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# AFC Theme 2
# Risk Informed Decision Making

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Risk Informed Decision Making
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ACTIONS for CHANGE

# Theme 2
# Risk Informed Decision Making

**Theme 2 emphasizes integrated risk management**

- USACE will use risk and reliability concepts in planning, design, construction, operations and major maintenance and to improve its review of completed works program

ACTIONS for CHANGE

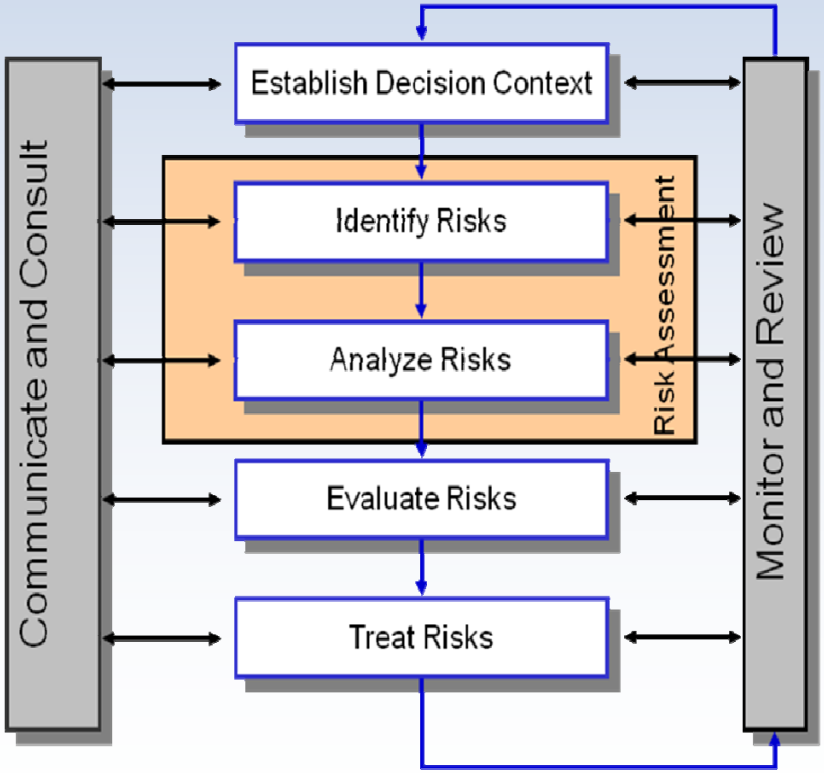
# Risk Informed Decision Making

**Infuse risk assessment and risk management into the life-cycle of a CW project**

- Recognize all risks
  - property, people, economy, environment, and cultural impacts
- Acknowledge uncertainty
- Collaborate with stakeholders throughout

# Risk Management

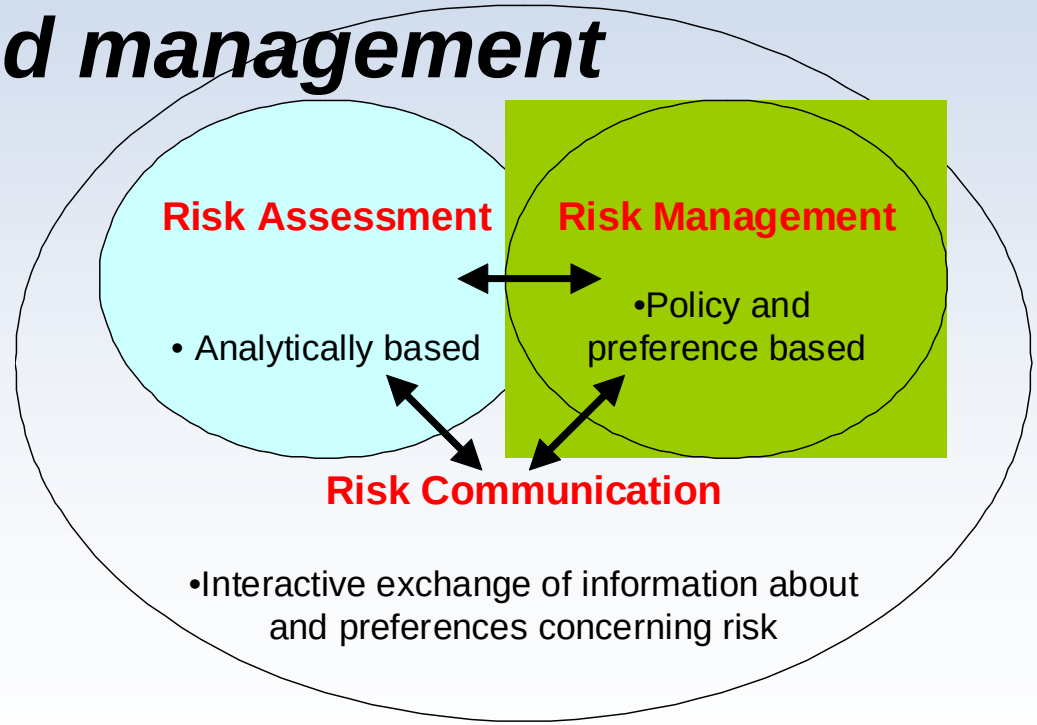
- **The process of identifying the problem and taking action to alter levels of risk**



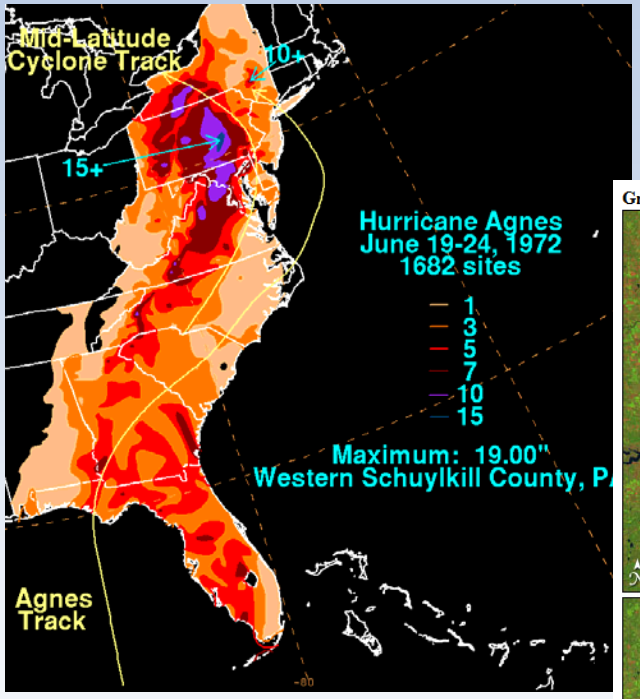

ACTIONS for CHANGE

# Risk Analysis

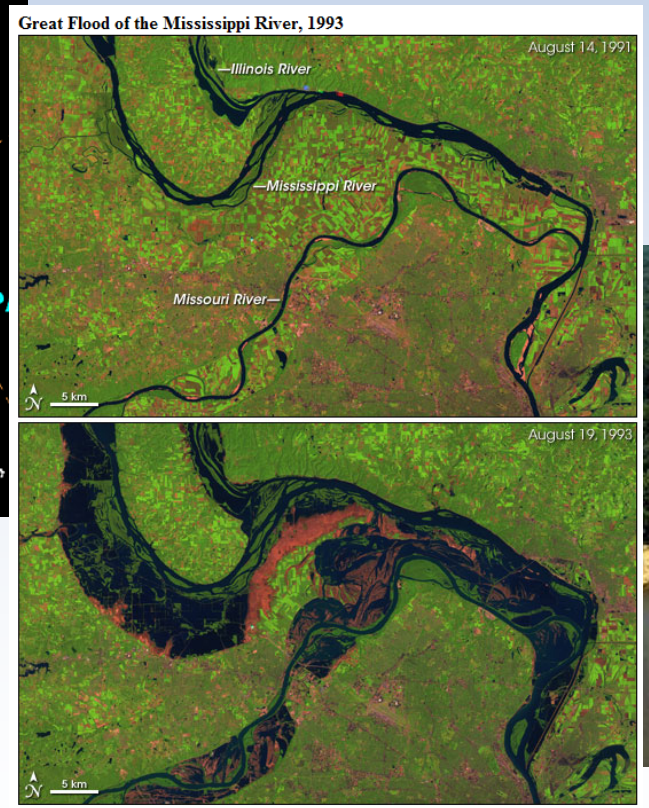
- ***Theme 2 tasks organized around risk analysis framework with focus on assessment and management***



# Assess Risks



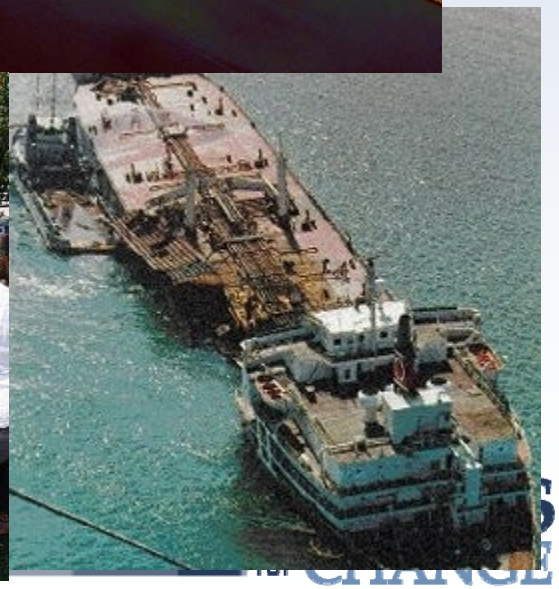

Risk sources may be natural or man-made



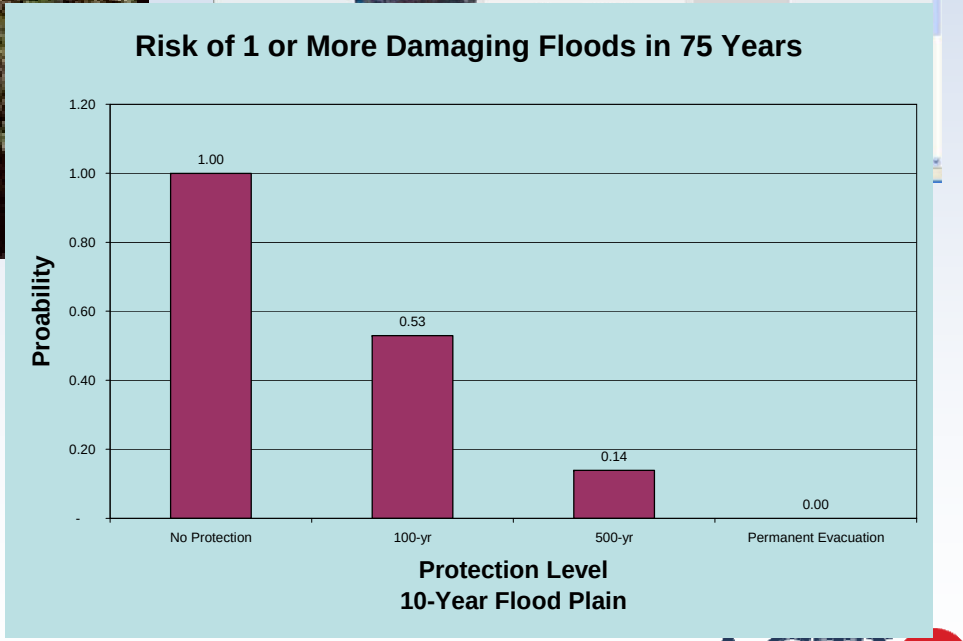
ACTIONS for CHANGE

# Manage Risks

There are good outcomes from risk management, but not always.



# Communicate Risks




Inform or change behavior?

ACTIONS for CHANGE

# Language is Important

- ***When federal officials repeatedly refer to "100 year" floods and levees designed to protect against them, they mislead people into thinking that such storms are once-in-a-lifetime events. Whatever statistical validity these terms ever had, they no longer serve the public, and the government would do better to drop them.*** **USA Today, 8 July**

ACTIONS for CHANGE

# Theme 2 Program Overview

**Risk Analysis Concepts, Models and Tools**

- Development of Flood Risk Management Tools
- Life-cycle Risk Management Framework
- Risk Technology Workshops

**Policy, Guidance and Standards**

- Tolerable Risk Policy
- Levee Certification

**Completed Works**

- Levee Risk Assessment Methodology, Policy and Procedures
- Reassess Levee Failure Mechanisms Based on IPET

**Invest in Research**

- Infrastructure Risk and Reliability Models and Tools
- Stage and Flow Frequency Limits
- Coastal Storm and Ecosystem Effectis Integration
- Engineering Models for Hurricanes

ACTIONS for CHANGE

# Status of Selected Theme 2 Actions

ACTIONS for CHANGE

# Development of Flood Risk Management Tools

- **Background**
  - Existing analysis tools are not system based and do not include a full range of flooding consequences. NRC panel recommended some improvements in 2000 report
- **Objective**
  - Develop conceptual strategy and methodology for a new flood damage analysis tool to align with the NRC recommendations and the Actions for Change.
  - This new software should be able to analyze the engineering and operational reliability of local protection systems as systems and to estimate consequences beyond economics to include loss of life.
- **Lead: Mike Deering--HEC**

ACTIONS for CHANGE

# Development of Flood Risk Management Tools

- **Status**
  - White paper developed and distributed recommending the basic design parameters of the new model currently referred to as HEC-FDA 3.0
  - Workshop with the dam and levee safety methodology team on HEC-FDA 3.0 and their model
  - Developing proof of concept model in conjunction analytical requirement of Section 408 for changes to existing levees in California

ACTIONS for CHANGE

# Life-Cycle Risk Analysis Framework

- **Background**
  - Risk approaches are not universally available to assist complex decision-making. As a result, the significance of life safety, social, environmental, and economic consequences have not been fully considered, resulting in a less-informed set of solutions from which to select. Also, there are many different decision-makers on the different measures and components of the solution, and thus their values and objectives need to be put into context with other stakeholders.
- **Objective**
  - To develop a comprehensive, multidisciplinary approach to integration of risk concepts in planning, engineering, operations, and emergency management, with the focus on a tool and process to allow decision-makers to see impacts on the full range of objectives.
- **Lead: Todd Bridges—ERDC and David Moser—IWR**

ACTIONS for CHANGE

# Life-Cycle Risk Analysis Framework

- **Status**
  - White paper on transforming the Corps into a risk managing organization
  - Executive session on Risk management for HQ  11 July 2008
  - Draft white paper “Risk informed planning” July 2008
  - Draft white paper “Proposed Risk management process for civil works” paper—August 2008

ACTIONS for CHANGE

# Risk Technology Workshops

- **Background**
  - The Corps has been doing risk assessments as part of flood risk management and major rehabilitation since 1992. These have introduced risk methods but the results have typically only been used based on expected values and single metrics. More extensive use of risk assessments to manage risks will be part of the way the Corps does business in the future.
- **Objective**
  - Risk informed decision making is new to the Corps. All Corps personnel need to be informed and educated on the basics of what will be expected in the future.
  - Training will include 2-hour executive level
- **Lead: Brian Harper--IWR**

ACTIONS for CHANGE

# Risk Technology Workshops

- **Status**
  - Two risk analysis training classes held in 2008 as part of regular training
    - Developing curriculum for education classes based on this class
  - First week session scheduled for Nov 2008
  - Curriculum for executive and short course under development

ACTIONS for CHANGE

# Tolerable Risk Policy

- **Background**
  - Tolerable risk is a concept used to inform risk management decisions. Establishing tolerable risk involves balancing the fundamental competing principles of equity, the right of individuals and society to be protected, and efficiency, the need that society has to distribute and use its available resources in such as way as to gain maximum benefit. Tolerable risk guidelines are used to guide the process of examining and judging the significance of risk and in managing the risk
- **Objective**
  - To develop and appropriately implement tolerable risk policy to aid Corps decisions, primary related to dams and levees.
- **Lead: Brian Harper and David Moser—IWR**

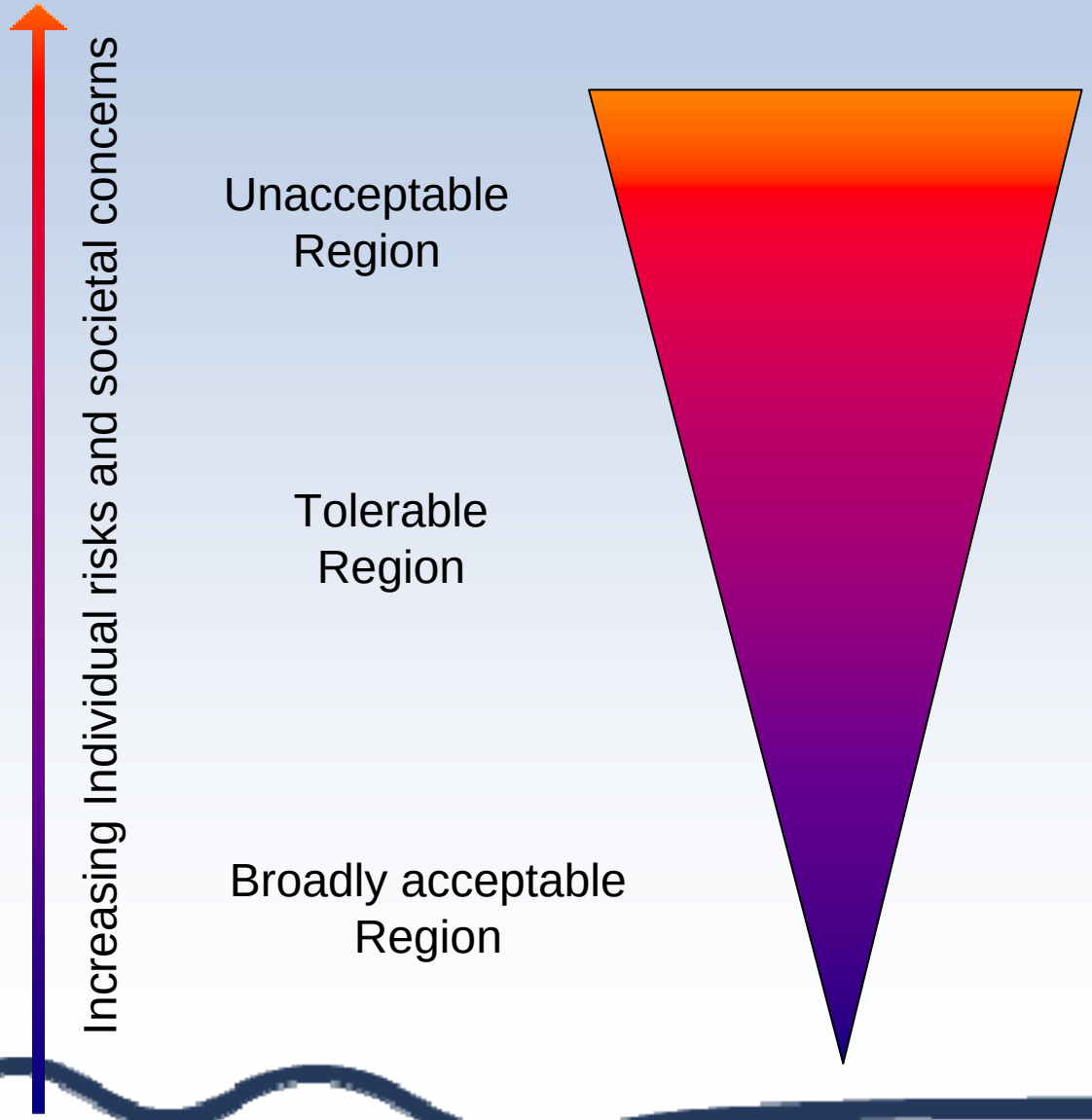
ACTIONS for CHANGE

# Tolerable Risk Policy

- **Status**
  - International workshop on tolerable risk held in Alexandria, VA 18-19 March 2008 sponsored by USCE, USBR, and FERC
  - Draft interim tolerable risk policy for dam safety—Draft completed July 2008
  - Continuing development for dams and levees

ACTIONS for CHANGE

# Tolerable Risk




Unacceptable Region

Risk cannot be justified except in extraordinary circumstances

Tolerable Region

People and society are prepared to accept risk in order to secure benefits

Broadly acceptable Region

Risk regarded as insignificant, further effort to reduce risk not required

ACTIONS for CHANGE

# Levee Risk Assessment Methodology, Policy and Procedures

- **Background**
  - Levee inspection was an issue identified by IPET. Risk analysis methods and tools specifically for levees are not available to assist complex decision-making regarding levees. The Corps of Engineers has approximately 2,000 miles of levees in its nationwide portfolio and approximately 10,000 miles of levees USACE has constructed and turned over to locals for O&M. However, USACE has minimal tools, policies, and procedures to implement a sustainable approach to levee risk management.
- **Objective**
  - This effort will develop comprehensive, tools, policies, and procedures to implement a robust Corps of Engineers Levee Safety Program. Products will provide a foundation for the Corps of Engineers' Levee Safety Program.
- **Lead: Michael Bart—MVP**

ACTIONS for CHANGE

# Levee Risk Assessment Methodology, Policy and Procedures

- **Status**
  - Leverage AFC funds with National Levee Safety Team
  - Screening tool to characterize Corps of Engineers portfolio of levees nearing beta test

ACTIONS for CHANGE

# Reassess Levee Failure Mechanisms Based on IPET

- **Background**
  - Investigations of the hurricane protection systems in Louisiana identified possible deficiencies in the guidance used to design I-walls. The (USACE) issued directed guidance regarding these deficiencies in a memorandum to MSC's. USACE needs to develop, peer review and deploy Detailed Evaluation Guidance for I-walls that pose risk of not performing as designed
- **Objective**
  - To develop the engineering and science to provide more definitive detailed guidance on dealing with I-wall performance across the nation. The approach is intended to be used for existing and any new I-walls across the country.
- **Lead: Kent Hokens—MVP and Anjana Chudgar—HQUSACE**

ACTIONS for CHANGE

# Reassess Levee Failure Mechanisms Based on IPET

- **Status**
  - PDT formed Nov 2007
  - Numerical model for I-wall performance under development
  - Test site soil investigations for data underway

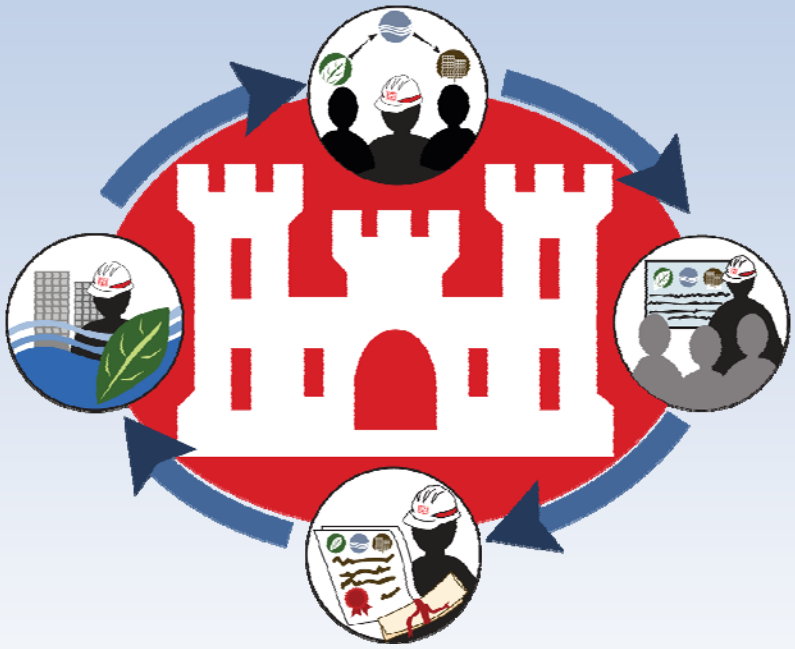
ACTIONS for CHANGE

# Research

- **Infrastructure Risk and Reliability Models—proposed FY09 start**
- **Coastal Storm and Ecosystem Effects Integration—proposed FY09 start**
- **Engineering Model for Hurricanes—building on work done for IPET and TFH**
  - developing storm modeling for MORPHOS which is ongoing

ACTIONS for CHANGE

# Questions?



To learn more about Actions for Change
visit us on the web at
**https://maps.crrel.usace.army.mil/AFC/**

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