Upper Mississippi River Restoration Program

Floods, Rain, Drought and Snakes

(Lake Odessa)

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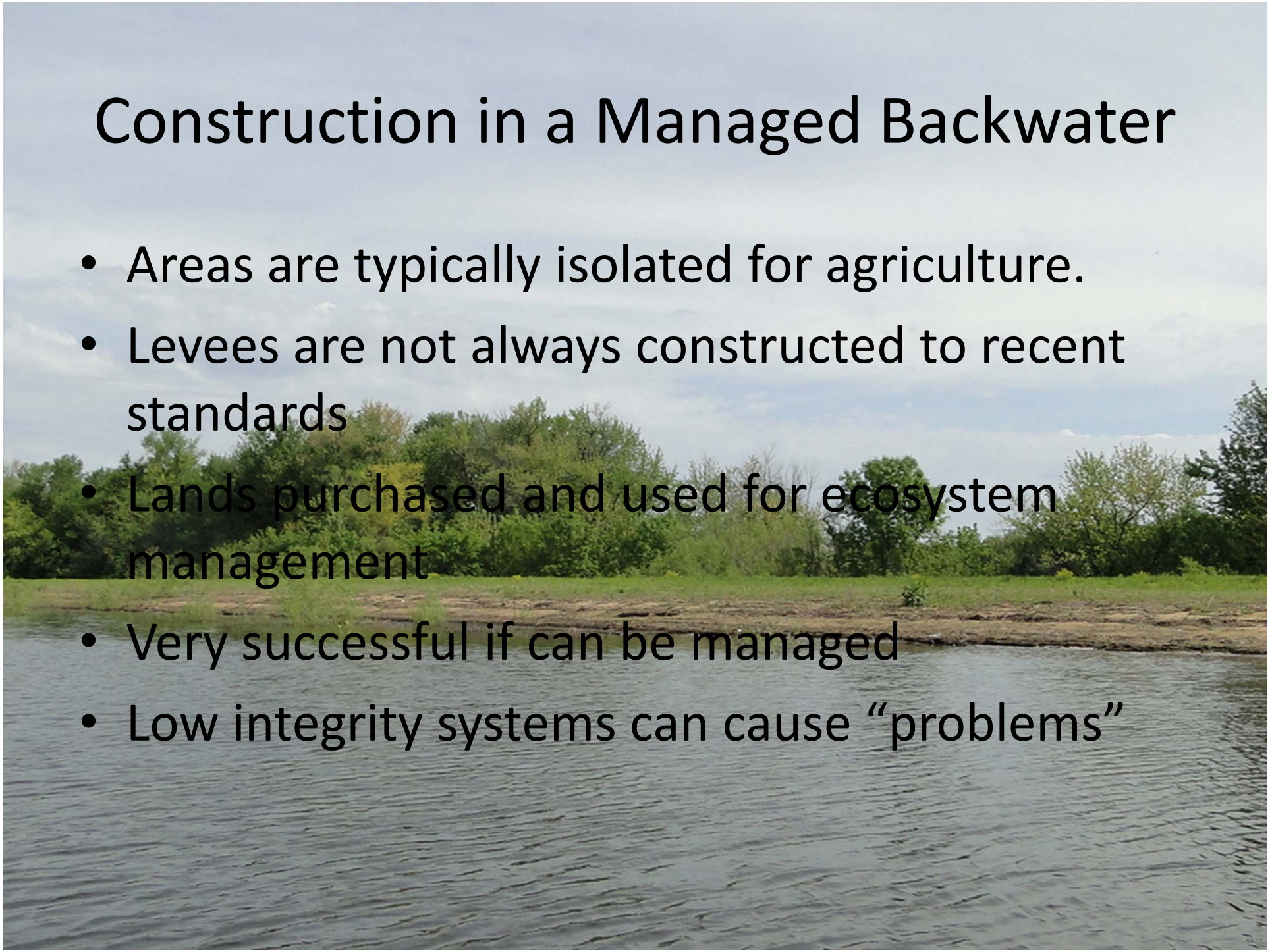
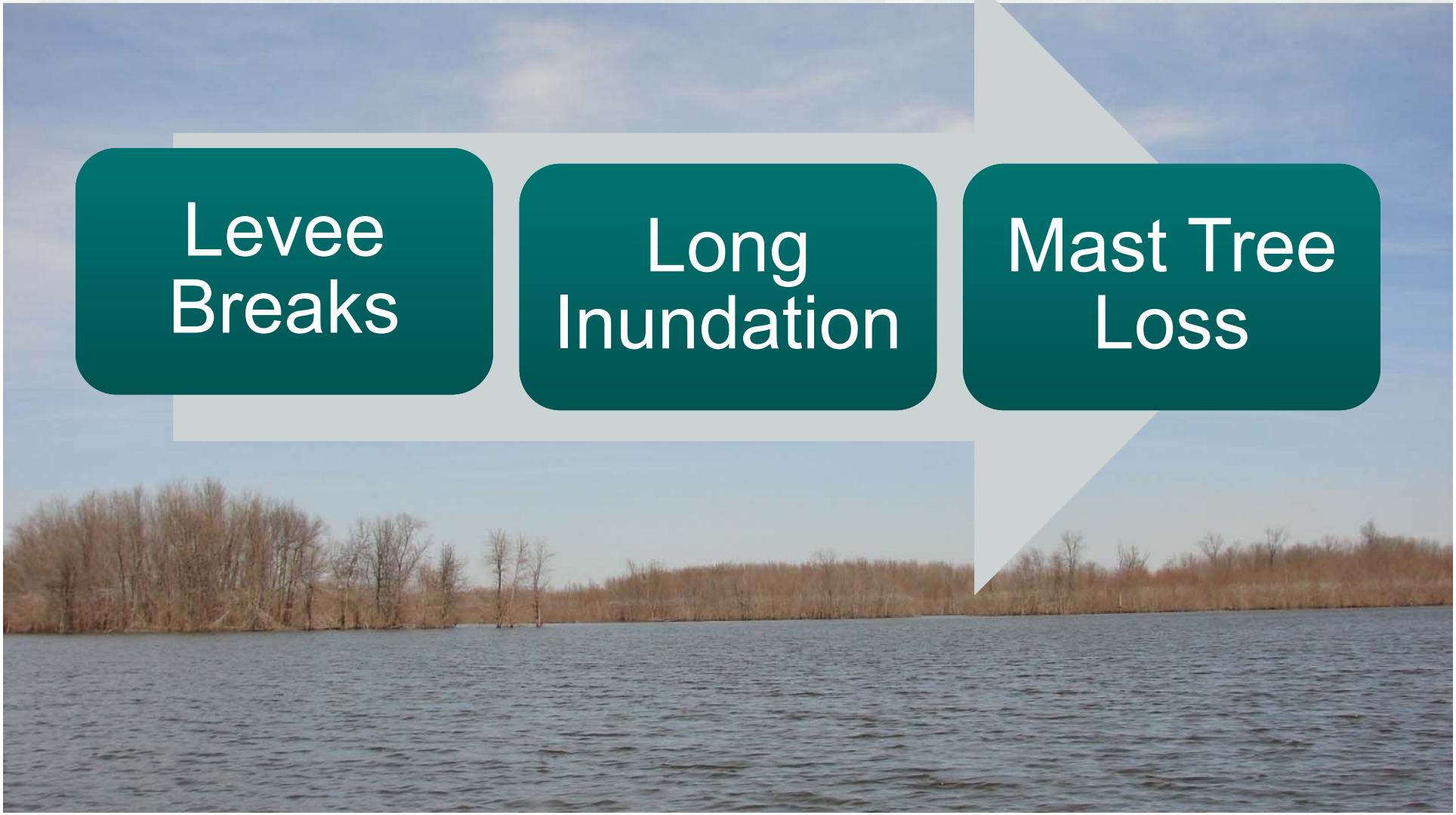


Construction in a Managed Backwater

- Areas are typically isolated for agriculture.
- Levees are not always constructed to recent standards
- Lands purchased and used for ecosystem management
- Very successful if can be managed
- Low integrity systems can cause “problems”

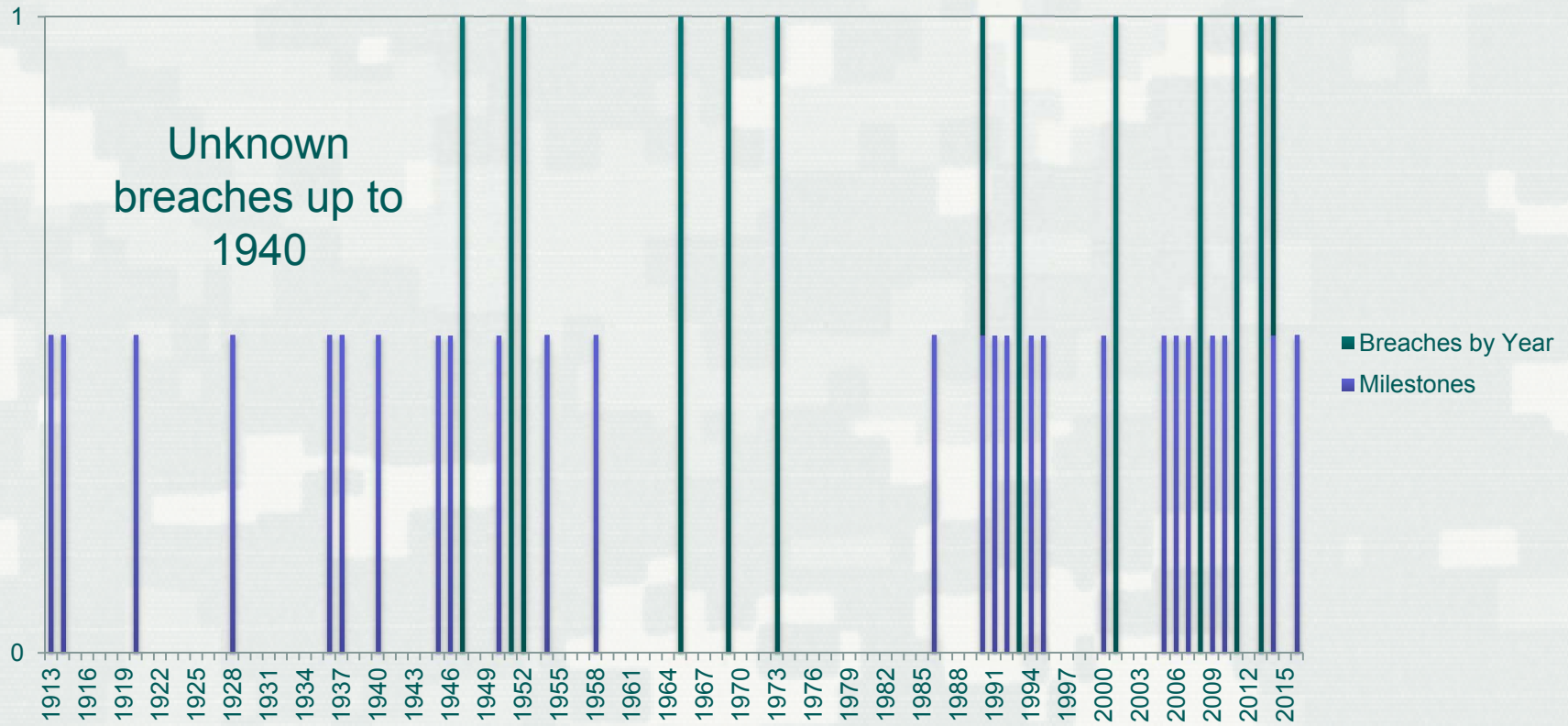
Managed Backwater Problems When the Levee Breaks

Managed Backwater Problems When the Levee Breaks



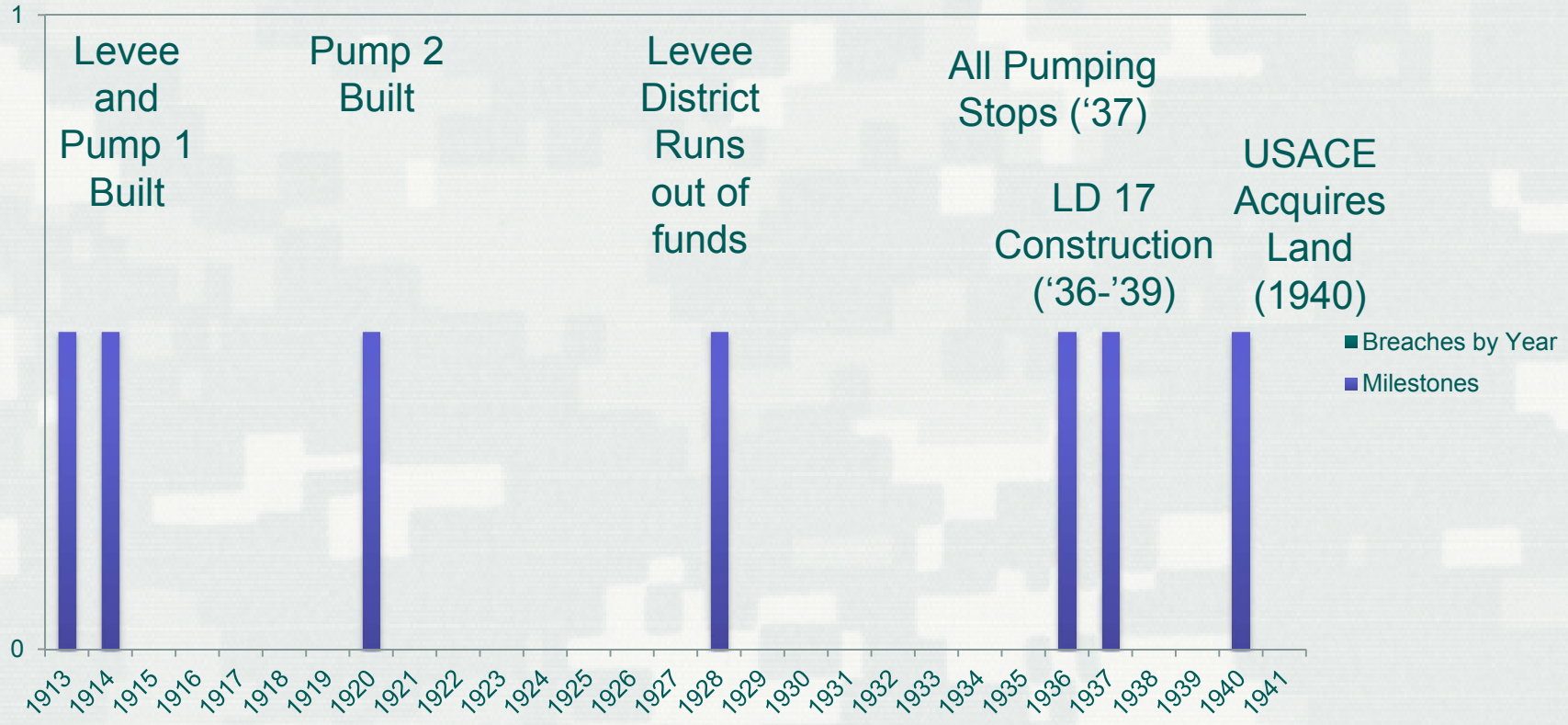
Managed Backwater Problems When the Levee Breaks

History of Odessa (Milestones and Breaches)



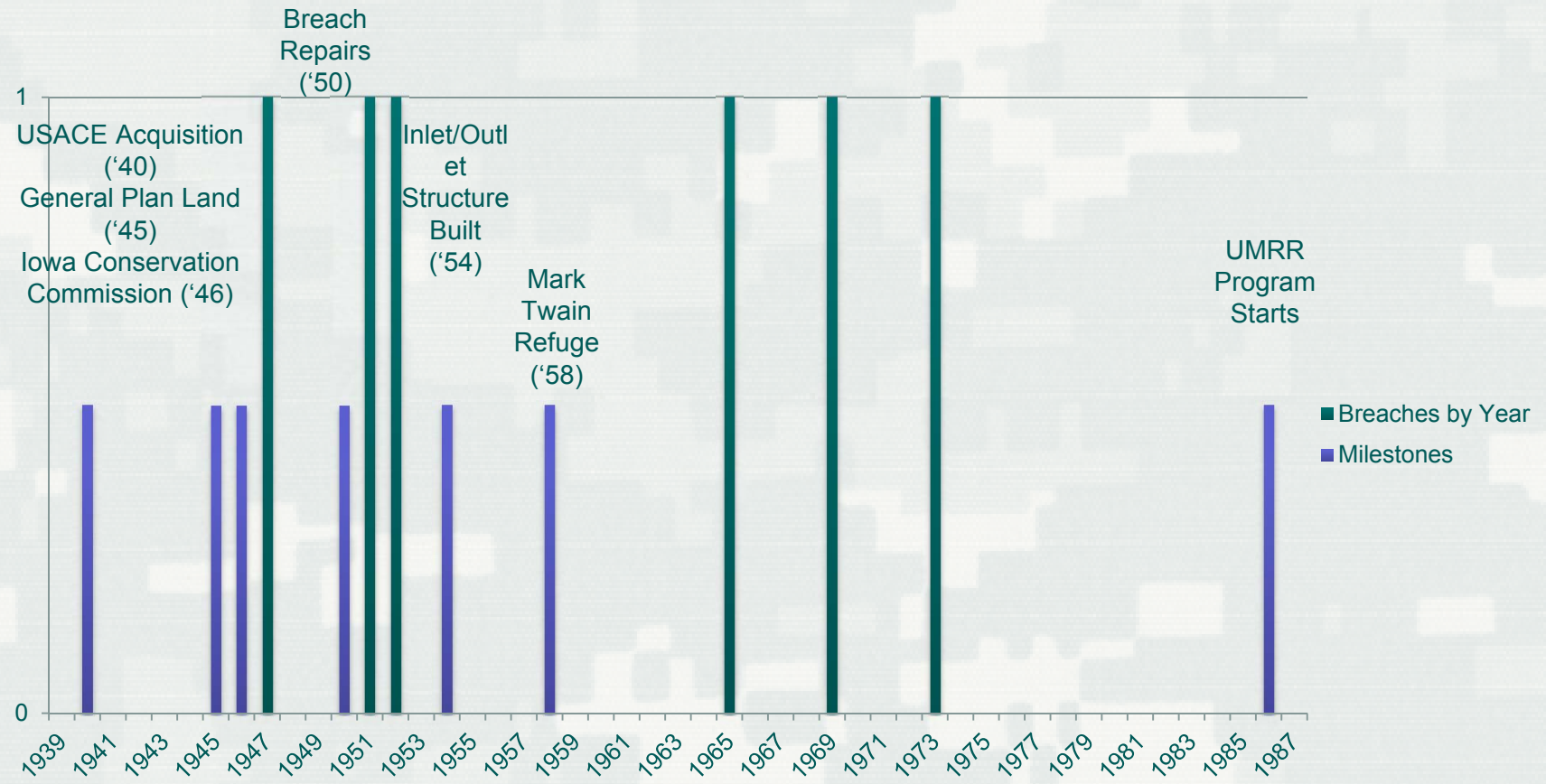
Levee breached during many flood events. While some sections of the levee had been improved, most sections were not resulting in a levee with numerous low spots and improper slopes.

Muscatine- Louisa Joint Drainage and Levee District Number 13

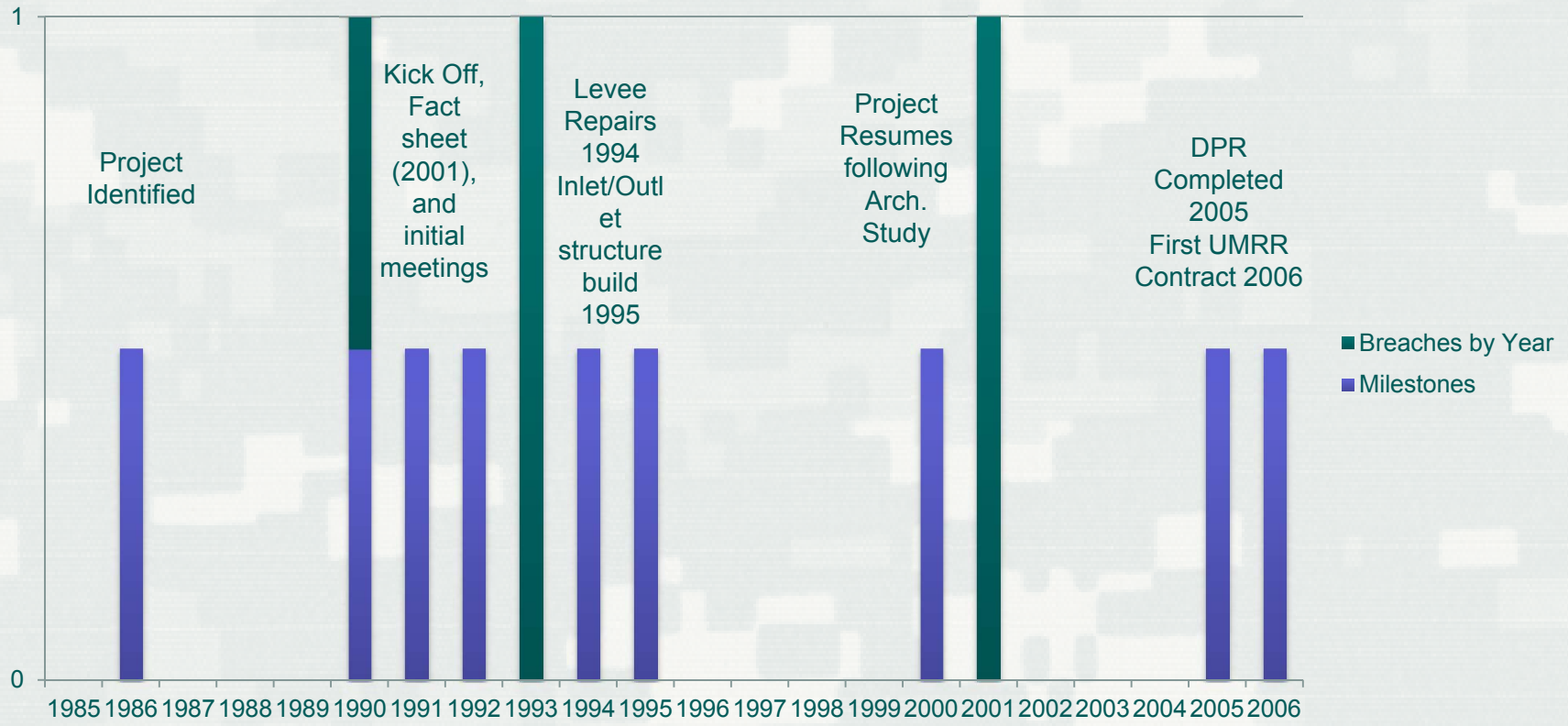


No record of levee breaches

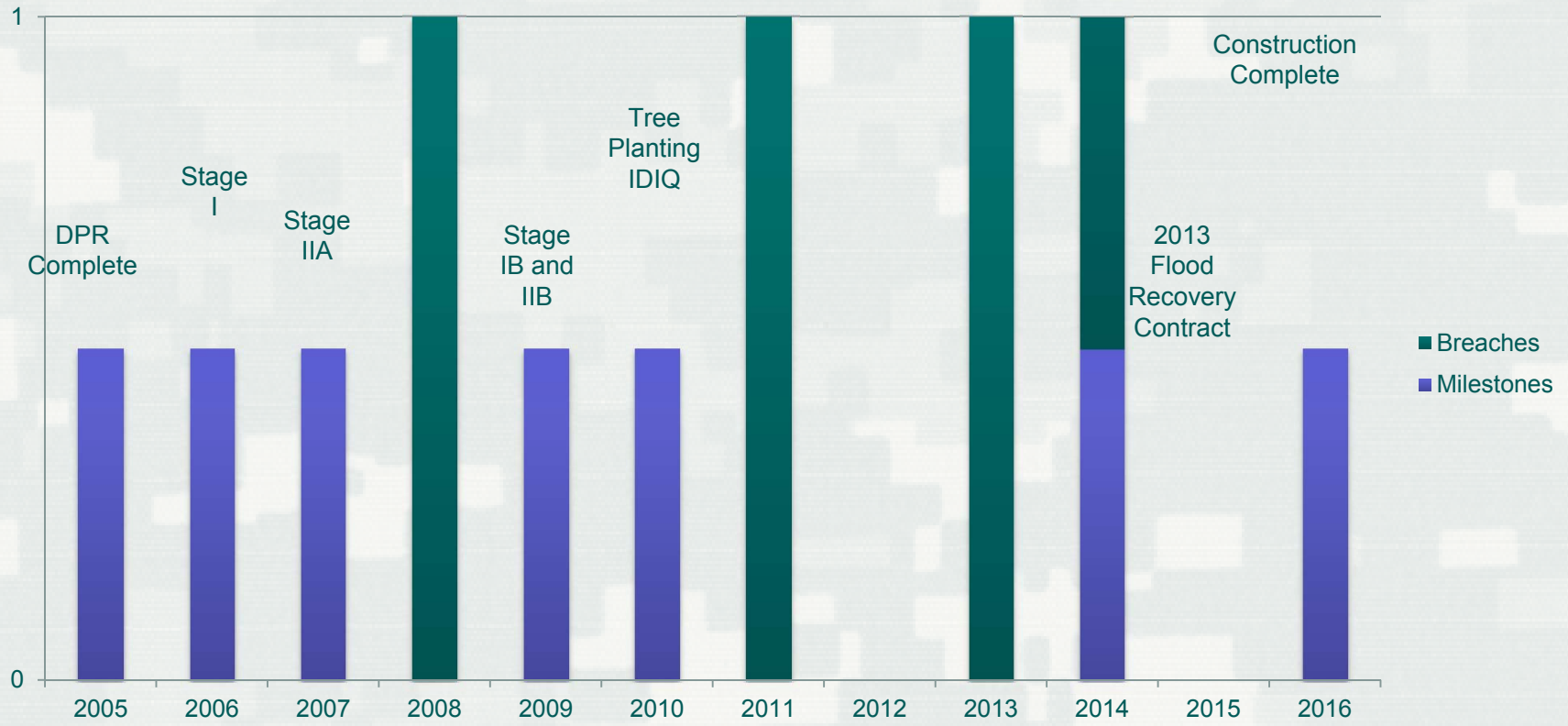
Land Management



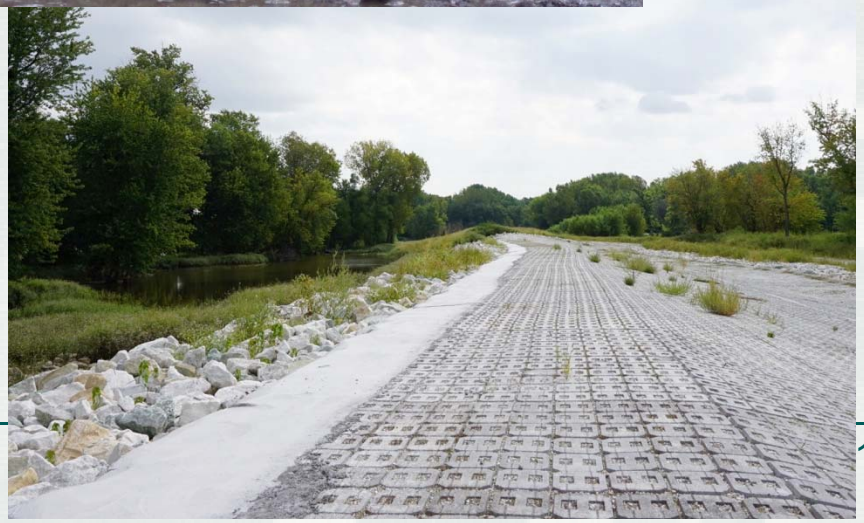
Planning Stage



Construction



The Fix (Part 1: Protect the Site)



- Allow for interior filling prior to overtopping.
  - 4 spillways.
  - Inlet Structure
  - Outlet Structure
- Ensure embankment top elevation slopes with river elevations uniformly.
- Clay cap for overtopping protection

Interior Filling Challenges During Construction

- Levee Design:
  - DPR: Sand Levee
  - Reality: Overtopping sand levees does not work. (Damage during Stage I)
  - Fix: Clay cap so when overtopped levee is protected (Stage IB)

Interior Filling Challenges During Construction

- Levee Design:
  - Condition: Sand Levee with Clay Cap that is SEEDED
  - Reality: Seed needs water to grow. There is not much water during a drought year. Following this with a flood year can cause damage.
  - Fix: Levee breaches repaired, seed reestablished (2013 Flood Recovery Contract). Consider praying for rain, rain dances, or add watering to your contract.

Interior Filling Challenges During Construction

- Spillway Design.
  - DPR: 2 spillways
  - Design Change: Spillway moved to protect historic site
  - Reality: 2013 was fastest river rise on record, exceeding design rise.
  - Fix: 2 additional Spillways added to allow for interior filling (2013 Flood Recovery)

The Fix (Part 2: Save the Fish)

- Remove sediment which has entered system through previous breaches

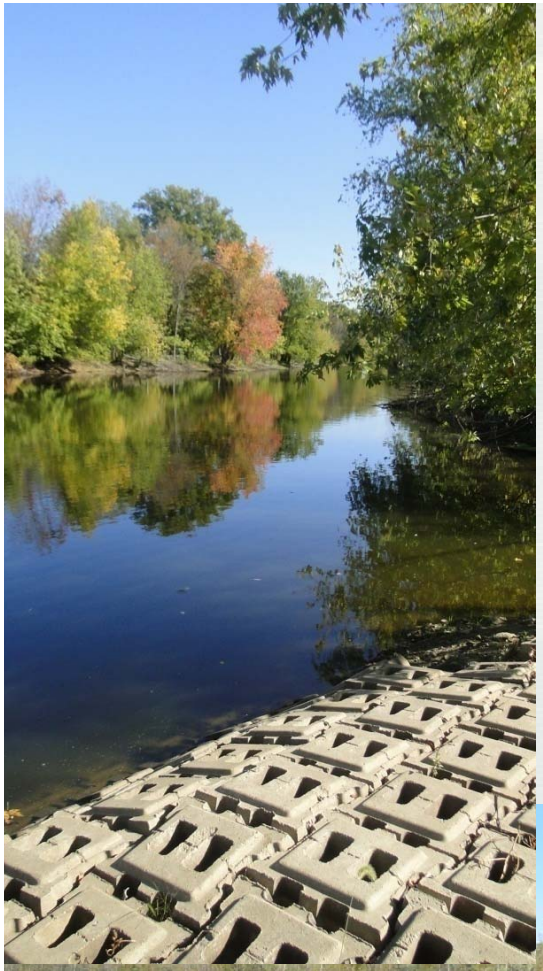
Dredging/Excavation Challenges During Construction

- Drought/Low Water Years made it difficult to access site.
- Flood years made it difficult to access site.
- Limited boring data did not discover clay which could not be hydraulically dredged (removed from Stage IIA and moved to Stage IIB)
- Hydraulically dredged material was to be used to cap a MSU. Without this material, water could not be held. Modification issued to grade MSU to ~~provide clay layer throughout.~~

The Fix (Part 3: Save the Trees)

- Timber Stand Improvement to compensate for trees which died from long inundation stress
- Protecting the system will help protect the trees.

The Fix (Part 4: Backup Plans)



Internal water level management in smaller moist soil management units

CONTRACT RUNDOWN…

Pumps Purchase (2005)
(for wetland water level management)

Stage I Contract

- W912EK-06-C-0054
  - Awarded June 17, 2006
  - Construction Completed September 30, 2009
  - $5,597,180.87
- Construction of new spillway;
- Enhancing the existing levee section with pervious embankment;
- Construction (excavation) of ephemeral wetlands;

Stage IIA Contract

- W912EK-07-C-0061
  - Awarded September 28, 2007
  - Completed on September 25, 2009
  - $3,239,485.07
- Hydraulic and mechanical dredging for overwintering habitat
- New water control structures
- Riprap placement
- ACM pump pads

Stage IB Contract

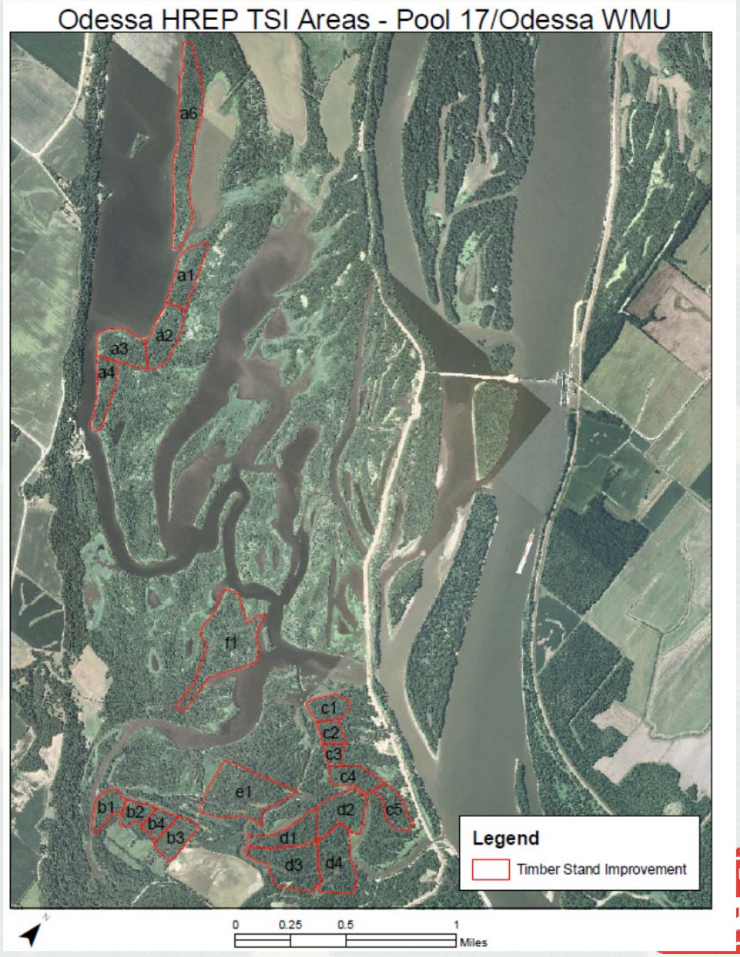
- W912EK-09-C-0099
  - Awarded August 28, 2009
  - Construction completed August 4, 2012
  - $2,596,778.78
- Clay “Cap”

Stage IIB Contract

- W912EK-10-C-0018
  - Awarded December 28, 2009
  - Construction completed on April 28, 2011
  - $2,275,894.70
- Mechanical dredging

Tree Planting Contract

- W912EK-10-D-004, Task Order 1 (IDIQ)
  - Awarded March 24, 2010
  - $149,959.
  - Work completed in April 2011.
  - 1,020 trees planted

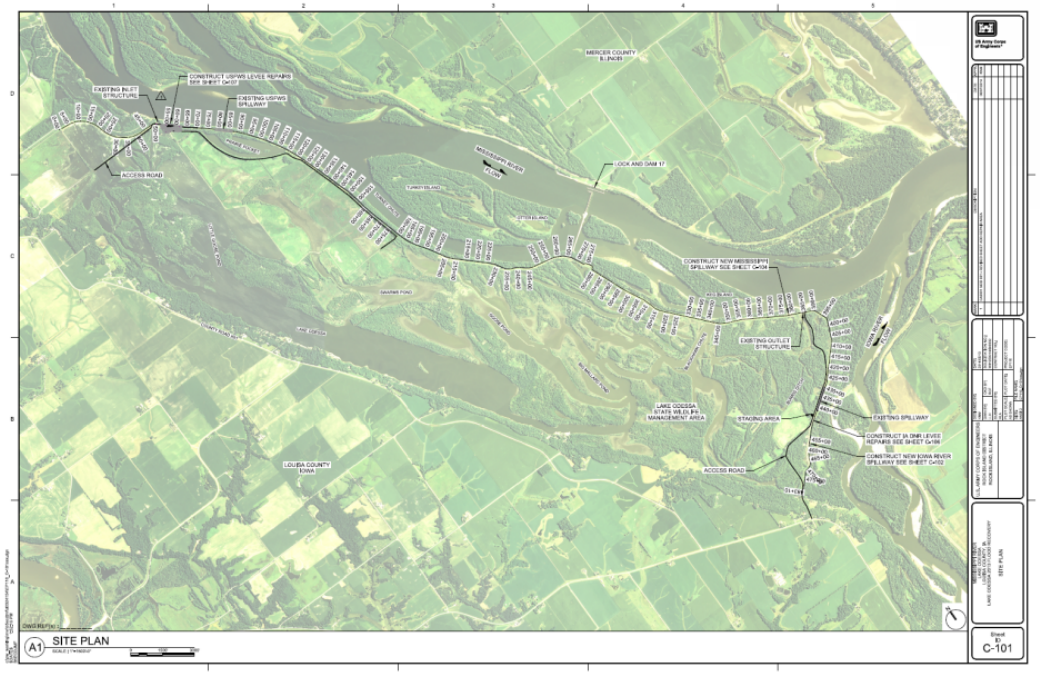


2013 Flood Repair Contract

- W912EK-14-C-0080
  - Award on August 18, 2014
  - $2,564,770
- Spillway at Iowa River Breach
- Spillway at Mississippi River Breach
- Levee Repairs (with clay cap)

2013 Flood Recovery Modification

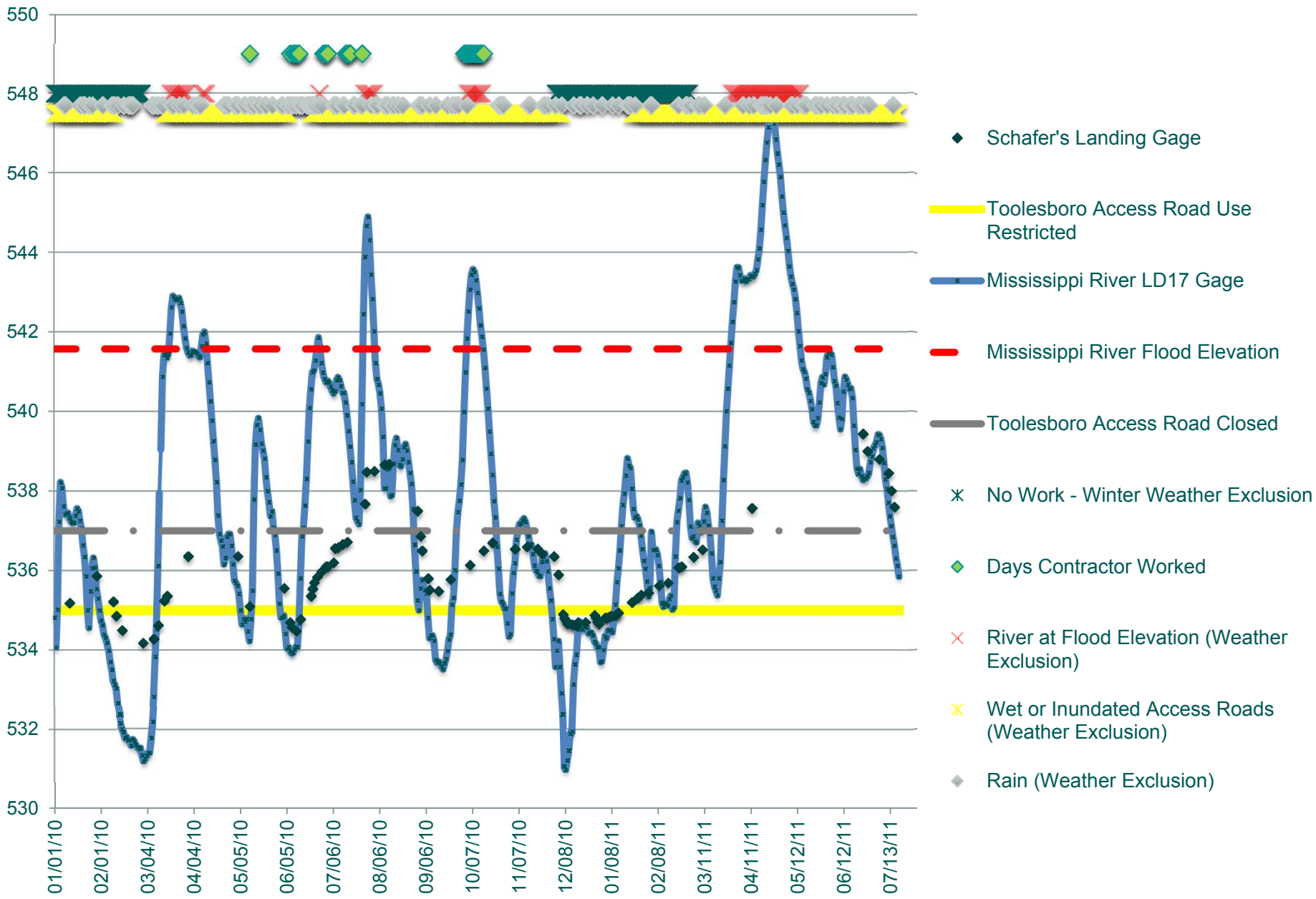
- Modification awarded July 14, 2015
- Cost: $200,149.19.
- Clay cap and clay face (river side)



HOW TO EXPLAIN TO MARVIN WHY THIS IS TAKING SO LONG…

SPREADSHEETS AND GRAPHS!

Lake Odessa HREP Weather Delays



Conclusions*

- Listen to your refuge and/or state managers. They are there every day and likely know what is needed more than the rest of the PDT.
- Do not underestimate an “ecosystem” project as needing lessor design or funding to construct.
- Fight for a good design.
  - Obtain data, survey, borings, and other pieces of information to minimize surprises later on.
  - It is important to save money, but if you go half way, it will likely cost more to fix later.

*These conclusions are the opinion of the presenter and do not necessarily represent agency views.

Conclusions*

- Consider that when you want it to rain, it won't. When you want it to be dry, it will rain. Accommodate this in your schedule, access routes, and funding amounts.
- Allow modifications to address issues that had not been identified during planning or design.

*These conclusions are the opinion of the presenter and do not necessarily represent agency views.

Problems Fixed!

- Construction Completed late 2016
- Flexibility in design and construction allows for a more manageable system

What about the snakes?

- Snakes love Lake Odessa.
- Specific habitat was constructed for threatened snakes.
- Really, I just love this photo by Andy Robbins, IA DNR and wanted you all to see it.

TRONG®

Questions?

Supplemental References

- This document was prepared by Kara Mitvalsky, P.E. CEMVR-EC-DN. Kara is the Design Project Engineer.
- Information was obtained from RMS, the DPR, as built drawings and construction contract drawings.
- River level data, flood levels, spillway elevations, and water level management plans were provided by Tom Gambucci, CEMVR-EC-HH.
- Precipitation data was provided by Chris Trefry, CEMVR-EC-HW.
- Contractor data (work days, rain delays, and updates to contracts) was provided by Rick Stebens and Jake Cawiezell, CEMVR-EC-CC.
- Reforestation data was provided by Joe Lundh, CEMVR-OD-MN.
- Schafer's Access Gage data, Toolsboro Road information, and downstream gate operation was provided by Andy Robbins, IA DNR.
- Access road data and upstream gate operation was provided by Cathy Henry, US FWS.
- "History of Lake Odessa", Undated manuscript (ca 1954) by Fred Schwob.
- http://www.fws.gov/refuge/Port_Louisa/about.html
- http://www.fws.gov/refuge/Port_Louisa/wildlife_and_habitat/index.html
- Port Louisa National Wildlife Refuge and Odessa Wildlife Management Area, http://www.iowadnr.gov/Hunting/PlacesToHuntShoot/WildlifeManagementAreas/LakeOdessaWMA.aspx
- Numerous photos from USACE, FWS, DNR sources and individual workers.
- http://www.fws.gov/refuges/refugeupdate/MarApr_2012/fourflyways.html Credit: North Dakota Game and Fish Department