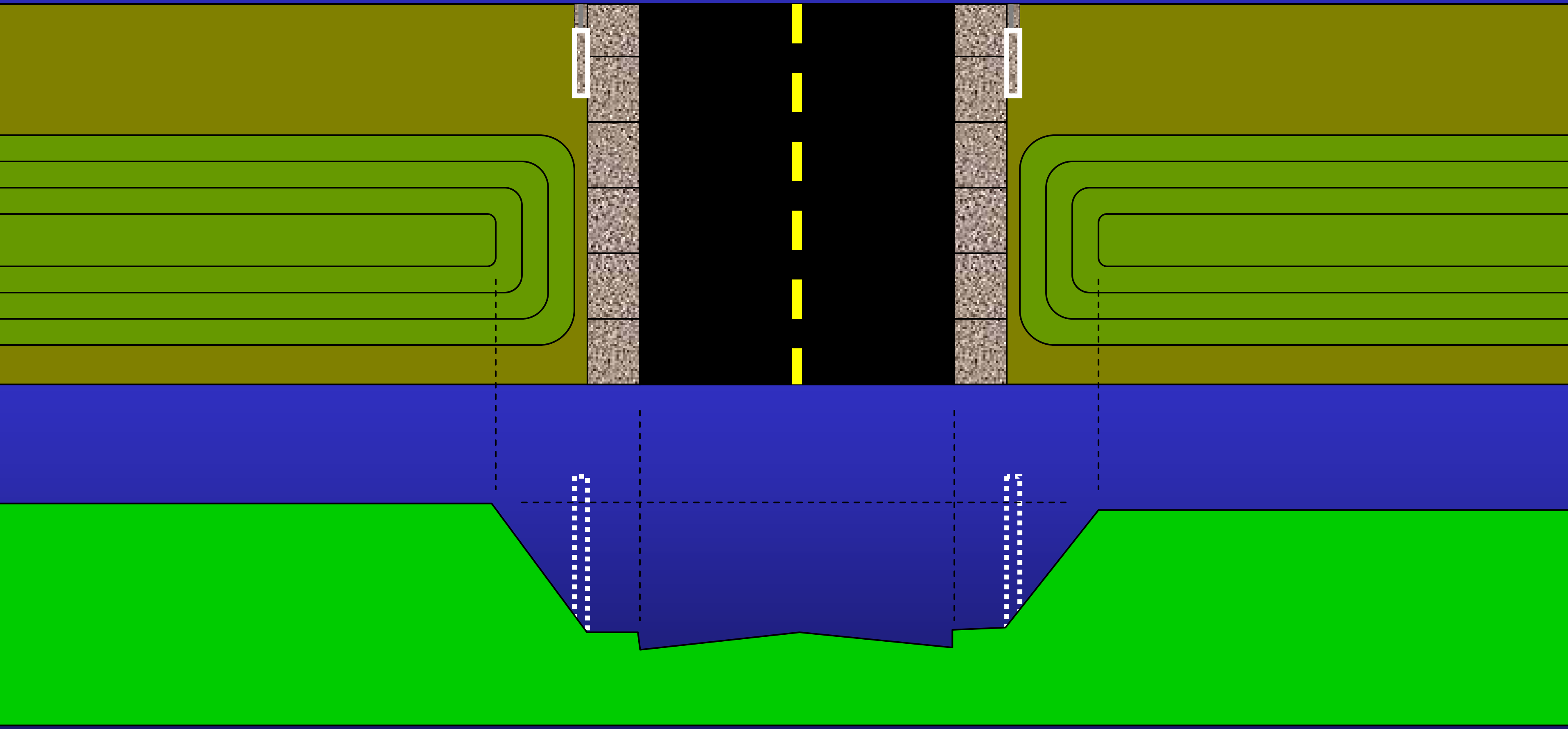
Des Moines Riverwalk

- **Pedestrian / Vehicular Traffic Concerns**



Des Moines Riverwalk

- Integration with Flood Control



Des Moines Riverwalk

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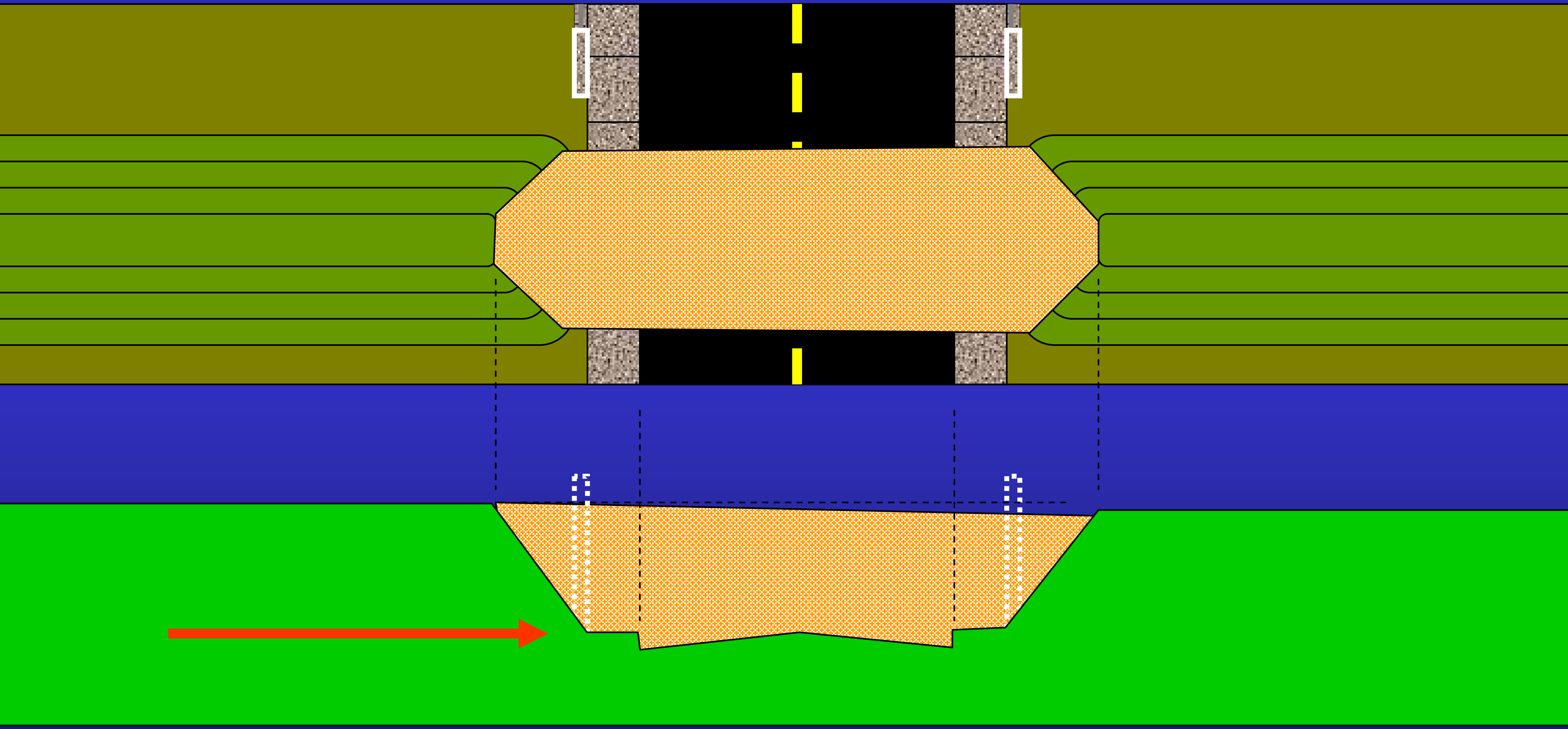
- Integration with Flood Control



Des Moines Riverwalk

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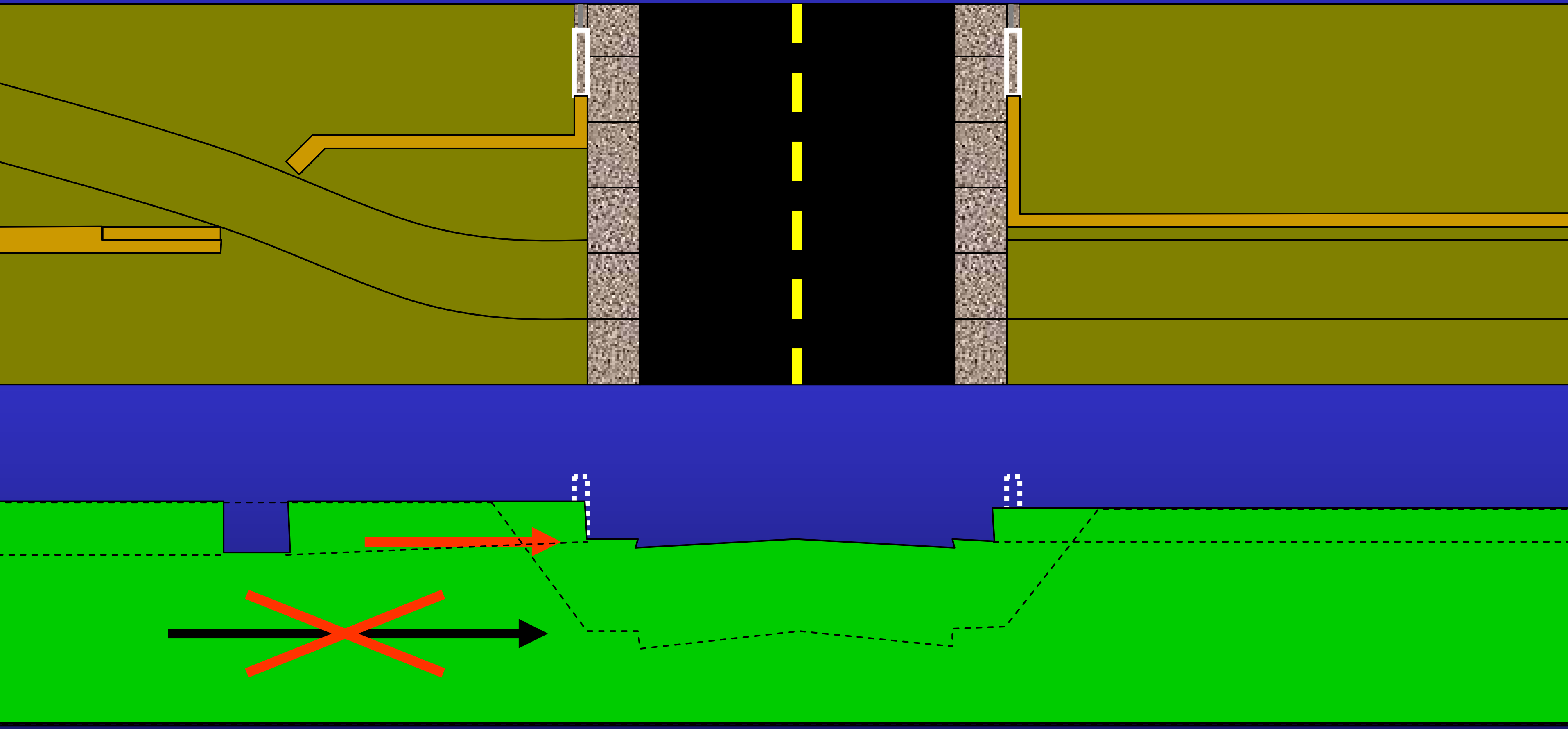
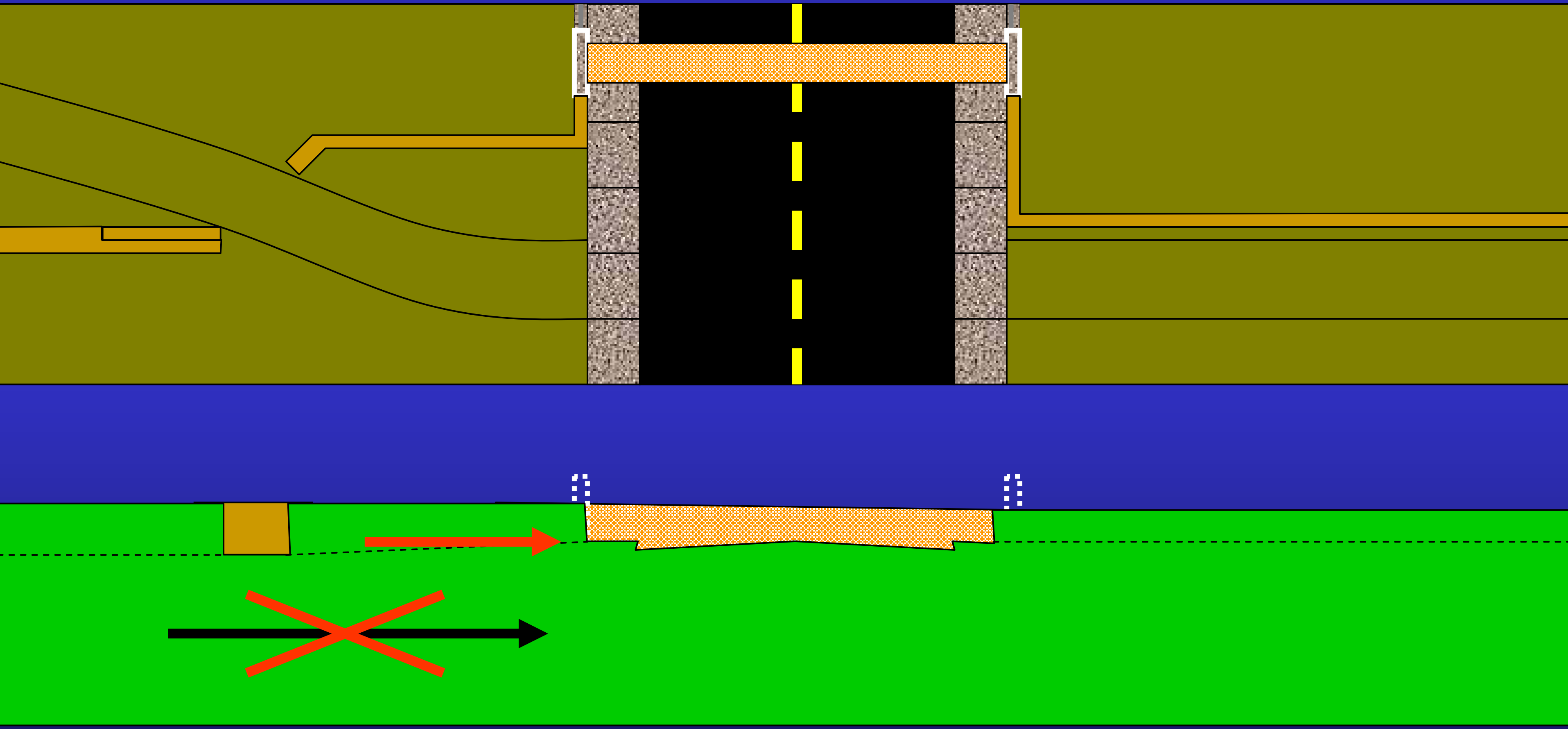
- Integration with Flood Control

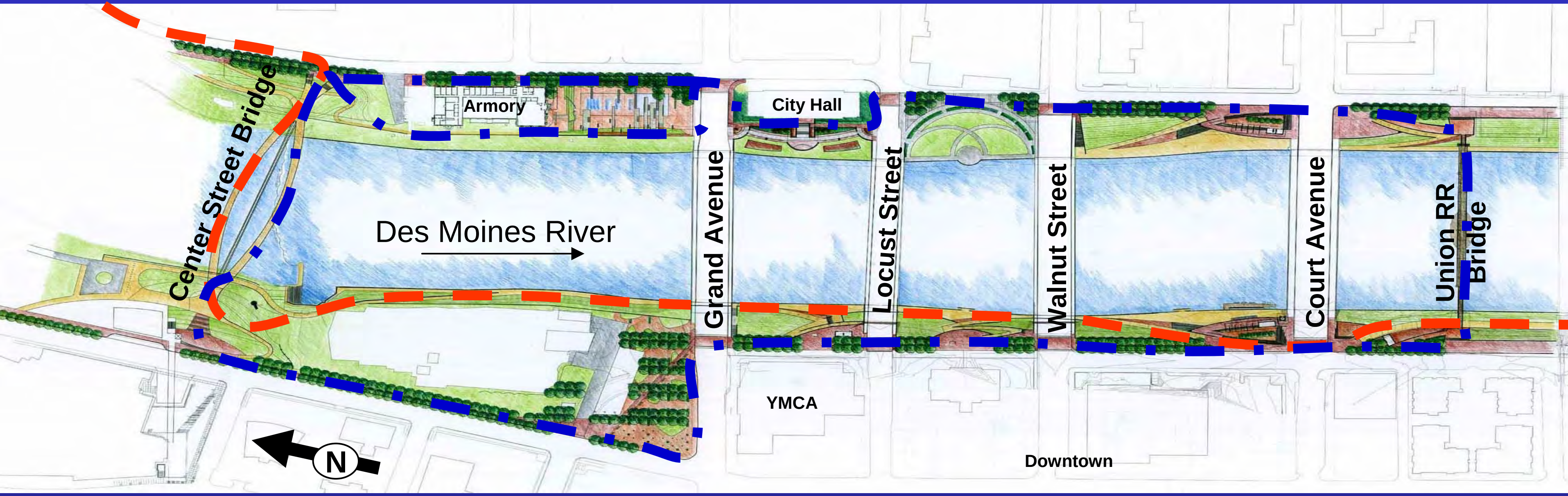


Des Moines Riverwalk

- Integration with Flood Control



Des Moines Riverwalk



Des Moines Riverwalk

- Acknowledgments
  - Stanley Consultants / INCA Joint Venture
    - Wallace, Roberts and Todd, LLC
  - The Weitz Group
  - Principal Financial Group
  - The Hanson Company
  - Center for Traffic Research and Education
    - Iowa State University

Des Moines Riverwalk

Thomas D. Heinold, P.E.
Project Engineer and Acting Chief of Specifications

(309) 794-5421

thomas.d.heinold@usace.army.mil

U.S. Army Engineer District, Rock Island
Clock Tower Building
Rock Island, Illinois, 61204-2004

Introduction to Multi-Disciplinary Tracks

Hosted by

Gregory W. Hughes

Multi-Disciplinary Concurrent Sessions

- 15 Separate Tracks
- 15 Separate Rooms
- Each Track Presented 3 Times
- 1st Showing 1400-1450 Hours
- 2nd Showing 1530-1620 Hours
- 3rd Showing 1630-1720 Hours

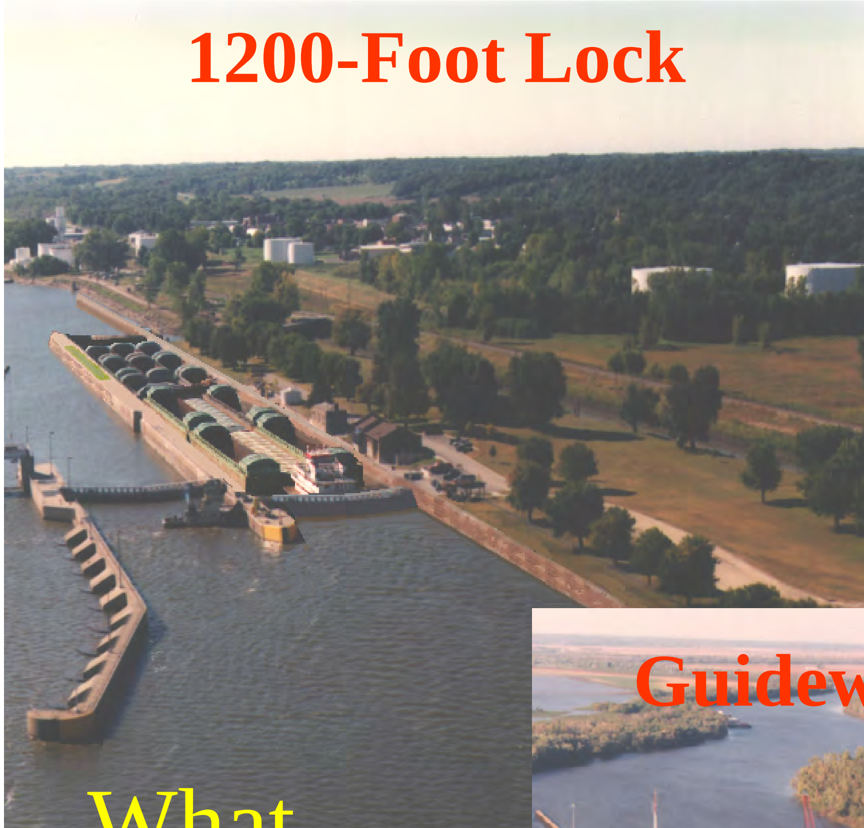
- Ice Breaker 1730-1900 Hours

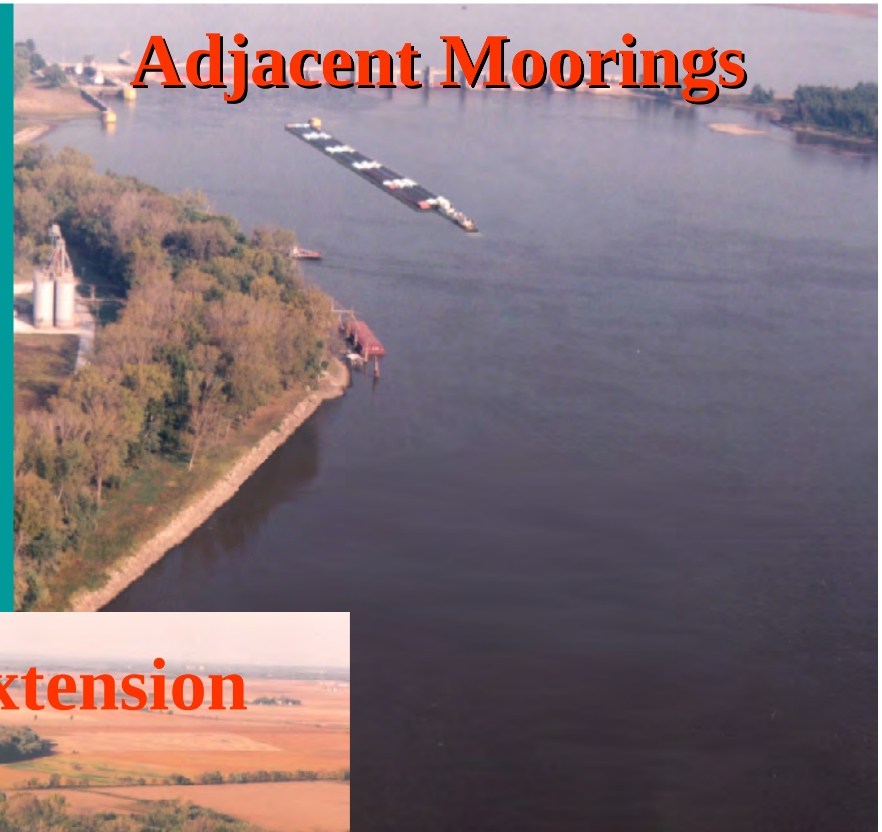
Track 1
ACQUISITION STRATEGIES FOR CIVIL WORKS
Room 230

Walt Norko & Bill Augustine

CECW-CE / CECW-B

HQ USACE





What acquisition strategy should you use ?

MAJOR ISSUES IN CIVIL WORKS PROJECTS

- Continuing Contracts
  - Change in current USACE policy
- Reprogramming Commitments
  - Trail of past under funded projects
- More funding needed
  - Current requirements exceed available funds


INFORMATION
PLANNING
ACQUISITION STRATEGY
RISK ASSESSMENT
IMPLEMENTATION

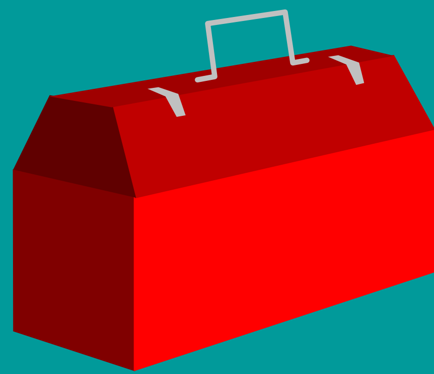
ACQUISITION STRATEGIES TOOLBOX

IDIQ SINGLE CONTRACTS

BPA

IDIQ MULTIPLE AWARD CONTRACTS

COST REIMBURSEMENT CONTRACTS



PURCHASE ORDER <$100K

OTHER IDT CONTRACTS

SOLE SOURCE 8(a) (RFP)

INVITATION FOR BID/REQUEST FOR PROPOSAL

DESIGN/BUILD

FIXED PRICE CONTRACT

CW Acquisition Strategies

- For presentation, discussion and questions ?
- Visit us in Room 220
- 3 sessions
  - 2:00 to 2:50 PM
  - 3:30 to 4:20 PM
  - 4:30 to 5:20 PM

Track 2

“Risk and Reliability Engineering”

Room 231

Anjana K. Chudgar/CECW-CE
David M. Schaaf/CELRL-ED-DS

Risk and Reliability Engineering

Risk

Potential for loss or harm to systems due to likelihood of an unwanted event and its adverse consequences. Risk is combination of the probability and consequences of an adverse event.

Risk and Reliability Engineering

Reliability

The probability that a systems will perform its intended function for a specific period of time under a given set of conditions.

Reliability is the probability that unsatisfactory performance or failure will not occur

Risk and Reliability Engineering

Outline of Presentation: Track 2 - Room 231

- Why Risk and Reliability Engineering: Chudgar
- Overview of HQ's Supported Activities: Chudgar
  - Major Rehabilitation
  - Dam Safety – PRA
  - Homeland Security
  - Major Maintenance
- Guidance-Risk and Reliability Engineering: Schaaf
- Navigation Risk and Recovery Study-CELRD: Schaaf
- R&D: Chudgar
- Related Presentations: Chudgar
- Questions and Discussion: All

Track 3
Integrating Risk & Reliability Into USACE Infrastructure Management
Room 232

Presentation for the
Multi-Disciplinary Concurrent Session
Tri-Service Infrastructure Conference
August 2005

Risk & Reliability

- What’s wrong?
- How likely is it to occur?
- What are the consequences?

Discussion Topics

- Why Risk & Reliability?
- How is USACE Integrating Risk & Reliability into Infrastructure Management?
- Influence on Engineering & Construction Communities of Practice
- The Way Ahead
- Question and Answer Session

Track 4

- Hydrology, Hydraulics & Coastal Engineering
- Jerry Webb & Darryl Davis
- Room 240

Hydrology, Hydraulics, and Coastal Engineering Support for USACE

- Multi-disciplinary Session, by HH&C CoP lead: Jerry Webb, Principal Hydrologic and Hydraulic Engineer, HQUSACE

- For: Tri-services Infrastructure Conference, St. Louis, MO   August 2, 2005

Session Summary

- Conference Agenda/Opportunities
- HH&C CoP Membership.
- CoP Charter and Governance.
  - Executive Advisory Group.
  - MSC, Lab, & Support POCs.
- Standing Technical Committees.
- Technical Excellence Network.
- HH&C Support to USACE, other DoD, Federal, and non-Federal partners.

USACE HH&C CoP Membership

- Who?: USACE Engineers and Scientists.
  - Surface and groundwater hydrology, river hydraulics and sediment transport, hydrologic statistics and risk, cold regions hydrology and hydraulics, reservoir systems analysis, hydraulic design, hydroelectric power water supply navigation ,dam safety water control management, water quality environmental restoration, and estuary coastal, and ocean engineering and processes.
- Where from?:
  - HQUSACE, MSCs, districts, R&D laboratories, support offices, and others.

Track 5

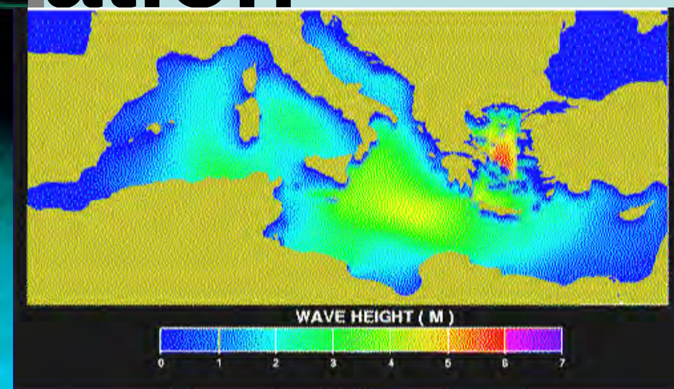
- Civil Works R&D Forum
- Joan Pope
- Room 241

Track 5 Civil Works R&D

- **Vision – technology leader for water resources management**
- **Capabilities/Products address needs of Corps' Civil Works program, with primary emphasis on:**
  - **Navigation**
  - **Flood & Storm Damage Reduction**
  - **Environmental**
  - **Watershed Assessment & Management**
- **Customers – Corps Districts**

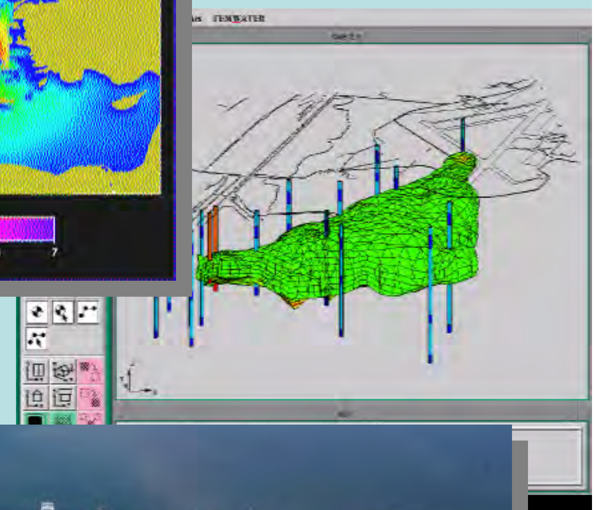
Water Resources Support to the Nation

Physical Models

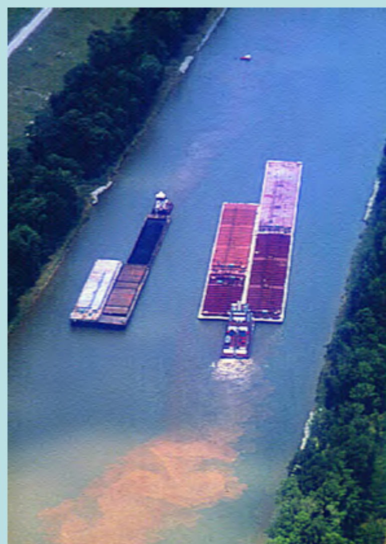


Navigation

Numerical Models



Coastal Engineering

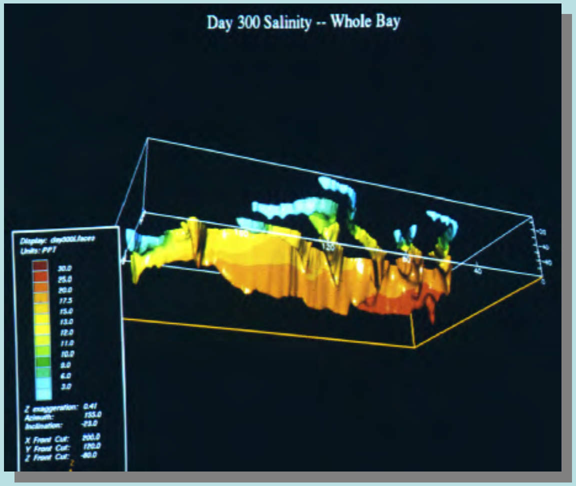


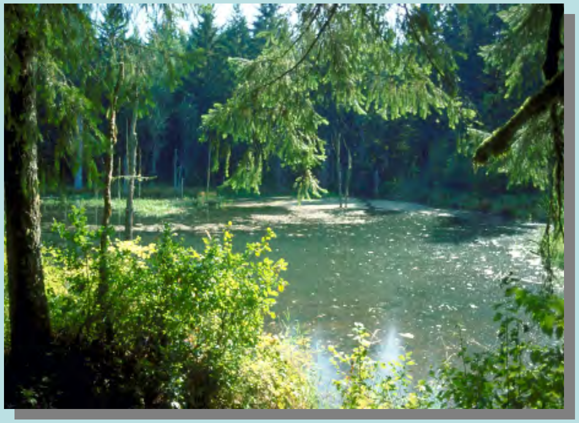
Flood Control

Water and the Ecosystem

Dredging and Disposal

Water Quality





Wetlands

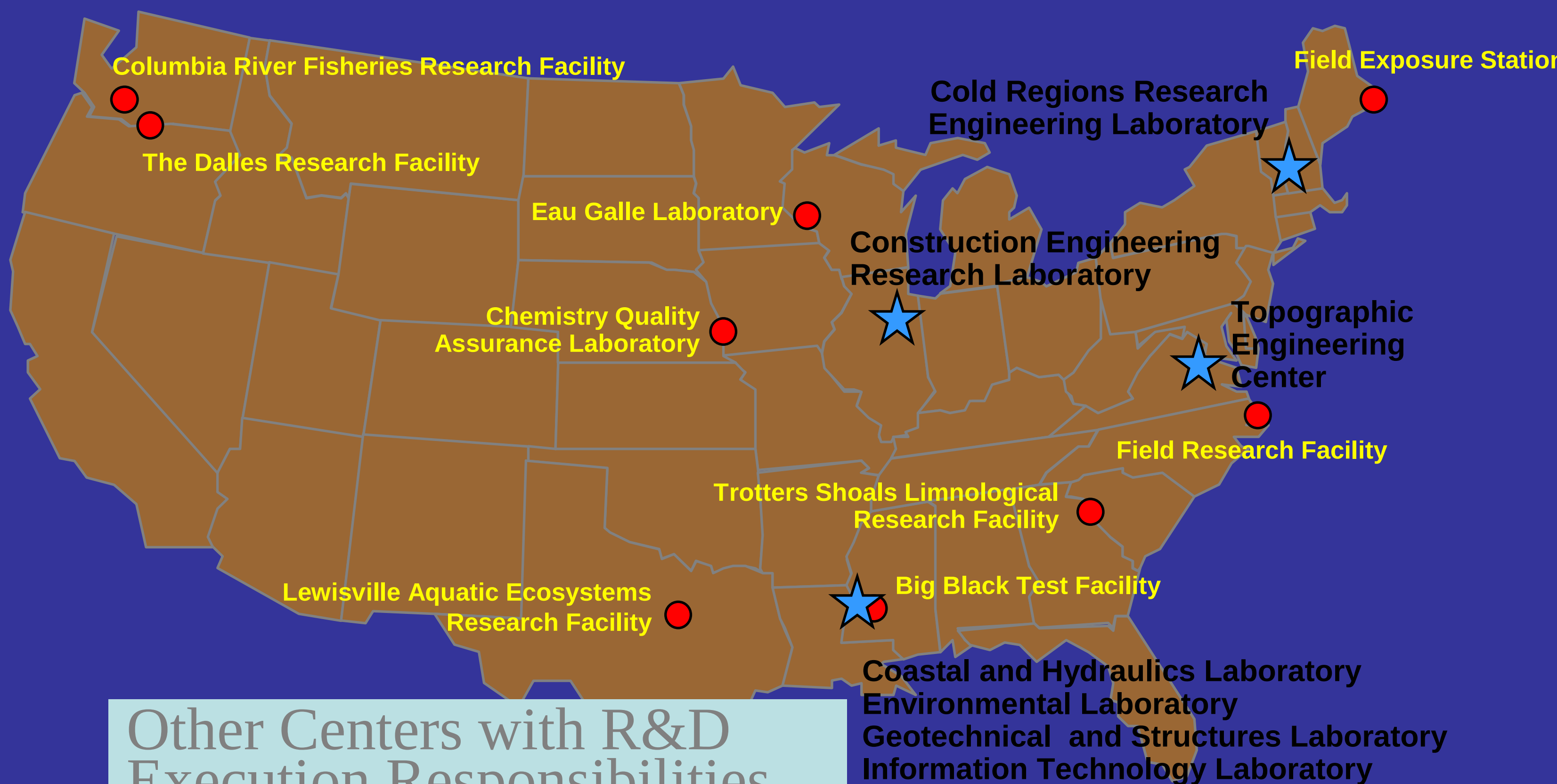
Invasive Species

Fisheries Mitigation

ERDC's Role
USACE's R&D Major Subordinate Command
DoD & Army Lead Engineering R & D Center

- Problem solvers
- Technology advisors
- Technology developers
- Business development partners
- USACE's National Science & Technology resource

Engineer Research and Development Center



Other Centers with R&D Execution Responsibilities

IWR and HEC

Civil Works R&D
Changes and Drivers

- **Changes 2003 - 2005**
  - **4 thrust areas now vs. 6**
  - **12 ERDC work packages now vs. 15**
  - **$29 M now vs. $27 M**
  - **HEC added to Senior Management Team**
  - **More reliance on MSC's/CoP Structure for R&D needs**
- **Drivers**
  - **USACE 2012**
  - **Civil Works Strategic Plan**
  - **Business Line budgeting**
  - **Congressional adds**
  - **Integration of ERDC/IWR collaboration**

ERDC Civil Works R&D

Thrust Area	Work Packages	FY 05	FY 06	FY 07
		$M w/estimated S&S removed		
Navigation				
	Navigation Systems	3.0	3.7	4.0
	Coastal Inlets Research Program (CIRP)	2.5	2.5	2.5
	Dredging Operations and Environmental Research (DOER)	5.8	5.8	5.8
Thrust Area Subtotal		11.3	12.0	12.3
Flood and Coastal				
	Flood and Coastal Storm Damage Reduction	2.8	2.7	2.8
	Risk Analysis for Dam Safety	0.6	0.6	0.6
Thrust Area Subtotal		3.4	3.3	3.4
Environmental				
	Environmental Technologies	1.3	1.4	1.4
	Aquatic Plant Control	3.2	3.0	3.0
	Aquatic Nuisance Species	3.2	0.7	0.7
Thrust Area Subtotal		7.7	5.1	5.1
System-Wide				
	Regional Water Management	1.5	1.7	1.7
	Regional Sediment Management	1.8	2.0	2.0
	Ecosystems Assessment & Management	1.6	1.7	1.7
	Unifying Technologies	2.0	2.2	2.3
Thrust Area Subtotal		6.9	7.6	7.7
TOTAL BY FISCAL YEAR		29.3	28.0	28.5

Track 6

- Civil Works Security Engineering
- Joe Hartman & Bryan Huston
- Room 242

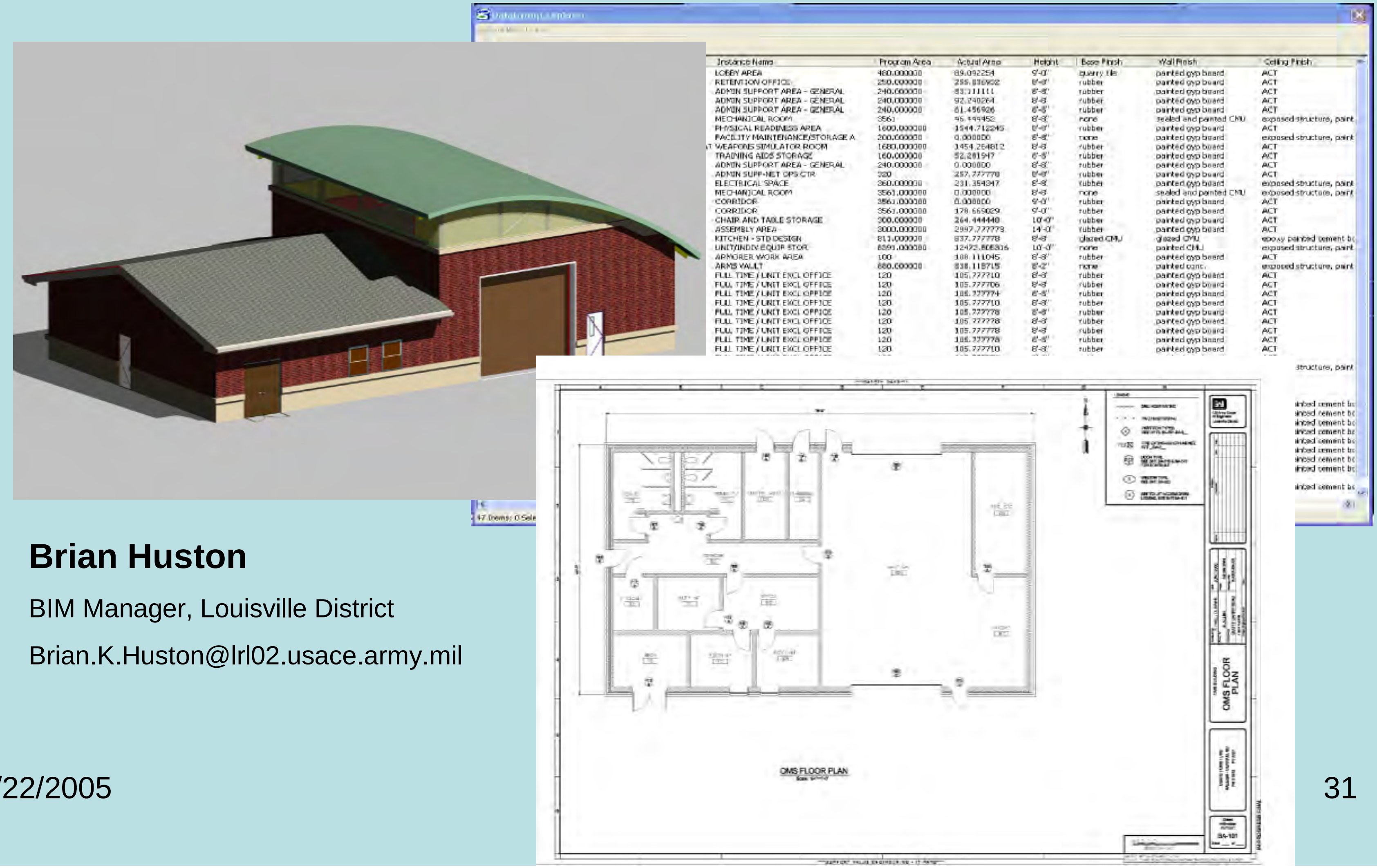
CIVIL WORKS SECURITY ENGINEERING

TRACK 6 - ROOM 242

- USACE Civil Works Infrastructure
- USACE response after 9/11
- Risk
  - Threats
  - Vulnerabilities
  - Consequences
- Bases of Design for Protective Measures

Track 7

- Building Information Model Applications
- Brian Huston & Daniel Hawk
- Room 226



Brian Huston

BIM Manager, Louisville District

Brian.K.Huston@lrl02.usace.army.mil

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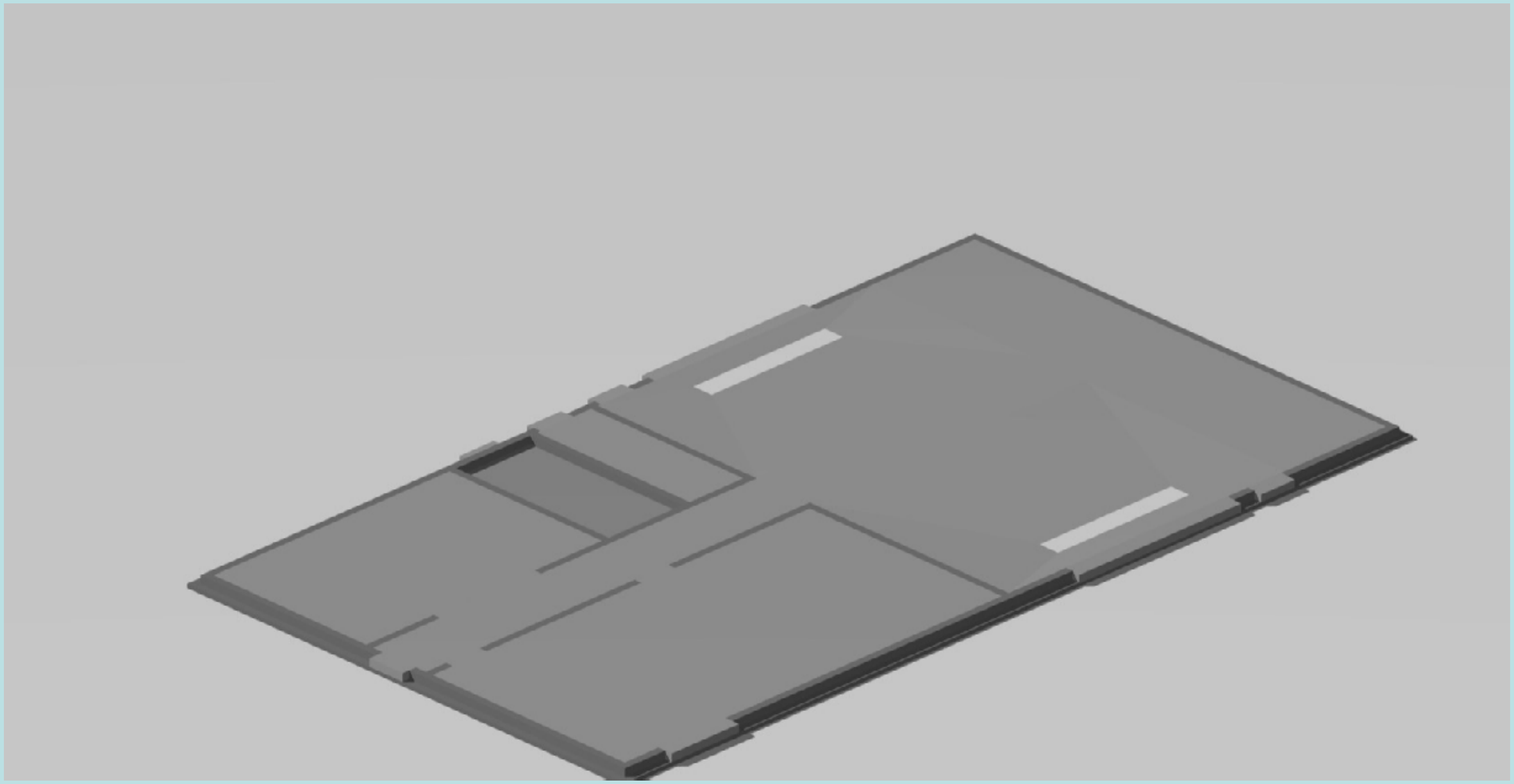
- BIM is finally the way that we can see real benefits of modeling both graphical and non-graphical data of structures simultaneously.

- Realizing those benefits is within our grasp. We need only to be open minded and resourceful to be successful.



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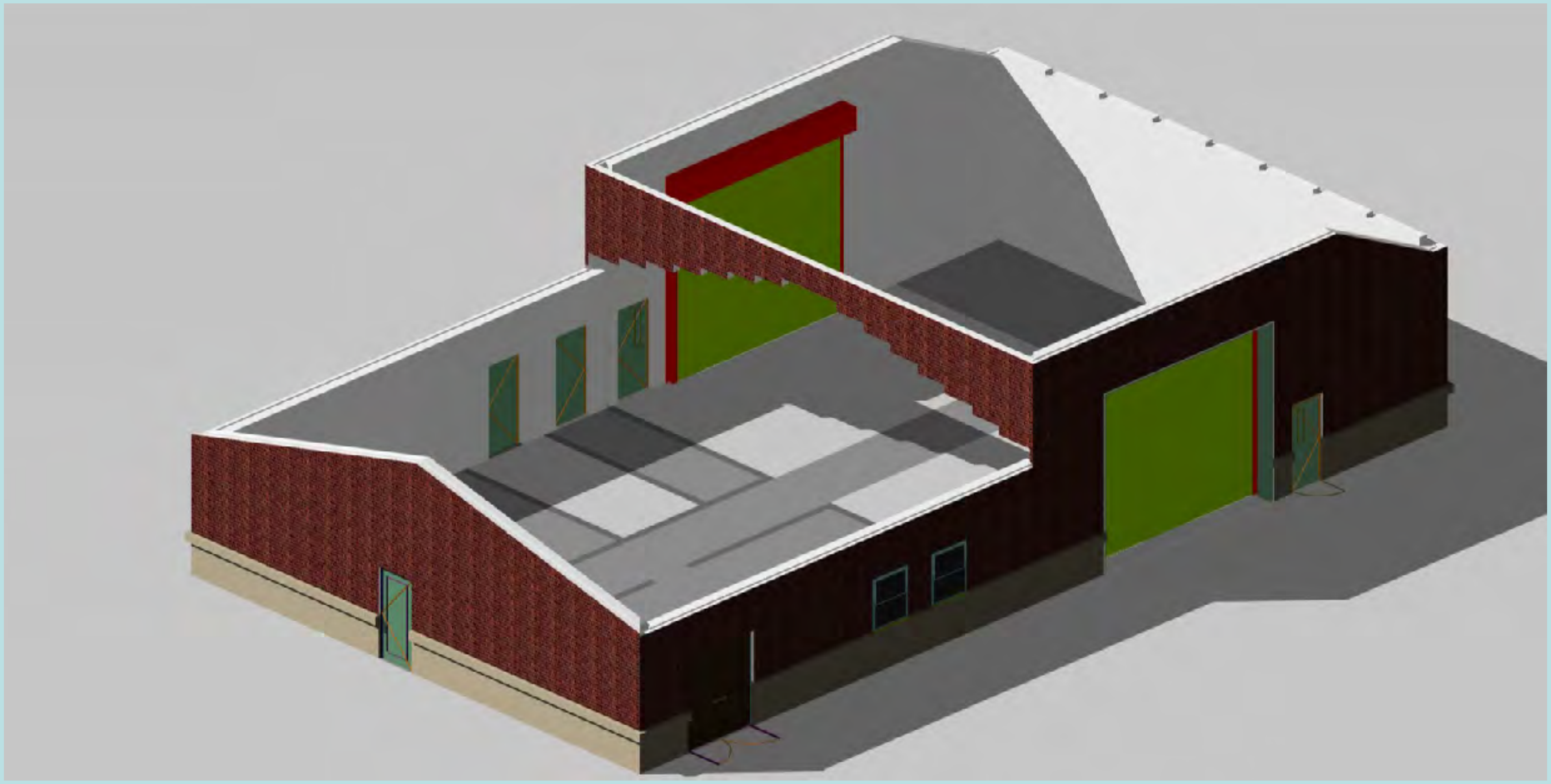
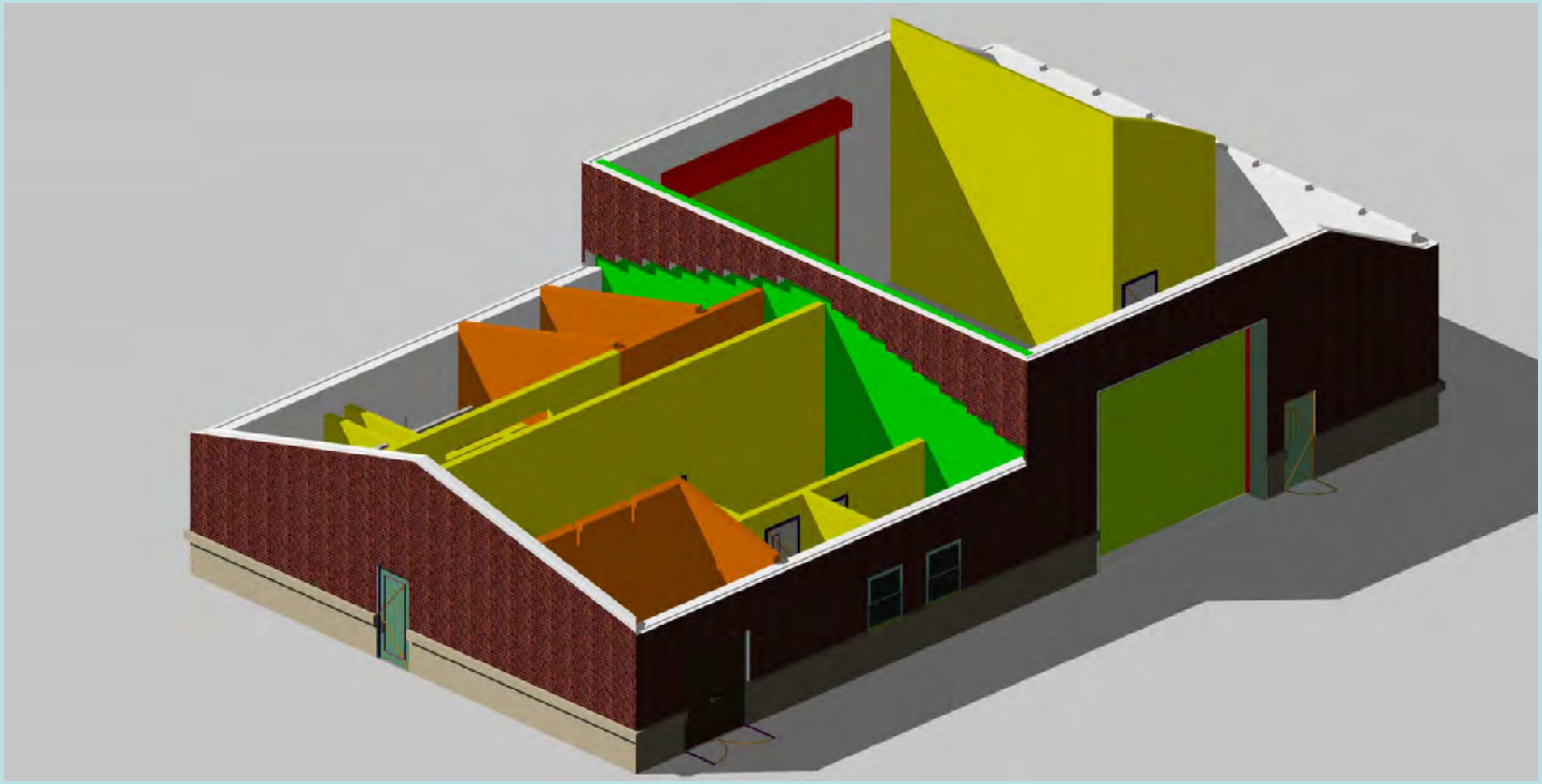


PMS Load Bearing Masonry



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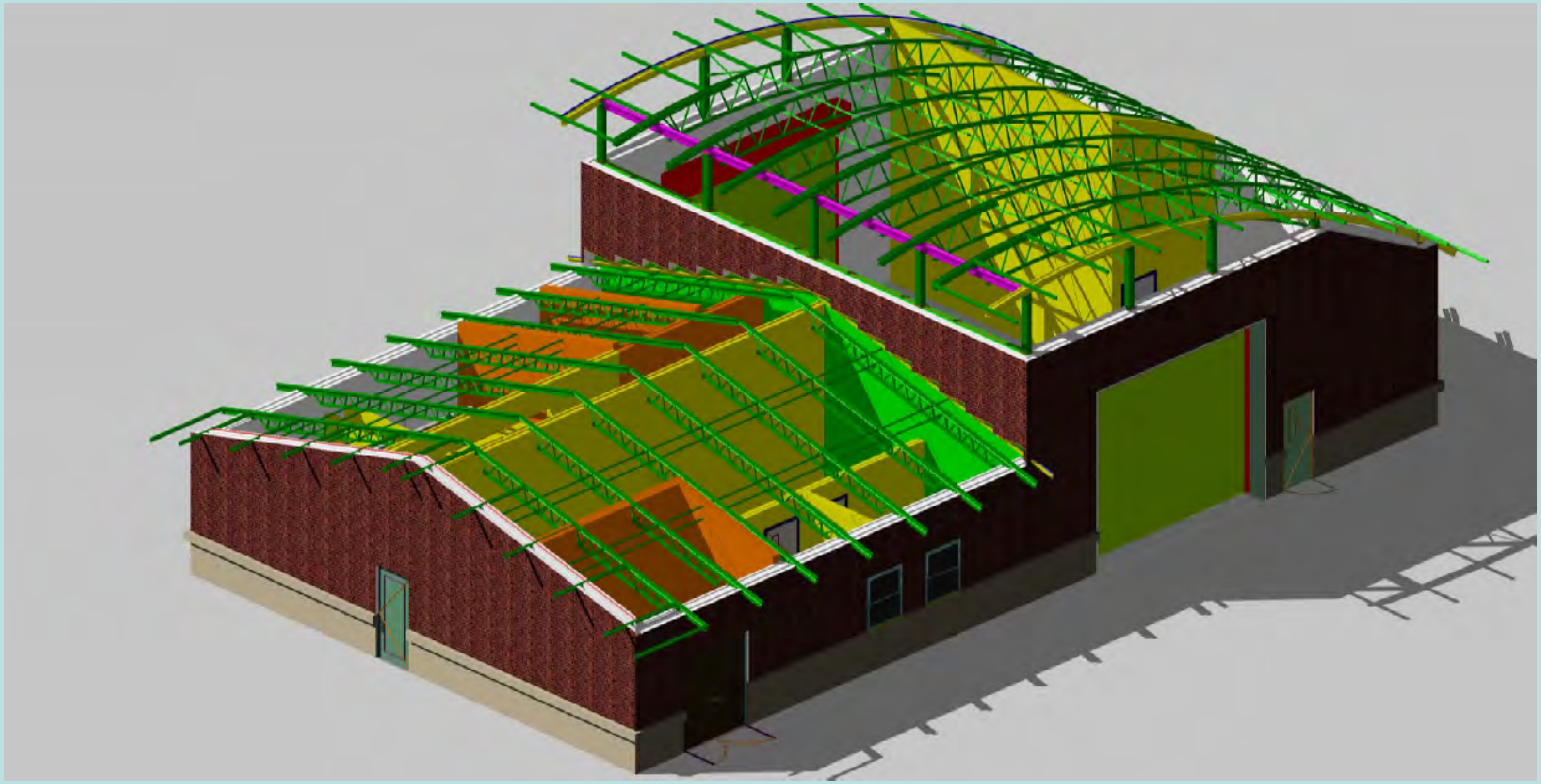

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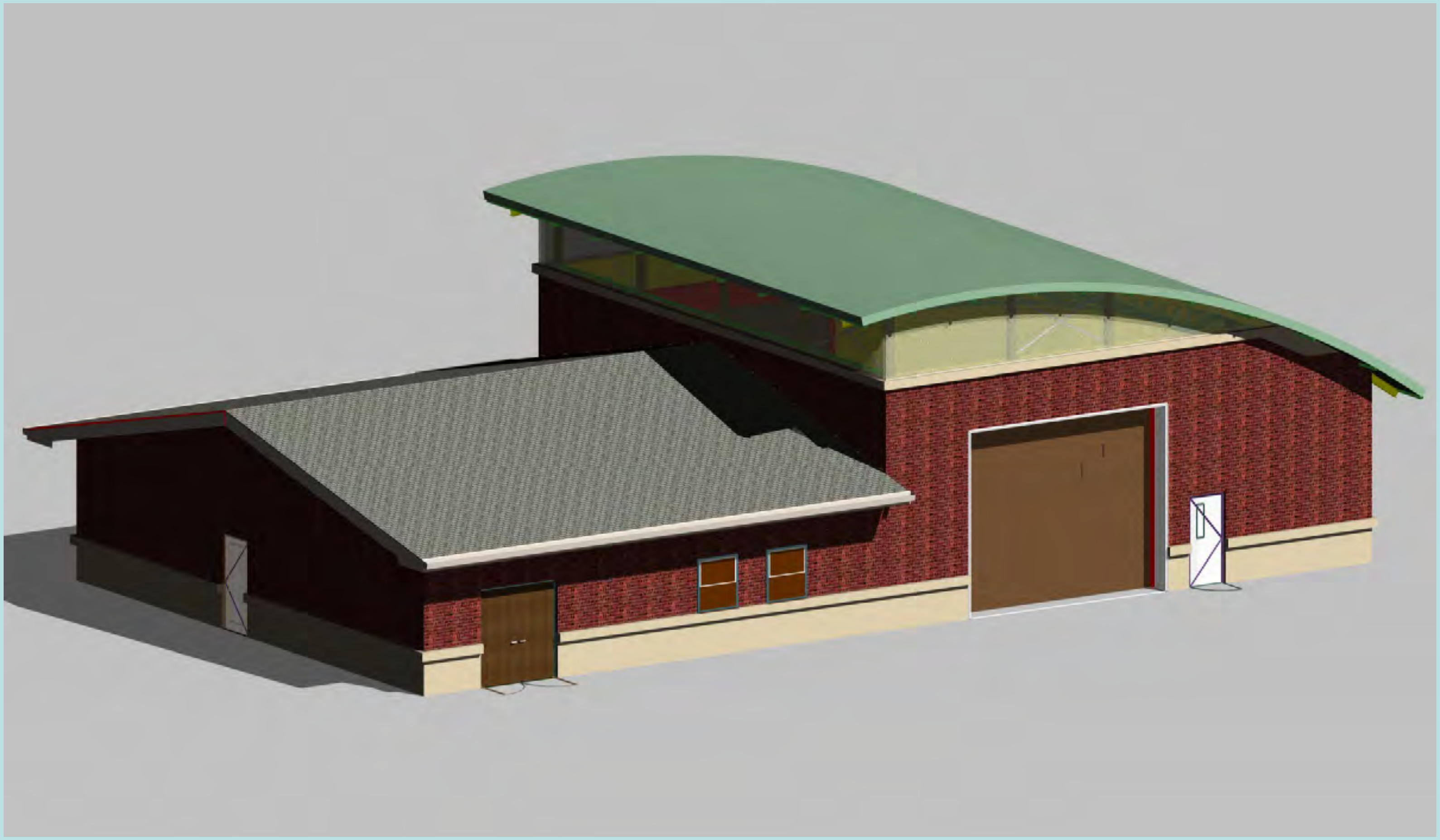

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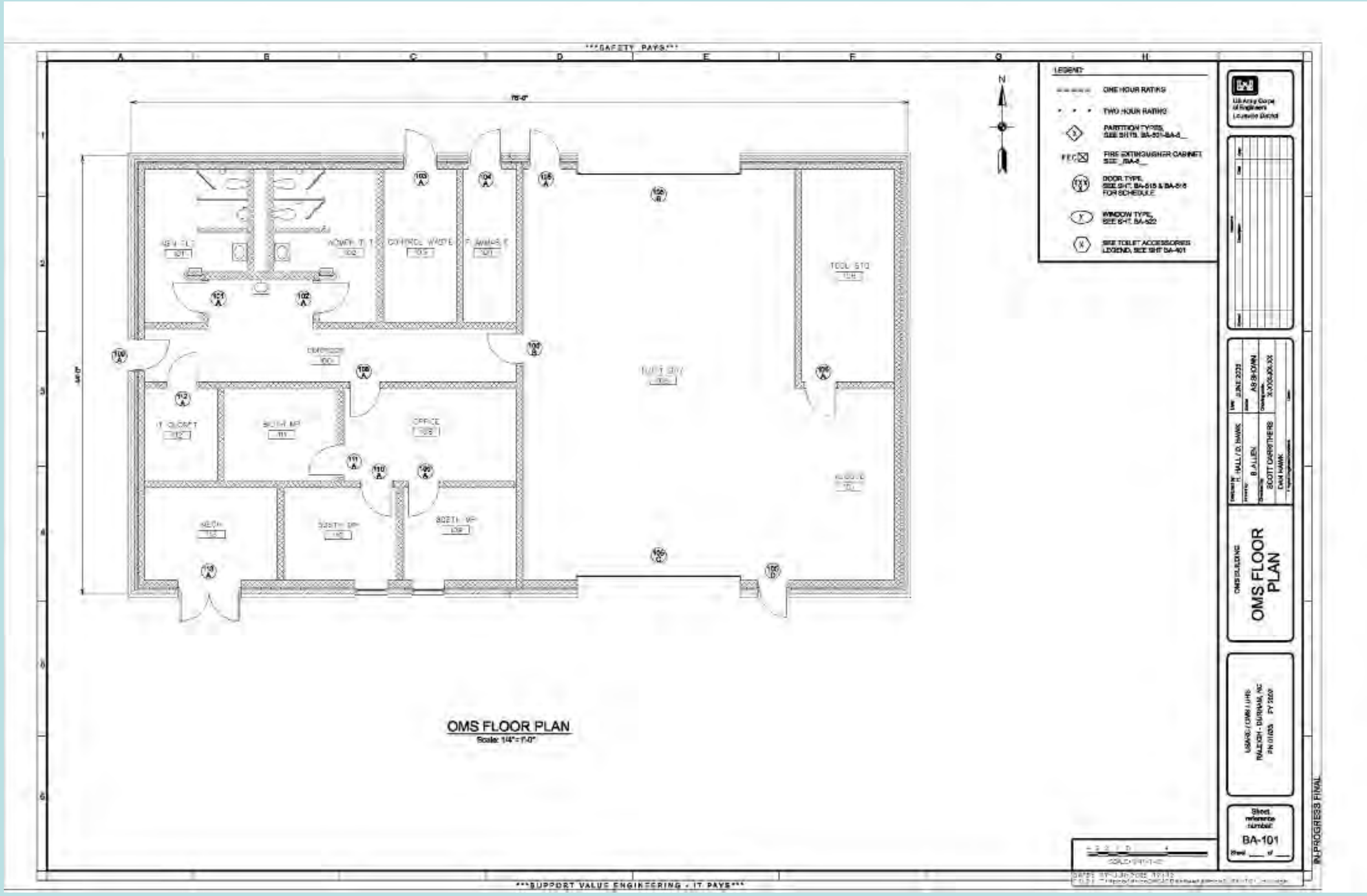
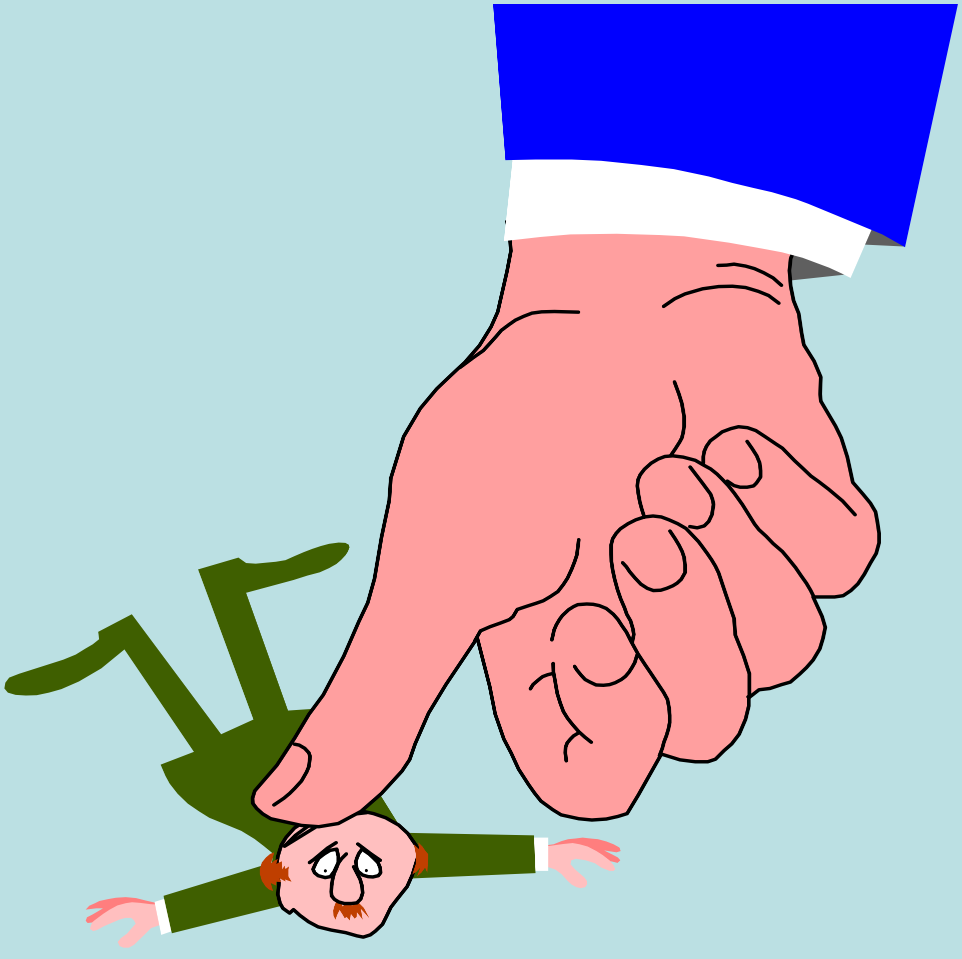

SAFETY PAYS
LEGEND
ONE HOUR RATING
TWO HOUR RATING
OMS FLOOR PLAN
Scale: 1/4" = 1'-0"
OMS FLOOR PLAN
BA-101
IN-PROGRESS FINAL
SUPPORT VALUE ENGINEERING - IT PAYS

Track 8

- Design Build for Military Projects
- Mark Grammer
- Room 220


Design-Build and
Army Military Construction
Preview
Mark Grammer, P.E.

Design-Build Requires Letting Go of Some Things We've Always Held



Presentation Outline

- Overview of Design-Build
- Design-Build Pitfalls
- Key Items for Design Review
- Procurement Strategy
- Contract Management Strategy
- RFP Content and Format
- Managing for Success

Mark Grammer, CECW-SAD
Room 220

mark.grammer@usace.army.mil

202-761-4108

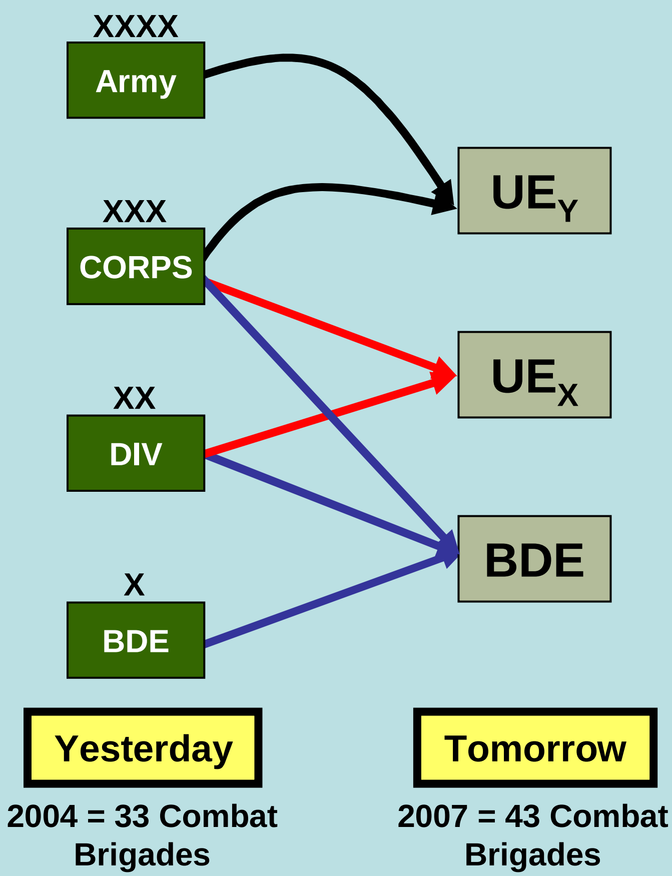
Track 9

- Army Transformation/Global Posture Initiative/Force Modernization
- Al Young & Claude Matsui
- Room 221

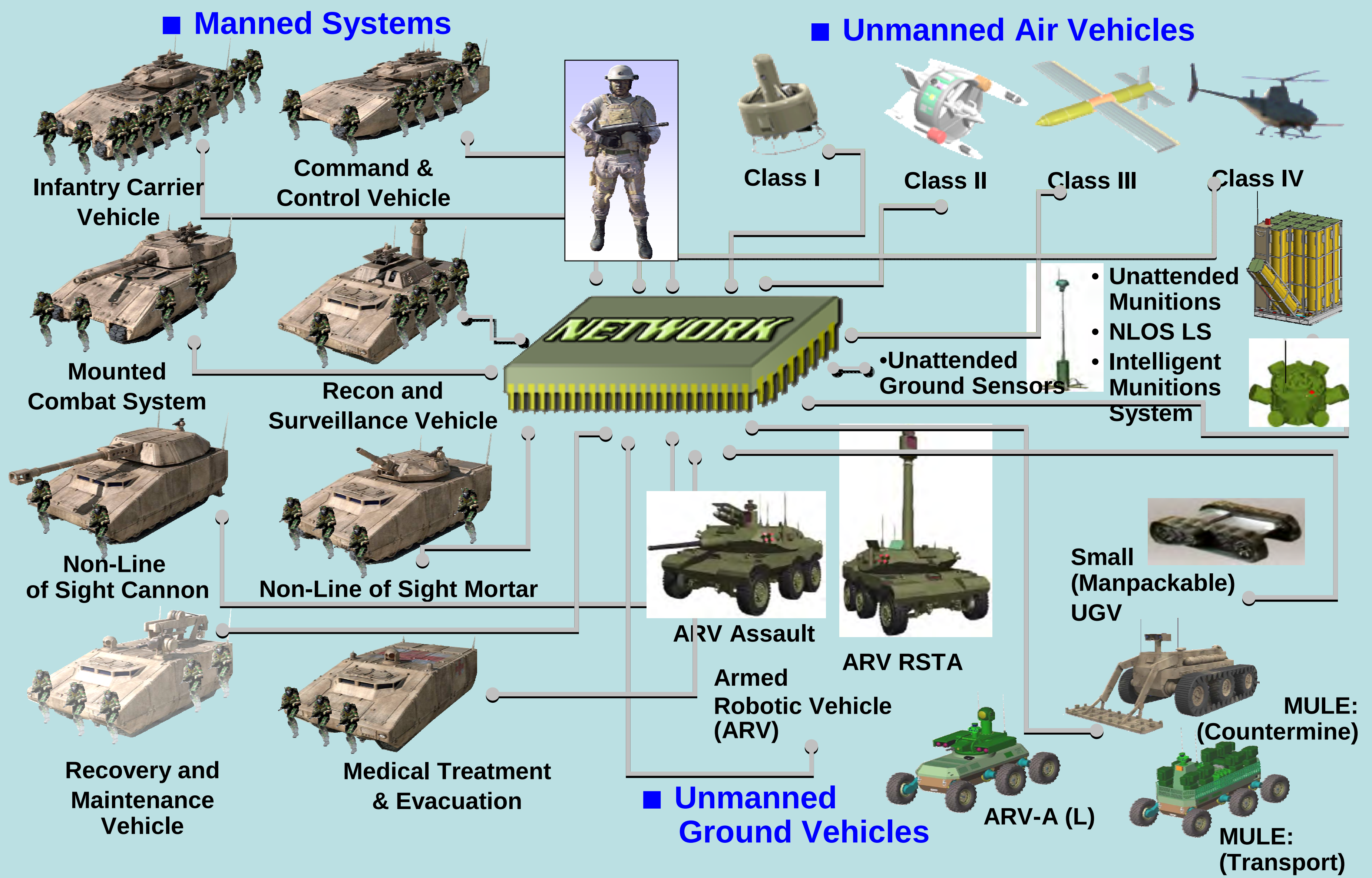
Engineering and Construction for Army Transformation

- **What is Army Transformation and how is it affecting traditional engineering and construction practices for the Army?**
- ***What's MILCON Transformation and how will it meet the accelerated pace of Transformation?***
- ***How can industry innovation and "best commercial practices" help the Army overcome the affects of a "Perfect Storm"?***

The largest stationing action in Army history … Army Modular Force, BRAC, and Global Posturing Initiative?



Future Technology Demands



Challenges to be Met

- **Programmed technology insertions will drive space allowances and necessitates adaptive/multipurpose facility designs**
- **Unprecedented connectivity required in facilities not previously considered**
- **Accelerated pace of change requires a faster construction execution window**
- **Fiscal reality causing need to reduce repetitive modification as Transformation occurs**
- **Current acquisition and contracting practices unable to meet pace and demand**
- **Change in facility duty cycle renders habitually used materials and methods less economical**

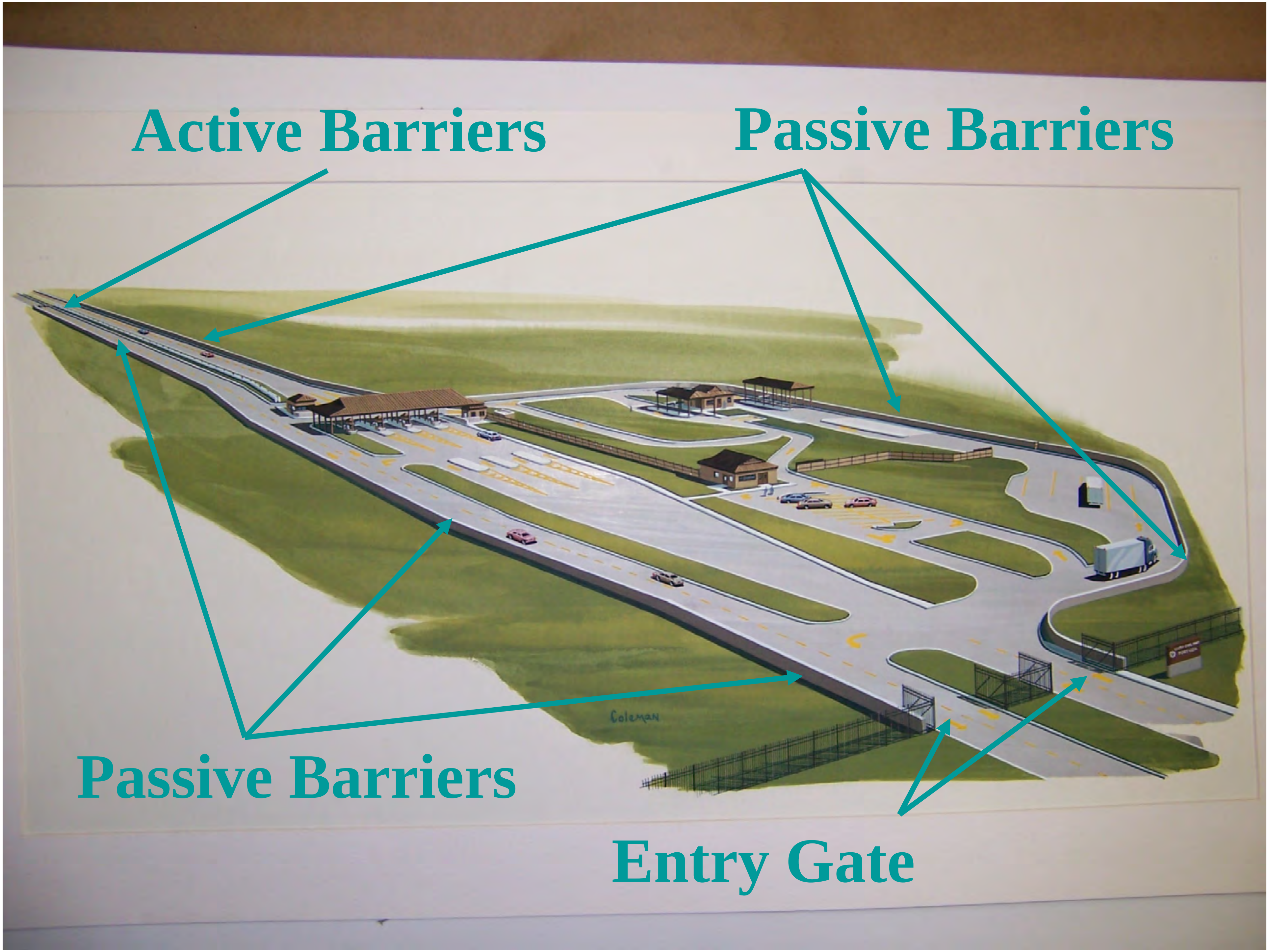
Track 10

- Force Protection – Army Access Control Points
- John Trout
- Room 222

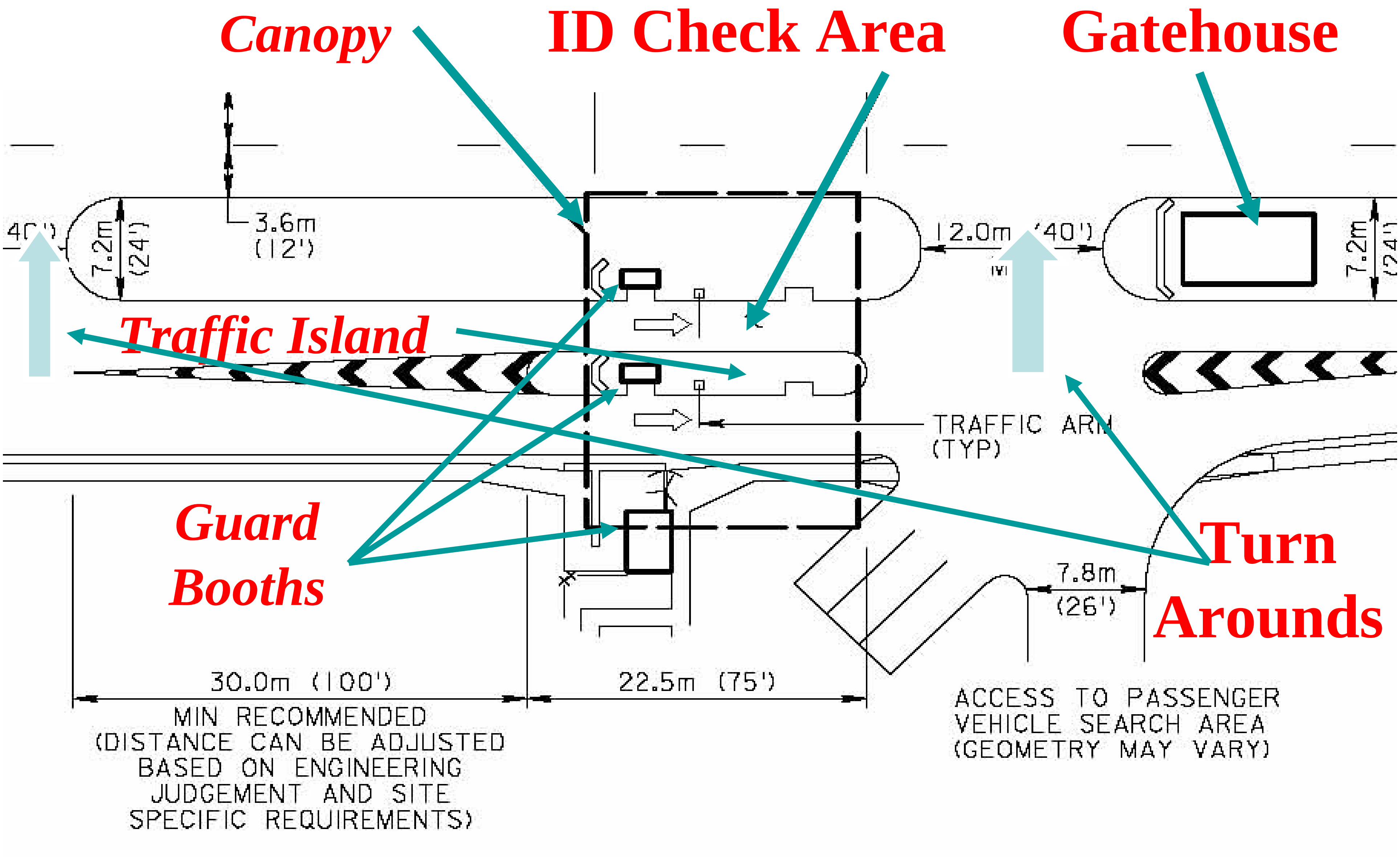
Track 10 Army Access Control Points

Criteria Sources

- Unified Facilities Criteria for ECFs/ACPs
- Army Standard Design for ACPs


Active Barriers
Passive Barriers
Passive Barriers
Entry Gate

Access Control Zone



Performance Standard

- Defeat the prescribed vehicle and pedestrian threats
- Ensure the safety of innocent motorists, pedestrians, and guards

General Design Strategy

- Detect Threat Vehicle
- Deploy Final Barriers
- Delay Threat Vehicle
- Defeat Threat at the Final Barriers

Defeated Bad Guy

Track 11

- Cost Engineering Forum on Government Estimates
- Ray Lynn, Jack Shelton, Joe Bonaparte, Kim Callan, Miguel Jumilla & Ami Ghosh
- Room 227

Track 11

Cost Engineering Forum on Government Estimates vs. Actual Cost

The purpose of a properly developed Programming Estimate is to reflect what the construction “should cost”; a Bid reflects what the construction “will cost.”

Track 11

Room 240

Track 12
E&C Technology Integration

M. K. Miles, PE, PLS
Chief, Construction and Technology Integration
Engineering and Construction
HQUSACE

Status Update: August 2005
Room 228

Integrating People, Processes and Technology through eGIS, SET and TEN

Enterprise GIS

CorpsMap
CADD/GIS Standards
Data Reference Model
Geospatial One Stop

Science and Engineering Technology

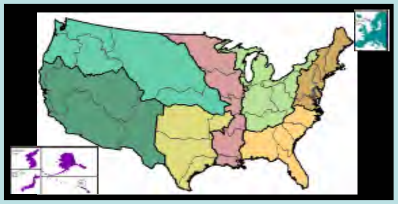
Corps Enterprise Architecture
Common Delivery Framework
SET Software Inventory
Technology Transfer

Technical Excellence Network

Communities of Practice

Body of Knowledge
Subject Matter Experts
Career Development

eGIS



At the Breakout Session you will find out:

- What are ***Enterprise Geographic Information Systems***
- Why we need eGIS
- How we plan to get there
- Update on the Deputy Chief's memo on eGIS & CAD/GIS data standardization & the field's responses
- Action items from the Director of Civil Works' VTC for the MSC Commanders
- Schedule for upcoming free training for CAD & GIS Data Standards

SET

At the Breakout Session you will find out:

- What is the ***Science and Engineering Technology (SET) Initiative***
- Results of the latest software usage survey
- Latest Information on Enterprise Licenses for CAD & GIS Software
- National Management Board (NMB) decision on Virtual Design Software
- Use of Building Information Models (BIM) in the Corps of Engineers

TEN

At the Breakout Session you will find out:

- What is the ***Technical Excellence Network (TEN)***
- Status of TEN today
- Some capabilities of TEN to locate information about E&C CoPs
- Next steps for TEN development
- Progress of some of the E&C CoPs

http://ten.usace.army.mil

Integrating People, Processes and Technology through eGIS, SET and TEN

Enterprise GIS

CorpsMap
CADD/GIS Standards
Data Reference Model
Geospatial One Stop

Science and Engineering Technology

Corps Enterprise Architecture
Common Delivery Framework
SET Software Inventory
Technology Transfer

Technical Excellence Network

Communities of Practice

Body of Knowledge
Subject Matter Experts
Career Development

Track 13 Sustainable Design

Tri-Service Infrastructure Systems Conference & Exhibition

Harry Goradia

HQ U.S. Army Corps of Engineers

202-761-4736

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Annette Stumpf

U.S. Army Corps of Engineers,

Engineer Research & Development Center

Construction Engineering Research Laboratory

Phone: 217-373-4492

Email: annette.l.stumpf@erdc.usace.army.mil

Overview

- **May 2001, started rating all MCA projects with SPiRiT (Sustainable Project Rating Tool).**
- **SPiRiT is based U.S. Green Building Council's (USGBC) LEED (Leadership in Energy and Environmental Design) 2.0**
- **SPiRiT Gold is target for all MCA and AFH projects FY06 and beyond.**
- **Soon we will be transitioning from SPiRiT to LEED to rate our facilities.**
- **The Army/USACE is a member of USGBC.**

Policy

Foundation

- **EO 13123**, Greening The Government Through Efficient Energy Management, June, 1999.
- **EO 13101**, Greening The Government Through Waste Prevention, Recycling, And Federal Acquisition, September, 1998.
- **EO 12873**, Federal Acquisition, Recycling, And Waste Prevention, October, 1993.

Current

- **ETL 1110-3-491**, Engineering and Design, Sustainable Design for Military Facilities, 1 May 2001.
- **DASA (I&E) Memo**, Sustainable Design and Redevelopment Requirements, 18 March 2003.
- **ECB 2003-20**, Engineering and Design, Sustainable Project Rating Tool (SPiRiT), 24 November 2003.

SPiRiT Rating

- **Points: 100 Possible.**
- **Score at least the following number to obtain the indicated rating:**
  - **75-100: Platinum**
  - **50-74: Gold**
  - **35-49: Silver**
  - **25-34: Bronze**
- **Beginning in FY06 Gold is minimum expected score.**

SPiRiT/LEED Goal Setting and Self Rating

- Project teams self rate projects using SPiRiT/LEED at 4 stages:
  - Planning Charrette* (identify SPiRiT/LEED goals/$$)
  - Parametric Design*
  - End of Design*
  - End of Construction*

- All stakeholders should concur on the ratings
- PDTs should submit score sheets to HQ w/ planning & design charrette results
- Cost template helpful for justifying project funding
- Keep copy of rating /design analysis in project file
- CG has asked to include SDD rating in Command Mgmt Review (CMR)
- Consolidated Command Guidance (CCG) is being updated, Districts will be required to report SPiRiT/LEED levels for each project
- Put SPiRiT/LEED Level and comments in P2.

*need member with SDD experience!

Track 14

- ACASS/CCASS/CPARS
- Ed Marceau & Marilyn Nedell
- Room 224

Architect-Engineer Contract Administration Support System (ACASS)

Modernization Coming October 1!

Construction Contractor Appraisal Support System (CCASS)

Ed Marceau
Modernization Project Manager
Naval Sea Logistics Center Portsmouth, NH
603-431-9460 x463
Edmond.Marceau@navy.mil

Overview

- Evaluation of Architect-Engineer and Construction Contractors
  - Why it’s important
- A new, automated process of completing the evaluation forms
  - Discussion of process workflow and system features

Overview (cont.)

- Suggestions for making the process work
- What’s changing
  - Manual vs. automated
- Training opportunities and available help
- Status of project

Track 15

- Whole Building Design Guide
- Earle kennett
- Room 229

WBDG
WHOLE BUILDING DESIGN GUIDE


Federal Bldg. Oakland, CA


U.S. Courthouse Las Vegas, NV


Bldg. 33 Washington Navy Yard

Track 15
Room 229
Earle Kennett

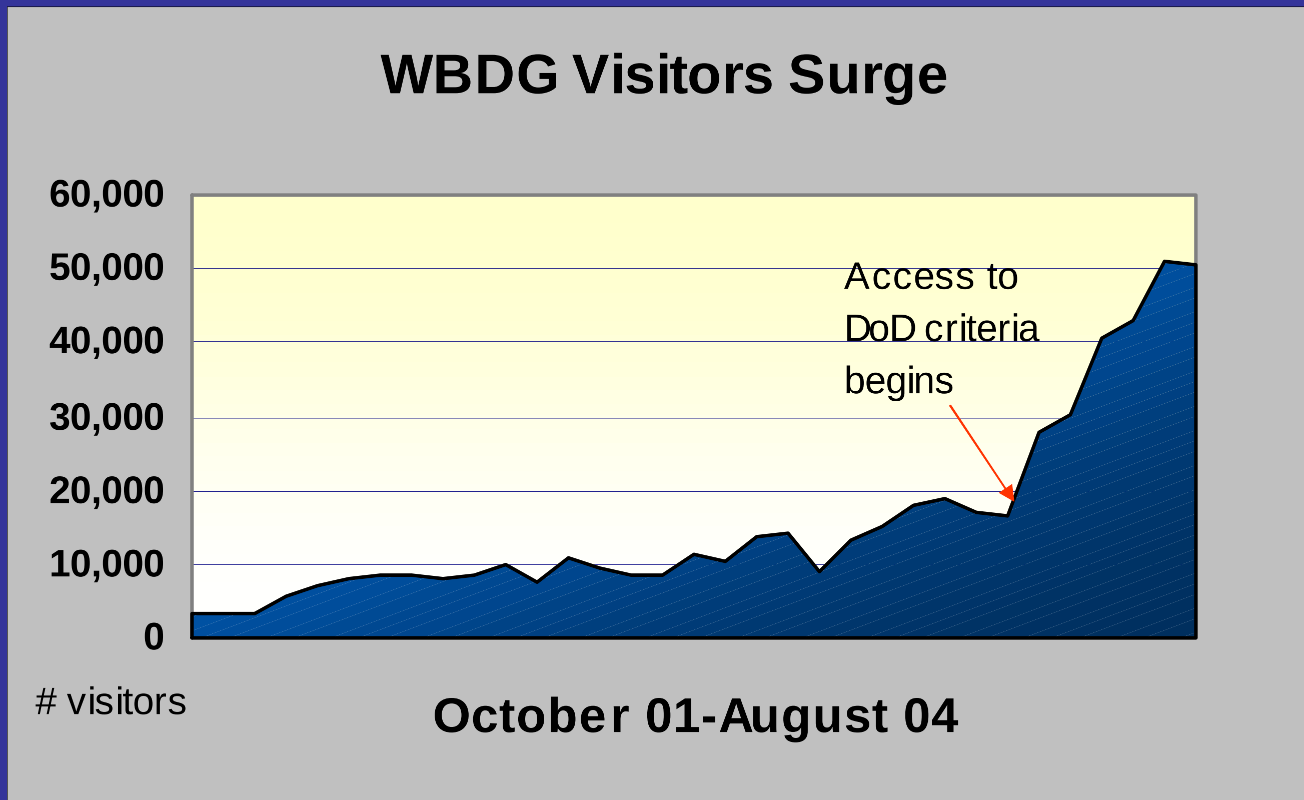
WHOLE BUILDING DESIGN GUIDE

WBDG Objectives

- ***Effective implementation of unified facilities criteria*** allowing for the sharing and consolidation of criteria, procedures and dissemination

- ***Partnering and integration*** of public and private sector efforts through the appropriate integration of the best federal/private sector criteria

- ***Centralized Knowledge Portal*** providing single point access to criteria

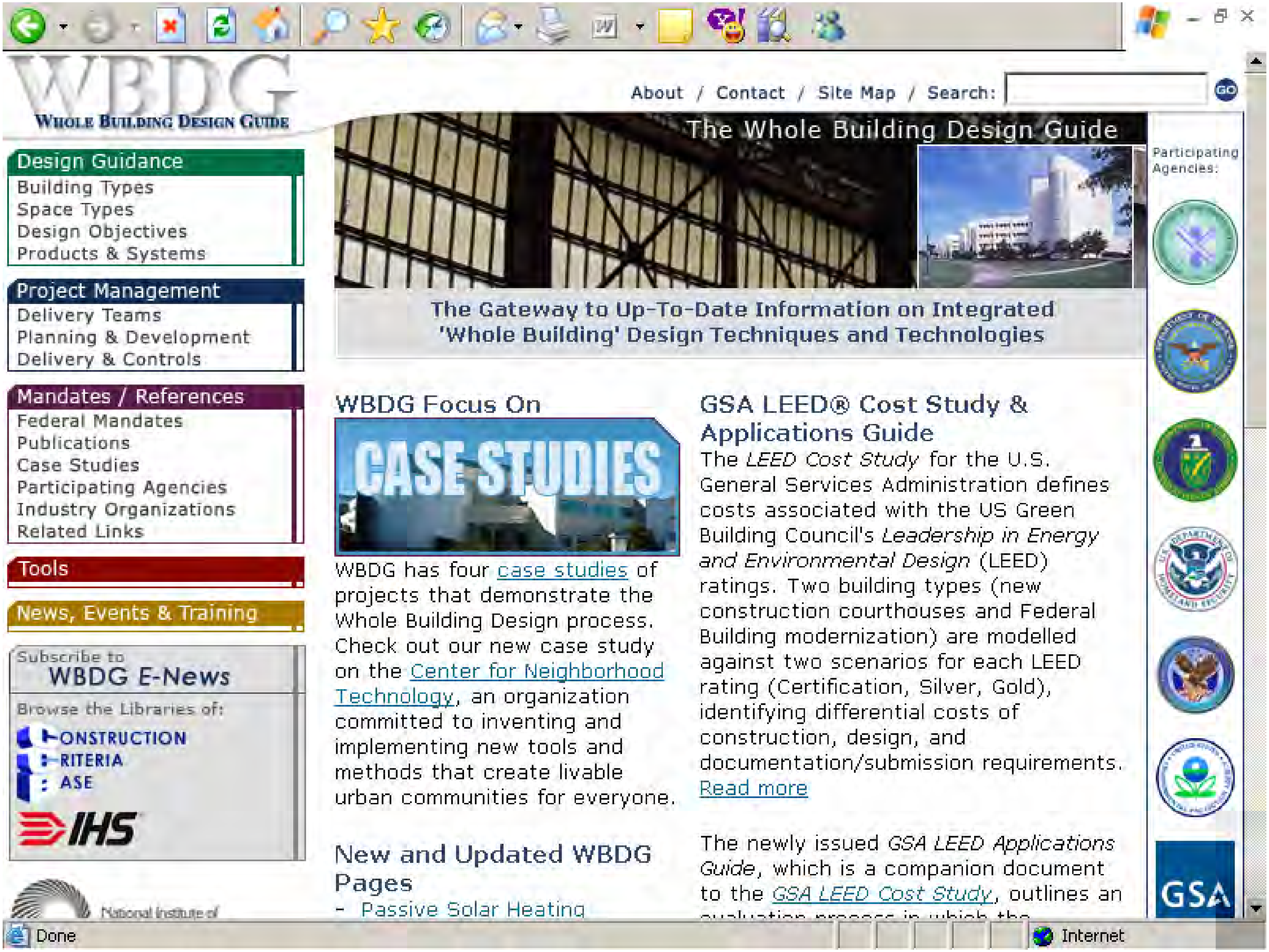


Since DoD designated WBDG as the sole portal for its design & construction criteria, visitors have increased over 200% in just six months!

WBDG provides a viable platform for ***Product Guide***

WBDG/CCB Federal Agency Participation

- Department of Defense
- Naval Facilities Engineering Command
- Army Corps of Engineers
- U.S. Air Force, AFCESA
- General Services Administration
- Department of Veterans Affairs
- National Aeronautics and Space Administration
- Federal Emergency Management Agency
- National Institute of Standards and Technology
- Department of Energy
- Department of State
- National Institutes of Health
- U.S. Access Board
- Department of Interior
- Environmental Protection Agency


WBDG
Whole Building Design Guide
About / Contact / Site Map / Search:
The Whole Building Design Guide
Participating Agencies:
Design Guidance
Building Types
Space Types
Design Objectives
Products & Systems
Project Management
Delivery Teams
Planning & Development
Delivery & Controls
Mandates / References
Federal Mandates
Publications
Case Studies
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CRITERIA
BASE
IHS
National Institute of
The Gateway to Up-To-Date Information on Integrated 'Whole Building' Design Techniques and Technologies
WBDG Focus On
CASE STUDIES
WBDG has four case studies of projects that demonstrate the Whole Building Design process. Check out our new case study on the Center for Neighborhood Technology, an organization committed to inventing and implementing new tools and methods that create livable urban communities for everyone.
New and Updated WBDG Pages
- Passive Solar Heating
GSA LEED® Cost Study & Applications Guide
The LEED Cost Study for the U.S. General Services Administration defines costs associated with the US Green Building Council's Leadership in Energy and Environmental Design (LEED) ratings. Two building types (new construction courthouses and Federal Building modernization) are modelled against two scenarios for each LEED rating (Certification, Silver, Gold), identifying differential costs of construction, design, and documentation/submission requirements.
Read more
The newly issued GSA LEED Applications Guide, which is a companion document to the GSA LEED Cost Study, outlines an
GSA
Done
Internet

2005 Tri-Service Infrastructure Systems Conference & Exhibition Re-Energizing Engineering Excellence

Wednesday & Thursday

Concurrent Sessions

Sessions Start at 0800

Tri-Service
Infrastructure Systems
Ice Breaker

- 1730-1900 Hours
- Located in Exhibit Hall
- Free Finger Food
- Free Soft Drinks
- Tickets for Alcoholic Beverages

Multi-Disciplinary Concurrent Sessions

- 1. Acquisition Strategies for Civil Works – Room 230
- 2. Risk & Reliability Engineering – Room 231
- 3. Portfolio Risk Assessment – Room 232
- 4. Hydrology, Hydraulics & Coastal Engineering – Room 240
- 5. Civil Works R&D Forum – Room 241
- 6. Civil Works Security Engineering – Room 242
- 7. Building Information Model Applications – Room 226
- 8. Design Build for Military Projects – Room 220
- 9. Army Transformation/Global Posture Initiative/Force Modernization – Room 221
- 10. Force Protection – Army Access Control Points – Room 222
- 11. Cost Engineering Forum on Government Estimates – Room 227
- 12. Engineering & Construction Information Technology – Room 228
- 13. Sustainable Design – Room 223
- 14. ACASS/CCASS/CPARS – Room 224
- 15. Whole Building Design Guide – Room 229

2005 Tri-Service Infrastructure Conference

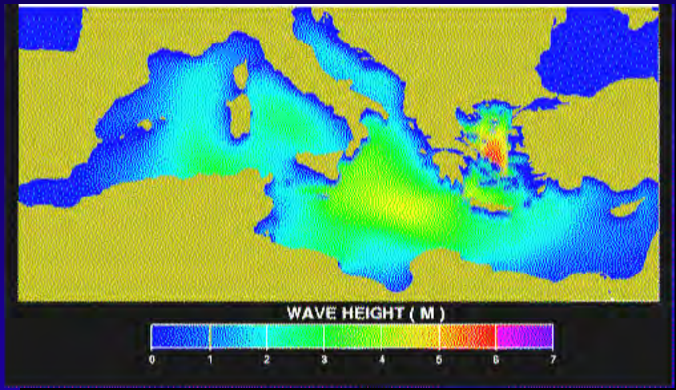
St. Louis, MO

Dr. Michael J. O'Connor

Director, Research & Development

Water Resources

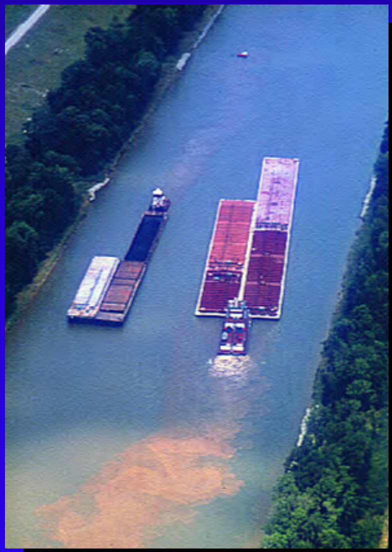
Physical Models



Numerical Models

Navigation

Coastal Engineering

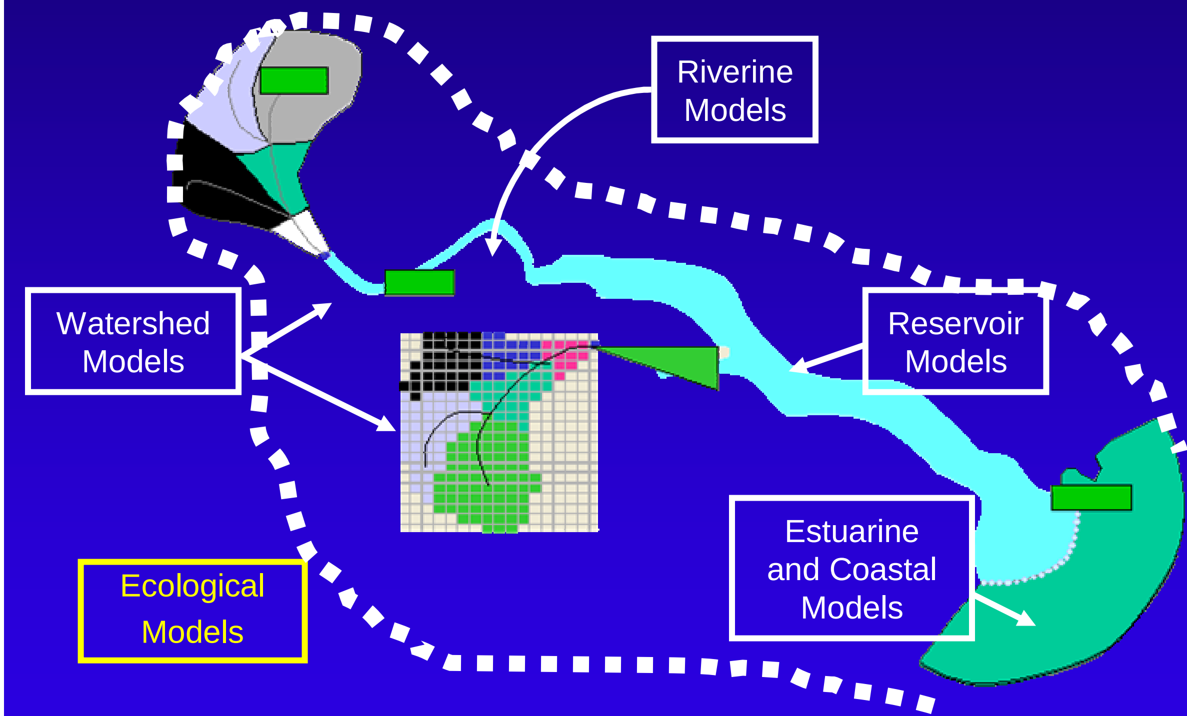


Flood Control

US Army Corps
of Engineers®

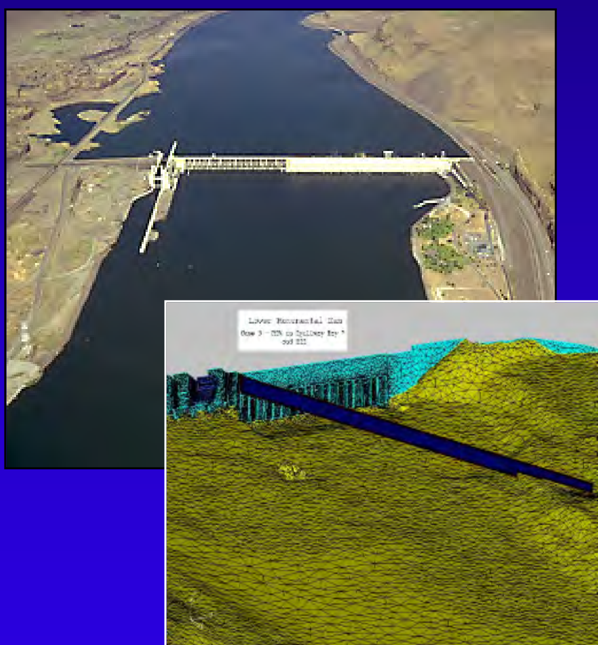
System-Wide Water Resources Management

- Suite of Tools for Regional/Basin Water Resources Management
- Collaboration with Stakeholders and Partners

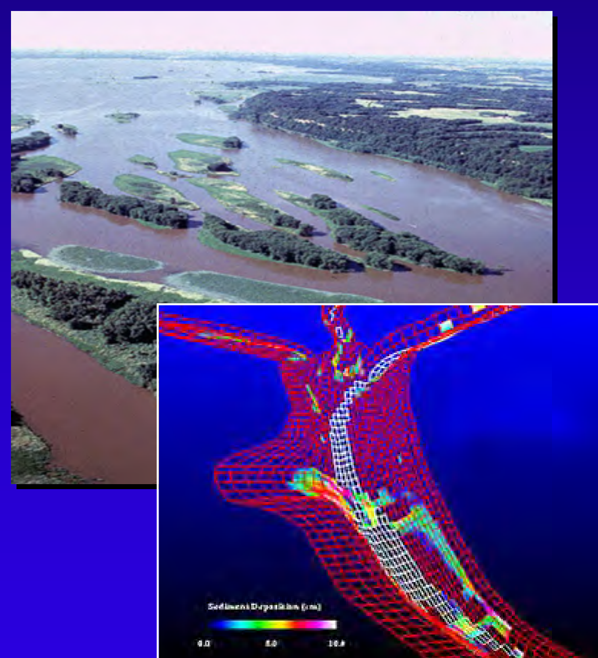


System-Wide Water Resources Management

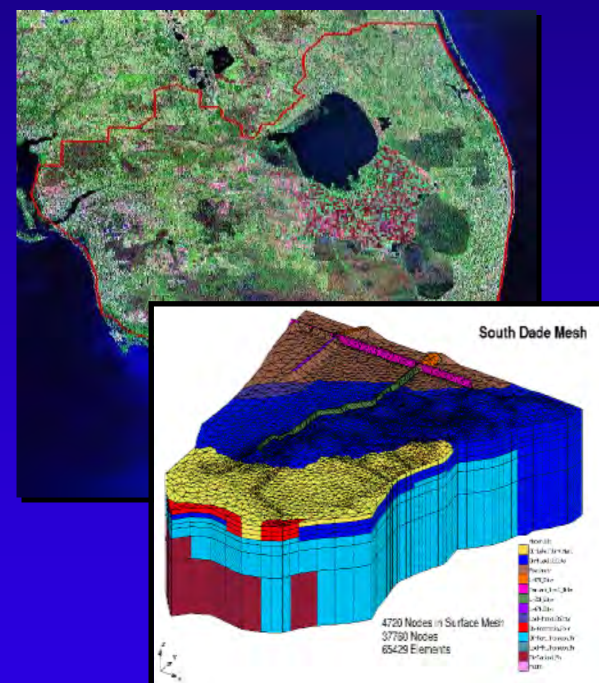
- Spiral Product Development and Annual Fielding
- Demonstration of Capabilities for Key Water Resources Projects



Columbia River



Upper Mississippi River



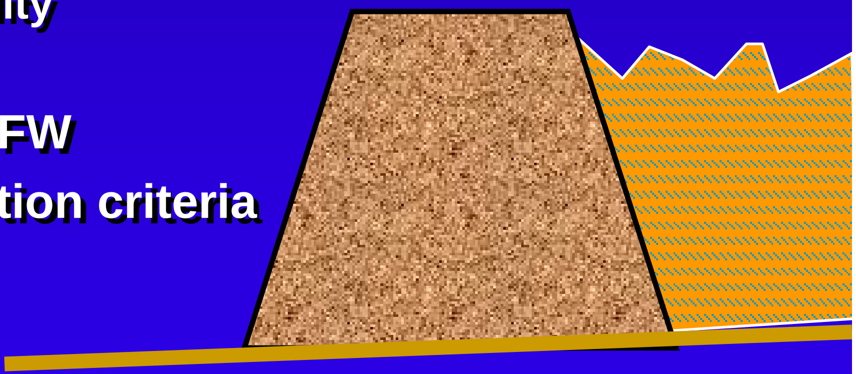
Everglades

System-Wide Water Resources Management

Problem: USACE requires tools and techniques to assess project alternatives and forecast project effects on regional and basin scales

Flood Fighting Structures Demonstration Program

- **Funding: $5 Million (Flood Control & Coastal Emergencies (FCCE))**
- **Concurrent with Lab Tests, 4 Systems to be Constructed**
  - **Sand bag levee**
  - **RDFW (mandated by Congress)**
  - **2 other vendor products**
  - **100’ river face with up to 50’ tie back to higher ground**
  - **Exact location and timing dependent upon river stages**
- **Monitor, Evaluate, and Document**
  - **Operational criteria (resources, construction time, repair, dismantling, reusability)**
  - **Performance – flows, levels, seepage, stability**
  - **Public posting of results**
- **Field PDT including POC referenced by RDFW concur with site, test plan, and vendor selection criteria**
- **Completion: 2007**



Lab and Field Tests of 3 Vendor Levee Raising Products + Sand Bags

Flood Fighting Structures Demonstration PILOT Program - Preliminary Findings

Pre-position material at up to 3 demonstration sites in different regions with different flood conditions, with products from 3 vendors, in cooperation with levee and drainage districts/ municipalities/ local governments, and with ERDC Guidance and Technical Support

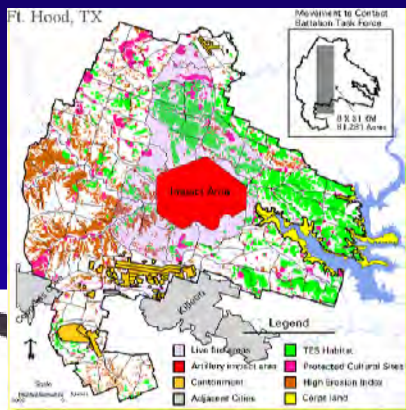
- **Seepage**
  - **Hesco Bastion leaked the most, need to redesign seam between units**
  - **Second highest leakage rate were for the sand bags, primarily at point of structure raising**
  - **Third RDFW**
  - **Least was Portadam after water level raised sufficiently to seal (lab performance unknown)**

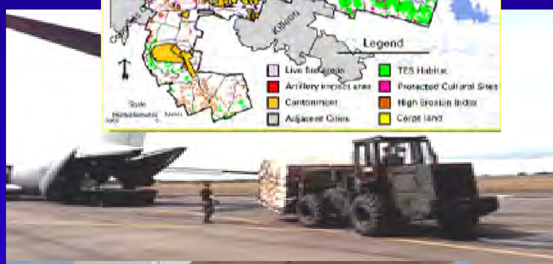
- **All vendor products have survived lab and field testing process (maintained structural integrity but some repairs required)**

- **Lab Tests - Sand bags failed during overtopping test, damaged during wave loading**

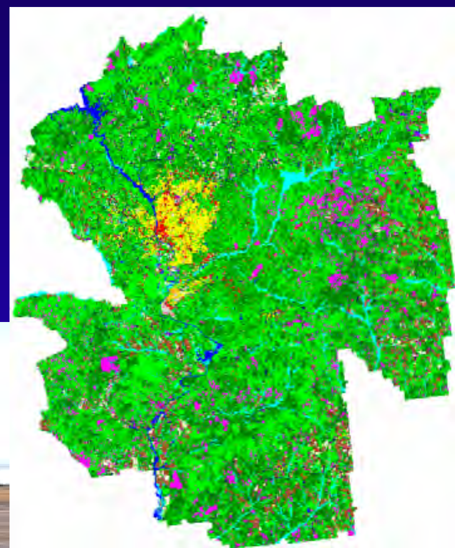
Support to Army Transformation

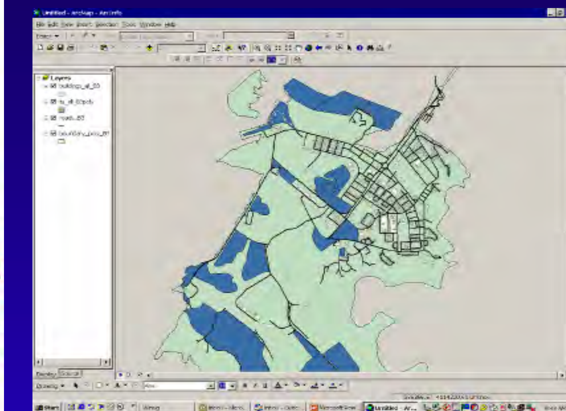
Power Projection





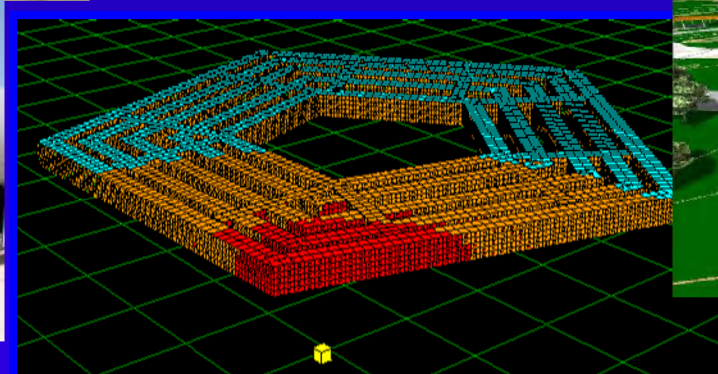
Encroachment Tools





Installation Master Planning

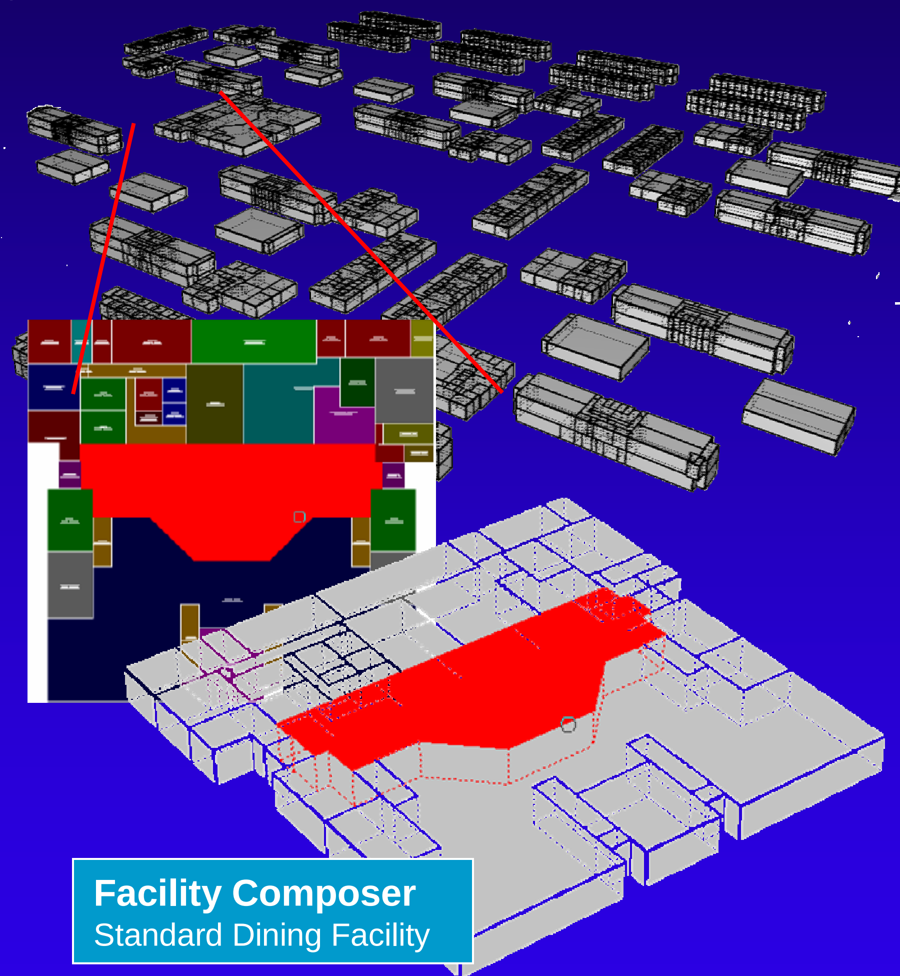
Facility Composer



Force Protection Tools

Facility Composer

- Standard facility libraries with current and complete Army design and construction criteria/requirements
- Rapid generation of parametric construction cost estimates
- Rapidly layout facility functions and cost during planning charrettes
- Ensure DD1391 always starts with current and complete standard Army criteria/requirements
- Manage standard facility criteria and requirements in a computable format for populating industry standard (IFC) object model

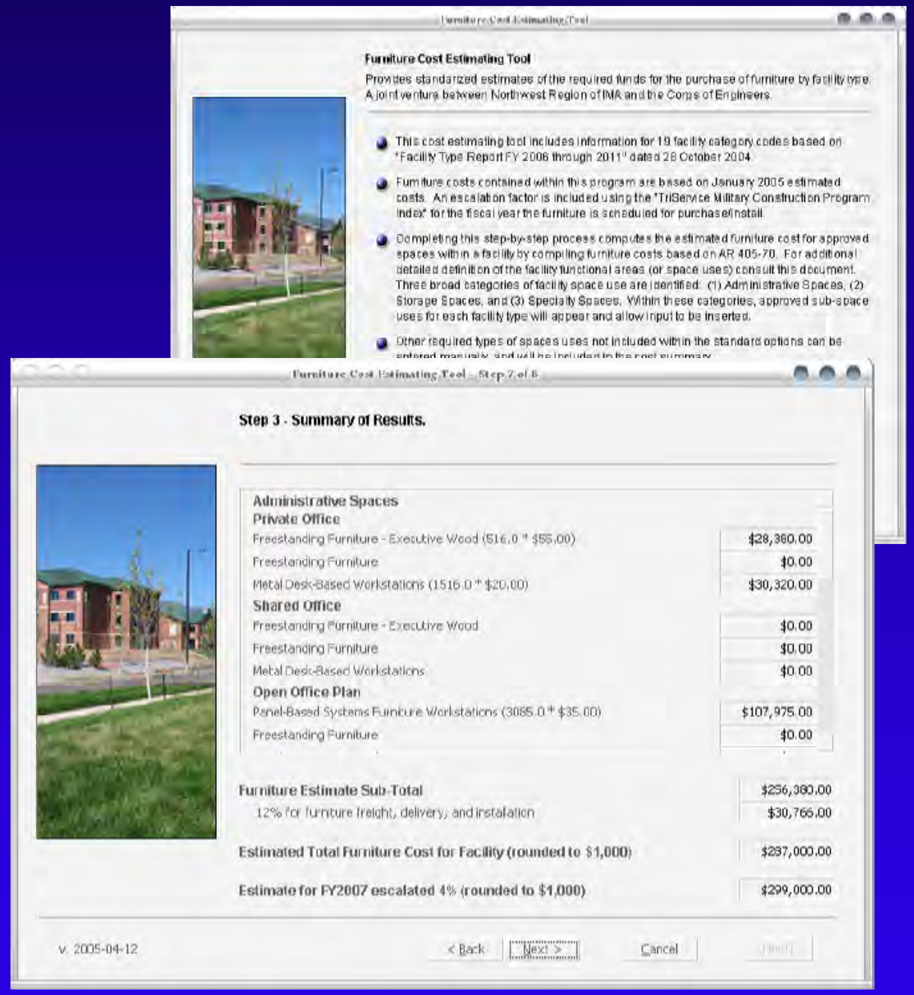


Facility Composer
Standard Dining Facility

ERDC POC: Beth Brucker (217-373-7293) or Susan Nachtigall (217-373-4579)

IMA Furniture Wizard

• Created in response to inconsistent furniture costs included in DD1391's.
•Building Category Codes (facility types) included based on the President's Budget through 2011.
•Furniture costs included were based on information from COE, AF & Navy designers, & Standard Facility Criteria Points of Contact.

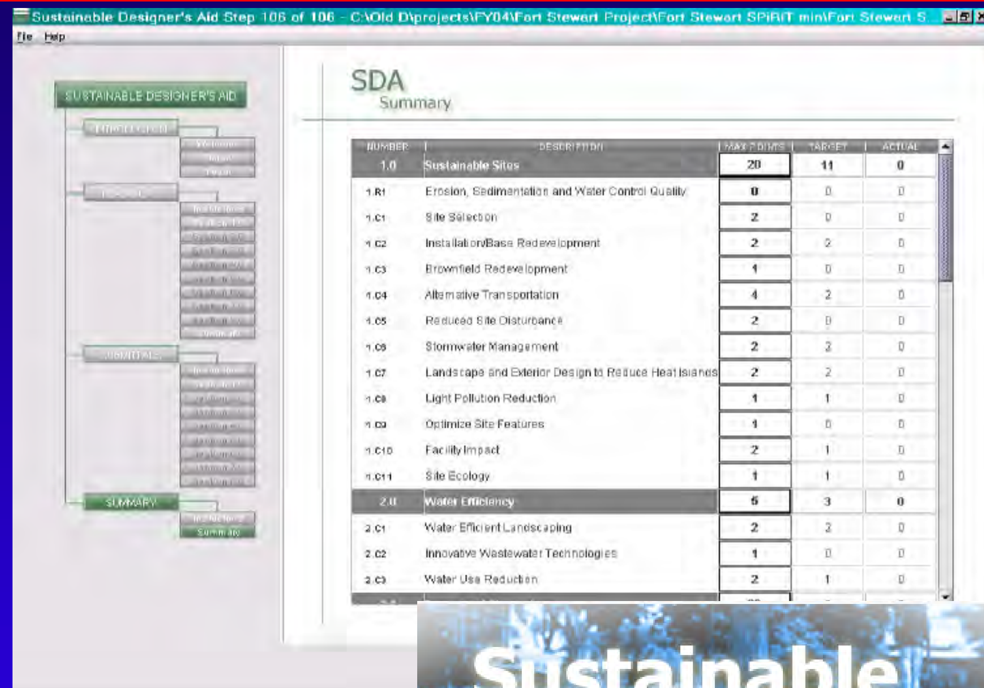


ERDC POC: Beth Brucker (217-373-7293) or Susan Nachtigall (217-373-4579)
LRL POC: Larry Cozine (502-315-6250) or Karen Gallman (502-315-6224)

Sustainability Analysis

Sustainable Designer's Aid

- Process tool helps teams use SPiRiT successfully
- Records SPiRiT goals, strategies and decisions
- Can reuse strategies in subsequent projects
- Generates SPiRiT goal, intermediate and final rating
- Pilot tested at Fort Stewart (UA4) & POD
- Possible DD1391 link
- Available free on the web



•**https://eko.usace.army.mil/fa/sdd/**

•**http://ff.cecer.army.mil/SDA**

ERDC POC: Annette Stumpf 217-373-4492 Annette.L.Stumpf@erdc.usace.army.mil

SPiRiT to LEED Transition

CERL Project Objective: Support ACSIM in transitioning from SPiRiT* to LEED® as the Army's Green Building Rating System.**

Products:

- **Army Implementation Guidance for:**
  - **LEED® NC2.2 (New Construction)**
  - **LEED® H (Homes)**
  - **LEED® EB (Existing Buildings)**
- **SDD Guidance for the transition from SPiRiT to LEED**

*SPiRiT = Sustainable Project Rating Tool
**LEED = Leadership in Energy and Environmental Design (by the USGBC)

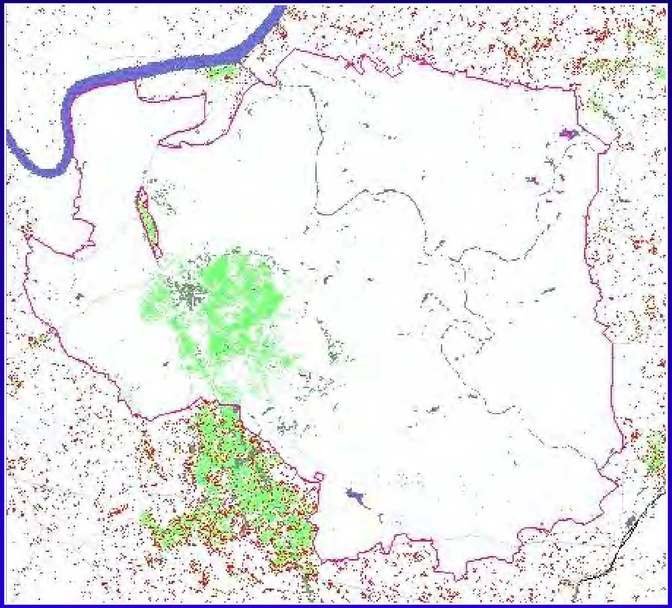
https://eko.usace.army.mil/fa/sdd/

ERDC POC: Richard Schneider 217-373-6724 Richard.L.Schneider@erdc.usace.army.mil

Predicting Encroachment

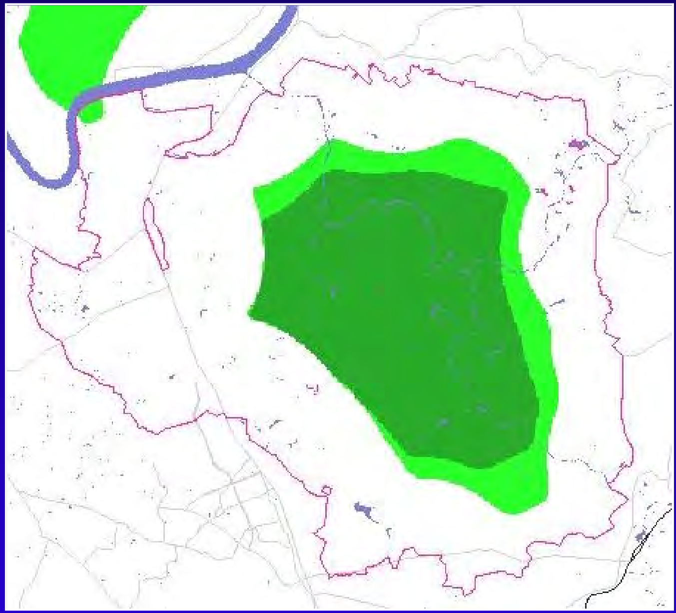
Impact of Today's Planning on Tomorrow's Ranges

Fort Knox



Projected regional urban development

Projected loss of artillery training opportunity



- Regional planning impacts future training opportunities
  - Highways, utilities, zoning, property purchases

- LEAM tools predict …
  - Land development attractiveness
  - Future urban patterns
  - Opportunities to train within those patterns

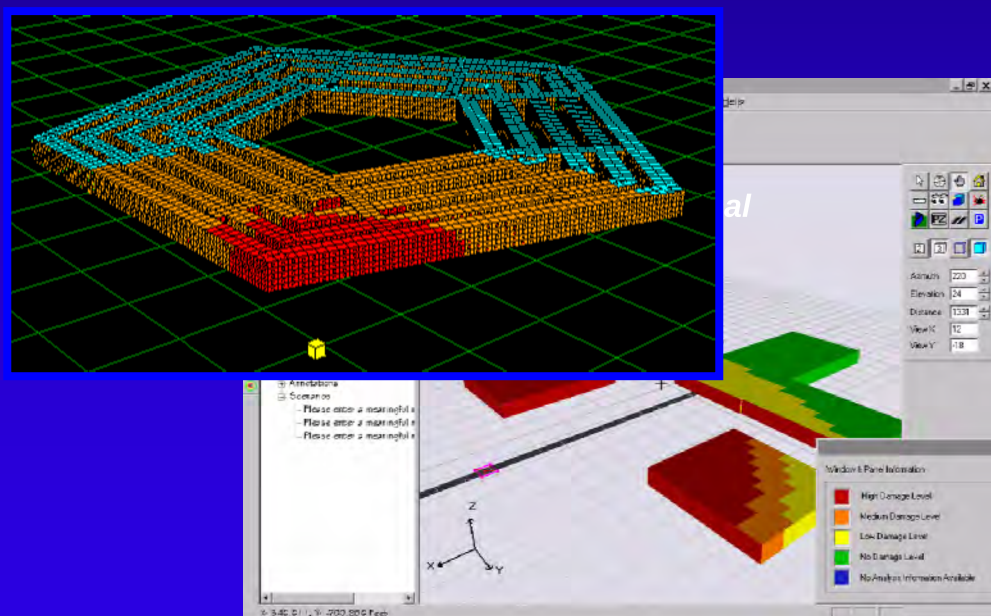
SERM: https://eko.usace.army.mil/fa/serm/

ERDC POC: Dr. Jim Westervelt; 217 373-4530; james.d.westervelt@erdc.usace.army.mil

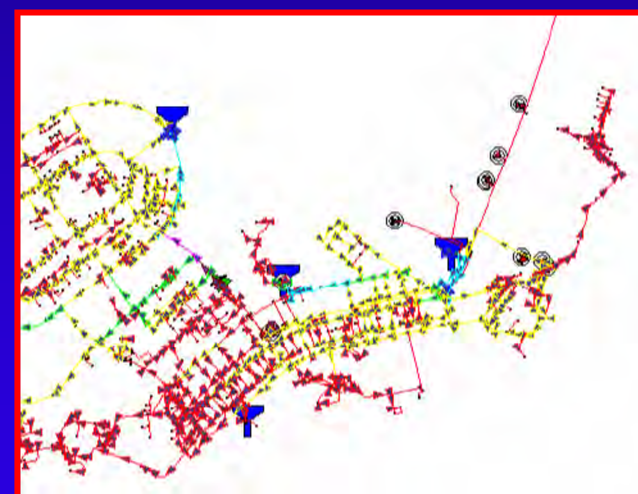
Force Protection Tools

- Determine infrastructure vulnerability to blast or CBR attack
- Assess impact of attack on human life and mission
- Assist in siting of new facilities

Airborne CBR attack



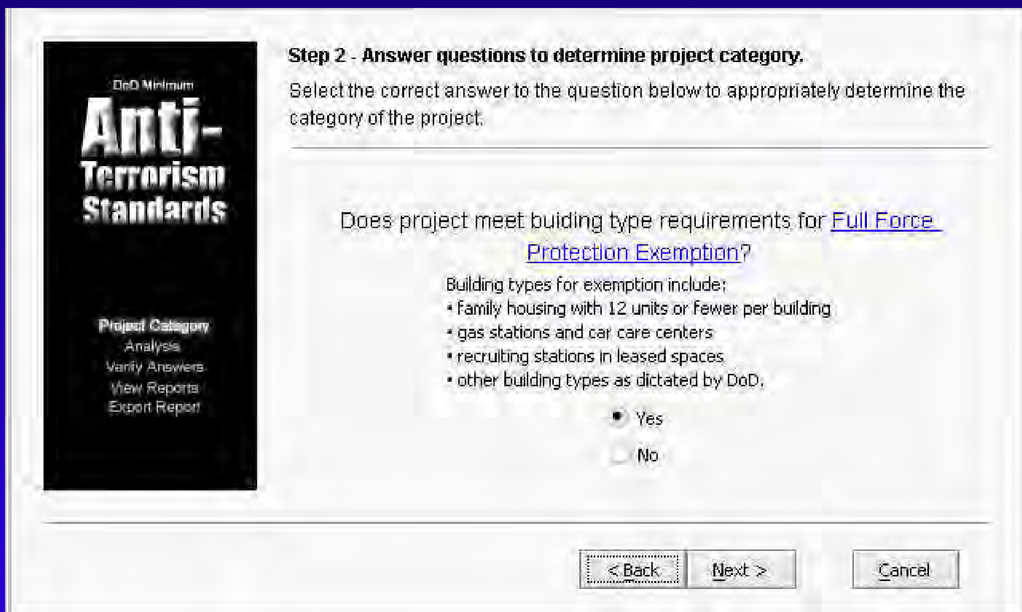
Facilities



Water system CBR attack

Requirement: Meet new security threats

Minimum AT Standards for Buildings Wizard



Aids facility planners and designers to comply with UFC 4-010-01 DoD Minimum AT Standards for Buildings

- **Steps user through yes/no questions**
- **Minimizes need to manually cross-reference UFC document**
- **Identifies site layout requirements**
- **Provides design/ construction requirements and recommendations**

ERDC POC: ERDC CERL Dave Bailey (217-373-6781)

Questions?

Engineering Circular

Engineering Reliability Guidance for Existing USACE Civil Works Infrastructure

David M. Schaaf, P.E.
LRD Regional Technical Specialist, Navigation Engineering
Louisville District

New Engineering Reliability Guidance

General Background

- Updating engineering reliability guidance sorely needed
- Currently, there is no structural reliability guidance since previous documents have been rescinded
- Existing reliability guidance for geotechnical discipline
  - Provides a good overview of geotechnical reliability issues
  - However, utilizes Beta-method not applicable for time dependent problems
  - Time dependent analysis, variable distribution, variable correlation issues
- Existing reliability guidance for mechanical/electrical disciplines
  - Also uses Beta methods which make time dependency an issue
  - Currently calls for establishing failure rates for navigation-related mech/elec components from performance of non-navigation uses
  - ORMSS analysis required very careful interpretation and calibration
- No systematic guidance that addresses development of other critical pieces of analysis such as event trees and integration with economic modeling for the purposes of decision-making

New Engineering Reliability Guidance

General Information

- Lack of Guidance Causes Problems for Districts and Projects
  - Use of Beta methods for time dependent structural problems
  - Some major rehab studies with very limited, inadequate reliability analysis

- HQUSACE Requested Team from ORMSS to Lead an Effort to Develop New Engineering Reliability Guidance to Cover All Existing Civil Works Infrastructure

- Intent is for New EC to Replace All Existing Guidance and Be Used for USACE Studies Requiring Probabilistic Analysis for Investment Decisions

- Major Rehab Guidance will Reference this Document as the Source for Completing Reliability Analyses

New Engineering Reliability Guidance

General Information

- Three Year Plan to Develop Infrastructure Reliability Guidance Engineering Circular (EC)
  - Initial funds received in FY04 to establish team, set general schedule, outline
  - Guidance will cover all major engineering disciplines (structural, geotechnical, mechanical, electrical, as well as basic economic aspects)
  - Integration with economics and plan formulation also included

- Technical Team Led By the Louisville District (Lead District on ORMSS Reliability Analysis Efforts)

- New Guidance Needs to be Incorporated in Major Rehab Evaluation Guidance with Respect to Engineering Requirements as well as Other Uses (Systems Studies, Evaluation of Existing Deteriorated Structures)

New Engineering Reliability Guidance
Historical Perspective

- Prior Year Efforts on Related Issues Led to Development of Rough Outlines and Formulating Budget and Schedule for New Guidance Document
- New Guidance Document Effort was Initiated in FY04 After Majority of FY Funds Loaded (March 2004)
- April 2004 "Kick-Off" Meeting Held in DC Area to Include Field Discipline Personnel as well as Corresponding HQ Discipline Personnel
- Briefed Group on Need for Updated R&R Guidance, Proposed Outline of Main Volume and Technical Appendices
- Outlines for Major Sections by End of FY04 and Start Narratives
- Lesson Learned from April 2004 Meeting – Keep Group Small and Focused
  - ✓ Keep Development Team Small and Focused
  - ✓ Budget Restraints
  - ✓ Reasonable Expectations

New Engineering Reliability Guidance

April 2004 Meeting Taskers

Outlines for Major Sections by End of FY04 and Start Narratives

Need More Emphasis on Non-Navigation Related Mechanical/Electrical and Coastal/Port Structures

Integrate On-Going Dam Safety Initiatives into the Document

Address Other USACE Initiatives Related to this Effort

- Navigation R&D Program
- General Miter Gate Analysis Model Development for Fatigue and Fracture on Parallel Path
- On-Going Economic Modeling Efforts at IWR

New Engineering Reliability Guidance

March 2005 Progress Review Meeting w/ HQ

FY05 Funds Received in February Limiting Much Progress During First ½ of FY

Progress Review Meeting with HQ in March 2005

Refined Outline as Per April 2004 Meeting Used as Guide

Major Portions of Following Main Volume Completed:

- Chapter 1 – Introduction and Background
- Chapter 3 – Engineering Reliability Guidelines
- Chapter 5 – Engineering and Economic Integration

Refocus Document to be More Business Line/Project Oriented

- Previous version from FY04 was separated by discipline

New Engineering Reliability Guidance

Major Changes Out of March 2005 Meeting

- Personnel at Meeting Approved Idea with Following Taskers from that Meeting
  - Create New Technical Appendices on Project/Business Line Basis
  - Determine Appropriate POC's to Lead These Appendices
  - Revise Main Volume Outline to Pull in General Discussions Regarding Reliability Analysis for Select Disciplines
- New Technical Appendices and Technical Leads
  - Navigation Appendix (David Schaaf, Louisville)
  - Flood Protection Appendix (Robert Patev, New England)
  - Hydropower Appendix – (Steve Loney, HDC Portland)
  - Coastal and Port Structures – (Dr. Jeff Melby, ERDC-WES)
- Technical Appendices to Contain Practical Examples/Case Studies
- Refine Main Volume Sections to Includes General Discipline Guidance
- Current Schedule Calls for Document Ready for Field Use by 30 Sep 06 Pending Available Funding

New Engineering Reliability Guidance

Current Status of Document

Outline for Main Volume

1. Introduction & Background (purpose, history, on-going initiatives)
2. Engineering Reliability Guidelines (load cases, criteria analysis)
3. Methodologies for Reliability Analysis (available methods, model set-up)
4. Expert Elicitation Methodology (general overview, when to use)
5. Systems Reliability Applications (component redundancy, parallel, series)
6. Engineering & Economic Integration (event trees, base condition)
7. Risk & Reliability for USACE Studies (major rehab, systems studies)
8. Integration with USACE Dam Safety Program (portfolio risk analysis)
9. Risk and Reliability Issues for Navigation Locks & Dams
10. Risk and Reliability Issues for Flood Control Projects
11. Risk and Reliability Issues for Hydropower Projects
12. Risk and Reliability Issues for Coastal/Port Structures
13. Guidelines for Report Writing
14. References

New Engineering Reliability Guidance

Current Status of Document

Outline for Navigation Lock and Dam Appendix

1. **Land Lock Wall Stability Reliability Analysis Example (ORMSS)**
2. **Approach Wall Stability Reliability Analysis Example (ORMSS)**
3. **Simplified Hydraulic Steel Structure Reliability Example (GLSLS)**
4. **HF Miter Gate Reliability Analysis Example (Markland Major Rehab)**
5. **Mass Concrete Deterioration Reliability Example (Chickamauga)**
6. **Concrete Stilling Basin Scour Example (J.T. Myers Major Rehab)**
7. **Miter Gate Machinery Reliability Analysis Example (ORMSS)**
8. **Lock Electrical Systems Reliability Analysis Example (ORMSS)**

Appendix Examples Have Complete Process of Model Development Including:

Selection of Modeling Features (Random Variables, Constants, Etc…)
Development of Applicable Limit State
Reliability Model Output and Interpretation
Development of Consequence Event Tree
Economic Analysis
Summary of Results

New Engineering Reliability Guidance

Current Status of Document

Outline for Flood Control Appendix

1. **Embankments and Levee Examples**
    a. **Hodges Village Dam Major Rehab Study**
    b. **Wolf Creek Dam Major Rehab Study**
2. **Outlet Works for Flood Control Projects**
    a. **Corrosion/Fatigue of Gates**
    b. **Performance of Conduits**
3. **Concrete Structures for Flood Control Projects**
    a. **Erosion of Spillways**
    b. **Alkali Aggregate Reaction**
4. **M/E Equipment for Flood Control Projects**
    a. **Reliability Block Diagrams (Wolf Creek)**
    b. **Fault Tree Analysis (Wolf Creek)**

US Army Corps of Engineers®

Tri-Service Infrastructure Conference

"Re-Energizing Engineering Excellence"

2 August 2005

LTG Carl A. Strock
Commanding General
U.S. Army Corps of Engineers

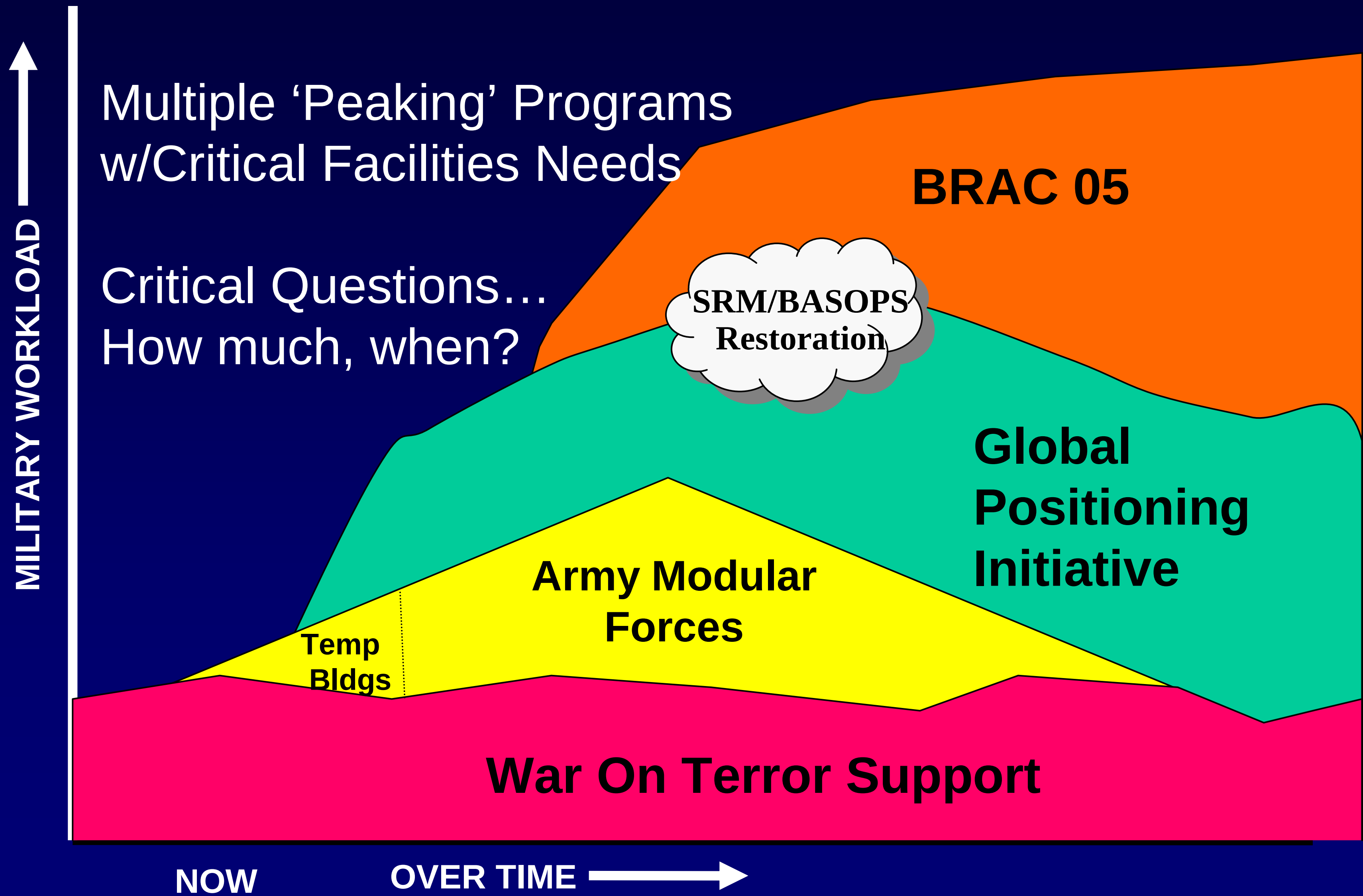
Agenda

- Engineering Excellence – Our Foundation
- Military Programs – Opportunities
- Joint Initiatives
- Military Construction Transformation
- On the Horizon

Engineering Excellence
Our Foundation

- *Engineering and Construction Management Capabilities*
- *People – Our Primary Investment*
- *COPs – They Must Succeed*
- *Balancing Execution to Maintain Capabilities - In House vs. Contracted*

Military Programs – Opportunities



Joint Basing

- *Tremendous Opportunity for DoD*
- *How Will it Work? - In Progress*
- *USACE Will be Part of the Solution*

Joint Engineering Initiatives

- ***Unified Design Criteria***
- ***Multi Agency CADD / GIS Standards***
- ***Sustainable Design***
- ***Civil Works Applications***
  - ***Total Watershed Planning to include;*** *Federal, Tribal, State and Local Agencies and the Private Sector*

Military Construction Transformation

- ***Planning / Programming***
- ***Standards & Criteria***
- ***Acquisition / Execution***

On the Horizon

- Focus on Regional Business Center
- Increased Joint, Interagency and Private Sector Cooperation
- Leverage R&D Capabilities
- More Emphasis on Leader Development

US Army Corps
of Engineers®

Tri-Service Infrastructure Conference

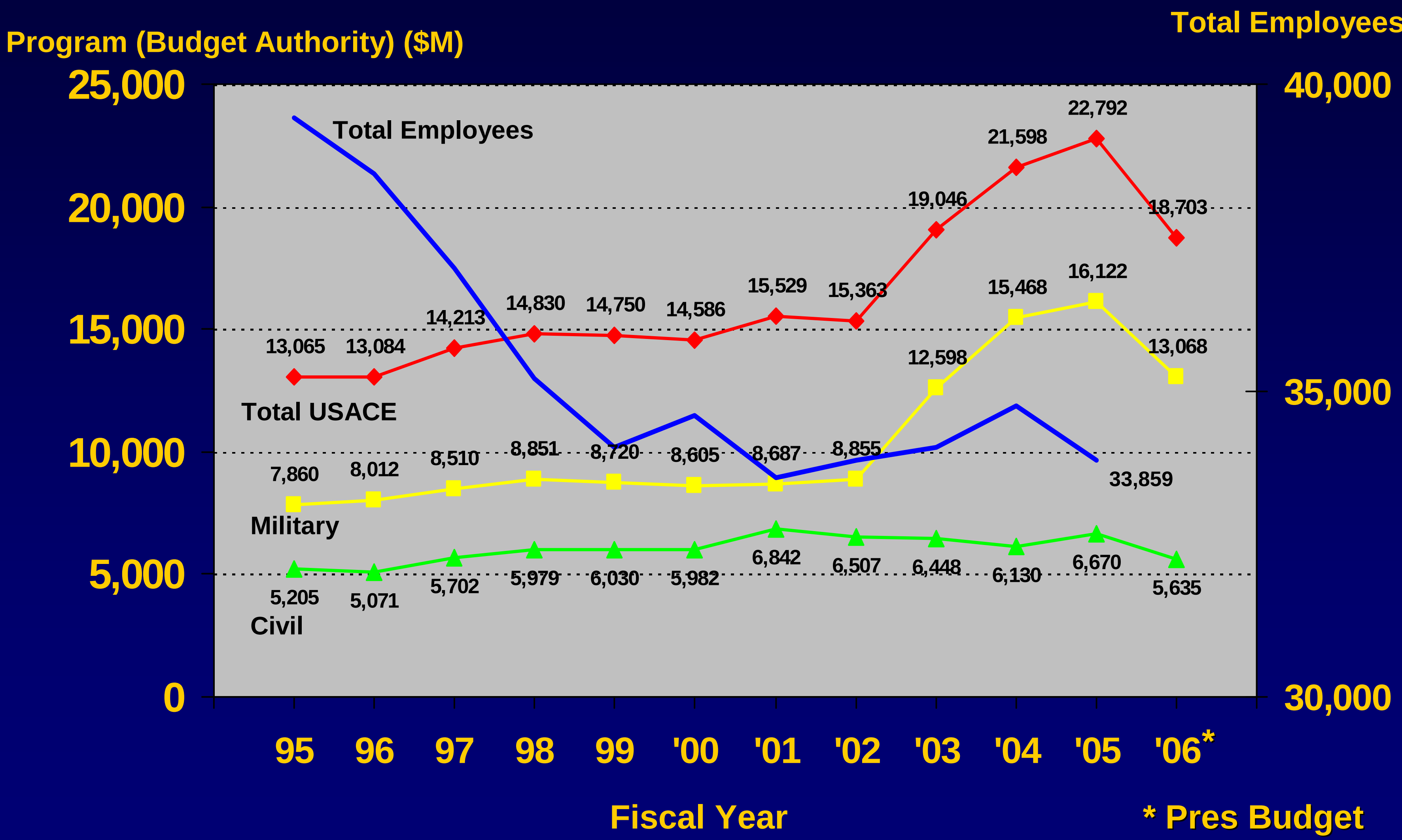
"Re-Energizing Engineering Excellence"

2 August 2005

LTG Carl A. Strock
Commanding General
U.S. Army Corps of Engineers

Backup slides

USACE Program Trends FY95 - 06



BRAC 2005

- **MILCON**
  - **Planning Charrettes & Master Planning**
  - **Design & Construction**
- **Real Estate**
  - **Agent for Army**
  - **Screening, Evaluations, Disposal**
- **Environmental**
  - **Environmental Survey / Assessment Of Property**
  - **Cleanup**

Civil Works – Update

- *Civil Works Strategic Plan*
- *Water Resources Development Act*
- *Performance Based Budgeting*

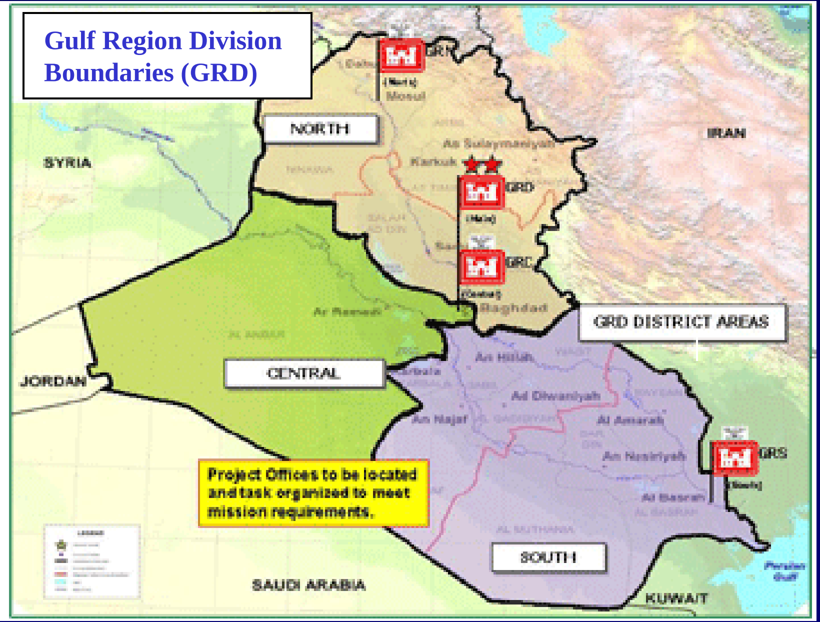
GRD / AED Program

- Support to U.S. Forces
- Support to the Iraqi / Afghan Government
- Support to USAID

114 Military
509 Civilian
222 Iraqis
+ Contractors

25 Military
100 Civilian
+ Contractors

Total = $6.7B



Total = $880M

BRAC 2005
USACE Support To Army

- MILCON
  - Planning Charrettes & Master Planning
  - Design & Construction
- Real Estate
  - Agent for Army
  - Screening, Evaluations, Disposal
- Environmental
  - Environmental Survey / Assessment Of Property
  - Cleanup

FY05 DoD Supplemental
($1.34 B)

- Iraq
  - $537 M (MILCON)
  - $354 M (CERP) GRD may execute some portion
- Afghanistan
  - $69.5 M (MILCON)
  - $285 M (ANA Infrastructure)
- Kuwait - $50.75 M (MILCON)
- UAE - $1.4 M (MILCON)
- Uzbekistan - $42.5 M (MILCON)

MILCON Transformation

MILCON Barracks (1+1) → **Private Industry Apart. (-20%)**

$168/SF, Scope: 99,500 SF
(OSD Unit Cost)

Commercial vs. "Bunker" Standards

Tactical Maint Facilities → **Hvy Equip Maint Fac (-10%)**

$159-170/SF, Scope: 25-30kSF
(OSD Unit Cost)

Projected cost savings 10-20%
Projected time savings 20-30%

→

Approx. $1.5 B
(over 5 yrs)

Water Resources Development Acts
~~’02~~ ~~’03~~ ~~’04~~ ‘05

- **WRDA 2005 introduced in Senate (S. 728)**
  - **Workable “process improvements” (AKA Corps Reform)**
  - **Louisiana Coastal Area Ecosystem Restoration**
  - **Navigation improvements and ecosystem restoration for Upper Mississippi River-Illinois Waterway**
- **House version pending**

Civil Works Continuing Contracts

- **High priority project funding trend**
- **Expect no change to contracts clause**
- **A contracting tool – used sparingly**
- **Requires HQ USACE approval**
- **Discussions ongoing**

Competitive Sourcing Program
(“A-76 Public-Private Competition”)

Overall program: 7,500 positions though FY08

- **Three competitions well underway:**
  - **Corps-wide IM/IT function – 1,300 positions**
  - **DPW at two locations – 44 positions**
  - **Finance Center Data Entry function one location– 80 positions**

$450 M Annually

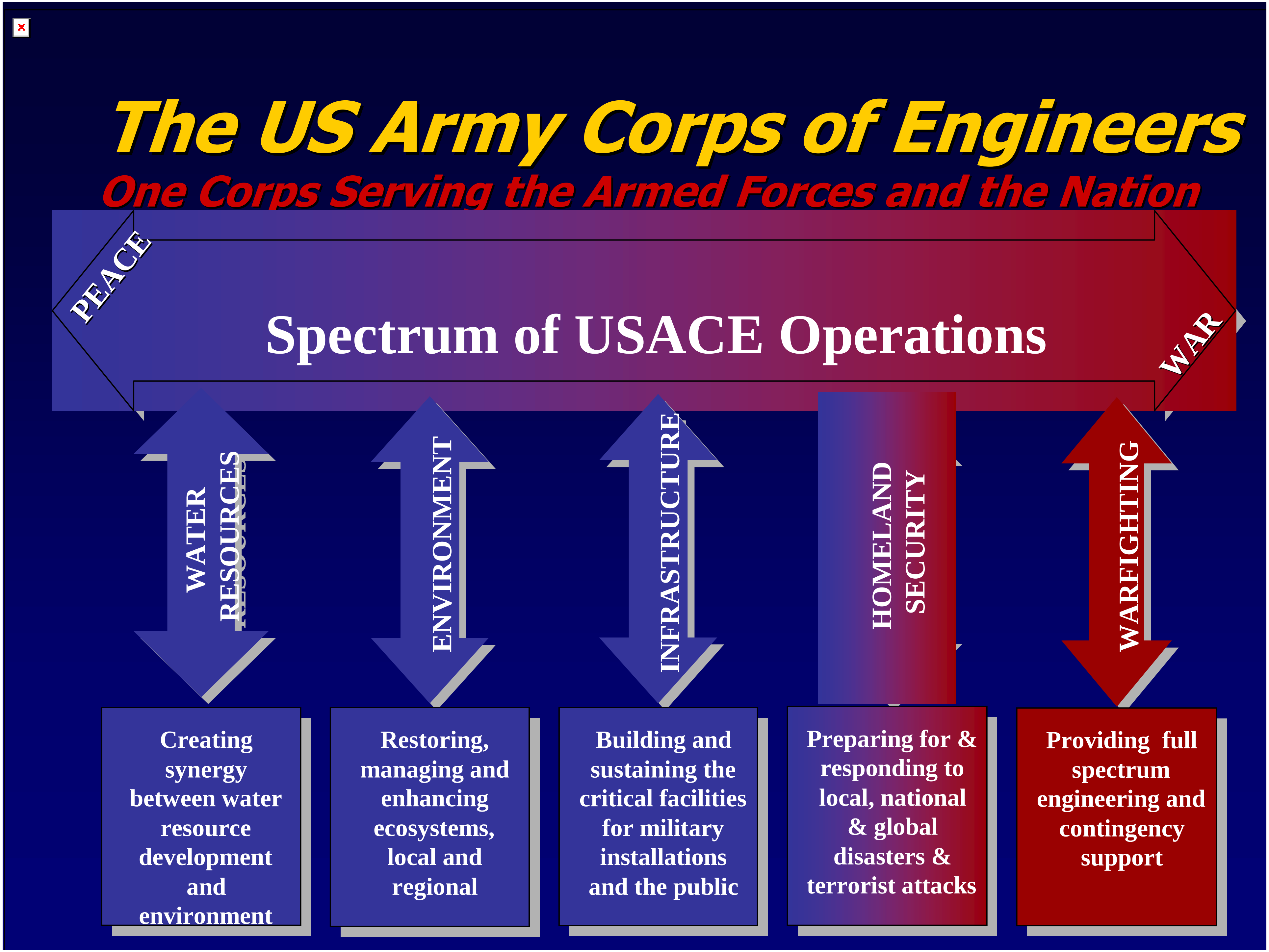
US Army Corps of Engineers®

Joint Engineer Senior NCO Symposium

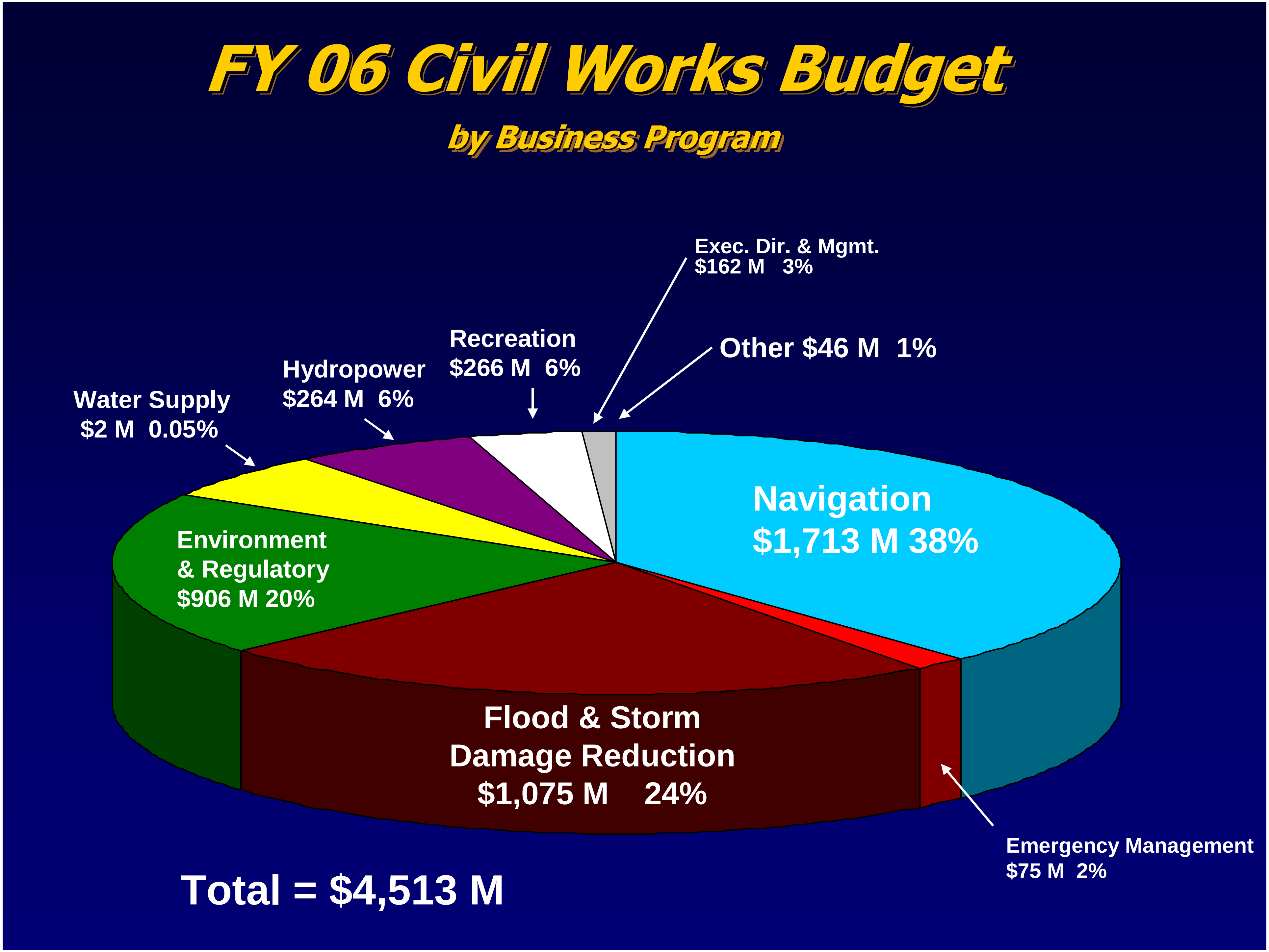
June 14-17, 2005

LTG Carl Strock, P.E.
Commanding General
U.S. Army Corps of Engineers


Support to the Army and Nation
Civil Works Value to the Nation
Recreation areas
376 M Visitors/yr
Generate $15 B in
economic activity,
500,000 jobs
¼ of Nation's
Hydropower:
$500 M + in
power sales
11,000 miles of
Commercial Inland
Waterways:
½ the cost of rail
1/10 the cost of
trucks
299 Deep Draft
Harbors
400 miles of
Shore protection
Destination for
75% of U.S.
Vacations
627 Shallow Draft
Harbors
8500 Miles of
Levees
Emergency
Operations
Stewardship of
11.7 Million Acres
Public Lands
Environmental
Restoration
Regulatory
Responsibilities
• US Ports & Waterways convey > 2B Tons Commerce
• Foreign Trade alone creates > $160 B Tax Revenues



The US Army Corps of Engineers
One Corps Serving the Armed Forces and the Nation
PEACE
Spectrum of USACE Operations
WAR
WATER RESOURCES
ENVIRONMENT
INFRASTRUCTURE
HOMELAND SECURITY
WARFIGHTING
Creating synergy between water resource development and environment
Restoring, managing and enhancing ecosystems, local and regional
Building and sustaining the critical facilities for military installations and the public
Preparing for & responding to local, national & global disasters & terrorist attacks
Providing full spectrum engineering and contingency support


FY 06 Civil Works Budget
by Business Program
Exec. Dir. & Mgmt.
$162 M 3%
Recreation
$266 M 6%
Other $46 M 1%
Hydropower
$264 M 6%
Water Supply
$2 M 0.05%
Navigation
$1,713 M 38%
Environment
& Regulatory
$906 M 20%
Flood & Storm
Damage Reduction
$1,075 M 24%
Emergency Management
$75 M 2%
Total = $4,513 M

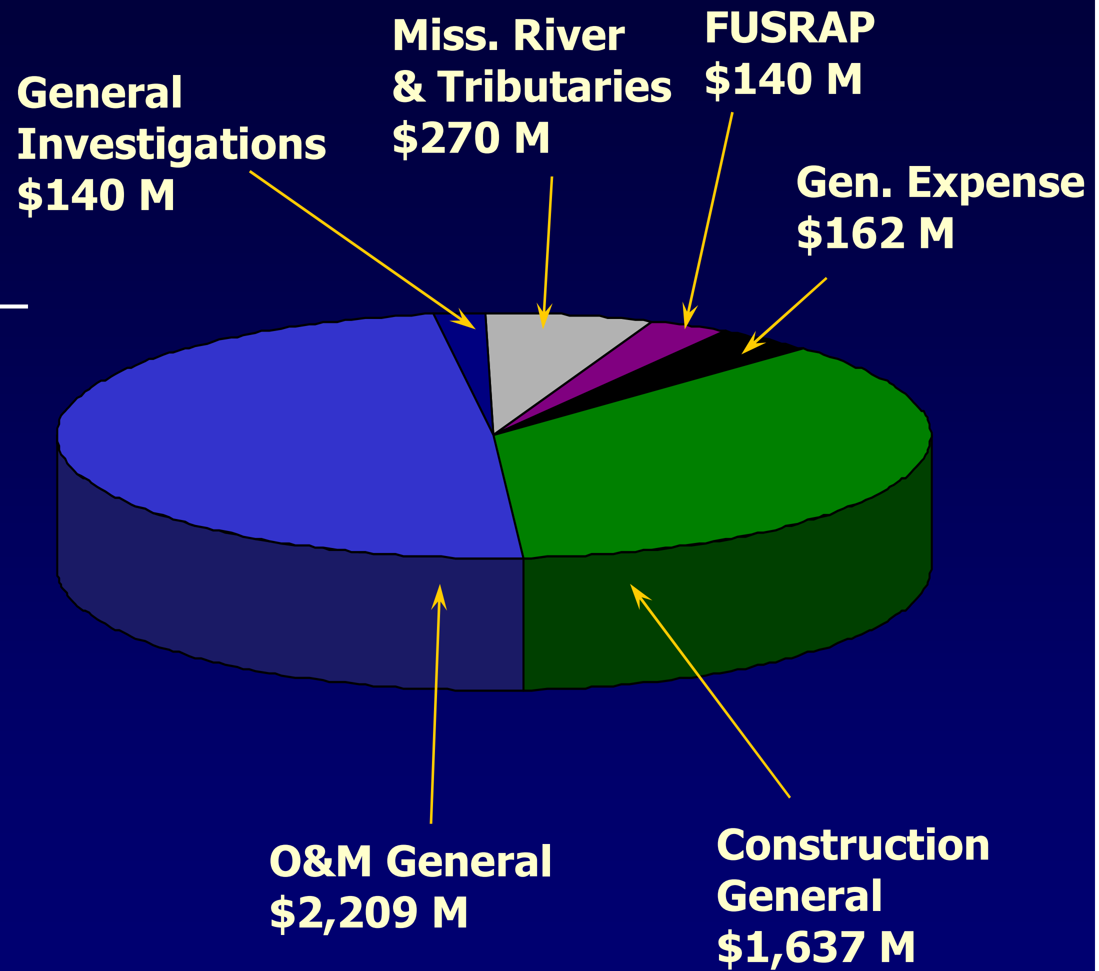
FY06 Civil Works Pres Budget

Trends

- Performance based budgeting – "efficient funding of fewer projects"
- Comprehensive approach (watershed)

Outlook

- Continued "flatline" funding resulting in overall less buying power

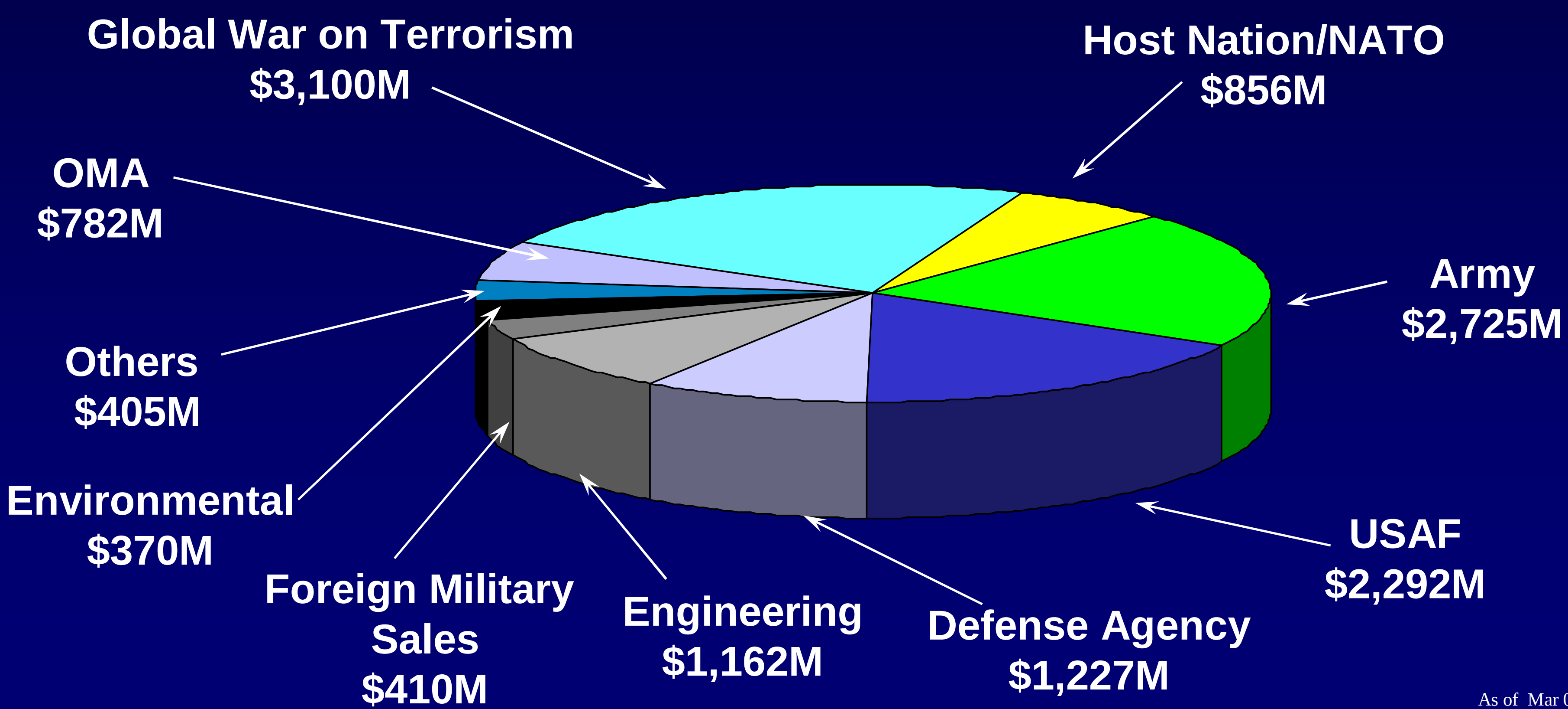


FY06 CW Pres Budget= $4.5 B

FY06 Military Programs Budget

Total = $13.3B

* Note: Environmental does not include Superfund or FUSRAP.



As of Mar 05

FY05 USACE Program
Military Programs

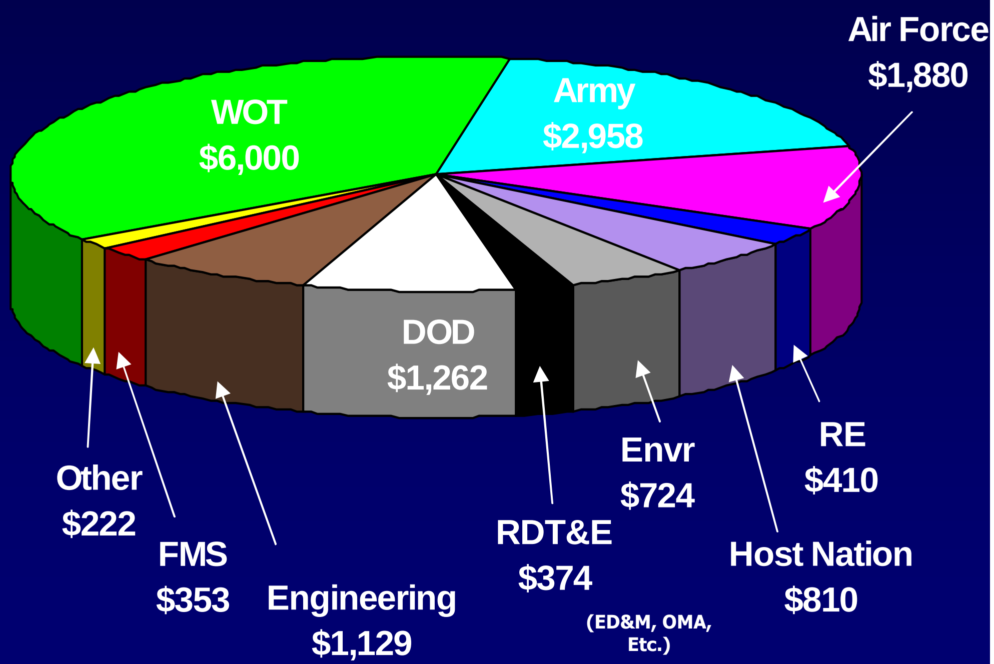
Total $16,122 M

Trends

- Total Military Construction (MILCON) at $3.6B is slight increase from FY04 ($3.5B)
- War On Terror (WOT) at $6.0B is significant increase from FY04 ($4.9B)

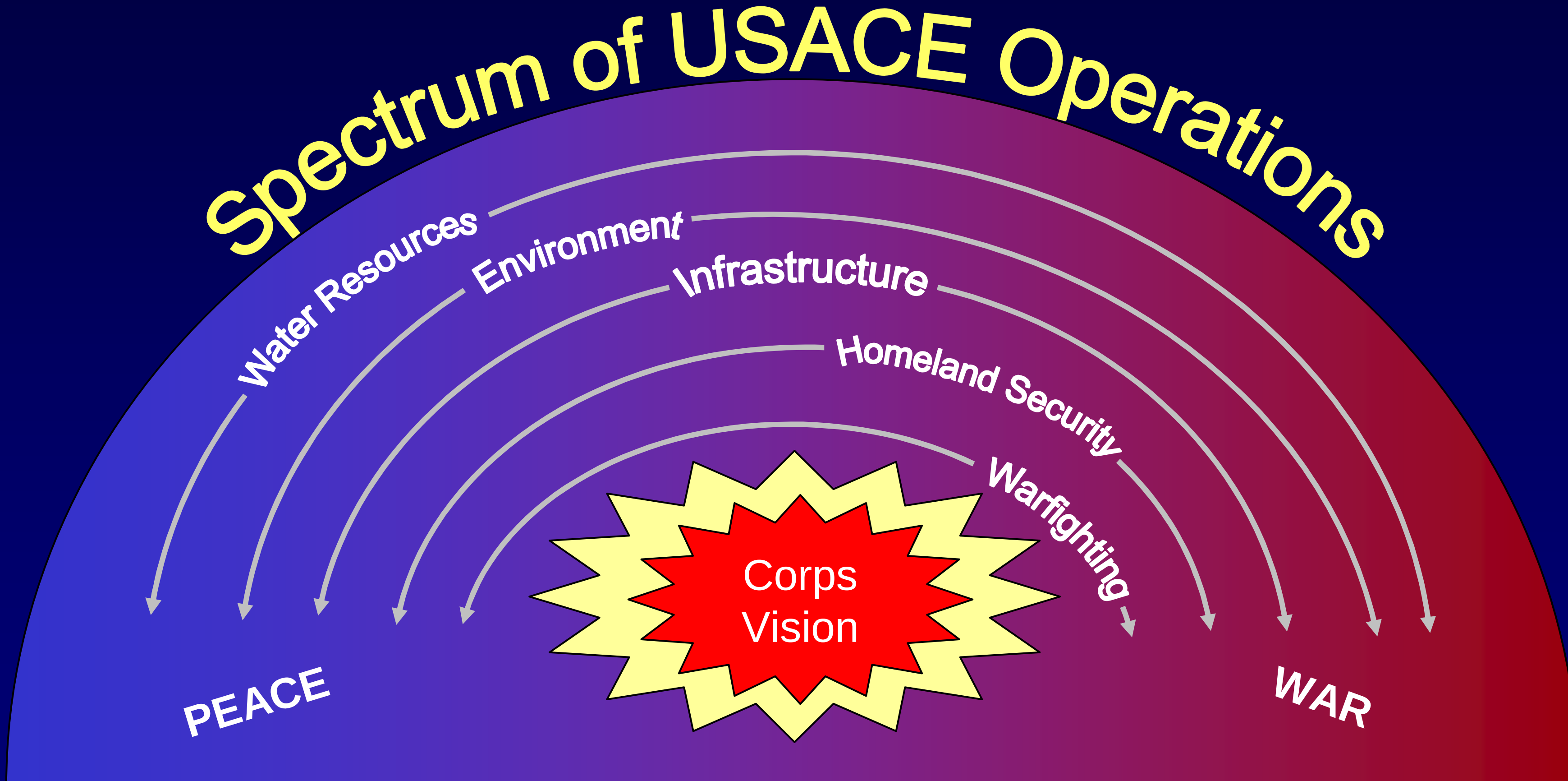
Outlook

- Continued support to BRAC 05 and Global Posturing Initiative (GPI), Army Modular Force
  - Commercial Industry Standards & Criteria (facilities & acquisition)
  - Manufactured buildings (not re-locatable structures)



U.S. Army Corps of Engineers

One Team Serving the Armed Forces and the Nation



US Army Corps
of Engineers

MILCON S&A Account Study

J. Joseph Tyler, PE
Chief, Programs Integration Division
Directorate of Military Programs
HQUSACE

4 Aug 2005

US Army Corps
of Engineers

Purpose

- Update attendees on recent leadership directions concerning management of construction S&A with a focus on MILCON
- Provide a summary of current status
- Describe a way ahead

US Army Corps
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Chief's Direction

- Evaluate and analyze the downward trend of the MILCON S&A Account.
- Evaluate the causes for the account deficit.
- Propose a corrective action plan to restore nominal balance to between $45 – $75M by end of FY 08 and still deliver a quality product to our military customers.
- GRD and AED are **NOT** included in this study or recommendations because they have stand alone S&A accounts.

US Army Corps
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S&A Flat Rate Accounting Concepts

- MILCON S&A Account uses the Civil Works Revolving Fund Structure
  - All projects in same category pay same rate
  - Breakeven accounting (gains offset losses i.e. big jobs pay for little ones).
- MILCON S&A Account fundamental to managing Military Construction Mission.
  - Funding associated with construction
  - Programming of S&A predictable using a flat rate
- Title 31 USC 1534
  - Allows Revolving Fund as accounting expedient to “wash” funds through S&A account provided certain legal conditions are met.

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S&A Flat Rate
Accounting Concepts (con't)

- S&A applies to post award Construction Management.
- P&D covers pre-award and DDC covers post award design.
- S&A Flat rates are standard across USACE (CONUS & OCONUS rates)
- S&A Flat Rates are set for each Appropriation category (MILCON, O&M, DERP)

US Army Corps of Engineers

S&A Flat Rate Accounting Concepts (con't)

- MILCON Flat Rate S&A is intended to recover the cost of service
- Political considerations have out weighed increasing Flat Rate.
- From 1963 to 1996 MILCON S&A rates ranged from a low of 5.0% to a high of 7.5%. Last increase was in 1989. Last decrease was in 1995.
- Current S&A Flat Rates:
  - MILCON: 5.7% CONUS; 6.5% OCONUS
  - O&M: 6.5% CONUS; 8.0% OCONUS
  - DERP: 7.0% CONUS; 7.5% OCONUS

US Army Corps of Engineers

Example of where we spent our S&A?

MILCON	CONST	CONTR	ENGRG	FIELD	OTHER	PPMD
Honolulu	21.1%	0.1%	0.4%	72.7%	0.0%	5.7%
Kansas City	16.2%	0.1%	4.5%	70.8%	0.0%	8.4%
Norfolk	8.9%	1.1%	5.1%	78.1%	1.2%	5.6%
Omaha	18.1%	0.0%	0.3%	75.4%	0.5%	5.7%
Seattle	36.6%	0.0%	4.6%	47.4%	0.2%	11.2%
MILCON Total	20.1%	0.2%	3.1%	68.7%	0.4%	7.5%

- **PM organization charges increased as management placed emphasis on PMBP implementation & as study progressed.**
- **Distribution of costs dependent on organizational structure.**

***Data Source: S&A Pilot Study Report DEC 03 (Data from FY01 & 02)**

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MILCON S&A Account
Nominal Balance

- USACE Policy
  - Draft ER 415-1-16
    - Required working balance: "...working balance of 3 to 4 months operating expense...". (Current HQ working policy is 3-5 months)
    - "The working balance is to cover loss of income during CRA or short-term moratorium, program, regional and seasonal variation, and to assure funds available to cover post construction, closeout and to demobilize on-site construction staff."

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MILCON S&A Account

FY05 Nominal Balance Requirement ($mil)

Probability		(Probability X cost)	Months
100%	Close out fiscally complete projects	$22.1	
100%	Expenses obligated but not expensed	$17.6	
	Minimum Nominal Balance - must fund at all times	**$39.7**	**2.9**
100%	Avg Annual fluctuation -$27M max	$8.9	
5%	120 day continuance of pay after RIF action - $55M	$2.7	
5%	Loss of Military function in a district - $15M	$0.7	
100%	Avg Accounting adjustment - $7.7M max	$1.1	
5%	Construction Moratorium/Pause in Awards -$27M	$1.3	
	subtotal	**$14.7**	
	Total Nominal Balance Requirement	**$54.4**	**4.0**
	Maximum Nominal Balance Requirement	**$69.1**	**5.1**

MILCON S&A Account Status
Where We Are:

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- As of 31 Mar 05 the MILCON S&A Account has $13.9M in reserve.
- Based on the “Working Balance” estimate the required minimum reserve is $40M (Rounded to 3 months, FY05)
- The current deficit is approx. $26M
- To restore the “Working Balance”, S&A income must increase 0.5% or expenses must be decreased 0.5%.

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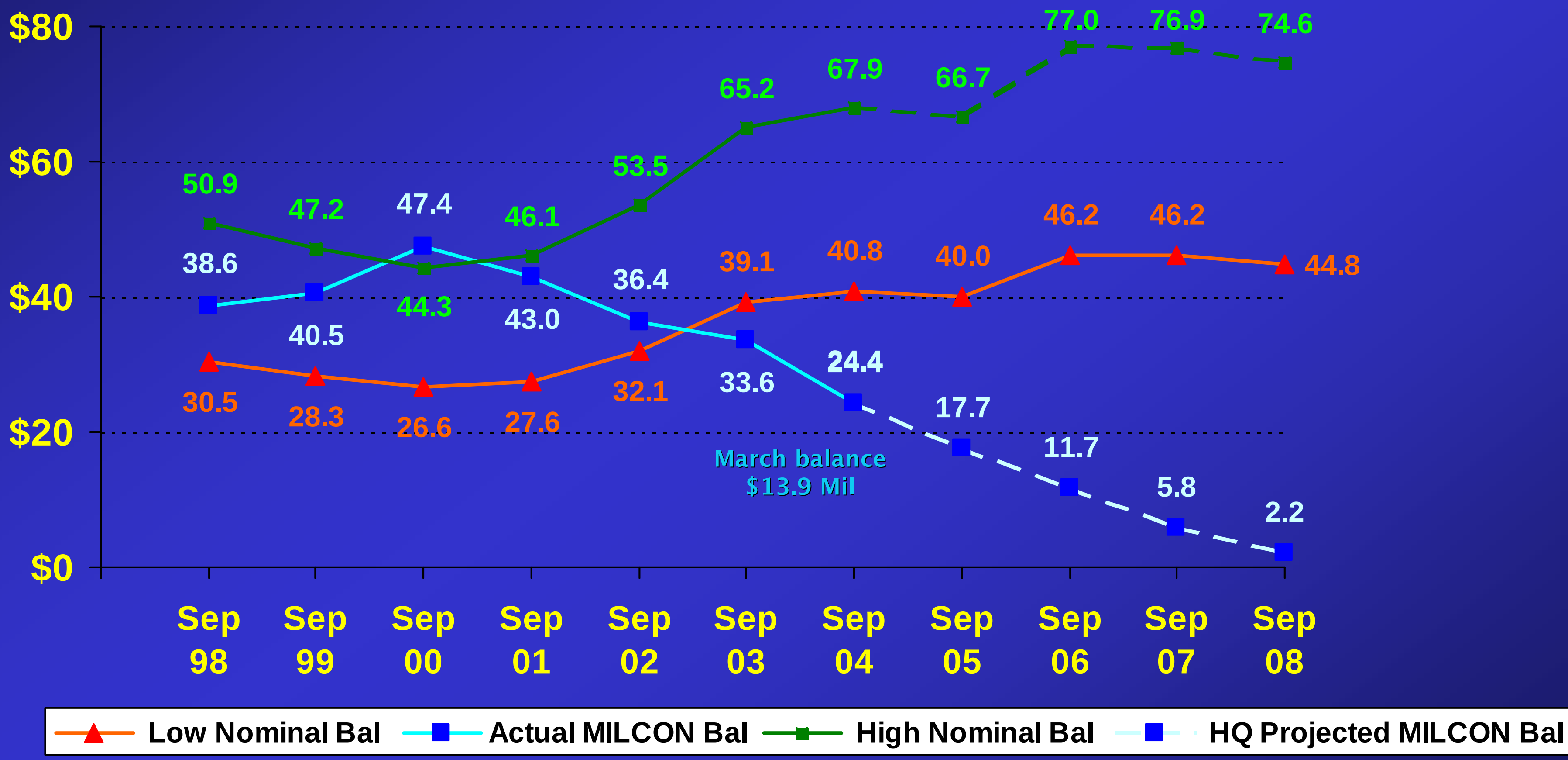
MACOM
MILCON S&A Account



HQUSACE S&A Account Manager est.

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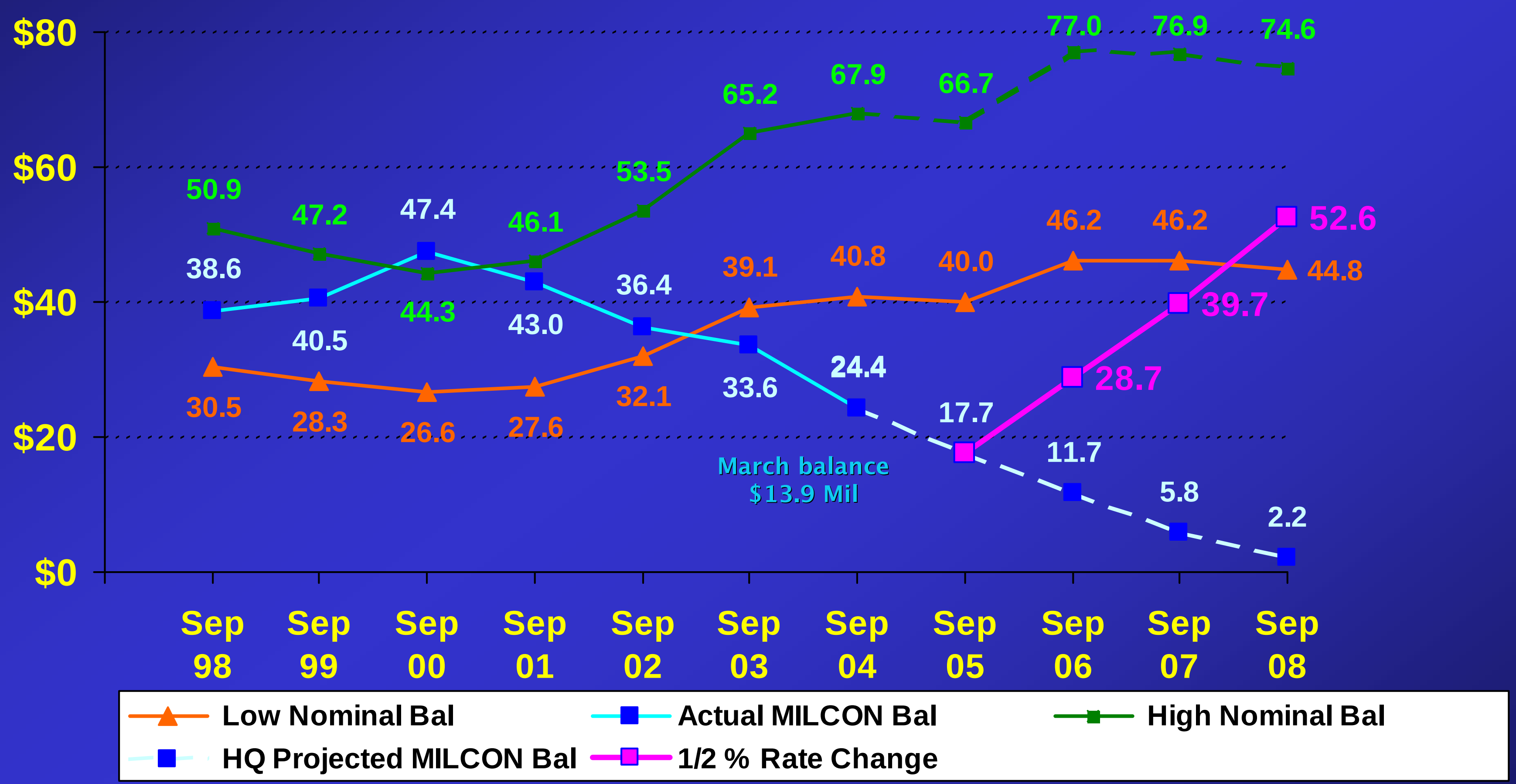
MILCON S&A Account
With ½% Delta



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Challenges
Across the Program

- Effective Rates have increased.
- Corps salary and benefits have increased at a greater rate than the Construction Cost Index.
- Apparent undercharging of O&M S&A and overcharging of MILCON S&A

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Expected Increases S&A expenses

- +5.9% CONUS (Current expense rate)
  - +.25 Rent (FY06)
  - +.05 Regional G&A (FY06)
  - +.10 Regional CDO (FY07)
  - +.05 Effective Rate (ea. FY due to salary increases)
  - +.?? Afghanistan, Iraq, GWOT - Temp Assignments
  - +.?? At Cost Deals (lost income when less than 5.7%)
- +6.35% Estimated S&A Expense

* Numbers were not derived from data but are estimates based on extensive experience of PDT members.

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of Engineers

Expected Decreases S&A expenses

- 6.35% CONUS (Estimated Expense Rate)
  - -.25 Proper Charging of P&D, DDC and S&A
  - -.25 Proper Charging Practices on O&M vs. MILCON
  - -.01 Disciplined Approach for Other than Flat Rate Deals
  - -.10 Eliminate Subsidizing At Cost Deals
  - -.15 Optimize and Streamline Services Charged to S&A
  - <u>-.15</u> Overhead Reduction (Assume 10% OH reduction)
- 5.44 Estimated S&A Expense Rate
  (5.7% income rate)

* Numbers were not derived from data but are estimates based on extensive experience of PDT members.

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Unknown impacts to S&A expenses

- MILCON Transformation
- BRAC PROGRAM
  - Major MILCON program increases will offer chance to execute more placement per FTE
    - Air Force/Army/DoD
- At Cost and Reduced Flat Rate Deals – HQUSACE Policy
- NSPS (Pay Banding Impact)

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Possible Corrective Actions

- Do Nothing
- Increase Rates
- Decrease Expenses
  - ✓Selected by the Director or Military Programs and approved by the Chief

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Reduce Expenses Option

- **MANAGED APPROACH**
  - Maintain MILCON S&A rate at 5.7% CONUS and 6.5% OCONUS with 0.3% “payback” to replenish the S&A fund (effective rate 5.4% CONUS & 6.2% OCONUS)
  - Stop deficit spending, replenish S&A Working Balance
  - Limited income will force changes in current business process to address inefficiencies
  - New costs will have greater negative impact on service
  - Current service levels will decrease unless changes to current business processes are developed
  - May impact field staff - “Boots on the Ground”
  - Collective punishment for successful Districts

Managed Approach Summary

- **FY 05 Implementation:**
  - Hold regional S&A expenses to 5.7% CONUS and 6.5% OCONUS for FY05
  - GRD and AED are **NOT** included in this study or recommendations
  - MP develop scenarios for impact of MILCON Transformation and BRAC Program on QA process.
  - MP finalize ER 415-1-16
  - Establish/continue District, RBC and HQ processes and business practices to manage S&A
  - Develop MACOM communications to explain implementation to field and customers

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Managed Approach Summary

- FY 06 Implementation:
  - Implement 0.3% “paypack” of S&A income (expense 5.4% CONUS; 6.2% OCONUS) to restore central S&A Account by end of FY08
  - GRD and AED are **NOT** included in this study or recommendations
  - HQUSACE & RBCs review S&A Account management plans at start of FY06 and mid-year to determine effectiveness and results of proposal.

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STATUS
MSC Recovery Plans

- 7 MSCs have submitted MILCON S&A Recovery Plans to HQUSACE (LRD, NAD, NWD, POD, SAD, SPD & SWD)
- Recovery Plans show a $1.925M draw on the National S&A Account
- 4 of 7 Recovery Plans submitted show a draw
- 2 of 7 Recovery plans submitted show break even
- 1 of 7 Recovery Plans submitted shows a contribution
- TAC has not submitted a MILCON Recovery Plan

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FY 05 Projections
MSC Recovery Plans

FY 05 MILCON S&A PROJECTIONS								
Division	FY05 Placement (000s of $)	Expenses	Income	CCG Target FY05 Rate	Projected FY05 Rate	CONUS/ OCONUS	Signed by CDR	**FY05 Gain/Loss**
LRD	123,000	7,011	7,011	5.9%	5.7%	C	NO	0
NAD	483,812	29,367	28,607	5.7%	6.1%	C/O	YES	(760)
NWD	333,184	19,536	18,992	5.7%	5.9%	C	NO	(544)
POD	483,075	31,593	31,400	6.6%	6.5%	C/O	YES	(193)
SAD	481,000	27,417	27,417	5.7%	5.7%	C/O	YES	0
SPD	171,673	11,151	9,785	5.7%	6.5%	C	NO	(1,366)
SWD	358,863	19,517	20,455	5.7%	5.4%	C	YES	938
TAC	No Data	No Data	No Data	No Data	No Data	O/C	No Respose	No Data
								(1,925)
NOTE: Does not reflect recent change counting all Modularity S&A as MILCON								

US Army Corps of Engineers

FY06 Projections MSC Recovery Plans

FY 06 MILCON S&A PROJECTIONS								
Division	FY06 Placement (000s of $)	Expenses	Income	Target FY06 Rate*	FY06 Rate*	CONUS/ OCONUS	Signed by CDR	**FY06 Gain/Loss**
LRD	185,000	9,990	10,545	5.4%	5.4%	C	NO	555
NAD	692,954	37,189	39,852	5.4%	5.4%	C/O	YES	2,663
NWD	536,153	28,853	30,561	5.4%	5.4%	C	NO	1,708
POD	760,244	42,673	49,416	6.2%	5.6%	C/O	YES	6,743
SAD	510,648	27,574	29,107	5.4%	5.4%	C/O	YES	1,533
SPD	259,000	13,986	14,763	5.4%	5.4%	C	NO	777
SWD	439,475	23,032	25,050	5.4%	5.2%	C	YES	2,018
TAC	No Data	No Data	No Data	No Data	No Data	O/C	No Respose	No Data
								15,997
NOTE: Does not reflect recent change counting all Modularity S&A as MILCON								

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Status of Actions and Way Ahead

- Study has been approved by Chief of Engineers
- MSC S&A Recovery Plans have been received
- MSCs and HQs must complete the remaining actions approved by the Chief
- Information Paper to be provided to Chief prior to the SLC

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Questions/Comments

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BACKGROUND SLIDES

Increase Rate Option

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– Increase MILCON S&A rate ½% to 6.2% CONUS and 7.0% OCONUS
– Corrects current imbalance in expenses vs. income
– Maintain current level of service with no change to existing business practices
– Maintains current level of "Boots on the ground"
– New costs can be absorbed with limited impact on staff
– Adjusts for increased Construction Costs
– Not acceptable to customers

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USACE MILCON S&A Rates

Implemented	CONUS	OCONUS*
1 Jan 63	7.5%	Same
1 Mar 65	7.0%	Same
1 Jul 65	6.7%	Same
1 Oct 65	6.5%	Same
1 Nov 66	6.0%	Same
1 Jul 67	5.8%	Same
1 Jan 71	5.6%	Same
1 Jul 71	5.4%	Same
1 Jul 72	5.0%	Same
1 Oct 78	5.2%	Same
1 Oct 79	5.0%	6.5%
1 Oct 83	5.5%	Same
1 Oct 89	6.0%	6.5%
1 Oct 95	5.7%	6.5%

*Includes AK, HI, & PR (Rate increase)

US Army Corps of Engineers

MILCON Gains & Losses

Org	FY99	FY00	FY01	FY02	FY03	FY04	99-04	99-01	02-04	delta
LRL	1140	675	(203)	(545)	(222)	(639)	206	1612	(1406)	(3018)
NAB	90	(121)	(277)	(355)	(548)	55	**(1157)**	(308)	(849)	(540)
NAE	259	(36)	(30)	336	106	(312)	322	192	130	(63)
NAN	570	390	64	210	(1225)	199	208	1024	(816)	(1839)
NAO	44	533	338	245	(678)	5	486	914	(428)	(1342)
NAP	(141)	(255)	(162)	(259)	284	115	(418)	(557)	140	697
NAU	90	391	20	(62)	(350)	(9)	80	502	(421)	(923)
NAD Tot	911	902	(47)	114	(2411)	53	(478)	1766	(2244)	(4011)
NWK	1181	(669)	(875)	(1620)	57	267	**(1659)**	(363)	(1296)	(933)
NWO	292	217	(585)	(386)	1390	468	**1397**	(76)	1472	1548
NWS	791	124	(54)	(1462)	(184)	(780)	**(1565)**	861	(2425)	(3286)
NWD Tot	2264	(328)	(1514)	(3468)	1264	(45)	**(1827)**	422	(2249)	(2671)
POA	(43)	105	(933)	(1406)	(1387)	(4365)	**(8028)**	(870)	(7158)	(6288)
POF	352	2511	3	(1024)	828	(1164)	**1505**	2866	(1360)	(4226)
POH	(124)	2014	(337)	313	1183	(1137)	**1913**	1553	360	(1193)
POJ	44	56	1	75	(36)	(134)	6	101	(95)	(195)
POD Tot	229	4686	(1266)	(2041)	587	(6800)	**(4605)**	3649	(8254)	(11903)

4 Aug 05

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MILCON Gains & Losses

Org	FY99	FY00	FY01	FY02	FY03	FY04	99-04	99-01	02-04	delta
SAM	64	94	(238)	592	194	(992)	(287)	(81)	(206)	(126)
SAS	85	516	624	(138)	(1142)	241	186	1225	(1040)	(2265)
SAD Tot	149	610	386	454	(949)	(752)	(102)	1145	(1246)	(2391)
SPA	510	(157)	(201)	(354)	(74)	(18)	(293)	153	(446)	(599)
SPK	305	292	(288)	(416)	33	(95)	(169)	309	(478)	(788)
SPL	154	145	(436)	(524)	1301	(197)	443	(137)	580	717
SPD Tot	970	281	(925)	(1294)	1260	(310)	(19)	325	(345)	(670)
SWF	251	779	246	199	(1909)	496	62	1276	(1214)	(2489)
SWL	(49)	15	(276)	(97)	(51)	(327)	(786)	(311)	(476)	(165)
SWT	14	204	(329)	92	(25)	(119)	(164)	(111)	(53)	58
SWD Tot	216	997	(359)	193	(1985)	50	(888)	854	(1742)	(2596)
TAC	761	(697)	(280)	(113)	(284)	(728)	**(1341)**	(216)	(1125)	(909)
Total	6603	7102	(4312)	(6971)	(2801)	(9188)	(9567)	9393	(18960)	(28352)

US Army Corps of Engineers

ABC STUDY SUMMARY Louisville District – FY01-02

MILCON	LMI (survey)	LRL (actual)
• Operating Budget Mgmt	*	4.1%
• Submittal Mgmt	12.0%	7.3%
• Quality Mgmt/Contract PM	38.0%	54.6%
• Mod/Change Order Mgmt	22.0%	14.6%
• Progress Payment Mgmt	3.0%	1.4%
• Completion/Closeout Mgmt	7.0%	3.6%
• Field Engineering Mgmt	16.0%	9.7%
• Project Funds Mgmt	2.0%	3.3%
• Contract Claims Mgmt	*	1.4%

** LMI study had discrepancy in categories of actual results vs 9 recommended ABC CM phases. ABC Study was part of the SAPS Study.*

Nature of Issue

- S&A Account Management is a **Corps** problem not a Construction Division problem.
- PMBP process has resulted in changes that impact the S&A account.
- CD, EN, PM, CT and RM all utilize the S&A account and have a vested interest in correcting the situation.
- The long-term solution to the S&A Account will require a TEAM effort with Districts, RBCs and HQUSACE all participating in a constructive way.

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Previous Studies

- Construction Capability Study - SEP 02
  - Recommends increasing MILCON S&A rate from 5.7% to 6.0% and no change in OCONUS rate.
- S&A Pilot Study Report (SAPS) - DEC 03
  - Recommends increasing MILCON S&A rate from 5.7% to 6.0% and no change in OCONUS rate.

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Military Programs - 2Q FY05

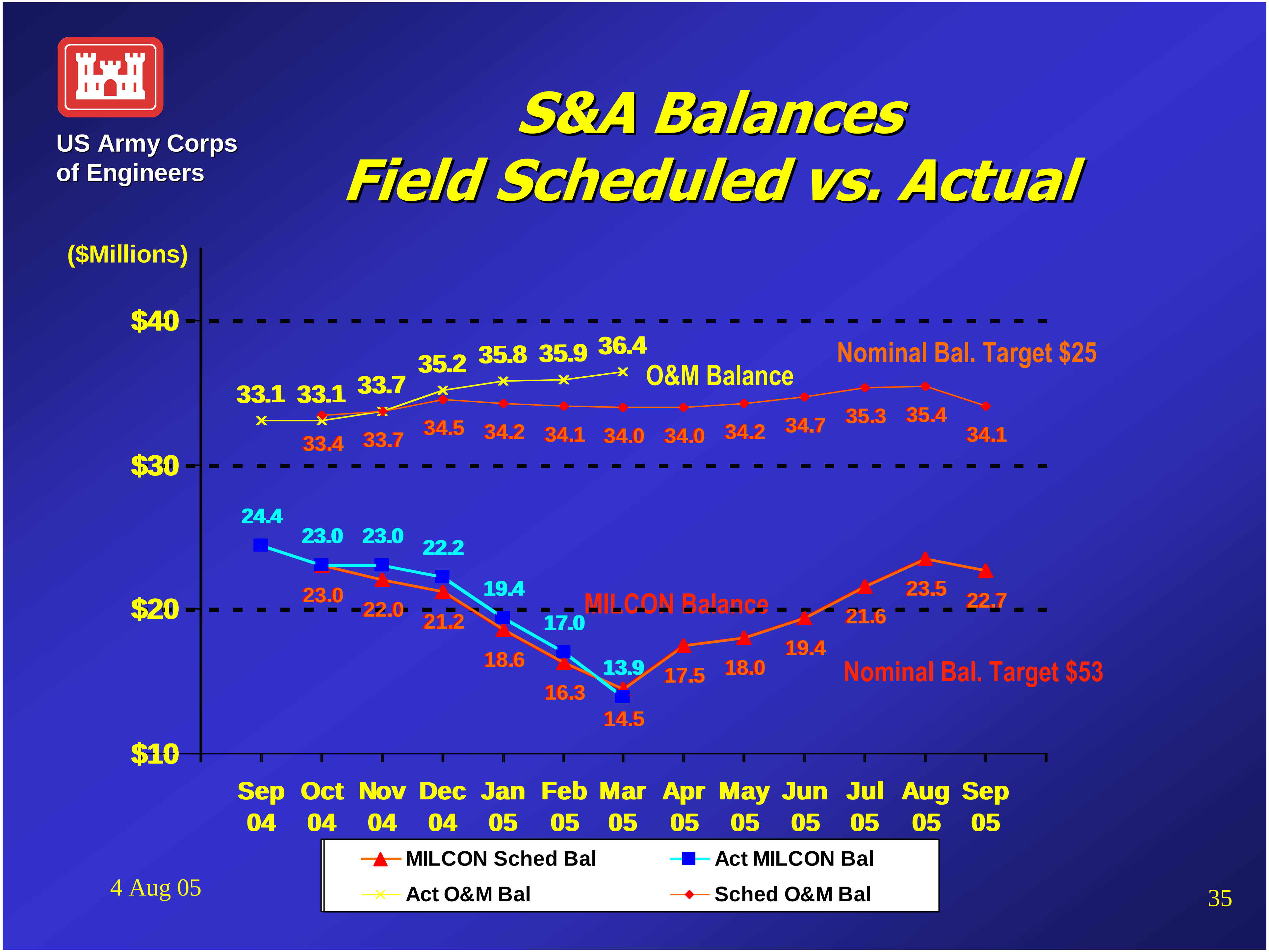
*MP-10 Project Fiscal Closeout **

Data Source: P2/PPDS

Fiscally Close All Projects within 12 Months (CONUS) or 15 Months (OCONUS) of BOD Actual
Ratings: Green: 90% Amber: 80% - <90% Red: <80%

RBC	PROJECTS FISCALLY OPEN WITHIN SELECTION PERIOD			Projects Fiscally Closed in Last 12 or 15 Month Period	Percent Closed & Rating	Projects Fiscally Open > 12/15 Months	Add'l Projects To Be Fiscally Closed Next 12/15 Months
	CONUS BOD Actual =/< 1 April 2004	OCONUS BOD Actual =/< 1 Jan 2004	TOTAL				
GRD		No Data				No Data	No Data
HNC	No Data					No Data	No Data
LRD	6		6	1	16.7%	5	10
NAD	4	2	6	0	0.0%	6	9
NWD	0		0	0			9
POD		8	8	1	12.5%	7	21
SAD	22		22	0	0.0%	22	30
SPD	4		4	0	0.0%	4	12
SWD	19		19	0	0.0%	19	18
TAC		1	1	0	0.0%	1	0
TOTAL USACE	55	11	66	2	3.0%	64	109

•Only projects/contracts linked between P2 and RMS are represented here. Many more projects remain fiscally open but have not been entered in P2 to obtain visibility.



US Army Corps
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S&A Balances
Field Scheduled vs. Actual
($Millions)
$40
$30
$20
$10
33.1
33.1
33.7
35.2
35.8
35.9
36.4
O&M Balance
Nominal Bal. Target $25
33.4
33.7
34.5
34.2
34.1
34.0
34.0
34.2
34.7
35.3
35.4
34.1
24.4
23.0
23.0
22.2
19.4
17.0
13.9
23.0
22.0
21.2
18.6
16.3
14.5
17.5
18.0
19.4
21.6
23.5
22.7
MILCON Balance
Nominal Bal. Target $53
Sep 04
Oct 04
Nov 04
Dec 04
Jan 05
Feb 05
Mar 05
Apr 05
May 05
Jun 05
Jul 05
Aug 05
Sep 05
MILCON Sched Bal
Act MILCON Bal
Act O&M Bal
Sched O&M Bal

Effective Rate Trends
(Burden Added to Labor)

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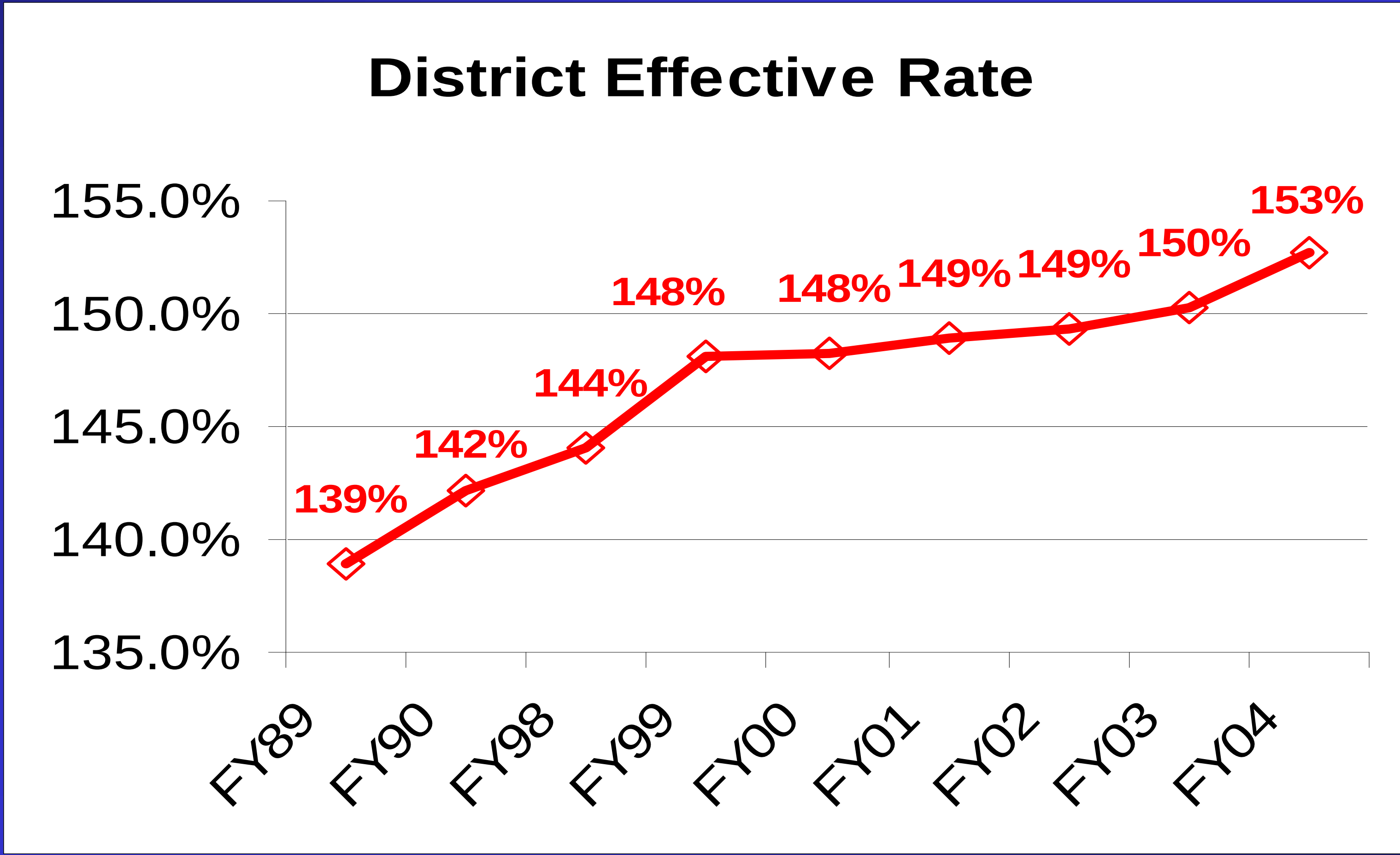

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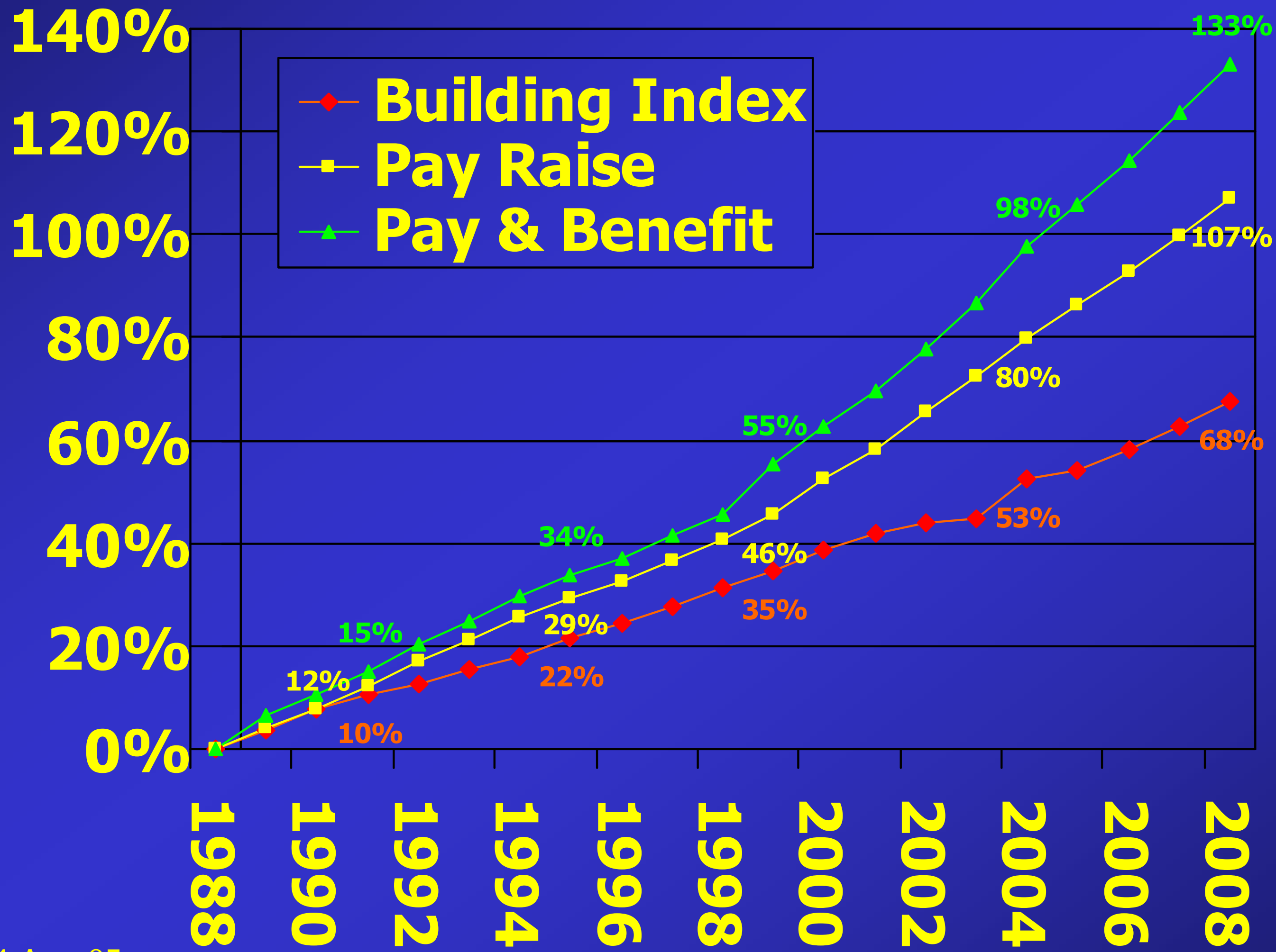
Construction Cost vs Government Cost



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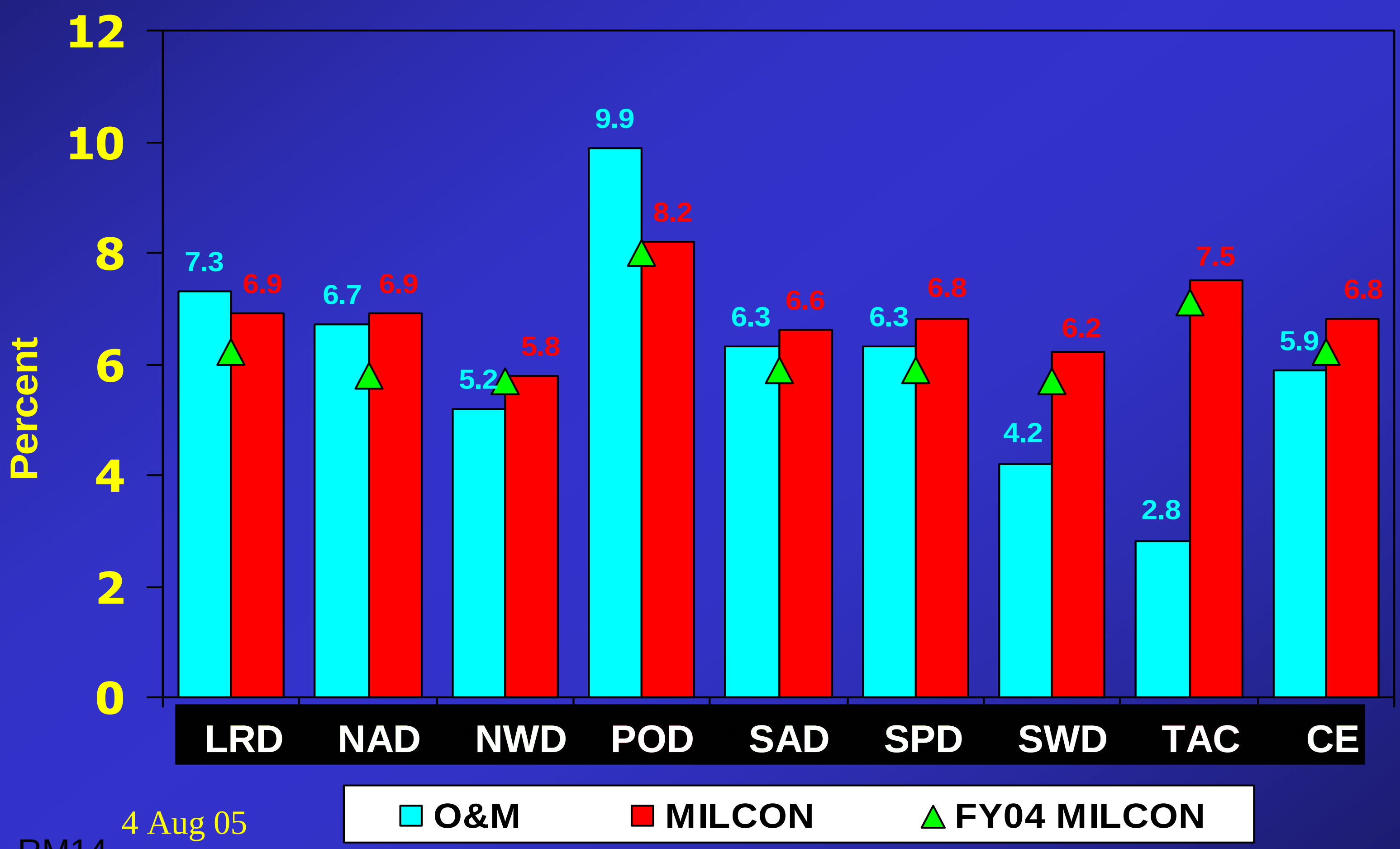
MSCs MILCON vs O&M Actual S&A Rates – 31 Mar 05



Orig Sched

4 Aug 05
RM14
Data as of 31 Mar 05

US Army Corps
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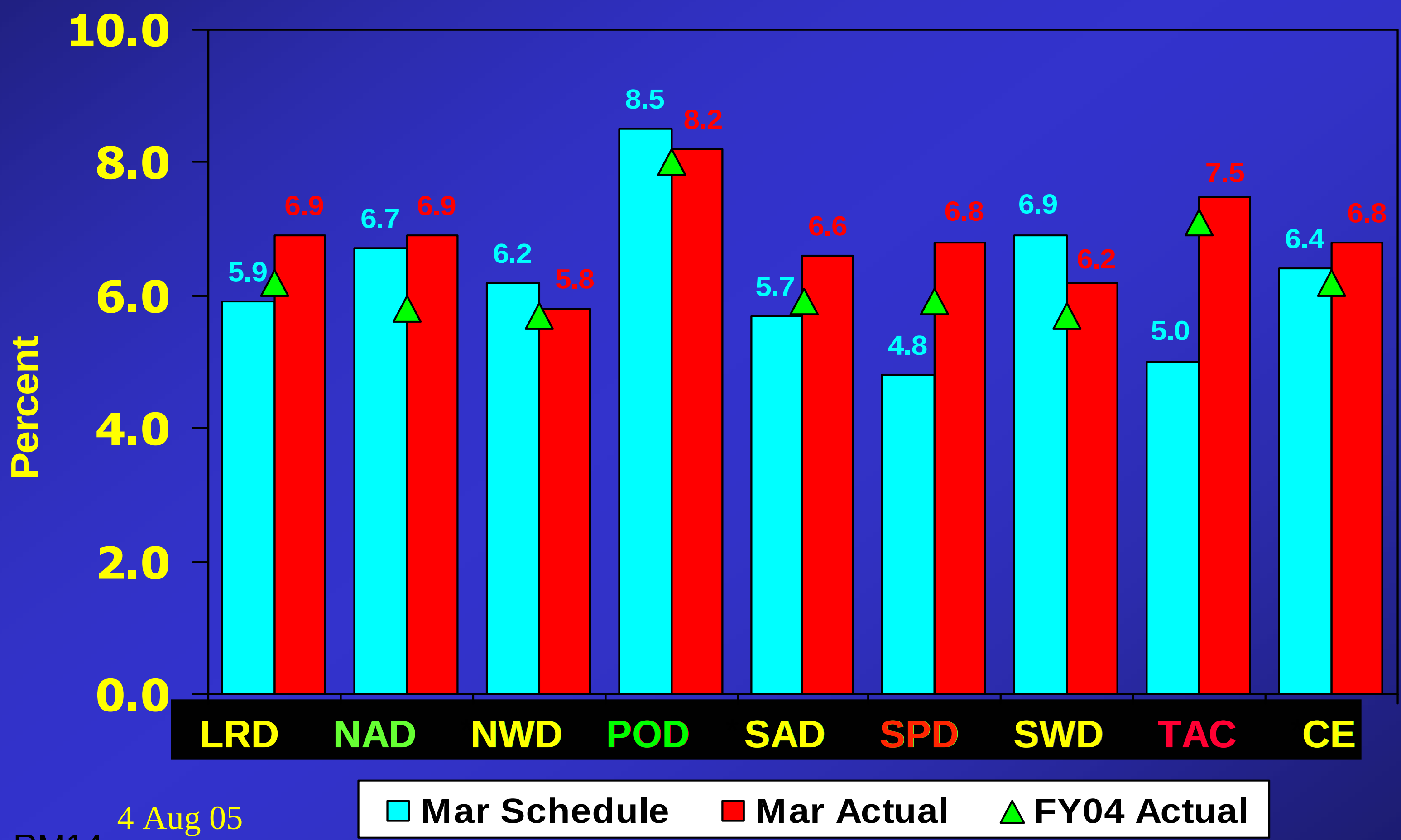
MSCs MILCON S&A Rates
31 Mar 05



4 Aug 05

RM14

Data as of 31 Mar 05

Orig Sched

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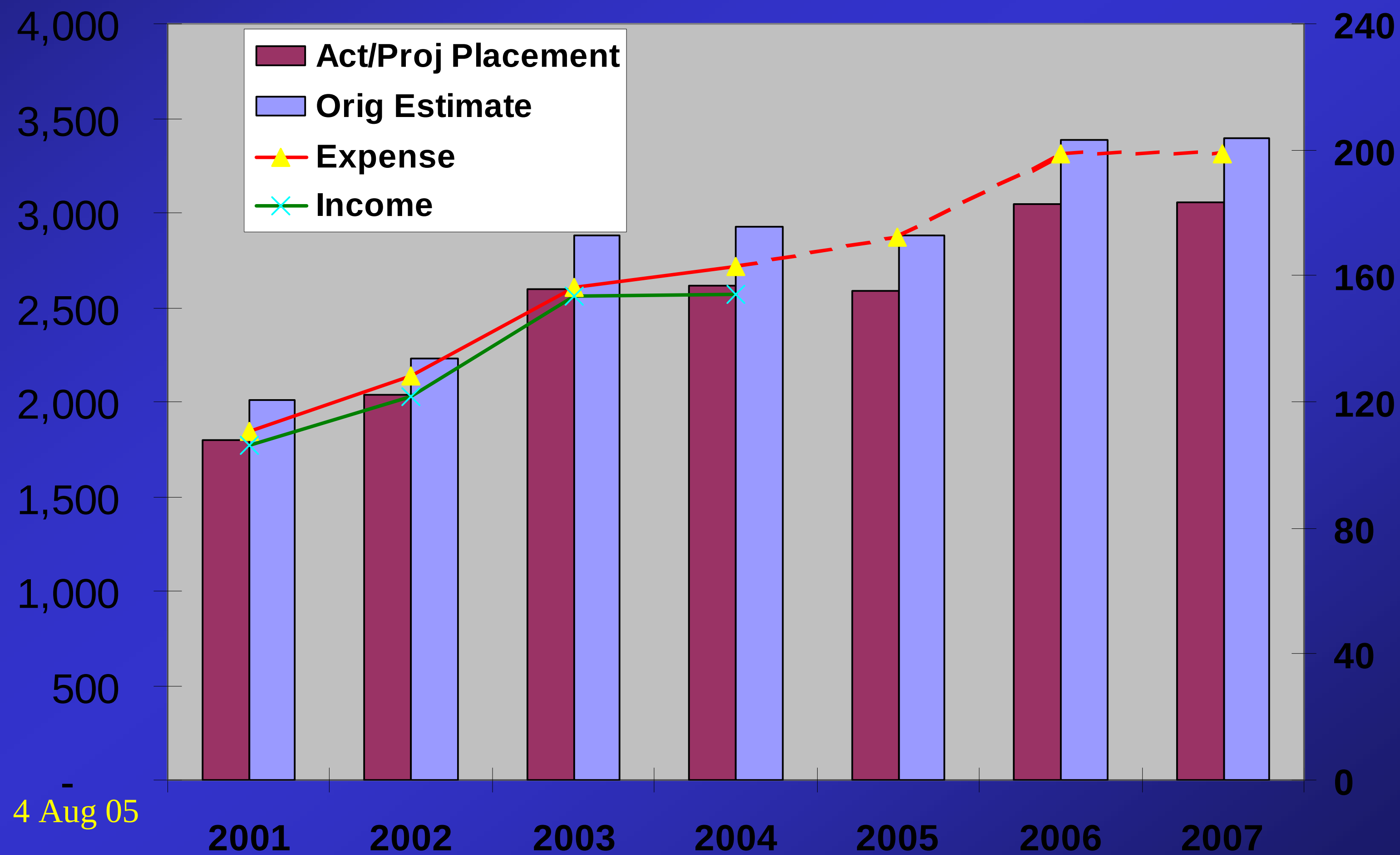
MILCON Gains & Losses

Dist	FY99	FY00	FY01	FY02	FY03	FY04	99-04	99-01	02-04	delta
LRL	1140	675	(203)	(545)	(222)	(639)	206	1612	(1406)	(3018)
MVR	(27)	79	(47)	10	(62)	(7)	(54)	5	(59)	(64)
NAB	90	(121)	(277)	(355)	(548)	55	**(1157)**	(308)	(849)	(540)
NAE	259	(36)	(30)	336	106	(312)	322	192	130	(63)
NAN	570	390	64	210	(1225)	199	208	1024	(816)	(1839)
NAO	44	533	338	245	(678)	5	486	914	(428)	(1342)
NAP	(141)	(255)	(162)	(259)	284	115	(418)	(557)	140	697
NAU	90	391	20	(62)	(350)	(9)	80	502	(421)	(923)
NWK	1181	(669)	(875)	(1620)	57	267	**(1659)**	(363)	(1296)	(933)
NWO	292	217	(585)	(386)	1390	468	**1397**	(76)	1472	1548
NWS	791	124	(54)	(1462)	(184)	(780)	**(1565)**	861	(2425)	(3286)
POA	(43)	105	(933)	(1406)	(1387)	(4365)	**(8028)**	(870)	(7158)	(6288)
POF	352	2511	3	(1024)	828	(1164)	**1505**	2866	(1360)	(4226)
POH	(124)	2014	(337)	313	1183	(1137)	**1913**	1553	360	(1193)
POJ	44	56	1	75	(36)	(134)	6	101	(95)	(195)
SAM	64	94	(238)	592	194	(992)	(287)	(81)	(206)	(126)
SAS	85	516	624	(138)	(1142)	241	186	1225	(1040)	(2265)
SPA	510	(157)	(201)	(354)	(74)	(18)	(293)	153	(446)	(599)
SPK	305	292	(288)	(416)	33	(95)	(169)	309	(478)	(788)
SPL	154	145	(436)	(524)	1301	(197)	443	(137)	580	717
SWF	251	779	246	199	(1909)	496	62	1276	(1214)	(2489)
SWL	(49)	15	(276)	(97)	(51)	(327)	(786)	(311)	(476)	(165)
SWT	14	204	(329)	92	(25)	(119)	(164)	(111)	(53)	58
TAC	761	(697)	(280)	(113)	(284)	(728)	**(1341)**	(216)	(1125)	(909)
Total	6603	7102	(4312)	(6971)	(2801)	(9188)	(9567)	9393	(18960)	(28352)

US Army Corps of Engineers

MILCON Placement & Expense Trend ($M)



4 Aug 05

US Army Corps of Engineers

MSC Response to 22 April VTC

- SPD, NWD, LRD, and NAD concurred in the recommendations
- POD had questions but indicated afterwards that they were proceeding to implement the recommendations
- SWD and SAD had questions and desired more discussions

US Army Corps
of Engineers

Corrective Action Plan
Option A

- **NO ACTION (NO CHANGE)**
  - Will not address current imbalance in expenses vs. income
  - Will not replenish S&A Account reserve
  - Will not improve current business practices
  - Threatens ability to retain and move staff and resources to meet variations in regional and national workloads

US Army Corps
of Engineers

PDT History

- MP initiated action to develop MILCON S&A PDT 7 MAR 05
- PDT started planning with teleconferences 10/14/17 MAR 05
- PDT met for two day workshop at HQUSACE on 23 and 24 MAR 05
- Briefing to Steering Committee – 15 APR 05
- Briefing to DMP and DDMP – 20 APR 05
- Briefing to MSC CDRs – 22 APR 05
- Briefing to CG 2 May 05

US Army Corps
of Engineers

WAY FORWARD

- OPTION A - NO ACTION
  - Does not address problem
- OPTION B - INCREASE RATE by ½%
  - Solution is Corps focused but does not take mission of customers into account
- OPTION C - MANAGED APPROACH
  - Corps will manage issue within current funding by improving internal practices & processes
  - Increase income vs. expenses by ½% by limiting expenses.

US Army Corps
of Engineers

Project Delivery Team

Jolene Birkett
- CENWO-CD-CM

Philip Blount
- CERM-P

Dick Carlson
- CENAE-CO

Darrell Deleppo
- CENAD-BRD

Tami Garret
- CESAS-RM

Harry Jones
- CEMP-IR

George Lea
- CENAB-CO

Louis Muzzarini
- CEPOH-EC-C

Walt Norko
- CECW-EC

James Spratt
- CEMP-IR

US Army Corps
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How We Got Here: Overdraft History

- HQUSACE provided $8.9M of the S&A Working Balance to the MSCs to offset costs of PMBP for FY 03 and 04.
- From FY99-01: 14 Districts added and 10 took a draw from the account for a total of + $9.4M. All MSCs contributed to the account
- From FY02-04: 5 Districts added and 19 drew on the account for a total of – $19.0M. No MSCs contributed to the account.
- MILCON execution and construction placement lagging behind Corps projections
- Major S&A challenges on very difficult projects in POA

Managed Approach Recommendations

US Army Corps of Engineers

- Immediate District CDR Actions:
  - District Commander responsible for S&A Account
  - Limit S&A expenses to target set by RBC
  - Ensure MILCON/O&M projects are properly charged
  - Fiscally Close Out contracts in a timely manner (12 months CONUS and 15 months OCONUS)
  - Review of G&A, CDO and S&A to determine if expenses are properly distributed – with RBC
  - Review charging to S&A account by PM/CD/ENG/CT and review % of S&A spent by all District elements

US Army Corps of Engineers

Managed Approach Recommendations

- Immediate District CDR Actions (cont):
  - Use P&D funding for pre-award activities per CEMP-M/ CERM-P memo dated 26 Mar 03, Sub: Clarification of USACE Policy on P&D, DDC, and S&A...
  - PM must seek DDC from customers when needed. Current practice in use of DDC funds is not consistent with above guidance
  - Review OH charging practices for Supervisors in PPMD, EN and CD to determine if practices are same across the board
  - Initiate review of S&A services to identify where service can be optimized without threatening mission
  - Manage S&A account to minimize impacts on field and still deliver quality product to customers

US Army Corps
of Engineers

Managed Approach Recommendations

- Immediate Division CDR Actions:
  - Division Commander responsible for S&A Account Management within the RBC
  - Limit expenses to 5.7% CONUS and 6.5% OCONUS for FY05
  - Develop and implement a recovery plan to limit S&A expenses to 5.4% CONUS/6.2% OCONUS for FY06.
  - Implement S&A Program Manager (PgM) “Gatekeeper” responsible and accountable for the S&A Account and all charges within the RBC

US Army Corps
of Engineers

Managed Approach Recommendations

- Division CDR Actions (cont):
  - Regional Recovery Plan to include:
    - Comprehensive review of G&A, CDO and S&A to determine if expenses are properly distributed
    - Review S&A account charges by PM/CD/EN/CT/RM
    - Initiate review of S&A services to identify where service can be optimized and streamlined without impacting service at the Regional level

US Army Corps
of Engineers

Managed Approach Recommendations

- **Immediate DMP Actions:**
  - Establish MACOM Recovery Plan PDT to evaluate impact on Construction Management services and the proposed S&A expense target of 5.4% CONUS & 6.2% OCONUS.
  - Develop scenario for impact of BRAC Program on the S&A Account and staffing level requirements
  - Update S&A Green Book for customers and the field
    - Can services will be optimized/Streamlined
  - Coordinate Green Book with MILCON Transformation for Design/Build S&A and establish services
  - Review and finalize the update of ER 415-1-16 Fiscal Management of Construction.

US Army Corps of Engineers

Managed Approach Recommendations

- **Immediate DMP Actions:**
  - Develop MACOM communications to explain implementation to field and customers
  - Initiate S&A AAR for top 5 S&A draw Districts
    - POA, NWS, LRL, POF & NWK
      - Reasons for draw systematic or unforeseen
  - Initiate AAR S&A Best Practices
    - Districts that contribute to S&A
      - NWO, SPL & POH
  - Complete AAR within 90 days of initiation

US Army Corps
of Engineers

END BACKGROUND SLIDES

2005 Tri-Service Infrastructure Conference

The Future of Engineering and Construction

2-4 August 2005

J. W. Wright, Ph.D., P.E.
Chief Engineer
Director, Capital Improvements

What we do…

- **Facilities Acquisition**
  - Planning, Design, Construction, Environmental, Utilities
- **Installation Engineering Support**
  - Public Works, Facilities Maintenance, Utilities, Real Estate, Transportation, Environmental, Ashore ATFP
- **Seabees/Contingency Engineering**

Capital Improvements Business Line (CIBL) Strategic Objectives

- People
  - Maintain technical competency
  - FTE realignments
  - Licensing & Technical Authority
  - Project Management Development
- Process
  - Sustainable development/LEED Program
  - Expand use of Design Build
  - Standard ROICC processes
  - Enhanced source selection
- Clients
  - Improve deliverables, timeliness, and use of Client resources
- Operations
  - Improve organizational alignment & interdependence
  - Work Induction Process implementation
    - Categories of Work

CIBL Major Initiatives

- Design/Construction
  - Leverage private sector capability by Design-Build
  - Accelerated Design and Construction
- Sustainable Development
  - Lower Life Cycle cost
- Partnering with Small Business
  - Sole source negotiated scope (projects < $3M)
- Risk Based QC / QA
- Safety – Operational Risk Management

Sustainable Development Objectives

- Lower Life Cycle Costs
- Energy Efficient Buildings
- High Productivity Work Spaces
- Recyclable Building Materials
- Reuse of On-Site Demolition Materials
- Environmentally Friendly Materials & By-Products

CIBL Ongoing/Future Initiatives

Design-Build-Commission (DBC) Demonstration:

- **May include up to 5 years of maintenance in MILCON contract**
  - **Congress authorized limited DOD test FY03**
  - **Goal = test feasibility, desirability & long-term impact on life cycle cost**

- **Status:**
  - **9 Navy/USMC pilots FY03-FY06**
  - **6 pilots awarded; 2 have begun maintenance phase**
  - **Interim report sent to Congress Feb 05**

- **Long-term monitoring and evaluation of results**
  - **Each pilot monitored for 5 years after BOD**
  - **To analyze 5-year maintenance cost, comparison to baseline facility, and impact on life cycle cost**
  - **DOD has requested demonstration extension beyond FY06**

CIBL Ongoing/Future Initiatives

Design-Build "Early Start" Demonstration:

- Award design portion of DB contract before project appropriation
  - Congress authorized limited DOD test FY05
  - Goal = start construction on both DBB & DB projects at appropriation
  - Use MCON design $ for design portion of contract
  - Authority expires end of FY07
  - Report to Congress due Mar 07

- Status:
  - Three Navy/USMC FY06 pilots tentatively selected
  - Anticipate up to six FY07 pilots
  - Developing demonstration policy and procedures

Innovative Acquisition Strategies

Naples Improvement Initiative ($750M)
- Complete support "city"--Gricignano
- Over 2 million SF to seismic standards
- 100% private financed ($500M Lease-Const.)
- Capo Ops/Support MILCON ($250M)

NII

Naples Hospital ($43.5M)
- Lease-Buy Acquisition (Complete in Apr 03)
- Integrated Construct/Outfit Approach
- Rights of Superficies - $Ms in Savings

Naples Hospital

NTC Great Lakes ($70M)
- $70 M Completed in 30 months
- Sustainable Design Showcase
- Zero Cost Growth

NTC Great Lakes

RTC Great Lakes ($750M)
- $201M Contract w/ Options for 5 Barracks
- Design-Build Commission Pilot for Full Building Maintenance of 2 Barracks

RTC Great Lakes

Summary

- Funding is declining
- Sustainable Development integral to our business
- Design-Build is the way ahead

US Army Corps
of Engineers
Chicago District

The Chicago Shoreline Storm Damage Reduction Project

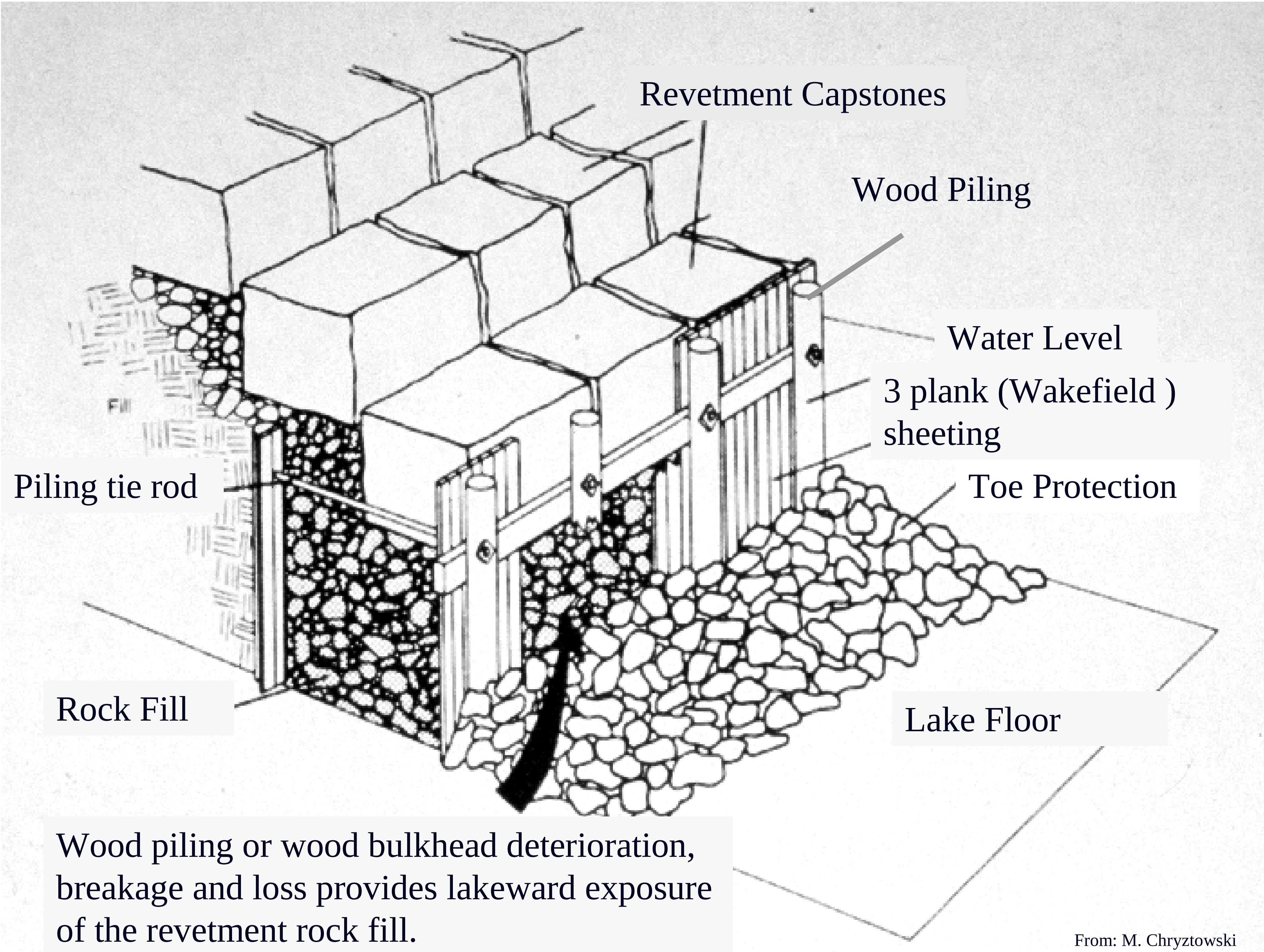
Andrew Benziger, Chicago District

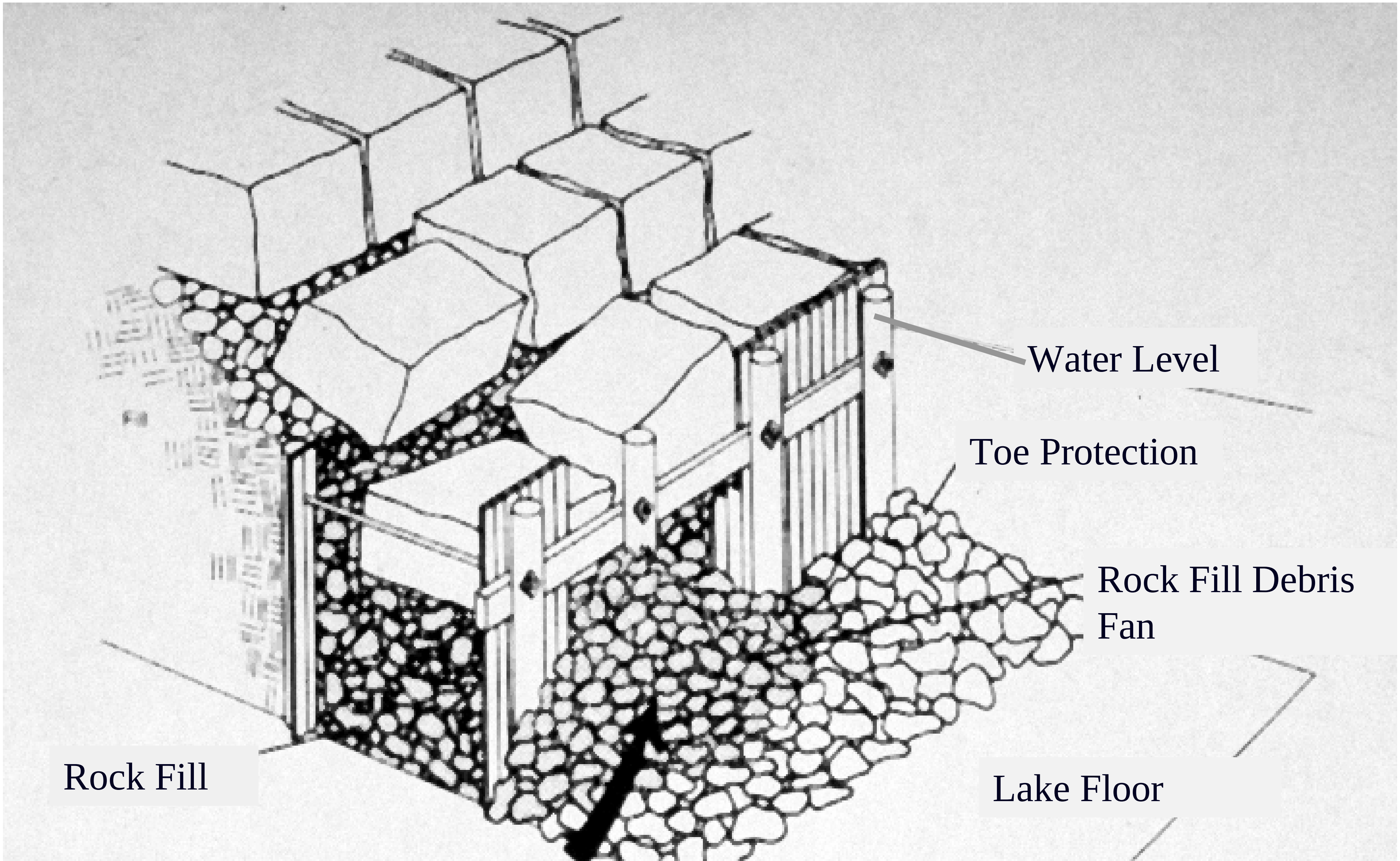
2005 Tri-Service Infrastructure Systems Conference

St. Louis, Missouri August 2-4, 2005


Photo by: V. Jurca


Photo by: V. Jurca


Revetment Capstones
Wood Piling
Water Level
3 plank (Wakefield) sheeting
Toe Protection
Piling tie rod
Rock Fill
Lake Floor
Wood piling or wood bulkhead deterioration, breakage and loss provides lakeward exposure of the revetment rock fill.
From: M. Chryztowski

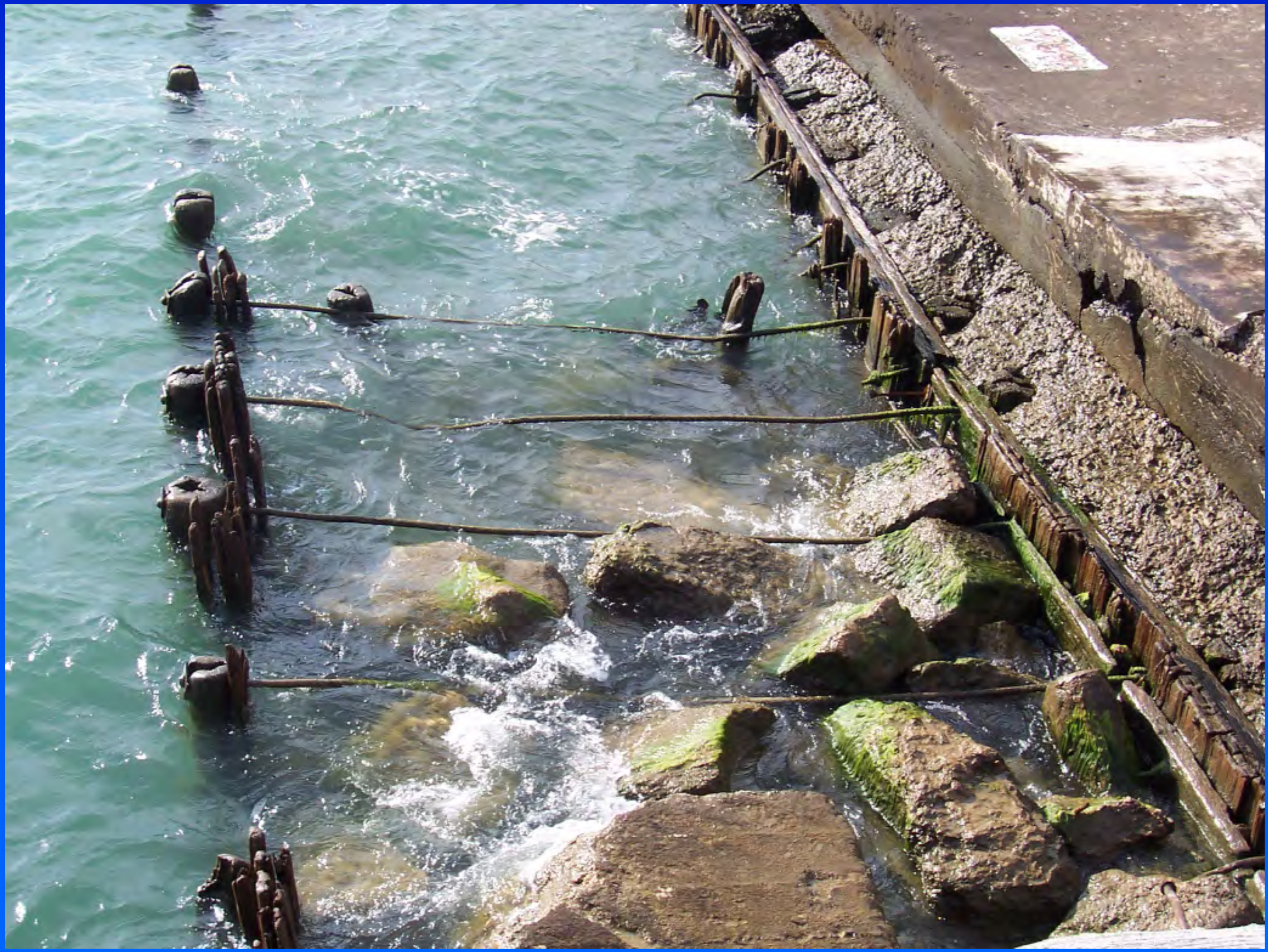


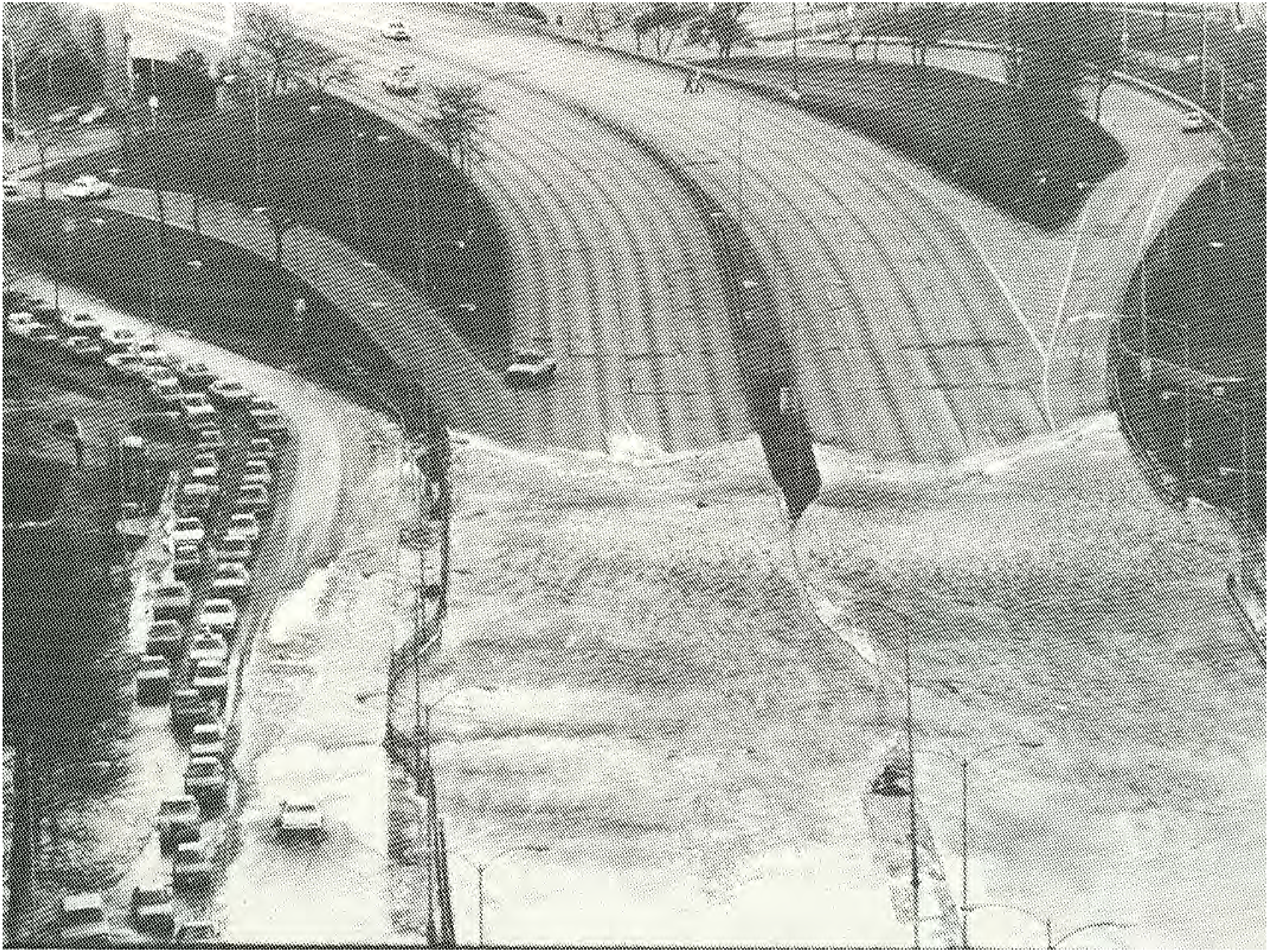
Revetment Rock fill is dispersed onto the toe protection by wave surge as well as gravity. Revetment capstones tilt, slide and fall as they lose their underlying support.

From: M. Chryztowski


DANGER

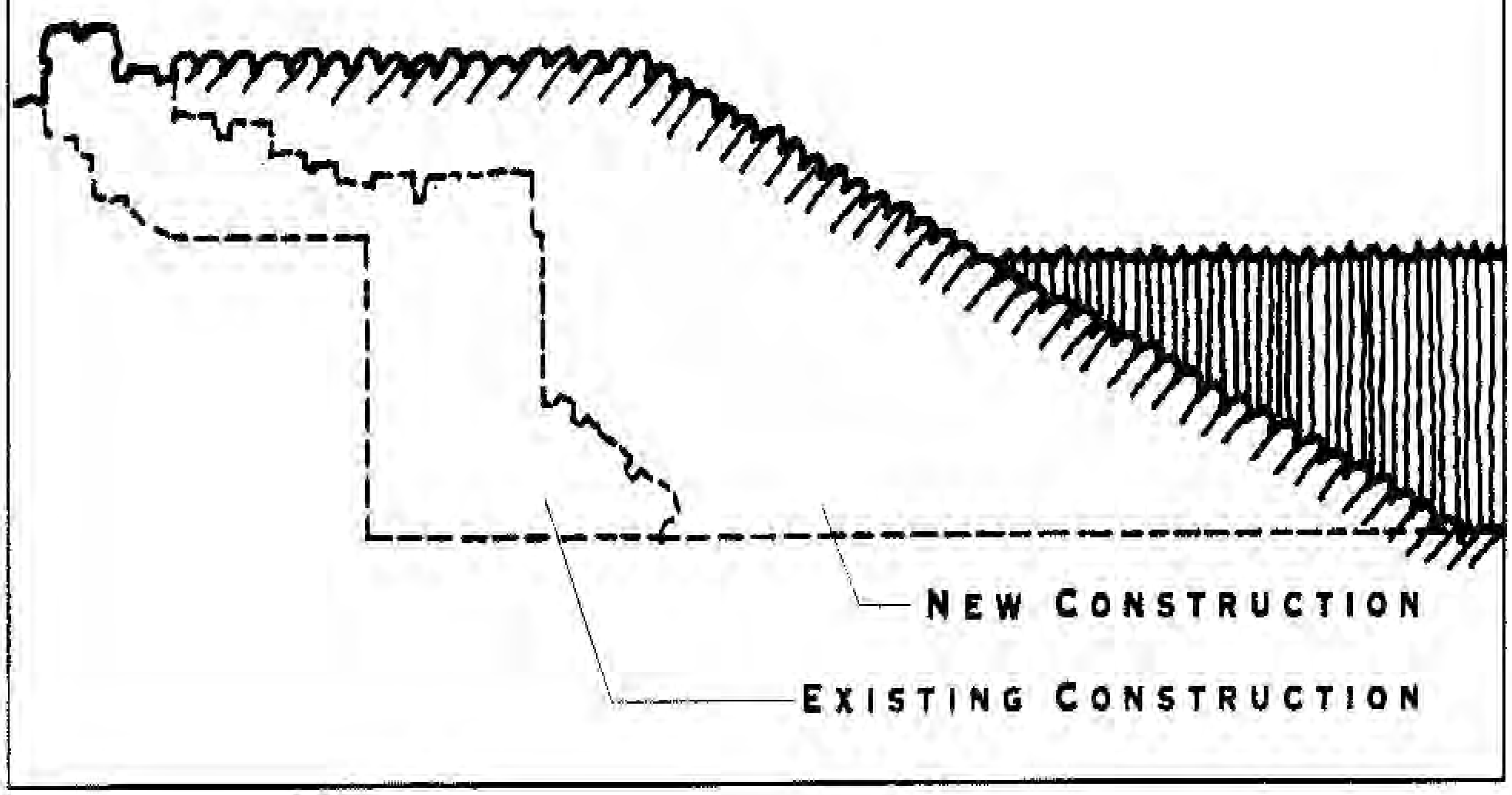
Failed Timber Crib





Federal Plan (NED)

Rubble mound revetment

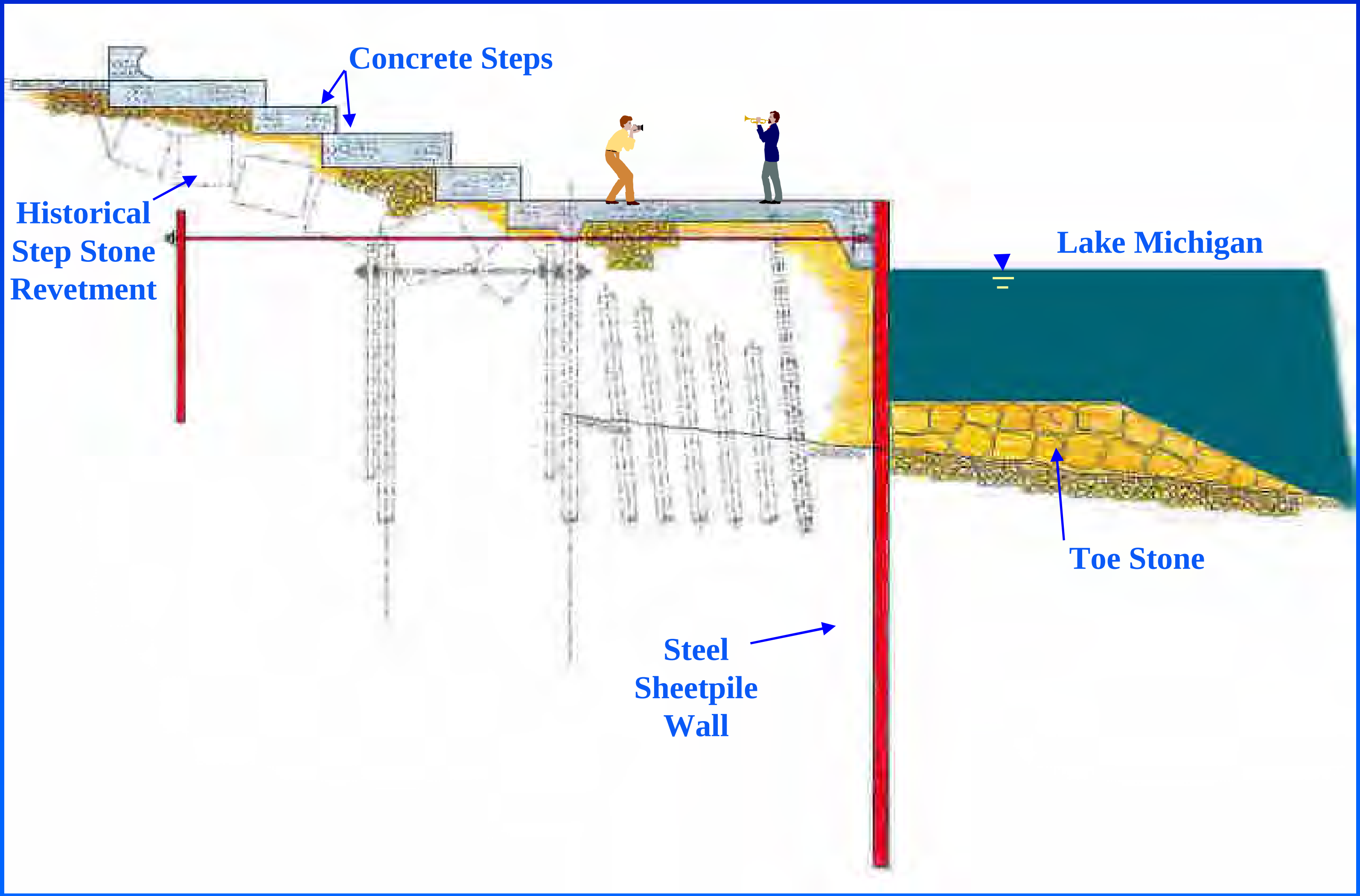


US Army Corps
of Engineers
Chicago District

Local Sponsor Requirements

- Provide safe access to the water's edge
- Provide and preserve an unobstructed view of Lake Michigan
- Provide universal access to all levels of the revetment
- Closely replicate original structure but use modern construction materials

Locally Preferred Proposal - Step Stone Revetment



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Chicago District

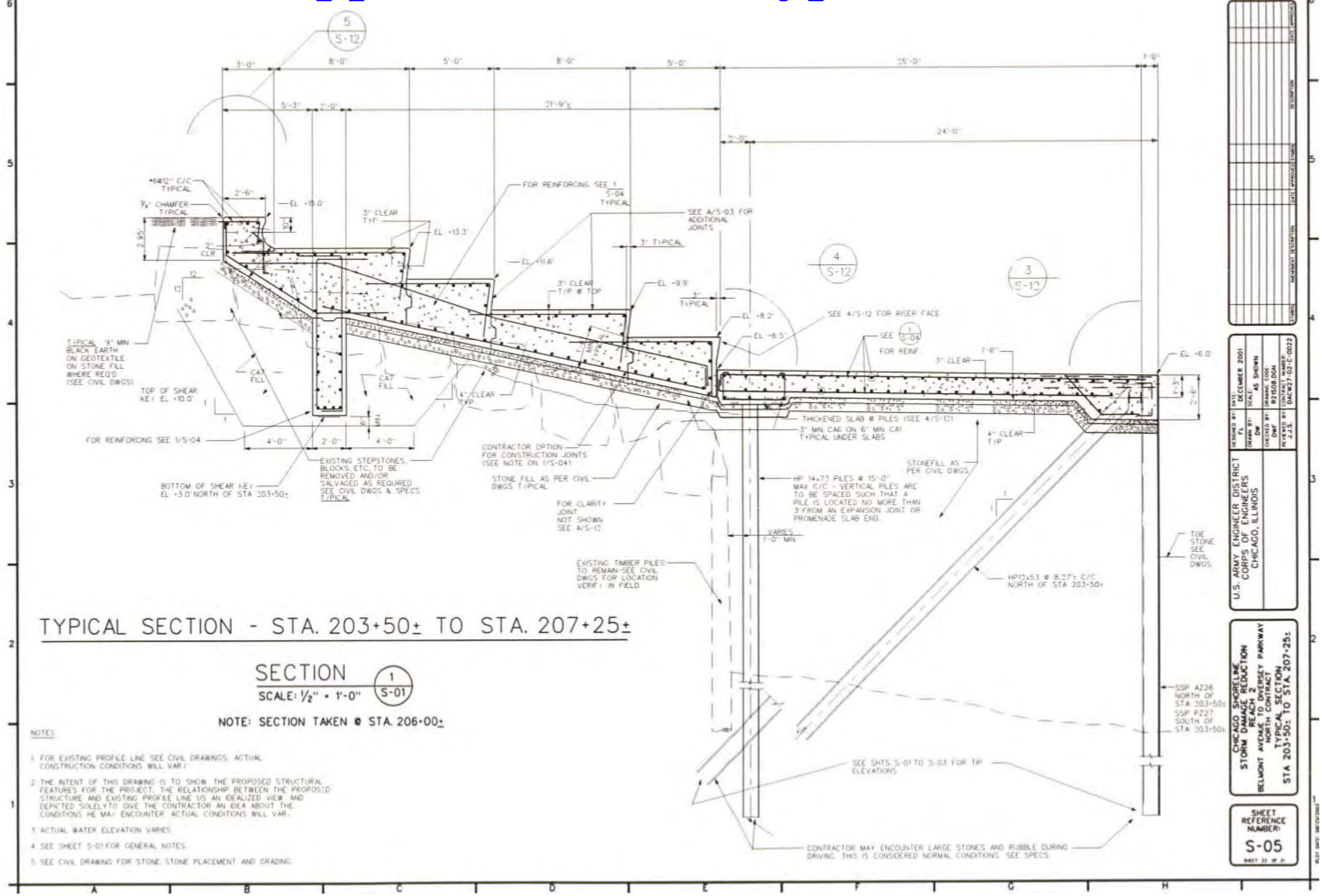
Design Analysis for Locally Preferred Plan

- 2-D Models for 18 different cross sections to quantify overtopping volume

- Optimize design crest elevation and overall structure width

- Developed an equation to predict overtopping rates for use in preliminary design efforts

New Stepped Revetment Typical Section



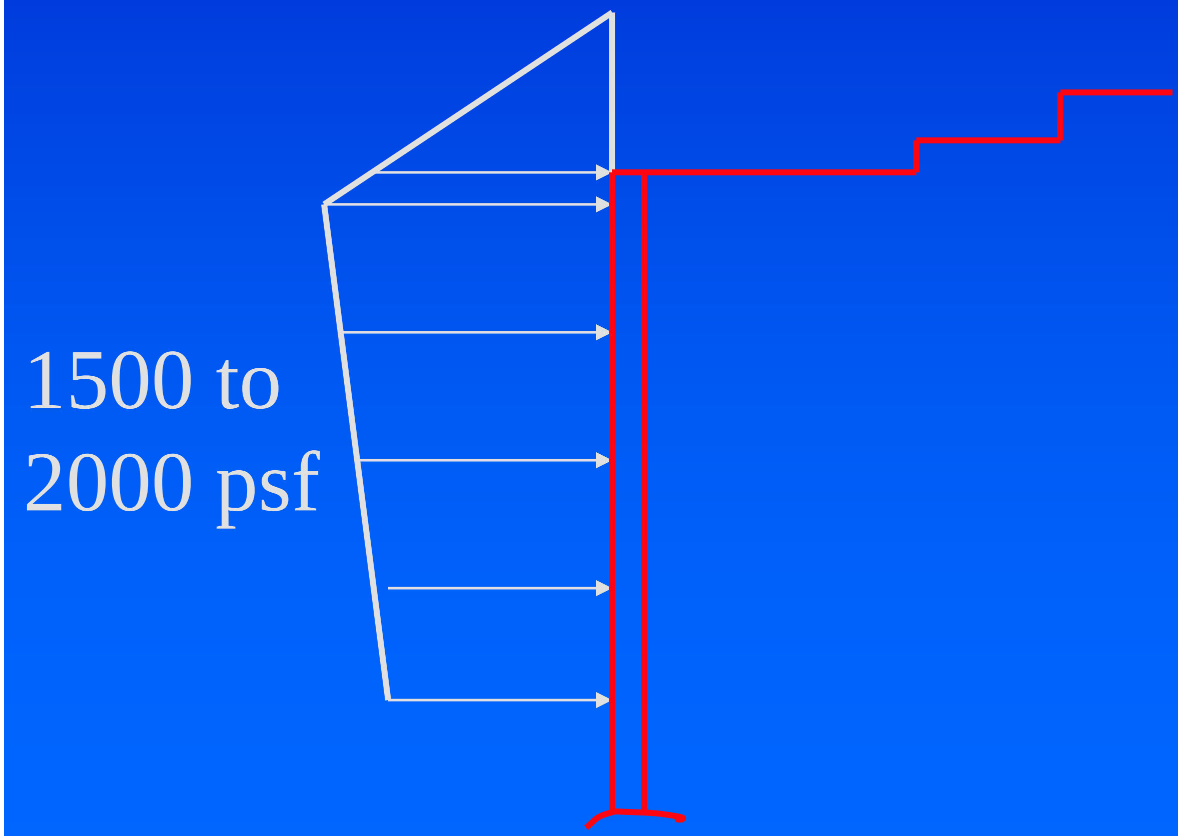
US Army Corps
of Engineers
Chicago District

Revetment Design Elements

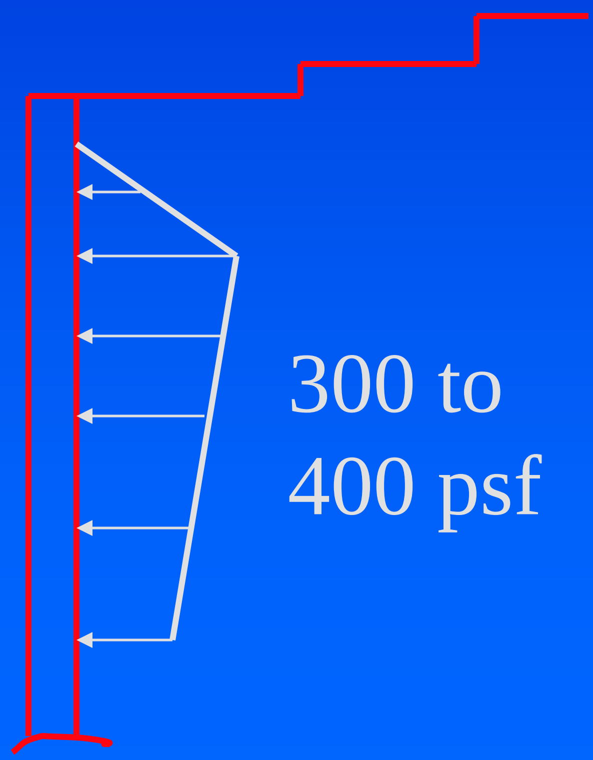
Photo by: M. Mohr

Wave Pressures

Wave Crest Load



Wave Trough Load

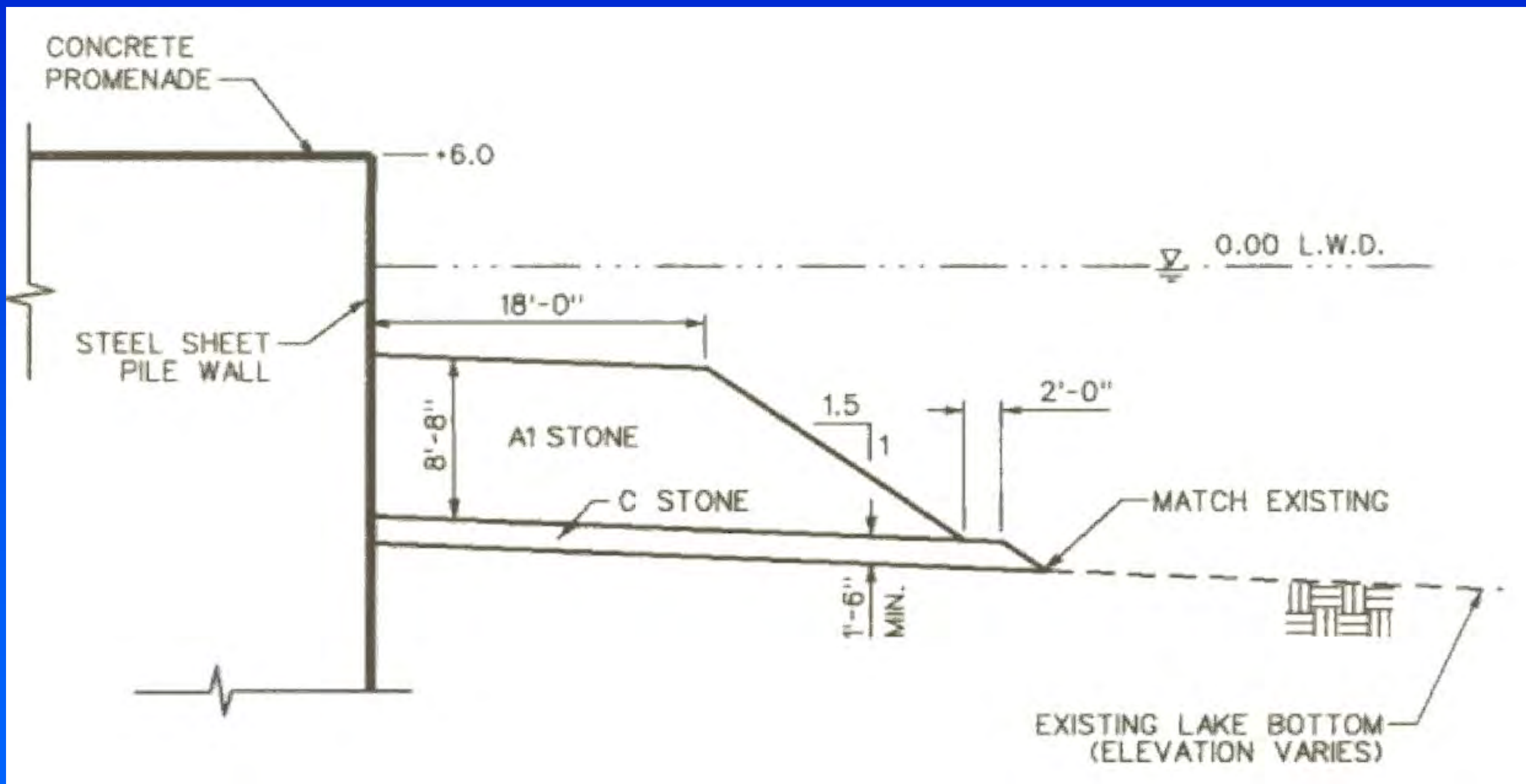



12 10:40AM
Photo by: M. Mohr


Photo by: M. Mohr

Gang Forms

Typical Toe Berm Section



Toe Stone Placement

Toe Berm at 33rd to 37th Street


Drainage Gap in the I-55 to 30th Street Revetment
Photo by: V. Jurca


I-55 to 30th Street Drainage Gap
Photo by: M. Mohr

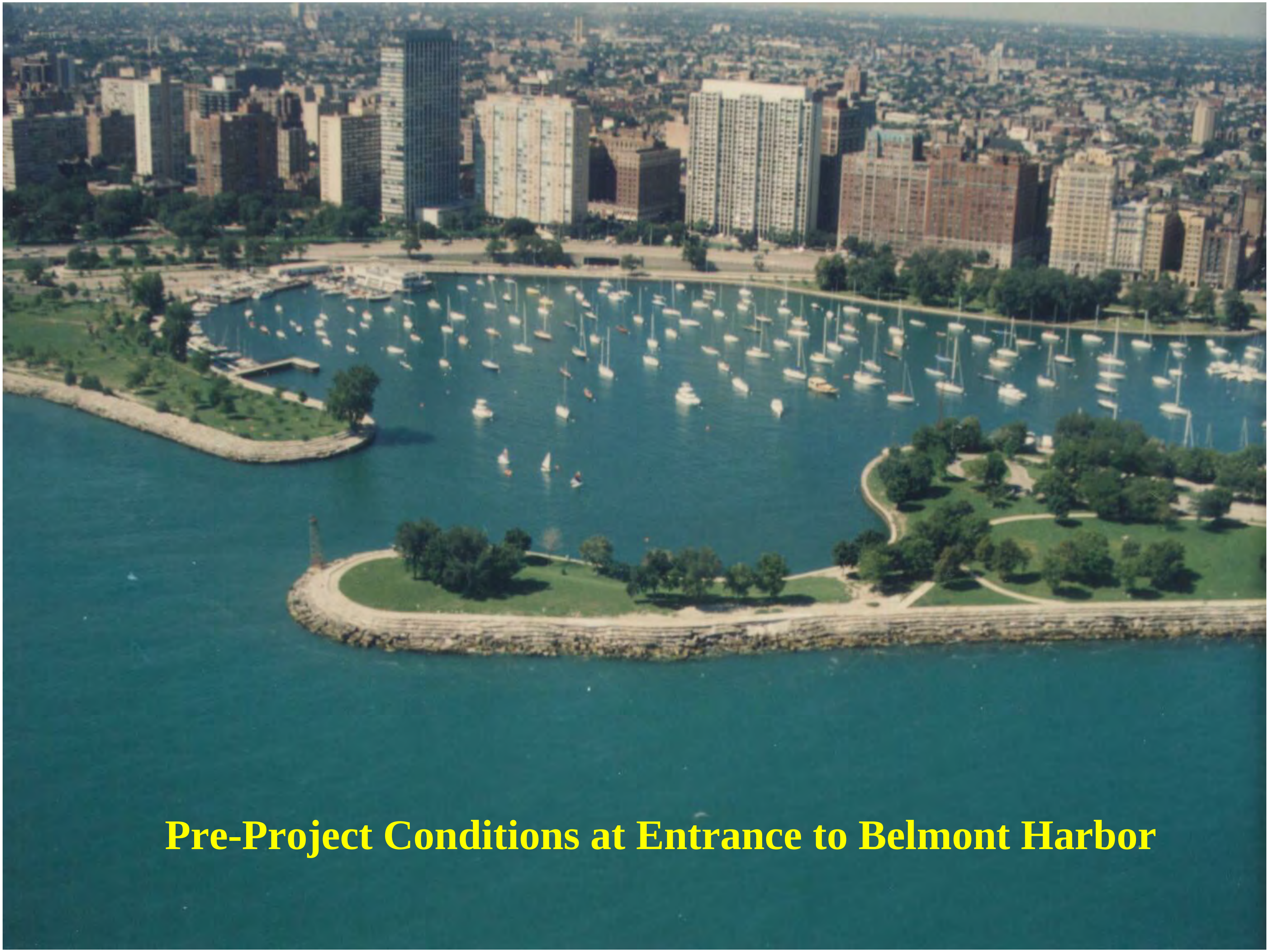
View of 37th Street Drainage Gap

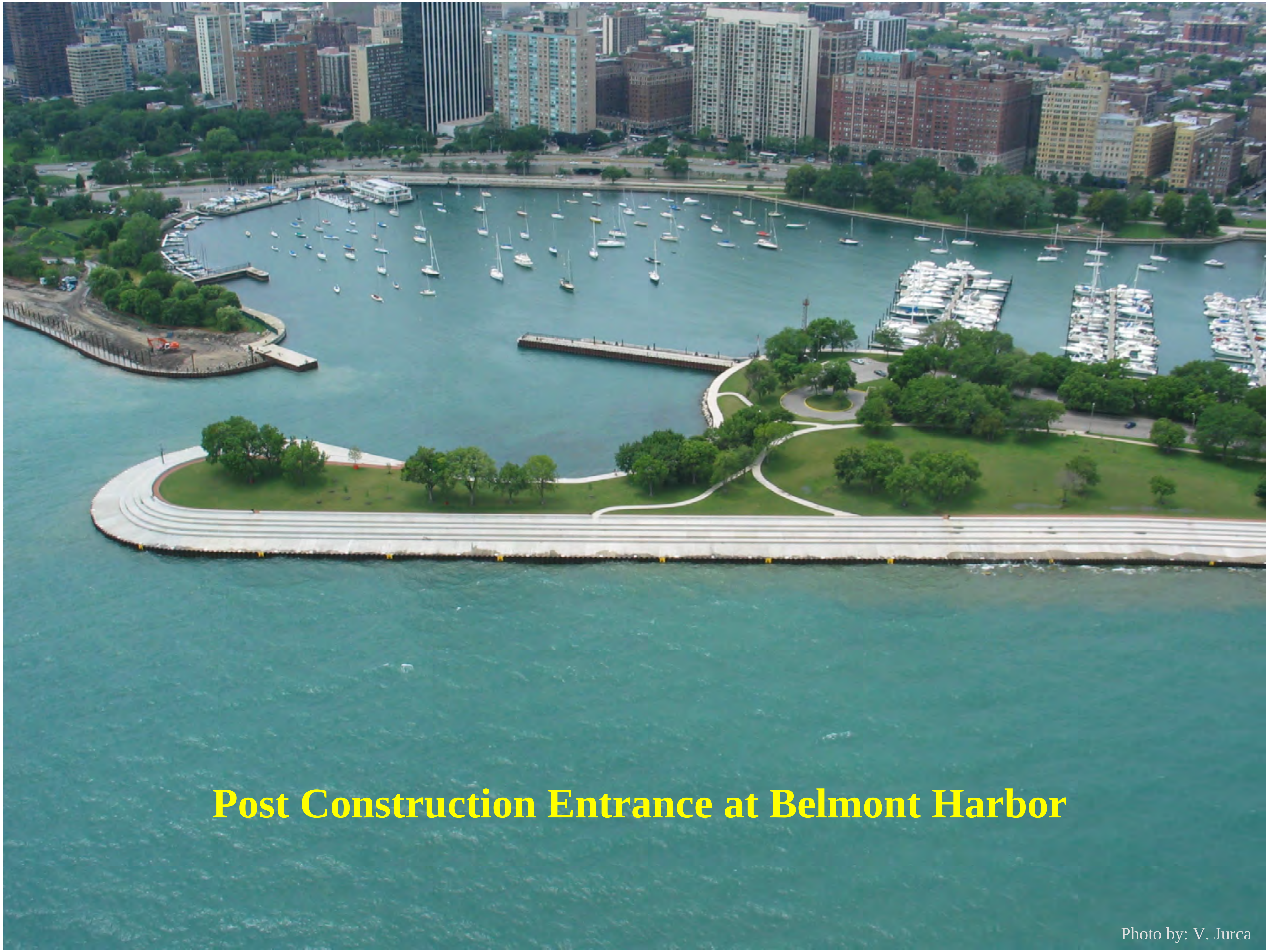
US Army Corps
of Engineers
Chicago District

Completed Projects

Montrose North Pre-Construction


Montrose North Post Construction
Photo by: V. Jurca

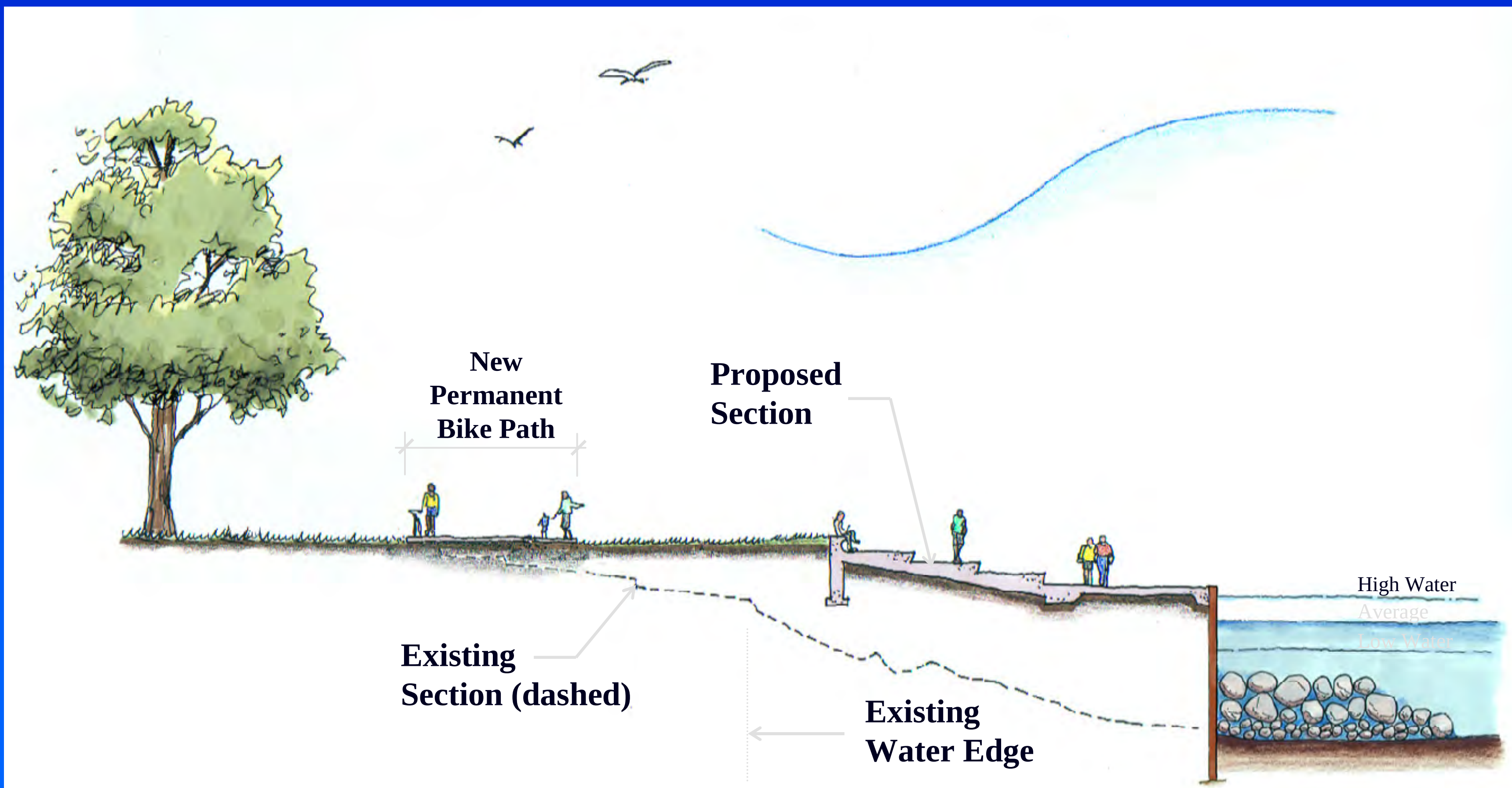

Pre-Project Conditions at Entrance to Belmont Harbor

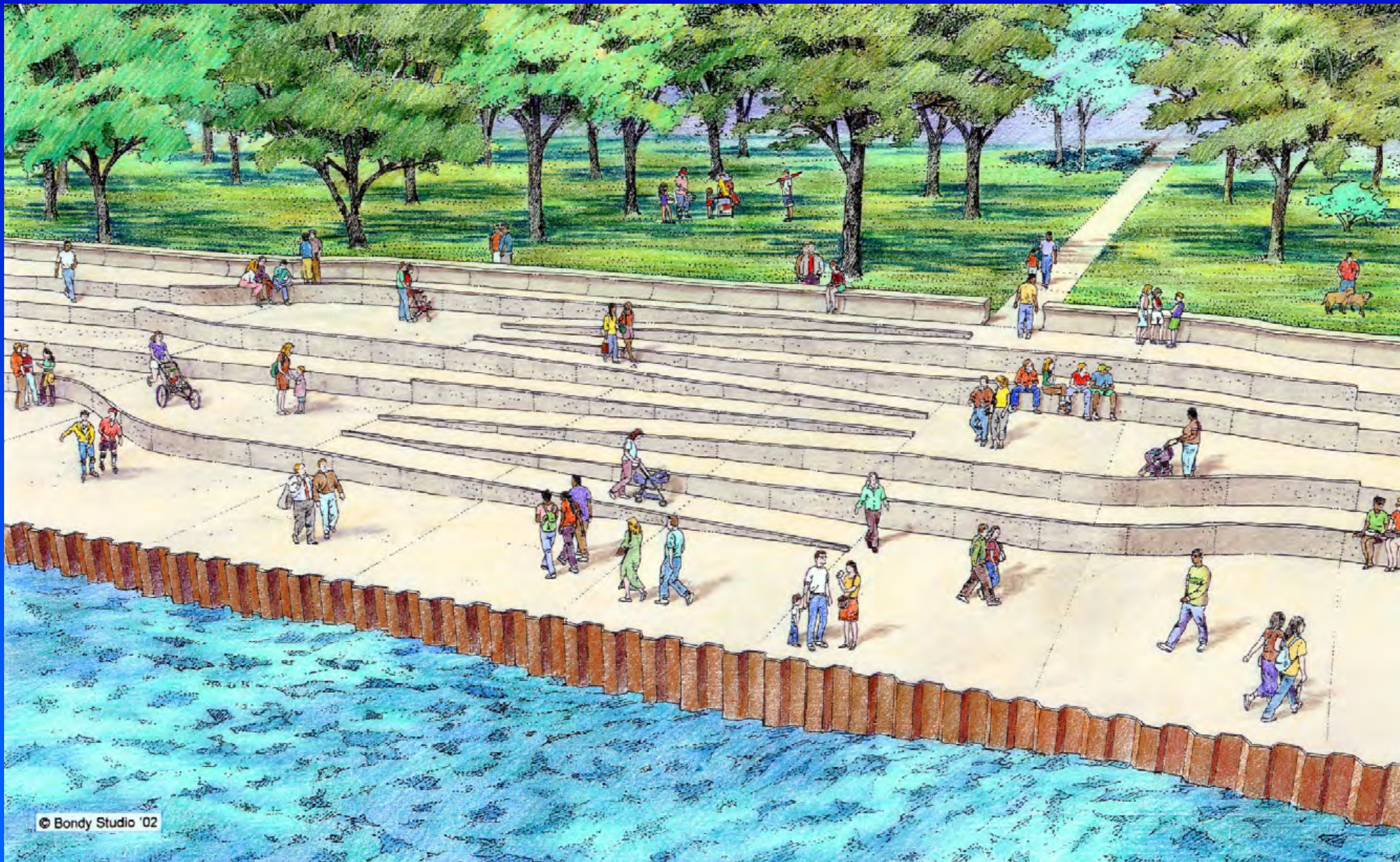

Post Construction Entrance at Belmont Harbor
Photo by: V. Jurca


Solidarity Drive
Photo by: V. Jurca

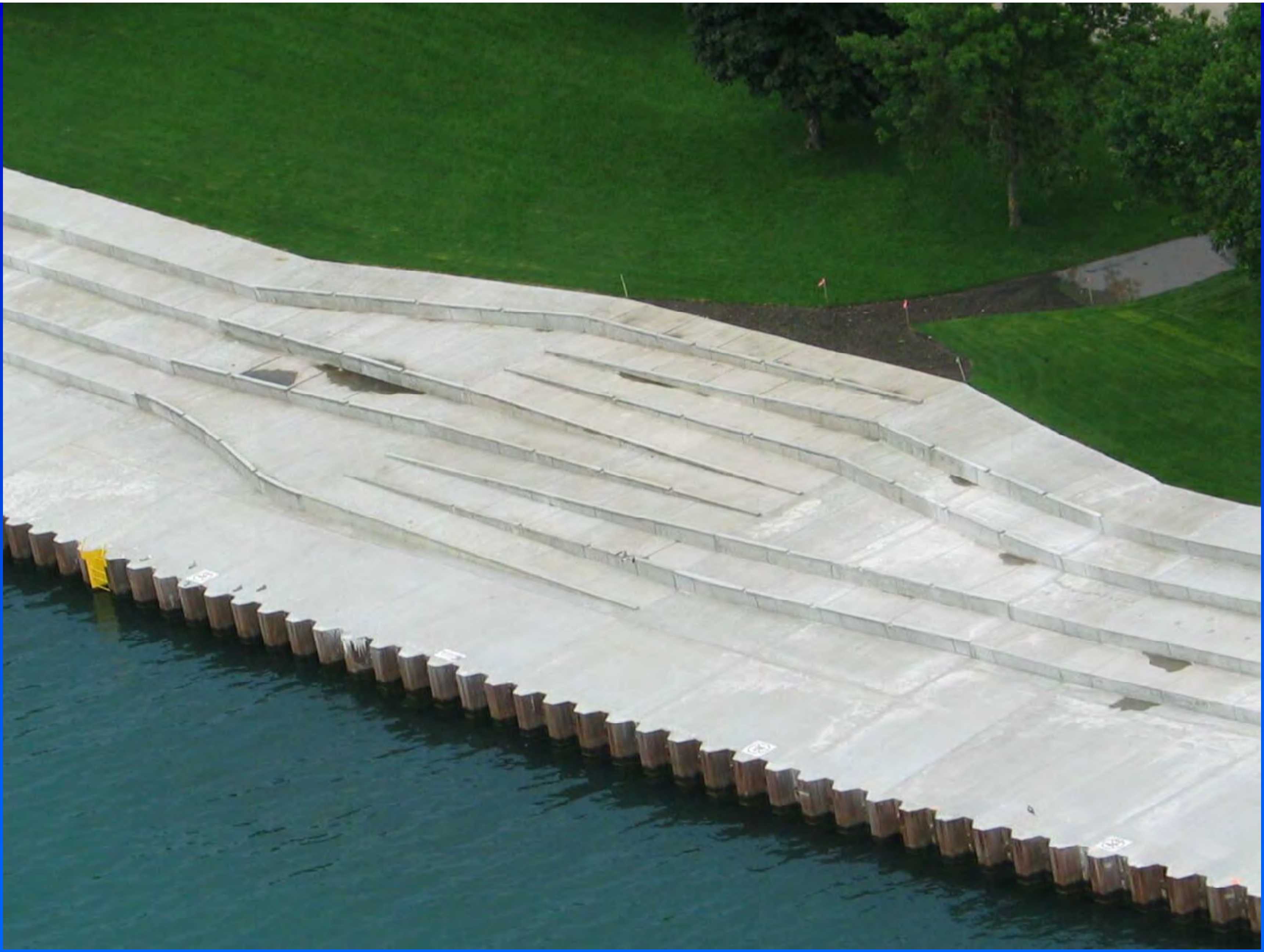

I-55 to 30th Street Revetment
Photo by: V. Jurca

Recreational Enhancements





Conceptual Design of Universal Access System



Universal Access Constructed on the Montrose Peninsula

Chicagoans Enjoying the Lakefront

37th to 40th Street

3180 ft. Revetment and Land Expansion Creating Approximately 15 Additional Acres of Parkland

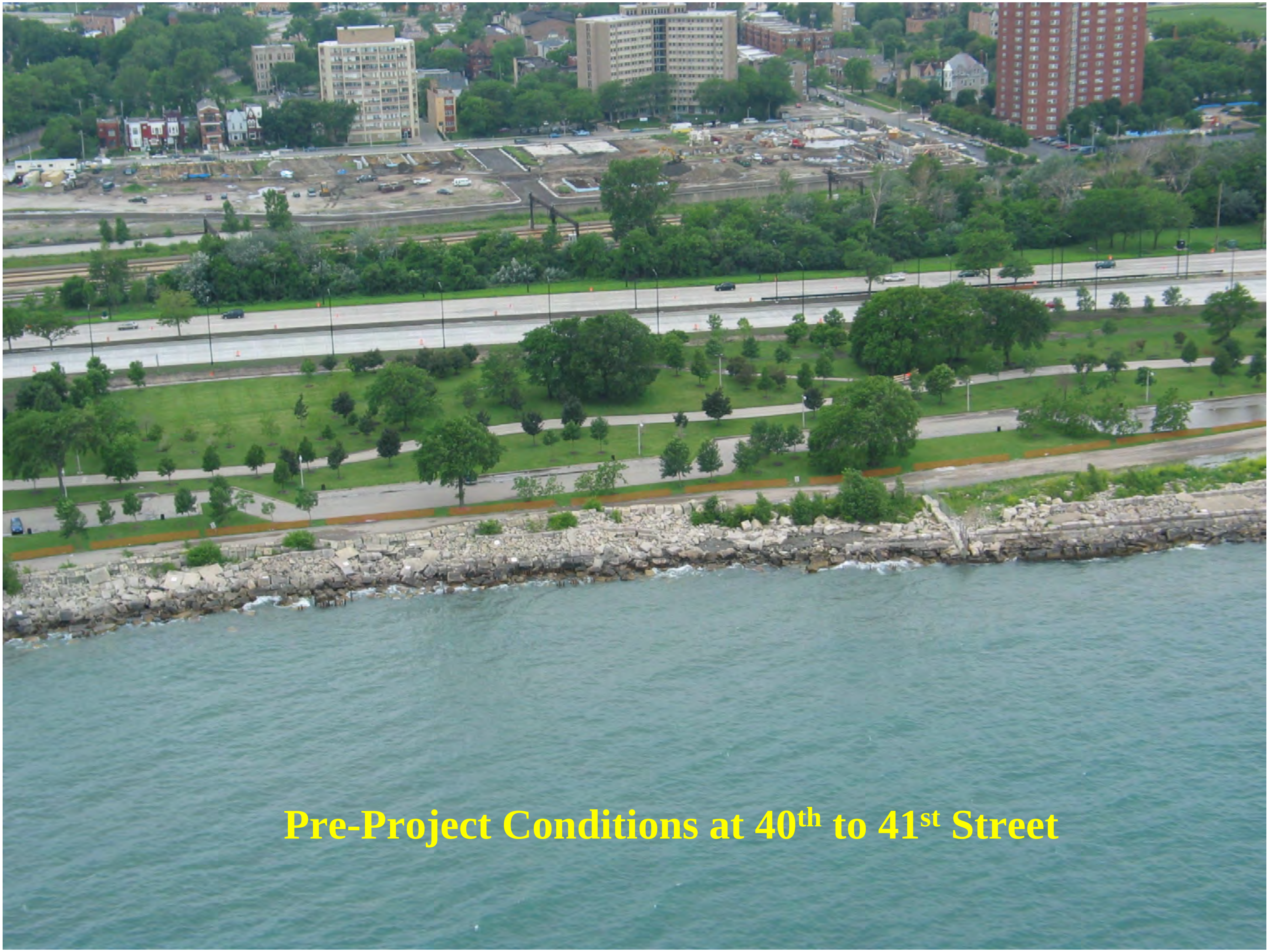

Construction and Land Expansion at 37th to 40th Street


Before
AirPhotoUSA


After
AirPhotoUSA

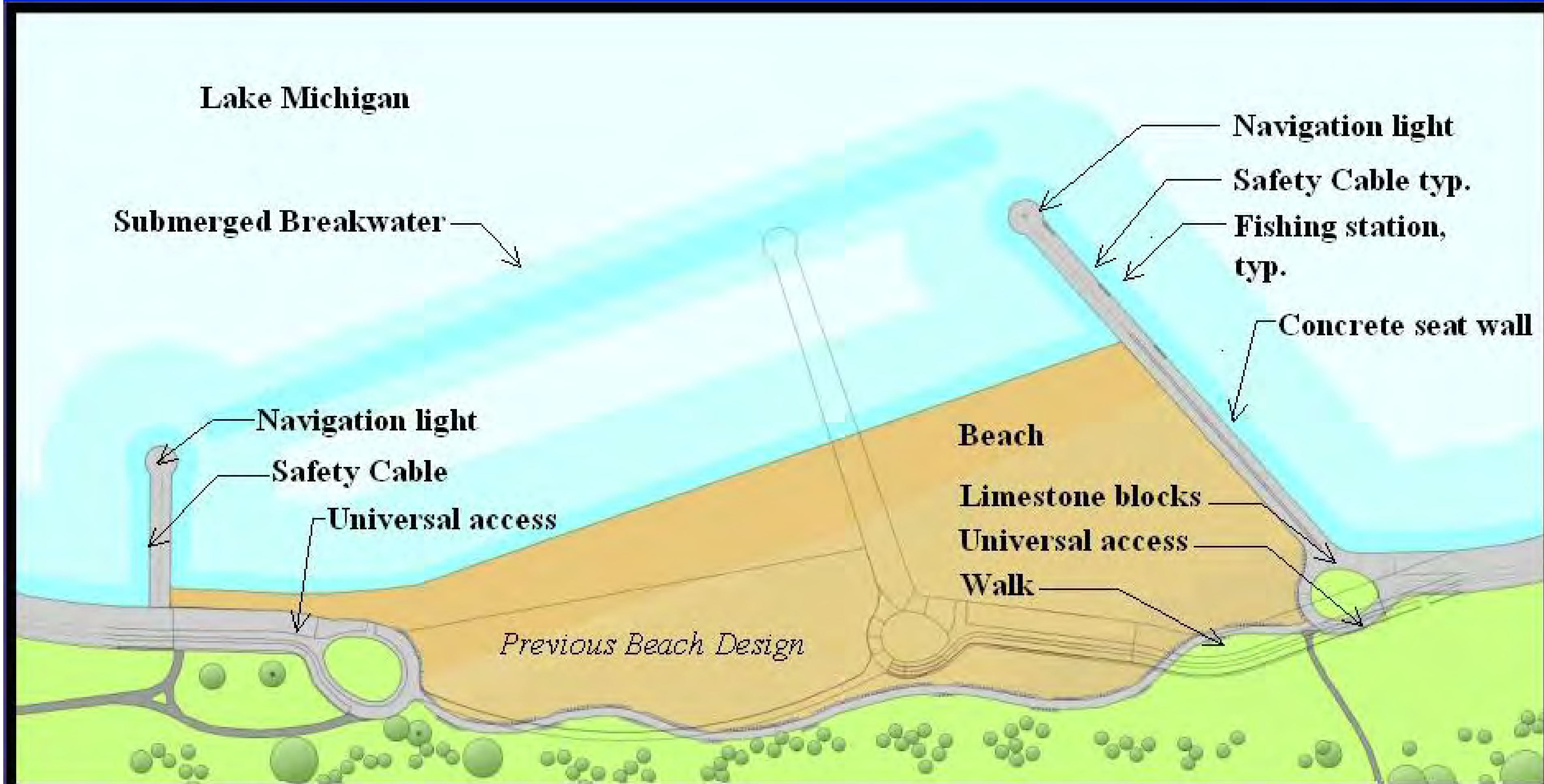

31st Street Beach
Photo by: V. Jurca

31st Street Beach



Pre-Project Conditions at 40th to 41st Street

Conceptual Beach Design for 40th to 41st Street



Morgan Shoals

Conceptual Beach Design for Morgan Shoals

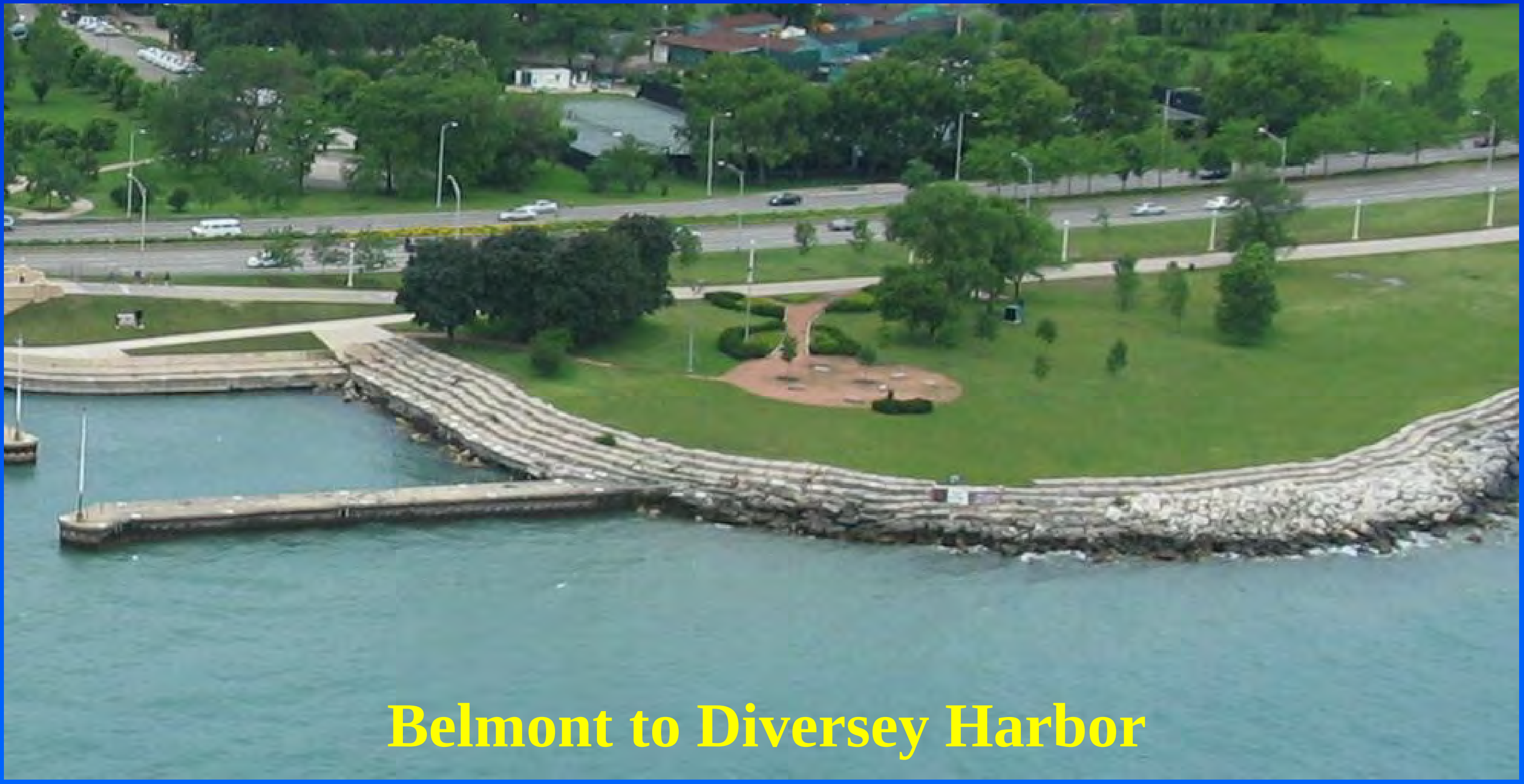
US Army Corps
of Engineers
Chicago District

Preserving the Historical Nature of the Chicago Shoreline

Preliminary Use of Form Liners

Step Relief Detail for Test Section Form Liners

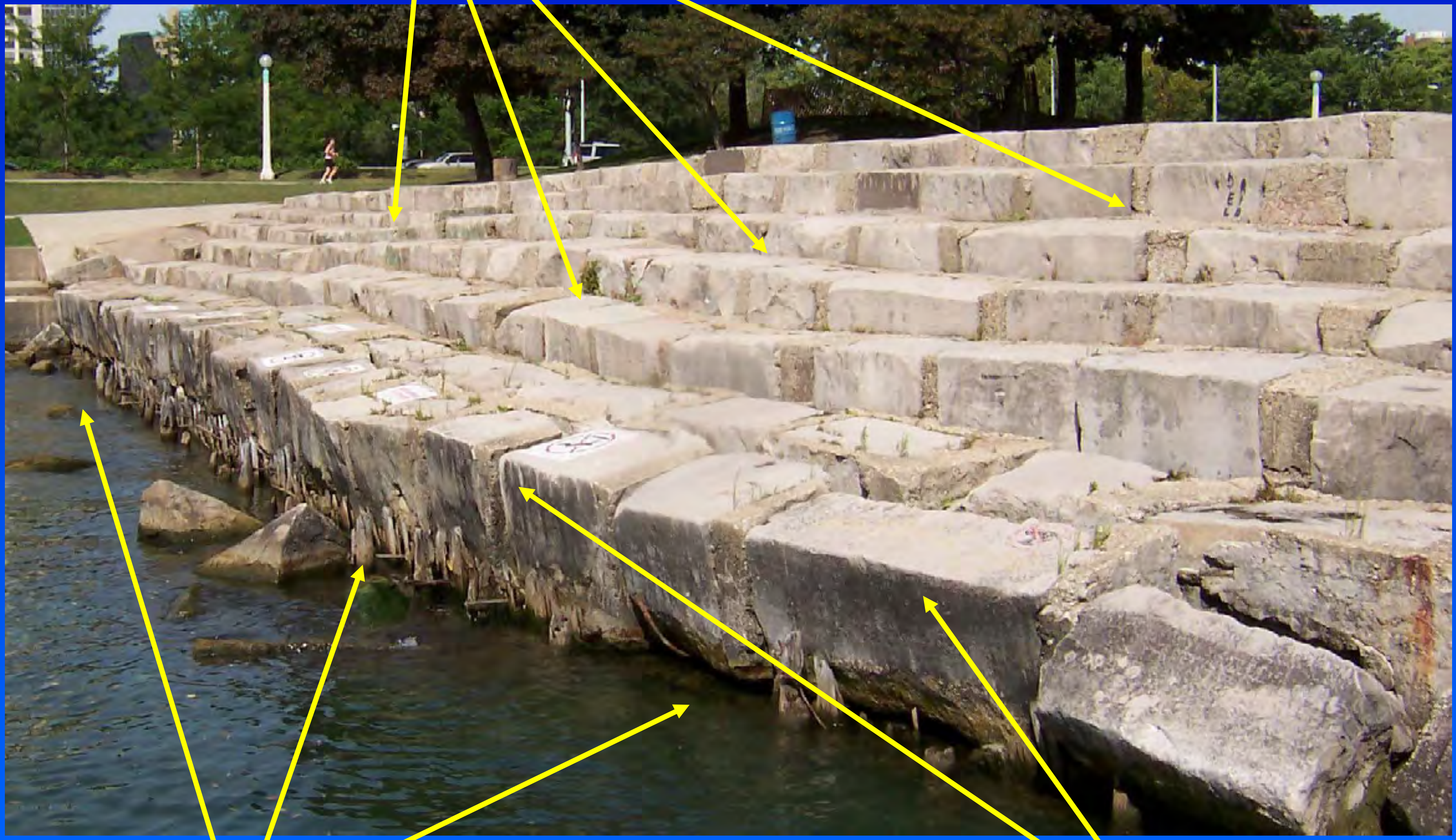
REVETMENT RESTORATION AND STEP STONE REPLACEMENT USING SHPO APPROVED FORM LINERS



Belmont to Diversey Harbor

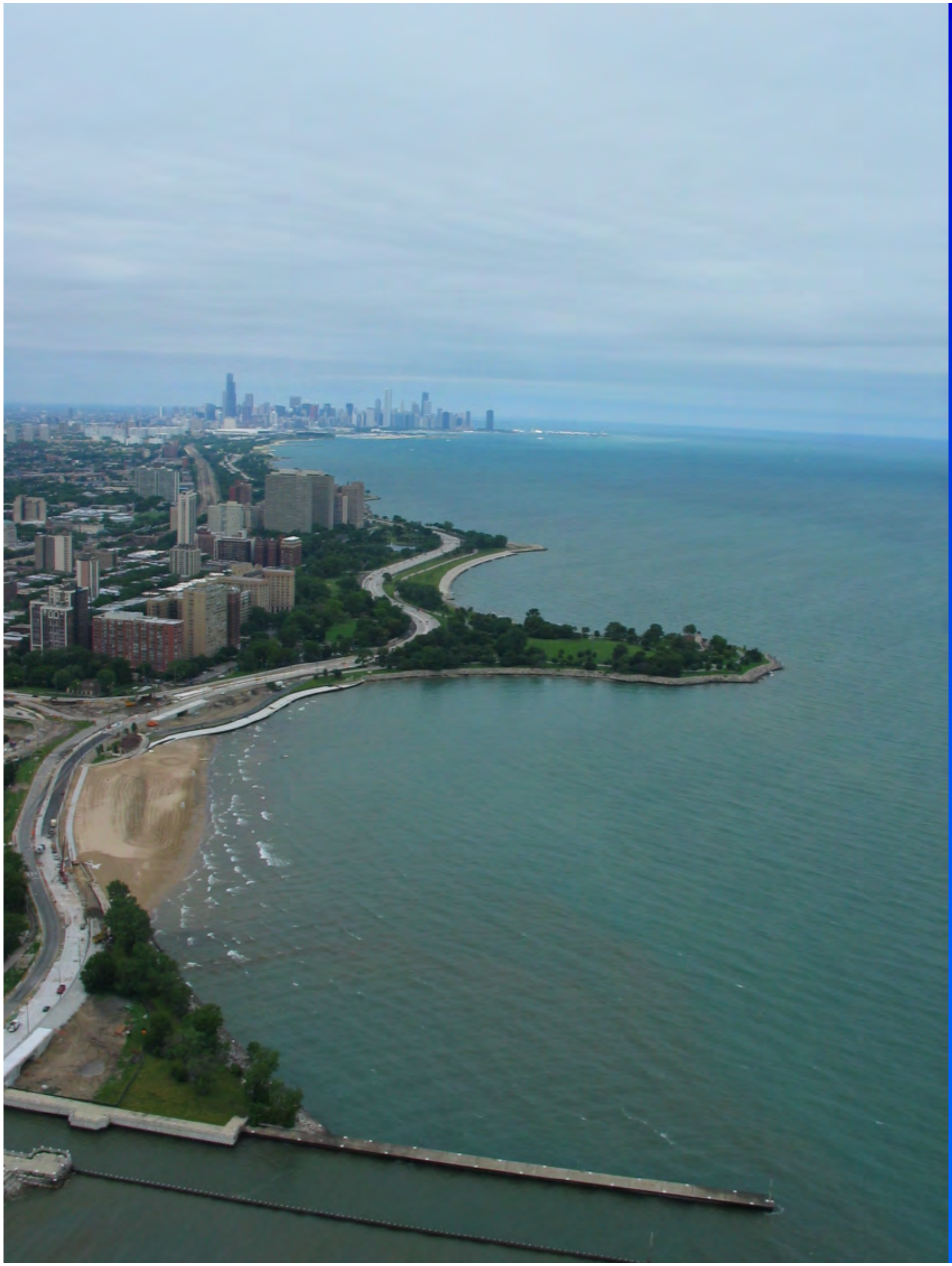
REVETMENT RESTORATION

Fill Voids with Low Pressure/High Viscosity Grout



Raise Elevation of Toe Stone

Reset Lowest Step



PROMONTORY POINT

- **Controversial Rehab Project**
- **Construction begins in 1920’s with fill operations and shore protection consisting of stone filled bulkheads covered with capstones**
- **Revetment steps added in 1930’s as part of WPA program**
- **Park landscaped by Alfred Caldwell**

“RESIDENTS OPPOSE CONCRETE SEA WALL”

“City plan for Point called far too pricey”

Chicago Sun-Times

Chicago Tribune

“Promontory Point panel formed Alderman aims at rehab dispute”

Chicago Tribune

“Promontory Point talks progressing”

Chicago Tribune

“Report boosts opponents of concrete lakefront wall”

Chicago Tribune

“55th Street promontory project halted”

Chicago Sun-Times

“Point talks collapse …”

Hyde Park Herald

“POINT REHAB WINS HOUSE SUPPORT”

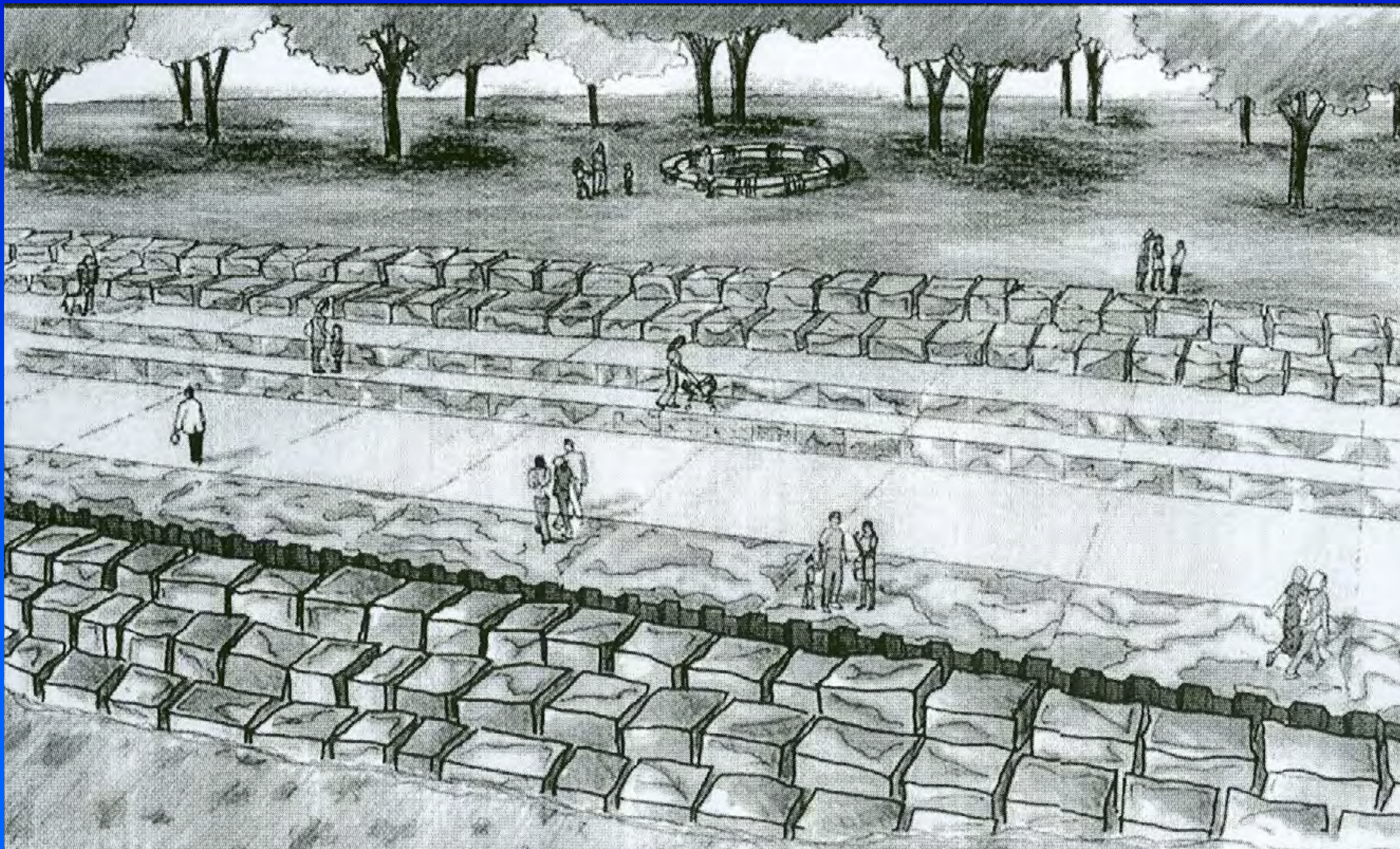
Hyde Park Herald

“Between rock, hard place, parks seek a compromise Point's top steps may be limestone”

Chicago Tribune

“Promontory compromise floated”-Chicago Tribune

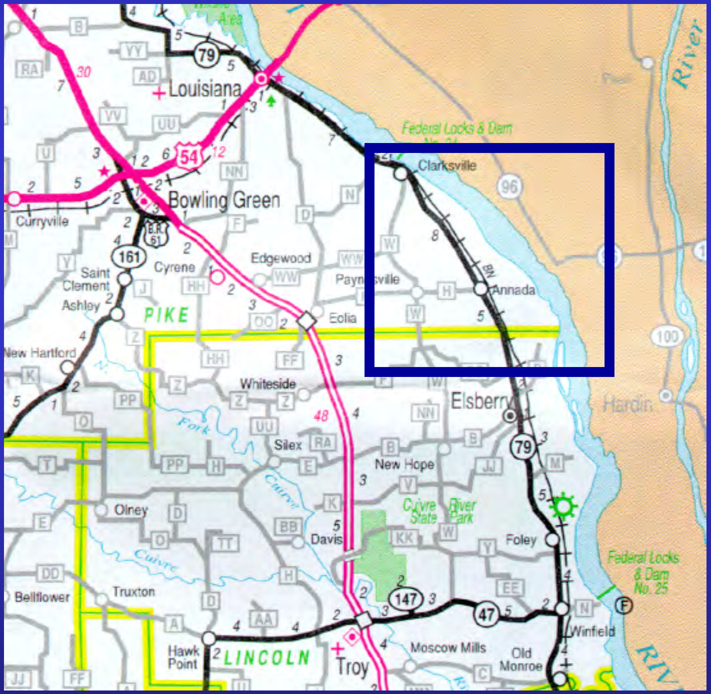

DANGER




Questions ?

CARROLL ISLAND MICROMODEL STUDY

River Miles 273.0-263.0



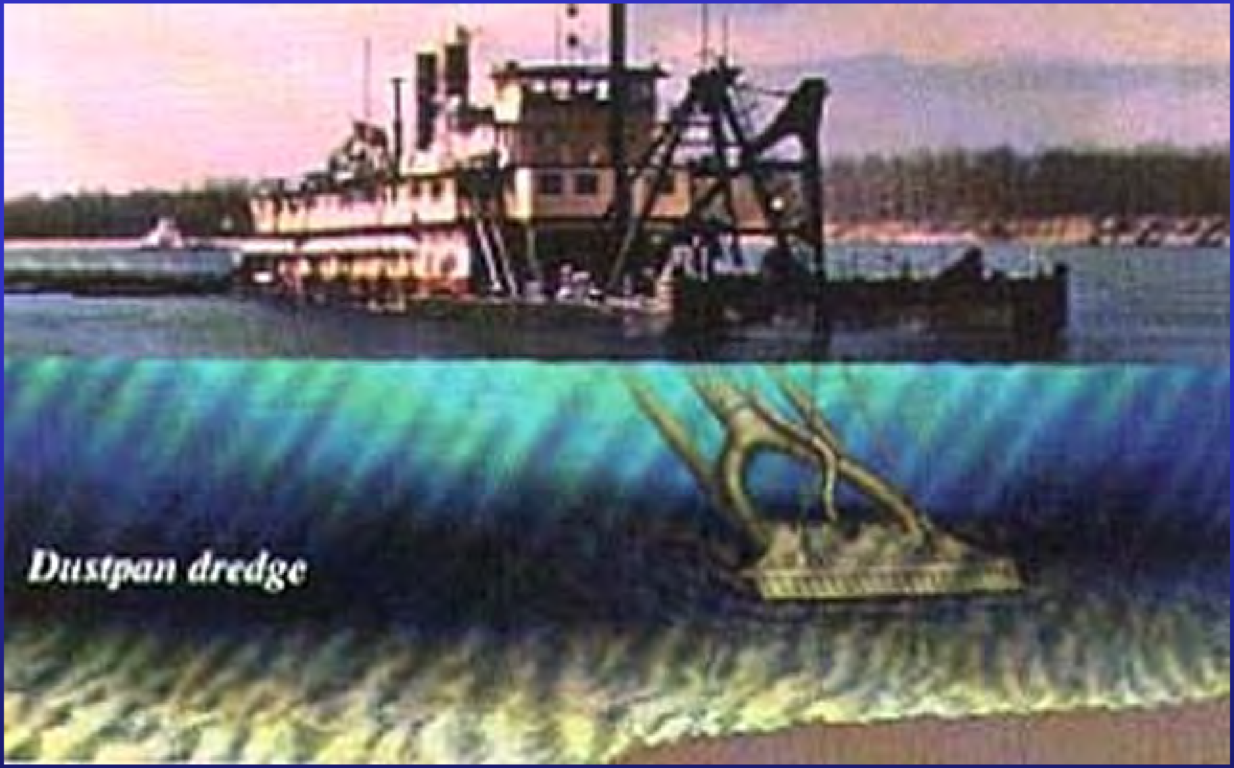
Sponsored by the

Avoid and Minimize Program

One Corps Serving the Armed Forces and the Nation

Purpose of the Study

The primary goal of this micromodel study is to reduce or eliminate the need for repetitive dredging adjacent to the upstream and downstream ends of Carroll Island, while maintaining or improving current environmental conditions.



Study Reach Characteristics

US Army Corps of Engineers

Multiple Round Point Structure

Chevron Structures

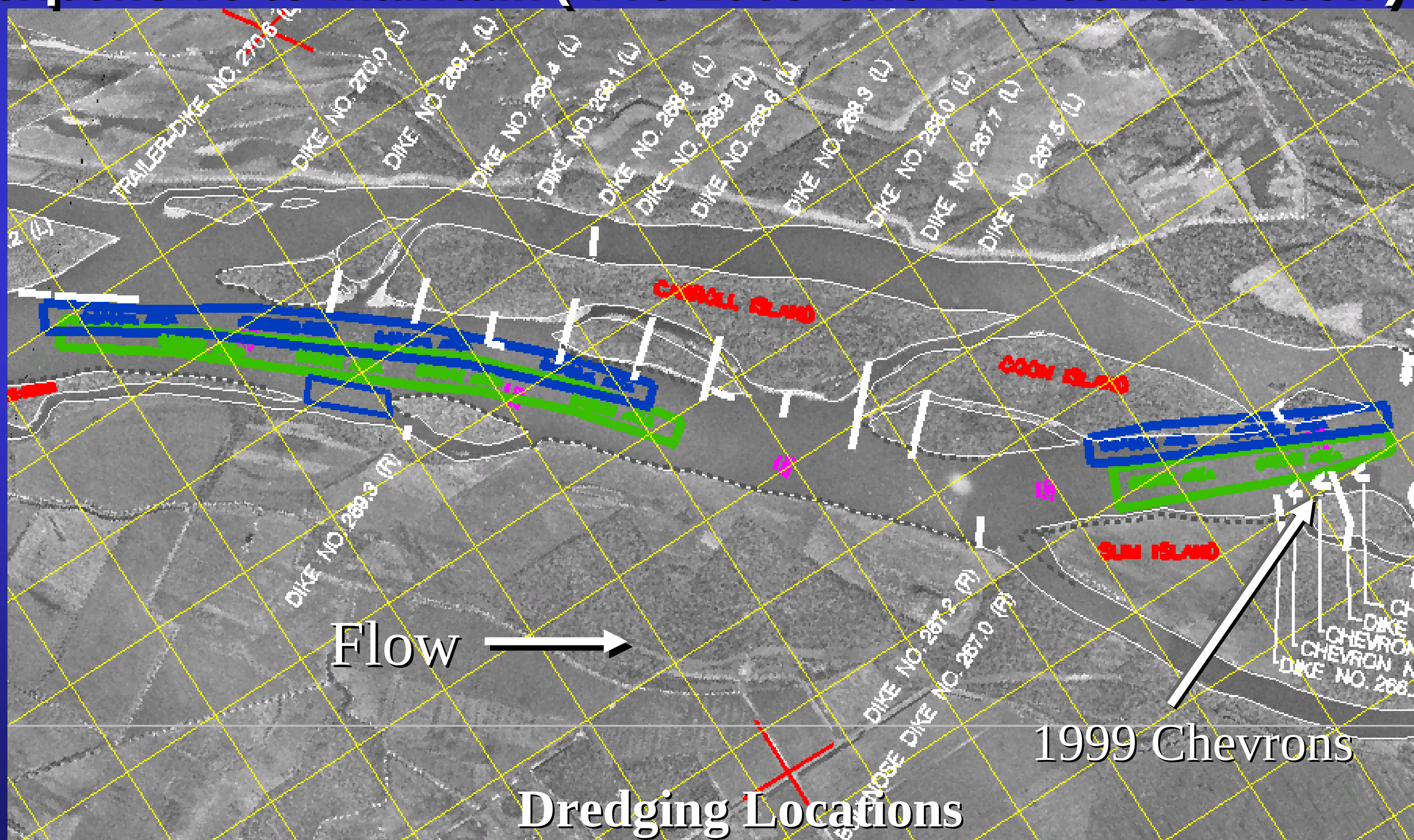
Flow Distribution

Notched Off-Bank Revetment

Carroll Island Dredging Costs

US Army Corps of Engineers

- **$6.4 Million between 1979 and 2001**
- **Upstream and Downstream dredging locations are equally expensive to maintain (Pre-1999 Chevron construction)**



US Army Corps of Engineers

Study Reach Challenges

- **Lock and Dam 24 as a controlling factor**
- **Important Environmental habitat in multiple side channels**
- **Existence of numerous buried pile dike structures**
- **Miles of Revetment**
- **Repetitive Dredging and artificial channel placement**

Model Characteristics

- Horizontal scale of 1” : 800
- Vertical scale of 1” : 27
- Distortion of 29.6
- Volumetric flow rate is approximately 2.7 GPM
- Table slope is approximately 0.00625 in/in

Micromodel Setup

US Army Corps of Engineers

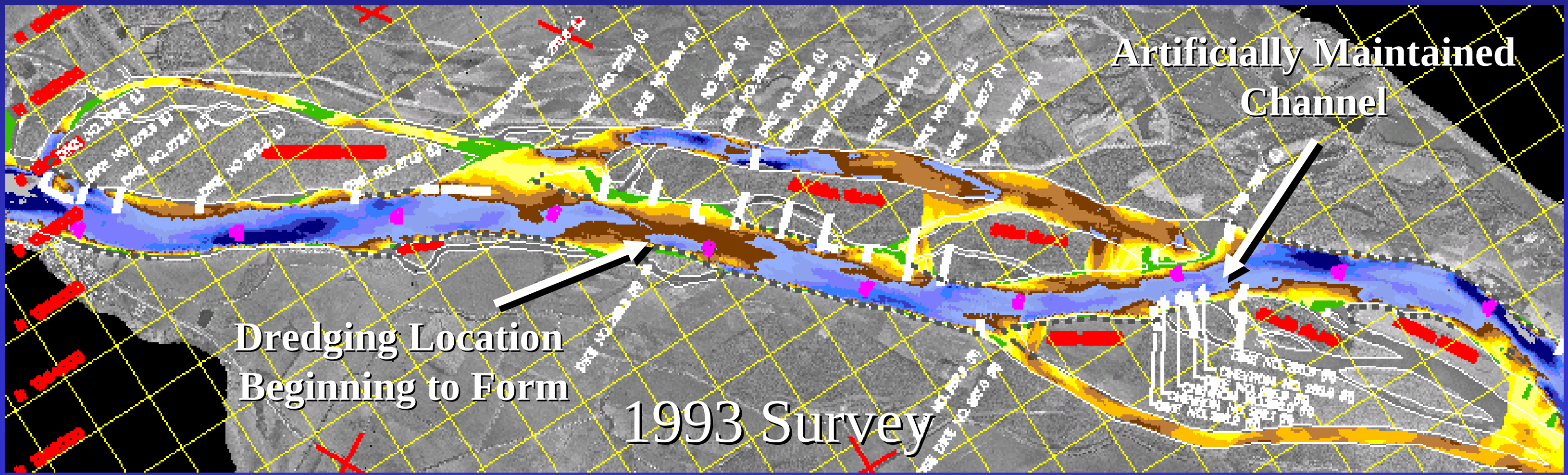
Model Insert

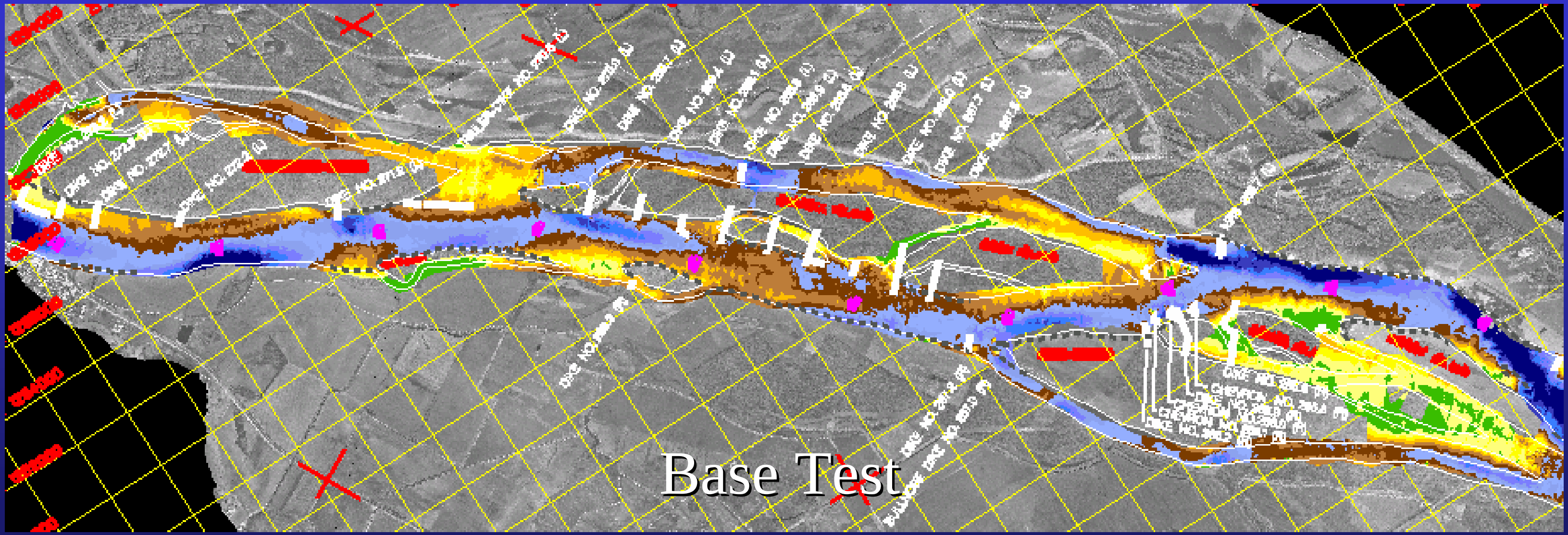
Standpipe

Storage Manifold

Model Calibration

US Army Corps of Engineers

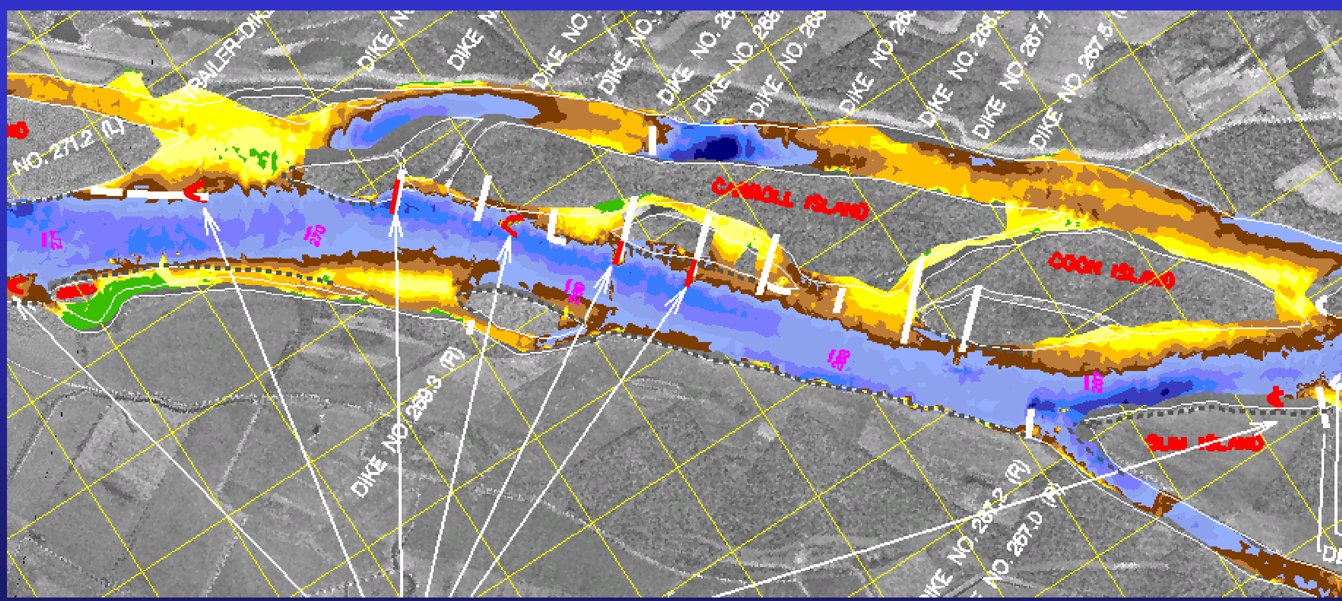




US Army Corps of Engineers

Alternative Testing

- 18 Alternatives Tested
- Dike Structures and Chevron Structures were tested in different combinations
- Alternatives 15 and 16 accomplished the study goals, although Alternative 16 added the additional benefit of an additional Chevron Structure, and one less Raised Dike Structure



Carroll Island Micromodel Summary

US Army Corps of Engineers

- Model Study was initiated to alleviate repetitive dredging concerns
- Innovative structures already implemented in this reach, such as a Multiple Round Point Structure and a Chevron field.
- Important Environmental reach, with many side channels.
- Excellent Model Calibration
- 18 Design Alternatives tested
- Design implementing 4 Chevrons and 3 Rock Dikes chosen as the best solution

US Army Corps of Engineers

Questions?

US Army Corps of Engineers

Jasen Brown

US Army Corps of Engineers, St. Louis District

Applied River Engineering Center

314-263-8093

Jasen.L.Brown@mvs02.usace.army.mil

Protecting the NJ Coast Using Large Stone Seawalls

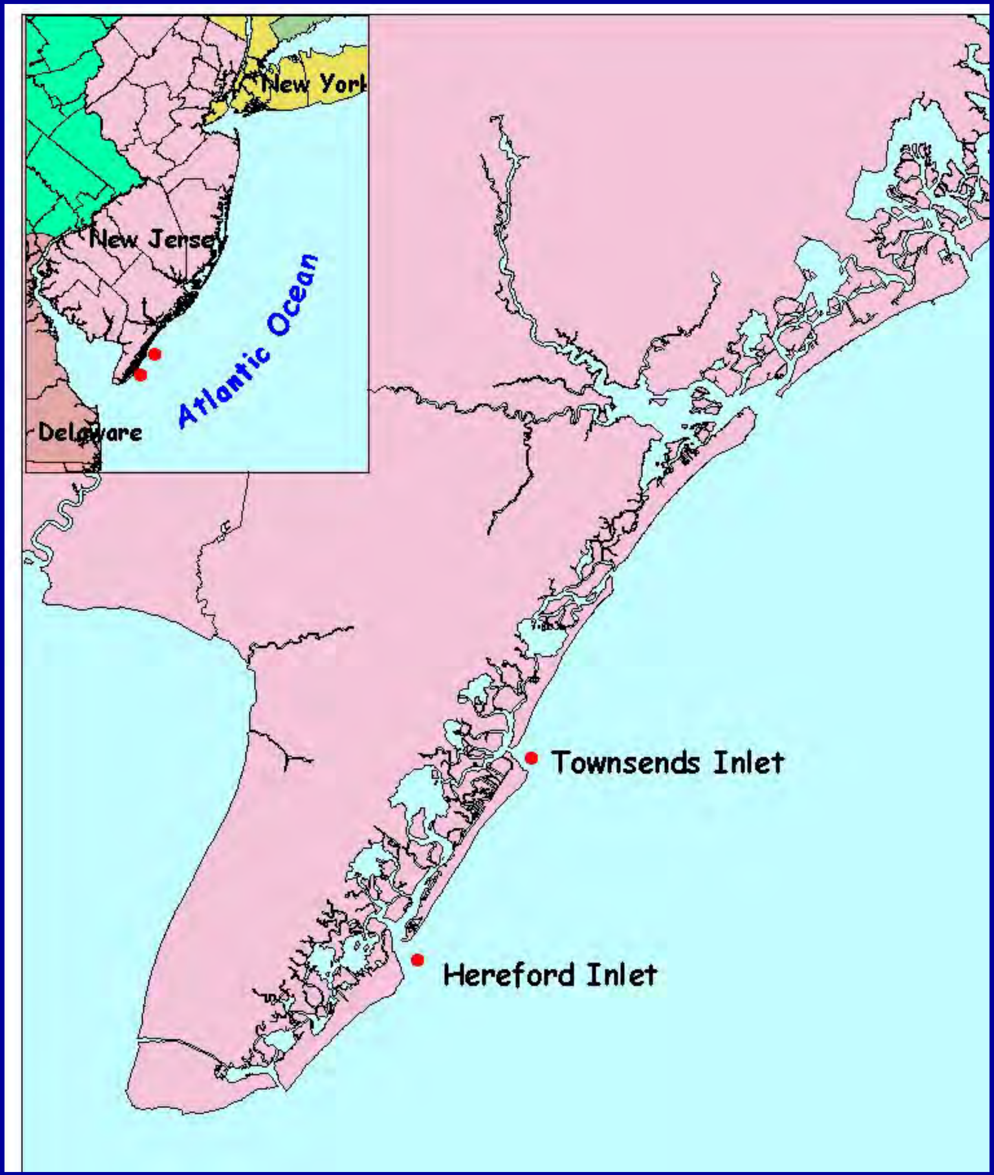
Cameron Chasten

Philadelphia District

Overview

- Project Description
- Design Overview
- Seawall Construction
- Deepwater Stabilization Construction
- Lessons Learned

Project Locations



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  - Failed sections

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Pre-Conditions - Hereford

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- Based on set of historical storms
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  - wave
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- SPM and CEM guidance
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- Crest height
  - Allowable wave overtopping w/ no damage
- Toe scour
  - Potential wave
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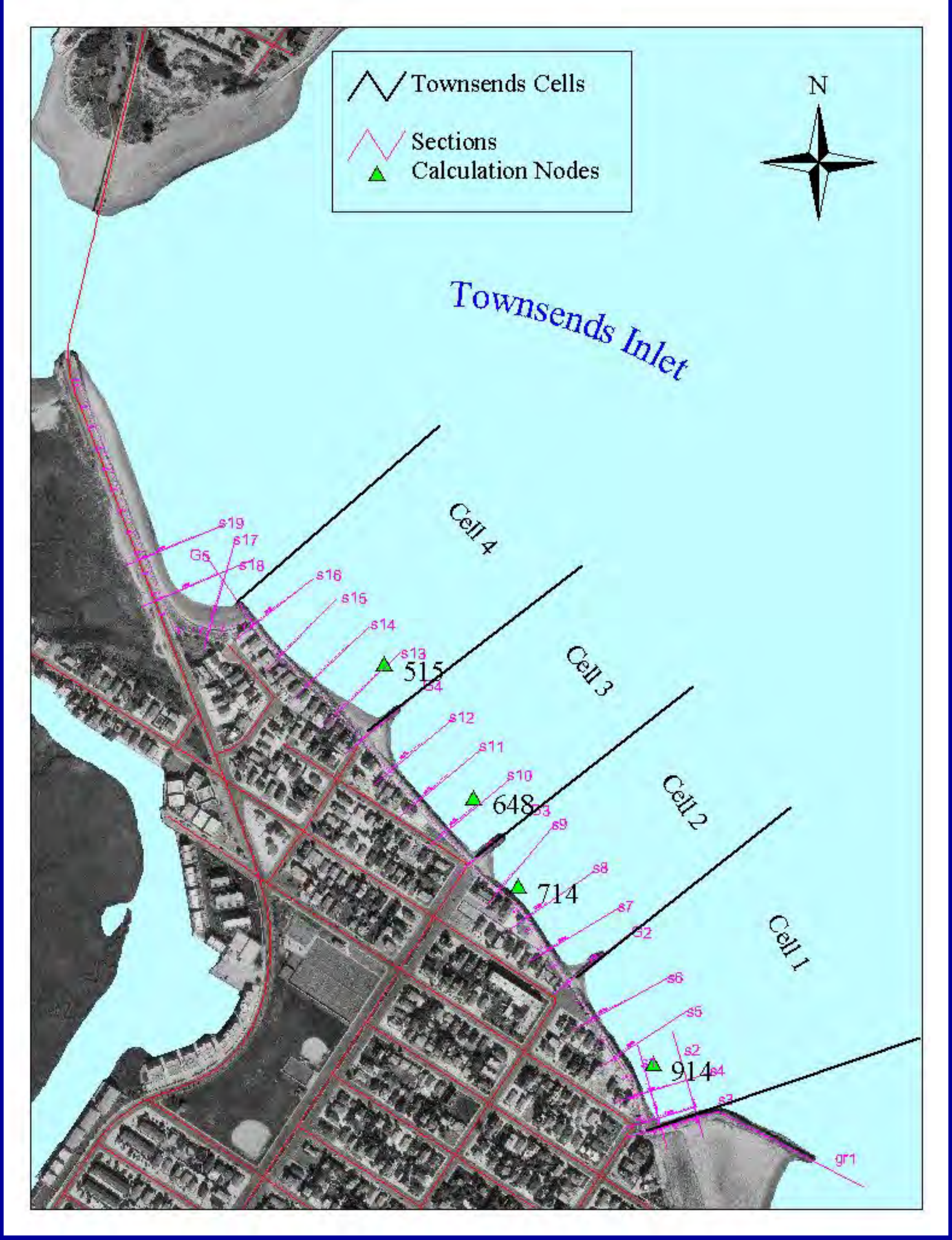
Avalon Seawall



Avalon Seawall Structure

- 3,000 ft rubble seawall
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- Marine mattress
- Sand infill

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- Two rounds of bids
  - Round 1: $25 M
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- Toe scour design and structural feature modification
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- Original Design Conservative wide berm; -15 ft depth
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- Eliminate removal effort and risk
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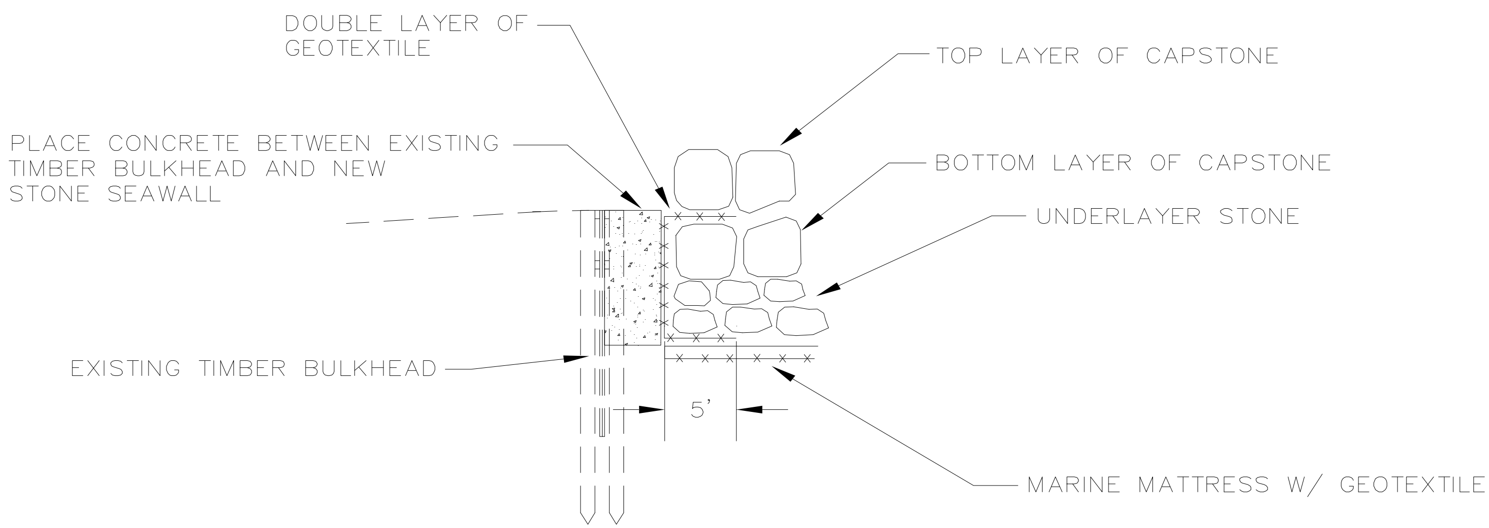
Sand Infill Design
Original



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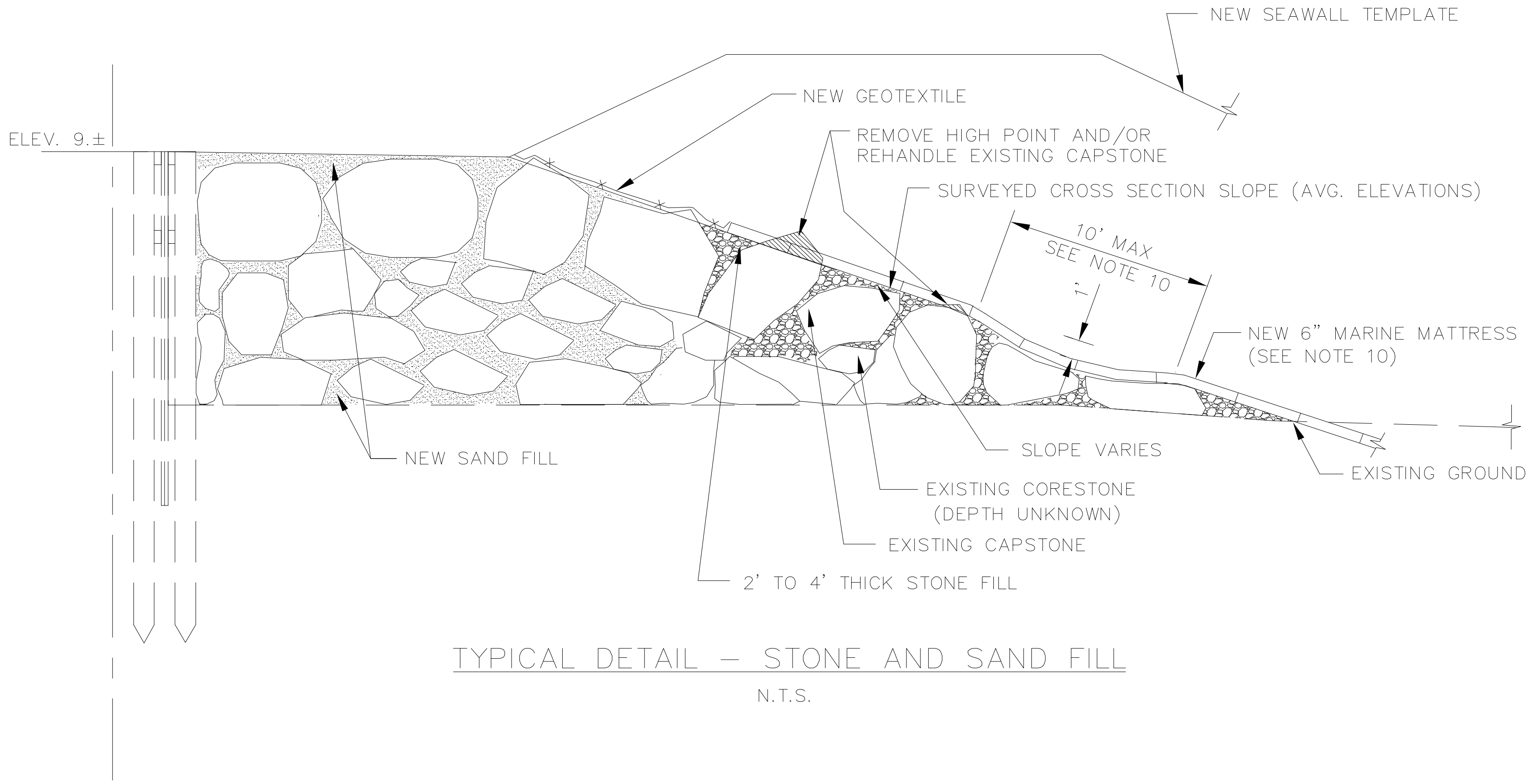

TYPICAL DETAIL – STONE AND SAND FILL

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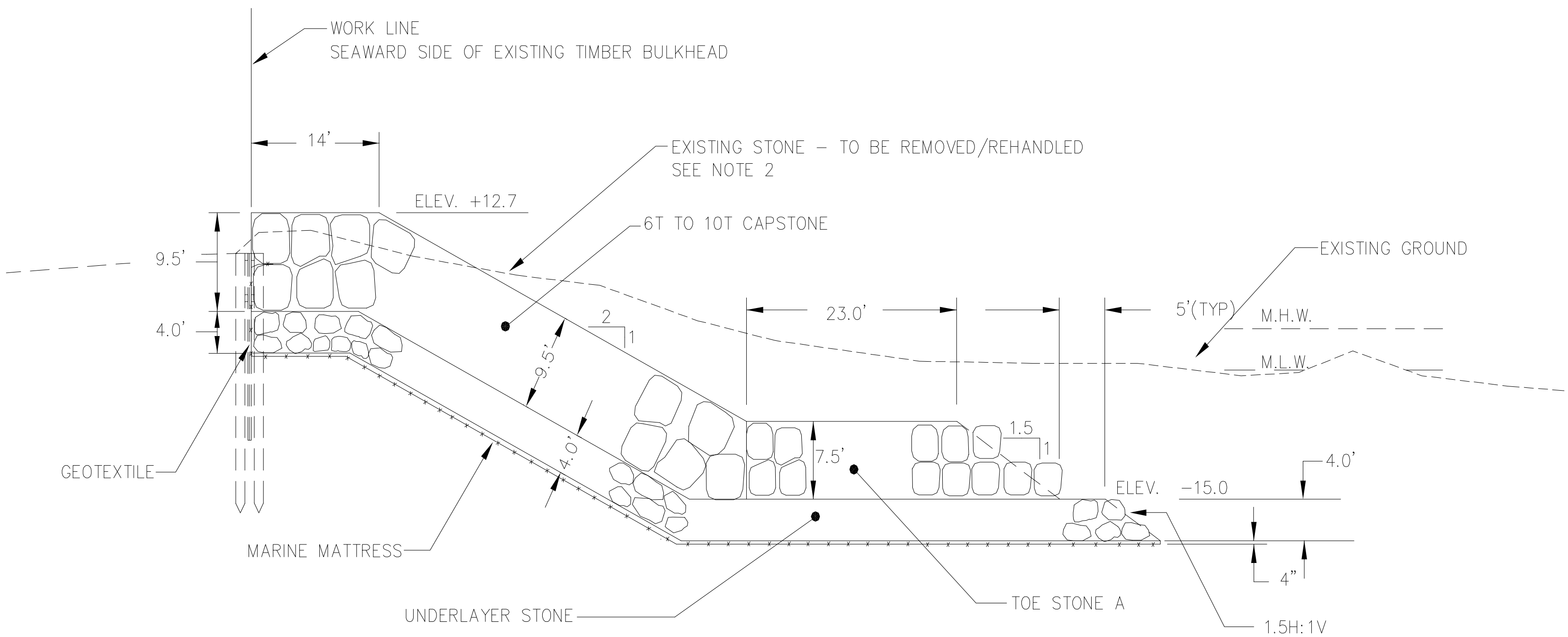

TYPICAL SECTION–STA. 3+28 TO STA. 9+30

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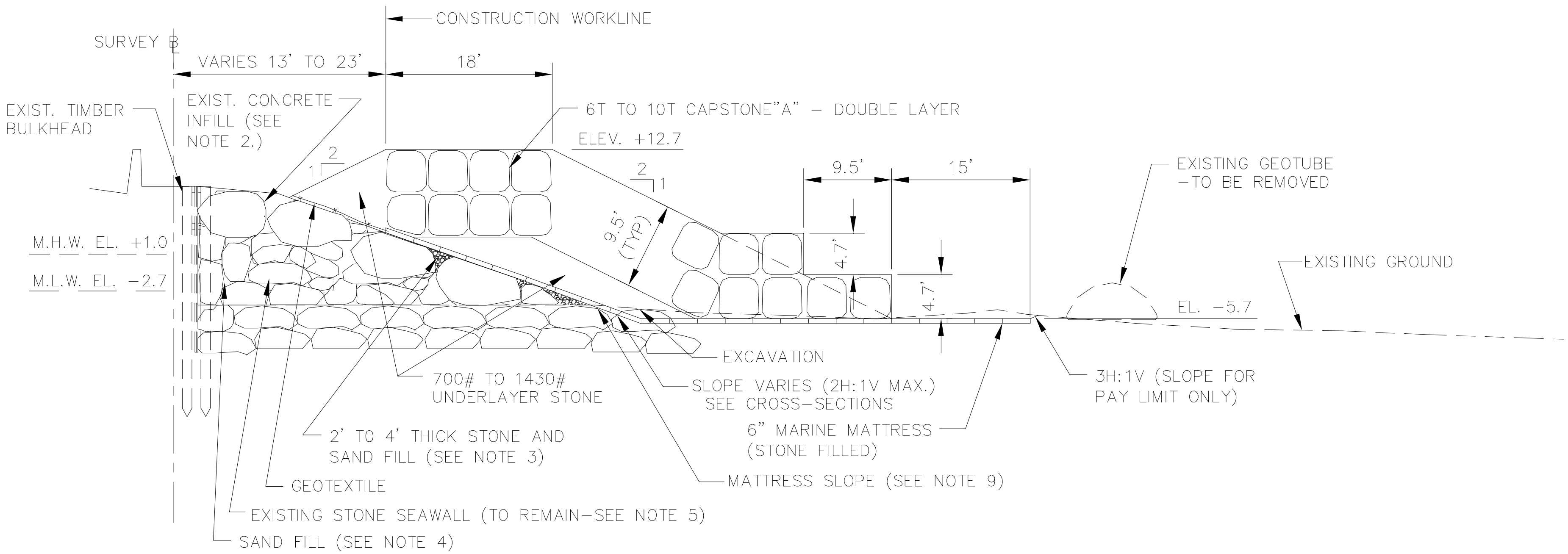

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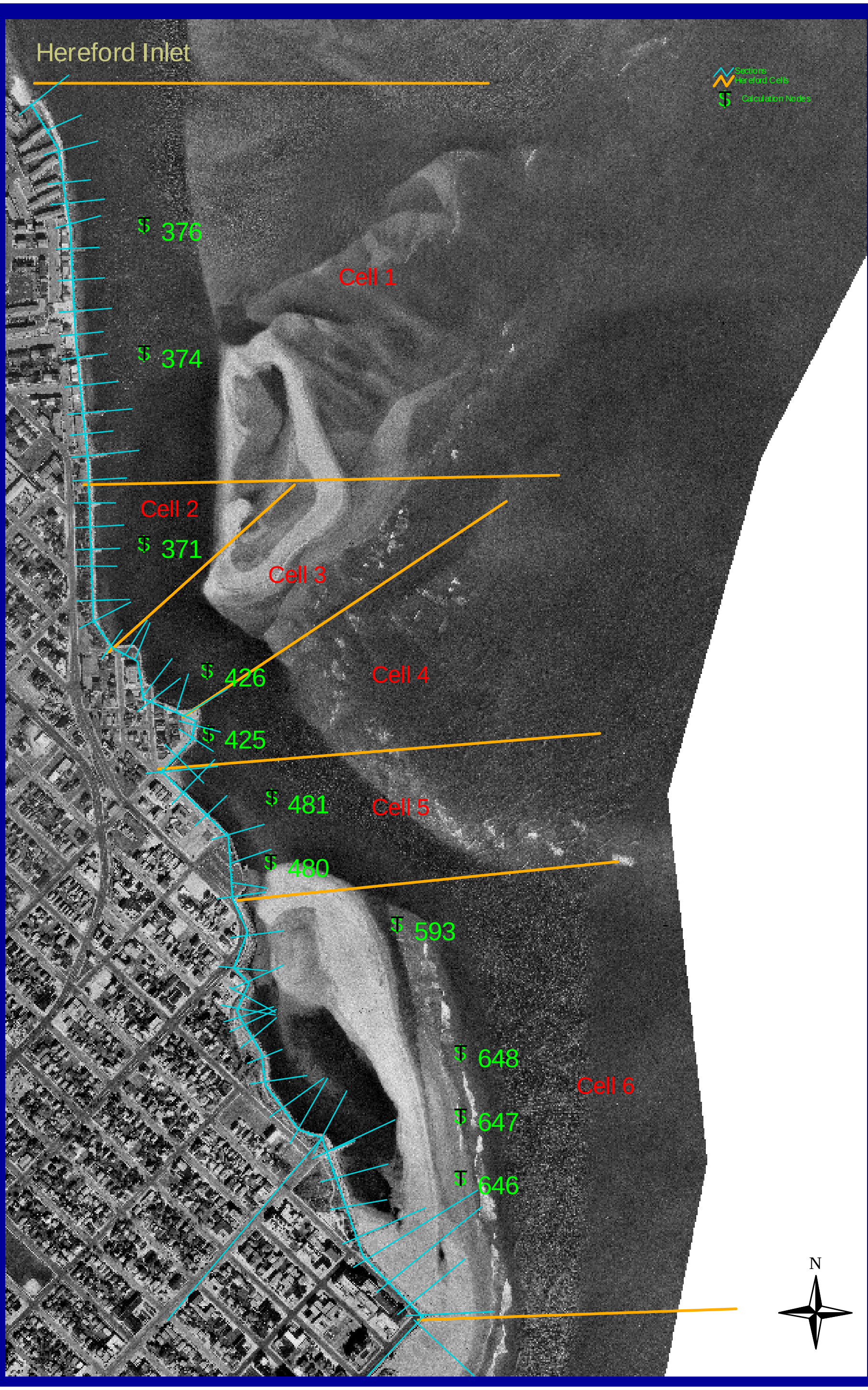
Hereford Seawall



Hereford Seawall Structure

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Multiple Projects

- Rehabilitation
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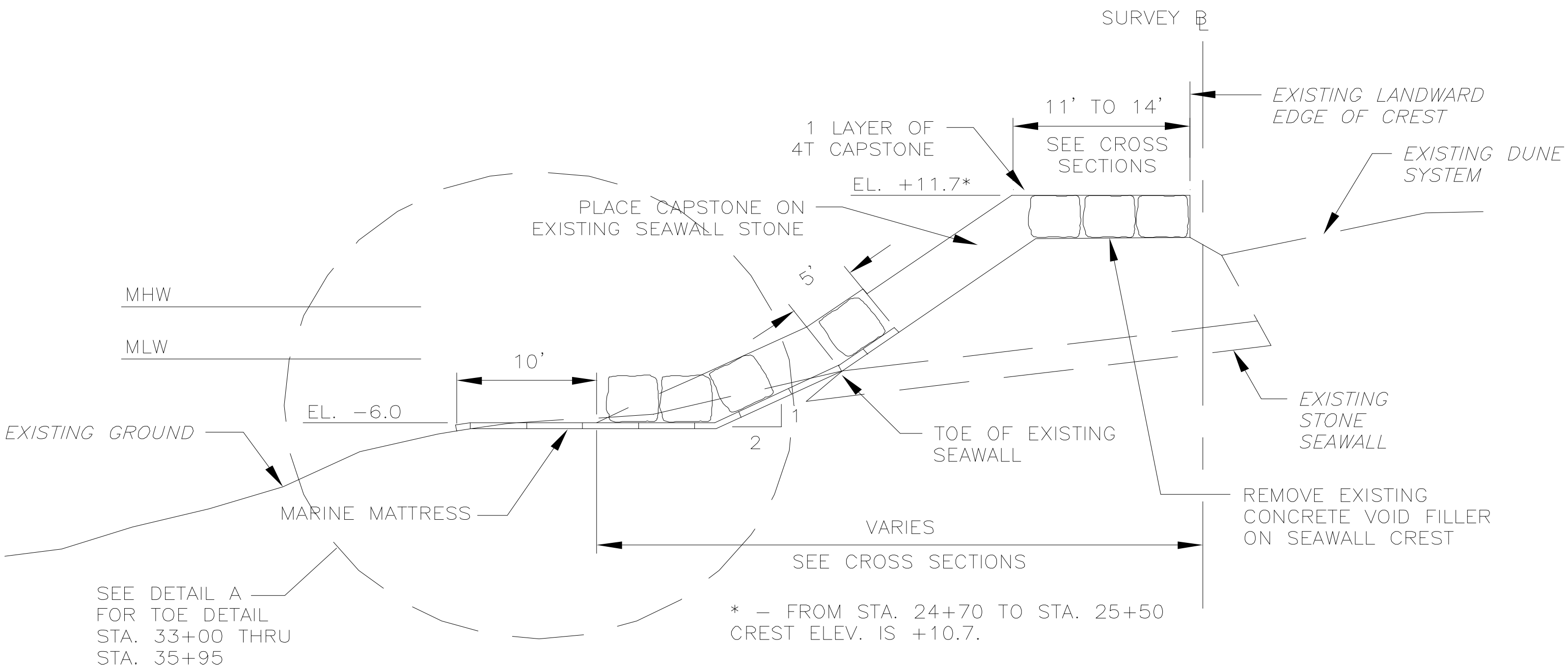
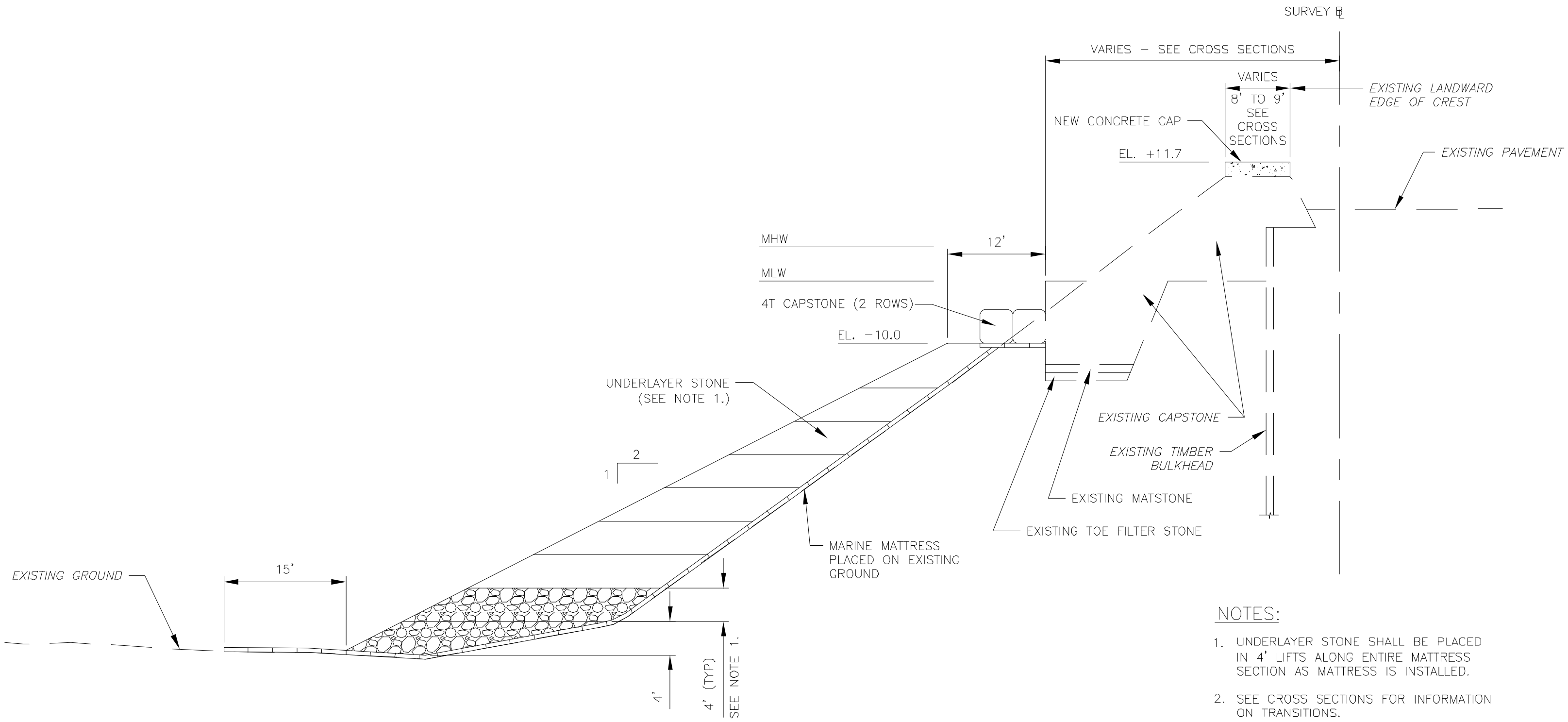


TYPICAL SECTION
STA. 24+70 TO STA. 35+03.47

Hereford Seawall
Deepwater Stabilization Detail

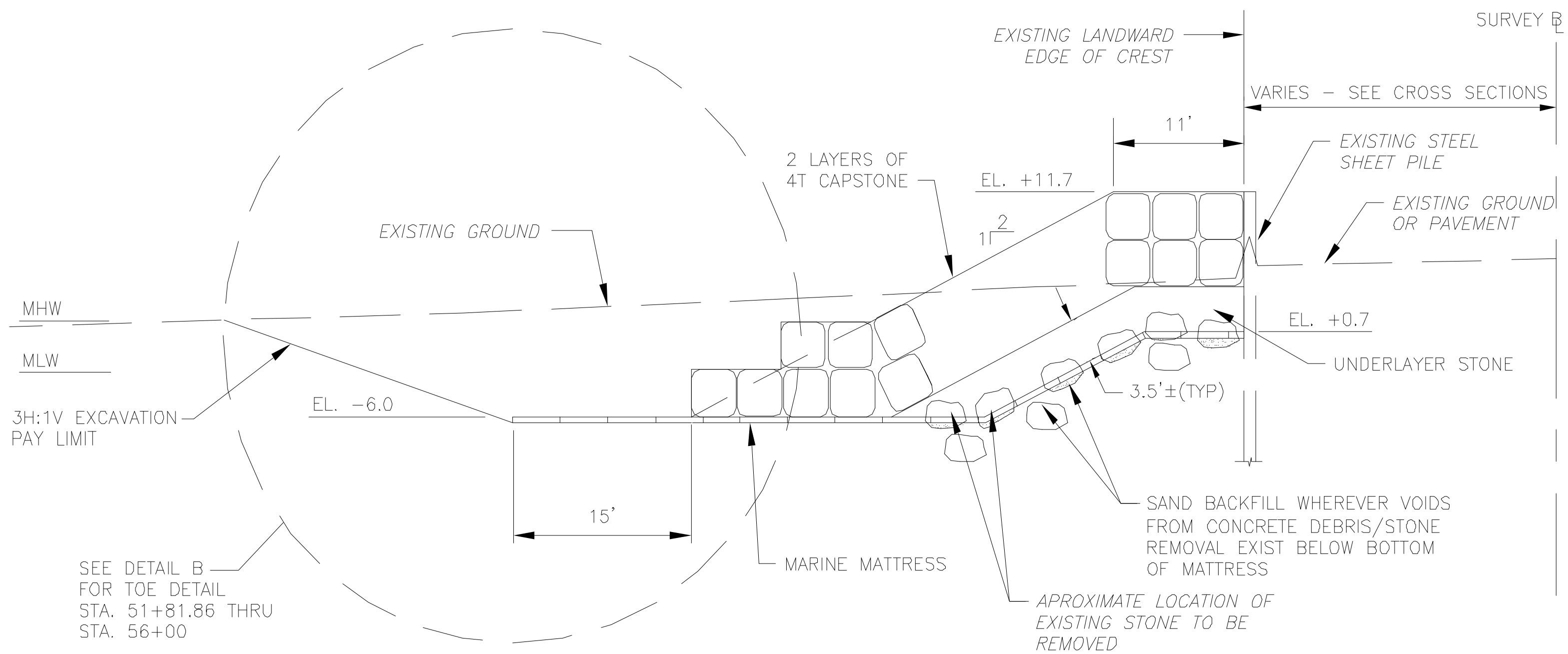


NOTES:

1. UNDERLAYER STONE SHALL BE PLACED IN 4' LIFTS ALONG ENTIRE MATTRESS SECTION AS MATTRESS IS INSTALLED.
2. SEE CROSS SECTIONS FOR INFORMATION ON TRANSITIONS.

TYPICAL SECTION – DEEPWATER STABILIZATION OF EXISTING SEAWALL
STA. 36+10.75 TO STA. 42+20

Hereford Seawall
New Seawall Detail



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STA. 44+82.89 TO STA. 56+00 @ 318° TO SURVEY BASELINE

Marine Mattress Description

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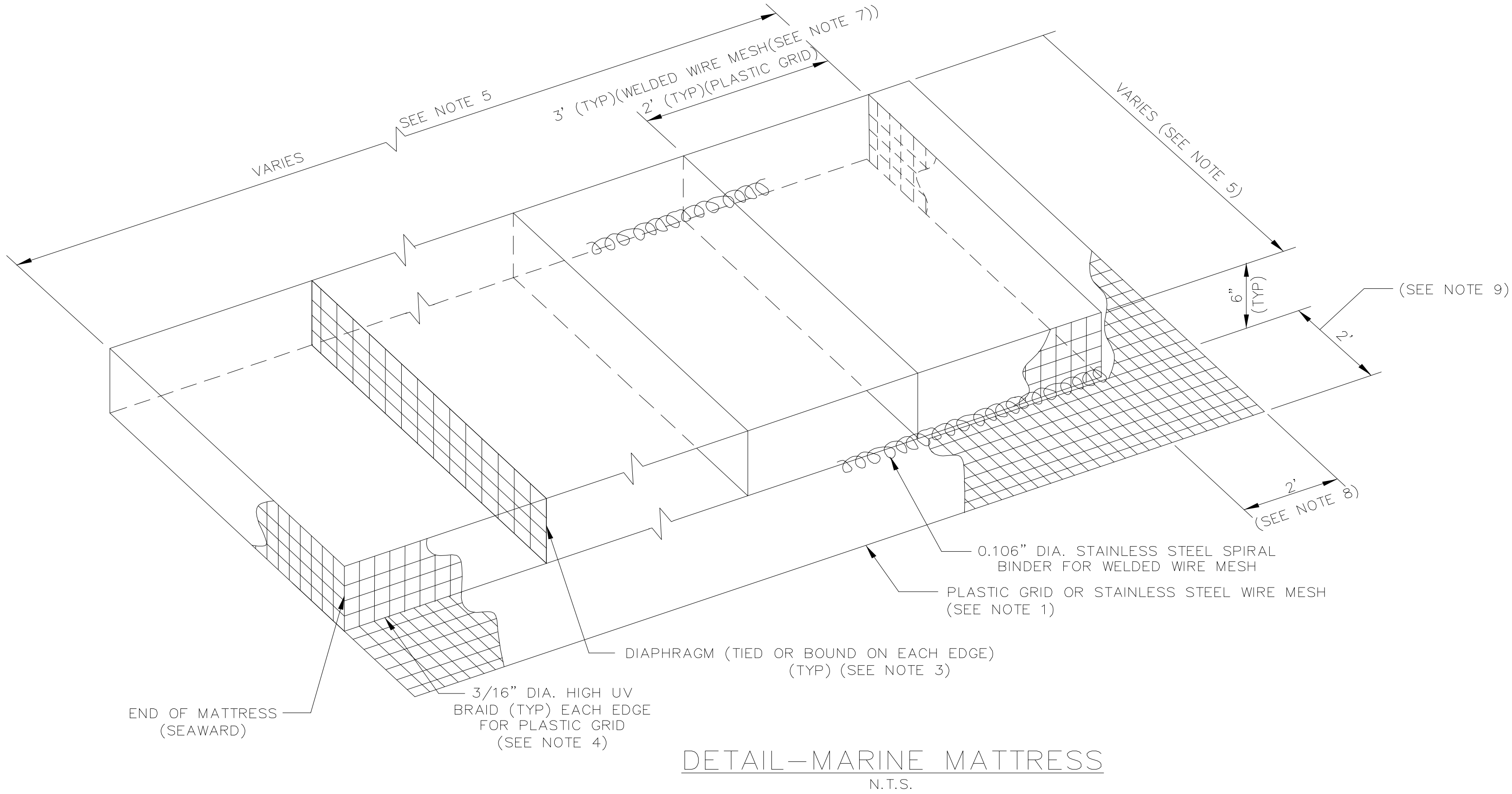

Marine Mattress

Marine Mattress Construction

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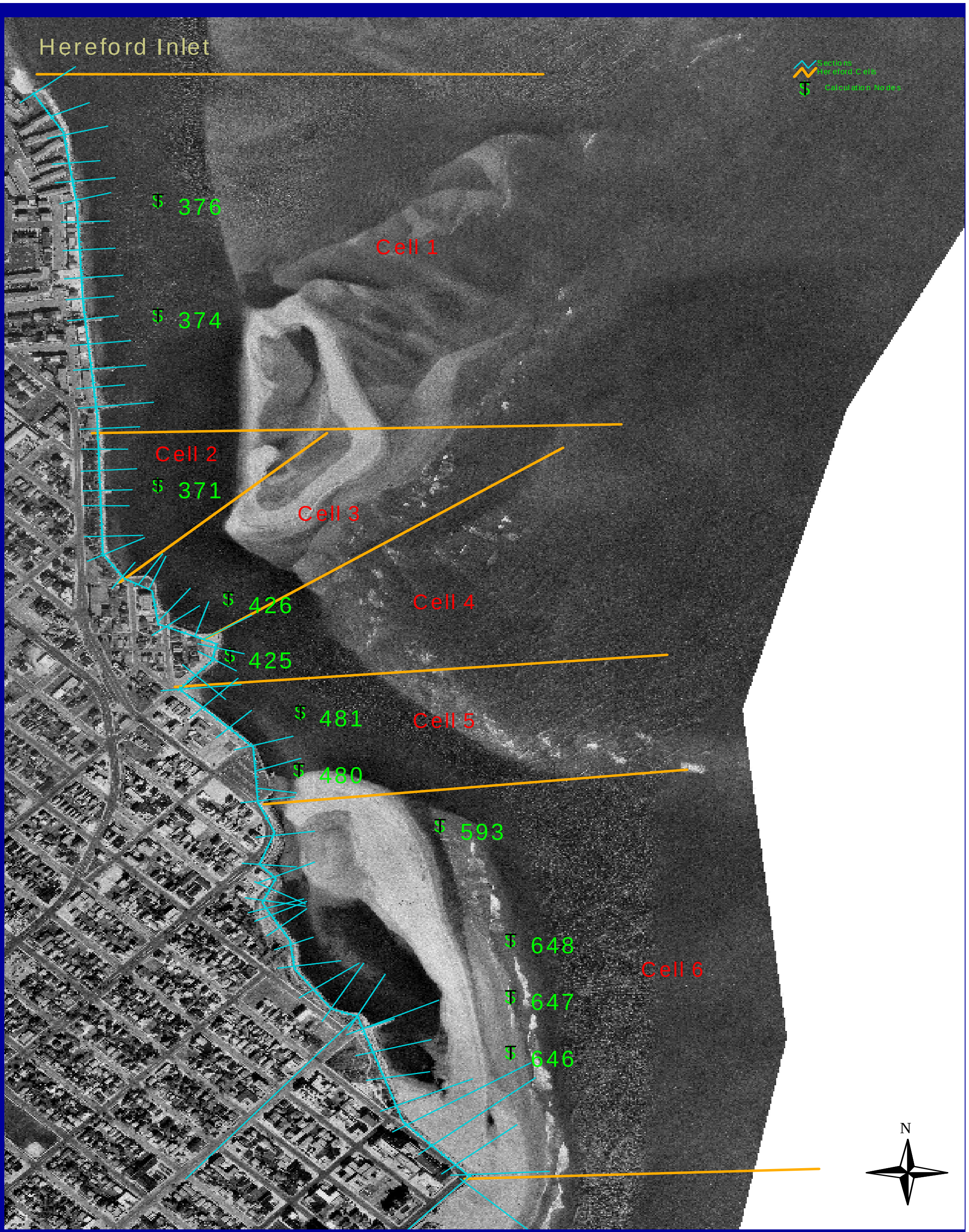
Seawall Construction Sequence

Seawall Finished Product

Avalon Seawall Action

Hereford Deepwater Stabilization

Deepwater Stabilization



Design Basis
Deepwater Stabilization

- Geotechnical slope stability
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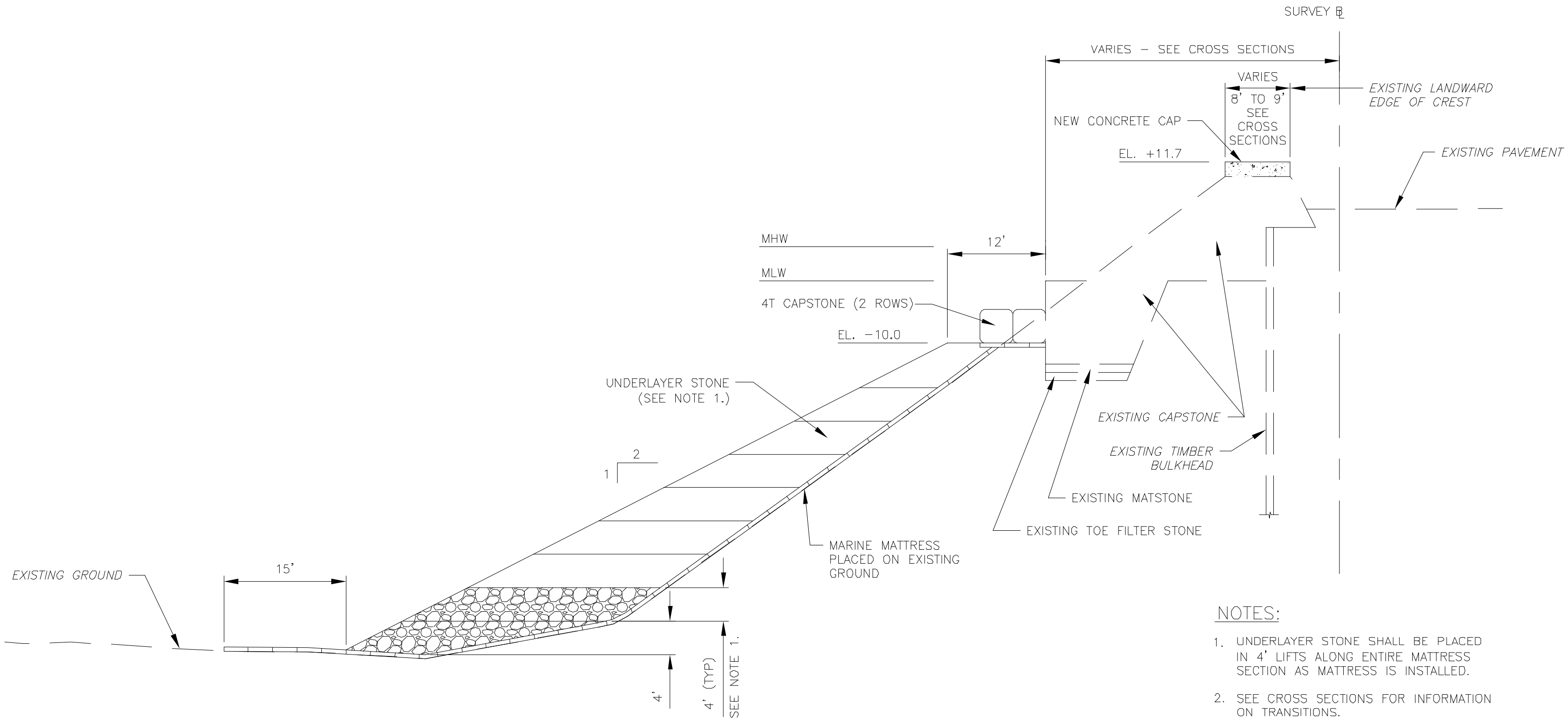
Deepwater Stabilization



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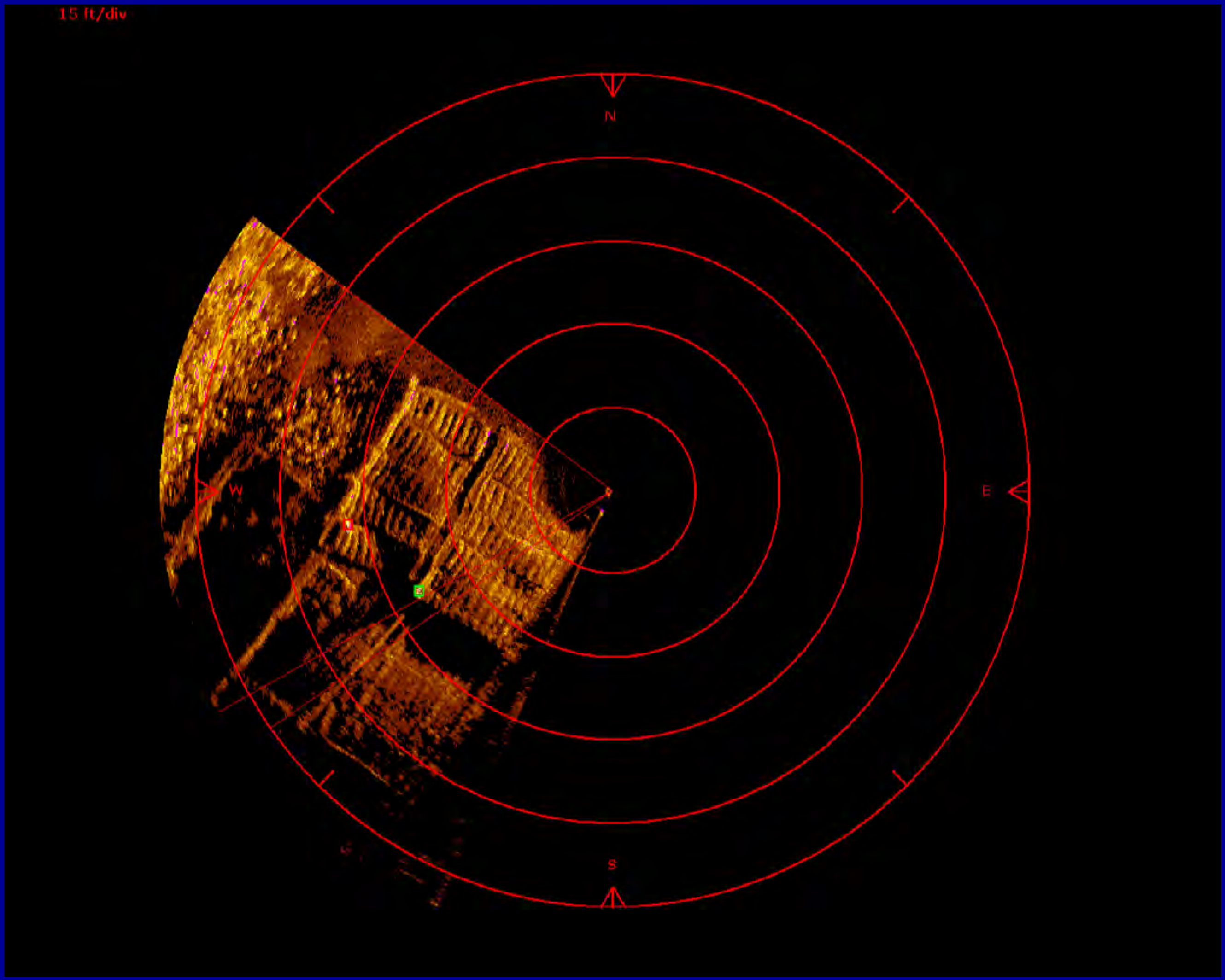

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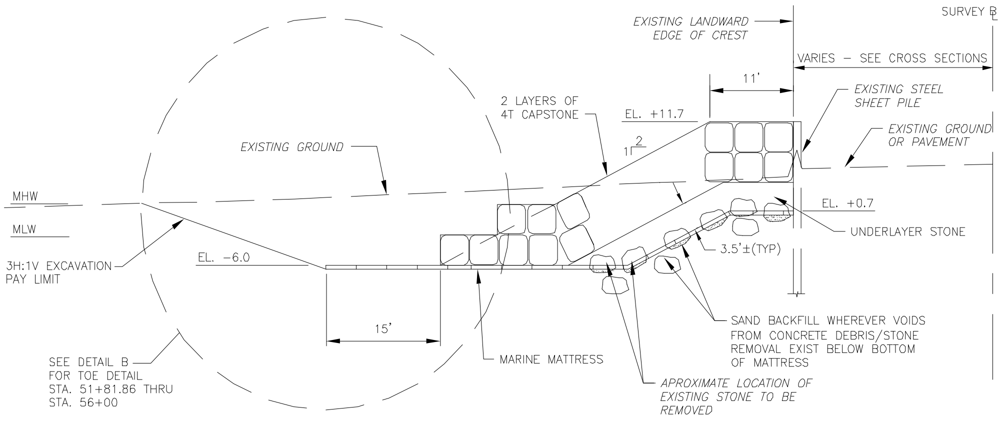

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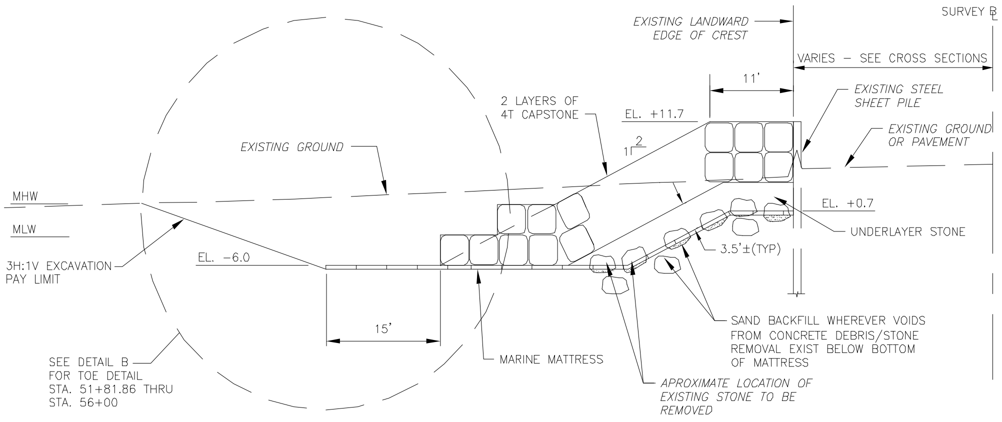

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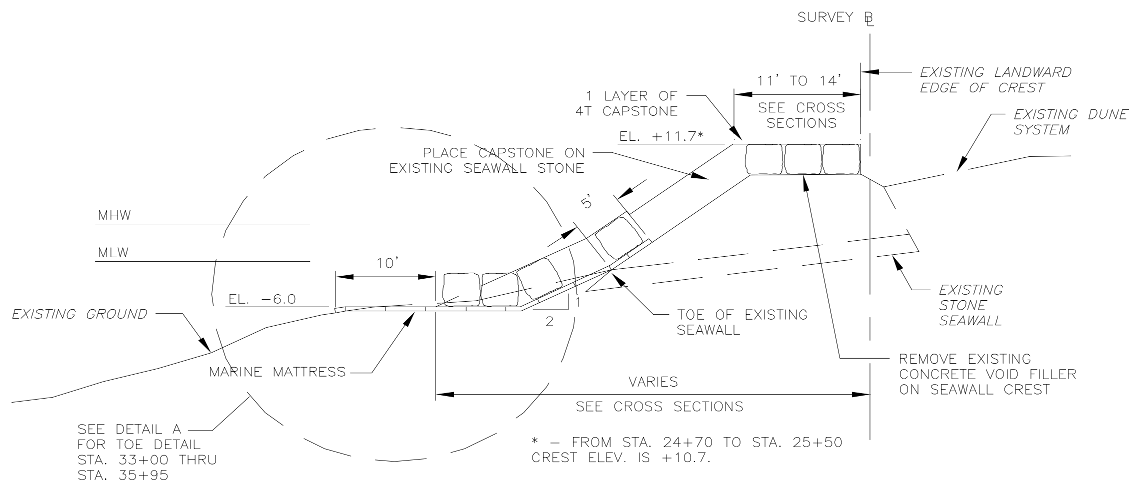

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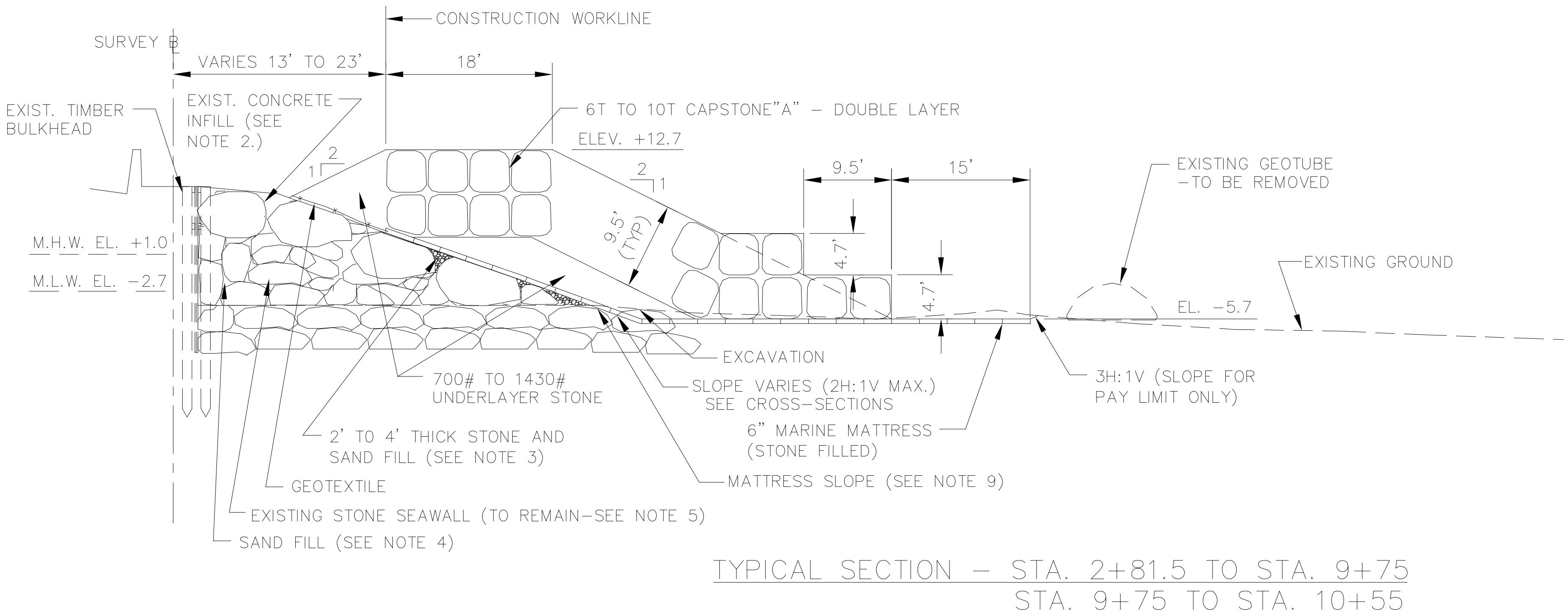


Actual Cross Section

Seawall Finished Product

Protecting the NJ Coast Using Large Stone Seawalls

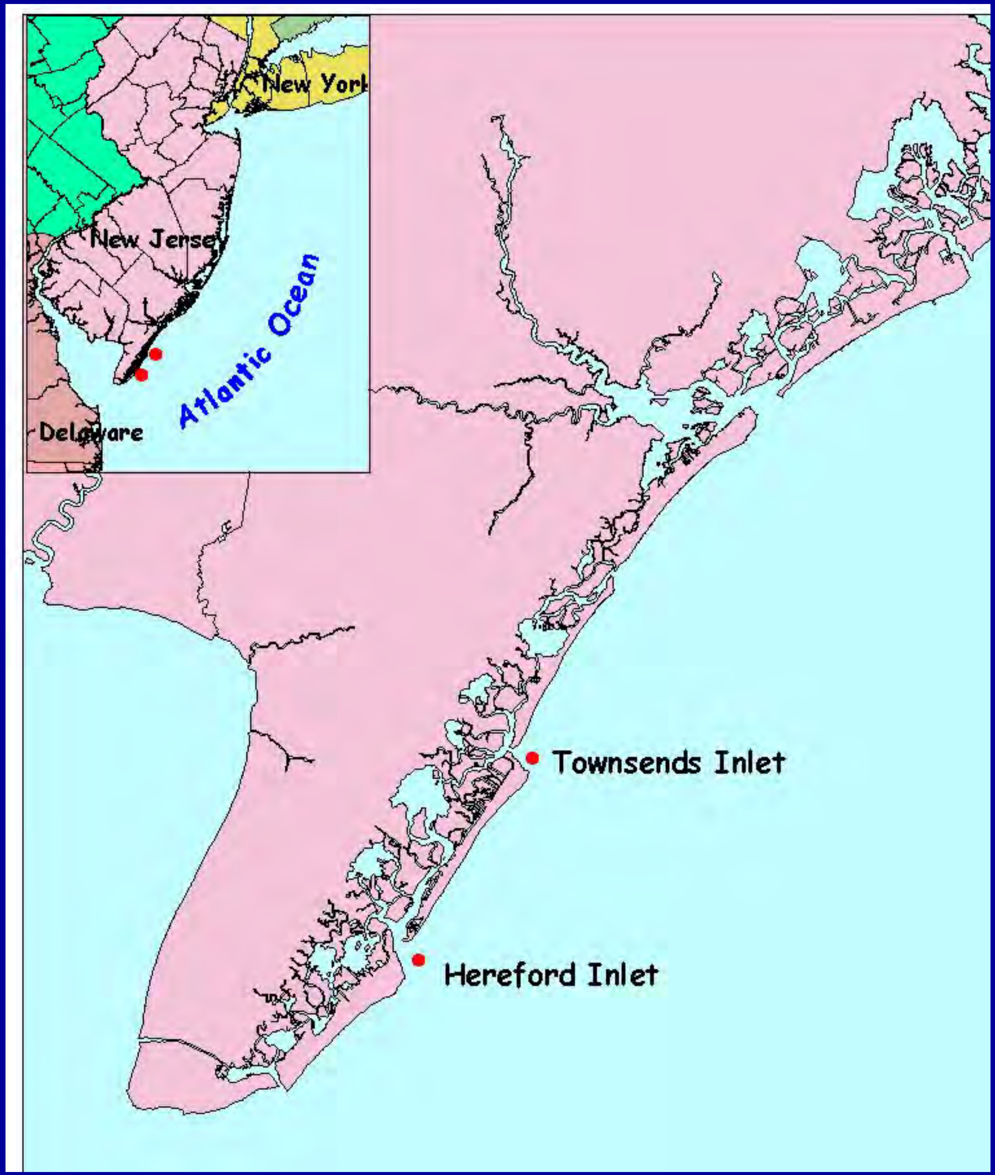
Cameron Chasten

Philadelphia District

Overview

- Project Description
- Design Overview
- Seawall Construction
- Deepwater Stabilization Construction
- Lessons Learned

Project Locations



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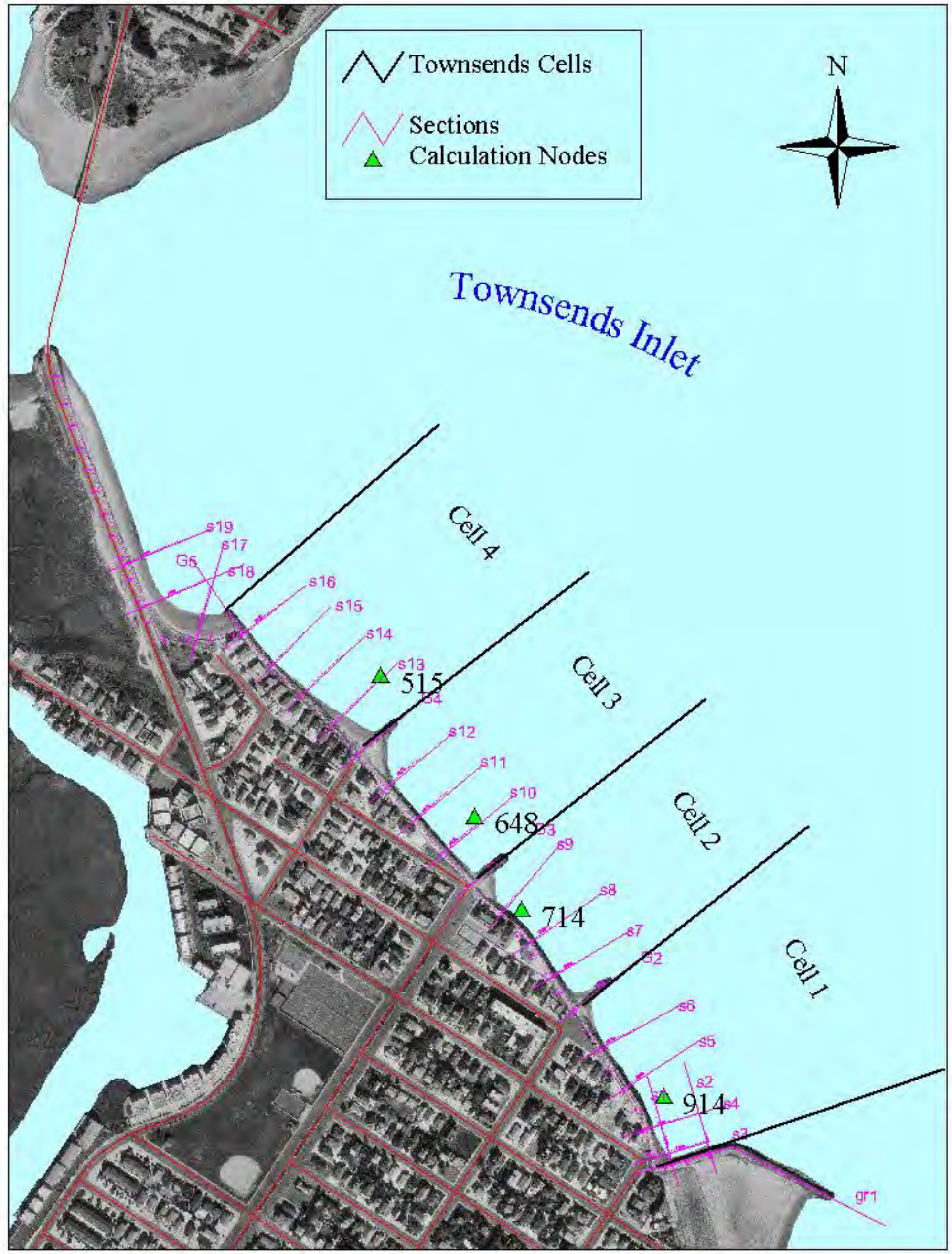

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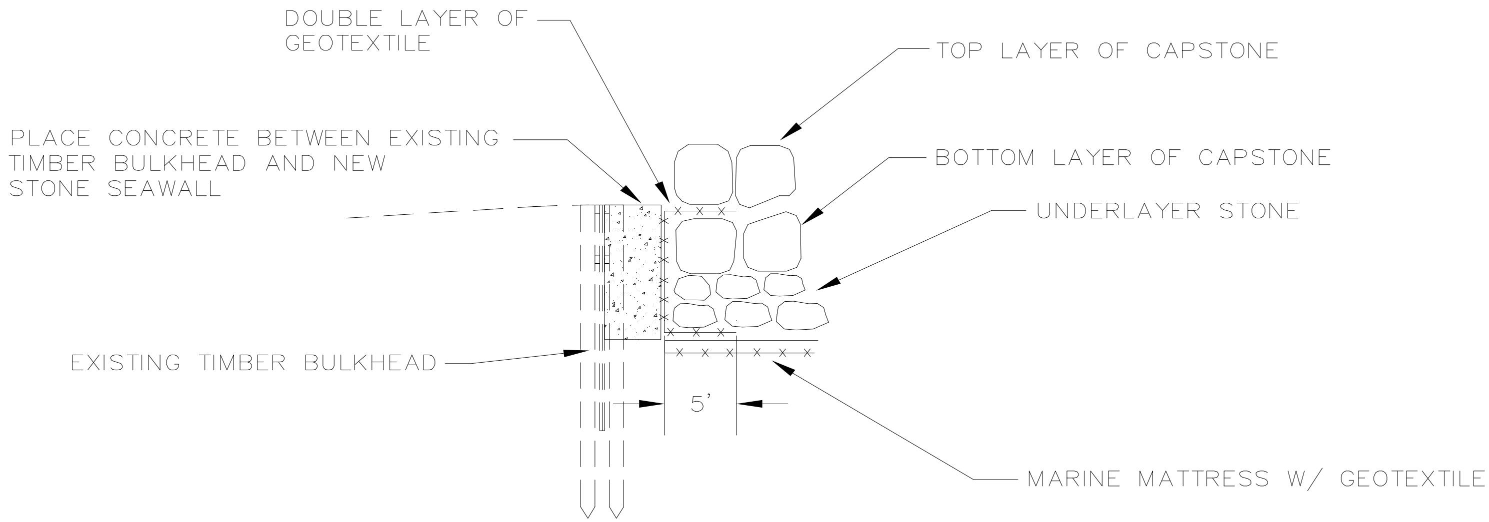

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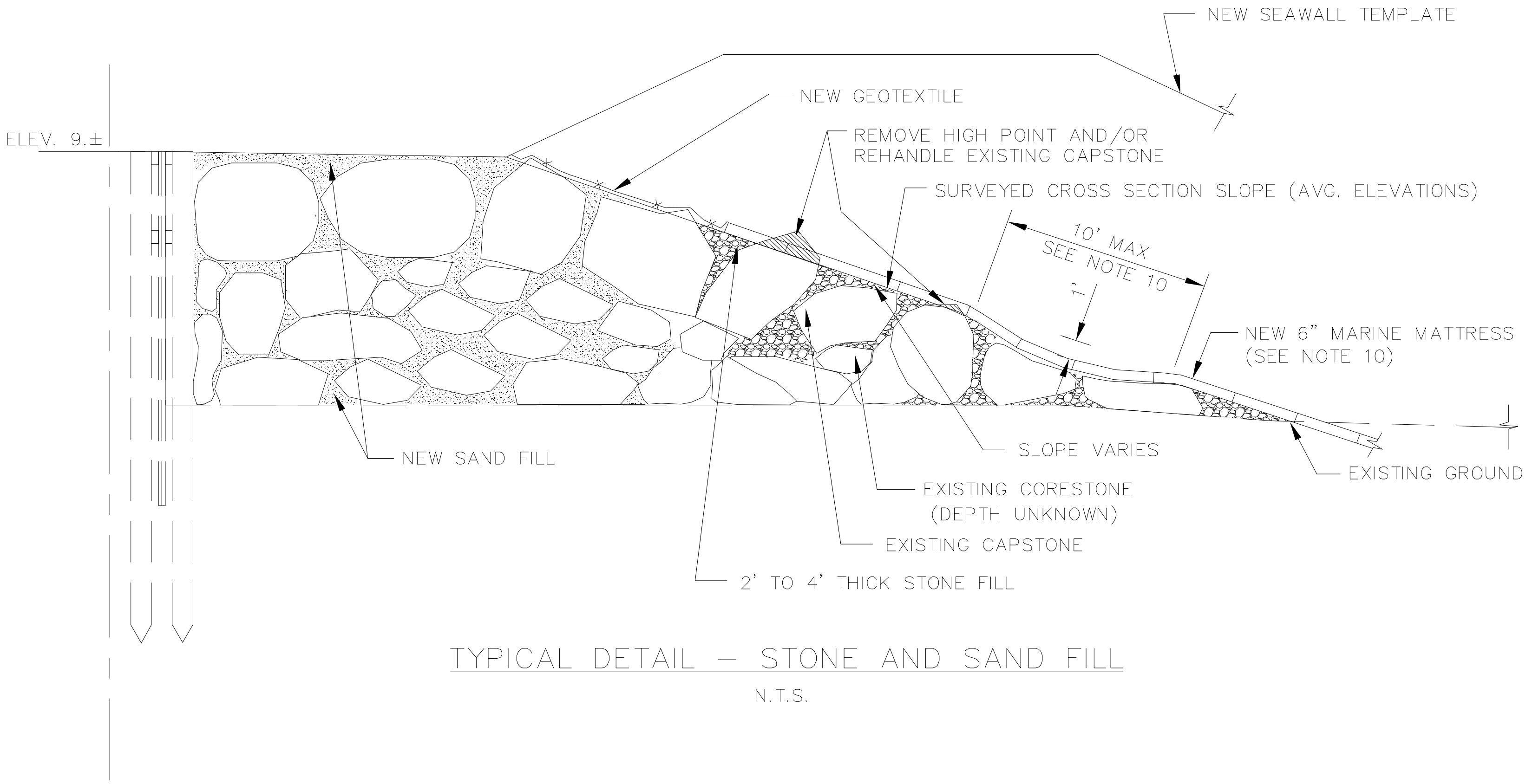

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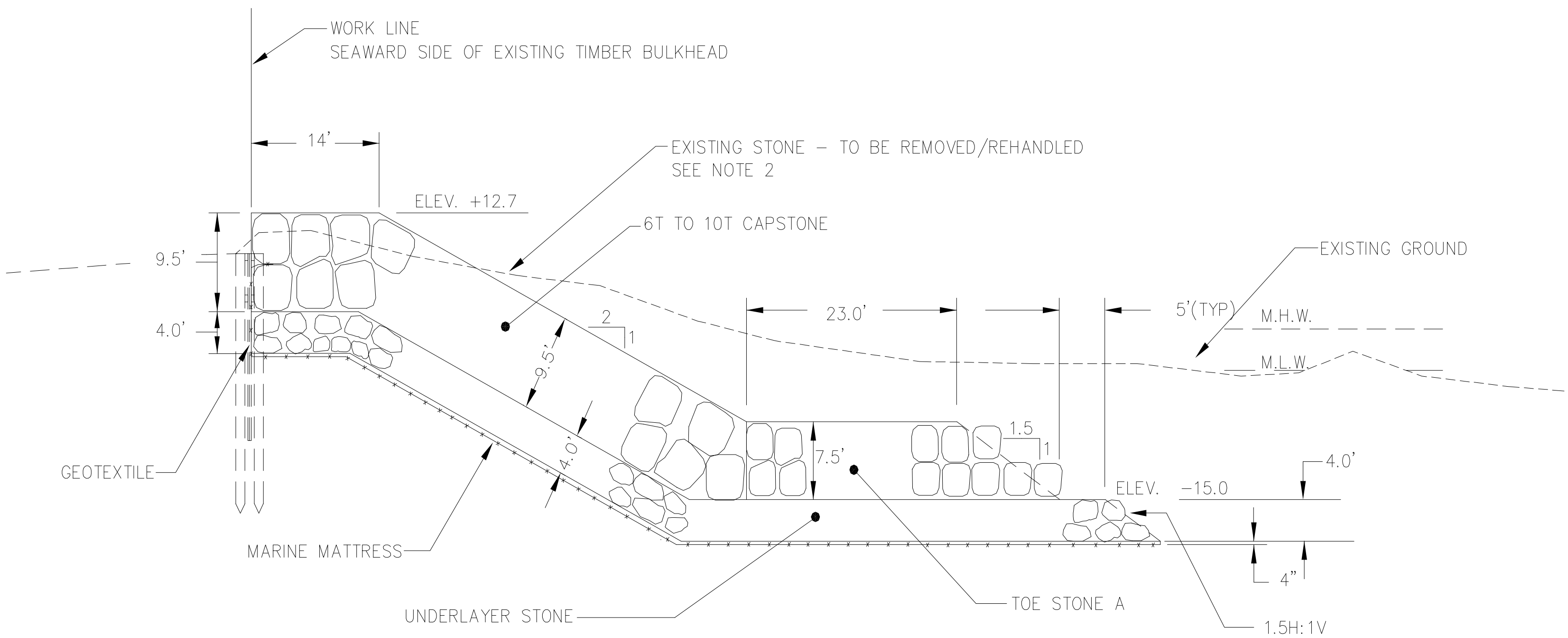

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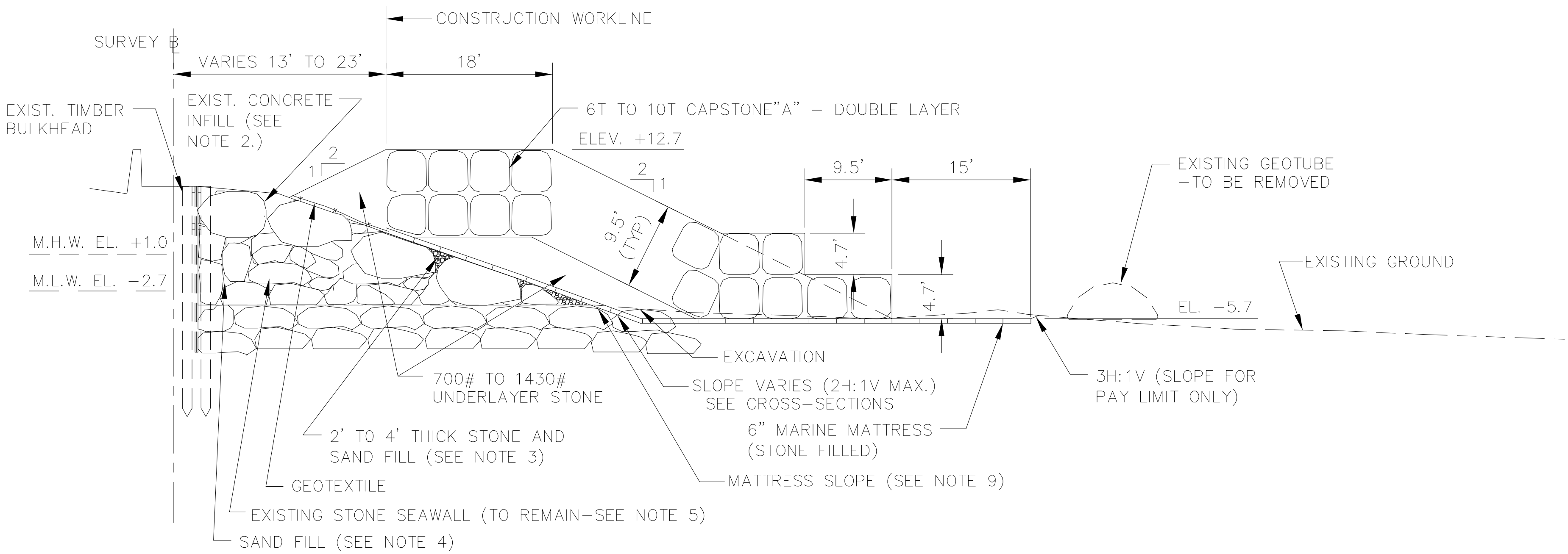

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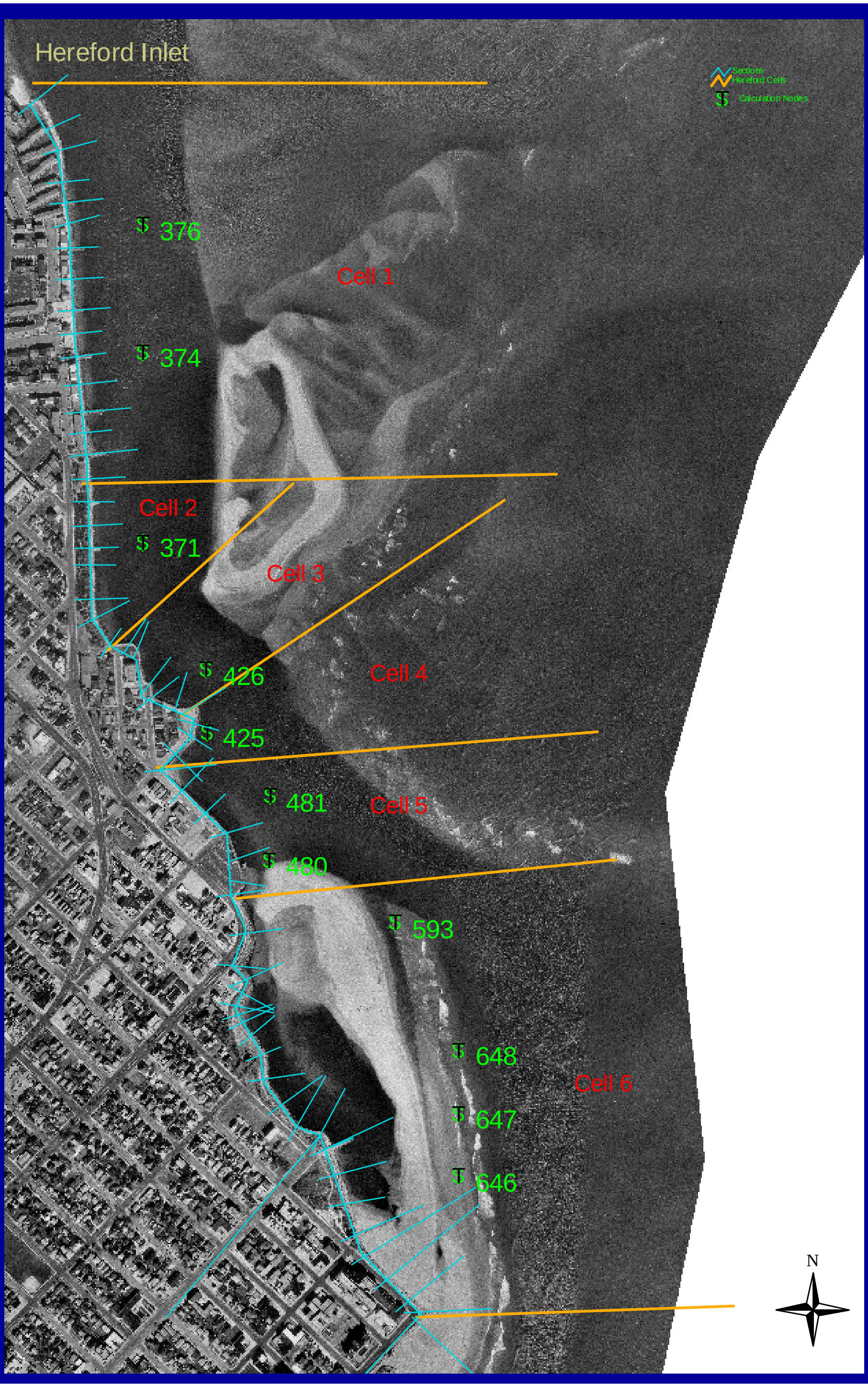
Hereford Seawall



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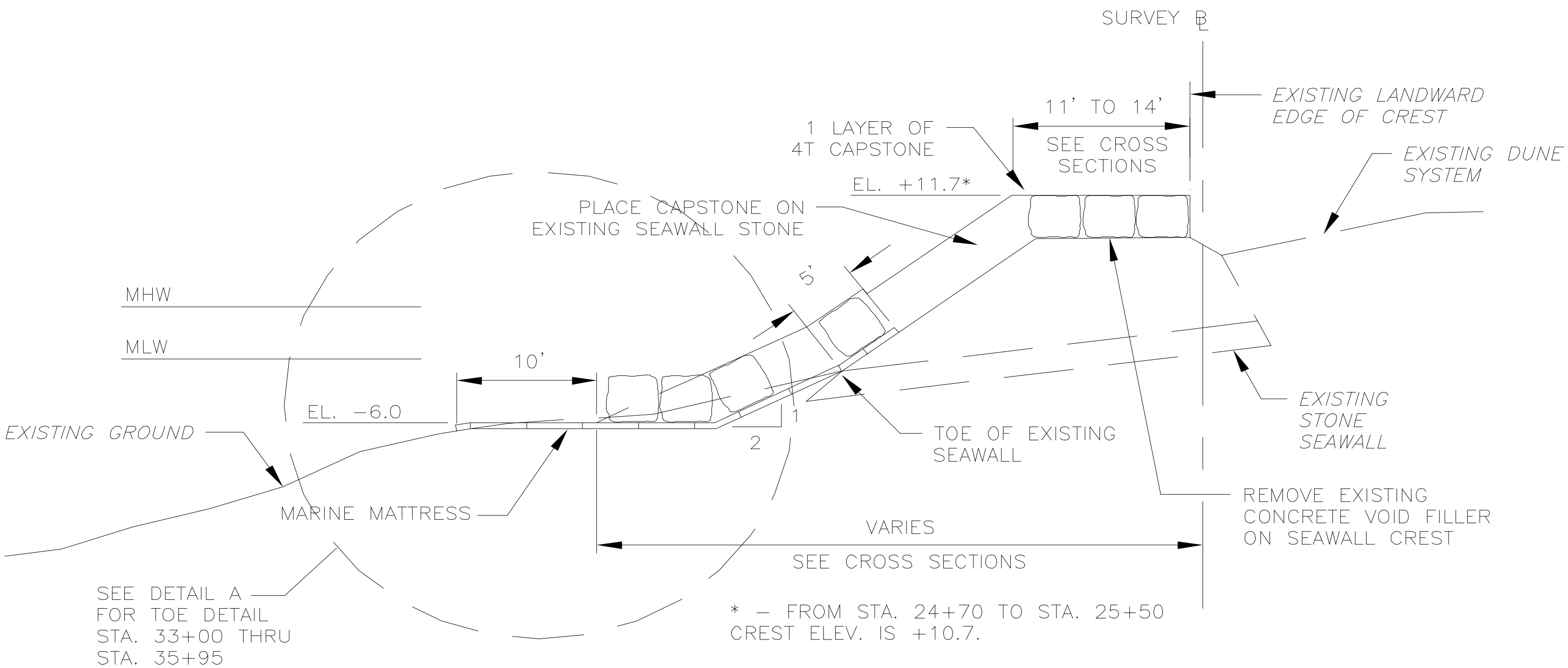

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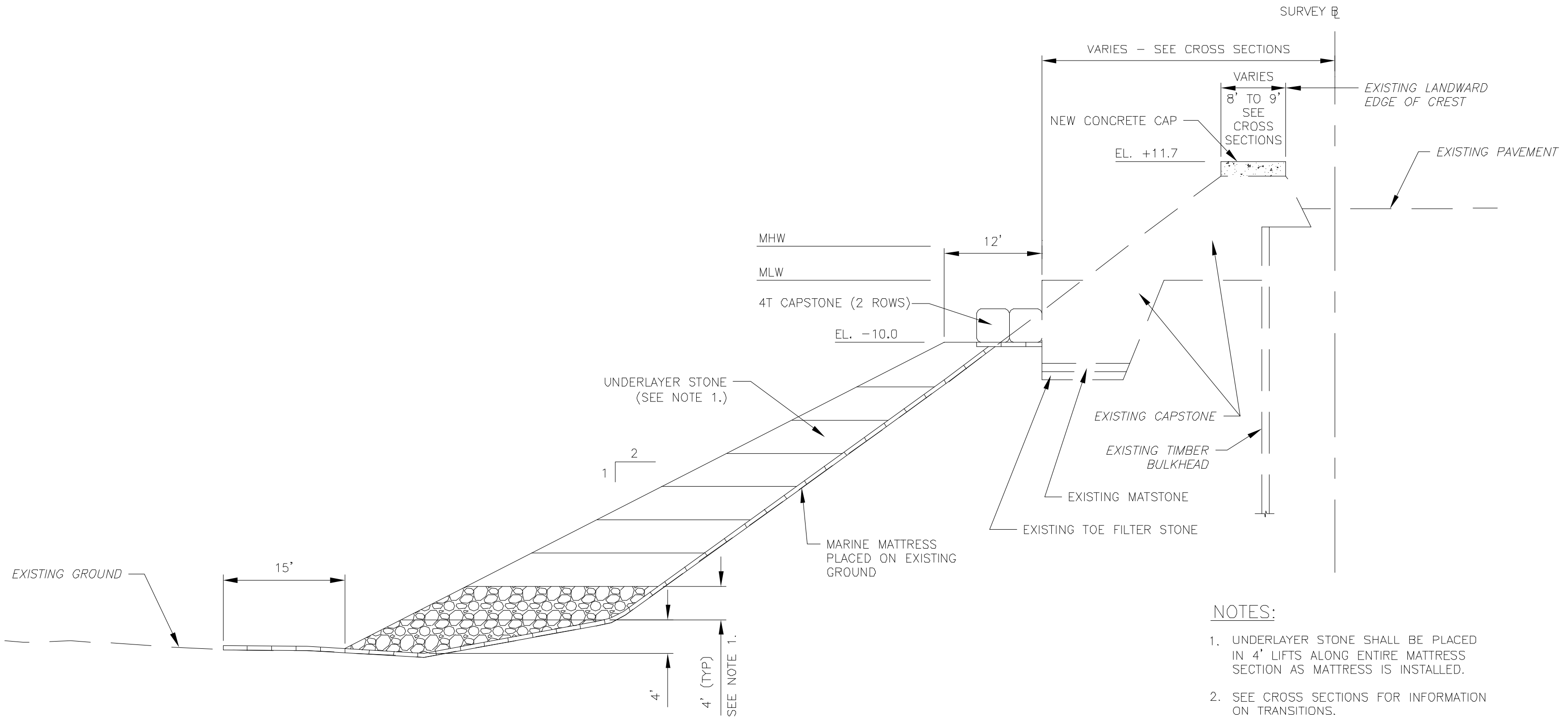

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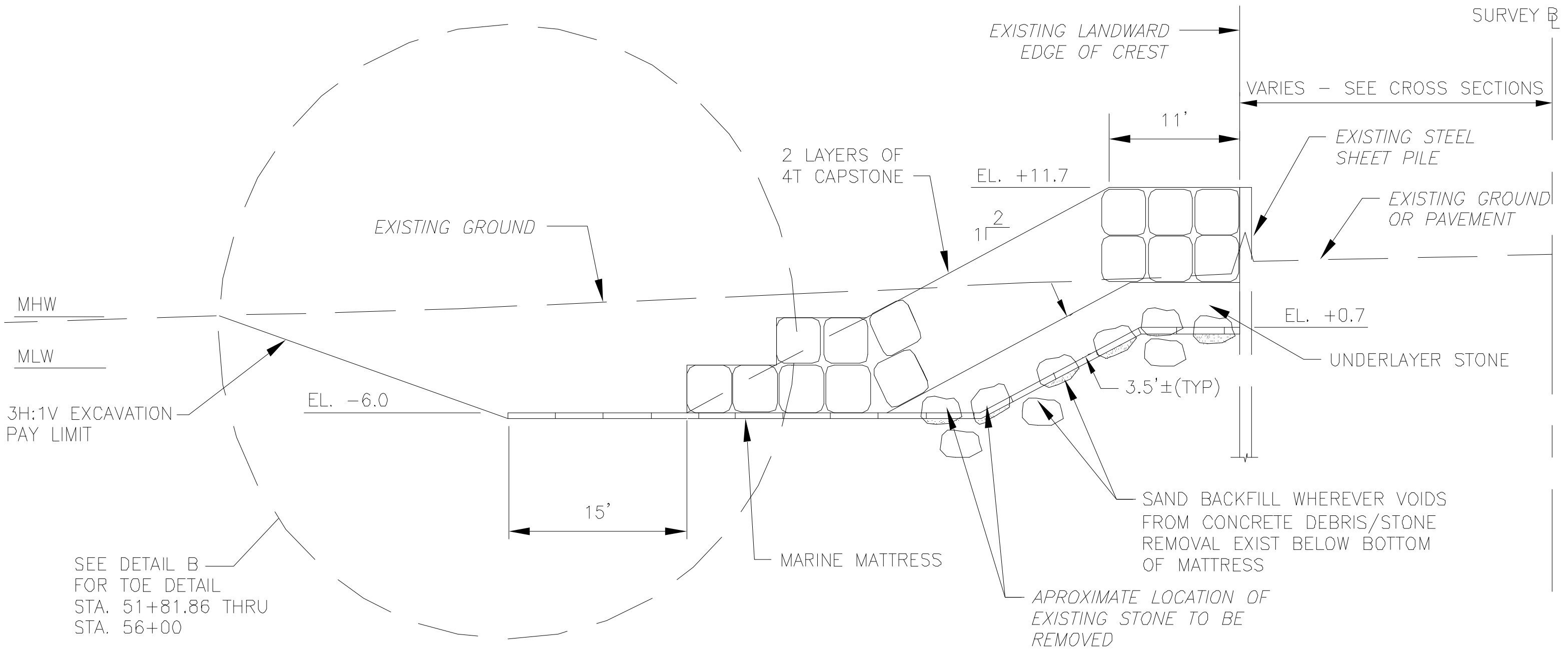

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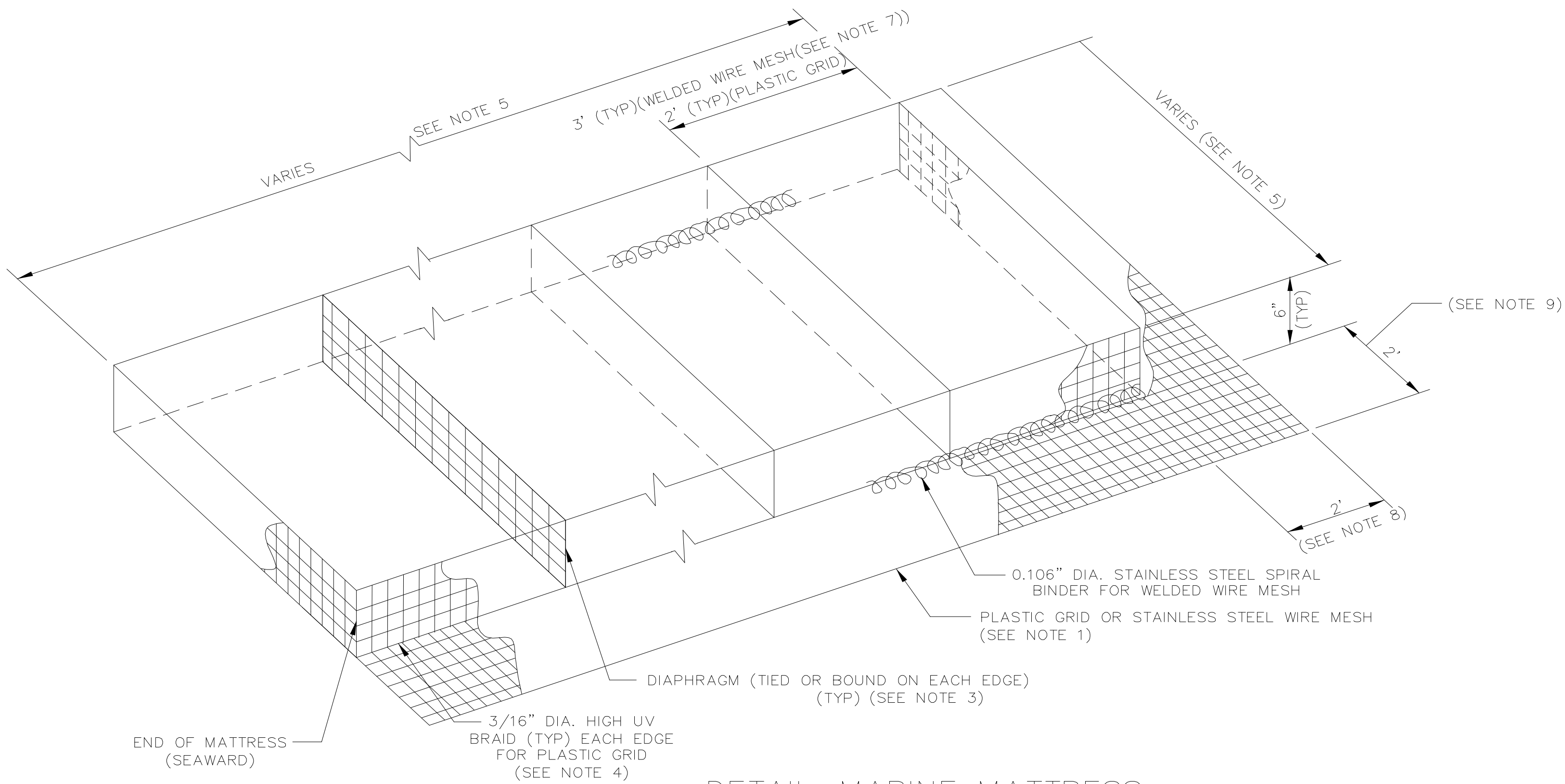

DETAIL–MARINE MATTRESS

N.T.S.

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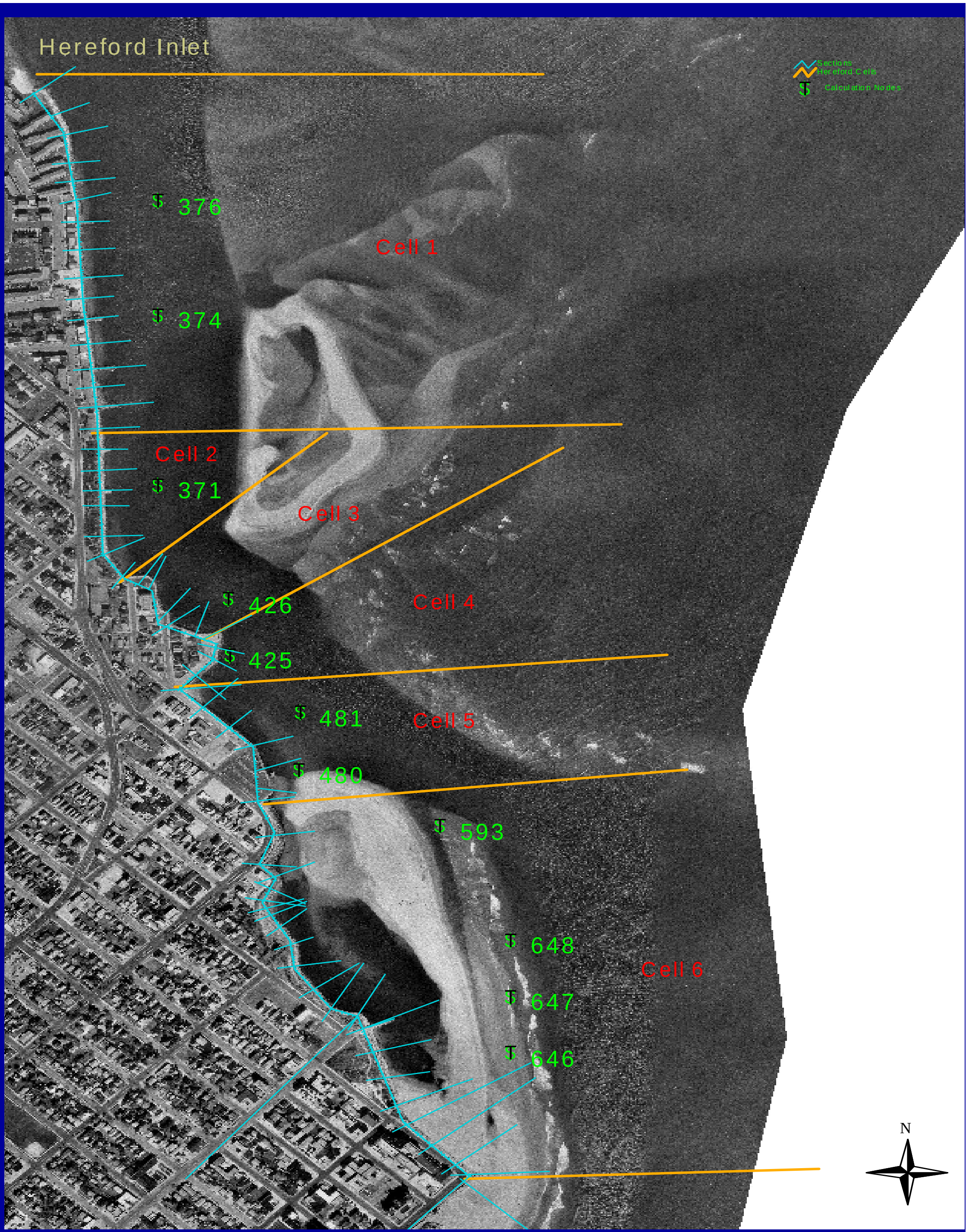
Seawall Finished Product

Avalon Seawall Action

Hereford Deepwater Stabilization

Deepwater Stabilization



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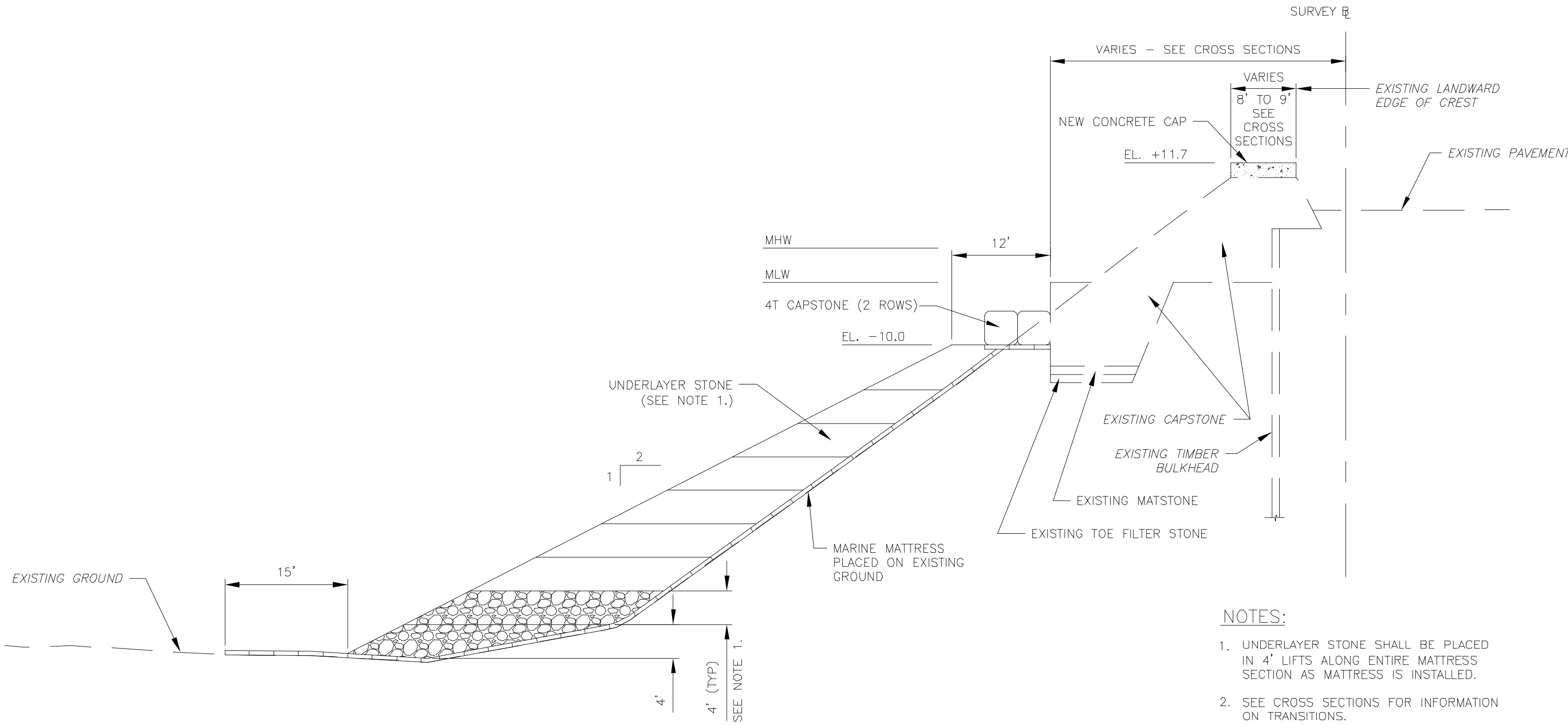

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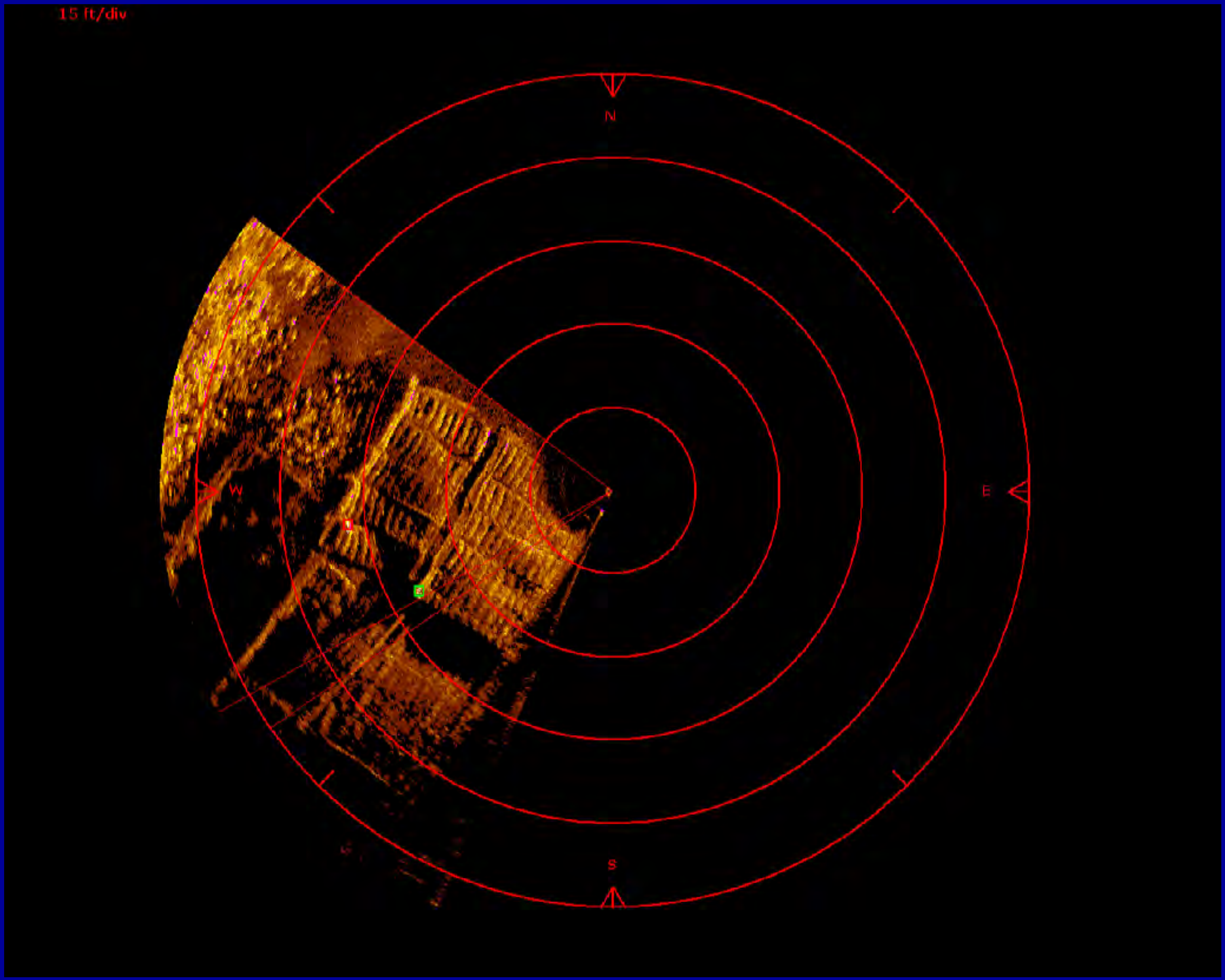

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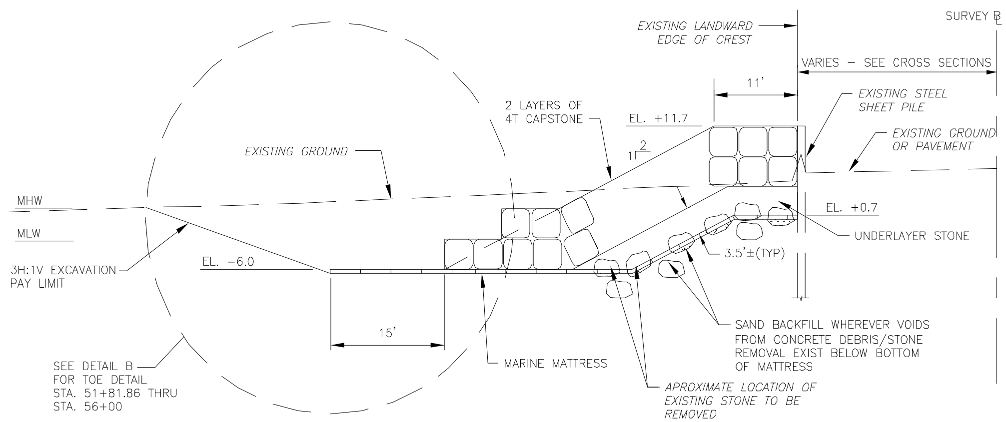

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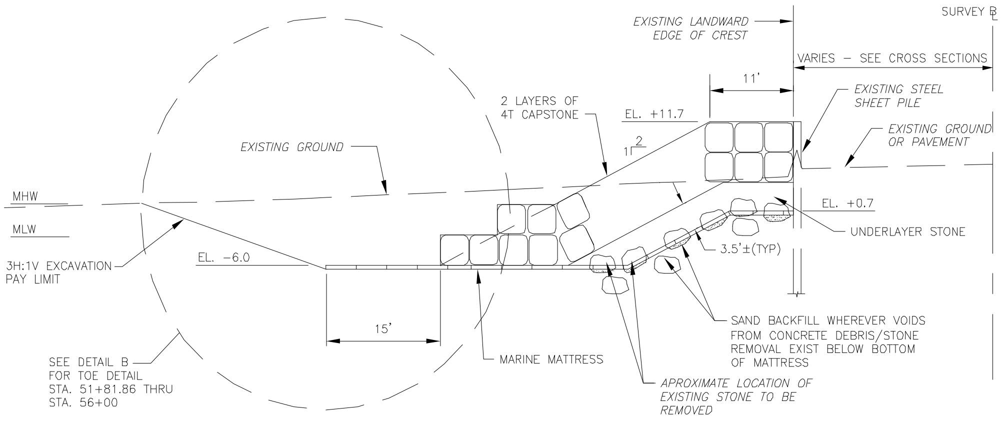

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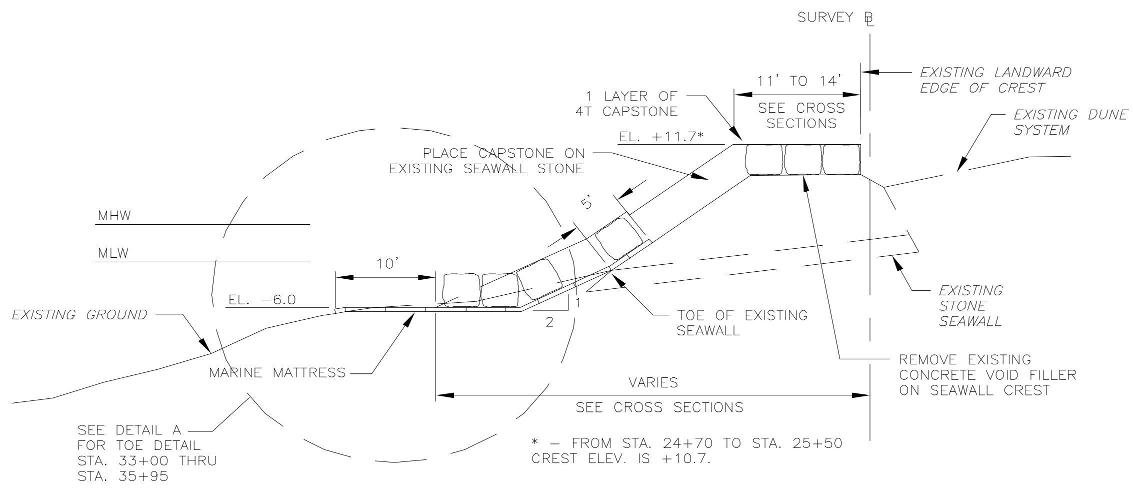

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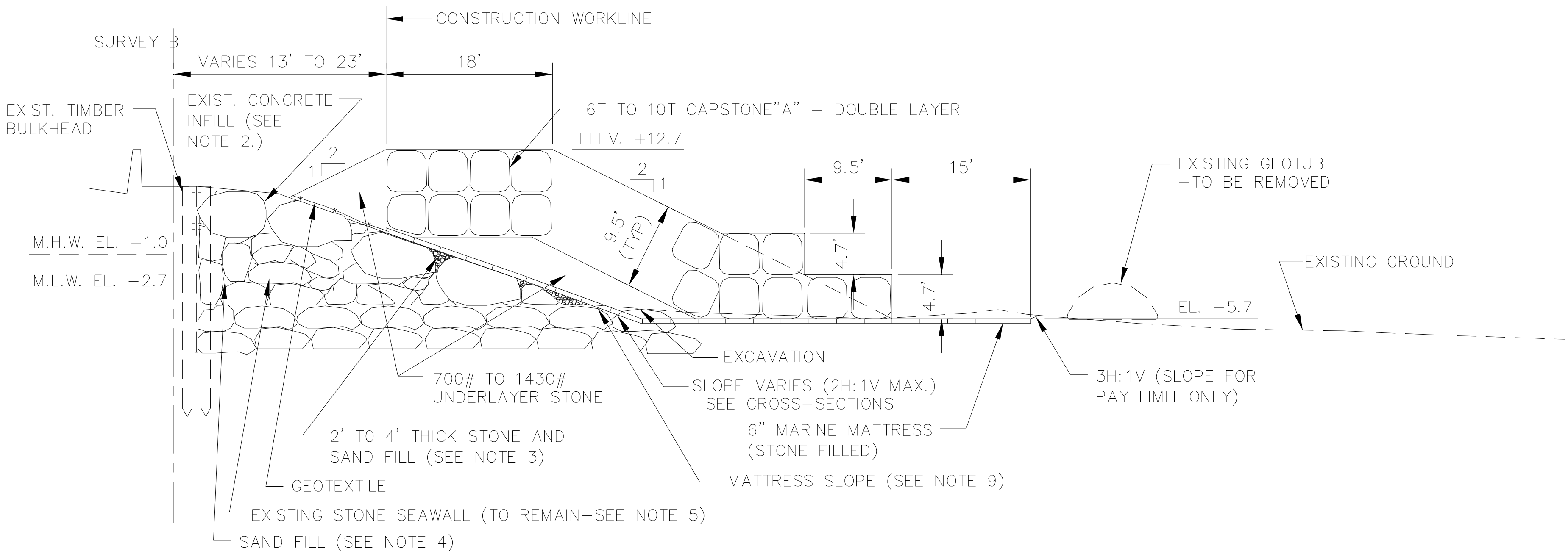

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Actual Cross Section

Seawall Finished Product

US Army Corps of Engineers
Philadelphia District

Evaluating Beachfill Project Performance in the USACE Philadelphia District

Monica Chasten and Harry Friebel
Engineering Division

US Army Corps of Engineers
Philadelphia District

Project/Study Phases

- Reconnaissance
- Feasibility
- Design/Plans and Specifications
- Construction
- Monitoring/Project Performance

US Army Corps
of Engineers
Philadelphia District

Overview

- USACE, Philadelphia District Beach Nourishment Program
- Monitoring of Beachfill Projects
- Cape May City and Ocean City Project Examples

US Army Corps
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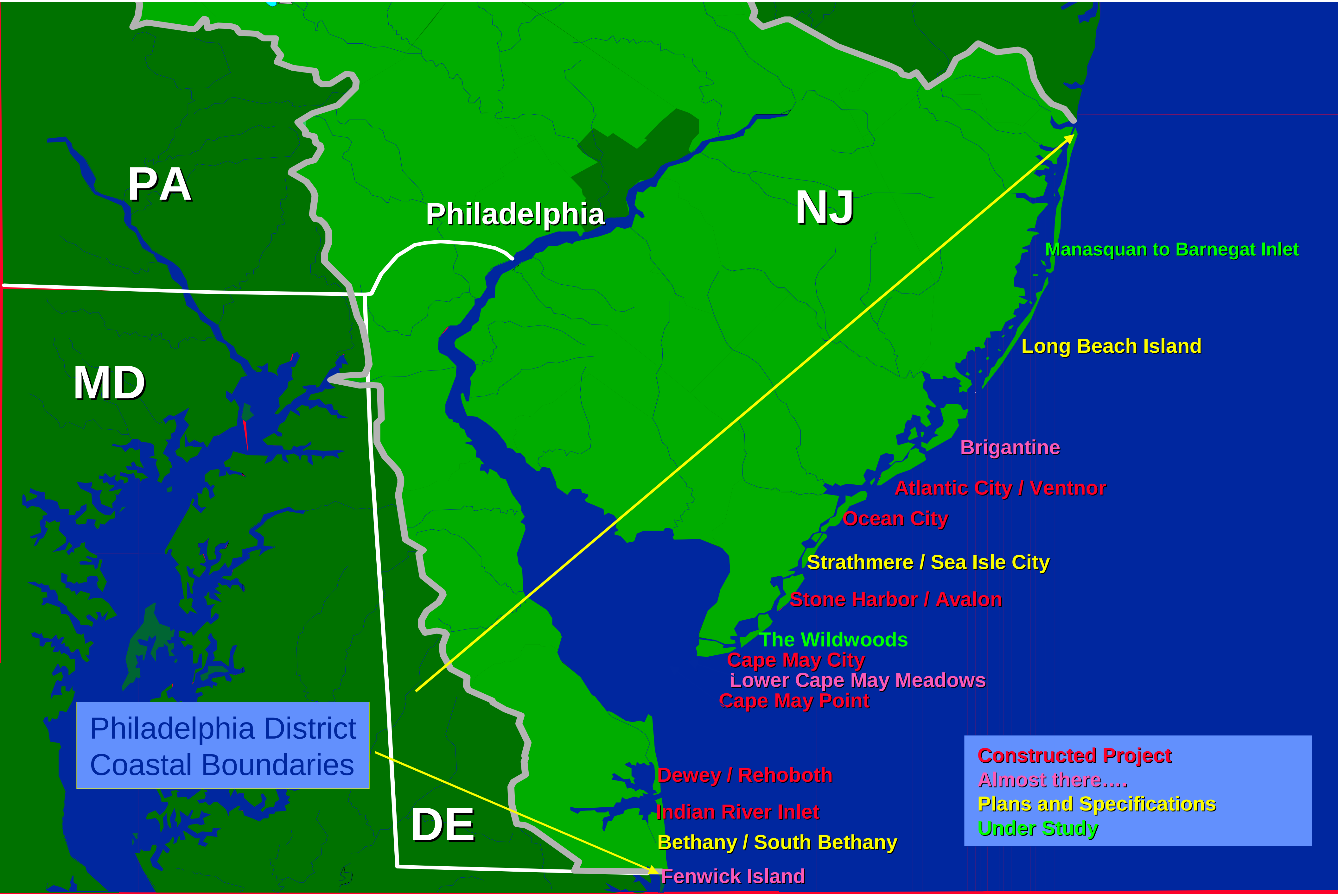
Philadelphia District

Keynotes

- Beach Nourishment Works!
- Importance of Project Monitoring
  - Must evaluate project performance to keep efficient
  - Monitoring program/techniques/analysis
  - Need adequate info for science-based decision making
- Adaptive Management/Design
- Regional Approach/Collaboration of Efforts
- Importance of Local Sponsor Relationships


PA
Philadelphia
NJ
MD
DE
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Long Beach Island
Brigantine
Atlantic City / Ventnor
Ocean City
Strathmere / Sea Isle City
Stone Harbor / Avalon
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Constructed Project
Almost there….
Plans and Specifications
Under Study

US Army Corps
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USACE -Philadelphia District
Coastal Project Monitoring Program

- Projects initiated 1989-1992
- Program formalized in 1994
- Initial coastal projects were Ocean City, Cape May, Indian River Inlet and Barnegat Inlet
- Recent project additions include Avalon/Stone Harbor, Absecon Island, Cape May Meadows/Point
- Monitor for the project life

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Why do we Monitor?

- Assess project condition to ensure project functionality and determine maintenance requirements
- Evaluate project performance relative to design objectives
  - adjacent area and environmental benefits/impacts
  - develop solutions to improve performance
  - BE PROACTIVE!
- Cost of data collection/analysis is minimal compared to project costs and potential savings
- Need to document the benefits of beachfill

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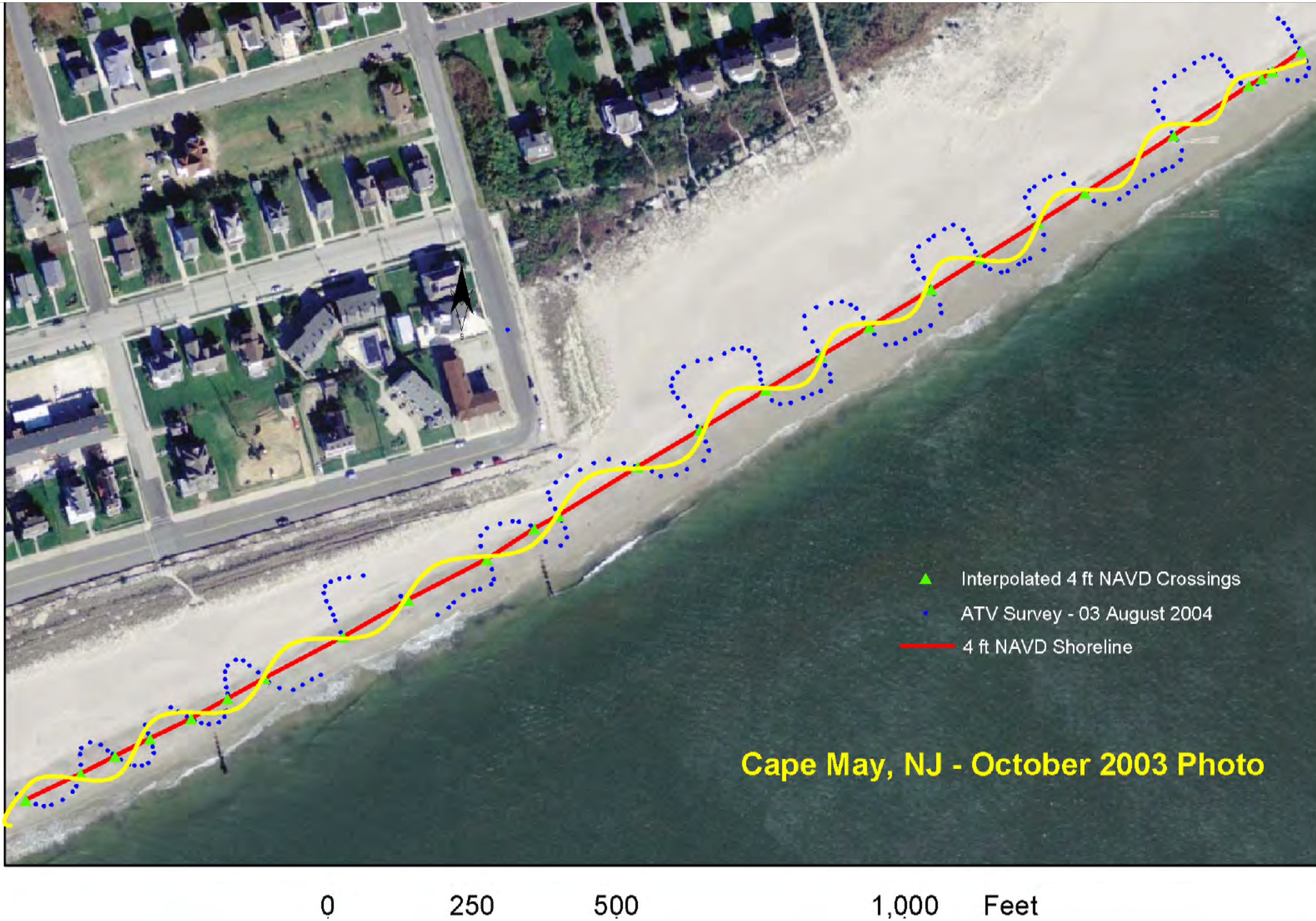
What data are typically acquired?

- Beach Profiles (improved accuracy, out to closure depth, semi-annually from 1994-present)
- Sediment Sampling
- Inlet/Borrow Area Hydrographic Surveys
- Aerial Photography (first quarterly/unrectified, now annually/rectified, also during construction)
- Water Level, Wave, Current and Meteorological Measurements (as need and funding permits)
- Environmental Monitoring (benthic, surf clam, etc)
- Other Measurements and Improvements (ATV, Tracer)

Rapidly-Deployed Shoreline Survey Vehicle


Interpolated 4 ft NAVD Crossings
ATV Survey - 03 August 2004
4 ft NAVD Shoreline
Cape May, NJ - October 2003 Photo
0
250
500
1,000
Feet

Development of Sea Sled Technology within District

Atlantic City
Beachfill Construction and Project Surveys

US Army Corps
of Engineers
Philadelphia District

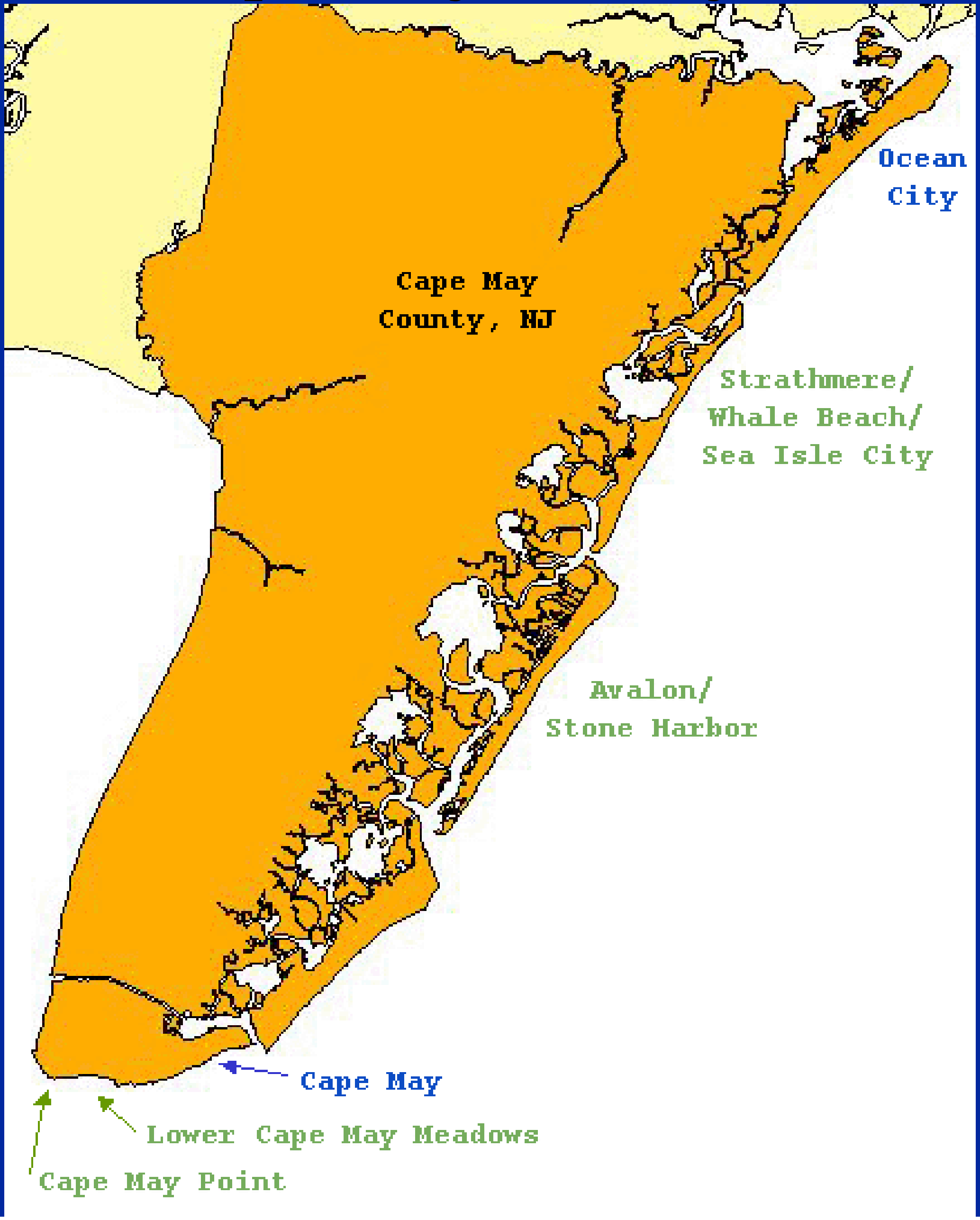
Beach Nourishment Case Examples

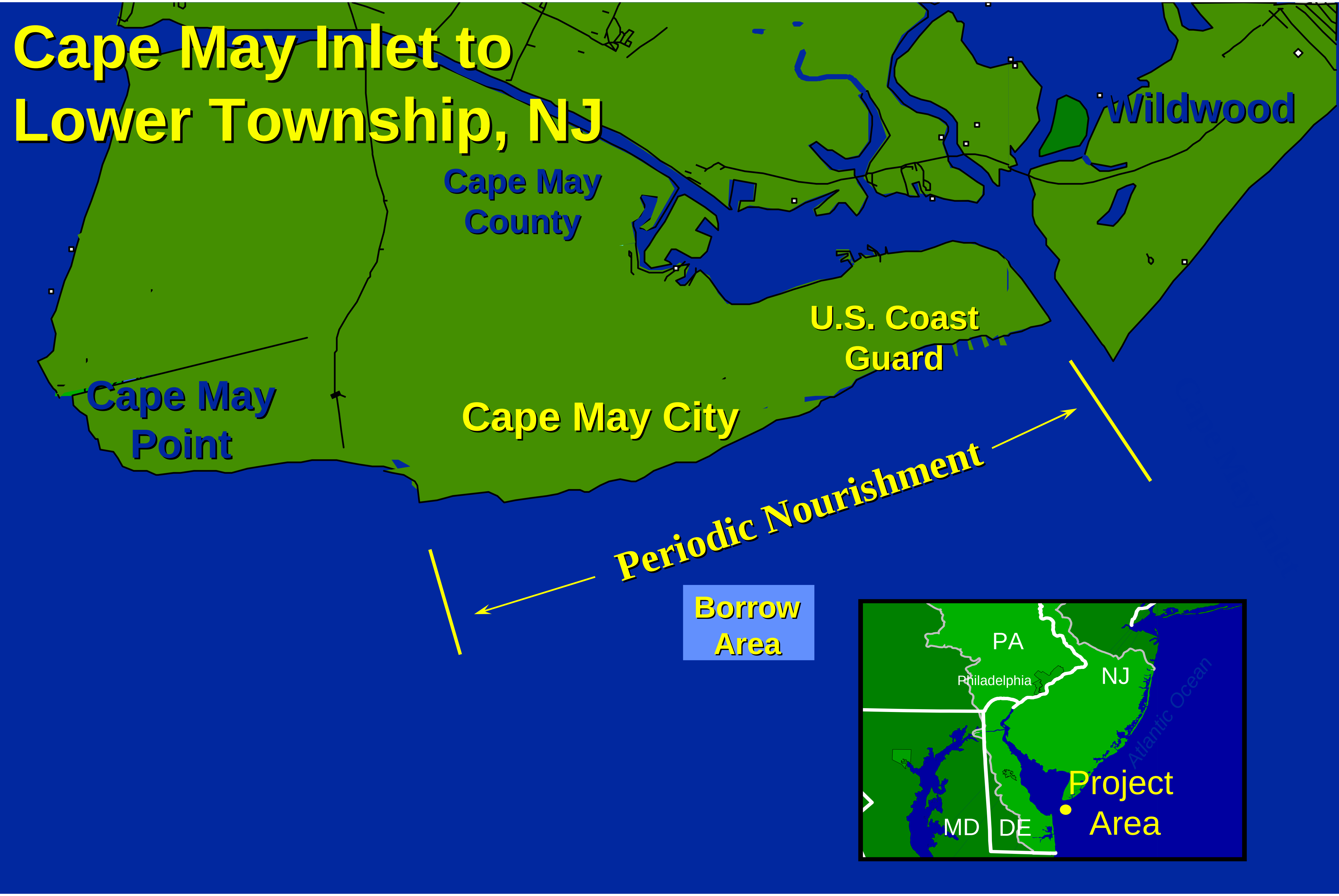
Cape May City, NJ

And

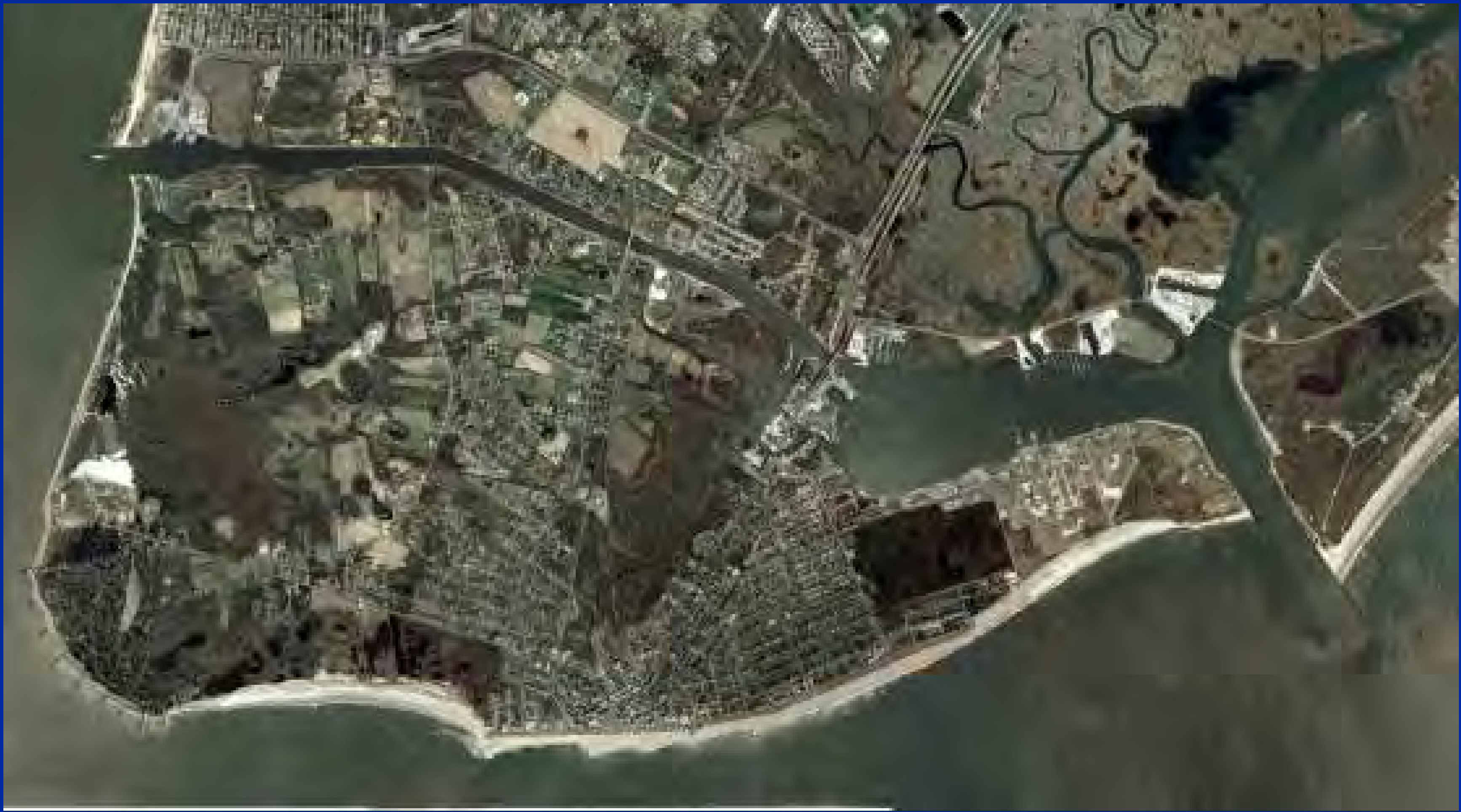
Ocean City, NJ

Cape May County, NJ




Cape May Inlet to
Lower Township, NJ
Cape May
County
Wildwood
U.S. Coast
Guard
Cape May
Point
Cape May City
Periodic Nourishment
Borrow
Area
PA
Philadelphia
NJ
Atlantic Ocean
Project
Area
MD
DE

Cape May Vicinity

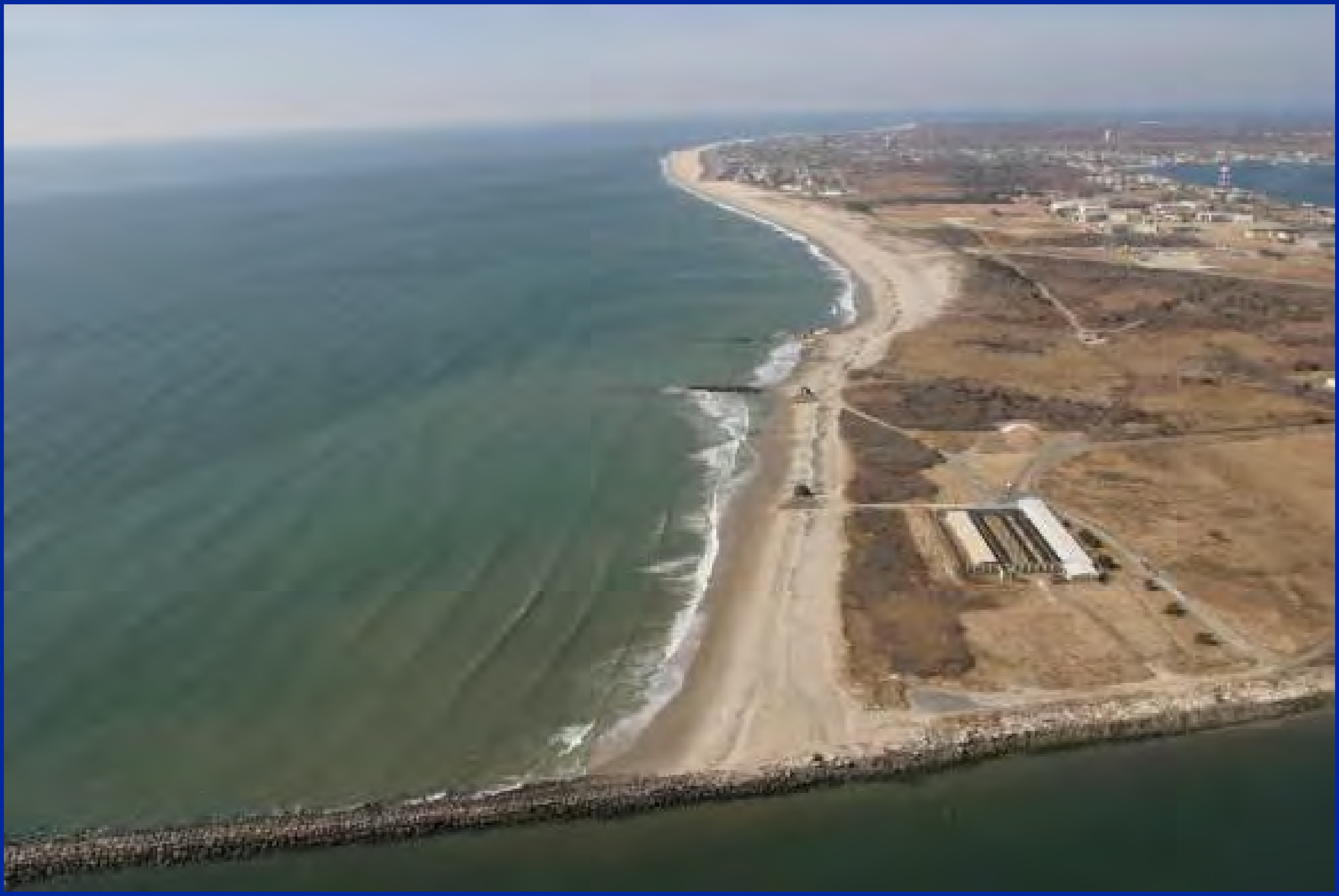


Cape May Inlet to Lower Township

Before

After

Cape May City Project
Looking South - March 2004

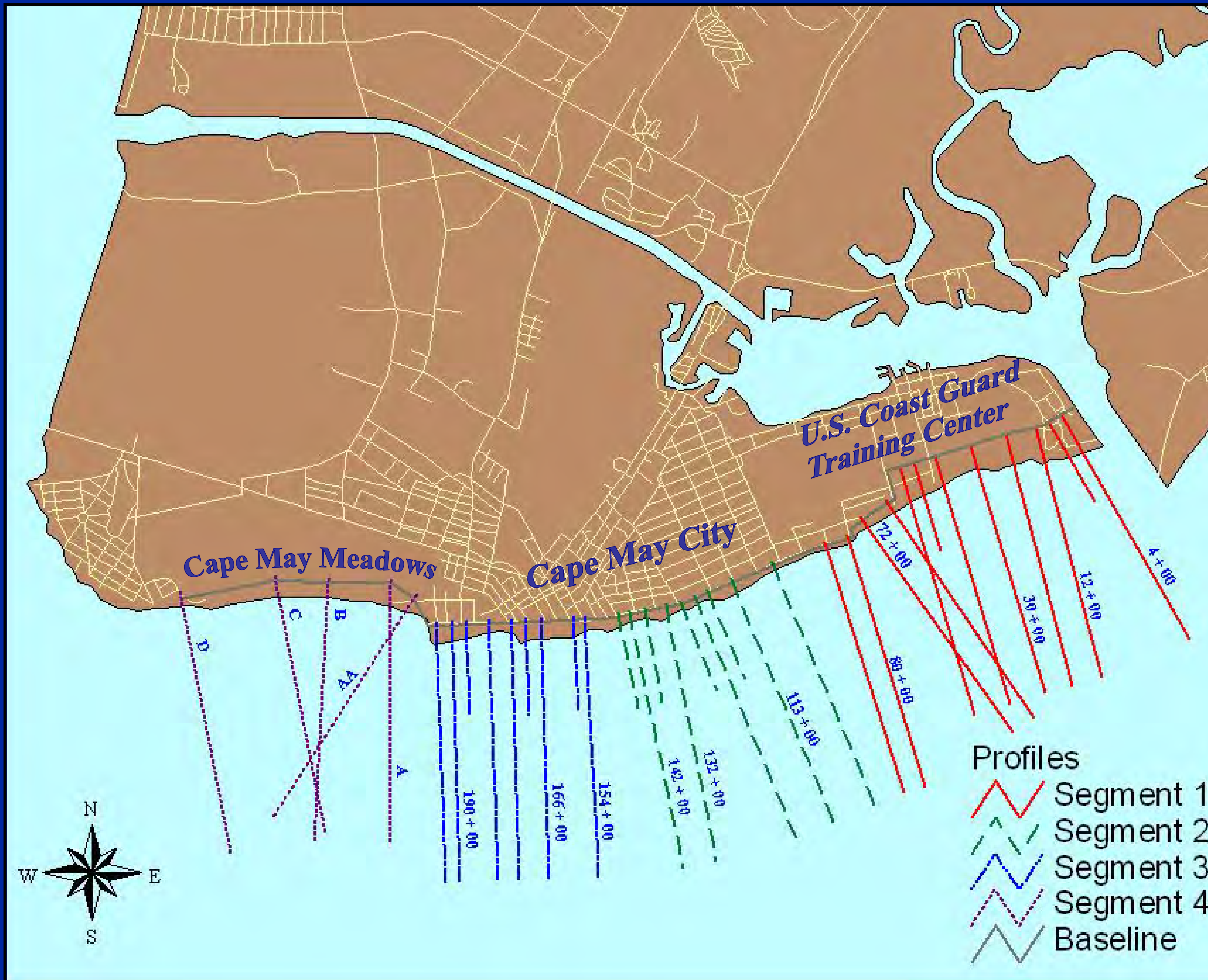


Cape May City Project
Looking South – March 2004

Cape May City
Looking North – September 2003

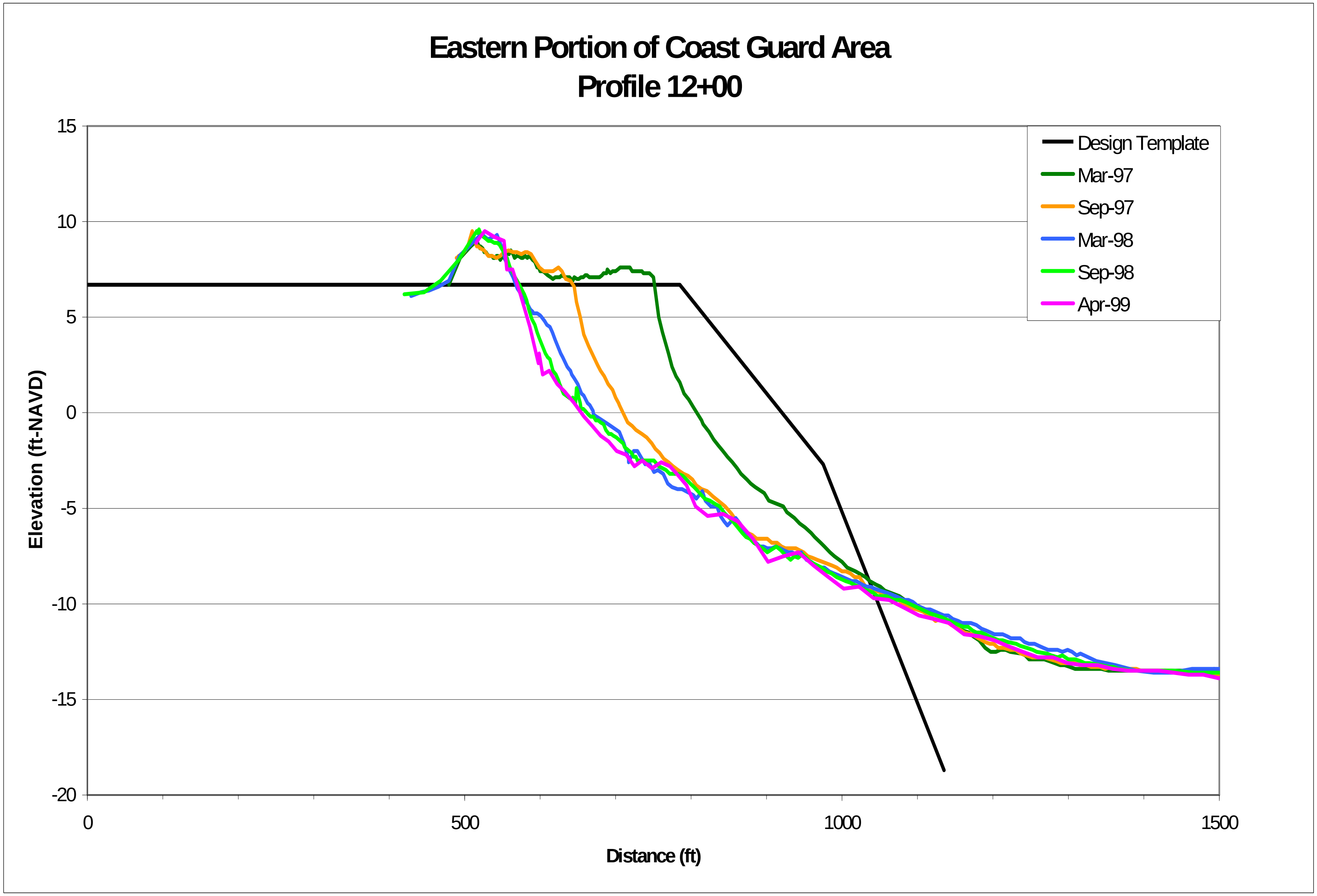
Cape May City
Looking North – September 2003

Cape May City
Dune Growth

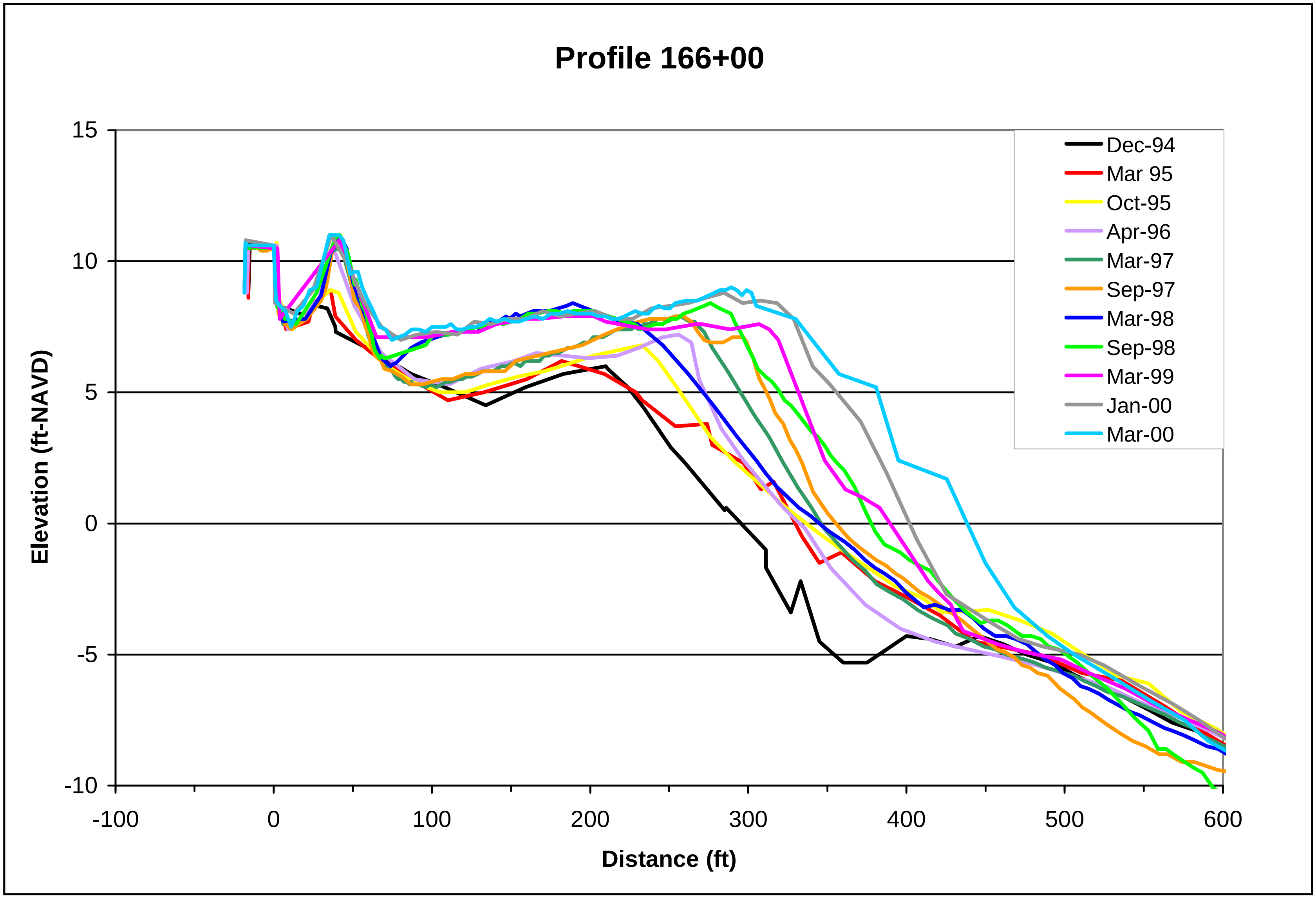


U.S. Coast Guard
Training Center
Cape May City
Cape May Meadows
D
C
B
AA
A
190 + 00
166 + 00
154 + 00
142 + 00
132 + 00
113 + 00
80 + 00
72 + 00
30 + 00
12 + 00
4 + 00
N
W
E
S
Profiles
Segment 1
Segment 2
Segment 3
Segment 4
Baseline

Segment 1-Feeder Beach



Segment 3-Cape May City South



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Cape May City Project

- Feeder Beach Concept performing as designed
  - About 300,000 cu yd placed every 2 years at CG
  - Cape May City has needed minimal nourishment
- Proactive community – dune program
- Update Sediment Budget
- Should we change nourishment cycle?
- Borrow area concerns, RSM Demo Project

Regional Sediment Management: Cape May, NJ Demonstration Project

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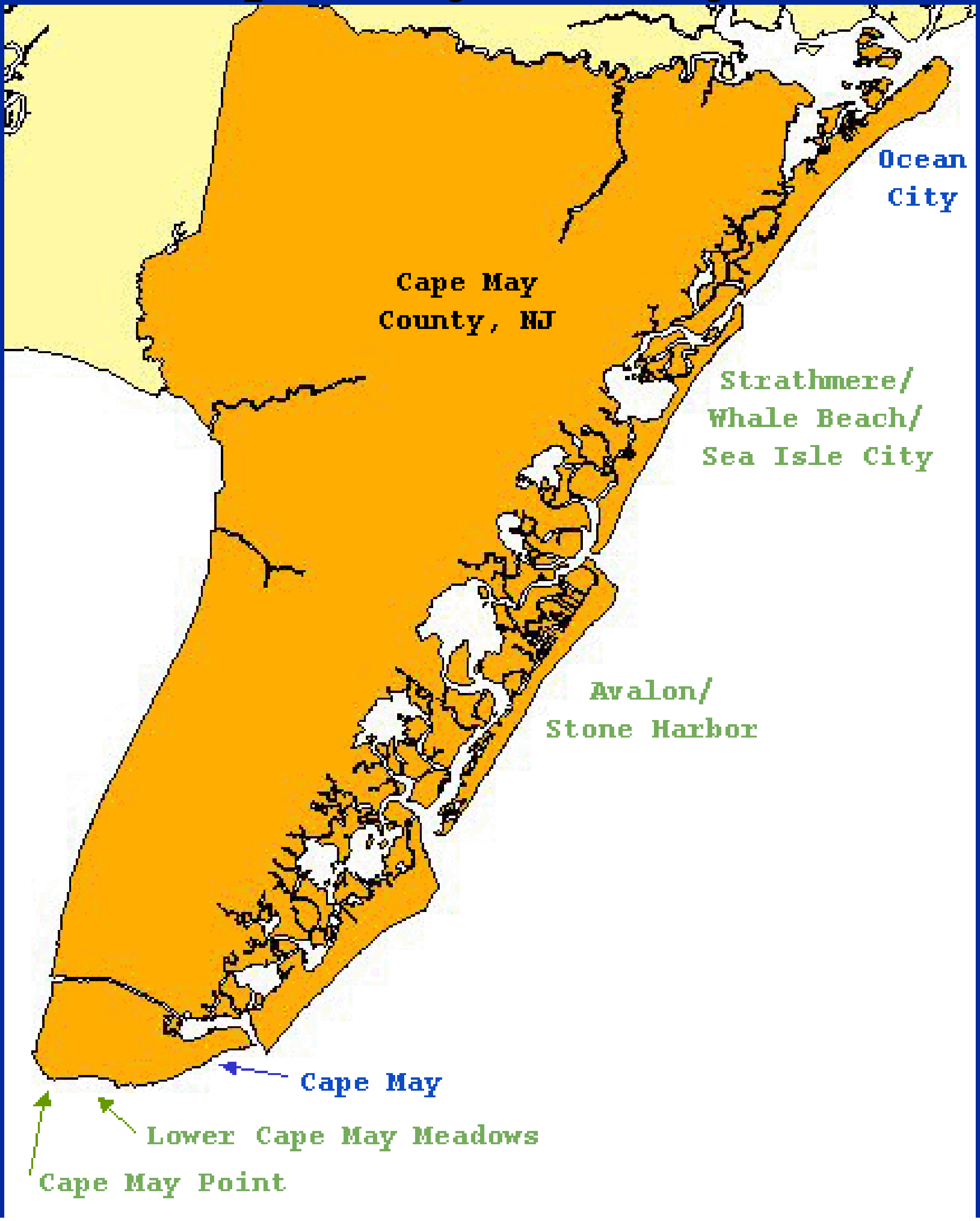
Philadelphia District

Cape May Fillet Area
Environmental and Geotechnical Testing

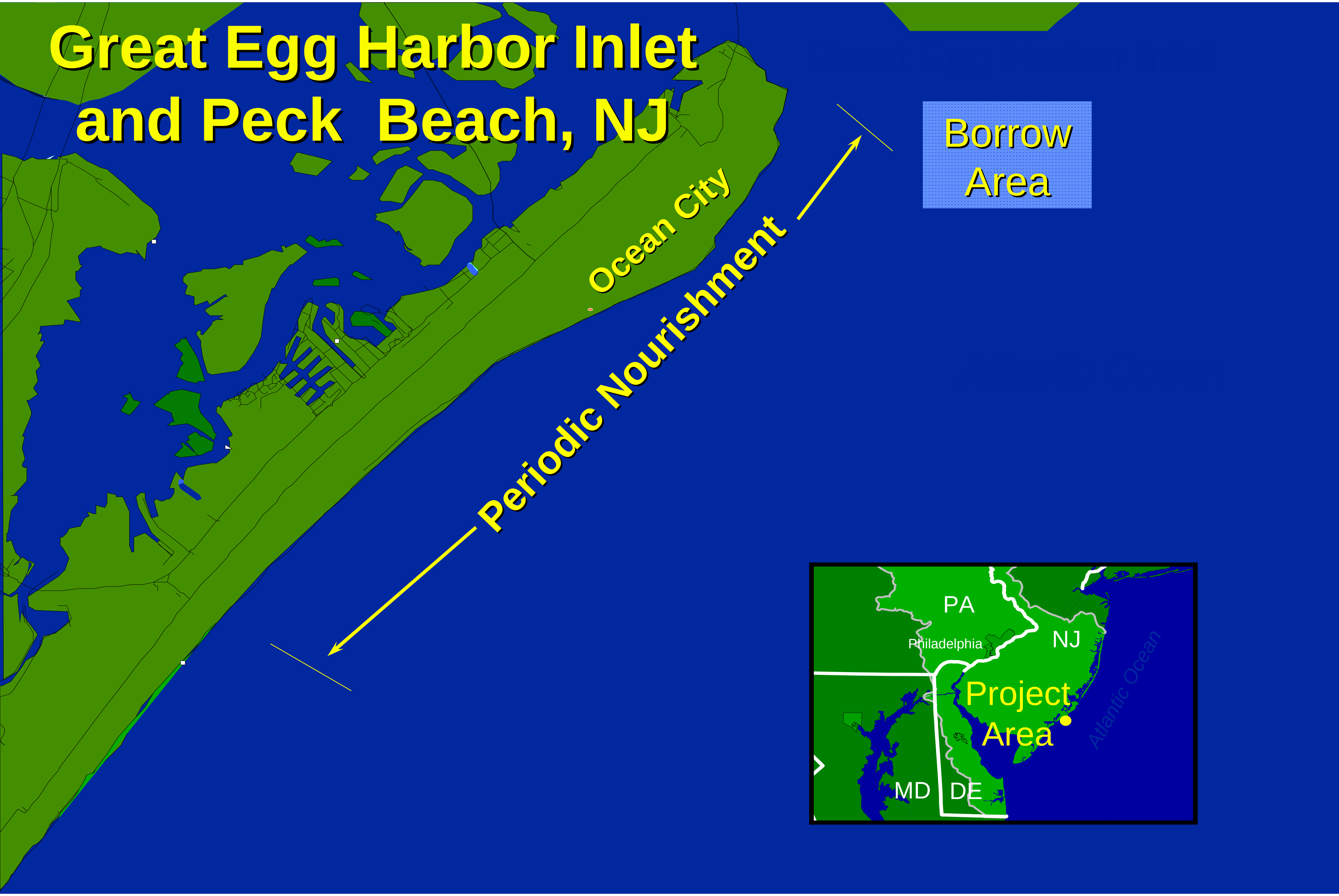
Cape May Meadows and Point
Initial Construction begins October 2004

Cape May Point
Initial Construction-January 2005

Cape May County, NJ



Great Egg Harbor Inlet and Peck Beach, NJ



Ocean City, NJ
During Halloween 1991 Storm

Great Egg Harbor Inlet and Peck Beach

Before **After**

112th Year, Number 49. Ocean City, N.J. 08226-0238 Thursday, December 17, 1992 Three Sections Price 40¢ (609) 399-5411

'Eclipse northeaster' worst since '62; new beach saved city

By WILLIAM BARLOW
Sentinel-Ledger Staff

"We spent more time trying to get people out of where they shouldn't have been in the first place"

— police captain

OCEAN CITY — Old-timers are calling the weekend's eclipse northeaster the worst storm since '62, but officials at every level are saying the damage would have been far worse if not for the nearly-completed beach replenishment project.

High tides flooded the city each day from Friday through Monday. The tides on Friday were higher than either of last winter's severe floods, with the oceanfront tide four feet above the normal high tide. While the tides had not returned to normal, at least by Tuesday most of the streets were clear at high tide. High winds began Thursday, just hours after Wednesday night's total lunar eclipse of the full moon (which would be closest to earth — in perigee — four days later).

Massive amounts of sand were lost from beaches, according to officials, especially from the nearly-completed replenishment project, and on Friday waves broke freely over the bulkhead in the south end.

High winds pounded the resort from Thursday night into Friday morning and pushed water into the back bays. For eight consecutive high tides, streets throughout the island were flooded and often impassible.

On Friday night, weather equipment on the *Beachbuilder* dredge anchored on the bay side of Longport clocked winds at up to 90 mph.

U.S. Rep. Bill Hughes, along with

(please turn to page A16)

STORM

(continued from page 1)

city officials and Federal Emergency Management Agency regional director Stephen Kemp, toured the coastline by Coast Guard helicopter Tuesday. See related front-page story.

Hughes said Tuesday that if and when the area is declared a federal disaster, FEMA will be setting up both stationary and mobile offices throughout the region for property owners to report damage. He said he expects President Bush will declare a state of disaster in the near future, which is necessary before any federal aid will be available.

was in the helicopter, said most of the structural damage to private property was to beach stairs, decks and other structures on the ocean side of the bulkhead, or by debris striking houses. Deaney said it is likely a City Council discussion on a proposed ordinance banning such structures is likely to be held sooner than scheduled.

Deaney added there was less debris than from last winter's storms because the boardwalk wasn't damaged.

Other damage included a roof blown off an oceanfront house in the south end. Also, nearly anything

"We spent more time trying to get people out of where they shouldn't have been in the first place," he said. "People think they have motorboats instead of cars."

He said the police department received, at a conservative estimate, 56,700 calls in 72 hours. Many of the calls were inquiries as to the status of the bridges in and out of town.

Pollock said there was no danger to people's lives or else the island would have been evacuated.

Just the same, some people made for Red Cross shelters in order to wait out the worst of it Friday.

fied out-of-town property owners whose properties were severely damaged or where the possibility of further damage was eminent without attention. However, he added that the city does need to be notified about specific damage to private property, as other towns had requested, and that property owners should report the damage to FEMA when a local office is set up.

Gov. James Florio is reportedly setting up an 800 number for damage reports, and is pushing the federal government to declare the area a disaster.

Some area businesses

Cumberland.

This storm appears to have done more damage than those of January, 1992 and October, 1991, according to the lawmakers. Although money will be available for shore protection in next year's budget, New Jersey will need federal aid to solve the immediate problem.

Gov. Jim Florio has also sent a formal disaster declaration to President Bush for Atlantic, Ocean and Monmouth counties, adding that additional counties would also need federal aid as figures continue to be filed.

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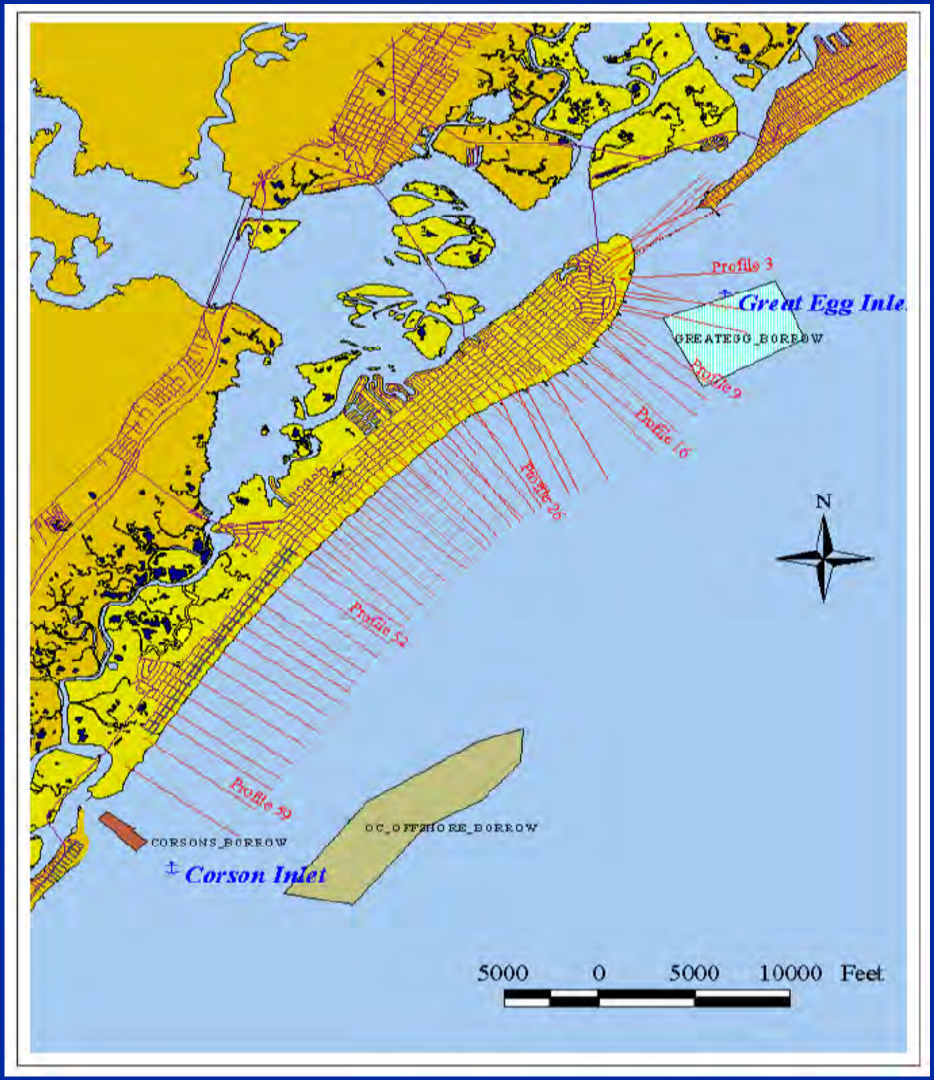
Ocean City, NJ Beachfill

- 4th Cycle of Renourishment completed from November 2003 to February 2004
- 1.6 Million Cubic Yds Placed from inlet to 15th Street (2 miles) @ approximate cost of $9 Million
- Southern portion of the project (2+ miles) has not needed fill since 1995
- Use of Monitoring Data to Improve Project Performance
- Proactive Stakeholders….RSM in Action!

Music Pier Area
Storm Berm Concept
October 2004 vs. May 2005

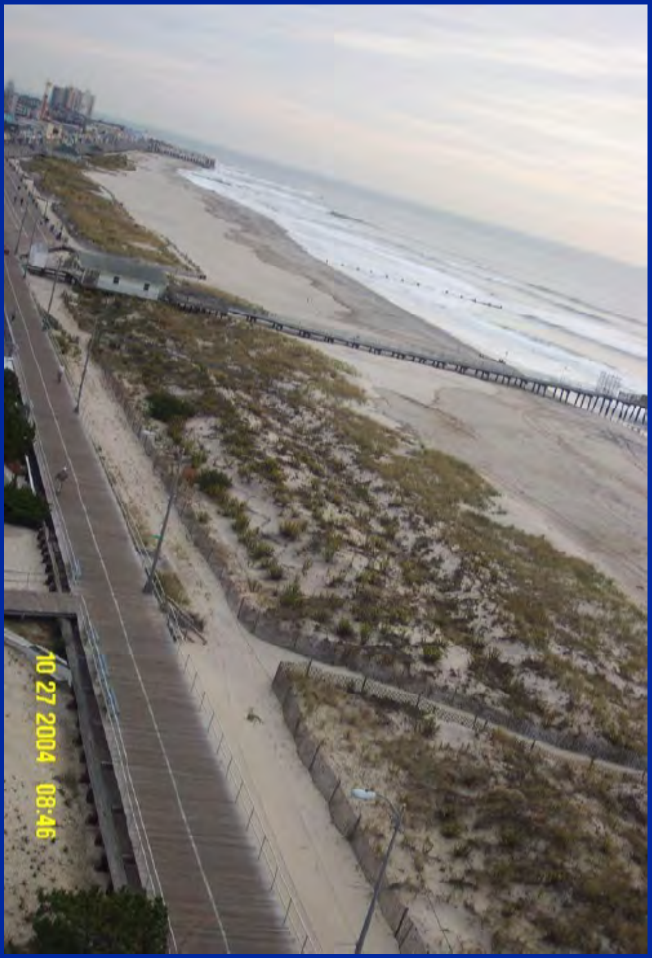
Ocean City, NJ
Monitoring Line Locations



Ocean City, NJ South End

During Initial Construction-Summer 1992

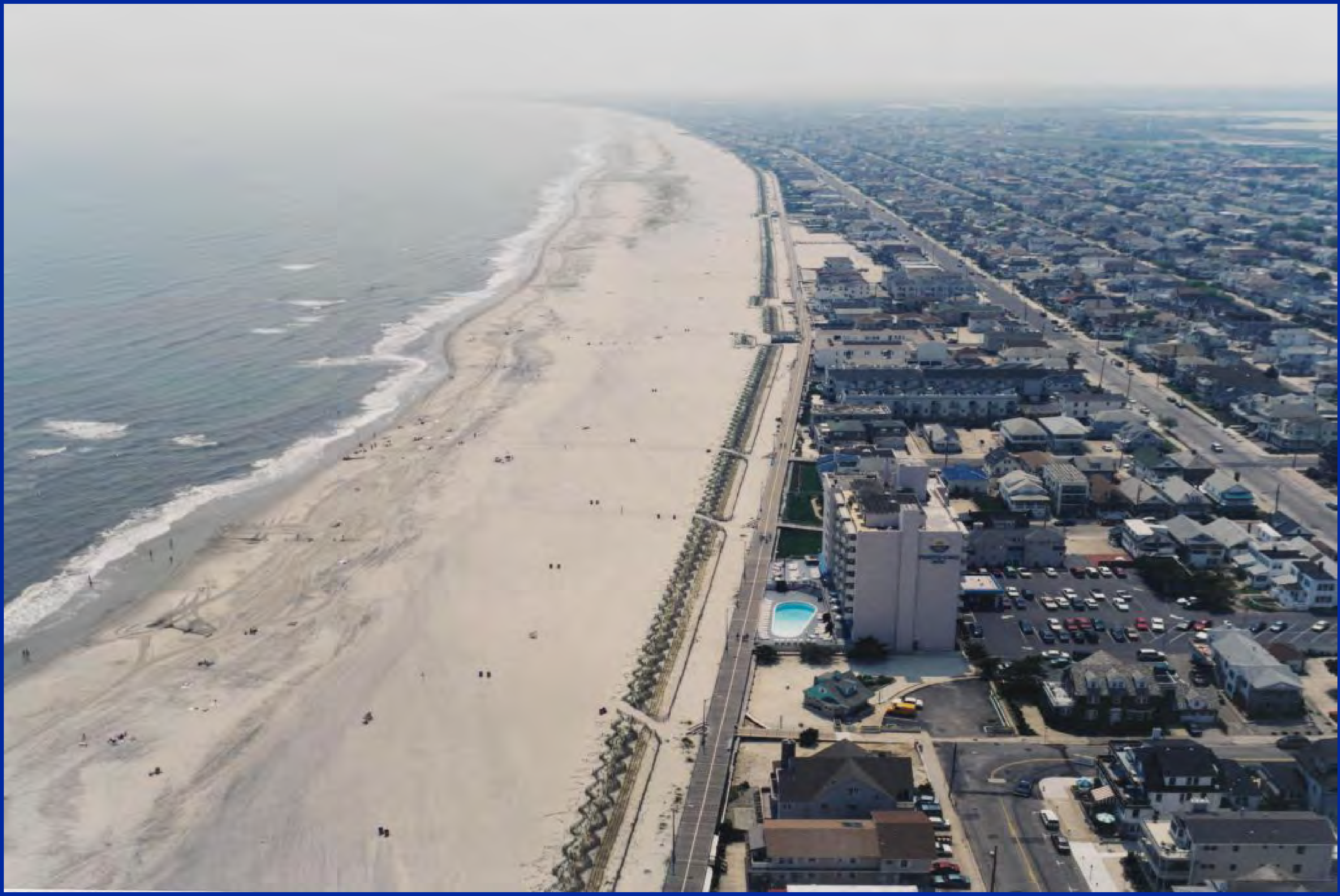
October 2004



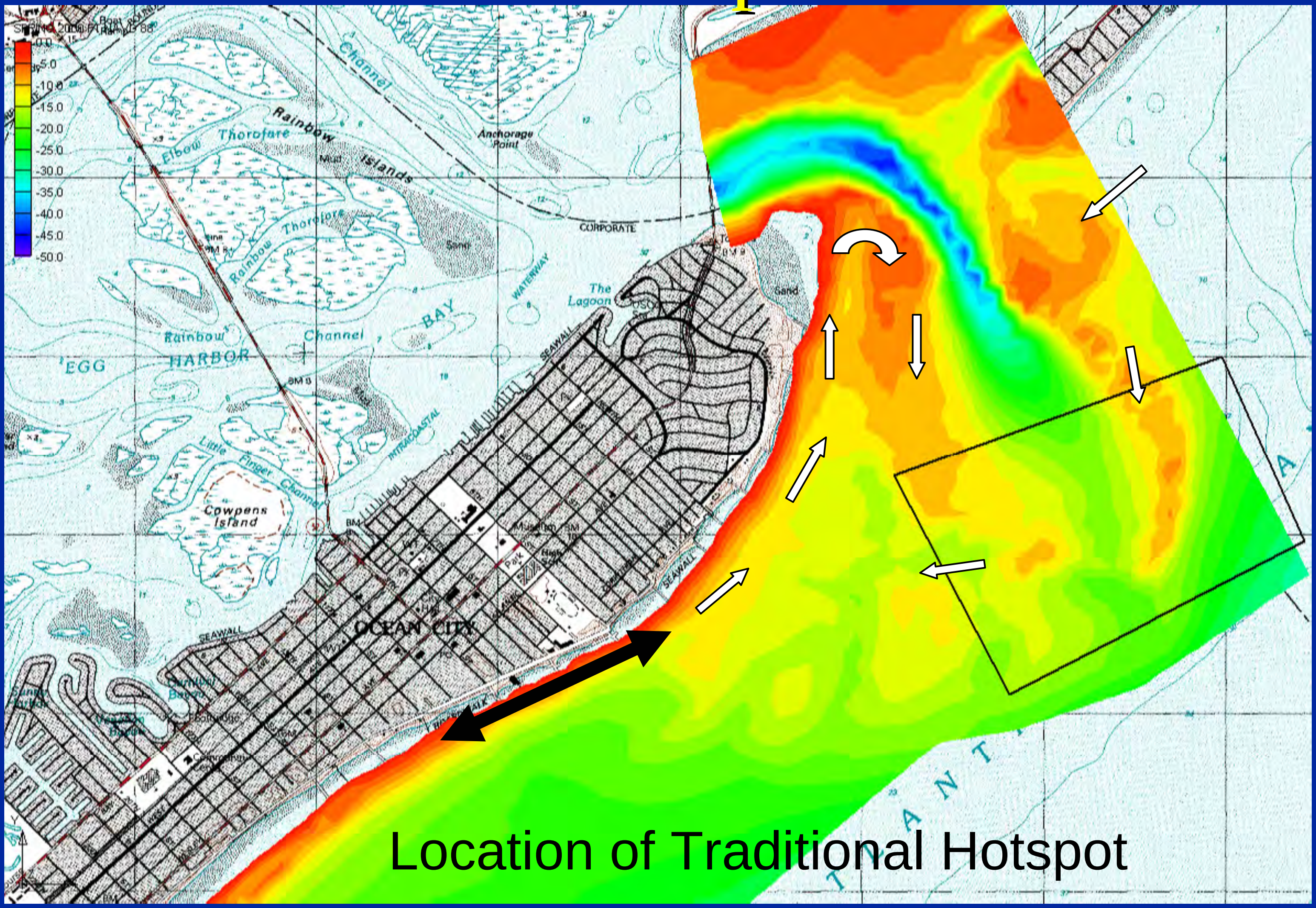
Ocean City, NJ
Southern Part of Project (no fill needed)
March 2004

Ocean City, NJ
Southern Part of Project (no fill since 1995)
Looking North - March 2004

Ocean City Dune Program



Understanding the Ocean City "Hot Spot"



Ocean City, NJ "Hot Spot"
4th Renourishment Cycle

Before (September 2003)

After (March 2004)

Ocean City, NJ North End
4th Renourishment Cycle

Before (September 2003)

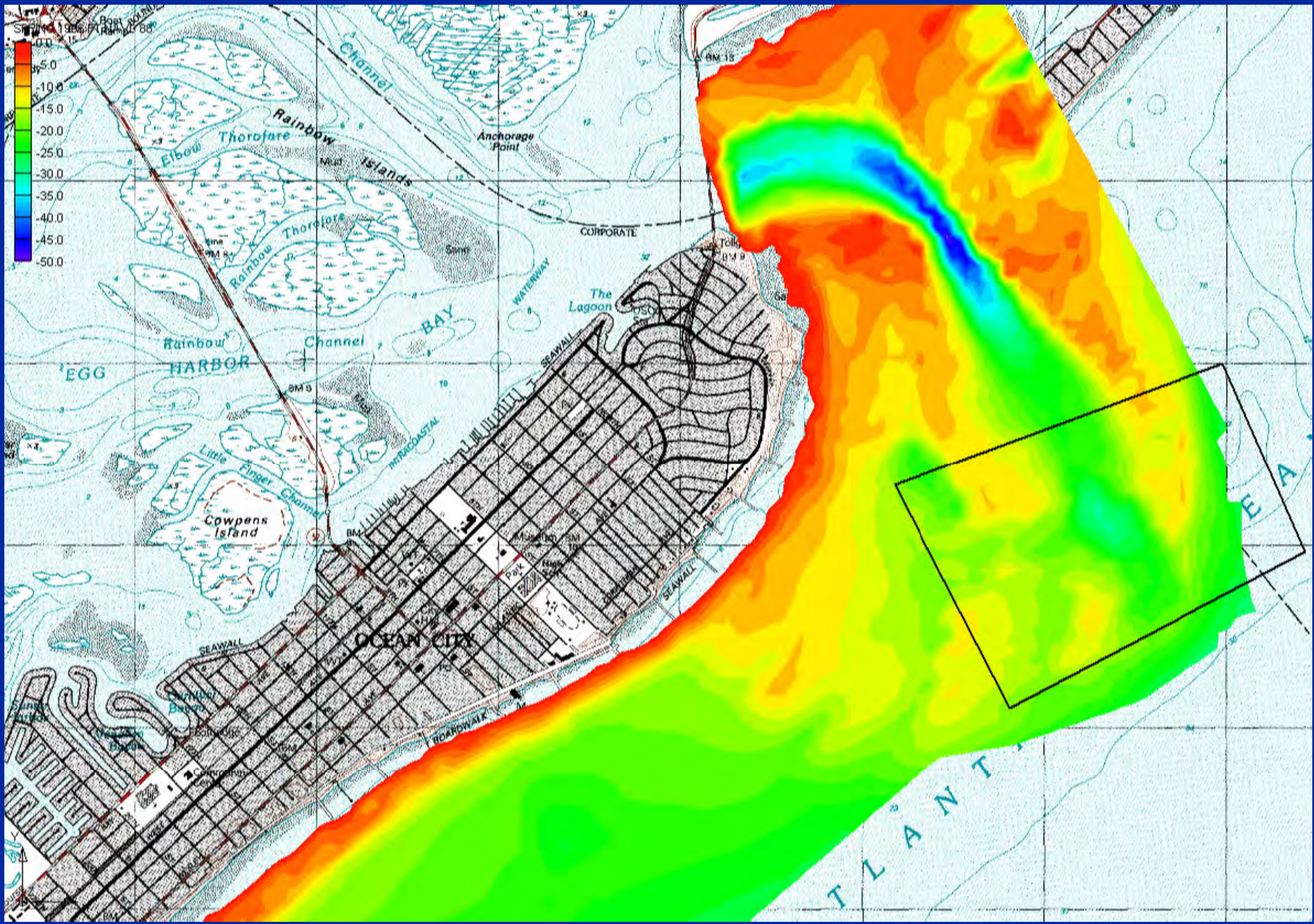
After (March 2004)

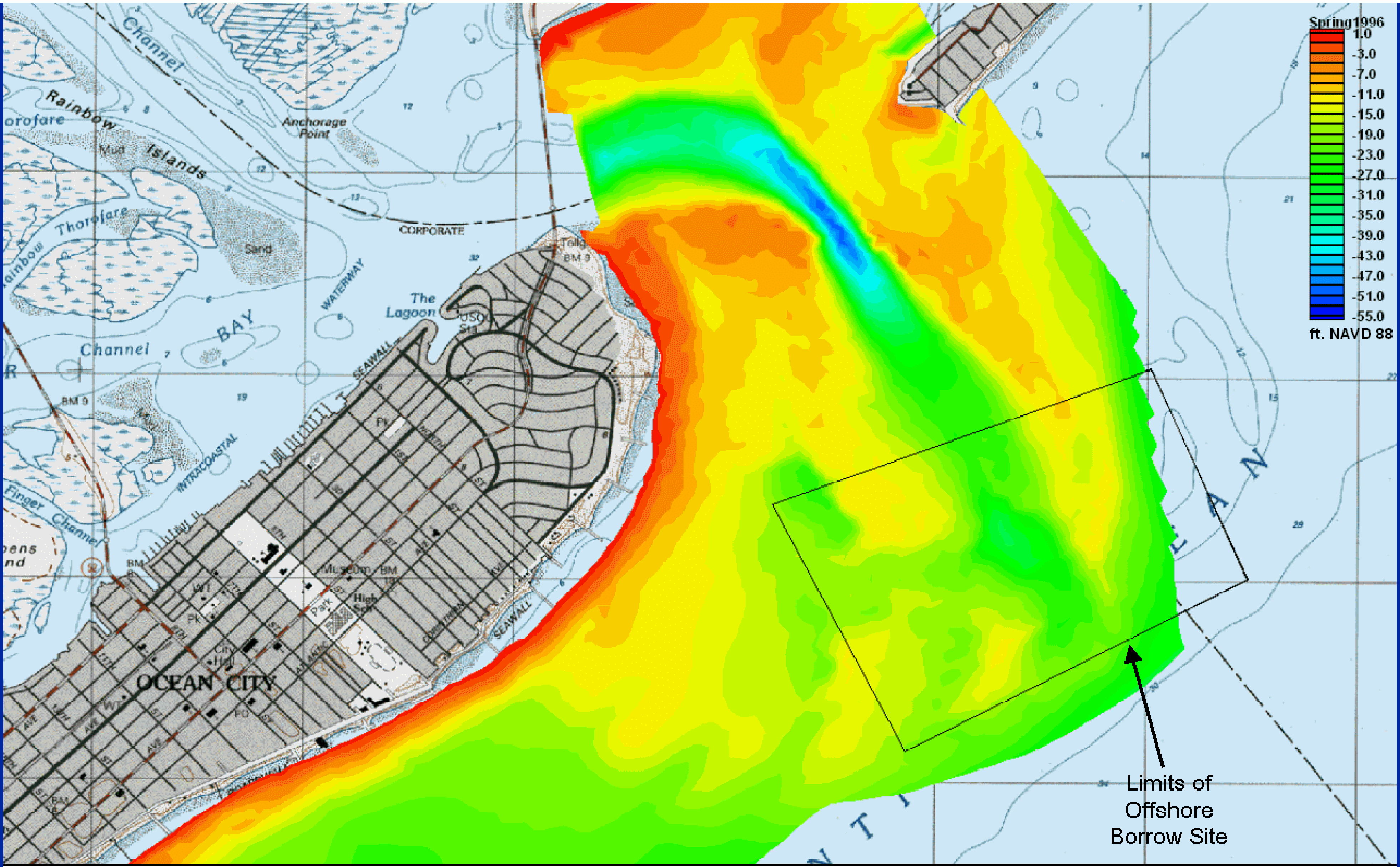
Erosion Issues

North End Closer to Inlet
January 2003

Hot Spot near 5th Street
May 2005

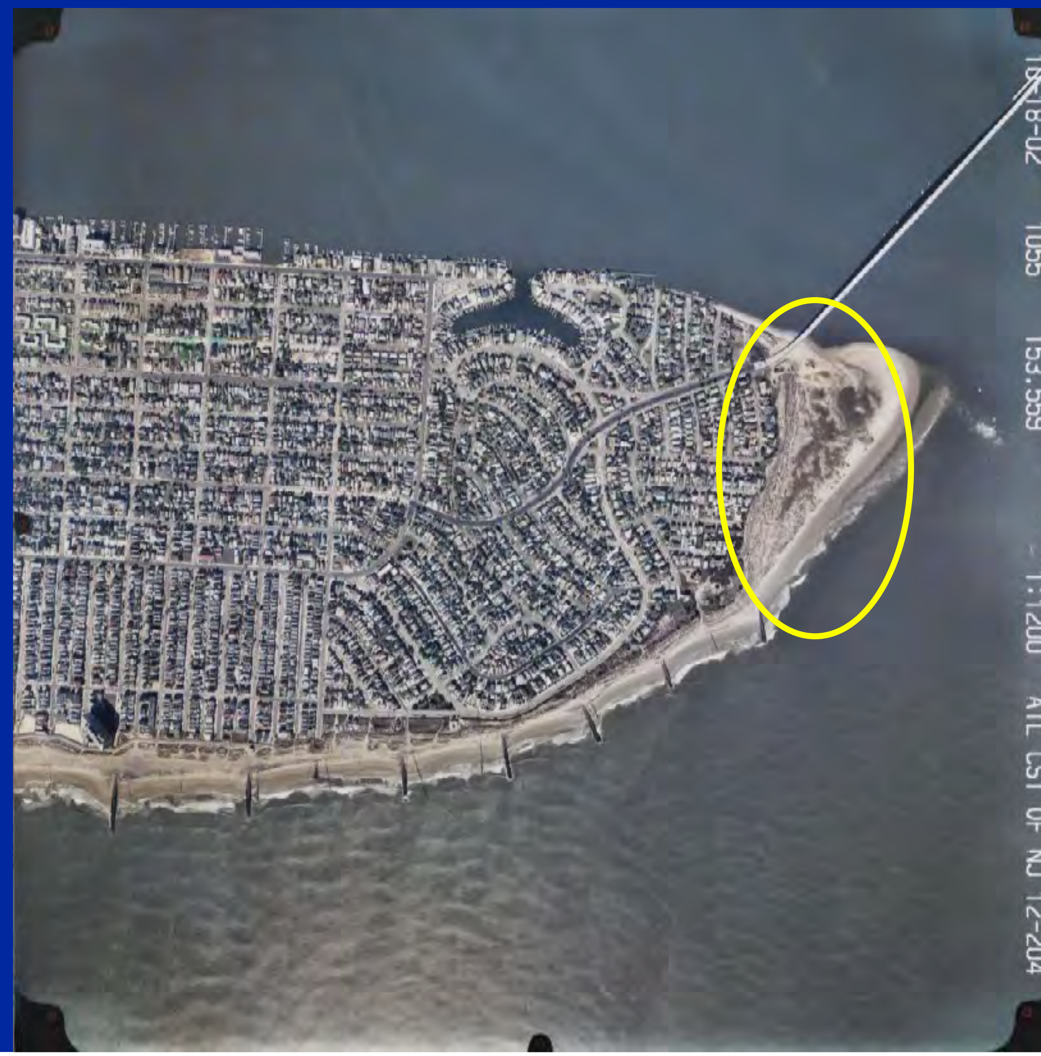
Great Egg Harbor Inlet
Spring 1996

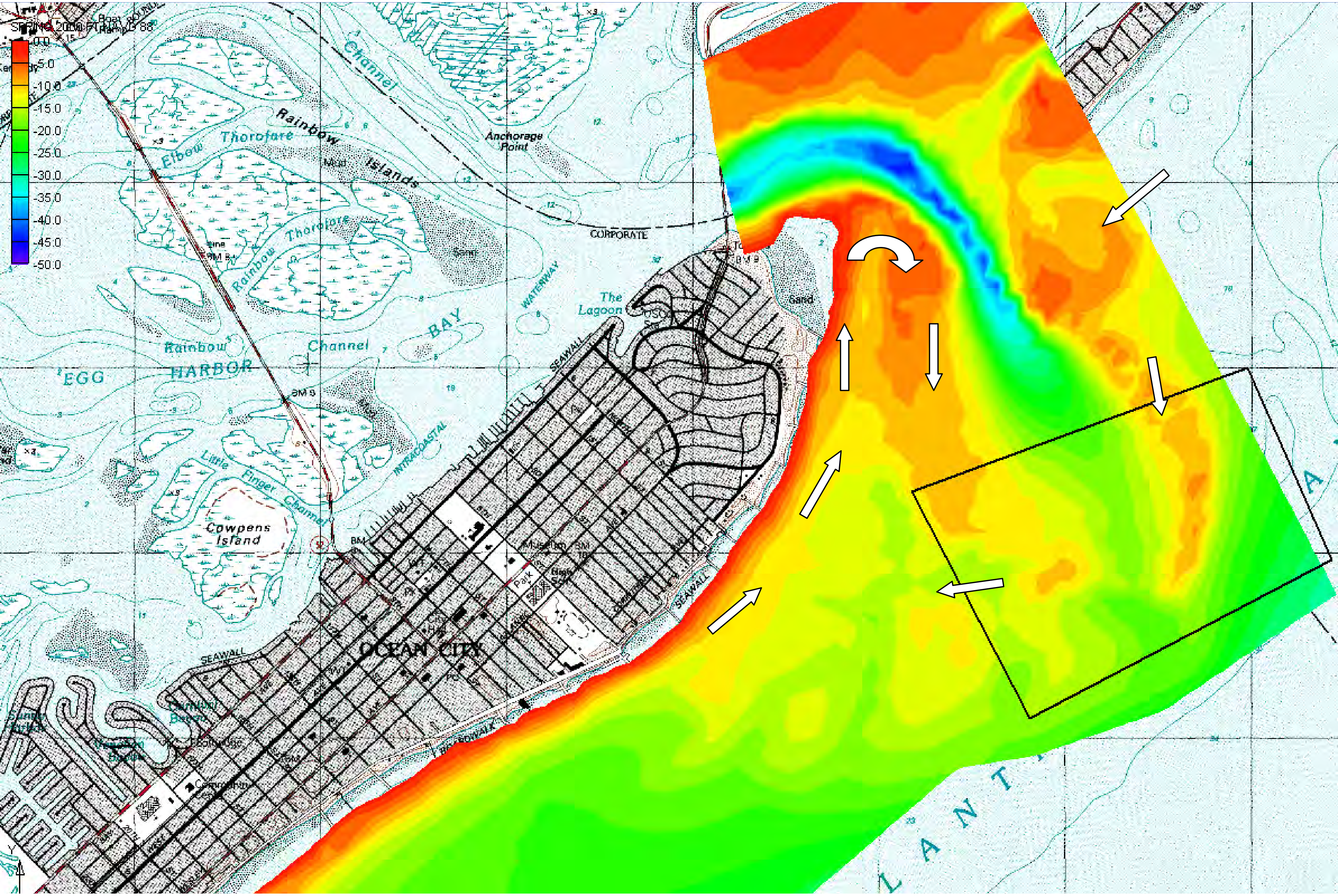




Great Egg Harbor Inlet
Spring 1996

How does your Garden Grow?
1994-2002




0.0
-5.0
-10.0
-15.0
-20.0
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-40.0
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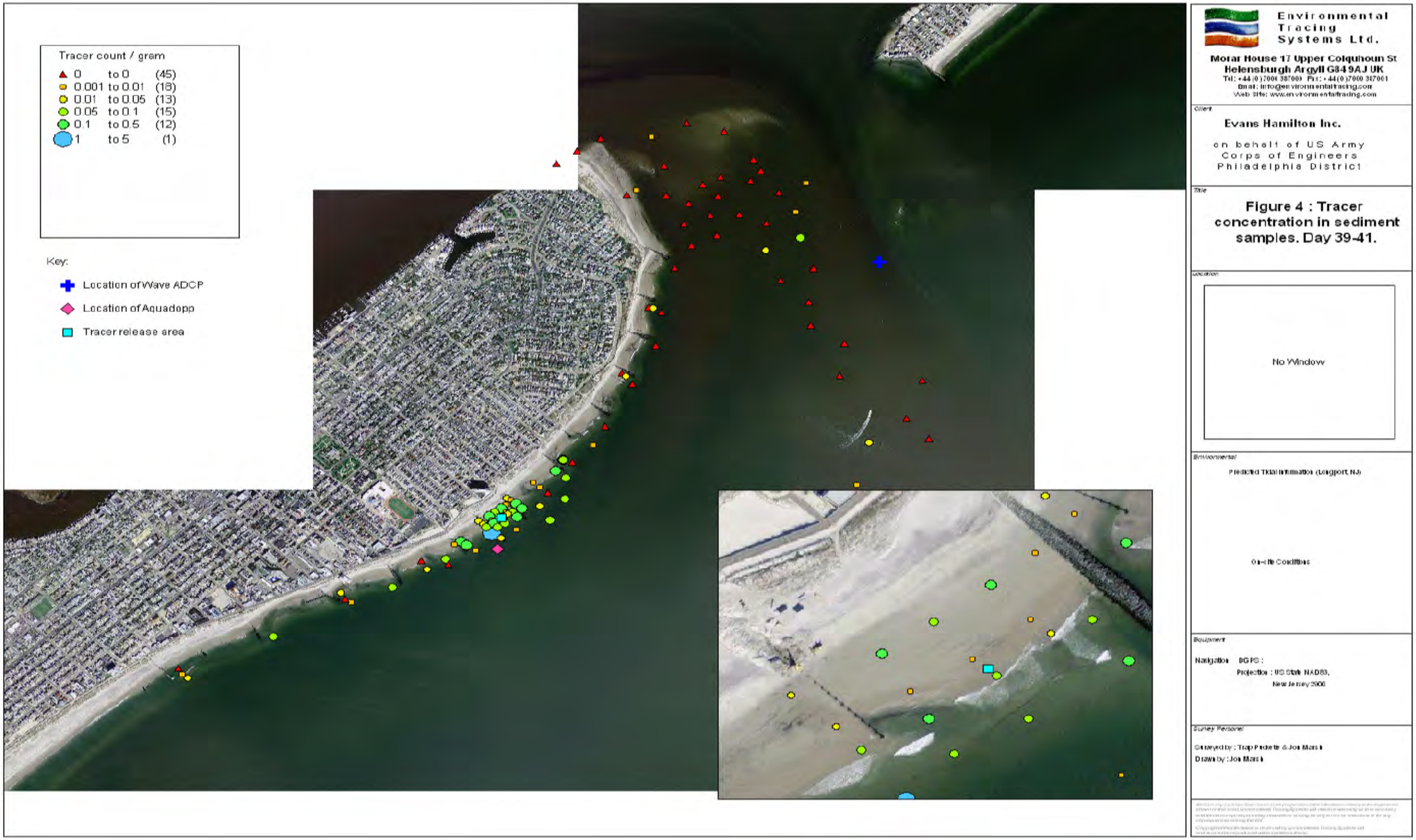
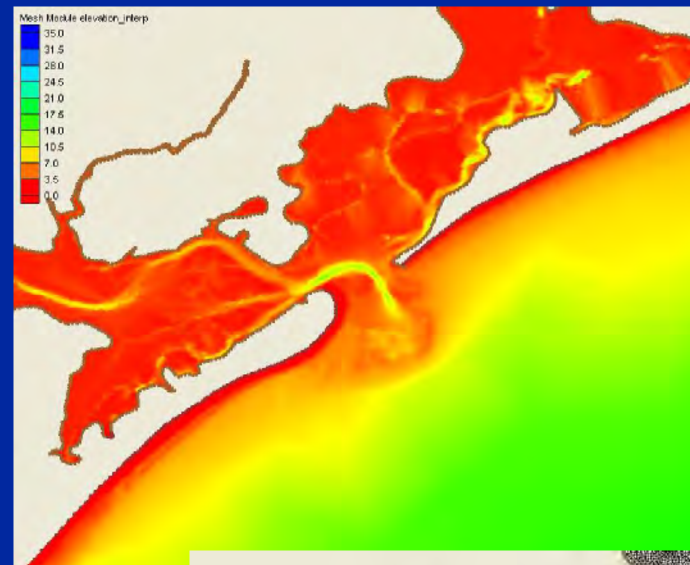
-50.0
Channel
Rainbow
Islands
Elbow
Thorofare
Rainbow Thorofare
Anchorage Point
CORPORATE
The Lagoon
WATERWAY
BAY
Rainbow
Channel
EGG
HARBOR
INTRACOASTAL
Little Finger Channel
Cowpens Island
SEAWALL
OCEAN CITY
BOARDWALK
Sand

Tracer Study in Hot Spot Area – April 2004



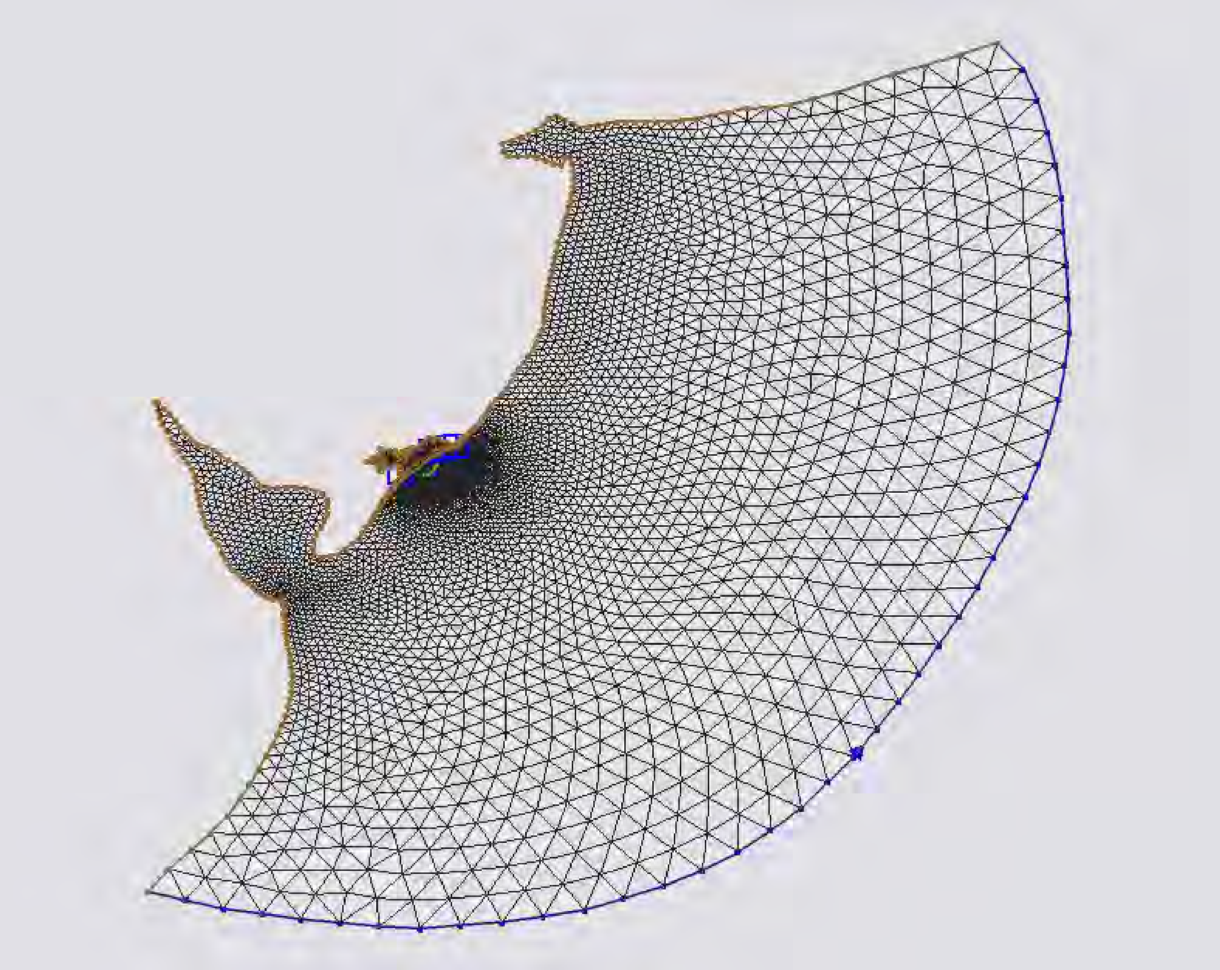
Hydrodynamic Modeling of Great Egg Harbor Inlet

- Investigate hydrodynamic forces influencing the north end beachfill
- Evaluate existing and alternative borrow area locations
- ERDC's SMS Beta Version 9.0
- Inlet Modeling System includes ADCIRC, STWAVE and M2D



ADCIRC

- 2D finite element circulation model.
- Forcing can include tidal constituents, wind, atmospheric pressure, wave stress gradients and flow rate (river discharge).



STWAVE

- Steady state spectral wave model.
- Rectangular grid.
- Model processes include refraction, shoaling, wave-current interaction, wave growth and breaking.
- Input – wave height, period, direction, spectrum and bathymetry.

Seaside Heights, Casino Pier,
10/16/02, Big Wednesday

M2D

- Horizontal circulation model (water level & current).
- Rectangular grid, variable cell spacing.
- Input (forcing) – tidal constituents, water level, wind, waves, and flow rates.

Coupling Models

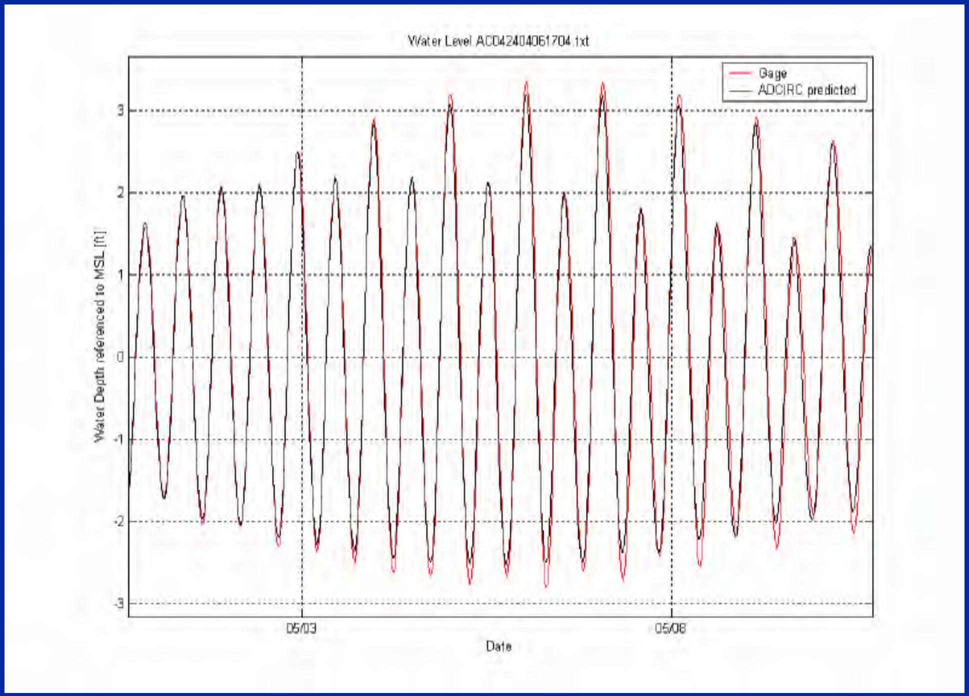
ADCIRC Regional Circulation Model

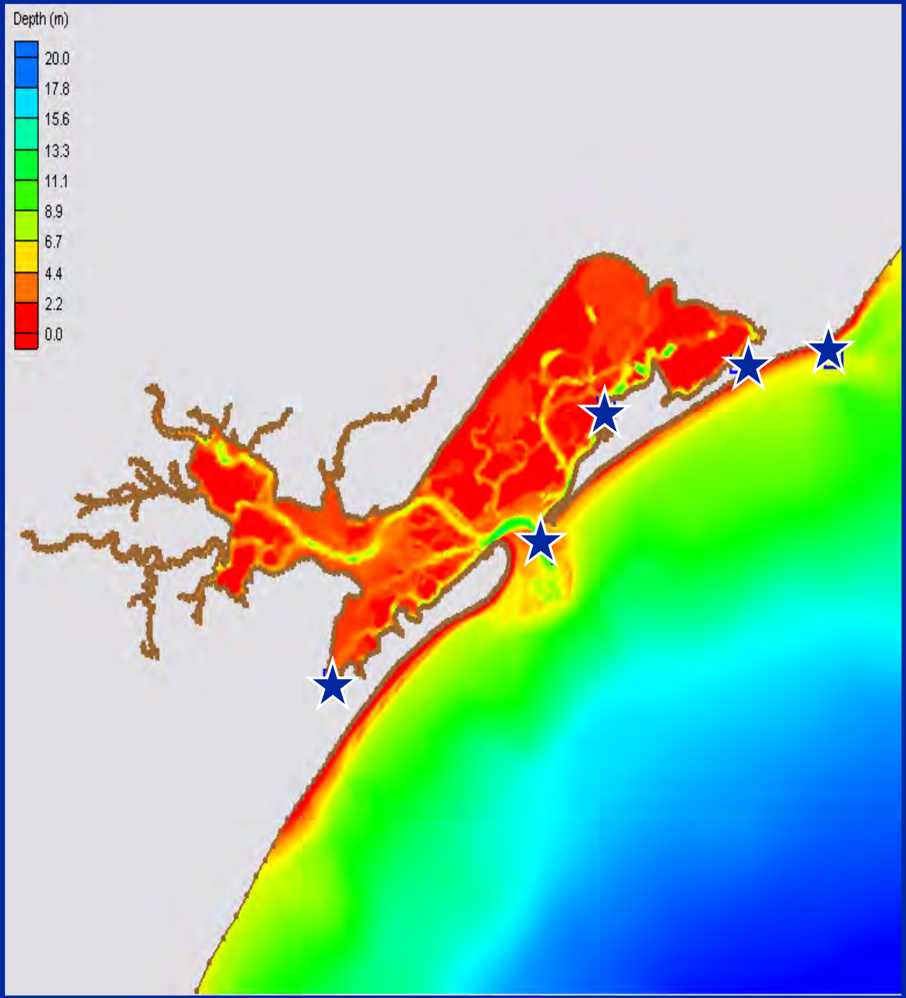
STWAVE Steady State Spectral Wave Model

M2D Local Circulation Model

Model Calibration

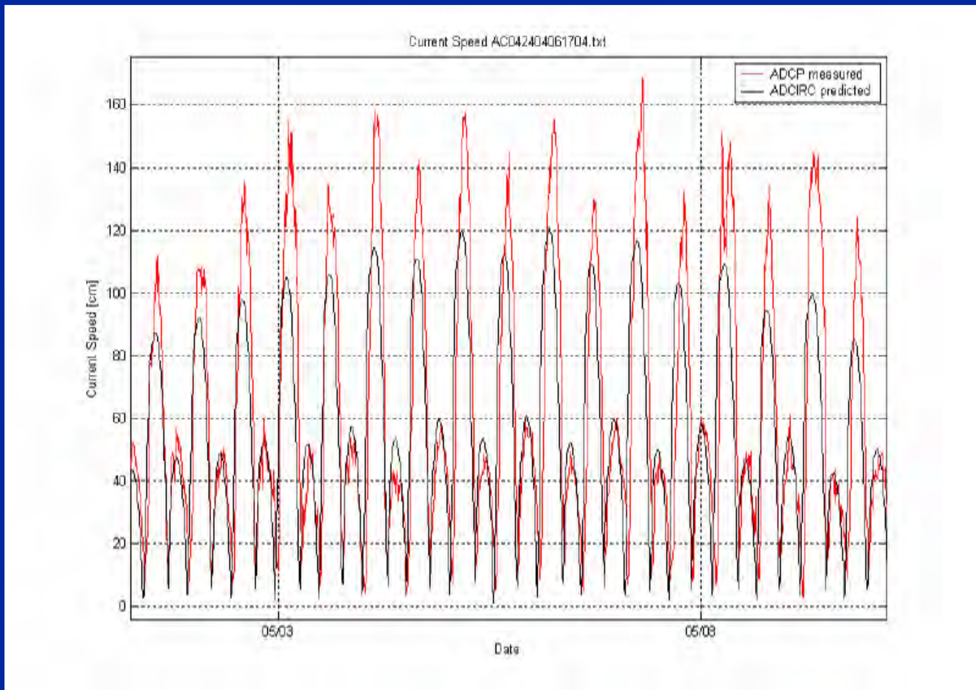
- Water Surface Elevation – range and phase differences at 5 locations.

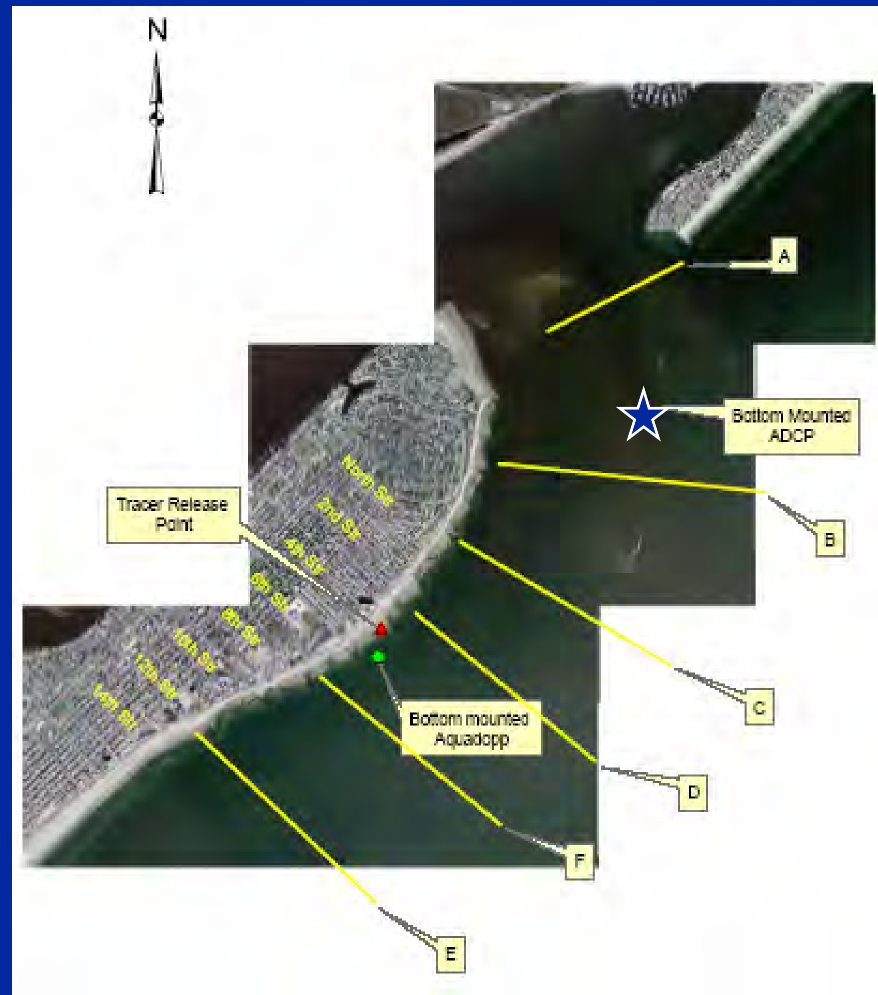




Model Calibration (con't)

- Current Velocities - magnitude differences at 7 different locations.





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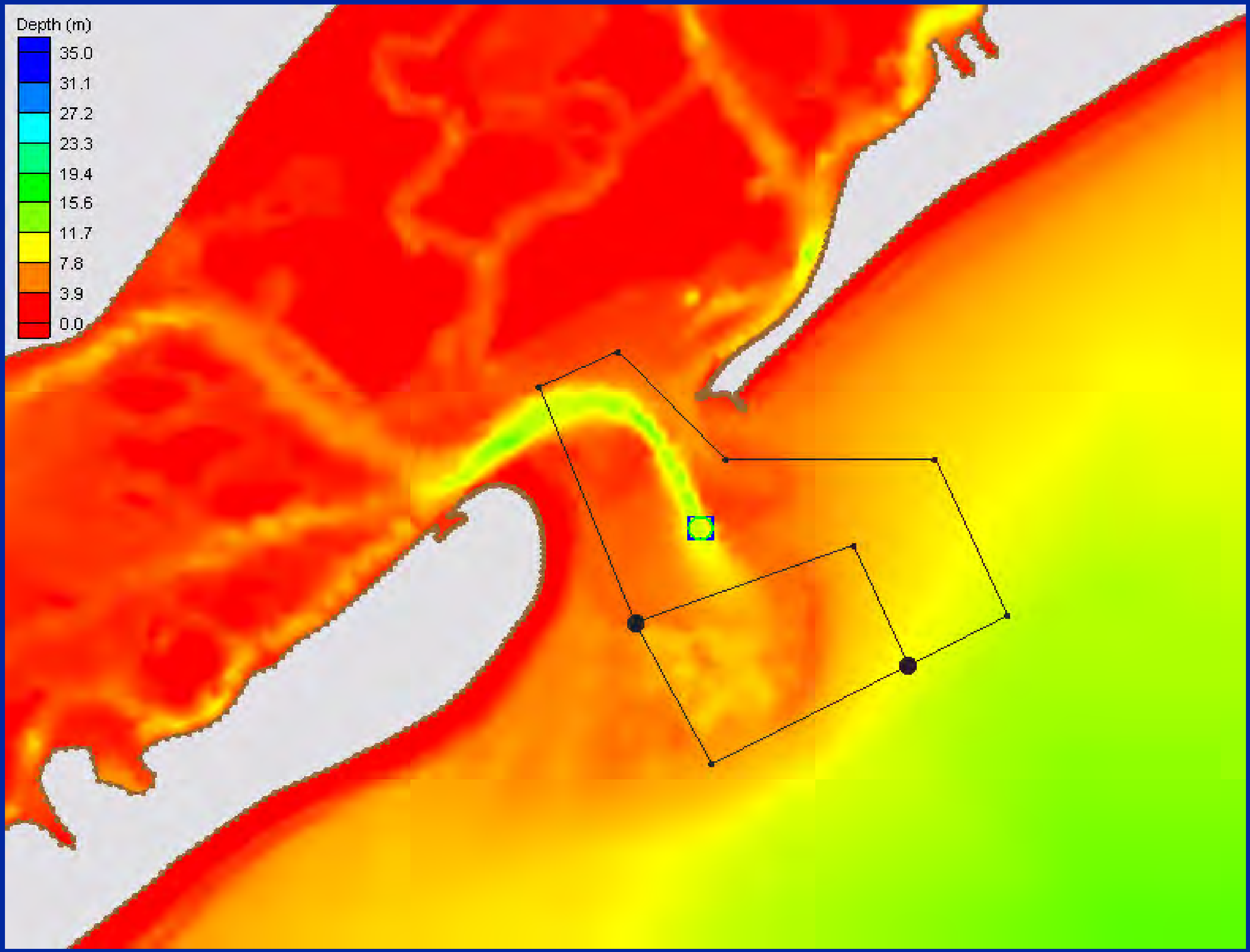
Philadelphia District

Continuing Analyses

- Hydrodynamic Model of Great Egg Harbor Inlet
- Borrow Area Modifications
- Updated Sediment Budget
- Template Modifications in Hot Spot Area? Storm berm concept, lower berm elevation?

Environmental and Geotechnical Testing



US Army Corps of Engineers
Philadelphia District

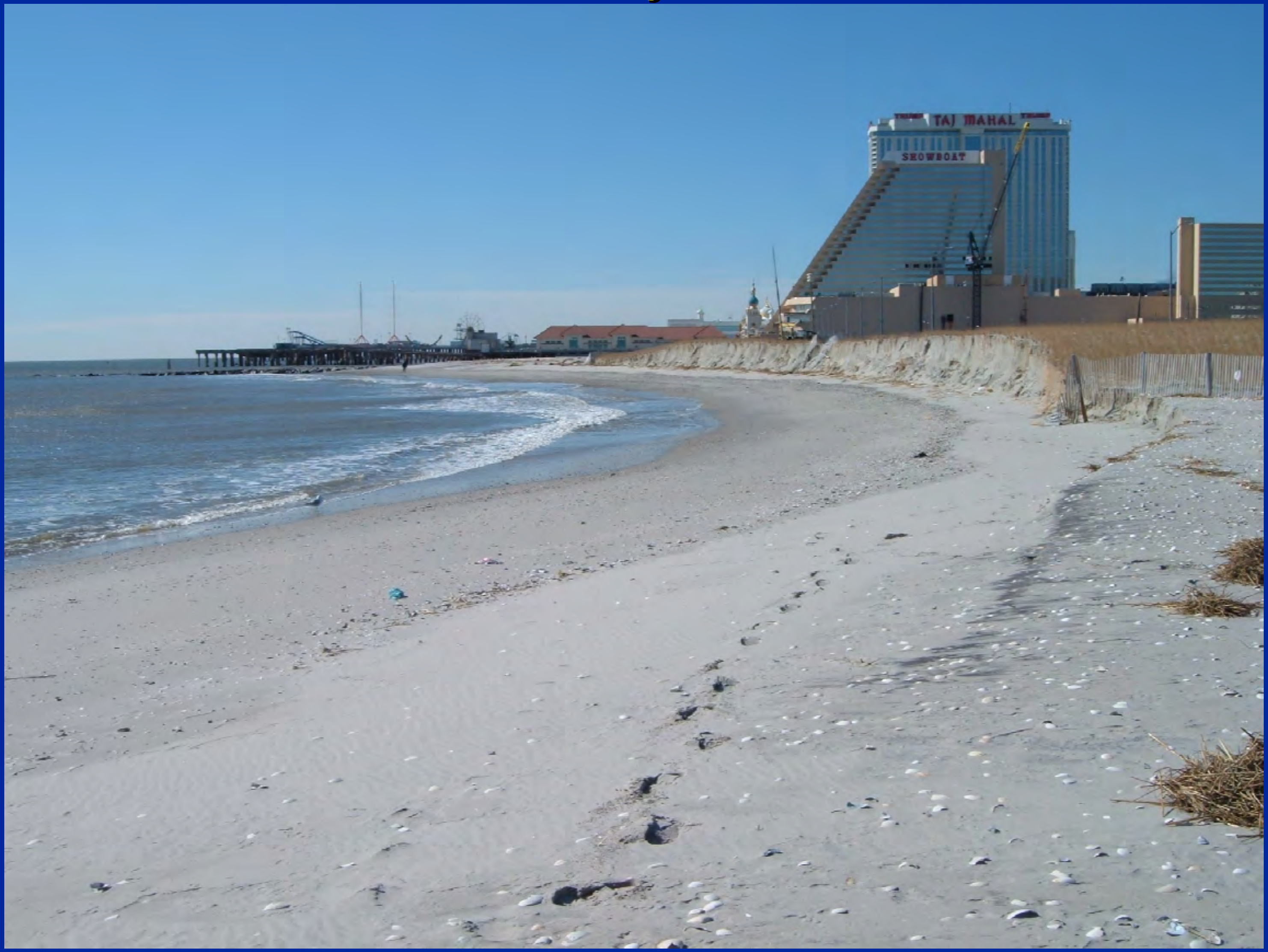
Summary

- **Yes….beachfill is worth it!**
  – Overall performance of Ocean City and Cape May
  – Hot spots are small compared to overall project, inlet relationship
  – Long-term response of the system
- **Importance of Project Monitoring**
  – Must evaluate project performance to keep efficient, find cause and effect relationships
  – Fund not only data collection, but ANALYSIS to make sound management decisions (now included in Feasibility cost estimate)
  – USACE Engineer Manual Update (POC: Stan Boc)
- Adaptive Management/Design
- Importance of Local Sponsor Relationships
- Regional Approach/Collaboration of Efforts

Extras

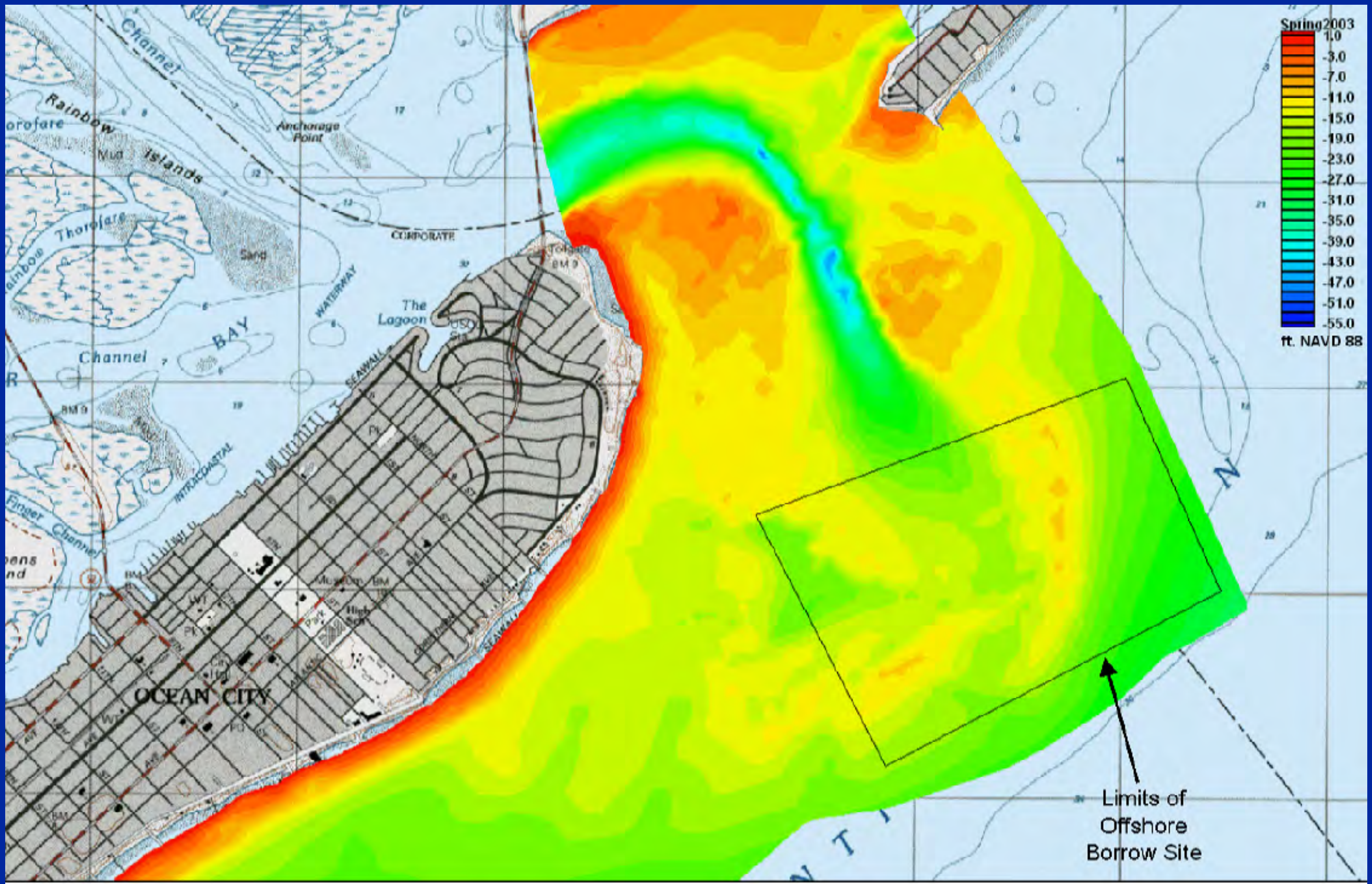
Atlantic City
After Beachfill - March 2004

Atlantic City North End Beachfill
February 2005



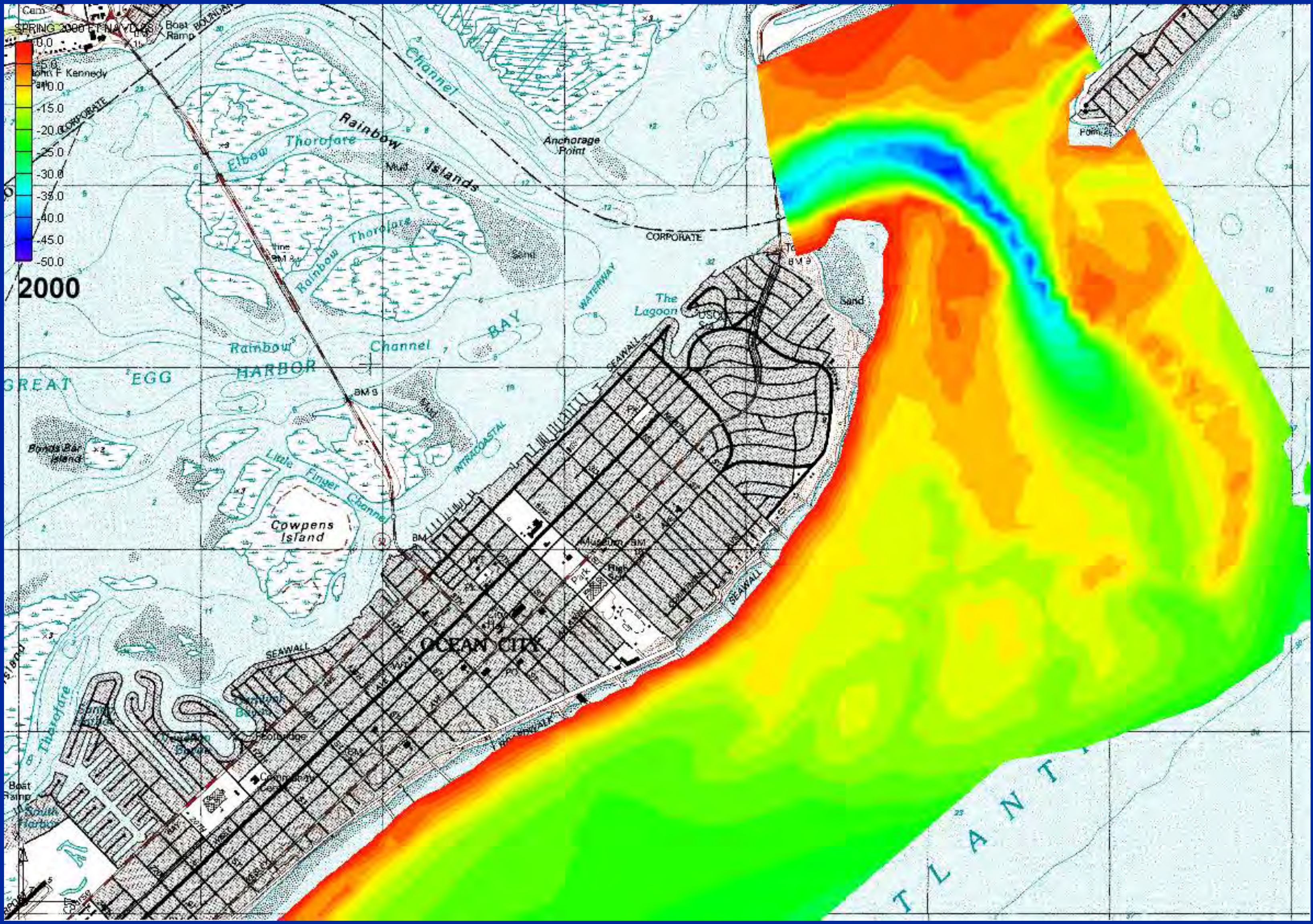
Ventnor Beachfill Erosion
February 2005

Great Egg Harbor Inlet
Spring 2003

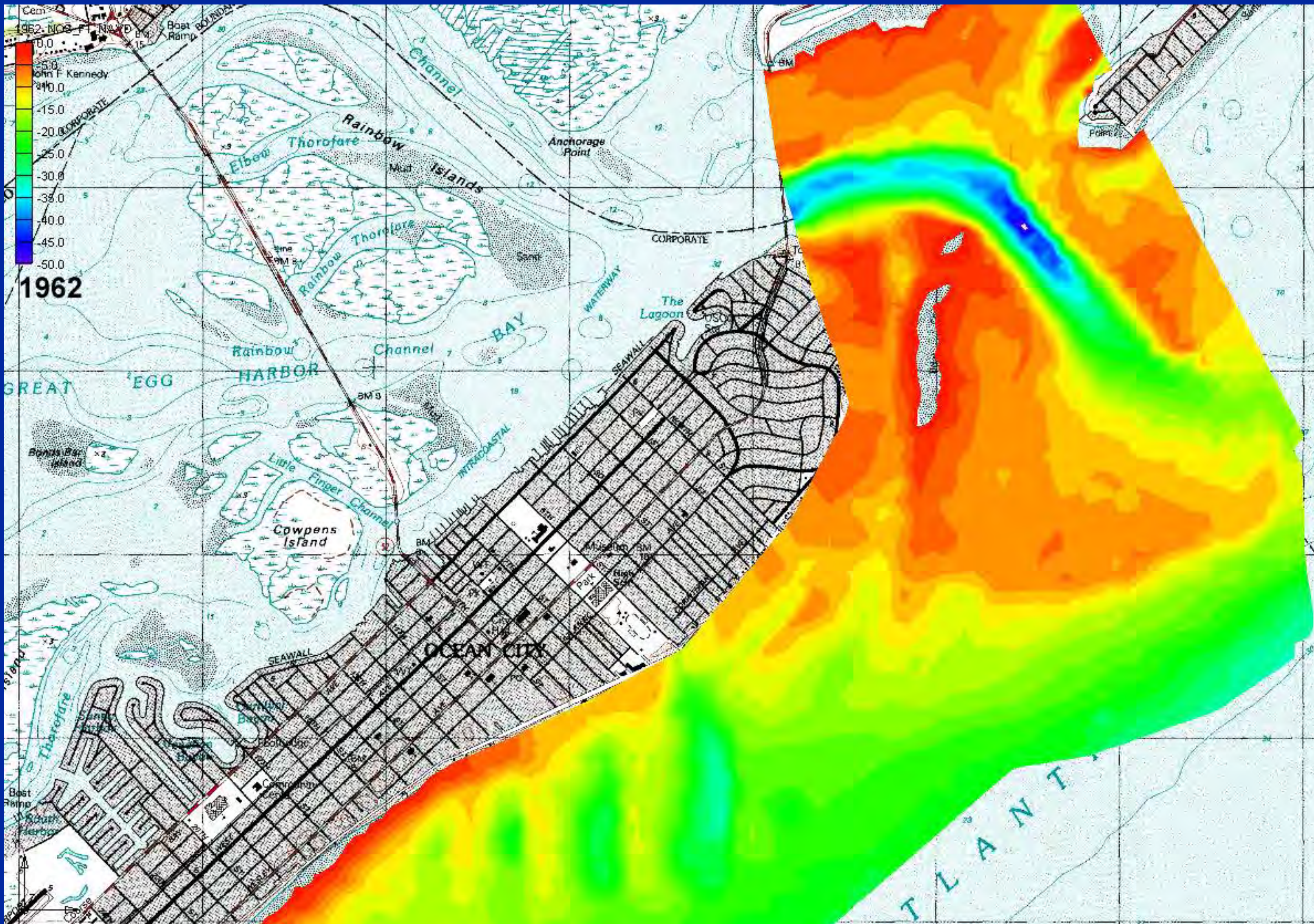


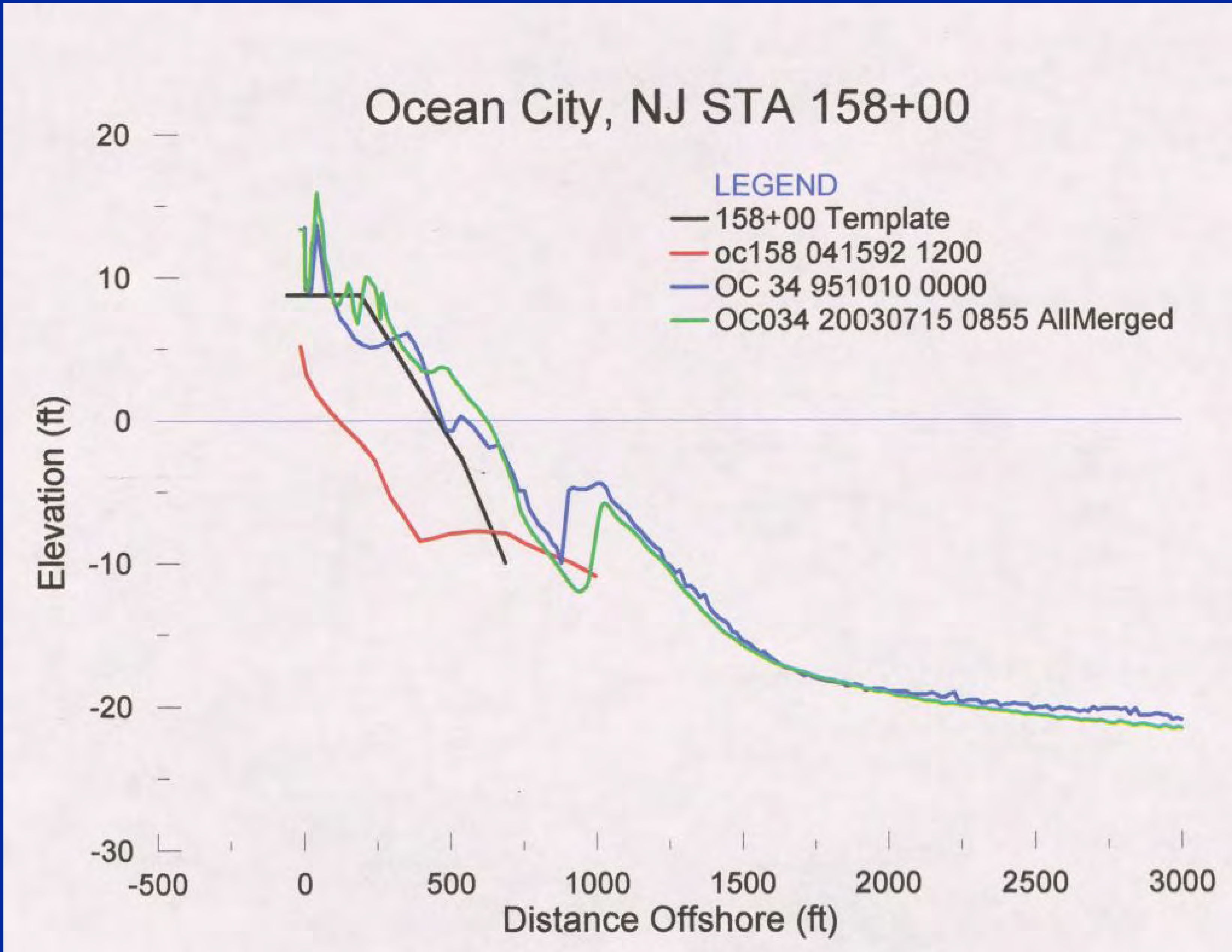
Great Egg Harbor Inlet
Spring 2003

Great Egg Harbor Inlet
Spring 2000

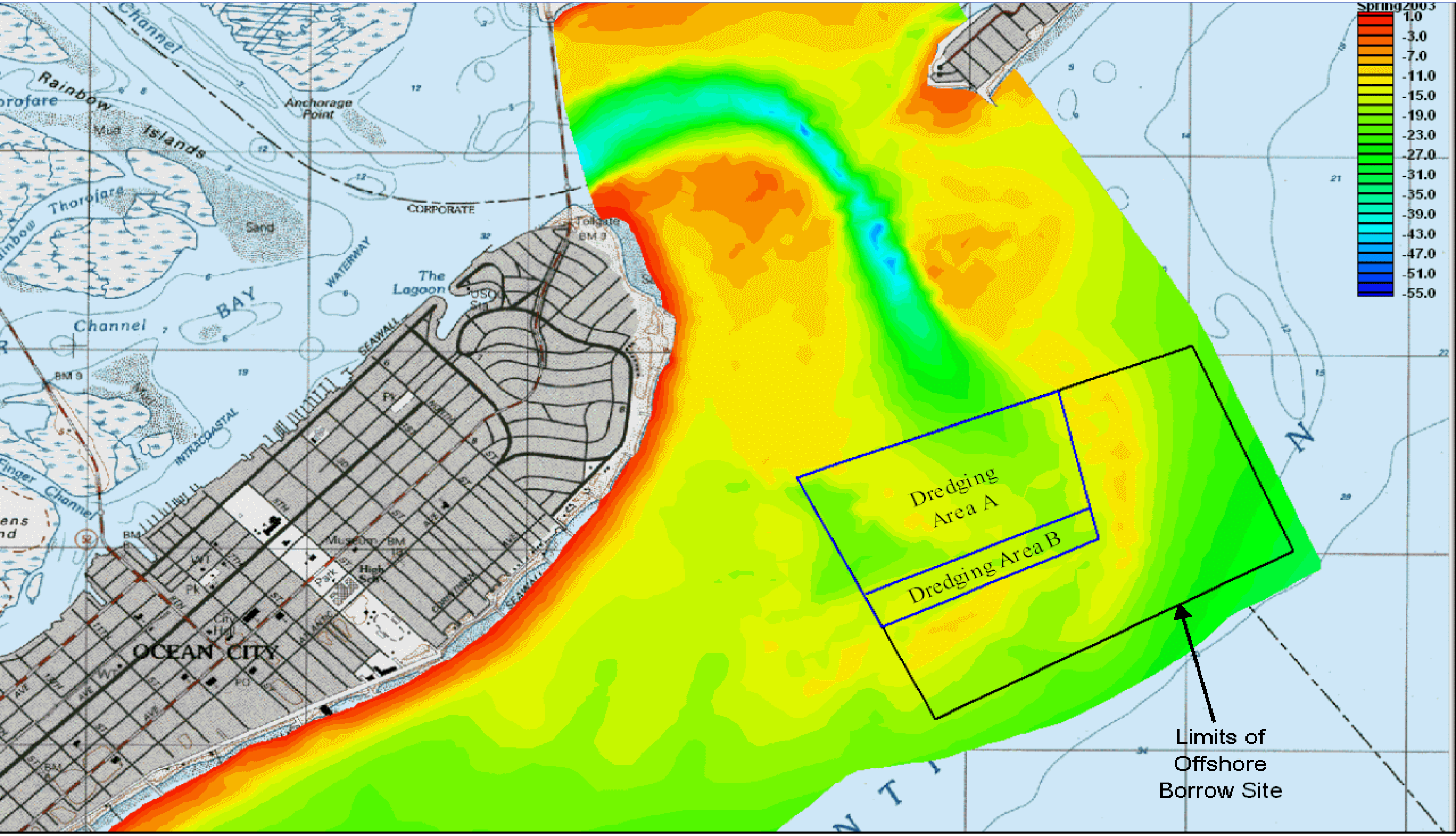


Great Egg Harbor Inlet
1962





Ocean City, NJ STA 158+00
LEGEND
158+00 Template
oc158 041592 1200
OC 34 951010 0000
OC034 20030715 0855 AllMerged
Elevation (ft)
20
10
0
-10
-20
-30
-500
0
500
1000
1500
2000
2500
3000
Distance Offshore (ft)



Great Egg Harbor Inlet
Spring 2003

Translating the Hydrologic Tower of Babel

Dan Crawford[1],

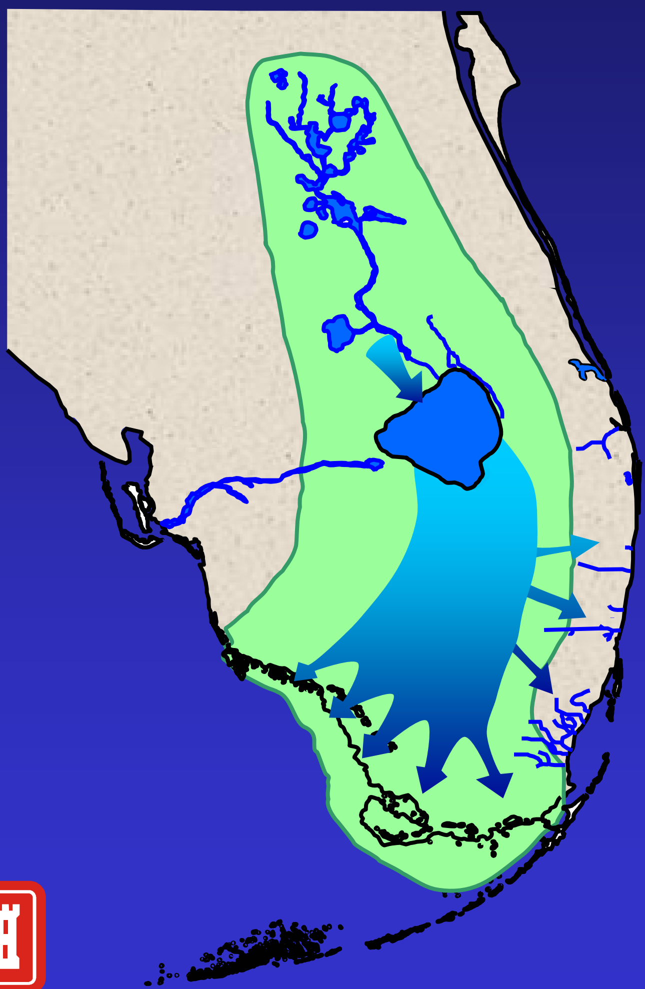
Bob Evans[1],
Dr. Richard Punnett[2],
Dan Vogler[3],
Schuyler Bishop[4]

1- US Army Corps of Engineers, Jacksonville District
2- consultant 3- contractor 4 - contractor

Topics to Cover

- The path to Everglades Restoration
- Regional and Sub-regional modeling tools
- Standard model outputs
- Transformation to “Performance Measures”
- Project-specific examples

The "Original" Everglades Ecosystem

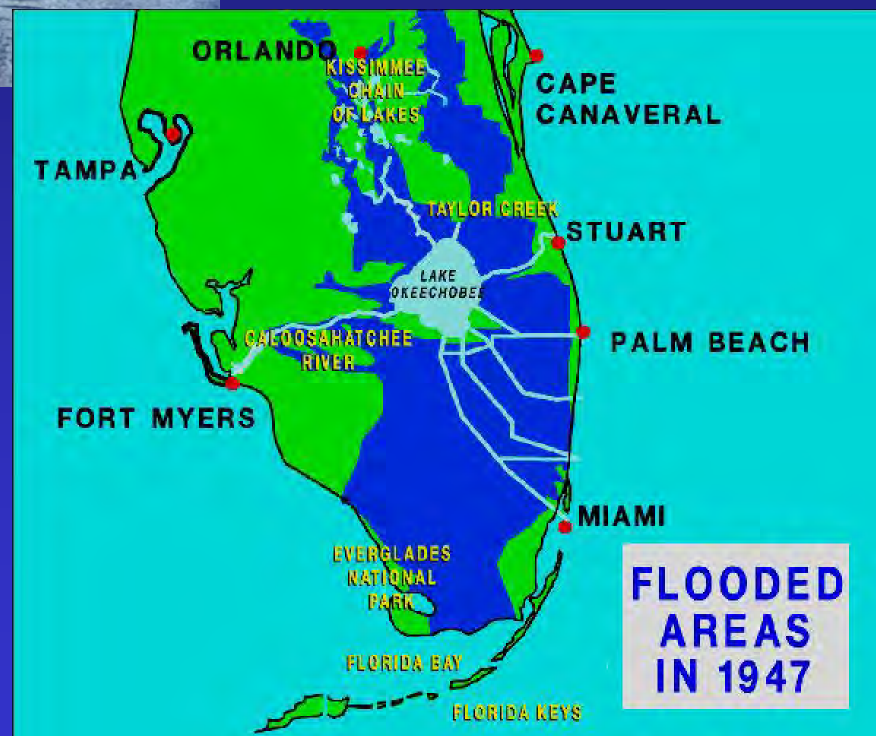


"River of Grass"

- Water connected the system, from top to bottom
- 9 million acres of wetlands providing a variety of habitat
- Diverse mosaic of landscapes and seascapes

PRE-DRAINAGE CHARACTERISTICS

- Large Spatial Extent
- Hydrologic Regime
  - Dynamic Storage
  - Sheetflow
- Diverse Habitats

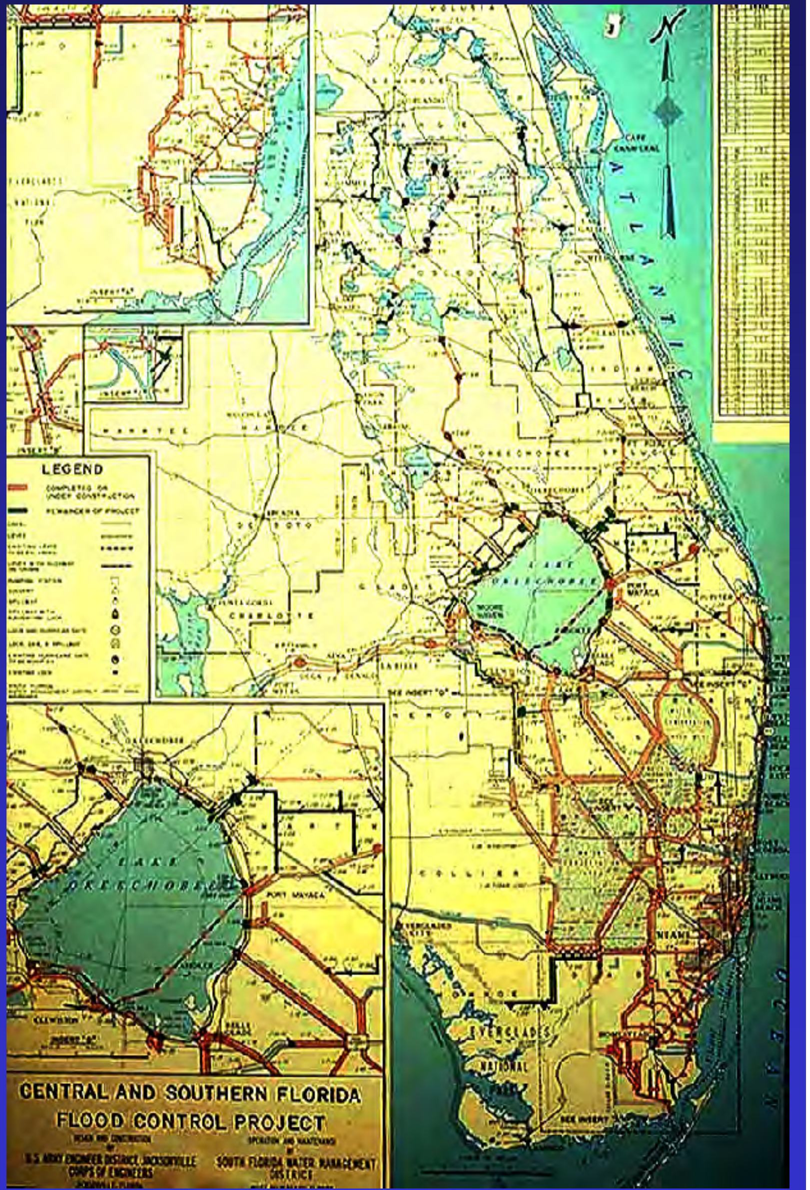

ORLANDO
KISSIMMEE CHAIN OF LAKES
CAPE CANAVERAL
TAMPA
TAYLOR CREEK
STUART
LAKE OKEECHOBEE
PALM BEACH
CALOOSAHATCHEE RIVER
FORT MYERS
MIAMI
EVERGLADES NATIONAL PARK
FLORIDA BAY
FLORIDA KEYS
FLOODED AREAS IN 1947

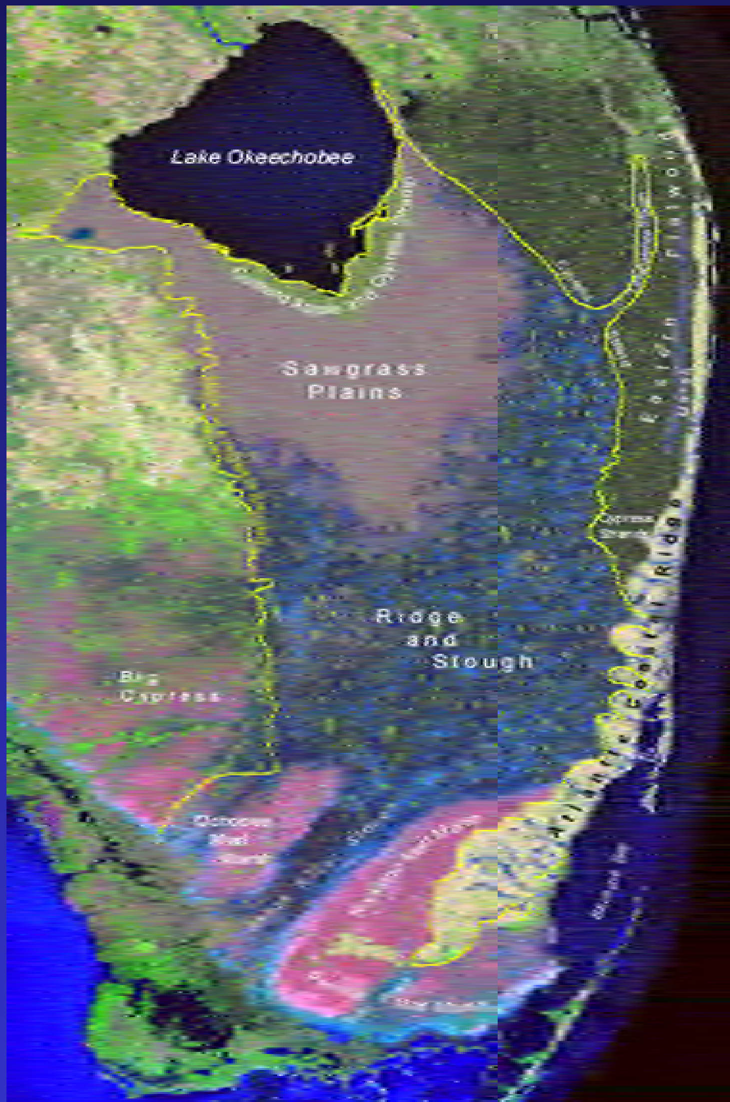
1947 Flood

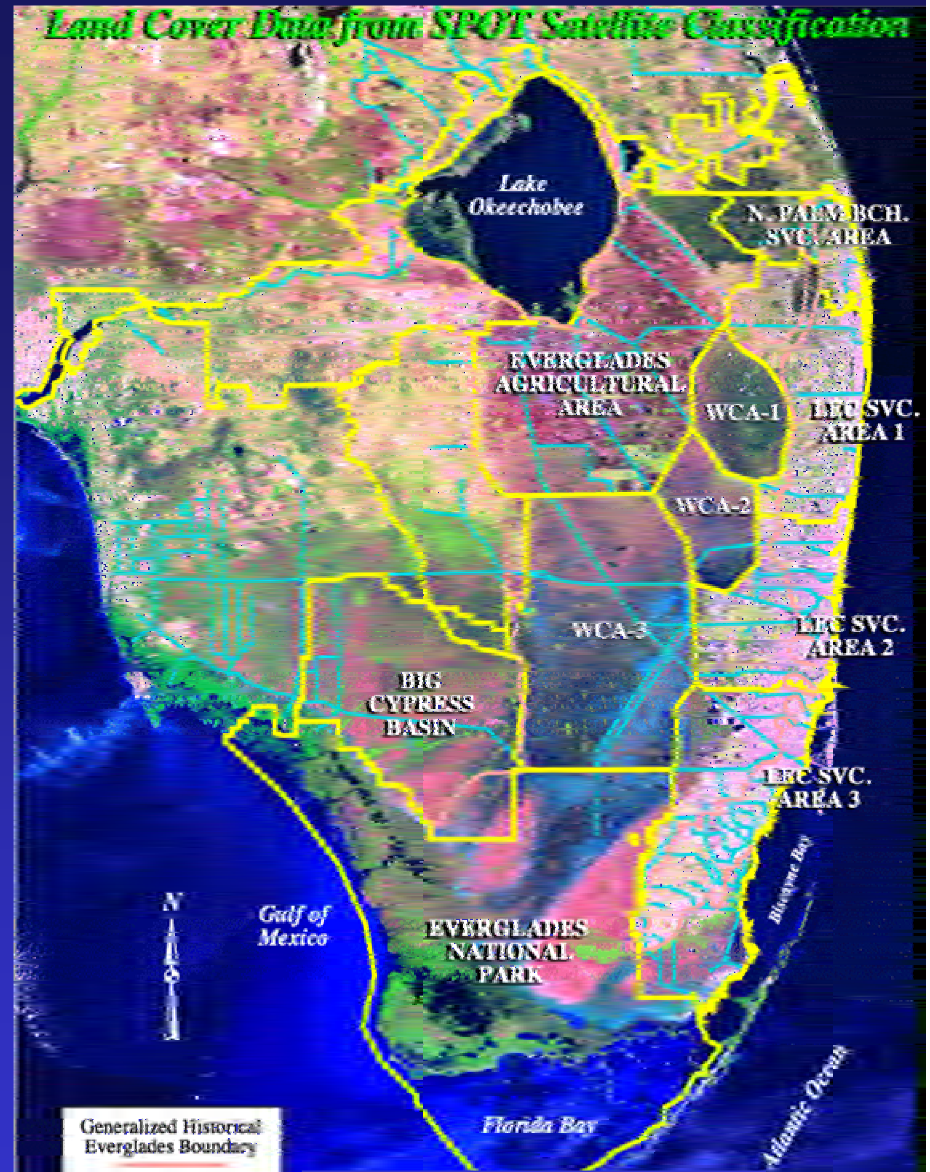
THE C&SF PROJECT

- Project Purposes: Flood control, water conservation and control, regional water supply, prevention of salt water intrusion, fish and wildlife conservation, and water supply to Everglades National Park

- Project includes: 10 locks, 1,000 miles of canals, 720 miles of levees, over 150 water control structures, and 16 pump stations







- Area - 18,000 square miles
- Population today ~ 6 million

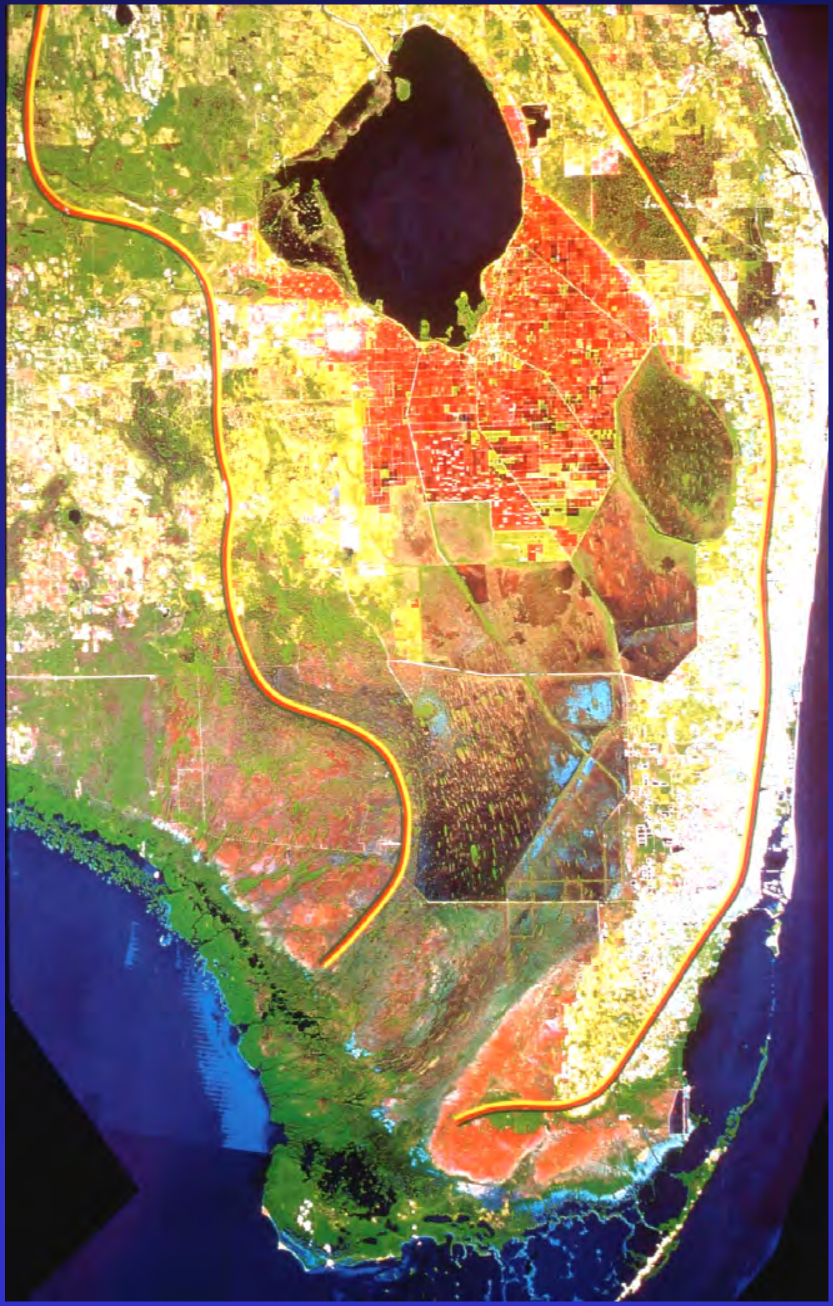
Estimated Pre-drainage System Landscape (circa 1850)

Current System (1995) Landscape

Today, water flows very differently

An Ecosystem in Trouble….

- Too much/too little water for the Everglades/south Florida ecosystem
- Massive reductions in wading bird populations
- Degradation of water quality
- Repetitive water shortages and salt water intrusion
- Declining estuary health
- 1.7 billion gallons of water a day wasted to tide



Why are the Everglades Unique and Important?

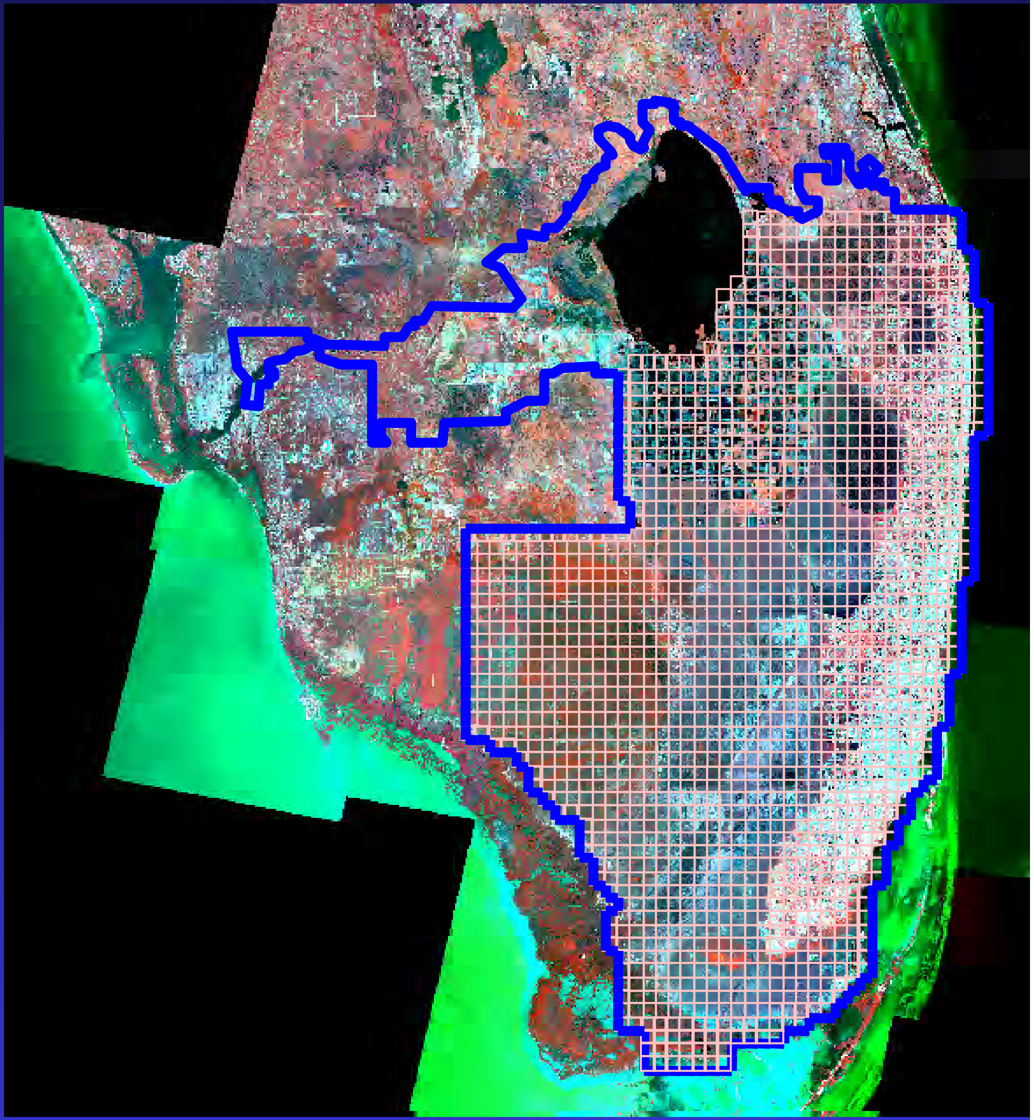
- the Everglades is a National Park
- the Everglades is an International Biosphere Reserve
- the Everglades is a World Heritage Site
- the Everglades is a Wetland of International Significance
- The Everglades function as a filter to purify water flowing into Florida Bay and the Gulf of Mexico
- The Everglades is home to 68 threatened or endangered plant and animal species
- The Everglades is home to more than 900 types of plant species
- The Everglades is home to more than 600 types of animals

Q: How do we determine the best path to Restoration?

A: Hydrologic Models

South Florida Water Management Model (the "2x2")

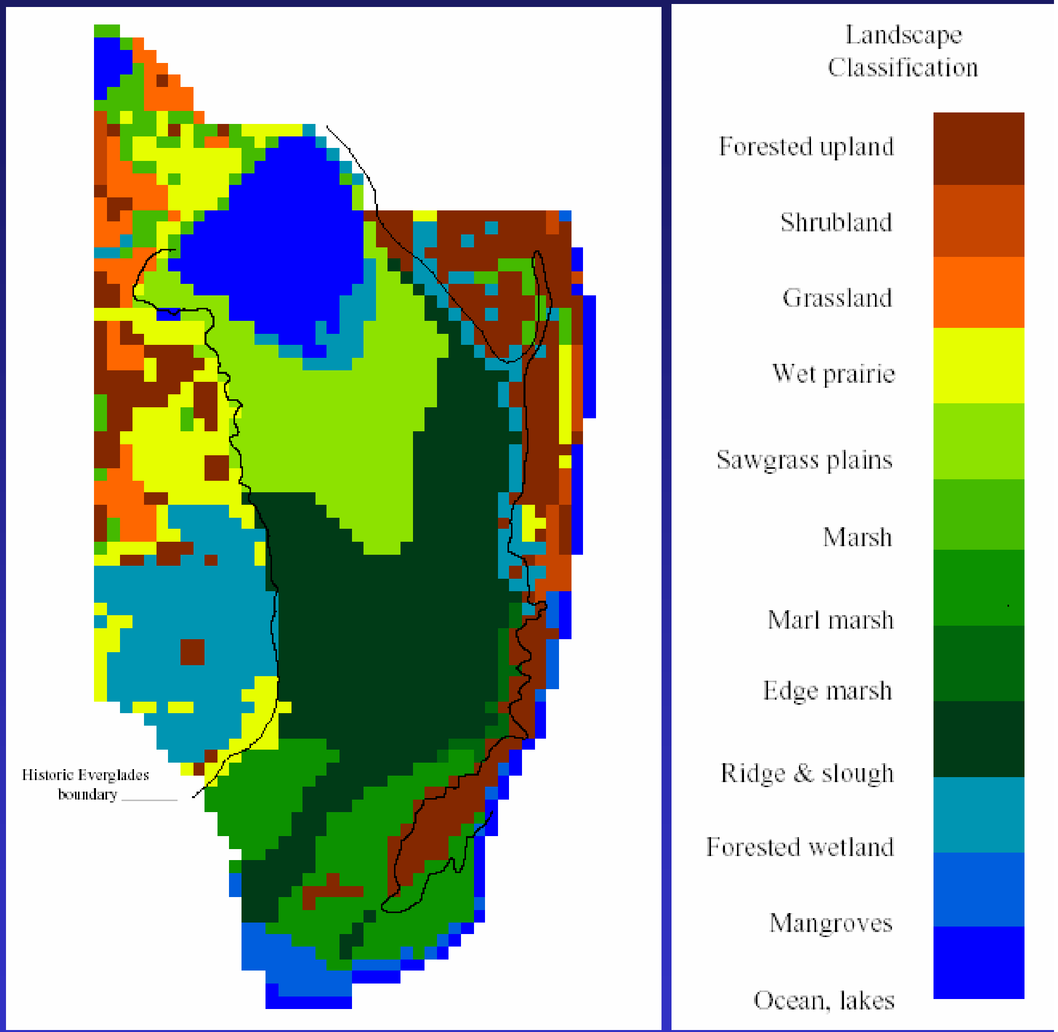
- Regional model to simulate hydrology and water management operations
- 2 mile x 2 mile grid
- Continuous daily simulation over 36 year record (1965 – 2000)
- Developed by SFWMD
- Domain from Lake Okeechobee to Florida Bay



www.sfwmd.gov/org/pld/hsm/models/sfwmm/index.html

Natural System Model (NSM)

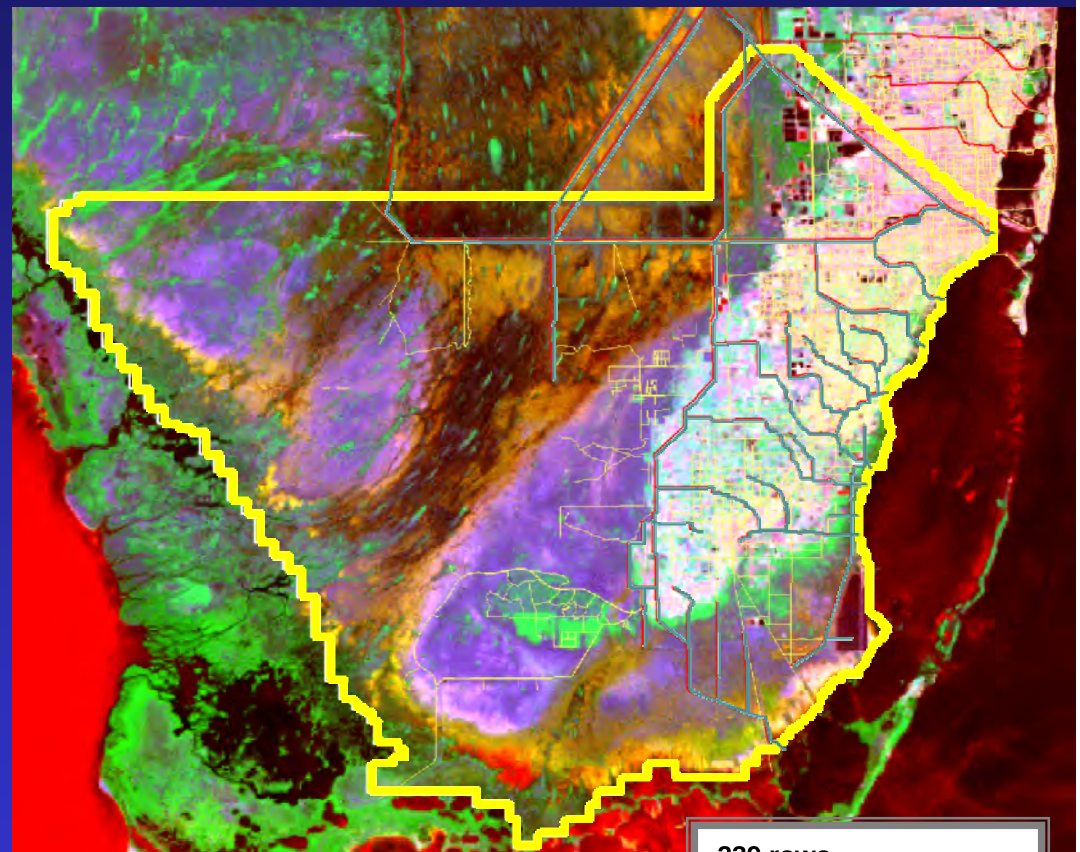
- Simulates hydrology of pre-drainage Everglades
- Based on the South Florida Water Management Model



www.sfwmd.gov/org/pld/hsm/models/nsm/nsm45doc/nsm45.htm

MODBRANCH

- Simulates hydrology and water management of sub-regions
- Highly refined and variable grid spacing
- Simulates 3D groundwater
- Used for short term simulations (~1year)
- 1-hour time steps
- Developed by USGS and USACE-Jacksonville
- Uses SFWMM2x2 results for boundary conditions
- Based on USGS MODFLOW and BRANCH models



239 rows
259 columns
5 layers
330+ miles of canals
54+ Structures

Key Tenet of South Florida Ecosystem Restoration:

Hydrologic restoration is a “must” for ecological restoration

Q: What does the term "hydrologic restoration" mean?

A: *It depends <u>to whom</u> you are talking and what are their concerns and issues!*

Agencies, Organizations, and other that have their own vision of restoration

•Agricultural Interests

•Miccosukee Indians

•Department of Interior (Everglades National Park)

•Department of Interior (US Fish and Wildlife Service)

•The State of Florida

•South Florida Water Management District

•Towns and Municipalities

•County Governments

•Audubon Society

•Sierra Club

•Friends of the Everglades

•Natural Resources Defense Council, ACLU, etc.

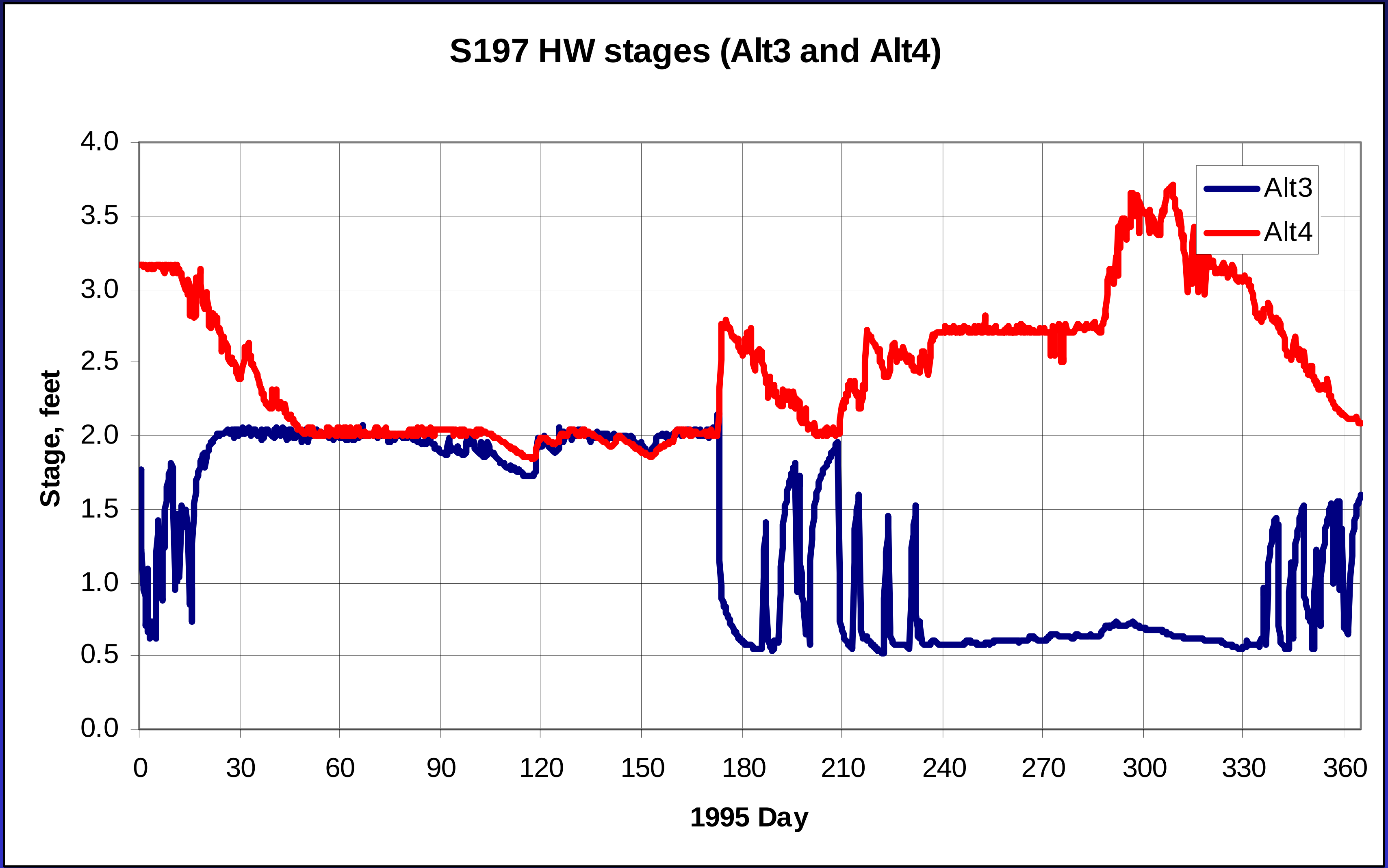
•Homeowners

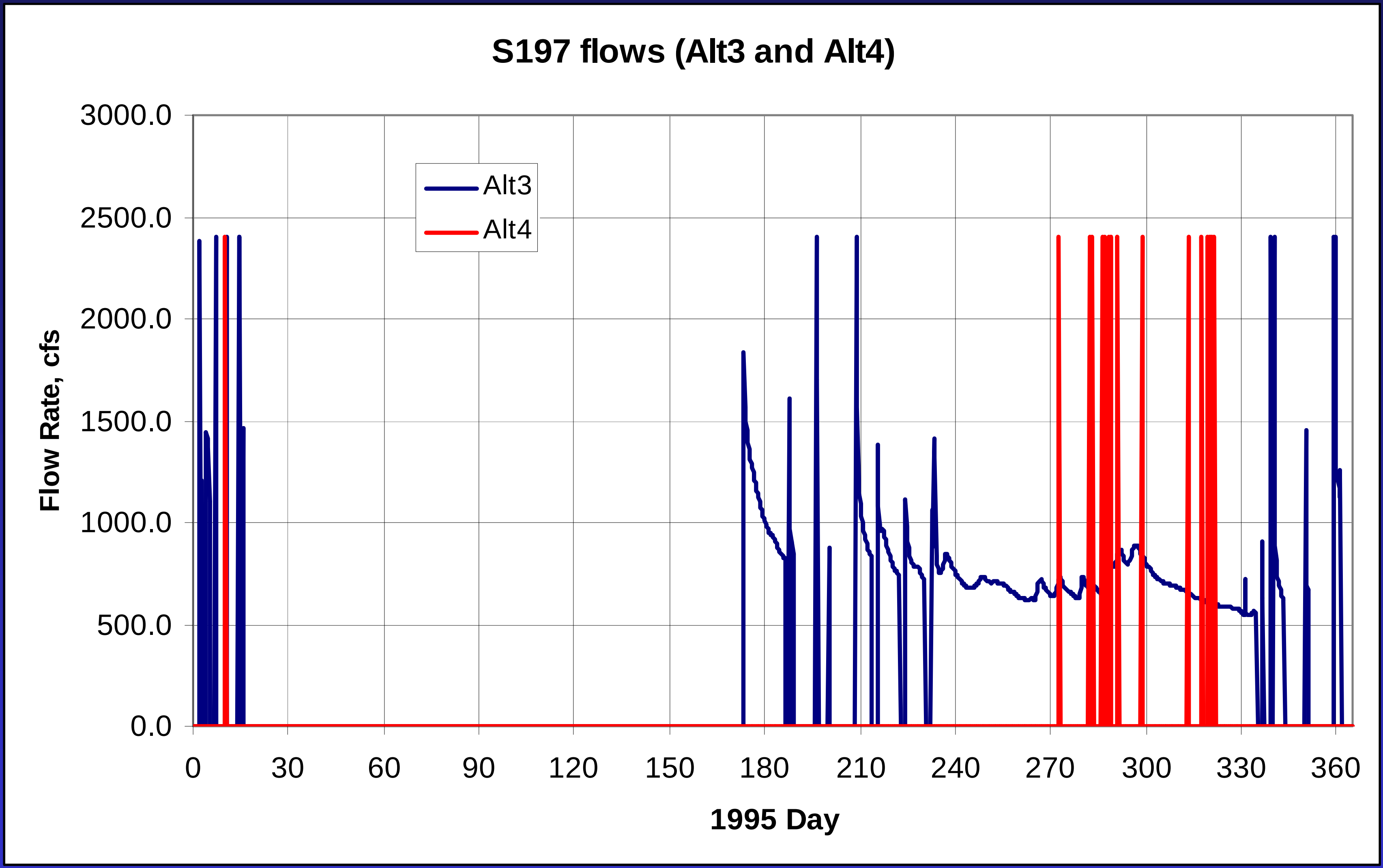
•Rock Miners

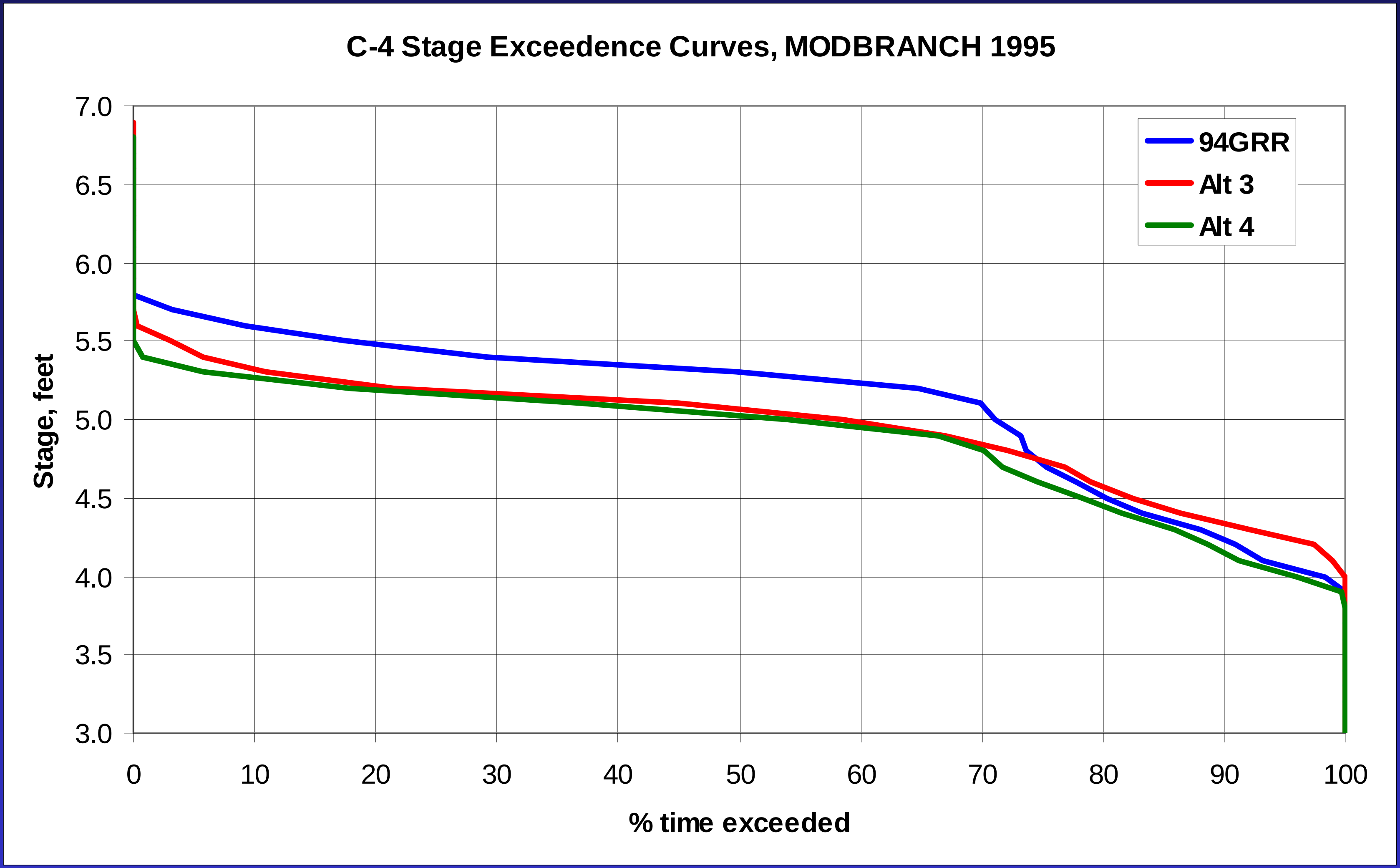
•Others…

Generalized Hydrologic Numerical Models produce the following basic data:

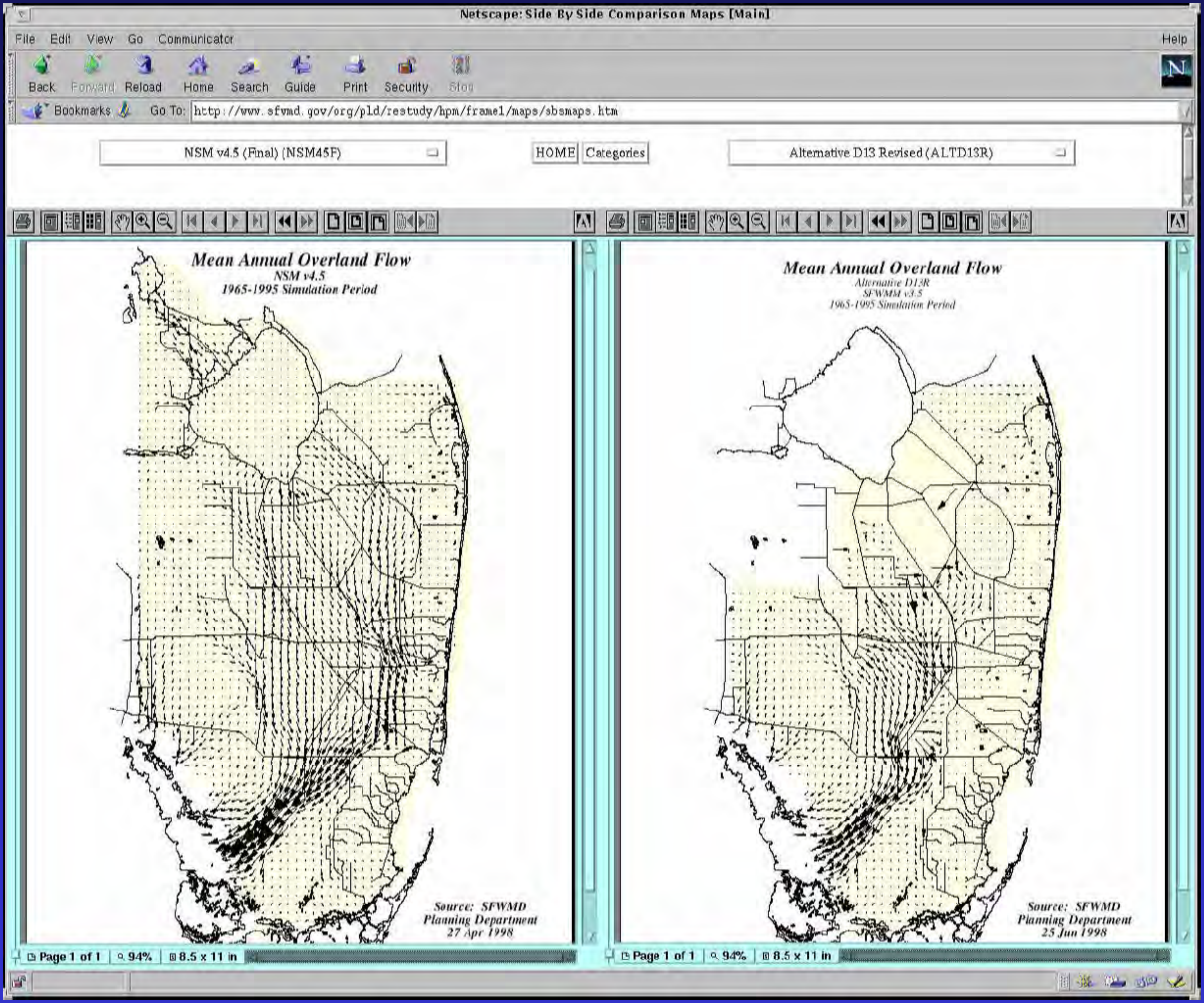
- **Stage for each time step**
- **Flow rates for each time step**


S197 HW stages (Alt3 and Alt4)
Stage, feet
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
30
60
90
120
150
180
210
240
270
300
330
360
1995 Day
Alt3
Alt4


S197 flows (Alt3 and Alt4)
3000.0
2500.0
2000.0
1500.0
1000.0
500.0
0.0
Flow Rate, cfs
Alt3
Alt4
0
30
60
90
120
150
180
210
240
270
300
330
360
1995 Day

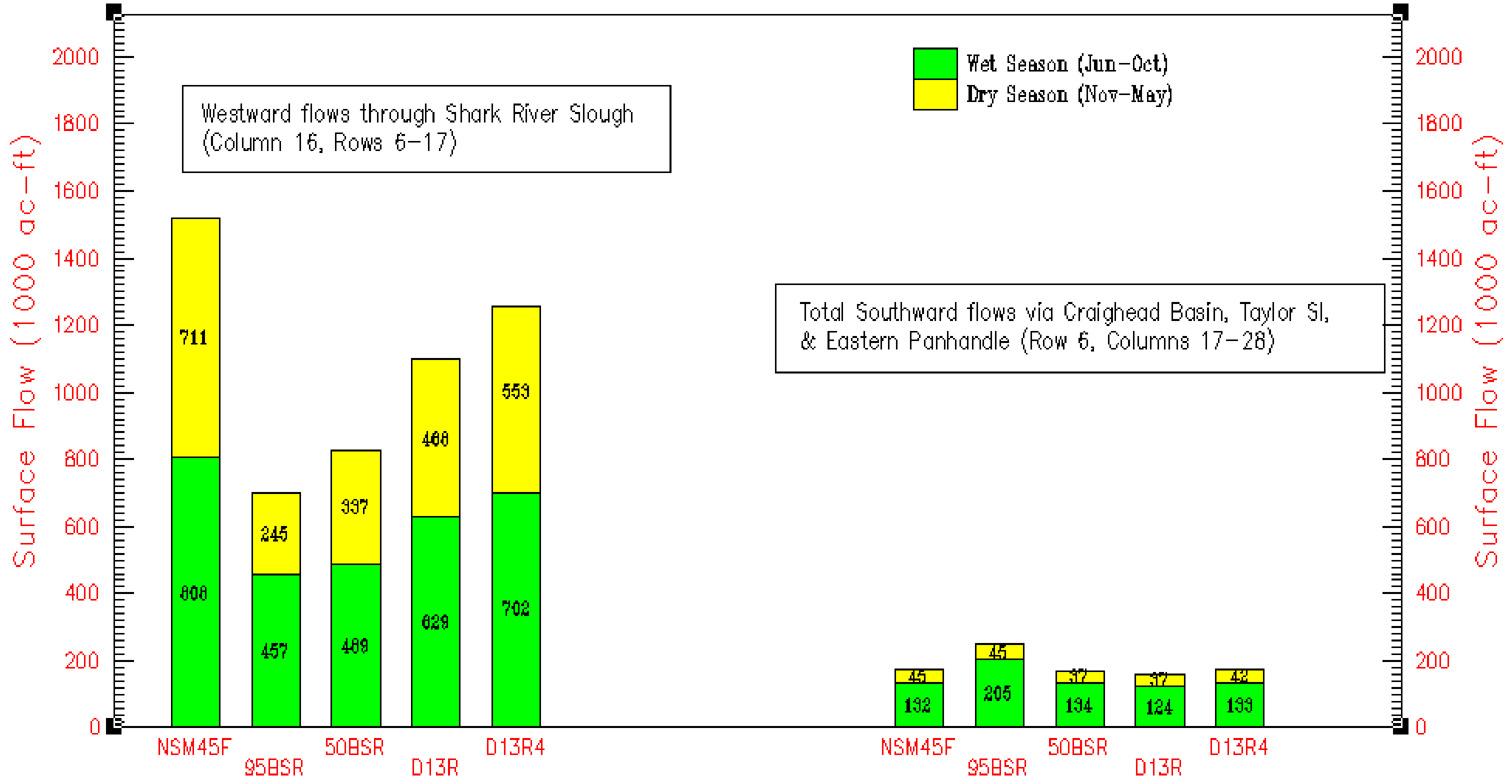


Stage-duration curves are derived directly from stage and time.



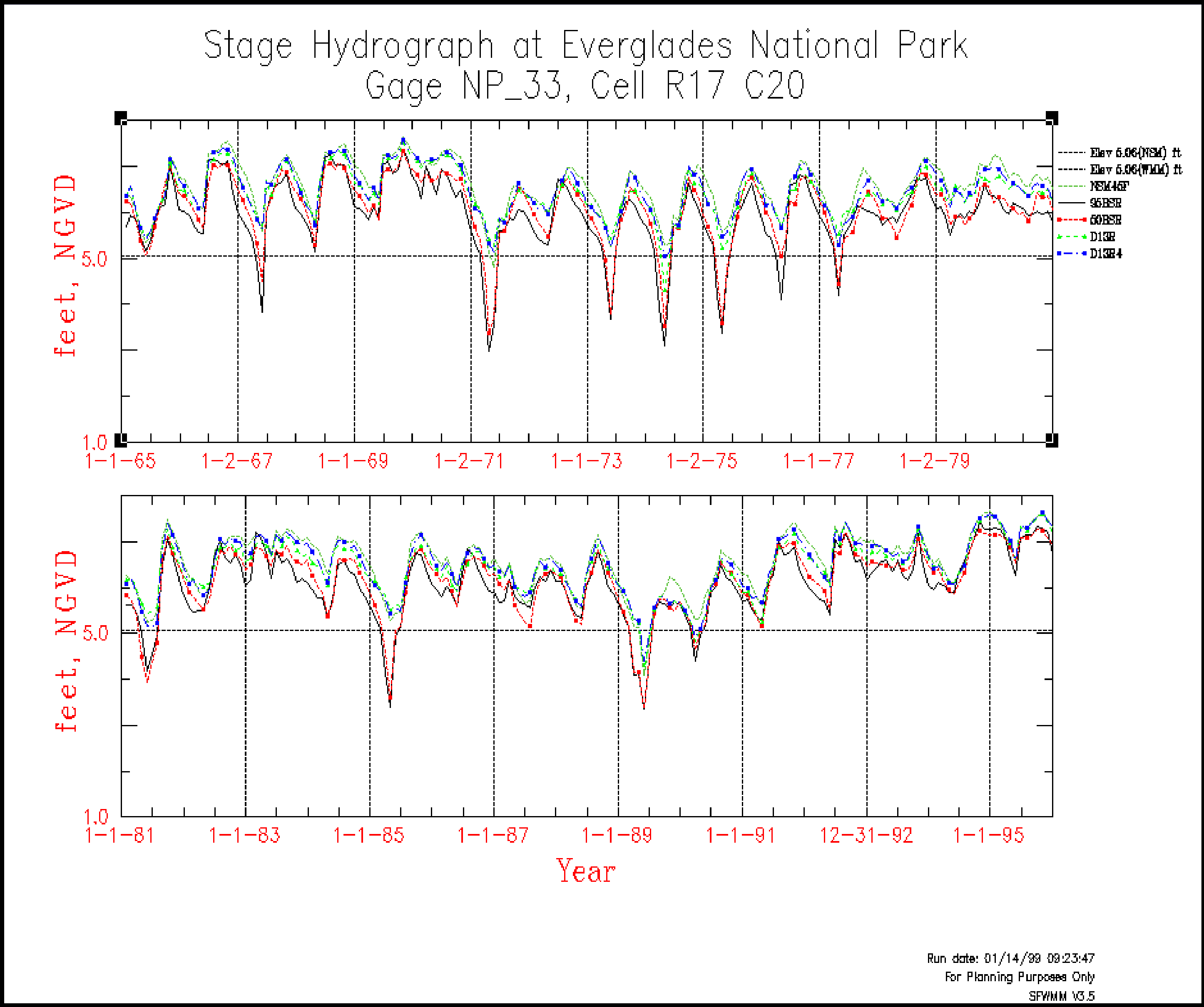
Netscape: Side By Side Comparison Maps [Main]
File Edit View Go Communicator Help
Back Forward Reload Home Search Guide Print Security Stop
Bookmarks Go To: http://www.sfwmd.gov/org/pld/restudy/hpm/frame1/maps/sbsmaps.htm
NSM v4.5 (Final) (NSM45F)
HOME Categories
Alternative D13 Revised (ALTD13R)
Mean Annual Overland Flow
NSM v4.5
1965-1995 Simulation Period
Source: SFWMD
Planning Department
27 Apr 1998
Mean Annual Overland Flow
Alternative D13R
SFWMM v3.5
1965-1995 Simulation Period
Source: SFWMD
Planning Department
25 Jun 1998
Page 1 of 1
94%
8.5 x 11 in
Page 1 of 1
94%
8.5 x 11 in

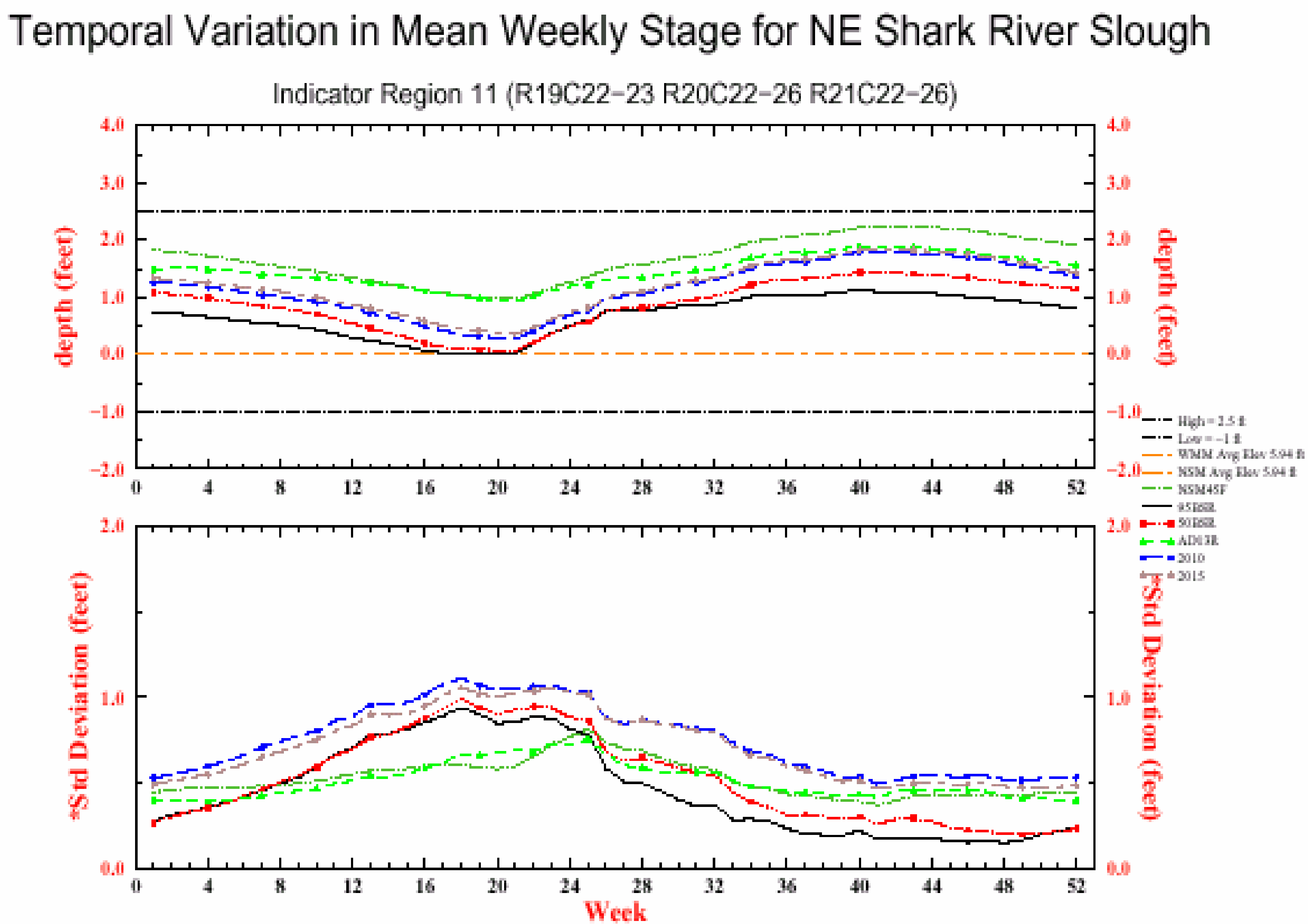
Average Annual Overland Flows toward Whitewater Bay and Florida Bay for the 31 year simulation period



Note: NSM water depths at key ENP gage locations are used as operational targets for most alternatives.
NSM flows are NOT targets and are shown for comparative purposes only.

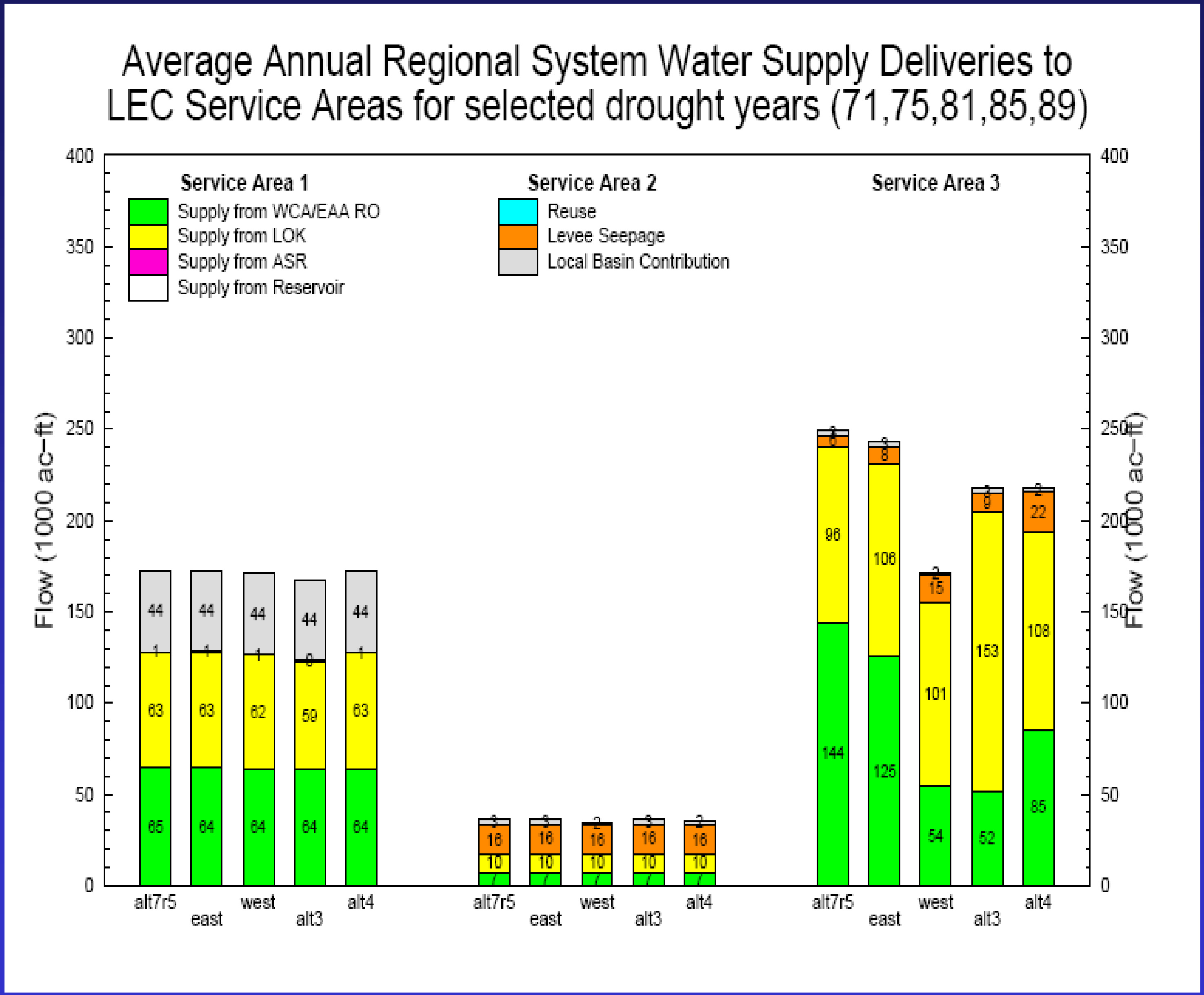
Run date: 01/14/99 07:24:11
For Planning Purposes Only
SFWMM V3.5


Stage Hydrograph at Everglades National Park
Gage NP_33, Cell R17 C20
feet, NGVD
5.0
1.0
1-1-65
1-2-67
1-1-69
1-2-71
1-1-73
1-2-75
1-1-77
1-2-79
95BSR
60BSR
D13R
D13R4
feet, NGVD
5.0
1.0
1-1-81
1-1-83
1-1-85
1-1-87
1-1-89
1-1-91
12-31-92
1-1-95
Year
Run date: 01/14/99 09:23:47
For Planning Purposes Only
SFWMM V3.5



WEEK 1 STARTS JAN 1
Depth and elev are weekly means for the indicator region for a 31 year simulation
High/Low = 0 indicates criteria undefined for region
* Standard Deviations are calculated among-year values;
* they illustrate interannual variation in mean weekly depth over the 31 year simulation period.

Run date: Wed May 26 12:23:37 EDT 1999
For Planning Purposes Only
SFWMM V3.4


Average Annual Regional System Water Supply Deliveries to LEC Service Areas for selected drought years (71,75,81,85,89)
Flow (1000 ac−ft)
Service Area 1
Service Area 2
Service Area 3
Supply from WCA/EAA RO
Supply from LOK
Supply from ASR
Supply from Reservoir
Reuse
Levee Seepage
Local Basin Contribution
alt7r5
east
west
alt3
alt4

So, what's the big deal?

- Engineers speak in terms of stage, flow, and Reynold's numbers.

- Biologists and Environmental Scientists speak in terms of breeding success and species diversity.

- Municipal and county governments talk about economic damages in dollars.

- Native Americans need to know how the plan will affect their way of life.

- Agricultural interests need to know if crops are likely to be damaged of if new crops need to be planted.

The Tree Islands are being harmed! ***(I think)***

You have reduced the number of habitat units! **(based on my best guess)**

Environmentalists

The stage-duration graphs are basically the same.

The Corps is going to hear from my lawyer!

Farmer

Engineer/
Hydrologist

We are going to lose $100,000,000 in Papayas!

Biologist, farmers, and others need more than the hydrological output of the models.

They need to have information that is important to them!

Q: How do we translate the hydrologic "babble" of stage and flow into information that is useful to people who speak and think in different ways?

A: Performance Measures!

Whether or not a plan is "good" for a specific purpose is determined by the use of "performance measures."

Performance Measures are functions of stage, flow, and other variables.

$$PM = f(\text{stage, flow, ground elevation, season, etc.})$$

A Performance Measure's functional definition is determined by the biologist, ecologist, economist, or other specialist.

The definition is provided to the hydrologist/engineer. The hydrologist/engineer and programmers use it to produce the performance measure from the standard numerical model outputs of stage and flow.

Performance Measures

A “performance measure” is a data value or a data set that will give an indication of how close an alternative will come to attaining a specific goal.

There can be as many different Performance Measures as there are interested parties!

Examples of Select CSOP Performance Measures

Peat Forming Wetlands
Marl Forming Wetlands
Cape Sable Seaside Sparrow (CSSS) habitat
Average Hydroperiod
Jurisdictional Wetlands
Recession Rates in Marl Wetlands
Stage-Duration Curves
Slough "wet days" for selected periods
Slough Tabular data

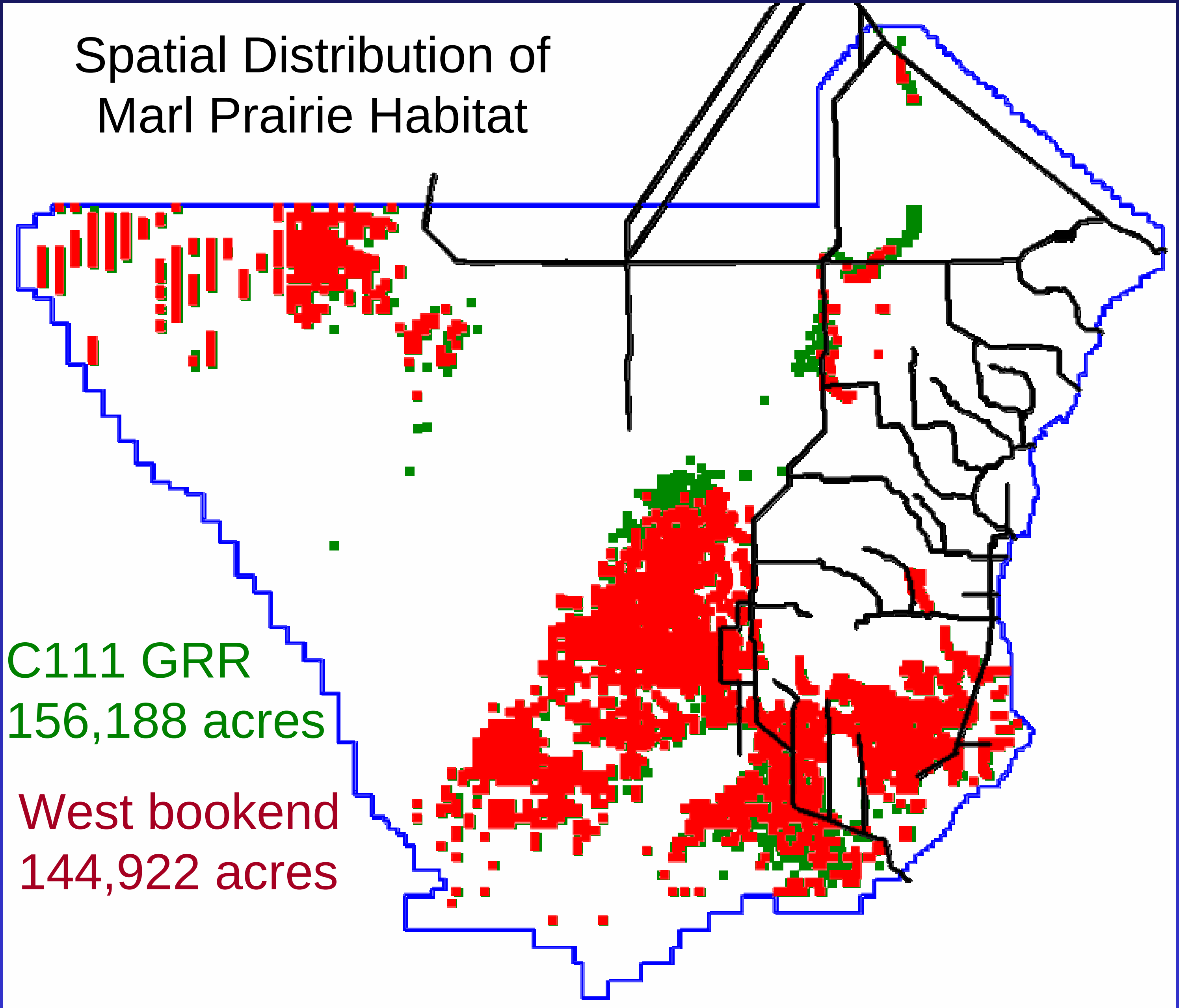
Example: Spatial Distribution of Marl Prairie Habitat

Delineation of habitat according to <u>hydroperiod:</u>

Required:	
Wet year:	120 – 364 days
Average Year:	60 – 364 days
Dry Year:	0 – 270 days

60 days minimum during an average year to discourage woody plant incursion in the dry end of marl prairie.
The maximum of 270 days during the dry year reflects conditions observed during the dry year.

Spatial Distribution of Marl Prairie Habitat



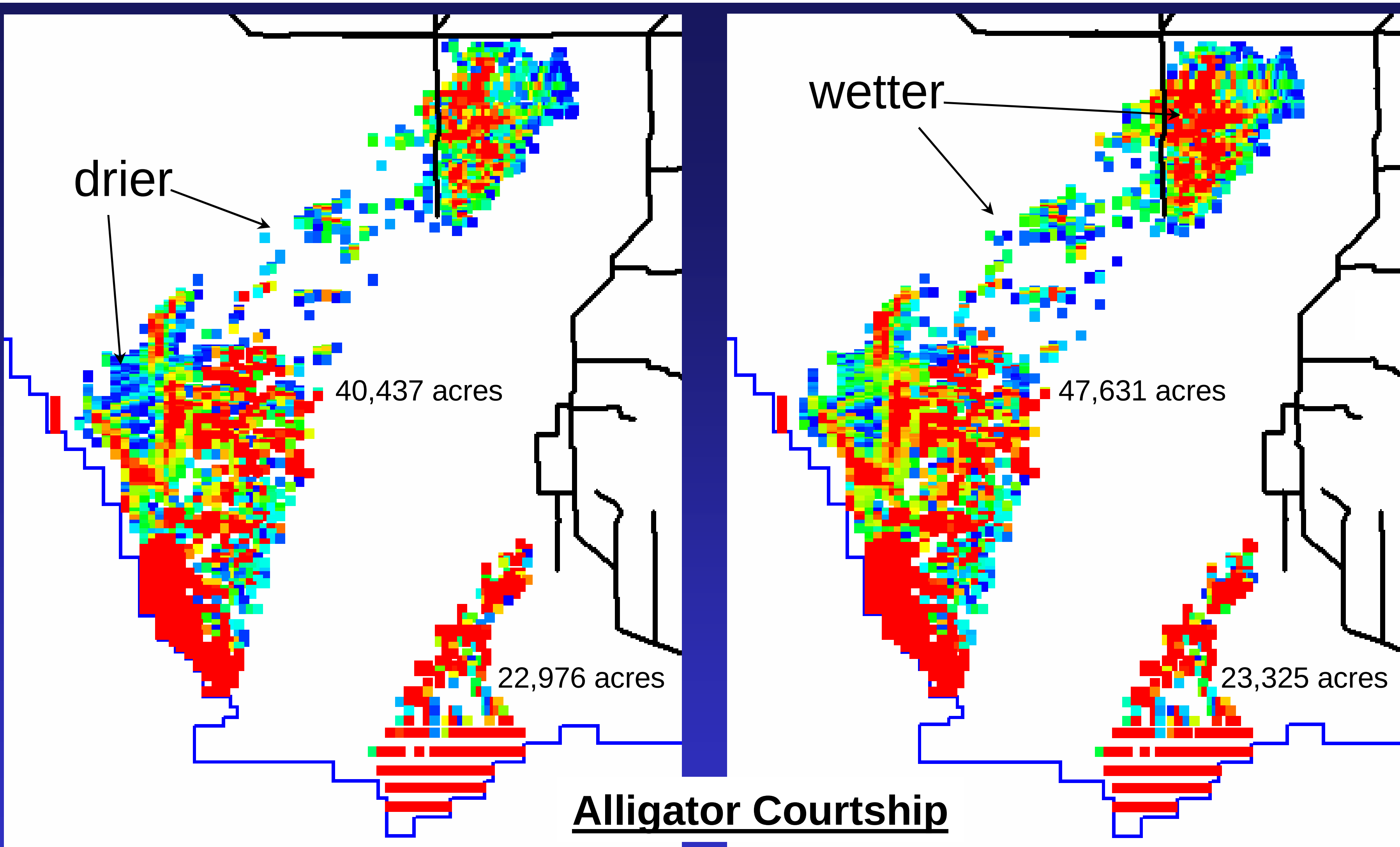
Example: Alligator Courtship

The number of adult female alligators that initiate nesting during June each year is proportional to the area of surface flooding in the sloughs during the courtship period in April and May.

Metric: Surface flooding in sloughs in April and May

Target: Maximize the area of surface flooding in the sloughs during the alligator courtship period in April and May

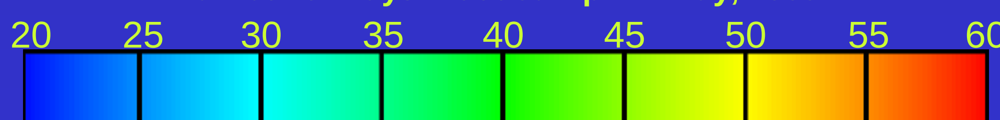
Alligator Courtship



C111 GRR

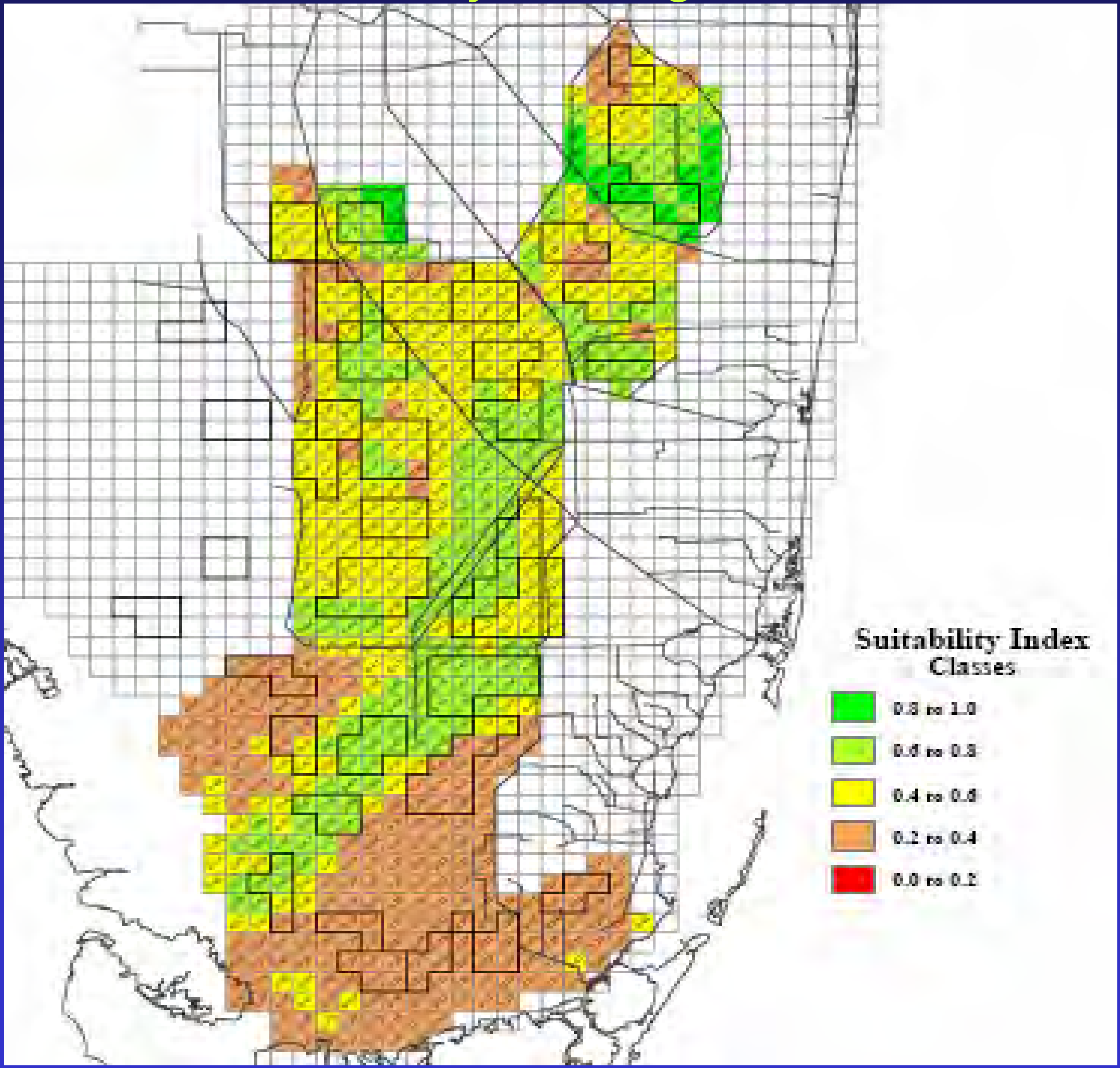
West Bookend

Number of Days Flooded April – May, 1989

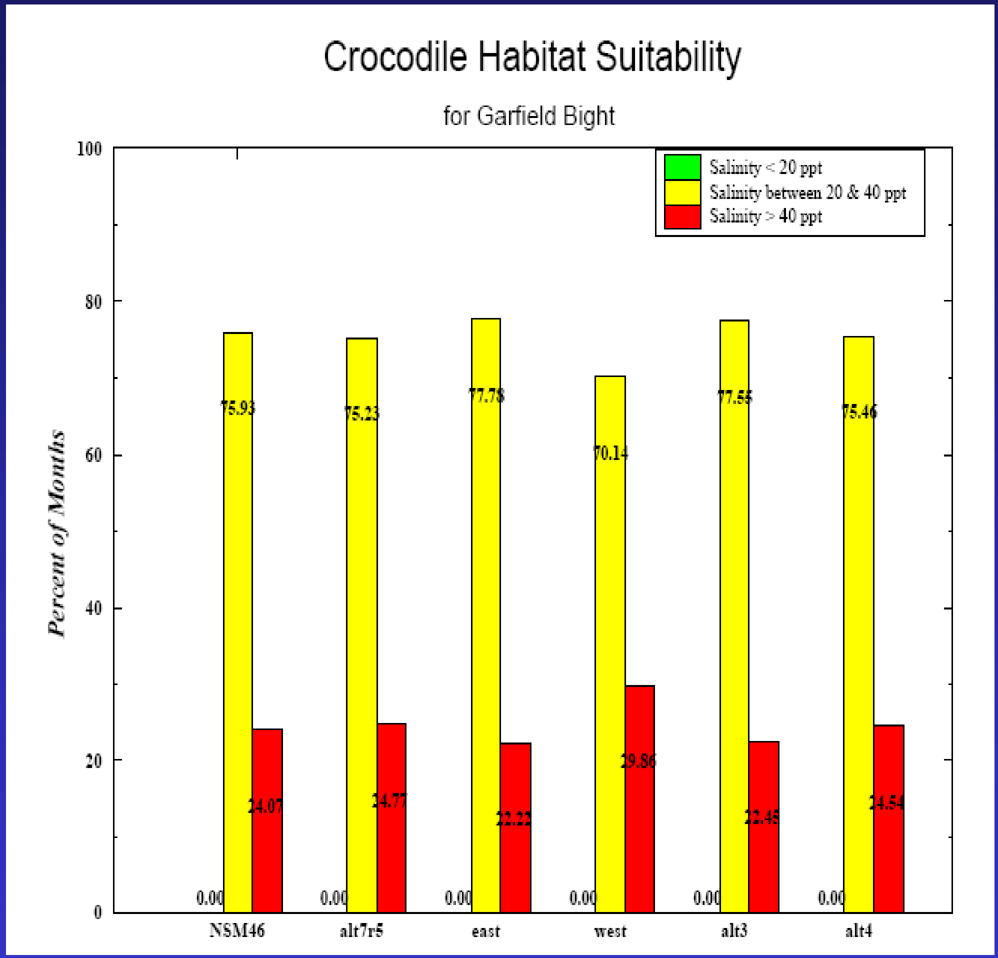


Example: Habitat suitability for alligators

What happens if we lump several performance measures together?



Example: crocodile habitat suitability

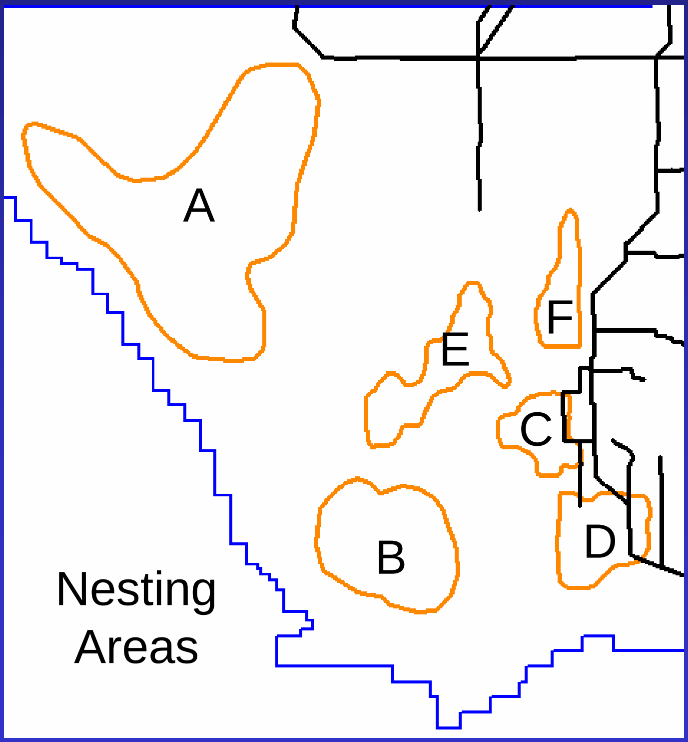


Salinity conditions in Florida Bay (a function of flows received from the Everglades system) directly impact species habitat range.

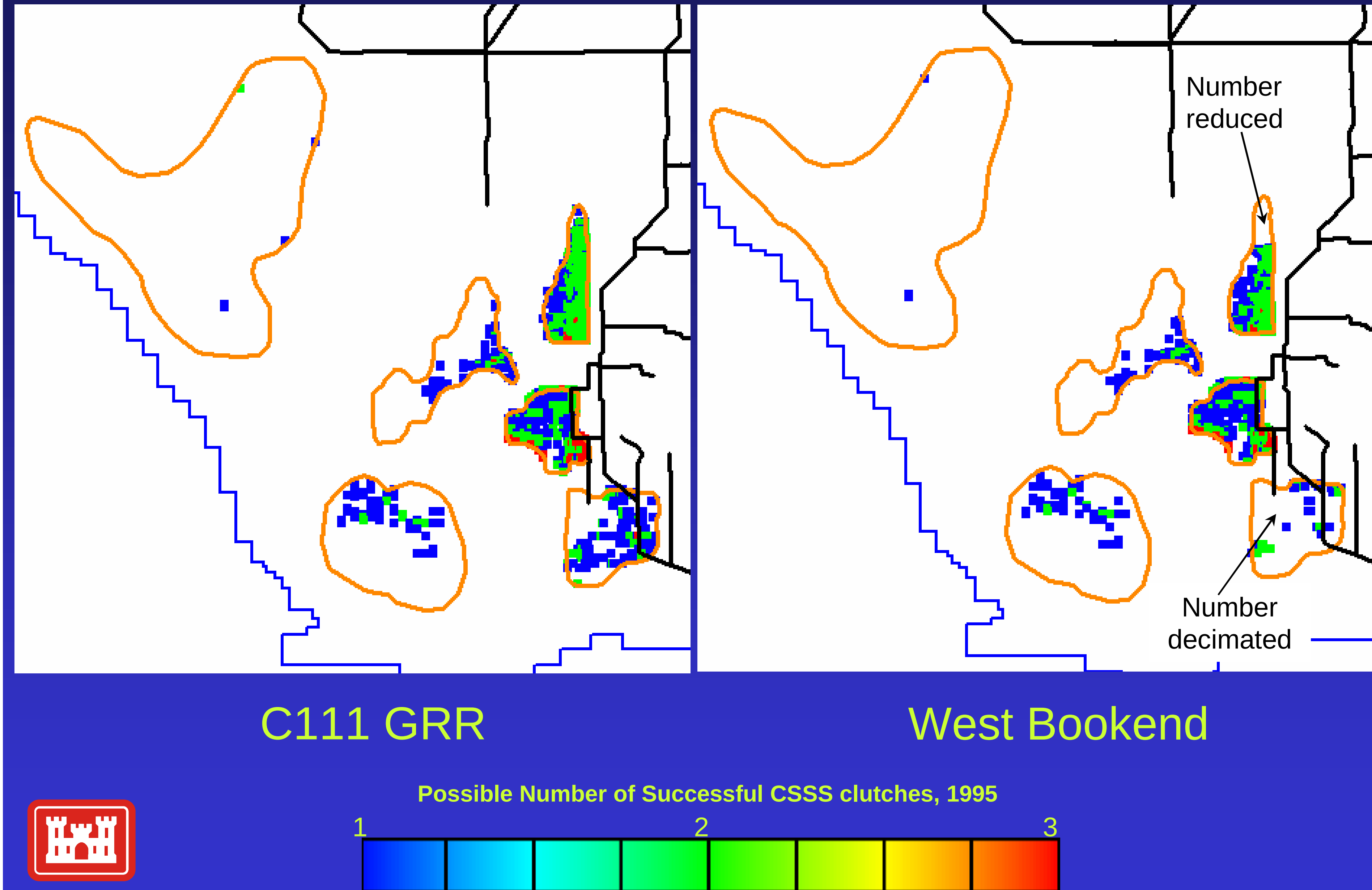
Example: Cape Sable Seaside Sparrow Breeding Success

The Cape Sable Seaside Sparrow nests between March 1 to July 15.

It requires a minimum of 45 days of dry conditions to successfully rear one clutch.



Example: Cape Sable Seaside Sparrow Breeding Success

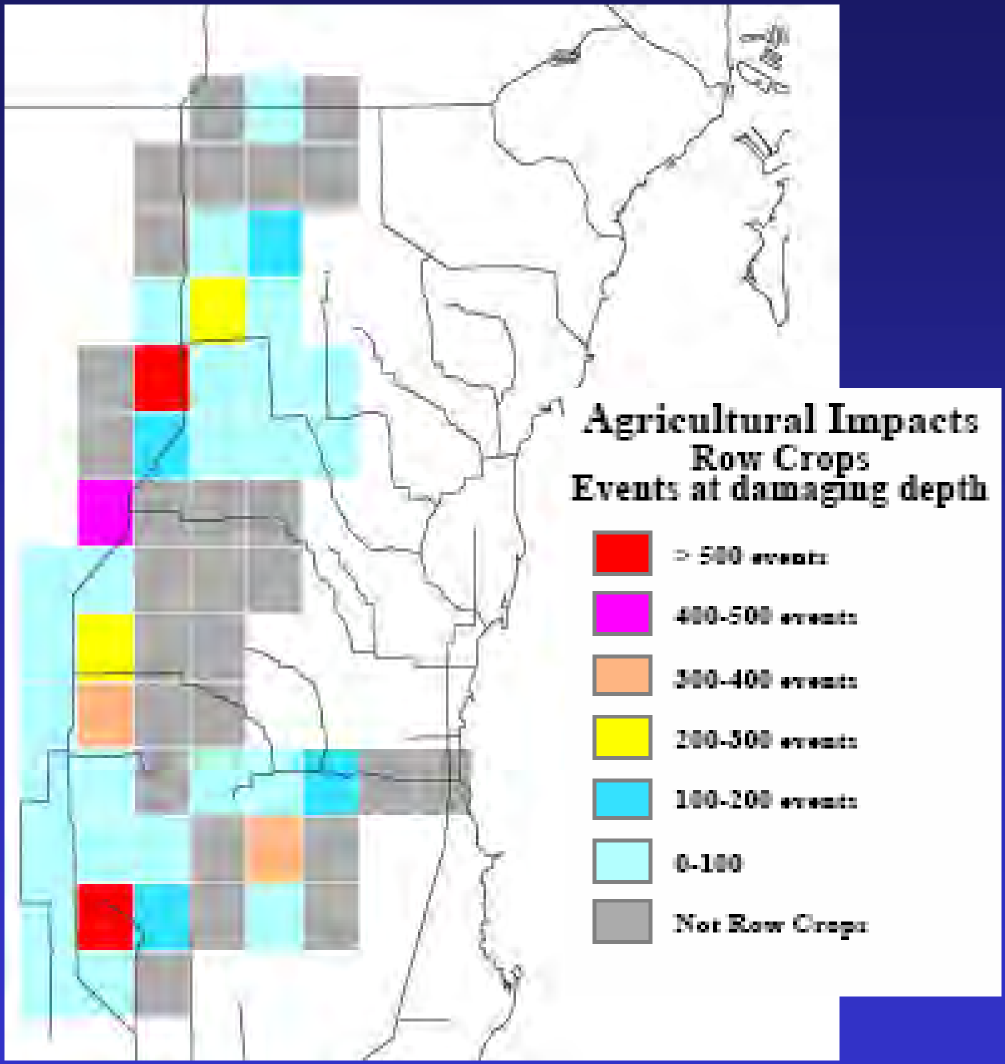


US Army Corps of Engineers

August 2005

Jacksonville District

Example: regional agricultural impacts to fruit crops



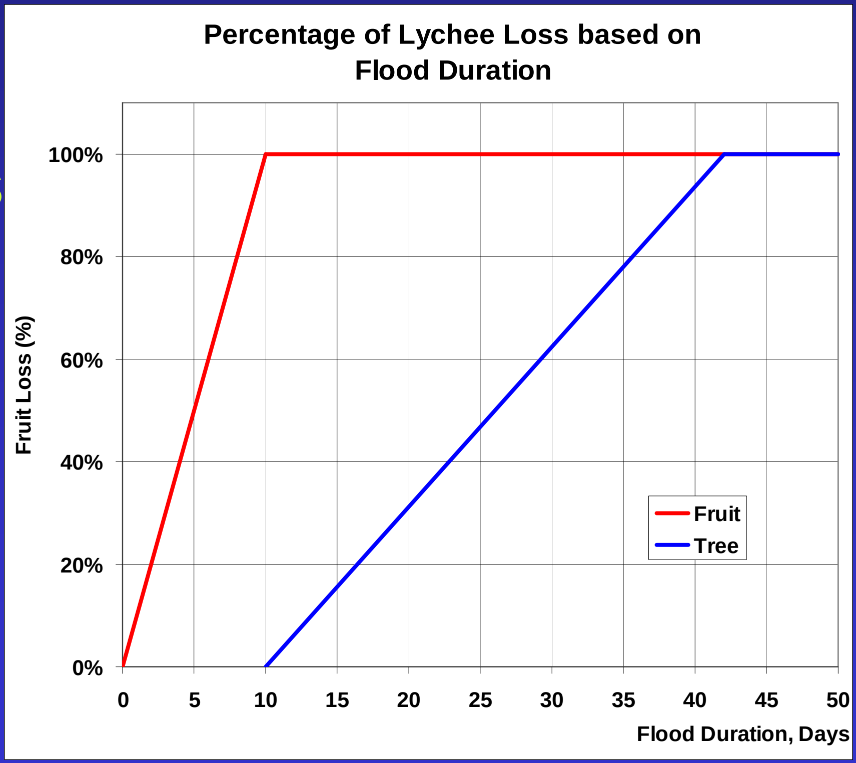
Damage to tree crops occurs whenever water is within 1.5 feet of the ground surface for a specified amount of time.

Example: Potential % Lychee Fruit Lost

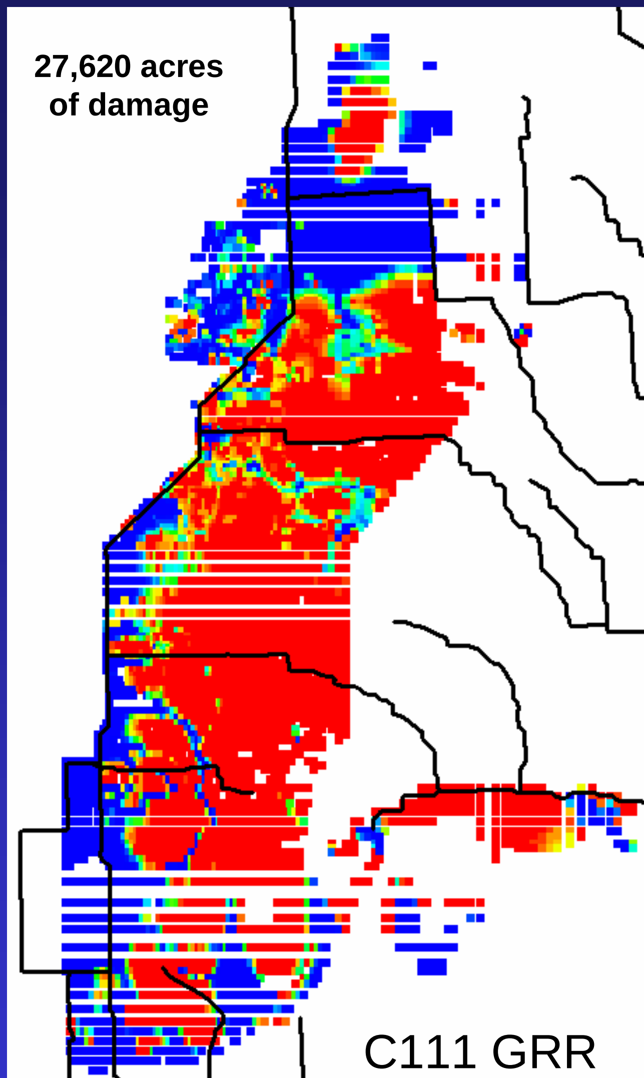
Potential damage to tree crops occurs whenever water is within 1.5 feet of the ground surface for a specified amount of time.

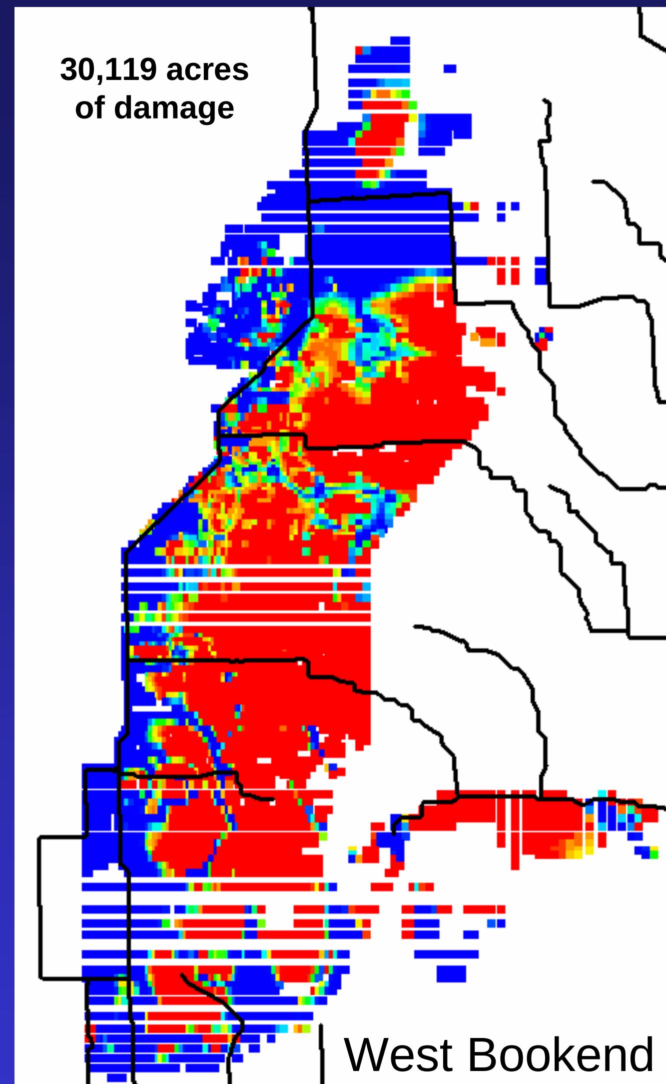
For Lychee trees the damage begins at 10 days with 100% loss at 42 days (reality vs. model)

For Lychee fruit the damage begins at 0 days an 100% crop loss at 10 days.

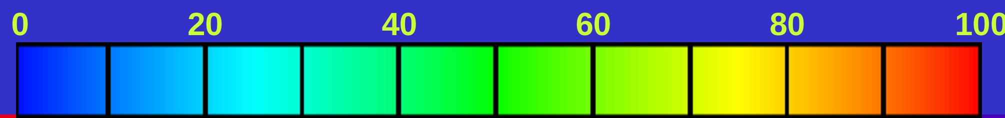


Example: Potential % Lychee Fruit Lost

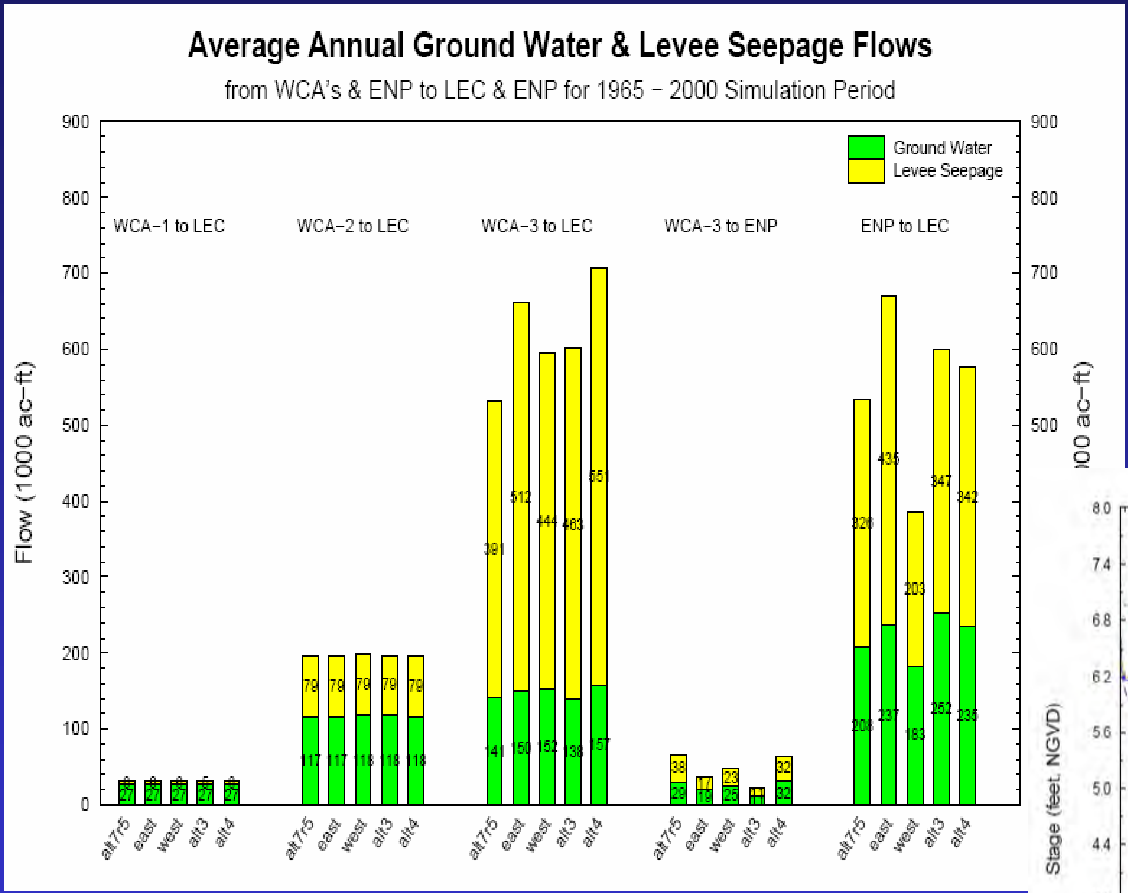


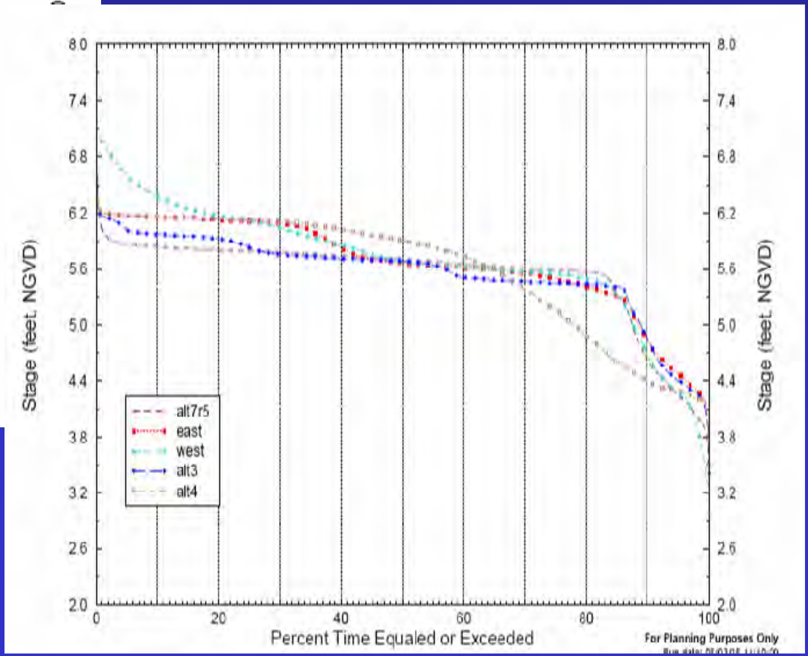


% of Lychee Crop Loss, 1995



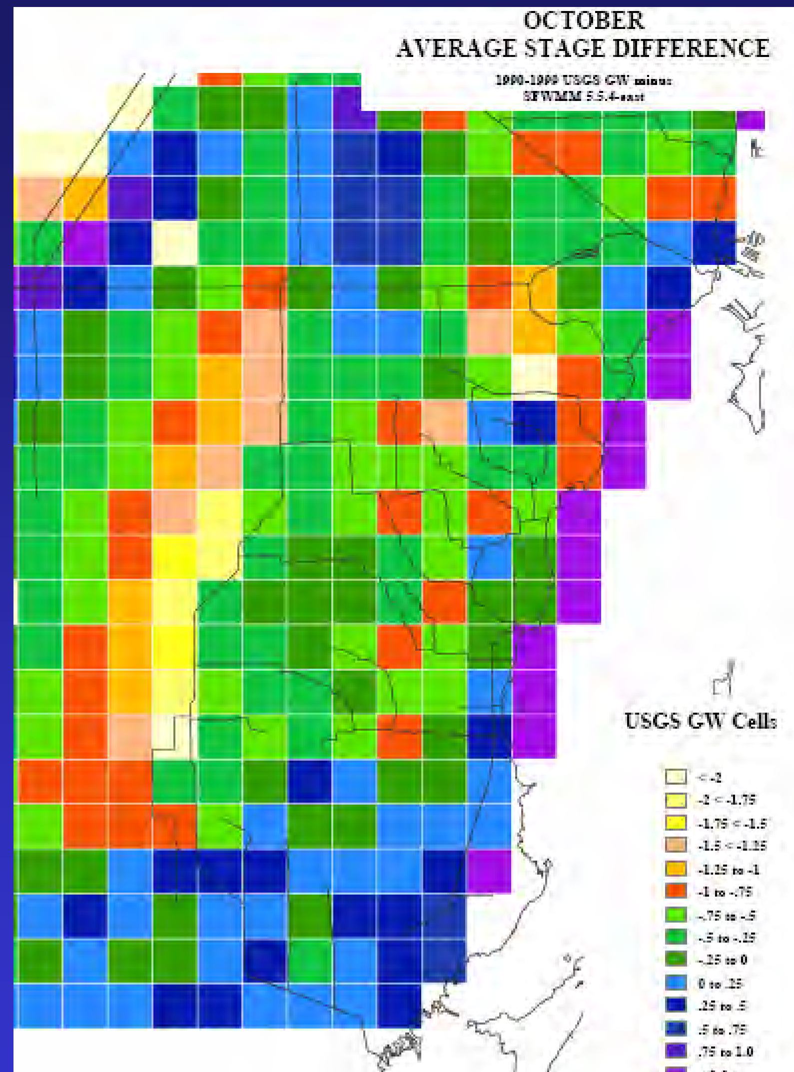
Generalized performance measures for flooding potential





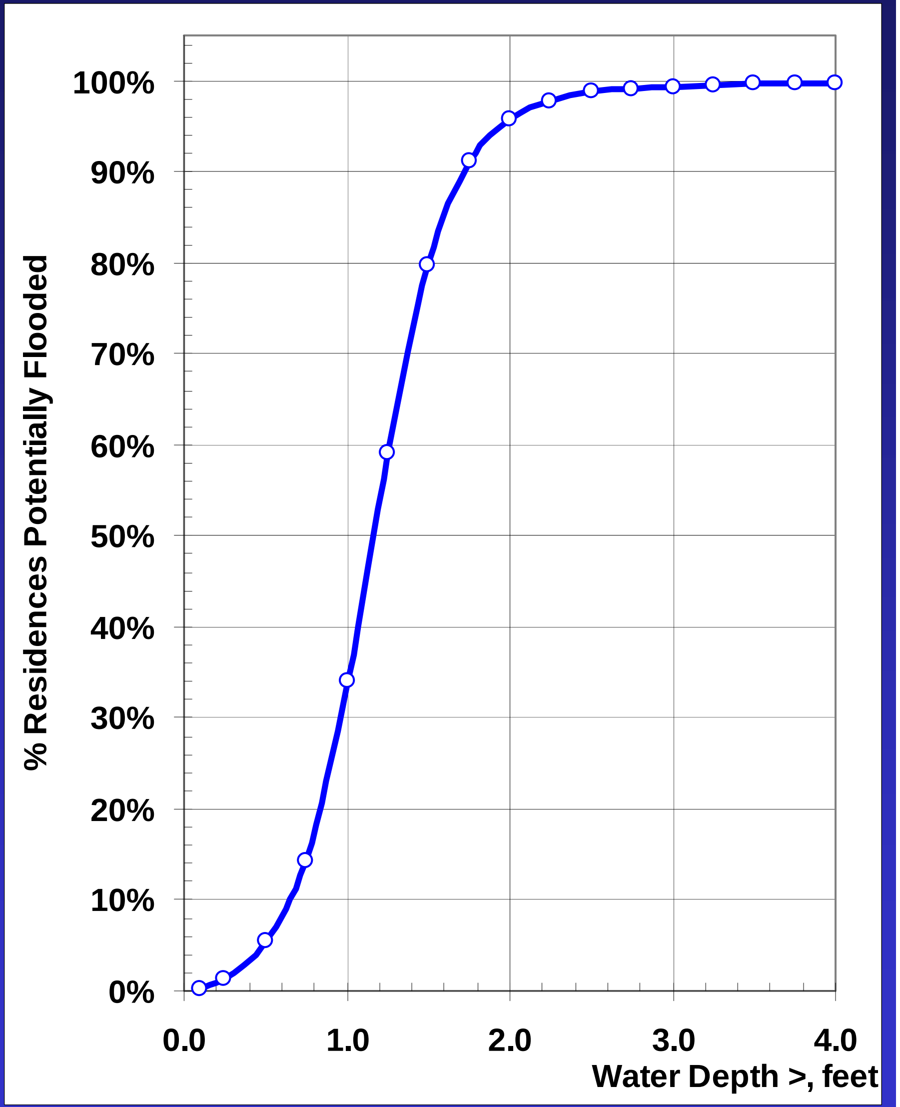
Example: average stage difference at the end of the wet season

Direct comparison of
model output stages
to an observed “target”
period of record



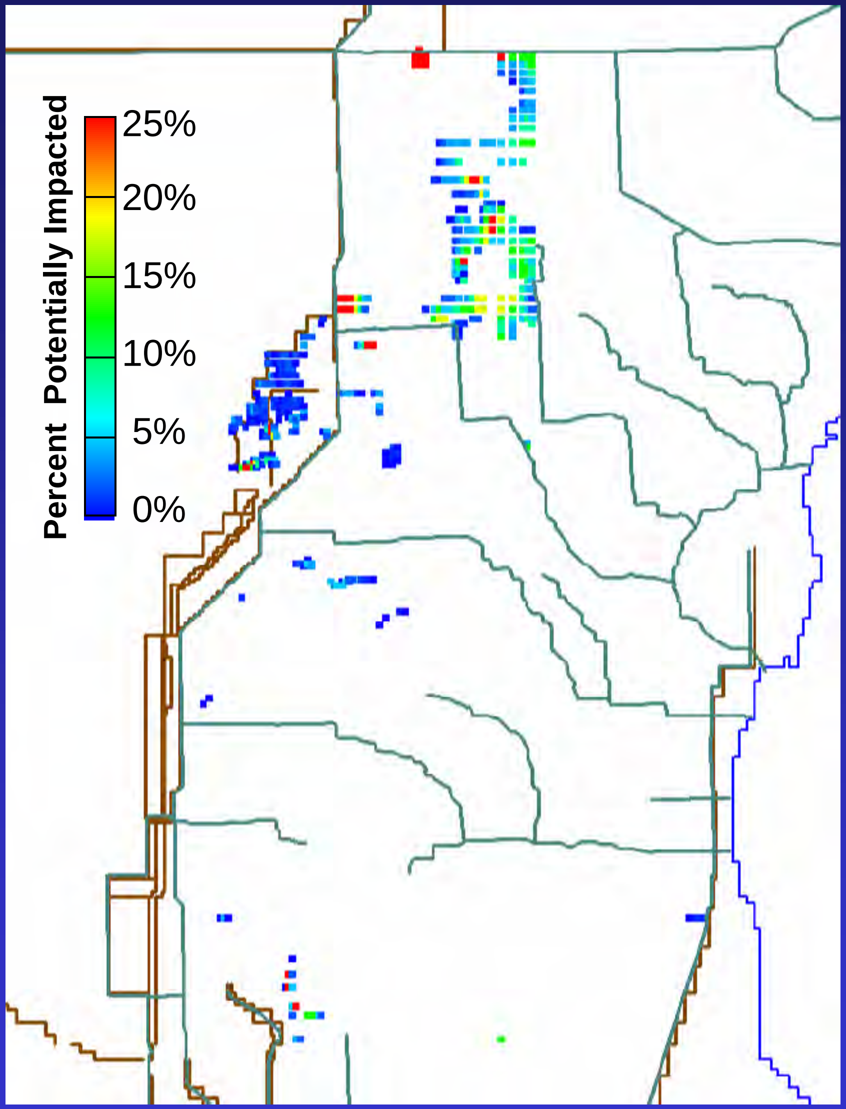
Example: Estimating the potential number of homes flooded

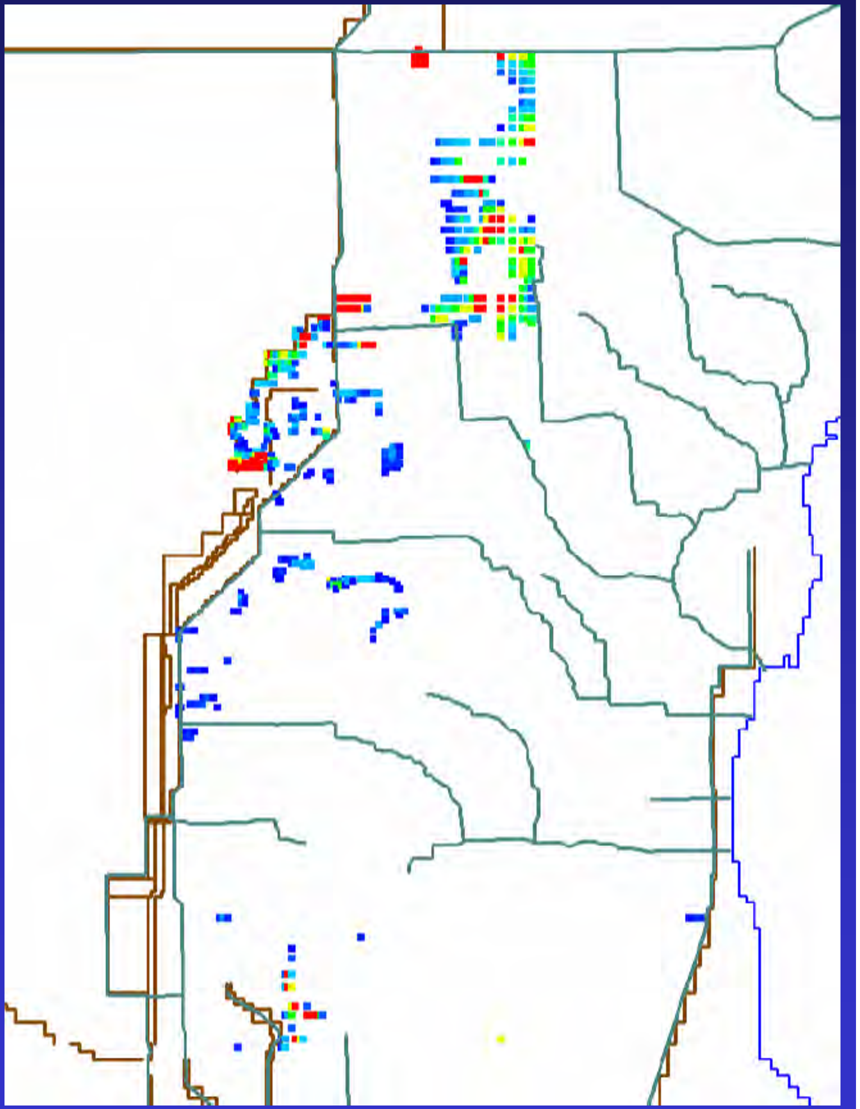
The potential number of homes that could be flooded under specified conditions is estimated based on peak stage, computational cell elevation, and a % Residence Flooded curve.



The probability curve is derived from 3,567 points consisting of surveyed 1st floor elevations and corresponding ground elevation.

Example: Estimating the potential number of homes flooded





What happens next?

- The suite of performance measures (several sessions would be needed to cover them all) are reviewed by interagency “experts”
- The results are tabulated, weighted, and compared to arrive at a recommended plan by the Project Delivery Team
  – Additional constraints are considered
- “Experts” can agree to disagree

- Special thanks to……..
  - Robert Evans
  - Richard Punnett
  - Dan Vogler
  - Schuyler Bishop

Questions?

Solutions?

- Contact Information

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US Army Corps of Engineers

Portland District

Tri-Services Infrastructure Systems Conference

Monitoring the Effects of Sedimentation from Mount St Helens

4 August 2005

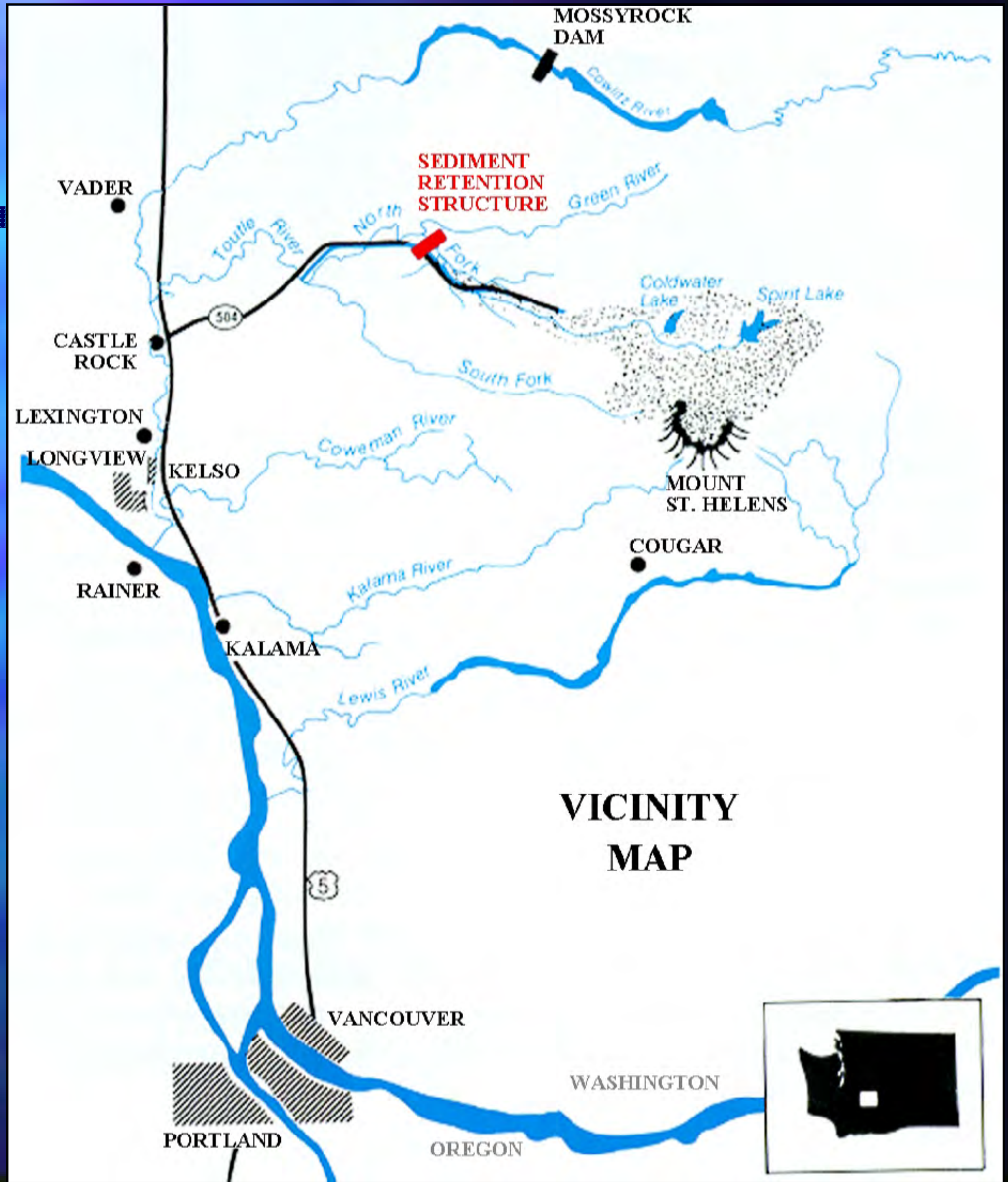
Alan Donner

Patrick O'Brien

David Biedenharn

The Area

- Cowlitz below Mayfield Dam – 1400 SqMi
- Sediment Retention Structure – 143 SqMi
- Toutle at Tower Road – 496 SqMi
- Toutle at Mouth – 510 SqMi
- Cowlitz at Castle Rock – 2238 SqMi
- Cowlitz at Mouth – 2480 SqMi



Mount St Helens

18 May 1980

- Eruption removes estimated 0.67 mi^3 (3.7 billion cy) of material from volcano
- Pre-eruption elevation- 9,677 feet
- Post eruption elevation- 8,363 feet

18 May 1980

- Earthquake - 5.1
- Debris Avalanche - 3,700 MCY
- Ash Coverage – 22,000 Square Miles
- Lahars
  - Toutle Damage
  - Cowlitz Channel Capacity
  - Columbia Navigation Channel

Immediate Actions after 1980 Eruption

- Dredge Columbia River navigation channel
- Dredge Cowlitz River channel
- Toutle River sumps
- Additional FC Storage U/S on Cowlitz River
- Levee raises on Cowlitz River

The Area

- Cowlitz below Mayfield Dam – 1400 SqMi
- Sediment Retention Structure – 143 SqMi
- Toutle at Tower Road – 496 SqMi
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- Cowlitz at Castle Rock – 2238 SqMi
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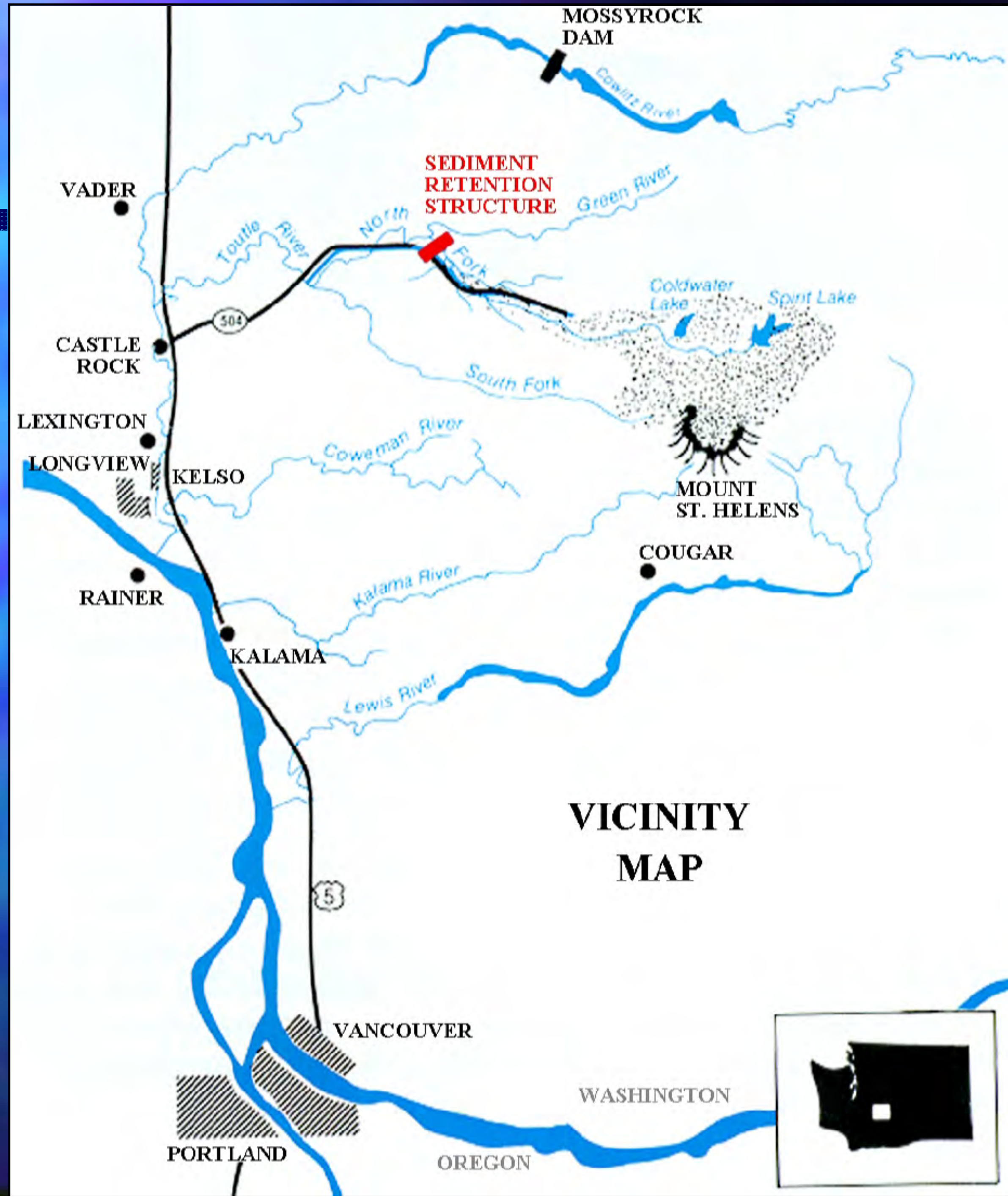


Immediate Actions after 1980 Eruption
(continued)

- Pumping plants for interior flooding
- Outlet channels for Coldwater and Castle Lakes
- Pumping of Spirit Lake
- N1 & S1 Small Retention Structures

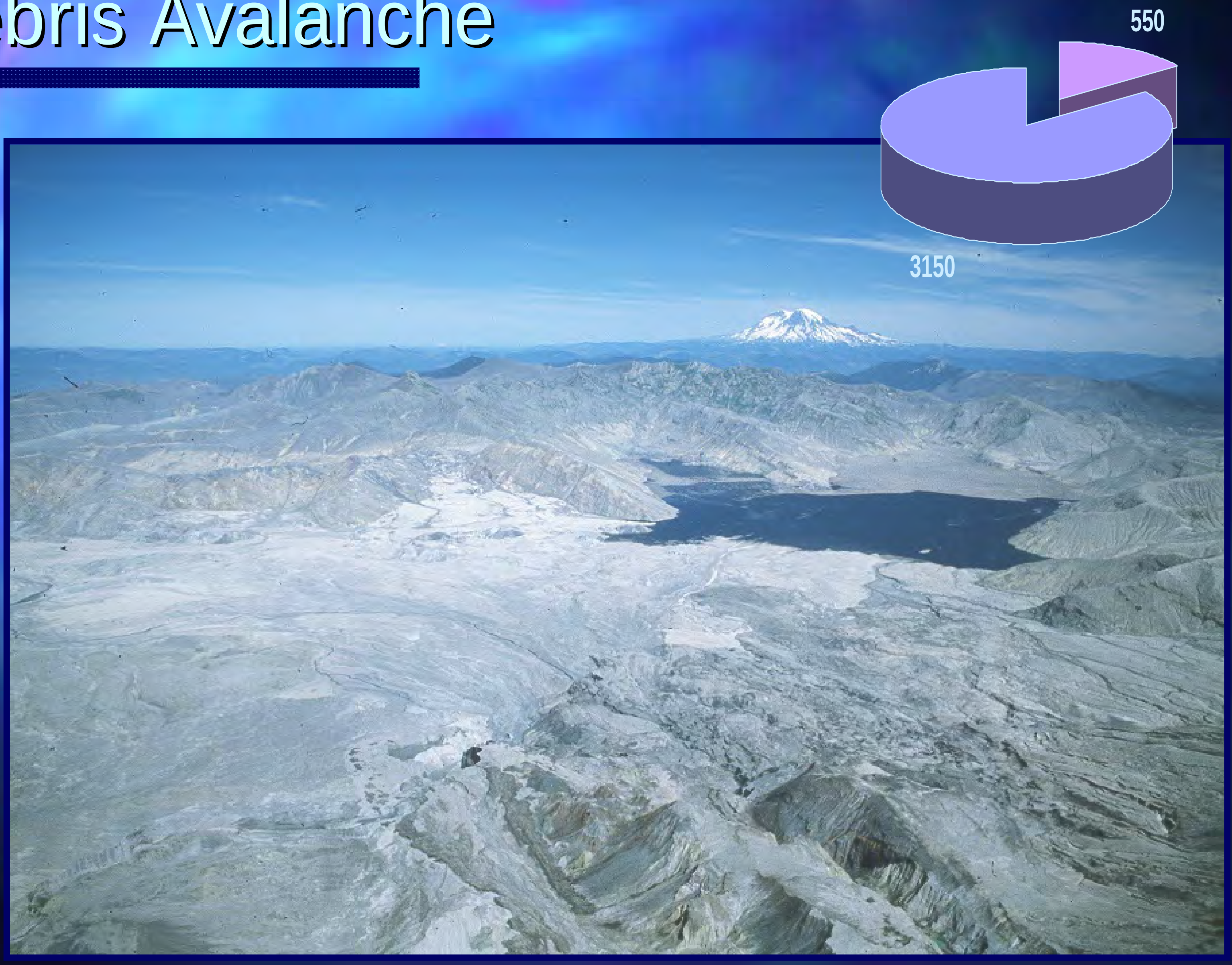
The MSH Project Goal

- To manage sediments eroded from the MSH debris avalanche and downstream bank deposits
  - to maintain authorized levels of flood protection on the Cowlitz River and
  - to maintain full navigation depths on the Columbia River

Areas of Concern

- Flood Damage Reduction - Cowlitz River
  - Kelso
  - Longview
  - Lexington
  - Castle Rock
- Navigation - Columbia River

Debris Avalanche



Selected Alternative

- Three Part Plan
  - Large Sediment Retention Structure
  - Base Plus Dredging
  - Levee Improvement
- And...
  - Monitor
  - Re-evaluate flood risk when the SRS starts passing medium/course sand
  - Identify and evaluate remedial actions if needed

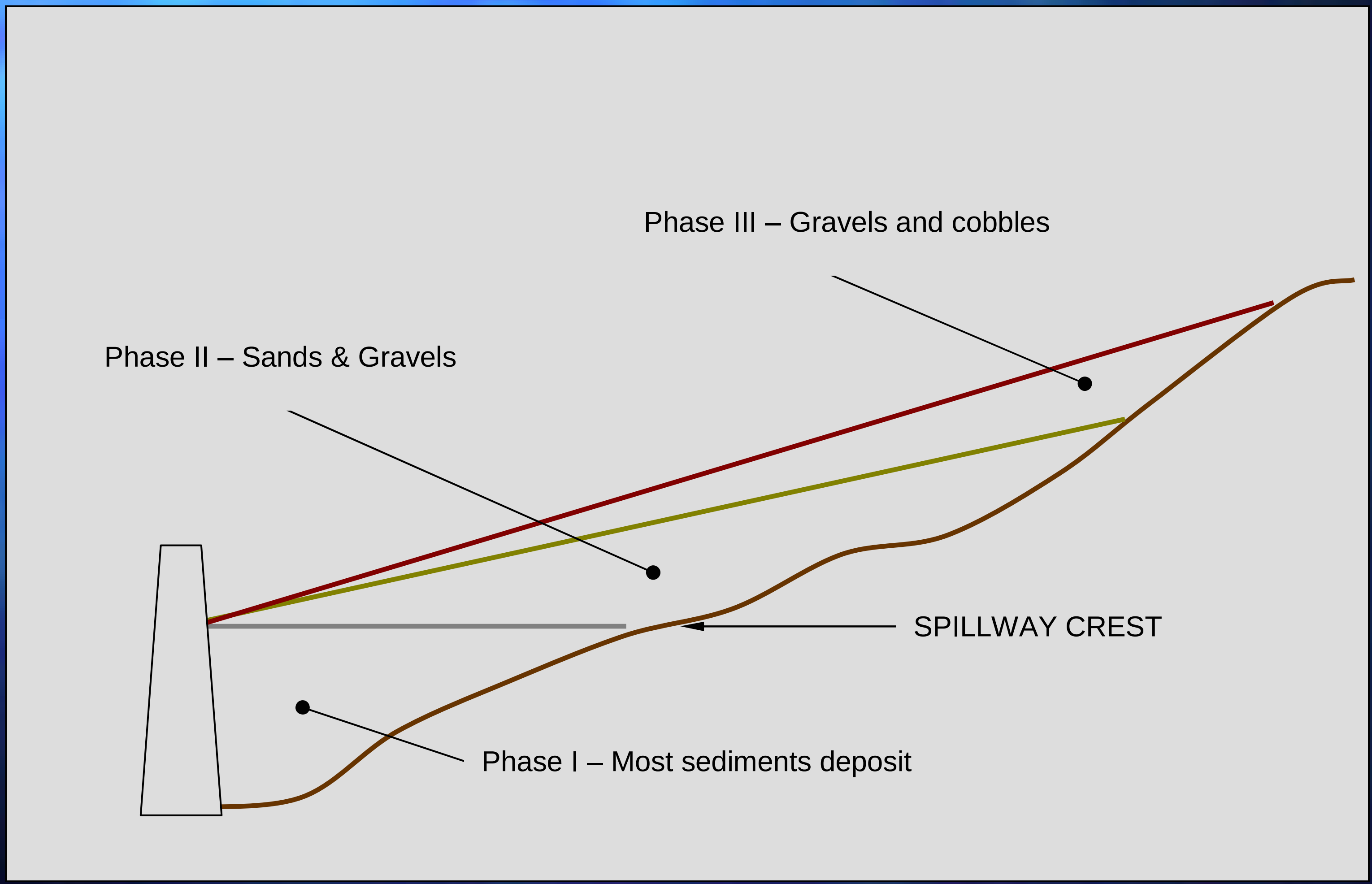
Cowlitz River Levels of Protection

- Pre-eruption
  - All Locations 100 - year+
- Post-eruption
  - All Locations < 2 - year
- Project Authorized LoP (= 106 kcfs - 117 kcfs)
  - Kelso 143 - year
  - Longview 167 - year
  - Lexington 167 - year
  - Castle Rock 118 - year

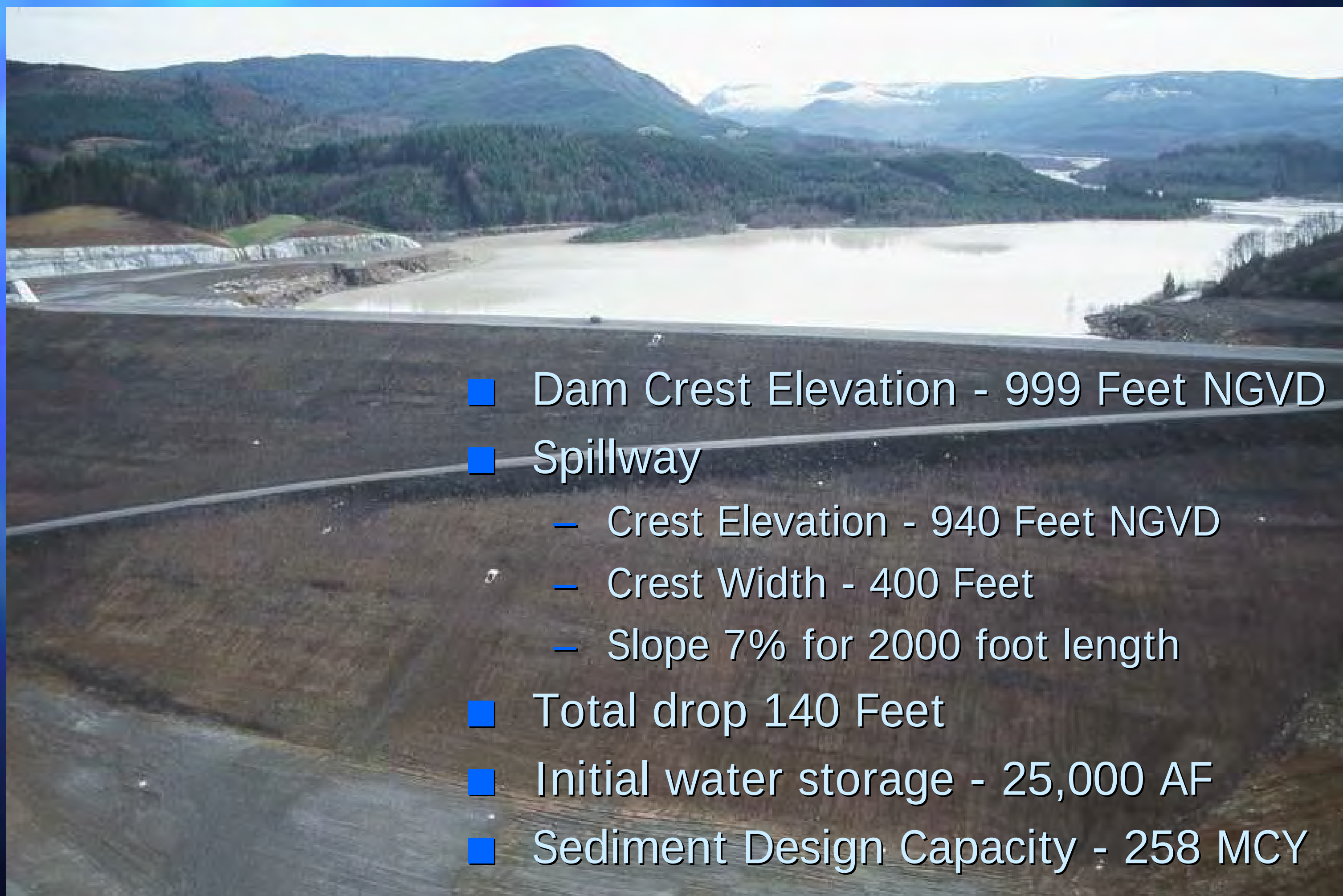
SRS Design Considerations

- Minimal pondage
  - Water Quality
  - Debris Flow
- Pass the PMF - 213,000 cfs
- Pass the OBM - 228,000 cfs
- Sediment Yield and Deposition
- Fish friendly spillway

The SRS Concept



Sediment Retention Structure - 1989

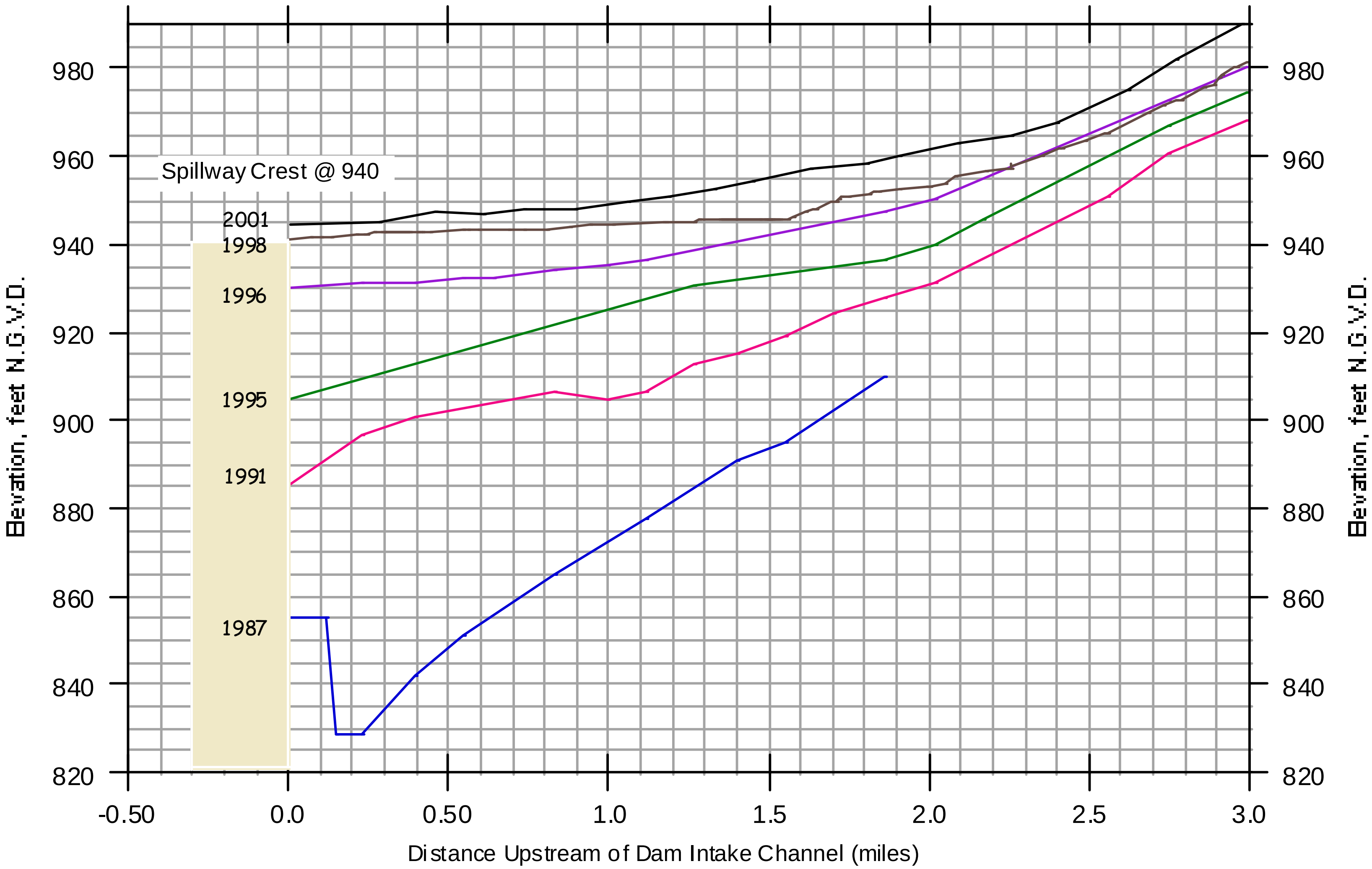


- Dam Crest Elevation - 999 Feet NGVD
- Spillway
  - Crest Elevation - 940 Feet NGVD
  - Crest Width - 400 Feet
  - Slope 7% for 2000 foot length
- Total drop 140 Feet
- Initial water storage - 25,000 AF
- Sediment Design Capacity - 258 MCY

1998

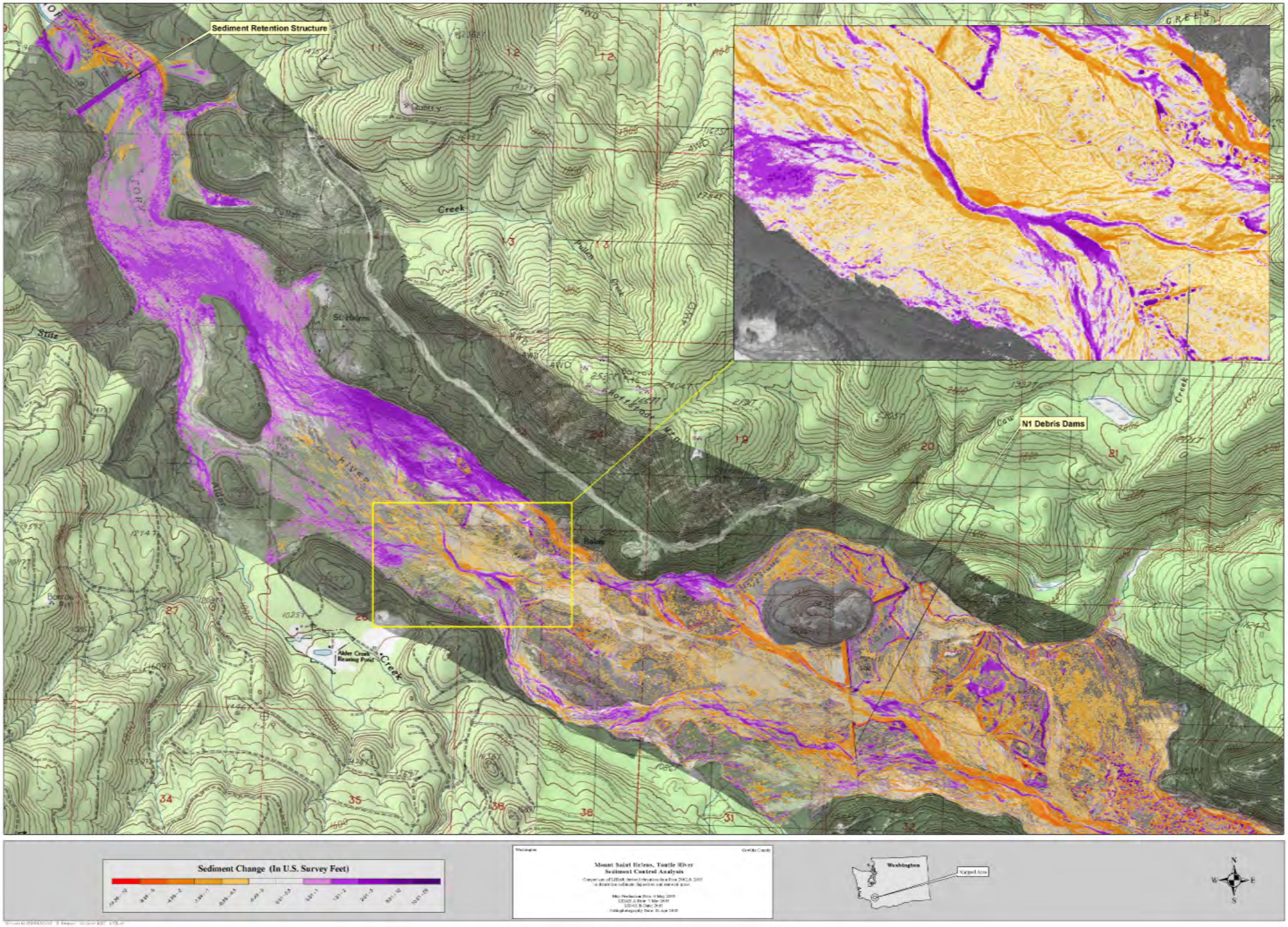
- Issues
  - Top row of outlets closed
  - Sediment reached Spillway Crest
  - Required Cowlitz Level of Protection at issue (FEMA Flood Hazard Study)
- Actions
  - Update Engineering Data
  - Evaluate Conditions • Estimate Potential
  - Recommend Next Action

SRS Sediment Profiles



Sediment Change 2003 to 2005

US Army Corps of Engineers®
Portland District



Sediment Yield Reanalysis - 2002

- Changed Conditions
  - Re-vegetation
  - Channel geometry and armouring
  - Channel roughness
  - SRS Filling
- Sediment at SRS spillway crest
- Cowlitz bed material
- Risk evaluation

Engineering Re-Analysis - Products

- Update Sediment Yield
  - DTM of Debris Avalanche - 1998
  - DTM of Debris Avalanche - 2000
  - other methods
- Update Hydrologic Data
- Re-evaluate Future Flood Risk - Cowlitz
  - HEC6
  - FDA
- Recommendations for Future Action

Mount St Helens Engineering Reanalysis (2002) Recommendations

- Periodic aerial photography of NF Toutle Basin
- Sediment sampling Toutle Basin and Cowlitz River
- Channel surveys NF Toutle River (SRS), Cowlitz River
- Monitoring gages on Cowlitz River

Current Levels of Protection

LOCATION	Authorized LoP (Years)	Nov 2004 Update (Years)
Kelso	143	259
Longview	167	277
Lexington	167	230
Castle Rock	118	209

- Monitoring
- Assessment
- Action

Monitoring/Assessment/Action

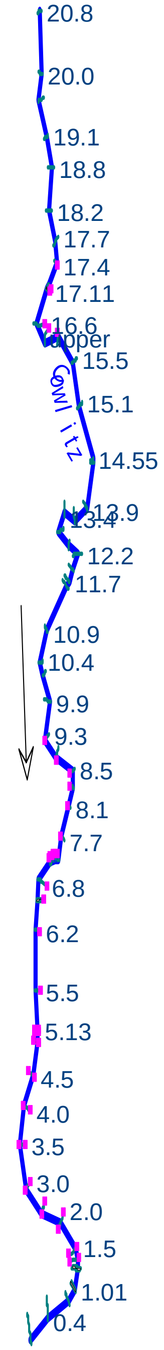
- Monitoring – data collection and field observations
- Assessment – qualitative analysis of data collected
  - Specific gage analysis from monitoring gages
  - Geomorphic assessment = field observations + bed material samples + USGS suspended sediment data
  - SIAM model uses data collected. The model should confirm and support observed geomorphic trend.

Monitoring/Assessment/Action

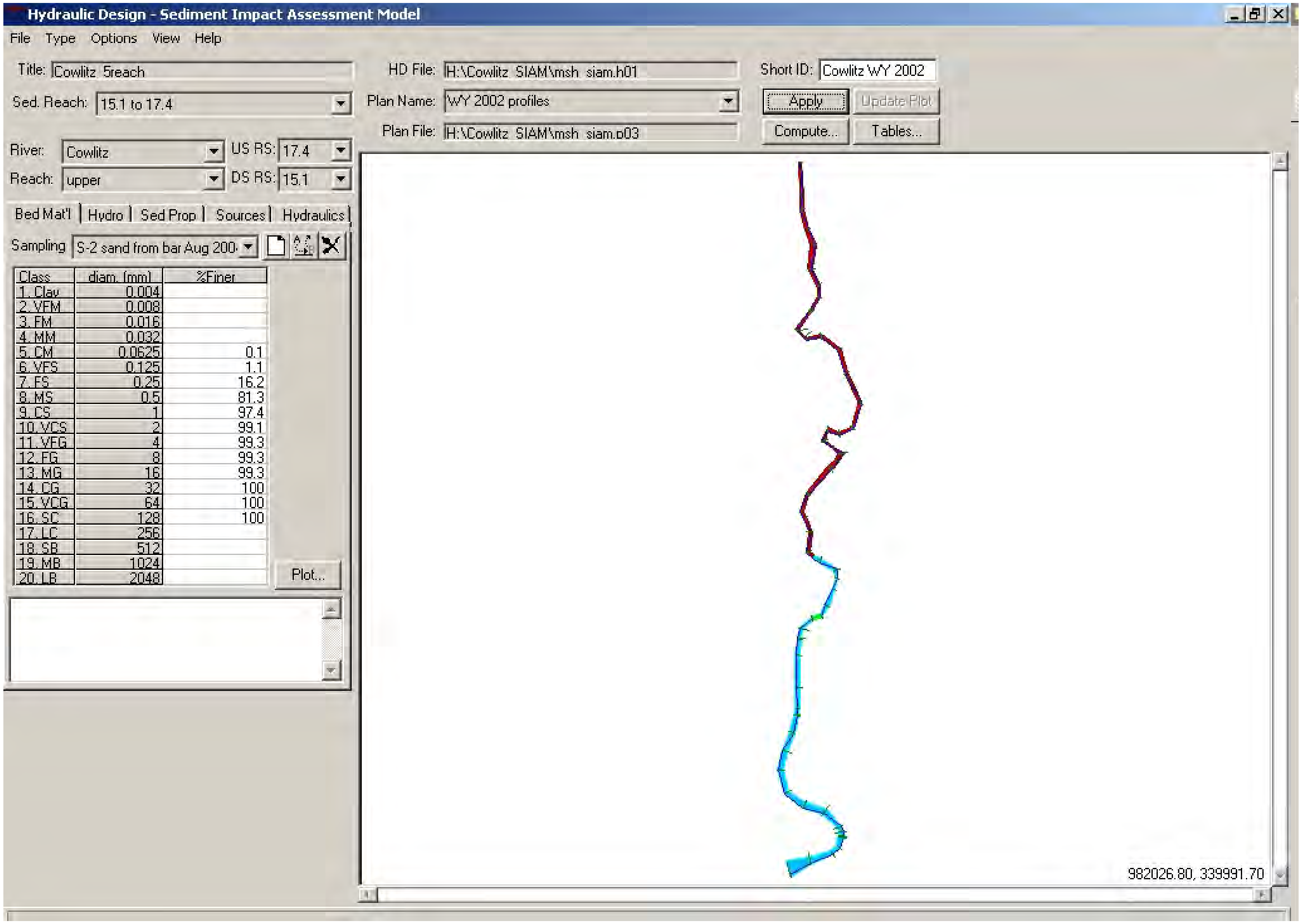
- Action - 2 possible outcomes
  - Assessment concludes aggradational trend in Cowlitz threatens authorized level of flood protection provided by levees. **Action – immediate measures, followed by alternative study**
  - Assessment concludes that channel is stable or aggradation/degradational trends do not threaten authorized level of flood protection provided by levees. **Action – Continue monitoring**

Data

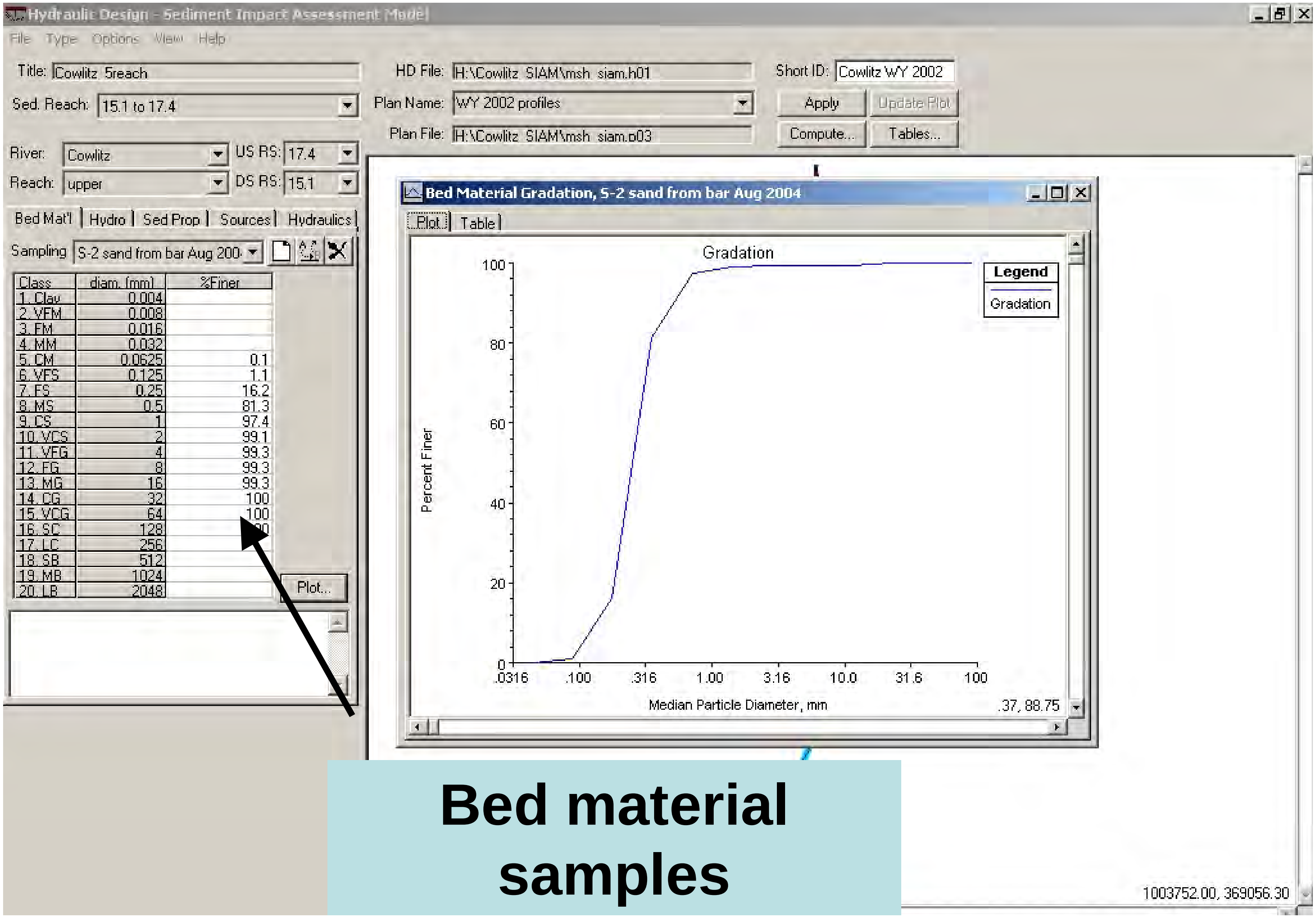
- Bed material samples
- Suspended sediment data
- Monitoring gage data
- Hydrosurvey data
- Bottom sediment classification mapping



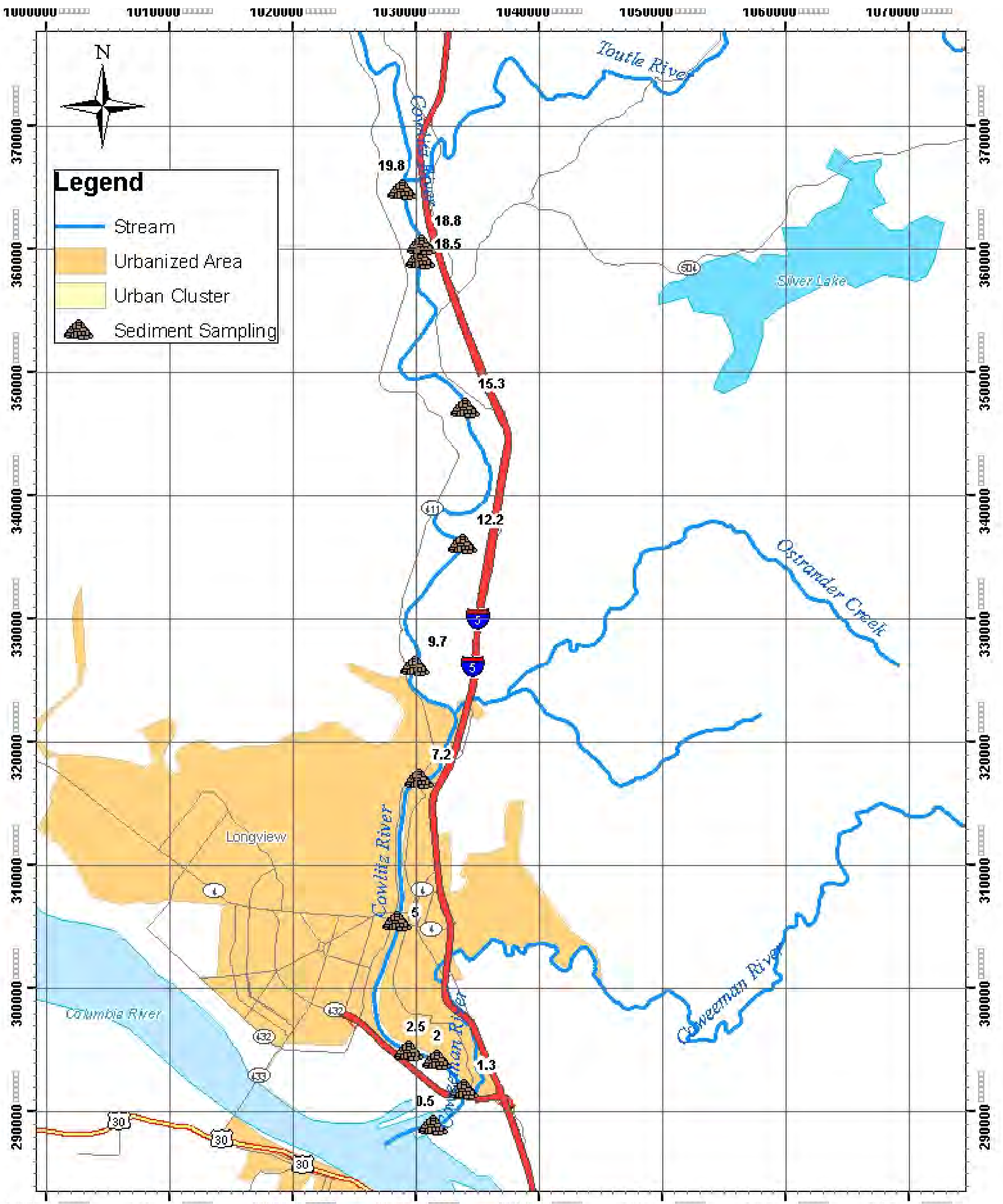
Sediment Impact Assessment Module



SIAM inputs

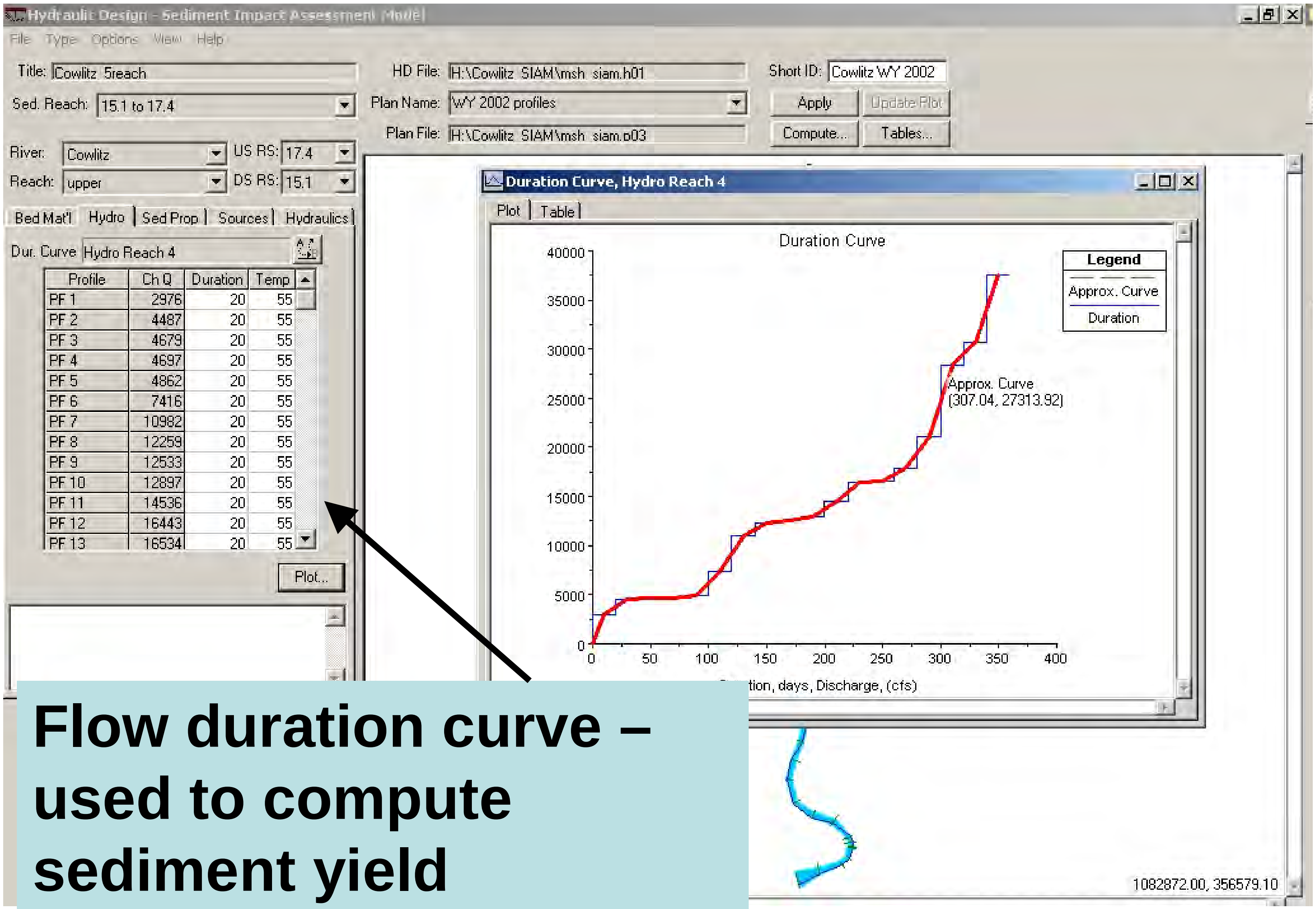


Bed material samples



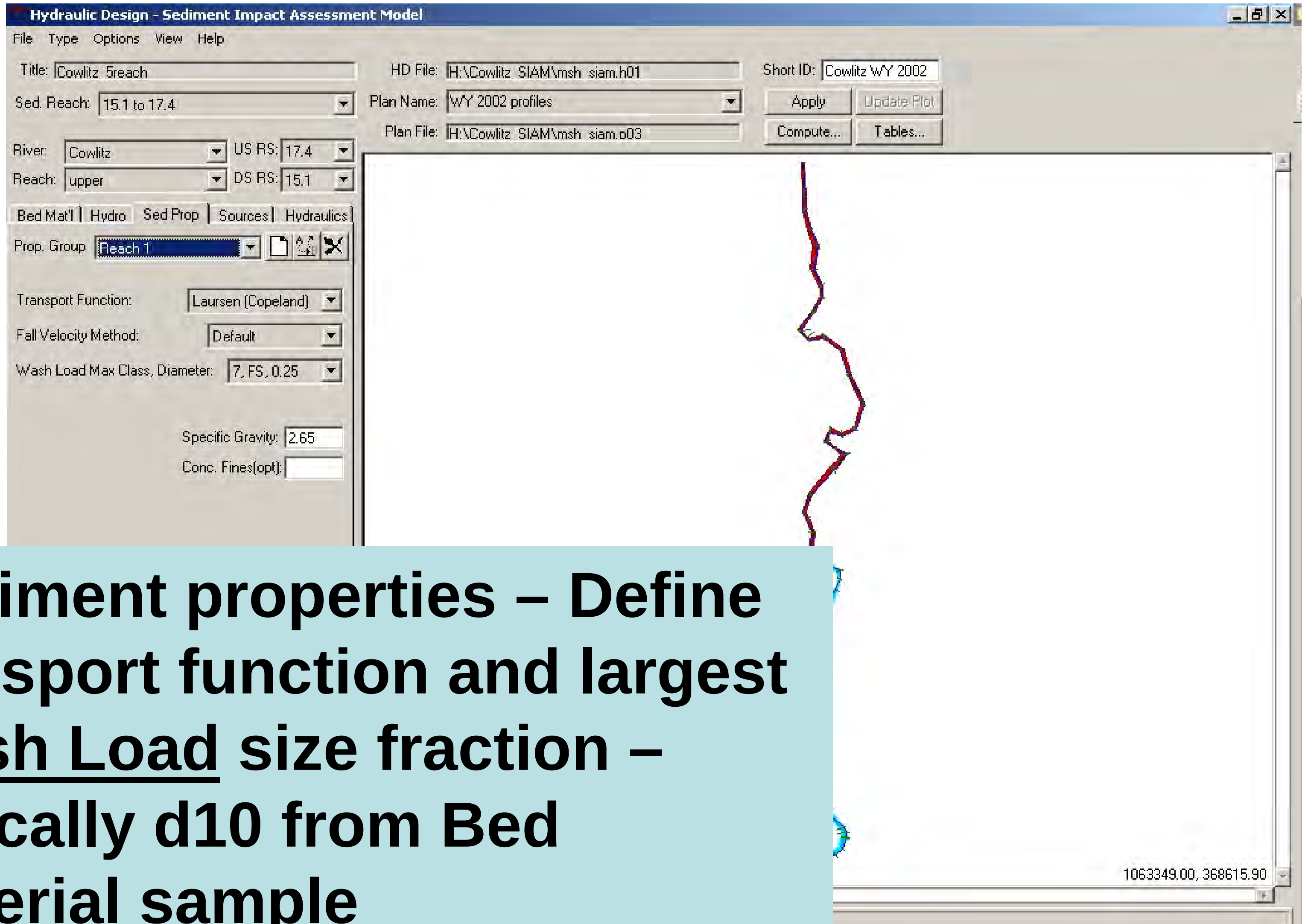
N
Legend
Stream
Urbanized Area
Urban Cluster
Sediment Sampling
Toutle River
Cowlitz River
Silver Lake
Ostrander Creek
Coweeman River
Columbia River
Longview
19.8
18.8
18.5
15.3
12.2
9.7
7.2
5
2.5
2
1.3
0.5
1000000
1010000
1020000
1030000
1040000
1050000
1060000
1070000
370000
360000
350000
340000
330000
320000
310000
300000
290000

SIAM inputs



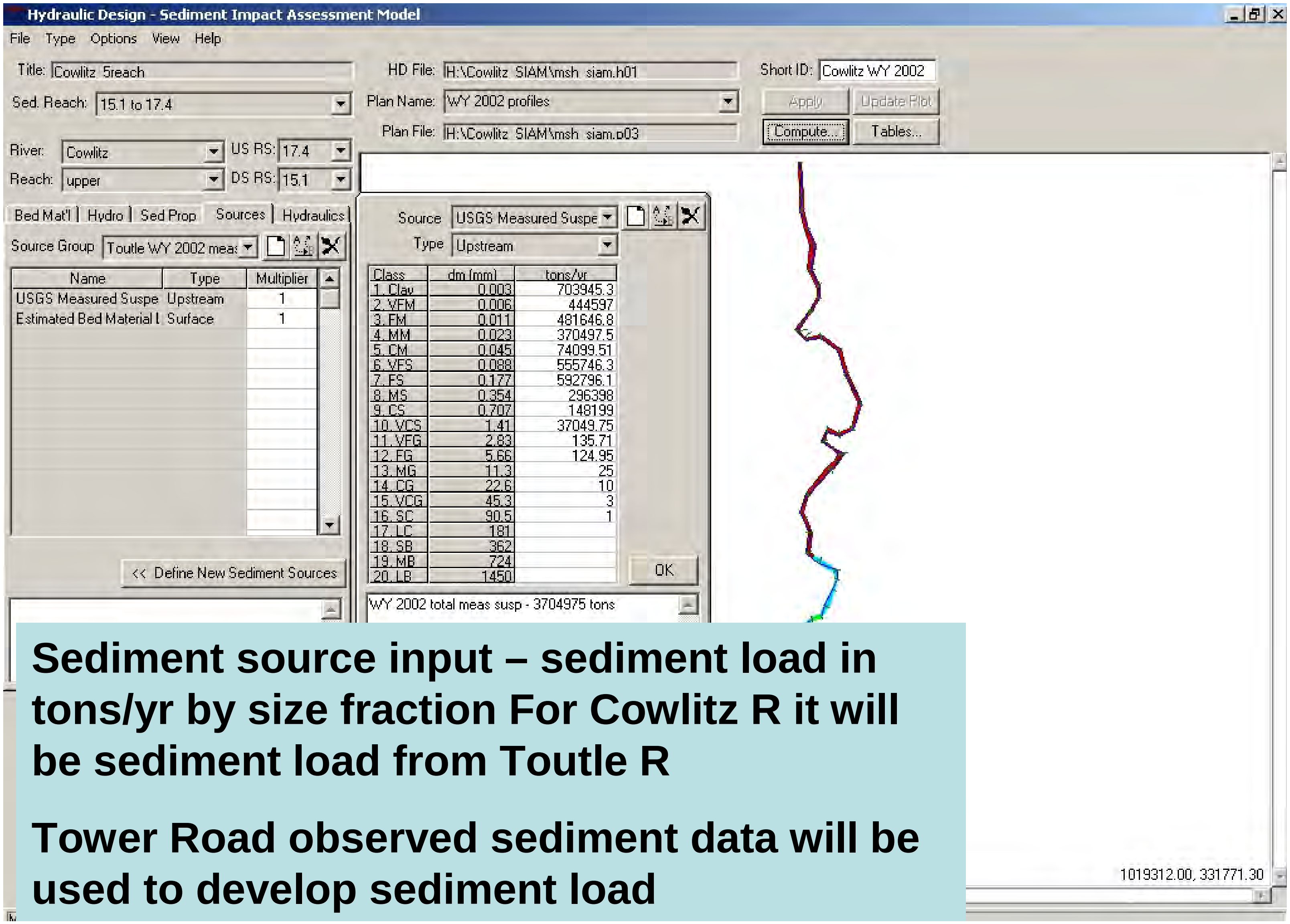
Flow duration curve – used to compute sediment yield

SIAM inputs



Sediment properties – Define transport function and largest <u>Wash Load</u> size fraction – typically d10 from Bed Material sample

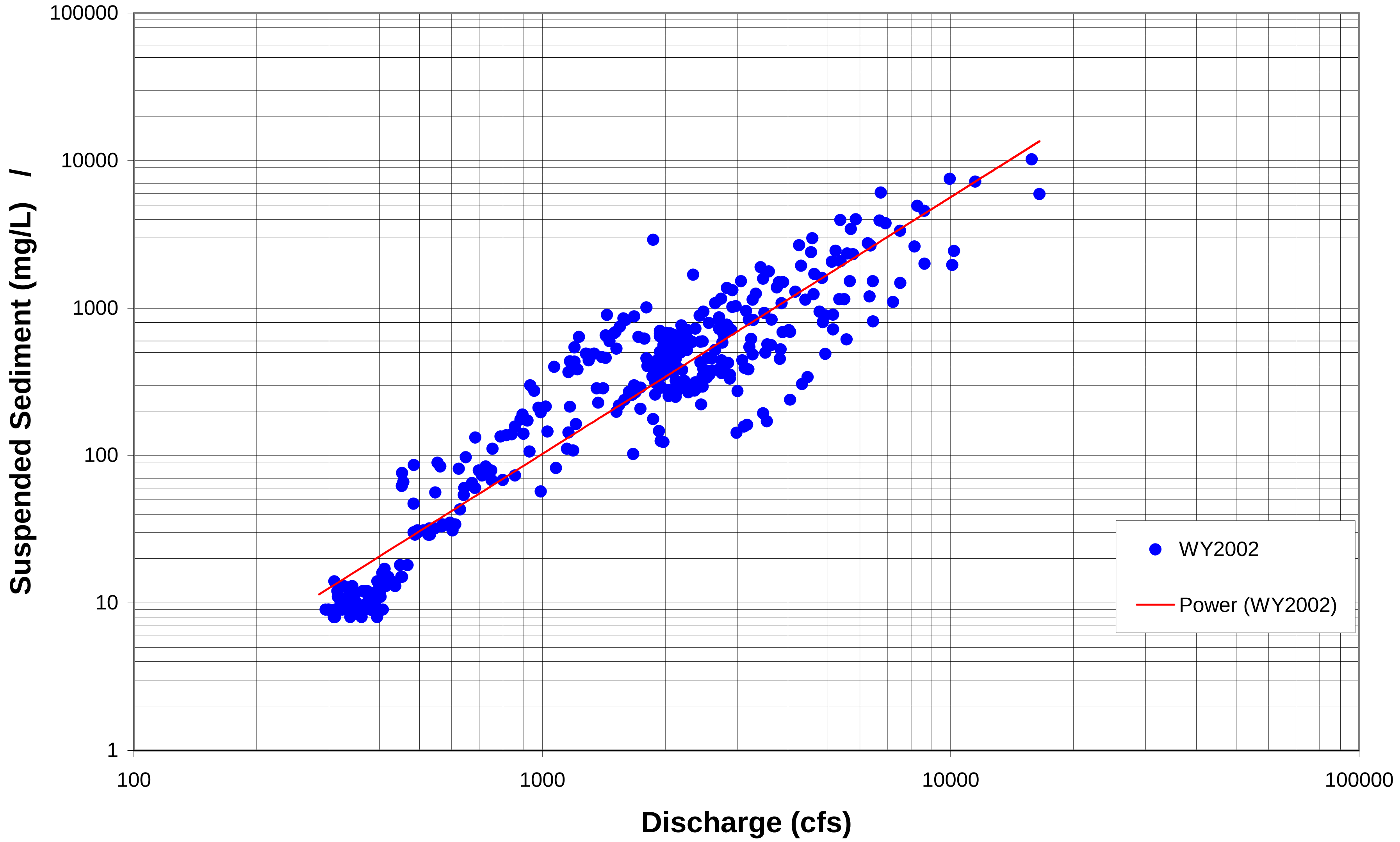
SIAM inputs



Sediment source input – sediment load in tons/yr by size fraction For Cowlitz R it will be sediment load from Toutle R

Tower Road observed sediment data will be used to develop sediment load

USGS observed suspended sediment data – Toutle R @ Tower Road



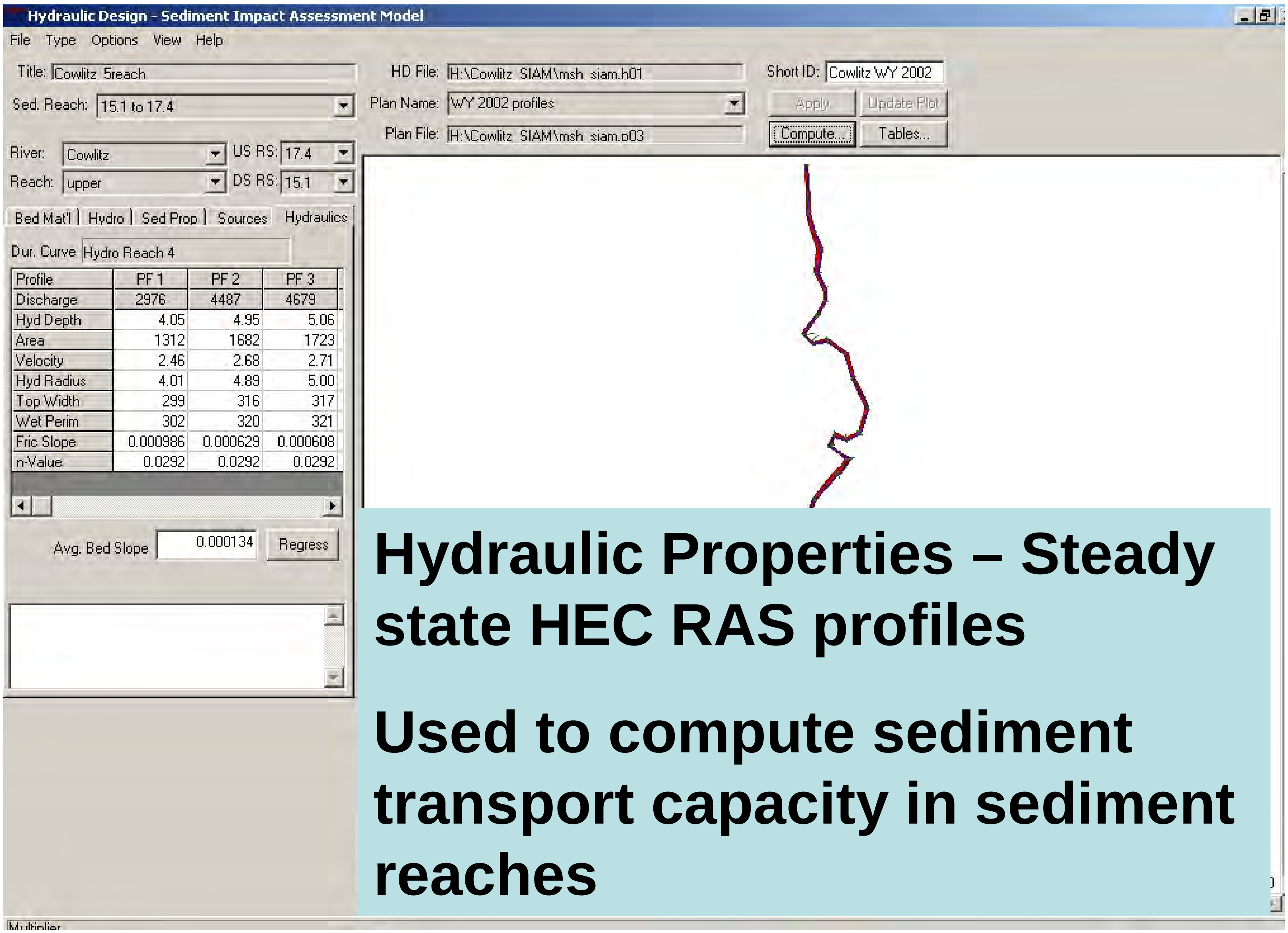
Toutle River source load

Wash load = suspended sediment data = measured load (USGS observed data)

Bed material load = unmeasured load estimated using data from sampling (Modified Einstein)

Total Load (tons/yr) = measured + unmeasured by grain size class

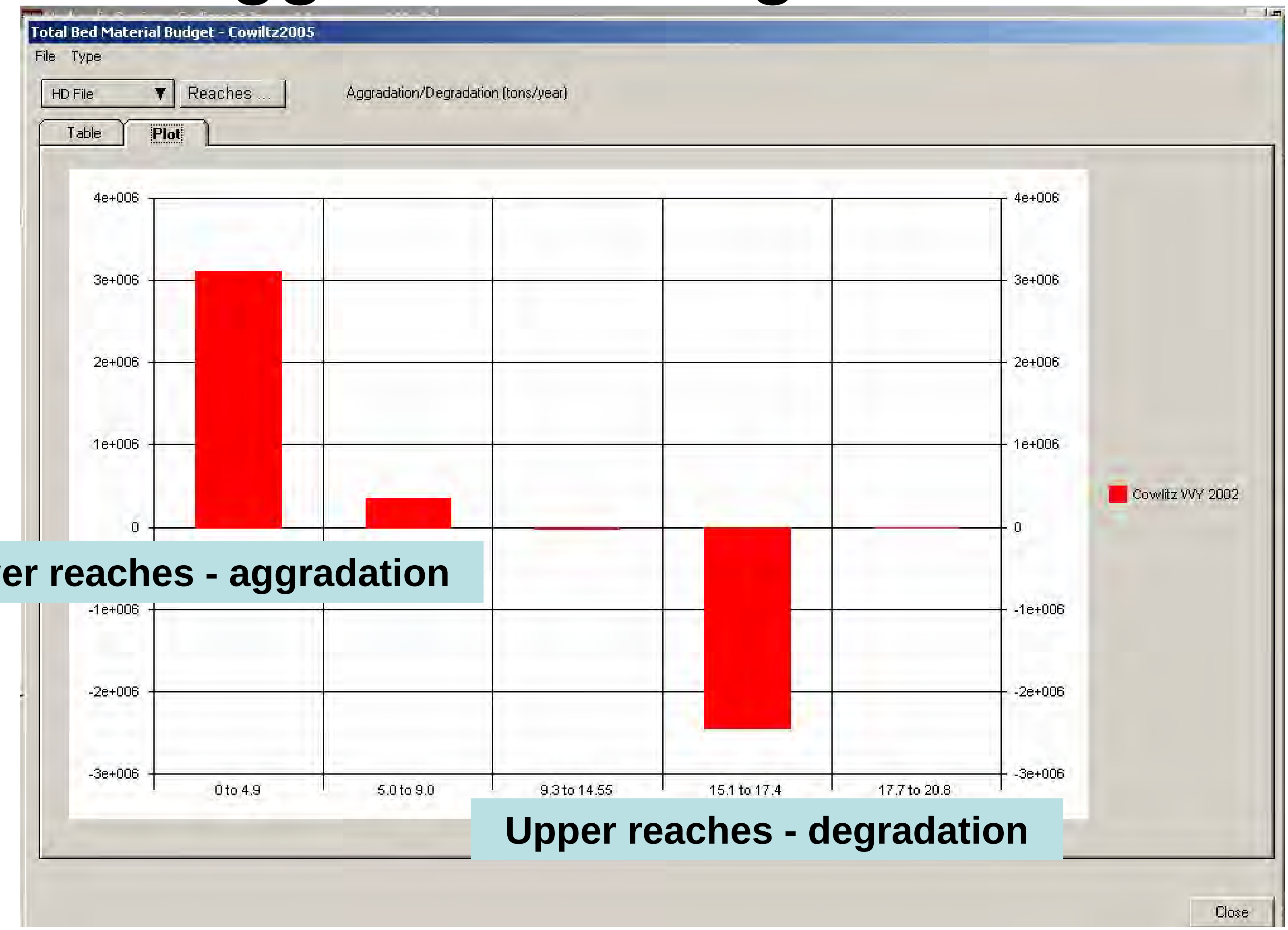
SIAM inputs



Hydraulic Properties – Steady state HEC RAS profiles

Used to compute sediment transport capacity in sediment reaches

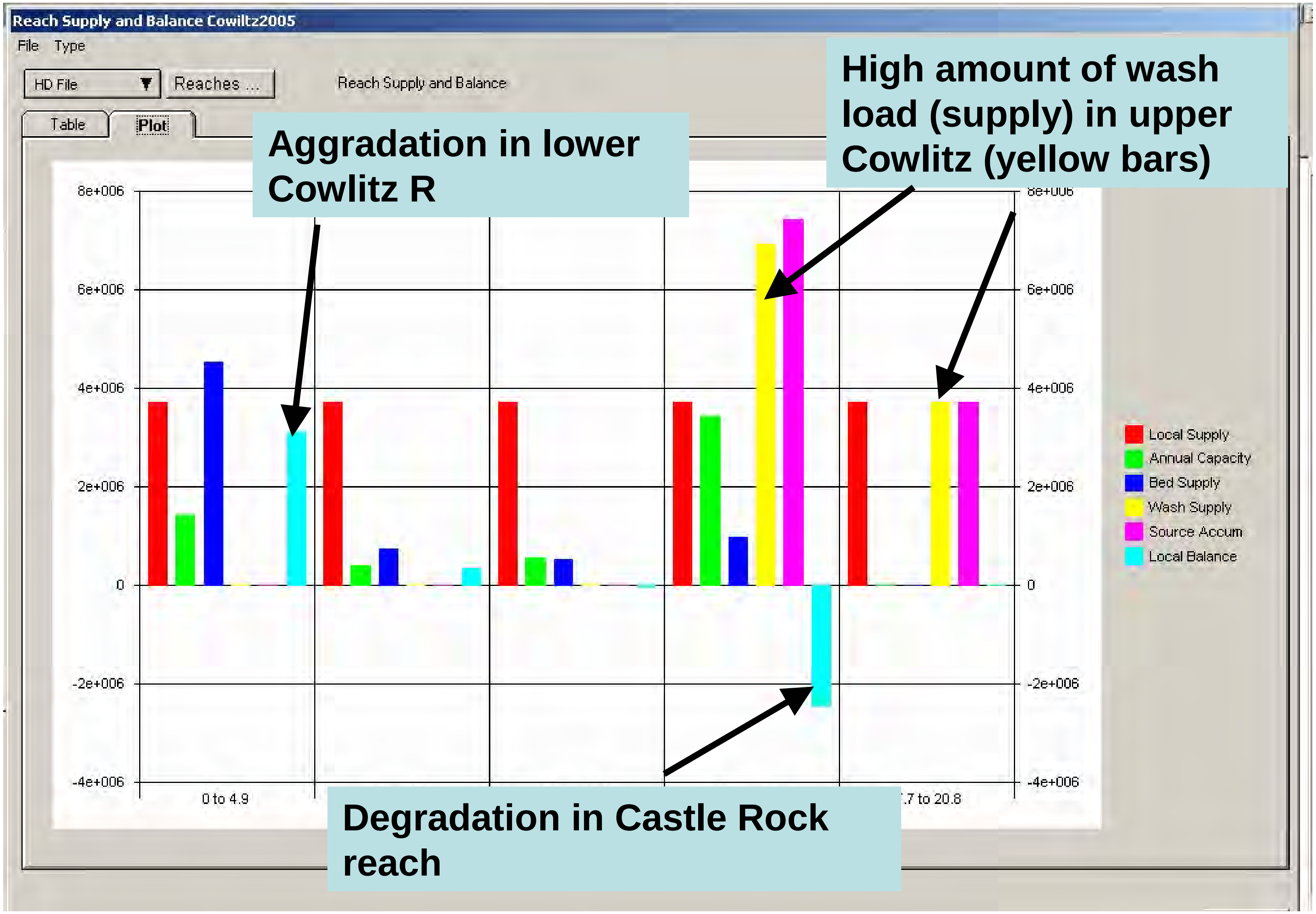
SIAM outputs – Aggradation/Degradation



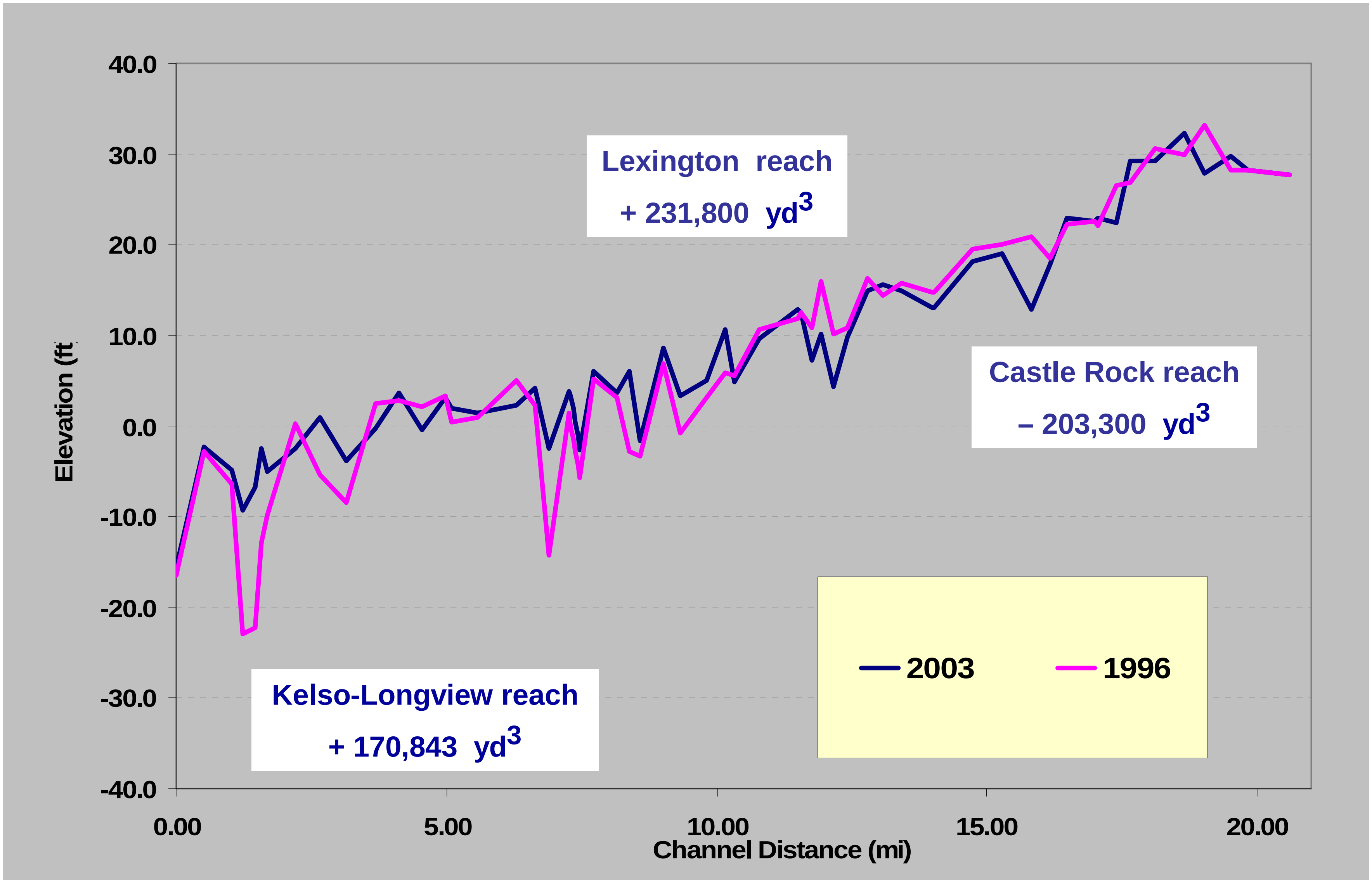
Lower reaches - aggradation

Upper reaches - degradation

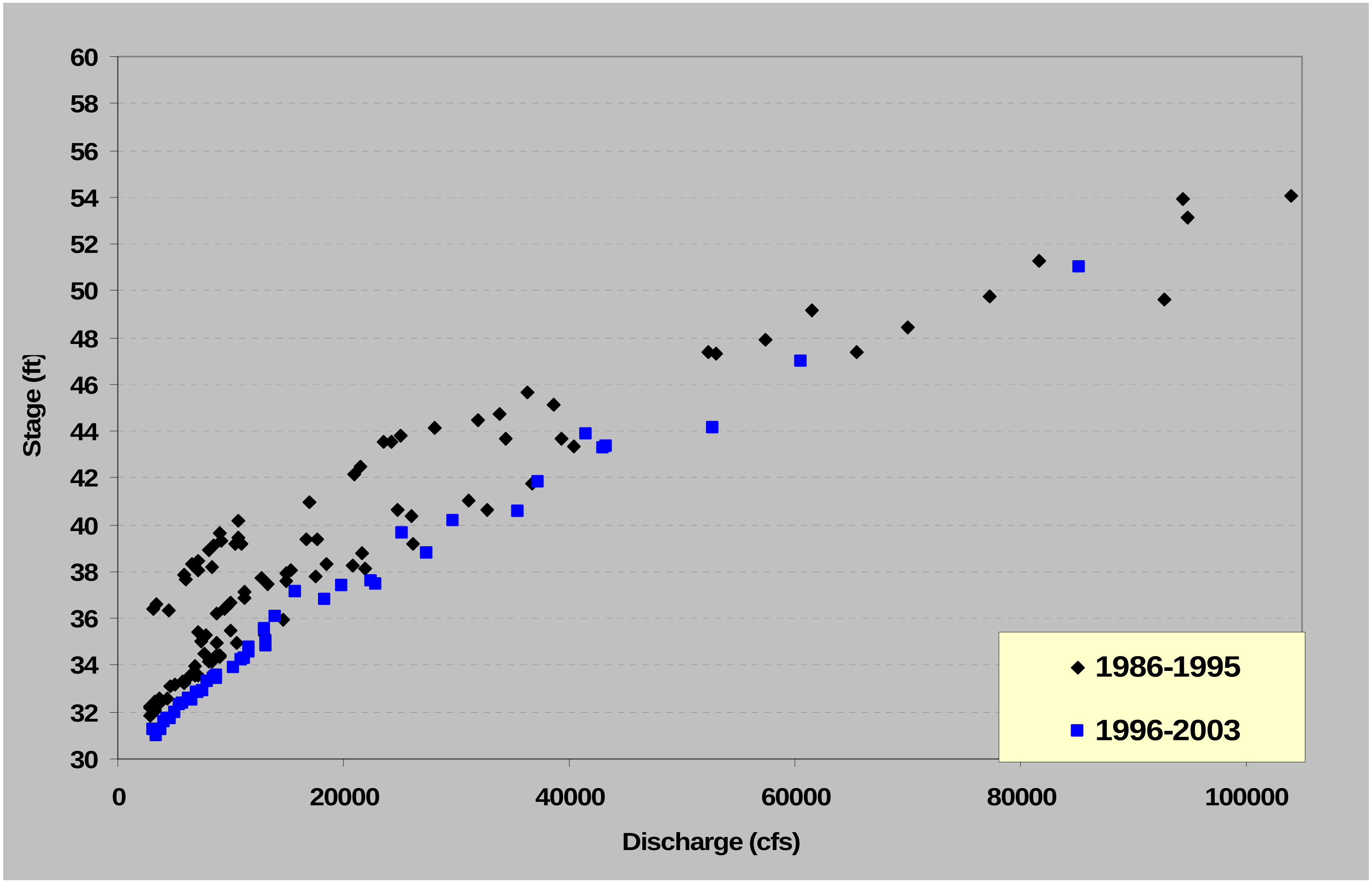
SIAM outputs – Local Balance



Cowlitz R Bed Profiles – 1996 vs 2003 **(from HEC RAS models)**



Cowlitz River at Castle Rock (USGS gage)



Potential Actions

- Additional Flood Control Storage (Mossy Rock)
- Flushing Flows (Mossy Rock)
- Levee Improvements
- Dredging
- Raise SRS

Demonstrating Innovative River Restoration Technologies: Truckee River, Nevada

A Demonstration of the Ecosystem Functions Model (HEC-EFM)

Presented By: Chris Dunn, P.E. (HEC)

Project Team: Includes members of HEC, DRI, and ERDC

USACE, Hydrologic Engineering Center
Desert Research Institute

Urban Flooding and Channel Restoration in Arid and Semi-Arid Regions Demonstration Program

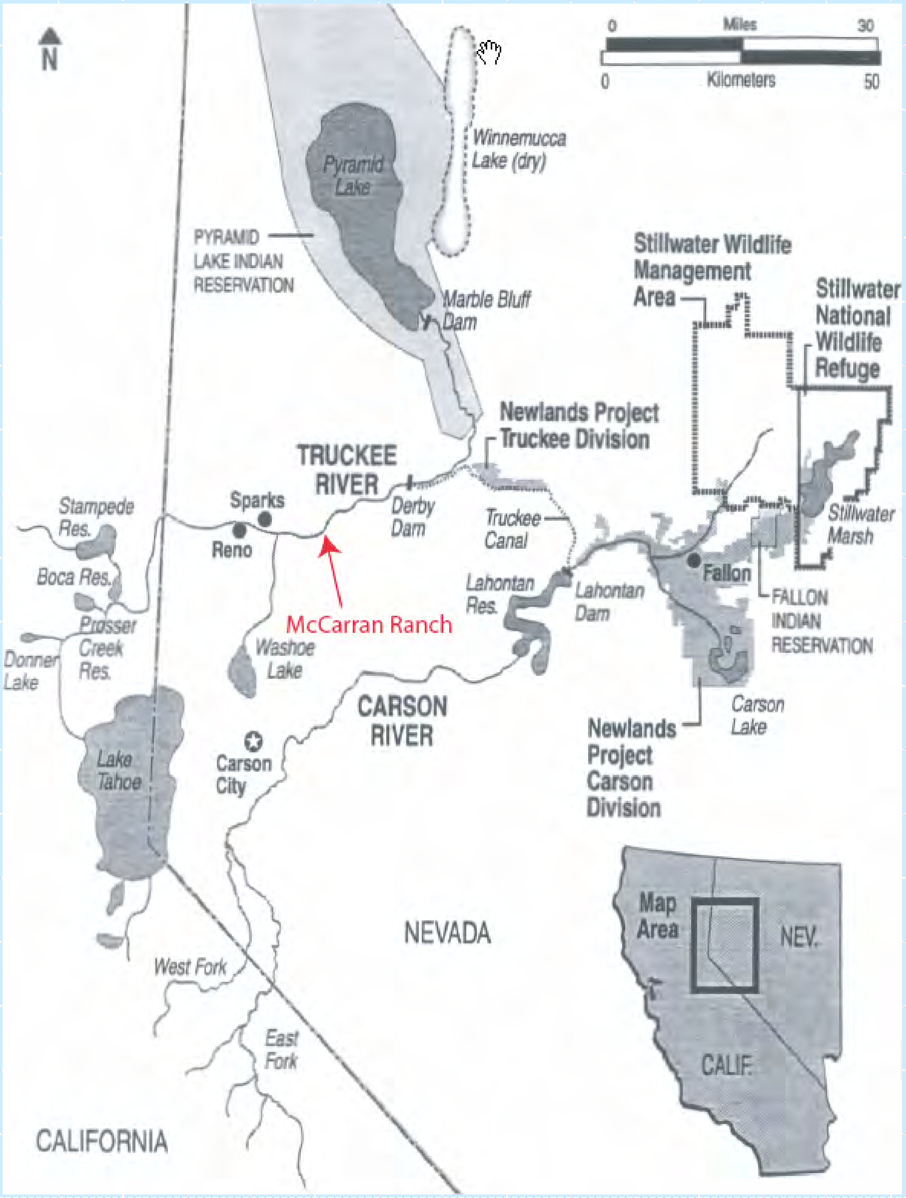
- Encourage collaboration between Corps and Desert Research Institute
- Take new or nearly completed urban flood and channel restoration R&D technologies and demonstrate them in the field
- Products must be useful to the field
- Regional program adapted for arid and semi-arid regions
- Teaming of ERDC, HEC, DRI, SPD, and local interests
- Envisioned as 5-year program with $2-3 million funding per year

Needs of Arid and Semi-Arid Regions

- Rapidly developing population centers
- Unique watershed management and demand issues
- Opportunity to meet the special needs of this region
- Expertise of Desert Research Institute
- National mission and expertise of Corps
- International potential for arid regions expertise
- High potential ROI benefits

Project Area

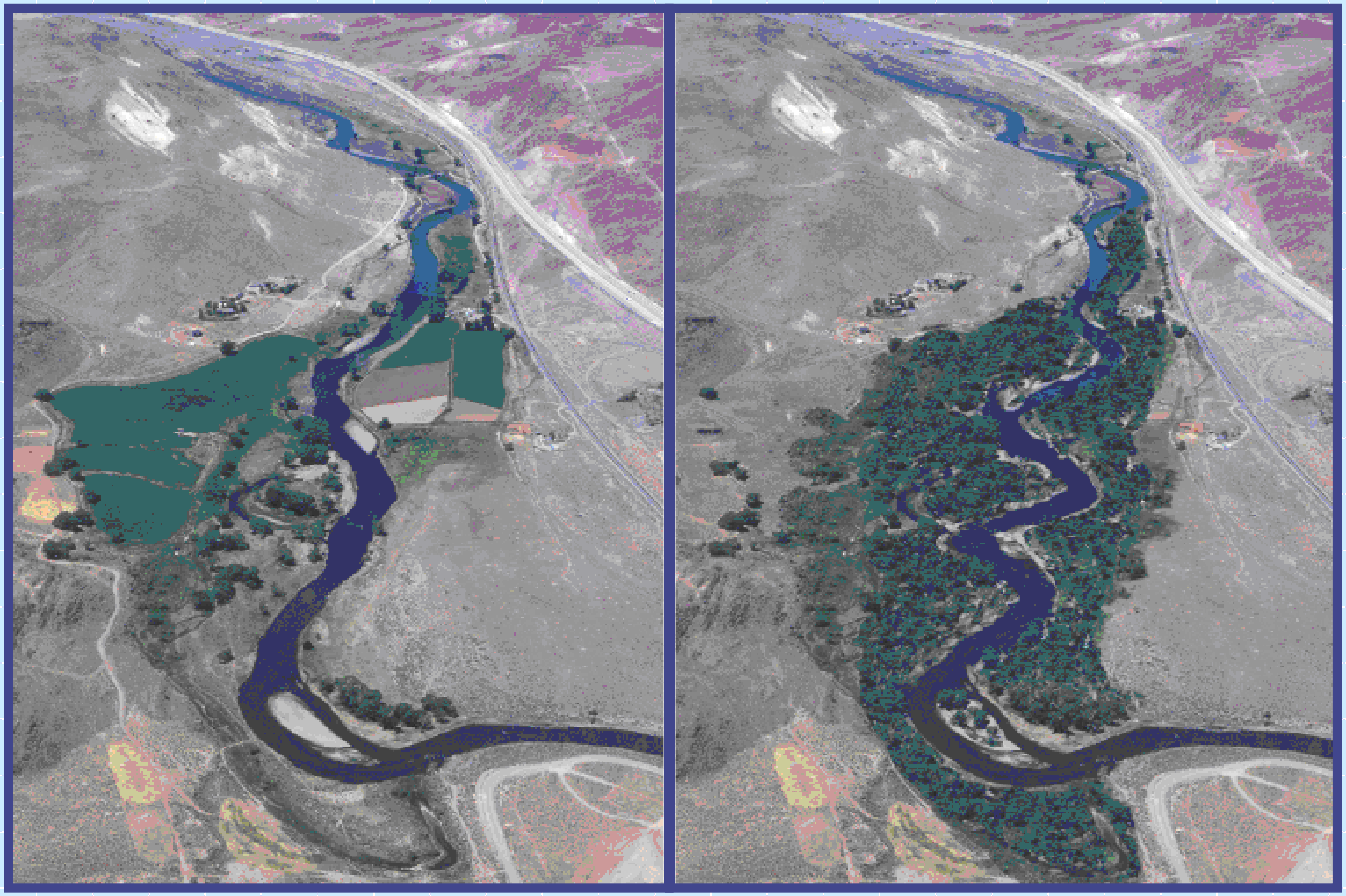
- McCarran Ranch – ~ 5 m
- Truckee River – ~ 100 m



Background –
McCarran Ranch/Truckee River Pilot Restoration Project

- Restore ~ 1 mi. of channel
  - Raise bottom
  - Narrow width from 200 down to 120 ft.
  - Add meanders
- Purpose - Reconnect channel to floodplain
- Highly leveraged by The Nature Conservancy, Cities of Reno and Sparks, US Fish and Wildlife Service, Nevada Division of Environmental Protection, Regional Water Planning Commission, National Fish and Wildlife Foundation and the US Bureau of Reclamation

McCarran Ranch/Truckee River Pilot Restoration Project



Our Purpose -

- Use and evaluate innovative approaches to assess the impact of river restoration activities on the Truckee River
  - Analyze/predict changes to ecosystem habitat caused by modifying channel geometry to more “natural” state.
  - Use the results from the intensively studied McCarran Ranch reach to later make decisions for the entire river.

Process Overview

- Apply the Ecosystem Functions Model (EFM) to identify flows that meet various physical parameters for existing and proposed channel modification.
- Run steady-state HEC-RAS and HEC-GeoRAS to produce floodplain maps of flows identified by EFM
- Process floodplain maps in GIS software to illustrate and quantify affects of channel modification on the various ecosystem habitats.

What is the EFM?

- Planning tool used by biologists, engineers, geomorphologists, and environmental managers to assess how proposed changes to the flow regime (e.g., reservoir operations or channel modifications) will impact terrestrial and aquatic habitat
- Indicates the directions and relative magnitude of biological change
- Use hydrologic and hydraulic data to help predict biological response in rivers and adjoining floodplains, wetlands, and estuaries

Input and Data Requirements

What do you need?

- Statistical Assessment only...
  - Hydrologic Data - Period of Record
    - flow time series
    - stage time series
  - Relationships between ecology and hydrology
- ...and for Spatial Features
  - Topographic Data (DTM)
  - Geo-Referenced Hydraulic Model
  - GIS Software and Data

EFM Relationships

To be Used as Indicators of Eco-Change

- Link the characteristics of hydrologic and hydraulic time series (flow and stage) to elements of the ecosystem through combinations of four basic criteria:
  1. Season
  2. Flow Frequency
  3. Duration
  4. Rate of Stage Recession
- Statistical analyses are performed on the time series records to determine the flow and stage that meet the criteria for each relationship

Relationships

- Have been developed to investigate a range of ecosystem elements, including fish spawning, fish rearing, fish stranding, recruitment of large woody debris, channel migration, riparian forest regeneration, and many others.
- Truckee application includes:
  - Cottonwood establishment
  - Cottonwood inundation
  - Substrate
  - Mayfly Habitat

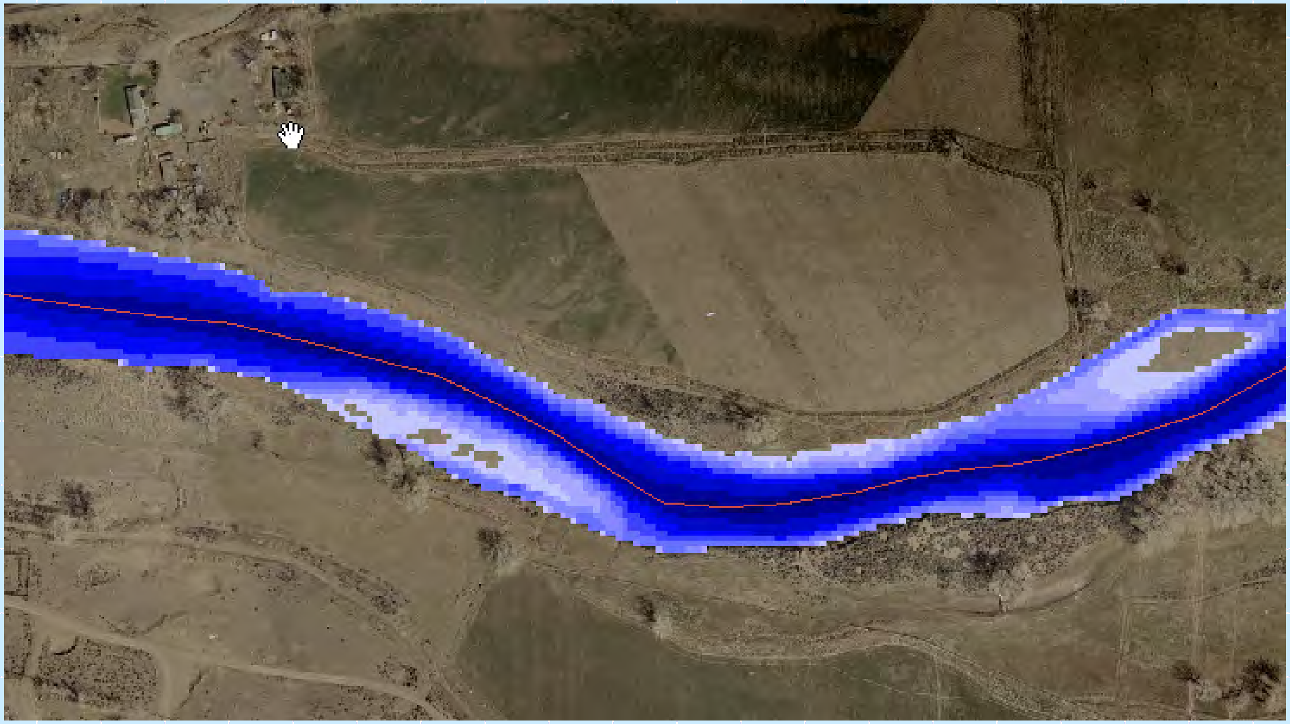
Terrestrial Relationship

Flow Events Suitable for Plant Establishment

- Physical Parameter:
  - recurrence of overbank flows in germination periods that recede slower than a threshold rate
- Ecological Response:
  - cottonwood regeneration
- Relationship(s):
  1) June 15 – August 1 time period
  2) must have a stage decline of < 0.58 ft/wk
  3) for events meeting the above criteria, return period of < 10-years
- Output:
  - GIS layer of regeneration zones

Criteria Area for Cottonwood Establishment

- Establishment
  - Flow = 1,256 cfs
  - Elev. = 4275.2



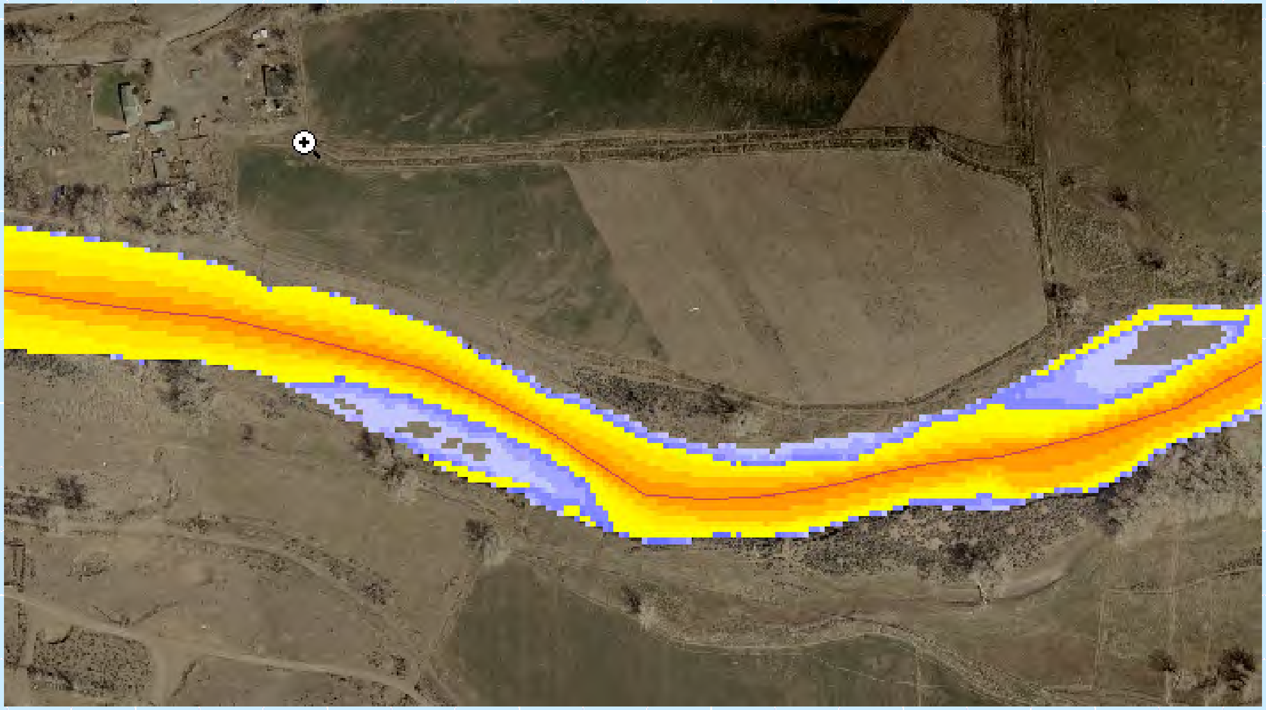
Terrestrial Relationship

Inundation of Habitat

- Physical Parameter:
  - sustained high stage during late growing season
- Ecological Response:
  - extent of seedling drowning
- Relationship:
  - highest stage sustained for twenty-one days from early August to mid-September during the period that germinate the seedlings
- Output:
  - GIS Layer of late season inundation extents

Fringe Habitat for Cottonwood Establishment

- Establishment
  - Flow = 1,256 cfs
  - Elev. = 4275.2
- Inundation
  - Flow = 385 cfs
  - Elev. = 4273.8



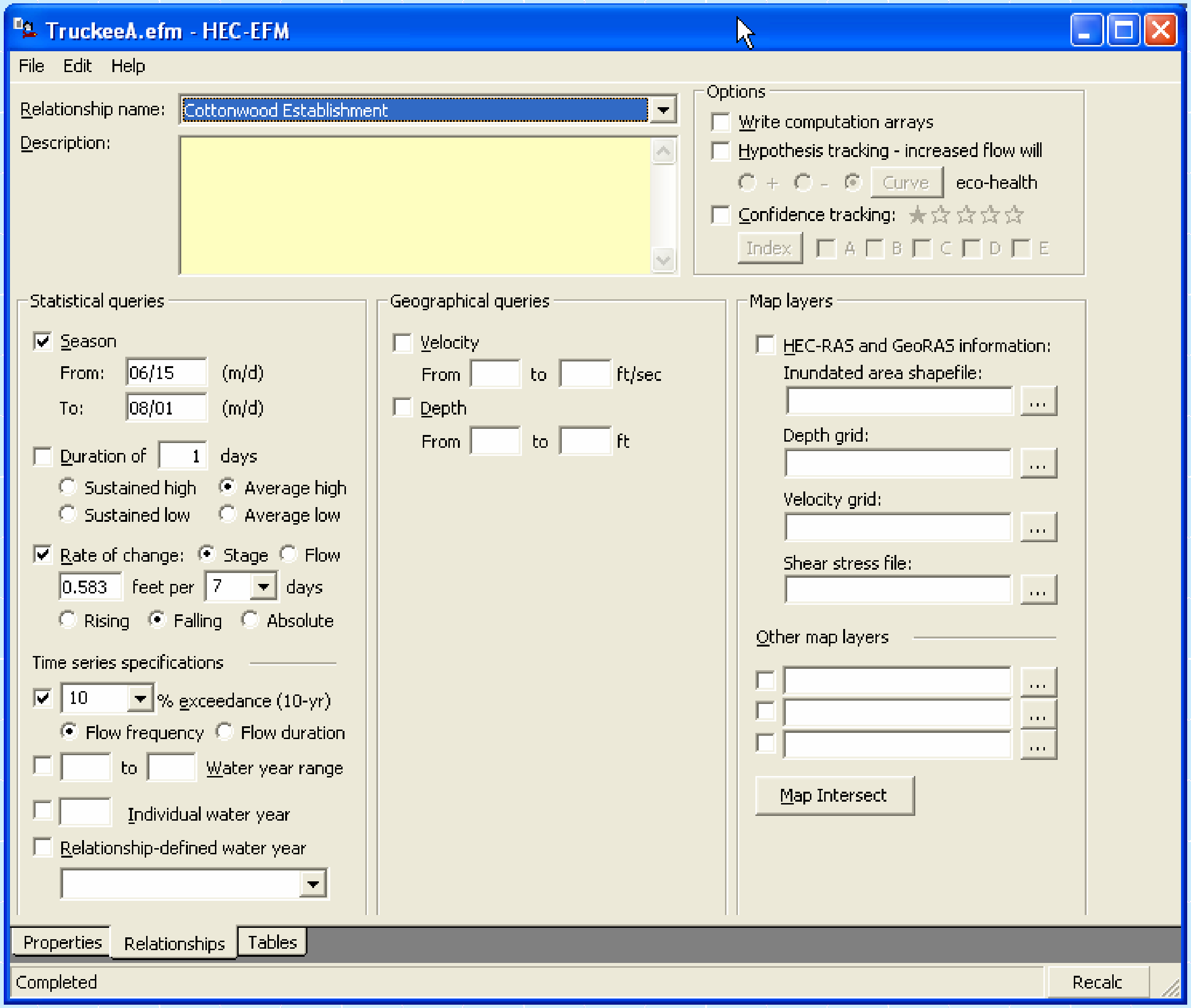
Truckee EFM Input Data

- Observed USGS flow/stage time-series records from 1972 to present
- Restored HEC-RAS model included cross-sections of restored design channel geometry from USACE SPK.
- Used representative restored channel geometry cross-section to derive restored stage time-series records

Truckee EFM Input Data

- DRI scientists provided relationships for:
  - Substrate
  - Cottonwood recruitment habitat
  - Mayfly habitat
- For results presentation in GIS software - generated restored DTM (TIN) by removing existing stream and integrating restored cross-sections with ArcView/Spatial Analyst tools.

EFM - Graphical User Interface (GUI)



Truckee EFM Application – Statistical Results

TruckeeA.efm - HEC-EFM

File Edit Help

Evaluated at: 07/19/2005 08:46

Summary

		Unimpaired		Gaged			Design		
Relationship	Conf.	Stage, ft	Flow, cfs	Chg.	Stage, ft	Flow, cfs	Chg.	Stage, ft	Flow, cfs
Cottonwood Establishment	n/a	4274.6	851	n/a	4275.2	1,256	n/a	4278.1	1,059
Cottonwood Inundation	n/a	4273.4	233	n/a	4273.8	385	n/a	4276.6	385
Substrate	n/a	4277.0	2,949	n/a	4276.2	2,155	n/a	4280.0	2,155
Baetis	n/a	4273.6	325	n/a	4273.9	451	n/a	4276.8	451

Index Values

Index	Gaged	Design
A	n/a	n/a
B	n/a	n/a
C	n/a	n/a
D	n/a	n/a
E	n/a	n/a

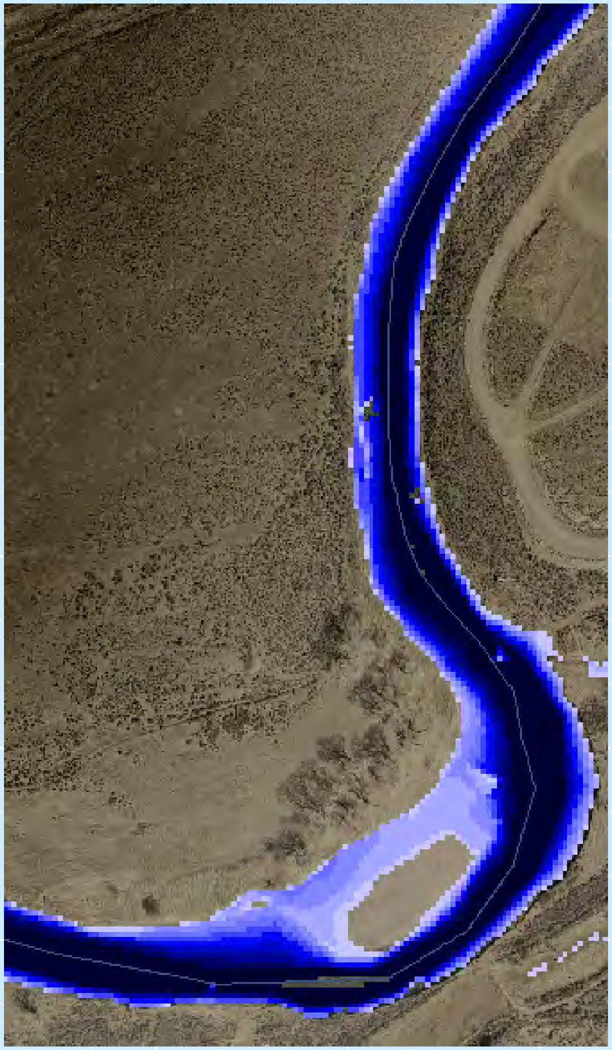
Notes:

Properties Relationships Tables

Completed Recalc

Spatial Analysis

- Statistical results (flows) are input to a hydraulic model (HEC-RAS) to develop:
  - water surface profiles
  - shear stress
- GeoRAS distributes RAS output into grids for GIS analysis and display
  - depth grid
  - velocity grid
  - inundation boundary maps



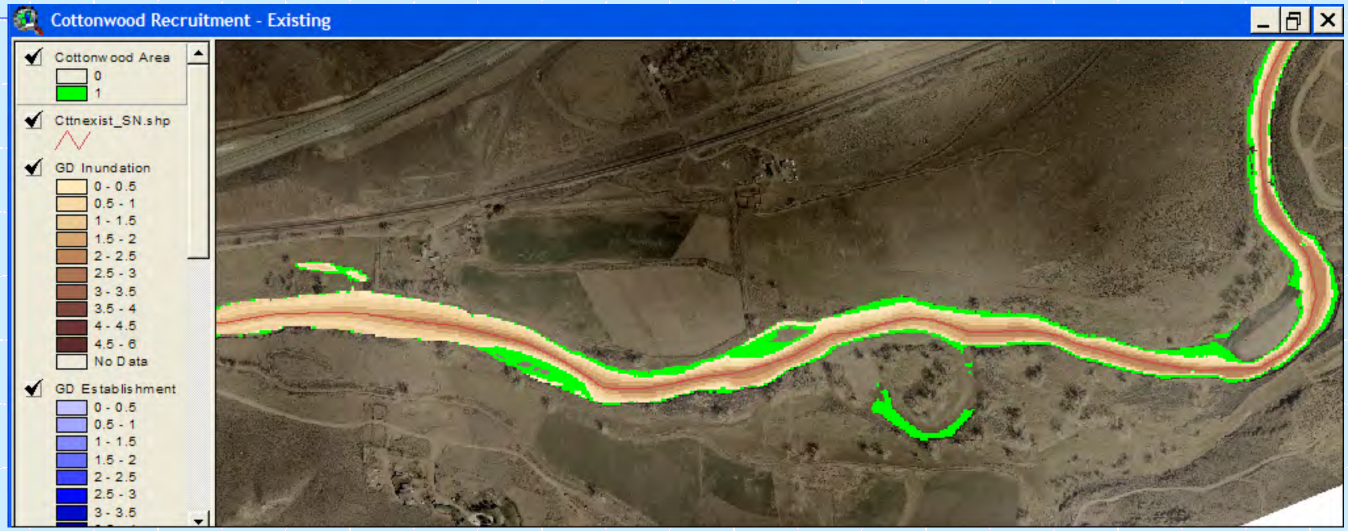
Truckee Relationships - Substrate

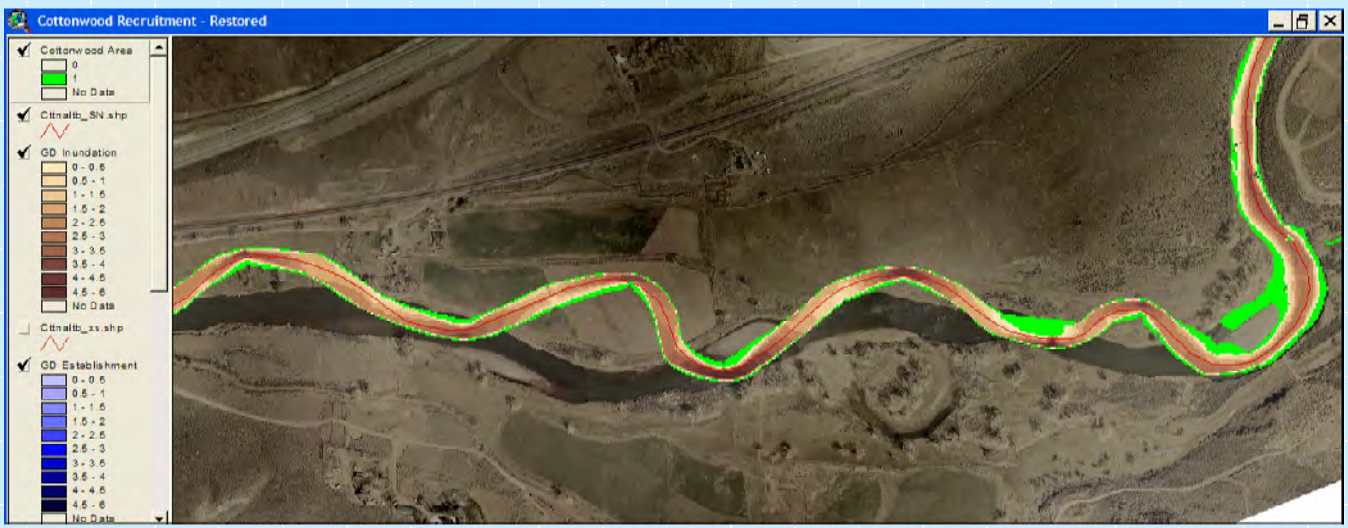
- Season – All year
- 2-year event (flushing flow)

Truckee Relationships – Mayfly Habitat

- Season – Mid Aug through mid Sep
- 2-year event

Truckee EFM - Spatial Results





Truckee EFM Future

- Provided to DRI for ongoing research
- Post McCarran Ranch Restoration
  - Actual results can be measured against EFM results to measure EFM application merit
  - Lessons learned can be used for future EFM development and application
  - EFM can be used on other locations along the Truckee saving time and money

Chris Dunn, P.E., Chief Water Resource Systems Division

U.S. Army Corps of Engineers

Hydrologic Engineering Center

(530) 756-1104

christopher.n.dunn@usace.army.mil

Shore Protection Project Performance Improvement Initiative (S3P2I)

2005 Tri-Service Infrastructure Conference
August 1-5, 2005
St. Louis, MO

Presented by: Susan Durden, IWR

Authority

Military Construction Appropriations and Emergency Supplemental Emergency Hurricane Supplemental Appropriations Act 2005
(PL 108-324, OCT. 13, 2004)

For an additional amount for "Construction, General" for emergency expenses for repair of storm damage for authorized shore protection projects and <u>assessment of project performance</u> of such projects, $62,600,000, to remain available until expended…

S3P2I Funding-Level: $11M
S3P2I Duration: FY05-FY07

Program Goals

Project Performance

- economic
- environmental
- physical response
- social

Outcome

- communicating to coastal management stakeholders
- leverage opportunities to improve future project performance

Approach

➢*Support* companion USACE efforts to clearly define the Federal role(s) in coastal management including shore protection

➢Improved evaluation frameworks for assessing net effects of existing and future shore protection projects

➢Improved predictive capability for project planning, design and decision support

Companion Initiatives/Opportunities

PL 108-324/84-99: Restore flood control and hurricane shore protection projects to their pre-storm condition (SAD)

USACE – District, NSMS, CFDCP, RSM Demo, PILOT…

Other Federal:

e.g., USGS, FEMA, NOAA, DOT, NHC, ONR, …

Non-Federal:

e.g., FL DEP, Local Partners, CSI, TNC…

Program Structure

Business Area Leader: Harry Kitch, CECW-CP

Program Manager: Bill Curtis, CEERD-HN-CE

Project Managers:

- **Performance Assessment Work Unit - Sharon Haggett, CESAW-PM-C**
- **Design and Formulation Work Unit - Stephen Couch, CENAN-PL-F**
- **3-D Physics Based Model Development - Dr. Don Resio, CEERD-HV-B**

Program Structure

PgRT/ Oversight Committee

Lillian Almodovar, IWR

Jan Rasgus, HQUSACE, Policy

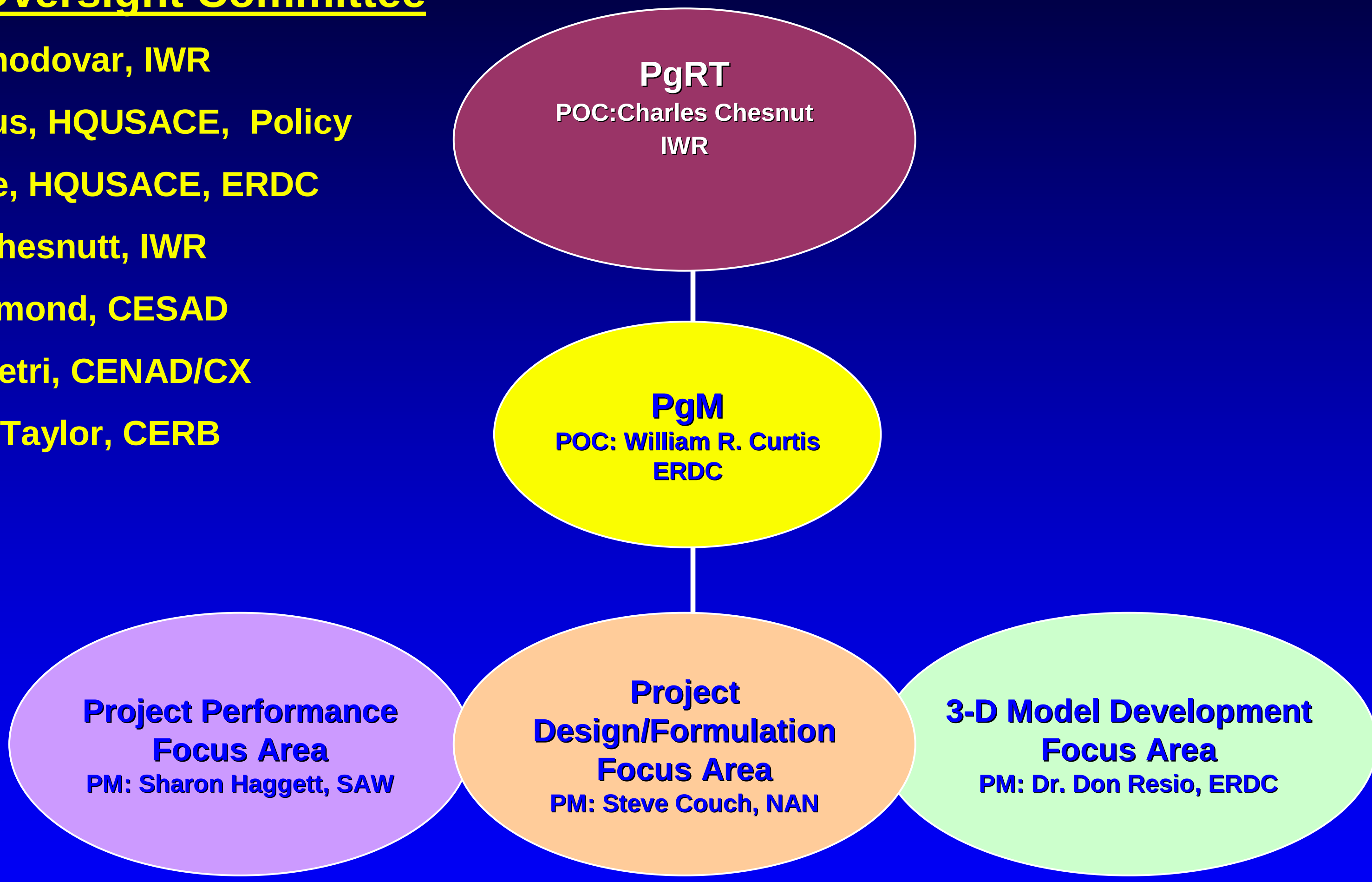
Joan Pope, HQUSACE, ERDC

Charles Chesnutt, IWR

Kaiser Edmond, CESAD

Joseph Vietri, CENAD/CX

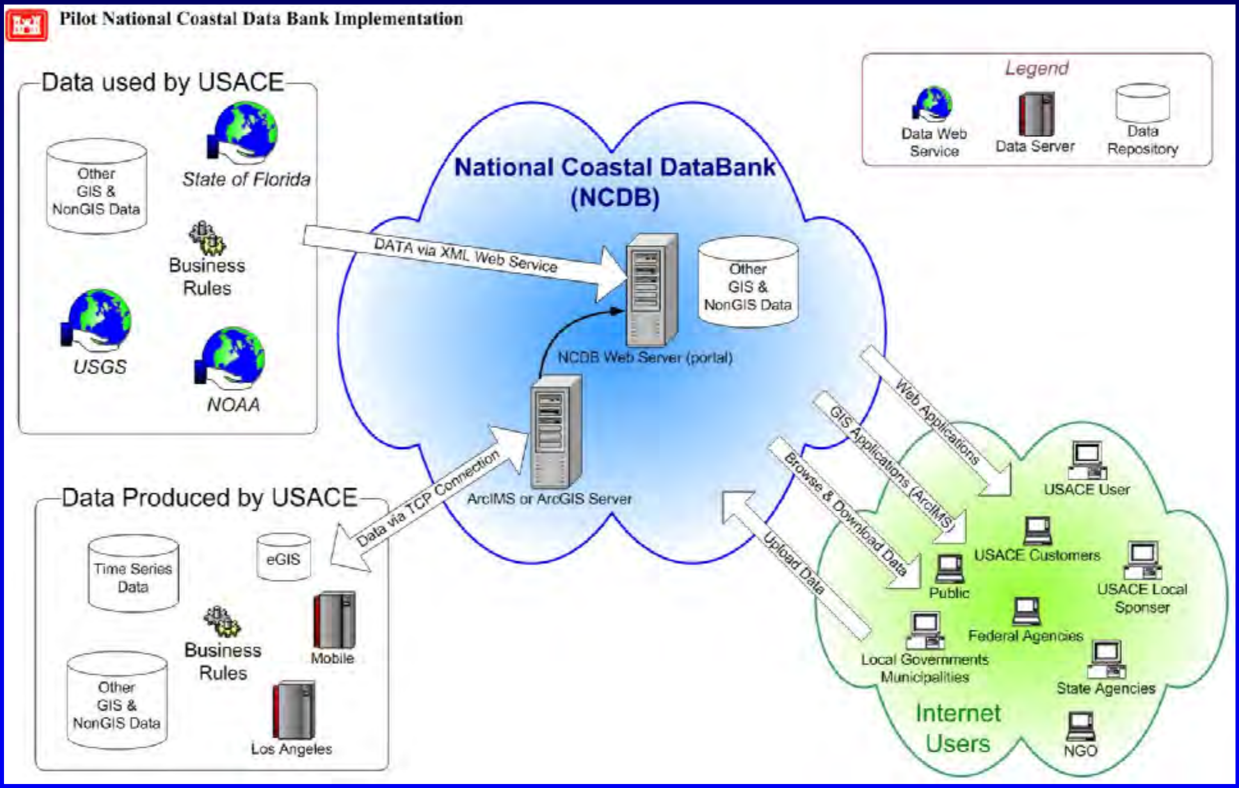
Dr. Bruce Taylor, CERB



Program-Wide Efforts: Data Mgmt

Approach:

- **Develop Pilot**
- **Web portal and search engine for coastal data and information**
- **Web application service for various coastal data manipulations, calculations, and analysis tools**
- **Data repository for a portion of USACE's coastal data**



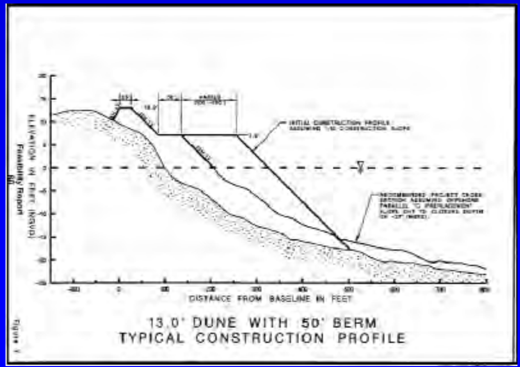
Program-Wide Efforts: Isabel Assessment

Objective(s):

•Complete evaluation of physical and economic performance of existing COE shore protection projects impacted by Isabel

-Virginia Beach, VA
-Sandbridge Beach, VA

•Complete evaluation of potential damages that could have been prevented along the NC coast had the Dare County beaches project been in place during Isabel (Nags Head, Kill Devil Hills, Kitty Hawk)



Program Wide Efforts
Strategic Communications

- Outreach and input from full range of stakeholders
- Inform and involve
- Translate science for public and decision makers
- Integrate and support work of sister Federal agencies
- Collaboration not just coordination

Shore Protection Project Performance Improvement Initiative

Performance Assessment Focus Area

Business Area Leader: Harry Kitch, CECW-CP
PgM: Bill Curtis, CEERD-HN-CE
PM: Sharon Haggett, CESAW-PM-C

Performance Assessment Focus Area

Objective:

- **Utilize information from the PIR effort undertaken by SAJ**
- **Enhanced time sensitive data collection and analysis**
- **Assess and identify the impact of the 2004 Atlantic tropical season on the physical performance of Federal shore protection projects with an emphasis on damages prevented and identifying other benefits such as recreation, social, environmental and regional benefits.**

Performance Assessment Focus Area Structure

Project Performance
Focus Area
PM: Sharon Haggett
CESAW-PM-C

Focus Area Work Units

Economic & Social Effects
PI: H. Shoudy
(Contractor)

Physical Performance
PI: M. Gravens
CEERDC-CHL-MS

Storm Characterization
PI: S. Corson
CEERCD-HF-FO

Environmental Consideration
PI: S. Ashby
CEERDC-EP-P

Watershed Analysis
PI: P.Grace
CESAM-OP-CO

Performance Assessment Focus Area

Products:

- Methods to identify data gaps
- Prioritize and gather missing data
- Assimilation of available data for utilization in modeling a storm event and characterizing the associated beach response
- Provide data for inclusion NCDB pilot study
- Quantified watershed performance
- Considerations to determine environmental benefits
- Technical report documenting (correlating) the empirical analysis of damage curves utilized in project formulation
- Journal/Conference papers detailing the various aspects of shore protection project responses

Performance Assessment Focus Area

Program Performance:

- Evaluation of full range of shore protection benefits
- Relational database for development of future guidelines for shore protection project and emergency storm response scenarios
- Empirical data and formulation criteria will be assessed in order to confirm the validity of benefits
- Identify enhanced environmental opportunities as part of shore protection projects.
- Congress has long recognized the value of shore protection projects. Their programmatic hypothesis that there is a Federal interest in shore protection projects will be assessed by evaluating the effectiveness of shore protection projects against the impacts of the Hurricanes of 2004.

Performance Assessment
Focus Area Structure
Economic & Social Effects WU

Economic & Social Effects
PI: H. Shoudy
(Contractor SME)

I. Produce storm characteristics for without project , IV. Produce without project pre-storm shoreline position,

V. Produce without project post-storm shoreline position

II. Produce residential damage vs. erosion/wave/inundation relationships

III. Collect commercial & public building and infrastructure damages

VI. Identify potential benefit categories,

VII. Collect available economic benefit data,

VIII. Develop missing economic data elements and/or data additions to inventory

IX. Produce benefit analysis procedures

X. Peer review of benefit analysis procedures

Phase 1

Performance Assessment Focus Area Structure

Economic & Social Effects WU (continued)

Economic & Social Effects
PI: H. Shoudy
(Contractor SME)

- XI. Apply benefit procedures to benefit categories
- XII. Estimate NED benefits
- XIII. Estimate other social effects
- XIV. Estimate environmental benefits
- XV. Estimate RED

Phase 2

Performance Assessment Focus Area Structure
Physical Performance WU

Physical Performance
PI: M. Gravens
CEERDC-CHL-MS

- I. Documentation of project design parameters
- II. Documentation of project construction details
- III. Pre- and Post-storm volumetric changes and redistribution of sediment
- IV. Analysis and comparison of Federal project performance
- V. Comparison of project performance with respect to project maturity
- VI. Synthesis of project performance as related to project design features

Performance Assessment Focus Area Structure
Storm Characterization WU

Storm Characterization
PI: S. Corson
CEERCD-HF-FO

I. Wind and wave observations

II. Water level and coastal inundation

III. Coastal numerical model performance for storm characterization

Performance Assessment Focus Area Structure

Environmental Considerations WU

Environmental Consideration
PI: S. Ashby
CEERDC-EP-P

I. Data compilation and evaluation

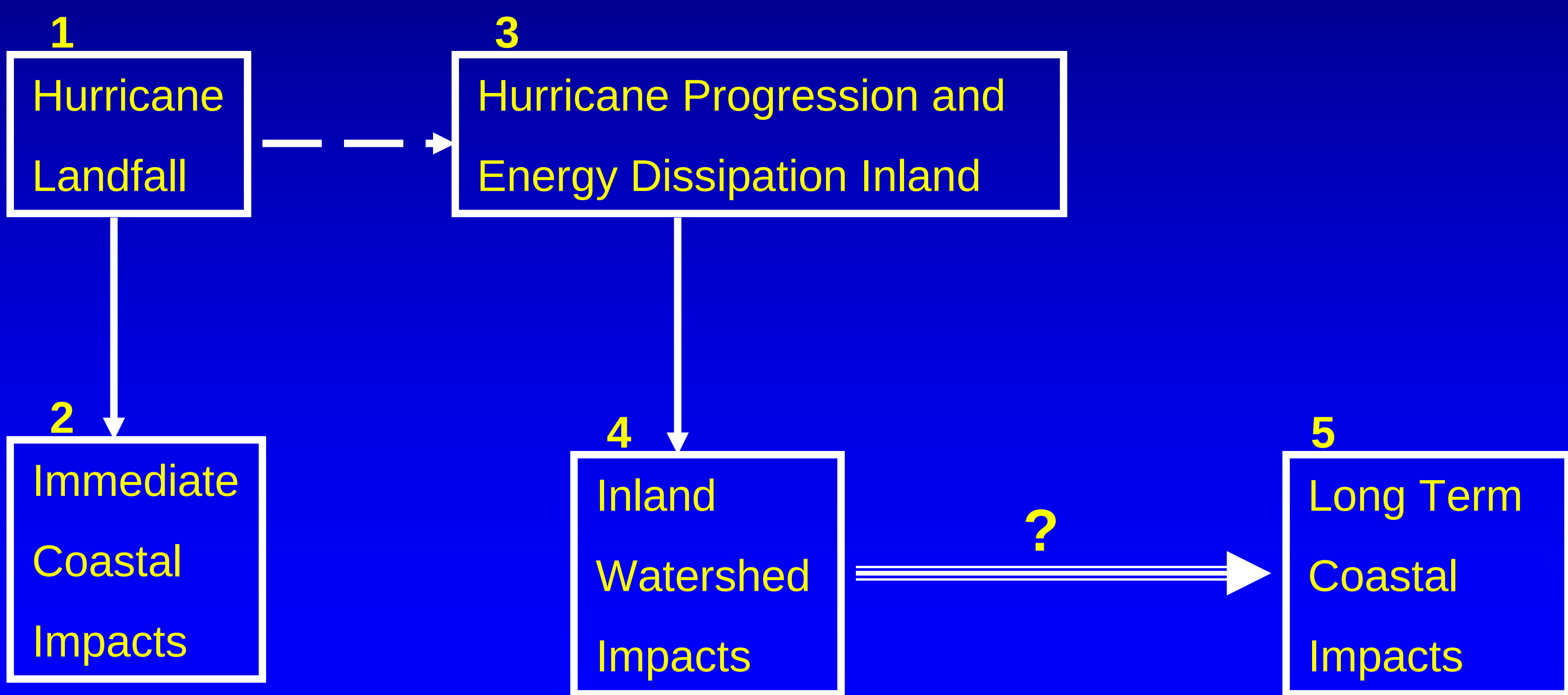
II. Project performance assessment

III. Environmental considerations in design and formulation

Performance Assessment Focus Area Structure

Watershed Analysis WU

Watershed Analysis
PI: P.Grace
CESAM-OP-CO



Performance Assessment Focus Area

Program Performance:

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Program Wide Efforts
Strategic Communications

- Outreach and input from full range of stakeholders
- Inform and involve
- Translate science for public and decision makers
- Integrate and support work of sister Federal agencies
- Collaboration not just coordination

Performance Assessment Focus Area

Questions?

Tri-Service Infrastructure Conference

Water Quality Management

San Francisco Bay Mercury TMDL – Implications for Constructed Wetlands

Dr. Herbert Fredrickson, Dr. Elly Best and Dr . Dave Soballe

U.S. Army Engineer R&D Center, Environmental Laboratory, Waterways Experiment Station, Environmental Laboratory,Vicksburg, MS 39180-6199

Total Maximum Daily Load (TMDL)

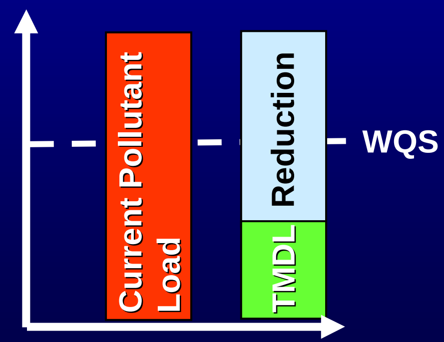
Definition

- **1972 Federal Clean Water Act [§ 303(d)] – essentially requires USEPA to manage the nation's water quality on a watershed basis.**

- **Calculation of the maximum amount of a specific pollutant that a water body can receive and still meet Water Quality Standards**

- **Allocation of that (maximum) amount to the various pollutant's sources**

TMDL = Σ WLA + Σ LA + Σ MOS



(from Steve Silva, EPA Region 1)

Total Maximum Daily Load (TMDL)

Process

1. Identify impaired water – “303(d) List”.
2. Determine maximum quantity of a pollutant that a water body can assimilate without exceeding a Water Quality Standard.
3. Quantify current sources of pollutant.
4. Determine necessary load reductions.
5. Allocate maximum pollutant loads to each source.

(from Steve Silva, EPA Region 1)

Mercury – an Environmental Pollutant

Human Exposure

http:www.nih.gov/od/prs/ds/nomercury/health.htm

- Neural impairment – chidren most susceptible
- Level of Concern in Blood = 5.8 THg µg per L
- 6% of U.S.A. childbearing-aged women, blood levels at/above 5.8 (1999-2002)
- Hair Hg levels 20% of U.S.A. childbearing-aged women greater than Federal health standards (UNC Asheville)
- 60,000 U.S.A. births per year Hg impaired (NAS, July 2001)
- Methylmercury (MeHg) is bioavailable form

Mercury – an Environmental Pollutant

Human Exposure Route - Mainly through eating fish

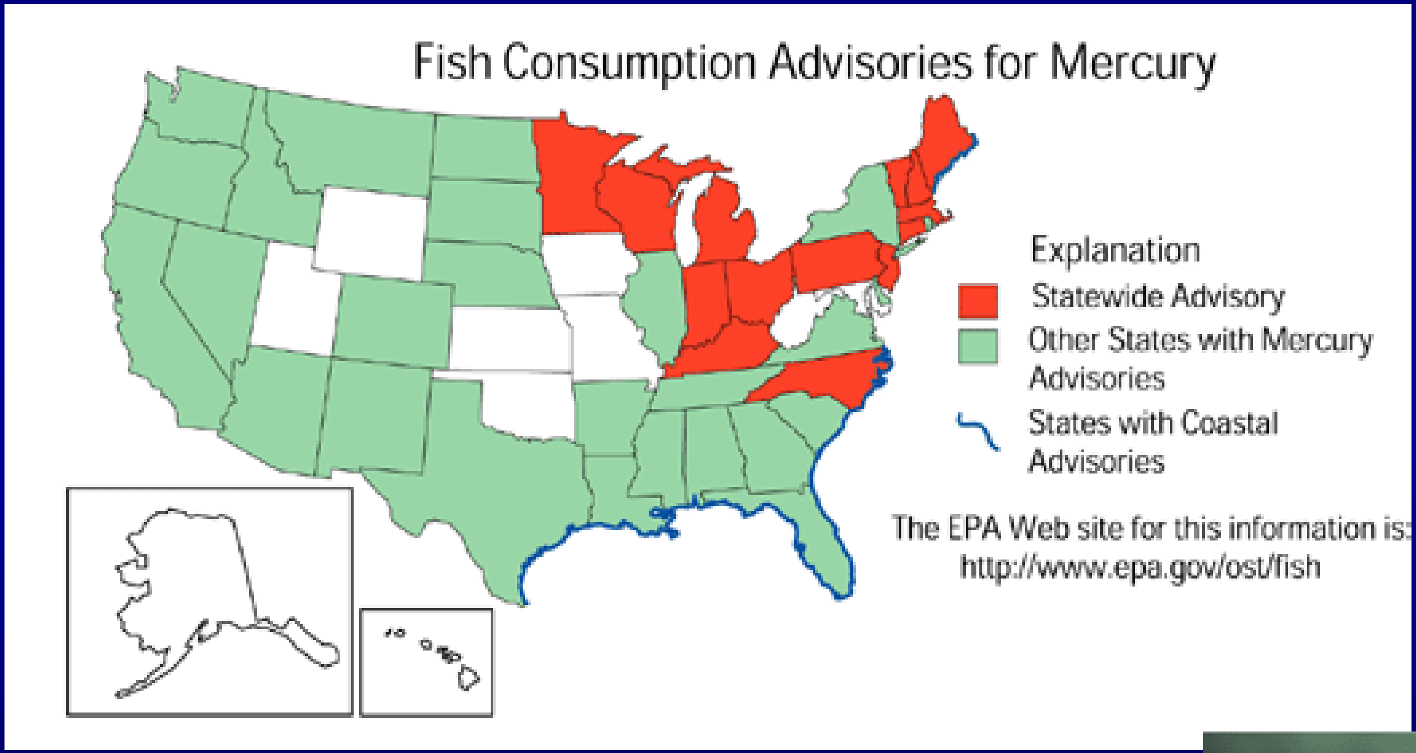
Fish Consumption Frequency	Average Hg Hair Concentration (µg/g of hair)
None	2.0
Less than 1 fish meal/month	1.4 (range 0.1 to 6.2)
Fish meals twice/month	1.9 (range 0.2 to 9.2
One fish meal/week	2.5 (range0.2 to 16.2)
One fish meal/day	11.6 (range 3.6 to 24.0)

World Health Organization Programme for Chemical Safety

Cited in EPA's Mercury Study Report to Congress December 1977

Mercury – an Environmental Pollutant

Environmental Effects



- **MeHg accounts for 75% of USA fish advisories**
- **2073 MeHg fish advisories in 41 states**

SF Bay Mercury Total Maximum Daily Load (TMDL)

GOALS:

1. Reduce total mercury loads into the bay.
2. Reduce methylmercury production.
3. Monitor and focus studies on understanding Bay system.
4. Encourage actions that address multiple contaminants.

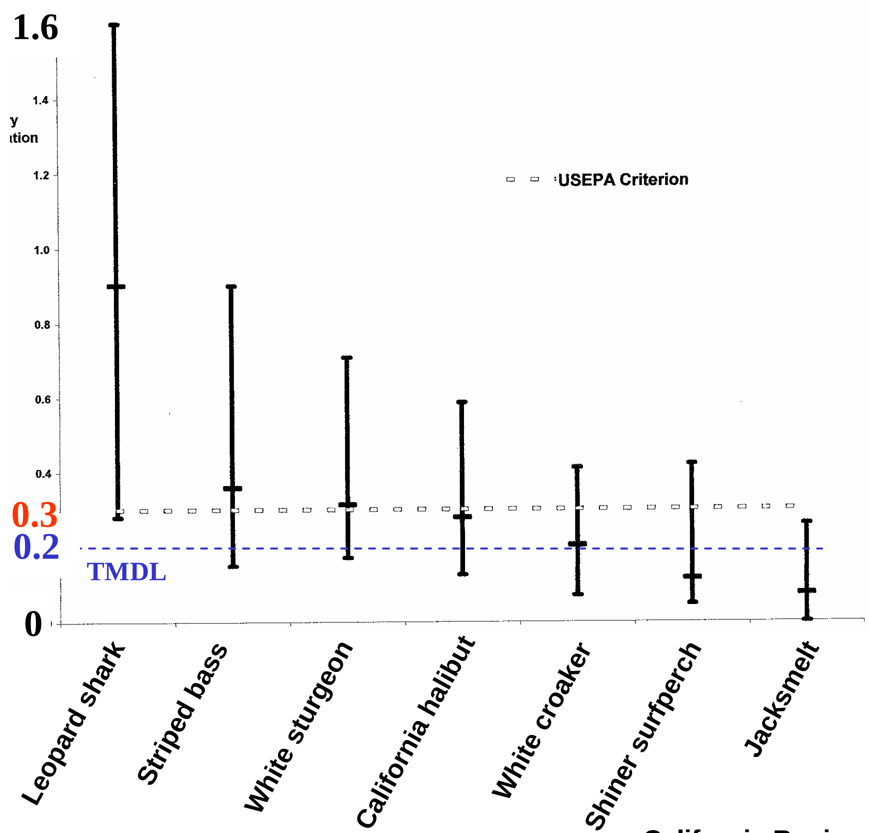
California Regional Water Quality Control Board
http://www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm

Mercury Total Maximum Daily Load (TMDL)

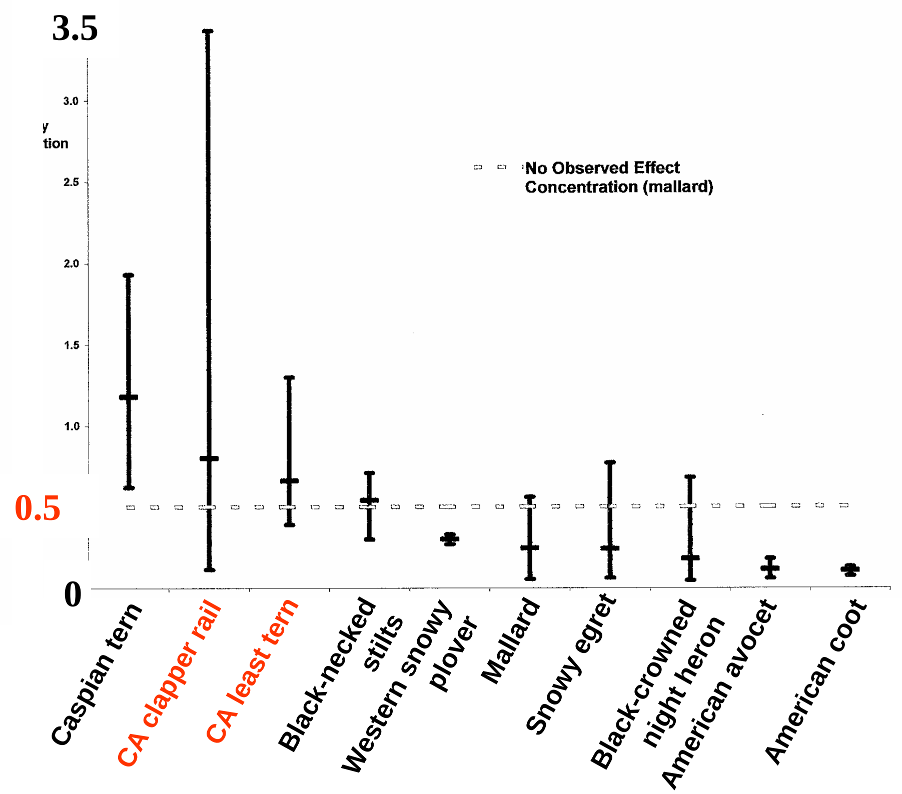
303(d) Impairment – Sports fishery, Endangered species, Habitat

µg THg per gram wet weight

SF Bay Fish Tissue THg Concentration Compared to US EPA Criterion



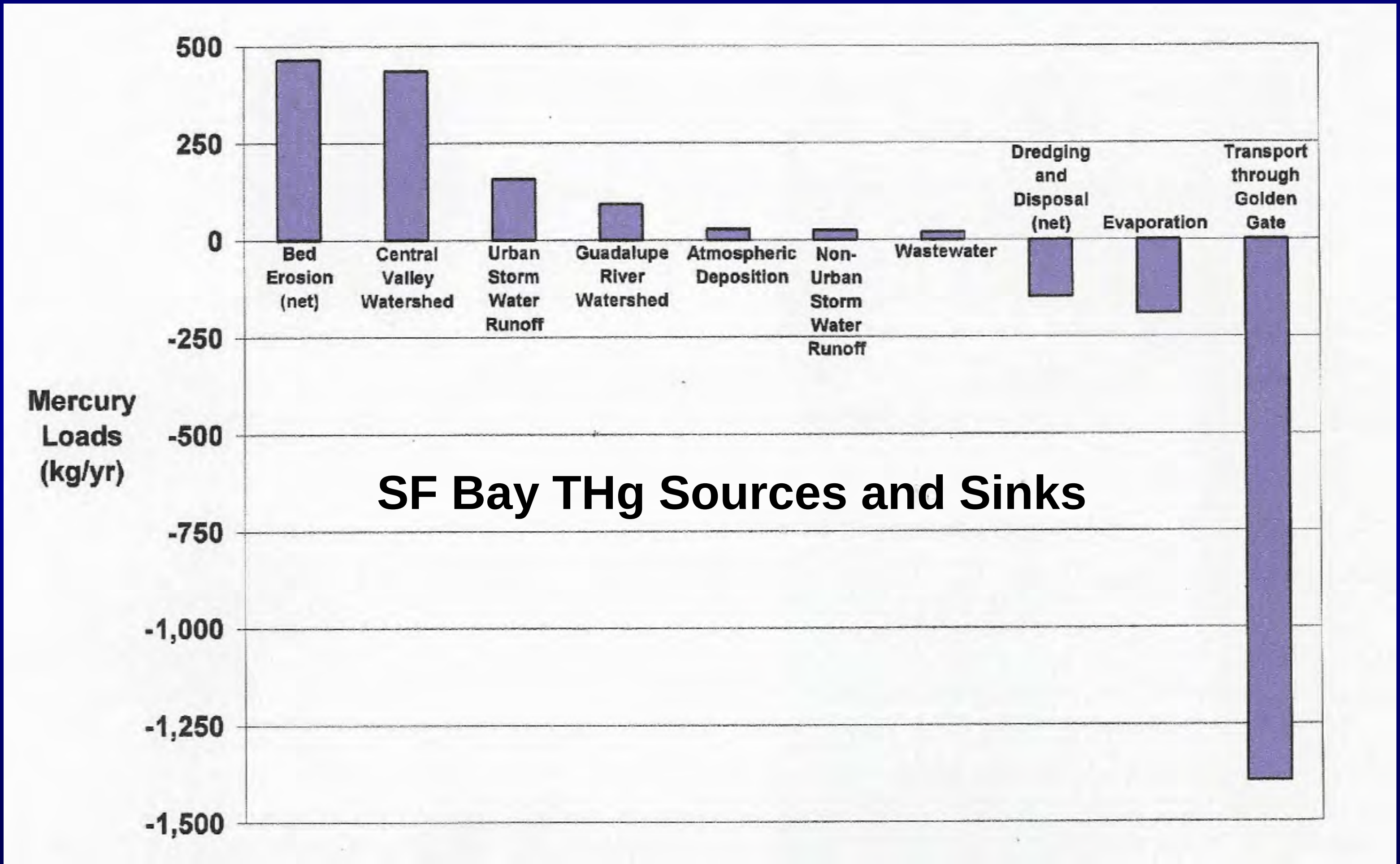
SF Bay Bird Egg THg Concentration Compared to No Effect Level



California Regional Water Quality Control Board
http://www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm

Mercury Total Maximum Daily Load (TMDL)

One Box Mercury Mass Balance Model



California Regional Water Quality Control Board

http://www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm

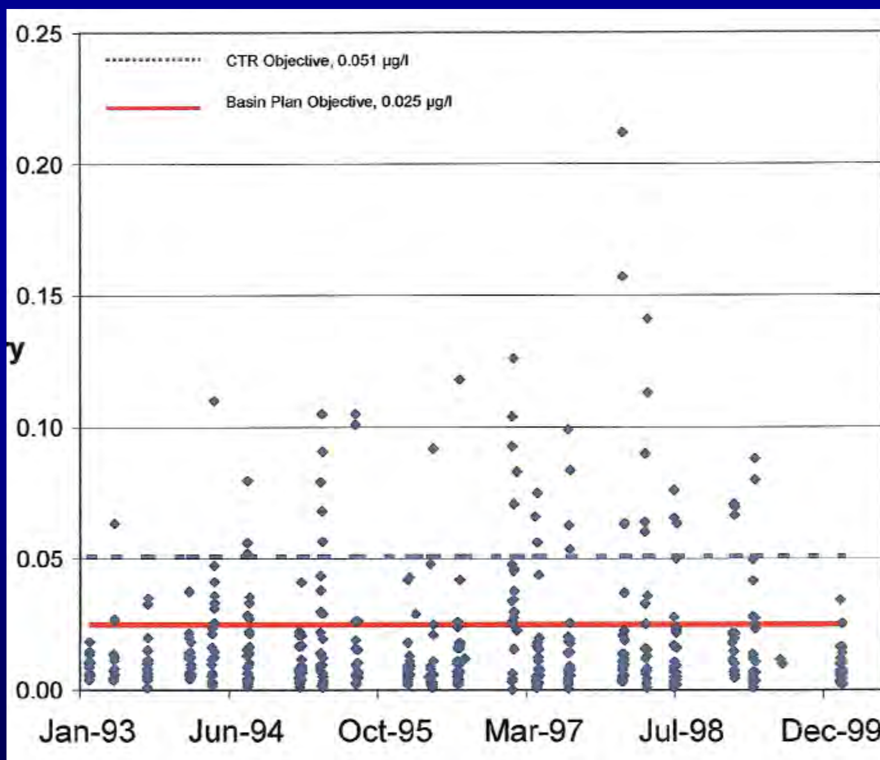
Mercury Total Maximum Daily Load (TMDL)

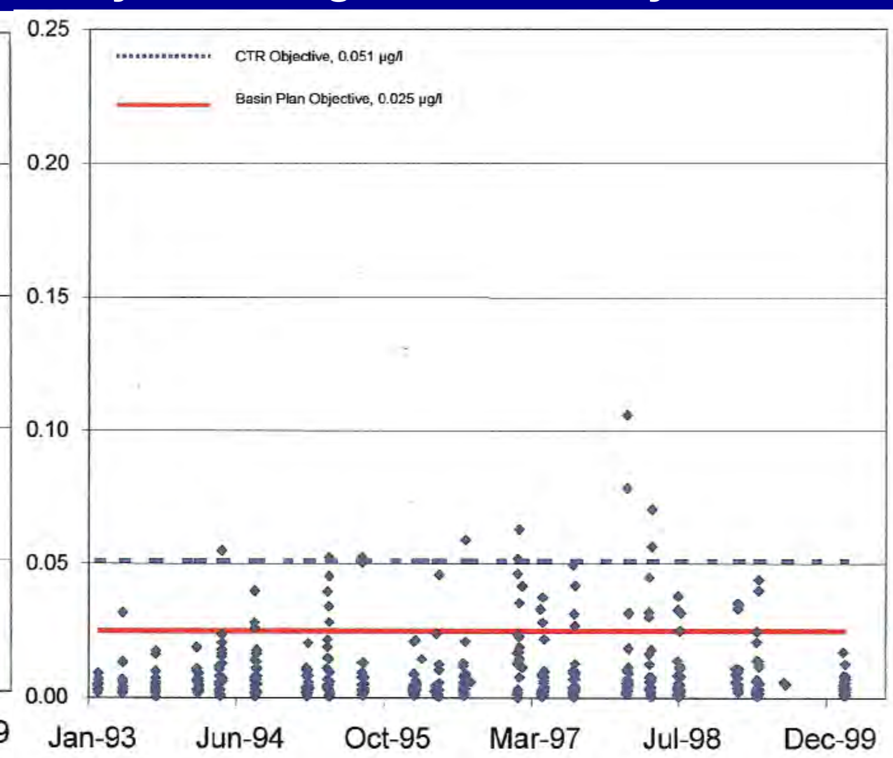
Levels of Particulate Total Mercury in the Water Column

Measured THg Levels

Predicted aqueous THg Levels by reducing sediments by 50%

µg THg per Liter water





California Regional Water Quality Control Board

http://www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm

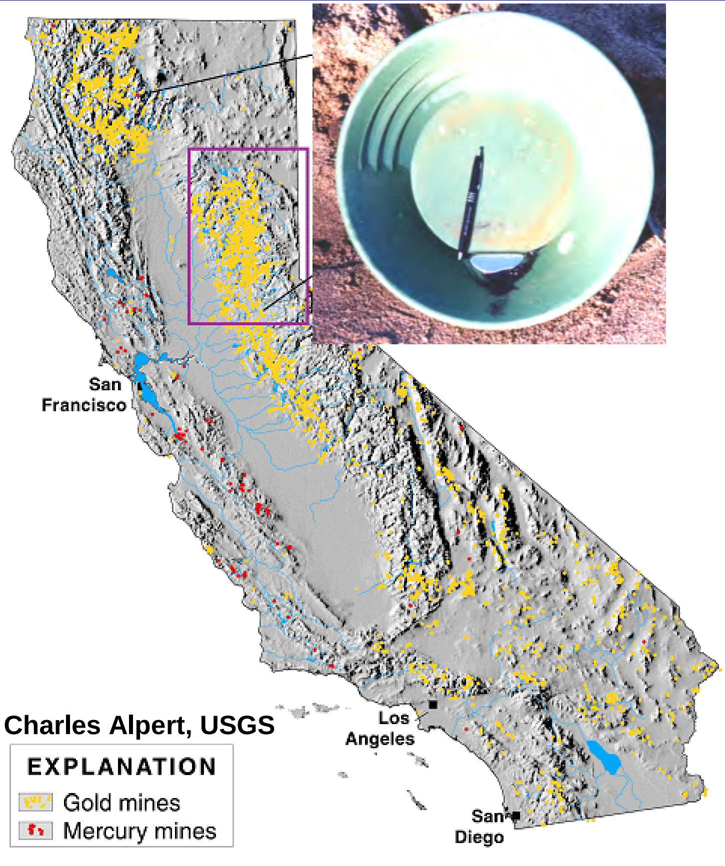
Mercury Total Maximum Daily Load (TMDL)

Mining Legacy *vs* Contemporary Atmospheric Loading

Current Mercury Loads /Proposed Allocations

SOURCE	Existing kg/yr	Allocation kg/yr	Per Cent Reduction
Sediments	460	220	53%
Upstream Sources (Central Valley)	440	330	25%
Urban Runoff	160	82	49%
Rural Runoff	25	25	0%
Historic Mercury Mine Drainage (Guadalupe River)	92	2	98%
Atmosphere	27	27	0%
Wastewater	16	16	0%
TOTAL	**1,220**	**702**	**42%**

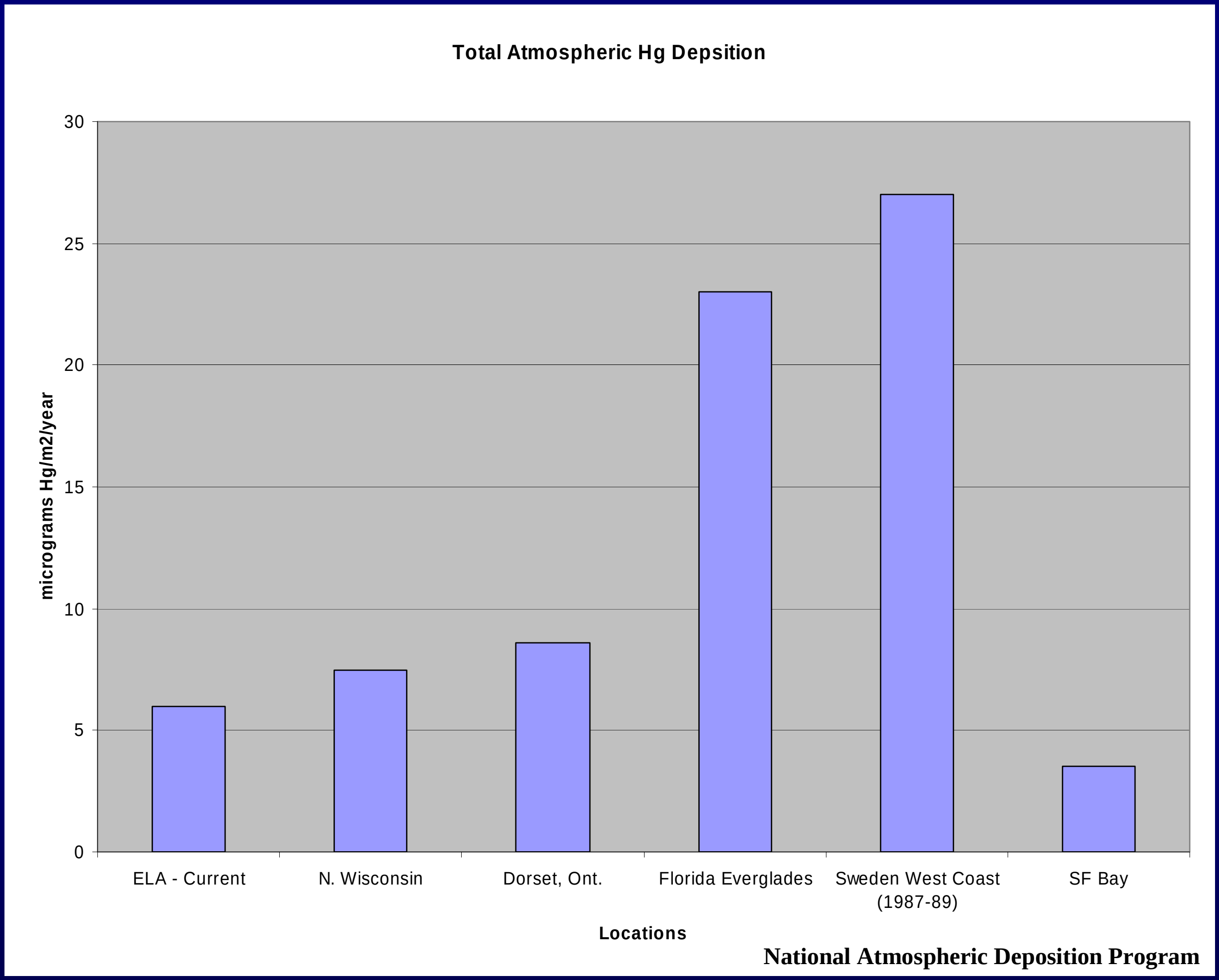
http://www.swrcb.ca.gov/rwqcb2/sfbaymercurytmdl.htm



SF Bay Catchment - ~40% area of CA; 47% of CA runoff

Mercury Total Maximum Daily Load (TMDL)

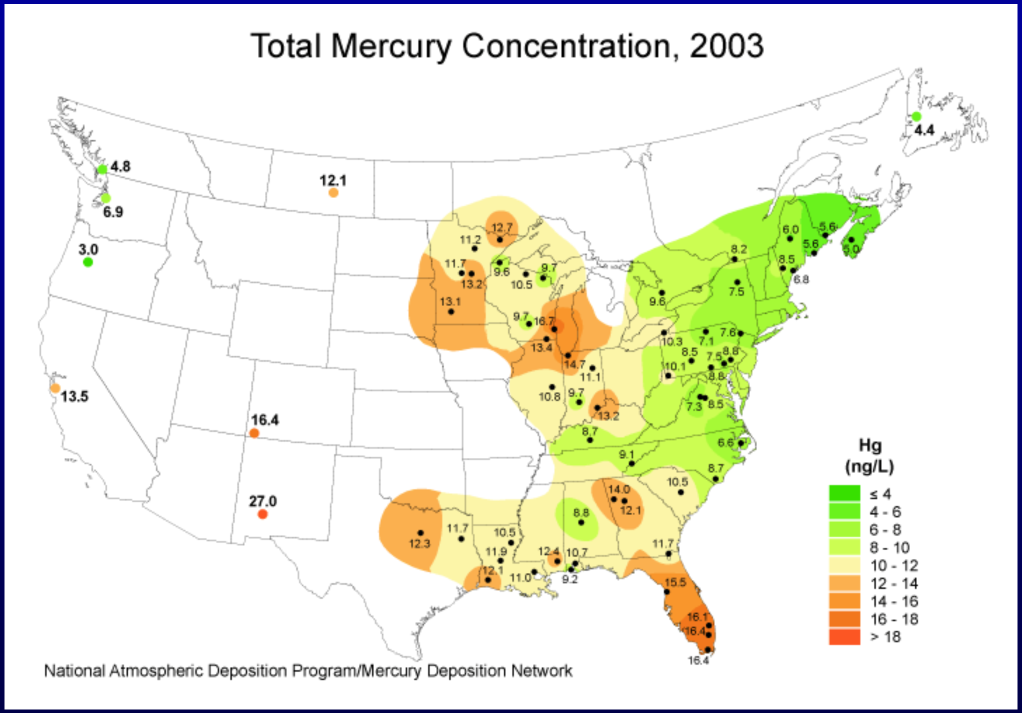
Comparison of Rates of Atmospheric Mercury Deposition



Newly deposited Hg more bioavailable than that in sediment (Benoit et al, 2003)

Mercury TMDL Compliance Issue #1

- Atmospheric deposition of mercury is an important source.
- States lack interstate regulatory jurisdiction



Mercury TMDL Compliance Issue #2

- **Linkages between <u>particulate</u> THg and MeHg and fish body burdens are not clear.**
- **Net MeHg production is site specific**
- **MeHg uptake and biomagnification is foodweb specific.**

San Francisco Bay Wetland Reconstruction

"… the restored wetland be designed and operated to minimize methylmercury production and biological uptake, and result in no net increase in mercury or methylmercury loads to the Bay."

California Regional Water Quality Control Board
Basin Plan Amendment – Resolution R2-2004-008

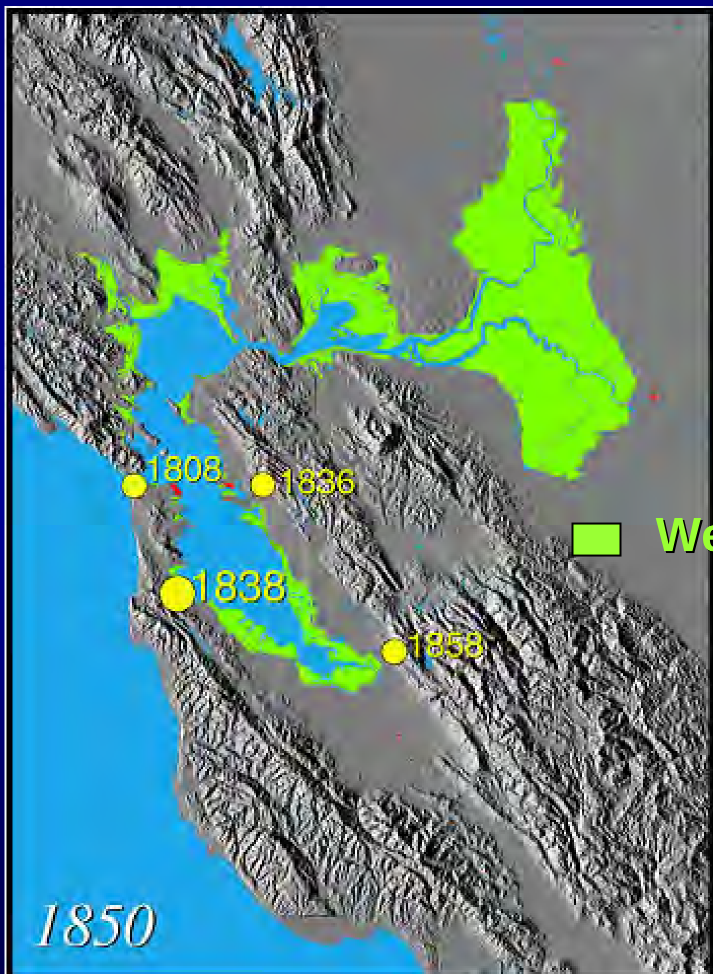
San Francisco Bay Wetlands- Ecological Importance

- Loss >90% of marsh wetlands since 1900
- West coast flyway
- Critical habitat for endangered species

California Clapper Rail

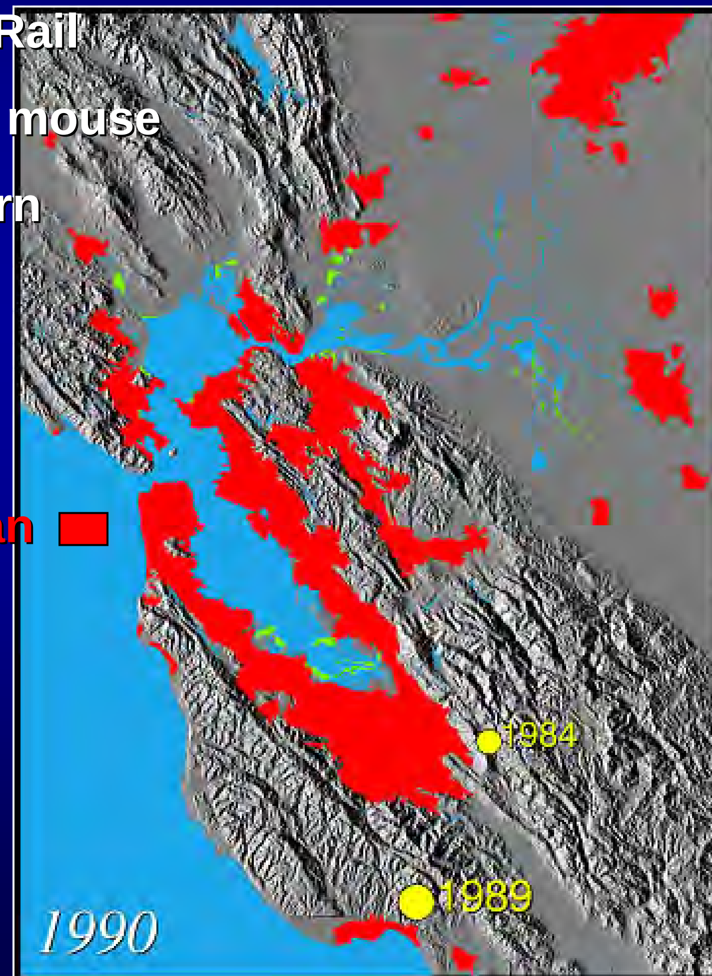
Salt marsh harvest mouse

California Least Tern



Wetlands

Urban

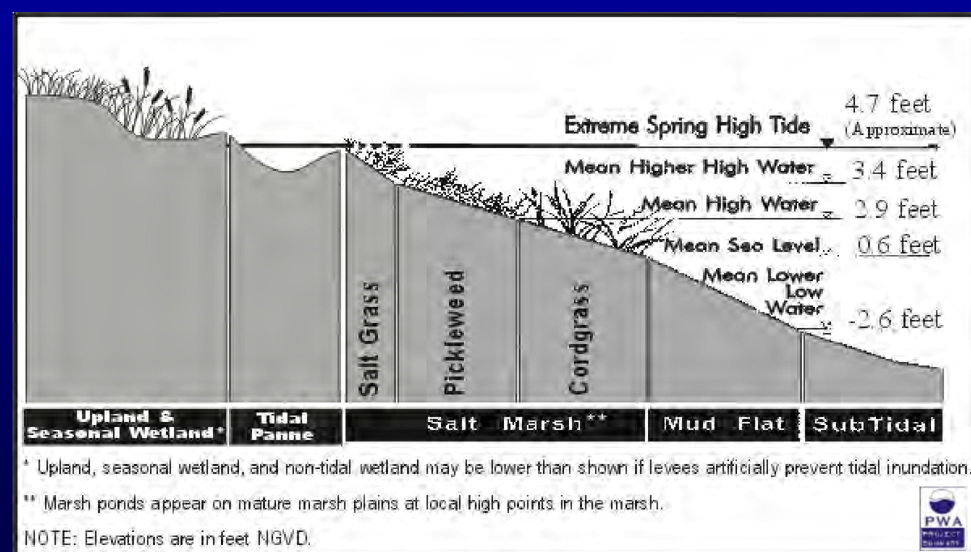


URL: http://sfbay.wr.usgs.gov/access/IntegratedScience/IntSci.html

Cumulative Effects of SF Bay Wetland Restorations

San Francisco Bay Area Wetlands Ecosystem Goals Project

- **HAAF represents only 203 hectares (0.8 %) of 26,300 hectares to be restored by 2055**
- **Many restoration sites will require fill material**
- **Intertidal wetlands are potential source of MeHg**



Port of Oakland - Commercial Importance

Most important on west coast ($30 B pa)

Deep Ocean Disposal Site

Potential Win – Win

1. **Reduce DM disposal costs.**
2. **Avoid material & transport cost.**

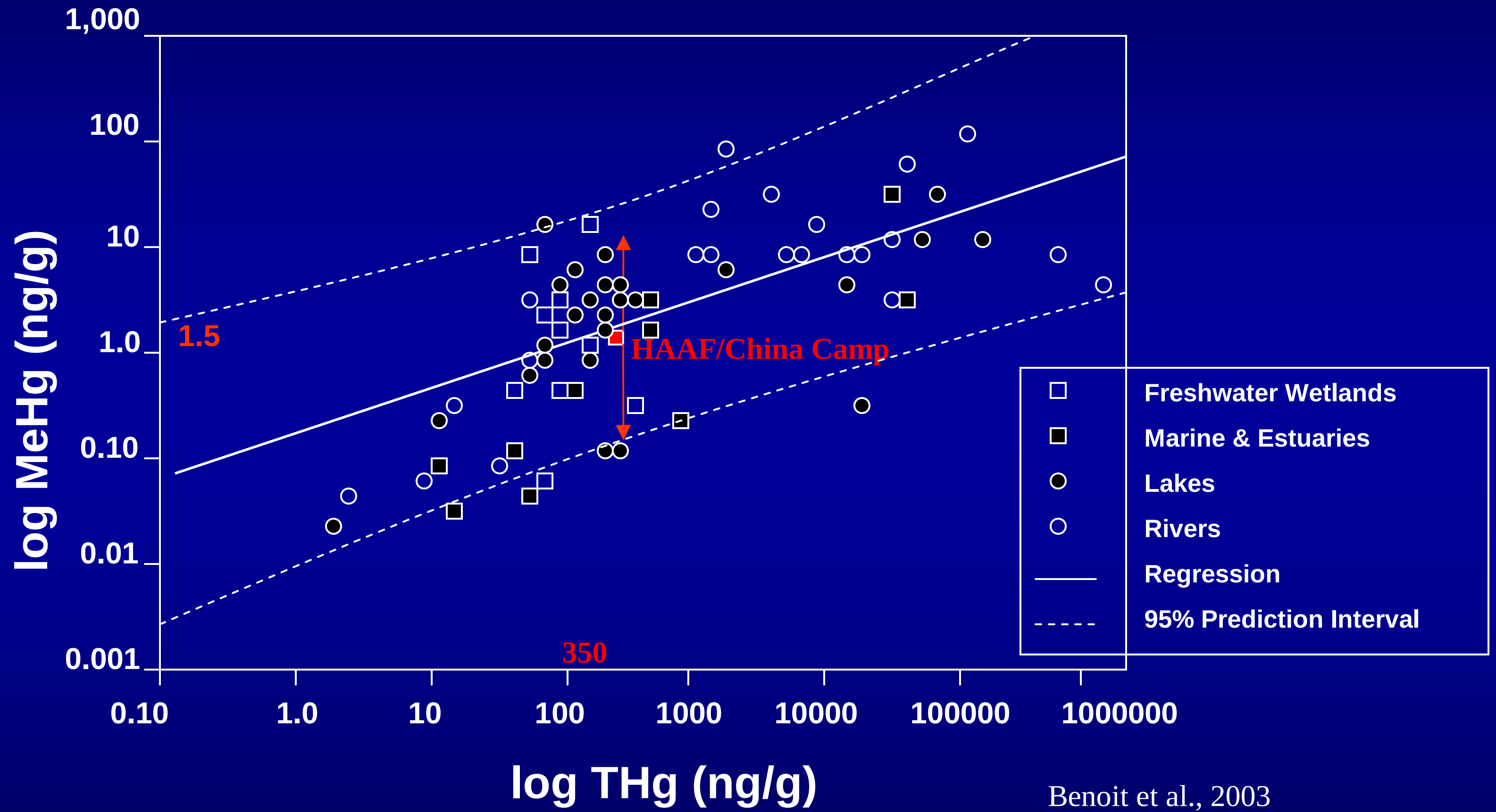
Hamilton Army Airfield – FUDS Site

- HAAF will require <10 M yd^3 of dredged material
- Upland disposal – Out of Bay (Hg Mass Balance)

China Camp State Park – Reference Site

Aquatic Systems Produce Methylmercury

THg and MeHg in surface (0-4 cm) sediments from various wetlands



Benoit et al., 2003

- Only a loose relationship between THg and MeHg levels (log – log plot).
- Despite history of mining level of THg and MeHg are median among contaminated sites.
- However, potential for a 10X increase/decrease in MeHg levels.

Mercury magnification in aquatic food webs
Biogeochemistry – Microbial Ecology

Question:

How do ppb levels of Hg in soil, water and sediment become ppm levels in top aquatic predators? (Benoit et al., 2003)

Gray et al., 2004 EST

Clues:

MeHg generally comprises <1% of the THg in soils and sediments, but comprises 99% of the total Hg in fish biomass.

Sulfate-reducing bacteria methylate mercury.

How Can We Minimize MeHg production?

Methylmercury is the species of highest concern

Food Web

↑

Biomass

↑

MeHg

SRB ↑↓ O_2

- Eh ↑↓ *+ Eh*

Hg^{2+} bioavailable

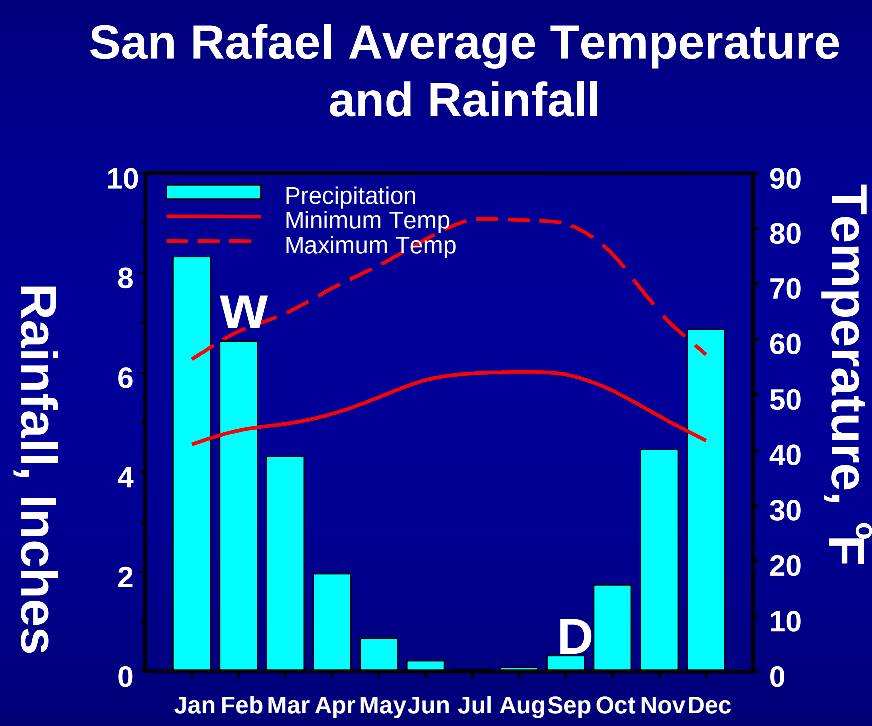
? ↑↓ ?

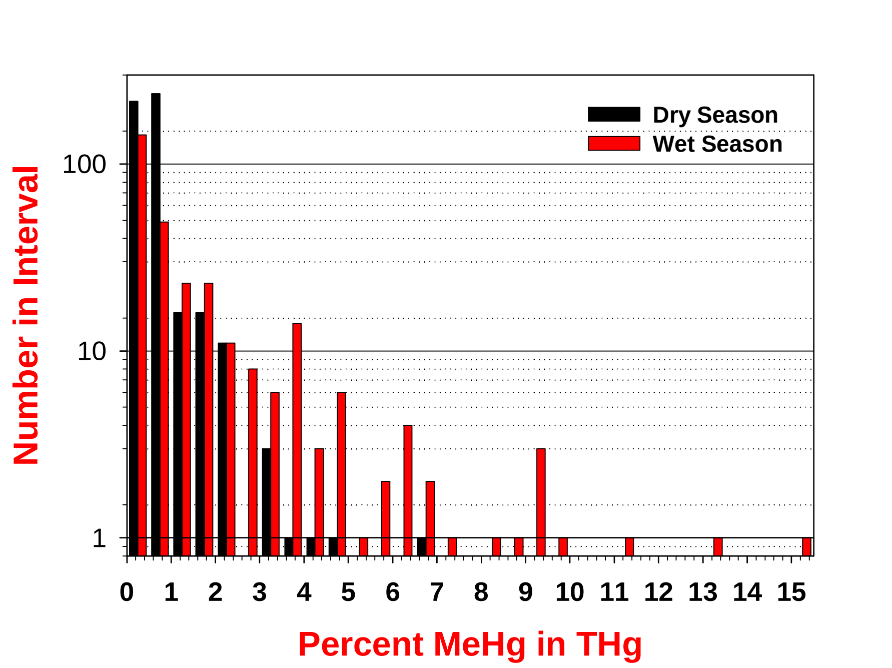
Hg^{2+} not bioavailable

- Bacteria in sediment catalyze antagonistic methylation and demethylation reactions.
- These reactions are very rapid.
- The availability of mercury to methylating bacteria limits MeHg production.
- Extent of biomagnification is foodweb specific.

Macro Drivers of Net Methylation

Wet Season *vs* Dry Season

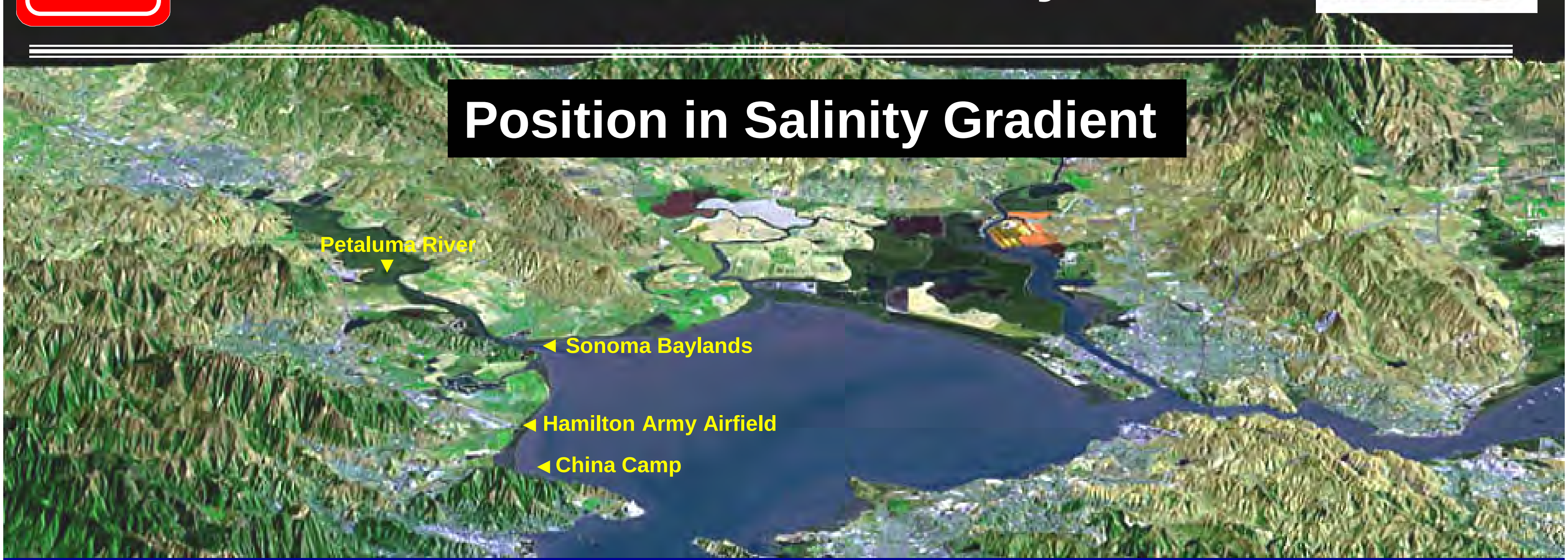




❖ Relative MeHg levels (% THg) are 3X greater on average in the wet season.

Macro Drivers of Net Methylation

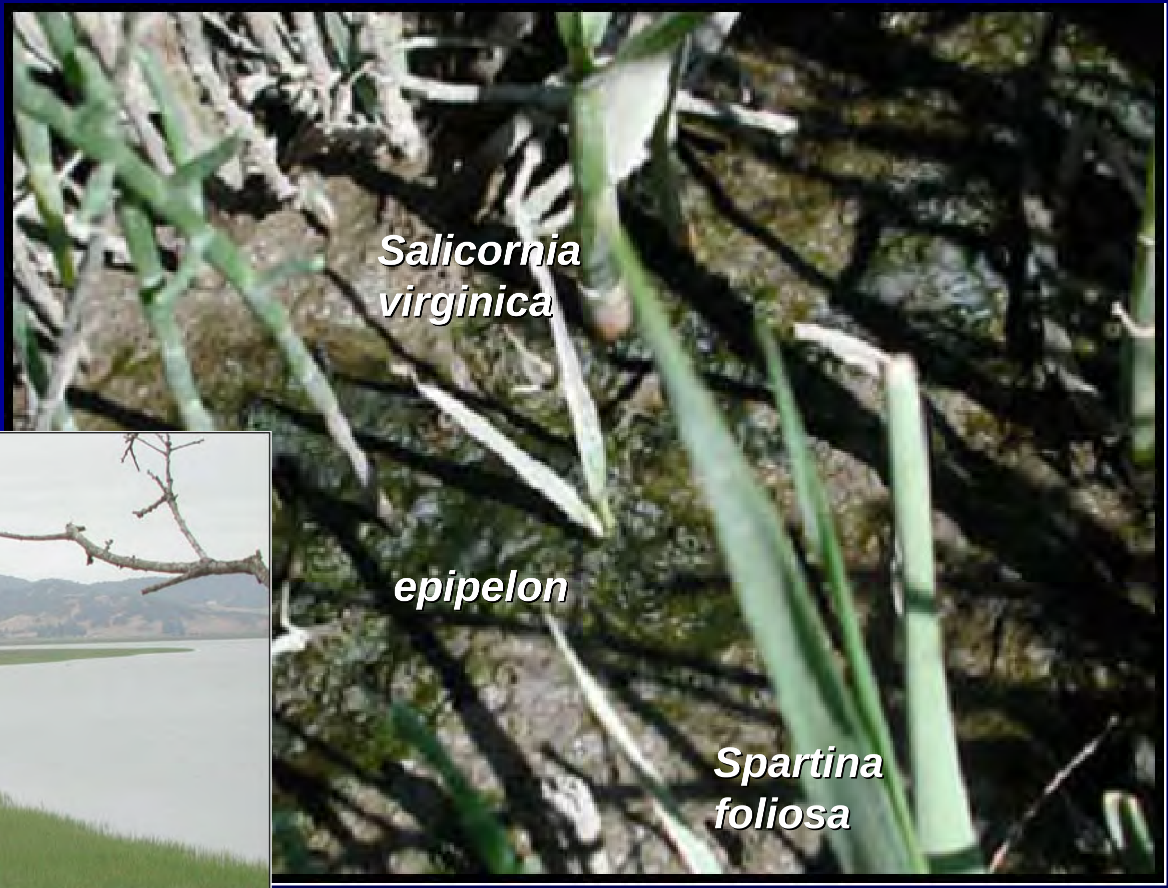
Position in Salinity Gradient



Site	THg	MeHg	Meth.rate	Dem.rate	M/D
Jul-04	(ng/gDW)	(ng/g DW)	(ng/gDW/d))	(ng/gDW/d)	
Petaluma River Mud	397 (2)	1.33 (0.32)	7.74 (2.21)	1.26 (0.39)	6.19 (0.99)
Sonoma Fringe Marsh Mud	358 (10)	0.49 (0.07)	2.80 (0.28)	0.42 (0.14)	7.36 (3.34)
Sonoma Baylands Mud	296 (10)	2.75 (0.16)	13.21 (3.18)	2.64 (0.14)	5.03 (1.33)
HAAF Fringe Marsh Mud	299 (117)	1.97 (0.89)	6.59 (4.87)	1.60 (0.91)	4.18 (1.44)
China Camp Mud	362 (35)	3.71 (0.59)	9.43 (0.19)	3.27 (0.71)	3.00 (0.81)

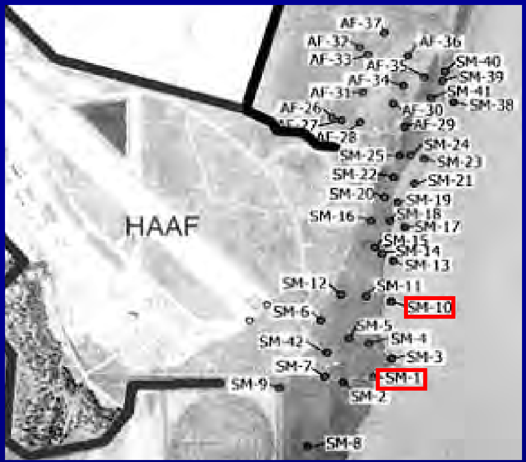
San Pablo Bay Wetland Trophic Structure

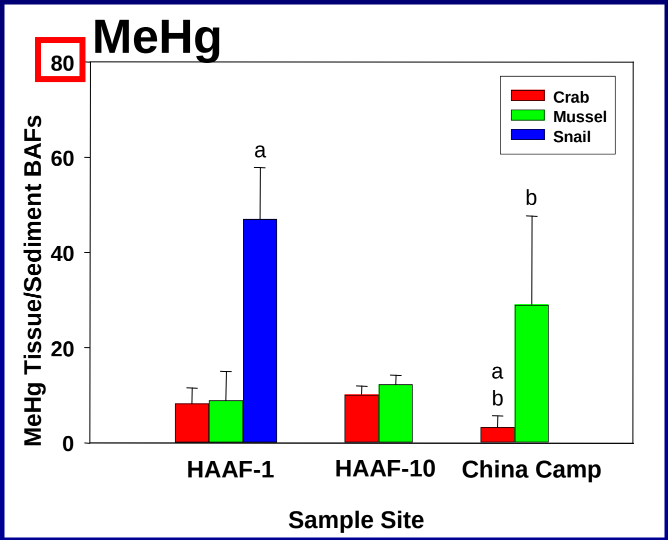
High Primary Production – Hallmark of Intertidal Wetlands

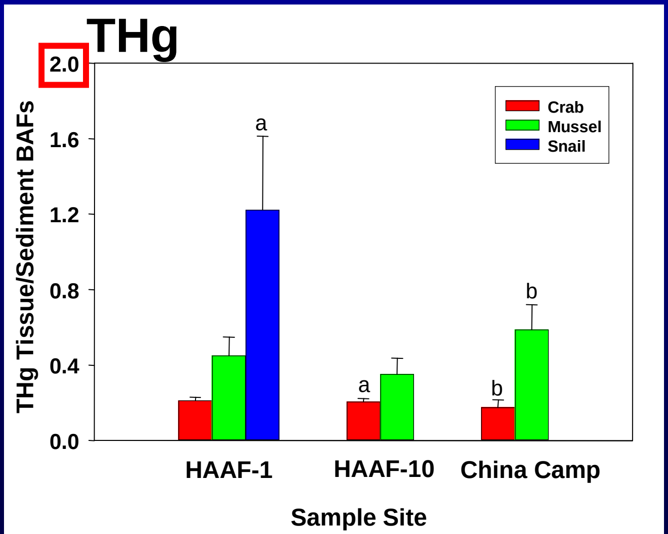


MeHg Biomagnification at the Base of the Foodweb

Mercury Bioaccumulation Factors (BAF)



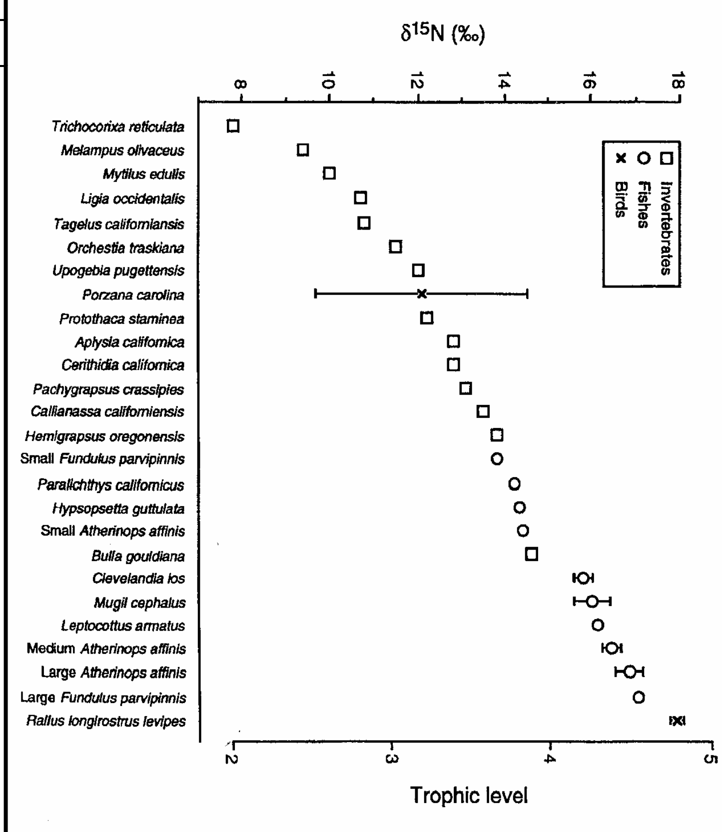




Use of Isotopic Ratios of C, N and S to Unravel San Pablo Bay Wetland Foodwebs?

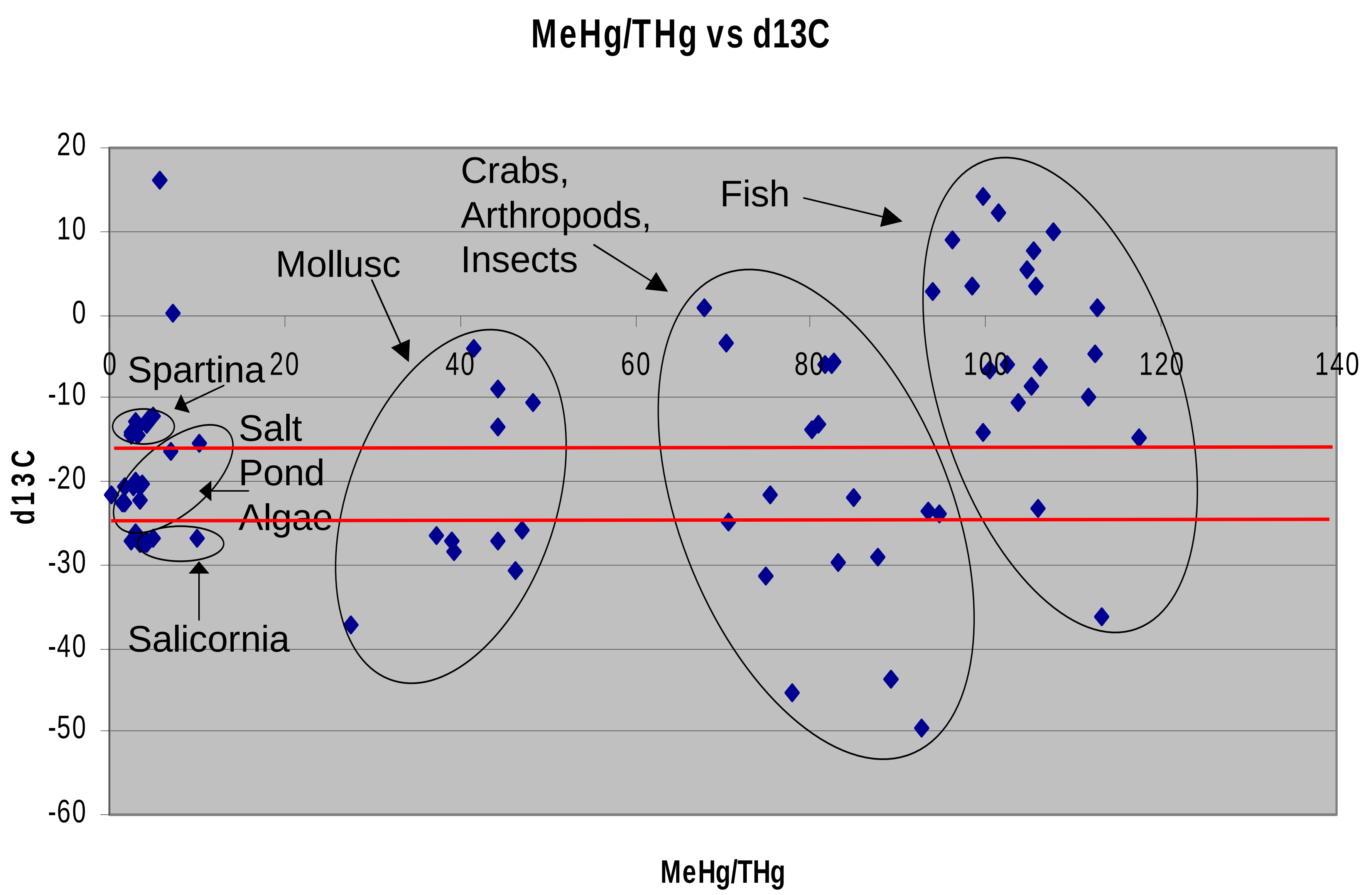
You are what you eat

Species	Marsh Habitat	$\delta^{13}C \pm SD$	$\delta^{15}N \pm SD$	$\delta^{34}S \pm SD$
Primary producers				
Macrophytes				
Spartina foliosa	Low marsh	-15.1 ± 0.2	10.3 ± 0.3	11.5 ± 0.5
Salicornia virginica	High marsh	-26.7 ± 0.2	11.0 ± 1.2	12.3 ± 2.2
Microalgae				
Microcystis sp.	Marsh pool	-17.7	5.1	9.5
Macroalgae				
Rhizoclonium sp.	Mid marsh	-20.2	9.6	17.5
Consumers				
Birds				
L-F Clapper rail	Low marsh	-18.4 ± 0.2	17.9 ± 0.1	14.6 ± 1.2
Fish				
Arrow goby	Channel	-18.4 ± 0.2	17.9 ± 0.1	14.6 ± 1.2
Striped mullet	Channel	-16.1 ± 0.2	16.0 ± 0.2	7.4 ± 0.2
Invertebrates				
Mytilus edulis	Channel	-18.0	10.0	13.7
Orchestia traskiana	Mid marsh	-21.5	11.5	14.1



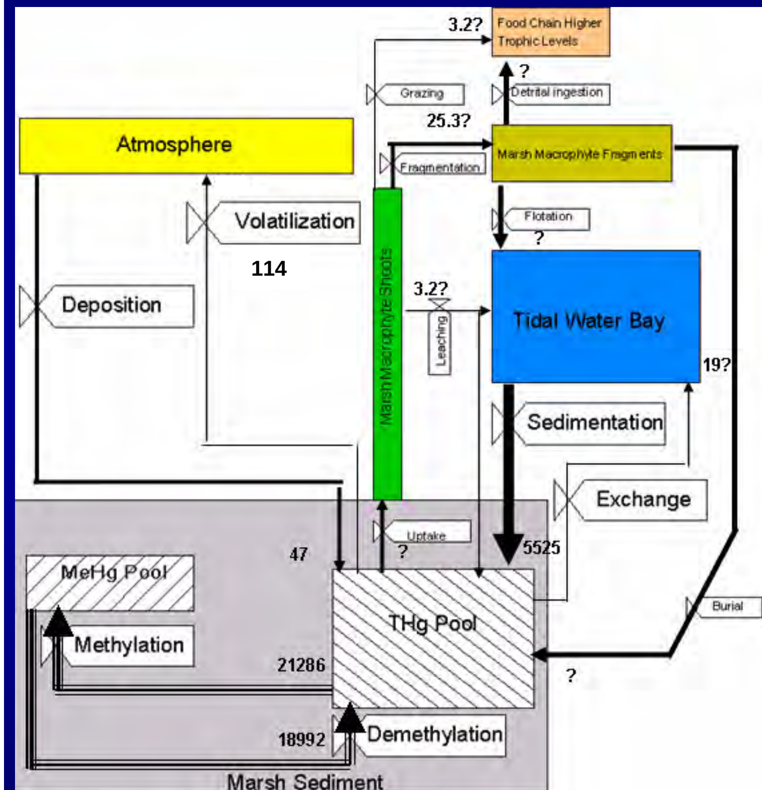
Dr. Joy Zedler's Study (1997) of Tijuana Estuary

Fish are trophically linked to *Spartina* derived carbon in the low marsh



SUMMARY

HAAF Mercury Mass Balance



- Marshes may become net Hg exporters as they mature
- Linkage between particulate THg and fish/egg burdens tenuous
- Antagonistic microbial methlyation/ demethylation rates are both fast (net MeHg)
  - ➢ Large temporal and spatial variability
- Macro drivers of net methylation
  - ➢ Wet season
  - ➢ Marsh position in salinity gradient
- Uncertainty due to lack of knowledge
  - ➢ Availability for methylation
  - ➢ Trophic structure and biomagnification
- Adaptive management is essential

San Francisco Bay Mercury TMDL – Implications for Constructed Wetlands

Questions?

fredrih@wes.army.mil

Presentation
to the

2005 TRI SERVICES INFRASTUCTURE CONFERENCE

by

JAMES D. GUTSHALL

CVIIL ENGINEER
MISSISSIPPI RIVER & TRIBUTARIES TEAM
MISSISSIPPI VALLEY DIVISION

August 4, 2005

Mississippi Valley Division

Monitoring The Mississippi River using GPS Coordinated Video

U.S. Army Corps of Engineers

US Army Corps of Engineers

- The Corps' mission:
  - Water Resources Development
  - Environment
  - Infrastructure
  - Disasters
  - Warfighting

US Army Corps
of Engineers

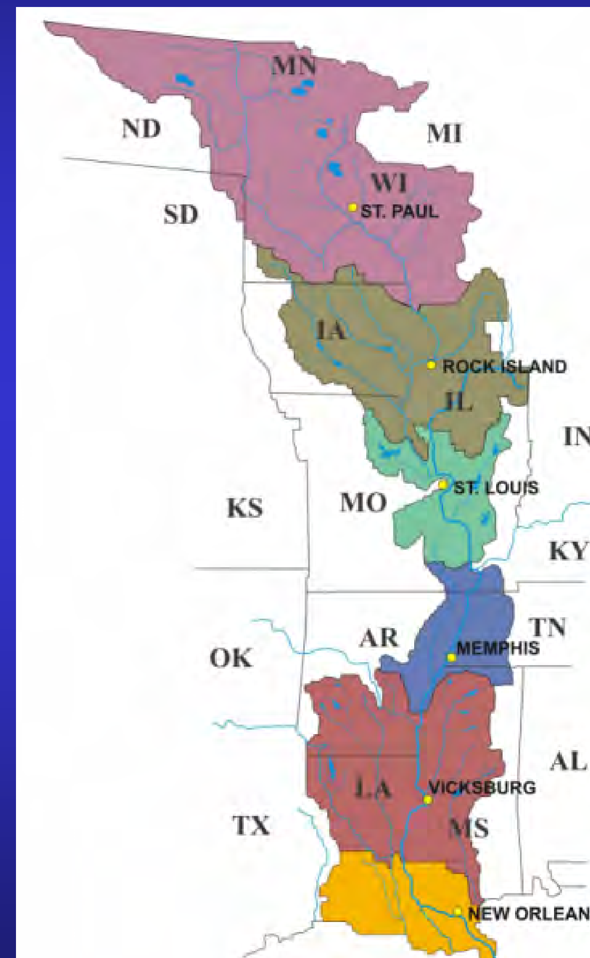
Mississippi River Commission

- Established June 1879
- Authority to operate on entire Mississippi River

- Seven Presidentially appointed members
- Advisors to:
  Secretary of the Army
  and
  Chief of Engineers

Mississippi Valley Division

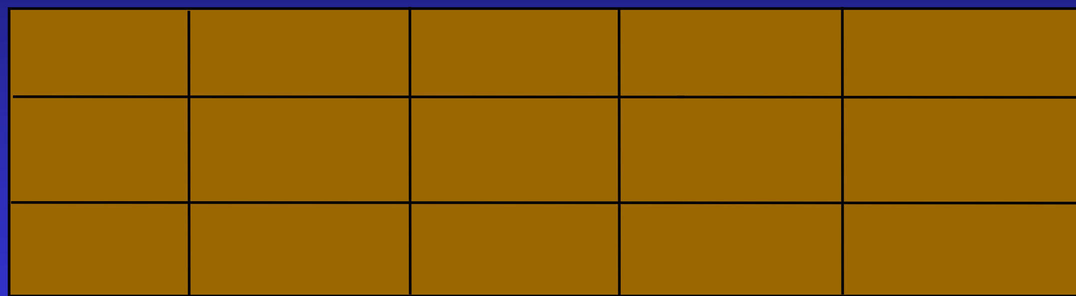
US Army Corps of Engineers



- Six districts
- 5,000+ employees
- 370,000 square mile boundary, encompassing all or parts of 12 states
- 4,267 miles of commercial waterways
- 44 flood control lakes/reservoirs

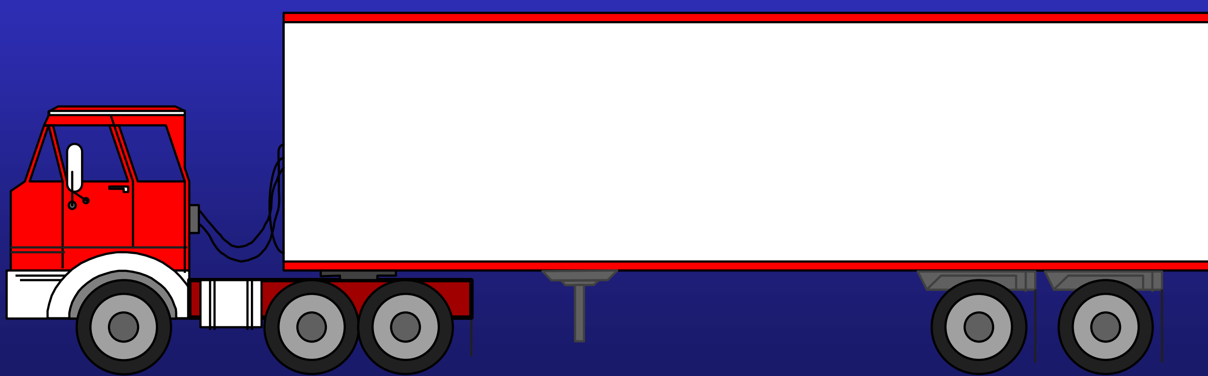
Why is the Mississippi River Important to the National Infrastructure

US Army Corps of Engineers



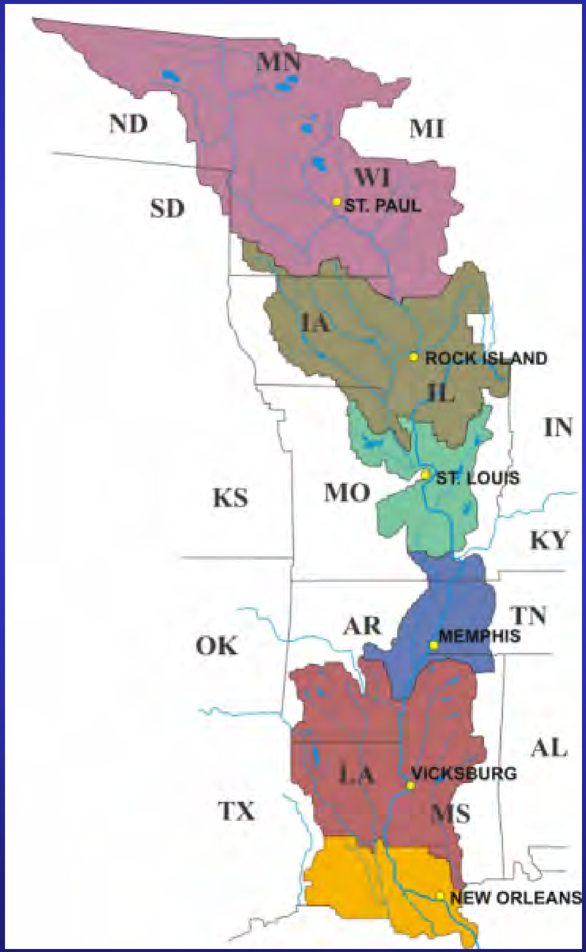
15 BARGE TOW

225 RAILCARS



870 TRUCKS

Flight Area



- Memphis & Vicksburg Districts
- Flew Along Both Banks
- Included Major Side Channels
- Connecting Streams To Over Bank Lakes

US Army Corps
of Engineers

Three Track Digital Tape

- Visual Data
- Audio Data
- Positional Data (GPS Referenced)

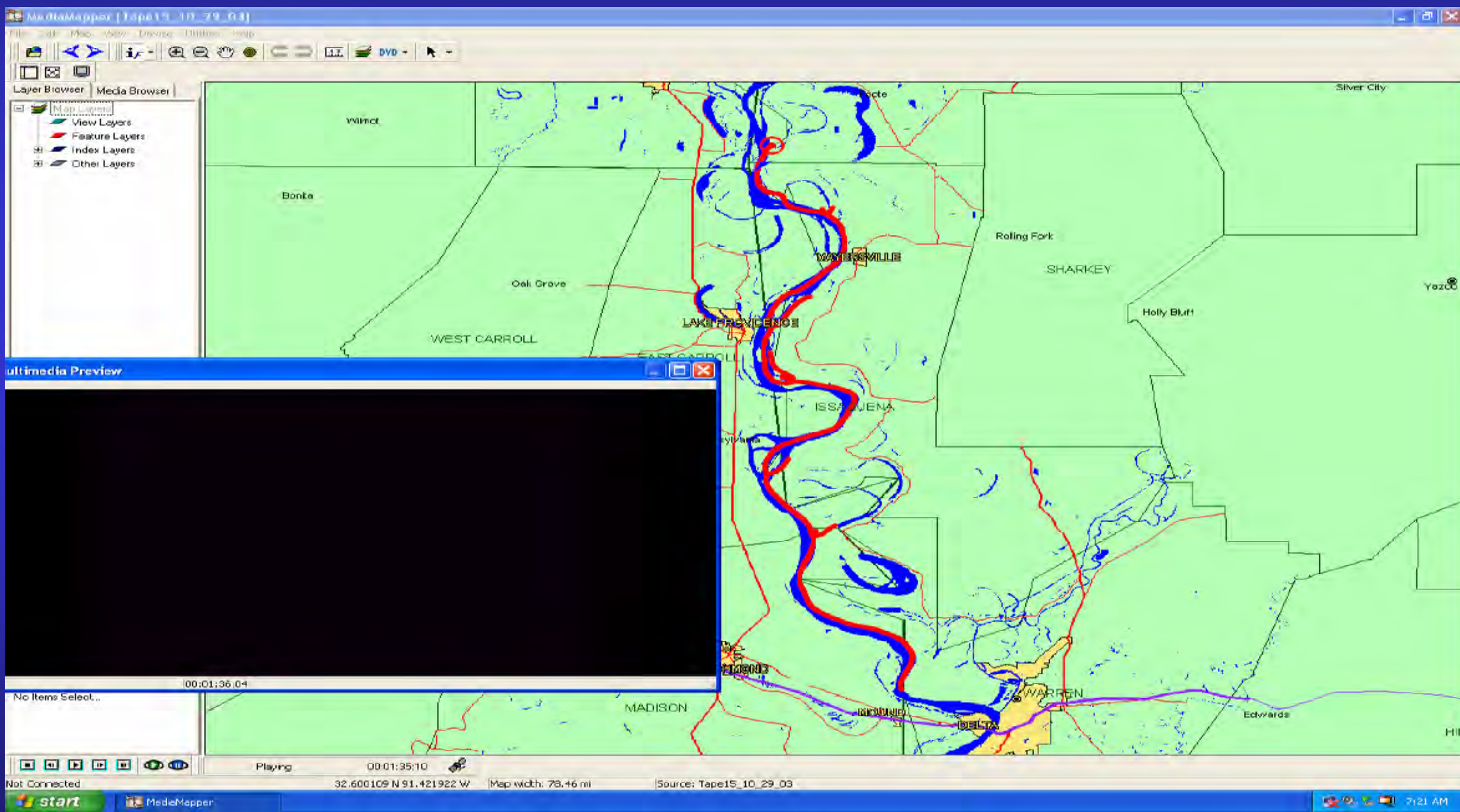
US Army Corps of Engineers

Purposes of Video

- Document Existing River Training Structures
- Record River Bank Conditions
- Assess Existing Environmental Habitat For Corps And Our Environmental Partners
- Build Database For Later Comparisons
- Prepare For Field Trips
- View Areas Of Customer Problems While In The Office

SCREEN SHOT

US Army Corps of Engineers



One Team: Relevant, Ready, Responsive and Reliable

Bell Long Ranger

US Army Corps of Engineers

Bell Long Ranger

Bell Long Ranger

US Army Corps of Engineers

One Team: Relevant, Ready, Responsive and Reliable

US Army Corps
of Engineers

Demo

Lessons Learned

- Large File Sizes
- DVD Compatibility
- Sun Angles
- Intense Interest

One Team: Relevant, Ready, Responsive and Reliable

Web Based Access

US Army Corps of Engineers

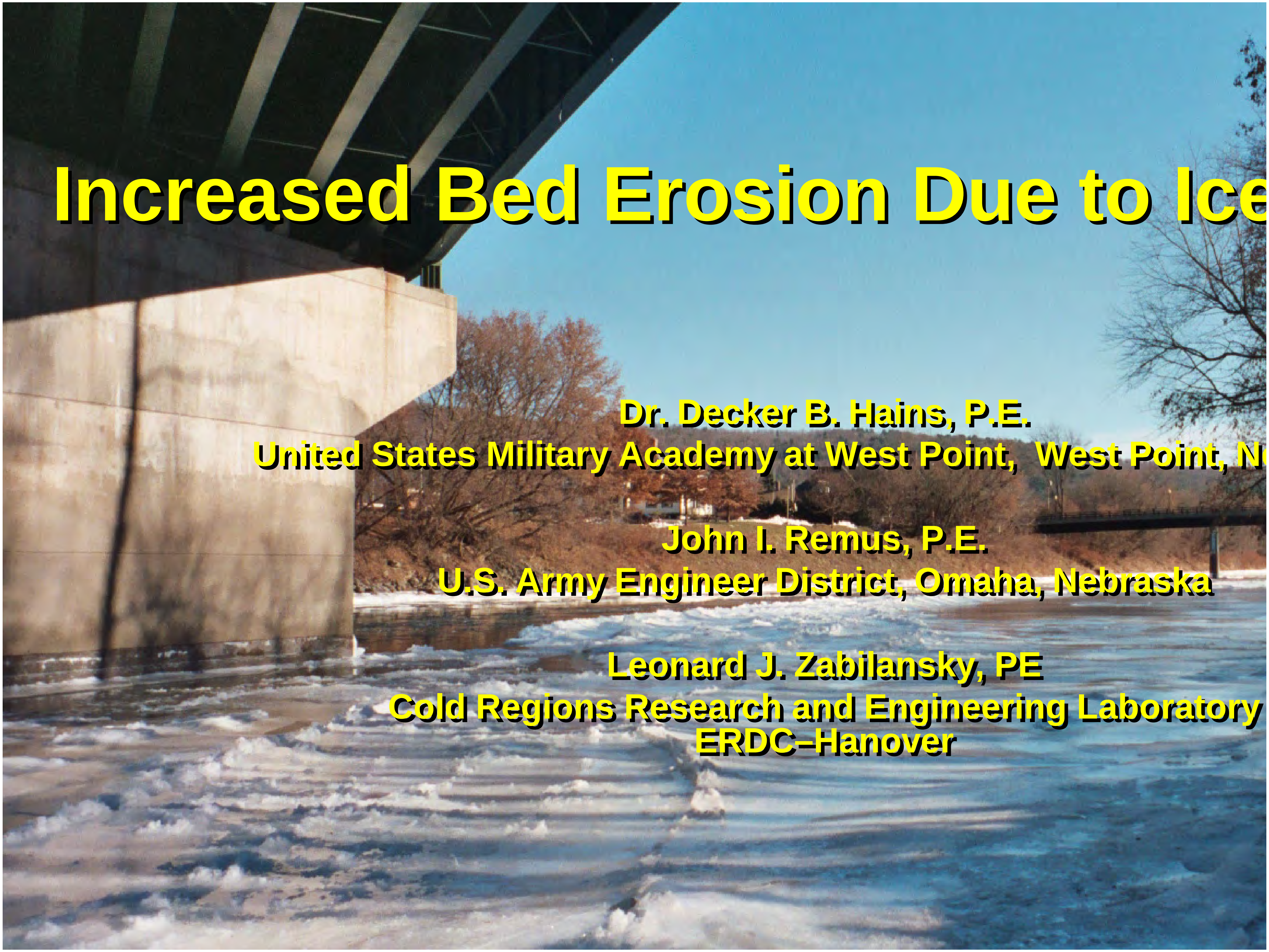
- Phase One - Internal Corps Use
- Phase Two - External Use By Password For Corps Partners (F&WS, LMRCC, State Agencies)
- Phase Three – Full Public Access

Problems For Web Access

- Expense
- Data Transfer Speeds
- Security Problems
- Homeland Security

US Army Corps
of Engineers

QUESTIONS



Increased Bed Erosion Due to Ice

Dr. Decker B. Hains, P.E.
United States Military Academy at West Point, West Point, N

John I. Remus, P.E.
U.S. Army Engineer District, Omaha, Nebraska

Leonard J. Zabilansky, PE
Cold Regions Research and Engineering Laboratory
ERDC–Hanover

Bridge Street Bridge Late 60's

US Army Corps
of Engineers

What Happened?

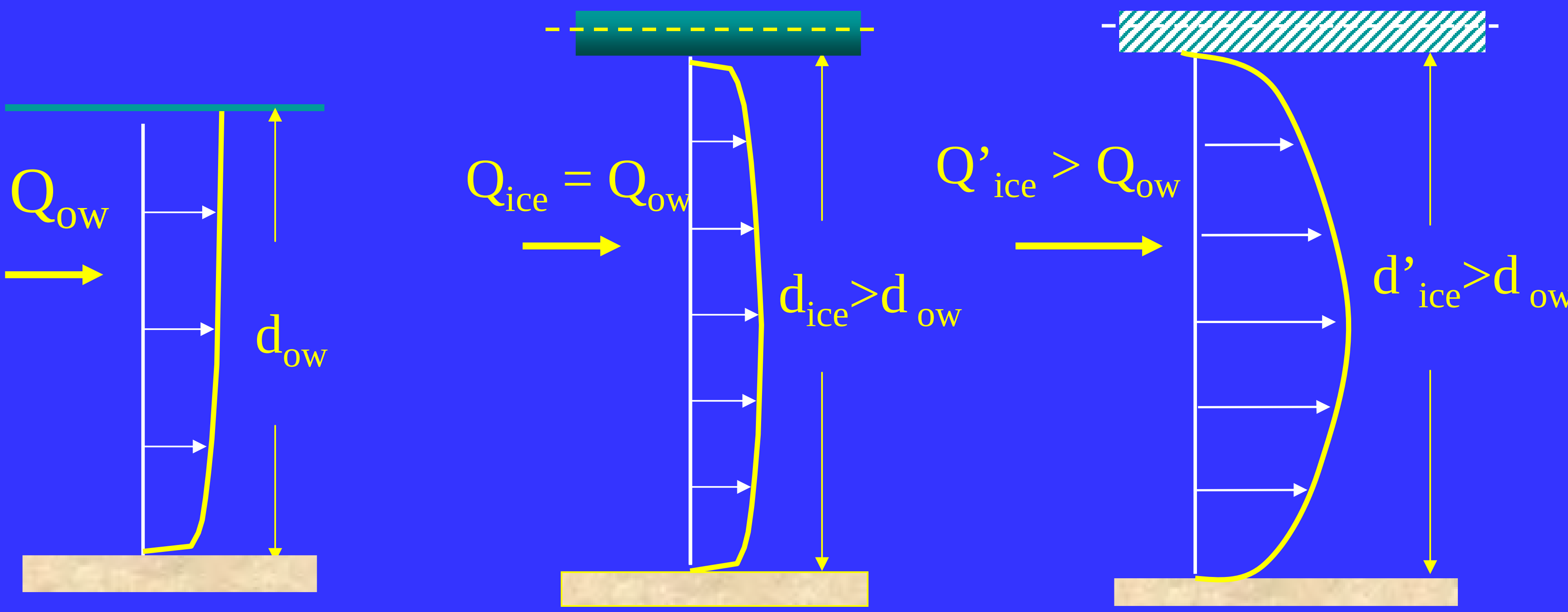
US Army Corps
of Engineers

ERDC
Engineer Research and Development Center

Open Water

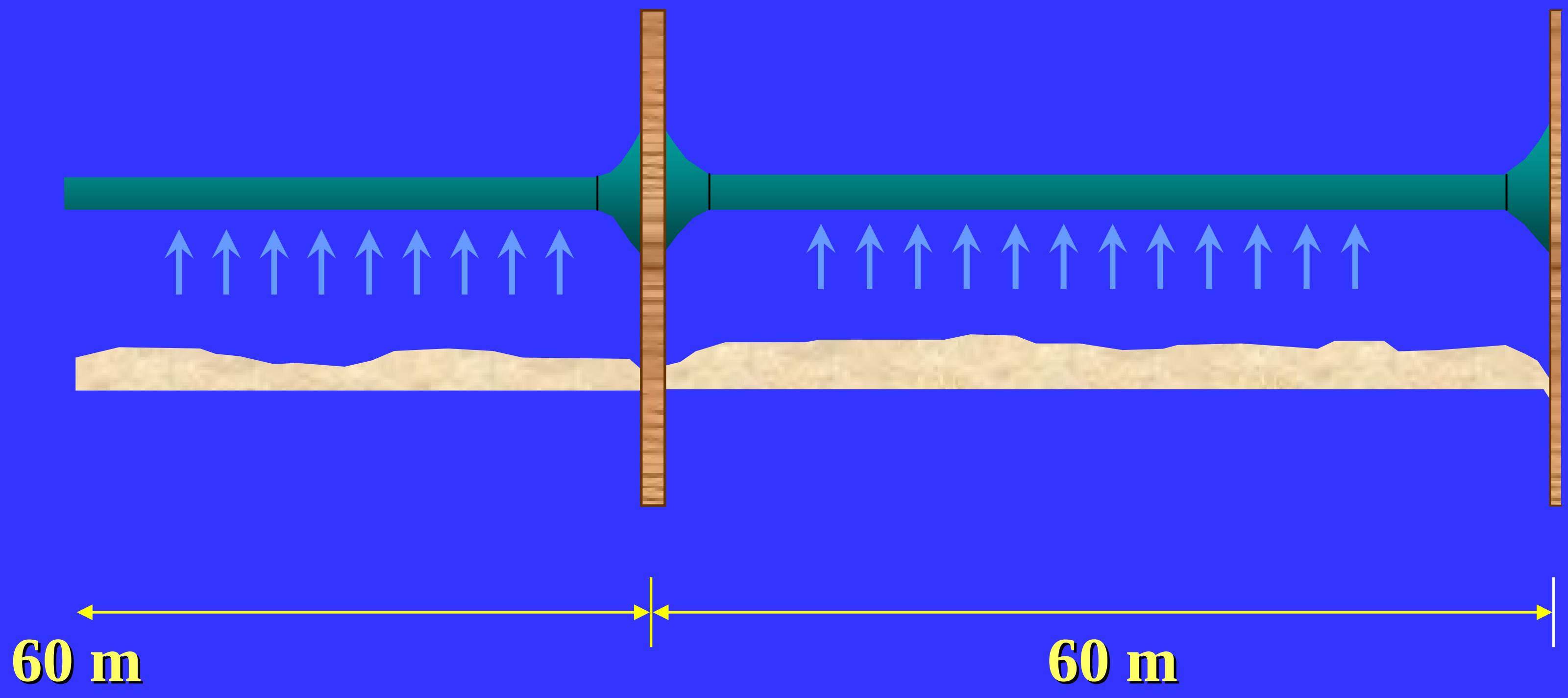
Stationary-Floating Cover

Fixed Cover



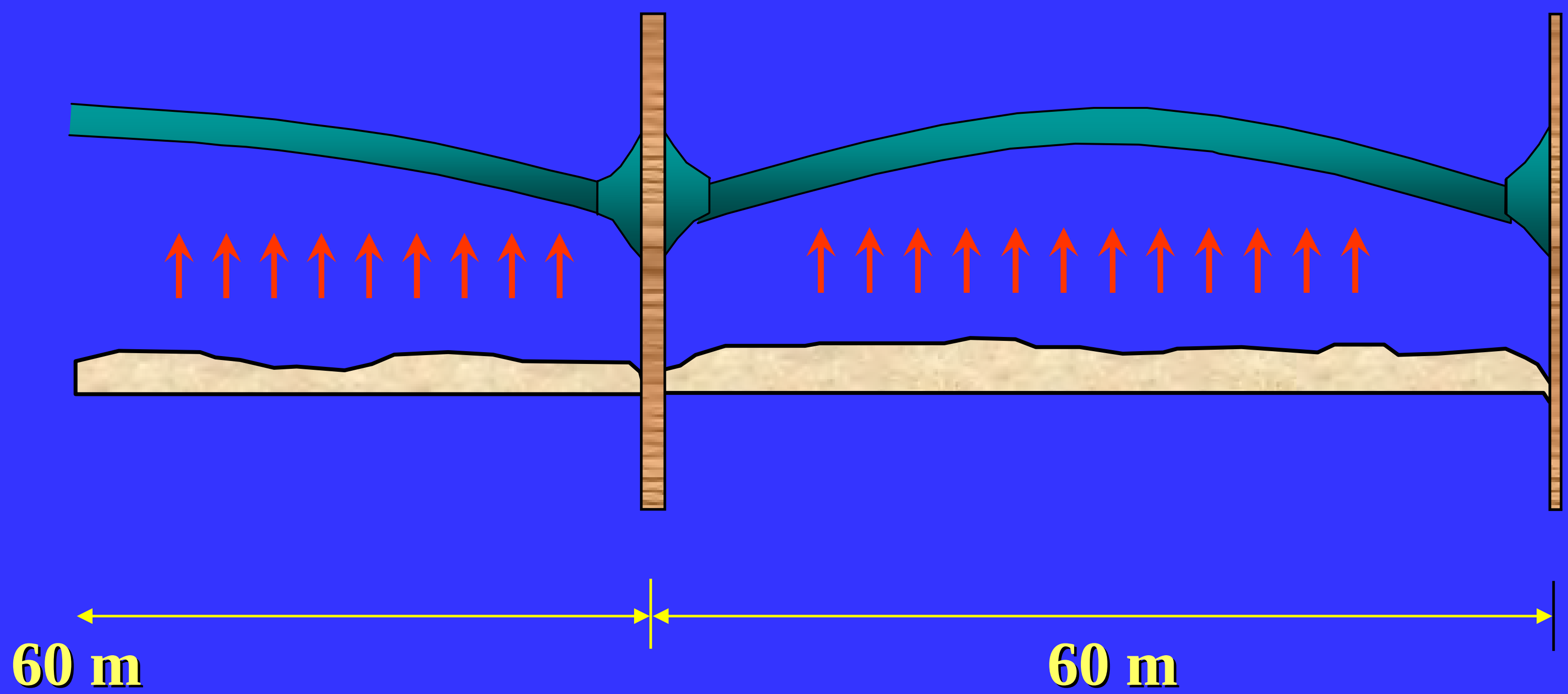
US Army Corps
of Engineers

Ice Cover Effects on Narrow Rivers
Initial Water Level



US Army Corps
of Engineers

Ice Cover Effects on Narrow Rivers
Rising Water Level



Characteristic length (*l*) for 50 cm ice thickness (*h*)
Approximated by 16$h^{3/4}$, l = 9.5 m
Radius of Influence (5*l) is >> Half the Span

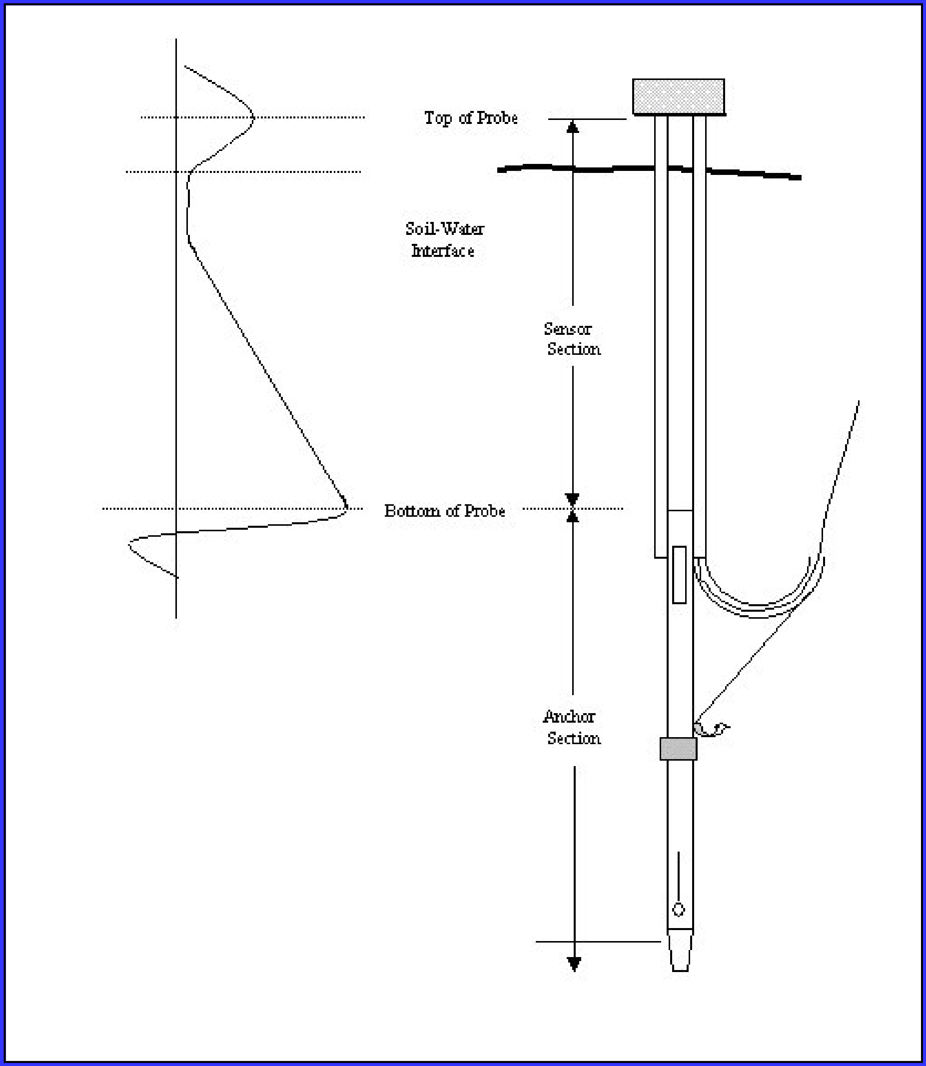
US Army Corps
of Engineers

ERDC

General Background

- Field Measurements
  - Scour probes using Time-Domain Reflectometry- independent of surface conditions
  - Stage must increase 2-4 times the ice thickness before break-up
  - Ice cover does not immediately respond to changes in stage
  - Increases above the freeze-up discharge but below the break-up threshold → increases in mean velocity

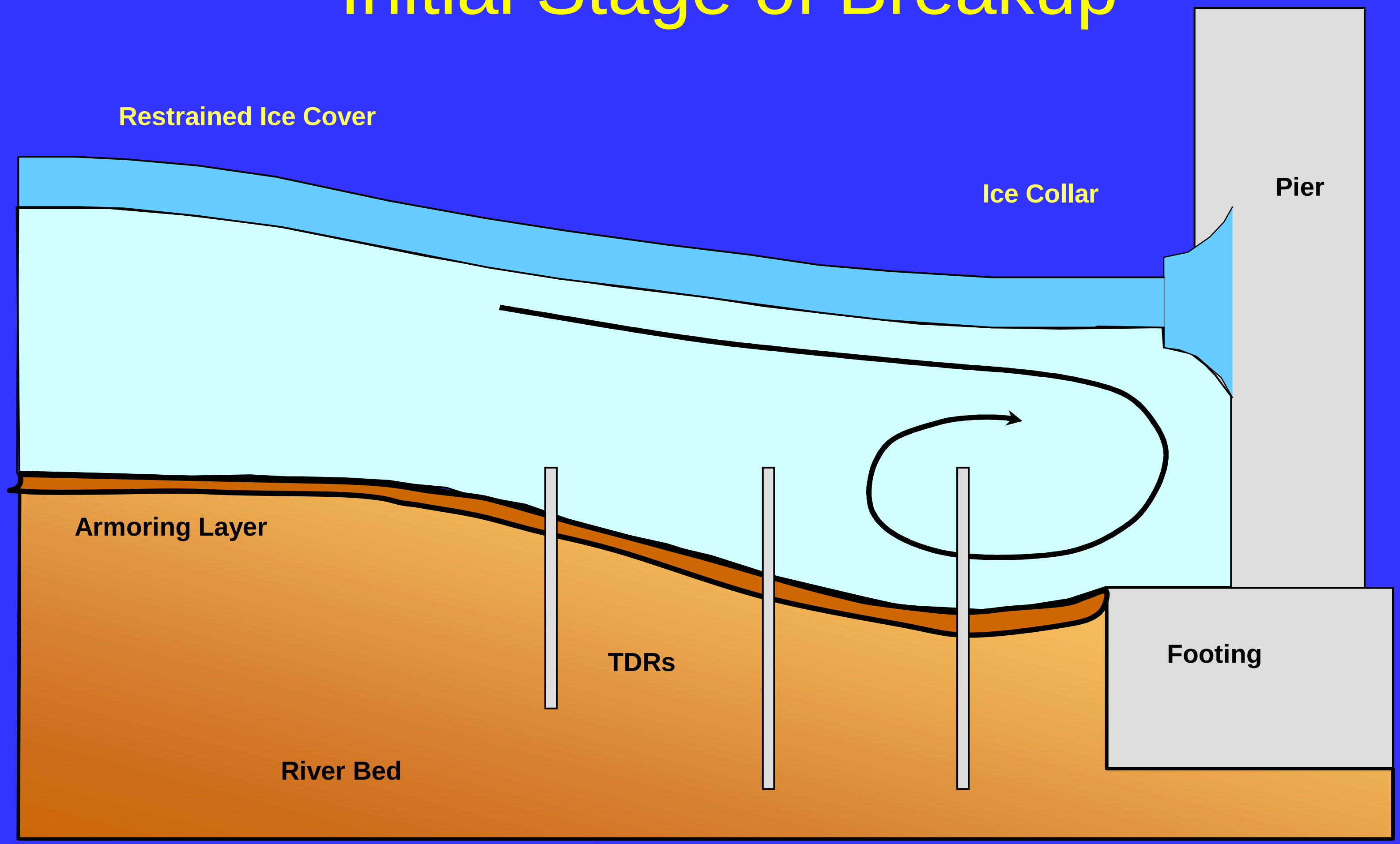
TDR Scour Probes



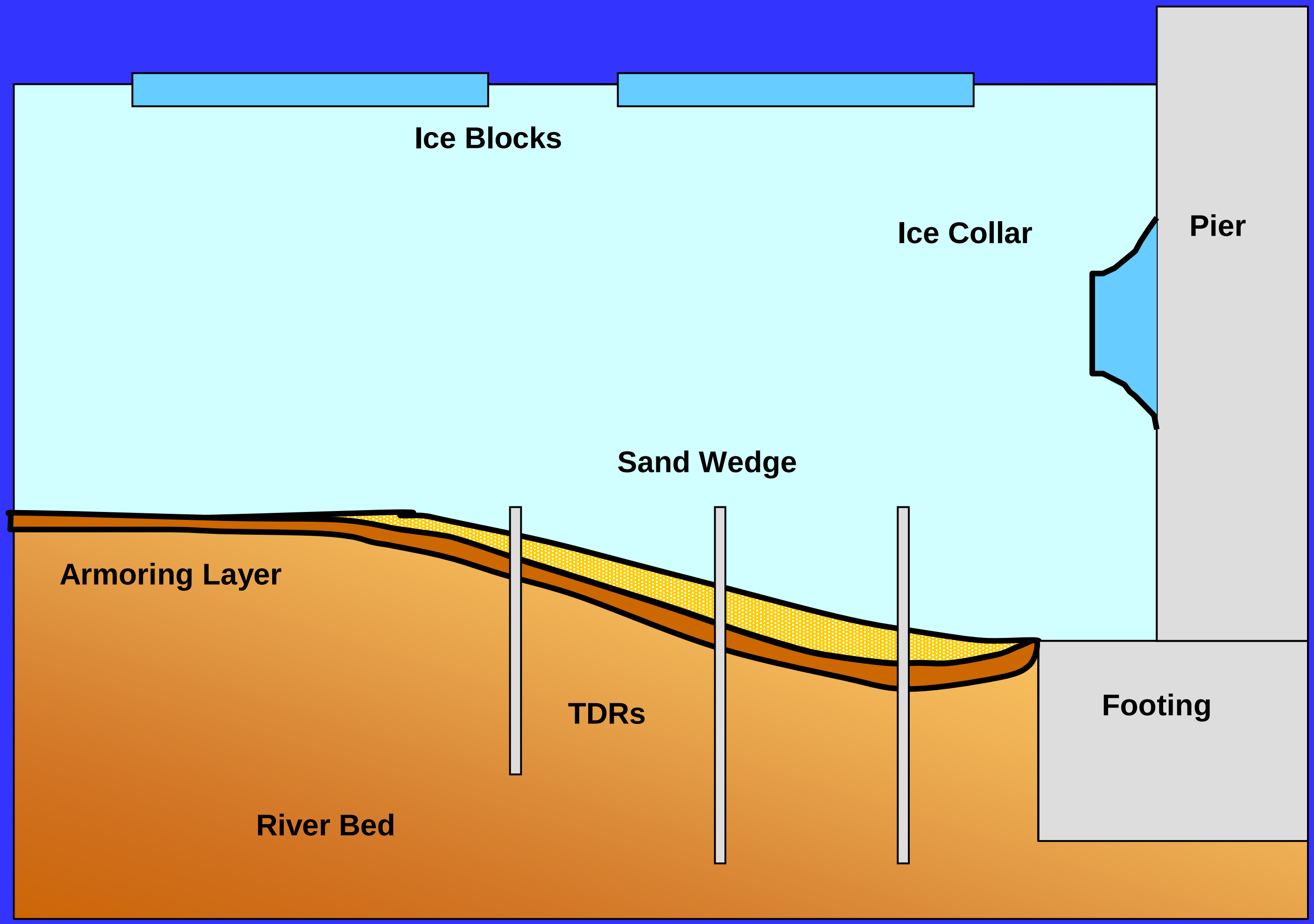
Ice Cover Rt. 5 Bridge

US Army Corps
of Engineers

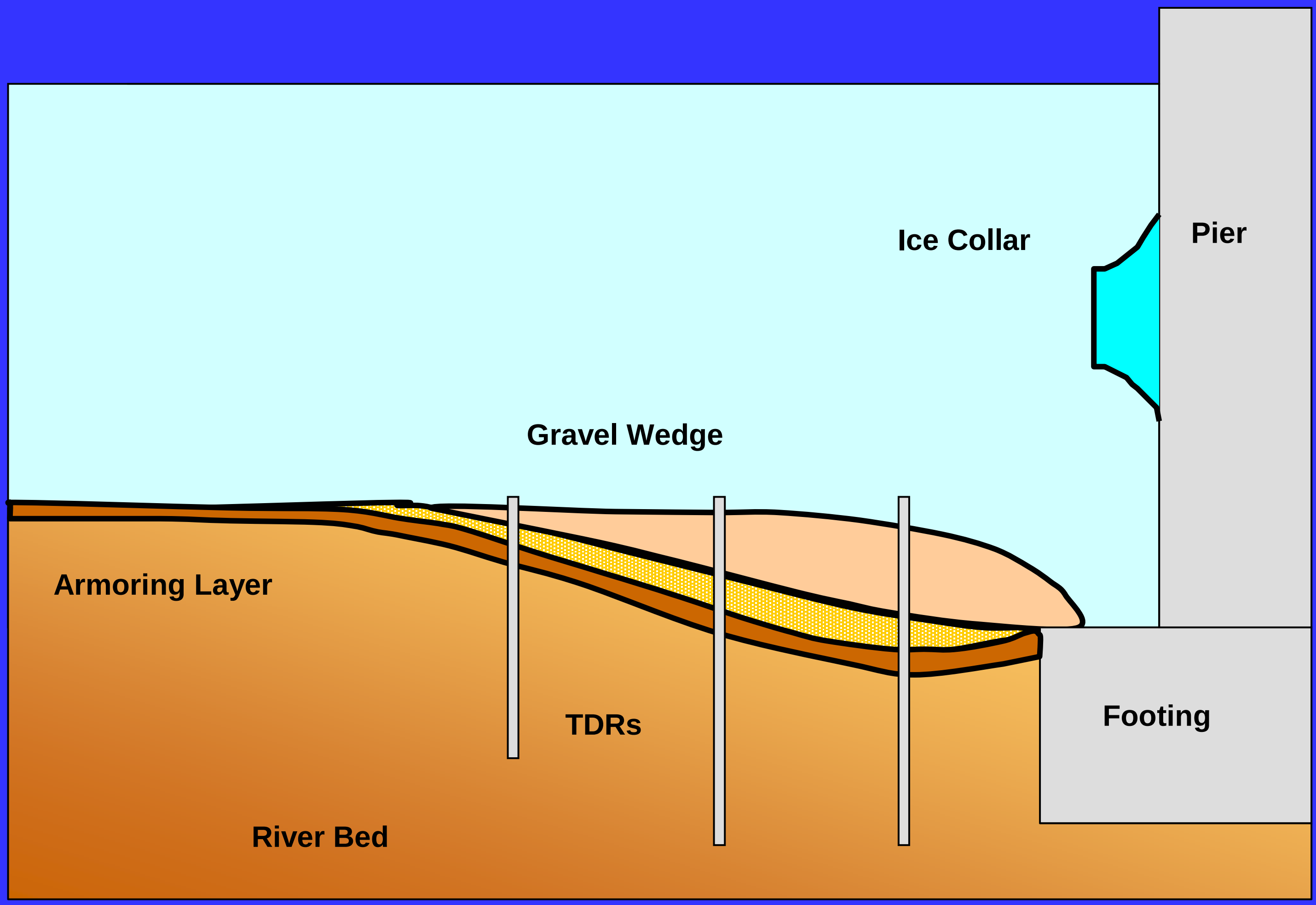
Scour Under an Ice Cover
Initial Stage of Breakup



Scour Under an Ice Cover Immediately Following Breakup



Scour Under an Ice Cover
High Water Following Breakup



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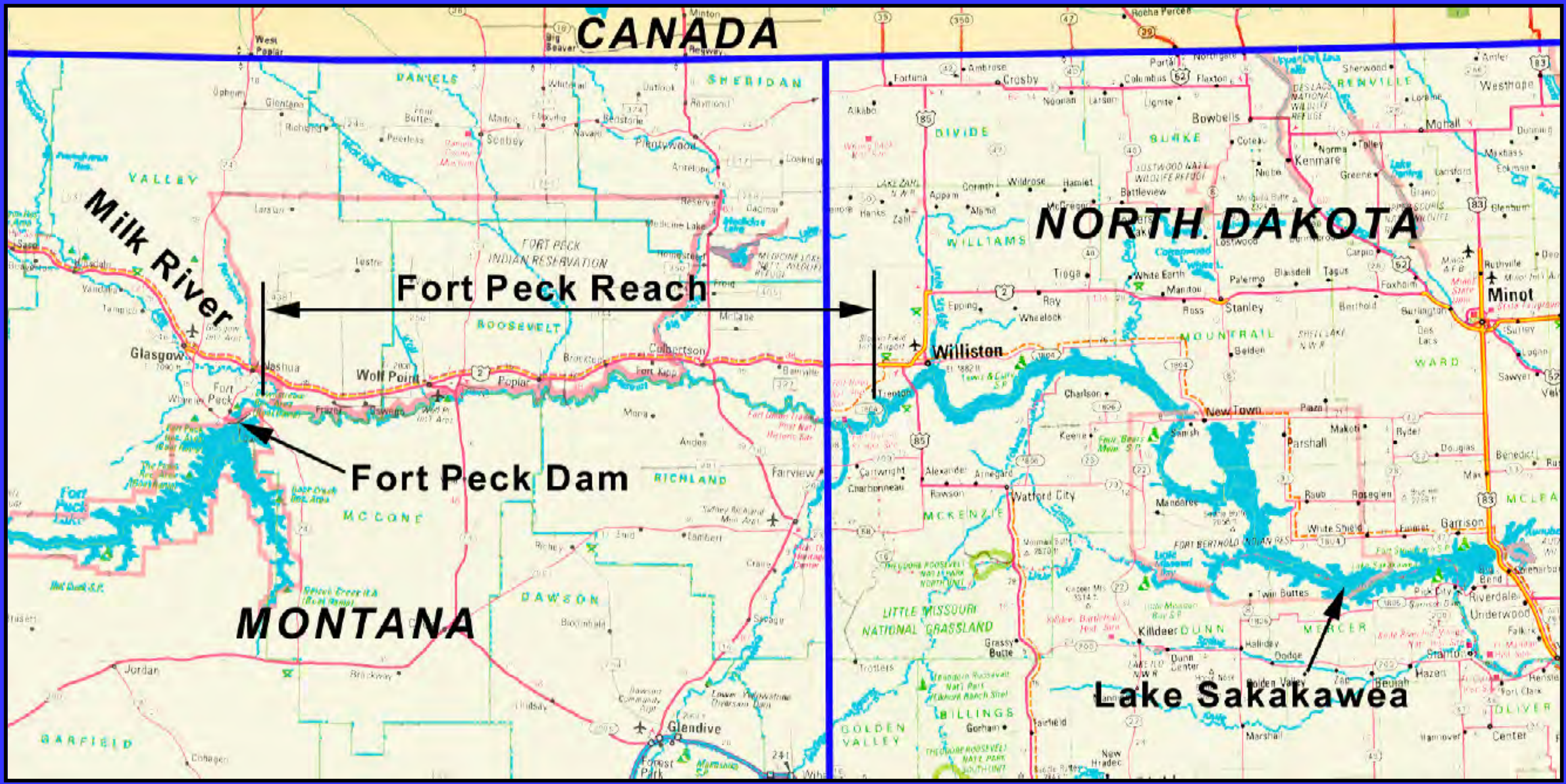
Fort Peck Reach of Missouri River

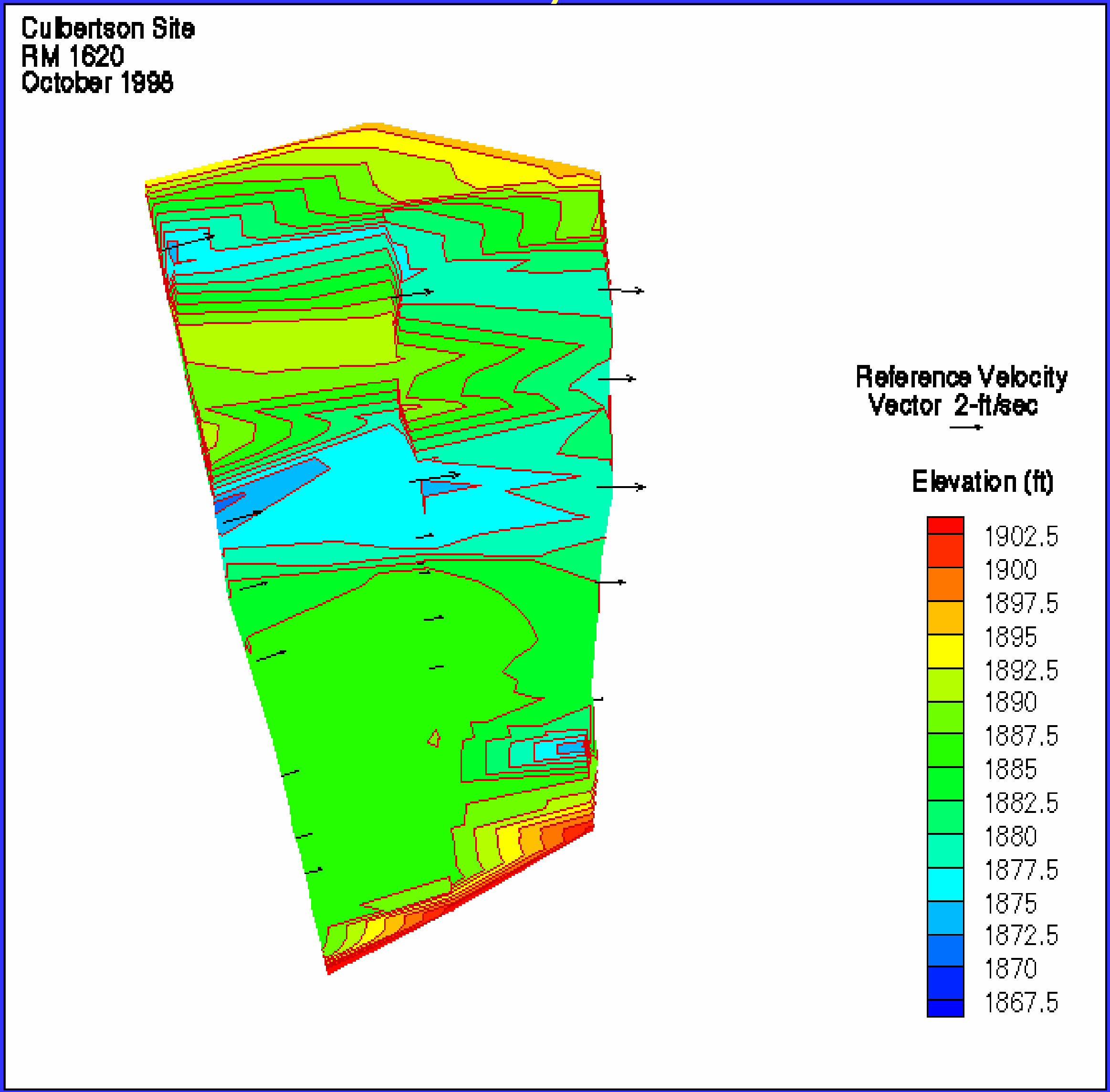


Five sites with periodic and continuous monitoring along the 170 mile reach

Culbertson, Montana

US Army Corps
of Engineers

Culbertson, Montana



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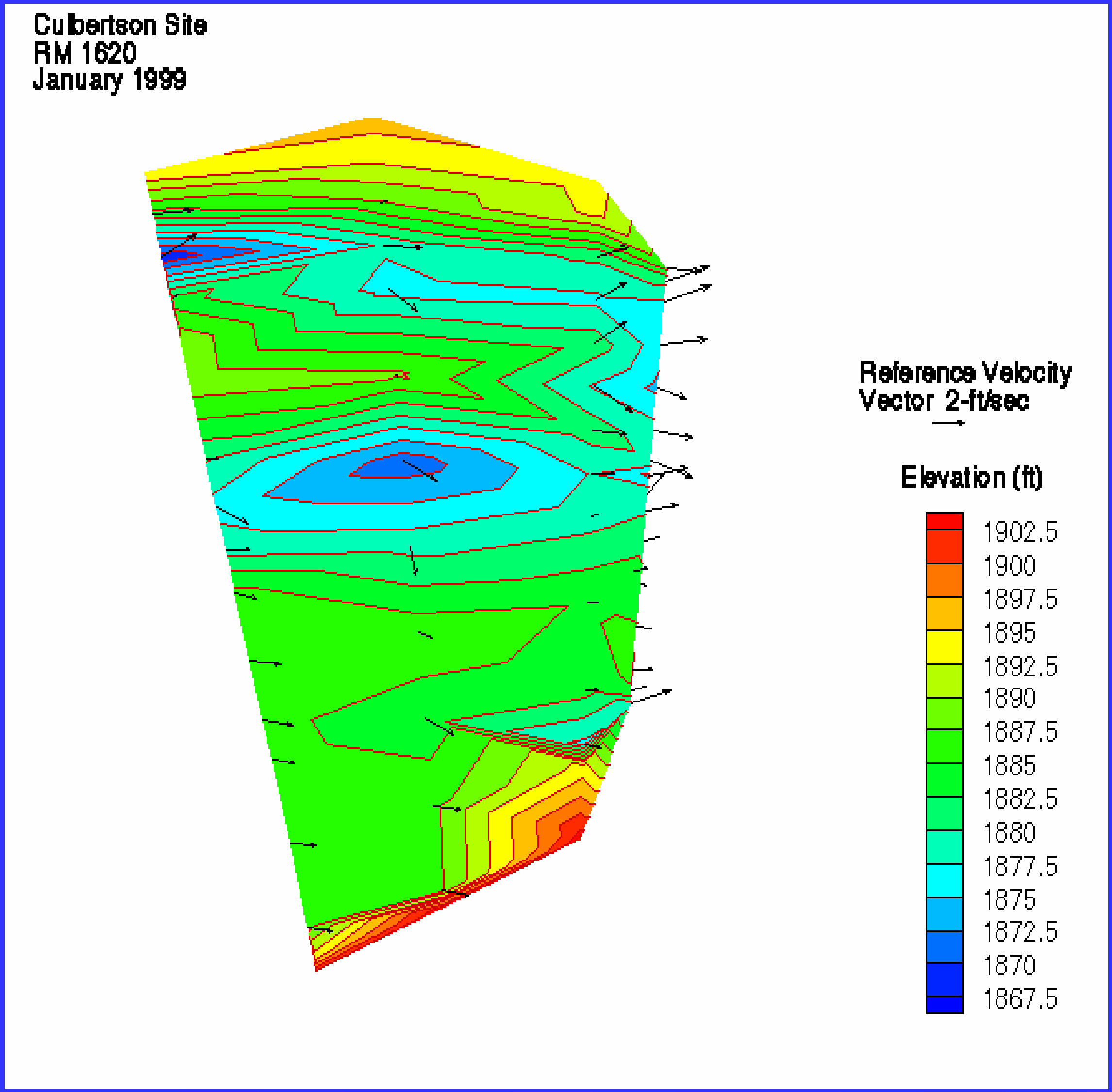
of Engineers

Culbertson, Montana

US Army Corps
of Engineers

Culbertson, Montana

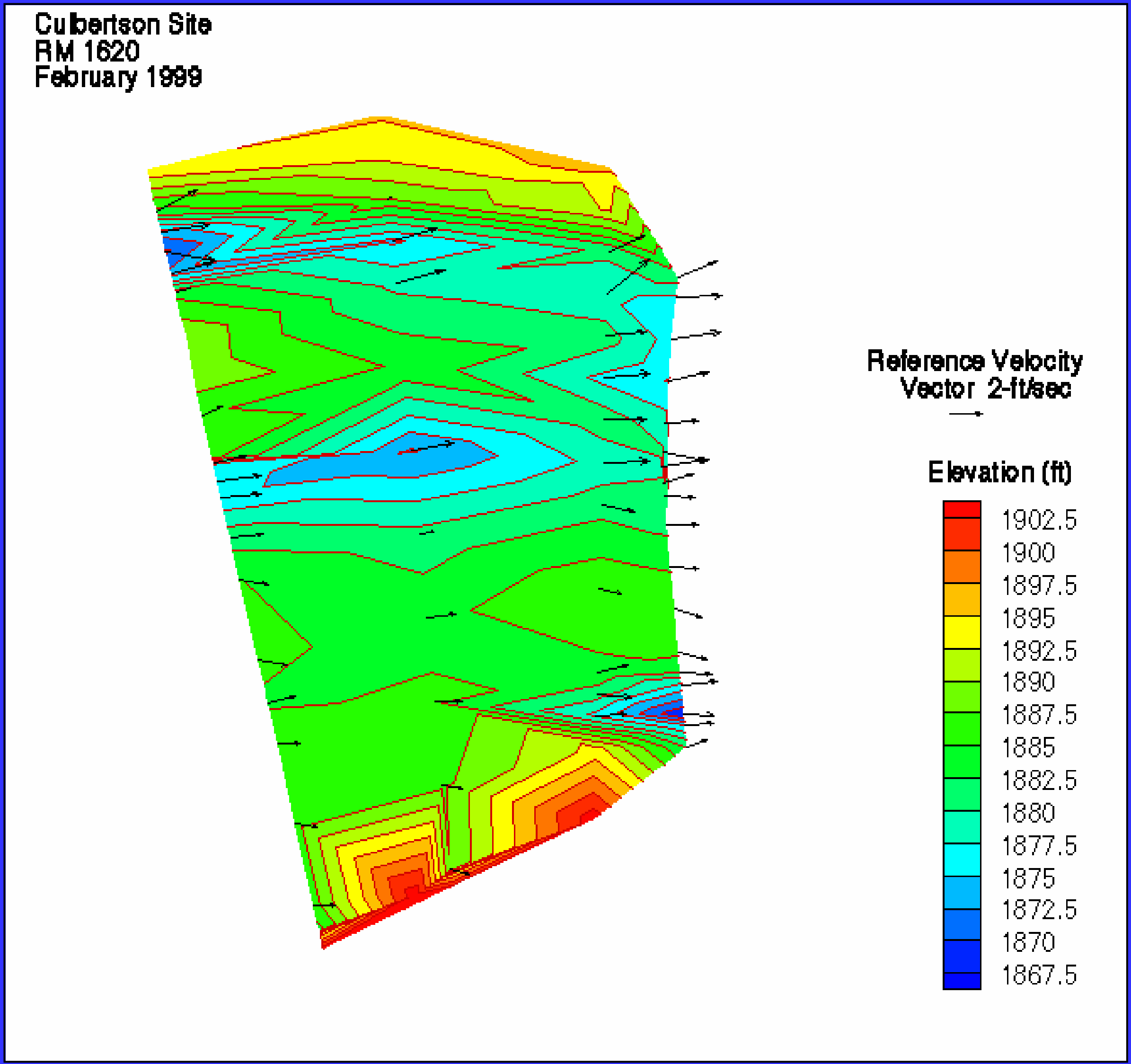


US Army Corps of Engineers

Culbertson, Montana

US Army Corps
of Engineers

Culbertson, Montana



US Army Corps
of Engineers

Culbertson, Montana

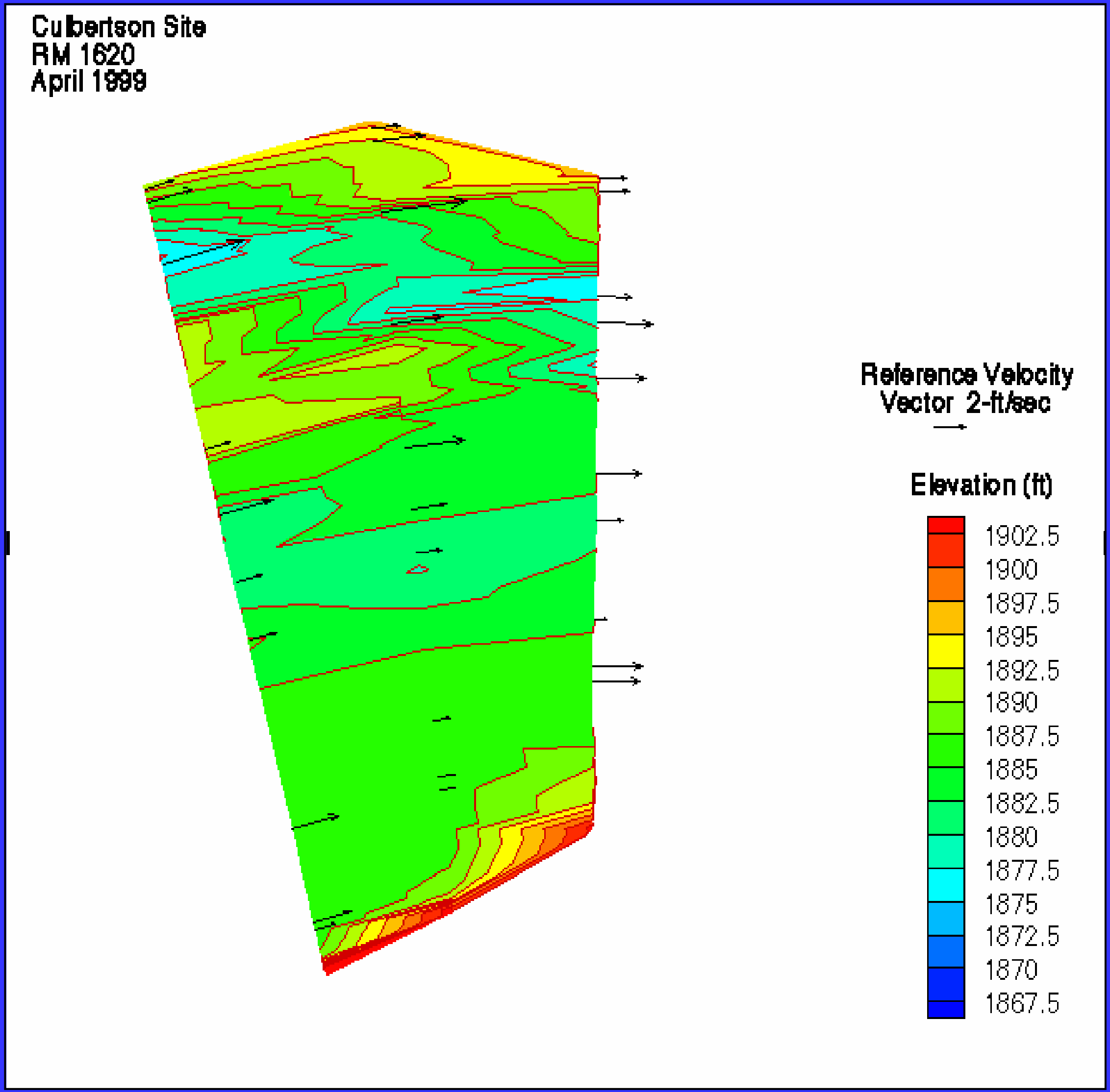
US Army Corps
of Engineers

Culbertson, Montana

April

US Army Corps
of Engineers

Culbertson, Montana



Milltown Dam located 120 miles downstream of historic Butte and Anaconda copper mining operations.

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Testing Parameters

- Clear Water Scour
- Cylindrical Pier
- Smooth & Rough Cover
- One type of Uniform Sediment
  (d_{50} = 0.13 mm)
- Two Pressure Conditions
  – 3” of head
  – 6” of head

Effect of Flow Intensity: V/V_c

- Clear-water Scour- <u>no</u> sediment transport on the bed

$$V_c > V \geq 0.5\ V_c$$

- Live-bed Scour- sediment transport on the bed

$$V \geq V_c$$

- For the sediment in this study, $V_c = 0.9$ fps

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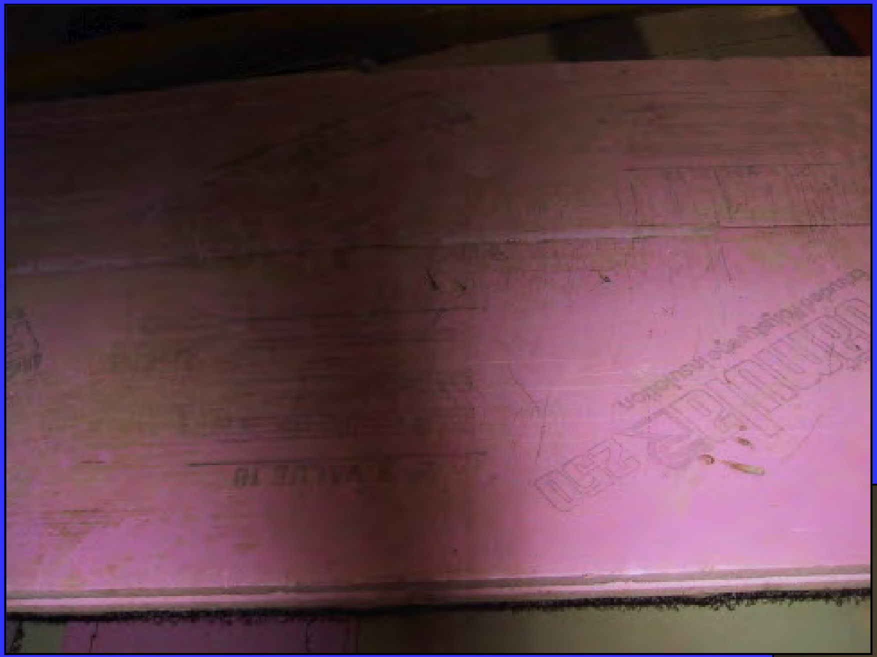
Test Conditions

Number of Tests	Cover Condition	Relative Cover Roughness
6	Open Water/Free Surface	N/A
5	Floating	Smooth
1	Floating	Rough
6	Fixed	Smooth
2	Fixed	Rough



Smooth Cover

Rough Cover

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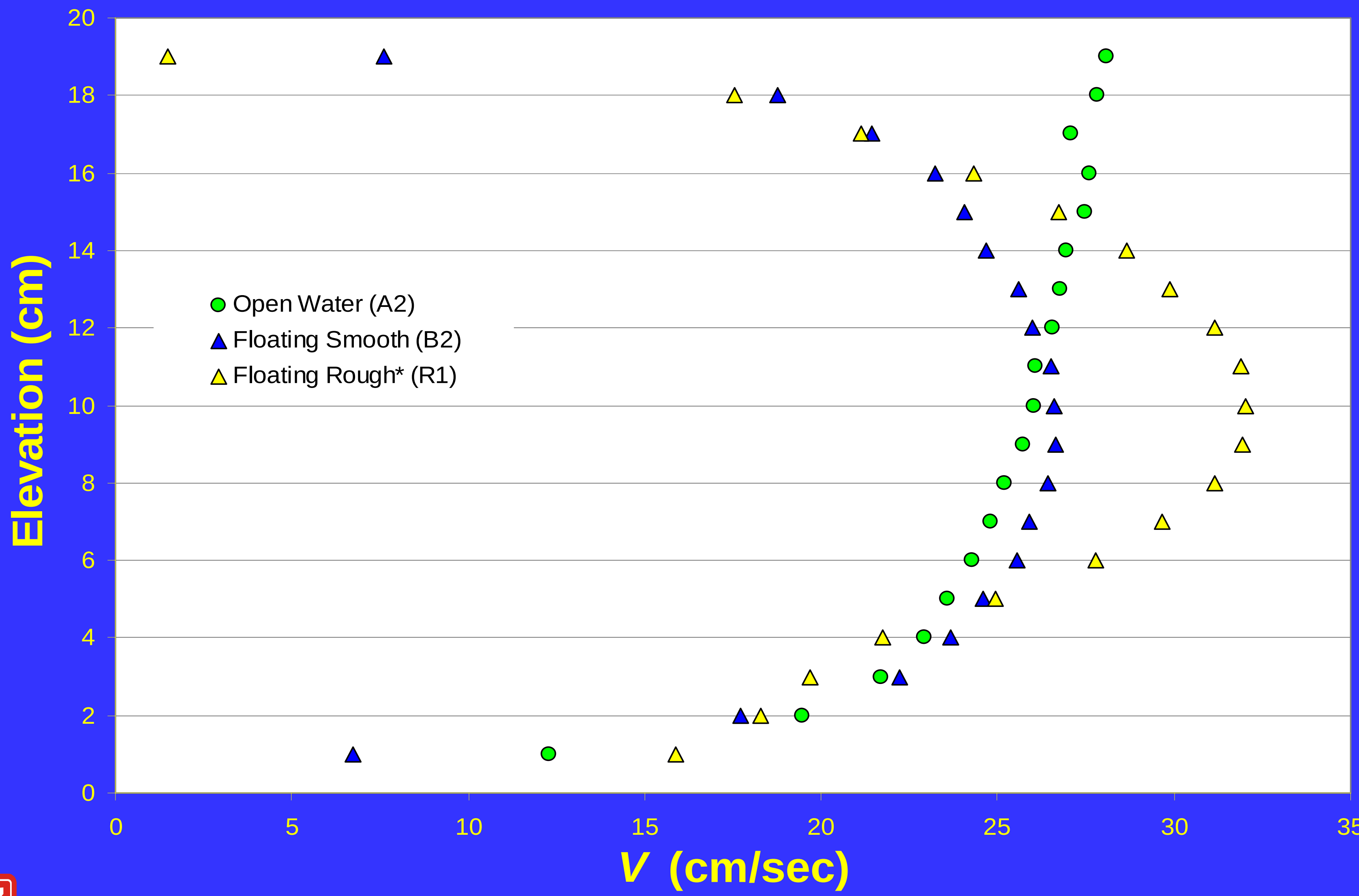
of Engineers

Velocity 1.96 cm/s, Vavg/Vc = 0.8589



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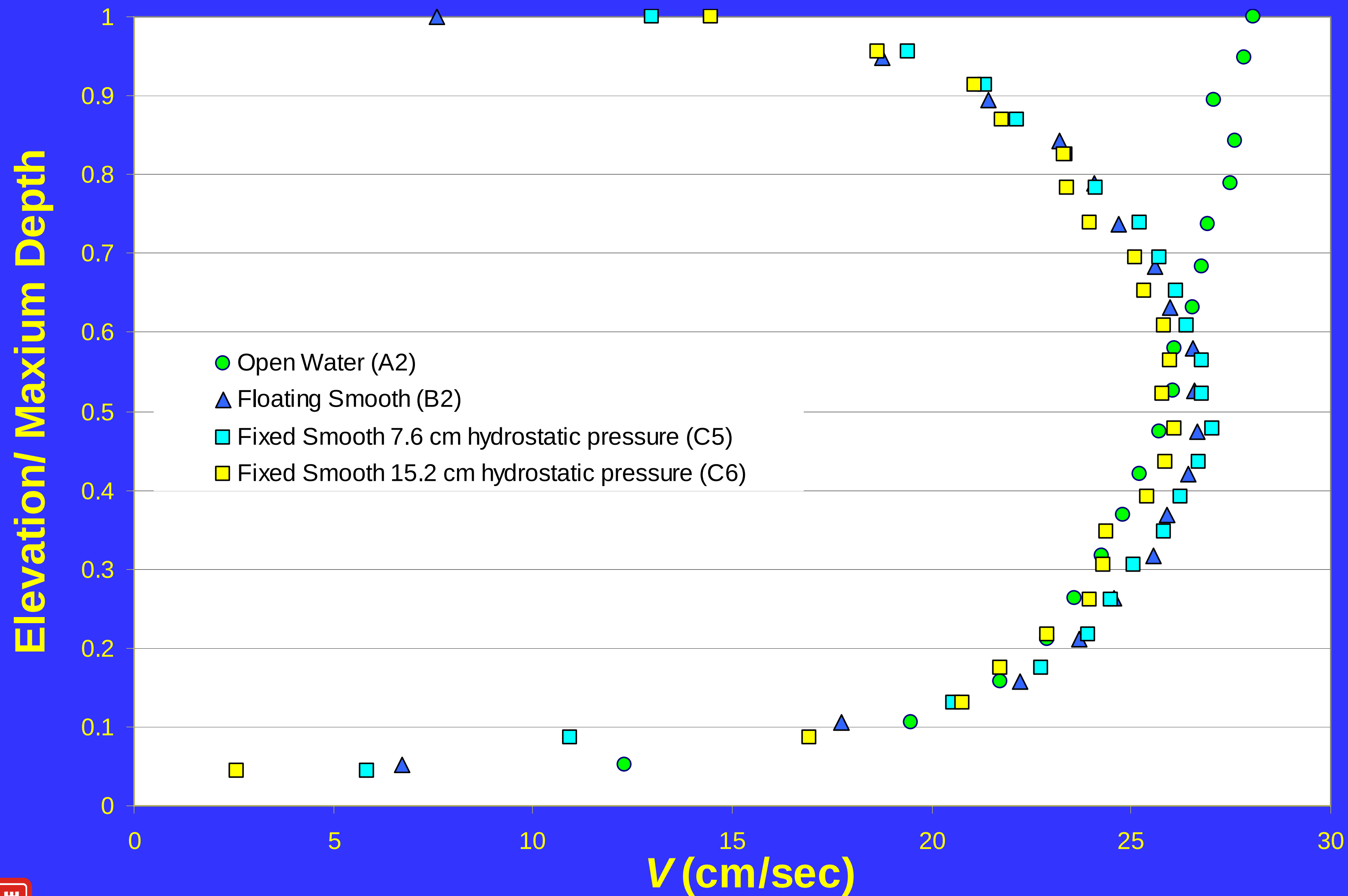
Velocity 1.96 cm/s, Vavg/Vc = 0.8589



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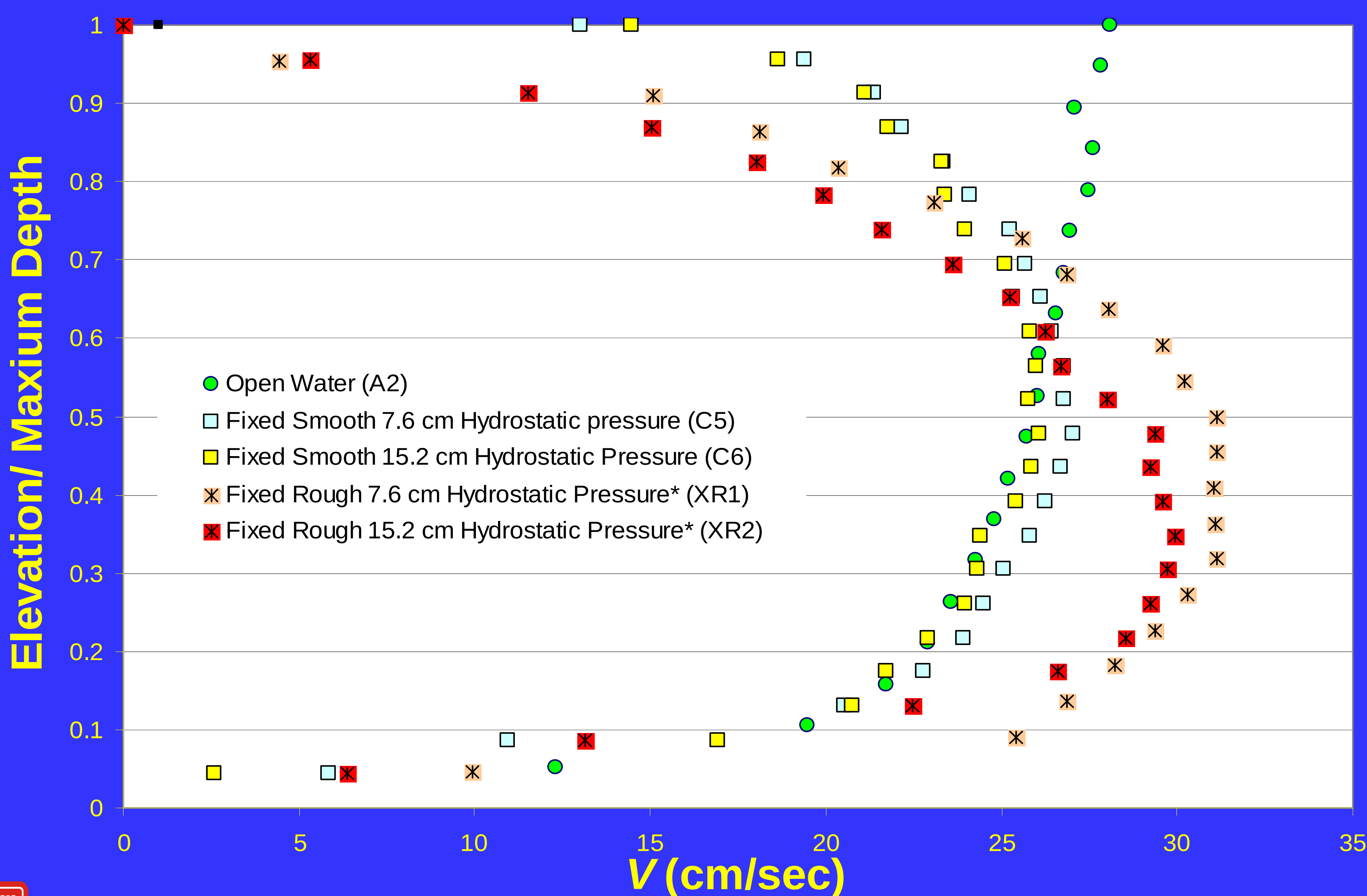
of Engineers

Velocity 1.96 cm/s, Vavg/Vc = 0.8589



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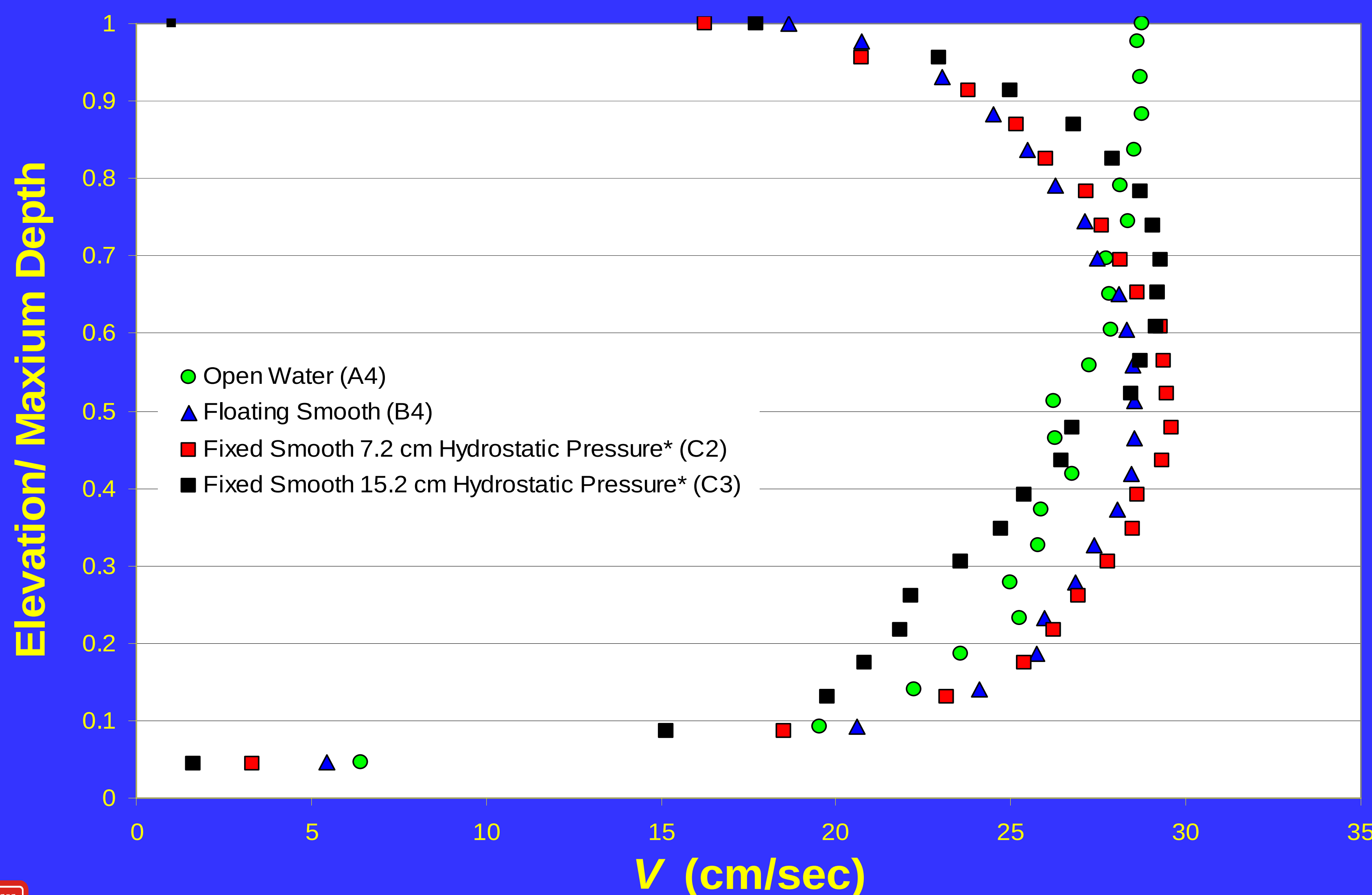
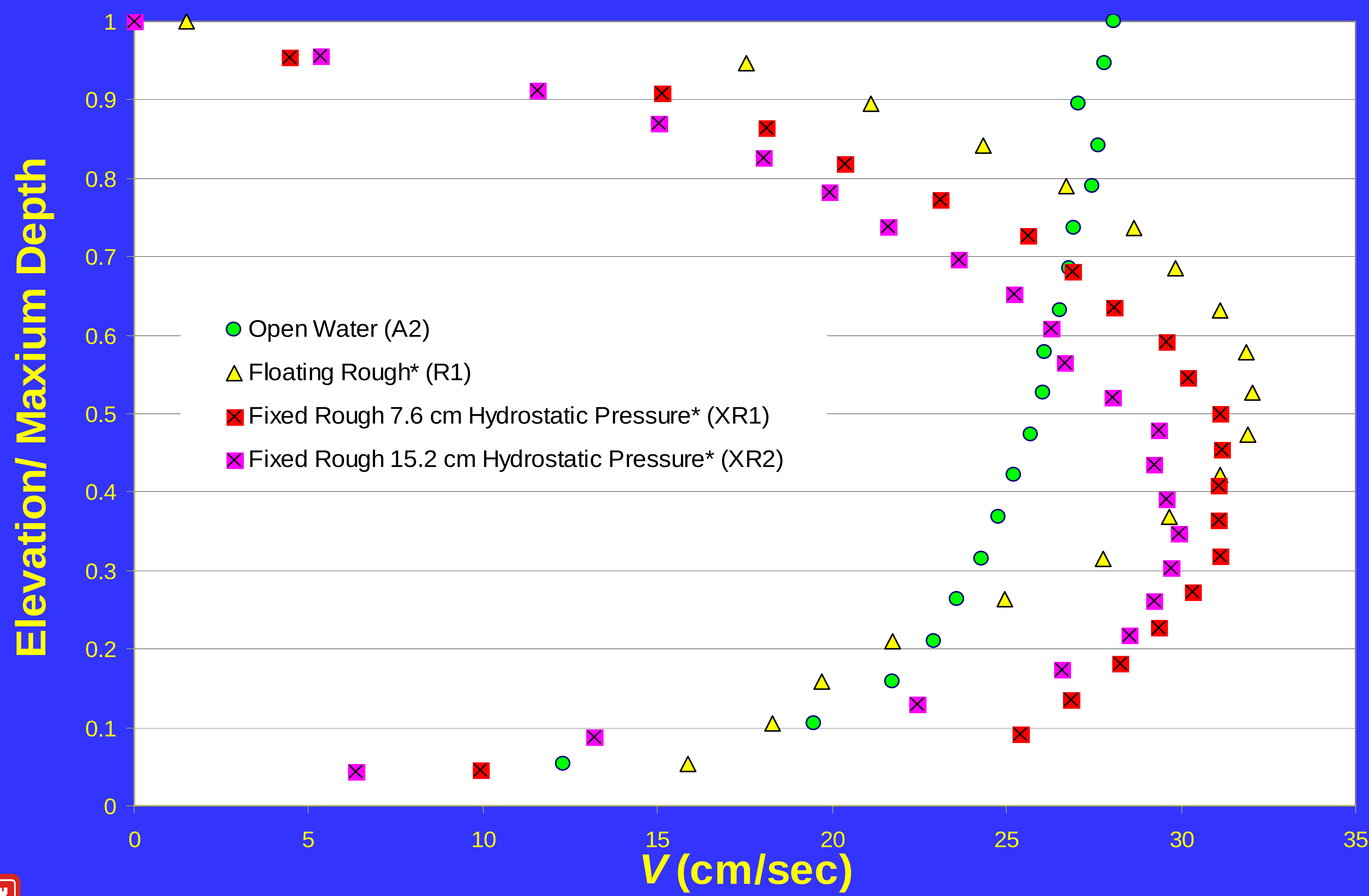
of Engineers

Velocity 2.12 cm/s, Vavg/Vc = 0.9278



US Army Corps of Engineers

Velocity 1.96 cm/s, Vavg/Vc = 0.8589



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Sample Scour Hole- Test C5

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Sample Scour Hole- Test XR2

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Conclusions

Ice Effects on Bed Erosion

•Ice cover can be a major factor in sediment transport and stability of contaminated sediment.

• Pressurized flow due to ice significantly increases mean velocity and the scour potential.

• Ice cover roughness increases turbulence, distorts the vertical velocity profile and increases bed shear.

• Existing theory and models do not adequately explain these field observations and flume experiments.

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72 Lyme Rd
Hanover, NH 03755
(603) 646-4319
ljzab@crrel.usace.army.mil

Summary Results Grouped by V_{avg}

Test	Avg V [fps]	Ya [in]	Duration [h:mm]	Scour Depth [in]	Scour Depth [cm]	Notes
0.650 fps; V_{avg}/V_c = 0.7222						
A5	0.650	9	16:12	2.6875	6.826	
B3	0.650	9	18:10	2.7500	6.985	
0.700 fps; V_{avg}/V_c = 0.7777						
A6	0.700	8.5	13:13	2.8750	7.303	
B5	0.700	8.5	15:29	3.2500	8.255	
0.735 fps; V_{avg}/V_c = 0.8167						
A3	0.735	10	9:05	2.6875	6.826	
B1	0.735	10	19:49	3.2500	8.255	
C1	0.735	3	18:35	3.1250	7.938	
C4	0.735	6	18:55	3.1250	7.938	

Summary Results Grouped by V_{avg}

Test	Avg V [fps]	Ya [in]	Duration [h:mm]	Scour Depth [in]	Scour Depth [cm]	Notes
0.773 fps; V_{avg}/V_c = 0.8589						
A2	0.773	8	17:57	3.1875	8.096	
B2	0.773	8	22:08	3.2500	8.255	
R1	0.773	8	18:13	3.0000	7.620	Live Bed Scour
C5	0.773	3	15:39	3.2500	8.255	
C6	0.773	6	15:39	3.1875	8.096	
XR1	0.773	3	17:17	2.8750	7.303	Live Bed Scour
XR2	0.773	6	16:06	3.3125	8.414	Live Bed Scour
0.835 fps; V_{avg}/V_c = 0.9278						
A4	0.836	9	14:27	3.3125	8.414	
B4	0.836	9	17:46	3.3750	8.573	
C2	0.836	3	16:22	3.2500	8.255	Live Bed Scour
C3	0.836	6	20:16	2.8750	7.303	Live Bed Scour

Velocity Profile Comparisons- Summary

- Open water- logarithmic as expected
- Covered flows-
  - Zero velocity at boundaries (no slip condition)
  - Maximum velocity location is a function of-
    - Flow depth
    - Roughness of boundaries
    - Viscosity of fluid
  - Maximum velocity located near the middle for floating smooth cover
    → similar boundary roughness
  - Larger maximum velocity for rough cover → live-bed
- Pressurized flows- velocity shifts toward smoother boundary
  - Less scour for pressurized smooth cover → shifts toward cover
  - More scour for pressurized rough cover → shifts toward bed
  - Shifts more pronounced for larger V_{avg}/V_c and larger pressure head
  - Pressurized flows- V_{avg} not acceptable indicator for live-bed scour
- **Combined effect of roughness and pressure flow**

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Philadelphia District

Jane Jablonski

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U.S. Army Corps of Engineers, Philadelphia

Jane.L.Jablonski@usace.army.mil

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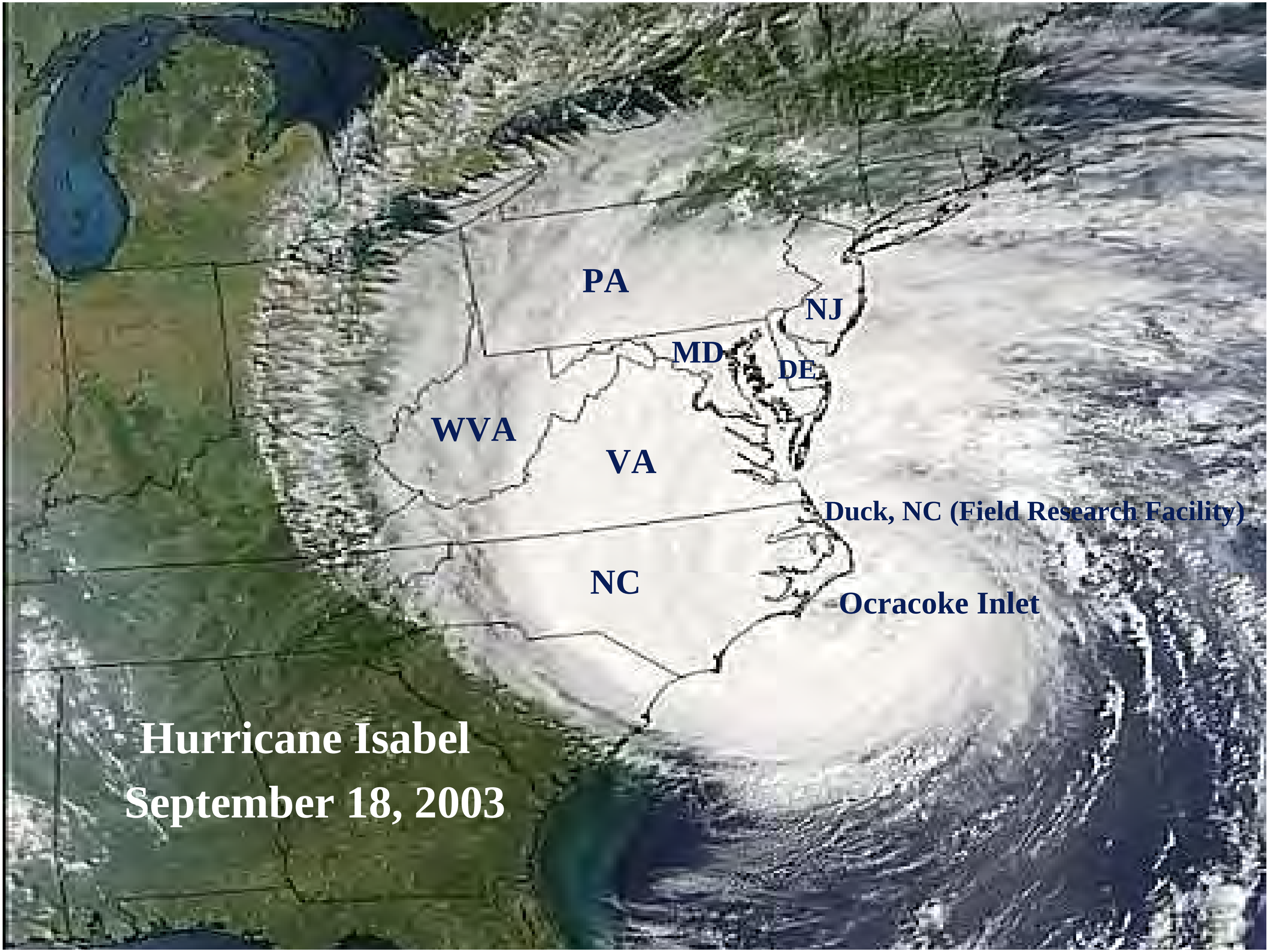
Philadelphia District

Hurricane Isabel Post-Storm Assessment

- Study Manager
  - Jane Jablonski (Coastal Planning Center of Expertise)
- Purpose
  - Evaluate Hurricane Isabel's impacts along coastal areas with and without Federal shore protection
- Study Team
  - Philadelphia District
  - Norfolk District
  - Wilmington District
  - Institute for Water Resources
  - Engineering Research and Design Center

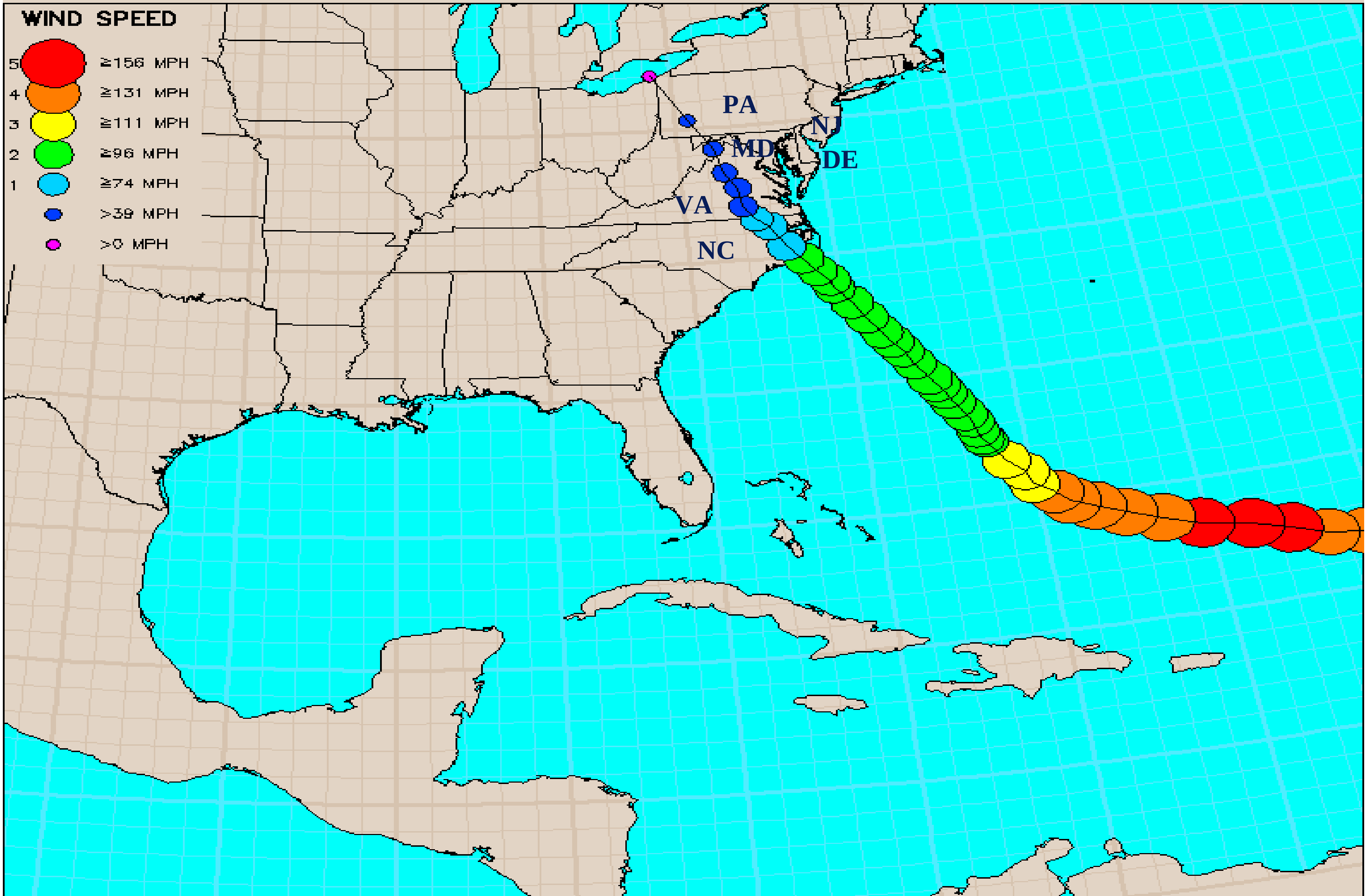

PA
NJ
MD
DE
WVA
VA
Duck, NC (Field Research Facility)
NC
Ocracoke Inlet
Hurricane Isabel
September 18, 2003


ARGUS2.1 snap Argus02a Thu Sep 18 15:00:08 2003 EST5EDT F: 1063911608
Duck Pier height of storm...17-18 ft waves at piers end!!
C: 1 S: 1 Inc: 0 Qual: 80

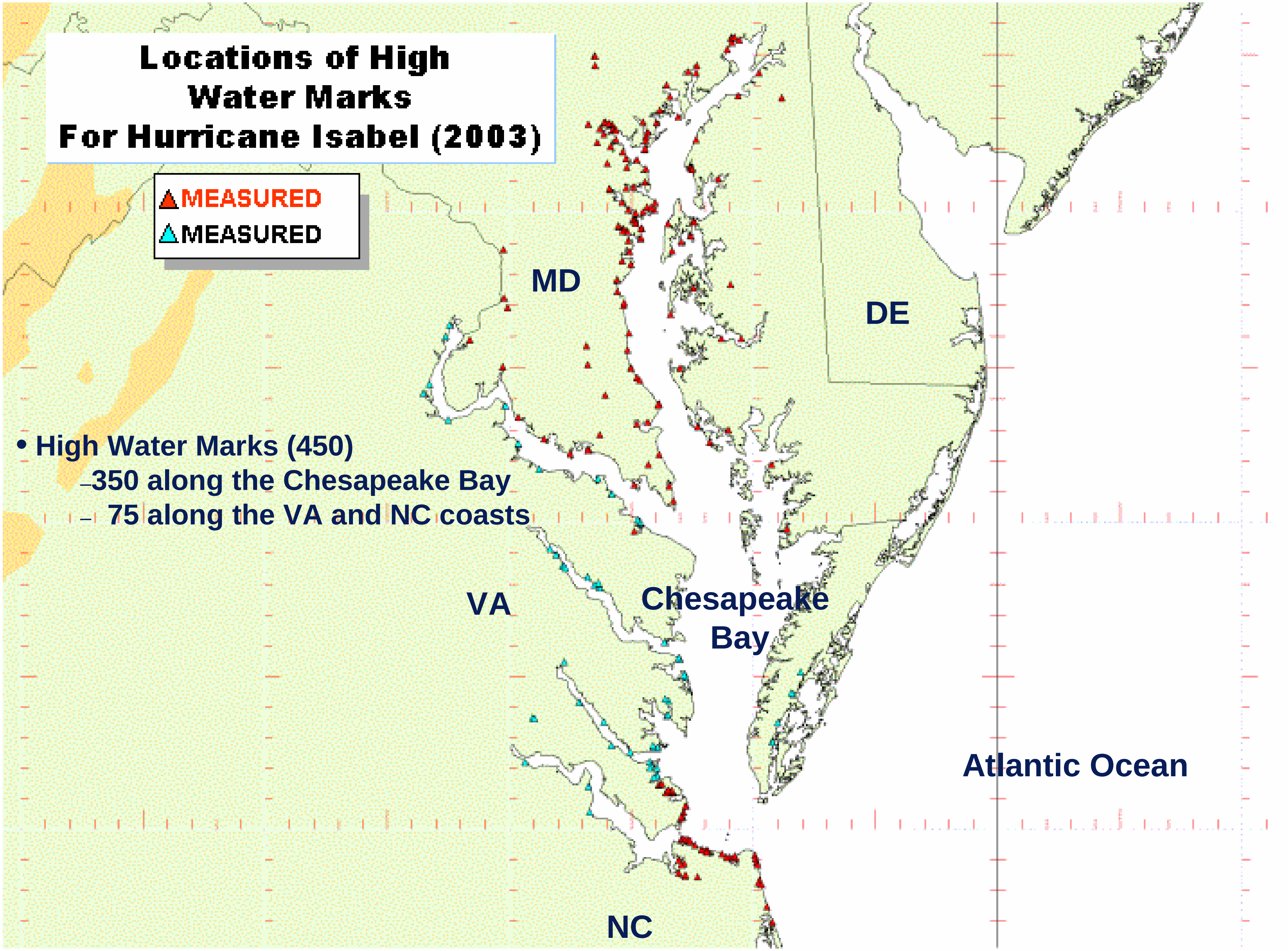

ARGUS2.1 snap Argus02a Fri Sep 19 15:00:08 2003 EST5EDT F: 1063998008
Duck Pier the next day!
C: 1 S: 1 Inc: 0 Qual: 80

Hurricane Isabel

13:00 Sat September 6, 2003 to 15:00 Fri September 19, 2003 UTC




DELAWARE CITY, DE
REEDY POINT, DE
Baltimore
BALTIMORE, FORT MCHENRY, MD
CHESAPEAKE CITY, MD
ATLANTIC CITY, NJ
TOLCHESTER, MD
SHIP JOHN SHOAL, NJ
Annapolis
BRANDYWINE SHOAL LIGHT, DE
Washington D.C.
CAPE MAY, NJ
U.S. NAVAL ACADEMY, MD
LEWES, FT. MILES, DE
WASHINGTON, DC
CAMBRIDGE, MD
Potomac River
OCEAN CITY INLET, MD
SOLOMONS ISLAND, MD
COLONIAL BEACH, VA
LEWISETTA, VA
Chesapeake Bay
9/19/03
0300 UTC
Richmond
WINDMILL POINT, VA
HURRICANE ISABEL
18-20 SEPT 2003
WACHAPREAGUE, VA
KINGSMILL, VA
GLOUCESTER POINT, VA
KIPTOPEKE, VA
SCOTLAND, VA
SEWELLS POINT, VA
CHESAPEAKE BAY BRIDGE TUNNEL, VA
James River
MONEY POINT, VA
9/18/03
23:00 UTC
Norfolk
Atlantic Ocean
DUCK, NC
OREGON INLET, NC
Raleigh
9/18/03
19:00 UTC
CAPE HATTERAS, NC
BEAUFORT, NC
9/18/03
15:00 UTC
Path of Hurricane Isabel
CO-OPS Water Level Gauges
N
W
E
S



- High Water Marks (450)
  - 350 along the Chesapeake Bay
  - 75 along the VA and NC coasts

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Hurricane Isabel

- Hurricane Isabel was the 6th most significant hurricane in U.S. history in terms of FEMA disaster relief funding up to that point in time .
  - More significant events in descending order included Hurricanes Georges ('98), Andrew ('92), Hugo ('89), Floyd ('99), and Fran ('96).
  - Does not include 2004 hurricanes.
- Presidential disaster declarations in Washington, DC; DE; MD; NC; VA; and WV.
  - FEMA disaster assistance estimated at $558.4 million.

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Flood Insurance Claims by State

State	Total # of Claims	Total Building ($)	Total Content ($)
Pennsylvania	166	1,387,527	131,573
West Virginia	50	279,390	45,517
Delaware	60	648,724	553,716
Washington, D.C.	8	216,138	84,345
Maryland	2,292	50,645,374	7,046,633
Virginia	11,040	184,159,838	25,165,007
North Carolina	6,435	81,063,587	13,529,785
Total	20,051	318,400,578	46,556,576

Potomac River near Fredericksburg, VA


Baltimore (Inner Harbor)

Baltimore (Inner Harbor)


Baltimore (Fells Point)


Baltimore (Fells Point)

Annapolis,MD (Market Place)

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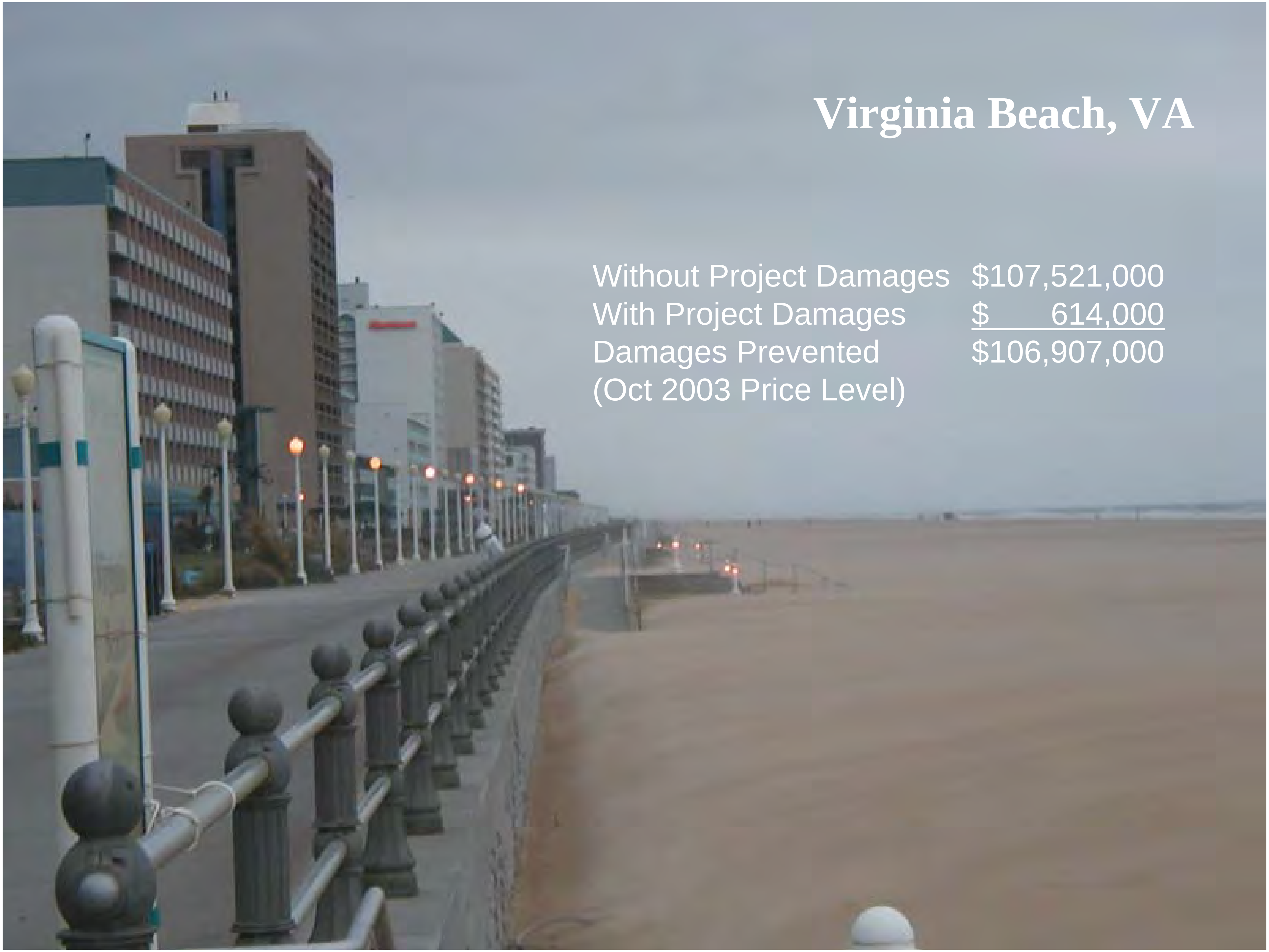
Hurricane Isabel Post-Storm Assessment Primary Objectives

- For protected coastal areas, address physical and economic performance of existing COE shore protection projects impacted by Isabel
  - Virginia Beach-VA BEC & HP
  - Sandbridge-VA BEC & HP

- For unprotected coastal areas, address potential damages that could have been prevented during Isabel had the proposed COE shore protection project been in place
  - Dare County, NC Beaches Project
    - Kitty Hawk, Kill Devil Hills, Nags Head


Federal Shore Protection Project at Virginia Beach
▪$120 M shore protection project completed by the Norfolk District in 2002
▪ 300 foot-wide beach (tripled existing beach)
▪ seawall at elev. +13.5 ft NGVD along the southern half of project
▪berm at elev. +10.0 ft NGVD
▪dune w/ a top elev. +18.0 ft NGVD along northern half of project
▪ 4 M cy sand over 6.3 miles of shoreline
▪ southern 4 miles of shoreline contains the “resort strip”
Virginia Beach, VA


Virginia Beach, VA
Without Project Damages $107,521,000
With Project Damages $ 614,000
Damages Prevented $106,907,000
(Oct 2003 Price Level)

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Economic Damage Assessment Virginia Beach

Without Project Damage Analysis

- Current total value for properties along the oceanfront
  - Residential property ($408,100,000) (incl. high rise condos)
    - Oceanfront property not available for less than $1,250,000
  - Commercial property ($357,000,000)
  - Government property ($20,400,000)

- Historical stage-damage data used in the original justification of the project was updated using appropriate growth indices and then related to the estimated storm frequency of Isabel (60 yr event)

- Based on a HWM (still water-no wave runup) near an inlet adjacent to the project, an elevation of +8.0 ft NGVD was used as an index of damage

- Total Without Project Damages estimated at $107,521,000
  - Residential ($74,103,000)
  - Commercial ($21,673,000)
  - Utilities/Bulkheads ($11,745,000)

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Economic Damage Assessment
Virginia Beach

With Project Damage Analysis

- Actual damages during Isabel relatively minor and limited to a few structures (one structure accounted for 70% of the damages)
- City of Virginia Beach was primary source of storm damage info as well as flood insurance claims data
- Total With Project Damages estimated at $614,000

Economic Damage Assessment
Virginia Beach

Damages Prevented during Isabel

– Without Project Damages		$107,521,000
– With Project Damages	-	$ 614,000
– Damages Prevented		$106,907,000


Hurricane Gordon-1994
Sandbridge, VA
(prior to Federal project)

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Sandbridge, Virginia

Federal Shore Protection Project at Sandbridge

- $11 M shore protection project completed by the Norfolk District in 1998
- 50 foot-wide berm at elevation +7.0 feet NGVD
- 1.1 M cy sand over 5 miles of shoreline

Storms threaten property and infrastructure.

Prior to beachfill- Dec 1994

After beachfill- July 2000

Without Project Damages $29,454,000
With Project Damages $ 2,990,000
Damages Prevented $26,464,000
(Oct 2003 Price Level)
Sandbridge, VA

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Economic Damage Assessment
Sandbridge, VA

Without Project Damage Analysis

- Primarily residential properties w/ interspersed publicly-owned lands
  - About 1,000 homes along the oceanfront (incl. first two rows of structures)
    - » Range from small traditional beach cottages to large multi-family homes
    - » Older homes valued at $750,000, newer homes valued at $1,500,000
    - » Large number of homes are vacation rentals
  - 236 oceanfront land parcels (206 parcels contain residential structures)
  - No commercial properties along oceanfront

- Current total value for properties along the oceanfront
  - Residential (incl. first two rows of structures) ($212,500,000)

- Historical stage-damage data used in the original justification of the project was updated using appropriate growth indices and then related to the estimated frequency of Isabel (60 yr event)

- Based on a HWM (still water-no wave runup) near the project, an elevation of +8.0 ft NGVD was used as an index of damage

- Total Without Project Damages estimated at $29,454,000
  - Residential ($9,169,000)
  - Utilities/Bulkheads ($20,285,000)

Economic Damage Assessment
Sandbridge, VA

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With Project Damage Analysis

- More damage at Sandbridge than at Virginia Beach
- Source of actual damage information
  - personal interviews
  - comprehensive questionnaire survey
    - » 440 surveys distributed to homeowners along the first two blocks of oceanfront property (45.5% response rate)
  - FEMA flood insurance claims
- Total With Project Damages
  - Surveys: $2,990,000 (used in analysis)
  - FEMA: $1,383,967

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Economic Damage Assessment
Sandbridge, VA

Damages Prevented during Isabel

– Without Project Damages		$29,454,000
– With Project Damages	-	$ 2,990,000
– Damages Prevented		$26,464,000

Economic Damage Assessment Summary
Virginia Beach and Sandbridge, VA

Total Damages Prevented during Isabel

Virginia Beach	$106,907,000
Sandbridge	$ 26,464,000
Total	$133,371,000


Kitty Hawk, NC

•Data from over 400 building inspections and 130 residential surveys are being used to develop erosion, wave, and inundation damage relationships for use in economic models

Nags Head, NC during Isabel


Nags Head, NC

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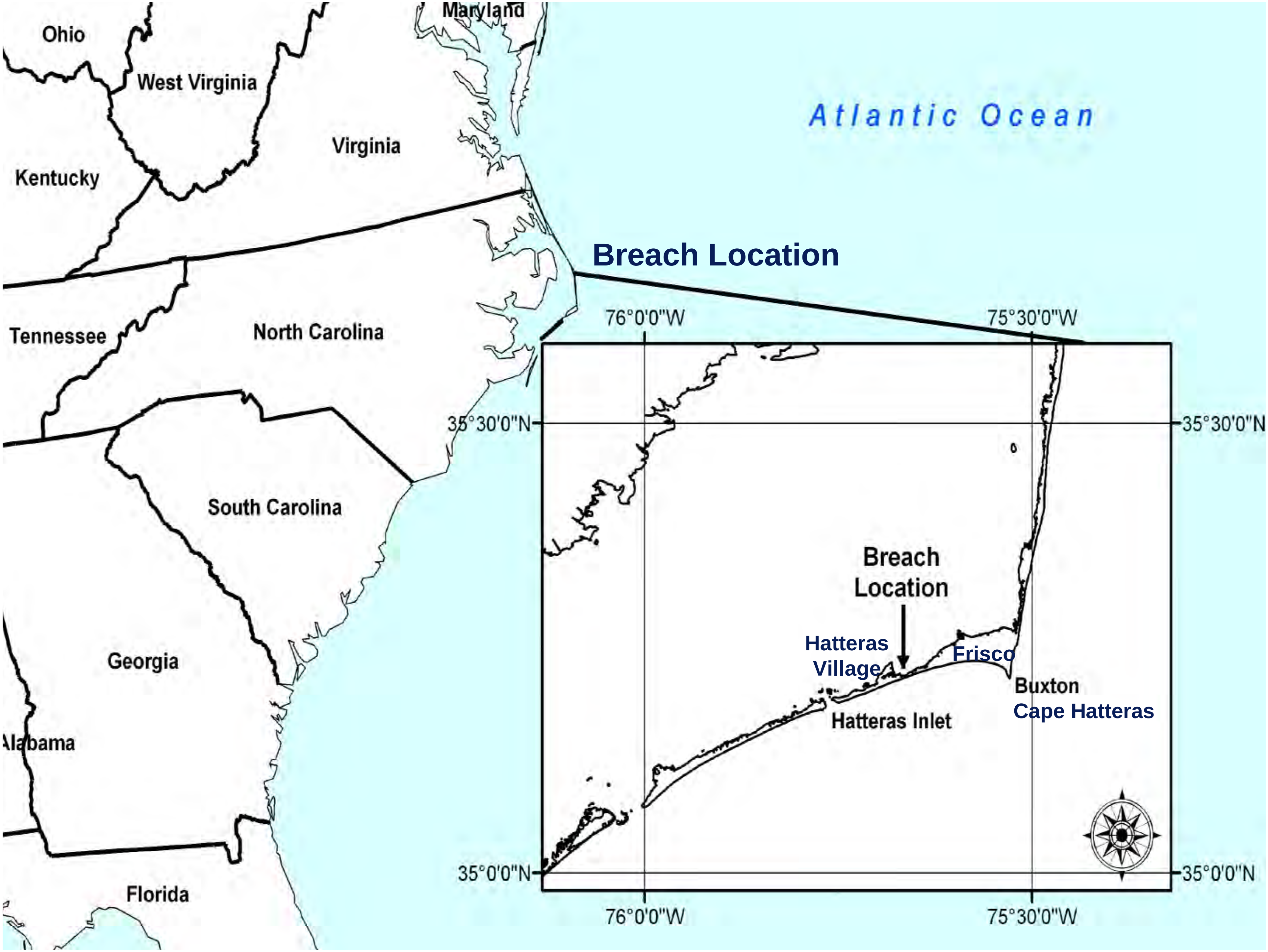
Dare County, NC Damage Estimates

- Dare County, NC had over $167 M in structural damage (mostly residential property)
  - – $96.8 million on Hatteras Island
  - – $25.2 million in Nags Head
  - – $20.6 million in Kitty Hawk
  - – At least 133 structures were destroyed and over 1,000 structures suffered major damage

- North Carolina Statewide Public Assistance following Hurricane Isabel (about $87 M)
  - $44.1 million in Debris Removal
  - $20.2 million in Protective Measures
  - $16.6 million in Public Utilities
  - $4.5 million in Recreation Facility Repair
  - $1.5 million in Roads and Bridges


Ohio
West Virginia
Maryland
Virginia
Kentucky
Atlantic Ocean
Breach Location
Tennessee
North Carolina
South Carolina
Georgia
Alabama
Florida
76°0'0"W
75°30'0"W
35°30'0"N
35°0'0"N
Breach Location
Hatteras Village
Frisco
Buxton
Cape Hatteras
Hatteras Inlet

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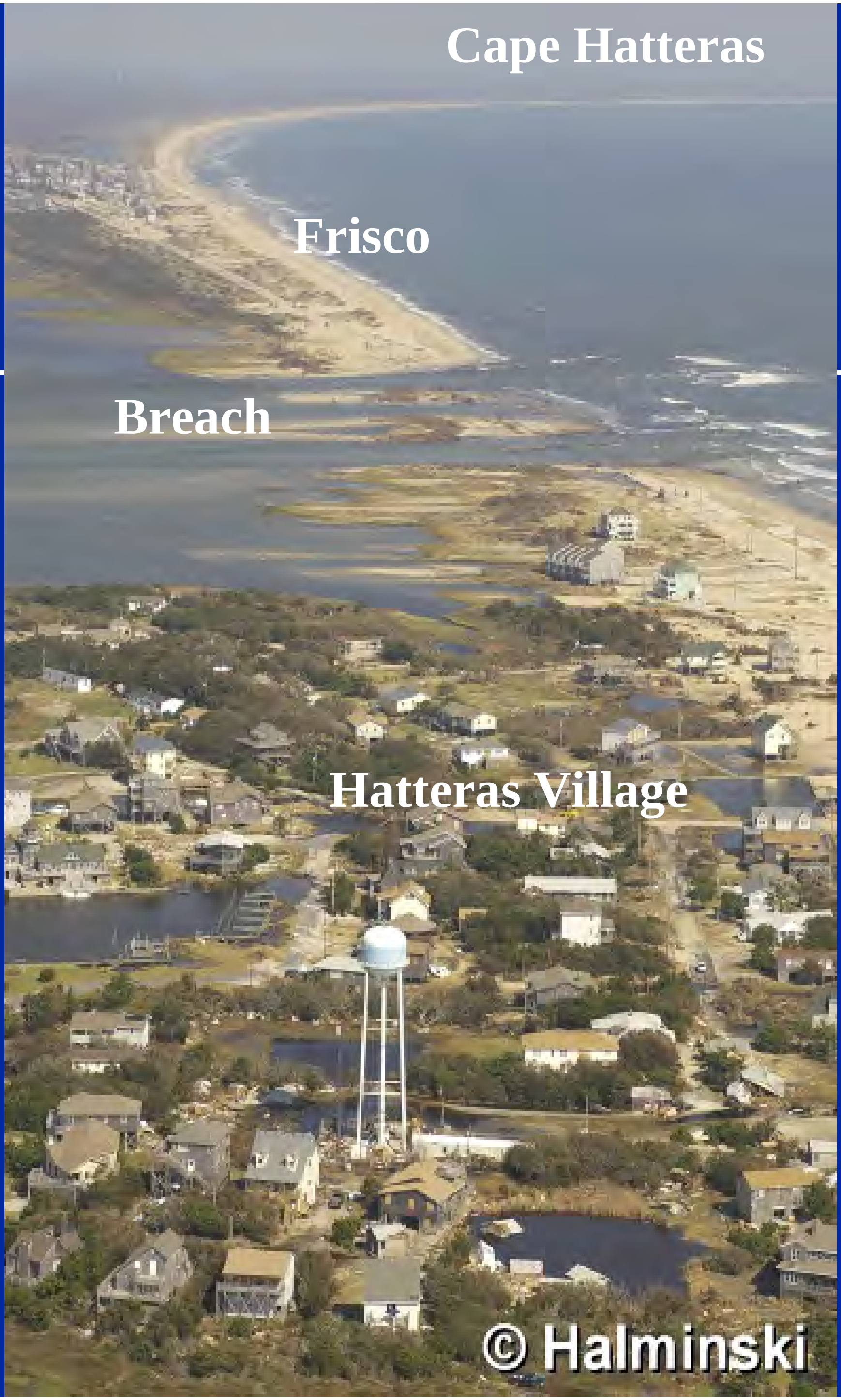


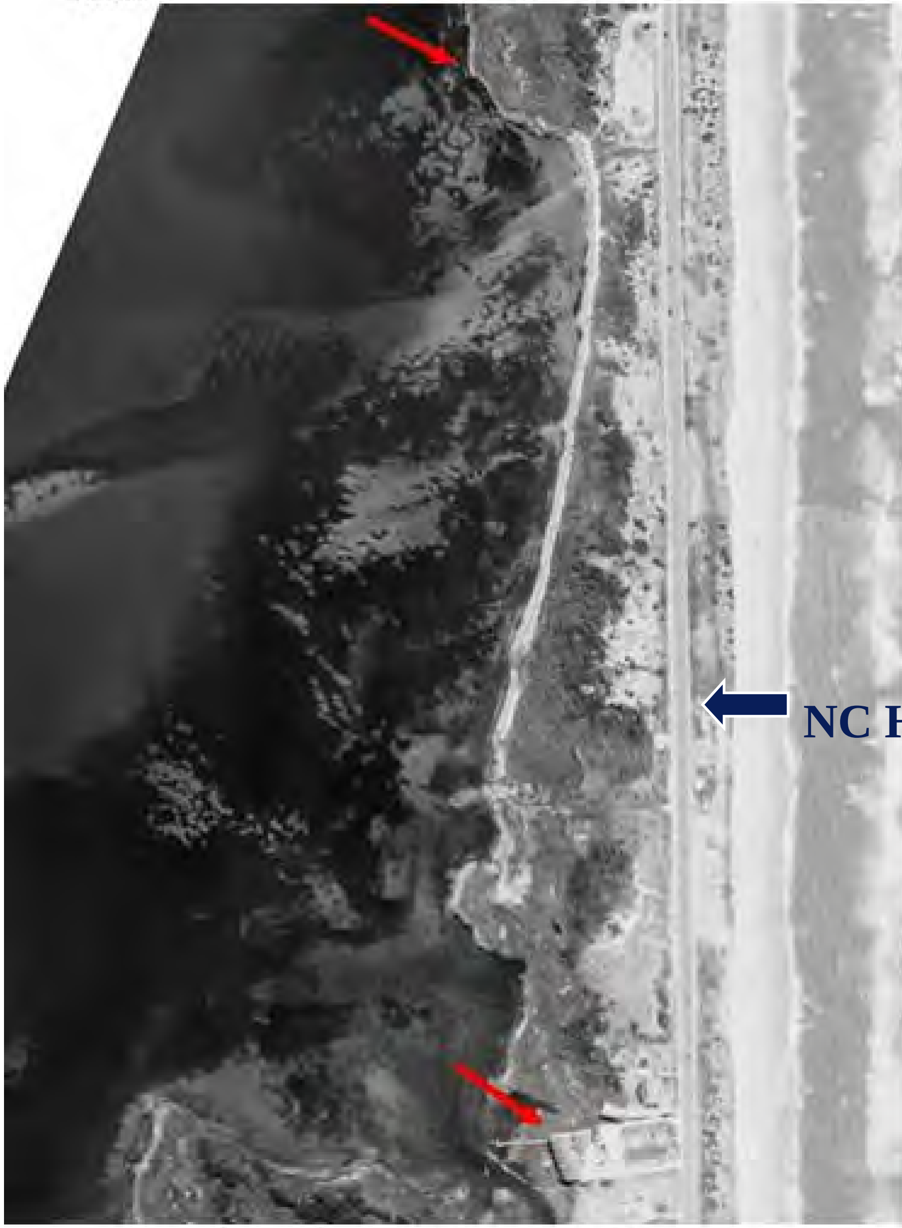
Hurricane Isabel Damage Assessment

Hatteras Village, North Carolina

1998

September 19, 2003

Hurricane Isabel Damage Assessment



Cape Hatteras National Seashore, North of Hatteras Village, NC.


Hatteras
Village
Breach
Frisco


Breach


Breach Closed
© Halminski

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Hurricane Isabel Post-Storm Assessment Primary Objectives

- Tell the story of the Breach
  - Emergency measurements made to characterize the breach (tides, currents, morphologic response) will be analyzed to quantify and document the formation and evolution of the breach
  - Document the process of closing the breach
  - Lessons learned

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Hurricane Isabel Post-Storm Assessment Primary Objectives

- Establish Coastal Storm Damage Relationships for Inundation, Waves, and Erosion
  - Determine coastal storm damage relationships based on post-storm damage data collection in Dare County, NC
  - Use damage functions in GRANDUC (Generalized Risk and Uncertainty-Coastal) coastal storm damage model to determine damages that could have been prevented during Isabel

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Hurricane Isabel Post-Storm Assessment
Primary Objectives

- Document Storm Characteristics and Morphologic Responses to Isabel
  - Storm Characteristics (combination of modeling, measured data, and data analysis)
    - storm meteorology hindcast (wind and atmospheric pressure fields)
    - wave hindcast
    - water level hindcast
  - Morphologic Response Parameters (pre- and post-storm topography and bathymetry)
    - shoreline change
    - dune retreat
    - beach and dune volume loss
    - offshore gains and losses

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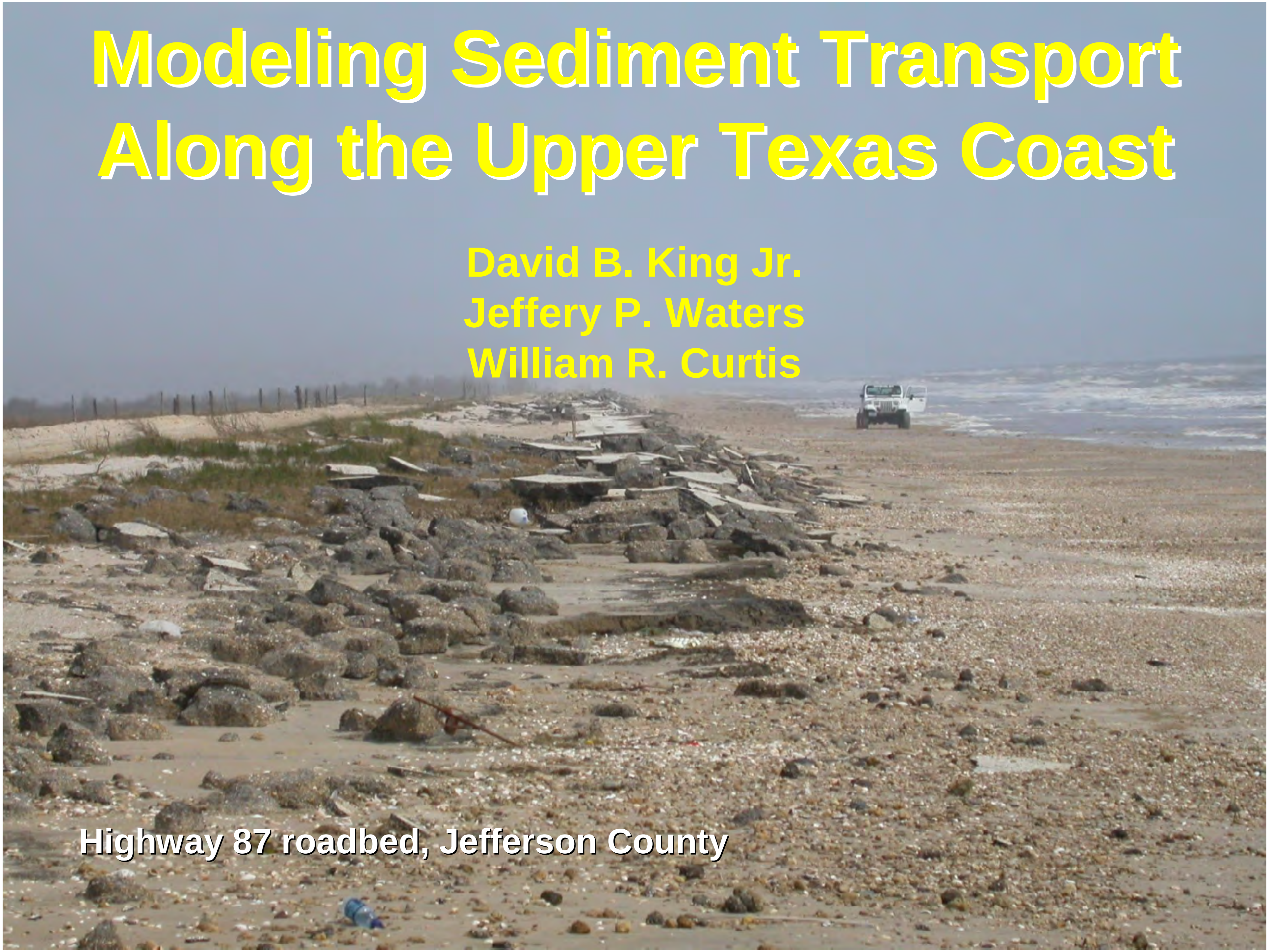
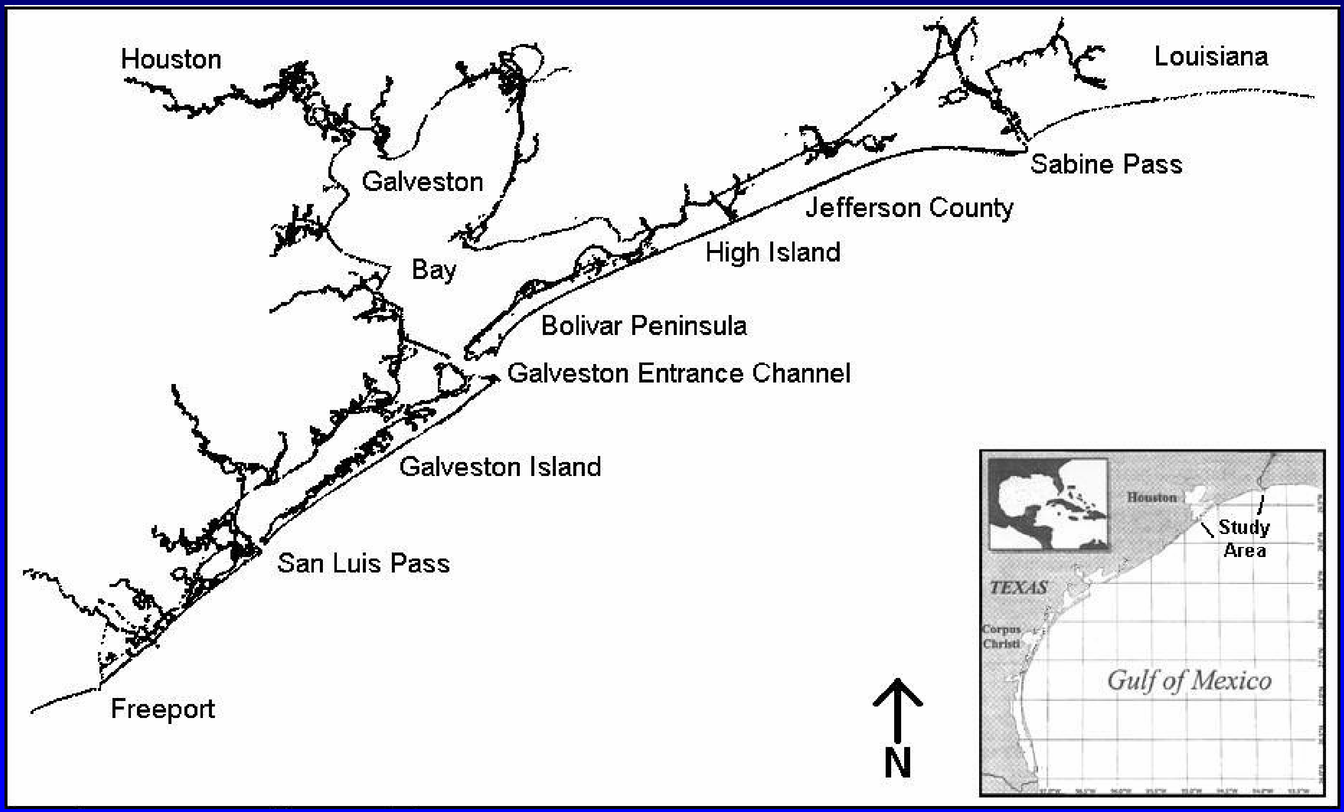
Hurricane Isabel Post-Storm Assessment Primary Objectives

- Address Model Performance
  - Wave model performance (WAM)
  - Water level (tides/surge) model performance (ADCIRC)
  - Storm-induced beach profile response model performance (SBEACH)


Modeling Sediment Transport
Along the Upper Texas Coast
David B. King Jr.
Jeffery P. Waters
William R. Curtis
Highway 87 roadbed, Jefferson County

Galveston District – Corps of Engineers
Sabine Pass to San Luis Pass
Shoreline Erosion Feasibility Study



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Coastal and Hydraulics Laboratory
Engineer Research & Development Center

ERDC's Role in the Feasibility Study

- WIS wave hindcast
- ADCIRC water level and currents
- Sediment Budget
- SBEACH storm-induced beach changes
- STWAVE / GENESIS longterm shoreline change modeling

Status

Current

- Develop numerical modeling tools to predict shoreline change
- Use these tools to evaluate design alternatives for erosion control, storm damage reduction, and environmental restoration

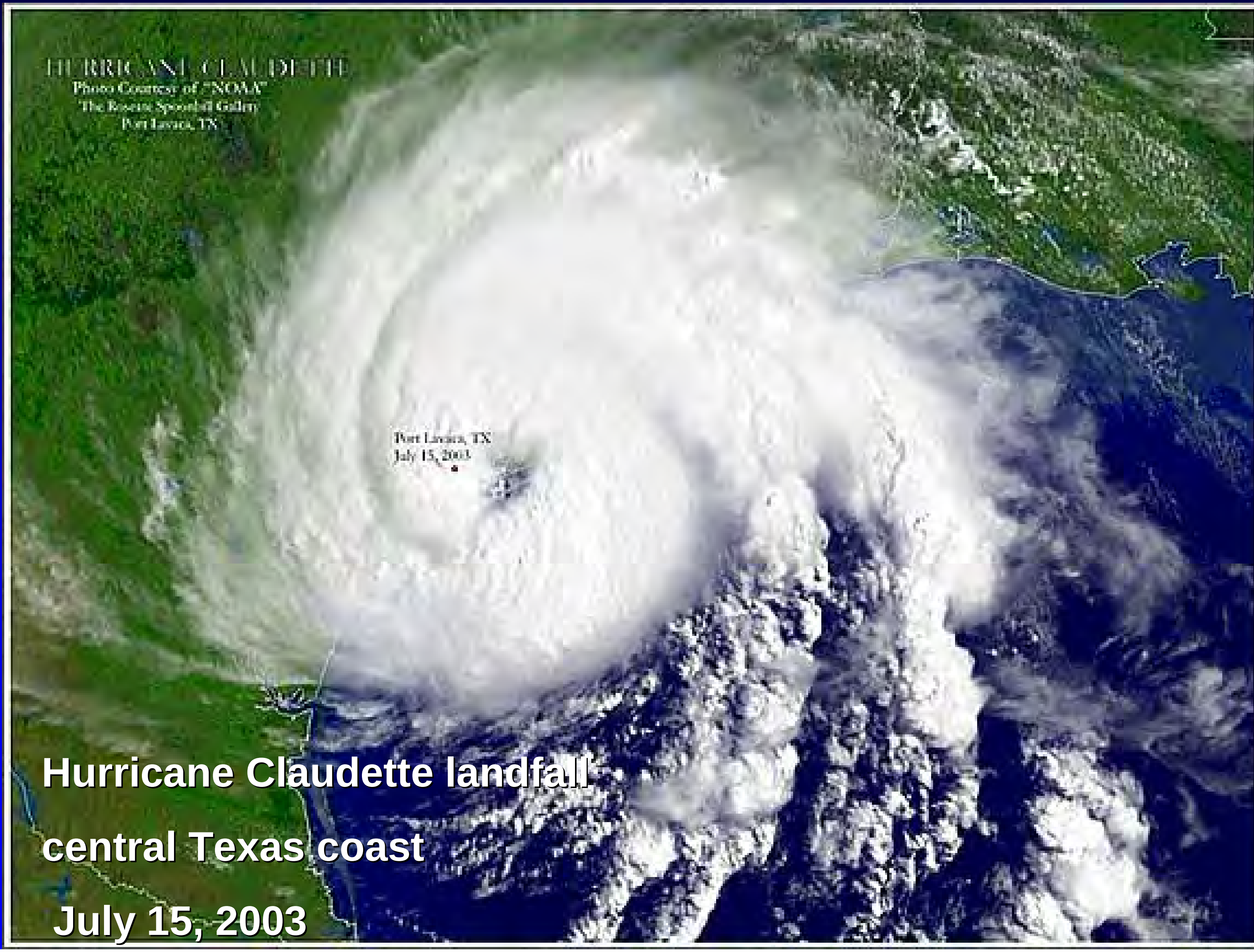
Near Future

- Final design refinement and optimization

SBEACH
(Storm-induced BEAch CHange)

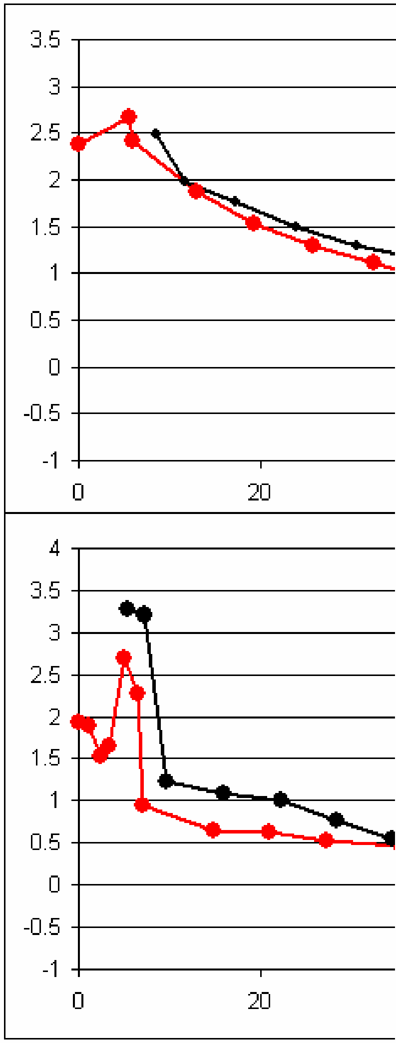
- Numerical Model for simulating cross-shore beach change
- Intended use is to predict short-term beach profile response to storms

SBEACH Calibration

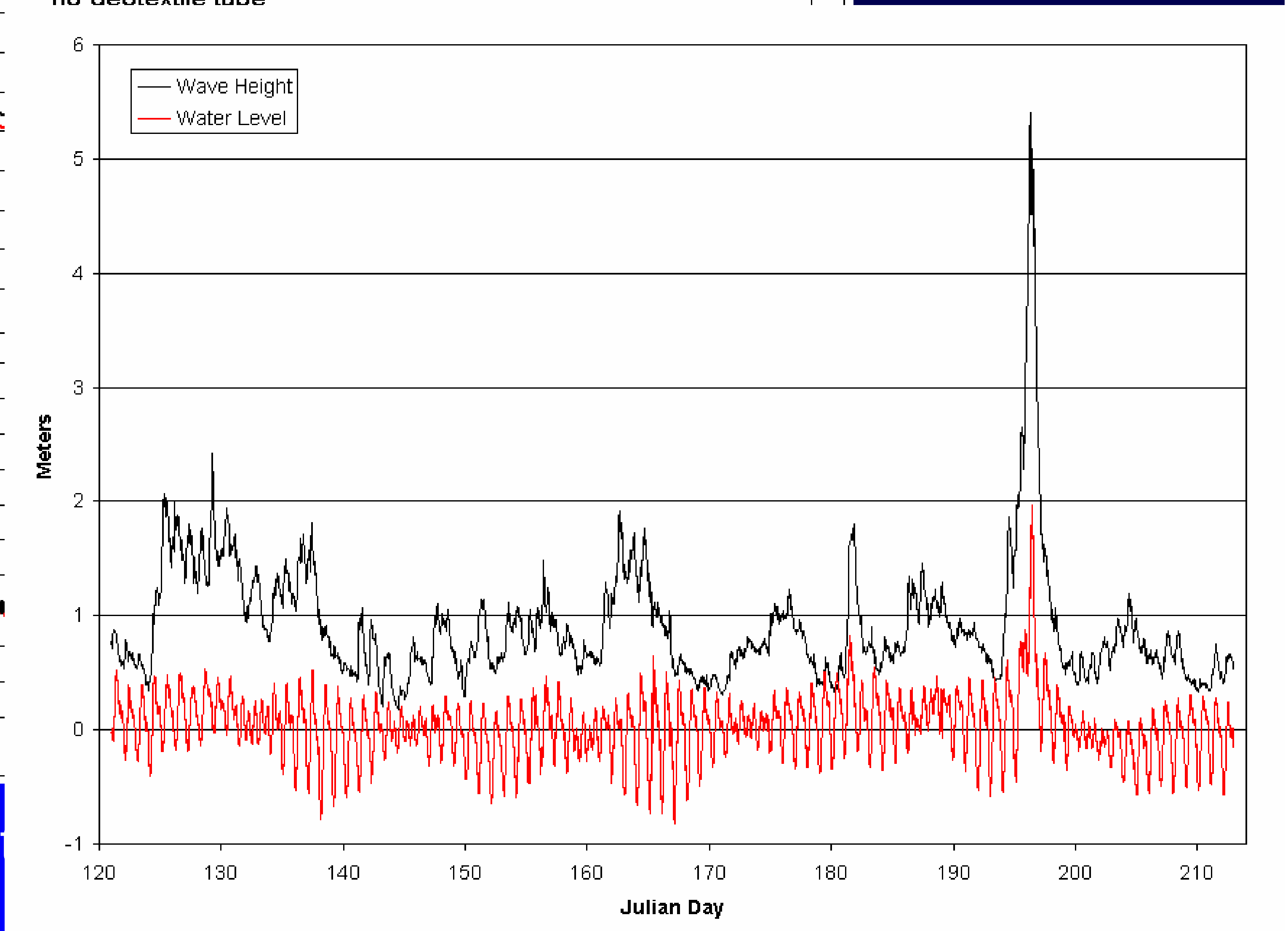


Hurricane Claudette Beach Erosion

Data Inputs

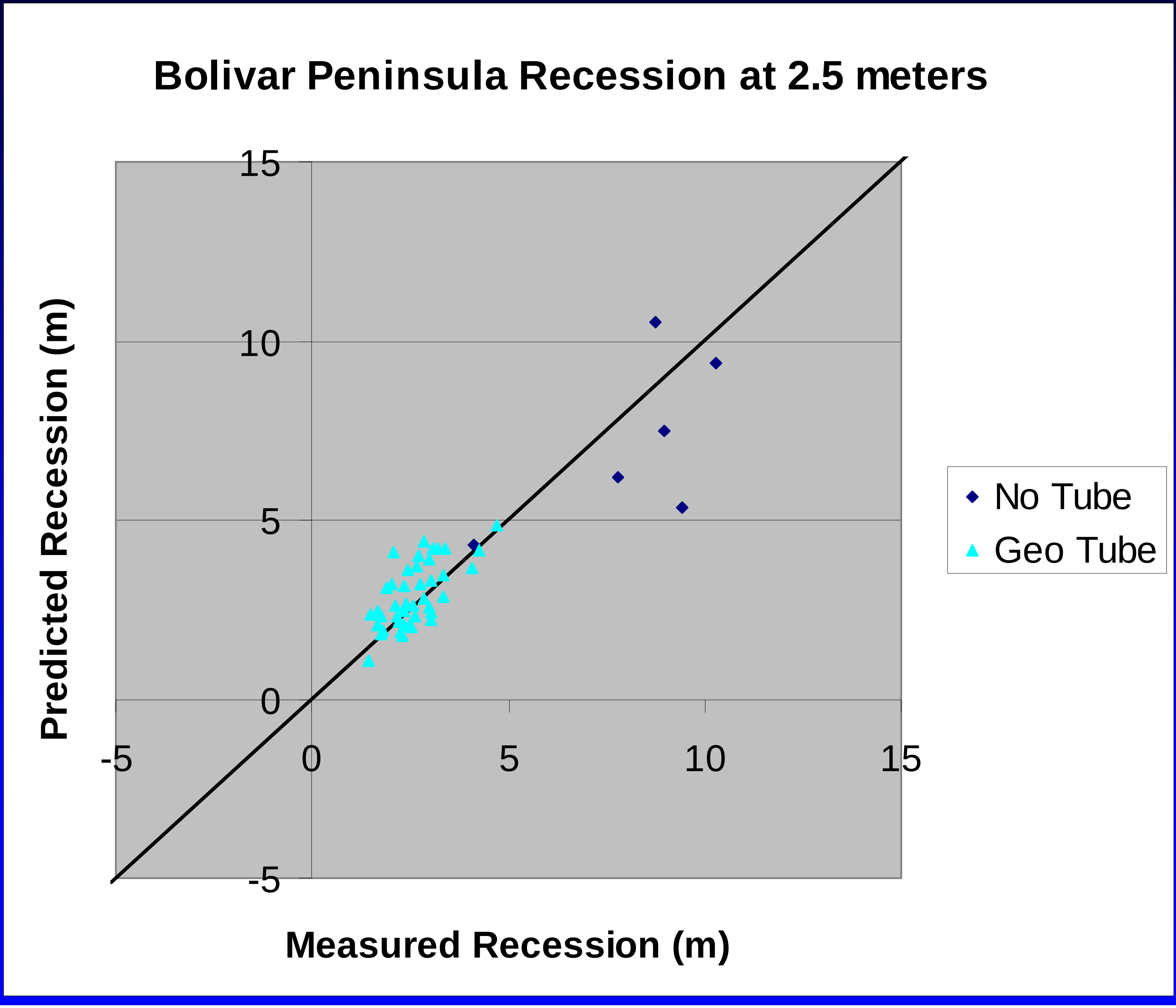


Pre- and Post



Waves and Water Levels

Example Result



GENESIS (GENEralized model for SImulating Shoreline change)

- Numerical Model for simulating along-shore beach change
- Intended use is to predict long-term shoreline evolution

GENESIS Calibration

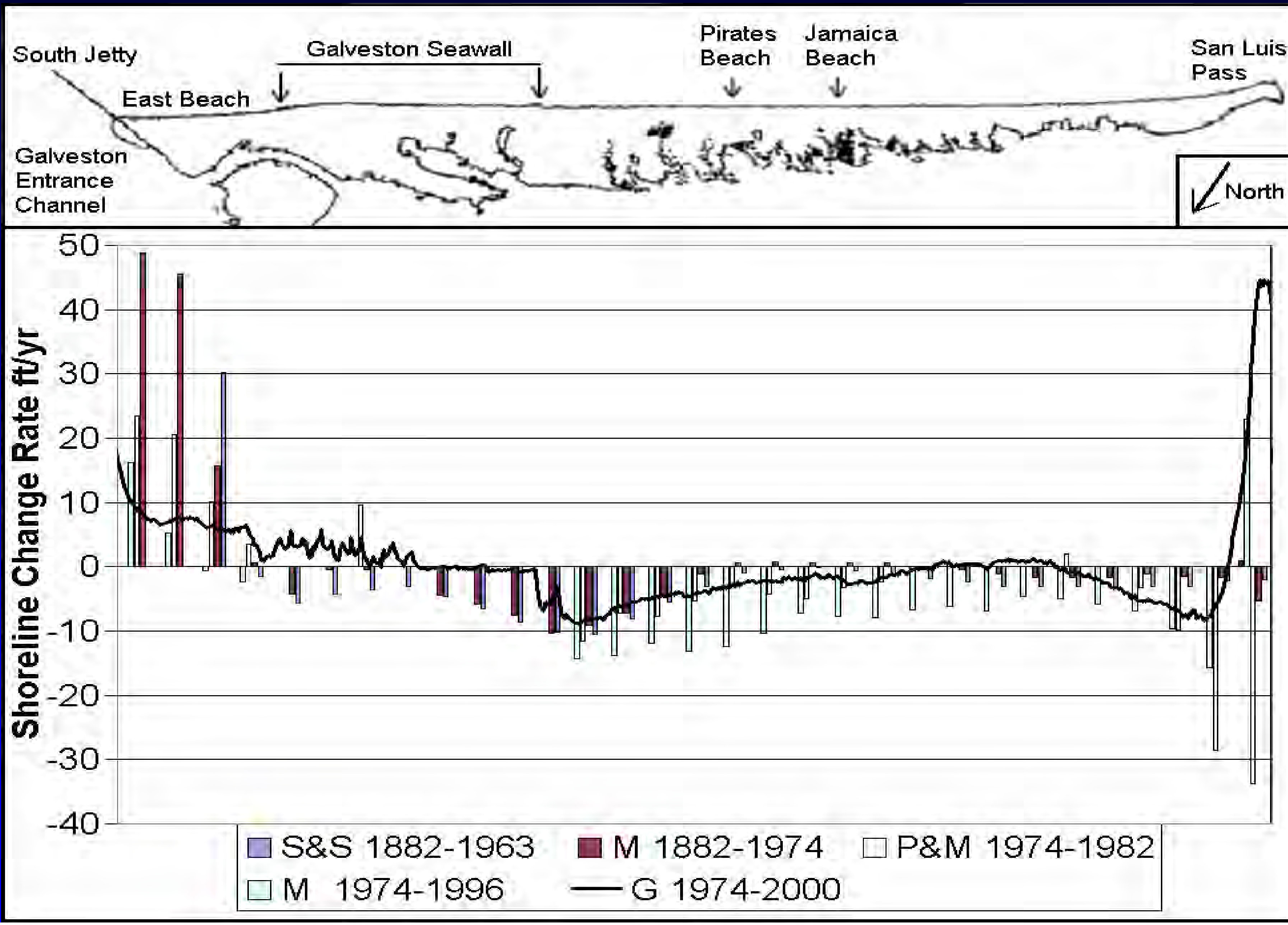
Tools

- STWAVE - transforms offshore waves to near-breaking depths
- GENESIS - predicts longshore transport rates and long term beach evolution

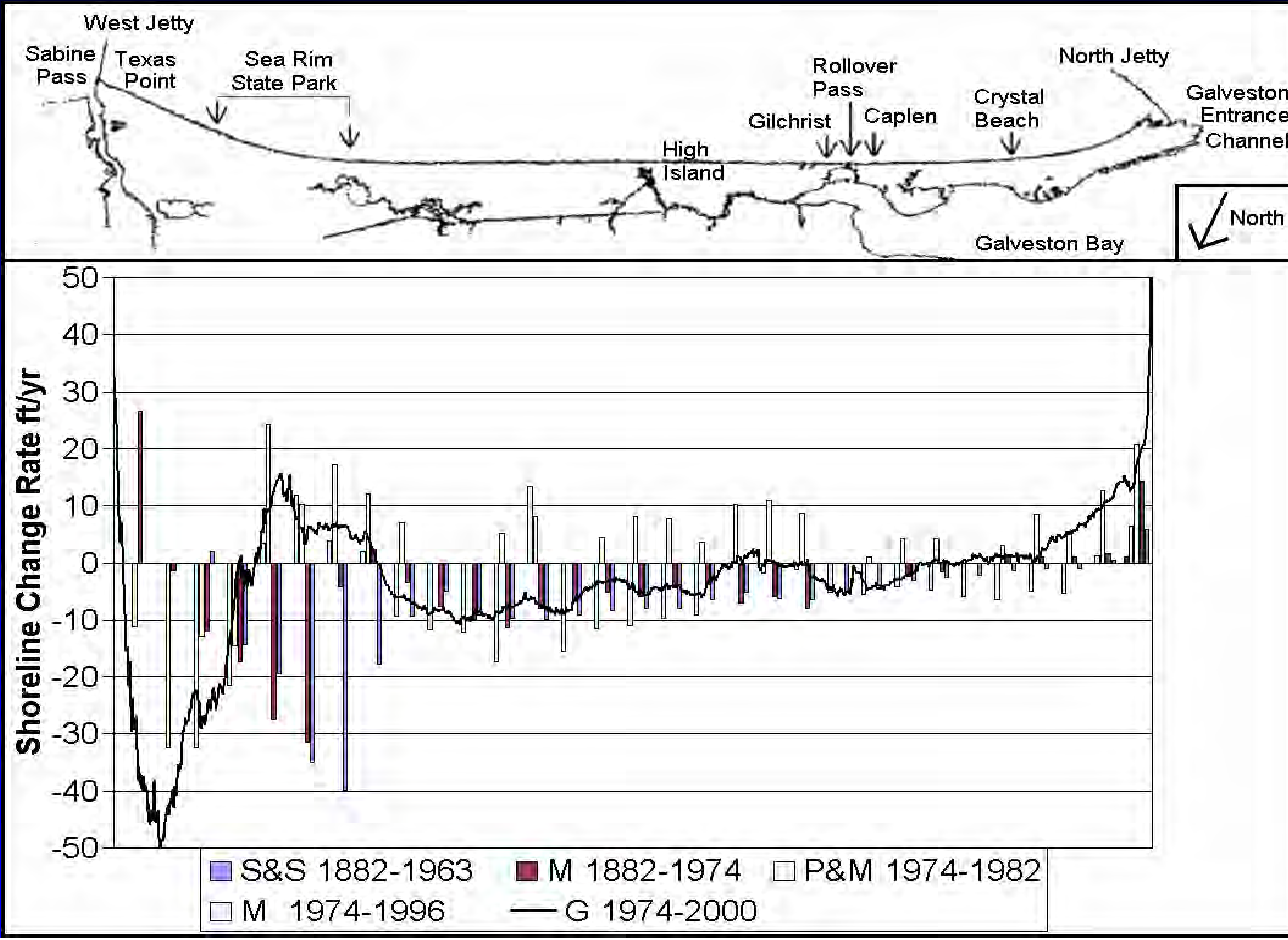
Data

- WIS hindcast waves
- WIS windfields
- NOS Bathymetry
- Texas BEG shorelines and change rates

Shoreline Change Rates - Galveston Island

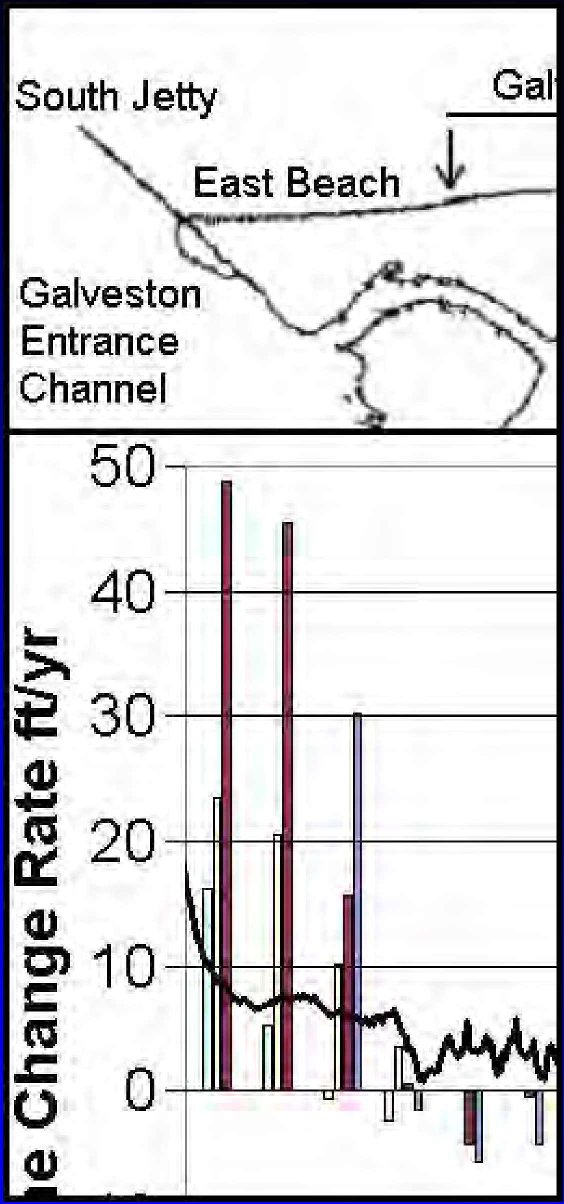


Shoreline Change Rates – High Island



Differences in Change Rates

- Differences in shoreline definitions
- Errors in the data and the analysis procedure
- Natural variations in the shoreline change rate at different times



Published Transport Rates

- Published reports indicate net transport is to the southwest along all or almost all of the study area.
- Net rates are generally within the 30,000 – 150,000 m^3/yr range to the southwest.

Bales, J. D. and Holley, E. R. (1989). Sand transport in Texas tidal inlet, *JWPCO Eng*, 115 (4), 427-443.

Hall, G. L. (1975). Sediment transport processes in the nearshore waters adjacent to Galveston Island and Bolivar Peninsula, Ph. D. diss., Texas A&M.

Mason, C. (1981). "Hydraulics and stability of five Texas inlets," Misc Paper CERC-81-1.

Prather, S. H. and Sorensen, R. M. (1972). "An investigation of Rollover Pass, Bolivar Peninsula, Texas,". TAMU-SG-72-202.

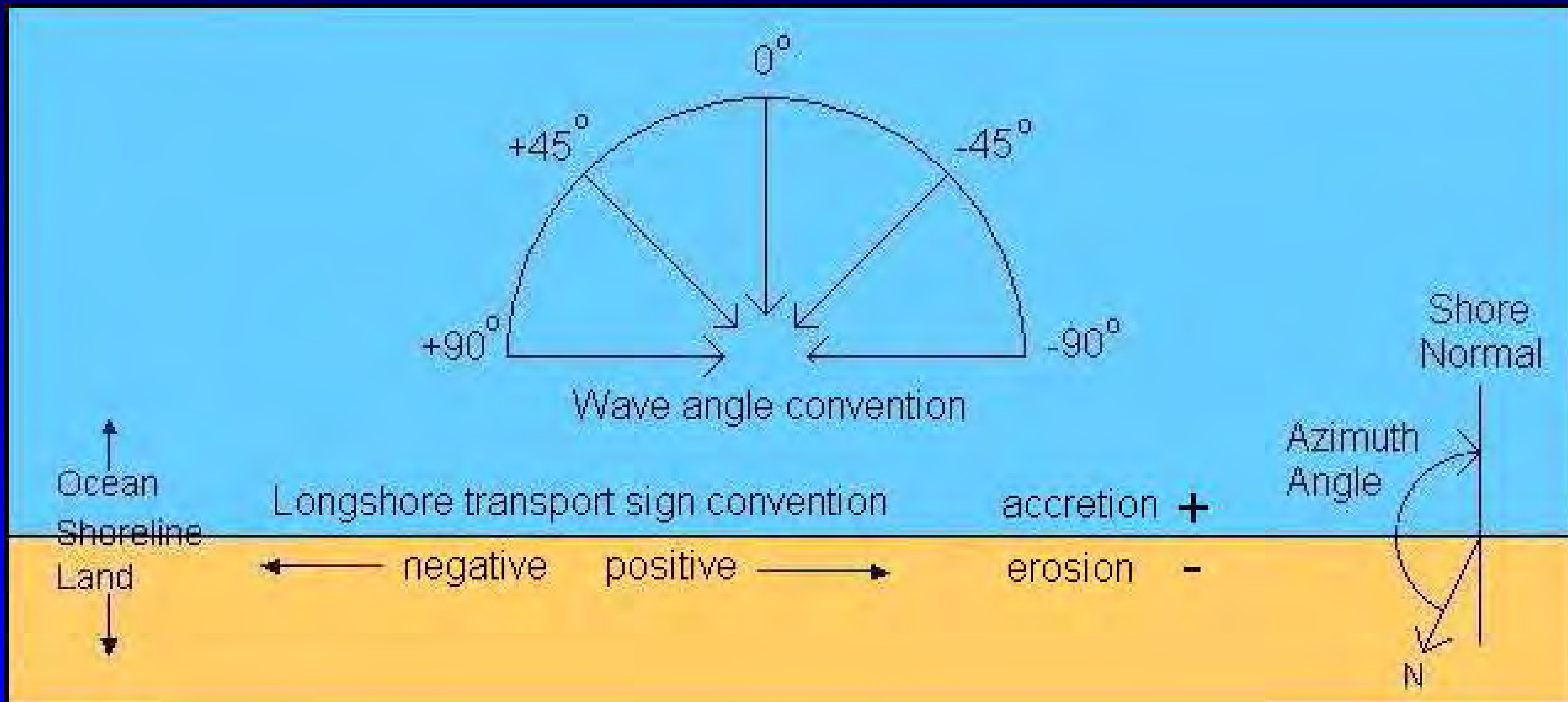
U.S. Army Corps of Engineers. (1983). "Galveston County shore erosion study, Feasibility report on beach erosion

West End of Galveston Seawall

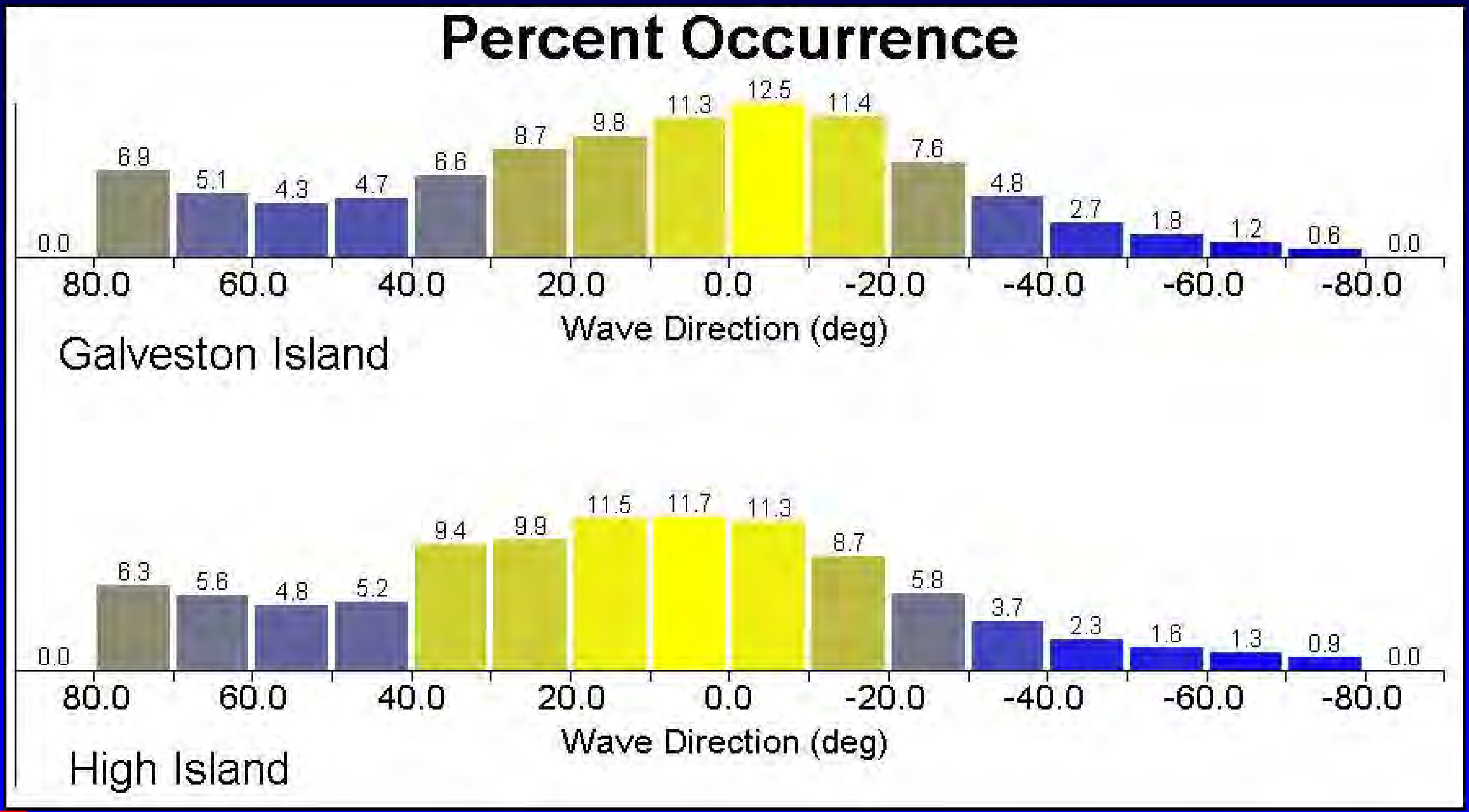
US Army Corps
of Engineers

Coastal and Hydraulics Laboratory
Engineer Research & Development Center

Angle and Sign Convention



Wave Angles



Percent Occurrence
0.0
6.9
5.1
4.3
4.7
6.6
8.7
9.8
11.3
12.5
11.4
7.6
4.8
2.7
1.8
1.2
0.6
0.0
80.0 60.0 40.0 20.0 0.0 -20.0 -40.0 -60.0 -80.0
Wave Direction (deg)
Galveston Island
0.0
6.3
5.6
4.8
5.2
9.4
9.9
11.5
11.7
11.3
8.7
5.8
3.7
2.3
1.6
1.3
0.9
0.0
80.0 60.0 40.0 20.0 0.0 -20.0 -40.0 -60.0 -80.0
Wave Direction (deg)
High Island

Preliminary Transport Calculations

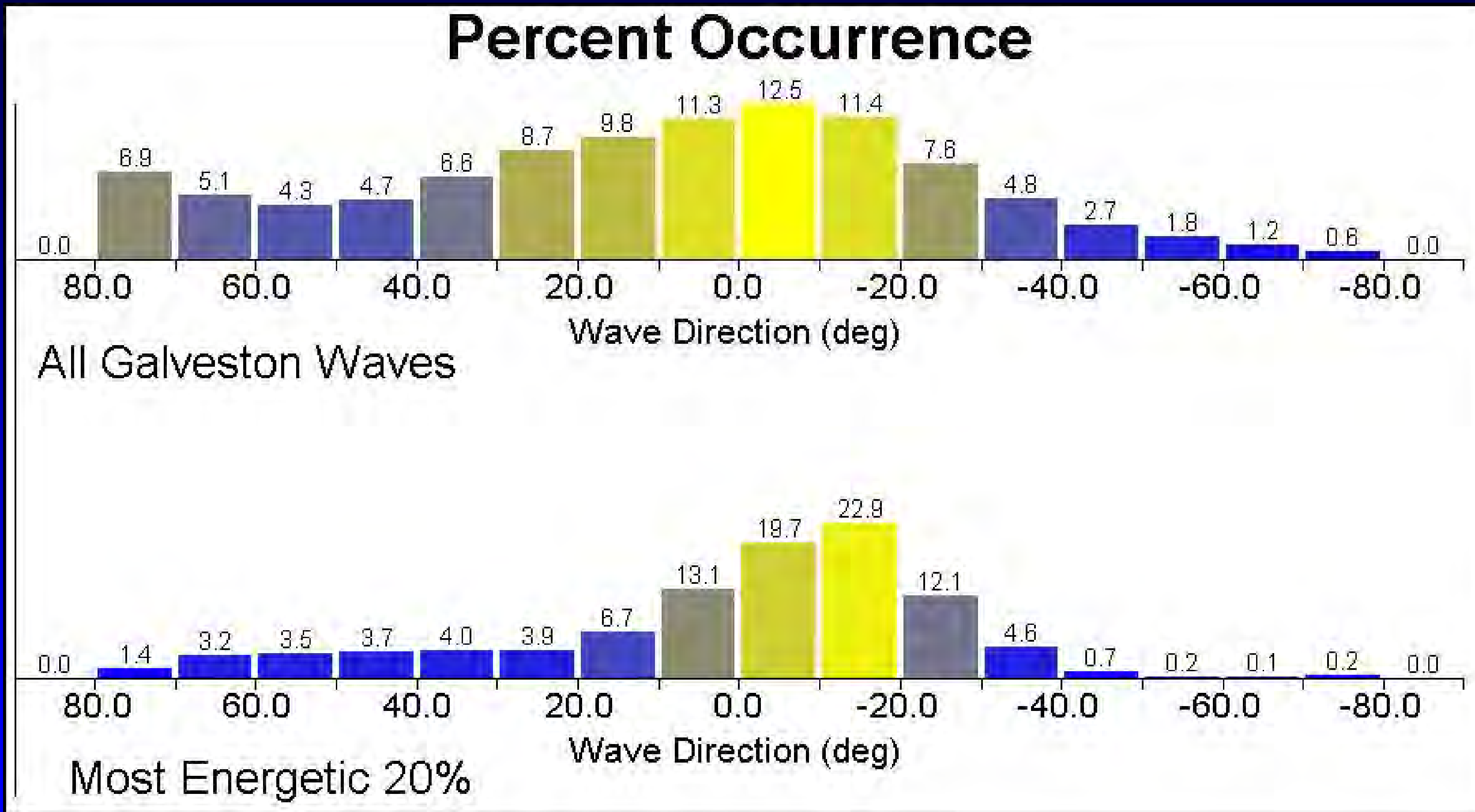
- Use offshore WIS wave data – 10 years of hourly data
- Remove offshore traveling waves
- Simple Snell's Law transformation to breaking depth
- Transport rate from "CERC" formula

Net longshore sediment transport rate results:

High Island – 75,000 m^3/yr to southwest

Galveston Island – 135,000 m^3/yr to northeast

High Energy Wave Angles



Solution Attempts

- Earlier WIS hindcast 1976-1995
- NOAA Buoy 42035 data (off Galveston)
- Different definitions of wave angle and period
- Influence of coastal currents

Nothing shifted the direction of net transport on Galveston Island to the southwest . . .

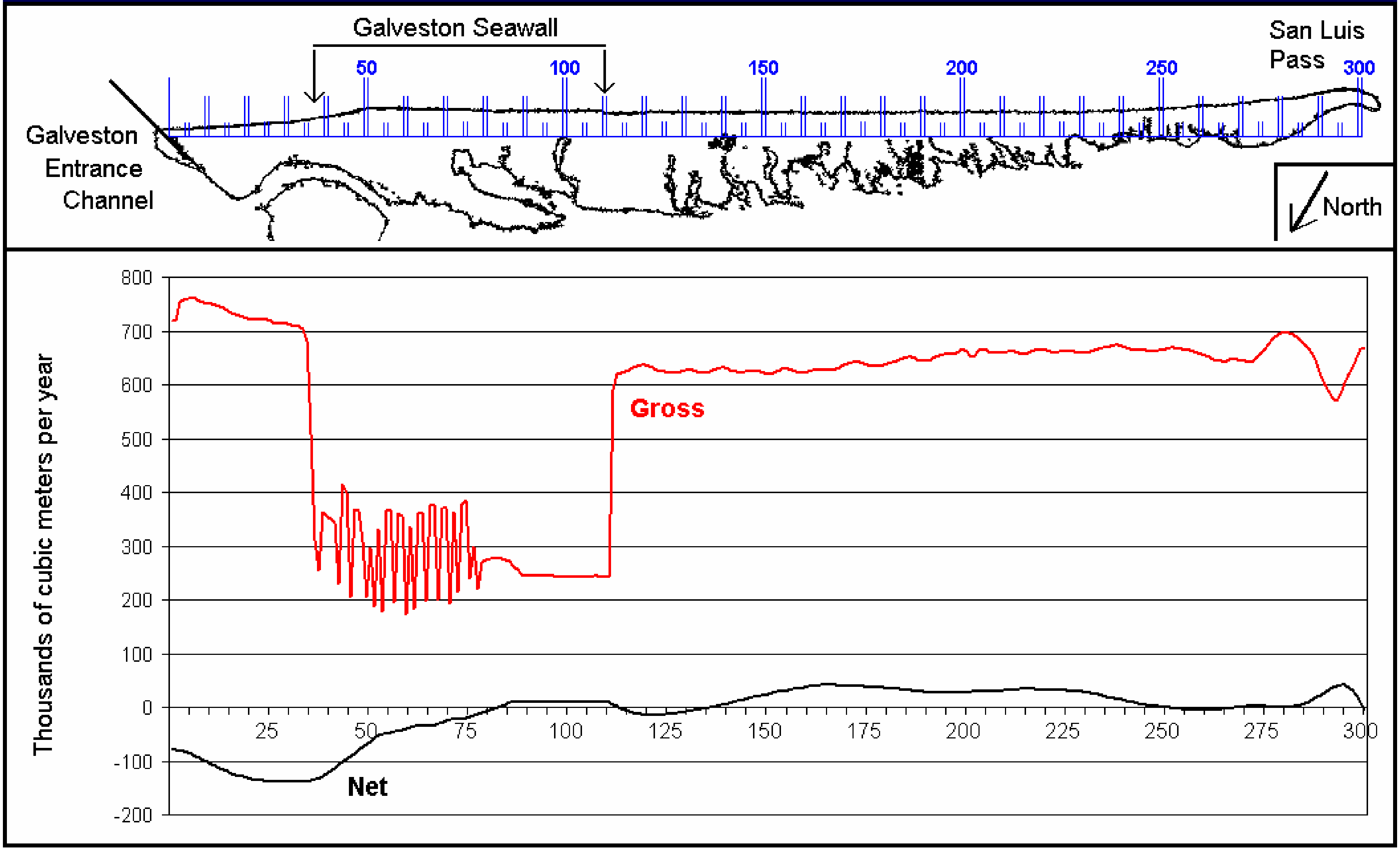
until we investigated the influence of local winds.

Local Wind Effects

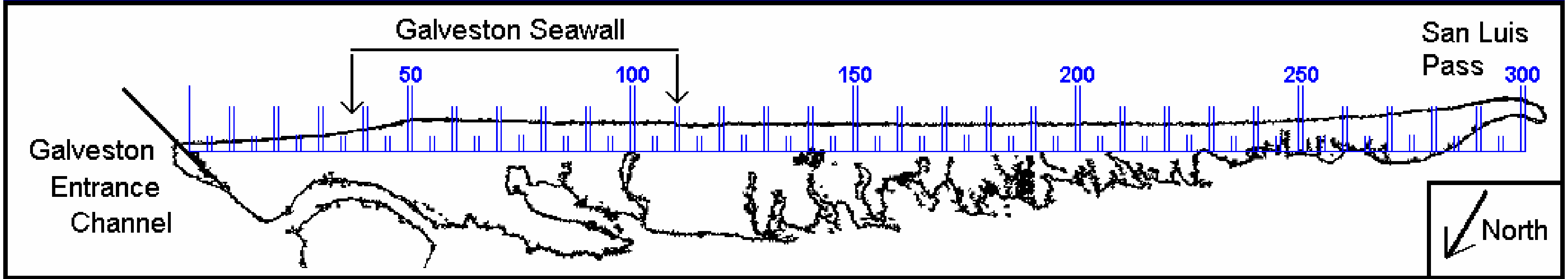
- Affects wave transformations (STWAVE).
- Modifies surfzone currents (GENESIS).

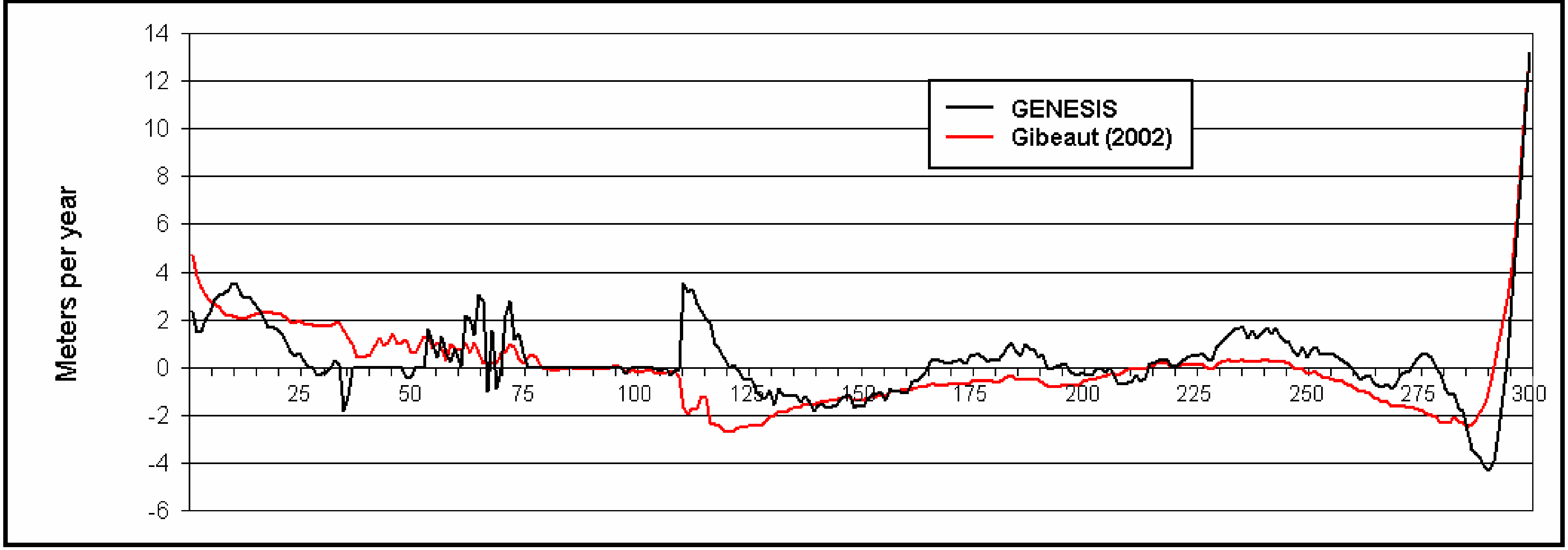
Including both requires modifications to both STWAVE and GENESIS standard procedures.

Net and Gross Transport Rates
Galveston Island



Shoreline Change Rate Galveston Island





Calibration Results

- Local winds are important in transport rate calculations
- 600-700 K gross and 0-40 K m^3/yr net transport to southwest along West Galveston Island
- 500 K gross and 50-100 K m^3/yr net transport to southwest along central portion of High Island
- Net transport reversals to the northeast at East Beach on Galveston Island and near Sea Rim State Park in Jefferson County

Current Activities

- Using SBEACH to look at the effects of storms on a suite of beachfill alternatives
- These data are being used by economic and environmental modelers to narrow the range of optimal alternatives

Cascade

An Integrated Coastal Regional Model for Decision Support and Engineering Design

Nicholas C. Kraus
Kenneth J. Connell

ERDC,
Coastal & Hydraulics Lab

Cascade

Motivation

- Need for predicting response of multiple-system, evolving coastal regions with interacting projects & coastal processes
- Oceanic and watershed scales involved: sea-level rise, storms, river sediment yields, sediment supply
- Coastal projects influence coast for centuries & on regional scale
- These process scales have not been studied! → Big benefit!

Objective

Develop a new class of model, called “Cascade,” for calculating

- Longshore sediment transport
- Inlet channel infilling, inlet morphology change, and bypassing
- Multiple projects, regional time and space scales
- Changes barrier islands, inlets, jetties, rivers, washover, wind-blown sand, and processes where data are not readily available

Cascade Overview

Simulate longshore and cross-shore sediment transport and long-term coastal evolution with respect to:

- **Complex regional trends**
- **Multiple, interacting projects with cumulative impacts**
- **Inlet sediment storage and transfer**
- **Breaching, washover (storms)**
- **Sources & sinks (beach nourishment, wind-blown sand, rivers)**
- **Jetty construction (impoundment, bypassing)**
- **Navigation channel maintenance**
- **Large-scale gradients in forcing**

Cascade Model Details

Formulation → Evaluation → Application

Formulation

1. Process identification
2. Equation selection
3. Numerical technique selection

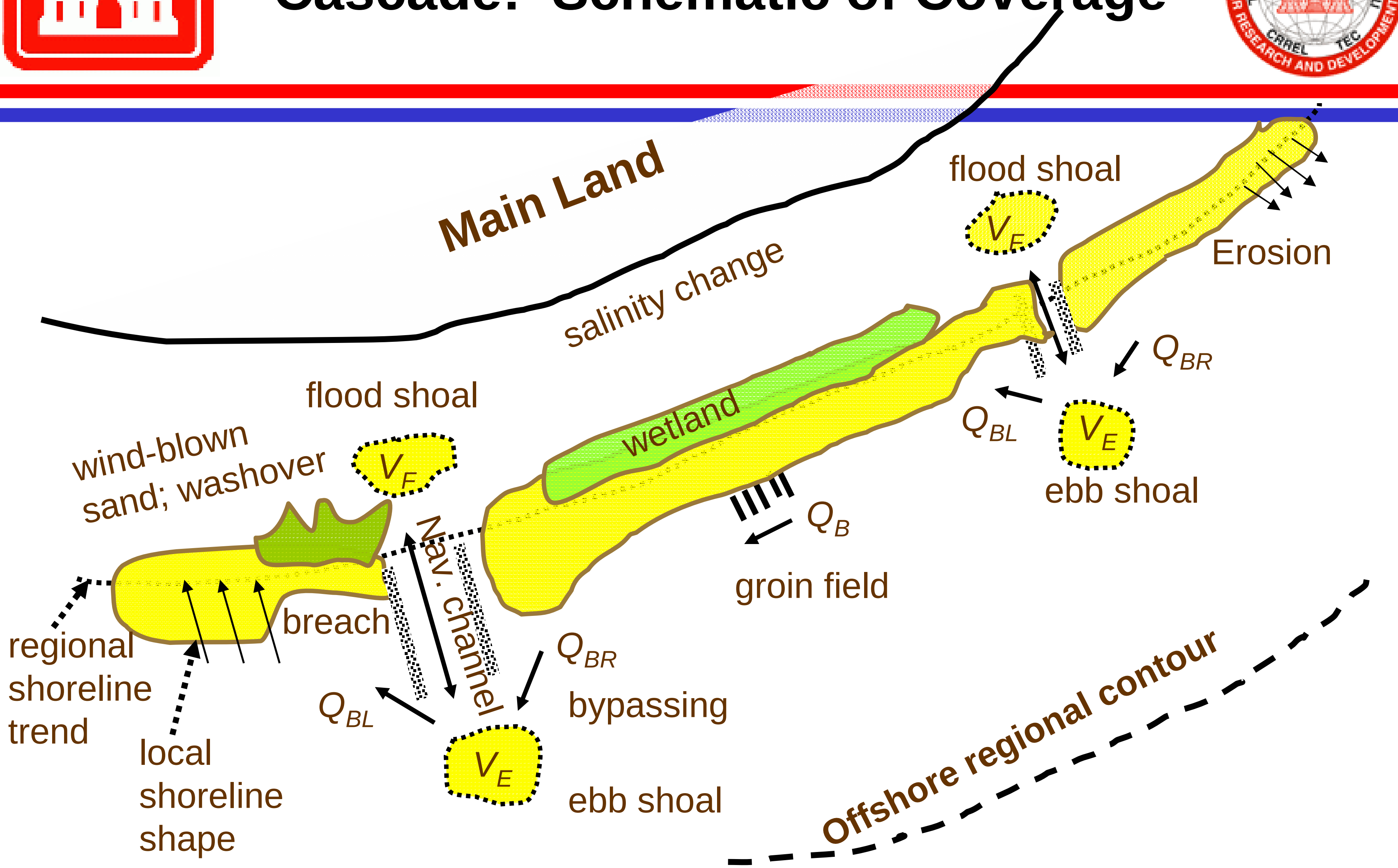
Evaluation

1. Baseline conditions
2. Calibration
3. Validation
4. Sensitivity analysis
5. Uncertainty estimate

Application

1. Analysis
2. Prediction
3. Design
4. O&M
5. "What if?"

Cascade: Schematic of Coverage



Longshore Sediment Transport Rate

New, General Meso-scale Theory

$$Q = \frac{\varepsilon}{(\rho_s - \rho)(1-a) g w} F V$$

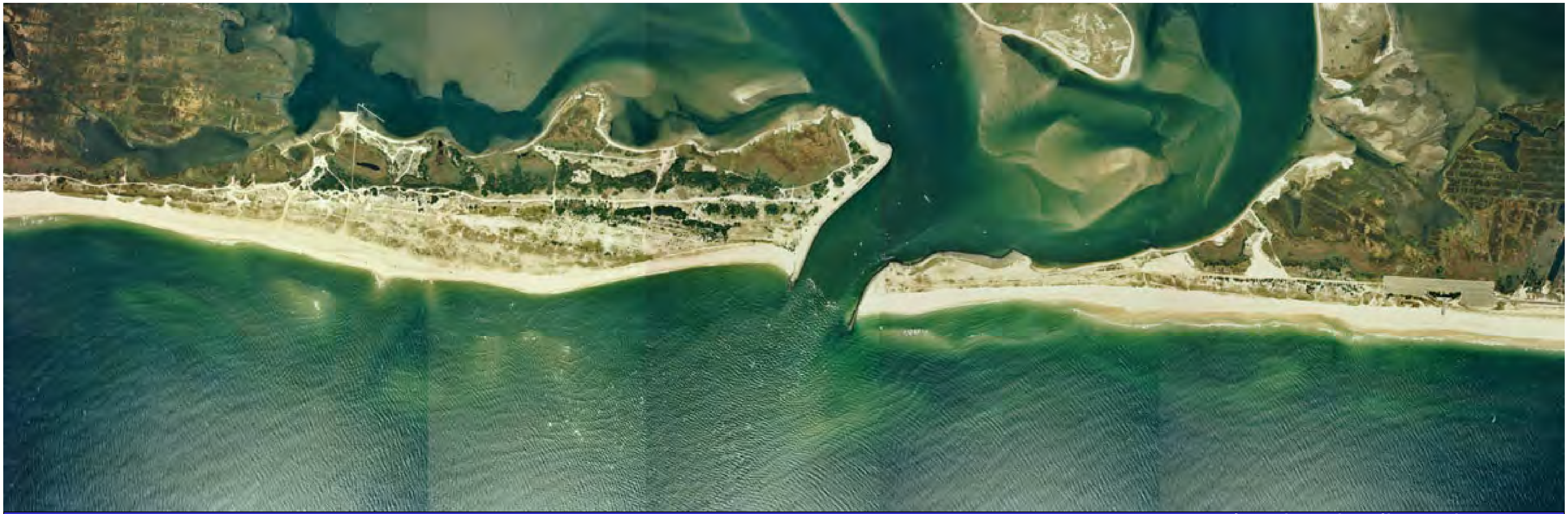
Q **= longshore sed. transport rate**

ε **= efficiency factor** $\varepsilon = 0.77 c_f K$

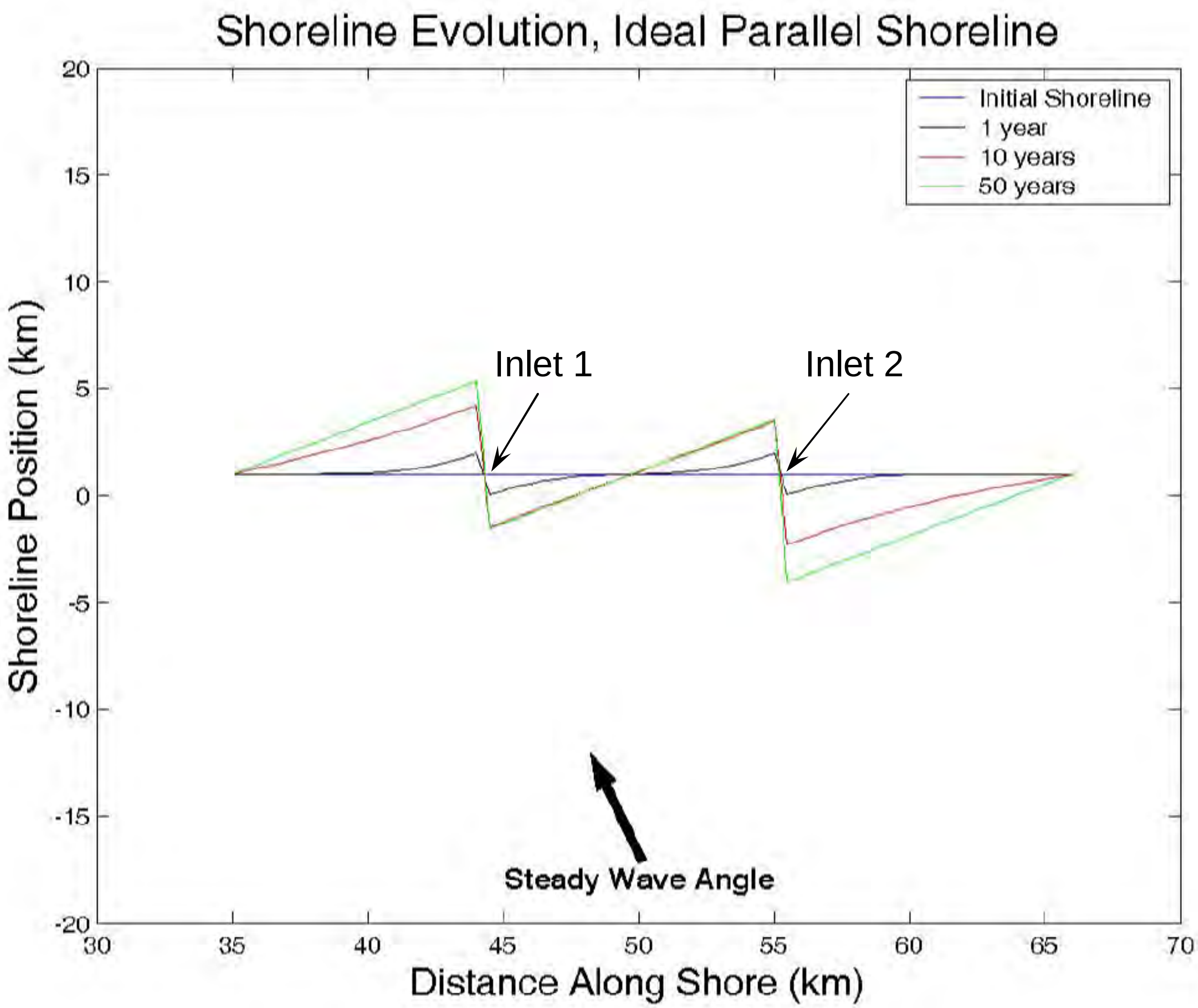
F **= wave energy flux towards shore**

V **= mean longshore current**

w **= sediment fall speed**



Cascade Sensitivity Analysis

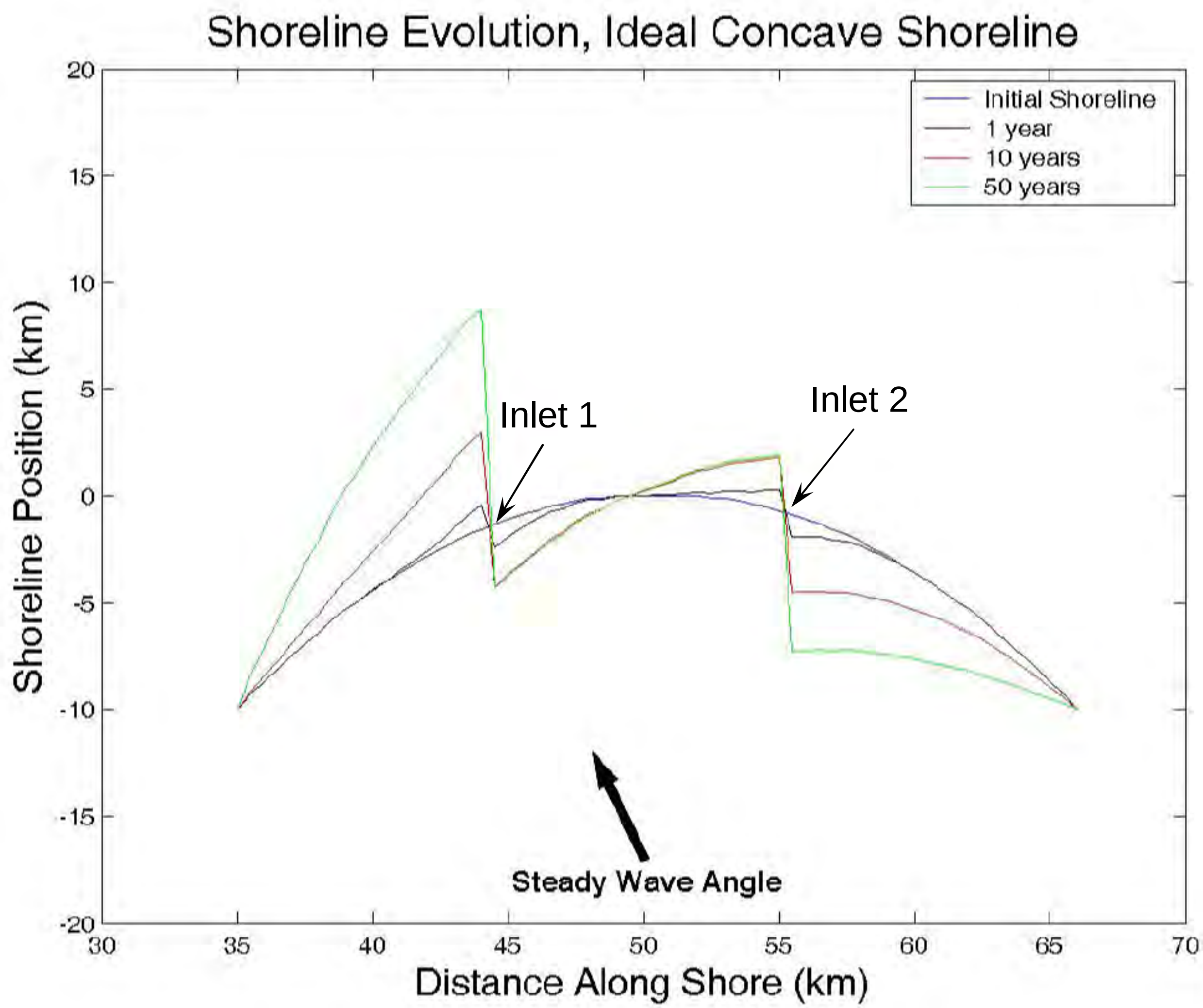


Idealized case:

- Three barrier islands
- Two inlets
- Constant wave height and angle
- Straight regional shoreline trend

Test to examine wave & shoreline angle with evolving shoreline

Cascade Sensitivity Analysis



Idealized case:

- Three barrier islands
- Two inlets
- Constant wave height and angle
- Curved regional shoreline trend

Test to examine wave & shoreline angle with evolving shoreline

Test Sites

Cascade Development and Validation

Present applications

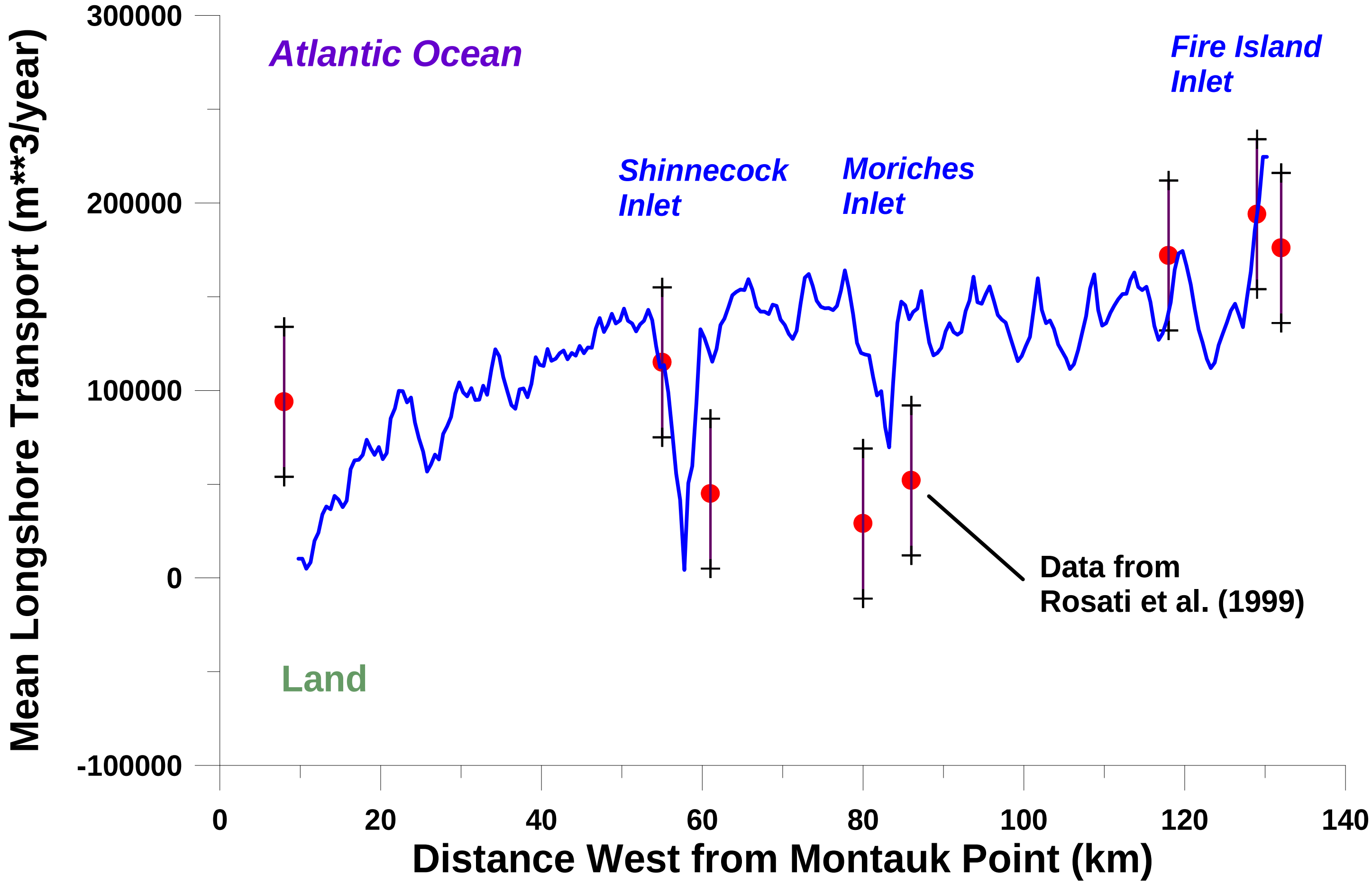
- **South Shore of Long Island (Montauk Point to Fire Island Inlet), NY (~ 80 miles)**
- **Ocean City Inlet with Fenwick and Assateague Island (Cape Henlopen to Chincoteague), Delmarva Peninsula (~ 75 miles)**

Future applications

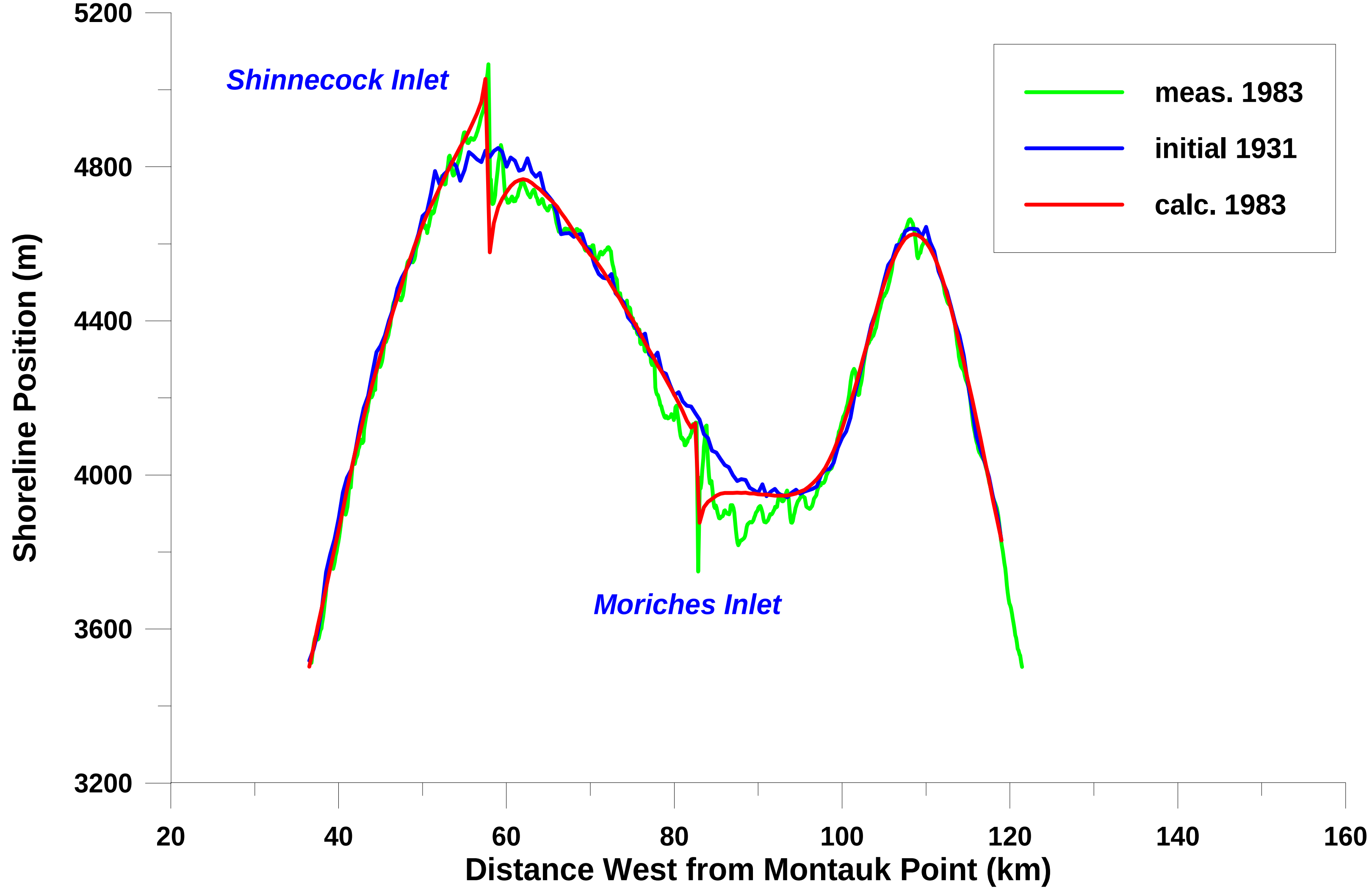
Searching for leveraging partners

Long Island, NY

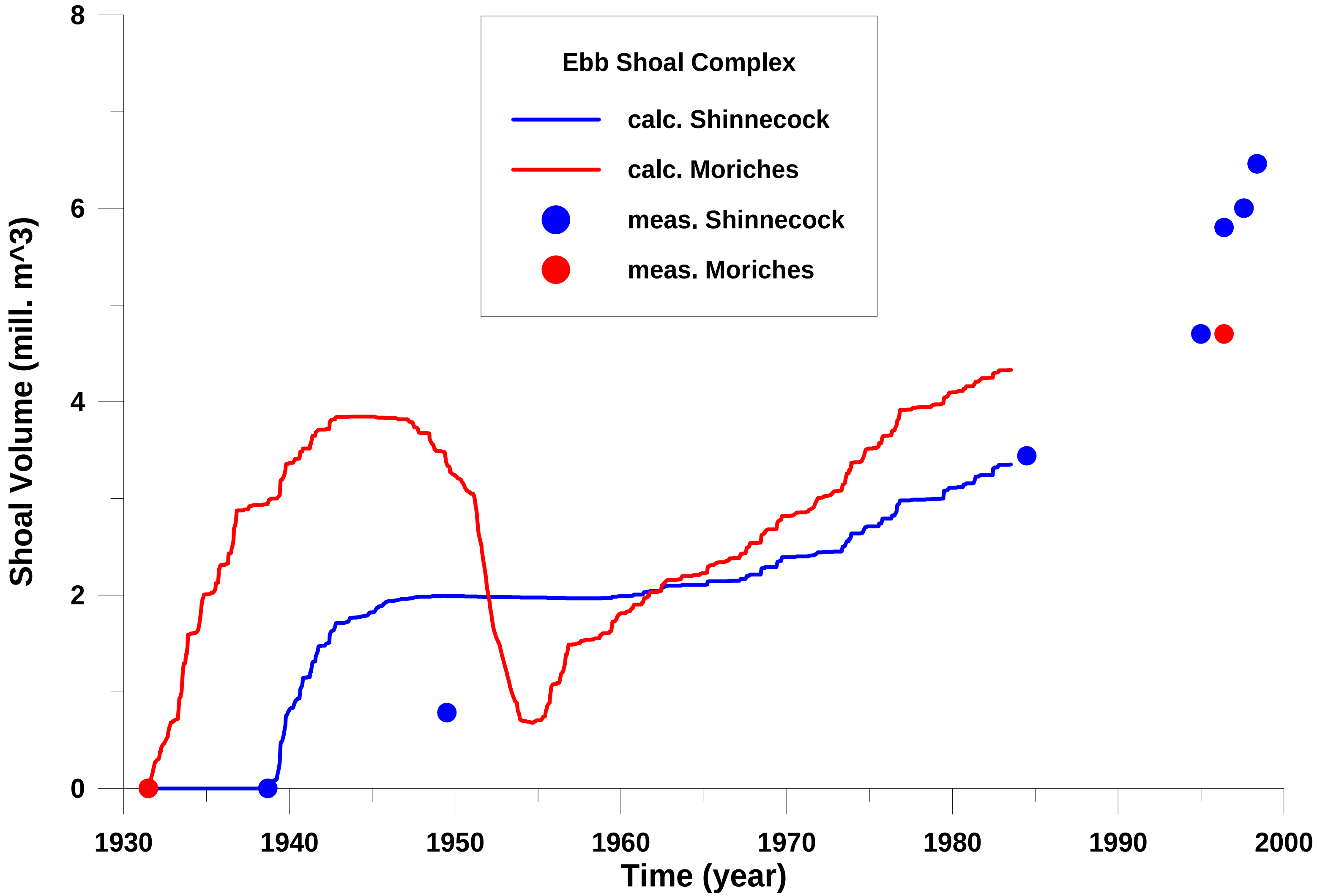
Cascade-Calculated Regional Net Longshore Sediment Transport Along South Shore of LI



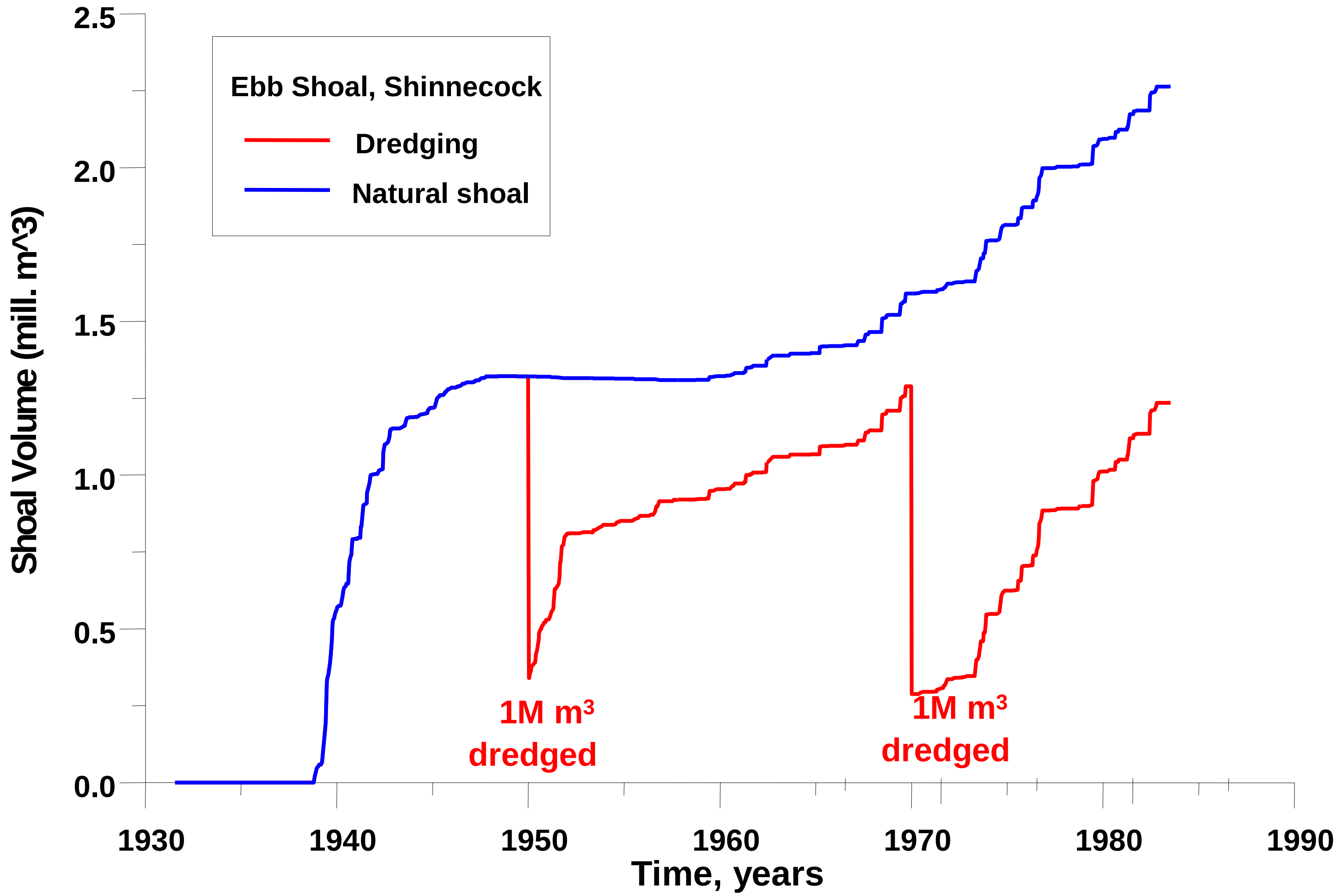
Simulation of Shoreline Evolution at Long Island, 1931-1983 (detail)



Time Evolution of the Ebb Shoal Complex at Shinnecock and Moriches Inlets

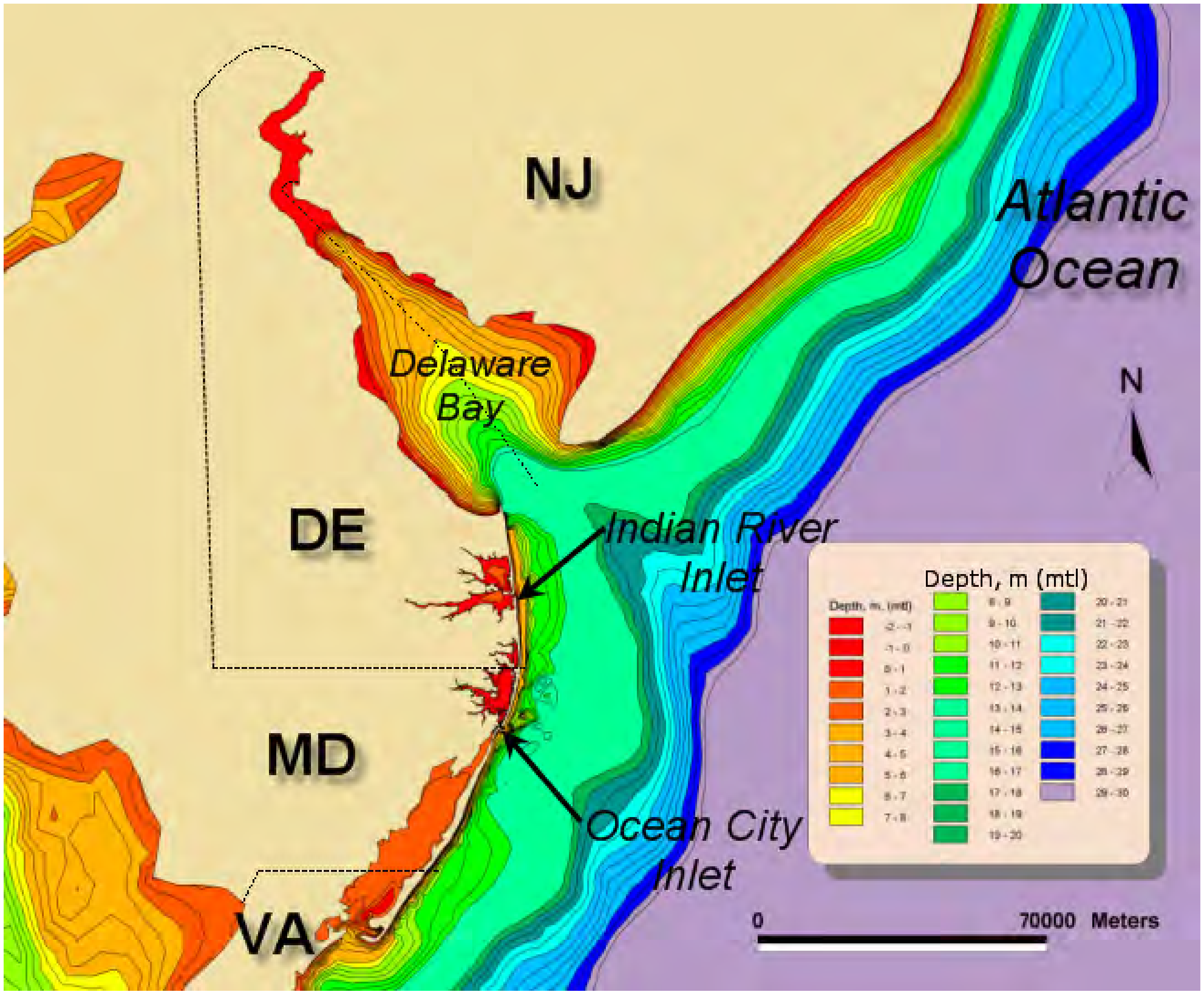


Simulation of Ebb Shoal Dredging, Shinnecock Inlet-Recovery of Shoal

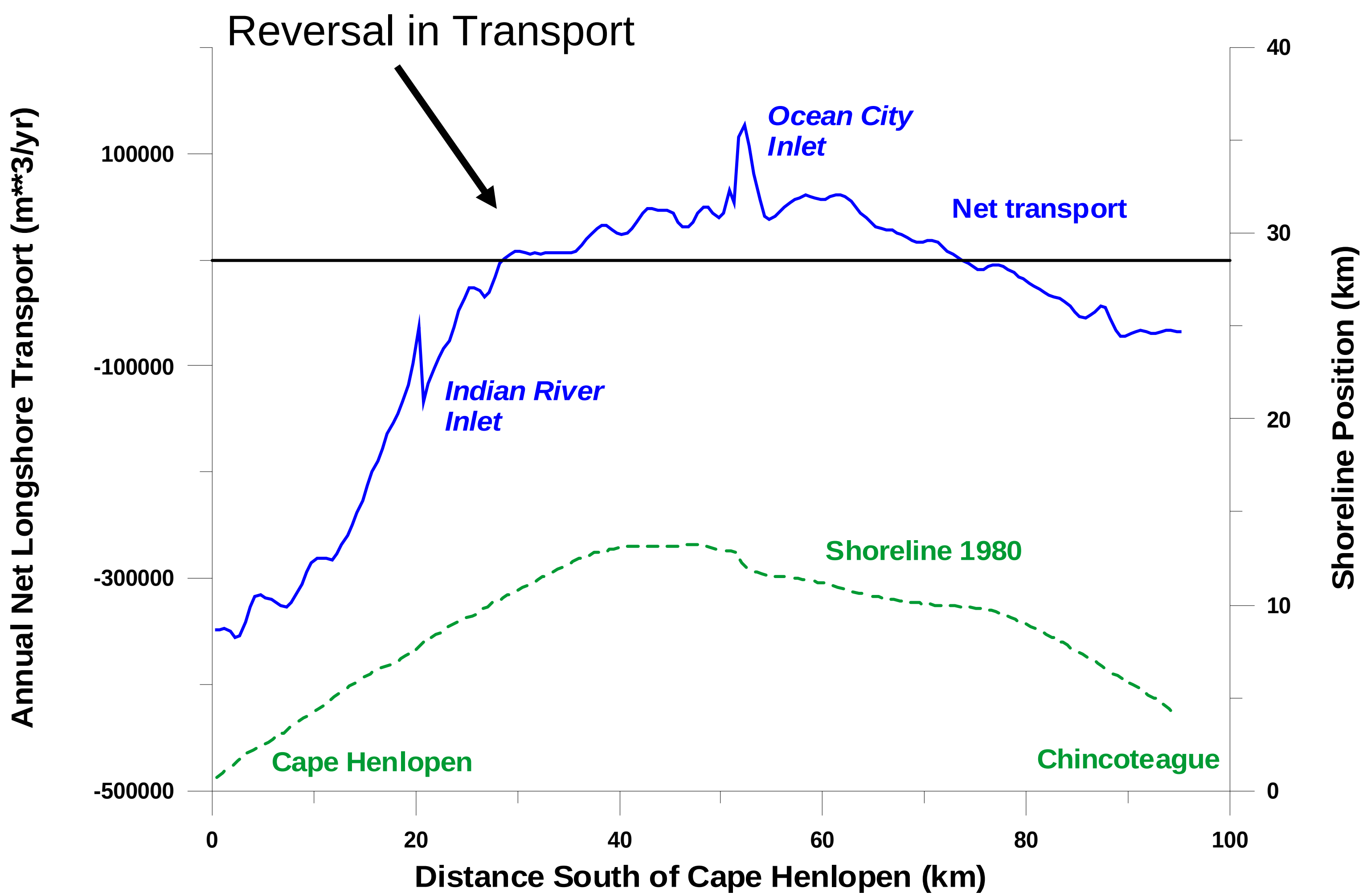


Delmarva Case Study

Large-Scale Topography of the Study Area

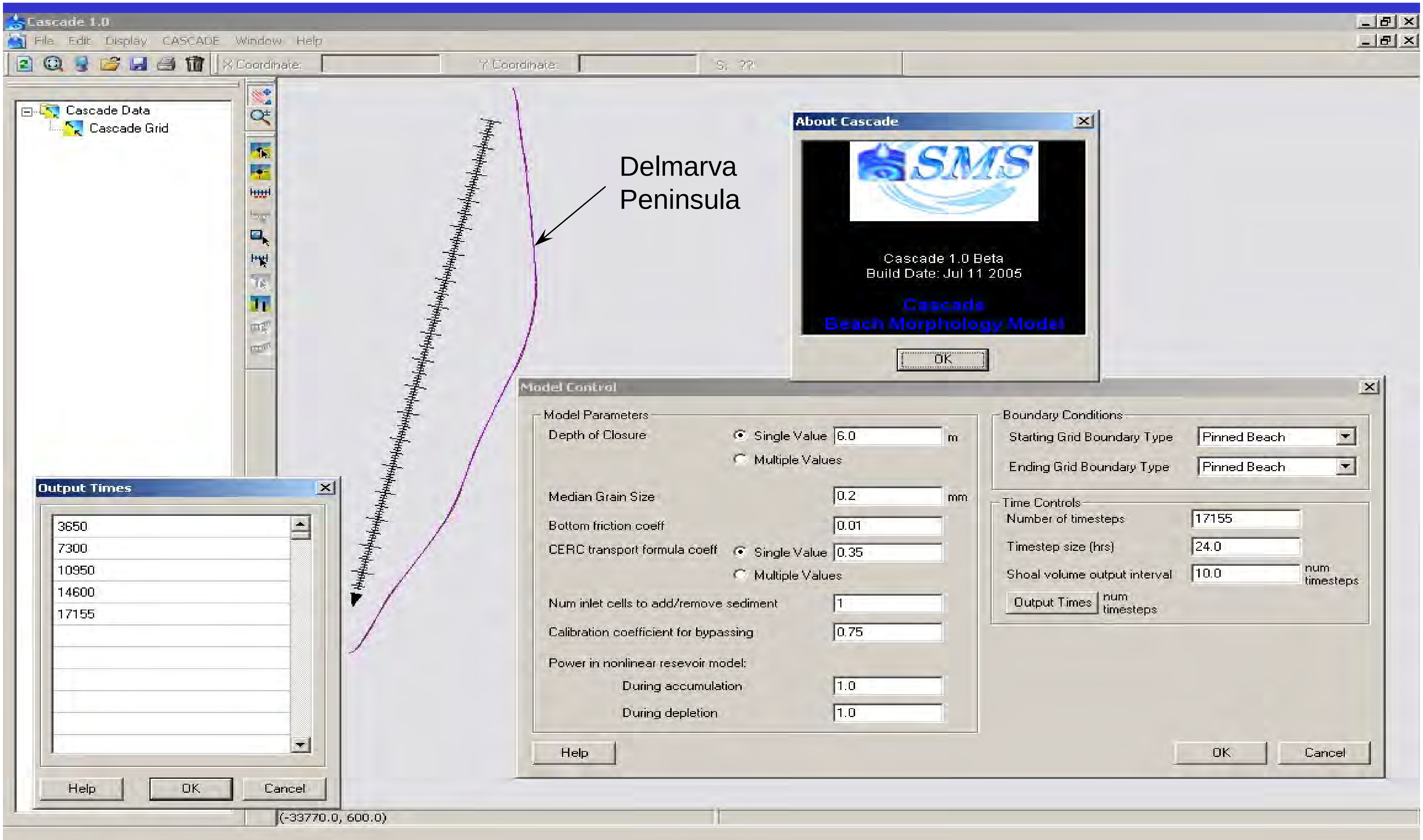


Calculated Net Annual Longshore Sediment Transport Along Delmarva Peninsula

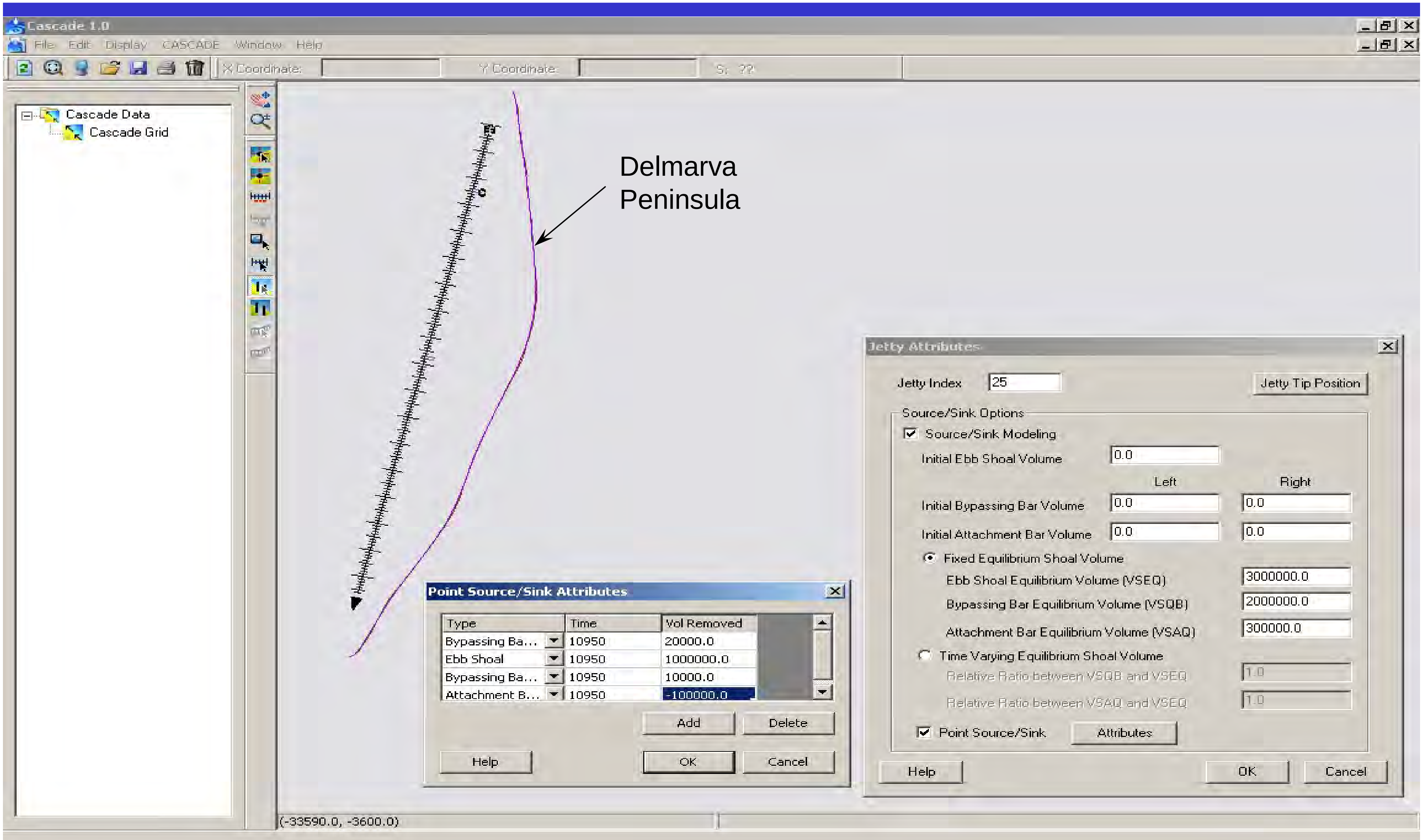


Coastal and Hydraulics Laboratory

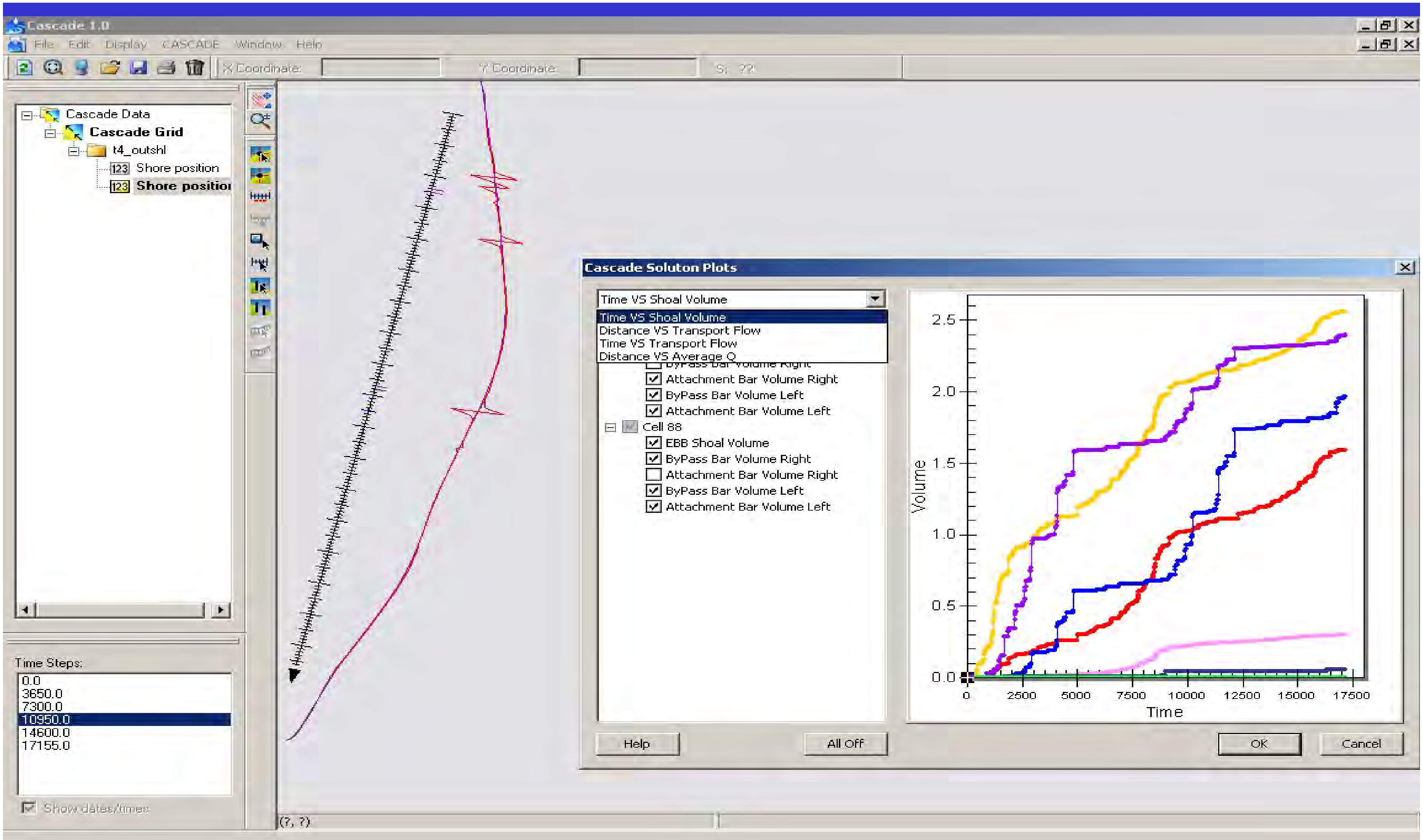
Cascade SMS Interface as Technology-Transfer Delivery Mechanism



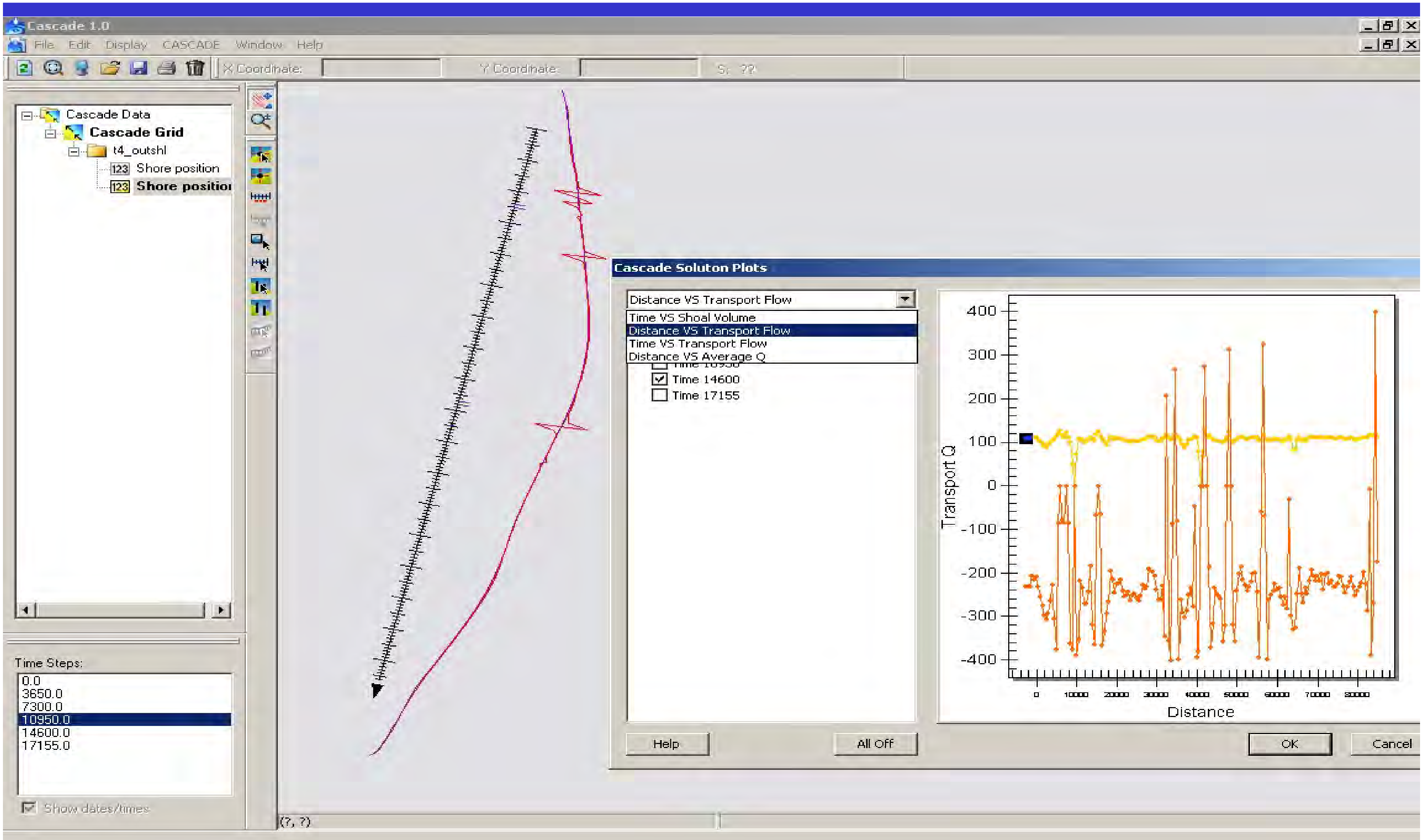
Cascade SMS Interface



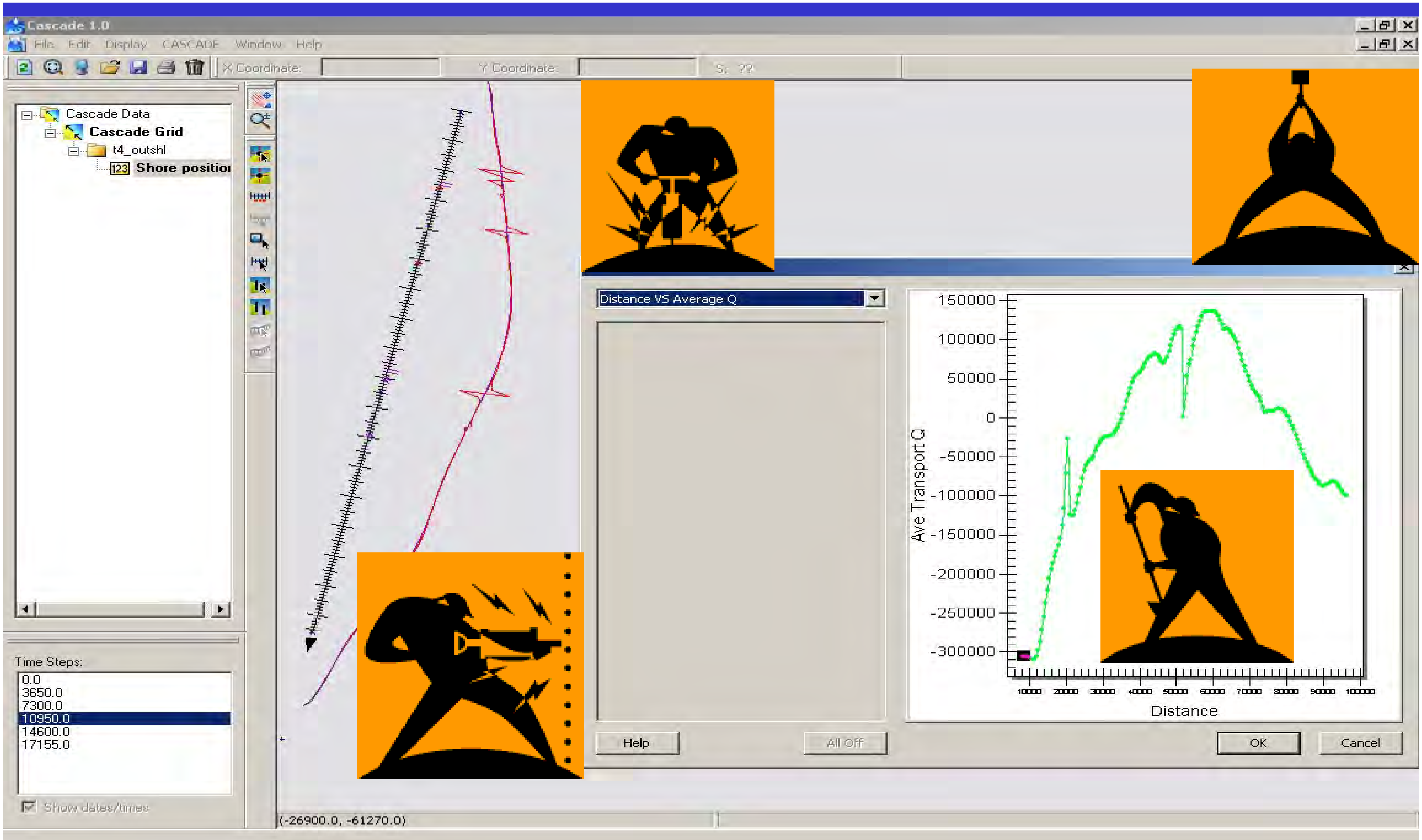
Cascade SMS Interface



Cascade SMS Interface



Cascade SMS Interface



Cascade Applicability

- **Coastal inlet maintenance**
- **Channel management**
- **Inlet and structure bypassing plans**
- **Fate of beach fill**
- **Beach fill project planning**
- **Storm erosion hazard management**
- **Overwash & breach susceptibility**
- **Unifying technology for multiple projects (RSM)**

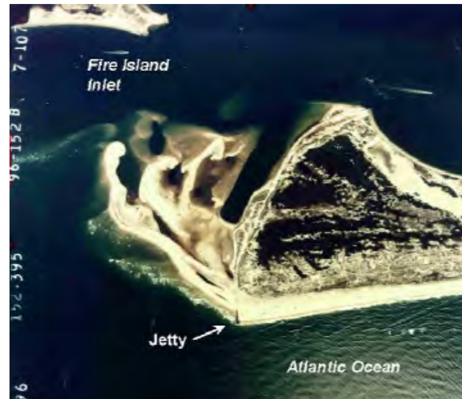
Cascade: Conclusions

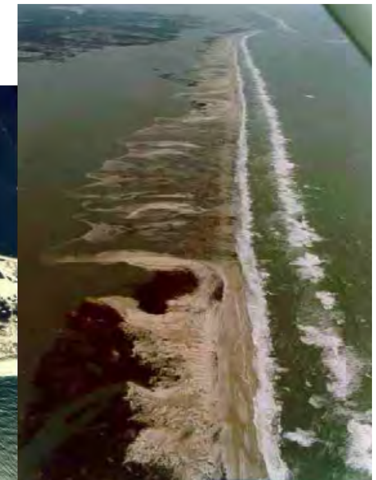
1. Sediment transport & coastal evolution occur at many different scales with implications for modeling
2. Engineering projects require considerations at regional scale, → dictating need for modeling processes & controls at this scale
3. Cascade can simulate coastal evolution within complex regional trends, including inlet sediment storage & transfer, engineering activities, & structures
4. Cascade SMS interface provides turn-key system to support practicing engineers & scientists in efficiently solving coastal watershed problems

Cascade: Current & Future Developments

- **Improved ebb & flood shoal bypassing**
  - **-Integrated reservoir model (Kraus 2000)**
- **Spit evolution**
- **Automated breach opening & closure**
- **Improved dune & cliff dynamics based on driving forces**

- **Further applied testing**
  - ➢**Partnerships welcome!**

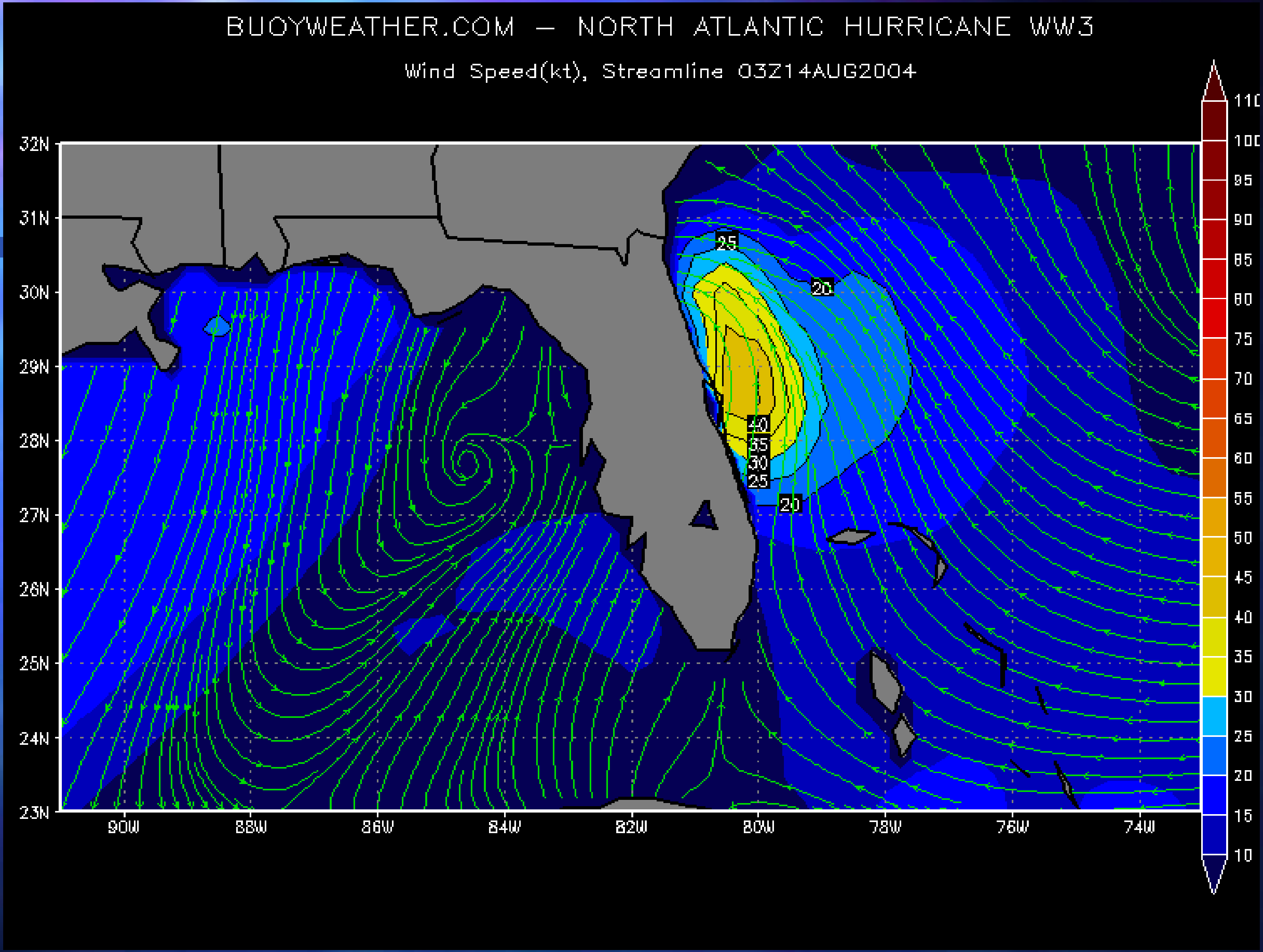




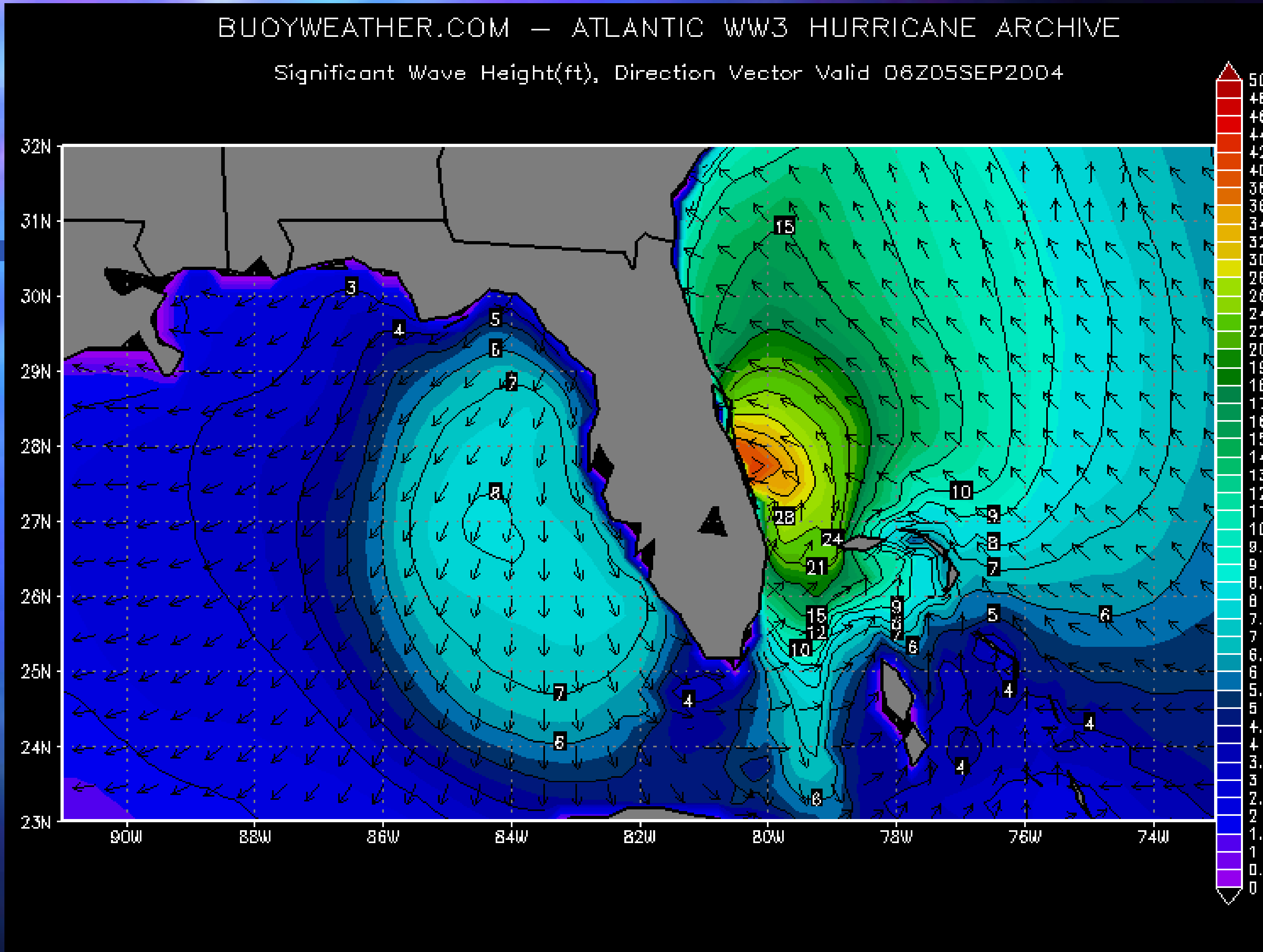
US Army Corps of Engineers Response to the Hurricanes of 2004

Rick McMillen, PE
Daniel R. Haubner, PE
Jacksonville District

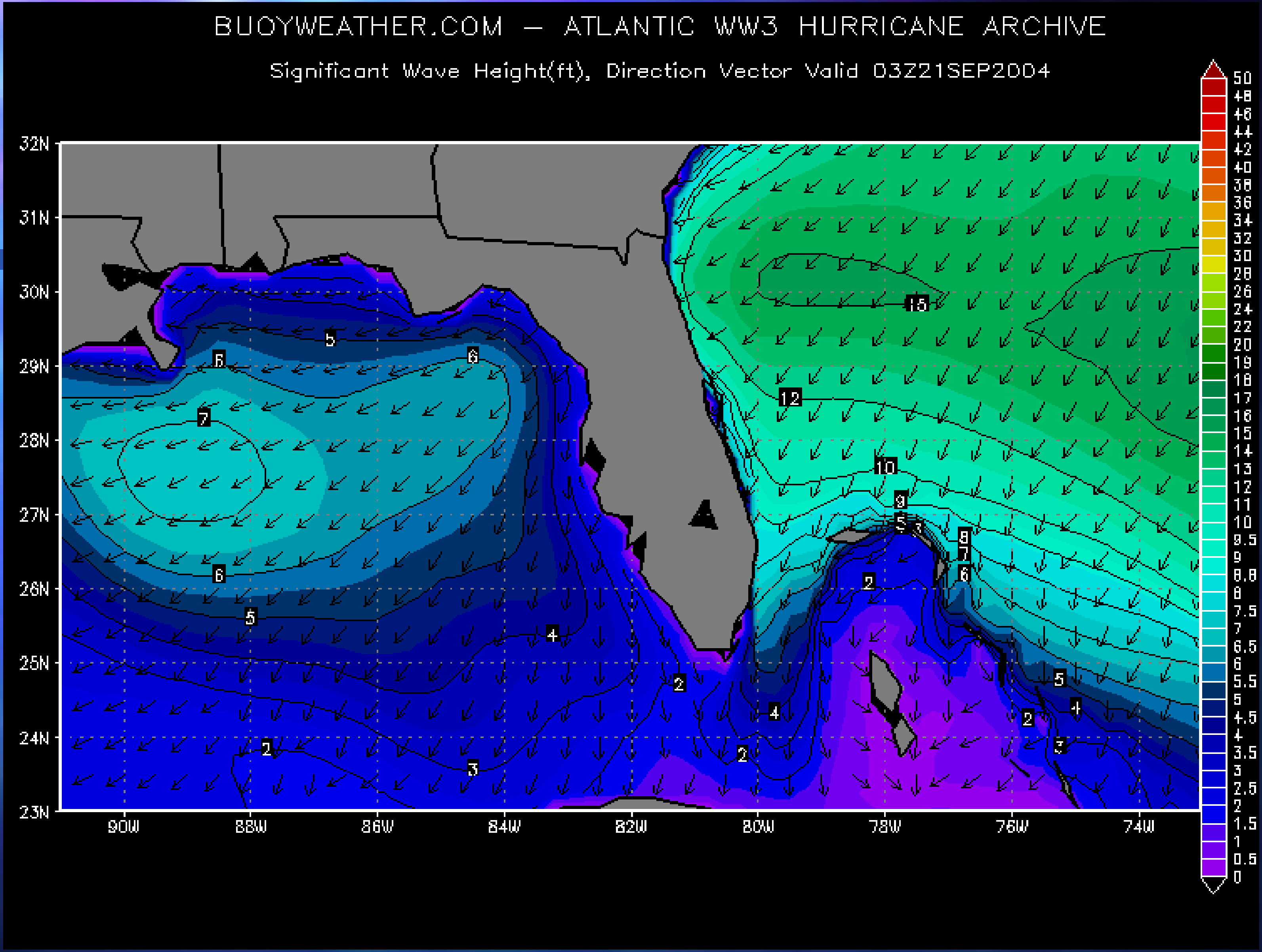
Florida Hurricane Paths
August - September, 2004
Hurricanes Charley, Frances, Ivan, & Jeanne
Ivan
16 Sep 2004
Frances
04 Sep 2004
26 Sep 2004
Jeanne
Charley
13 Aug 2004
Georgia
Florida
Gulf of Mexico
Atlantic Ocean



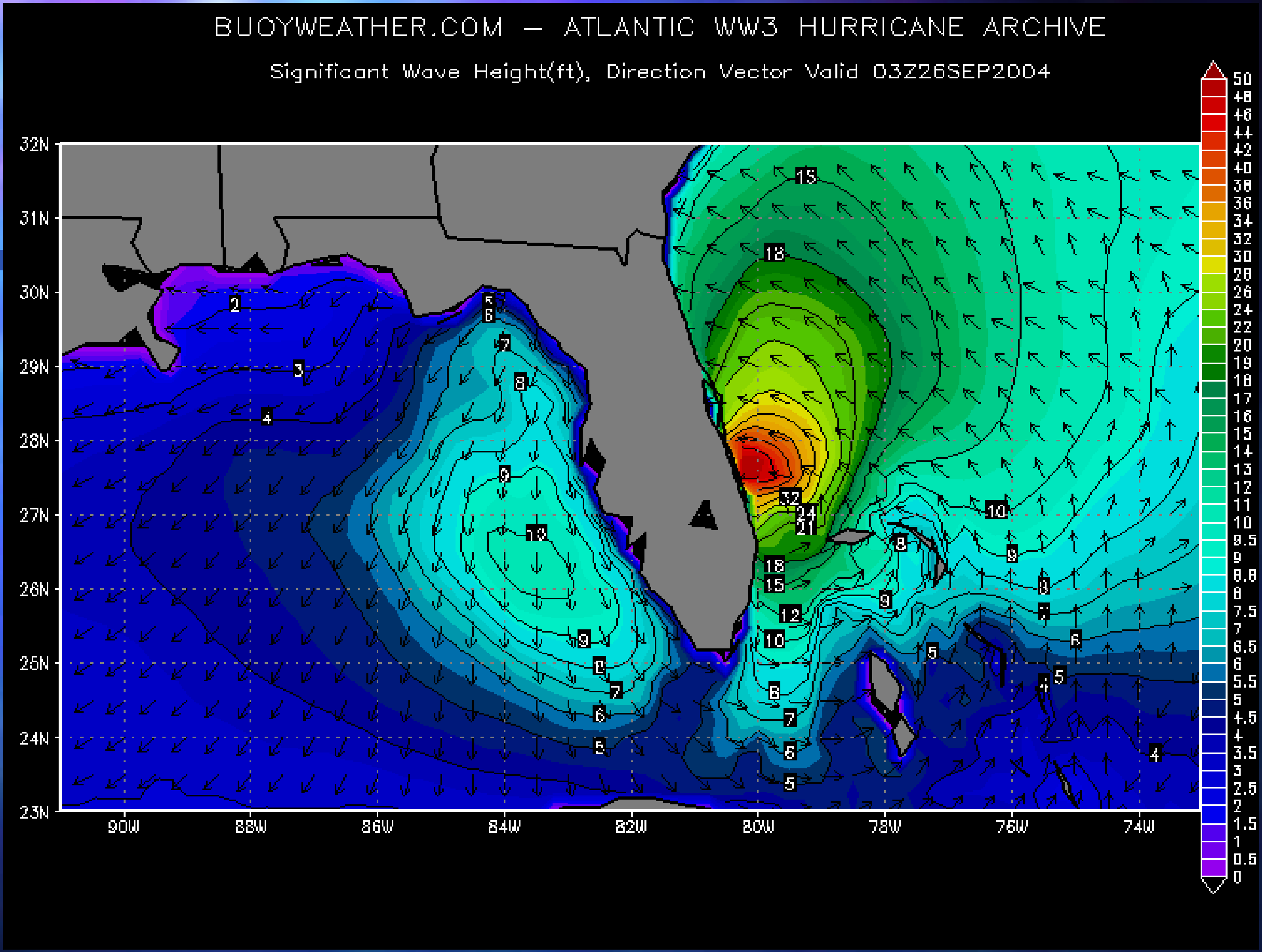
Hurricane Charley- 2300 EDT 08/13/2004: Wave height (ft)



Hurricane Frances- 0200 EDT 09/05/2004: Wave height (ft)

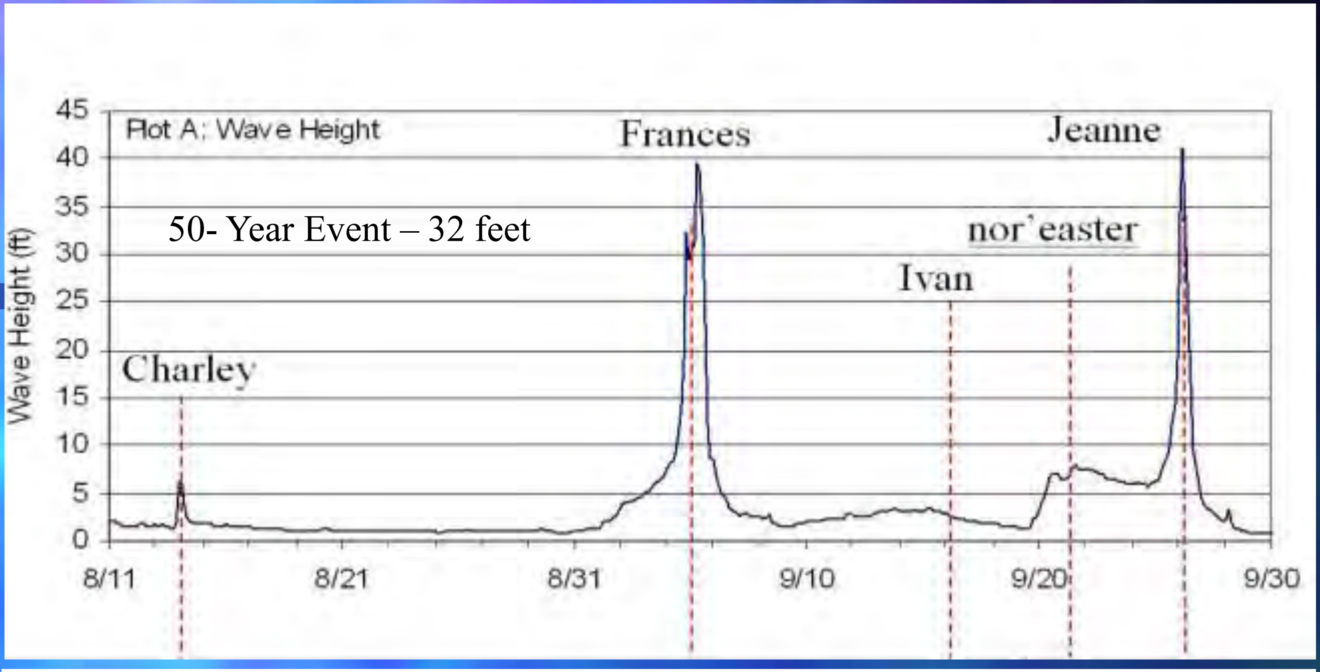


September 20th Nor'easter (pre-Jeanne) 2300 EDT
09/20/2004: Wave height (ft)

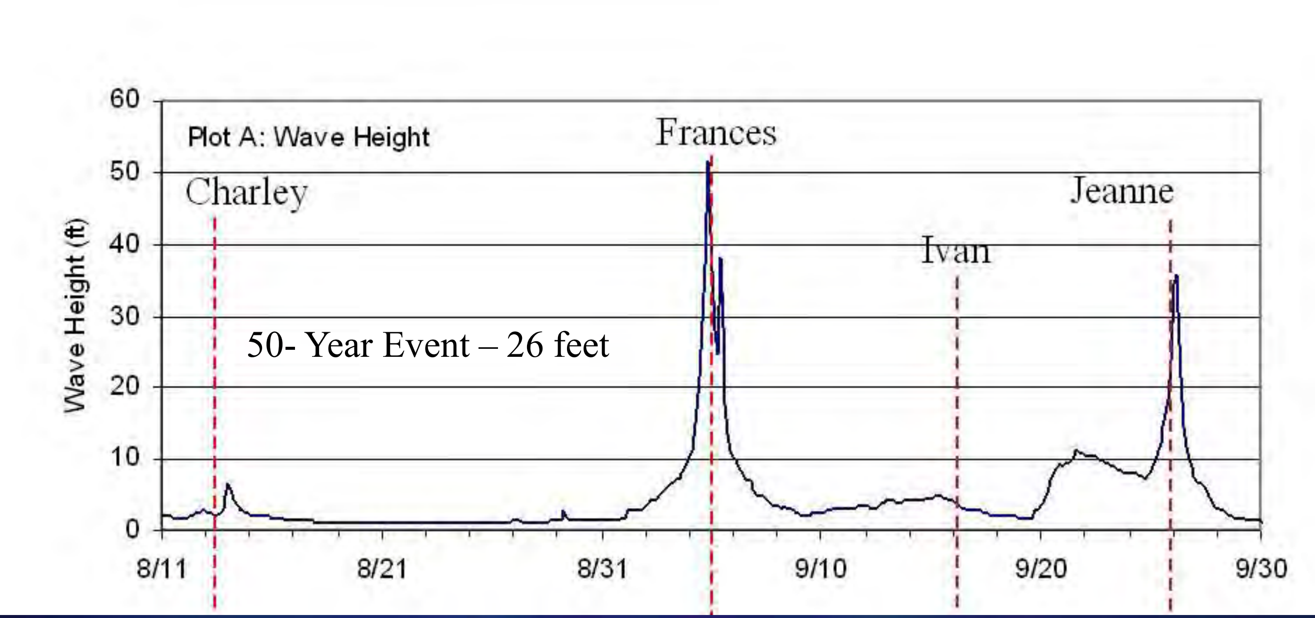


Hurricane Jeanne- 2300 EDT 09/25/2004: Wave height (ft)

Brevard County



Martin County



SAJ 2004 HURRICANE SEASON

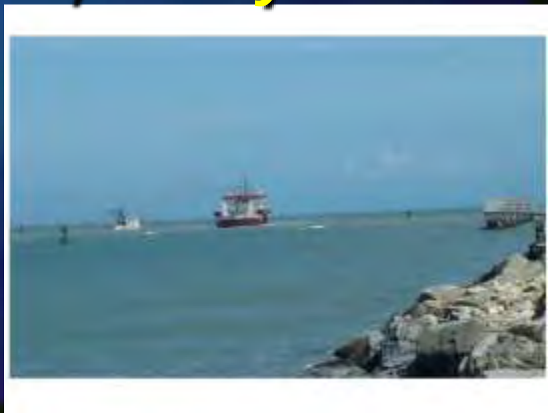
- $565.5M in FEMA assigned missions.
- 2 Separate ERROs w/ 1,263 personnel.
- SAJ – placed 83,997 roofs (136,449 total for all of Florida).
- SAJ – delivered 5.85M Liters of water, 22M Liters total.
- SAJ – delivered 635,446 lbs of ice, 24M lbs ordered total.

SAJ 2004 HURRICANE SEASON

- Installed 420 emergency generators (hospitals, pump stations, sewage).
- Identified 57 Mobile Home group parks for temporary housing.

EMERGENCY DREDGING ISO OF SHOALING

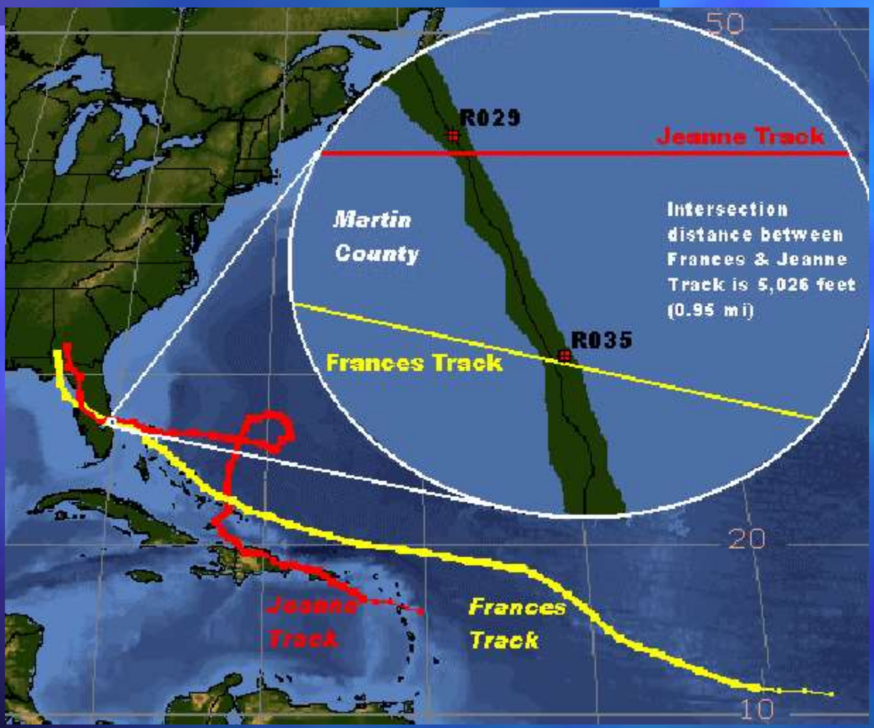
- 3 – Deep Draft Navigation Projects effected USCG closures.
- Emergency Dredging contracts in place by mid-Sep, completed early Oct & Nov.
- After Jeannes’ interruption, over 700,000 cy of material removed, over 300,00 cy going into the nearshore.



Summary – HSPP Prevention of Damages

- 17 Projects Lost 7,595,600 Cu. Yd. Due to Storms from Aug 11 to Sep 30, 2004
- HSSP Projects Prevented $54 Million in Average Annual Damages
- Little or no Damage to Upland Structures from Wave Damage or Beach Erosion

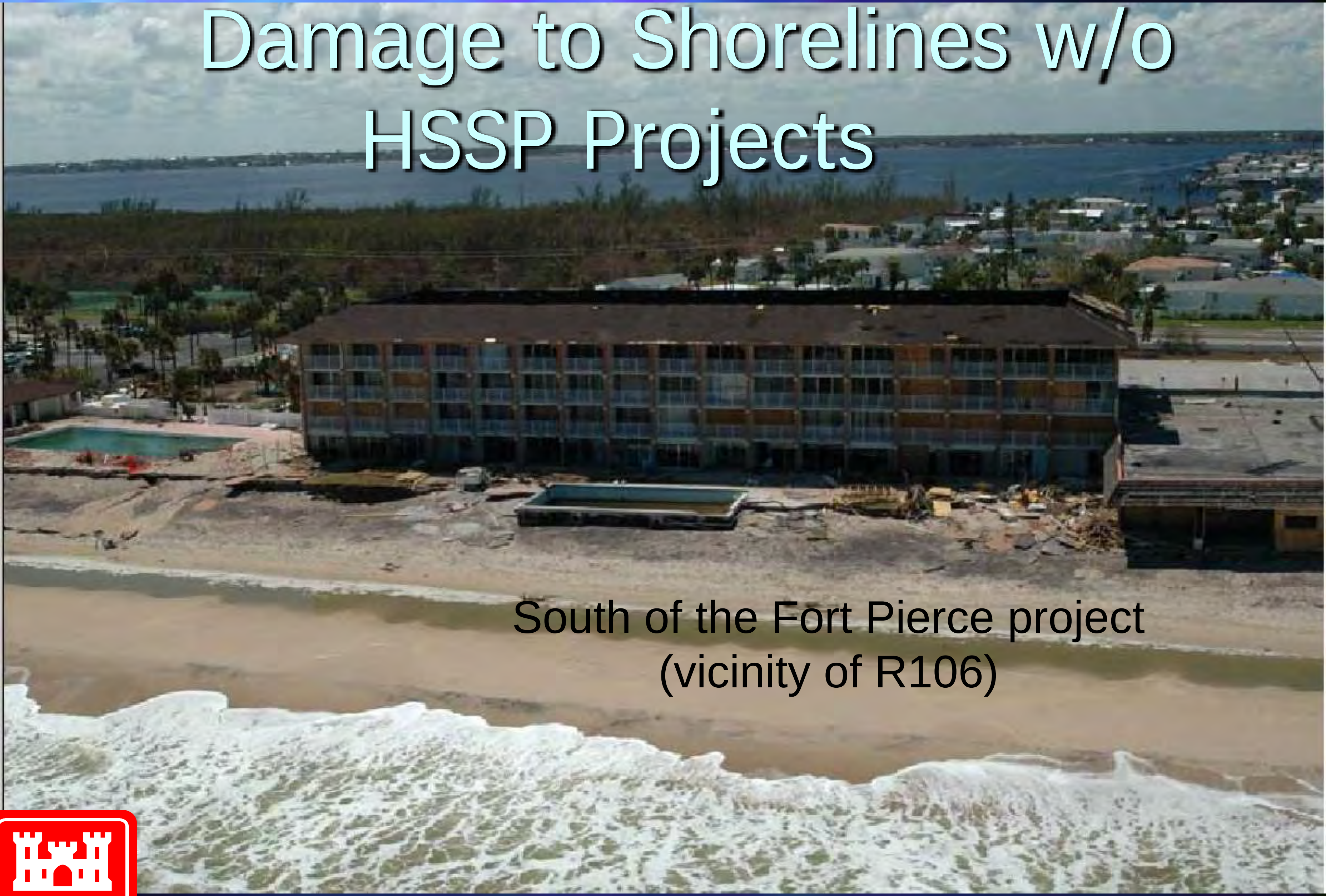
Summary – HSPP Prevention of Damages



Damage to Shorelines w/o HSSP Projects

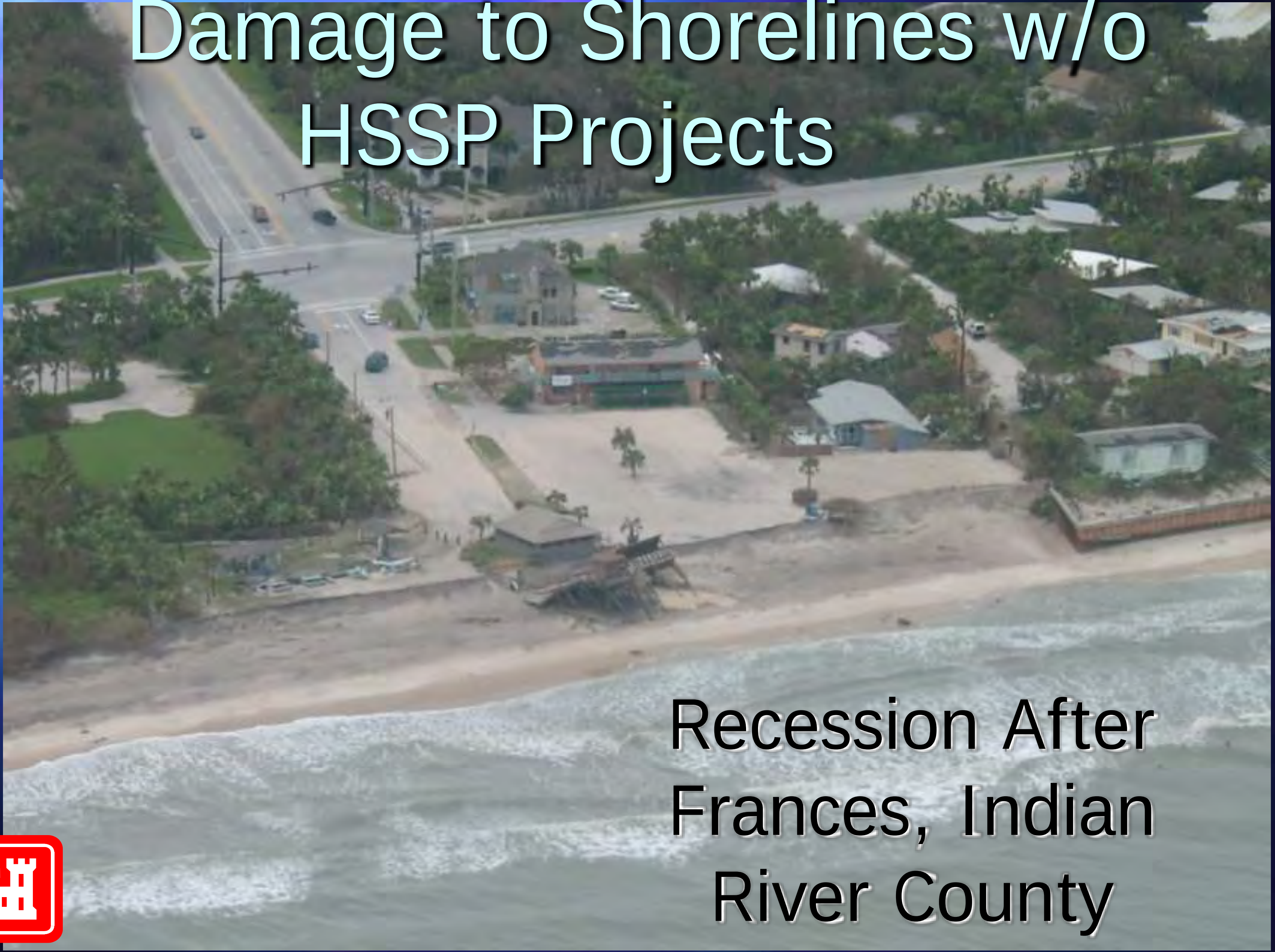
North of the Fort Pierce project
(vicinity of R2)

Damage to Shorelines w/o HSSP Projects



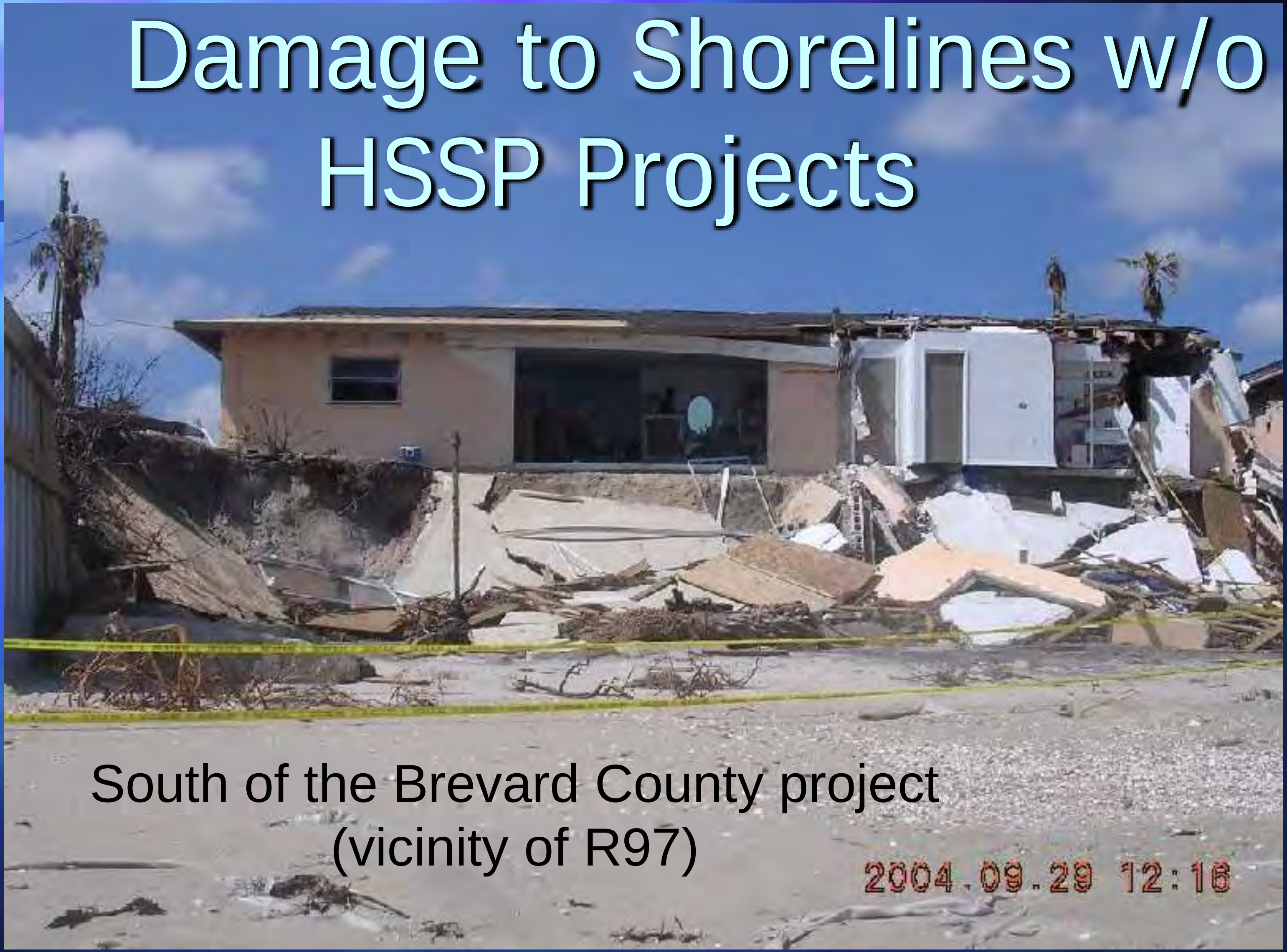
South of the Fort Pierce project
(vicinity of R106)

Damage to Shorelines w/o HSSP Projects



Recession After Frances, Indian River County

Damage to Shorelines w/o HSSP Projects



South of the Brevard County project
(vicinity of R97)

Damage to Shorelines w/o HSSP Projects

South of the Brevard County project
(vicinity of R76)

Damage to Shorelines w/o HSSP Projects

South of the Brevard County project
(vicinity of R162)

Damage to Shorelines w/o HSSP Projects

Damage to Shorelines with HSSP Projects

Broward County project

Damage to Shorelines with HSSP Projects

Captiva Island, Lee County
(vicinity of R96)

Public Law 108-324, Emergency Hurricane Supplemental Appropriations Act of 2005
13 October 2004

- Flood Control and Coastal Emergencies (FCCE) - $148,000,000 for Repair of HSPP damaged by storms
- Construction General (CG) - $62,600,000 for Federal Share of Emergency Repair of Storm Damage to Authorized Shore Protection Projects and Assessment of Project Performance of Such Projects
- General Investigations (GI) - $400,000 for Walton County Beaches, FL to Update Studies Underway to Account for Storm Impacts

FCCE Basic Project Eligibility Criteria

- Must be a Completed Element of a Federally Authorized Project
- A Portion of a Federally Authorized Project Constructed by Non-Federal Interests When Approval of Such Construction was Obtained from Commander, USACE
- A Portion of a Federally Authorized Project Constructed by Non-Federal Interests and Designated by an Act of Congress as a Federal Project

Joint Explanatory Statement, Conference Committee, and HQUSACE Guidance

- FCCE Funds Provided in the Act are to Restore Constructed Projects to Pre-Storm Condition
- Rehabilitation Will Only Replace Sand Lost Due to Extraordinary Storms
- Restoration Beyond the Pre-storm Condition will be Cost-Shared between the Federal Government (using Supplemental CG) and the non-Federal Sponsor

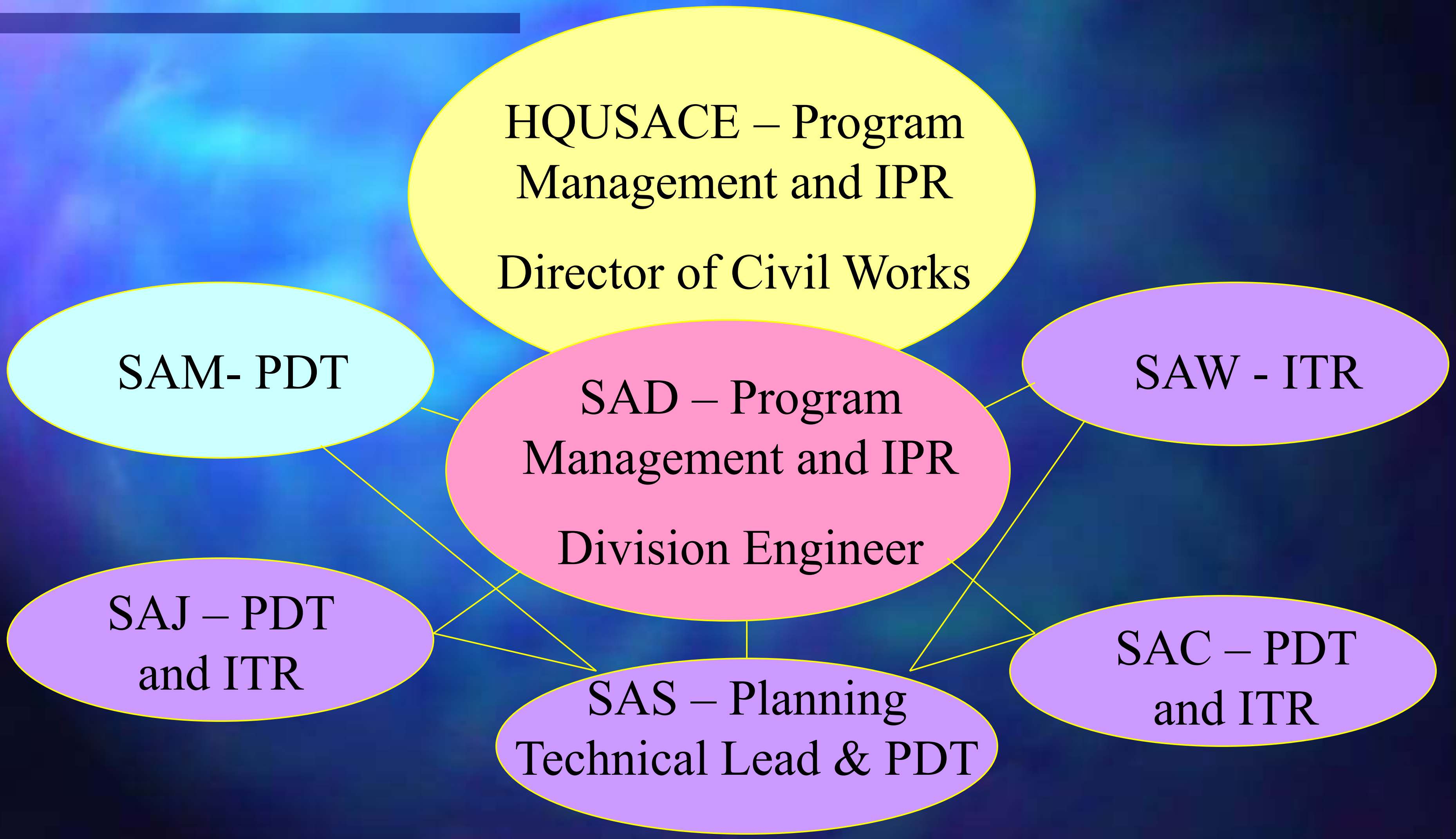
Expedited Process

- Guidance Provided Early by HQUSACE on FCCE
- Early Resolution of Legal & Authority Issues
- Bulk Funding for Project Implementation Reports (PIRs) and Post-Storm Surveys
- Dedicated Regional/Virtual PDT and ITR
- Standardized PIR Format
- Review by Division and HQ Concurrent with PIR Development

Fast Start

- 13 Oct - Act Passed
- 19 Oct - Regional/Vertical Project Delivery Team Includes Staff from HQ, SAD, and all Five Districts in SAD
- 25 Oct - HQUSACE Guidance Provided
- 26 Oct - First PDT Meeting in Jacksonville
- 1 Nov - Funds Received for PIRs
- 1 Nov - Regional ITR Team Established
- 5 Nov - Dedicated SAD and HQ In-Progress Review Team Established

Corps Regional/Vertical Teams



Fast Start
(Continued)

- District Engineer Public Notices Issued:
  - Jacksonville District 26 October 2004
  - Charleston District 10 November 2004
  - Mobile District 18 November 2004
- Surveys for Pre-Post Storm Analysis
  - Sponsors and A/Es, Corps Surveys
  - SHOALS Pre-Storm Surveys Taken Summer 2004, Post-Storm Survey of Entire FL Coast 6 Nov 04 - 6 Dec 04
- Corps - DEP Mtgs Held Nov 5th and 9th, 2004
- Contract Acquisition Plan Approved 12 Nov 04

Sponsor Response to Public Notice

- 30 Letter/Email Requests Received for Emergency Project Rehabilitation Assistance
- 21 Projects Met HSSP Initial Eligibility Criteria
  - 14 in Jacksonville District
  - 5 in Mobile District
  - 2 in Charleston District
- 9 Projects Deemed Ineligible – Initial Federal Project Construction not Completed, or Sponsor Declined the Opportunity to Request Assistance

Must Meet First of Two Key Criteria

Extraordinary Storm: Is a storm that due to its prolongation or severity creates conditions that cause significant amounts of damage. Prolongation or severity means:

- A category 3 or higher hurricane
- A storm that has an exceedance frequency equal to or greater than the design storm of the authorized project.

2nd Key Criteria

Significant Amount of Damage: A significant amount of damage has occurred when:

1. Estimated cost of the repair exceeds $1M and is greater that two percent of the original construction cost
2. Estimated cost of repair exceeds $6M
3. More than 1/3 of the planned or historically placed sand for renourishment effort has been lost due to the storm.

In-Progress Review

- Significant Storm and Significant Project Impact Analysis Developed Early and Submitted for In-Progress-Review (IPR)
- Weekly Video and Telephone Conferences held by IPR team beginning 5 Nov 04 to Review Significant Storm and Project Impact Analysis, Last IPR held 14 Dec 04
- Result – Of the 22 Projects Considered, 21 are Eligible for Rehabilitation

Environmental Coordination

- Interagency Team Established to Discuss and Resolve Issues and Conflicts
  - EPA, NMFS, USF&WS, FEMA, Corps and DEP
- 1st Meeting Held 15 Dec 2004
- Conference Calls held Every Wednesday Thereafter

Project Implementation Reports (PIRs)

- 19 PIRs Approved by HQ
- 2 Section 14 PIRs Disapproved (SAM)

Contract Awards – 12/14 to date

Brevard County (combined)	26 Jan 05
Martin County	28 Jan 05
Fort Pierce Beach	25 Feb 05
Delray Beach	04 Mar 05
Broward Cty Seg III	04 Apr 05
Venice Beach	22 Apr 05
St. Johns County	25 May 05
Duval County	27 May 05
Manatee County	03 Jun 05
Pinellas - Sand Key	23 Jul 05
Lee County – Captiva	27 Jul 05

Remaining Contract Awards

- Palm Beach Ocean Ridge – Sep 2005 (turtle window)
- Broward County Segment II – Nov 2007 (monitoring issues)

What Worked?

- Bulk Funding for Project Implementation Report Preparation
- HQ Program Management Team
- PDT, ITR and IPR Teams
- Early Policy Guidance and Direction
- Standardizing PIR formats
- Surveys

What Was Hard?

- Working Though the Thanksgiving, Christmas, New Years and MLK Holidays
- 21 PIRs being Prepared Simultaneously
- Environmental Clearances and Coordination
- Educating Sponsors on Eligibility for an Emergency Rehabilitation

What Can Be Improved?

- Construction General (CG) - $62,600,000 for Emergency Repair of Storm Damage to Authorized Shore Protection Projects and Assessment of Project Performance of Such Projects
- Shore Protection Project Performance Improvement Initiative (S3P2I)

S3P2I

- The S3P2I has four Focus Areas:
  - Program Level Efforts
  - Assessment of Existing Project Performance
  - Project Formulation and Evaluation, and Design Improvements
  - 3-D Morphological Model Development
- Goals are to:
  - Improved Evaluation and Assessment and Net Effects of Proposed Shore Protection Projects
  - Improved Predictive Capability for Project Planning and Design and Decision Support

S3P2I Program Management Team

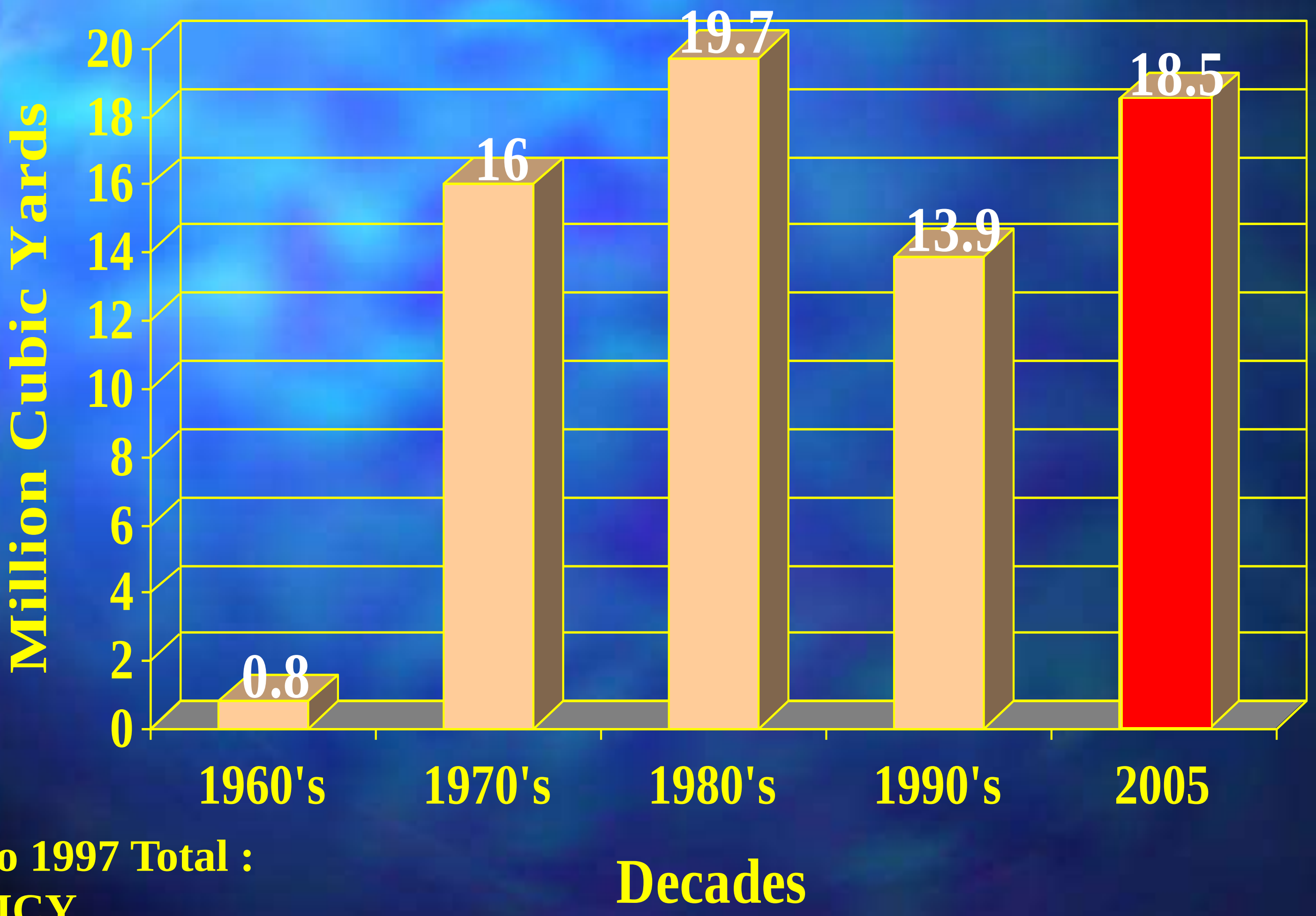
- William Curtis, ERDC
- Sharon Haggett, Wilmington District
- Stephen Couch, North Atlantic Division
- Dr. Donald Resio, ERDC
- Lillian Almodovar, HQUSACE
- Thomas Richardson, ERDC
- Charles Chesnutt, Institute for Water Resources
- Kaiser Edmond, South Atlantic Division
- Joseph Vietri, North Atlantic Division
- Dr. Bruce Taylor, CERB

FCCE/HSPP PROGRAM SUMMARY

■ FCCE Volume	8 MCY
■ 100% Federal Cost	$78.8 Million
■ Additional Nourishment Volume	11 MCY
■ Full Restoration Cost	$107.9 Million
■ Federal Restoration Share	$ 62.4 Million
■ Non-Federal Restoration Share	$ 45.5 Million
■ Total Volume	19 MCY
■ Total Cost	$186.7 Million

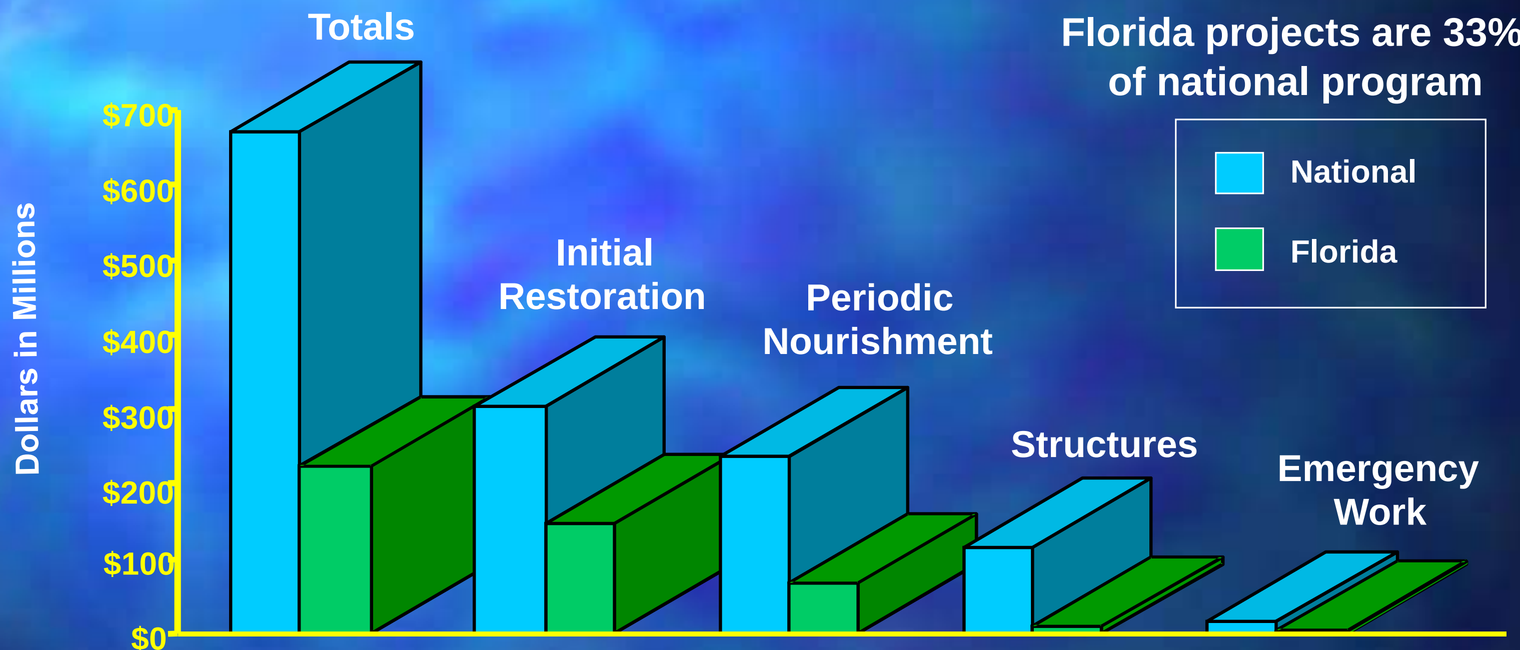
Shore Protection Program

Sand Deposition 1960 – 1997 vs. 2005



**1960 to 1997 Total :
50.5 MCY**

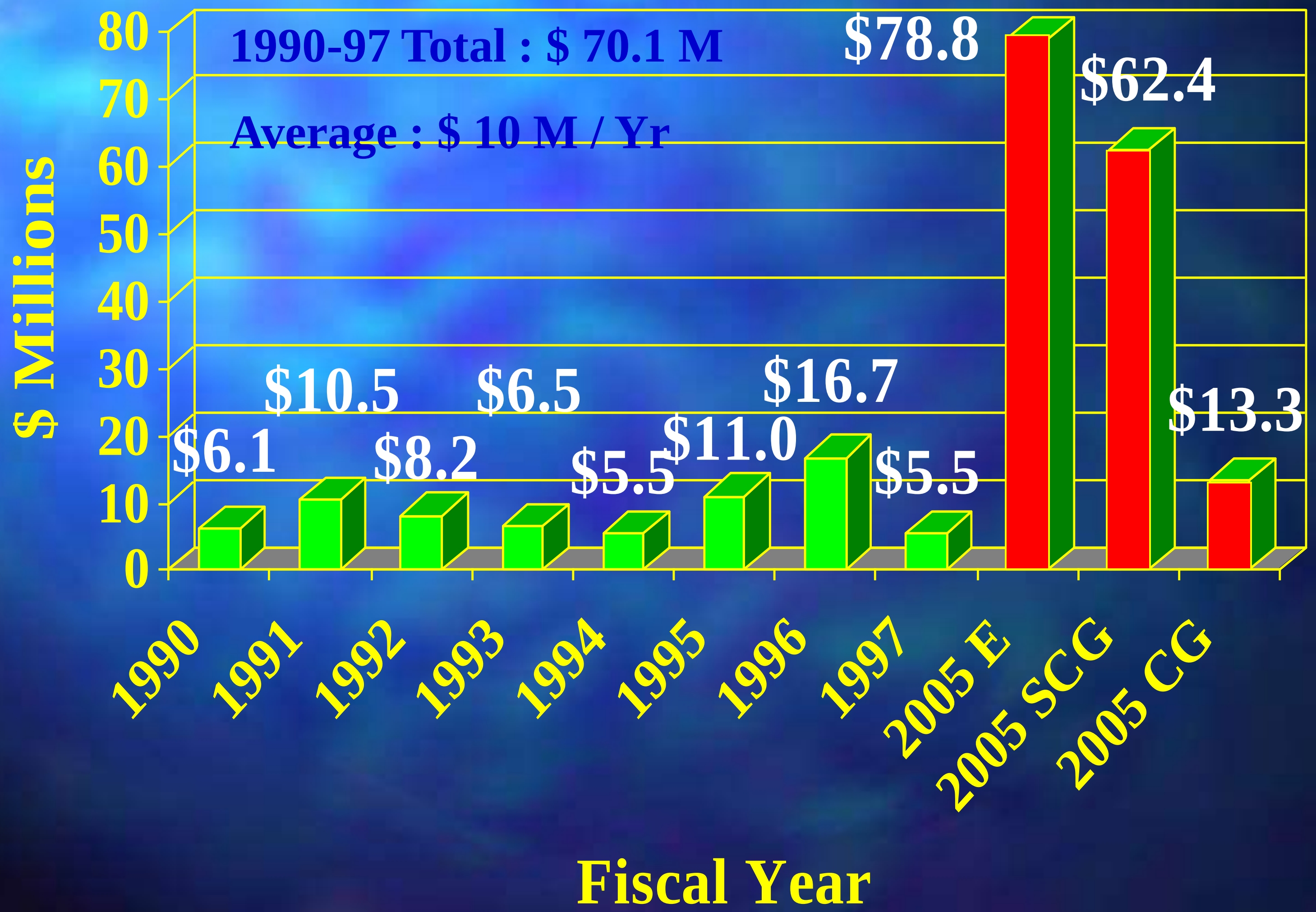
Federal Shore Protection Expenditures National vs. Florida (1993)



	NATIONAL	FL	FL %
EMERGENCY WORK	$ 15.9	$ 3.2	20.1%
TOTAL	$670.2	$223.0	33.3%

Shore Protection Program

Federal Funding 1990 to 1997 vs. 2005



Summary

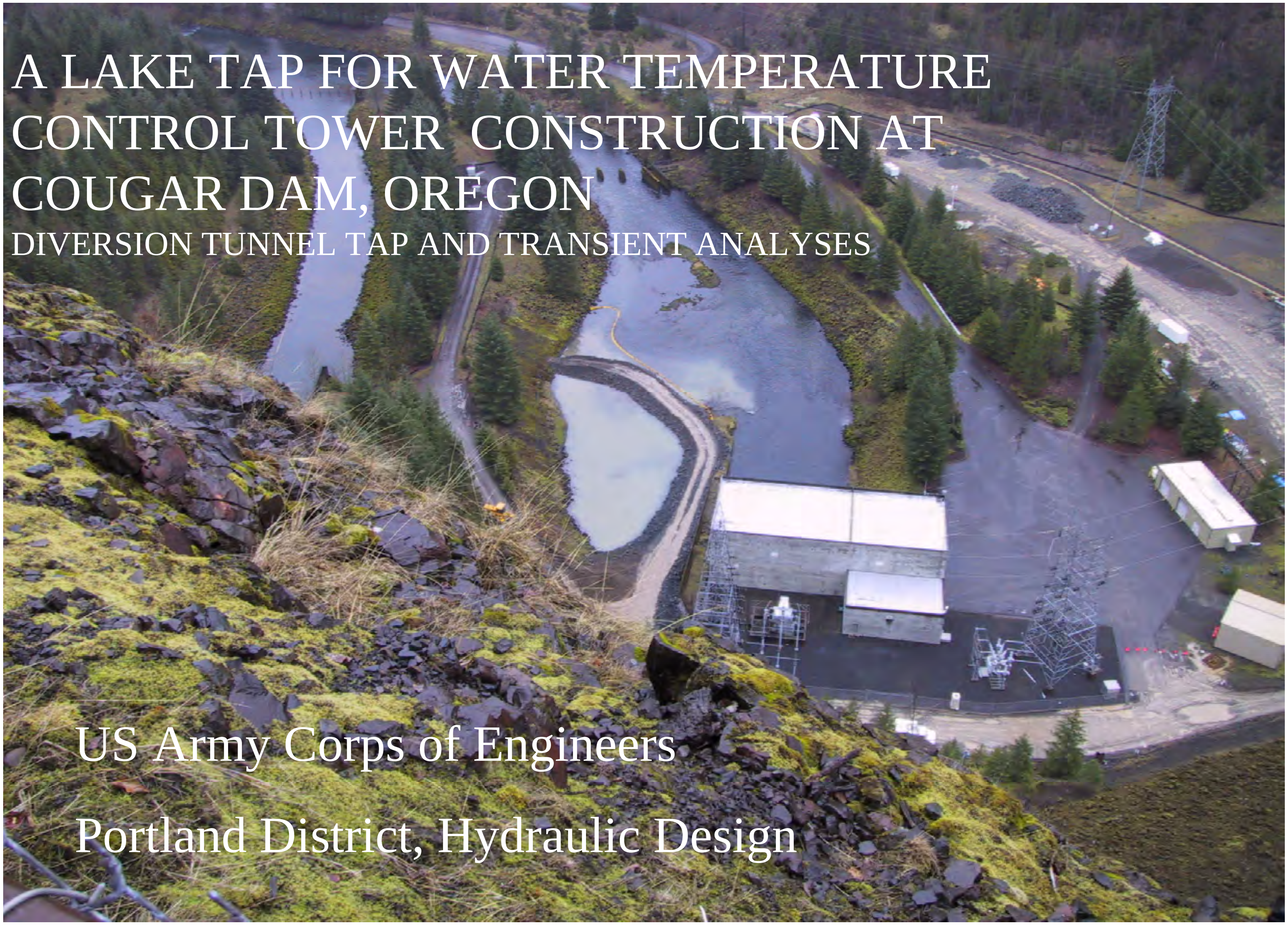
- Scope of Program Unprecedented
- Corps Project Management Business Process at its Best, Regional and Vertical Teams, Sponsors, Contractors and Environmental Resource Agencies Working Together, Rapidly Solving Problems

- ftp://ftp.saj.usace.army.mil/pub/uploads/k3pdpckb/Hurricane04/

Thank You …..

A LAKE TAP FOR WATER TEMPERATURE CONTROL TOWER CONSTRUCTION AT COUGAR DAM, OREGON

DIVERSION TUNNEL TAP AND TRANSIENT ANALYSES



US Army Corps of Engineers

Portland District, Hydraulic Design

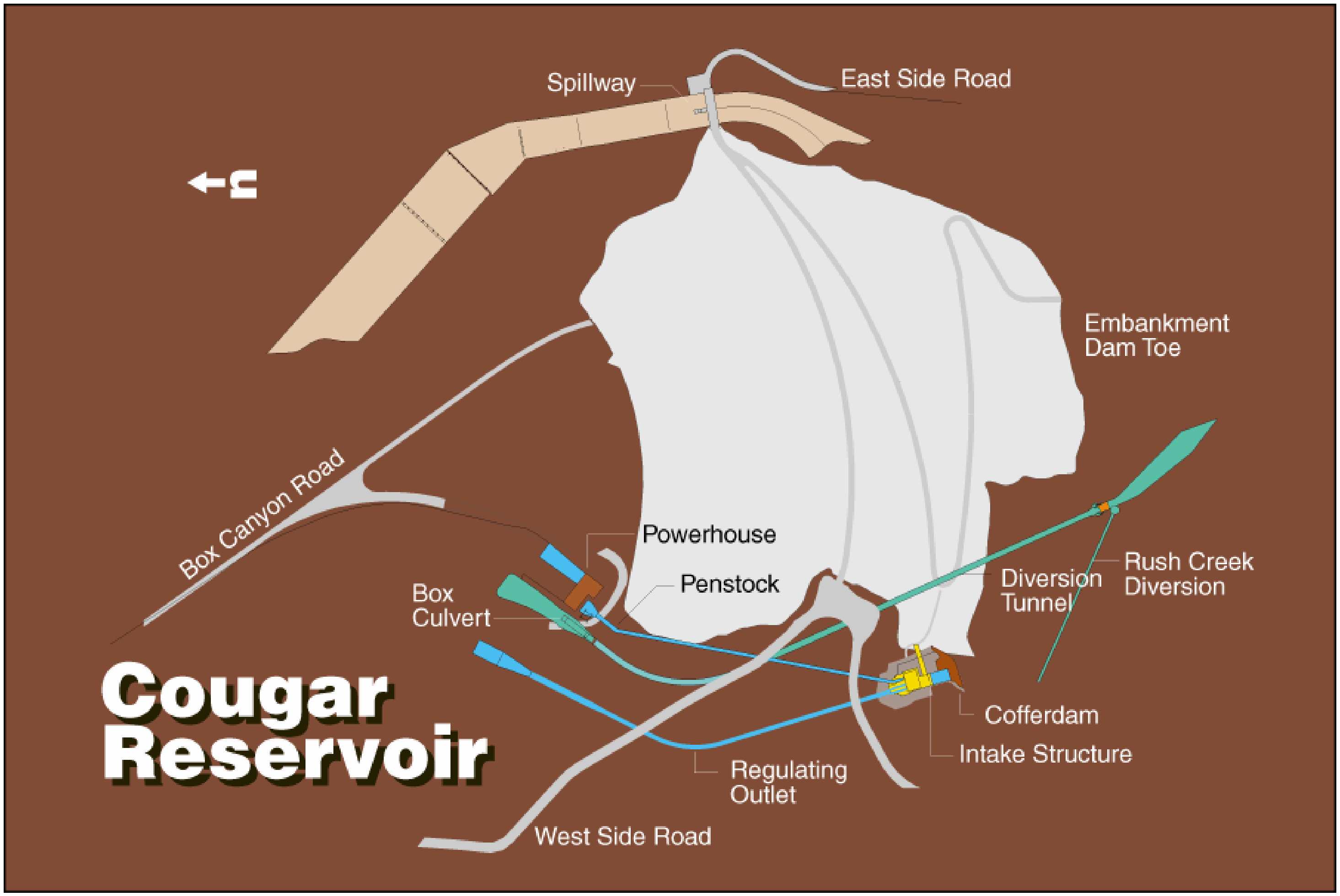
Cougar Dam, Willamette Basin

McKenzie Subbasin, Oregon

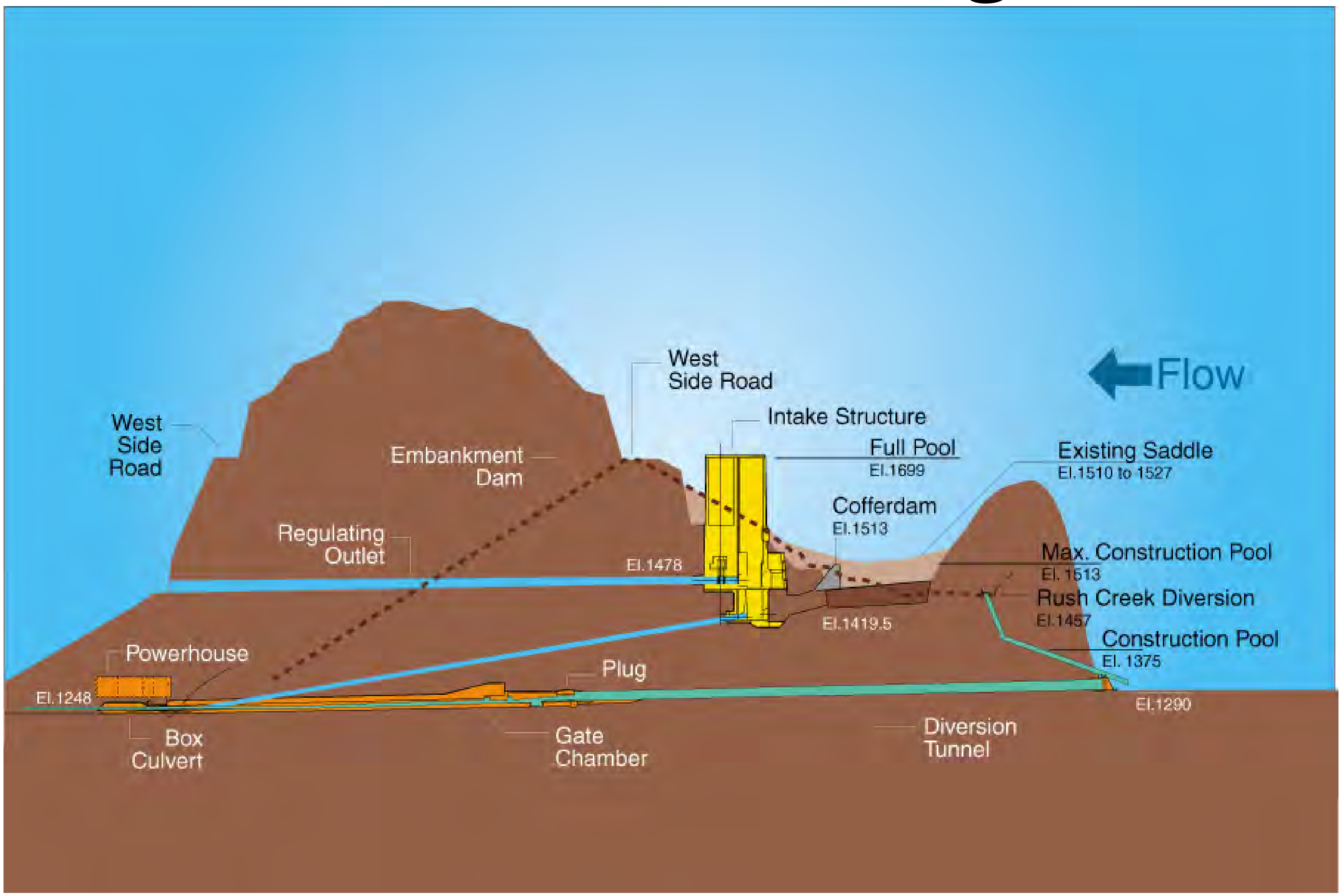
Cougar Dam Specifications

- Year: 1964
- Type: Rockfill
- Cost: $111 Million
- Head: 437 ft
- Height, max: 519 ft
- Height, grn lvl: 435 ft
- Crest Ele: 1705 ft
- Min Power: 1516 ft
- Min Flood: 1532 ft
- Max Pool: 1699 ft
- Store: 219000 ac-ft
- RO Cap: 12 kcfs
- SW Cap: 76 kcfs
- Power: 25MW

Plan View of Cougar Dam



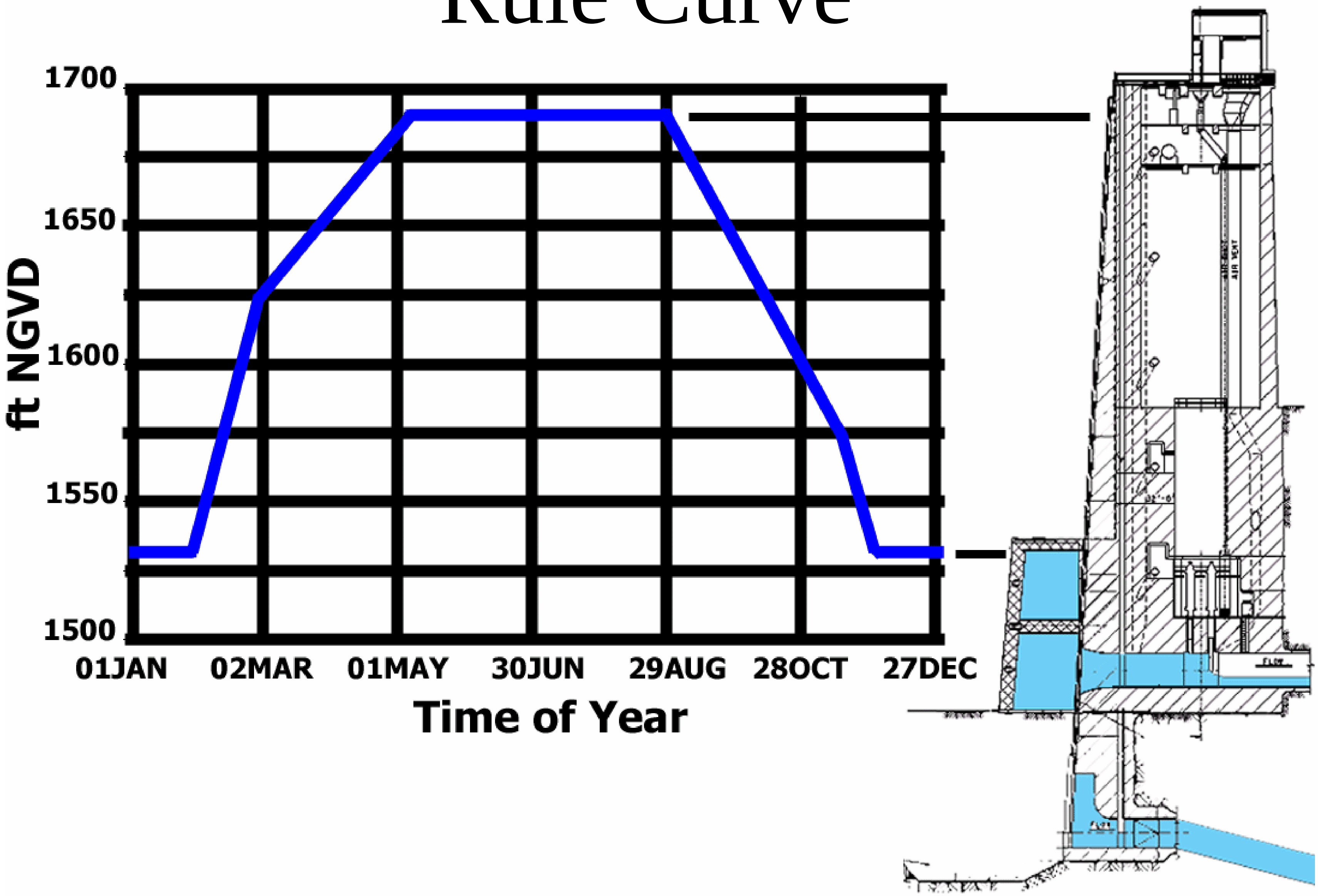
Elevation View of Cougar Dam



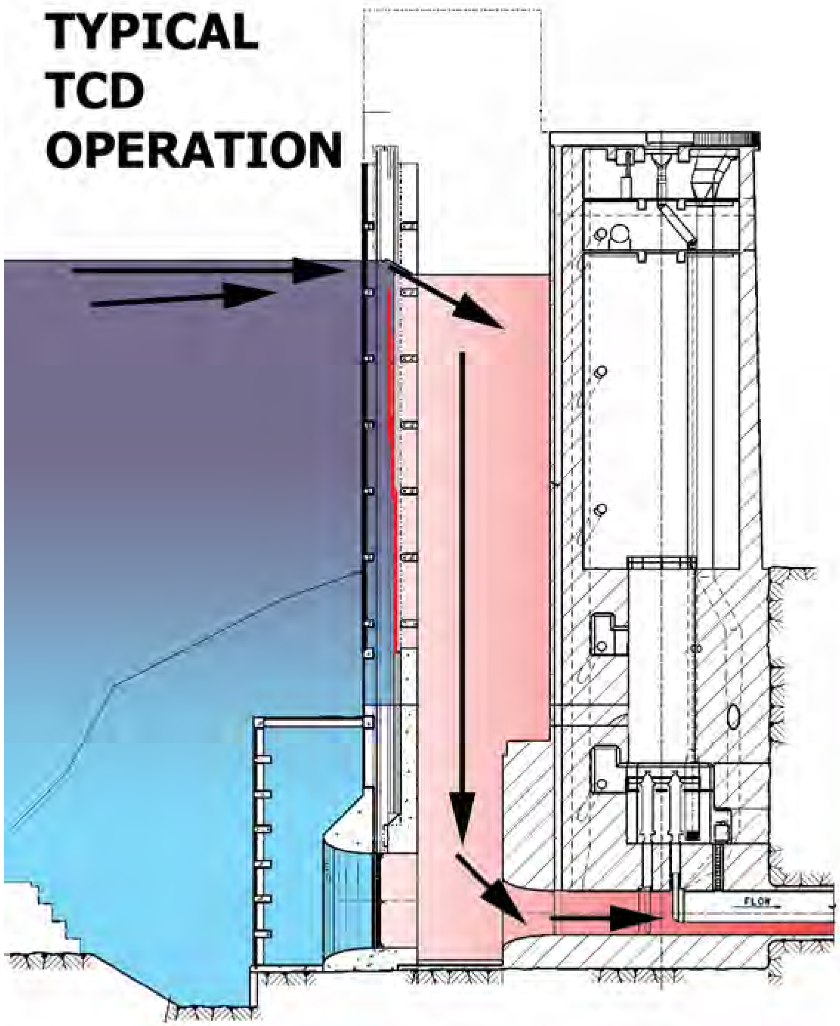
Need for Temperature Control

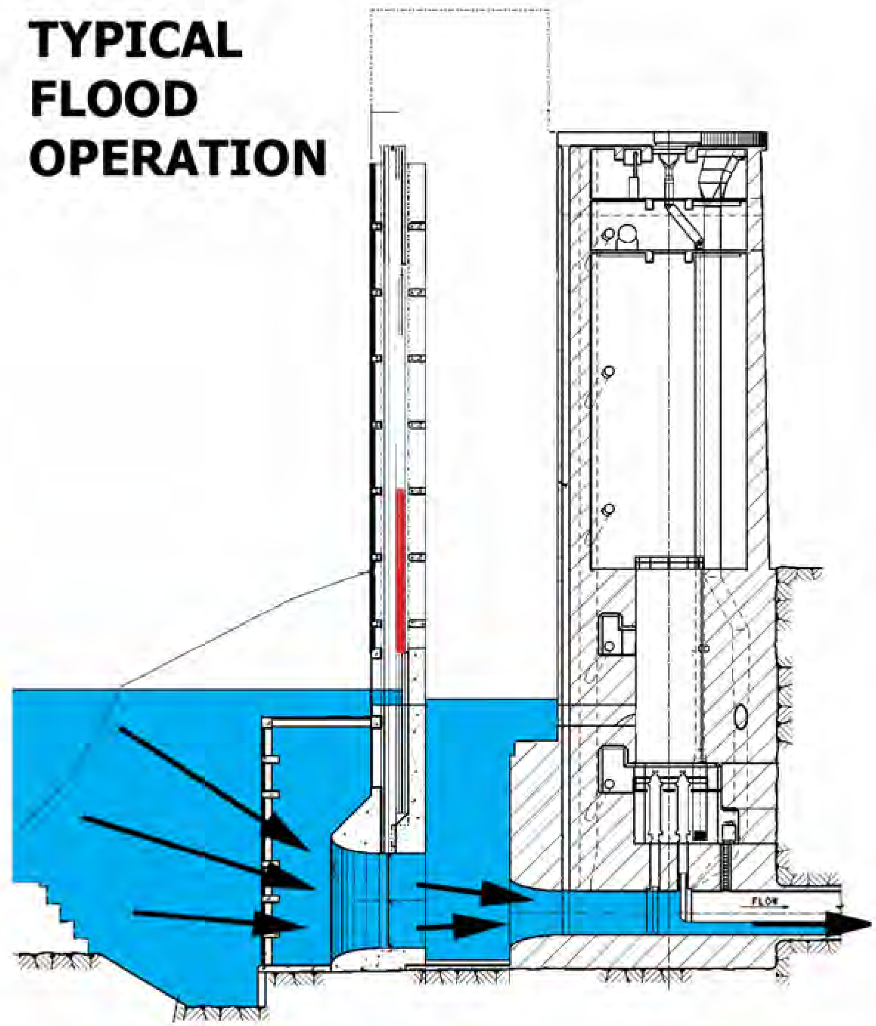
- Spring/Summer: High Pool, very cold deep water is drawn from bottom intakes of original tower,
  - Causes downstream cold spikes reducing migration of Spring Chinook.
- Fall/Winter: Low Pool, cold reservoir is used up,
  - Water is mixed and warmer than before dam,
  - Causes pre-spawning mortality and premature fry emergence.
- Project objective is to restore natural temperature cycle in MacKenzie River downstream of dam.

Rule Curve

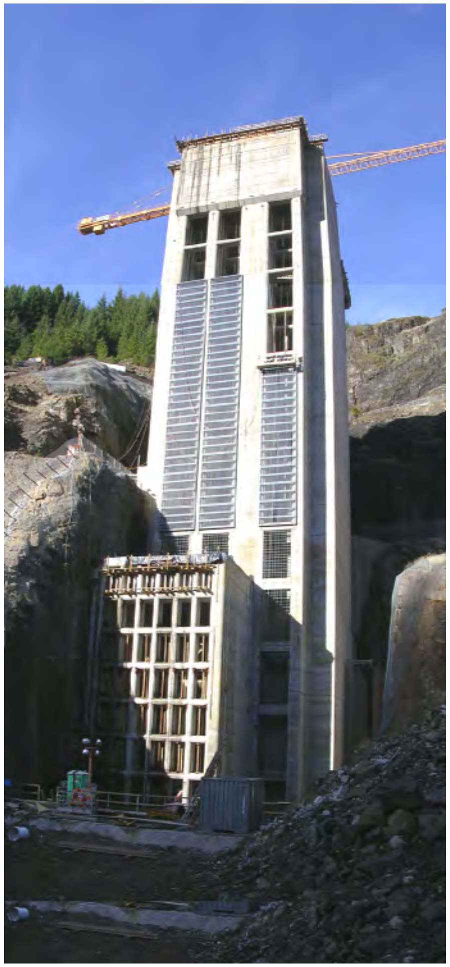

1700
1650
1600
1550
1500
ft NGVD
01JAN
02MAR
01MAY
30JUN
29AUG
28OCT
27DEC
Time of Year

Operating Diagram





Old Tower vs. New Tower



Reason for Lake Tap

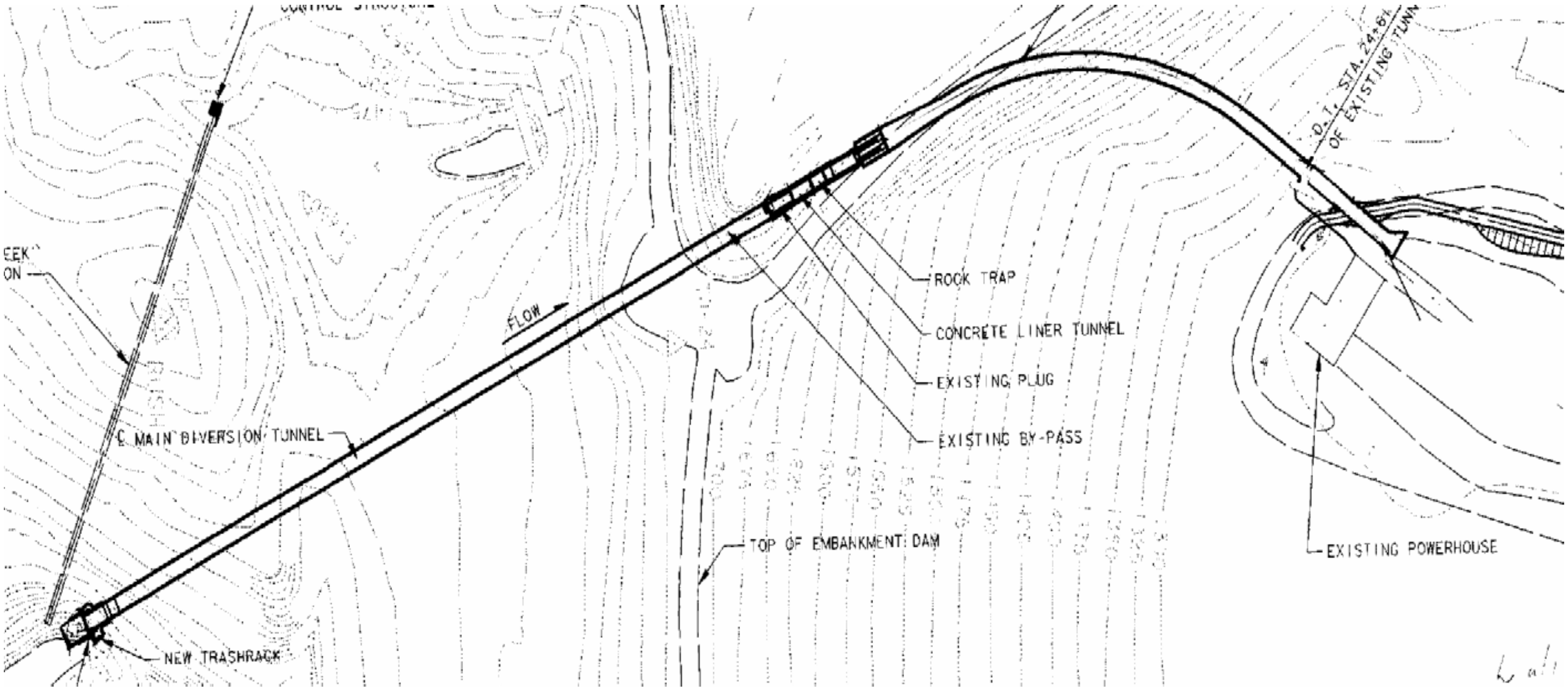
- Reservoir level must be drawn below invert elevation in Reservoir Outlet Intake Tower to construct tower modifications
- Intake to original Diversion Tunnel is lower.
- Diversion Tunnel was plugged after dam construction.
- Plug must be blasted open to operate tunnel and control reservoir outflow during construction of new tower.
  - Lake Tap performed in Feb 2002
  - Tower Construction Completed in 2005

Cougar Diversion Tunnel

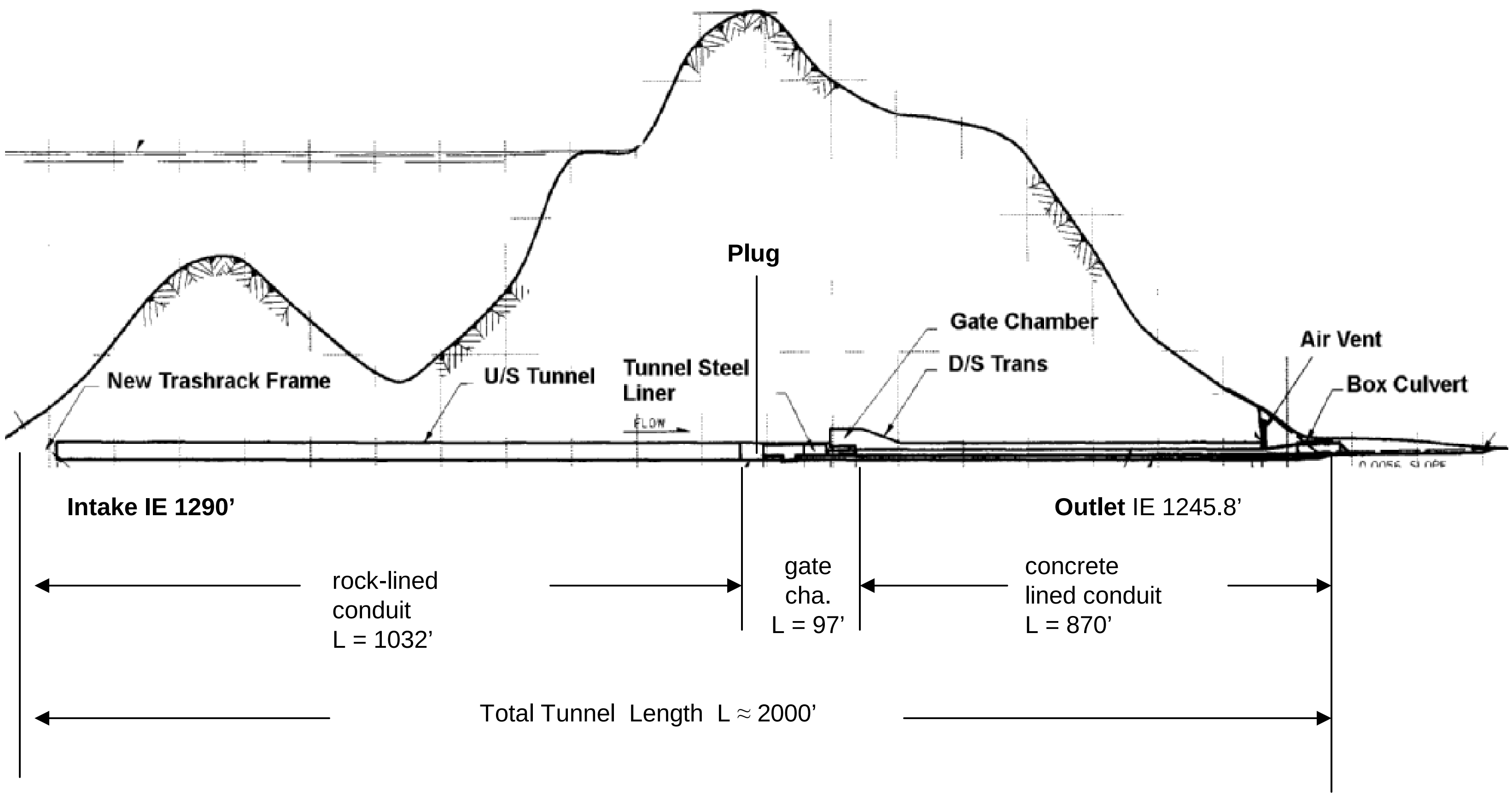
- 2000-foot long, rock-lined horseshoe tunnel
  - Built for river diversion during original dam construction
  - Tunnel plugged after dam completion
- Tunnel Reopened for construction of Water Temperature Tower
- Features Added for Tunnel Flow Control
  - New Control gate chamber in middle of tunnel
  - Lower half of tunnel lined with high velocity concrete

Plan View Diversion Tunnel

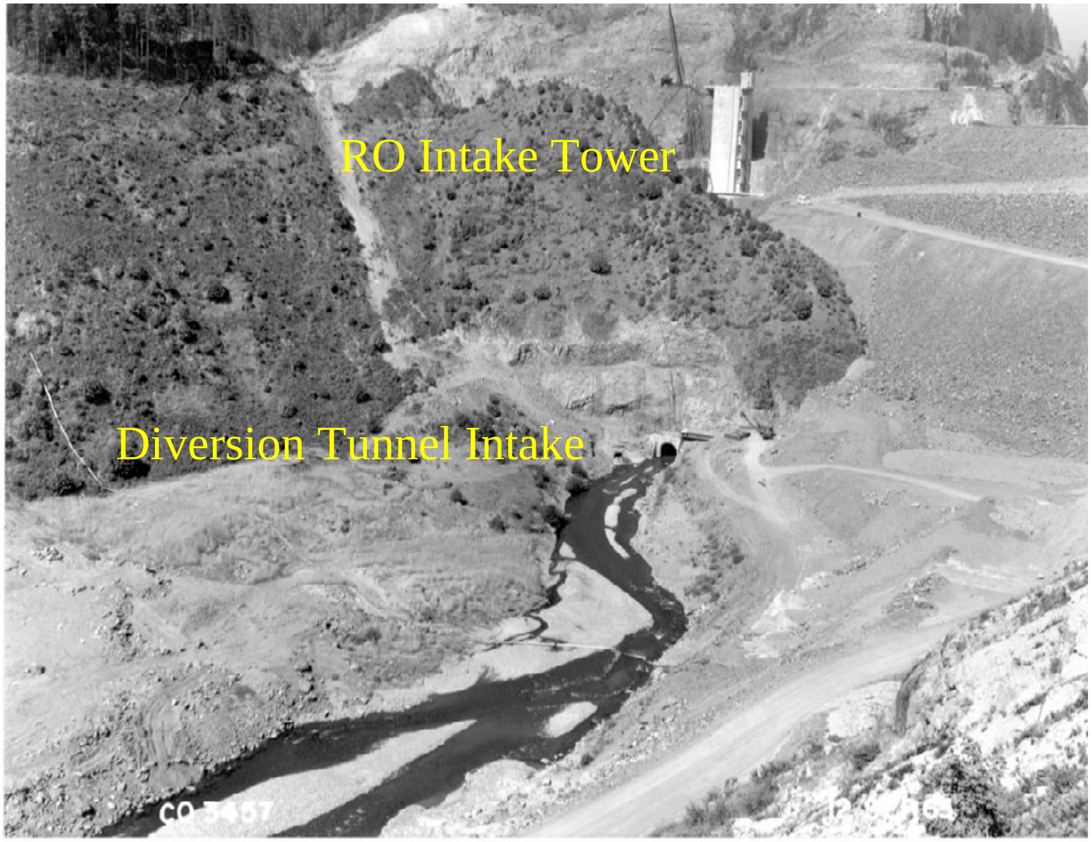
2000 feet long *19.5 feet wide horseshoe tunnel*



Diversion Tunnel Profile



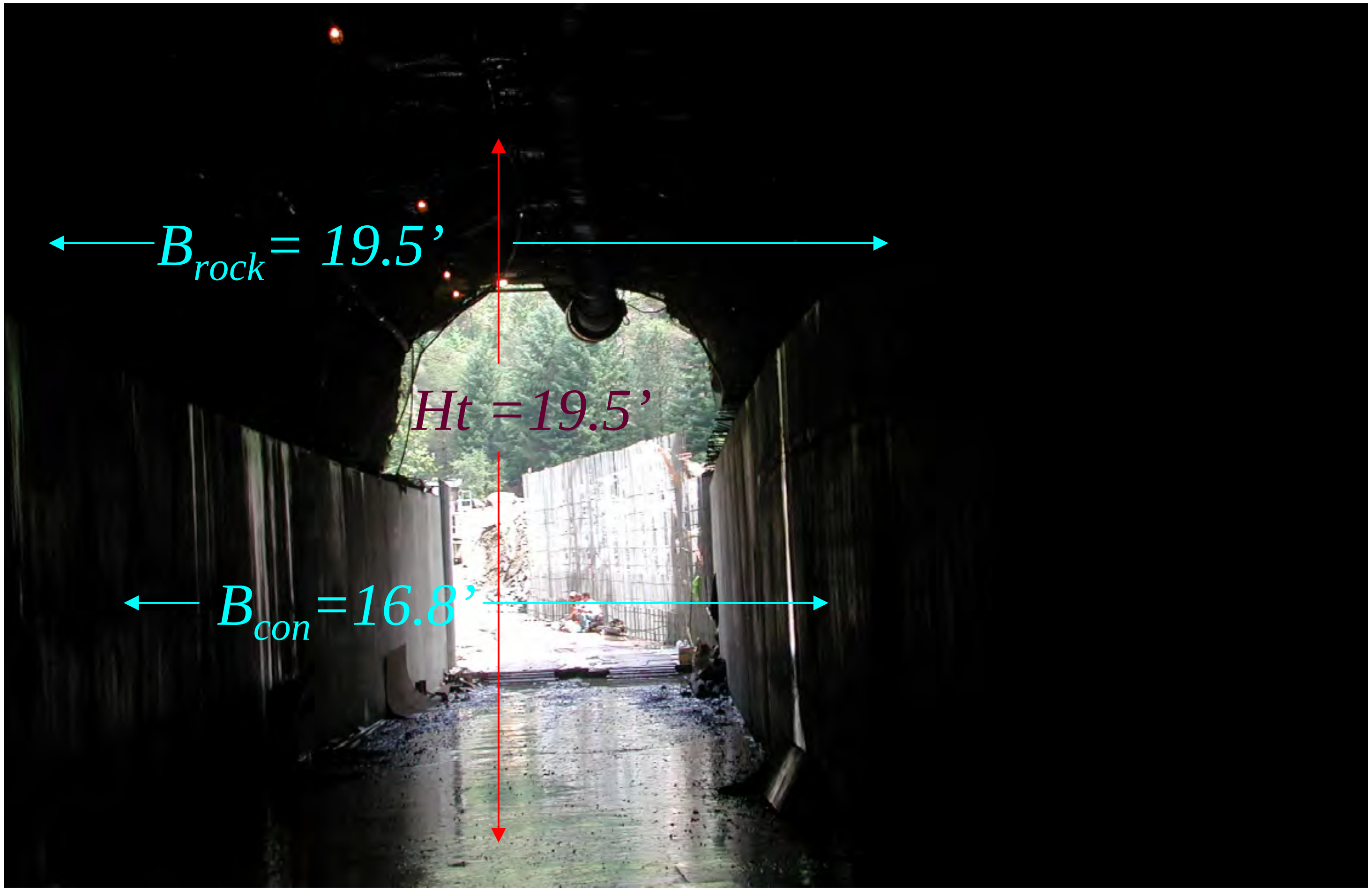
Diversion Tunnel Intake & RO Tower (Old Photo)



Construction photo, McKenzie River flowing into diversion, intake tower in background, Cougar Dam.

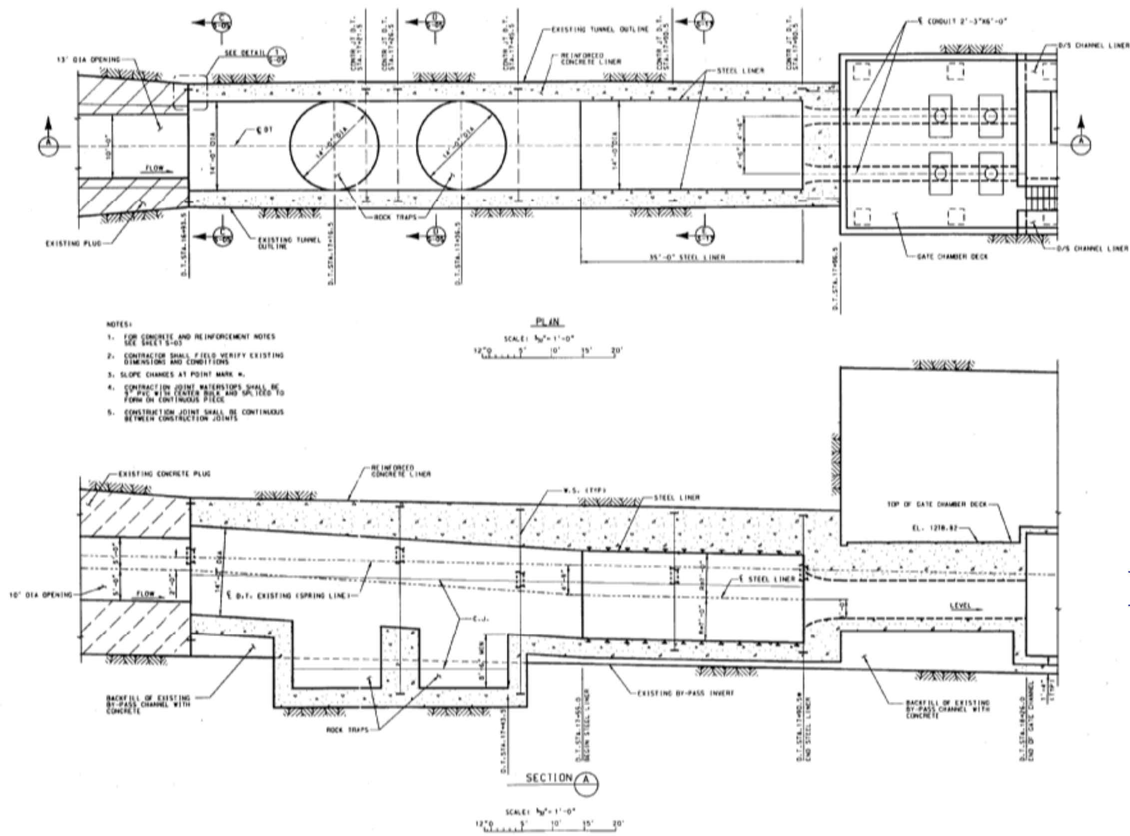
RIVER CHANNEL AND LEFT BANK. Pictures taken progressively from Borrow Area to toe of Dam. Camera on East Side Road. Merritt-Chapman & Scott Corp., Cont. 59-270.

D/S End of Diversion Tunnel Under Construction



Tunnel Plug & Gate Chamber

97’



Plan View

Elev. View

Lake Tap Analysis History

- 1:20 scale model at ENSR Lab, Seattle WA, during DM Phase
  - Recommended two phased opening
  - Feasibility ruled out by Blasting Contractor during construction phase (no wet charges)
- Rigid body slug flow analyses with closed gate:
  - Ht (Max Tap Head) = 12 * HR (Reservoir Head)
- FORTRAN SIMULATION using Method of Characteristics:
  - Closed Gate Ht = 6 HR
  - Open Gate Ht = 3 HR

Solutions for Transient Analyses

– Basic Water hammer: $$\Delta H = -a \cdot \frac{\Delta V}{g}$$

– Wave Speed a ~ 4600 ft/s

– Gate chamber air compression & evacuation
  - Perfect gas law (P/r = RT); $(P/\rho)^k$
  - Air outflow= f(Cd,A, RT, Pb, Pi) *Streeter & Wiley*
  - Air chamber continuity
  - Secant method used to solve for pressure head in chamber

– Method of Characteristics
  - Simultaneous solutions of momentum and continuity

– FORTRAN program developed for analyses
  - *References: Streeter & Wiley; Tullis*

Governing Equations for Water Hammer

Water Hammer Equation

$$\Delta H = -a \cdot \frac{\Delta V}{g}$$

In which:

ΔH = change in pressure head at location of changed velocity

a = acoustic wave speed in water (maximum = 4,671 ft/s at T = 40 degrees)

ΔV = incremental change in velocity

g = gravity

Wave Speed (a)

For Water Temperatute = 40 degrees:

K = bulk modulus of elasticity of water (= 294,000 psi)

$$K := 294 \cdot 10^3 \cdot \mathrm{psi}$$

ρ = water density (= 1.94 slugs per cubic foot) (slug = lb force * sec ^{2}/feet)

$$\rho := 1.94 \cdot \frac{\mathrm{slug}}{\mathrm{ft}^3}$$

d = equivalent diameter of pipe (about 17 feet)

$$d := 17 \cdot \mathrm{ft}$$

E = bulk modulus of elasticity of pipe material
Rock lined, assume 4000 psi concrete

$$E := 57000 \cdot \sqrt{4000} \cdot \mathrm{psi}$$

$$E = 3.605 \cdot 10^6 \cdot \mathrm{psi}$$

e = thickness of pipe wall (asssume 100 feet)

$$e := 100 \cdot \mathrm{ft}$$

Wave Speed:

1.

$$a := \frac{\sqrt{\frac{K}{\rho}}}{\sqrt{1 + \frac{K \cdot d}{E \cdot e}}}$$

$$a = 4.639 \cdot 10^3 \cdot \mathrm{ft} \cdot \mathrm{sec}^{-1}$$

AIR CHAMBER EQUATIONS

Perfect Gas Law

I. PERFECT GAS

2. $$\frac{P}{\rho_a} = R \cdot T$$ >>>>> $$P \cdot Vol = mass \cdot R \cdot T$$

In which:
P = absolute air pressure
ρ_a = air density
R = gas constant (= 1715 ft-lb/slug/deg R
T = absolute air temperature (degrees Rankine)

In which:
Vol = air volume (ft^3)
mass = air mass (slugs)

3. $$\left(\frac{P}{\rho_a}\right)^k = constant$$ >>>>> $$RT_i = RT_b \cdot \frac{\left(P_i\right)^{\left(\frac{k-1}{k}\right)}}{\left(P_b\right)^{\left(\frac{k-1}{k}\right)}}$$

In which :
k = specific heat ratio (use k = 1.2)
subscript i refers to conditions at current time step
subscript b refers to barometric pressure conditions

AIR OUTFLOW (mass rate)

4. Subsonic Flow (Wiley page 131):

IF : $\frac{P_b}{0.53} > P_i > P_b$

THEN:

$$\frac{dm}{dt} = C \cdot A \cdot P_i \cdot \sqrt{\frac{7}{RT_i} \cdot \left[\left(\frac{P_b}{P_i} \right)^{1.4286} - \left(\frac{P_b}{P_i} \right)^{1.714} \right]}$$

In which:

dm/dt = rate of air mass outflow from chamber

C = Coefficien of discharge through gates

P_b = barometric pressure (= 2028 lbs/ft ^{2})

P_i = pressure at current time step

AIR CHAMBER CONTINUITY

5. Open Chamber Gates

$$P_2 \cdot \left[Vol_1 + \frac{\Delta t}{2} \cdot \left(Qin_1 - Qout_1 + Qin_2 - Qout_2 \right) \right] = \left[m_1 + \frac{\Delta t}{2} \cdot \left(\frac{dm}{dt_1} + \frac{dm}{dt_2} \right) \right] \cdot RT_2$$

In which
Qin = water inflow rate to chamber
Qout = volumetric air outflow rate from chmaber through open gates
Δt = time step interval used in calculations
m = mass of trapped air in chamber
Vol = volume of air in chamber
Subscrpt 1 refers to beginning time step
Subscript 2 refers to end of time step

6. Closed Gates (simplified EQ)

$$P_2 \cdot \left[Vol_1 + \frac{\Delta t}{2} \cdot \left(Qin_1 + Qin_2 \right) \right] = m_1 \cdot RT_2$$

SECANT METHOD
to Solve for Pressure Head in Chamber

Solved for Head (P) in chamber using the
Secant (Newton) method

7. $$F = P \cdot \left[Vol + \frac{\Delta t}{2} \cdot \left(Qin_1 + Qin_2 \right) \right] - m_1 \cdot RT_2$$

Want F to go to zero

Guess P and solve iteratively until |F| < very small number

8. Secant Method

$$P_{i+1} = P_i - \frac{F_i}{\left(\frac{F_i - F_{i-1}}{P_i - P_{i-1}} \right)}$$

Method of Characteristics

- Solves Equations for momentum and continuity simultaneously
- Uses finite differences to solve for conditions at each node
- Nodes evenly spaced along pipeline based on the interval distance:

  $dx = a/dt$
- Incorporates conduit friction and change in water density
- Boundary conditions set at:
  - Upstream end: Constant Reservoir head
  - Downstream end:
    - Plug opening area (as function of time)
    - Gate area (open or closed)
    - Initial mass & volume of air in chamber
- **FORTRAN program developed for analyses**

Method of Characteristics Equations solved

METHOD of CHARACTERISTICS: for $\Delta x/\Delta t = a$

9. C+ Equation

$$\frac{g}{a}\cdot\frac{\Delta H}{\Delta t}+\frac{\Delta V}{\Delta t}+\frac{f\cdot v\cdot|V|}{2D}=0$$

from knowns at d/s node

10. C- Equation

$$\frac{g}{a}\cdot\frac{\Delta H}{\Delta t}-\frac{\Delta V}{\Delta t}-\frac{f\cdot v\cdot|V|}{2D}=0$$

from knowns at u/s node

Tunnel Tap Strategies

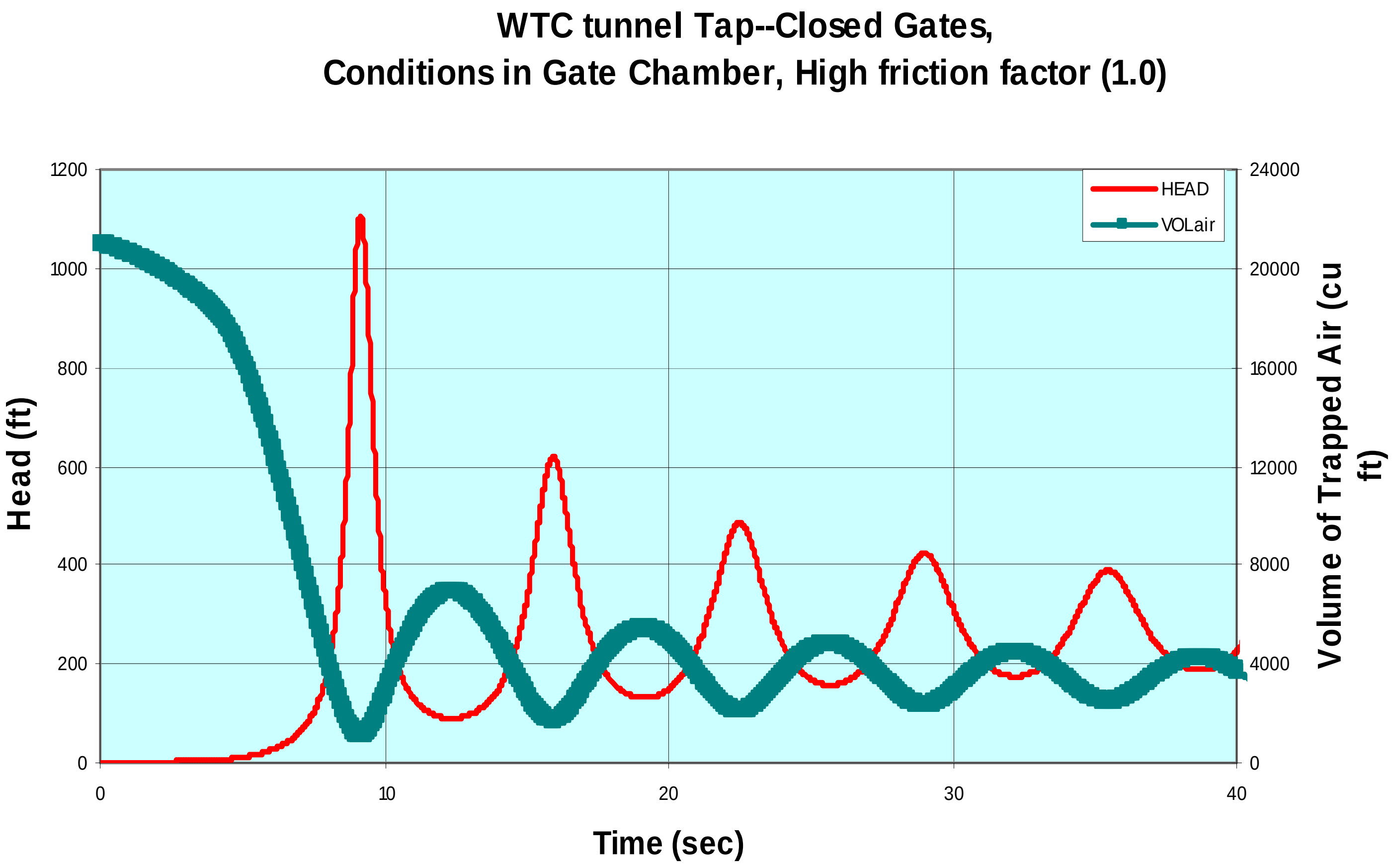
- Closed Gates (*assumptions below*)
  - Perfect Gas Law
    - $P/\rho = RT$; $(P/\rho)^{\kappa} = \text{constant}$; k = 1.2
  - No change in mass of trapped air after tunnel tap.

OR

- Open Gates (*assumptions below*)
  - Perfect Gas Law
  - Continuity equation for air volume and mass change
  - Outflow Through Gates
    - When trapped air volume > 0; all outflow is air
    - When Trapped air Volume = 0; all outflow is water

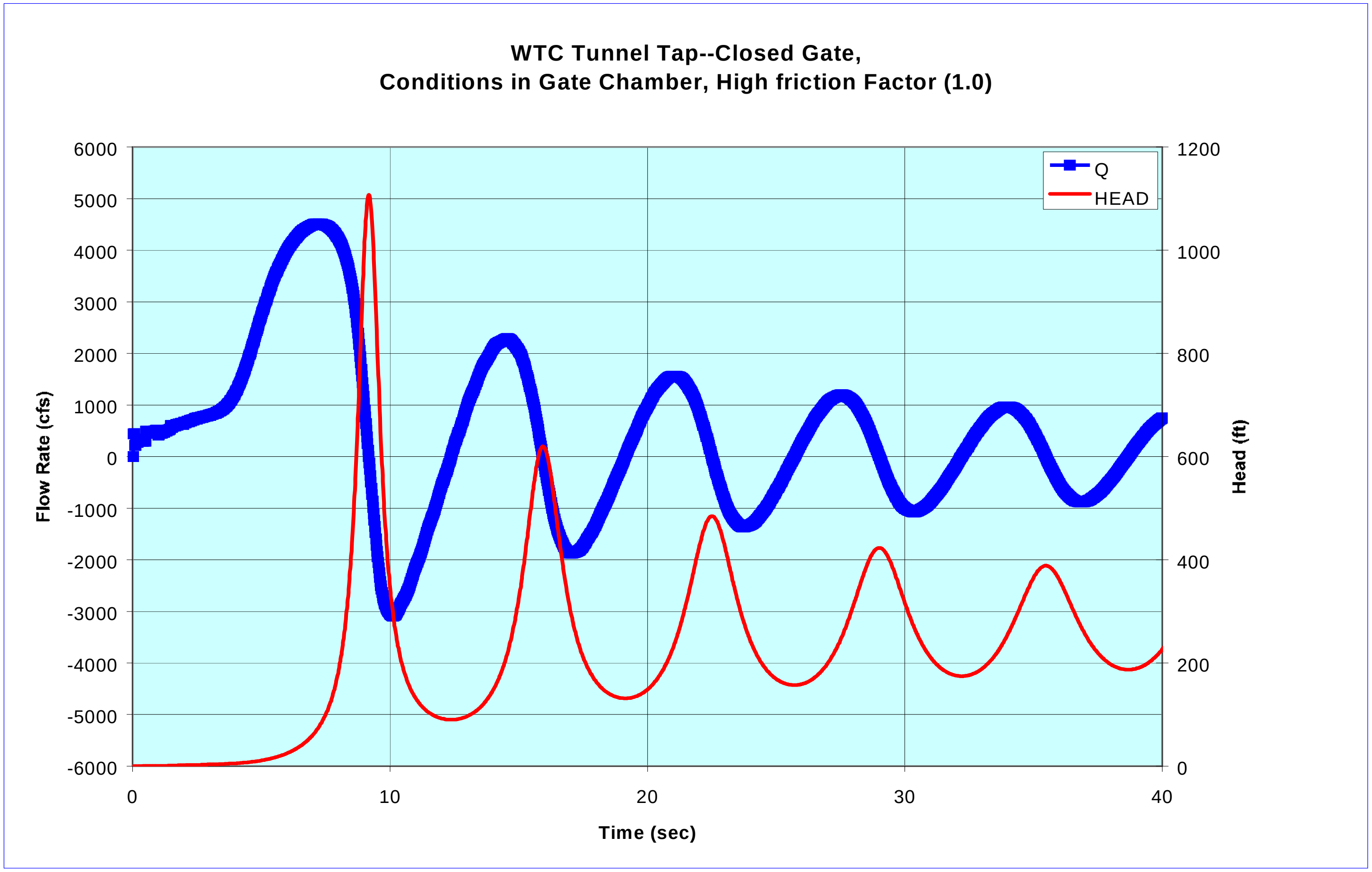
Closed Gate Results

Head & Air Volume VS Time



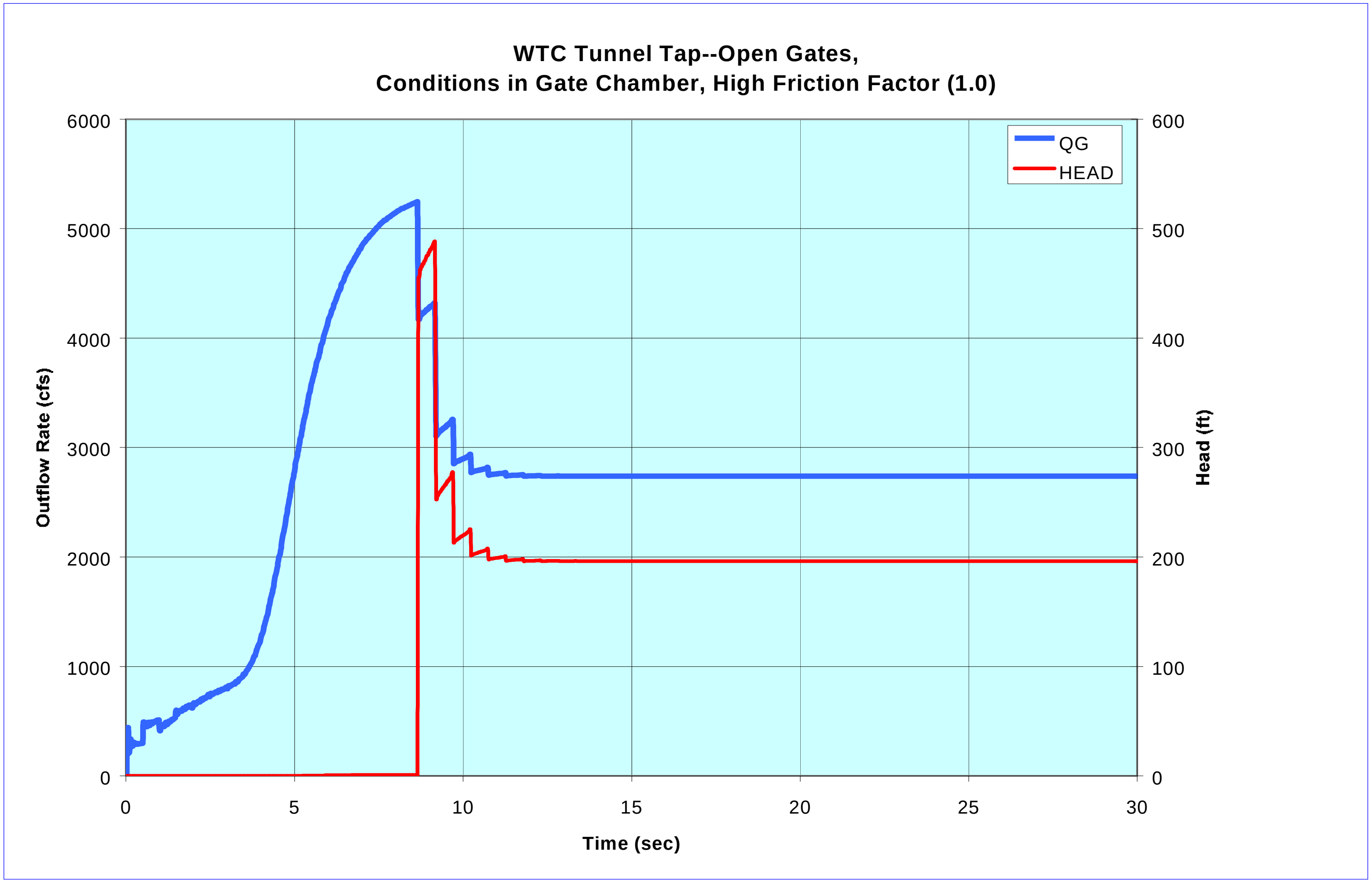
Closed Gate Results

Water Inflow & Head VS Time



Open Gate Results

Water Inflow & Head VS Time

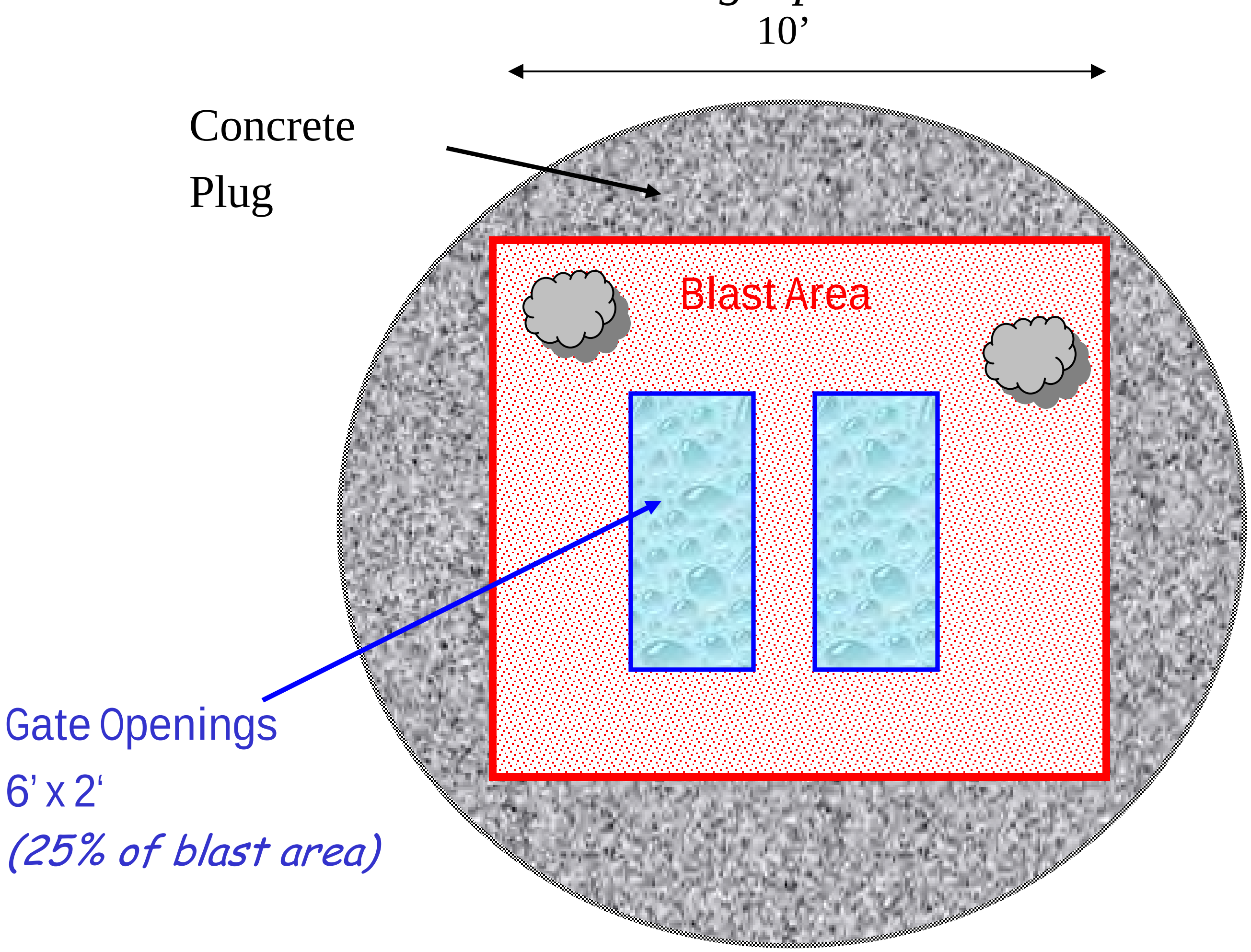


Tunnel Tap—02/23/2003

- Concrete Plug: 35’ long
  - *New 10-feet square hole*
- Most material mechanically mined before tap
- Tunnel Tap
  - *Tap conducted under 270 feet of reservoir head*
  - *Control gates open during tap*
  - *0.4 second long controlled blasting sequence starting from interior of cross-section*
  - *Rock trap to catch debris*

Cross-sections of Blast Area and Gate Openings

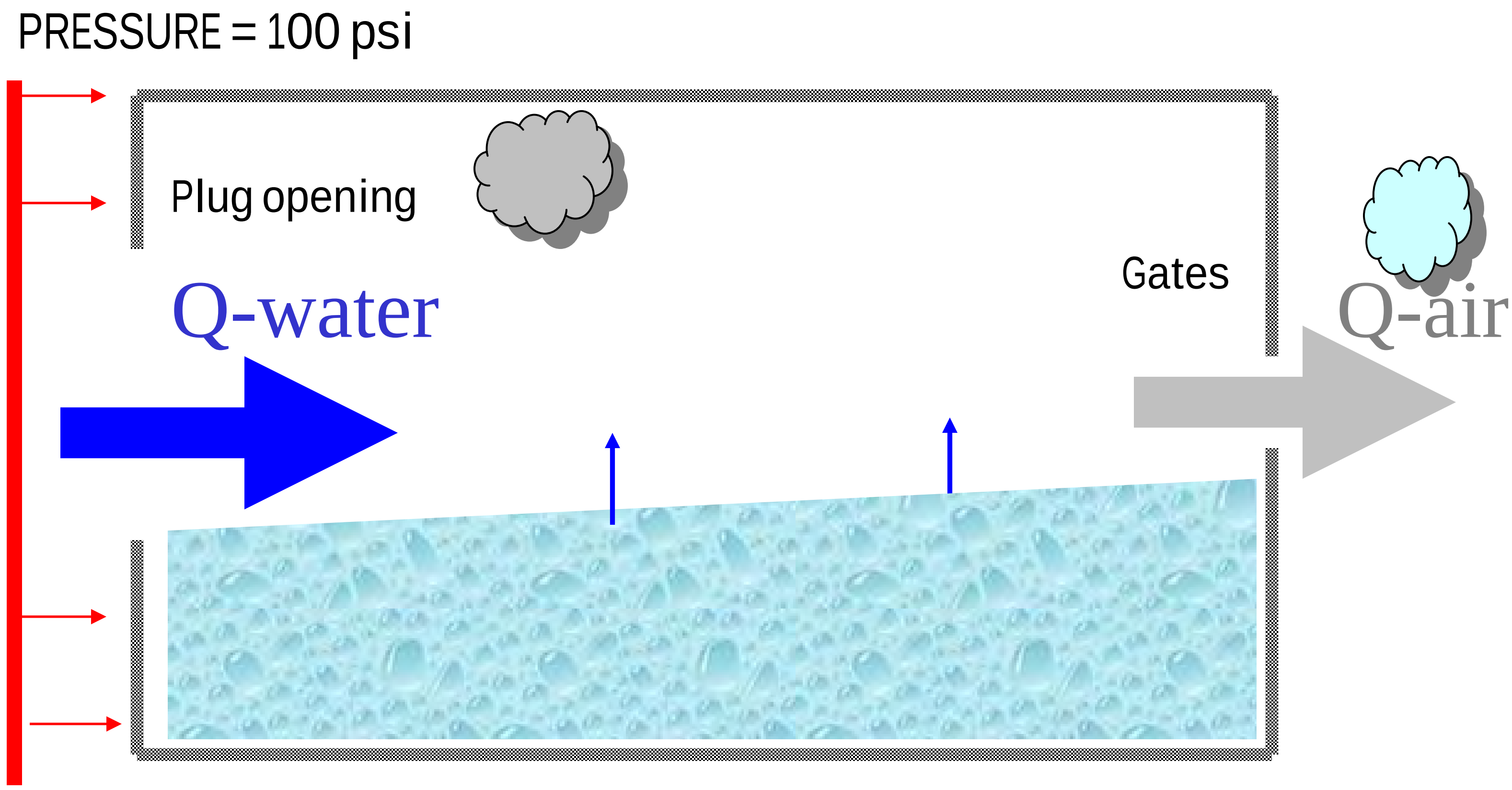
Looking Upstream



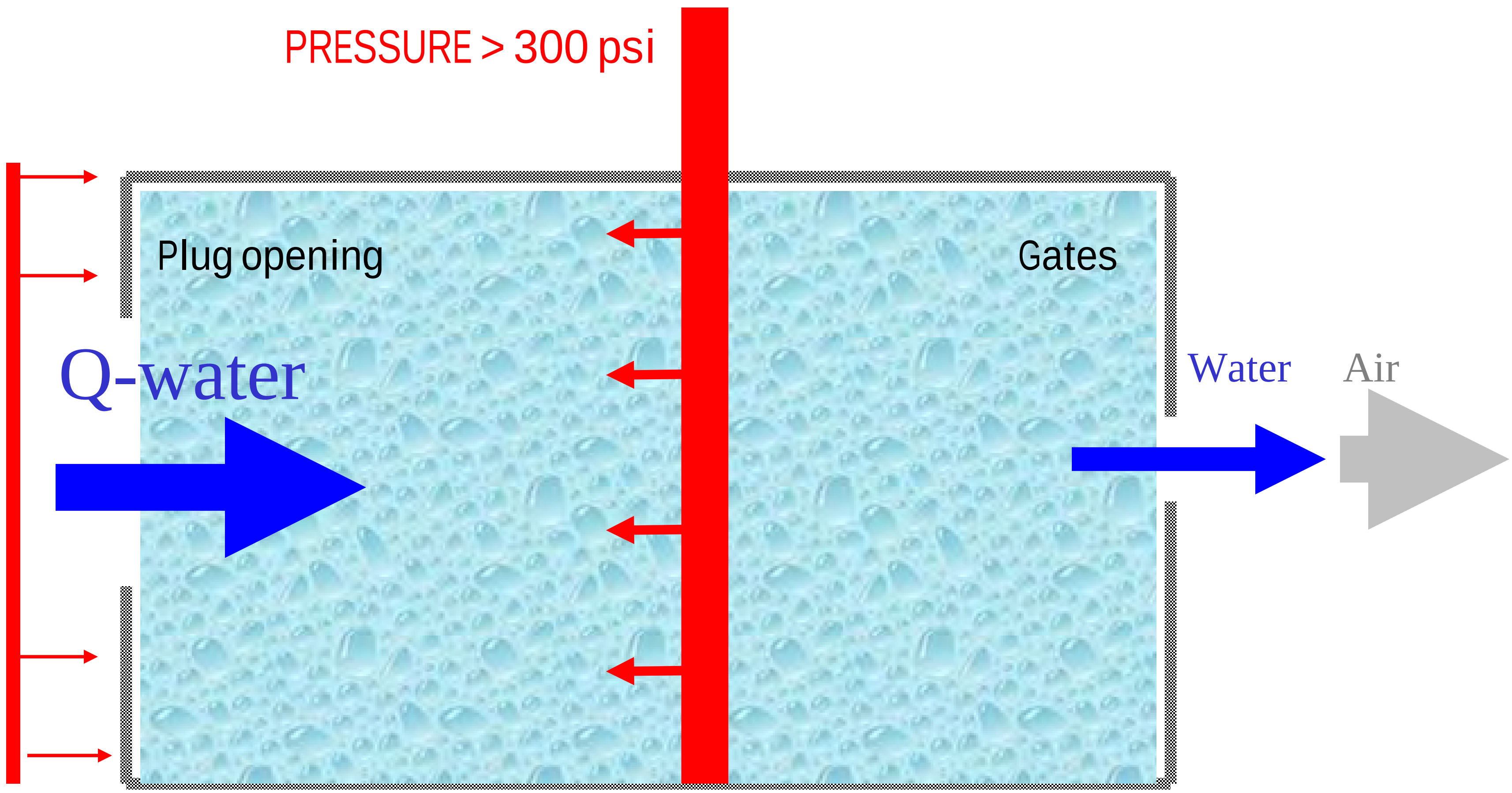
Tunnel Tap Transient Issues

- Tap conducted under 270 feet of reservoir head
- High initial discharge (5000 - 6000 cfs)
- Potentially high transient pressure head
  - *inevitable drops in discharge lead to pressure rises*
  - *3 times ambient reservoir head*
- First studied in 1:20 physical model (ENSR)
- FORTRAN program used for final analyses
  - *Evaluated alternative tap strategies*
  - *Refined blasting procedures*
  - *Estimated actual pressure and discharges during tap*

Gate Chamber Filling Right After Plug Opening

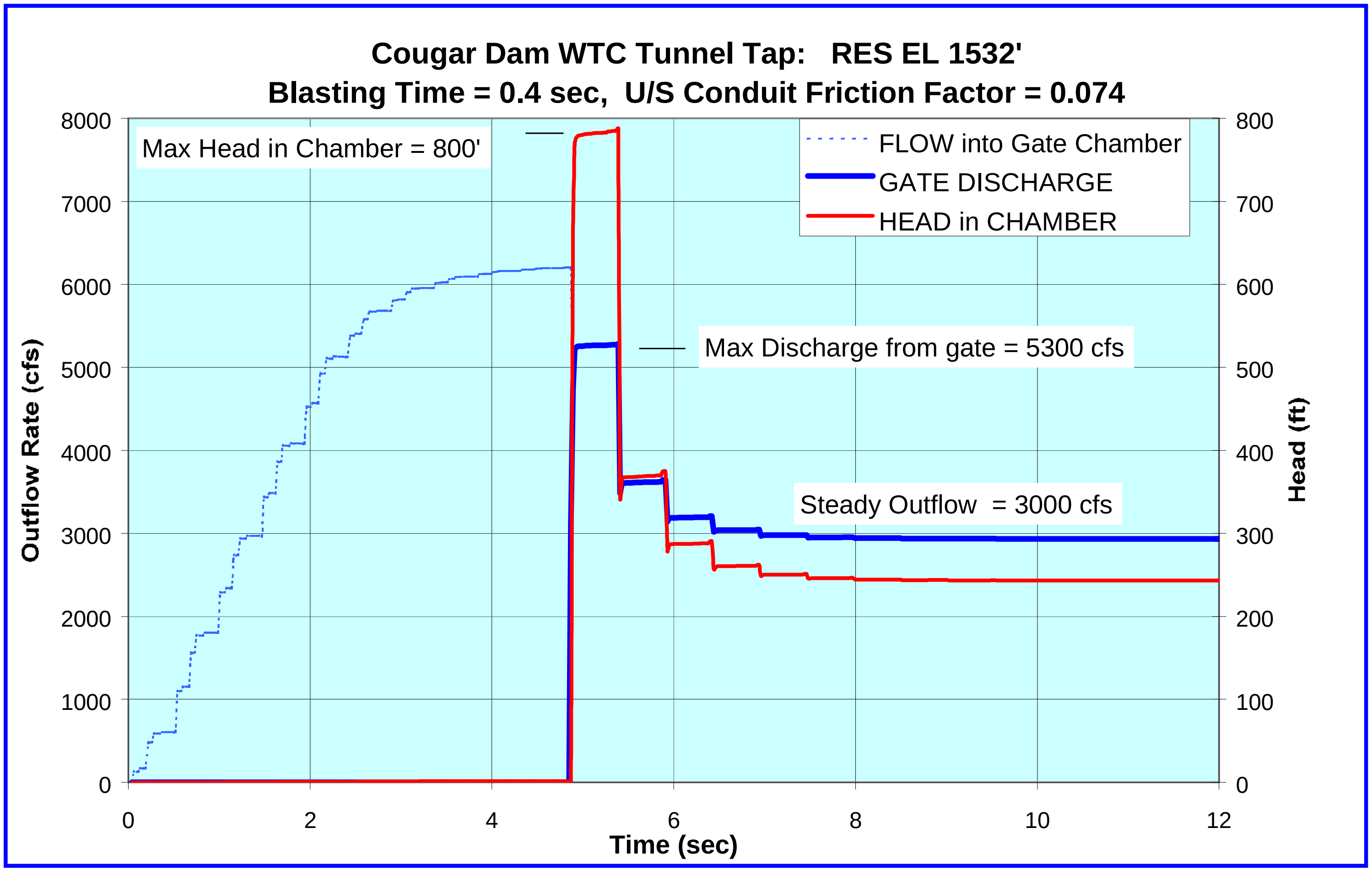


Gate Chamber Right After Filling With Water



Open Gate Results-Contractors Proposal

Water Inflow & Head VS Time



80 second Tunnel Tap Video

Tap Photos:

Downstream End of Tunnel Before Tap

Tunnel Tap: Peak Outflow

Tunnel Tap: Steady Outflow (Later)

Tunnel Tap, D/S Channel (Early)

Tunnel Tap, D/S Channel (Later)

LESSONS LEARNED

- Provide more distance between plug and gates in design phase
  - Distance and volume will reduce potential pressure rise.
- Coordinate with Blasting Contractors while developing lake tap plan
- Obtain pressure transducers with capacities greater than estimated pressures.
- Use both physical and numerical models to predict maximum potential tap pressures and refine procedures.

Conclusions on Tunnel Tap

- Successful tap
  - *no apparent structural damage in tunnel or in downstream channel*
  - *Downstream erosion minimized*
  - *Great coordination between Construction, Cougar Project, NWD Reservoir Control Center, Blasting Contractor, & NWP Design team*
- Predictions
  - *Pressure transducers did not work*
  - *Timing of exit discharge conformed to transient results*
  - *Water level rise at d/s USGS gage < 1 foot (predicted)*

END

- <u>Acknowledgements:</u>

  - *Brad Bird, EC-HD lead*
  - *Nathan Higa, EC-HD (design)*
  - *Steve Schlenker, EC-HD; technical support*
  - *Kyle McCune, EC-HD; technical support*
  - *Sean Askelson, EC-HD; technical support*
  - *Tony Norris, (EC-HD); previous lead*
  - *Robert Buchholz, Branch Chief HH&G*
  - *NWD Reservoir Control Center*
  - *Willamette Valley Project*
  - *Don Erickson, Project TL* *George Miller, Project PM*
  - *HEC-RAS-UNET* *ENSR Lab, Seattle WA*
  - *Dr. J.P. Tullis* *Streeter & Wiley*

US Army Corps
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Vicksburg District

Tri-Service Infrastructure Systems Conference & Exhibition

2-5 August 2005

John B. Smith

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Watershed Approach to Stream Stability
and
Benefits Related to the Reduction of Nutrients

US Army Corps
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Vicksburg District

Mississippi Delta Headwaters (MDH) Project

US Army Corps of Engineers® Vicksburg District

Mississippi Delta Headwaters (MDH) Project

Authorizations

- SECED in 1970's (PL 93-251)
- DEC Emergency Jobs Appropriations Act 1983 (PL 98-8)
- WRDA 1986 (PL 99-662)

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Purpose of MDH Project

- Erosion Control
- Sediment Management
- Flood Control
- Environmental Enhancement
- Demonstrate Innovative Technologies for Watershed Treatment

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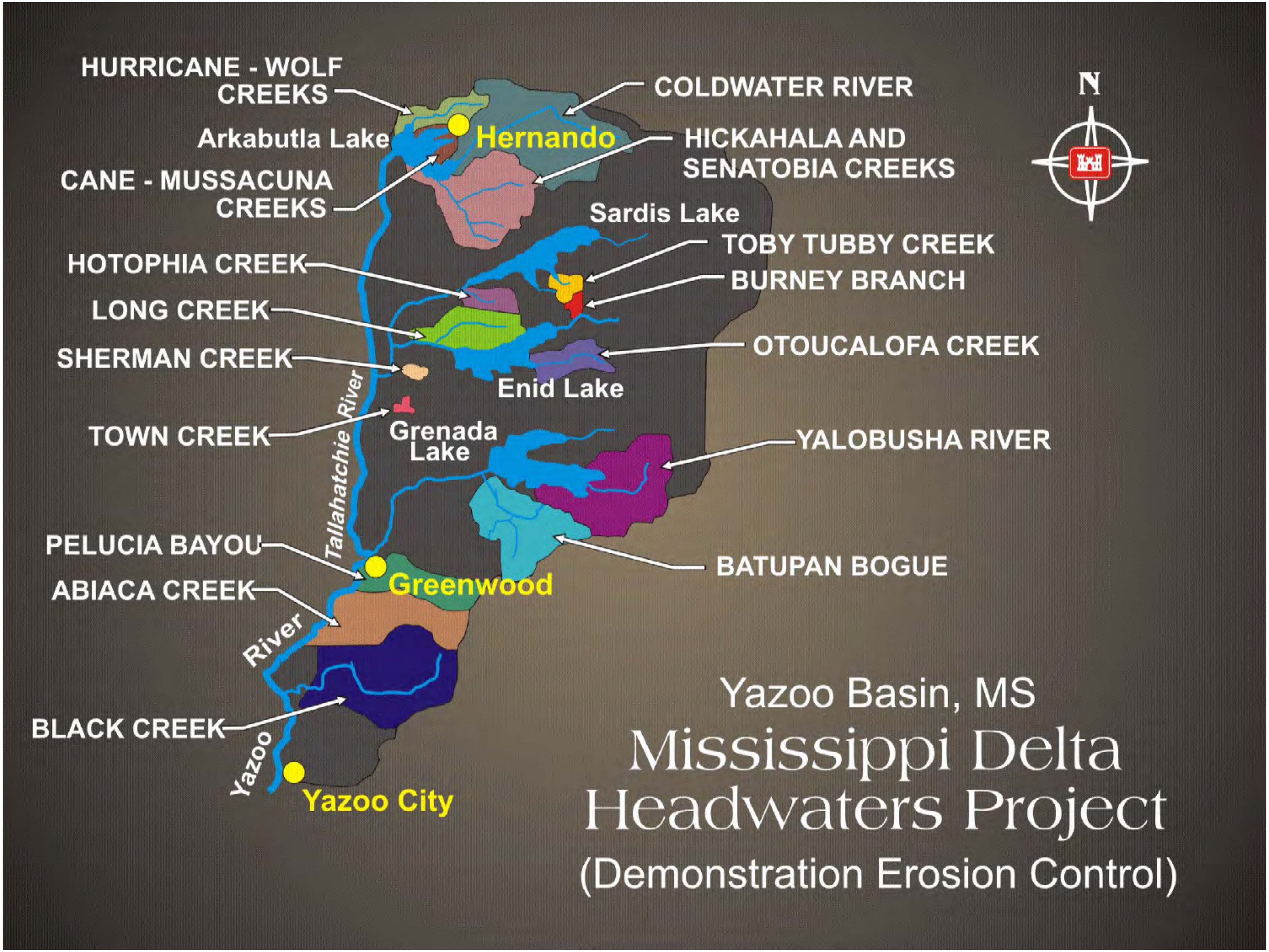
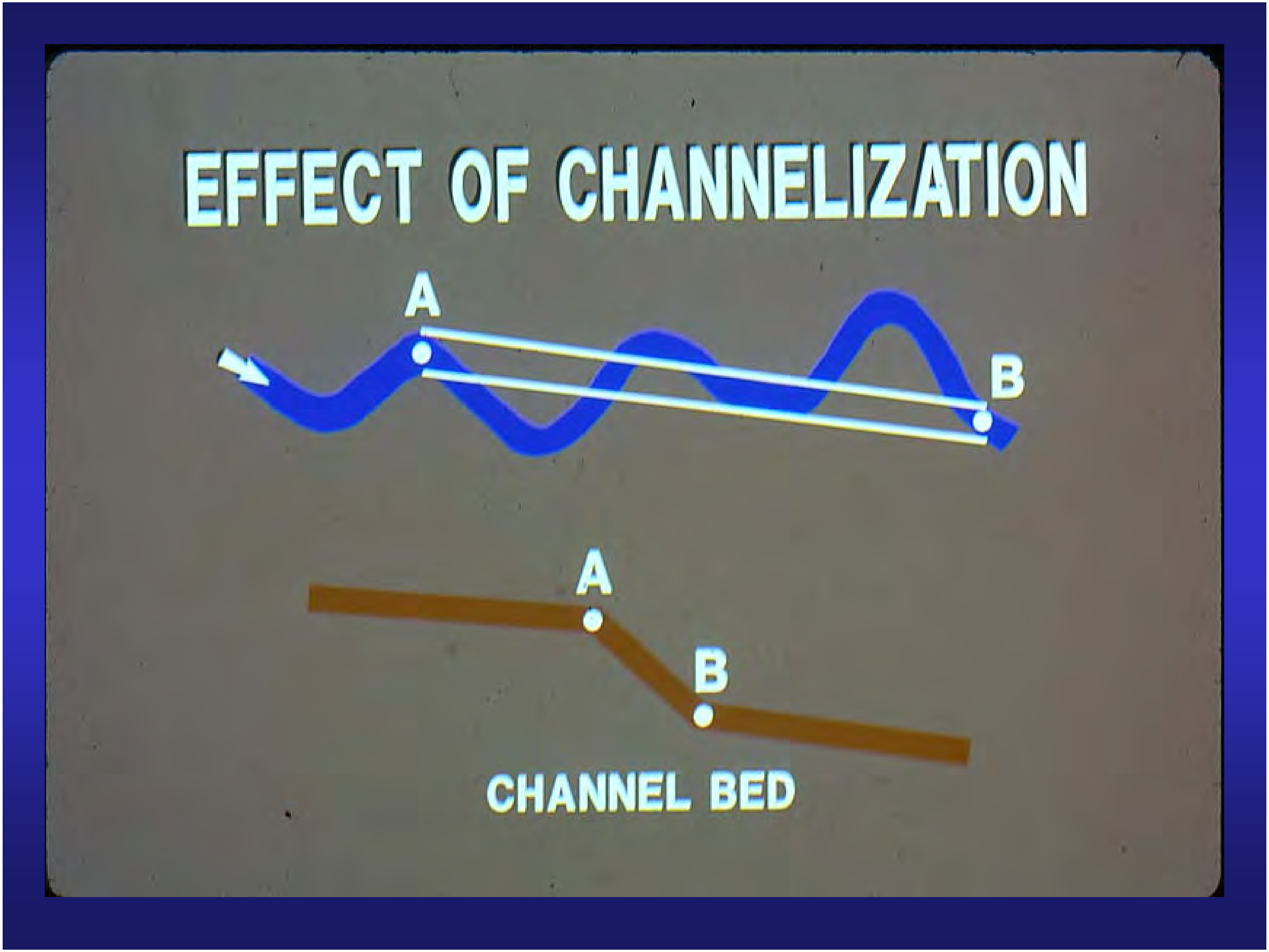
Vicksburg District

Participating Agencies

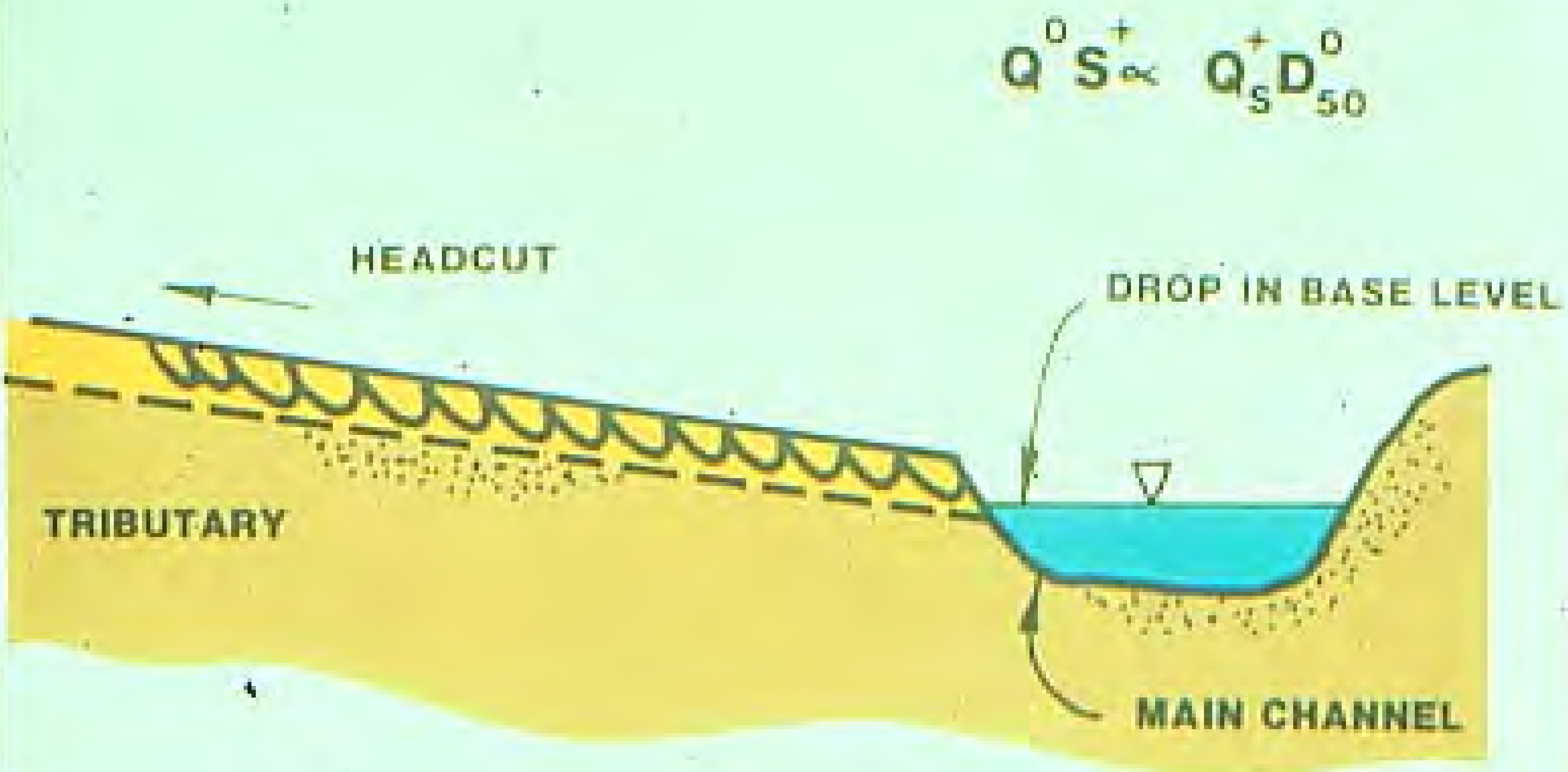
- Corps of Engineers, Vicksburg District
- NRCS
- Engineer Research Development Center
- USDA Sedimentation Laboratory
- University of Mississippi Center for Computational Hydraulics
- USGS


HURRICANE - WOLF CREEKS
Arkabutla Lake
CANE - MUSSACUNA CREEKS
Hernando
COLDWATER RIVER
HICKAHALA AND SENATOBIA CREEKS
N
Sardis Lake
TOBY TUBBY CREEK
BURNEY BRANCH
HOTOPHIA CREEK
LONG CREEK
SHERMAN CREEK
OTOUCALOFA CREEK
Enid Lake
TOWN CREEK
Grenada Lake
Tallahatchie River
YALOBUSHA RIVER
PELUCIA BAYOU
BATUPAN BOGUE
Greenwood
ABIACA CREEK
Yazoo River
BLACK CREEK
Yazoo City
Yazoo Basin, MS
Mississippi Delta Headwaters Project
(Demonstration Erosion Control)

Channel Straightening



EFFECT OF CHANNELIZATION
A
B
A
B
CHANNEL BED



LOWERING OF BASE LEVEL FOR TRIBUTARY STREAM (AFTER SIMON, 1977)

Headcut

Knickzone

Effects of Degradation

Effects of Degradation

Effects of Degradation

Effects of Bank Erosion

Gully Erosion

Channel Degradation

Deposition in Lower Reaches

Dredging

Levee Break

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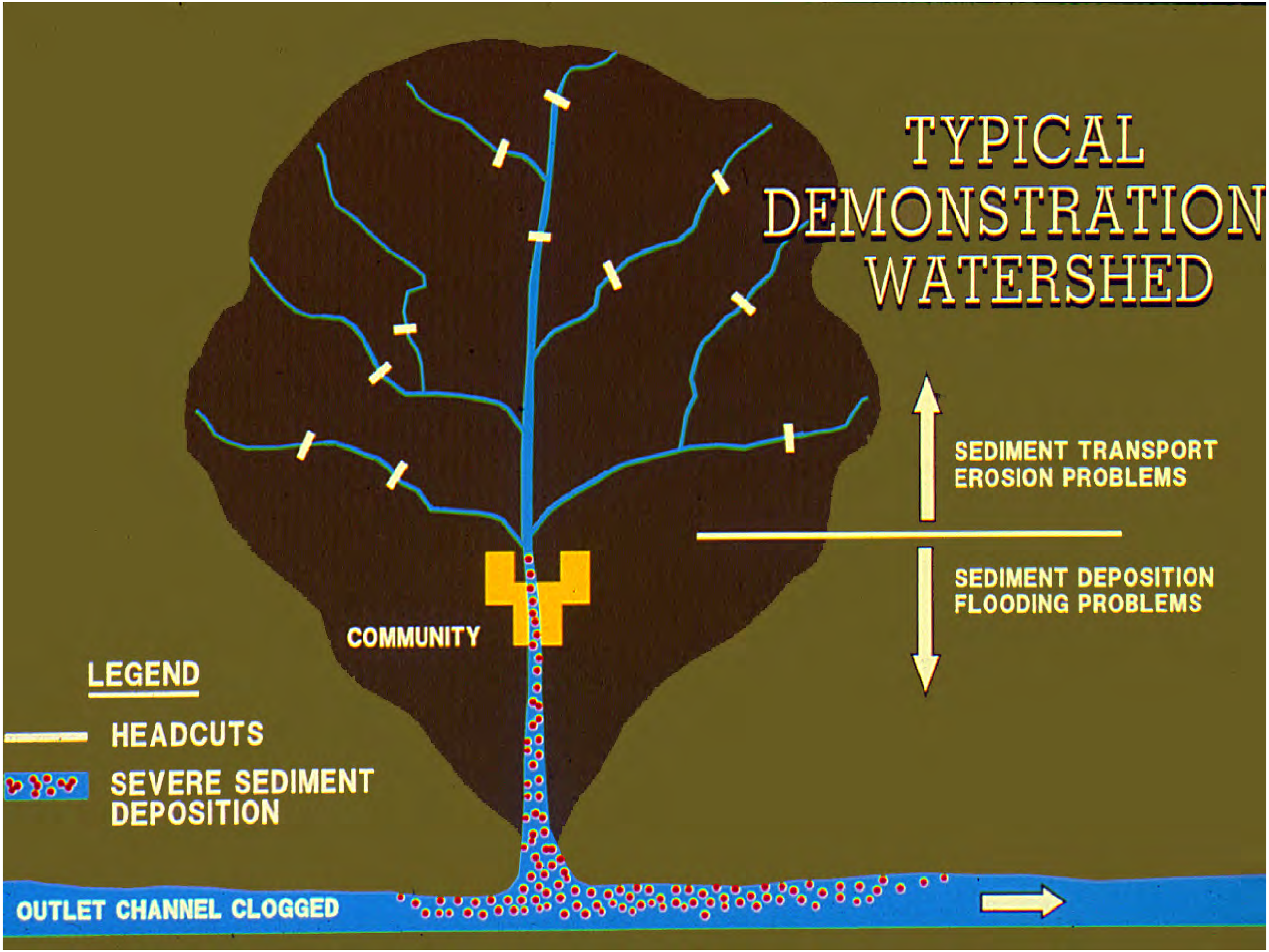
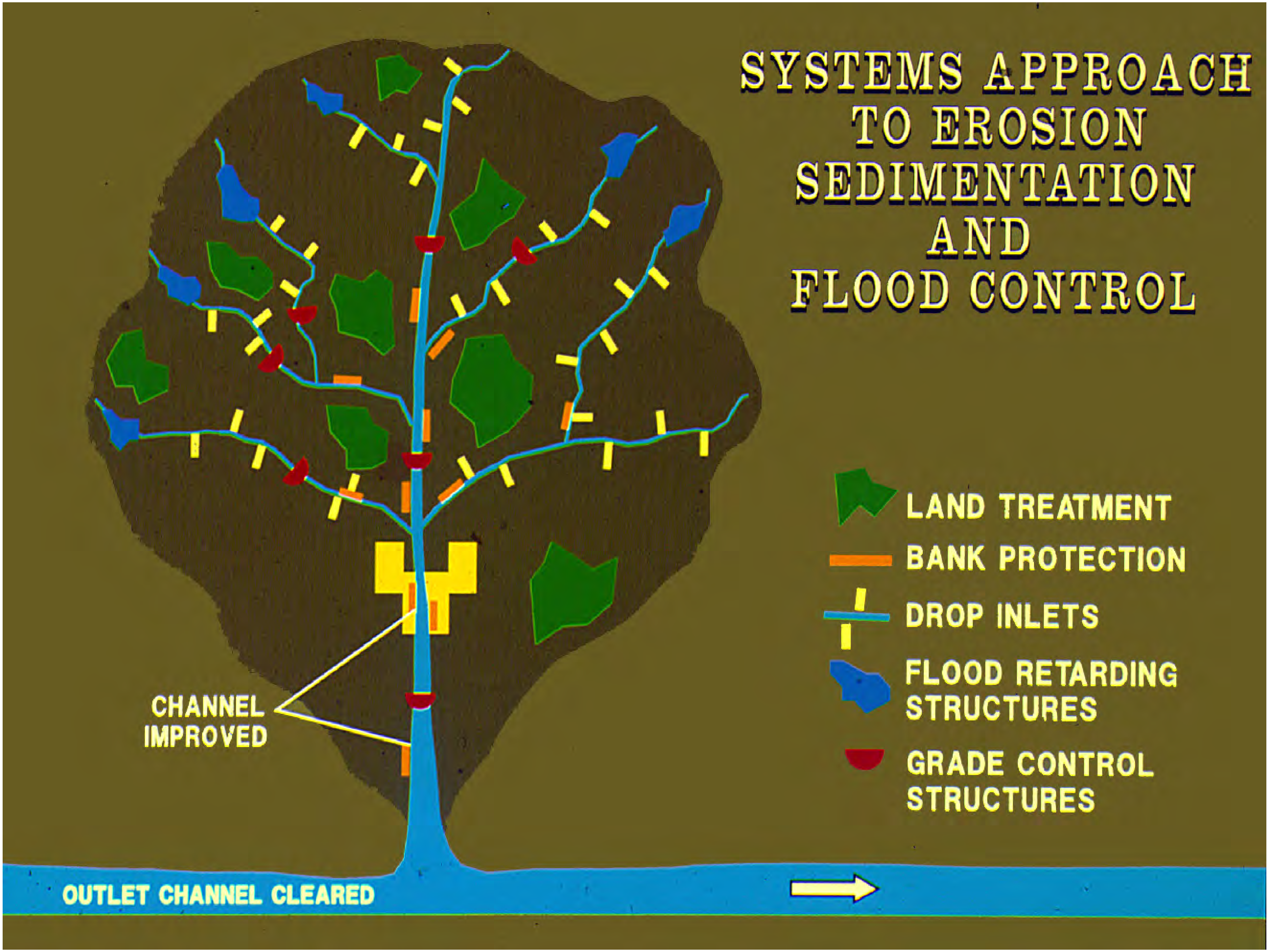
Systems Approach to Watershed Analysis

One Corps Serving the Armed Forces and the Nation


TYPICAL DEMONSTRATION WATERSHED
SEDIMENT TRANSPORT
EROSION PROBLEMS
SEDIMENT DEPOSITION
FLOODING PROBLEMS
COMMUNITY
LEGEND
HEADCUTS
SEVERE SEDIMENT DEPOSITION
OUTLET CHANNEL CLOGGED


SYSTEMS APPROACH TO EROSION SEDIMENTATION AND FLOOD CONTROL
LAND TREATMENT
BANK PROTECTION
DROP INLETS
FLOOD RETARDING STRUCTURES
GRADE CONTROL STRUCTURES
CHANNEL IMPROVED
OUTLET CHANNEL CLEARED

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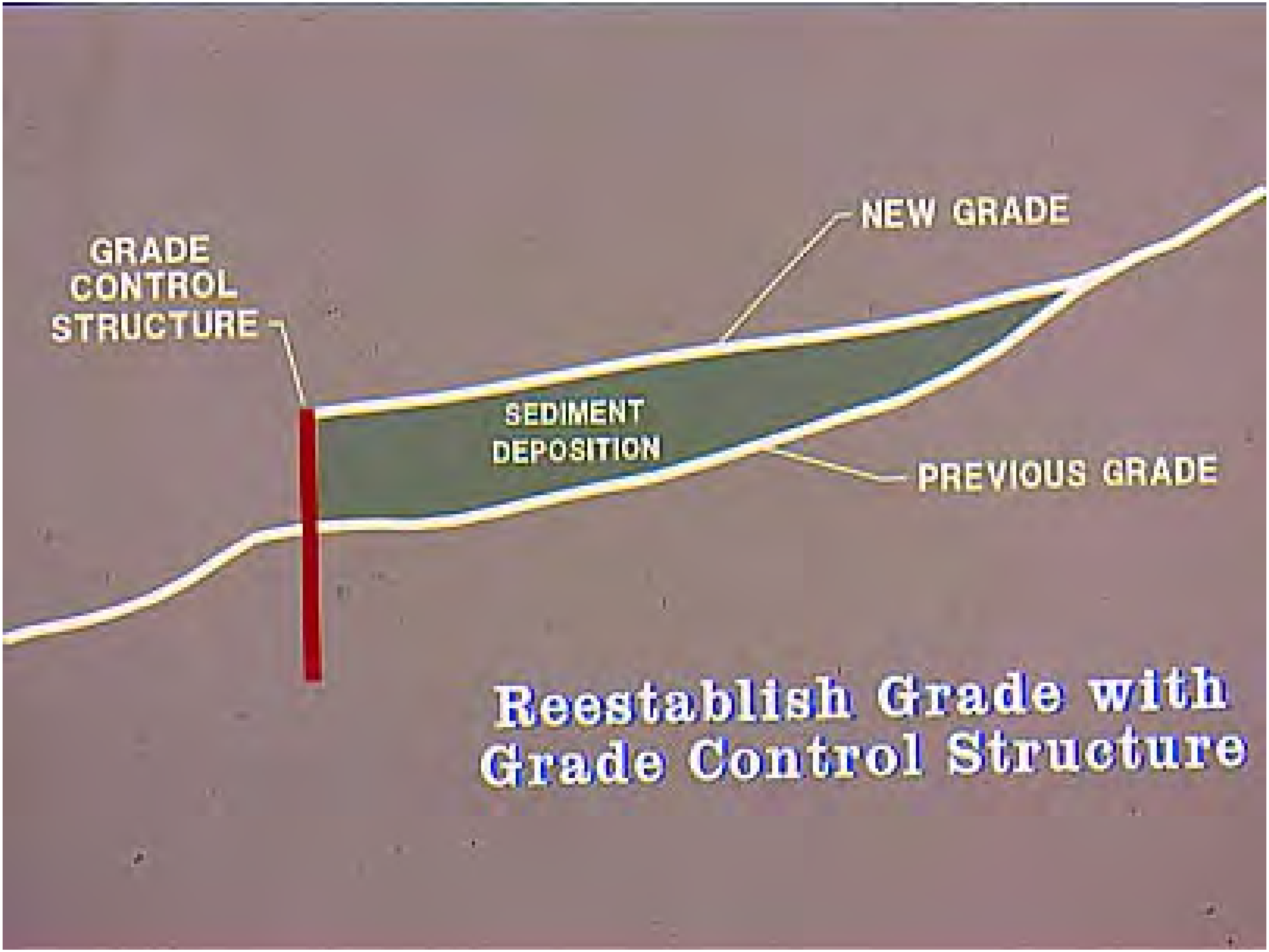
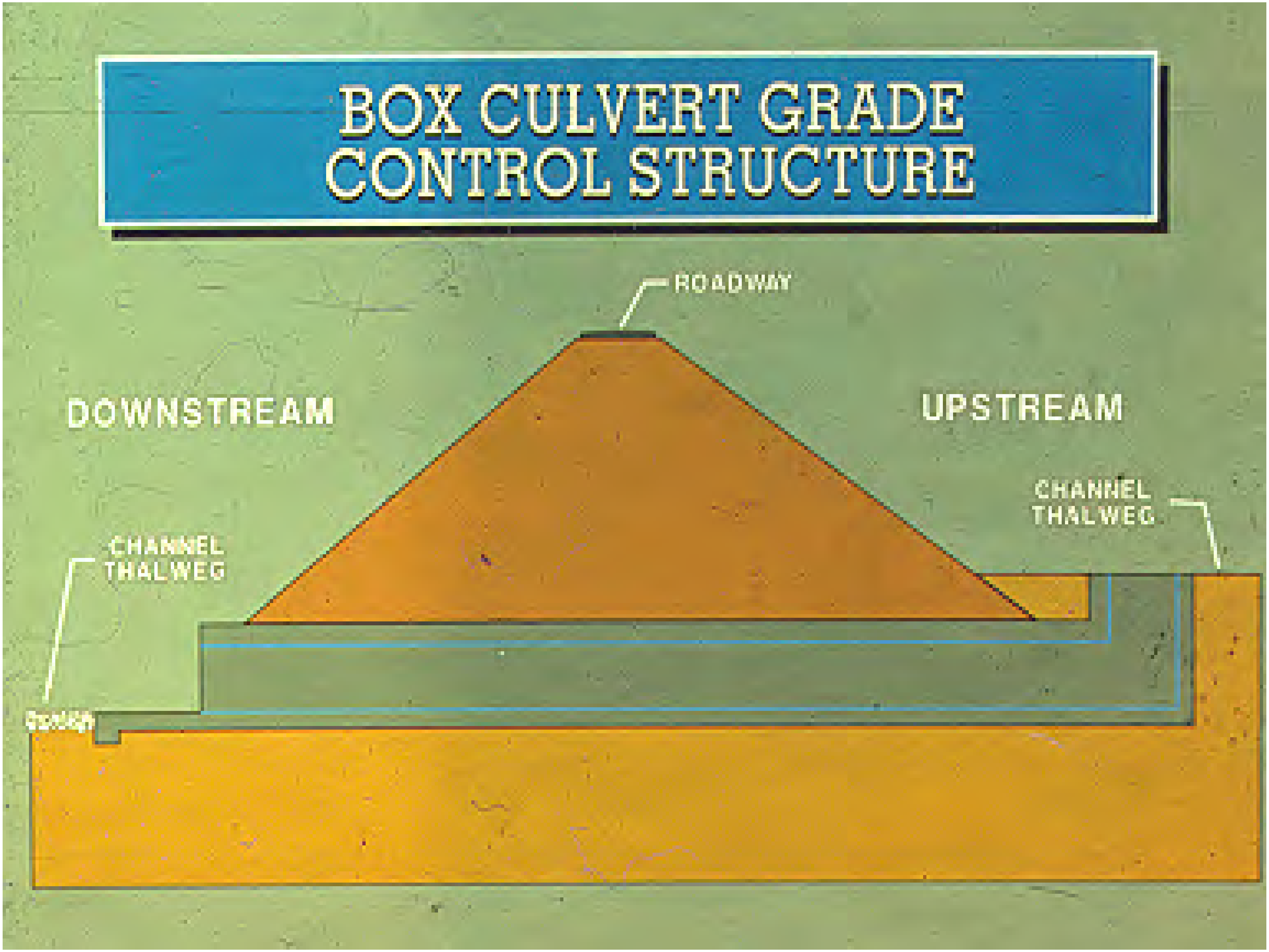
Typical MDHP Structures

- Grade Control Structures
- Riser Pipes
- Bank Stabilization
- Floodwater Retarding Structures


NEW GRADE
GRADE CONTROL STRUCTURE
SEDIMENT DEPOSITION
PREVIOUS GRADE
Reestablish Grade with Grade Control Structure

Low Drop Grade Control Structure


BOX CULVERT GRADE
CONTROL STRUCTURE
ROADWAY
DOWNSTREAM
UPSTREAM
CHANNEL
THALWEG
CHANNEL
THALWEG

Box Culvert Grade Control Structure

High Drop Grade Control Structure

Riser Pipe

Bank Stabilization

Bank Stabilization

Floodwater Retarding Structure

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MDHP Monitoring Program

MDHP Monitoring

- 33 monitoring sites (40 miles of stream)
- Field investigations and surveys
- Data collection
- Geomorphic, hydraulic, and sediment transport analyses
- Environmental studies

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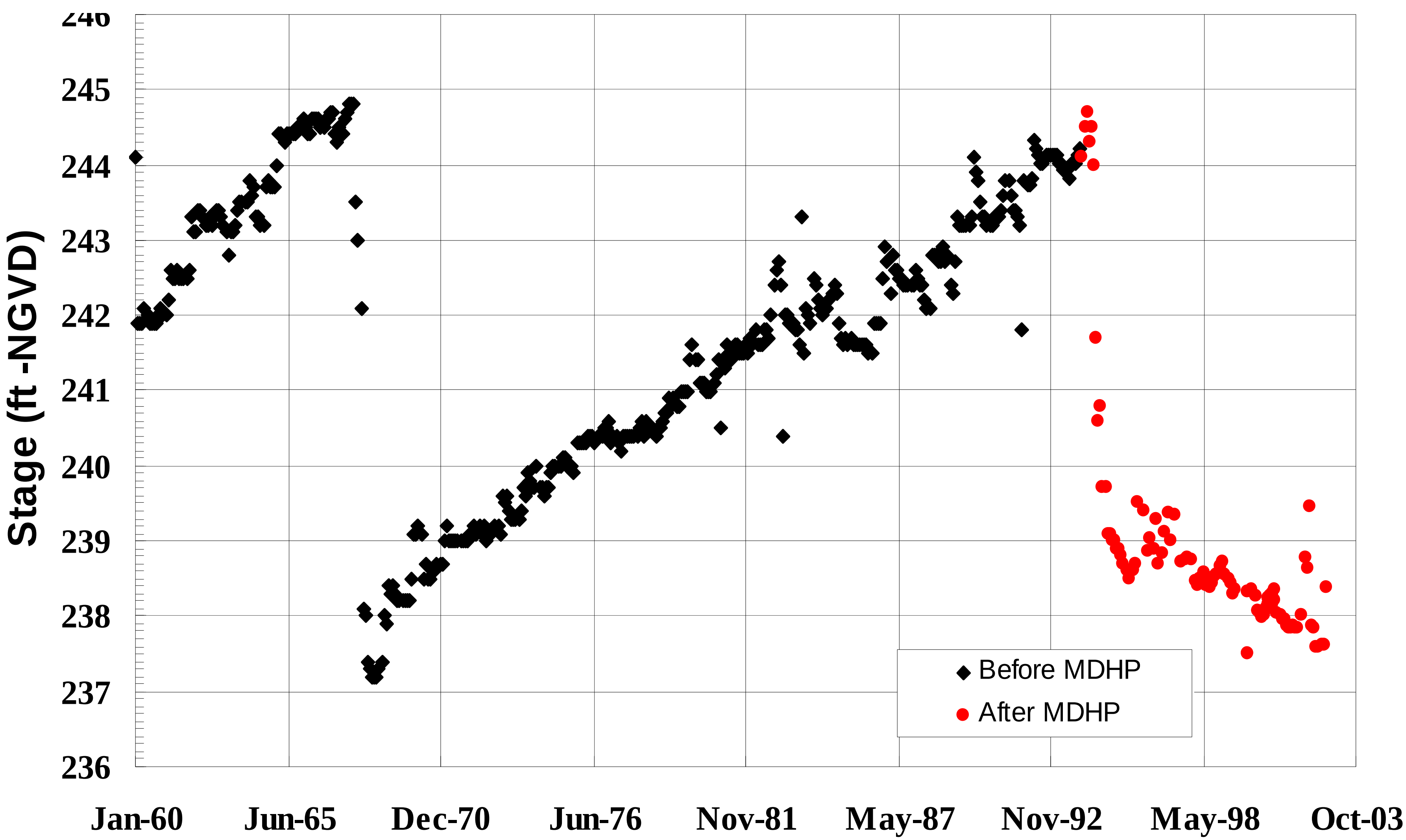
Results of MDHP Program

- Channel Response
- Structure Performance
- Environmental Impacts
- Impacts on Sediment Yield
- Design Guidance for Systems Approach to Watershed Rehabilitation

Minimum Monthly Gage Readings on Hickahala Creek



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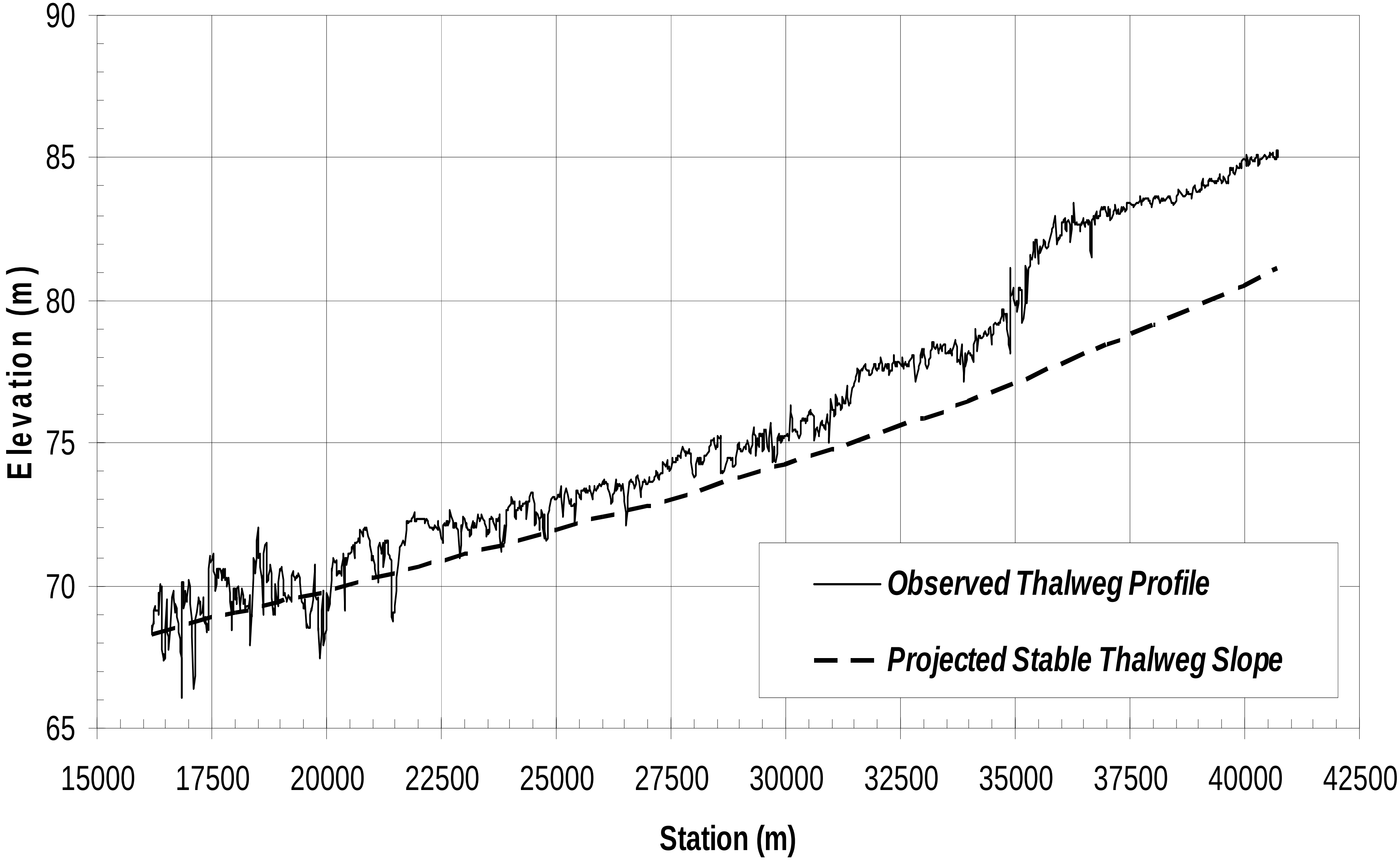
Effects of MDH Project on Long-Term Sediment Delivery

Yalobusha River Canal Thalweg Profile



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Watershed	Bed & Bank Erosion no/GCS (1000m3)	Bed & Bank Erosion w/GCS (1000m3)	Percent Reduction in Bed & Bank Erosion
Batupan Bogue	180,000	90,000	50%
Hickahala	14,000	4,500	68%
Long	30,000	14,500	52%
Hotophia	5,500	950	83%

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Vicksburg District

Phosphorus Reductions Due to MDHP Project Features

- Over 500 samples collected in FY 2000
- Average total phosphorus content approximately 200 mg/kg or (0.4 lbs/ton)

Impacts of Excess Nutrients

- Negative impacts to fish and other wildlife
- Economic impacts resulting from phosphorus removal, BMP
- Contribution to hypoxia problem in the Gulf of Mexico

Phosphorus Reduction
Based on 50 Year Response

Watershed	Bed & Bank Erosion Reduction (1000 tons/yr)	Phosphorus Retained (1000 lbs/yr)
Batupan Bogue	3000	1200
Hickahala	300	120
Long	550	220
Hotopha	150	60

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Agricultural best management practices (BMPs) have indicated that some non-point source management programs spend in excess of $185 per lb of phosphorus reduction per year.

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Phosphorus Benefits
Batupan Bogue

- 10% of actual annual phosphorus reduction or 120,000 lbs/yr
- 10% of $185/lb or $18.5/lb
- $2,220,000/yr benefits

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Potential for Nitrogen Reduction and Control

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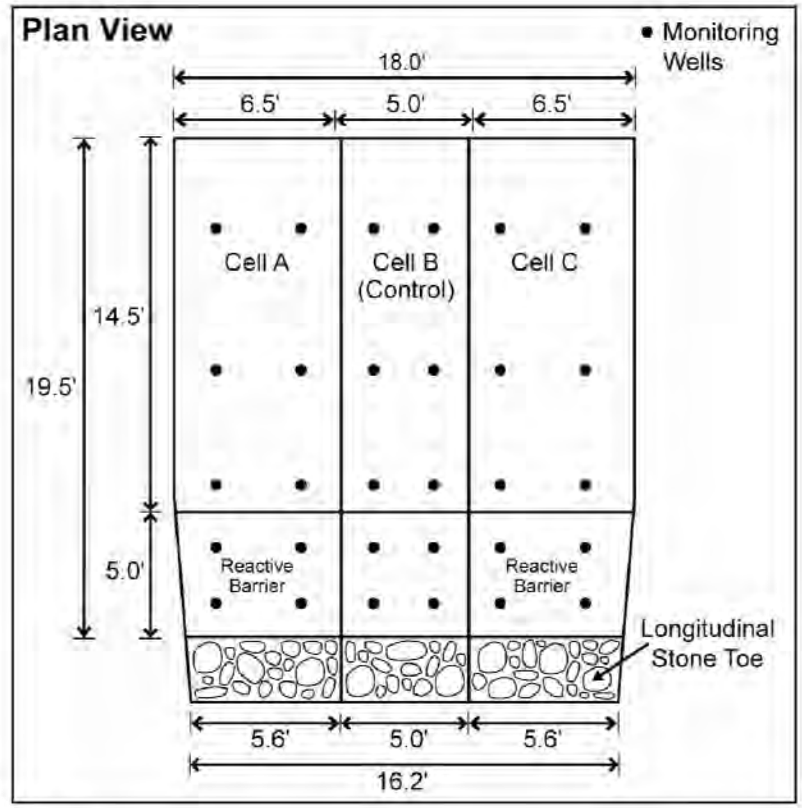
Modification to Longitudinal Stone Toe-Dike

One Corps Serving the Armed Forces and the Nation

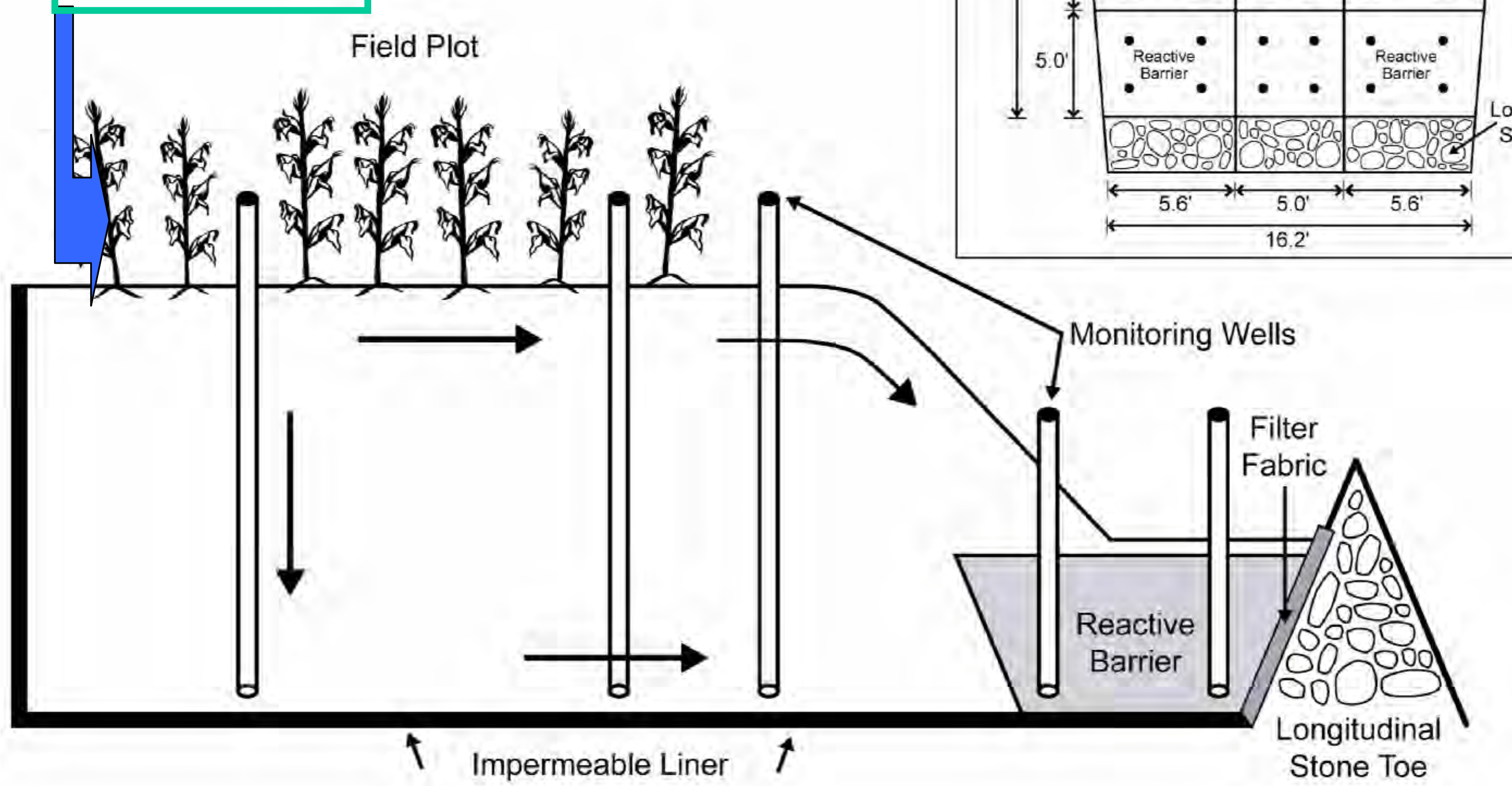
A: Nitrogen Removal

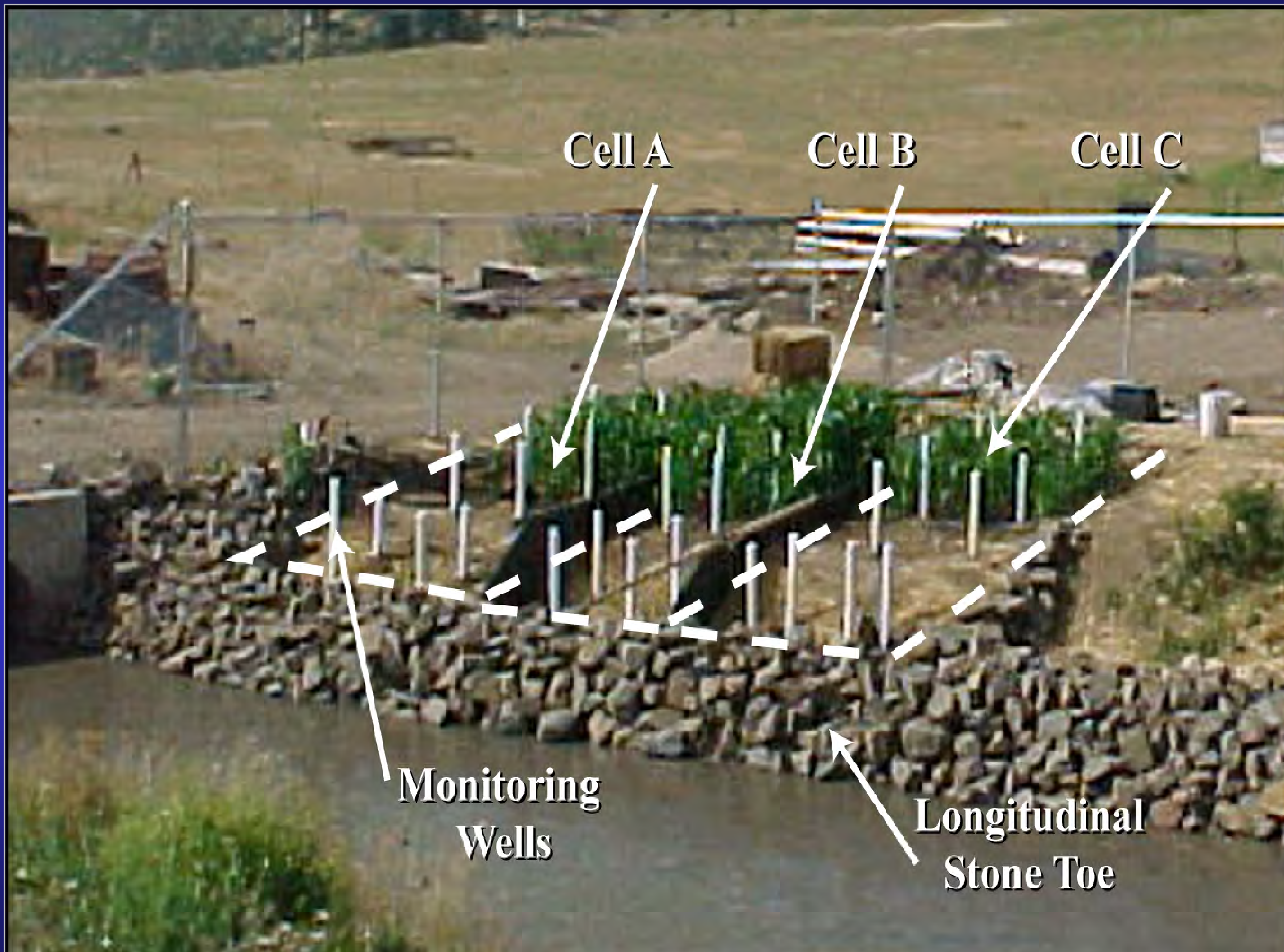
B: Control

C: Nitrogen & Phosphorus Removal



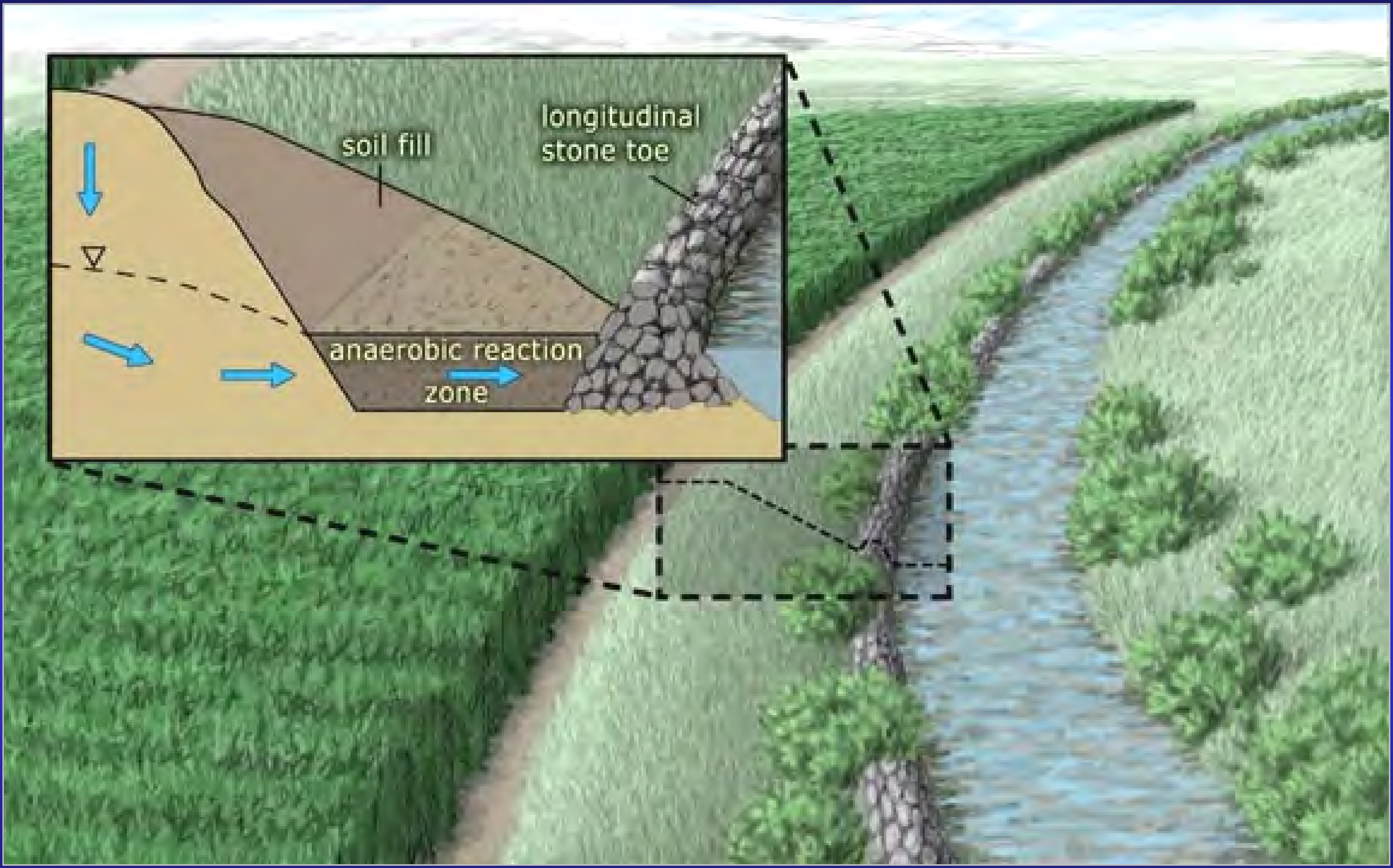
Irrigation/ Fertilization




Cell A
Cell B
Cell C
Monitoring
Wells
Longitudinal
Stone Toe

Preliminary Findings of Nutrient Removal Rates

Organic Amendment	Nitrogen	Phosphorus
None	30%	N/A
Sawdust only	60% to 80%	N/A
Sawdust & Aluminum Hydroxide	60% to 80%	>90%



Conceptual Diagram of Bank Stabilization
Structure Modified to Control Nutrients

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Benefits of the MDH Project

- Improved understanding of effects of watershed treatments on sediment delivery
- Quantified benefits of watershed treatment measures, particularly with respect to channel stability, sediment delivery and reduction of pollutants
- Improved design guidance for systems approach to sediment management
- Development of effective, lower cost environmentally friendly stabilization measures

Questions?

Tri-Service Infrastructure Systems Conference & Exhibition

2-5 August 2005

System-Wide Water Resource Management – Tools of the Trade

Goals

Provide the Corps and its partners the capabilities to:

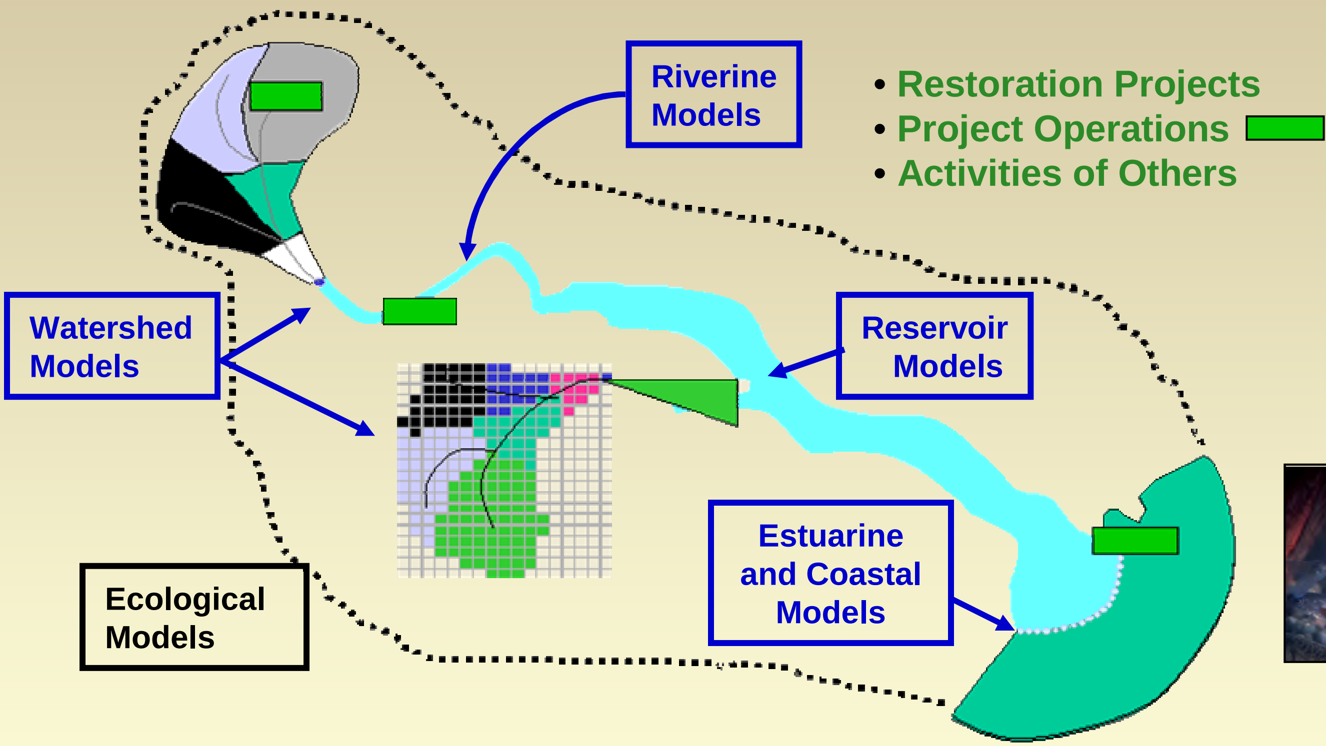
- **Balance development with ecosystem requirements**
- **Restore and manage water resources over multiple spatial and temporal scales**
- **Achieve environmental sustainability**

System-Wide Water SWWRP Resources Program

Support for Civil Works Strategic Plan

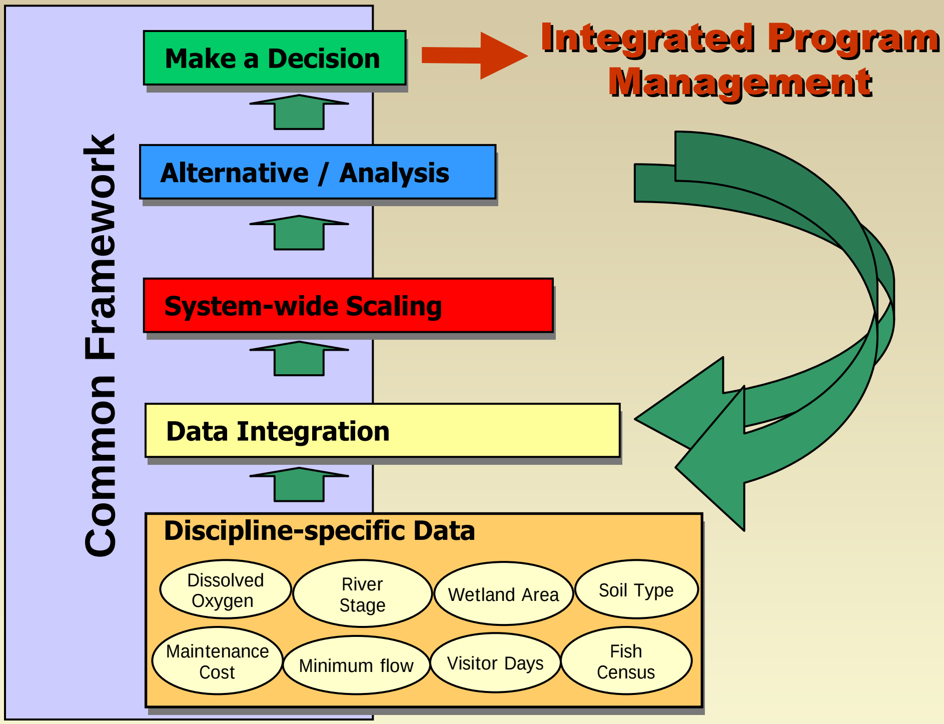
- Supports goals of ecosystem restoration and environmental sustainability
- Provides technology for meeting mission requirements over broad temporal and spatial scales
- Designed to maximize interactions within the Corps and with its partners

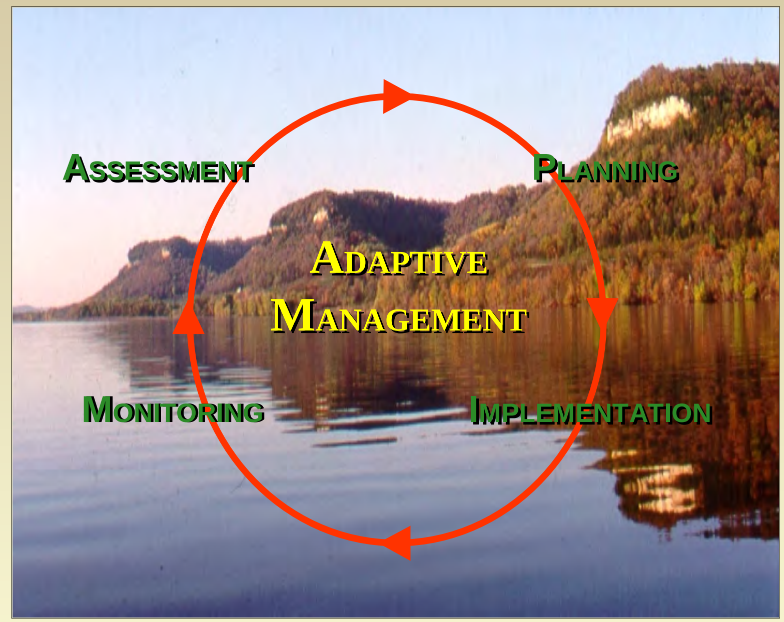
Comprehensive Water Resources Management



Technologies for system-wide assessments

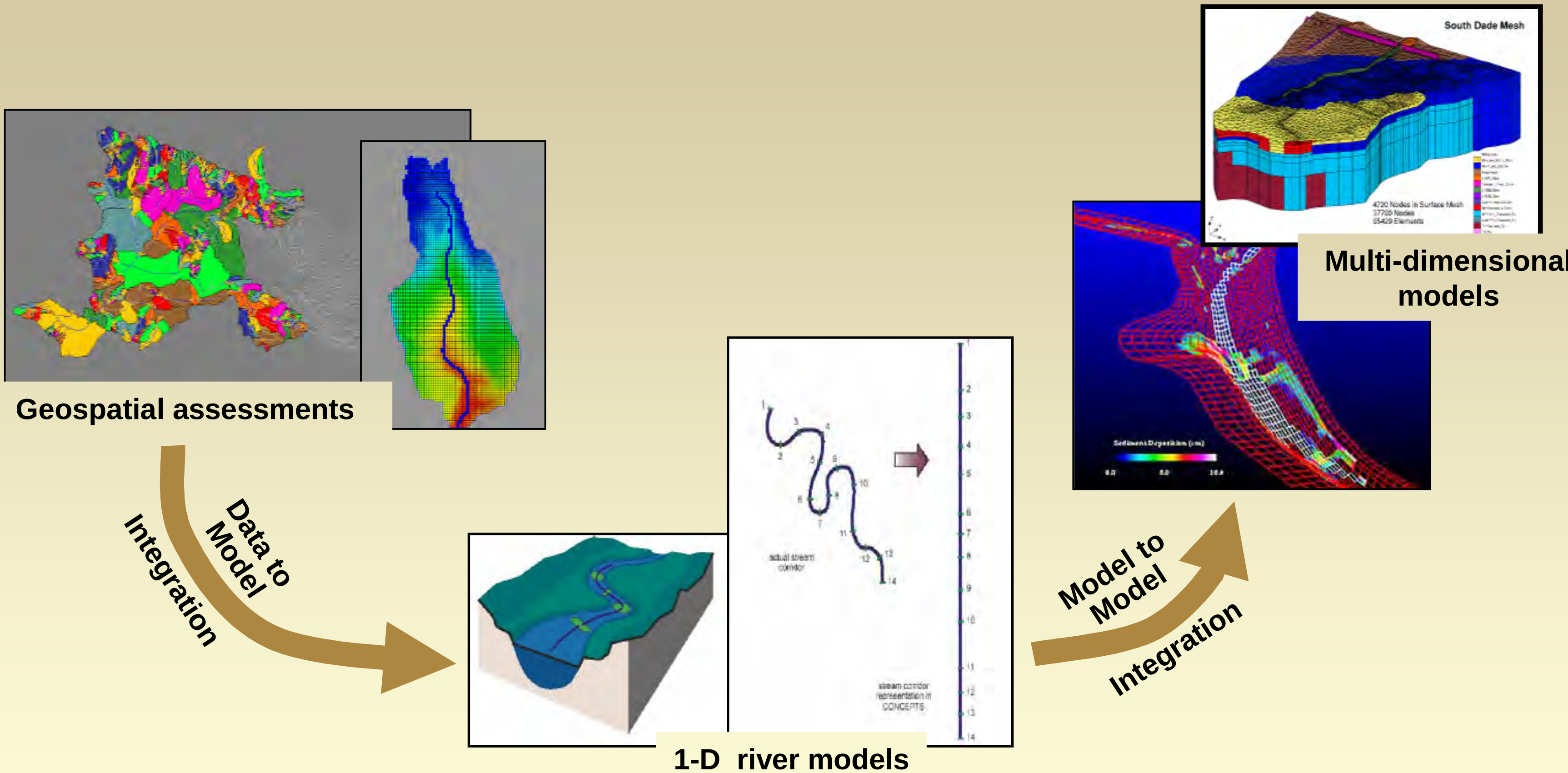
Decision-Making Process





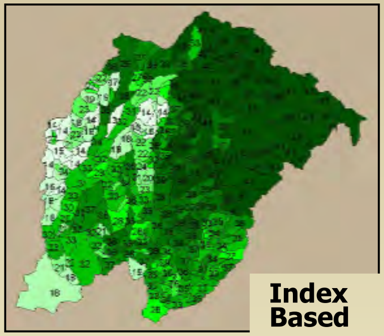
Combines – scientific assessments – stakeholder review and principles of adaptive management in an Iterative process for desired sustainable management

Tiered Approach to Water Resources Management

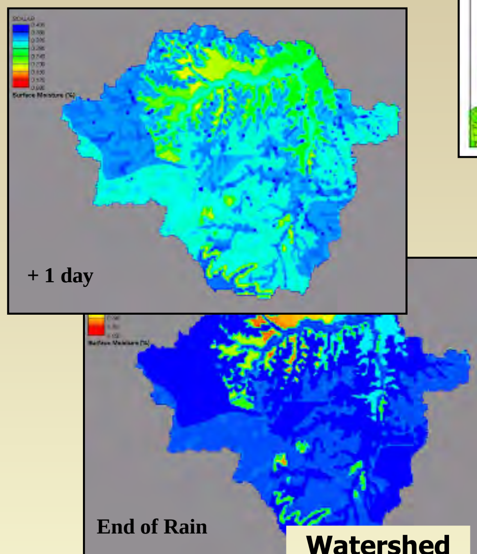


Allows assessments at various levels of tool "fidelity" to meet stakeholder requirements with consideration for available capabilities and resources

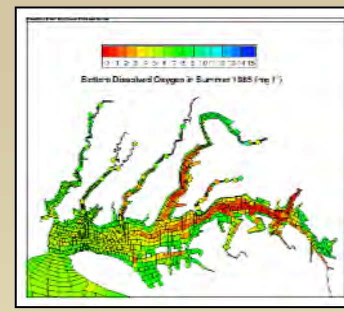
Assessment Approaches



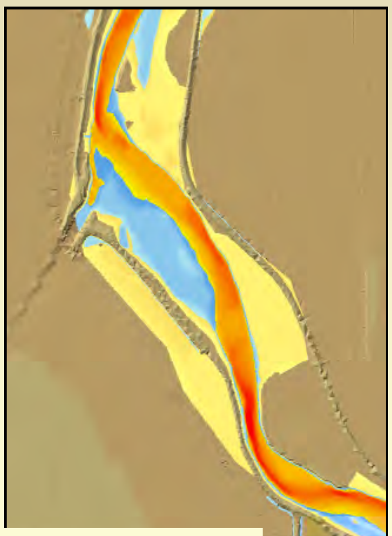
Index Based



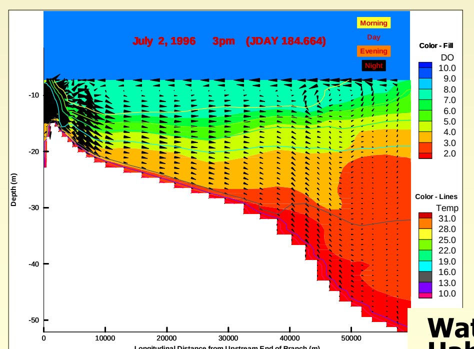
Watershed runoff



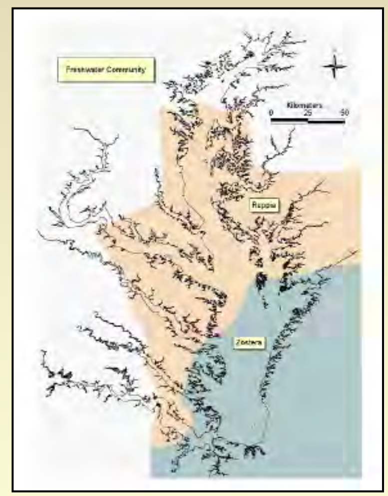
Hydrodynamics and Water Quality



Habitat



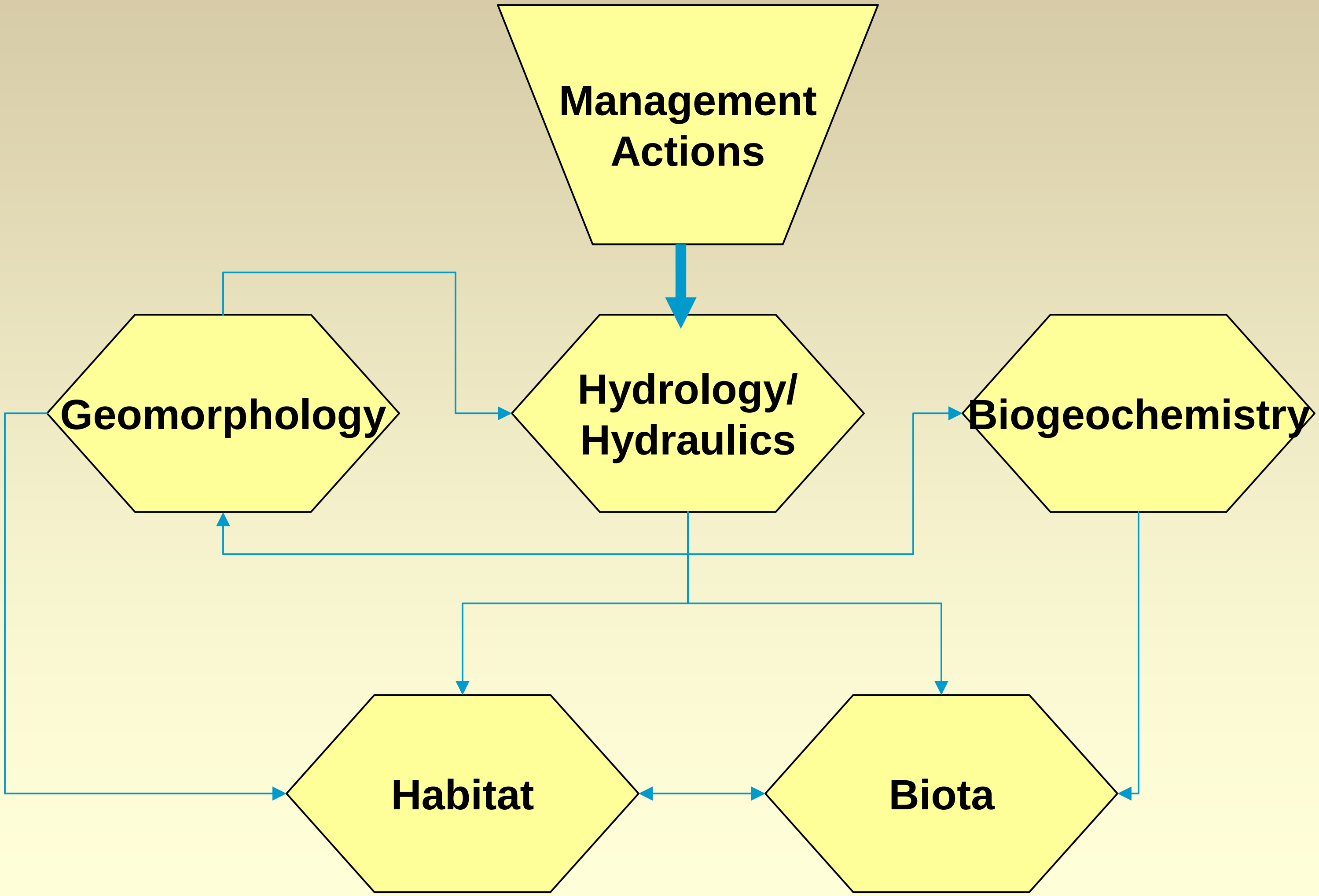
Water Quality and Habitat

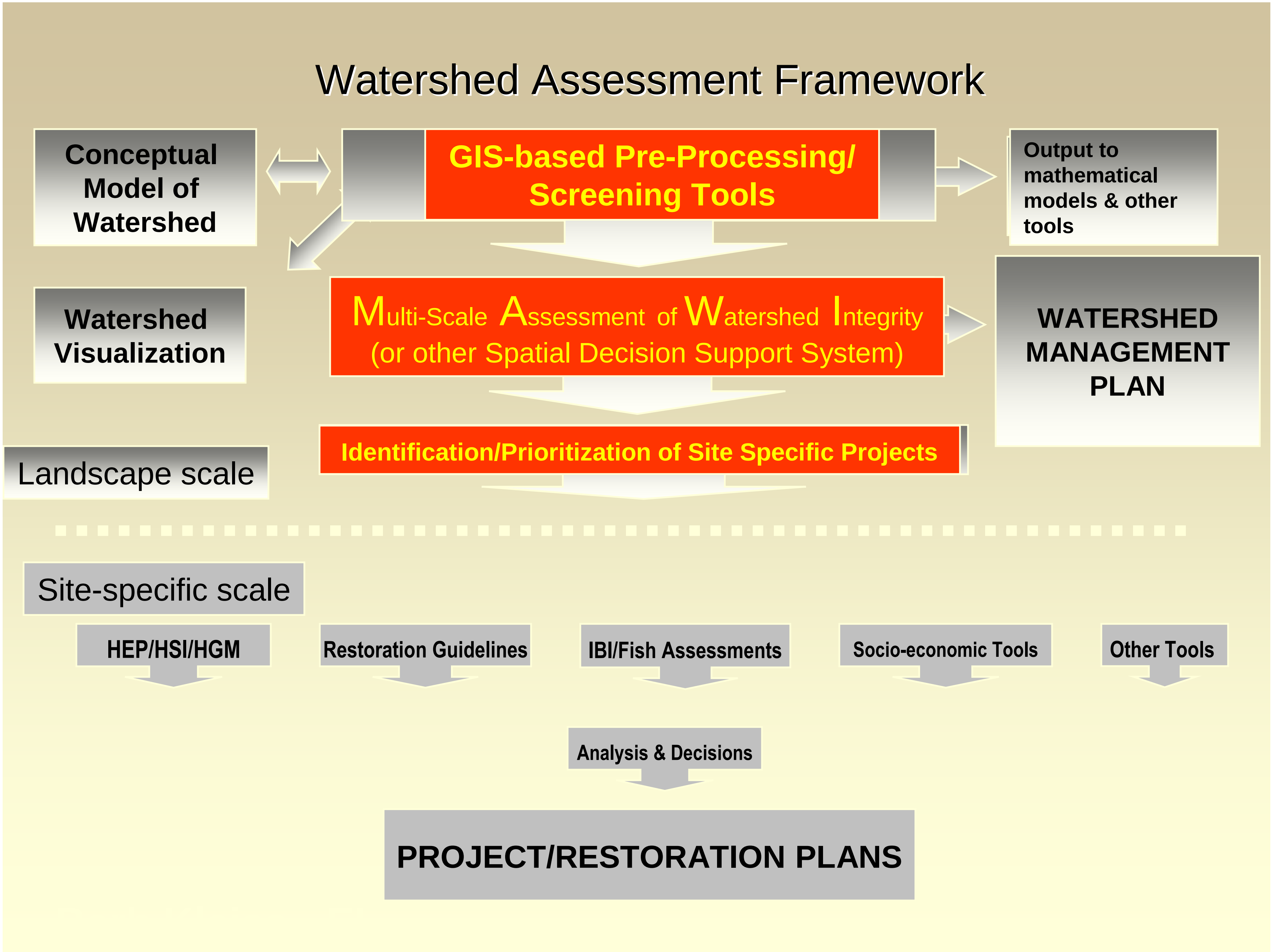


Submerged Aquatic Vegetation

Approaches are affected by fidelity and scale.

Conceptual model for water resource management





Watershed Assessment Framework
Conceptual Model of Watershed
GIS-based Pre-Processing/ Screening Tools
Output to mathematical models & other tools
Watershed Visualization
Multi-Scale Assessment of Watershed Integrity (or other Spatial Decision Support System)
WATERSHED MANAGEMENT PLAN
Landscape scale
Identification/Prioritization of Site Specific Projects
Site-specific scale
HEP/HSI/HGM
Restoration Guidelines
IBI/Fish Assessments
Socio-economic Tools
Other Tools
Analysis & Decisions
PROJECT/RESTORATION PLANS

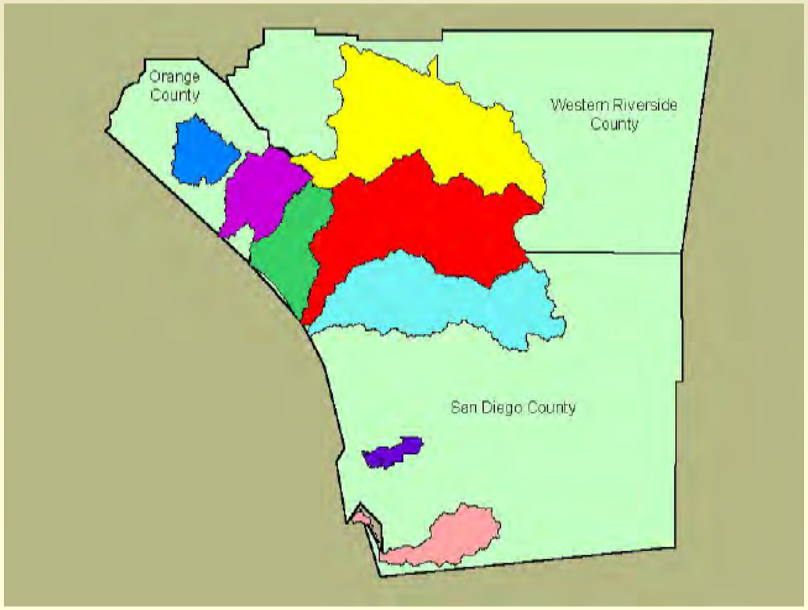
Geospatial Assessments

Dan Smith, EL

Barb Kleiss, EL

Bob Lichvar, CRREL

SPL - Regulatory



Project Objectives - Delineation

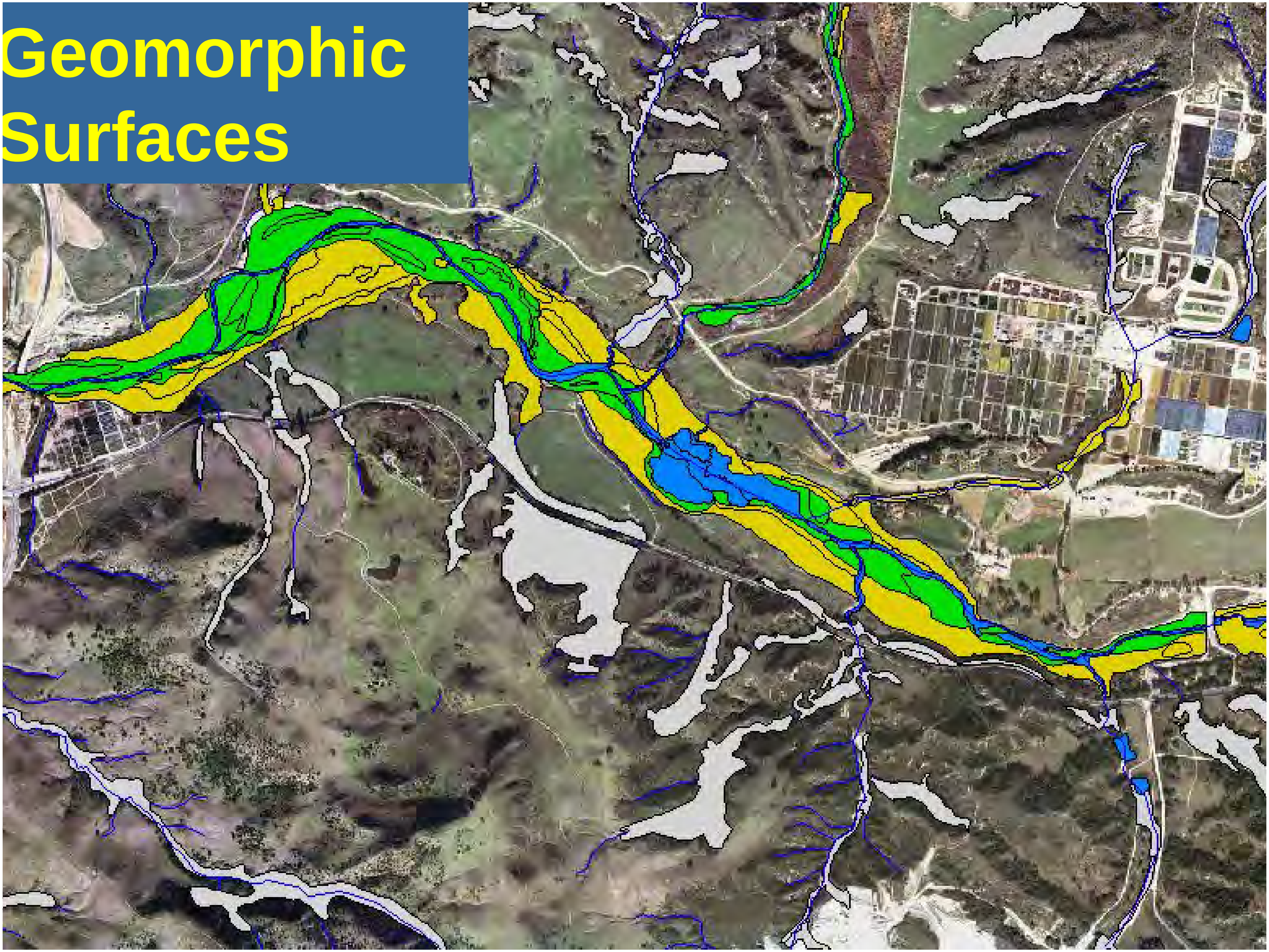
- Map non-wetland waters
- Map riparian ecosystems using geomorphic surface and vegetation communities
- Correlate hydrology, soils, and hydrophytic vegetation to geomorphic surfaces
- Develop ratings for riparian ecosystems that define the likelihood of WoUS occurring

Approach

- Indicator Scores and Indices
  - Indicator metric values were converted to a score based on an ordinal scale relationship between indicators and assessment endpoints established using field observation and judgment
  - Selected indicator scores were summed to give hydrologic, water quality and habitat integrity indices

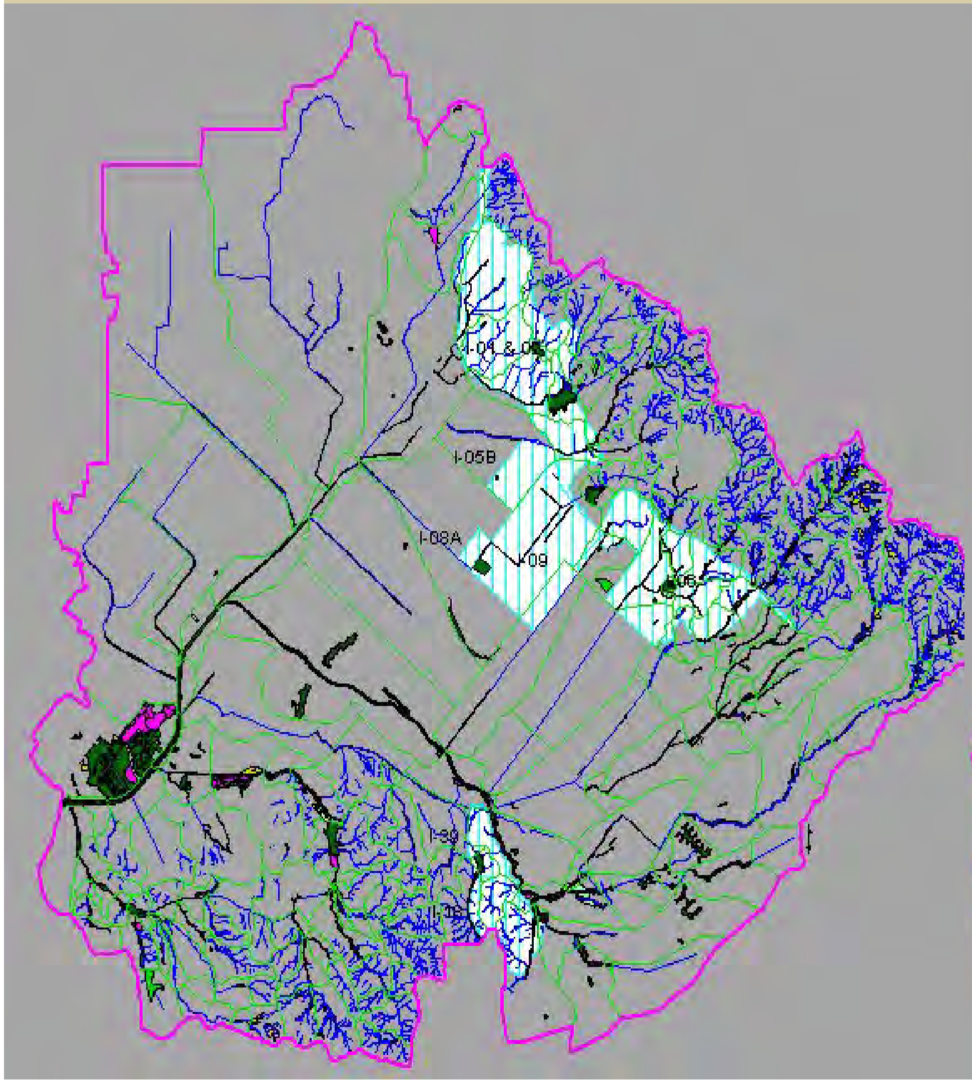
Indicator Metric Value Range	Score
<5% of main stem channel disconnected from the floodplain	5
>5 and <15% of main stem channel disconnected from the floodplain	4
>15 and <30% of main stem channel disconnected from the floodplain	3
>30 and <50% of main stem channel disconnected from the floodplain	2
>50% of main stem channel disconnected from the floodplain	1

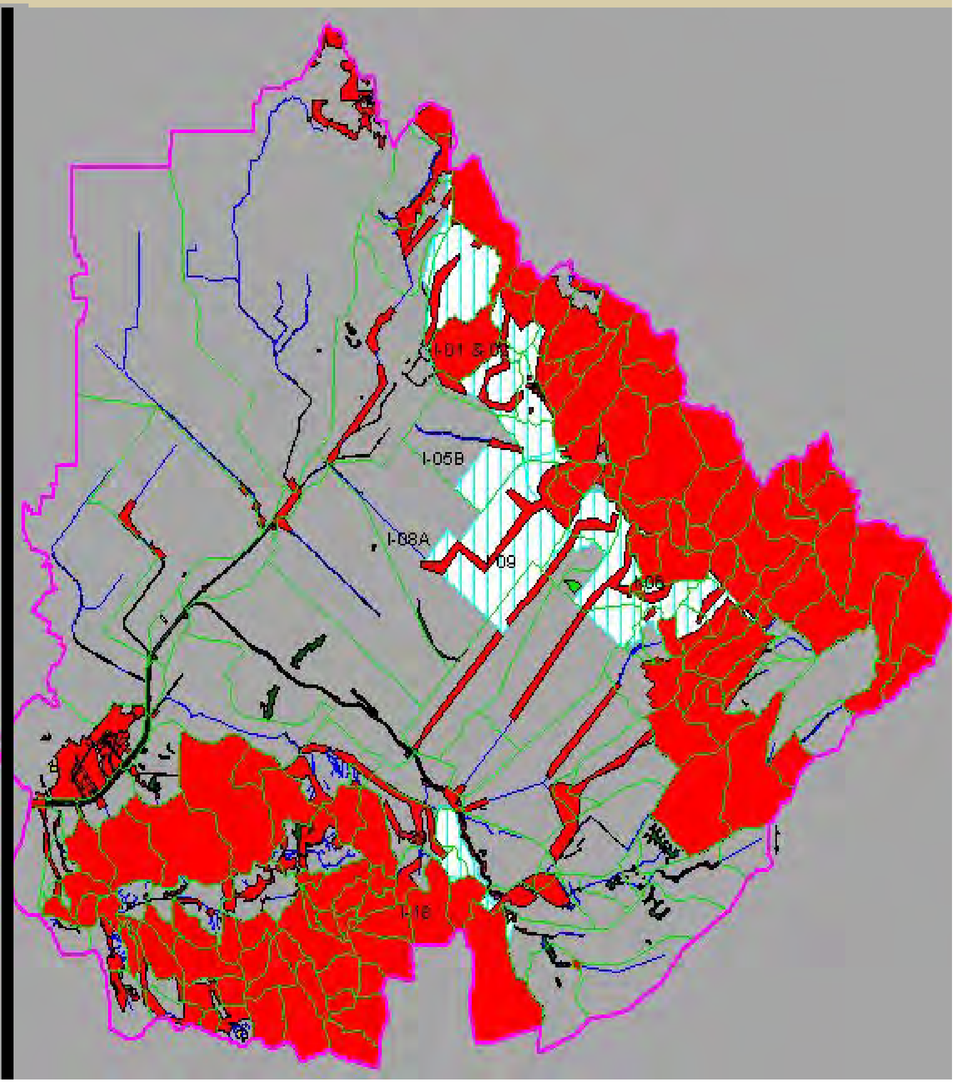
Geomorphic Surfaces



General Land Use Plan Alternative

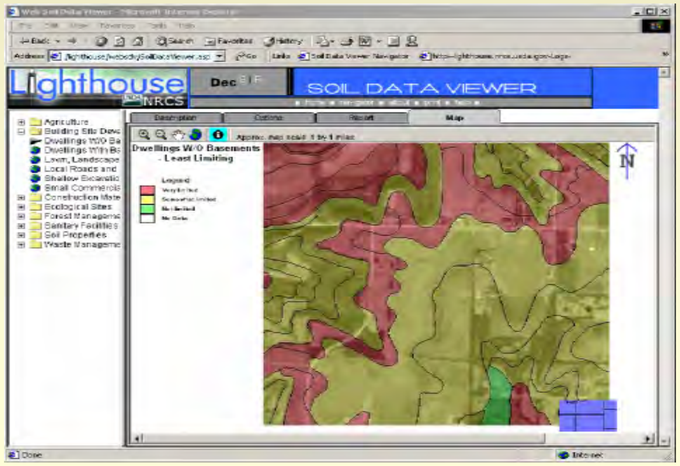
Selective Protection/Impact/Restoration Alternative

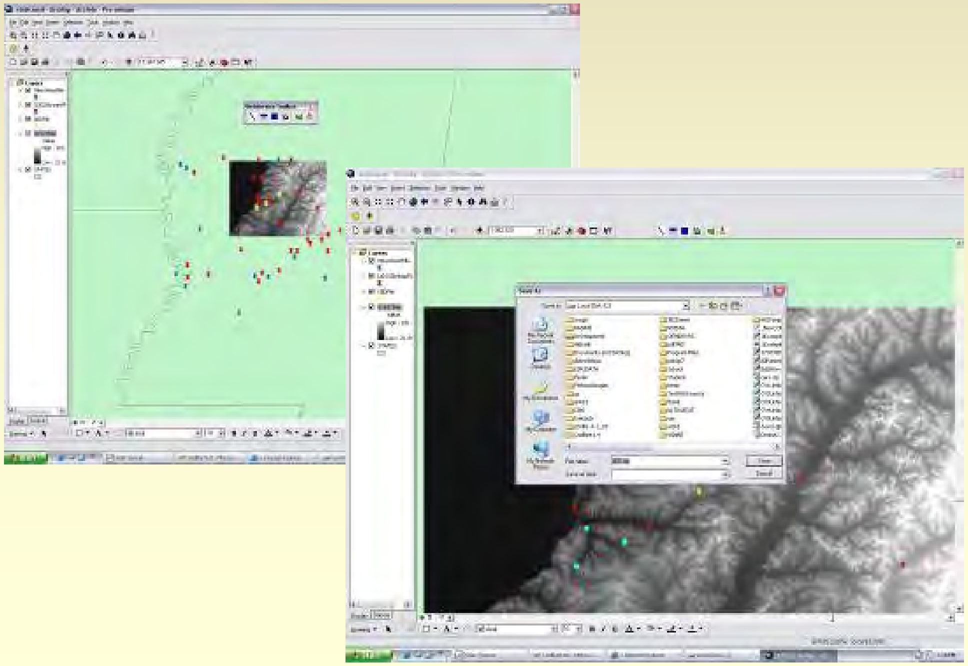




Geospatial Applications

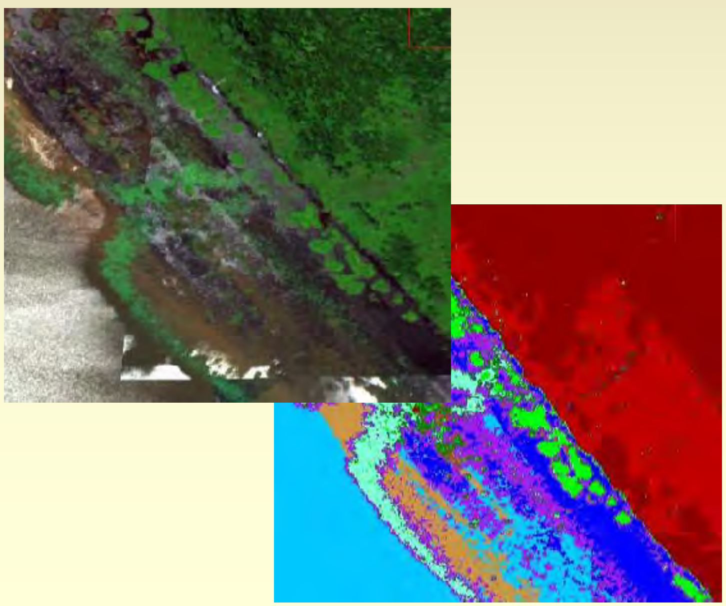
- Geospatial application design document: shows how individual GIS applications will be designed, engineered, and tested
- Geospatial application development: includes numerous applications that meet the specific requirements of the Pillars

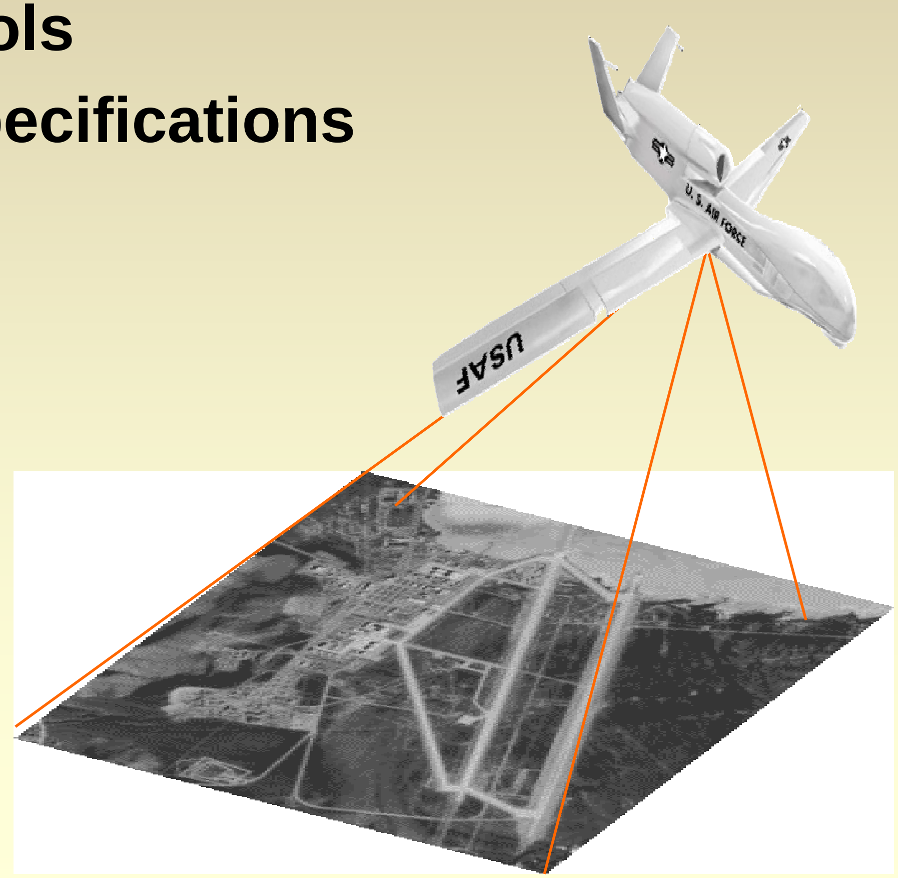




Regional Measurement & Monitoring

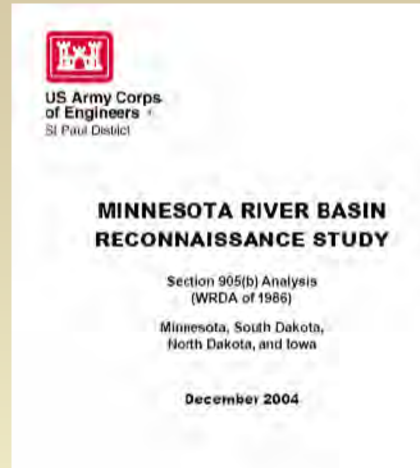
- RMM strategic operating procedures
- Data acquisition methodologies
- Data loading/QA/QC tools
- RMM guidelines and specifications





Minnesota River/Upper Miss

Figure 1. Minnesota River Basin (MRB) Location Map.



US Army Corps of Engineers
St Paul District

MINNESOTA RIVER BASIN RECONNAISSANCE STUDY

Section 905(b) Analysis
(WRDA of 1986)

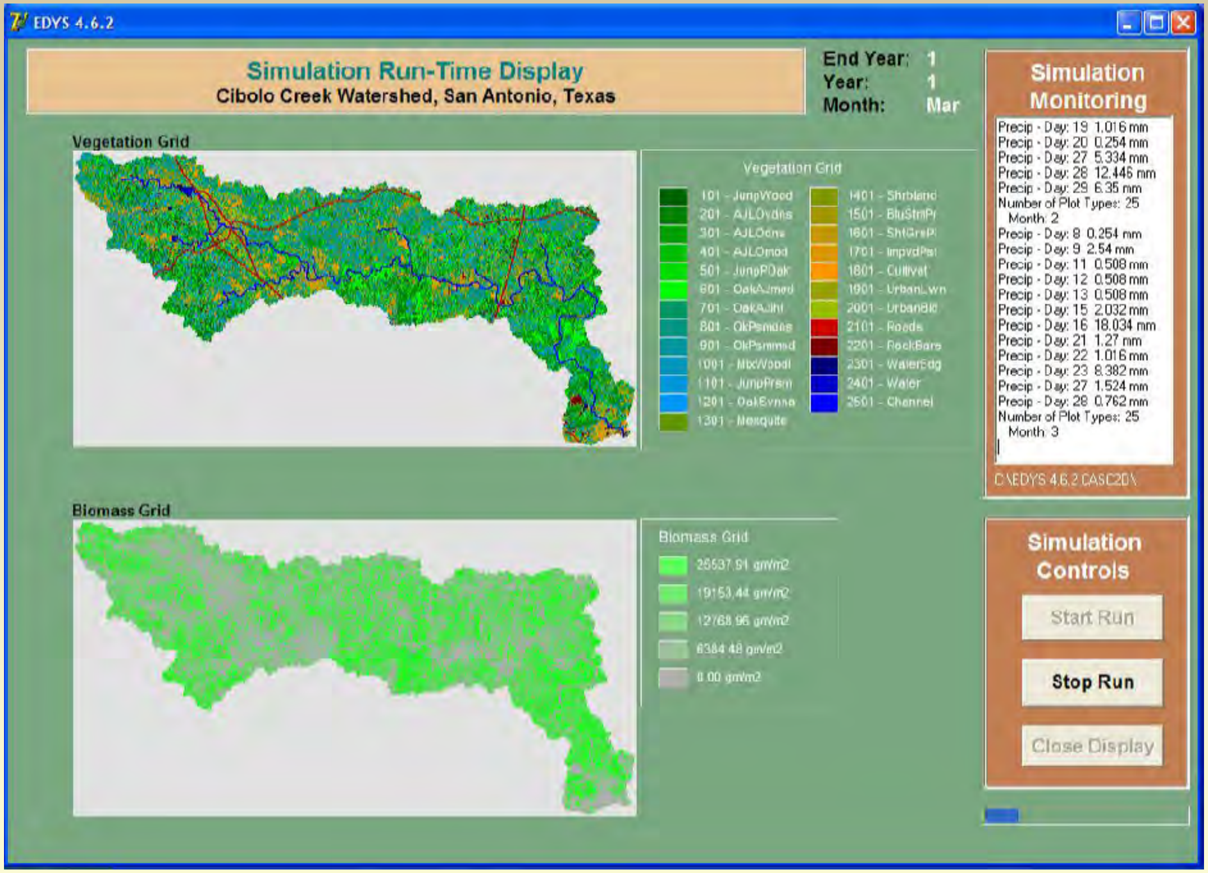
Minnesota, South Dakota, North Dakota, and Iowa

December 2004

Issues
Land use changes associated with urban sprawl
Water quality and habitat degradation related to land use
Agricultural practices include tile drainage

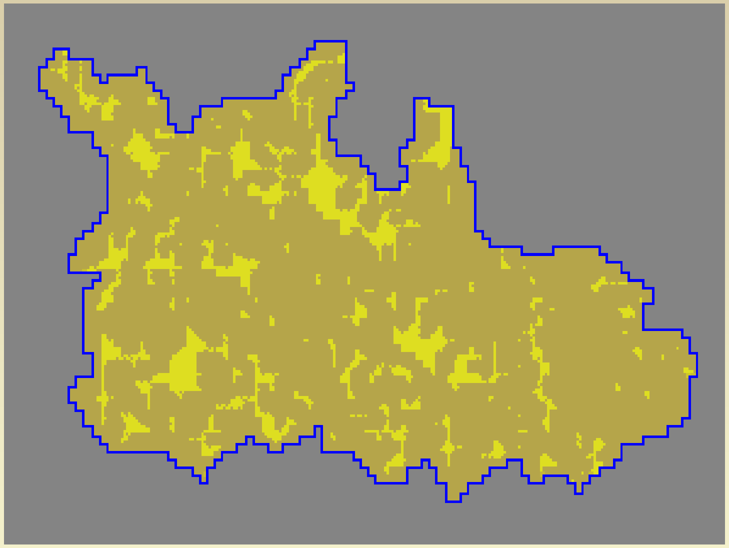
Approaches
Conceptual model – stakeholder involvement, goal setting
Watershed assessments – geospatial, runoff/loading
Landuse planning – decision support tools
River/reservoir response – CE-QUAL-W2

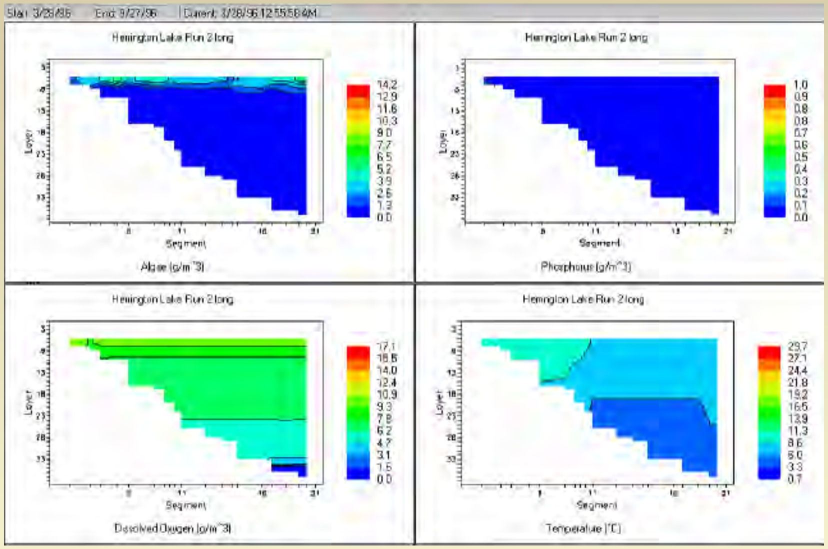
Watershed/Plant Interaction GSSHA-EDYS Linkage



Vegetative uptake of water and nutrients interaction with surface and subsurface flow

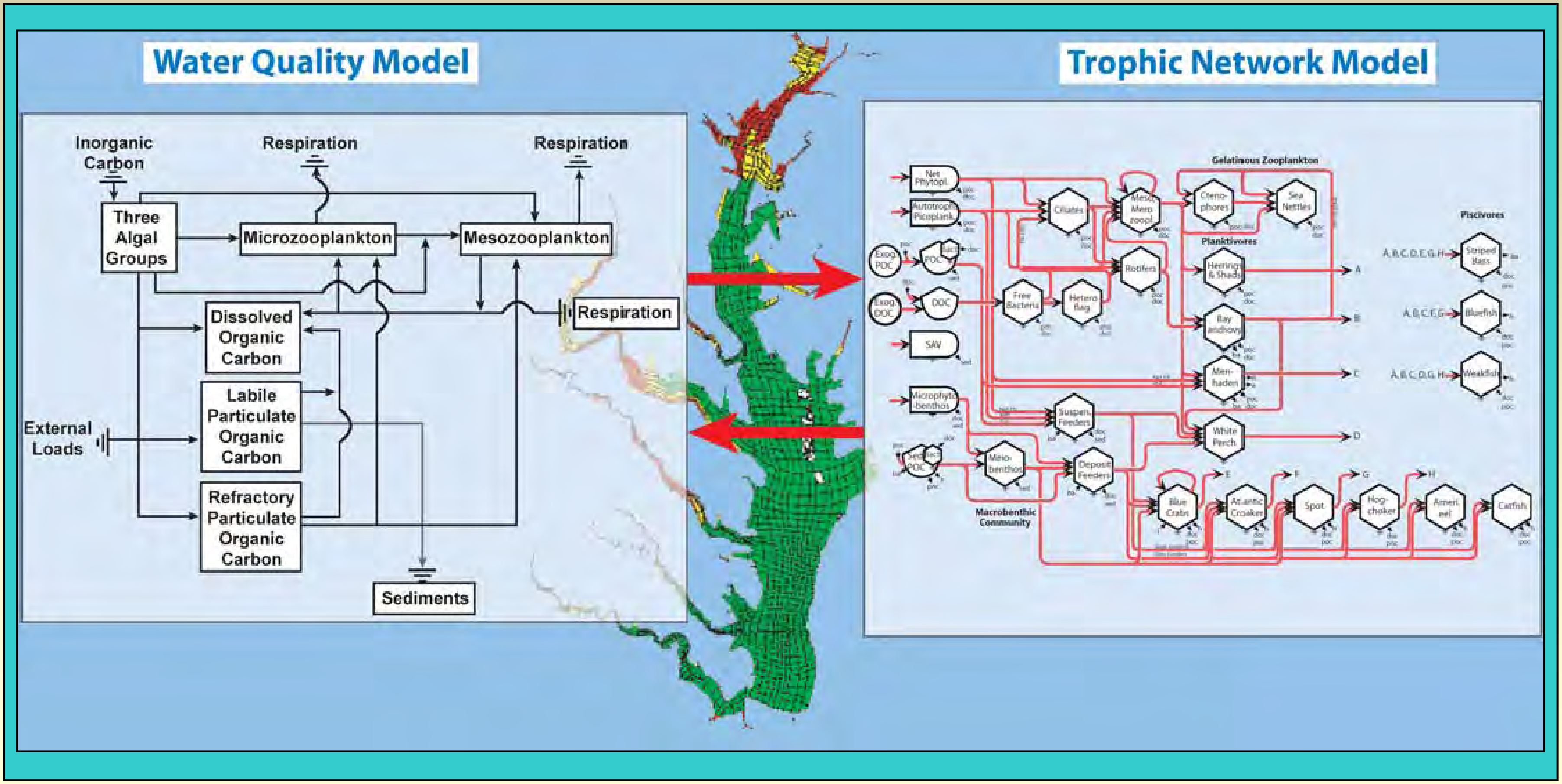
Biological Response Modeling Example

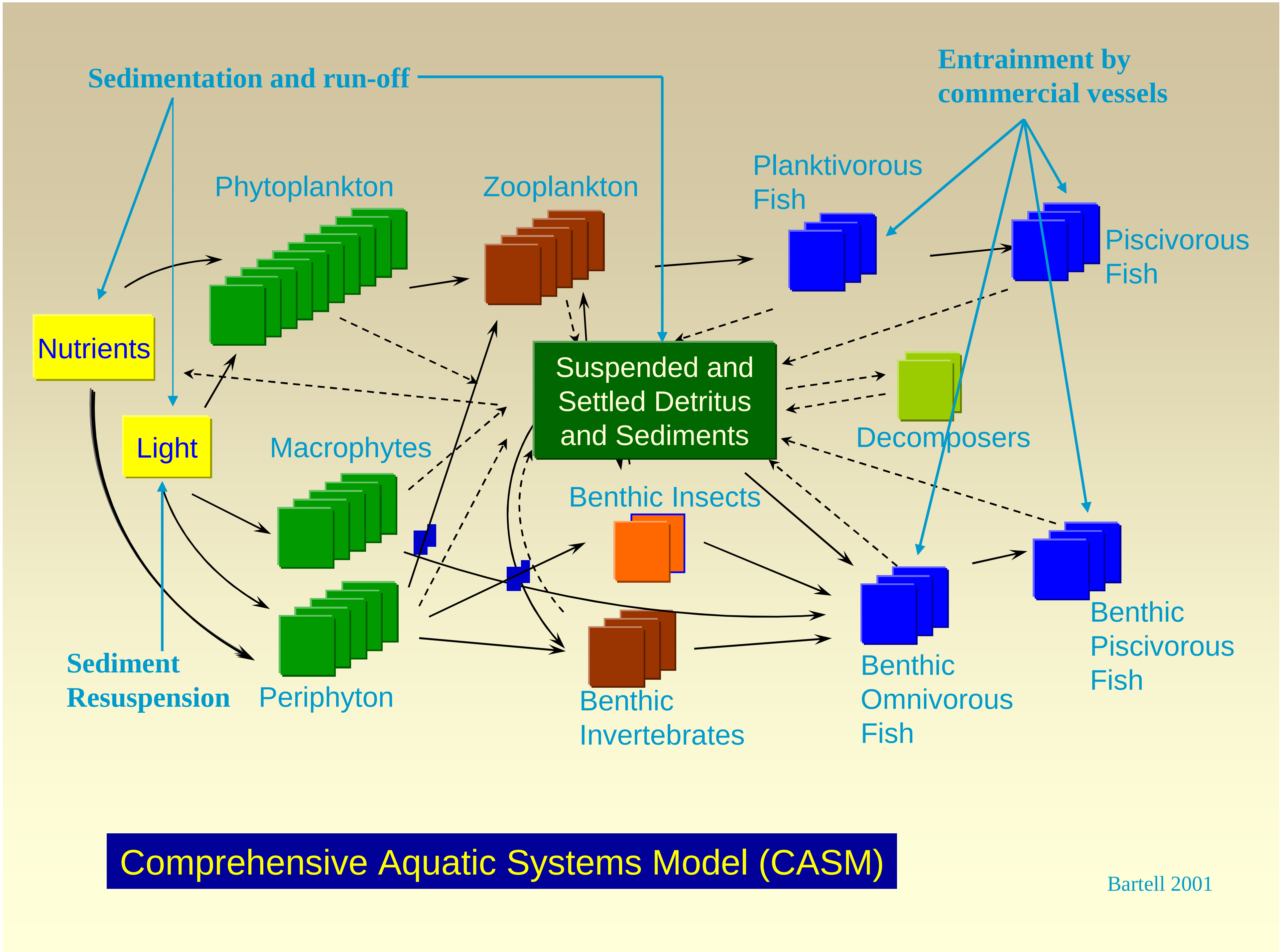


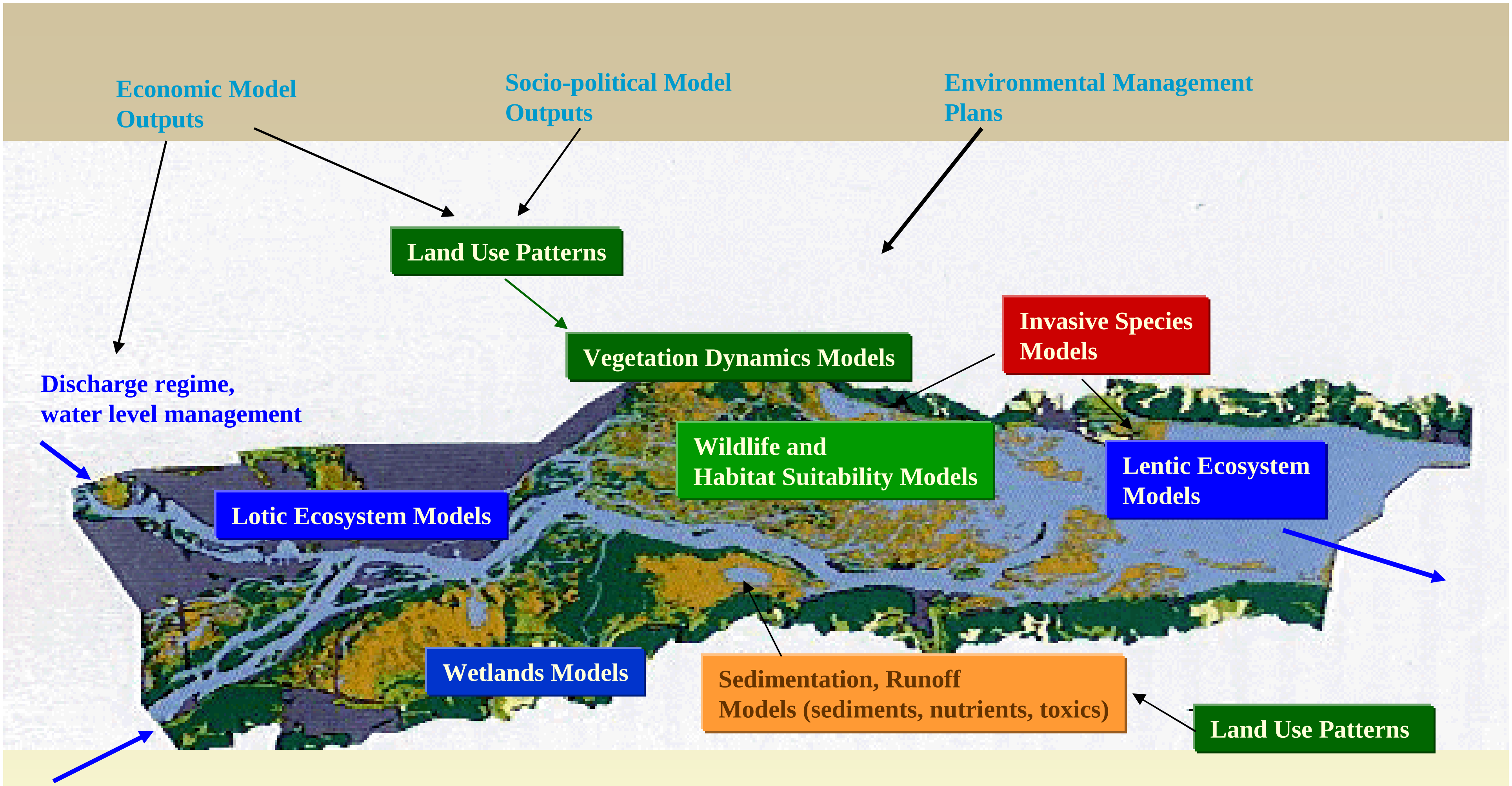


Coupled process based models (e.g., HMS/GSSHA and CEQUAL-W2) to forecast biological response to land use changes and water resources management

e.g., Coupling Ecological with Eutrophication Models




Sedimentation and run-off
Entrainment by commercial vessels
Phytoplankton
Zooplankton
Planktivorous Fish
Piscivorous Fish
Nutrients
Suspended and Settled Detritus and Sediments
Light
Macrophytes
Decomposers
Benthic Insects
Benthic Piscivorous Fish
Sediment Resuspension
Periphyton
Benthic Invertebrates
Benthic Omnivorous Fish
Comprehensive Aquatic Systems Model (CASM)
Bartell 2001



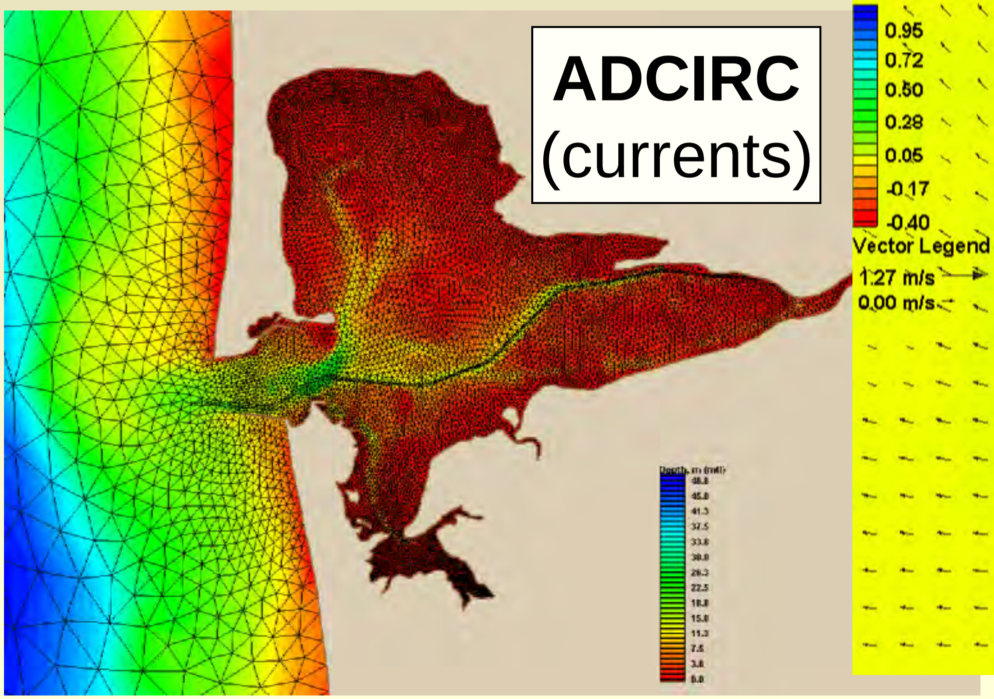
UMRS Environmental Conceptual Model

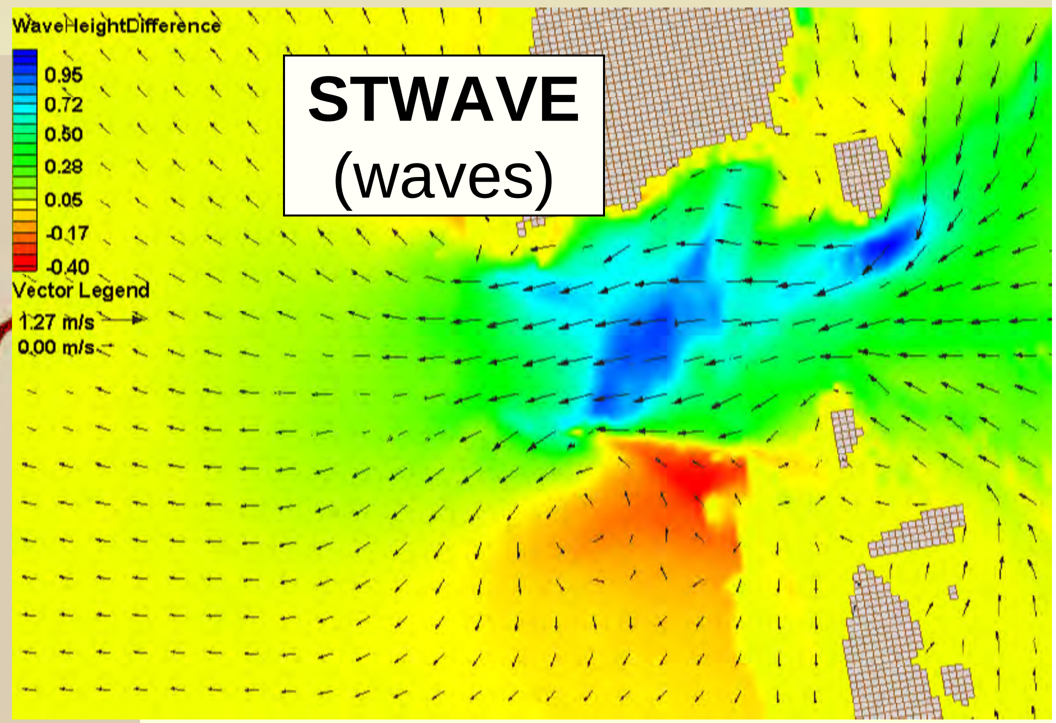
diverse set of ecological performance measures...

Bartell, 2001

Estuarine and Coastal Simulation

- Improved wave model (STWAVE)
- Improved coastal circulation models (ADCIRC & ADH)
- Integrated wave/current interaction environment





System-Wide Water Resources Program

Other District Interactions

MAWI (Barb Kleiss) – Onondaga Lake (LRB)
EFM (Chris Dunn) – Truckee River (SP)
GSSHA (Aaron Byrd) – Judy's Creek (MVR)
Ecological Response Modeling – (MVR)
Hyperspectral Imagery (Steve Wilhelms/Tim Pangburn)– Missouri River (NWO)

In the works

TMDL Assessment Toolkit
WAT
HMS
River Basin Morphology Modeling System
CASCADE
Coastal Morphology Modeling

System-Wide Water SWWRP Resources Program

https://swwrp.usace.army.mil

Impacts to Ice Regime Resulting from Removal of Milltown Dam, Clark Fork River, Montana

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Introduction

Dam located 120 miles downstream of Butte and Anaconda historic copper mining district.

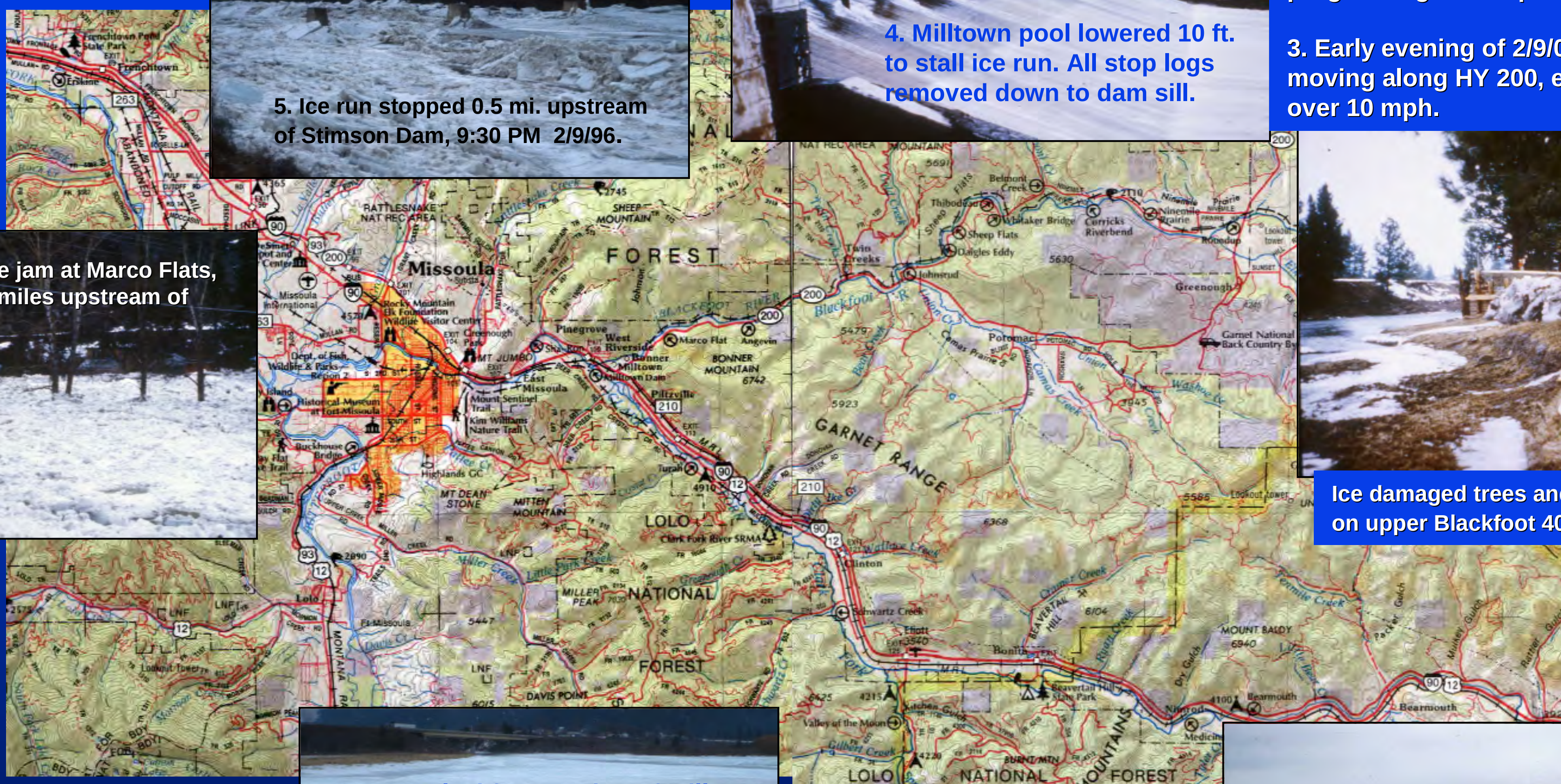
7 MCY sediment behind Milltown Dam containing As, Cd, Cu, Pb and Zn. 2.4 MCY to be removed.

During floods and ice events, metal-contaminated sediment are scoured from impoundment and deposited downstream.

Milltown Dam on Clark Fork River, built 1907
Now part of nations largest Superfund site.
Remedial action plan calls for phased removal of dam and contaminated sediments.

Stimson Dam 1 mi. upstream on Blackfoot R. to be removed as well.

1996 Ice Event



5. Ice run stopped 0.5 mi. upstream of Stimson Dam, 9:30 PM 2/9/96.

4. Milltown pool lowered 10 ft. to stall ice run. All stop logs removed down to dam sill.

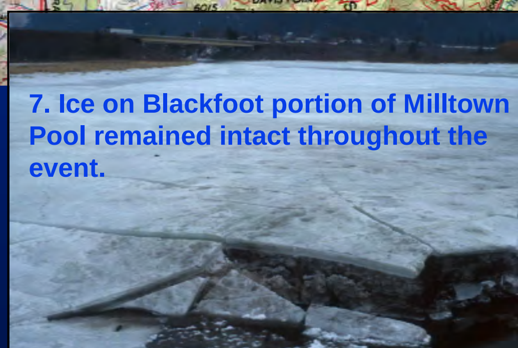
1. Three weeks of extreme cold produced extensive thick ice covers on Clark Fork and Blackfoot.

2. Sudden thaw with rain on 2/9/96 triggered dynamic downstream-progressing breakups on both rivers.

3. Early evening of 2/9/05, ice run tracked moving along HY 200, estimated speed over 10 mph.

6. 15-ft thick ice jam at Marco Flats, Blackfoot R. 3 miles upstream of Milltown.

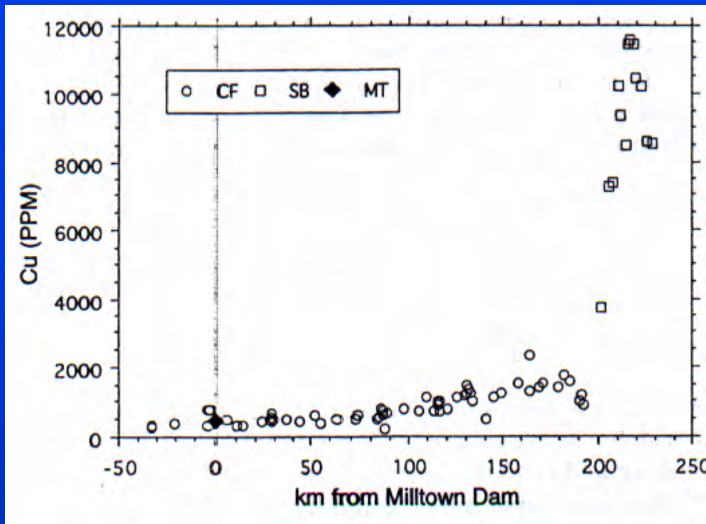
Ice damaged trees and destroyed bridge on upper Blackfoot 40 mi u/s of Milltown.



7. Ice on Blackfoot portion of Milltown Pool remained intact throughout the event.

8. Upper Clark Fork ice jammed at Turah Bridge and at head of Milltown Dam impoundment. Clark Fork channel through impoundment broke up on 2/10/96. Much ice passed dam.

Migration of Contaminated Sediments on the Clark Fork River



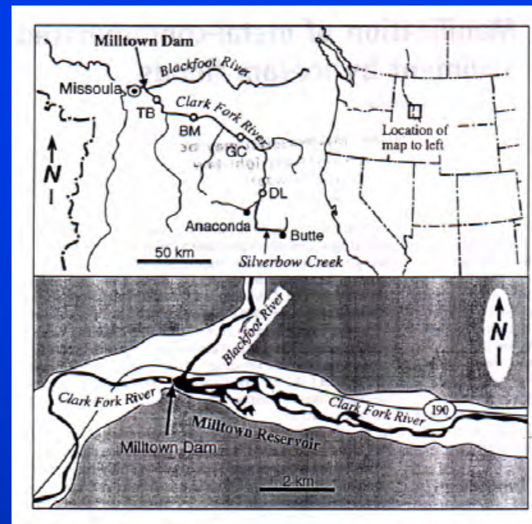
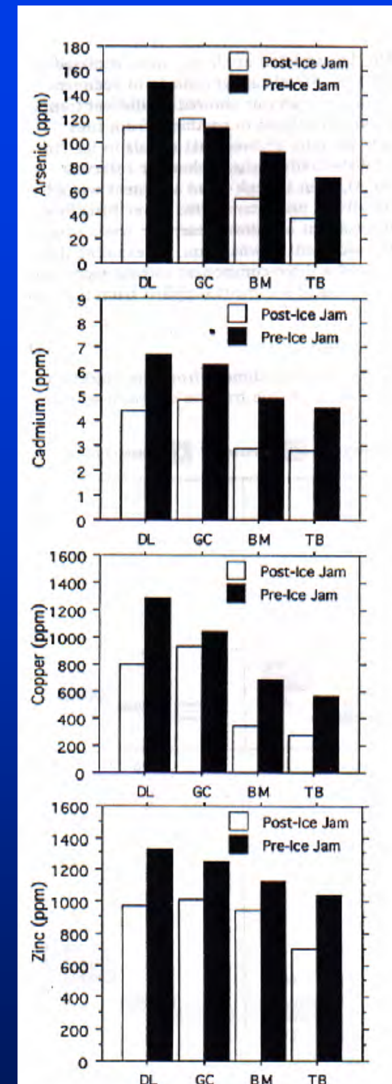


Table 1
Average metal concentrations in fine-grained sediment [* data from sediment collected from the tops of ice blocks (Landrigan 1997); † data from shallow cores taken from within Milltown Reservoir (Woessner and others 1984)]

Site	As (ppm)	Cd (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)
Blackfoot R. above reservoir*	8	0.3	20	16	43
Clark Fork R. above reservoir*	43	2.9	300	60	800
Within reservoir†	372	16.3	2506	289	4283
Below reservoir	100	4.5	700	90	1300



-Milltown Reservoir traps metal contaminated sediments from upstream mining activities.

-Ice events scour contaminated sediment from upstream channel and reservoir, enriching downstream sediments with metals.

-Significant fish kill downstream.

Figures from Moore and Landrigan (1999) "Mobilization of metal contaminated sediment by ice jam floods" Environmental Geology 37 (1-2)

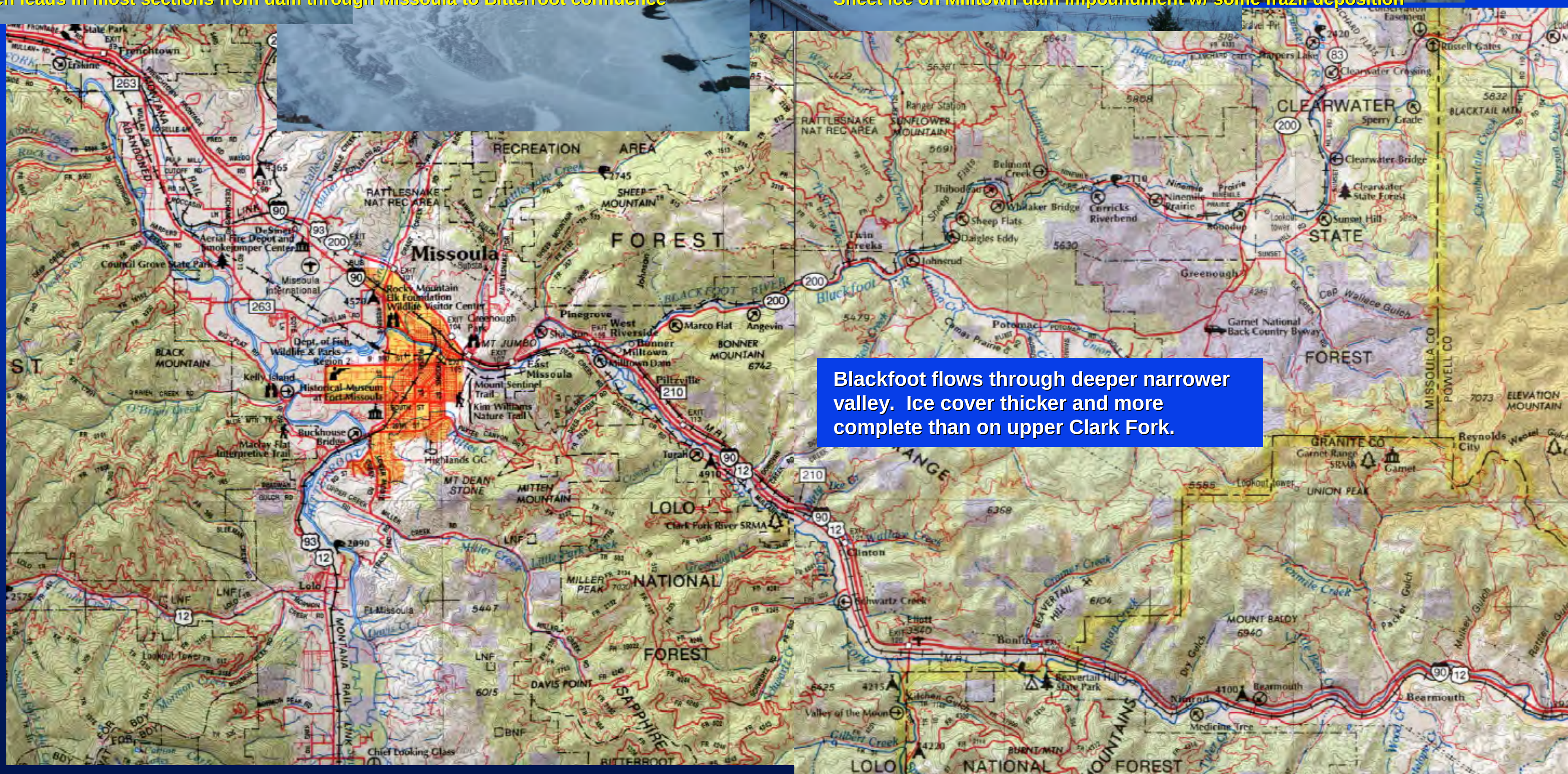
Study Objectives

- Characterize the existing ice regime through historical review and field observation
- Model ice cover formation and breakup for the pre- and post-dam removal cases
- Evaluate the potential for post-dam removal ice jam scour around the bridge piers on the lower Blackfoot
- Identify and outline ice mitigation measures that may be needed

Characterization of Existing Ice Regime

Open leads in most sections from dam through Missoula to Bitterroot confluence

Sheet ice on Milltown dam Impoundment w/ some frazil deposition



Blackfoot flows through deeper narrower valley. Ice cover thicker and more complete than on upper Clark Fork.

Winter 2004-2005 Ice Observation Program

- Ice conditions documented 10-14 Jan. 2005 representing maximum ice extent for winter.
- Ice covers composed primarily of frazil, up to 4-ft-thick. Complete covers on pool sections. Open leads up to ½ the channel width on faster sections of river, compared to near complete ice cover that preceded 1996 ice event.
- 12-inch-thick sheet ice on Milltown and Stimson Dam impoundments. Some frazil deposition beneath, particularly u/s of Stimson Dam.

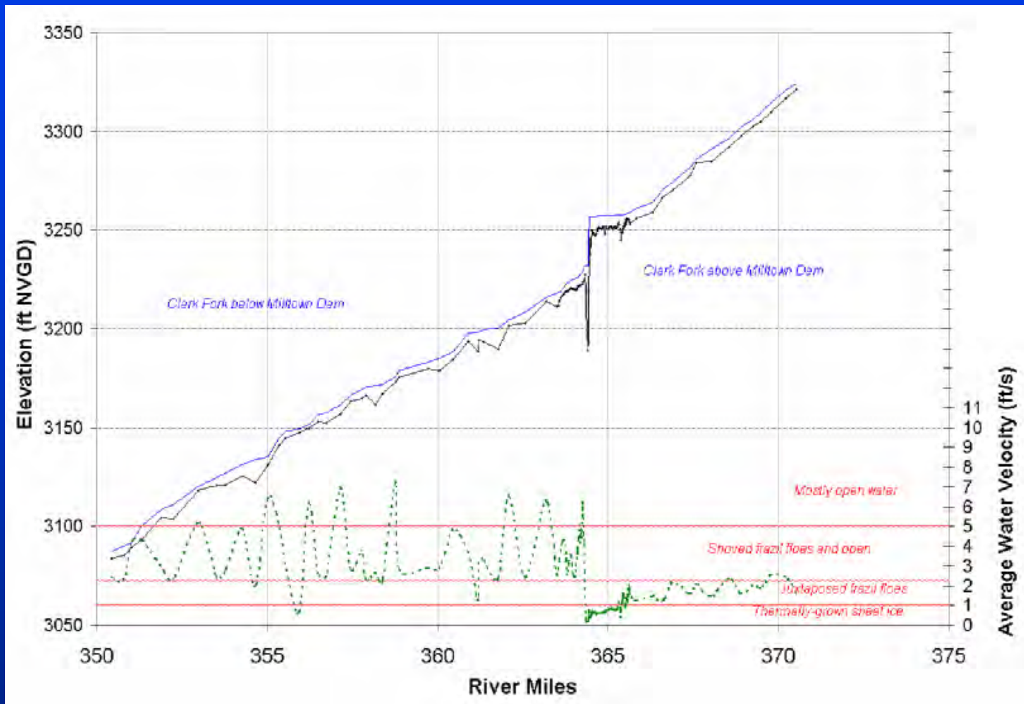

Open channel on upper Clark Fork below Turah Bridge

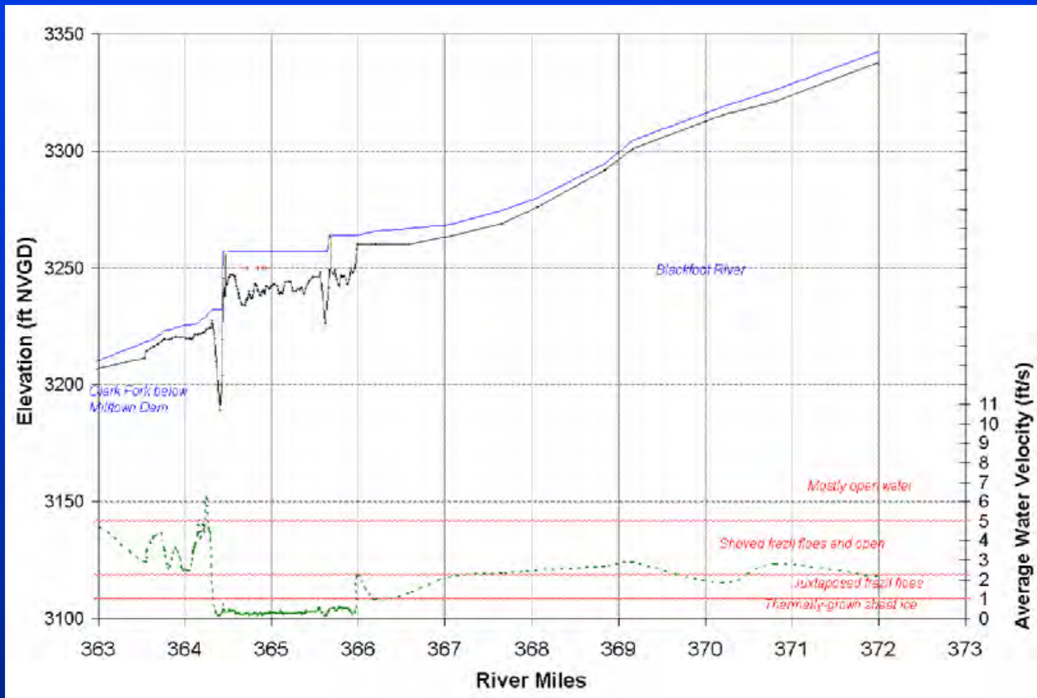

Frazil ice cover and anchor ice on upper Blackfoot River


Frazil ice accumulation on pool section, Clark Fork River, Missoula

Open channel with border ice on Clark Fork through Missoula

Winter Base Flow Velocity Profiles

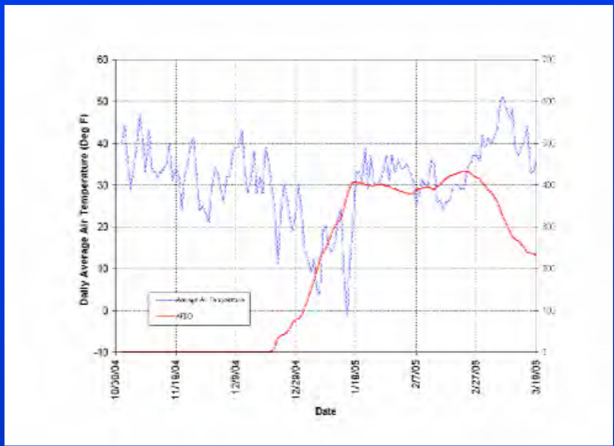




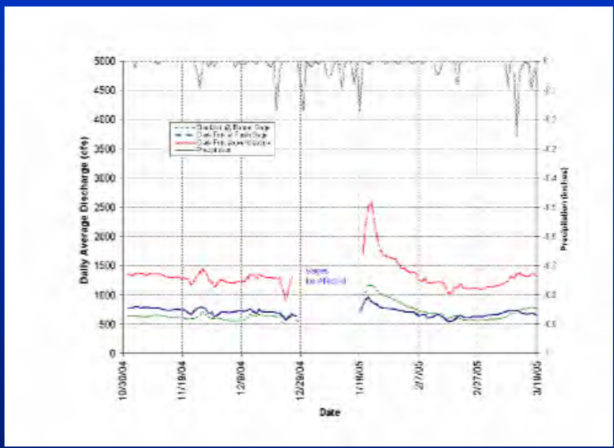
Average water velocity as a predictor of ice cover type:
 <= 1.0 ft/s   sheet ice
1.0 – 2.3 ft/s juxtaposed frazil floes
2.3 – 5 ft/s shoved frazil floes
> 5 ft/s channel stays open all winter

With the exception of the Milltown and Stimson Dam Impoundments, few pool sections of any great length.

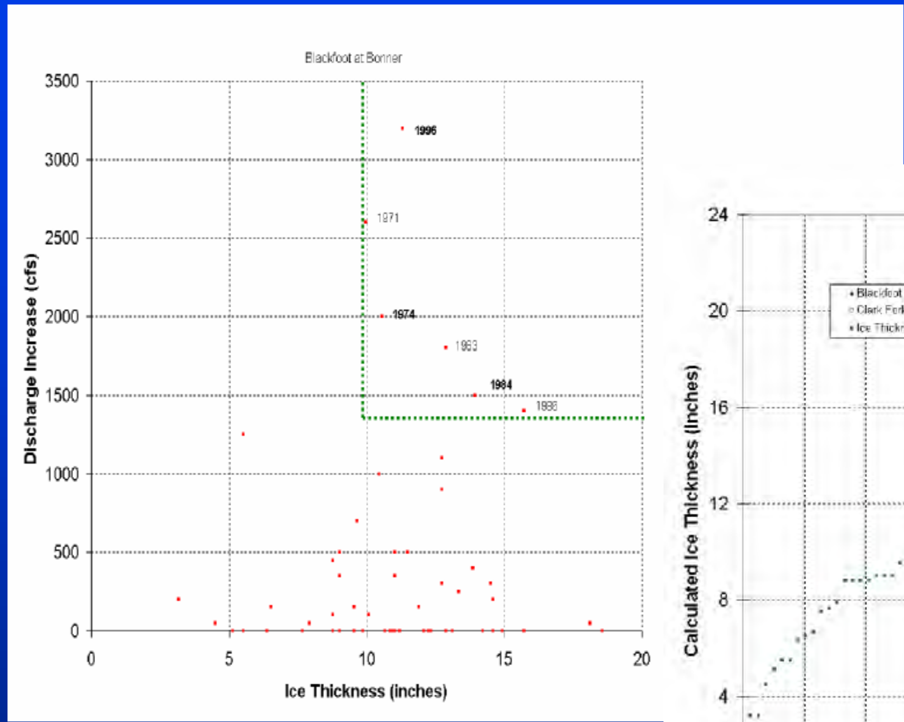
Frequency and Magnitude of Ice Events



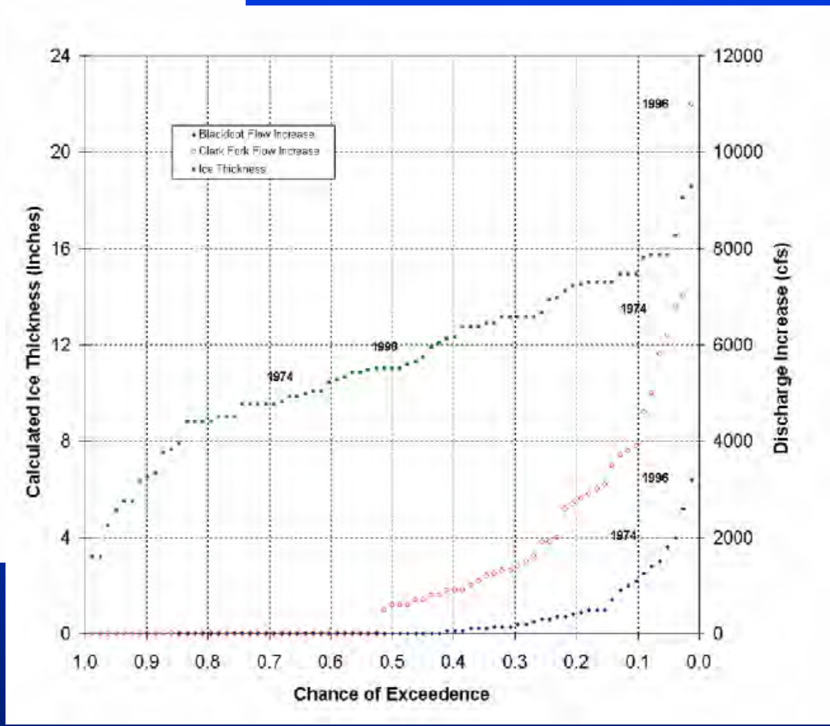
Historic ice thickness calculated from maximum AFDD



Occurrence of ice events influenced by breakup hydrograph.



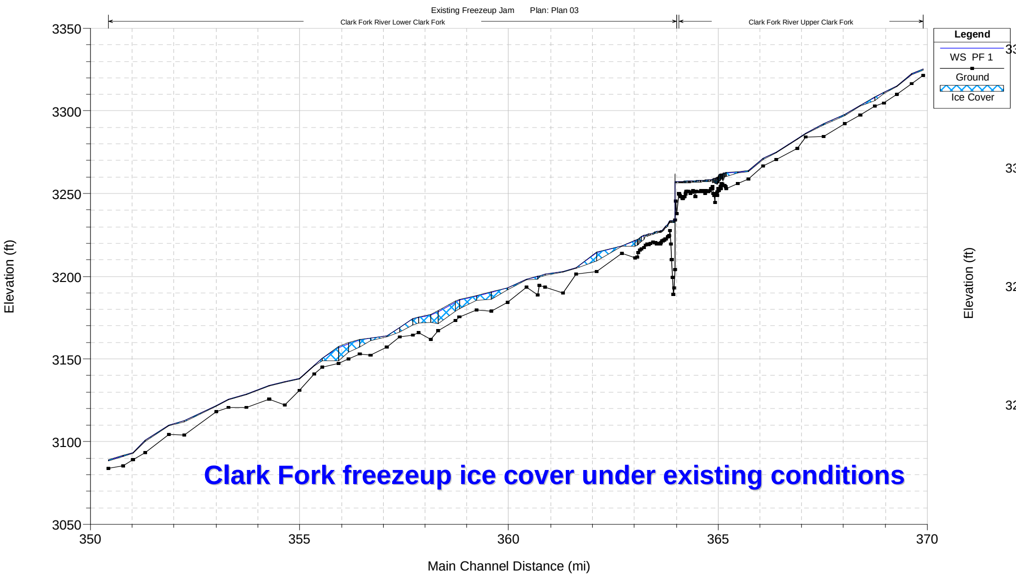
For all known historic ice events,
ice thickness >= 10 in and
Blackfoot discharge increase >= 1400 cfs

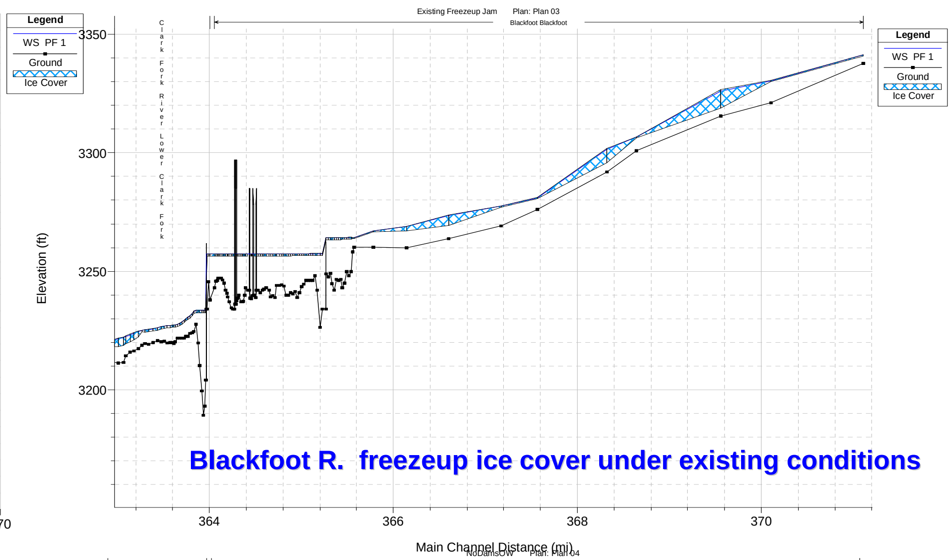


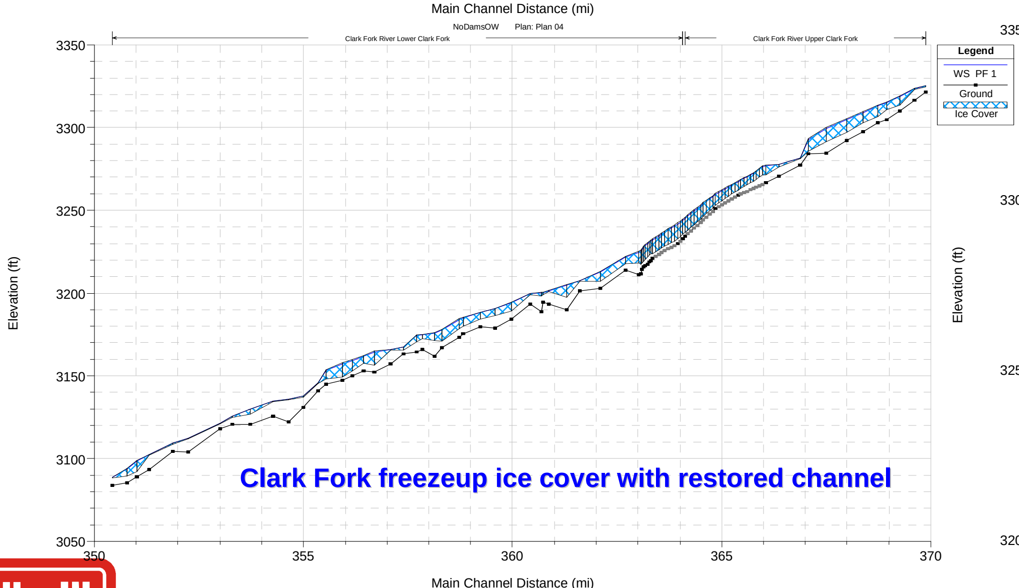
Ice thickness and discharge increases ranked and assigned probabilities.

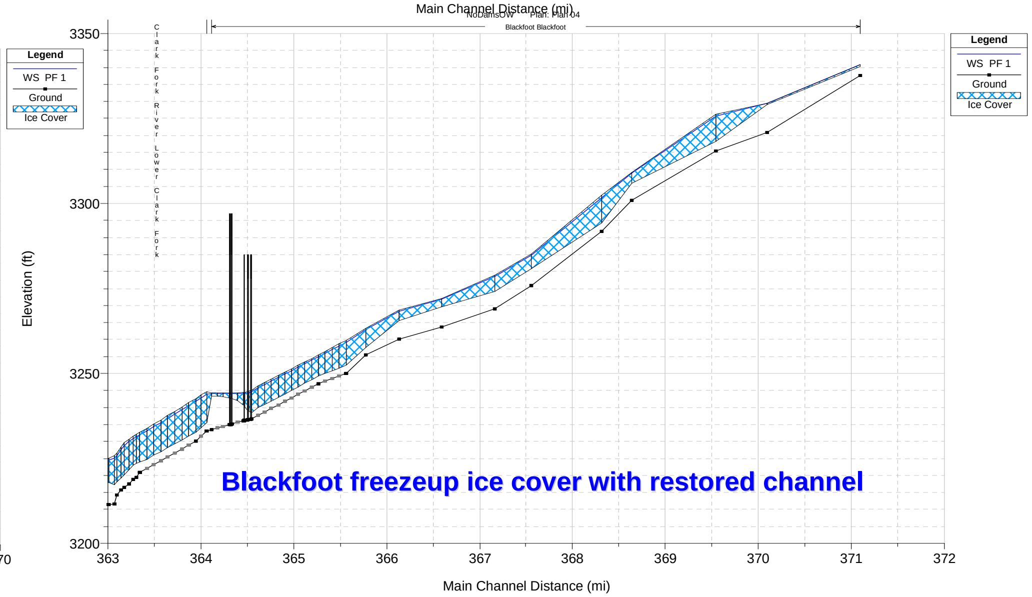
- Historical review found event similar but less severe than 1996 occurred Jan. 1974.
- Ice jam near Bitterroot Confluence in Jan. 1984
- No known jams from Milltown Dam through Missoula
- By “hindcasting” analysis, chance of recurrence of a 1996-like event extremely small.

HEC-RAS Modeling of Ice Cover Formation Pre and Post Project



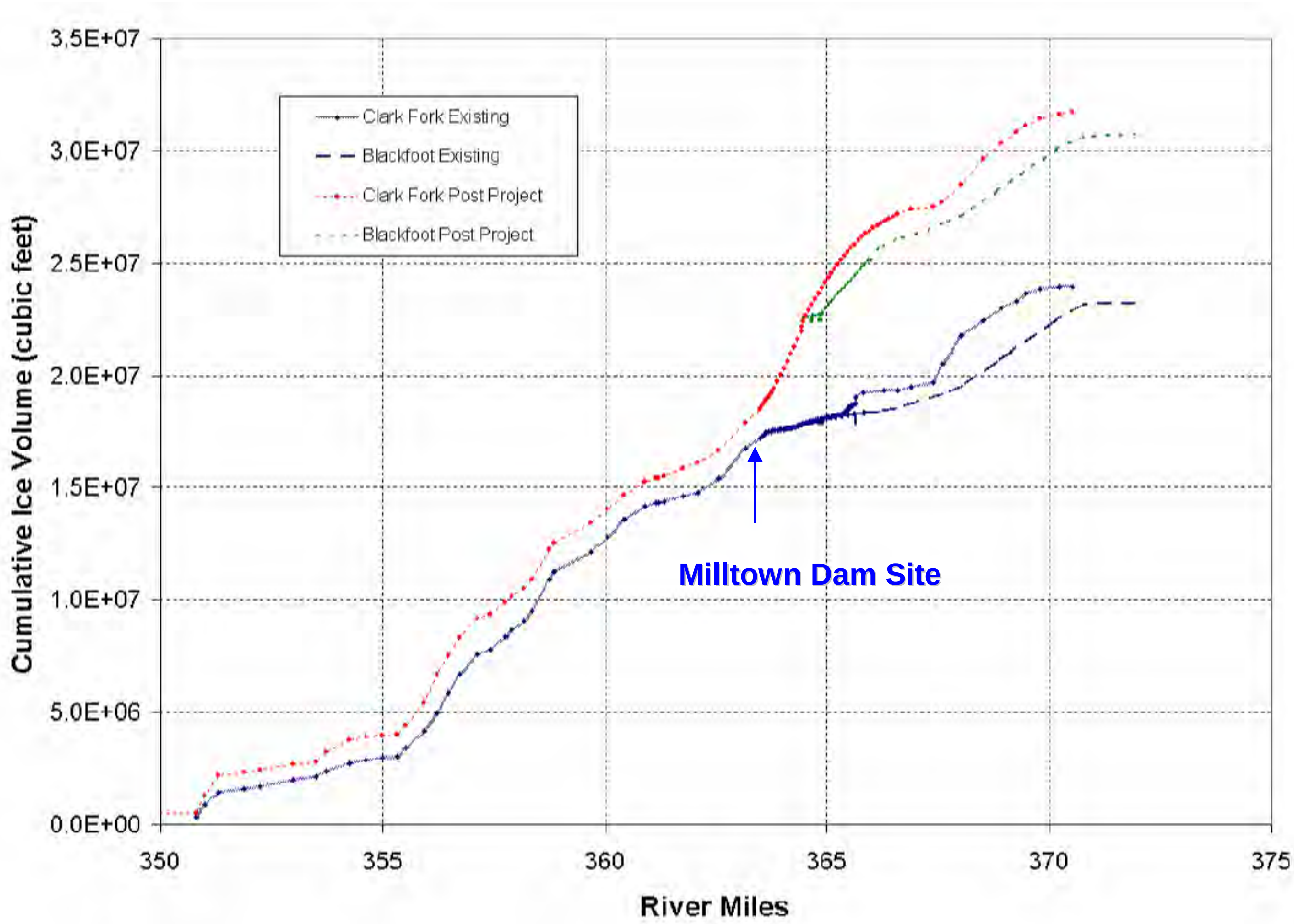






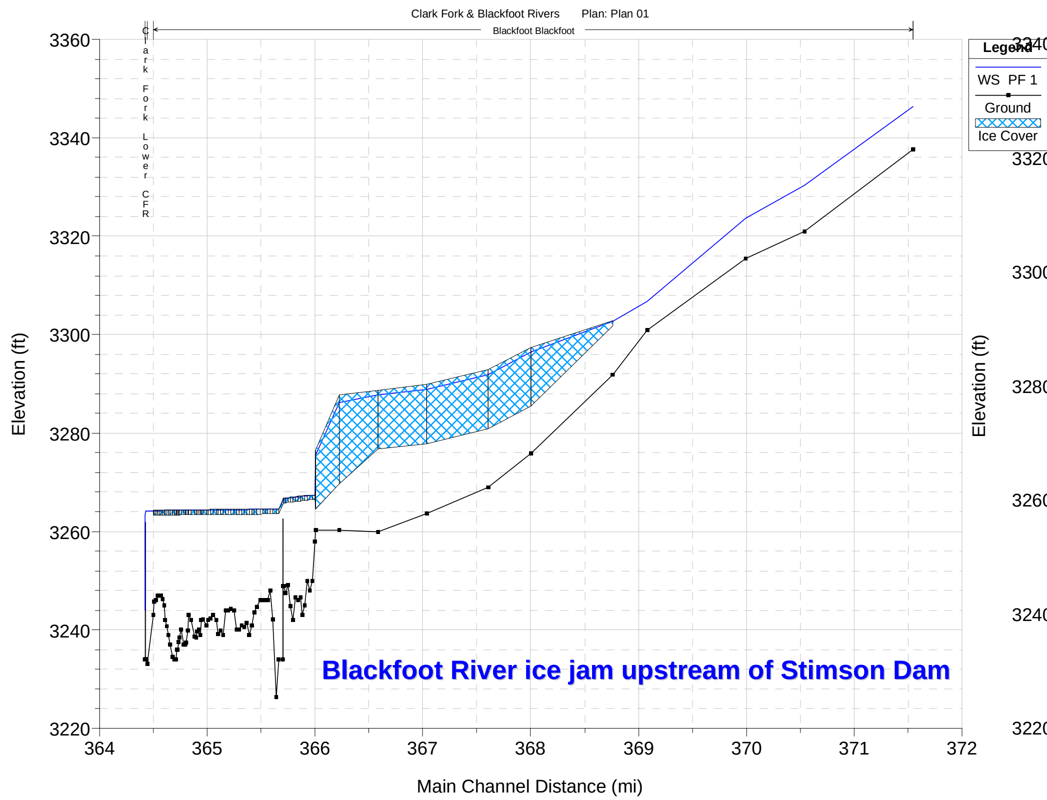
Simulations based on long-term January discharges of 899 cfs at Turah and 1711 cfs on the Clark Fork below the Blackfoot confluence.
These profiles represent worst case scenarios. A prolonged period of extreme cold and a large upstream area for frazil ice generation area assumed.

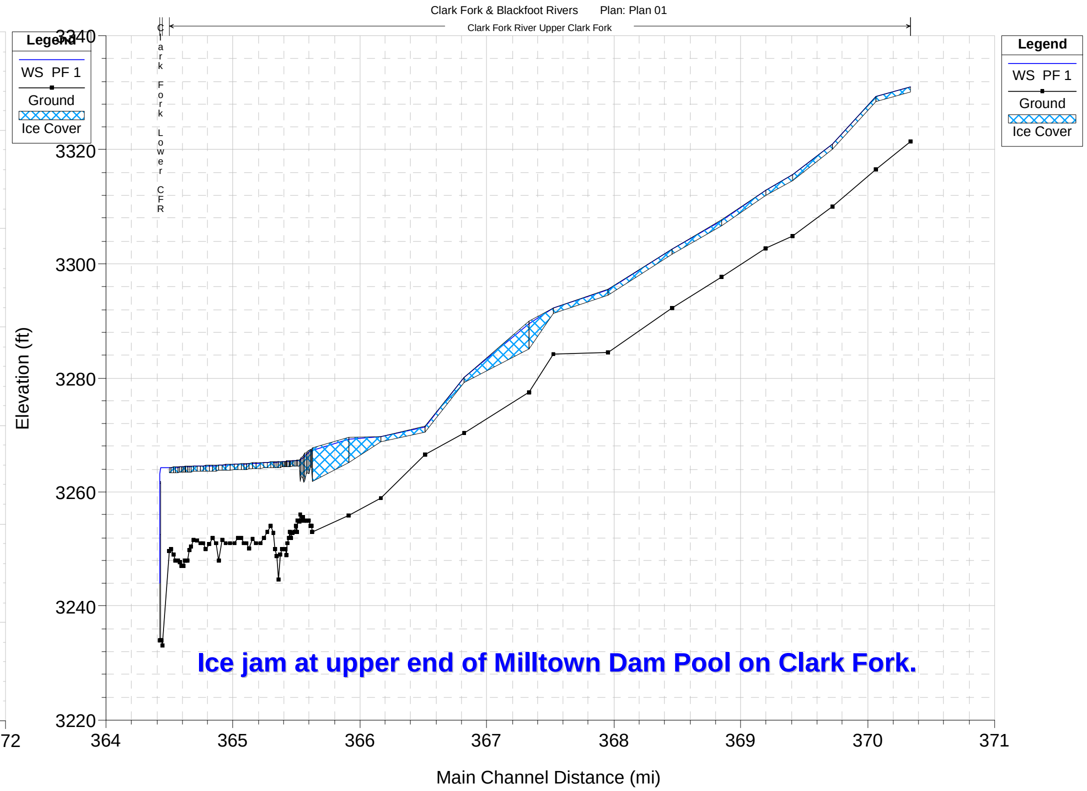
Cumulative Freezeup Ice Volumes Pre and Post Project



Freezeup ice volumes expected to increase post-project as a result of frazil accumulations upstream of Milltown dam site.

HEC-RAS Modeling of Existing Conditions Breakup Ice Jams





Worst case scenario based on the February 1996 ice event.

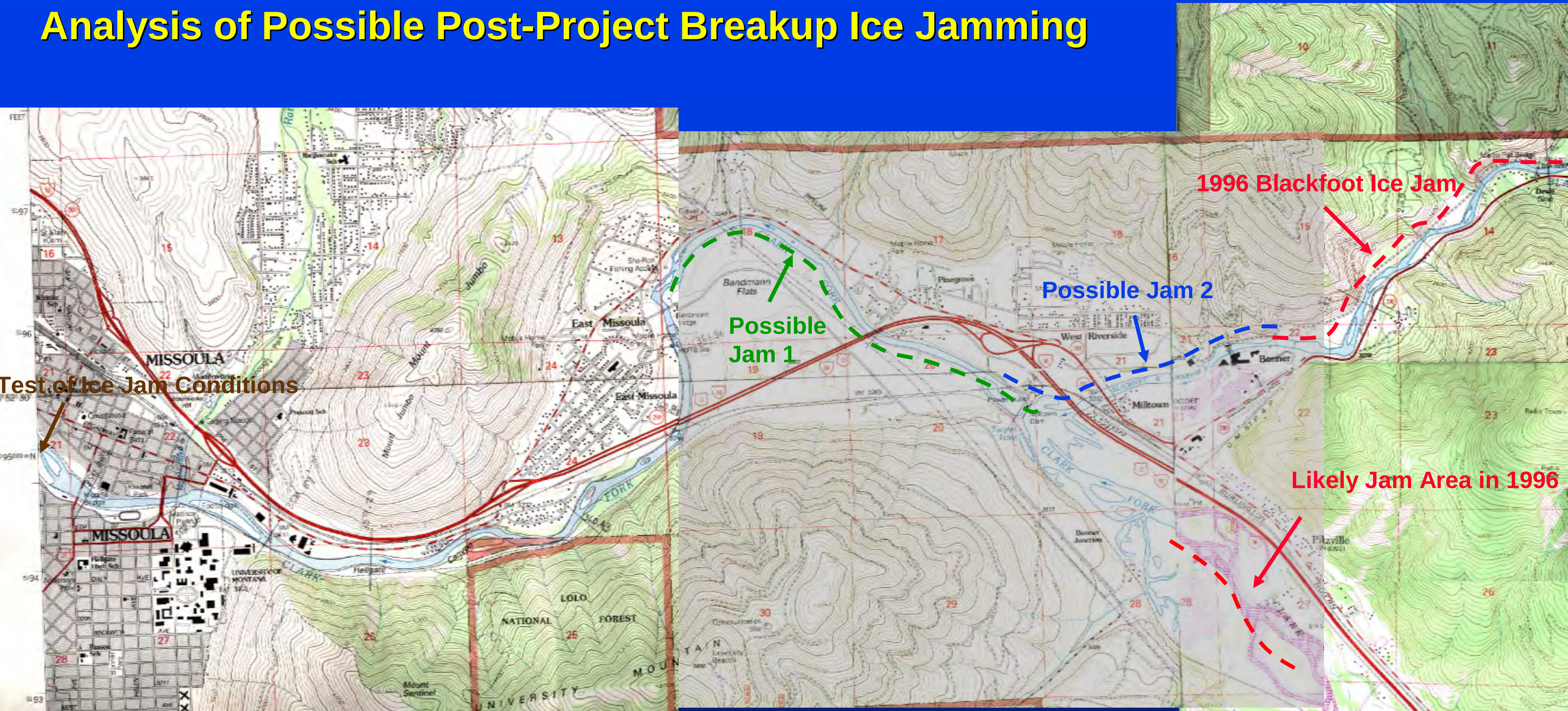
Blackfoot ice jam calibrated to observed high stages and ice thickness from the 1996 ice jam.

Location of Clark Fork Ice jam assumed.

Breakup Ice Jam Parameters

Blackfoot discharge at Bonner Gage	4000 cfs
Clark Fork discharge at Turah Gage	6000 cfs
Clark Fork discharge above Missoula	11,000 cfs
Under-ice roughness	0.06
Ice erosion velocity	4 ft/s
Ice jam porosity	0.5
Internal angle of friction for ice material	45º

Analysis of Possible Post-Project Breakup Ice Jamming

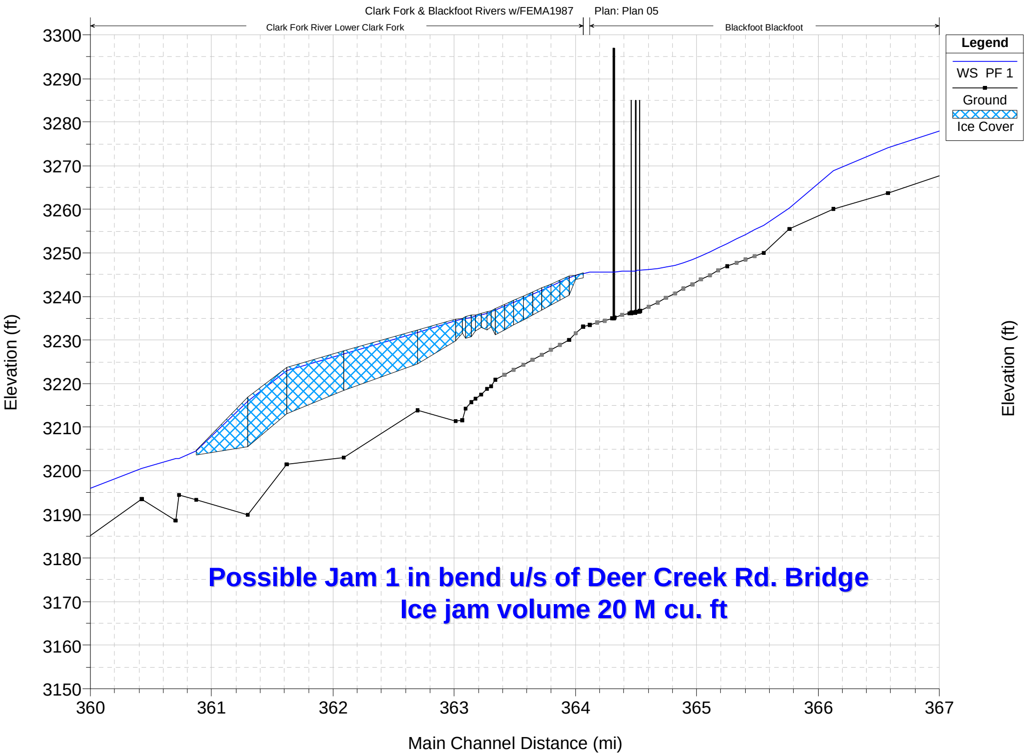


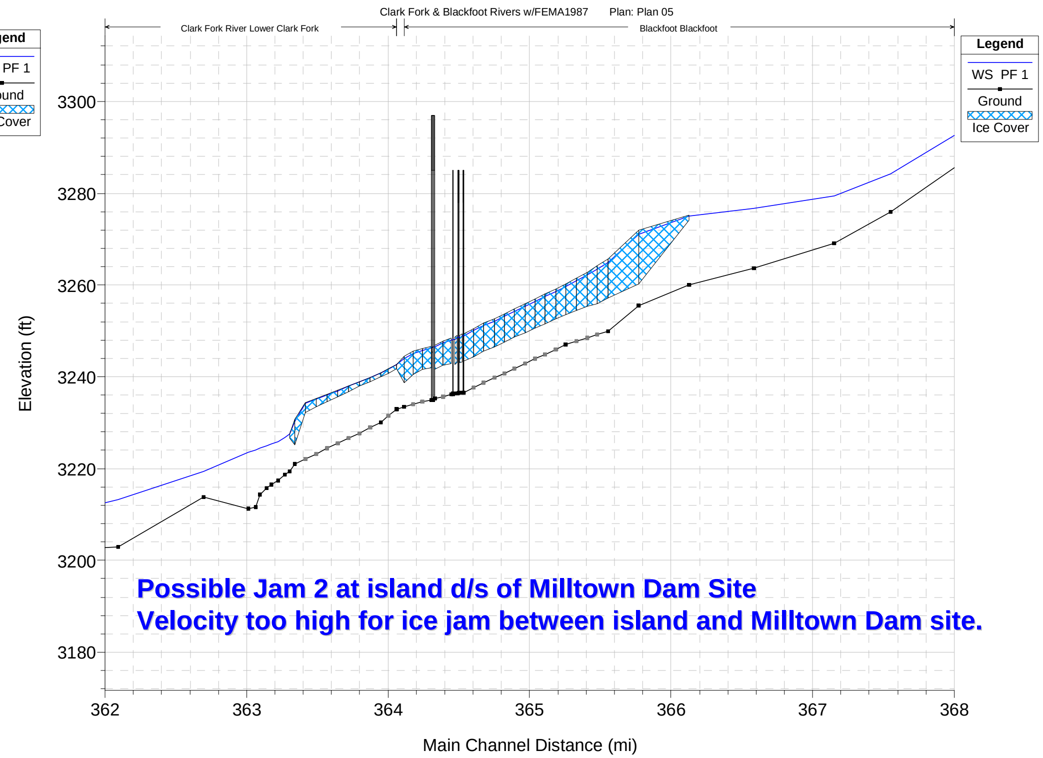
Site map showing historic breakup ice jam locations upstream of Milltown Dam.

Two possible post project ice jam locations modeled.

Simulation to tests of jam stability in downtown Missoula reach near Orange St. Bridge.

HEC-RAS Modeling of Possible Post-Project ice Jamming





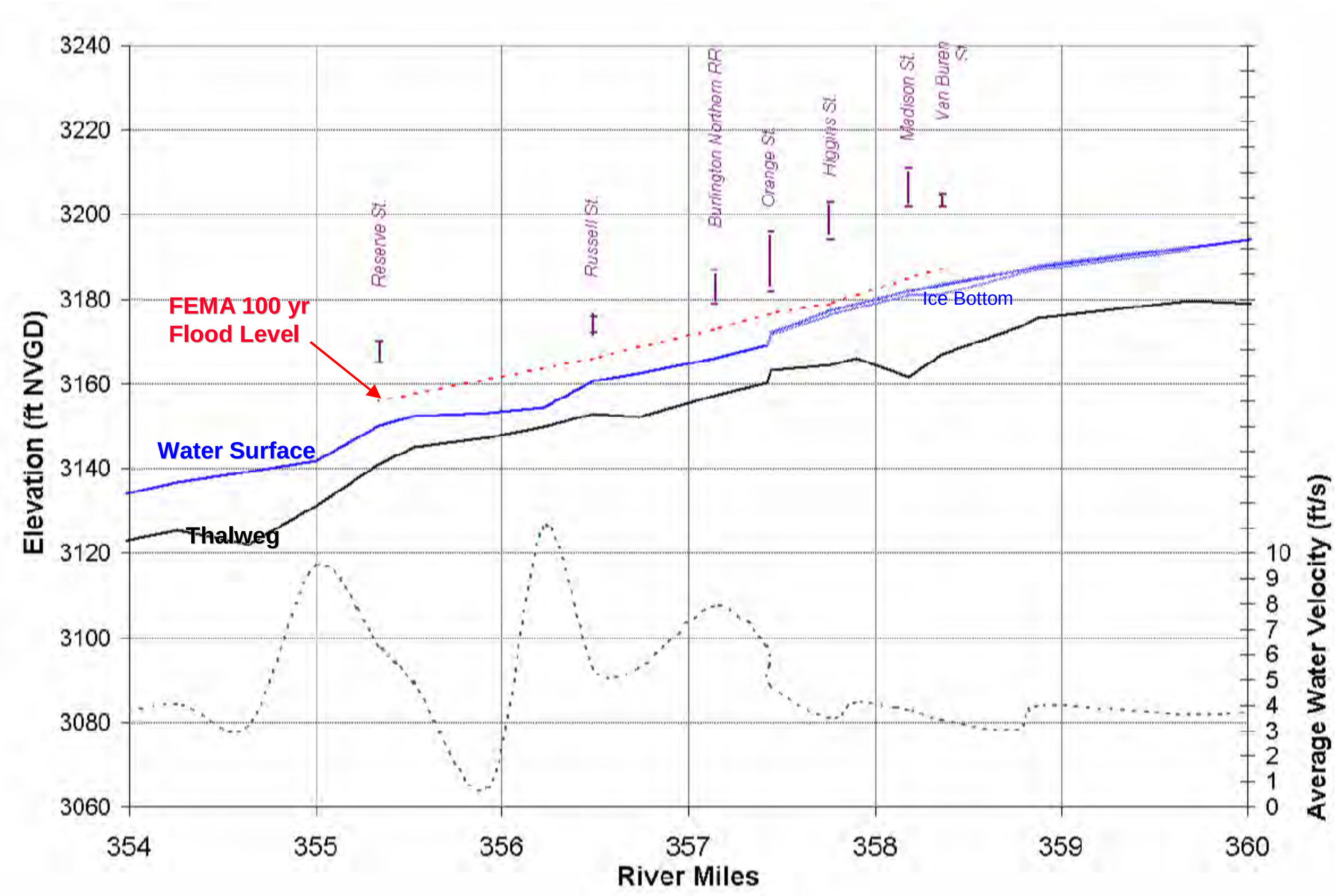
Total ice jam Volume based on the February 1996 ice event.

Same breakup ice jam parameters as in simulation of 1996 Blackfoot ice jam.

Breakup Ice Jam Parameters

Blackfoot discharge at Bonner Gage	4000 cfs
Clark Fork discharge at Turah Gage	6000 cfs
Clark Fork discharge above Missoula	11,000 cfs
Under-ice roughness	0.05
Ice erosion velocity	4 ft/s
Ice jam porosity	0.5
Internal angle of friction for ice material	45º

HEC-RAS Test of Ice Jam Stability in Downtown Missoula Reach

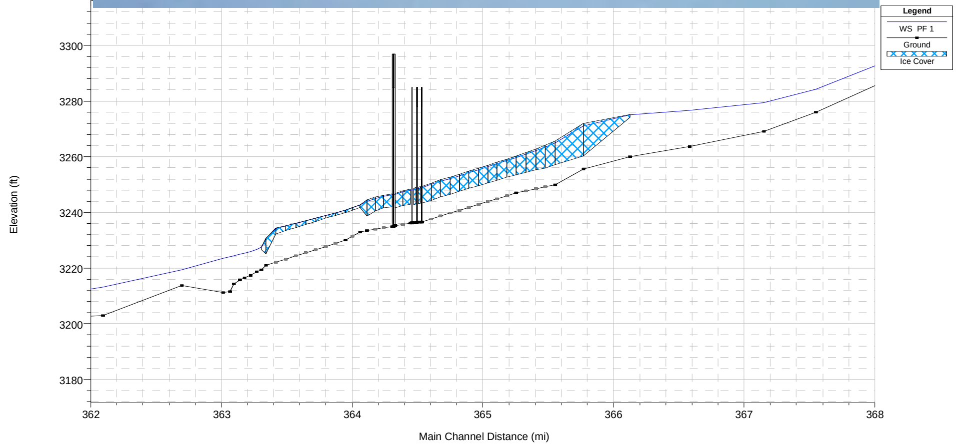


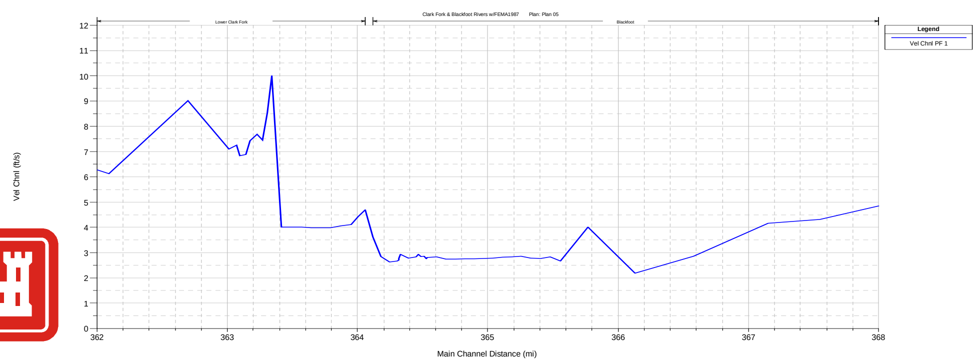
Simulation motivated by concern for post-project ice jam impacts to downtown bridges.

At breakup discharge of 11,000 cfs, water velocity too high for stable ice jam to exist in the downtown area.

Lack of observed ice jams in this section of river support simulation results.

Bridge deck elevations and 100 year flood profile shown for comparison.





Ice-Related Bridge Scour Analysis

Ice-hydraulic parameters were taken from HEC-RAS simulation of possible Jam 1 in the confluence area.

Q_{BF} = 4000 cfs, Q_{UCF} = 6000cfs, t_j = 6 ft, y_{ui} = 6 ft
S = 0.00250, n_i = 0.06, v_{eros} = 4 ft/s, R_i = 2.86 ft

Mean bed shear of 0.45 psf, calculated by depth-slope product

$$\tau_b = \gamma R_i S$$

For the open water 100 year flood: Q = 24,000 cfs, y = 20 ft, S = 0.00256 , mean bed shear by depth slope product was 2.8 psf

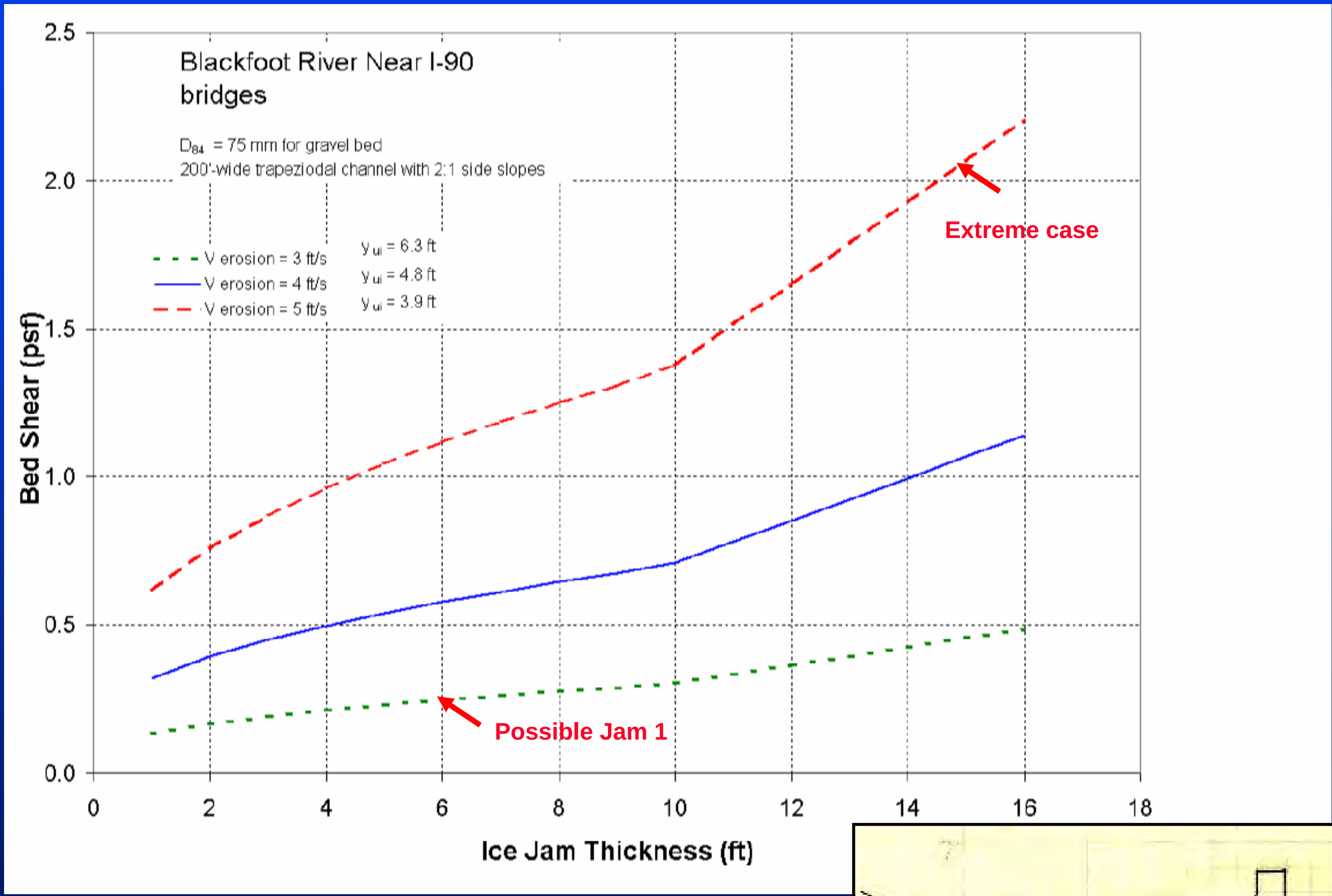
The Beltaos (2001)* approach which better accounts for the effect of ice jam roughness on bed shear was also used. With D_{84} for coarse gravel = 75 mm, an ice-influenced friction factor f_b was calculated for the bed as function of ice and bed roughness, and bed shear calculated using the Darcy-Weisbach equation:

$$\tau_\mathrm{b} = \frac{1}{8} f_b \rho_w U^2$$

For an average under-ice water velocity of 3 ft/s, the Beltaos method gave an ice-affected bed shear of 0.25 psf, which is about half the shear calculated by the depth-slope product, and an order of magnitude less than the calculated mean bed shear for the open water 100-year discharge.

***Beltaos, S (2001) "Hydraulic Roughness of Breakup Ice Jams", Journal of Hydraulic Engineering, Vol. 127, No. 8, August, 2001.**

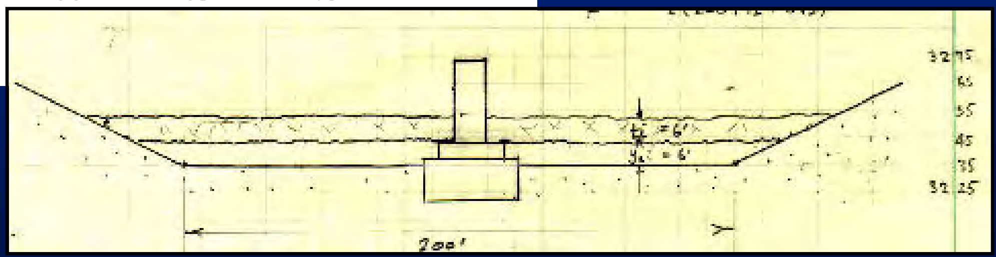
Sensitivity of Bed Shear with respect to Ice Jam Thickness and Under Ice Water Velocity



In the HEC-RAS ice option, under ice flow depth governed by user-input ice erosion velocity.

Higher erosion velocity results in thicker jam and greater calculated bed shear.

In terms of calculated bed shear, a 15-ft-thick ice jam with an under ice velocity of 5 ft/s would be comparable to the 100-yr open discharge water case.



Conclusions

- Juxtaposed and shoved frazil with semi-continuous open leads characterize the ice cover in the study reach. The pools upstream of dams where sheet ice exists are an exception.
- Severe ice jams have occurred at the upstream end of the Milltown and Stimson Dam impoundments, but historical research and hindcasting analysis found this type of event very infrequent.
- Based on HEC-RAS modeling, severe ice jams on the lower Clark Fork are not anticipated following dam removal and channel restoration. At the expected breakup discharges, average water velocity should be sufficient to convey the breakup ice run through this section of river without significant jamming.
- In the event of an ice jam forming near the Clark Fork-Blackfoot confluence, HEC-RAS predicts that a stable, floating ice accumulation could exist on the Blackfoot in the vicinity of the I-90 bridge piers. Calculated ice-affected bed shear is less than the mean bed shear for the 100-year open water discharge, however.
- The Blackfoot ice run may continue to jam in its traditional location upstream of the Stimson Dam Site. Grade control and possibly ice retention piers would insure that this occurred, but it is not clear at this point that such structural measures will be needed.

Acknowledgements

The U. S. Environmental Protection Agency funded this study in support of the Clark Fork River Superfund Project. The Seattle District of the U. S. Army Corps of Engineers managed the study and participated in the program of winter field observations.

U.S. Naval Academy

Flood Damage Reduction Project Using Structural and Non-Structural Measures

3 August 2005

Presentation by

Stacey Underwood, U.S. Army Corps of Engineers, Baltimore District

Co-Author, Larry Buss, U.S. Army Corps of Engineers, Omaha District

Why has this project received strong customer support?

- The project was customer-focused
- We used all of the “tools” in the “tool box”
- We developed an innovative solution that combines structural and non-structural measures

Background

- Hurricane Isabel struck Annapolis, Maryland in September 2003
- Storm surge created water levels equivalent to the 100-year flood event
- 18 buildings were flooded
- USNA incurred over $80 million in damages
- USNA had never experienced significant flooding prior to this event

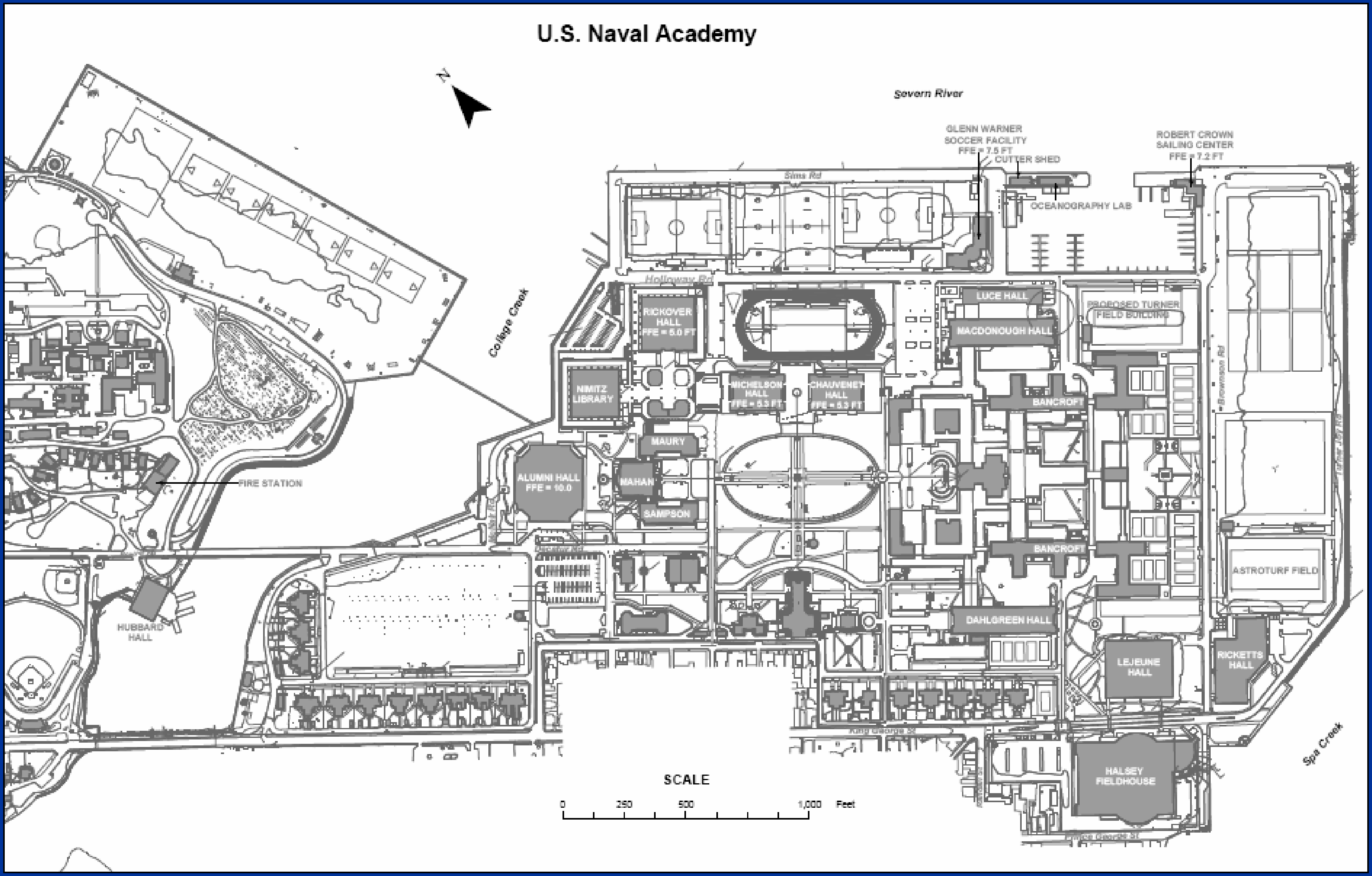
Project Goal

To prevent floodwaters from disrupting operations and damaging the existing structures during the 100-year flood event, or higher

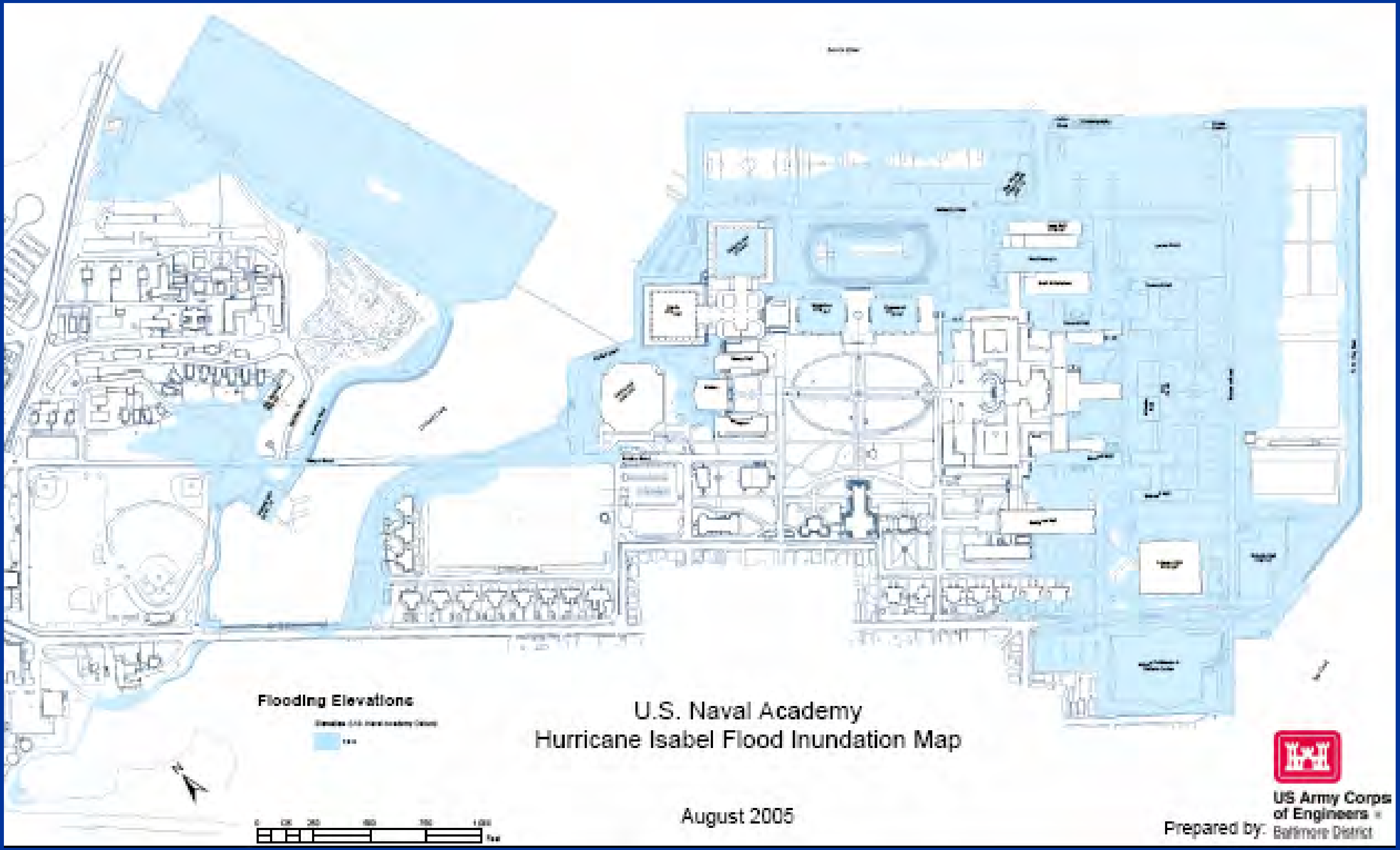
USNA Objectives

- Include the existing buildings as flood protection (dry flood proof to the extent possible)
- Recommend durable, low maintenance, low-tech, easy to use flood protection measures
- Consider and minimize historic and aesthetic impacts
- Recommend a plan that may be constructed incrementally

Orientation



Hurricane Isabel Flooding



Study Process

- Step 1 – Conducted field reconnaissance
- Step 2 – Identified alternative solutions
- Step 3 – Evaluated and compared alternatives
- Step 4 – Recommended a plan for implementation

Step 1 - Field Reconnaissance

- **2 sets of teams were established**
- **Structural team**
  - investigated potential structural solutions (flood walls, berms)
- **Non-Structural team**
  - comprised of representatives from the Corps' National Non-Structural/Flood Proofing Committee
  - investigated each building to identify flood-proofing opportunities

Flood Damage Reduction Considerations

- **Flooding characteristics – depth, velocity, duration**
- **Site characteristics – site location, soil types**
- **Building characteristics – foundation, construction, condition**

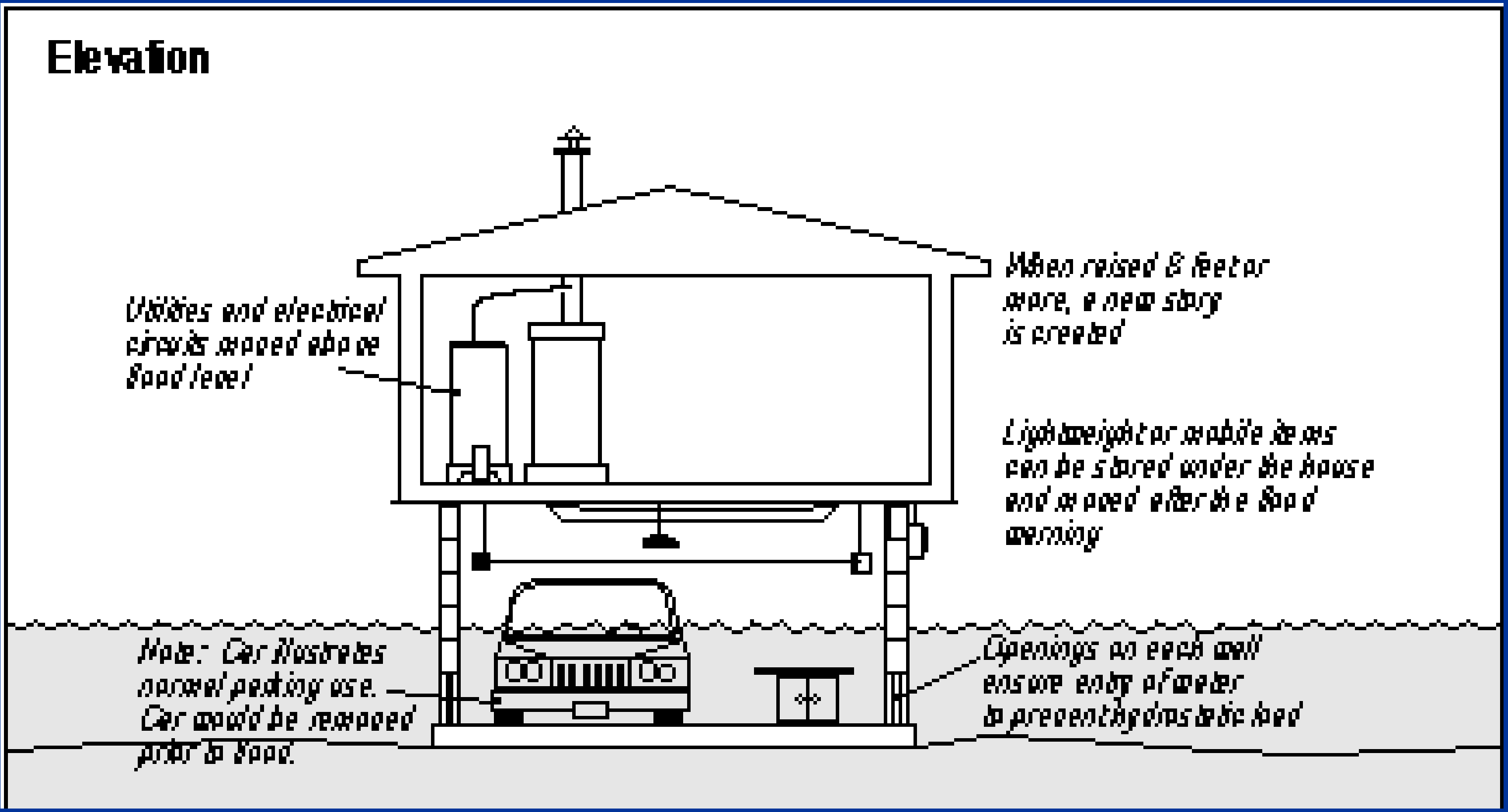
Types of Non-Structural Flood Proofing

- **Elevation**
- **Relocation**
- **Dry flood proofing**
- **Wet flood proofing**

Elevation

- Raise the building so that floodwaters cannot reach damageable portions of it
- Construct new or extended foundation or elevate on piles or columns

Elevation


Elevation
Utilities and electrical circuits moved above flood level
When raised 8 feet or more, a new story is created
Lightweight or mobile items can be stored under the house and moved after the flood warning
Note: Car illustrates normal parking use. Car would be removed prior to flood.
Openings on each wall ensure entry of water to prevent hydrostatic load

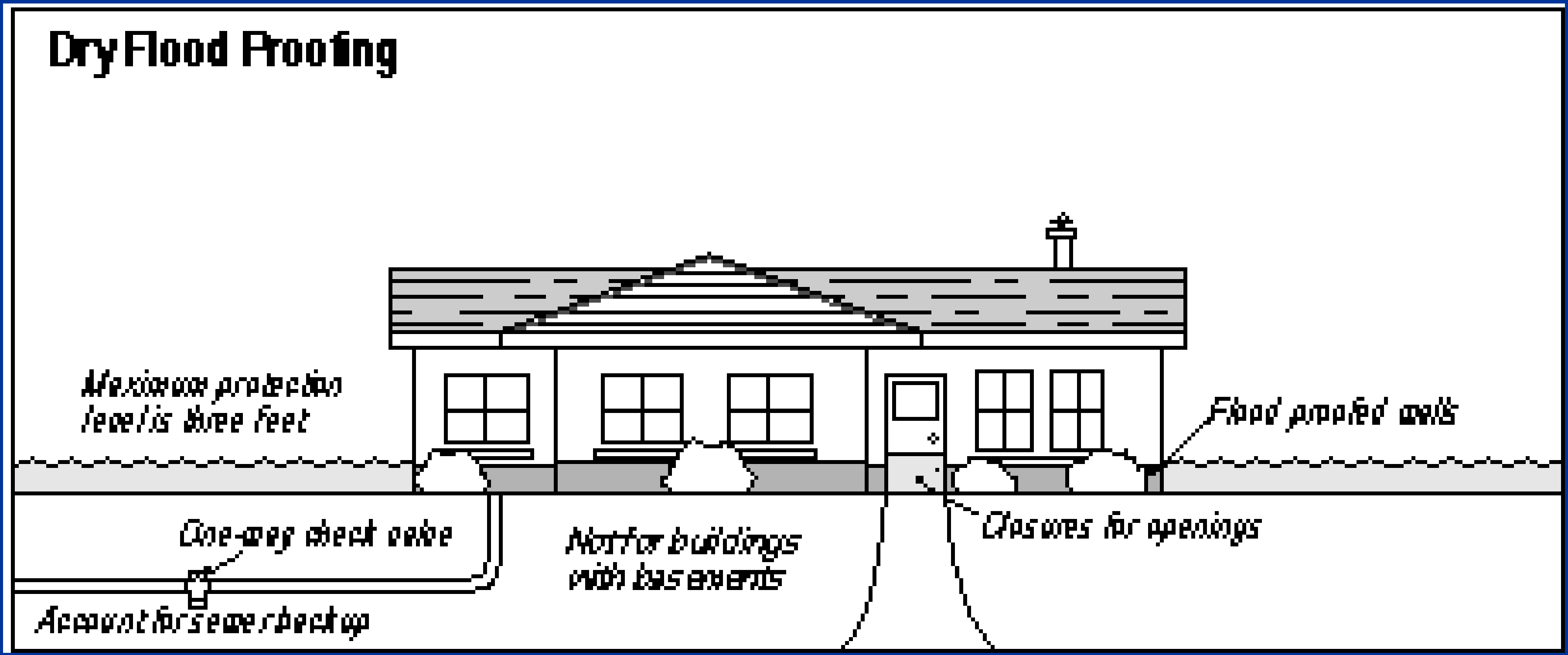
Relocation

- Move the building to another location where floodwaters cannot reach it

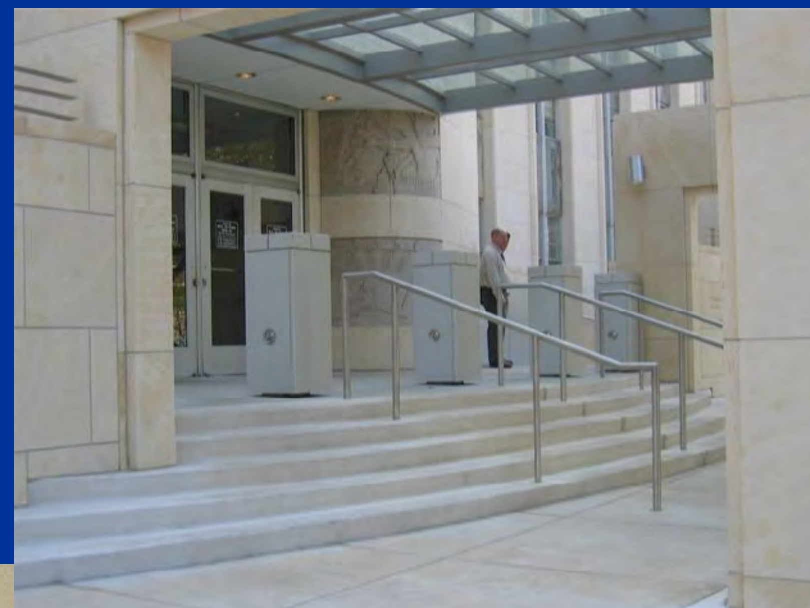
Dry Flood Proofing

- **Seal the building so that floodwaters cannot get inside**
- **Typically, can be done only where floodwaters are less than 3 feet deep**
- **Types of features include:**
  - Sealing walls with waterproofing compounds or impermeable sheeting
  - Closing openings such as doors, windows, sewer lines, and vents with permanent closures or removable shields

Dry Flood Proofing



Types of Flood Gates

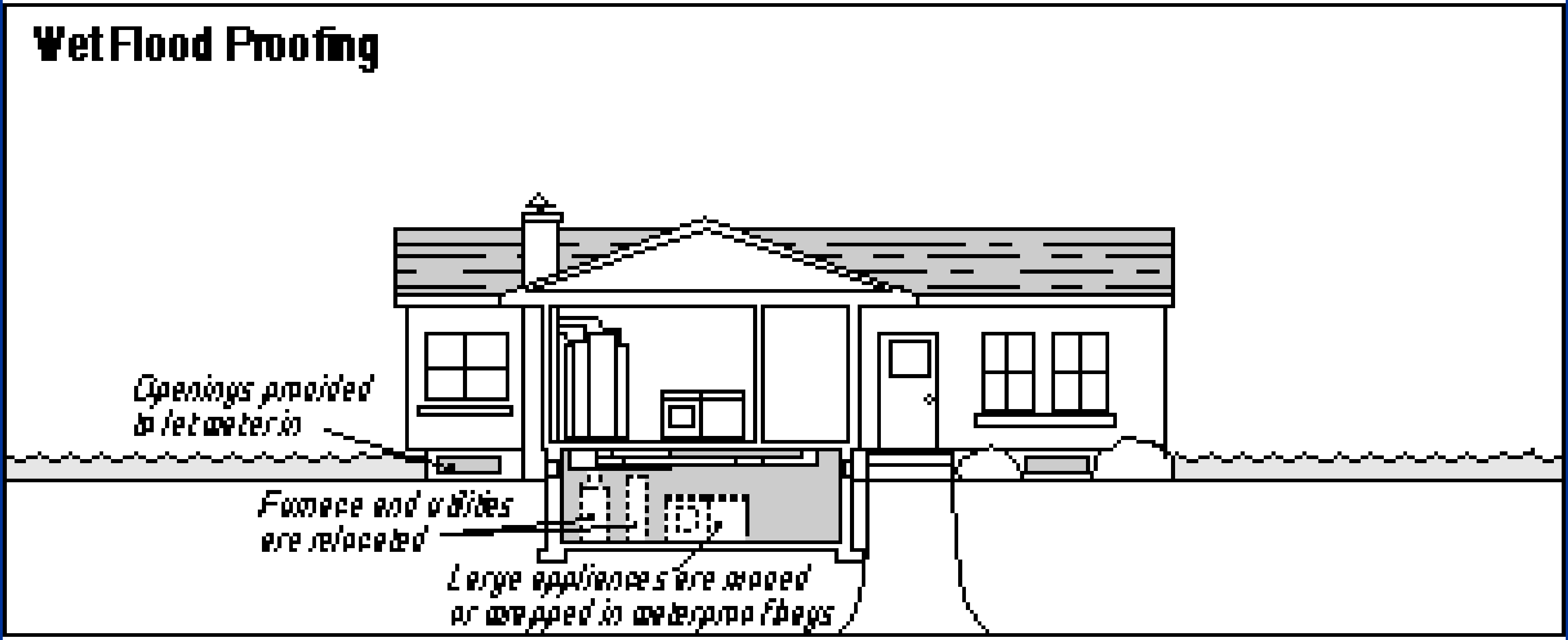


Courtesy of Reelan
Industries and
PS Doors

Wet Flood Proofing

- **Wet flood proofing – Modify the building to allow floodwaters inside, but ensure that there will be minimal damage to the structure and its contents**
- **Often only used when other measures are not possible or too costly**
- **Types of features include:**
  - Protecting or moving utilities and furnaces to an area above anticipated flood level
  - Installing vents so that floodwaters can easily enter and exit the structure
  - Raising or moving critical items prior to the flood event
  - Retrofitting items below the flood level to make them water resistant

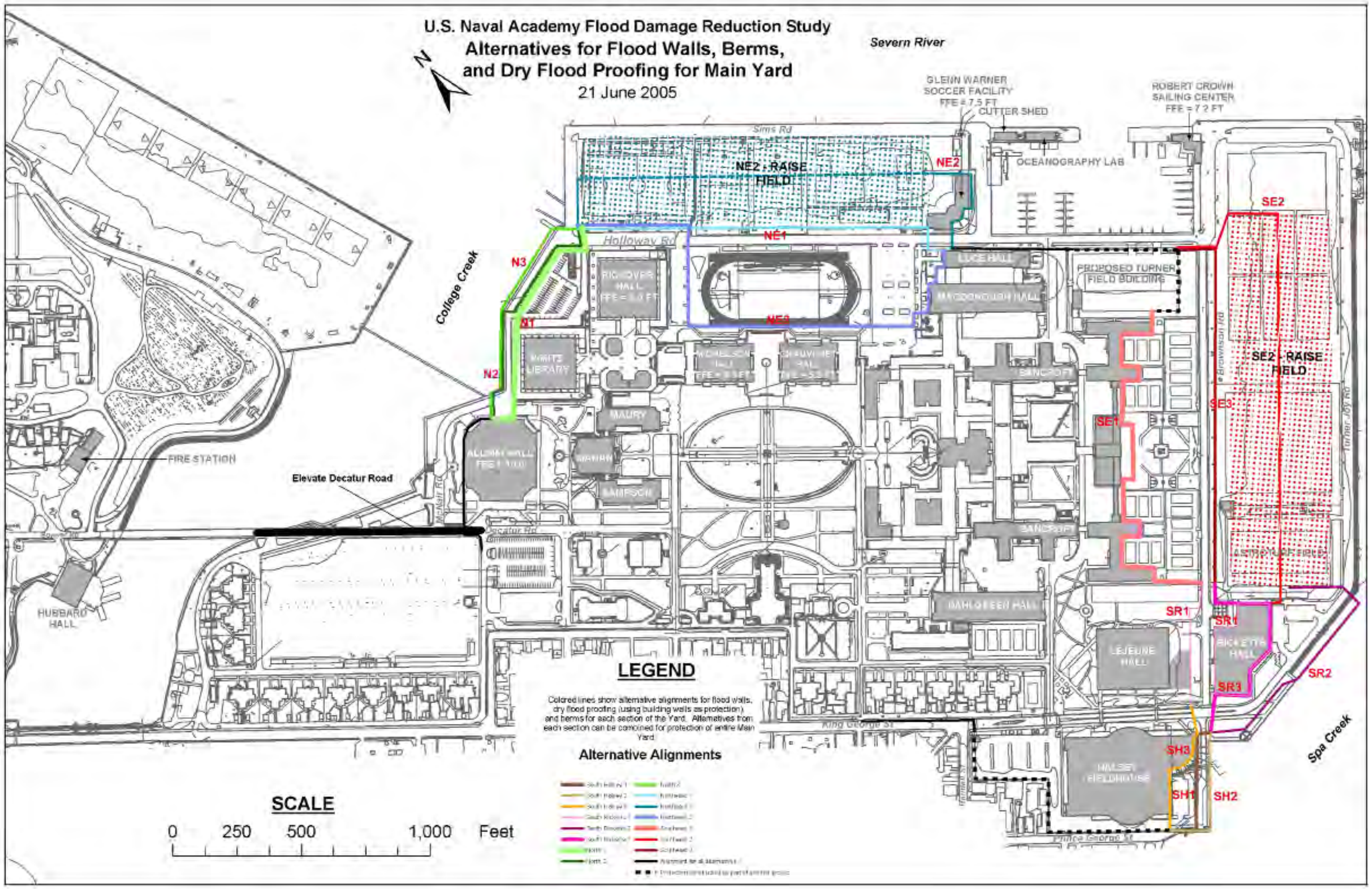
Wet Flood Proofing



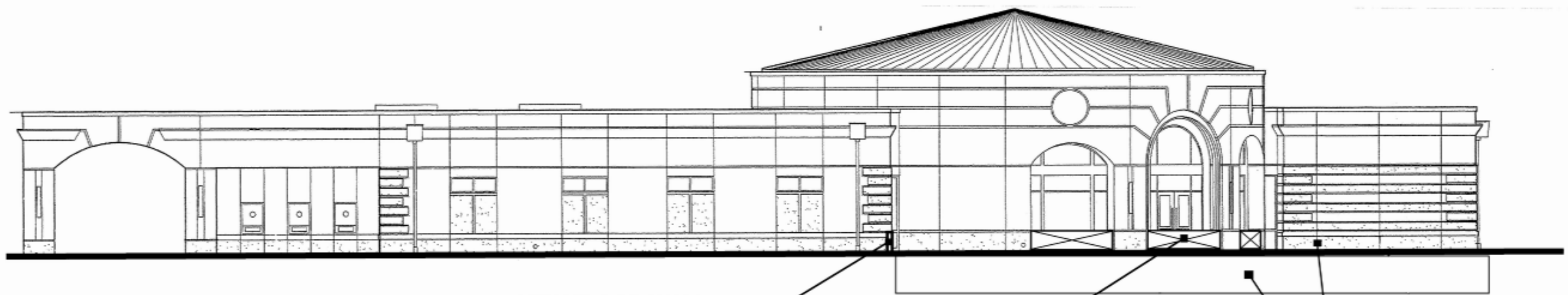
Step 2 – Identify Alternative Solutions

- **Entire team gathered to develop comprehensive solutions to the flooding problem**
- **Team investigated flood proofing individual buildings and using sides of buildings as part of the flood wall**
- **Types of structural features investigated include flood walls, berms, and raising ball fields**
- **Due to numerous combinations of alternatives, the USNA was divided into 5 areas**

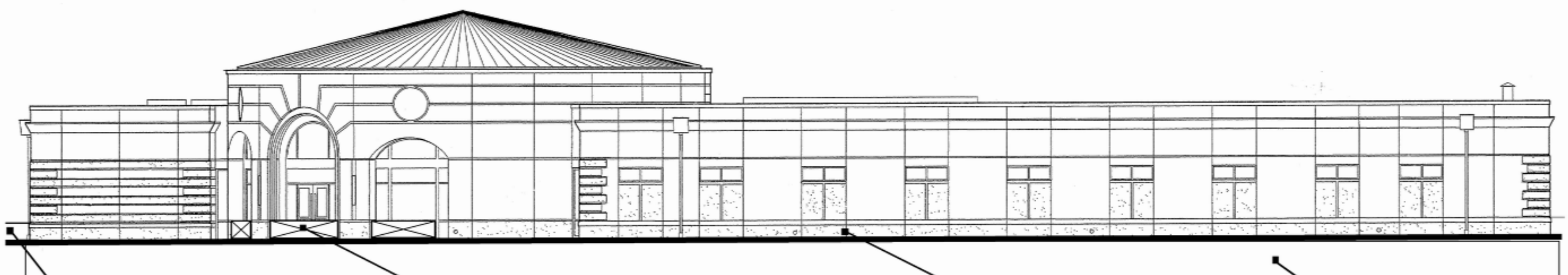
Alternative Solutions



Soccer Facility



SOUTHEAST ELEVATION

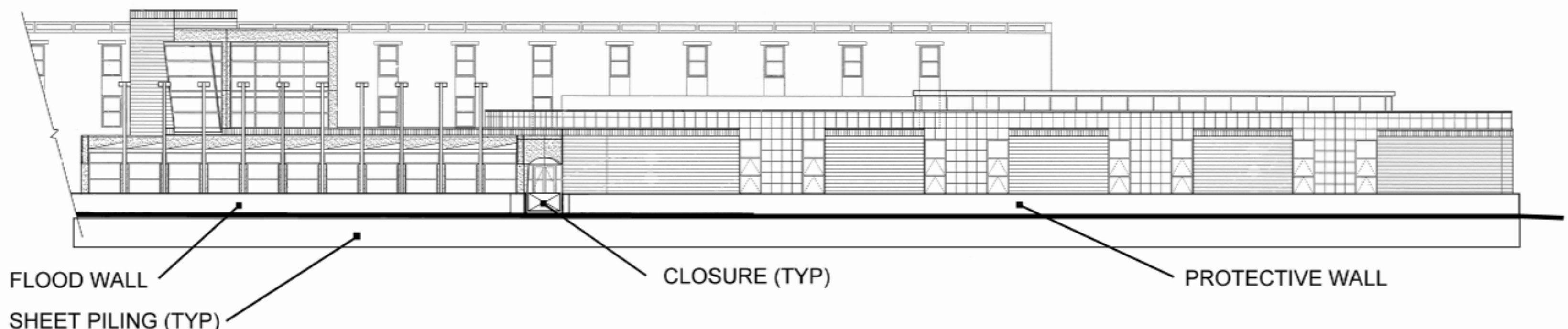


SOUTHWEST ELEVATION

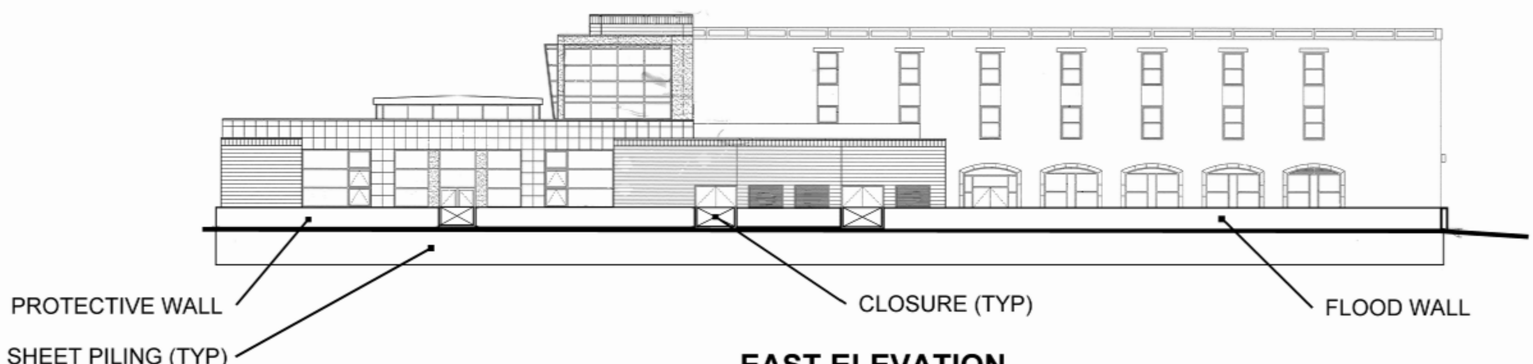
BLDG/DRWG/PHASE **GLENN WARNER BUILDING ELEVATIONS - SW&SE 5% - CONCEPT DESIGN**	ALTERNATIVE PROTECTIVE WALL	SCALE NTS	NATIONAL NON-STRUCTURAL/ FLOOD PROOFING COMMITTEE
	LEVEL OF PROTECTION ELEV. 10.8'	DATE MAR 05	

Ricketts Hall

Ricketts Hall



SOUTH ELEVATION



EAST ELEVATION

BLDG/DRWG/PHASE **RICKETTS HALL BUILDING ELEVATIONS - S&E 5% - CONCEPT DESIGN**	ALTERNATIVE PROTECTIVE WALL	SCALE NTS	NATIONAL NON-STRUCTURAL/ FLOOD PROOFING COMMITTEE
	LEVEL OF PROTECTION ELEV. 10.8'	DATE MAR 05	

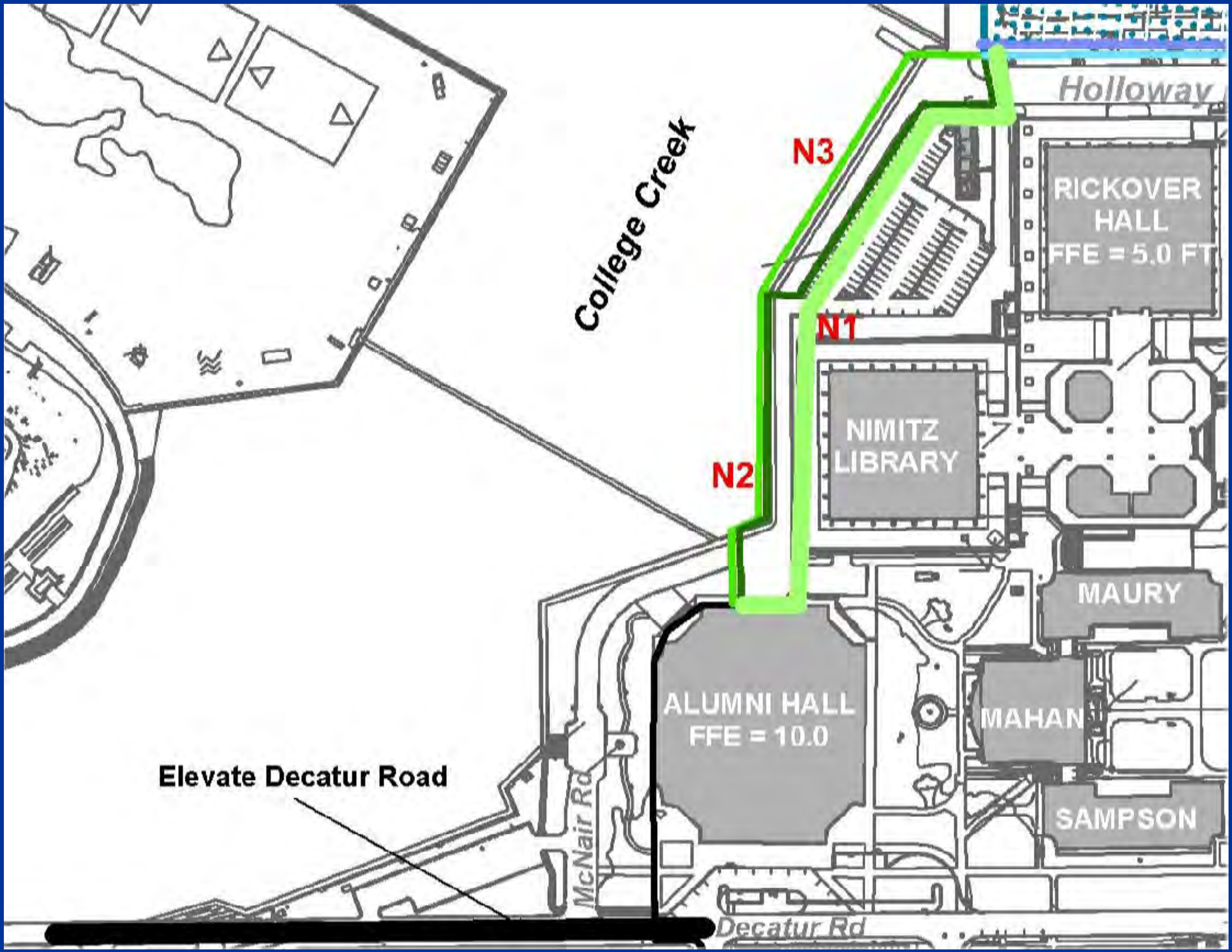
North side of Nimitz Library

Potential Flood Wall Location

Step 3 – Evaluate and Compare Alternatives

- **Evaluation Criteria:**
  – Construction Cost
  – Operation and Maintenance Activities
  – Actions Prior to Flood
  – Cultural and Historic Impacts
  – Aesthetic Impacts
  – Accessibility through Yard
  – Impact to facility/operations
  – Dual-use of flood wall as inner security fence

Alternatives for North Area



North side of Nimitz

Flood Proof Alumni Hall

Alternatives for North Area

***N1 – Flood wall along Nimitz and dry flood proof Alumni**

- 4 closure structures
- Minimal impact to water view
- $5-6 million; highest cost
- McNair Rd closed during construction

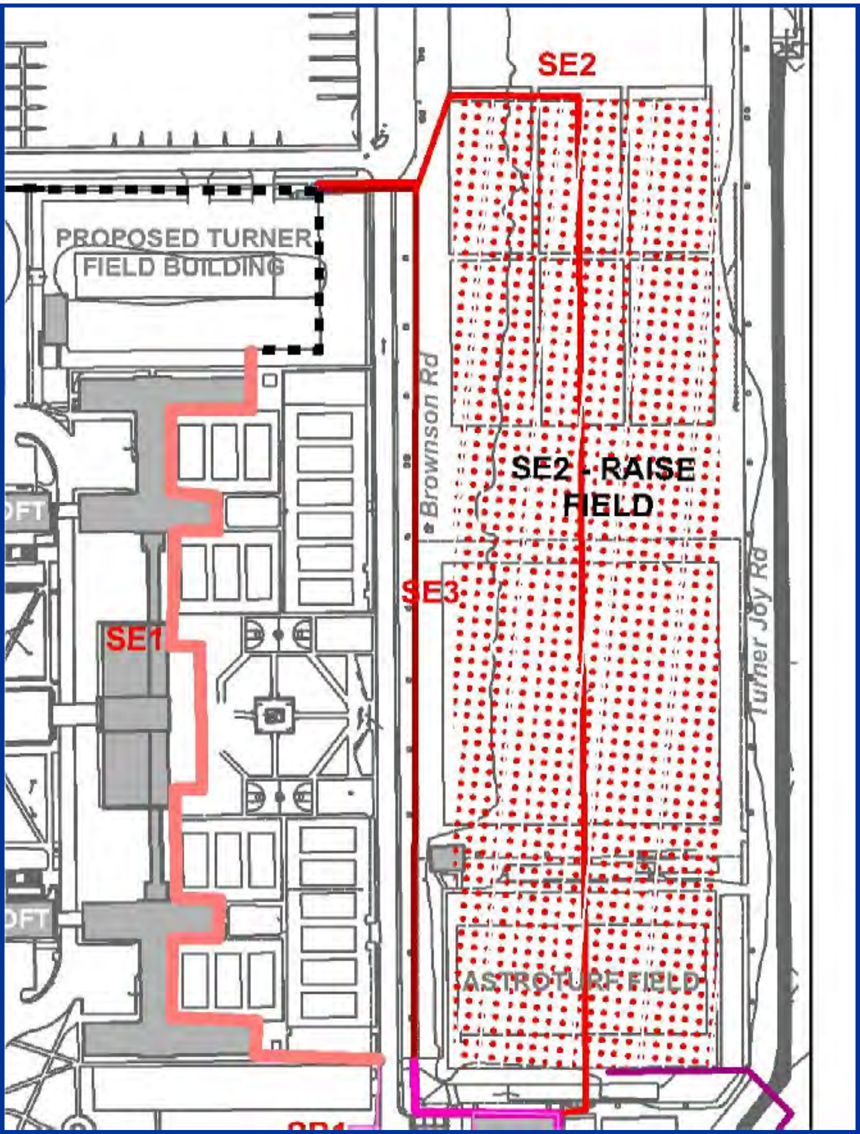
N2 – Flood wall along sea wall and parking area and dry flood proof Alumni

- 4 closure structures
- Moderate impact to water view; sidewalk could be raised
- $4,200,000

N3 – Flood wall along sea wall and dry flood proof Alumni

- 2 closure structures
- Severe impact to water view; sidewalk could be raised
- $3,400,000; least cost

Alternatives for Southeast Area



Bancroft Hall

Alternatives for Southeast Area

***SE1 – Dry flood proof Bancroft and Levy**

- Only 1 closure structure
- No impact to view; protection would be nearly “invisible”
- Numerous flood gates across doorways
- Larger area would be flooded; smaller pumps needed
- $1,710,000; least cost

SE2 – Raise football fields

- Only 1 closure structure
- Minimal impact to view (field raised ~2 feet)
- Would need to ensure safe slopes around fields
- $3,620,000; highest cost

SE3 – Flood wall along Brownson Road

- 4 closure structures
- Severe impact to view (water and fields)
- $1,770,000

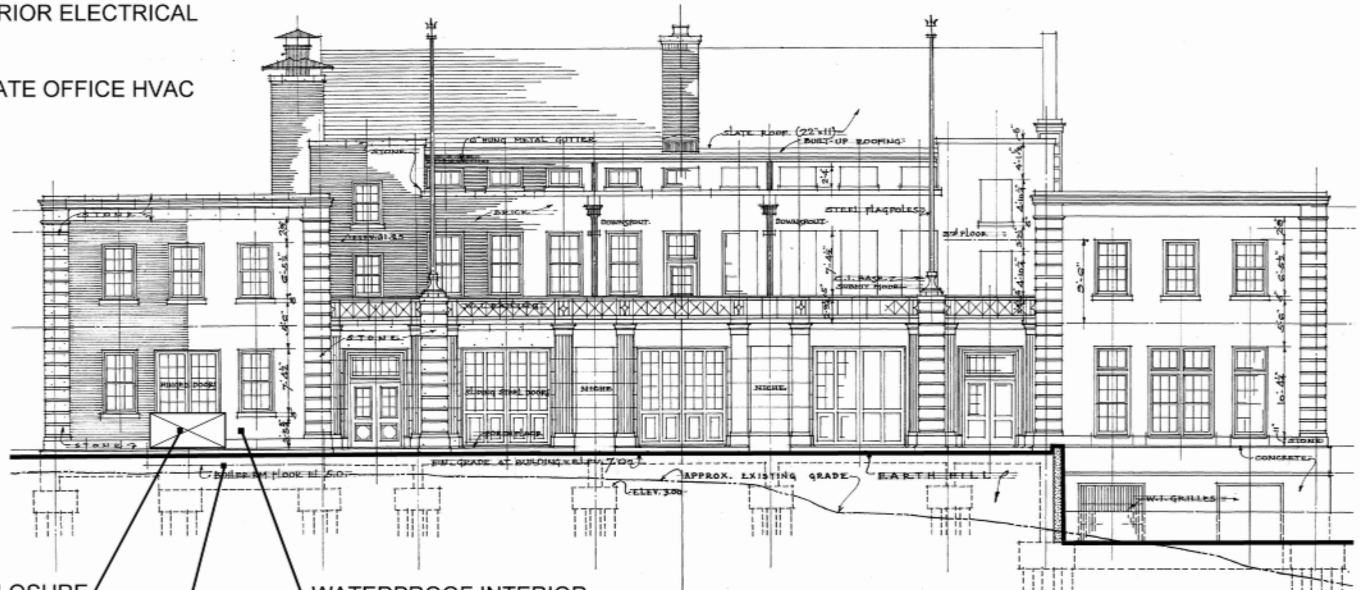
NOTES:

1. RELOCATE OFFICES FROM 1ST FLOOR TO UPPER LEVEL

2. RELOCATE ELECTRICAL SYSTEM (OUTLETS, SWITCHES, PANELS, ETC.,..) ABOVE THE DEIGN ELEVATION

3. RING WALL EXTERIOR ELECTRICAL EQUIPMENT

4. ELEVATE/RELOCATE OFFICE HVAC EQUIPMENT



CLOSURE

WATERPROOF INTERIOR WALLS OF BOILER ROOM

SUMP PUMPS ON EMERGENCY POWER AT FLOOF OF BOILER ROOM

NORTH ELEVATION

BLDG/DRWG/PHASE	ALTERNATIVE	SCALE	
HUBBARD HALL BUILDING ELEVATION - NORTH 5% - CONCEPT DESIGN	WET FLOOD PROOF	NTS	NATIONAL NON-STRUCTURAL/ FLOOD PROOFING COMMITTEE
	LEVEL OF PROTECTION: ELEV. 10.8'	DATE: MAR 05	

Alternatives for Hubbard Hall

H1 – No action

- No flood protection
- Similar flood damages would be incurred during similar flood event; Isabel damages were $500,000

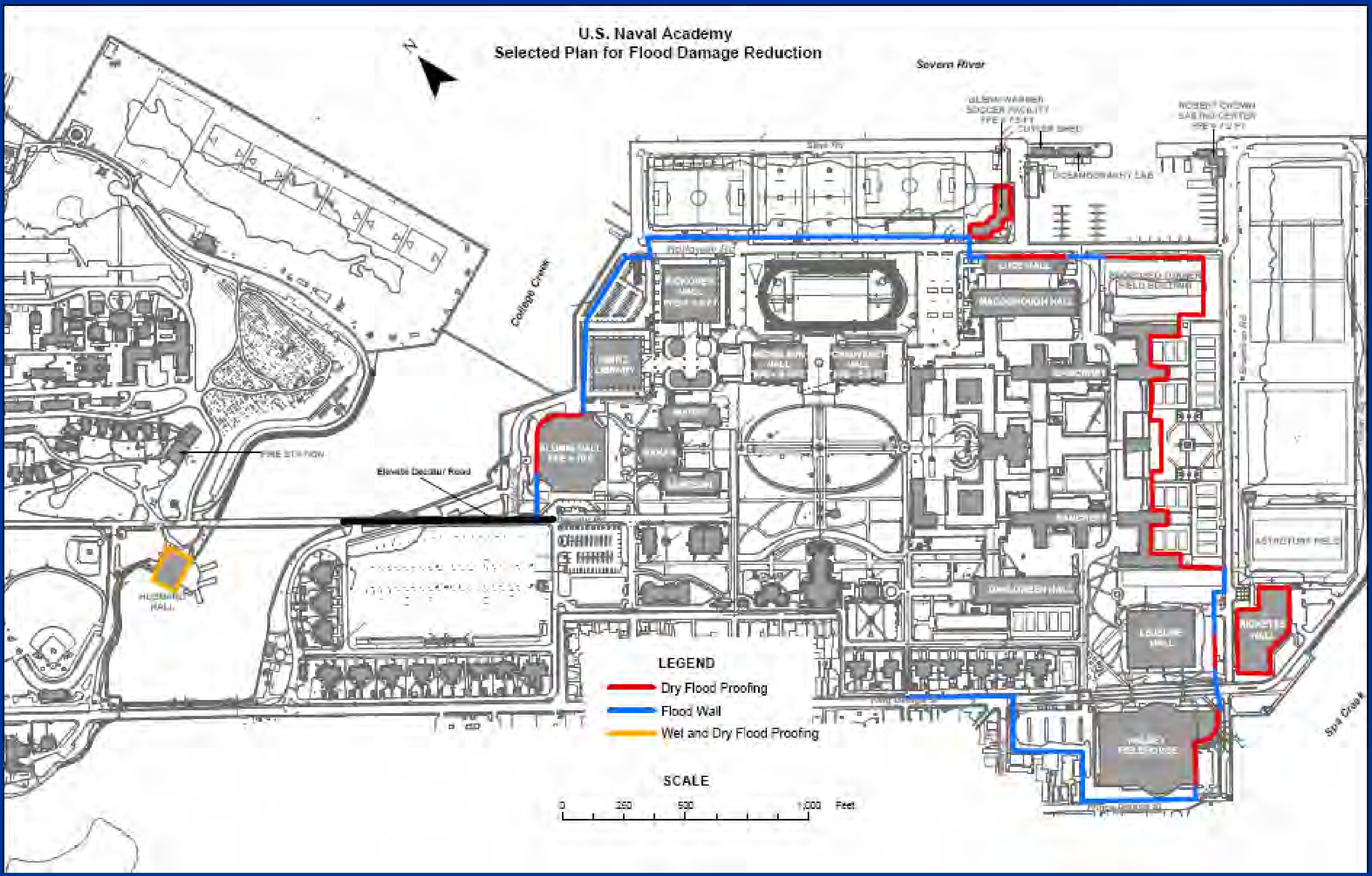
*H2 – Wet flood proof structure and dry flood proof mechanical room

- Relatively low cost and damages would be minimized
- Building would still be flooded and clean-up would be required
- Critical items must be moved/raised prior to flood
- $160,000

Selected Course of Action

- Based on evaluation of alternatives, USNA selected a plan for implementation
- Final selected plan includes:
  - Approx. 4000 linear feet of flood walls
  - 2 buildings entirely dry flood proofed
  - 6 buildings dry flood proofed on 1 or 2 sides
  - 1 building combination wet and dry flood proofed

Selected Plan



Questions?

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US Army Corps
of Engineers®

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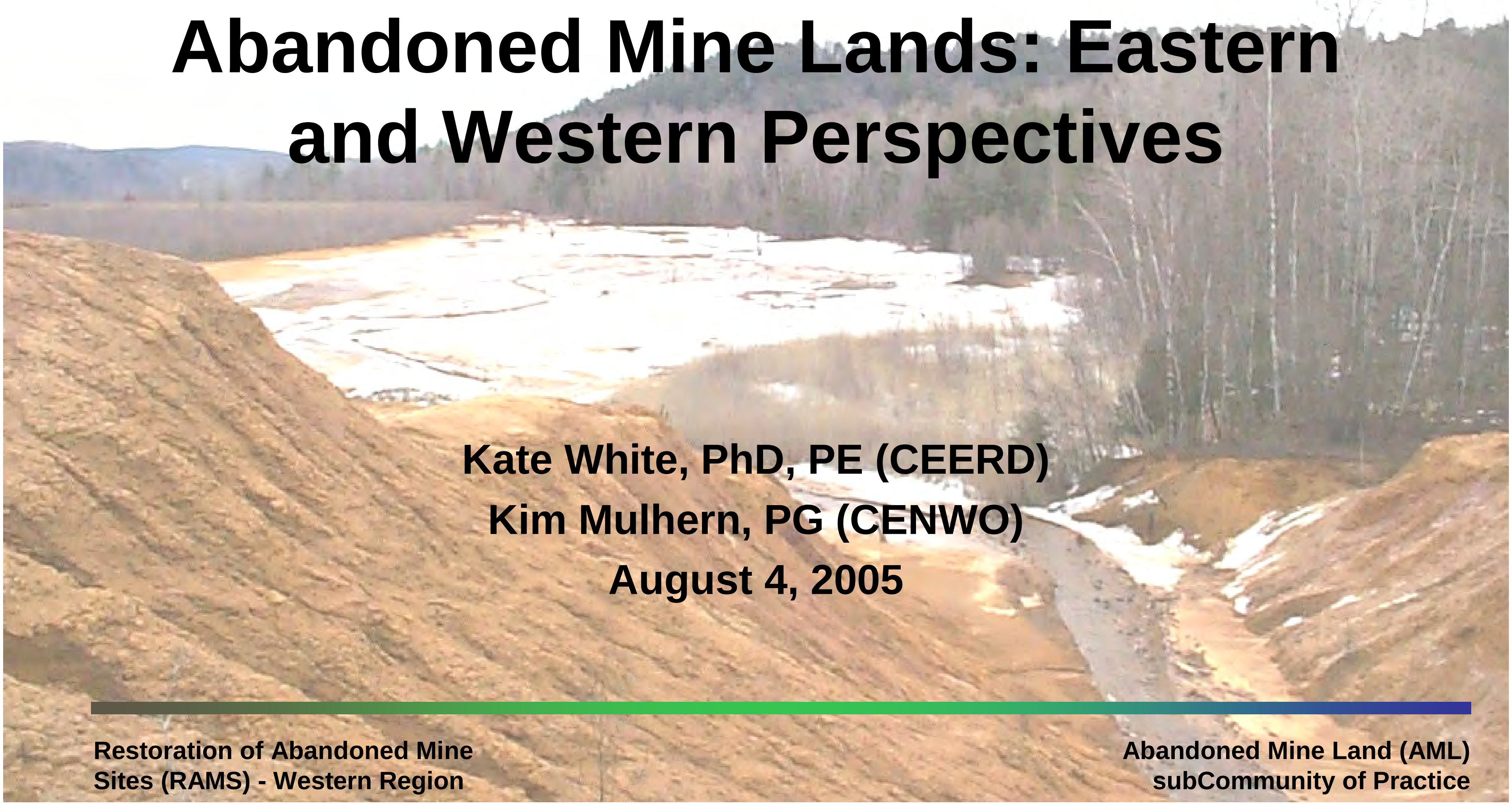
Tri-Service Infrastructure Conference
2-5 August 2005 - St. Louis



Abandoned Mine Lands: Eastern and Western Perspectives

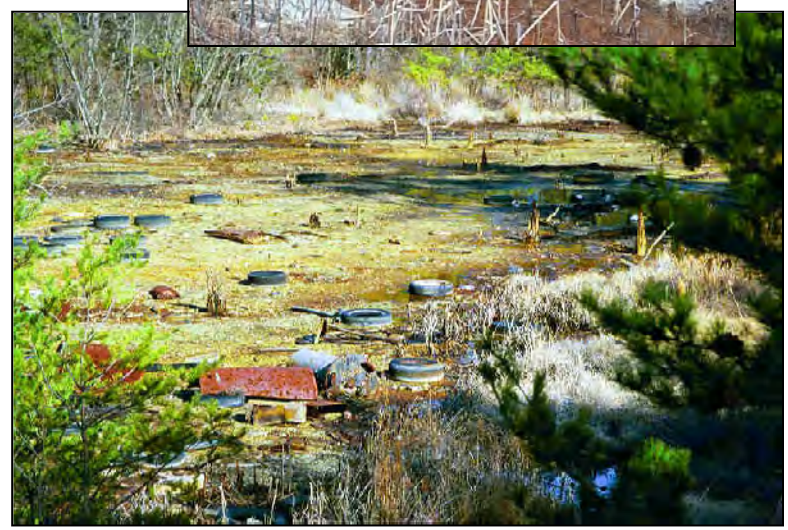
Kate White, PhD, PE (CEERD)
Kim Mulhern, PG (CENWO)

August 4, 2005

Scope of AML Problem

US Army Corps
of Engineers

- **Estimated 200K to 500K AML sites in US (Lyon et al. estimate 550K hard-rock alone)**
  - **Public health hazard**
  - **Safety hazards**
  - **Environmental degradation**
- **Hard Rock**
  - **$32B to $72B estimated for cleanup of worst sites (Lyon et al)**
  - **About 15K hard rock AML sites threaten surface and ground waters or contain potentially hazardous substances**



US Army Corps

Scope of AML Problem

- **Coal**
  - **OSM estimates $8.2B high priority (health and safety hazards) coal-related AML sites**
    - **80% or $6.6B unreclaimed**
    - **8 states account for 95% of estimated AML remediation costs (PA, WV, KY, KS, VA, OH, OK, IL)**
    - **PA has $3.6B alone**
  - **OSM estimates $2B coal-related environmentally damaged AML sites**
    - **90% or $1.8B unreclaimed**

US Army Corps
of Engineers

Existing Corps Authorities

- Specific Authorizations: GI Program
- Section 22: Planning Assistance
- Sections 206 : Ecosystem Restoration
- Section 204: Beneficial Use of Dredged Material
- Section 1135: Impact to Existing Corps/Military Projects
- Section 539 (Abandoned Coal Mine Restoration in WV, PA, MD)
- Section 560 (Abandoned Non-Coal Mine Restoration)
- Support for Others:
  - Cleanup of hazardous materials
  - Safety hazard remediation
  - Ecosystem restoration
  - Technical studies for other agencies
  - Major customers: USEPA, USDA FS, USNPS, USBLM

US Army Corps
of Engineers

Potential Corps Activities

- Clean Water Action Plan
- USACE-TNC Sustainable Rivers Project
- Apply existing Corps authorities to fill niches in watershed restoration
- Corps engineering support to other Federal agencies
- Team building with non-government organizations
- Technical support & oversight, investigation, design & construction of identified projects
- Contracting assistance
- Analysis of alternative measures including cost effectiveness & risk assessment
- Development of emerging technologies data base (RAMS)

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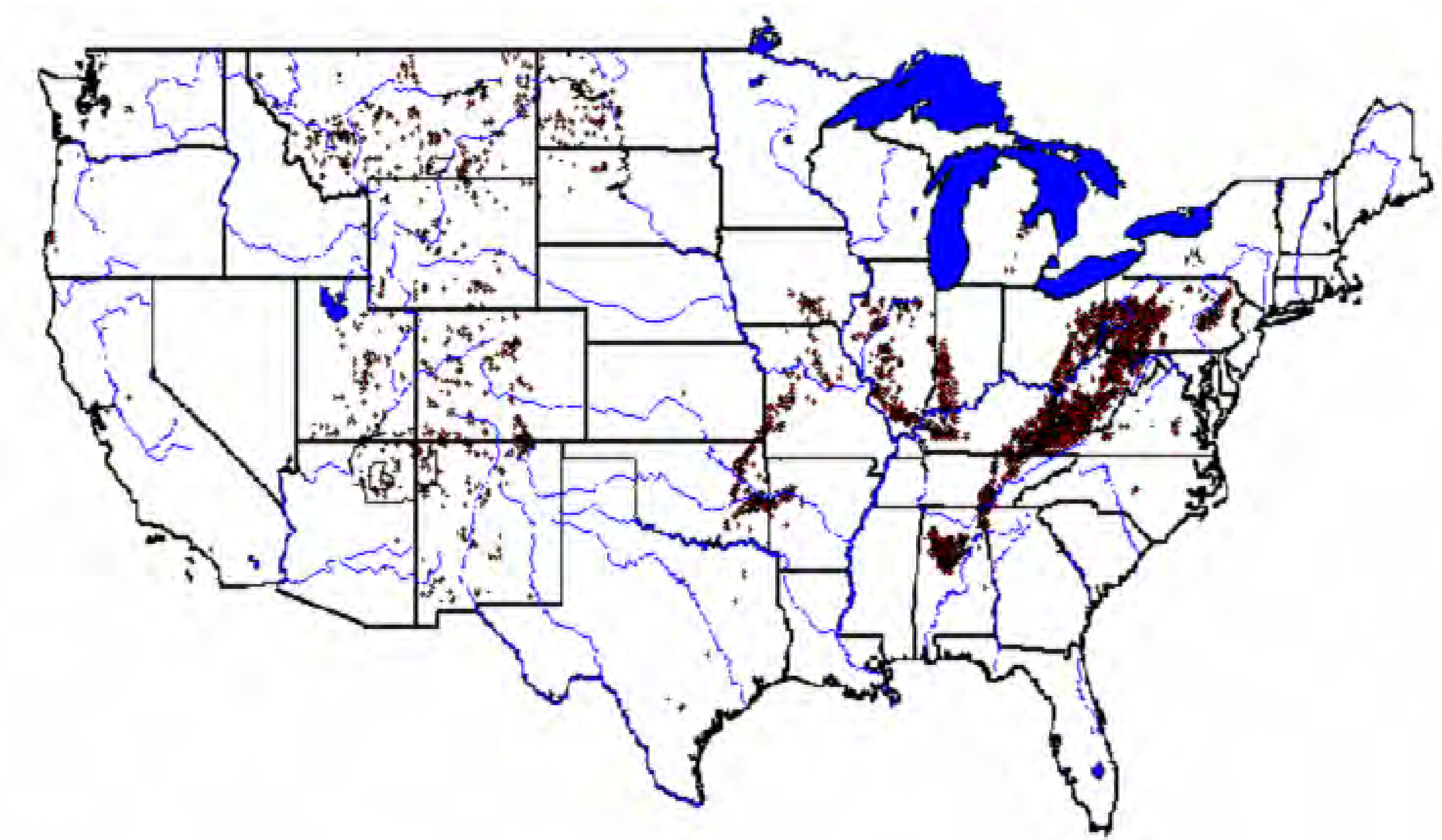
AML: Eastern and Western

- **Eastern:**
  - **Termed “humid” or “wet”**
  - **Mostly coal (perception)**
  - **Focus is largely on WQ issues**
  - **NAL/LRD AMD team**
- **Western:**
  - **Termed “dry”**
  - **Mostly hard rock (perception)**
  - **Focus on capping/vegetation/geotech**
  - **RAMS (NWD, POD, SPD, SWD)**
- **Both: members of eCoP’s AML sub-CoP**

Known hard rock AML sites on lands administered by the US Park Service (USPS 2001)



OSM AMLIS high priority coal AML sites in continental US (OSM 2002)

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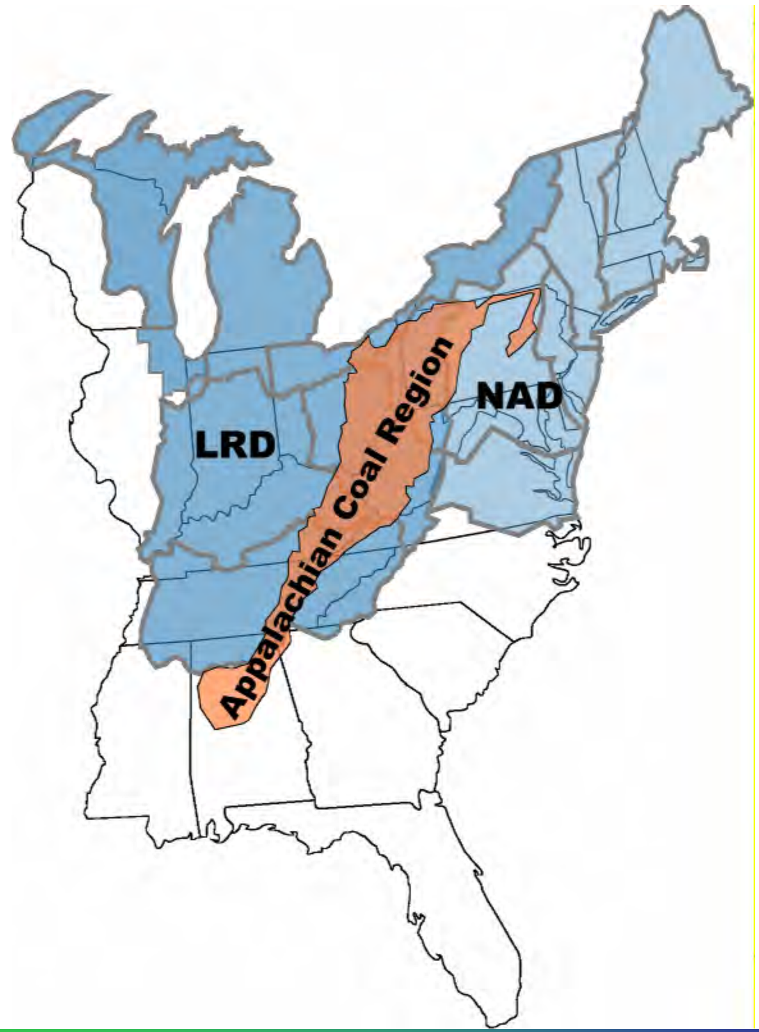
RAMS Background

- December 1998: Internally formalized through a MOU between NWD, POD, SPD (SWD joined in 2004)
- August 1999: Congress formalizes through Section 560 of WRDA 1999 (study authority)
- January 2001: Western Region RAMS Program Management Plan approved
- Total funding of $11 million to date - 560, SFO, 206
- Over 80 RAMS Projects completed or on-going in 11 states

NAD/LRD AMD PDT Background

US Army Corps of Engineers

- **April 2004 NAD/LRD PDT forms**
- **June 2004 Draft PMP developed**
- **23 Projects - 206, 1135, PAS, SFO, 313 (S. Central PA), 303 and 503 (upper Susquehanna)**
- **~$10-12M**
- **AMD Demonstration Program supported by WV, VA, MD, OH, PA, KY, AL ⇒ WRDA underway**
- **Flooding of mine pools is major current and future issue**
  - **WQ, TMDL**
  - **H&H**



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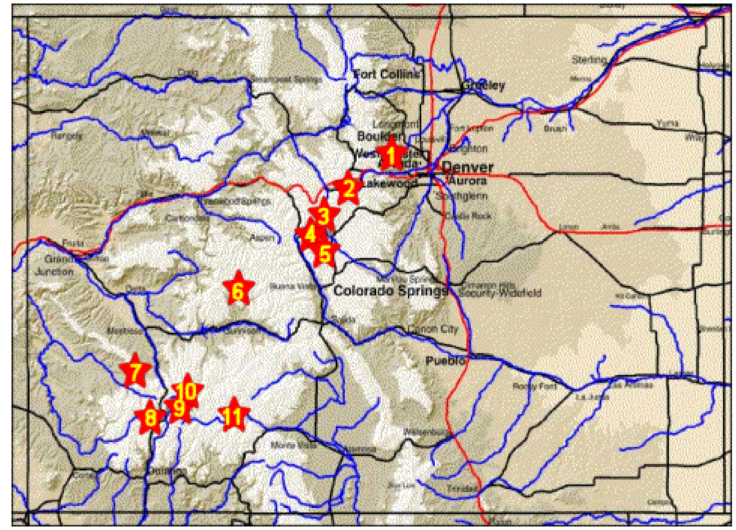
Partnering Mechanisms

- **Both: Stakeholder-driven program**
  - **Allows the Corps to assist agencies meet their abandoned mine land priorities**
- **Both: Division-level interactions**
  - **Allows program to regionally maximize**
    - **in-house technical staff and**
    - **specialized contractors available to our partners**
- **RAMS:**
  - **Corps provides funding assistance with minimal additional requirements, needs construction authority**
- **NAD/LRD et al:**
  - **CAP programs have cost-sharing and other requirements**

RAMS

US Army Corps
of Engineers

- **Program Successes**
  - **Nevada Interagency Abandoned Mine Lands Environmental Task Force**
  - **Montana projects**
  - **Colorado projects**



- **On The Horizon**
  - **WRDA 2005 – Senate has proposed reauthorizing program at $45 million annually**
  - **FY 06 Requests – Stakeholders nationwide have requested nearly $20 million for RAMS projects**
  - **Continue to meet partners goals on projects**

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Easy Junior Mine, NV

Heap Leach Pad

 

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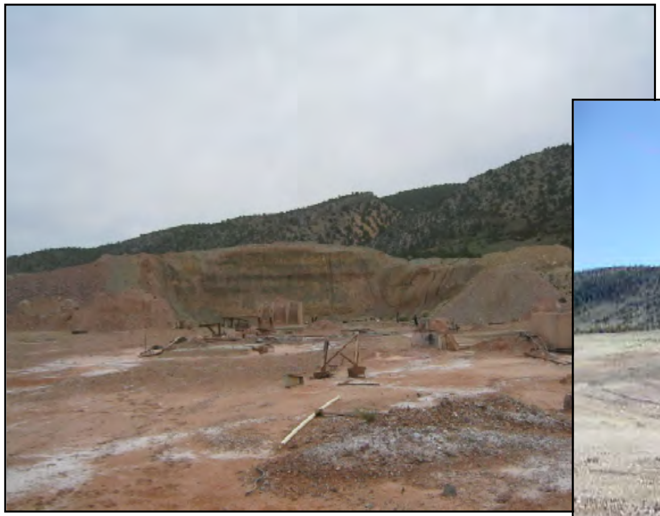
Main Haul Road



Crusher Area

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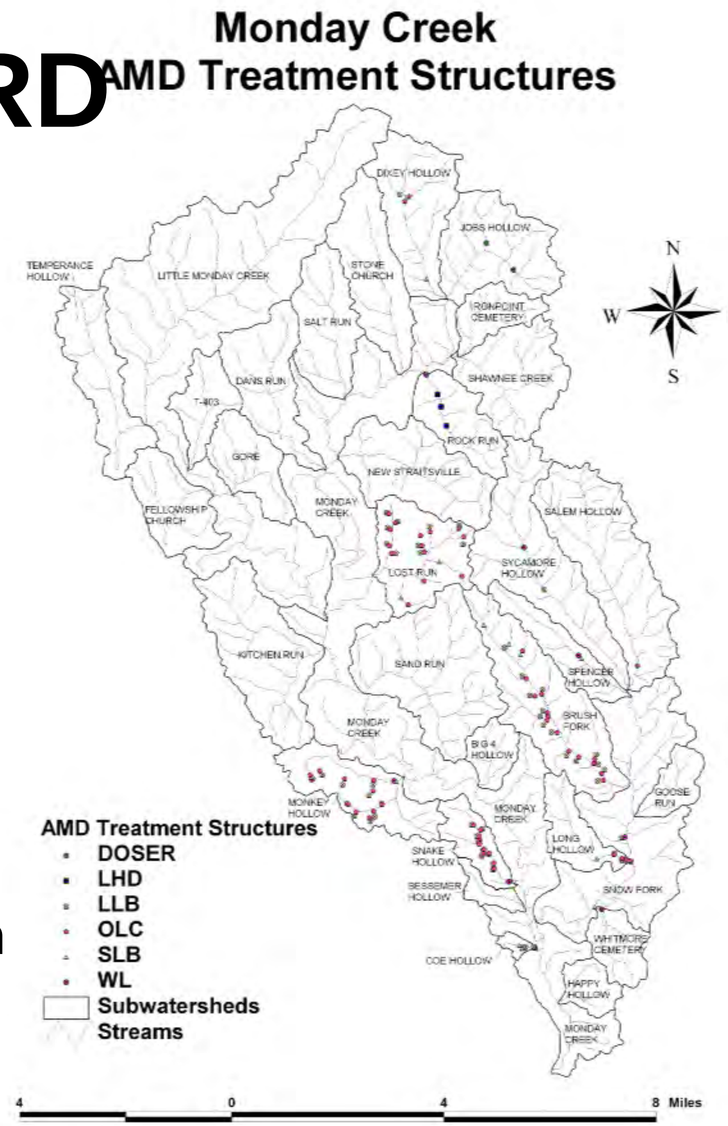
NAD/LRD

- **Successes**
  - **Monday Creek OH**
    - **116 Square Miles (74,240 Acres)**
    - **~10% of Flow to the Hocking River**
    - **Heavily mined for coal past 180 Years (4,000 surface acres and 15,000 underground acres)**
  - **Elizabeth Mine Superfund Buttress Stabilization**
- **On the Horizon**
  - **AMD Demo Program**
  - **Southern Anthracite Coal Region**
  - **Formalizing Regional Business Center**



Elizabeth Mine (copper)
Strafford VT
New England District SFO for EPA Region 1

Emergency buttress stabilization of tailings dam

Funding
Real Estate
AMD Remediation Exp
Cost Data on AML Projects

US Army Corps of Engineers®

Funding
AMD Remediation Exp
Watershed Planning
Feasibility Report/NEPA

Biological Sampling & Analysis
Set Biological Targets

Real Estate
Recreation Benefits
Haul Road & Tree Cutting Plans

Master Data Base
Social & Cultural Data
AMD Remed Exp

Endangered Species Analysis

Site Knowledge
Water Quality Sampling
Public Involvement

Mass Balance
AMD Remed Exp
Model Oversight

Model Study
AMD Remed Exp
Historical Cost Data

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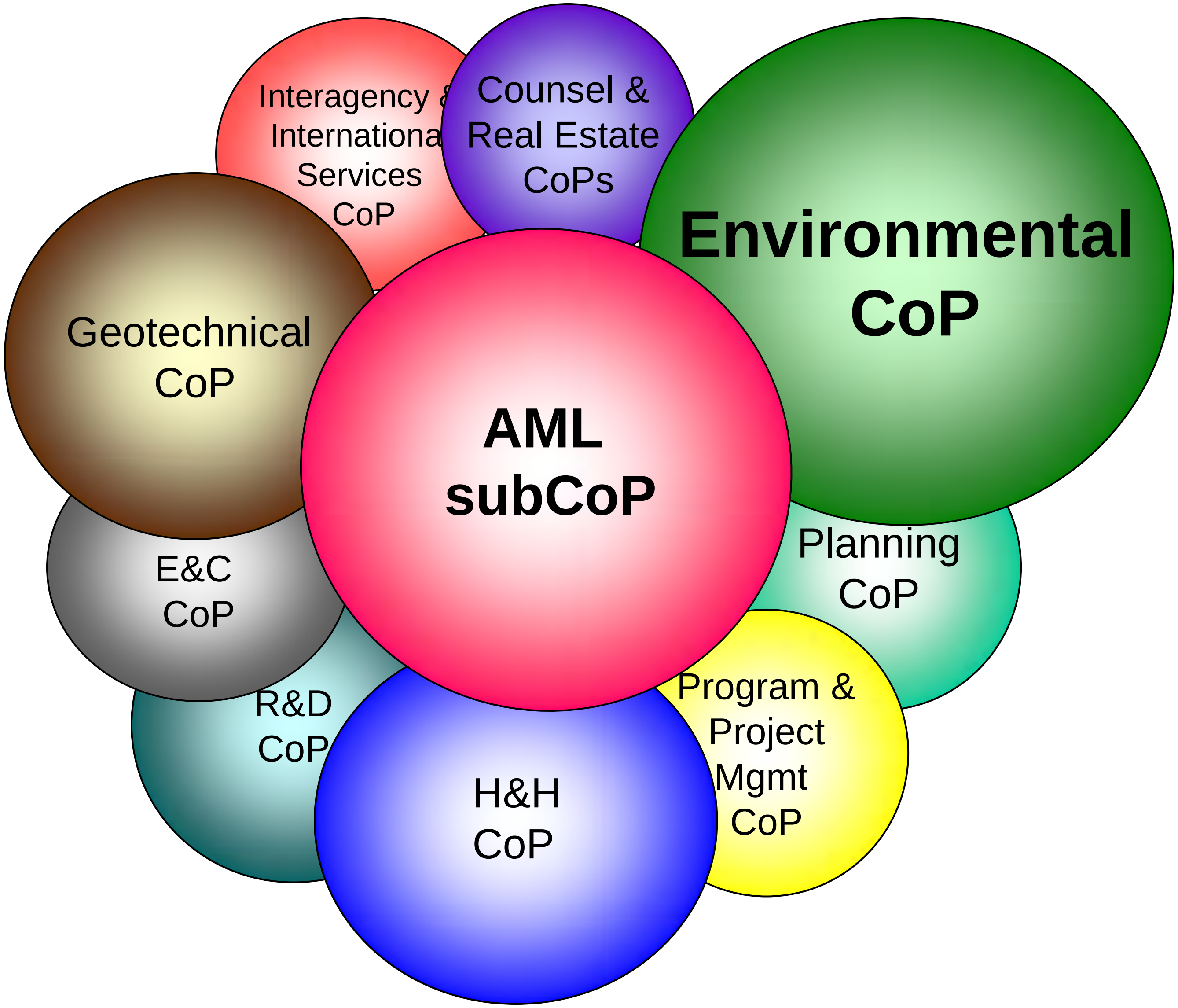

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Abandoned Mine Land eCoP sub CoP

- **Representatives of the AML CoP**
  - share a concern with improving and restoring water resources that have been impacted by abandoned mine lands
  - will increase the efforts, cooperation and partnership among us to restore and protect the streams and watersheds affected by mine drainage
- **Mission:**
  - The AML CoP provides expertise in all technical and policy areas of abandoned mine land remediation and restoration to effectively plan, characterize, design, and construct AML-related projects with its partners in a timely and cost-effective manner

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AML SubCoP Goals

- Cooperate as a clearinghouse to share and exchange data and information
- Raise the level of awareness on the serious environmental problems associated with mine drainage from abandoned coal mines
- Work with public and private organizations to target streams and watersheds which have been degraded by abandoned mine lands
- Increase the understanding and applications of the best technology available for remediating and preventing mine drainage, and to support the development of new technologies
- Provide a forum for the purpose of transferring technologies
- Develop shared information management systems to minimize overlap in data collection and development, to save resources and maximize the usefulness of data developed
- Meet periodically to discuss the current status of ongoing efforts to improve and restore degraded watersheds

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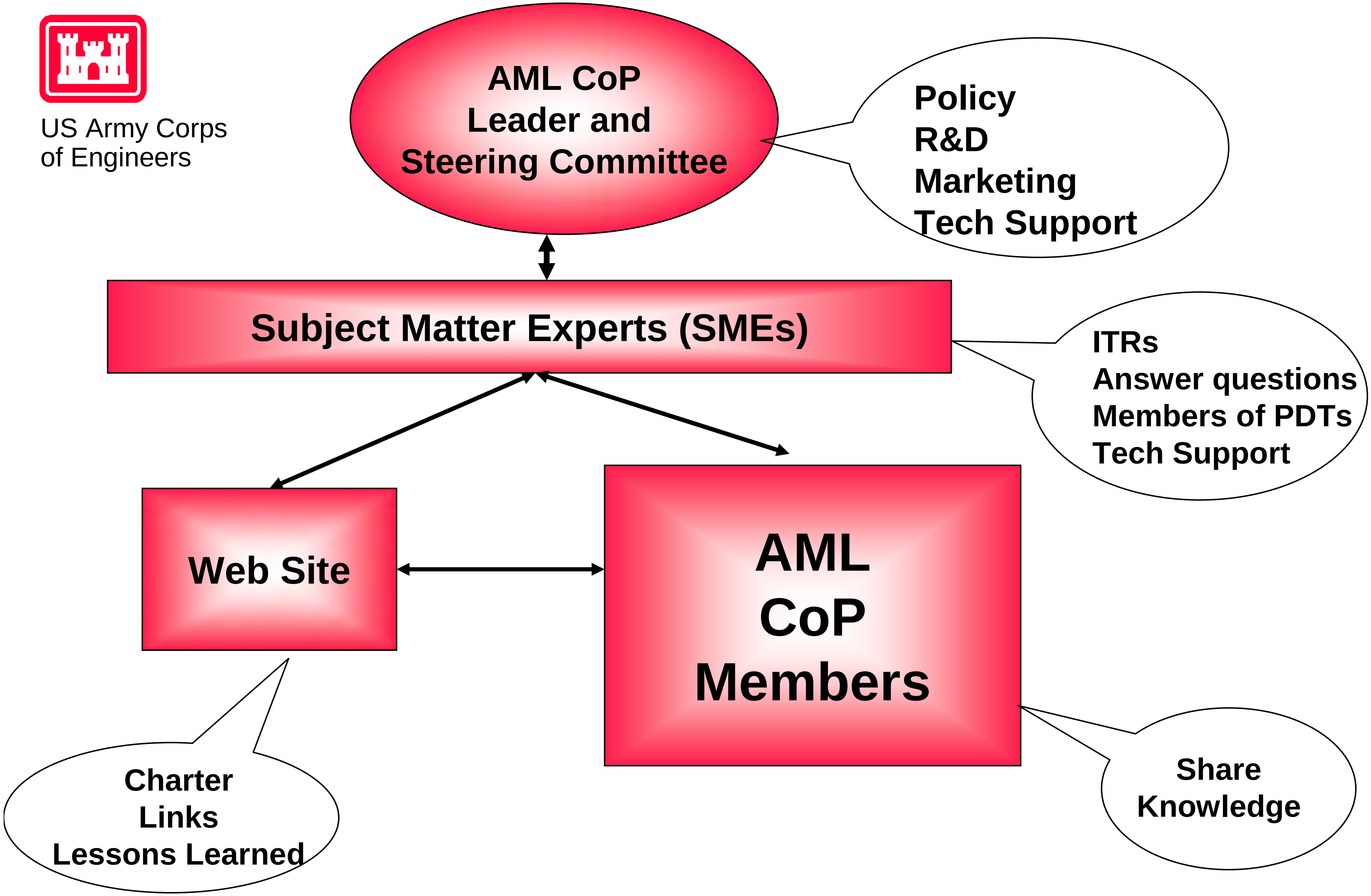

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Corps AML Workshops

- **5 workshops to date**
  - **St. Louis, MO, 14-15 November 2000**
  - **Fairmont, MT, 16-18 October 2001**
  - **Gallup, NM, 22-25 July 2002**
  - **McHenry, MD, 29 July-1 August 2003**
  - **Hanover, NH July 8-10 2004**
- **19 Districts (LRH, LRL, LRN, LRP, MVP, MVR, NAB, NAN, NAP, NWK, NWO, NWS, NWW, POA, SAM, SPK, SPL, SWL, SWT)**
- **3 Divisions (NAD, NWD, and SPD), HQUSACE, ERDC**
- **Other Federal agencies: BLM, USEPA, USDA Forest Service, USDOE, OSM, USGS, US Park Service**
- **9 states (CO, IL, MD, MN, NM, OH, PA, VA, WV)**
- **Universities (WVU, Penn State, Montana Tech, University of Utah)**
- **Tribal representatives (Navajo Nations)**
- **Consulting Engineers**

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Corps AML Workshops

- Overview of current technology in coal & noncoal remediation Briefs by BLM, FS, USGS, DOE, EPA, ERDC on Federal R&D
- Briefs by Districts on Corps AML experiences
- Breakout sessions similar to Corps Listening Sessions
- Field Trips: reclaimed mines
  - MO Lead Mine: cap/cover/surface drainage, biosolids application
  - IL Coal Mine: cap/cover, anoxic limestone drain with polishing ponds
  - MT Silver Bow Creek Channel Restoration
  - MT High Ore Creek Reclamation Project and Comet Mine: removal of fluvial tailings deposits into two repositories, bank stabilization, and stream reconstruction
  - AZ Cove and Red Valley Uranium reclamation: cap/cover
  - NM McKinley Mine: Coal reclamation (#29 largest US coal mines)
  - MD and WV Coal AML: ALD, lime addition

- **Defining Issues**
- **Technology Demonstration**
- **Relationship Building**

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Challenges Identified During Workshops

- Planning/Policy Issues
  - Funding and authorities
  - Staff development
  - Clarify Corps role in AML
  - Project issues (e.g., PCA, O&M, NGO)
  - Process improvements
- Technology Issues
  - Technology transfer
  - Site characterization
  - Standards and criteria for restoration/remediation
  - Improved technology
  - Monitoring

Opportunities

- AML sub-CoP develops
- AMD teams form across stovepipes and technical areas
- WRDA 539 amendment
  - MD, OH, PA, VA, WV, KY, SMCRA tribe
  - Demonstration program similar to RSM, 227 programs
- GI R&D
  - Could move up schedule for implementing TAMDL in HEC-RAS
  - Hire experts within the labs for easy access
- Planning CX
- Technical support for AML projects by Districts
  - Direct technical support
  - Tech transfer
  - Field demonstrations

Sediment Compatibility for Beach Nourishment in North Carolina

Tri-Services Infrastructure Conference
St. Louis, MO
3 August 2005

US Army Corps of Engineers
Wilmington District

Gregory L. Williams, Ph.D., P.E.
Chief, Coastal, Hydrology & Hydraulics Section
USACE Wilmington District

US Army Corps
of Engineers
Wilmington District

Wilmington District

Constructing Shore Protection
Kure Beach, NC

Problem/Issue

What does “compatible” mean?

- **North Carolina**
  - Sand used for beach nourishment ***shall be compatible*** with existing grain size and type
- **Florida**
  - Borrow from navigation channels $\leq$ 10% fines
  - Borrow from other sources $\leq$ 5% fines
- **USACE**
  - Any borrow material $\leq$ 10% fines
  - Default criteria accepted through coordination with resource agencies

NC State Agencies

- **Division of Coastal Management (DENR)**
  - Coastal Area Management Act (CAMA) of Federal CZM Act
  - Using rules and policies of Coastal Resources Commission
  - Permitting/enforcement, CAMA land use planning, et al.
- **Coastal Resources Commission**
  - Establishes policies for the Coastal Management Program
  - Adopts rules for CAMA
  - Designates Areas of Environmental Concern (AEC)
  - Adopts rules and policies for coastal development within AECs and certifies local land-use plans
- **Science Panel on Coastal Hazards**
  - Technical experts advising DCM
  - Provides CRC with scientific data and recommendations pertaining to coastal topics

Science Panel on Coastal Hazards

- Dr. John Fisher, Chair
  NC State University
- Dr. Margery Overton
  NC State University
- Dr. Orrin Pilkey
  Duke University
- Dr. Stan Riggs
  East Carolina University
- Dr. Bill Cleary
  UNC Wilmington
- Mr. Tom Jarrett
  Consultant (Retired USACE)
- Mr. Steve Benton
  Retired DCM
- Mr. Spencer Rogers
  NC Sea Grant
- Dr. Pete Peterson
  University of North Carolina
- Dr. John Wells
  Virginia Institute of Marine Science
- Dr. Greg Williams
  USACE Wilmington District

Proposed Criteria

1. General Definitions
2. Characterization of Beach to be Nourished
3. Characterization of Borrow Site Material
4. Compatibility of Borrow Site Material to Beach to be Nourished
5. Execution of Nourishment Project
6. Monitoring and Mitigation

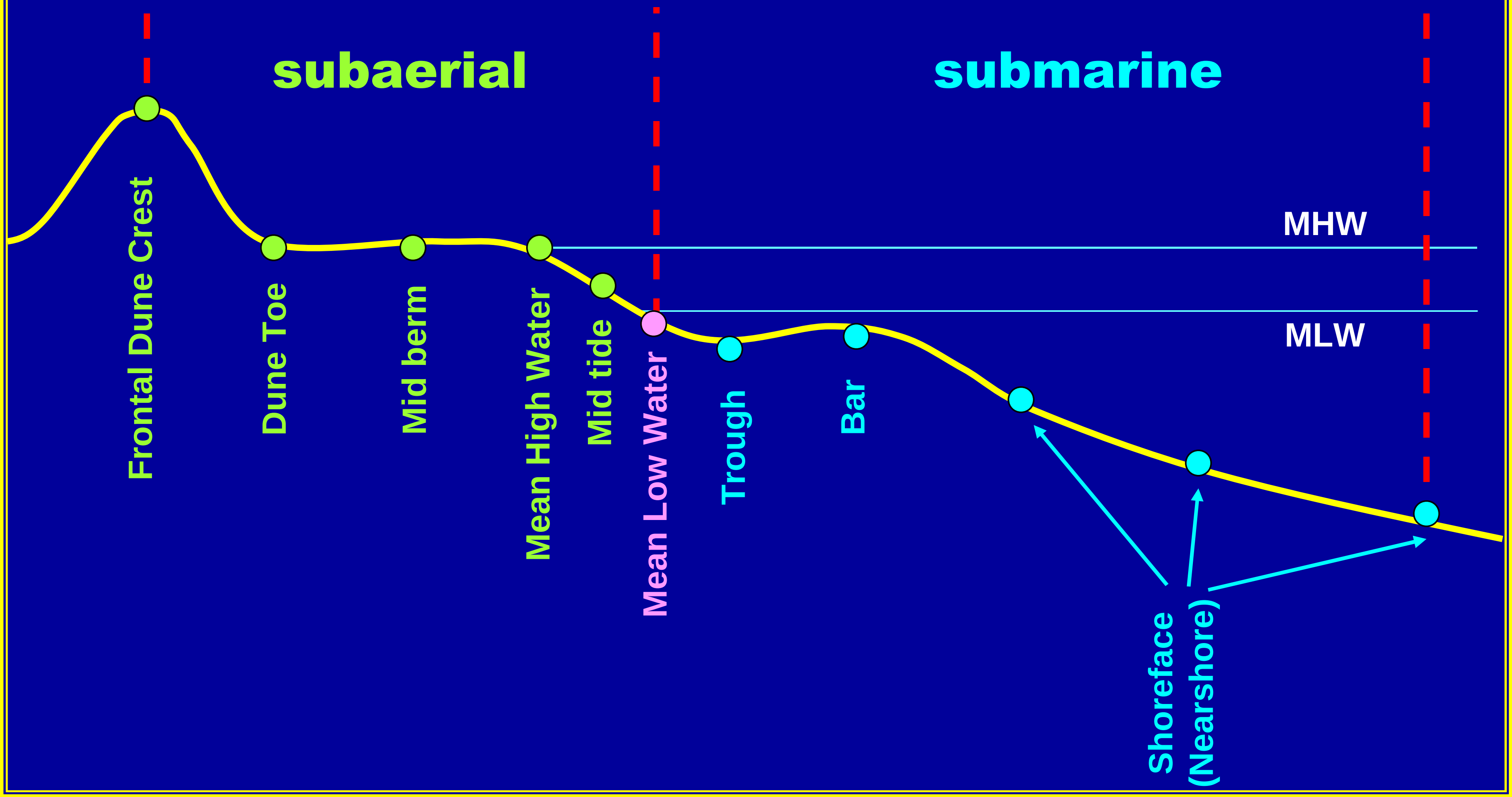
Definitions

- Beach nourishment
- Borrow area
- Sand resource
- Sand reserve
- Compatibility
- Sediment
- Grain size

Beach Characterization

- Sediment sampling to geological and engineering standards capturing 3-D spatial variability of sediment characteristics
- Minimum of 3 evenly spaced (not exceeding 5,000 ft), shore-perpendicular transects
- Sampling locations to follow morphology – half of total samples taken landward of MLW, half seaward of MLW and one at MLW
- Average grain size, fine grained fraction (<0.0625 mm) and coarse grained fraction (>4.76 mm) calculated by simple arithmetic mean of all samples collected
- For prior nourished beaches use best available data
- Beach sediment characterization fixed for future

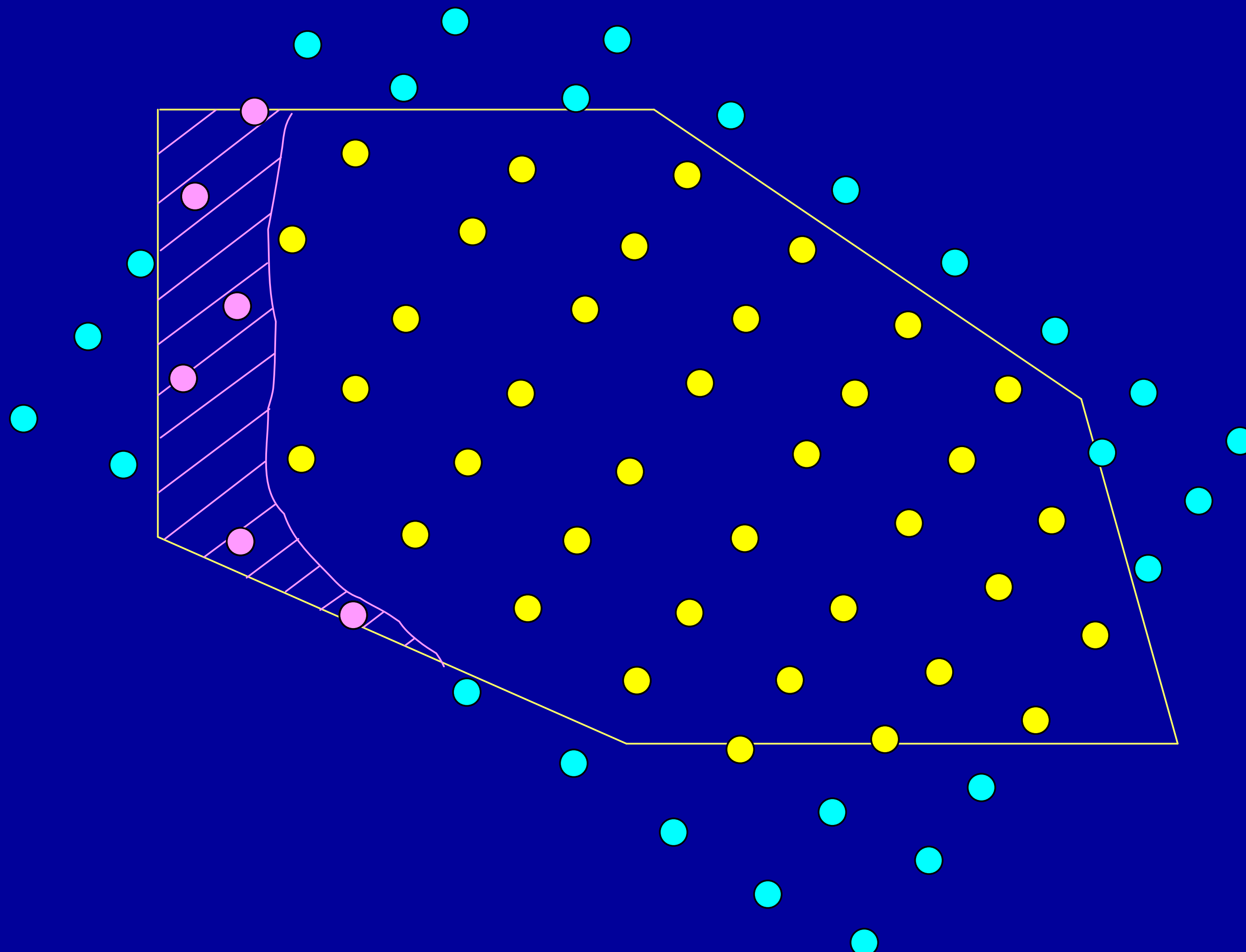
Sampling Protocol for beach



Borrow Site Characterization

- Use appropriate acoustic and/or equivalent remotely sensed bathymetric and subsurface survey techniques
- Sampling methodology shall use a core barrel of no less than 3 inches (76.2 mm) in diameter
- No characterization and sampling required from a regularly maintained navigation channel*
- Fine- (<0.0625 mm) and coarse-(>4.76 mm) grained fraction determined by a simple arithmetic mean of all samples collected

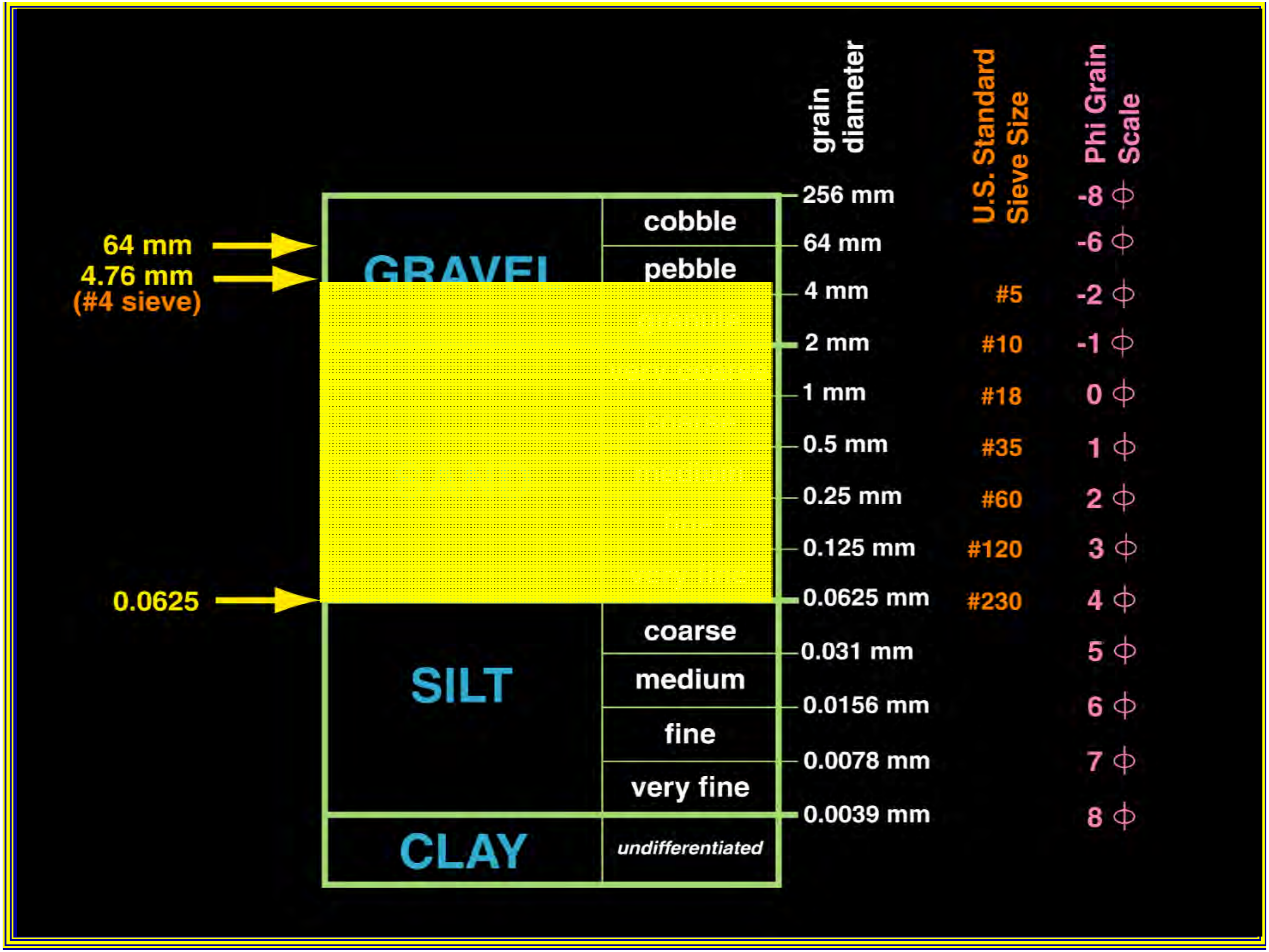
Borrow site sampling



Compatibility—Size

- **The average percentage by weight of the *fine-grained* fraction (<0.0625 mm) of borrow material shall not exceed average percentage by weight of native beach fines plus 5%**
  - ***e.g., 6% native plus 5% = 11% threshold***

- **The average percentage by weight of the *coarse-grained* fraction (>4.76 mm) of borrow material shall not exceed average percentage by weight of native beach coarse material plus 4%**
  - ***e.g., 6% native plus 4% = 10% threshold***



grain diameter
U.S. Standard Sieve Size
Phi Grain Scale
64 mm
4.76 mm
(#4 sieve)
0.0625
cobble
pebble
coarse
medium
fine
very fine
SILT
CLAY
undifferentiated
256 mm
64 mm
4 mm
2 mm
1 mm
0.5 mm
0.25 mm
0.125 mm
0.0625 mm
0.031 mm
0.0156 mm
0.0078 mm
0.0039 mm
#5
#10
#18
#35
#60
#120
#230
-8 Φ
-6 Φ
-2 Φ
-1 Φ
0 Φ
1 Φ
2 Φ
3 Φ
4 Φ
5 Φ
6 Φ
7 Φ
8 Φ

Compatibility—Mineralogy

- **Composite mineralogy shall be similar, specifically carbonate content that shall not exceed 40% over the average percentage by weight of the native beach.** ***(This topic warrants further investigation.)***
  - ***e.g., 25% CO_3 on native beach plus 40% = 65% threshold***

- **Sandy sediment from navigation channel maintenance shall not exceed 10% percentage by weight of fine-grained material (<0.0265 mm) regardless of native beach content**

Project Execution

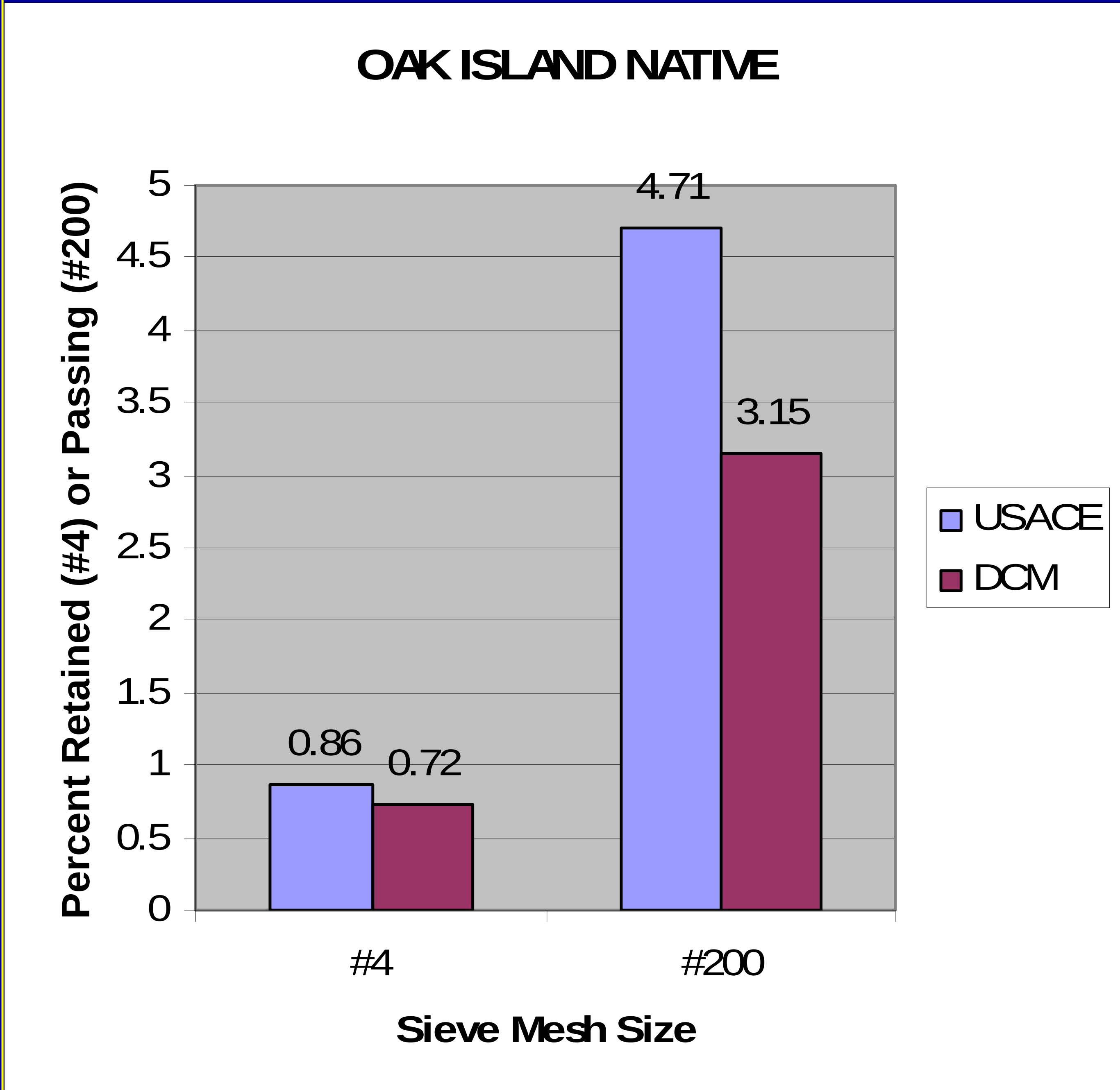
- Be consistent with the Submerged Lands Mining Rules
- Not alter wave refraction patterns resulting in adverse impacts to adjacent shoreline(s)
- Not alter inlet hydrology resulting in increased erosion or an adverse impact ecosystems or habitat
- Be done in a manner consistent with State policy regarding habitat protection
- Not contain foreign material (construction debris, toxic material, etc.)

Monitoring & Mitigation

- **Material placement shall not violate water quality standards**
- **Exceedingly coarse material (>64 mm) greater than pre-nourished values shall be removed in an environmentally sound manner**
- **Biological and physical monitoring data shall be used to design biological and ecological mitigation where impacts are sufficient to require it**
- **Goal of scientific monitoring to better understand biological and physical response to beach nourishment and decrease adverse impact(s)**

Implementation Process

- Review formal recommendations from CRC Science Panel on Coastal Hazards
- New scientific data?
- Stakeholder input
- Analysis of how recommendations and draft rules will affect the "real world"



<u>COARSE LIMITS</u>

USACE = none

DCM = native + 4%

= 4.72%

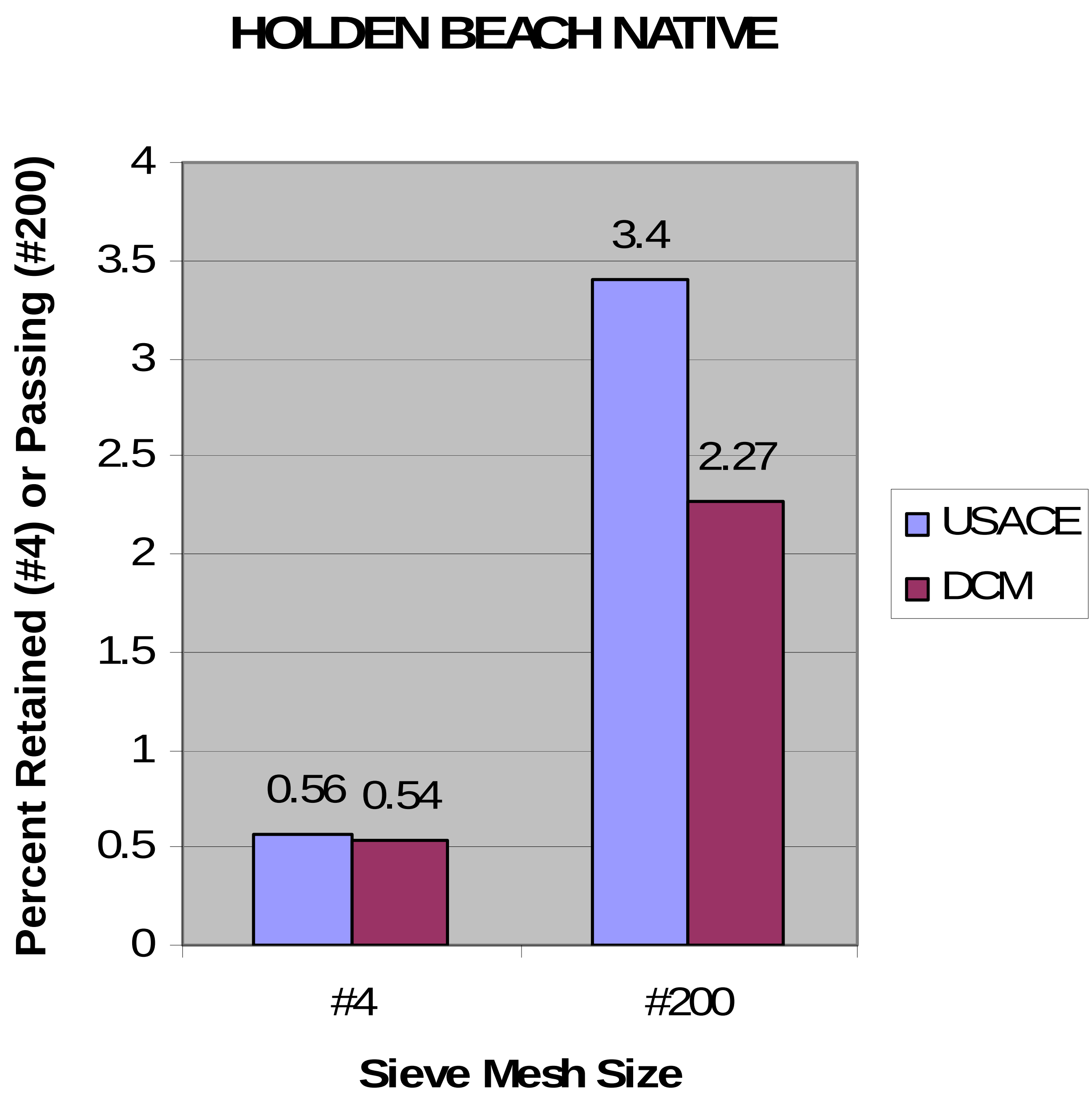
Florida = 5%

<u>FINE LIMITS</u>

USACE = 10%

DCM = native + 5%
= 8.15%

Florida = 5%



COARSE LIMITS

USACE = none

DCM = native + 4%
= 4.54%

Florida = 5%

FINE LIMITS

USACE = 10%

DCM = native + 5%
= 7.27%

Florida = 5%

Conclusions

- Impacts of these criteria (or some variation) is not yet known
  - DCM staff goal is little/no impact to beach nourishment
  - DCM goal is to be as compatible with USACE as possible
- White paper is being prepared by DCM
- Final DCM recommendations to go to CRC this fall


Questions?

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US Army Corps of Engineers' National Coastal Mapping Program

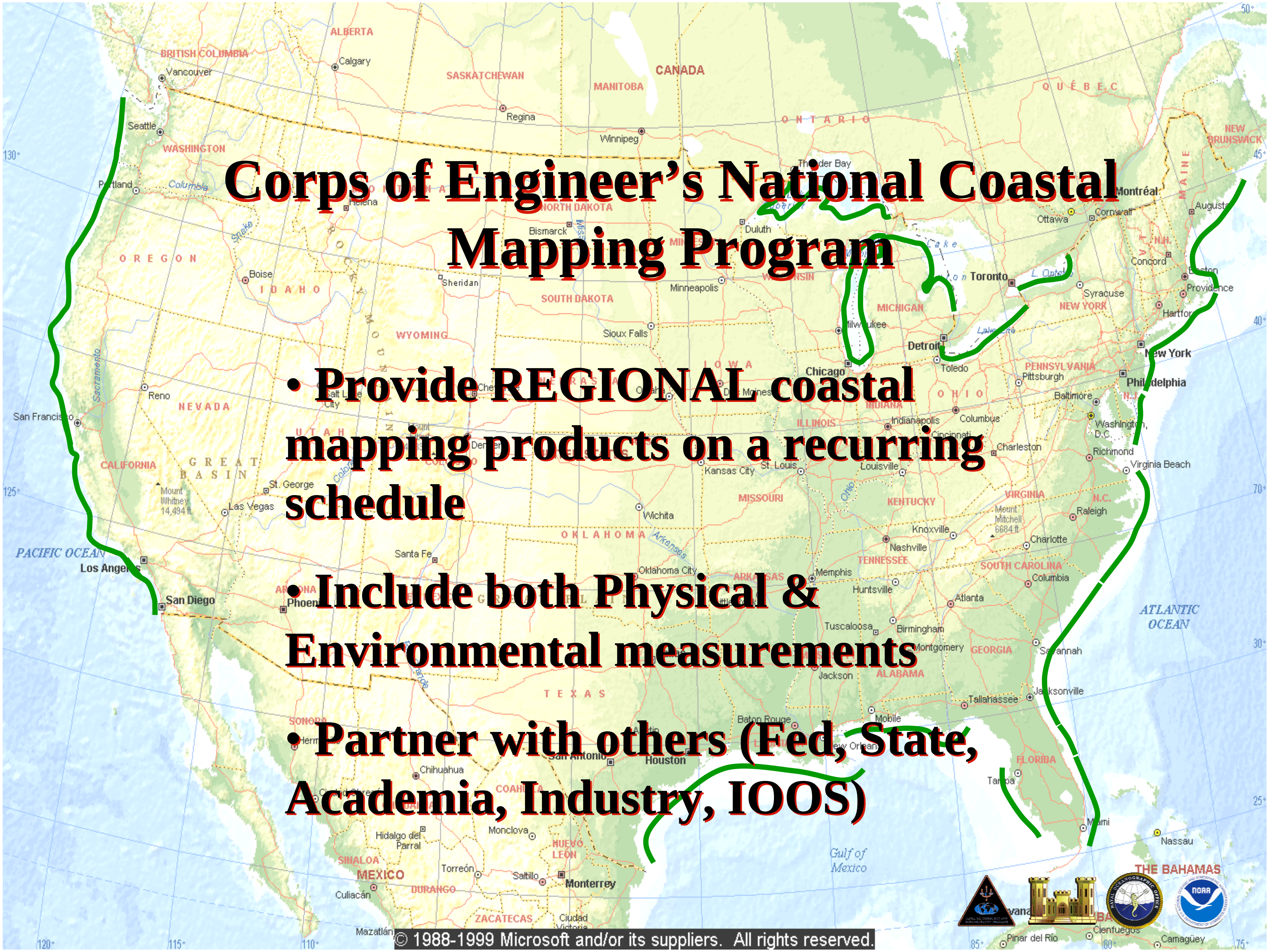
Joint Airborne Lidar Bathymetry Technical Center of Expertise

Jennifer Wozencraft

Agenda

1. Program & Organization
2. 2004, 2005 & 2006 Operations
3. Data & Products
4. Summary

Corps of Engineer’s National Coastal Mapping Program

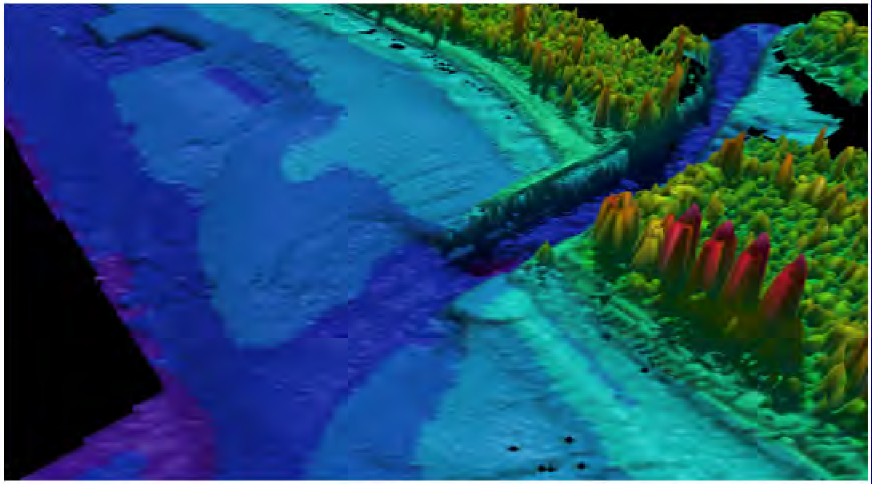


- Provide REGIONAL coastal mapping products on a recurring schedule
- Include both Physical & Environmental measurements
- Partner with others (Fed, State, Academia, Industry, IOOS)

PROGRAM MANAGEMENT PLAN

for the

US ARMY CORPS OF ENGINEERS
REGIONAL COASTAL MAPPING
PROGRAM



Joint Airborne Lidar Bathymetry
Technical Center of Expertise

JALBTCX PDT Aug 2004 version2.doc

Coastal Mapping PDT

JALBTCX PDT			
Division	**Name**	**Organization**	
South Atlantic	Greg Baer	MT-E	
Wilmington	John McCormick	TS-EC	
Charleston	Sara Brown	TS-DH	
Savannah	Caro Abercrombie	EN-HC	
Jacksonville	Dan Haubner	PD-P	
Mobile	Linda Lillycrop	EN-HH	
North Atlantic	Larry Cocchieri	DM-PP	
Norfolk	Mark Hudgins	TS-EW	
Baltimore	Greg Bass	EN-GH	
Philadelphia	Monica Chasten	EC-H	
New York	Jen Irish	EN	
New England	John Winkelman	EP-EW	
Lakes & Rivers	John Kangas	E-EW	
Buffalo	Tom Bender	TD-DC	
Detroit	Phillip Ross	HH-E	
Chicago	Andrew Benzinger	TS-HH	
North Western	Patti Etzel	CM-WP-N	Al Swobod
Seattle	Bernard Hargrave Jr	PM	
Portland	Heidi Moritz	EC-HY	
South Pacific	George Domurant	CM-O	
Los Angles	Art Shak	ED-DC	
San Francisco			
Pacific Ocean			
Hawaii	Tom Smith	EC-T	
Alaska	Ken Eisses	EN-HH	
Mississippi Valley			
New Orleans	Jay Ratcliff	ED-SS	
South Western			
Galveston	Jeff Waters	PE-PL	

Board of Directors

Greg Baer - SAD
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Patti Etzel – NWD
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John Kangas - LRD
MK Miles - HQUSACE
Tom Richardson - ERDC

Joint Airborne Lidar Bathymetry Technical Center of Expertise

Operations

- USACE
- Navy

Technology Evolution

- Coastal Measurements & Data Usage
- Sensors & Systems
- NOAA

Optech

itres

US Army Corps of Engineers MOBILE DISTRICT

U. S. Naval Research Laboratory Stennis Space Center, MS

EARTH SCIENCE APPLICATIONS DIRECTORATE
John C. Stennis Space Center

Welcome to the US Army Corps of Engineers,
Engineer Research and Development Center
Waterways Experiment Station, Vicksburg, MS

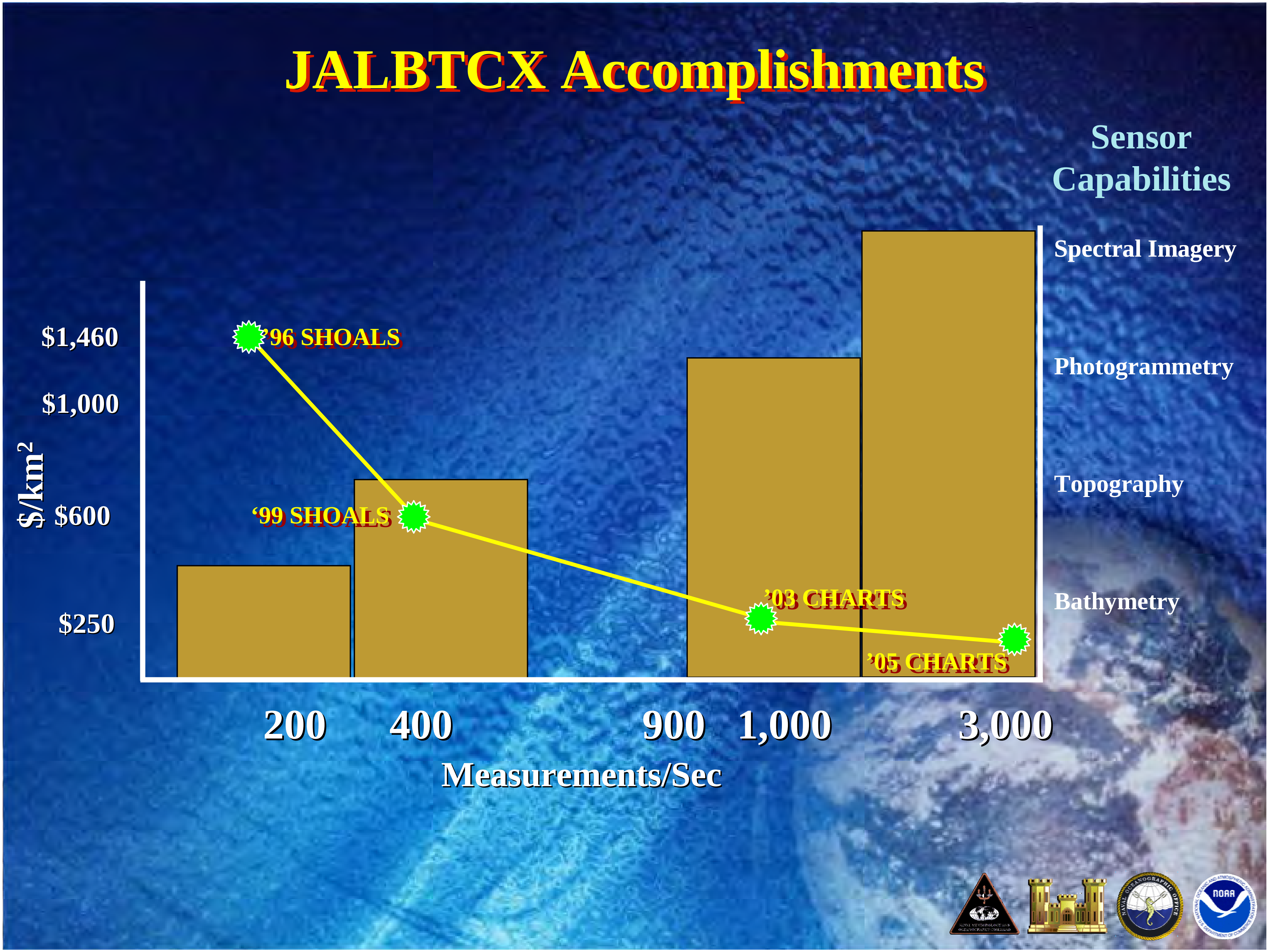
Department of Marine Science
of The University of Southern Mississippi

NAVAL OCEANOGRAPHIC OFFICE

NOAA Satellites and Information
National Environmental Satellite, Data, and Information Service

FUGRO

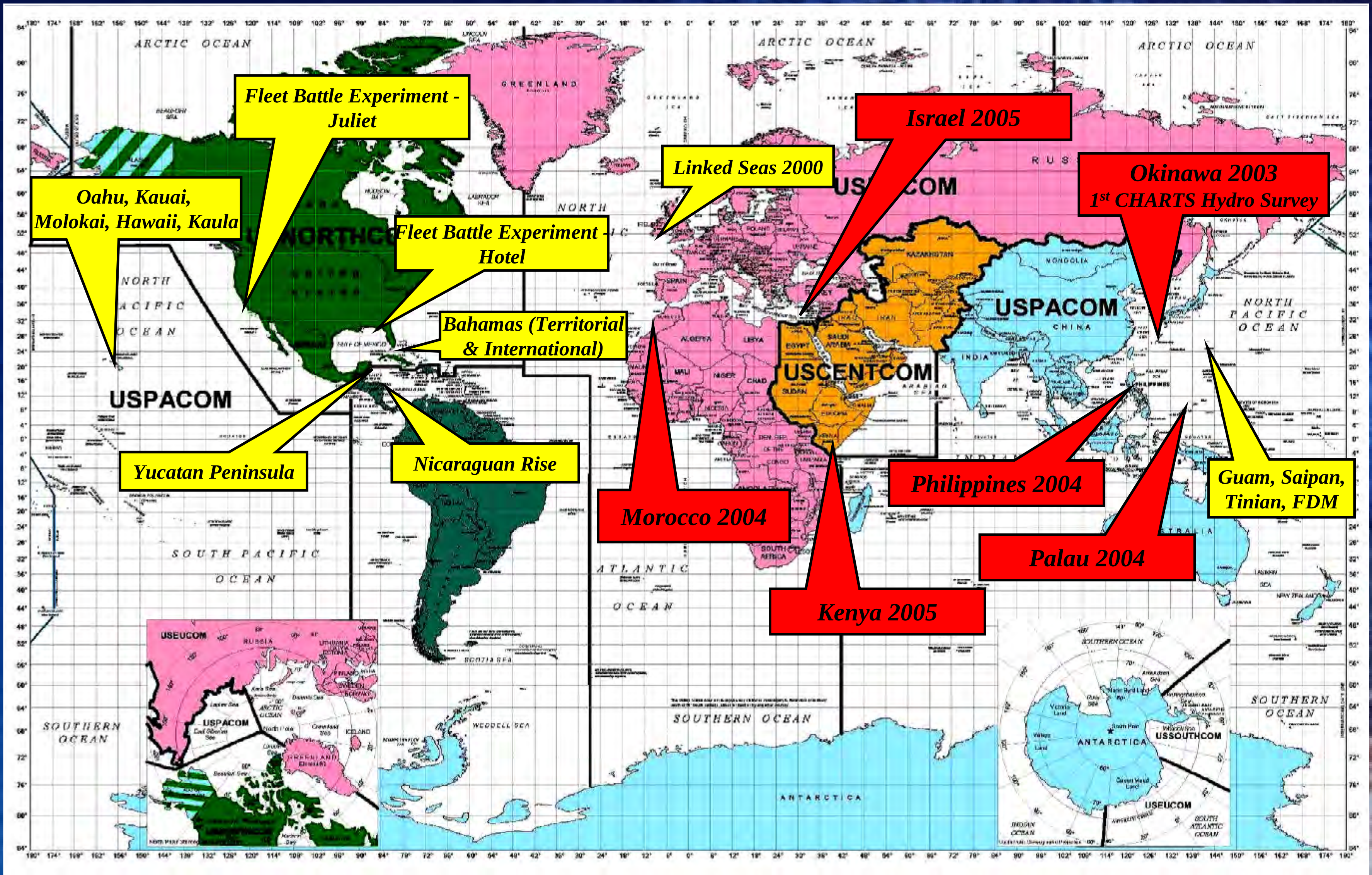
Leveraging Federal, State, Academia, and Industry


JALBTCX Accomplishments
Sensor Capabilities
Spectral Imagery
Photogrammetry
Topography
Bathymetry
$/km²
$1,460
$1,000
$600
$250
'96 SHOALS
'99 SHOALS
'03 CHARTS
'05 CHARTS
200
400
900
1,000
3,000
Measurements/Sec

Agenda

1. Program & Organization
2. 2004, 2005 & 2006 Operations
3. Data & Products
4. Summary

Coastal Charting Operations for Navy



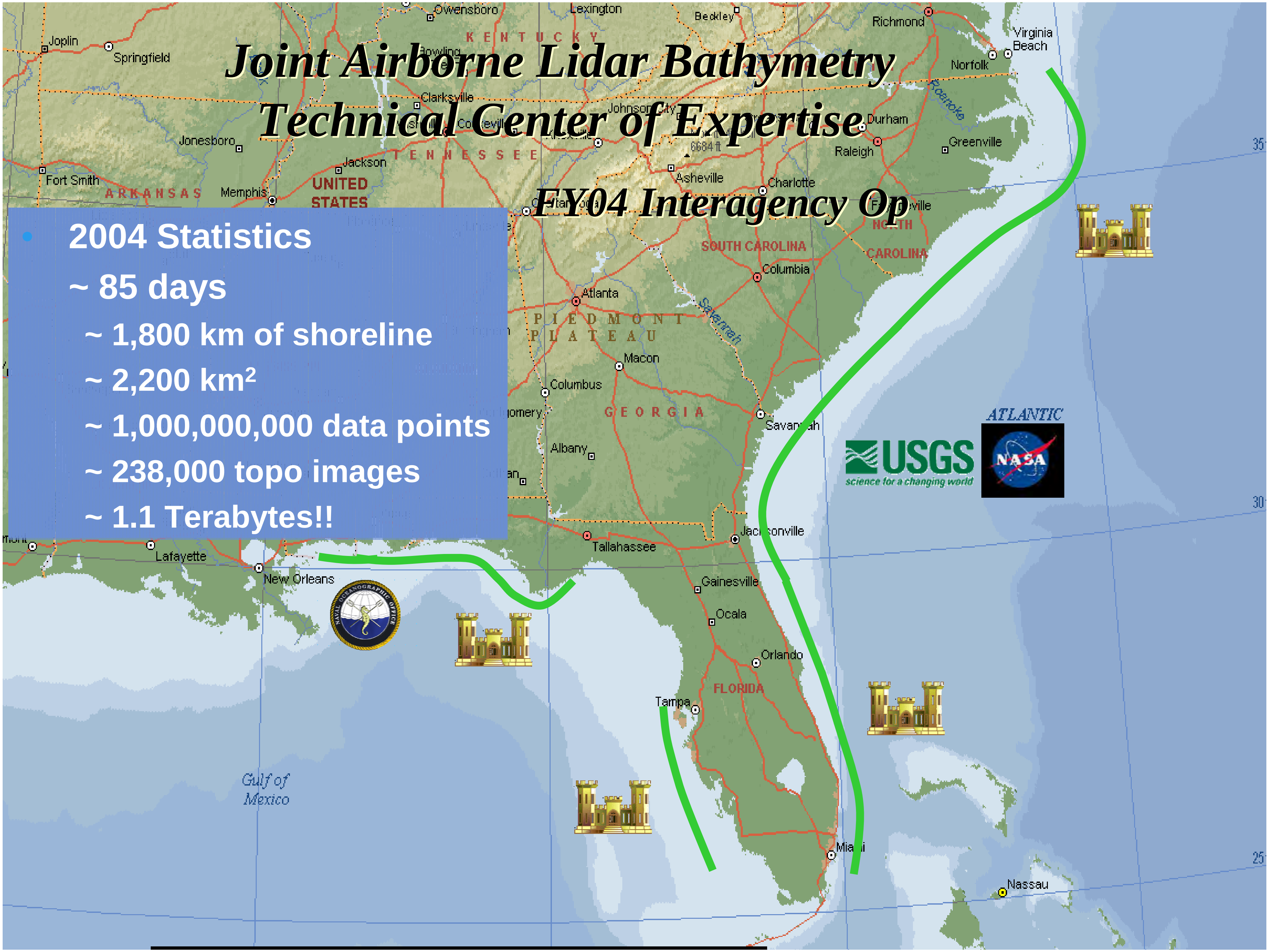
USACE SHOALS System (1996 – 2002)

US Navy CHARTS System (2003-present)

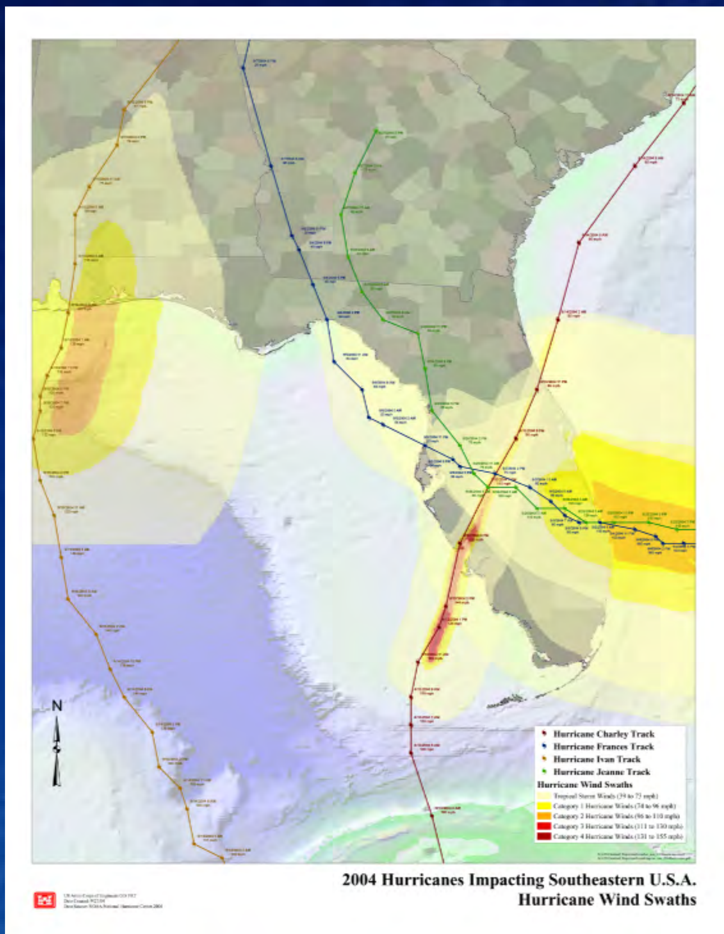
Joint Airborne Lidar Bathymetry Technical Center of Expertise

FY04 Interagency Op

- 2004 Statistics
- ~ 85 days
  - ~ 1,800 km of shoreline
  - ~ 2,200 km^2
  - ~ 1,000,000,000 data points
  - ~ 238,000 topo images
  - ~ 1.1 Terabytes!!



Post-Hurricanes



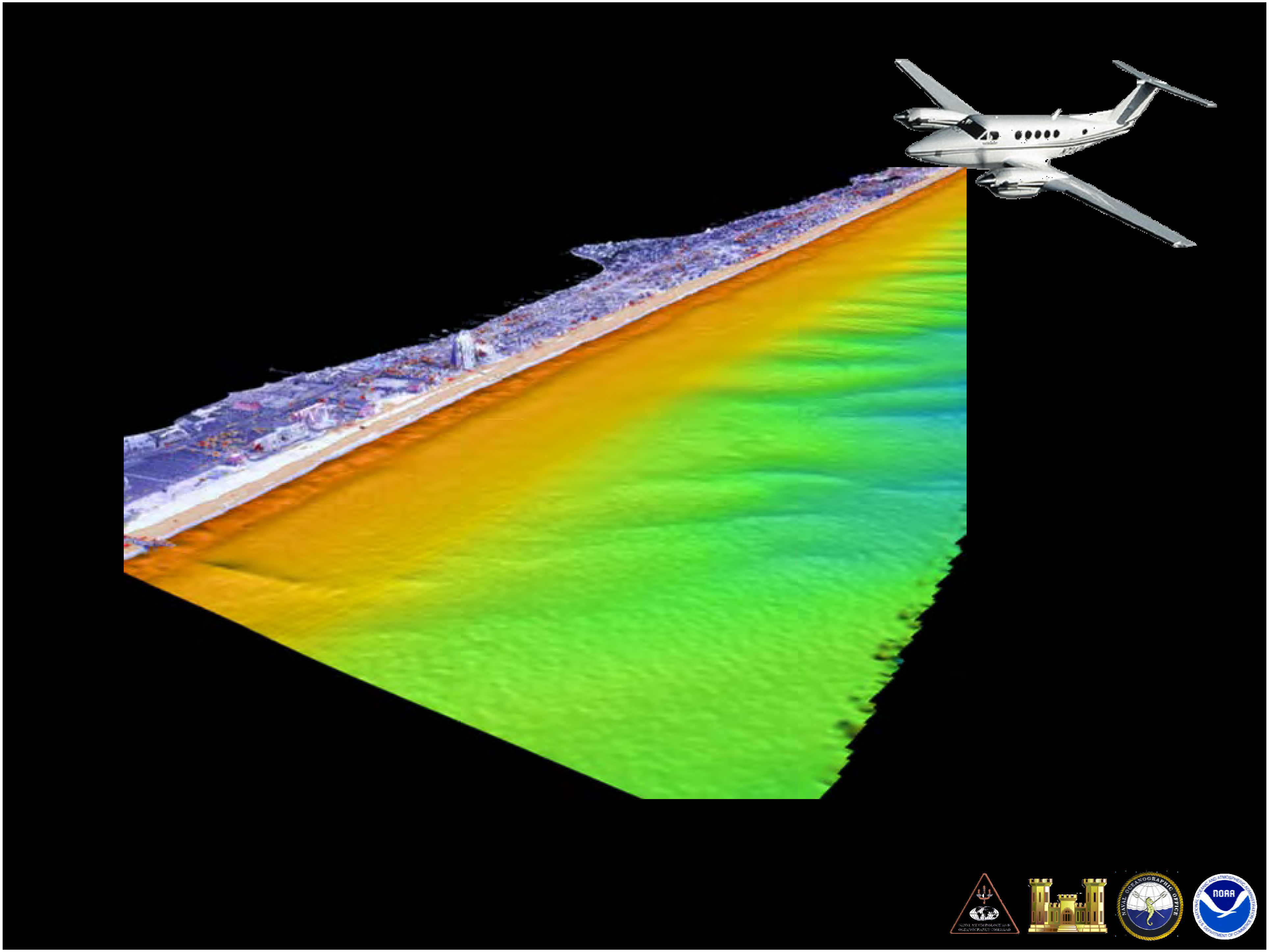
2004 Hurricanes Impacting Southeastern U.S.A.
Hurricane Wind Swaths

Post-storms only

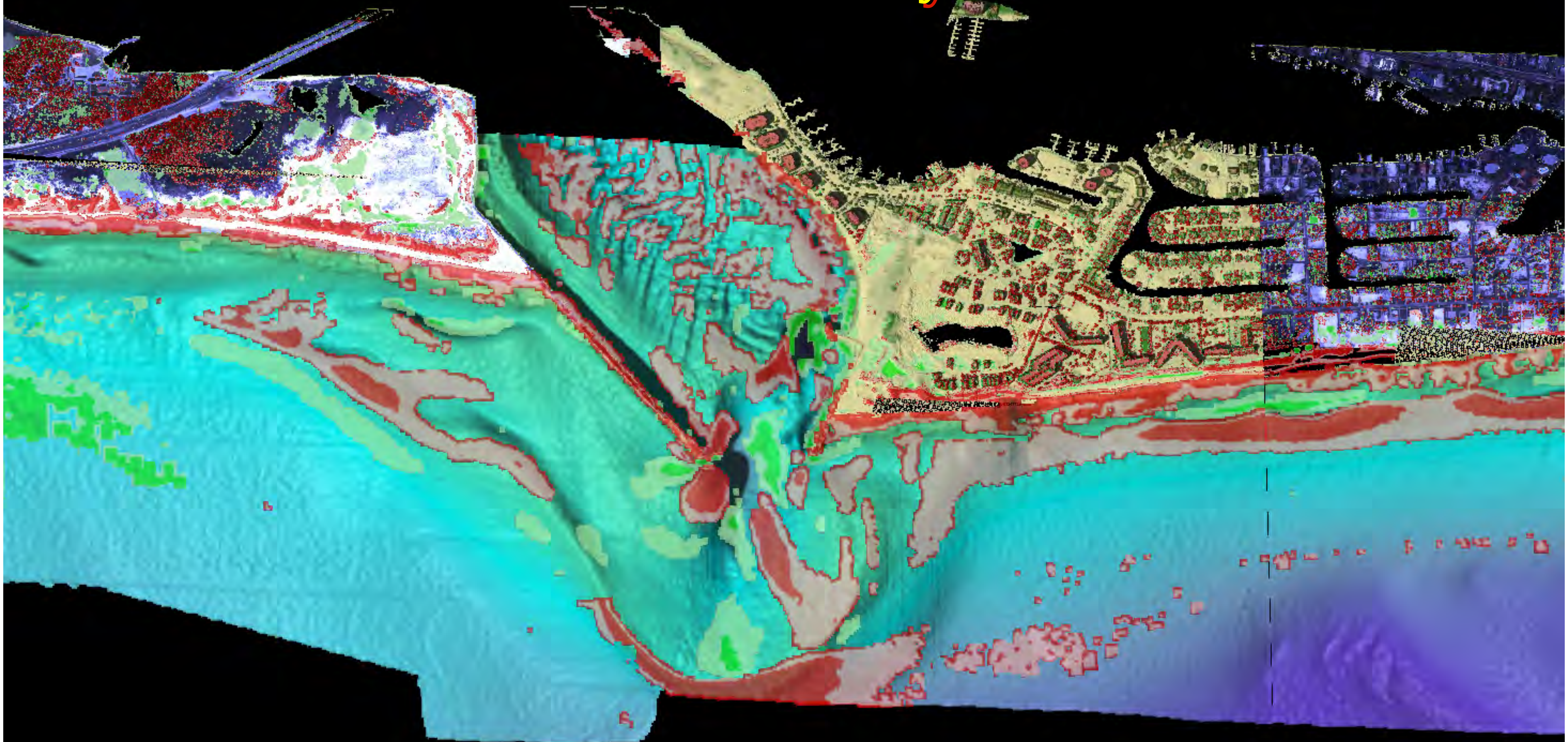
- ~ 35 days (including down days)
- ~ 680 miles of shoreline
- ~ 1,300 km^2
- ~ 15 Federal Shore Protection Projects
- Data for FSPs delivered prior to leaving field!!

- 680 Gigabytes!!

- **Total FY2004 USACE 1.7 Terabytes**


NAVAL OCEANOGRAPHIC OFFICE
NOAA

USACE Post-Hurricane Survey



East Pass, Florida

Pre / Post Hurricane Ivan

Nov – Dec 2004

Post-Hurricane Reconstruction

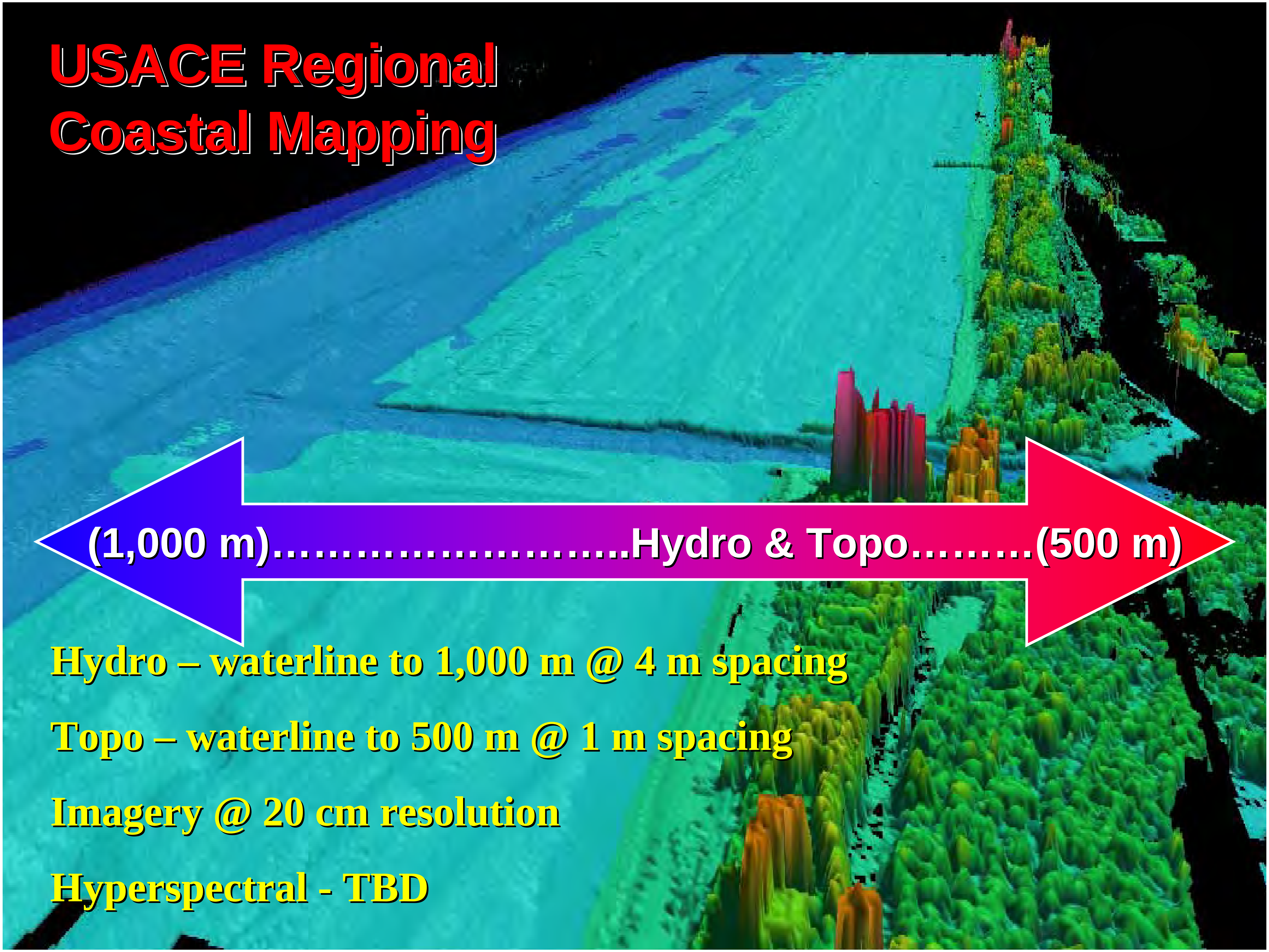
16 federal projects
$200,000,000 reconstruction

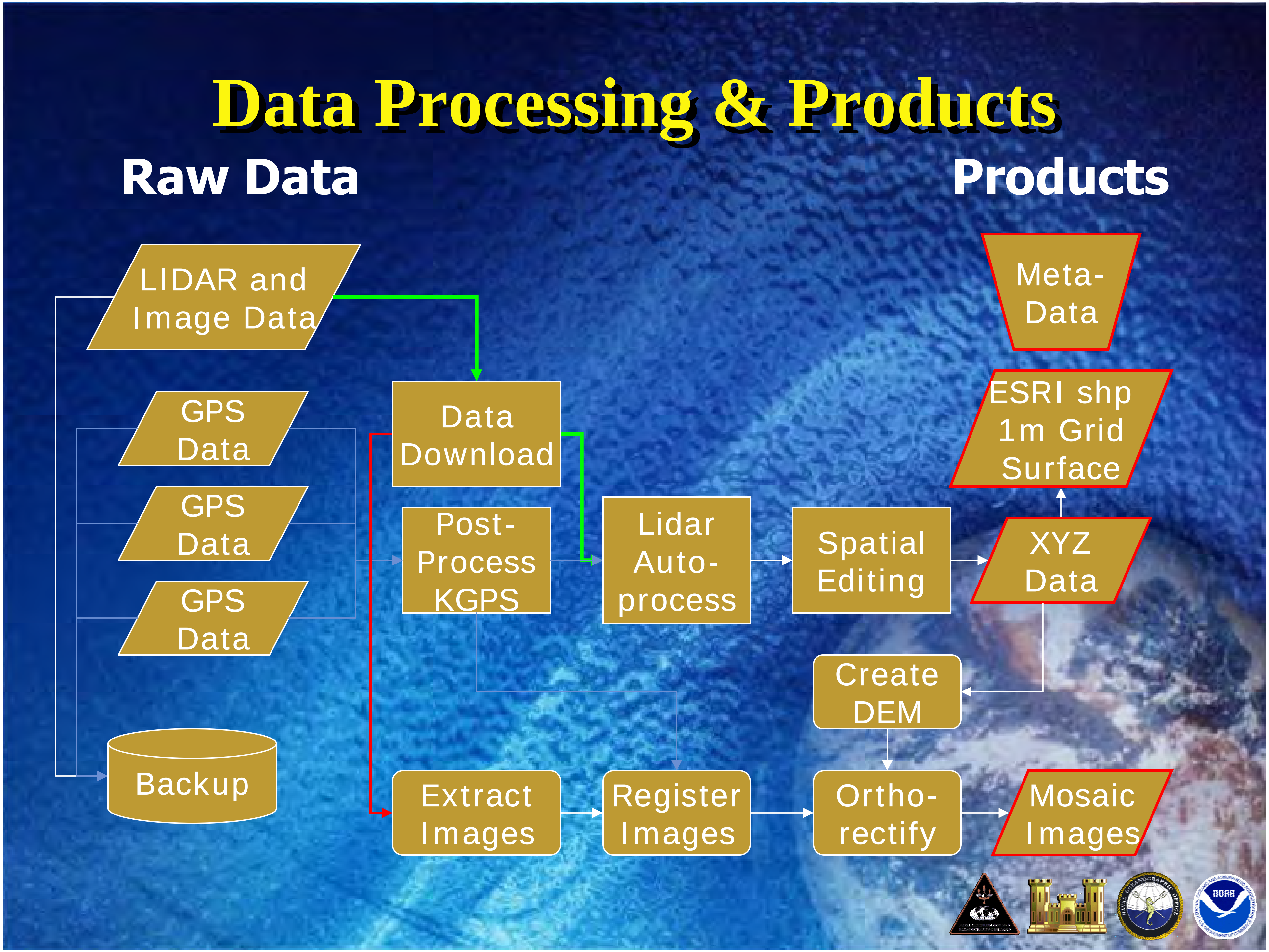
FY 2005 Surveys


FY 2006 & 2007
Washington
Oregon, too in 07
CANADA
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
NEW YORK
PENNSYLVANIA
QUÉBEC
UNITED STATES
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Lake Nipissing
SUPERIOR UPLAND
Eagle Mountain 2301 ft
Thunder Bay
Duluth
Houghton
Ontonagon
Marquette
Munising
Newberry
Sault Ste. Marie
Marathon
Schreiber
Terrace Bay
Wawa
Sudbury
North Bay
Ottawa
Kingston
Toronto
Mississauga
Escanaba
Green Bay
Appleton
Manitowoc
Sheboygan
Milwaukee
Chicago
Cheboygan
Petoskey
Alpena
Traverse City
Cadillac
Bay City
Saginaw
Flint
Lansing
Grand Rapids
Detroit
Ann Arbor
Toledo
Cleveland
Erie
Buffalo
Rochester
Syracuse
Sarnia
London
Owen Sound
South Bend
Rockford
Janesville
Dubuque
Decorah
Winona
Eau Claire
Marshfield
Wausau
Antigo
Stevens Point
Iowa City
Clinton
Davenport

Agenda

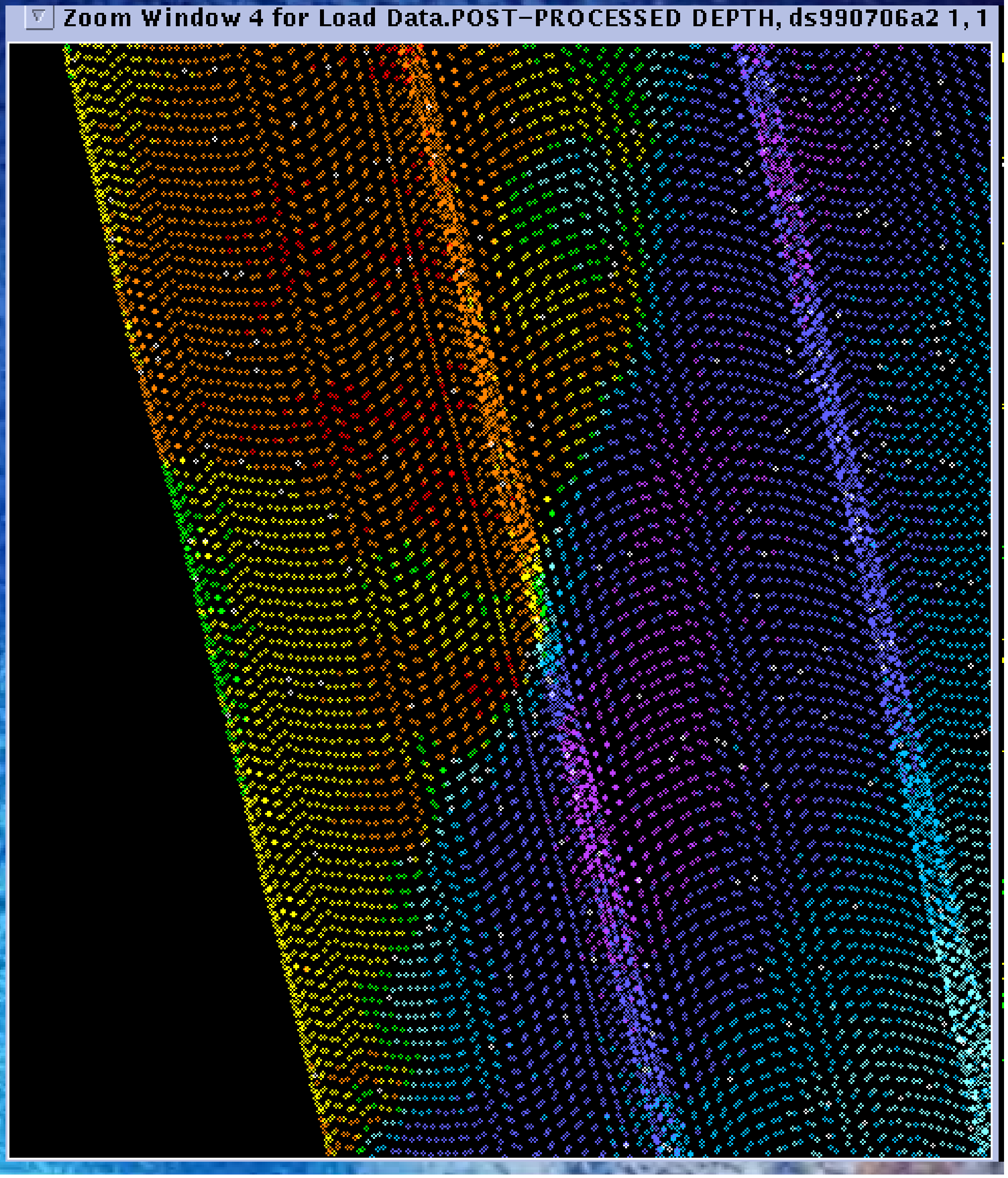
1. Program & Organization
2. 2004, 2005 & 2006 Operations
3. Data & Products
4. Summary


USACE Regional
Coastal Mapping
(1,000 m)……………………..Hydro & Topo………(500 m)
Hydro – waterline to 1,000 m @ 4 m spacing
Topo – waterline to 500 m @ 1 m spacing
Imagery @ 20 cm resolution
Hyperspectral - TBD


Data Processing & Products
Raw Data
Products
LIDAR and Image Data
GPS Data
GPS Data
GPS Data
Backup
Data Download
Post-Process KGPS
Lidar Auto-process
Spatial Editing
Meta-Data
ESRI shp 1m Grid Surface
XYZ Data
Create DEM
Extract Images
Register Images
Ortho-rectify
Mosaic Images

Elevation Data Characteristics

- Point data X,Y,Z ascii files
- Land @ 1m x 1m
- Hydro @ 4m x 4m
- ~250 Meg / mile



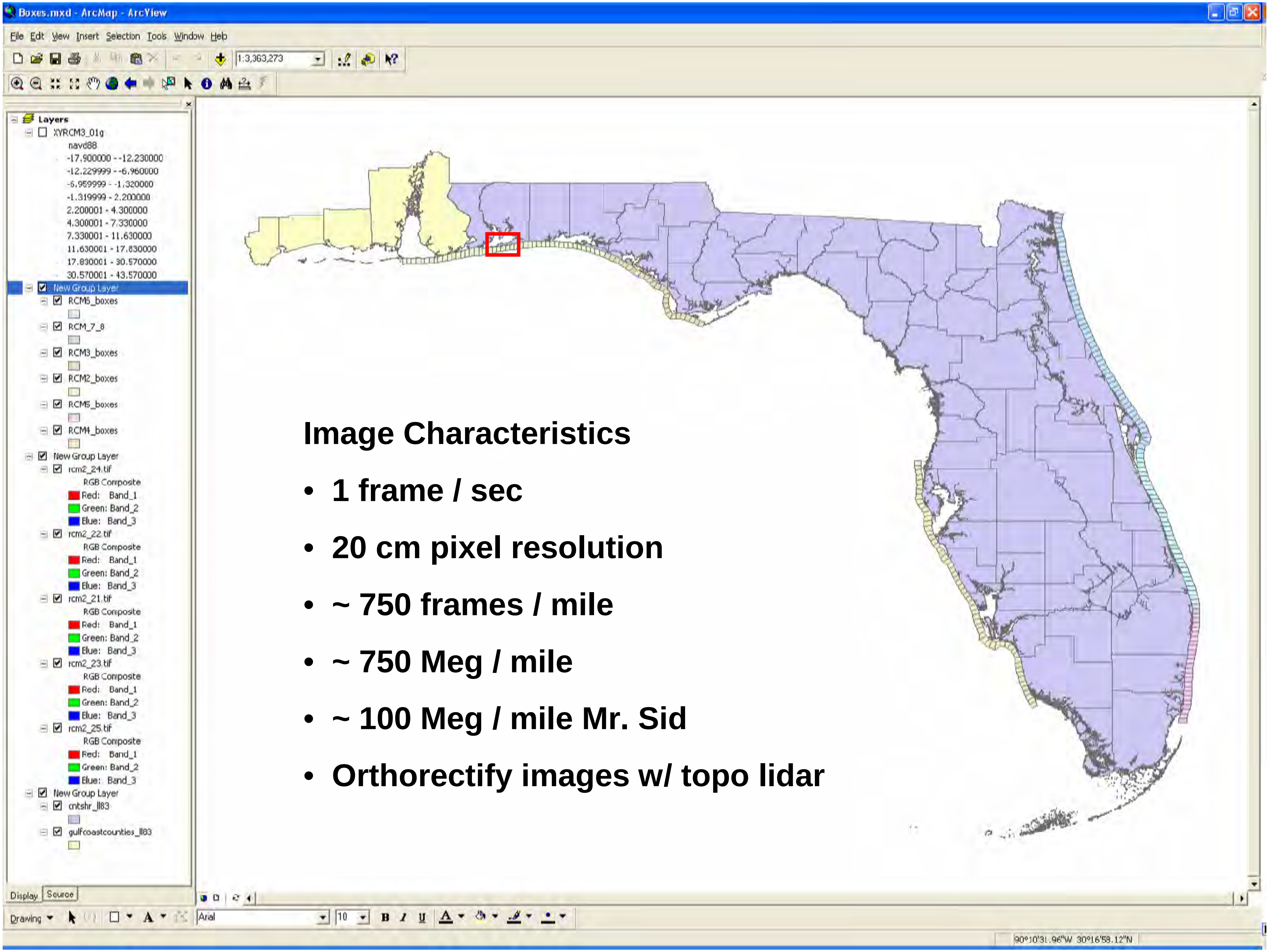
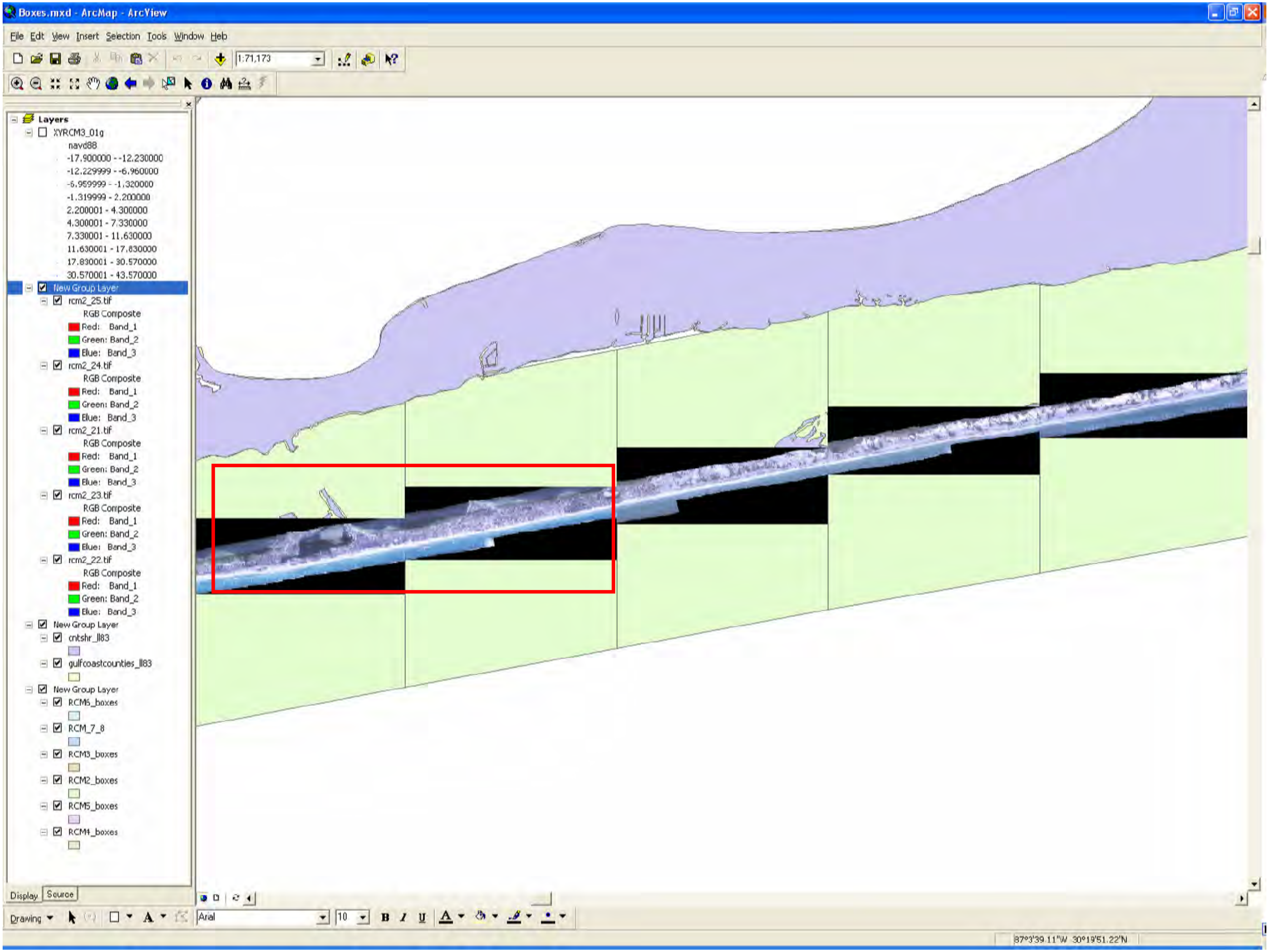


Image Characteristics

- 1 frame / sec
- 20 cm pixel resolution
- ~ 750 frames / mile
- ~ 750 Meg / mile
- ~ 100 Meg / mile Mr. Sid
- Orthorectify images w/ topo lidar



Boxes.mxd - ArcMap - ArcView
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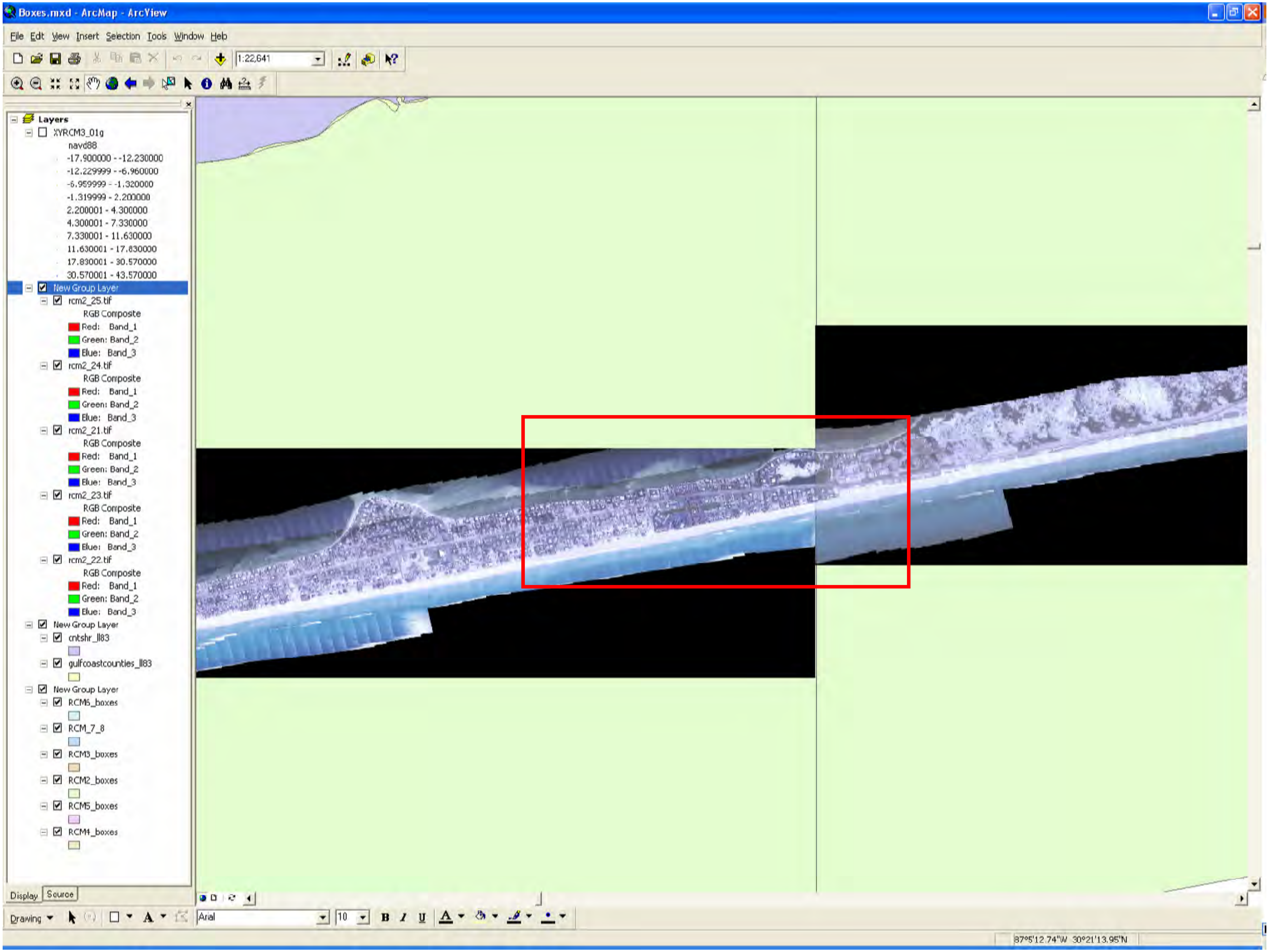
-12.229999 - -6.960000
-6.959999 - -1.320000
-1.319999 - 2.200000
2.200001 - 4.300000
4.300001 - 7.330000
7.330001 - 11.630000
11.630001 - 17.830000
17.830001 - 30.570000
30.570001 - 43.570000
New Group Layer
rcm2_25.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_24.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_21.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_23.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_22.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
New Group Layer
cntshr_ll83
gulfcoastcounties_ll83
New Group Layer
RCM6_boxes
RCM_7_8
RCM3_boxes
RCM2_boxes
RCM5_boxes
RCM4_boxes
Display Source
Drawing
Arial
10
87°3'39.11"W 30°19'51.22"N



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4.300001 - 7.330000
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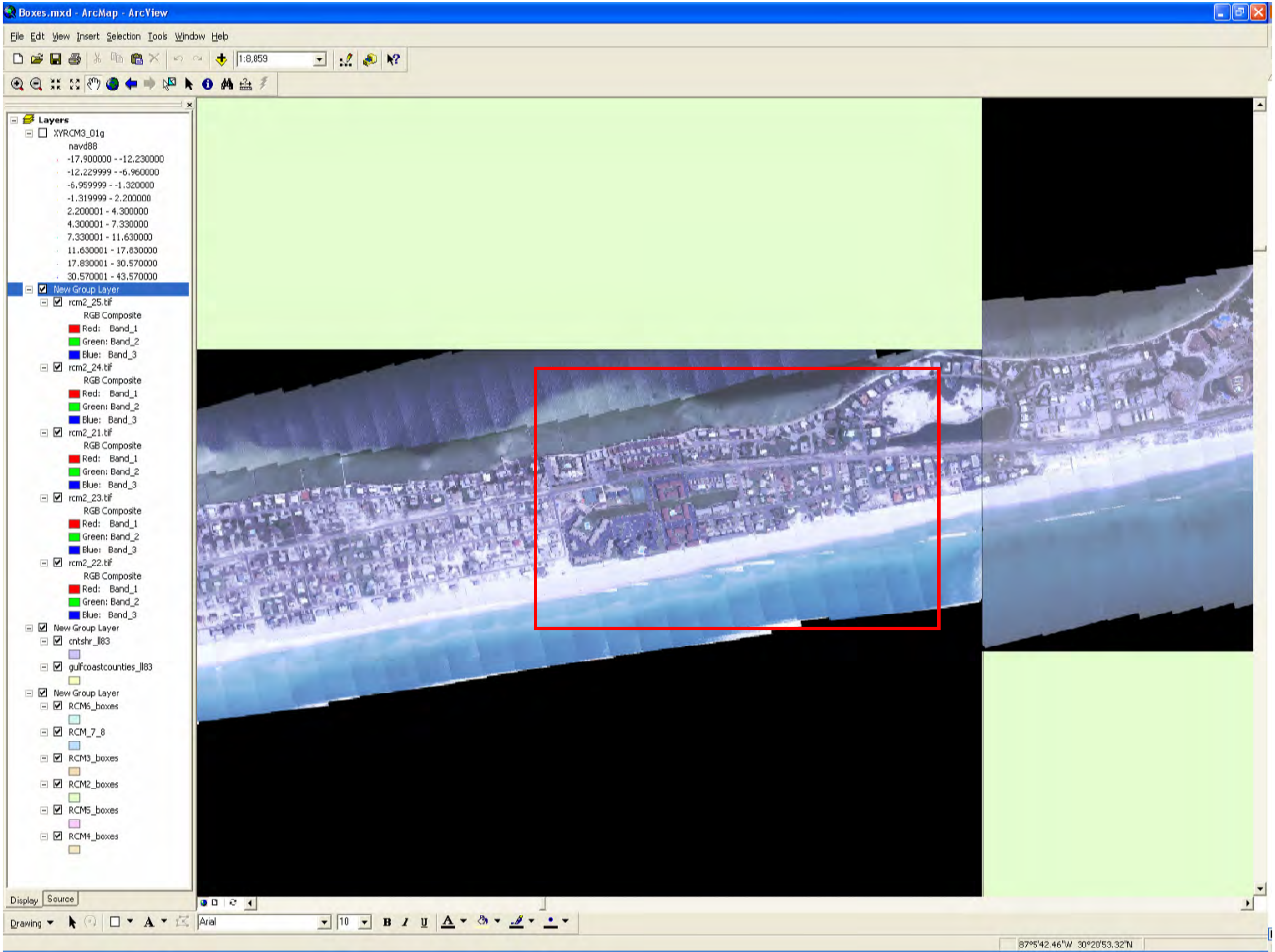
17.830001 - 30.570000
30.570001 - 43.570000
New Group Layer
rcm2_25.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_24.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_21.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_23.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_22.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
New Group Layer
cntshr_ll83
gulfcoastcounties_ll83
New Group Layer
RCM6_boxes
RCM_7_8
RCM3_boxes
RCM2_boxes
RCM5_boxes
RCM4_boxes
Display Source
Drawing
Arial
10
87°5'12.74"W 30°21'13.95"N


Boxes.mxd - ArcMap - ArcView
File Edit View Insert Selection Tools Window Help
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2.200001 - 4.300000
4.300001 - 7.330000
7.330001 - 11.630000
11.630001 - 17.830000
17.830001 - 30.570000
30.570001 - 43.570000
New Group Layer
rcm2_25.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_24.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_21.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_23.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_22.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
New Group Layer
cntshr_ll83
gulfcoastcounties_ll83
New Group Layer
RCM6_boxes
RCM_7_8
RCM3_boxes
RCM2_boxes
RCM5_boxes
RCM4_boxes
Display
Source
Drawing
Arial
10
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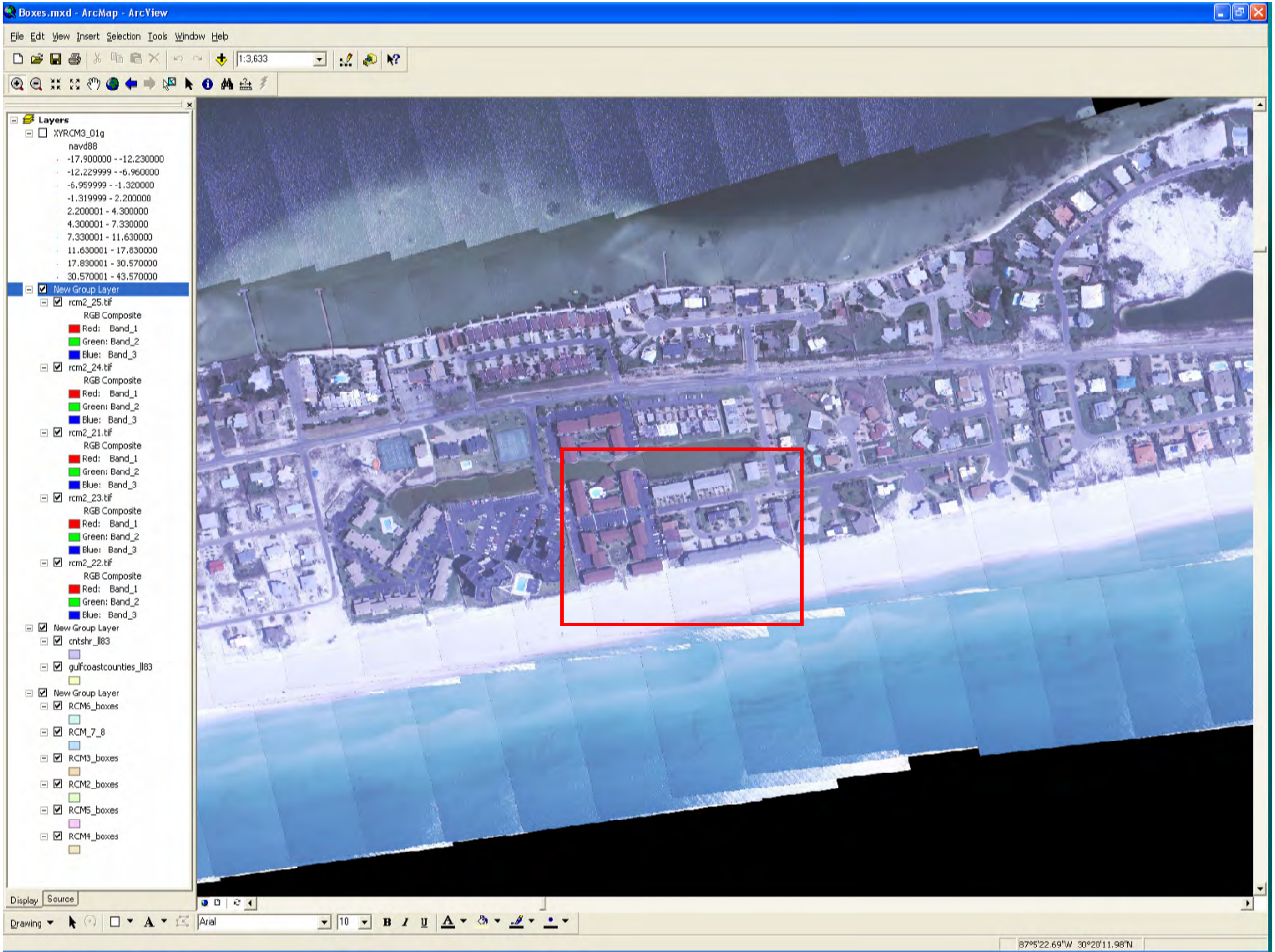
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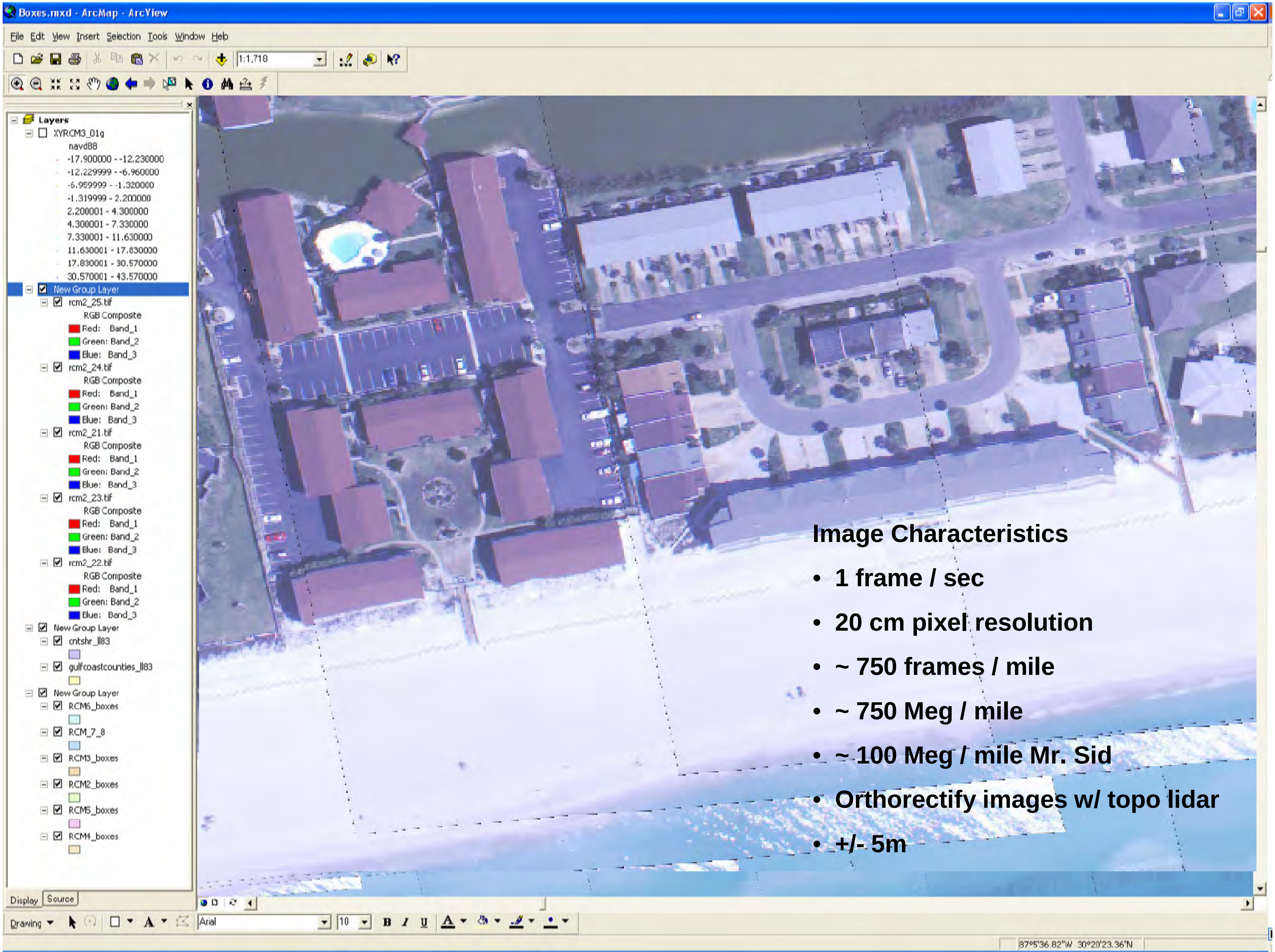
2.200001 - 4.300000
4.300001 - 7.330000
7.330001 - 11.630000
11.630001 - 17.830000
17.830001 - 30.570000
30.570001 - 43.570000
New Group Layer
rcm2_25.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_24.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_21.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_23.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_22.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
New Group Layer
cntshr_ll83
gulfcoastcounties_ll83
New Group Layer
RCM6_boxes
RCM_7_8
RCM3_boxes
RCM2_boxes
RCM5_boxes
RCM4_boxes
Display
Source
Drawing
Arial
10
87°5'22.69"W 30°20'11.98"N


Boxes.mxd - ArcMap - ArcView
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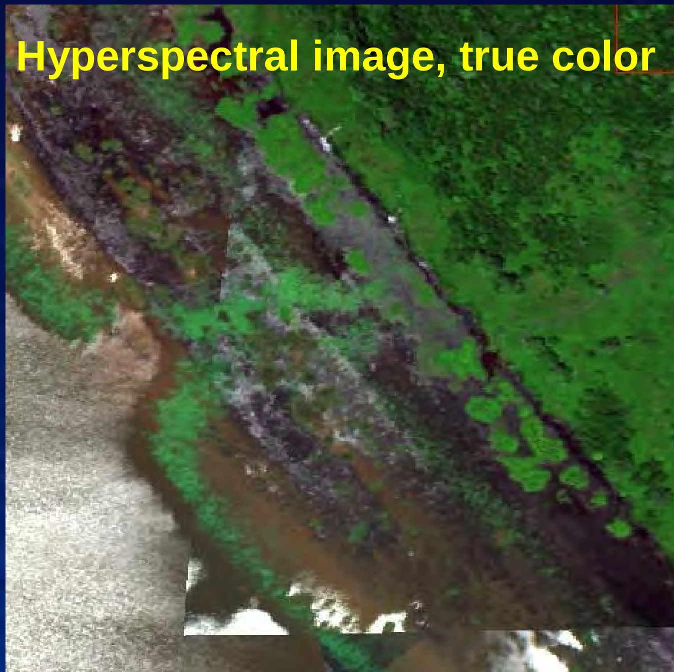
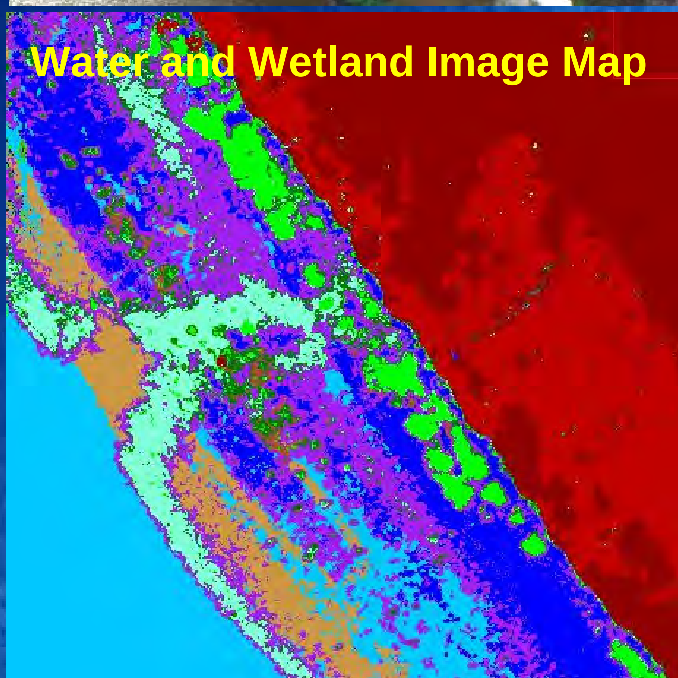
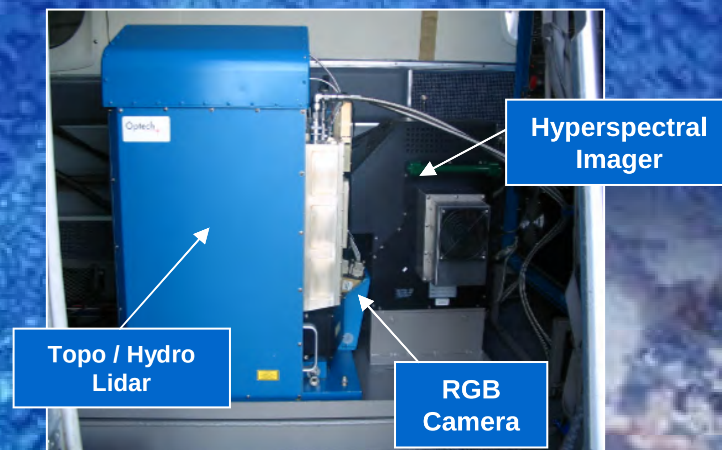
2.200001 - 4.300000
4.300001 - 7.330000
7.330001 - 11.630000
11.630001 - 17.830000
17.830001 - 30.570000
30.570001 - 43.570000
New Group Layer
rcm2_25.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_24.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_21.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_23.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
rcm2_22.tif
RGB Composite
Red: Band_1
Green: Band_2
Blue: Band_3
New Group Layer
cntshr_ll83
gulfcoastcounties_ll83
New Group Layer
RCM6_boxes
RCM_7_8
RCM3_boxes
RCM2_boxes
RCM5_boxes
RCM4_boxes
Display Source
Image Characteristics
• 1 frame / sec
• 20 cm pixel resolution
• ~ 750 frames / mile
• ~ 750 Meg / mile
• ~ 100 Meg / mile Mr. Sid
• Orthorectify images w/ topo lidar
• +/- 5m
Drawing
Arial
10
87°5'36.82"W 30°20'23.36"N

Added Hyperspectral Imager for Environmental Characterization







Classification Key

- Water
- Dense Floating Vascular
- Dense SAV, Emergent
- Apparent Bottom
- Dense SAV
- Emergent Grass (Wild Rice, etc.)
- Forest
- Grasses
- Undetermined Floating Grasses

Advanced Products & Information

Hyperspectral & Lidar

- SAV
- Wetlands
- Land use
- Bottom type
- Bottom reflectance

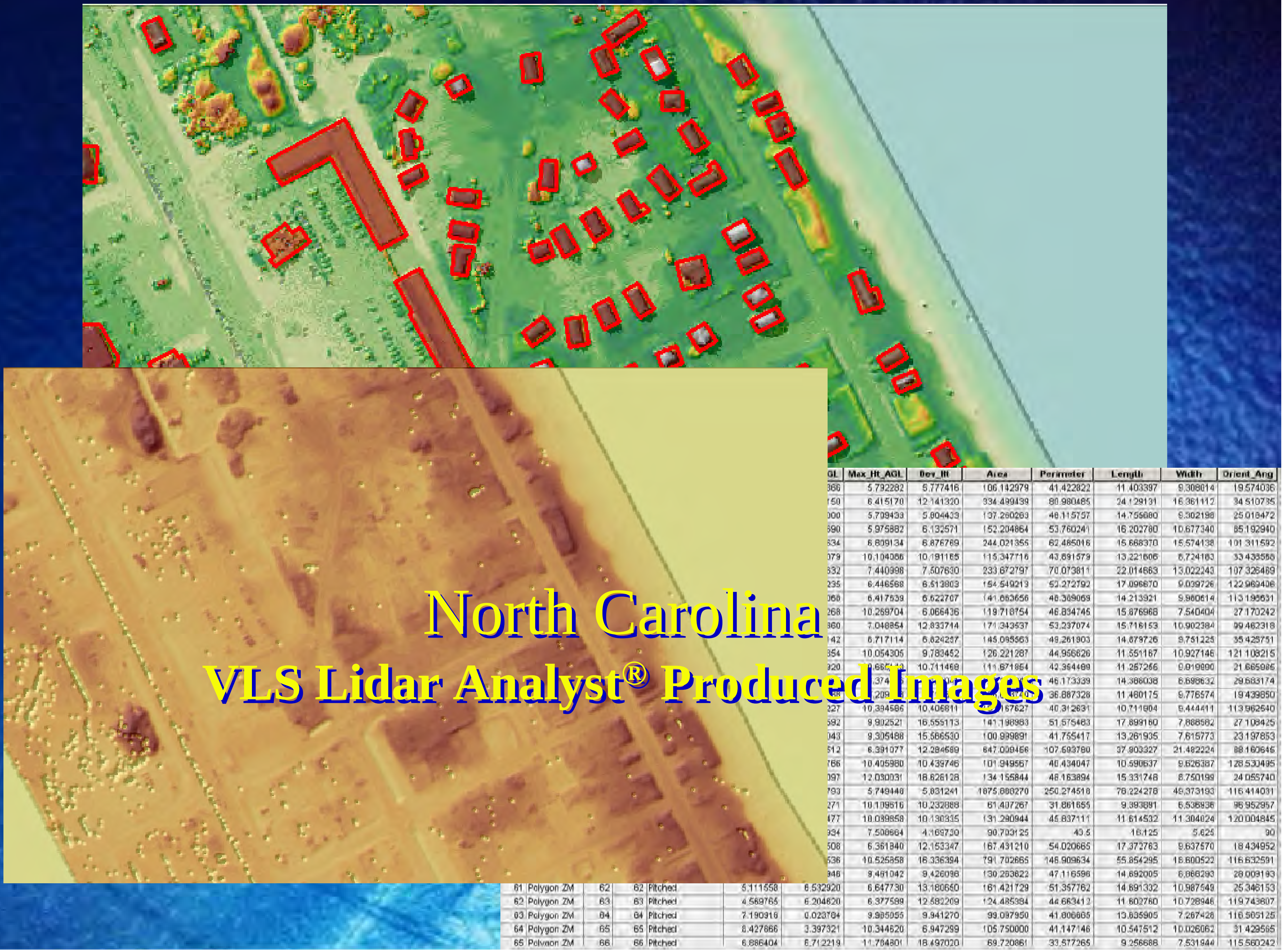
Lidar & Imagery

- Economic inputs
- Forestry management
- Shoreline position
- Condition Index Reports

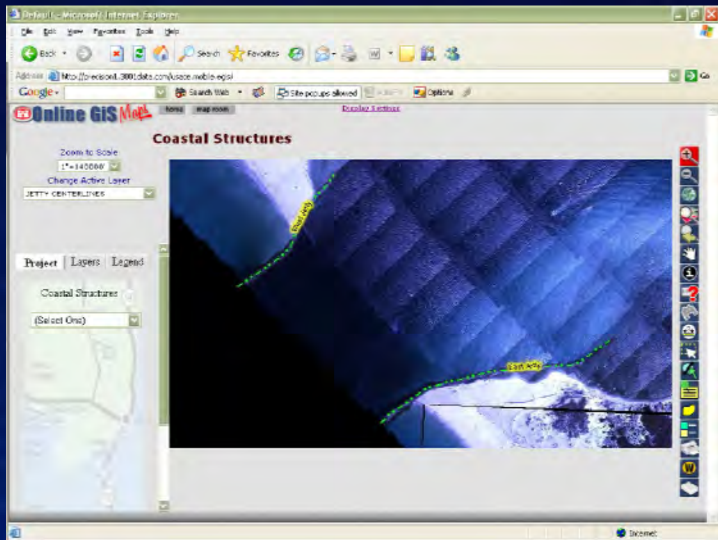
Others in development…

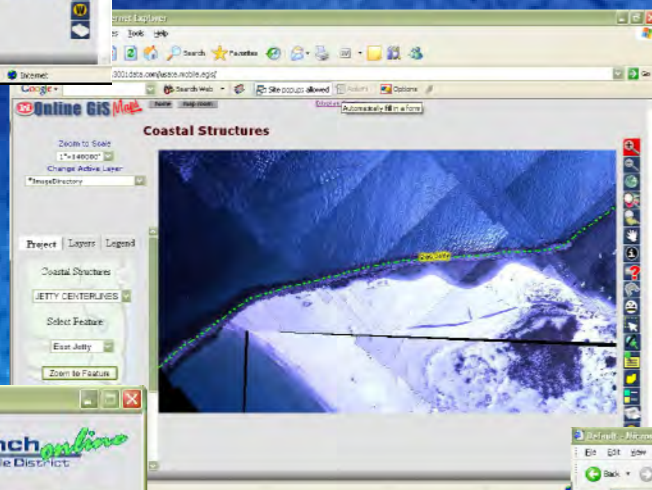
North Carolina

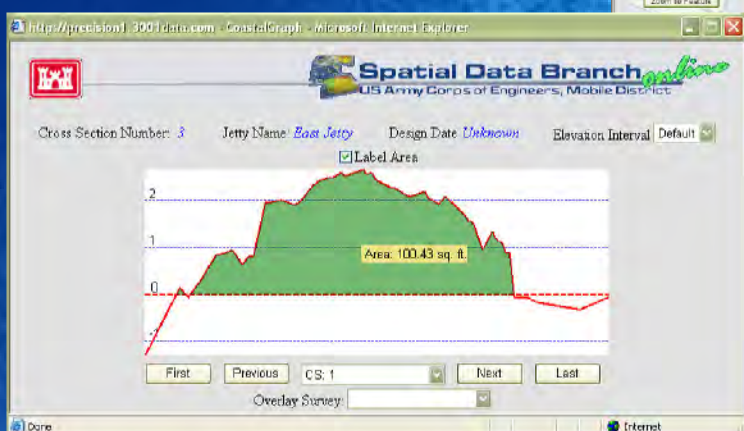
VLS Lidar Analyst® Produced Images

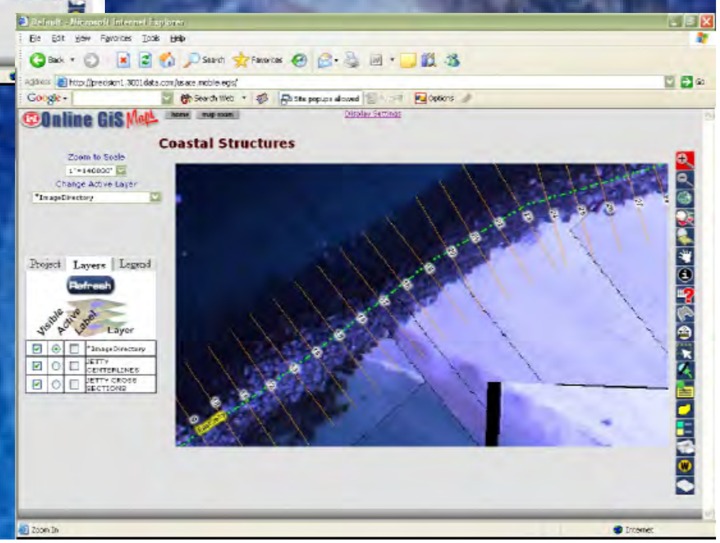


Condition Index Information









JALBTCX R&D Initiatives

Visiting Professor & Post Doc

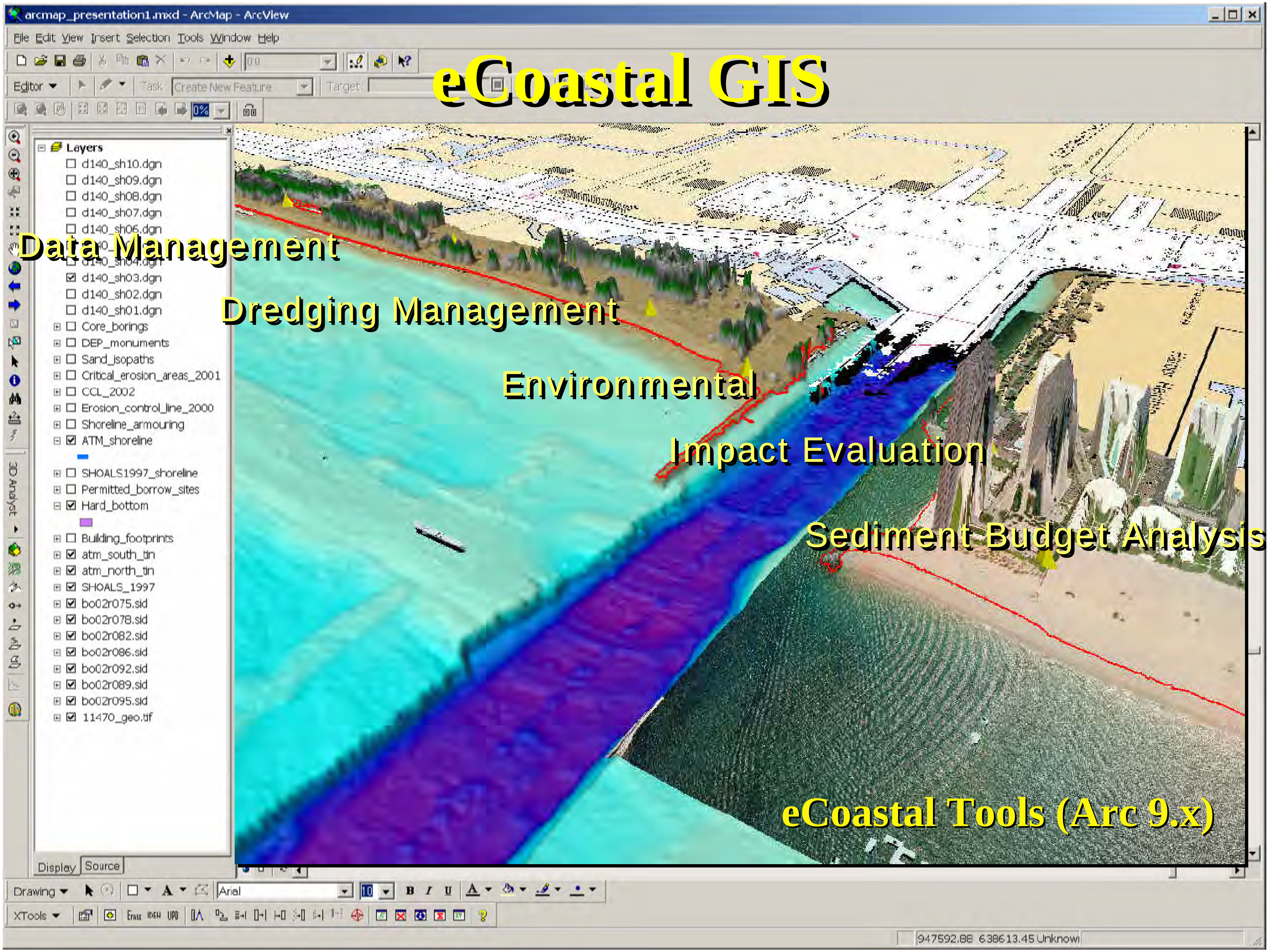
NOPP Project & NOS Project

National Coastal & Ocean Mapping Strategy

1 MS & 2 PhD Students

Automated Feature Extraction

Annual Technical Workshop


eCoastal GIS
Data Management
Dredging Management
Environmental
Impact Evaluation
Sediment Budget Analysis
eCoastal Tools (Arc 9.x)
arcmap_presentation1.mxd - ArcMap - ArcView
File Edit View Insert Selection Tools Window Help
Editor
Task Create New Feature
Target
Layers
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d140_sh09.dgn
d140_sh08.dgn
d140_sh07.dgn
d140_sh06.dgn
d140_sh03.dgn
d140_sh02.dgn
d140_sh01.dgn
Core_borings
DEP_monuments
Sand_isopaths
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CCL_2002
Erosion_control_line_2000
Shoreline_armouring
ATM_shoreline
SHOALS1997_shoreline
Permitted_borrow_sites
Hard_bottom
Building_footprints
atm_south_tin
atm_north_tin
SHOALS_1997
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bo02r086.sid
bo02r092.sid
bo02r089.sid
bo02r095.sid
11470_geo.tif
Display Source
Drawing
Arial
XTools
947592.88 638613.45 Unknown

Agenda

1. Program & Organization
2. 2004, 2005 & 2006 Operations
3. Data & Products
4. Summary

For more information, please contact…..

Jennifer Wozencraft 228-252-1114

Jeff Lillycrop 228-252-1101