

*2014 RSM & EWN IPR and Working Meeting*



Engineer Research and  
Development Center

# FRM-EWN Workshop Summary

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Coastal and Hydraulics Laboratory

July 22, 2014



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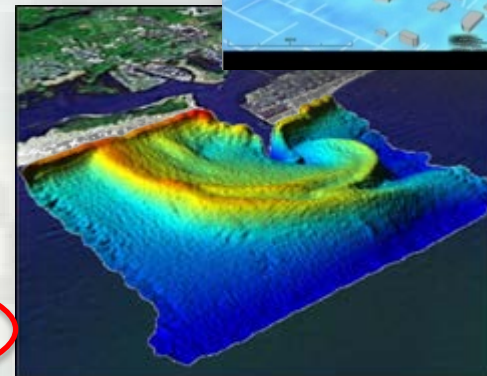
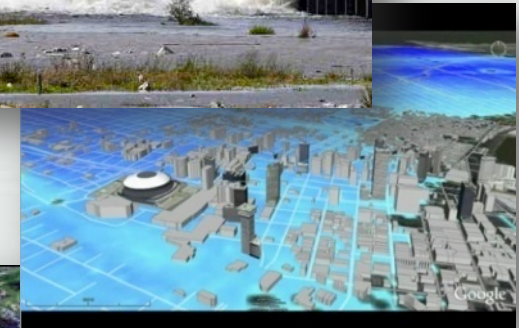
US Army Corps of Engineers  
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# FRM and R&D Nexus

## Strategic Needs & Priorities

- Determine Risk & Uncertainty for Project Alternatives Evaluation & Performance
- Optimize Design & Management of Resilient Coastal & Estuarine Resources
- Assess Comprehensive & Multidisciplinary Management of Watersheds
- Improve Flood Risk Management & Water Control Infrastructure Resiliency & Reliability
- Enable effective disaster preparation, response & recovery
- *Engineering with nature to enhance ecosystem and processes, benefits and services*
- *Deliver sound engineering and scientific solutions that meet Planning Modernization guidelines*



# FRM & EWN Collaborative Meeting

## CHL, 10-11 June 2014

- 29 Participants
- 8 CoPs/sub-CoPs:
  - Flood Risk Management
  - Emergency Management
  - Economics
  - Eco
  - HH&C
  - Sustainability
  - Regulatory
  - R&D





# Meeting Purpose & Objectives

- Introduce EWN to FRM business line
- Identify FRM-EWN demo projects
- Develop a research agenda
- Identify policy and guidance opportunities

*Horseshoe Island with Upriver Feeder Mounds*



# Outcomes & Key Themes

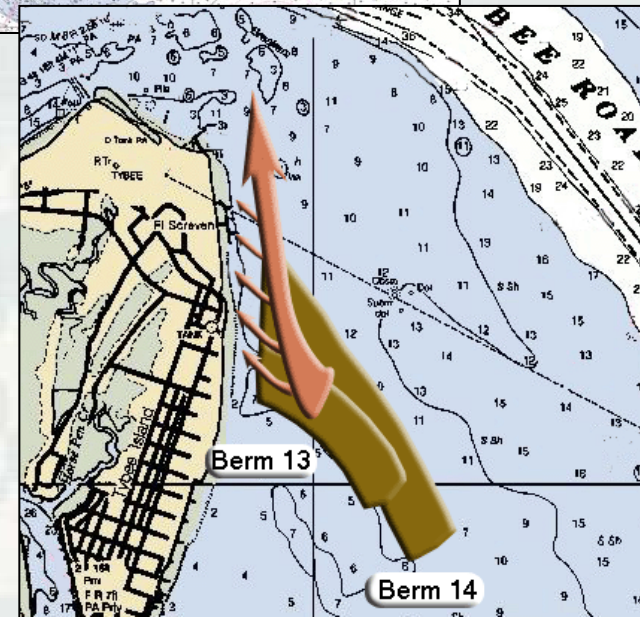
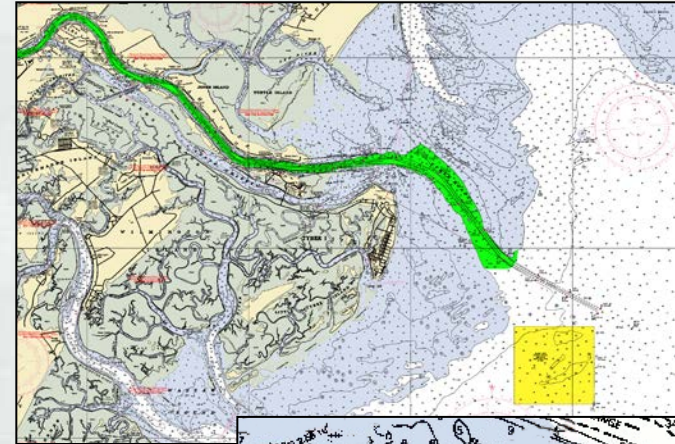
- EWN should be part of the FRM culture
- Expand EWN application
- Communicate, collaborate and engage
- Demo projects are key
- Explore new funding mechanisms



*Wave attenuation by vegetation flume experiment*

# EWN & USACE FRM Culture

- Improve operational efficiency
- Maximize benefits
- Broaden range of benefits and services
- Improve project sustainability & resilience



*Neashore strategic berm placement*



# FRM Opportunity

## Beneficial Functions of Floodplains

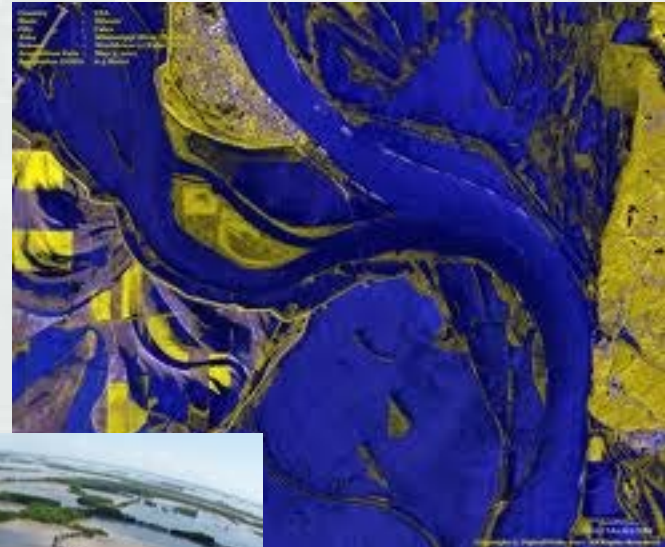
Floodplain benefits to name a few...

Storage: 1 acre x 1' depth = 330k gallons

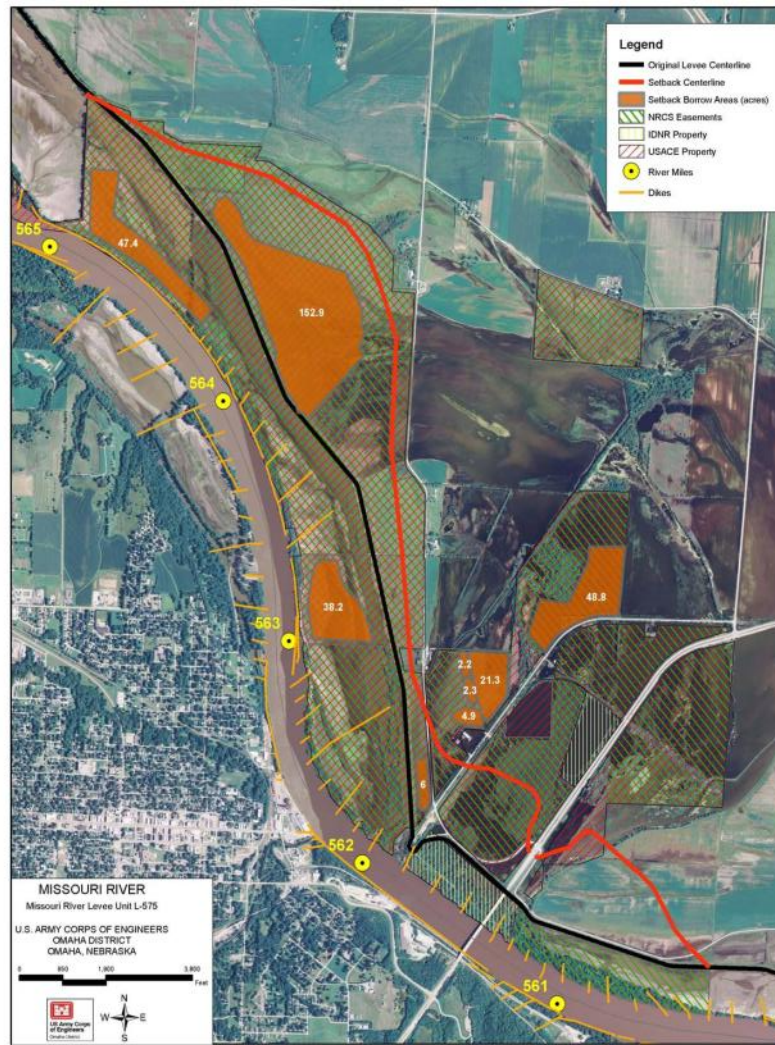
Conveyance

Water quality/  
sedimentation

Habitat



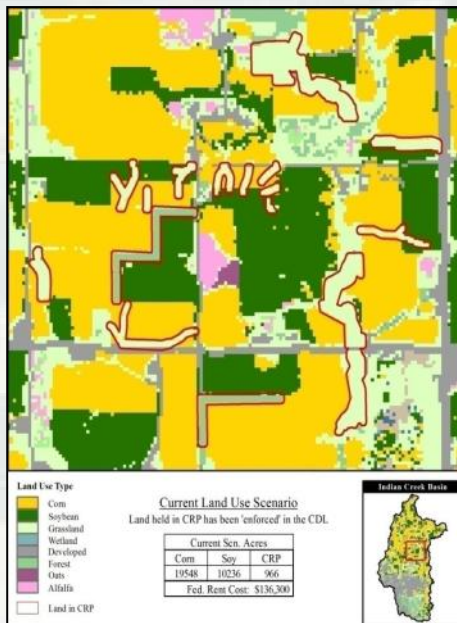
# FRM Opportunity Levee Setback/Realignment



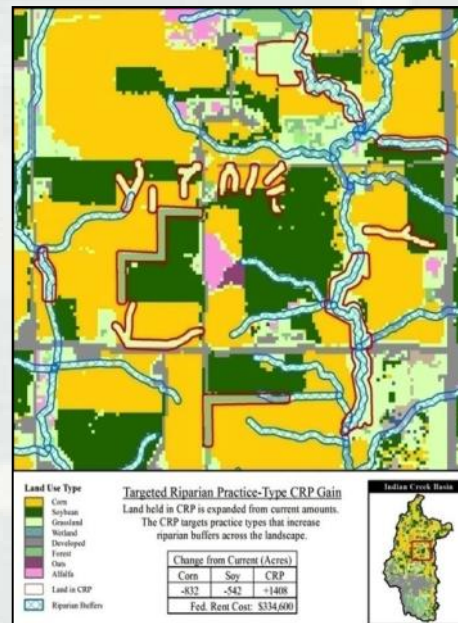


# FRM Opportunity CRP in Urbanized Watersheds

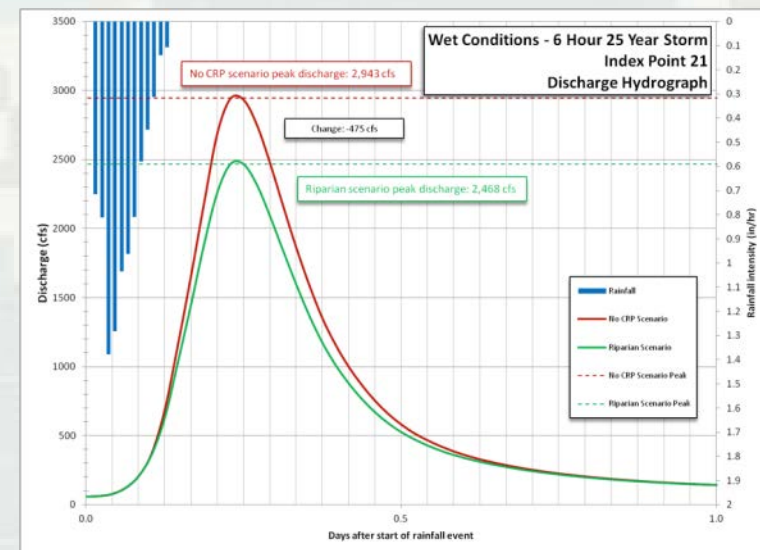
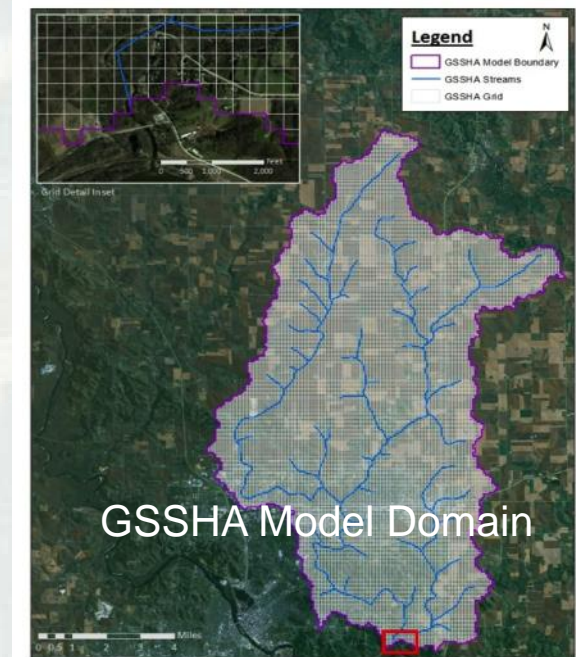
Indian Creek Basin, IA



Current Land Use



Targeted Riparian CRP Gain



# FRM Opportunity

## RhEPS Sand Boil Mitigation Concept

Field Studies have shown Bio-sealing to reduce flow rates by 5-20 times



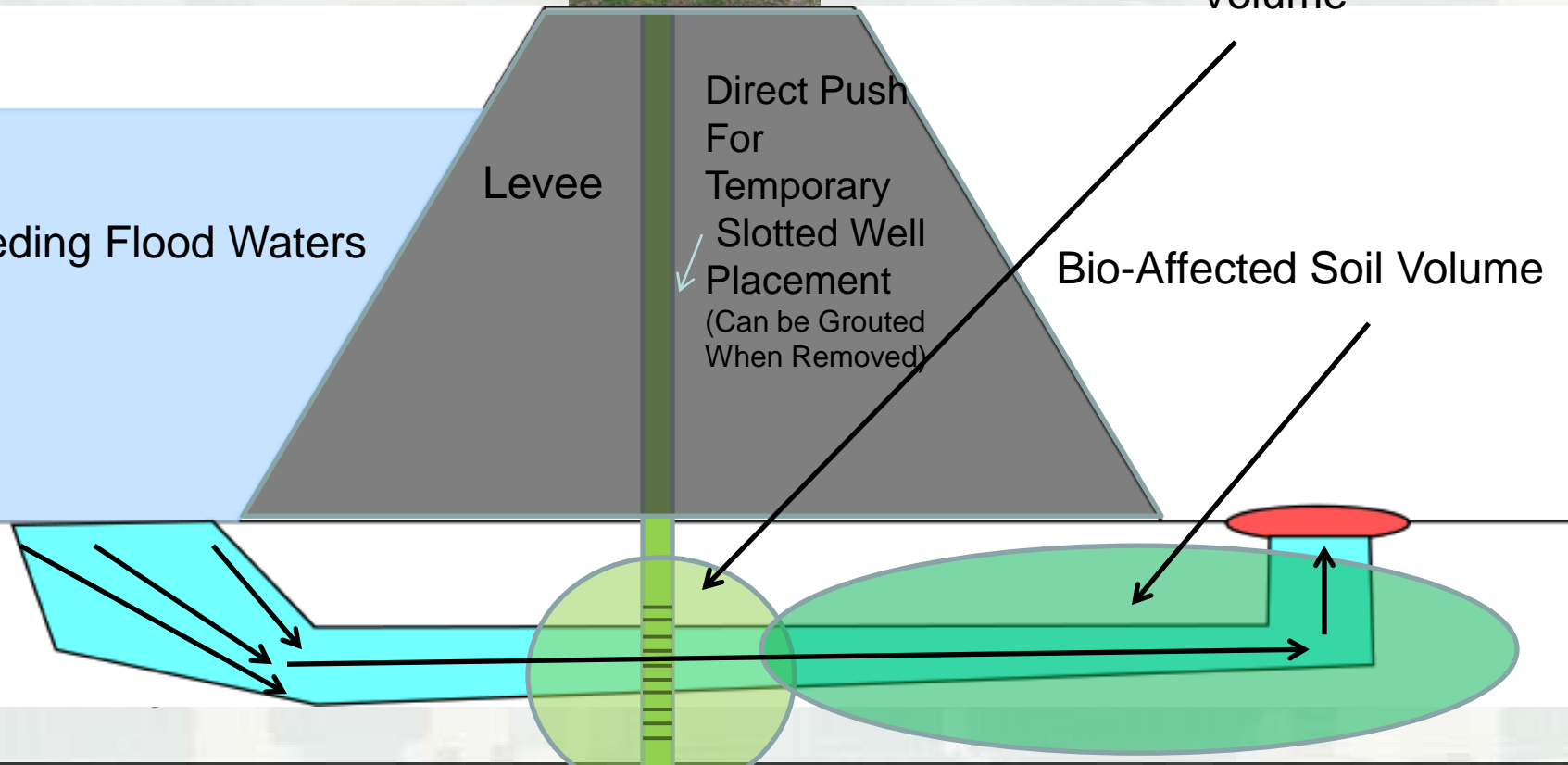
Nutrient and Microbial Consortia Placement Volume

Receding Flood Waters

Levee

Direct Push For  
Temporary  
Slotted Well  
Placement  
(Can be Grouted  
When Removed)

Bio-Affected Soil Volume



# FRM Opportunity

## Reservoir Sediment Management

### Rule Curve Adaptation



Delta Formation  
Tuttle Creek Reservoir, KS



Passing Sediment  
Sanmenxia Dam, Yellow River, China



## Natural and Nature-Based Infrastructure at a Glance

GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:  
STORM INTENSITY, TRACK, AND FORWARD SPEED, AND SURROUNDING LOCAL BATHYMETRY AND TOPOGRAPHY



### Dunes and Beaches

#### Benefits/Processes

Break offshore waves  
Attenuate wave energy  
Slow inland water transfer

#### Performance Factors

Berm height and width  
Beach Slope  
Sediment grain size and supply  
Dune height, crest, width  
Presence of vegetation



### Vegetated Features:

#### Salt Marshes, Wetlands, Submerged Aquatic Vegetation (SAV)

#### Benefits/Processes

Break offshore waves  
Attenuate wave energy  
Slow inland water transfer  
Increase infiltration

#### Performance Factors

Marsh, wetland, or SAV elevation and continuity  
Vegetation type and density



### Oyster and Coral Reefs

#### Benefits/Processes

Break offshore waves  
Attenuate wave energy  
Slow inland water transfer

#### Performance Factors

Reef width, elevation and roughness



### Barrier Islands

#### Benefits/Processes

Wave attenuation and/or dissipation  
Sediment stabilization

#### Performance Factors

Island elevation, length, and width  
Land cover  
Breach susceptibility  
Proximity to mainland shore



### Maritime Forests/Shrub Communities

#### Benefits/Processes

Wave attenuation and/or dissipation  
Shoreline erosion stabilization  
Soil retention

#### Performance Factors

Vegetation height and density  
Forest dimension  
Sediment composition  
Platform elevation

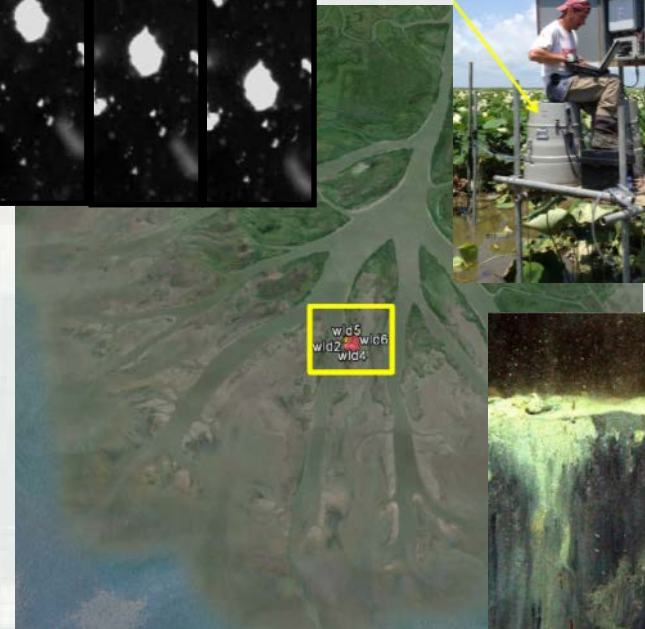
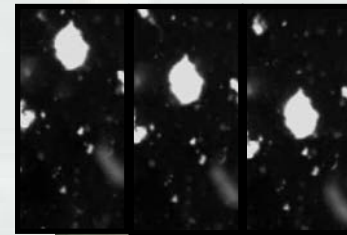
# EWN FRM Guidance & Policy Opportunities

## Under Review:

- WRDA 2014 - Resilience and sustainability
- E.O. 11988 – Floodplain management/impacts
- PL-84-99, Section 408 – SWIF
- Corporate Policy & Engineering Guidance

# Work In Progress: EWN FRM Research Agenda

- Habitat processes vs. habitat units
- Fluid-structure-sediment interaction
- Mixed sediment transport
- Large scale geomorphology
- Bioengineering



*Wetland processes research*



# Thank you

## <http://operations.usace.army.mil/flood.cfm>

Operations & Regulatory: Flood Risk Management Gateway

US Army Corps of Engineers

### Flood Risk Management Gateway

Home Visitors People Forums Learning BMPs Tools News/Events Submit Search

Help \* Contact Us

**Communities of Practice**

- USACE CoPs
  - Operations & Regulatory
    - Asset Management
    - Flood Risk Management
    - Hydropower
    - Inland Navigation Infrastructure
    - Natural Resources Management
    - Navigation
    - Operations Project Managers
    - Regulatory
    - Safety
  - Civil Works Environment

**Business Processes**

- Headquarters
- Acquisition
- Administration
- Budget
- Communication & Marketing
- Environment
- Financial Management
- Human Resources
- PMP & PgMP
- Policy & Procedures
- Programs & Partnerships
- Related Sites
- Research & Development
- Safety, Security & Risk Management
- Teams
- Tools/AIS

### Flood Risk Management Notes

Welcome to the Flood Risk Management Business Line  
Formerly Flood & Coastal Storm Damage Reduction Business Line

- FRM R&D Statements of Need

**Quick Links**

- Civil Works Engineering and Construction
- Corps Guidance on Flood Control
- Flood Damage Reduction PCX
- Flood Risk Management - Planning CoP
- FY06 Civil Works Watershed Assessments
- Glossary of terms
- Hurricane and Coastal Storm PCX
- National Flood Proofing Committee
- National Flood Risk Management Program (NFRMP)

**FRM Newsletter (Formerly FCSDR)**

- About the FRM Newsletter
- 10 December 2013
- 4 November 2013
- 16 July 2013
- All FRM Issues
- Subscribe to FRM

**Contacts**

- Flood Risk Management SmartBook
- Field Office Directory



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