

# WRDA 2016 SECTION 1184: CONSIDERATION OF MEASURES

## PCoP WEBINAR SERIES

Maria Wegner

Senior Policy Advisor

7 December 2017



US Army Corps  
of Engineers.



# I HAVE READ THE IMPLEMENTATION GUIDANCE FOR SECTION 1184 OF WRDA 2016

YES

NO



# TODAY'S TOPICS

- Big Picture (Context)
- Implementation of Section 1184
- A little more on NNBF
- POCs
- Questions



# BLUF

- Defined Natural and Nature Based Features
- For FRM, CSR, and ER projects, it requires consideration of:
  - Natural features
  - Nature-based features
  - Nonstructural measures
  - Structural measures
- Reporting requirement



US Army Corps  
of Engineers.



## BLUF PART TWO

- Good formulation already considers natural, nature-based, nonstructural, and structural measures alone and in combination
- IG outlines consideration for the formulation and evaluation of NNBF and the reporting requirement
- Additional work is needed to understand performance of emerging NNBF



# A LITTLE ON NATURAL AND NATURE BASED FEATURES

## Definitions and Examples



Mordecai Island

File Name



US Army Corps  
of Engineers.



# DEFINITIONS (FROM THE IG)

- Natural Features
  - Those features created through the action of physical, geological, biological, and chemical processes over time.
- Nature-based features
  - Those features created by human design, engineering, and construction that work in concert with natural processes or to mimic as closely as possible conditions which would occur in the area absent human changes to the landscape or hydrology in order to achieve study objectives.



# EXAMPLES OF NNBF: COASTAL STORM RISK

## 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



US Army Corps of Engineers.



# EXAMPLES OF NNBF



File Name



US Army Corps of Engineers.



# EXAMPLES OF NNBF: FLOOD RISK MANAGEMENT



Photo by F. Carter Smith, courtesy Houston Parks Board



Photo from HCFCD

# EXAMPLES OF NNBF: ECOSYSTEM RESTORATION



File Name



US Army Corps  
of Engineers.



# THE BIG PICTURE



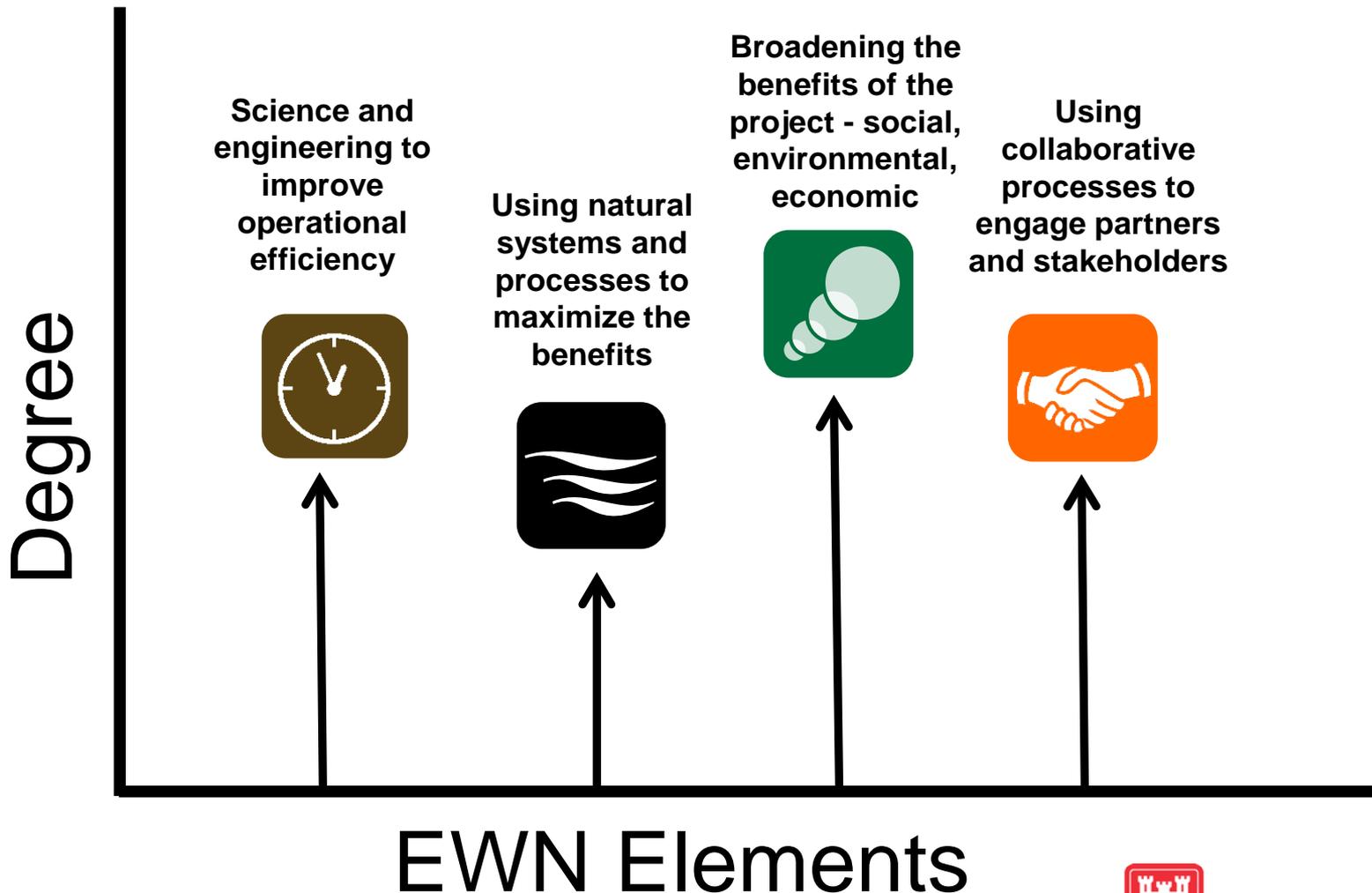
# ONGOING ACTIVITY

- June 2017 Dalton memo: Further Advancing Project Delivery Efficiency and Effectiveness of USACE Civil Works
  - Line of Effort 5: Incorporate Social and Environmental Benefits in to Project Formulation, Design, and Implementation

a. Planning is conducting an effort to incorporate concepts of integrated water resources management, climate variability, resilience, sustainability, natural and nature-based solutions, and ecosystem goods and services into Planning guidance and procedures;



# Engineering With Nature Elements



Dr. Todd Bridges – from October 2015 PCoP Webinar:  
<https://planning.ercd.dren.mil/toolbox/resources.cfm?Id=0&WId=275&Option=Planning%20Webinars>



US Army Corps  
of Engineers.



# MORE ON ENGINEERING WITH NATURE

## Engineering With Nature to Create Project Value

Dr. Todd S. Bridges

Senior Research Scientist, Environmental Science  
U.S. Army Engineer Research and Development Center,  
U.S. Army Corps of Engineers  
todd.s.bridges@usace.army.mil

Planning CoP Webinar

October 15, 2015



Engineering With Nature website  
<https://ewn.el.erd.c.dren.mil/>

October 2015 PCoP Webinar  
by Dr. Todd Bridges

<https://planning.erd.c.dren.mil/toolbox/resources.cfm?Id=0&WId=275&Option=Planning%20Webinars>

**UPCOMING EVENTS**

30 Jul - 3 Aug 2018 International Conference on Coastal Engineering 2018  
Baltimore, Maryland

**WHAT'S NEW**

- Working with Nature in Rivers: Managing Ecosystem Services and Risks Short Course, Pittsburgh, Pennsylvania - September 2017
- Building a Resilient Scheldt Delta Conference, Vlieland, Netherlands, June 2017
- ERDC-SWG Demonstration Workshop on Engineering with Nature, Galveston, TX Mar 2017
- USACE-NOAA Collaboration Workshop on NNRF February 2017

**EWN NEWS**

- EWN initiative plays role in wetland restoration - August 2017
- EWN team presented WEDA's 2017 Environmental Excellence Award - June 2017
- EWN featured on Dredging Today.com - March 2017
- EWN featured on Dredging Today.com - March 2017
- EWN field-based workshop, Galveston, TX - March 2017

US Army Corps  
of Engineers.



# ONGOING ACTIVITY

- Research and Development
  - Processes, performance, and more
  - Modeling to reflect the systems and broad application
  - Monitoring technologies
- International Guidebook
- External Collaboration



# IMPLEMENTING SECTION 1184

## Plan Formulation



US Army Corps  
of Engineers.



# PLAN FORMULATION CONSIDERATIONS

objectives. Consistent with Section 1184(b) and existing policy, study teams must consider natural and nature-based features alone and in combination with other nonstructural and structural measures, **as appropriate**, when formulating and evaluating alternatives to meet study objectives for flood risk management, hurricane and storm

- What is appropriate?
  - Connect effectiveness to study objectives
  - Systems context
    - Interactions between human, natural, and built environment
    - Interactions between the measures and features of the alternative
  - Process context (Physics, geology, biology, chemical, etc)

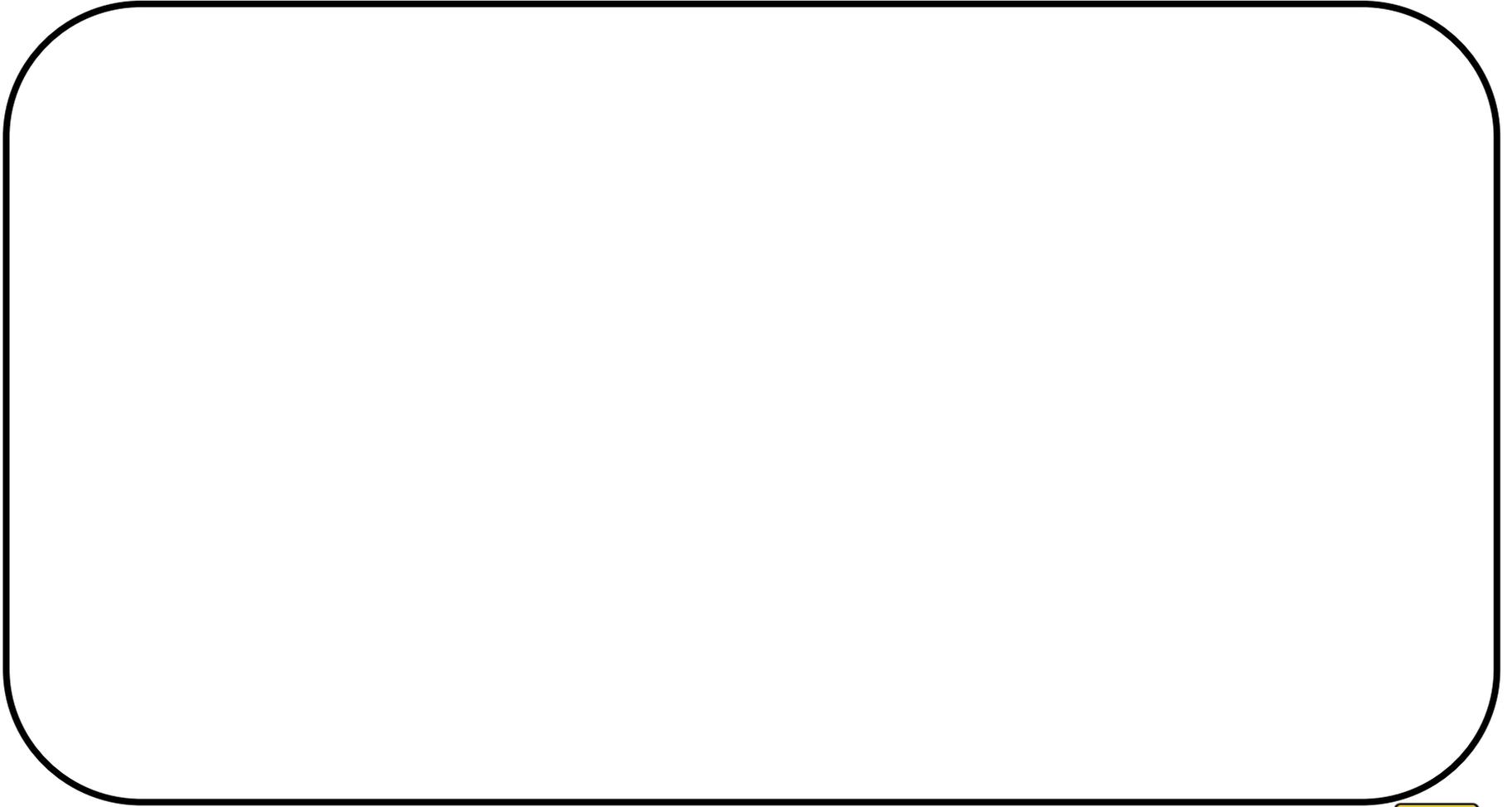


# MORE CONTEXT CONSIDERATIONS

- In which settings are NNBF effective? At what scale?
- Who and what is at risk?
- Alone? In combination?
- Can we avoid disrupting natural processes/features that provide some benefit now?
- Which combinations avoid incompatibilities while reinforcing functions and outputs?
- Uncertainty



# ONE TYPE OF NNBF I WOULD LIKE MORE INFORMATION ON IS:



File Name



US Army Corps  
of Engineers.



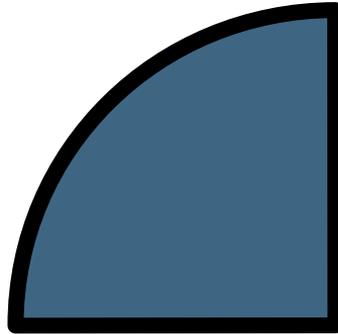
# IMPLEMENTING SECTION 1184

## Plan Evaluation

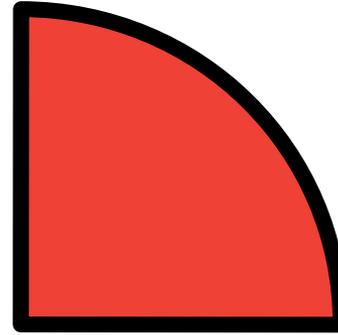


# Evaluation Considerations

**National  
Economic  
Development**

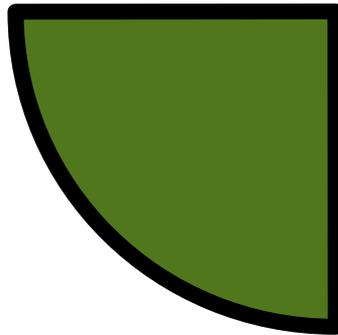


**Regional  
Economic  
Development**

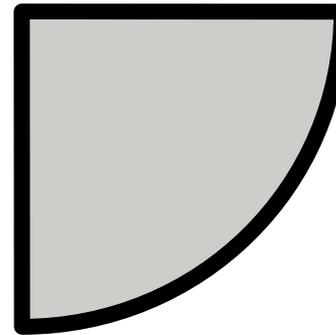


## Four Accounts

**Environmental  
Quality**



**Other Social  
Effects**



US Army Corps  
of Engineers.



# EVALUATION CONSIDERATIONS

- Effectiveness
  - Reliability, performance over time and across a range of conditions
    - Some features better understood than others
    - Engage experts if in doubt
- What do the models capture and what is missing?
- Long-term OMRR&R
  - How much damage before replacement or another strategy is needed?
  - Self-sustaining features
  - Adaptive management?



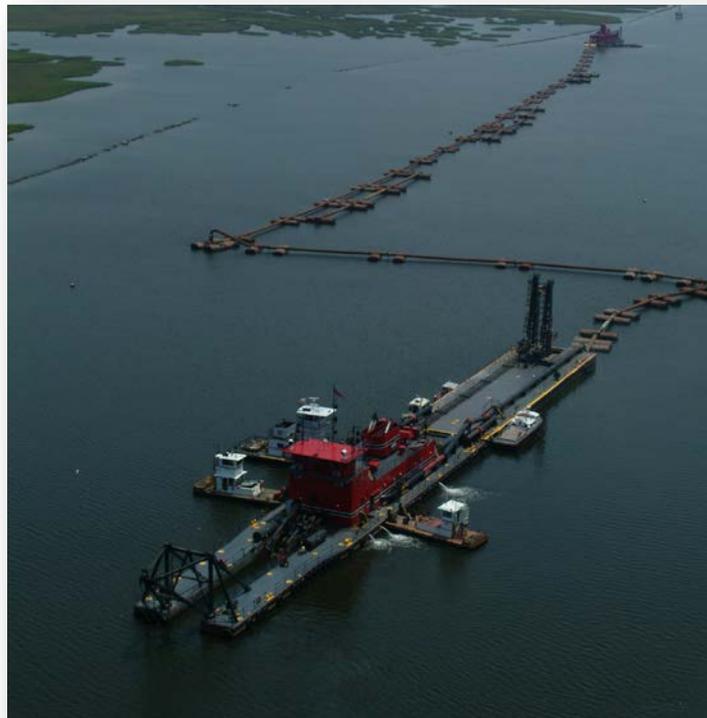
# IMPLEMENTING 1184

## Recommendation



# RECOMMENDATION

- Current policy applies
  - NED, NER, combined NED/NER or...
  - LPP or...
  - Exception to NED with ASA(CW) approval



## REPORT (TO AID WITH THE REPORTING REQUIREMENT)

- For CSRM studies, the Executive Summary must include how natural and nature based features, nonstructural measures, and structural measures were formulated, evaluated, and compared
  - Cost
  - Benefits
  - Impacts
  - Trade-offs



# IMPLEMENTING 1184

Some Challenges and Needs



# CHALLENGES

- Which new, or adjustments to old, tools are needed?
- How much economic efficiency are we willing to trade for non-monetary outputs?
- What constitutes “the system”?
- How do we design NNBF?
- What’s the right mix of NNBF and more conventional measures?
- How do we evaluate engineering performance of NNBF?



# HELP!

When the District and MSC don't know, who do we contact?



# POINTS OF CONTACT AND MORE

- Engineering
  - Mr. Sean Smith, Principle Hydrologic and Hydraulic Engineer (HQUSACE)
- Planning and Policy
  - Ms. Maria Wegner, Senior Policy Advisor (HQUSACE)
- Engineering with Nature
  - Dr. Todd Bridges, Senior Research Scientist (ERDC)
- Additional resources
  - Planning Centers of Expertise



**MORE TO COME IN 2018 AND  
BEYOND!**



# INTERACTIVE QUESTION/SLIDE

What do you need to improve implementation of the guidance?



# Questions?

Type questions in the chat box.  
We will answer as many  
as time allows.

This webinar will be posted to the  
Planning Community Toolbox:  
<http://www.corpsplanning.us>



US Army Corps  
of Engineers.



# SECTION 1184 OF WRDA 2016

SEC. 1184. Consideration of measures.

(a) Definitions.—In this section, the following definitions apply:

(1) NATURAL FEATURE.—The term “natural feature” means a feature that is created through the action of physical, geological, biological, and chemical processes over time.

(2) NATURE-BASED FEATURE.—The term “nature-based feature” means a feature that is created by human design, engineering, and construction to provide risk reduction in coastal areas by acting in concert with natural processes.

(b) Requirement.—In studying the feasibility of projects for flood risk management, hurricane and storm damage reduction, and ecosystem restoration the Secretary shall, with the consent of the non-Federal sponsor of the feasibility study, consider, as appropriate—

- (1) natural features;
- (2) nature-based features;
- (3) nonstructural measures; and
- (4) structural measures.

(c) REPORT TO CONGRESS.—

(1) IN GENERAL.—Not later than February 1, 2020, and 5 and 10 years thereafter, the Secretary shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of Representatives a report on the implementation of subsection (b).

(2) CONTENTS.—The report under paragraph (1) shall include, at a minimum, the following:

(A) A description of guidance or instructions issued, and other measures taken, by the Secretary and the Chief of Engineers to implement subsection (b).

(B) An assessment of the costs, benefits, impacts, and trade-offs associated with measures recommended by the Secretary for coastal risk reduction and the effectiveness of those measures.

(C) A description of any statutory, fiscal, or regulatory barriers to the appropriate consideration and use of a full array of measures for coastal risk reduction.



US Army Corps  
of Engineers.

