

# ZOAR LEVEE & DIVERSION DAM

## Muskingum River Basin, Tuscarawas River, OH

### INTRODUCTION TO DAM SAFETY MODIFICATION STUDY PROCESS & PUBLIC PARTICIPATION

**COL. Robert D. Peterson**  
**Commander,**  
**Huntington District**  
**21 March 2011**



US Army Corps of Engineers  
**BUILDING STRONG®**



# Agenda

- History of Zoar Levee & Diversion Dam
- Study Process
- Public Participation



## Project Features:

Levee: 3,900 ft. (L) x 45 ft. (H) ; Crest El. 928.5 (min.); Crest Width varies min. 8 ft. to max. 60 ft.

Pump Station:  
30,000 gallons per minute (twin 125 hp motors rated at 15,000 gallons per minute capacity each)

Diversion Dam:  
440 ft. (L) x 35 ft. (H)  
Crest El. 934

Diversion Channel:  
Invert El. 916



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# Zoar Levee & Diversion Dam

- Dam Safety Action Classification (DSAC) I
  - ▶ Confirmed by Independent External Peer Review (IEPR) Panel of Experts
- Alert Pool For Levee is Elevation 900
  - ▶ Observations and monitoring by field personnel, supplemented with district office personnel
- Levee Can withstand Pool Elevation 909 (90-year event, 1.1% annual chance)
- Dam – no permanent pool recommended
- Emergency Actions if necessary



# Zoar Levee & Diversion Dam

- Dam Safety Action Classification (DSAC) I
  - ▶ Urgent & Compelling
  - ▶ Characteristics – progression toward failure is confirmed to be taking place under normal operations
  - ▶ Actions – immediate action to avoid failure, validate classification, implement interim risk reduction measures, and conduct heightened monitoring and evaluation



# Zoar Levee & Diversion Dam

## ■ Project History

- ▶ 1936-37 - Constructed Levees (1 & 2) Crest El. 919, Diversion Dam crest El. 934, Diversion Channel invert El. 916
- ▶ 1947 - Dover Pool reaches 902.7, significant underseepage
- ▶ 1948 – Added 14 Relief Wells along landward toe (40 ft. deep on 125 ft. spacing) & 13 Piezometers installed between wells
- ▶ 1950-51 - Raised & Joined levee embankments – Crest El. 928.5 & Constructed Pump Station
- ▶ 1975-2010 - Shallow slides on embankment
- ▶ 1992 - Install new manhole extensions and outlet pipes on existing Relief Wells



# Zoar Levee & Diversion Dam

- Project History – continued
  - ▶ 1993 Diversion Dam – Installed Upstream Seepage Control, Downstream Seepage Blanket and Collection System



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# Zoar Levee & Diversion Dam

- Project History – continued
  - ▶ 1994-95 - Installed 3 replacement relief wells RW-11, 12, and 13 & added 5 piezometers
  - ▶ 1997 - Levee Embankment Reanalysis Report and Diversion Dam Adequacy Analysis Report
  - ▶ 2005 - Record High Water Event, El 907.4, Filter Fabric & Sand bag rings for boils



# Zoar Levee & Diversion Dam

- Project History – continued
  - ▶ 2008 – Installed Emergency Filter Blanket



# Zoar Levee & Diversion Dam

- Project History – continued
  - ▶ 2008-09 - Rehab Relief Wells, Interior Collection System & Abandonment of Old Relief Wells



# Zoar Levee & Diversion Dam

- Project History – continued
  - ▶ 2009-Present – Installing Emergency Generator & 3<sup>rd</sup> Pump

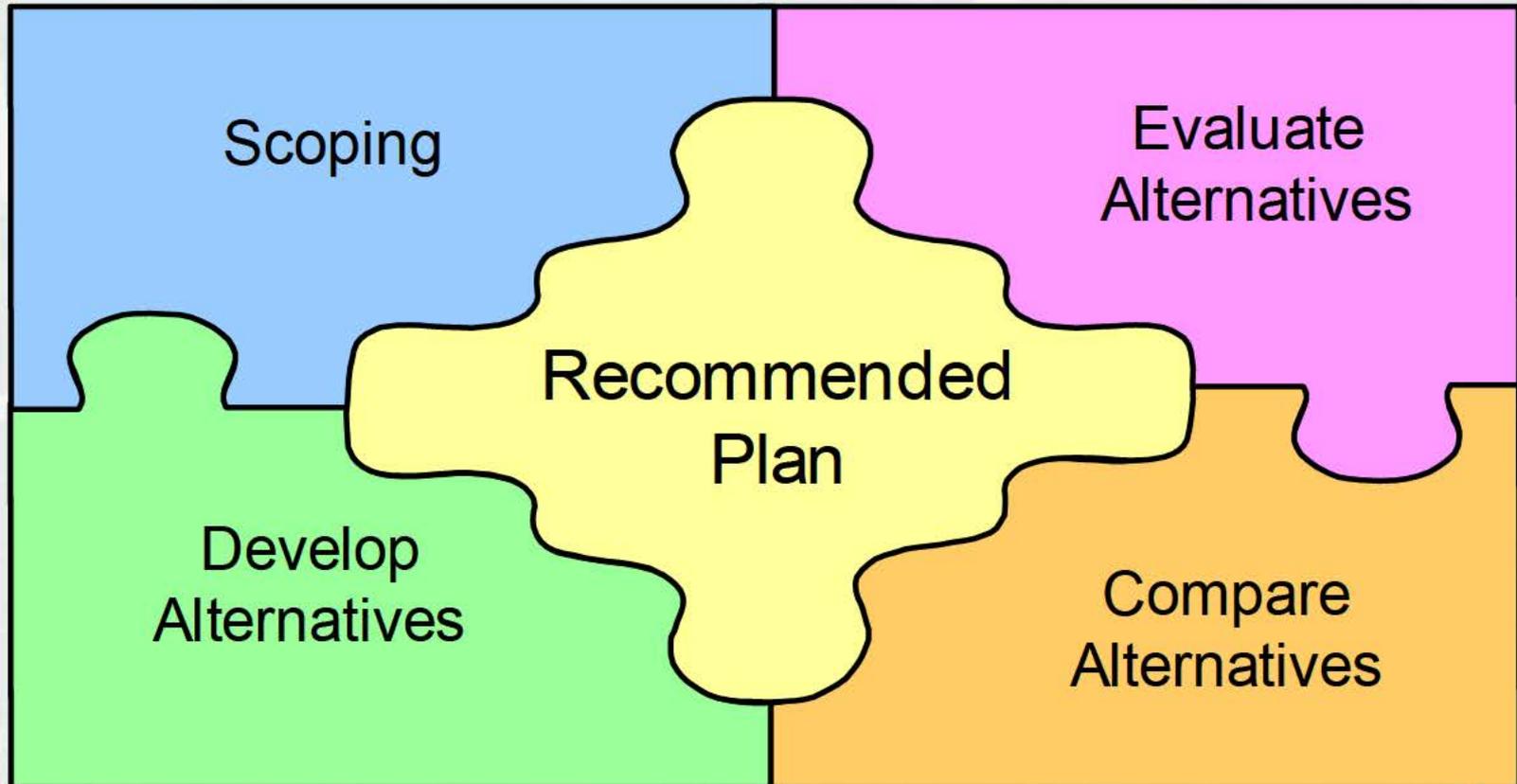


# Zoar Levee & Diversion Dam

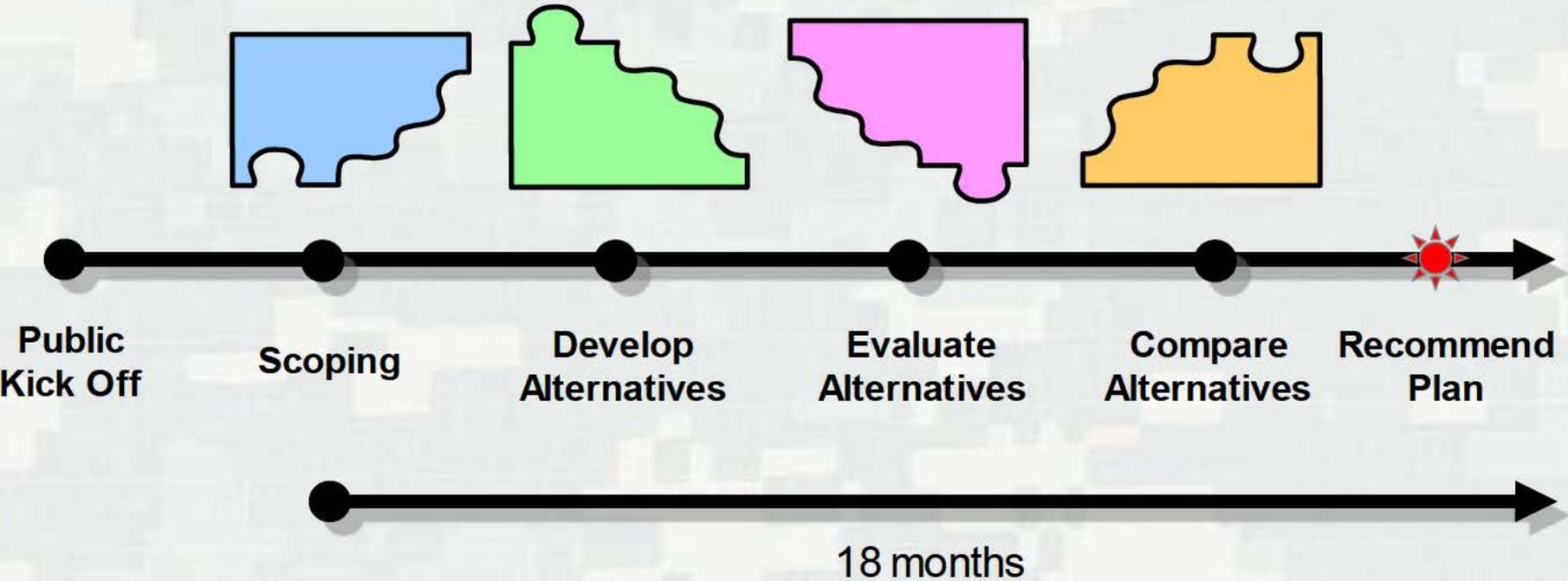
- Prior Efforts for Major Rehabilitation Report
- Section 2033 of WRDA 2007, Nov. 8, 2007
- ER 1110-2-1156
  - ▶ Prepare a Dam Safety Modification Report
  - ▶ Risk Reduction Plan



# Civil Works Studies Main Phases



# Civil Works Timeline



# 6 Step Study Process

1. Determine Scope of the Study
2. Defining Potential Consequences
3. Identify Alternatives
4. Evaluate Alternatives
5. Compare the Alternatives
6. Identify the recommended plan.



# Types Of Measures

Including but not limited to...

- Structural Measures: Modify The Structure To Reduce Risk

- ▶ Cut-off walls
- ▶ Seepage blankets / berms
- ▶ Relief wells
- ▶ Rehab pumps
- ▶ Relocate / reconstruct dam
- ▶ Abutment grouting
- ▶ Consider replacement of levee and/or dam



- Non-Structural Measures: Modify The Environment To Reduce Risk

- ▶ Acquisition
- ▶ Flood Warning Early Evacuation Plan
- ▶ Flood-proofing
- ▶ Breaching & Abandonment of the Levee And / Or Diversion Dam



# Additional Selection Considerations

- National Environmental Policy Act (NEPA)
- National Historic Preservation Act (NHPA)



# National Environmental Policy Act (NEPA)

- All reasonable alternatives
- Consider impacts to:
  - ▶ Social Environment
  - ▶ Cultural Environment
  - ▶ Natural Environment
- Avoid, minimize, or mitigate impacts



# National Historic Preservation Act

- **FACT:** Zoar Village is listed in the National Register of Historic Places
  - Levee and Diversion Dam also potentially eligible for inclusion on the National Register

## Goals

- Avoid, minimize, and/or mitigate adverse effects to historic properties



# Public Participation Plan

- Seek public participation during the study process to help us evaluate alternatives
- How:
  - A Community Advisory Board
  - Regular public meetings
  - Establish mailing distribution list



# Public Participation Plan

## ***Community Advisory Board***

- PURPOSE:
  - Unify the voice of the community
- HOW:
  - Fill out the form in your packet
  - Email us at: [zoarlevee@usace.army.mil](mailto:zoarlevee@usace.army.mil)
  - Call us 304-399-5720



# Public Participation

## *Public Meetings*

- PURPOSE: To get input on scoping and the evaluation/comparison of alternatives
- HOW:
  - Participate in the meetings to give **YOUR** input and to receive updates to the study process



# Public Participation

## *Mailing Lists*

- PURPOSE: Keep public up to date on all activities, meetings, and milestones
- HOW:
  - Fill out the form in your packet
  - Email us at: [zoarlevee@usace.army.mil](mailto:zoarlevee@usace.army.mil)
  - Call 304-399-5720
  - Write us



# Path Forward

## Our Goals Tonight

- To inform you of the study process and draft Public Participation Plan
- To get your input on our Public Participation Plan
  - Input requested in the next 30 calendar days

## In the Future

- Begin with a public and agency scoping meetings
  - 24 May 2011

### Ways to submit ideas and comments this evening:

- Comment Cards
- Talk To A Team Member After The Meeting
- Call us: (304) 399-5720
- Email us: [zoarlevee@usace.army.mil](mailto:zoarlevee@usace.army.mil)
- Web site: <http://www.lrh.usace.army.mil/projects/review/>
- Write us:

