

Reservoir Habitat Workshop: Sedimentation



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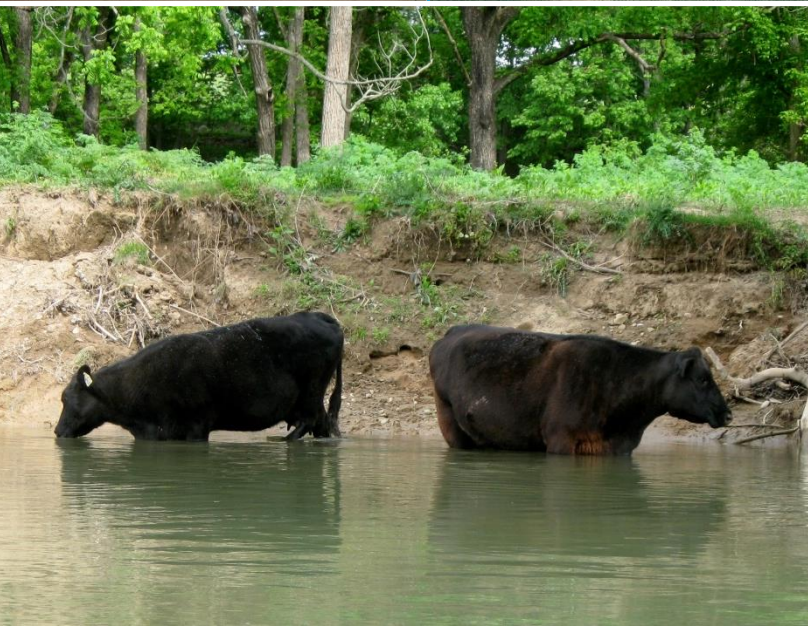
Outline-Sedimentation



- Sources of sediment
- Impacts
 - How reservoirs differ from lakes and rivers
- What you can do
 - Watershed
 - Within the reservoir
- Examples
- Lessons learned
- Questions?



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Watershed > 90% stabilized



Watershed < 20% stabilized



Turbidity can last for weeks



Reservoir impacts



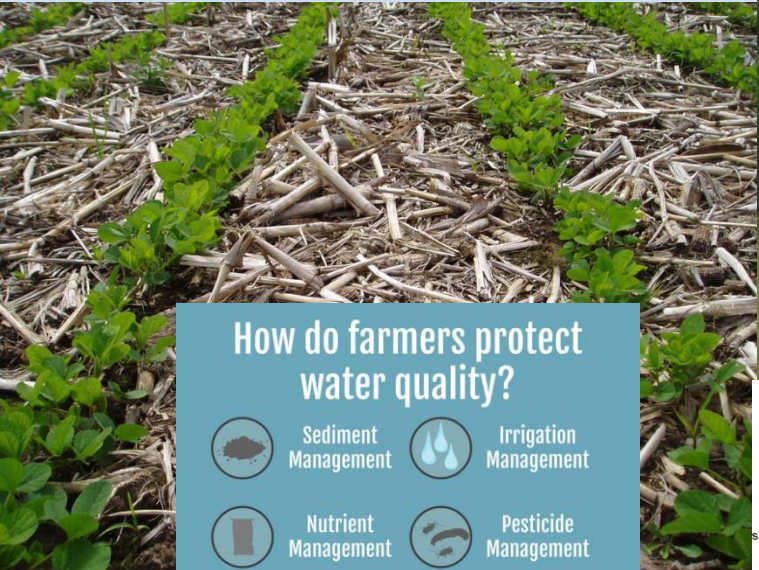
- Physical
 - Loss of volume, increasing shallow areas
 - Homogenized littoral areas and no basin relief
 - Shoreline erosion (Lynde's talk)
- Water quality
 - Excess nutrients (Reed's talk)
 - Algal blooms, HAB's
 - Decreased clarity, less sun penetration
 - Reduces rooted vegetation, converts to algal dominance

What can you do?



- Work in the watershed
 - Raise awareness
 - Implement BMP's
- Estimate sedimentation inputs
 - Identify the sources (erosion types, entry points-stream channels, overland)
 - Model mobilization rates (NRCS-hydrology, soils, land practices)
- Develop protective measures
 - Watershed and reservoir

Watershed Measures



How do farmers protect water quality?

- Sediment Management
- Irrigation Management
- Nutrient Management
- Pesticide Management
- Animal Facility Management
- Grazing Management

By using proper managing techniques, farmers preserve a quality water supply.

<http://water.epa.gov/polwaste/nps/outreach/point6.cfm>



Example



Lessons learned



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 - Watershed and reservoir

Example

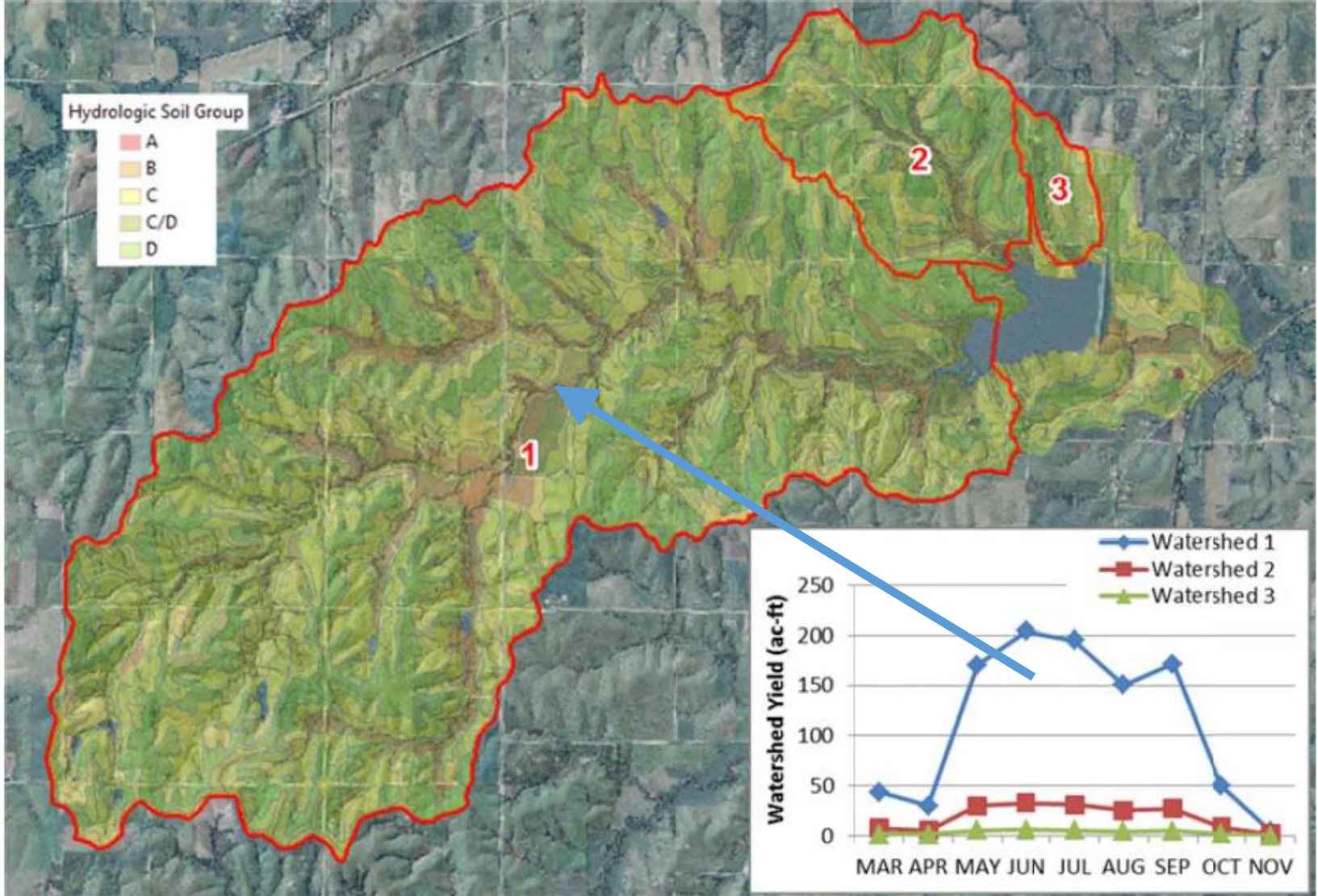
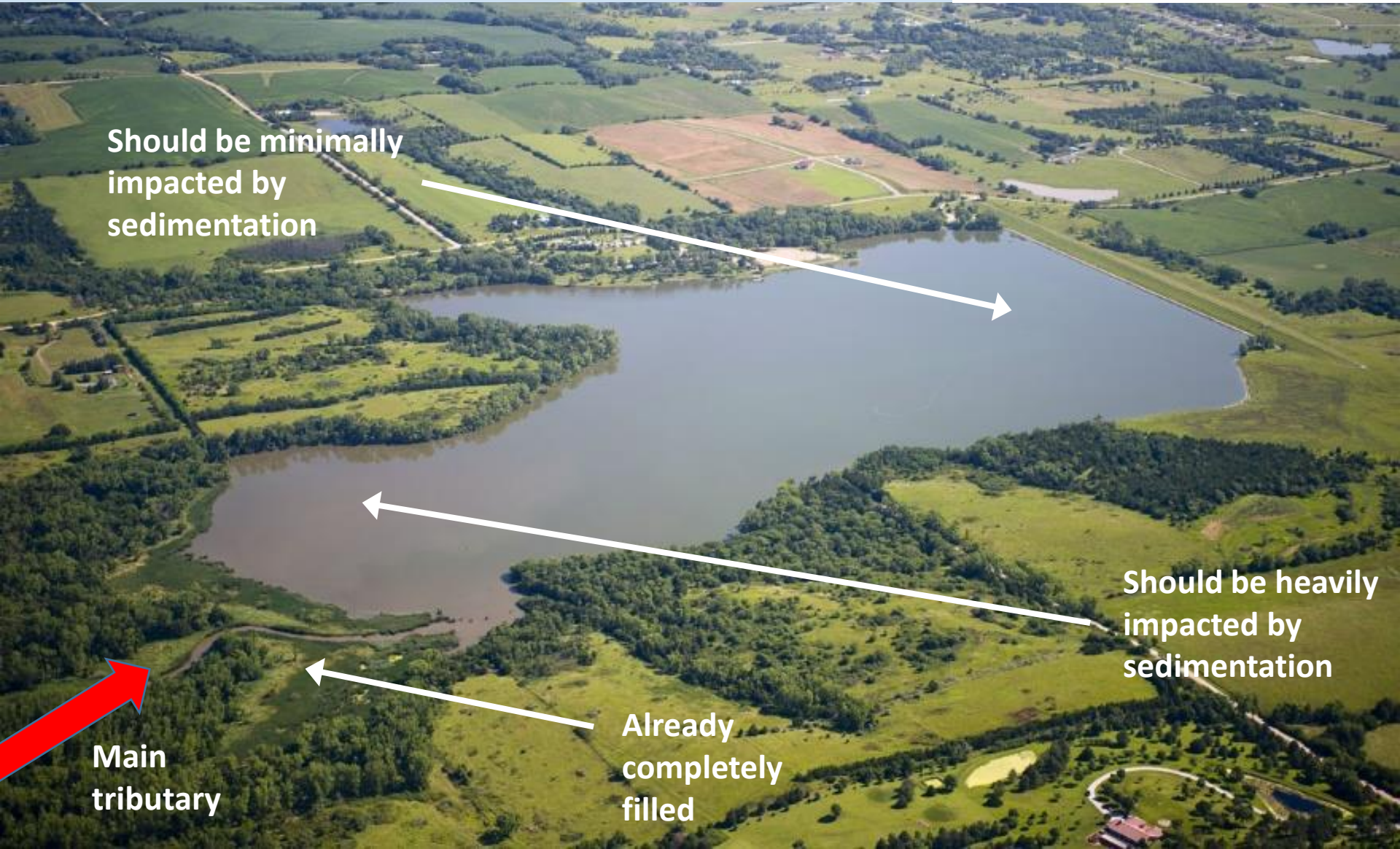


Figure 1. Watershed Yield Analysis – Average Monthly Volume (ac-ft)

Assumed deposition



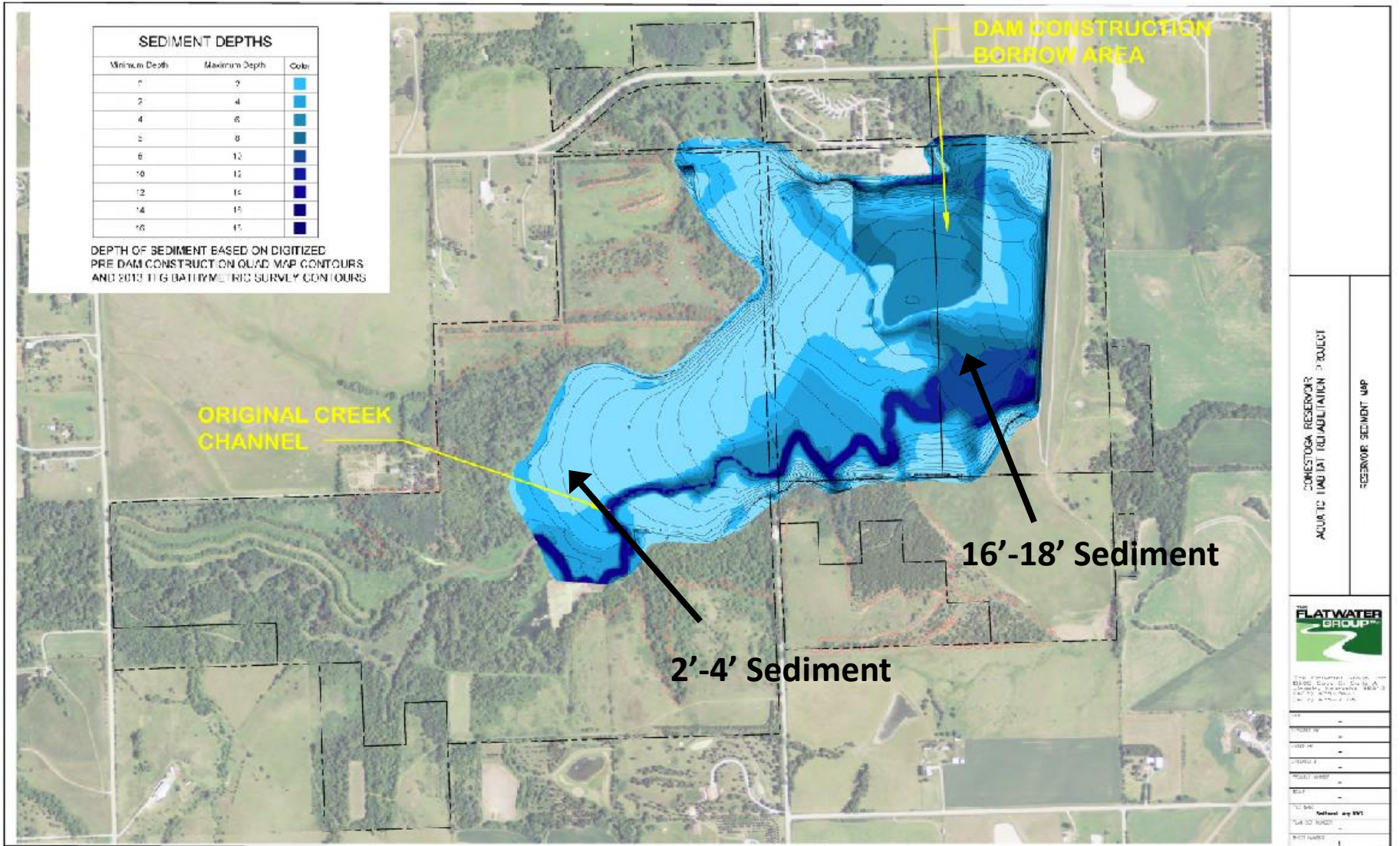
Should be minimally impacted by sedimentation

Should be heavily impacted by sedimentation

Main tributary

Already completely filled

Lessons learned



What can you do?



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- Estimate sedimentation inputs
 - Identify the sources (erosion types, entry points-stream channels, overland)
 - Model mobilization rates (NRCS-hydrology, soils, land practices)
- Develop protective measures
 - Watershed, stream channel, and reservoir

Excavation is expensive



Usually possible but pricey



Be flexible



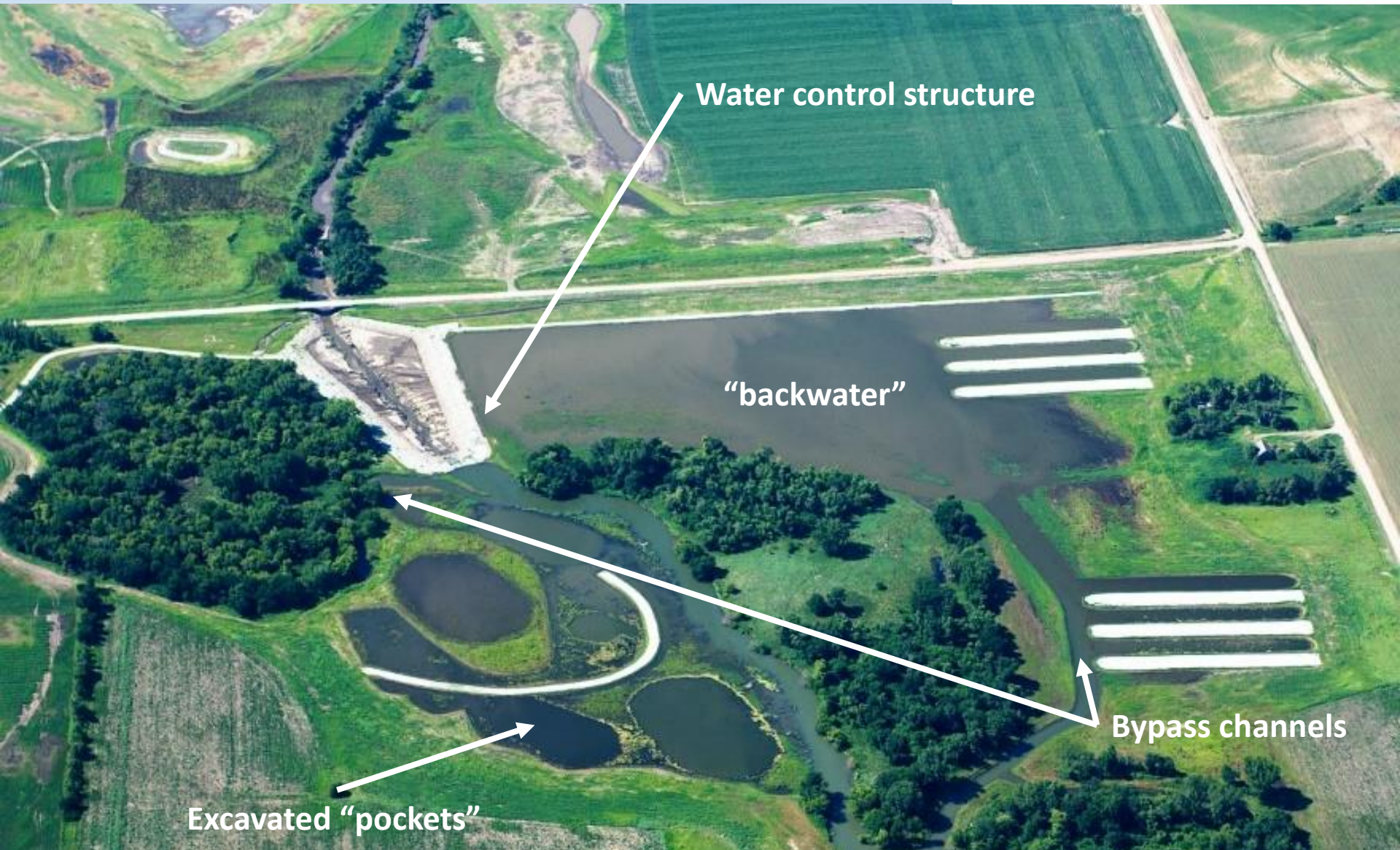
Lessons learned



Stream Channel Measures



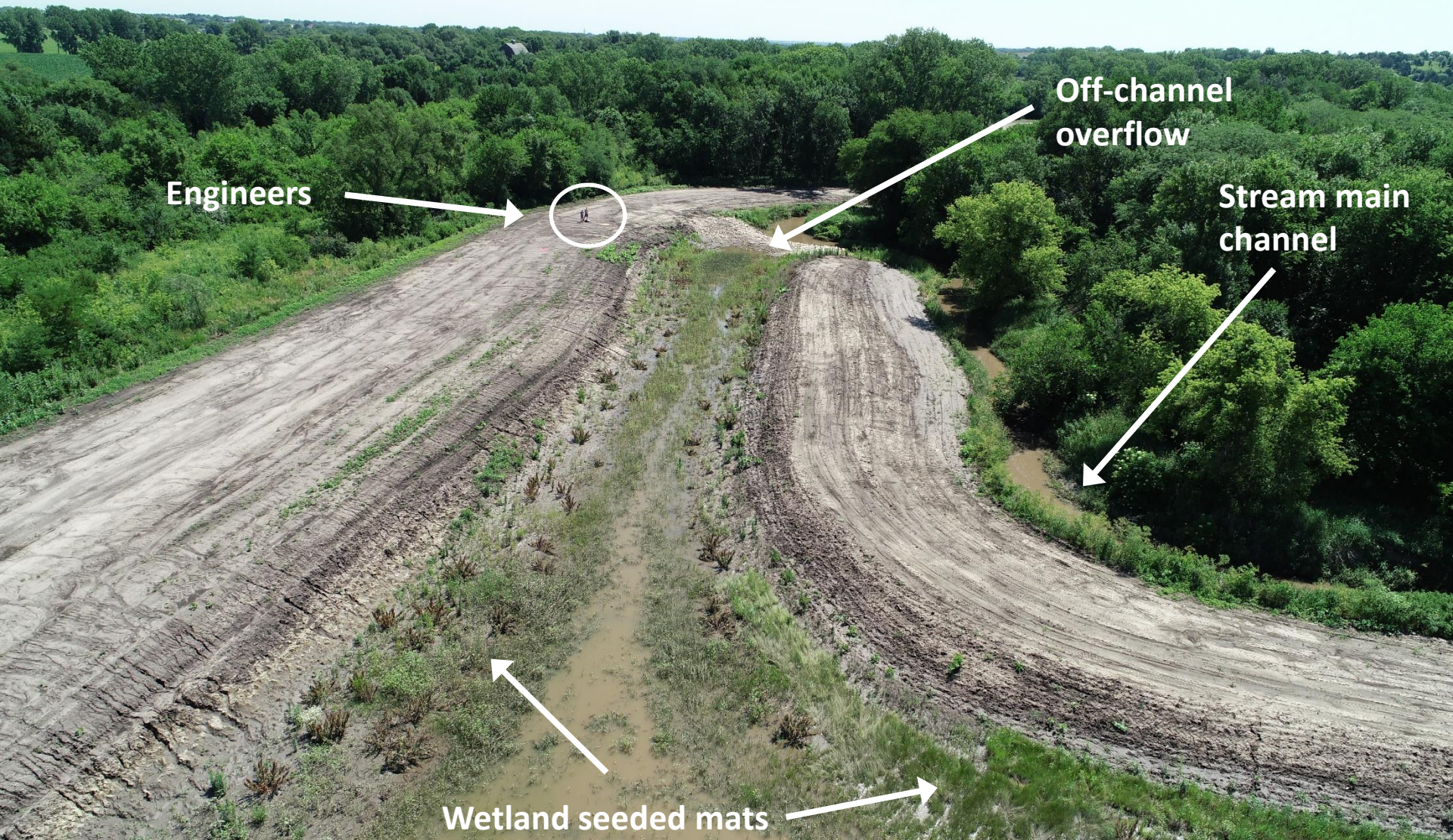
Artificial wetlands



Example



Stream channel measure



Engineers

Off-channel overflow

Stream main channel

Wetland seeded mats

Lessons learned



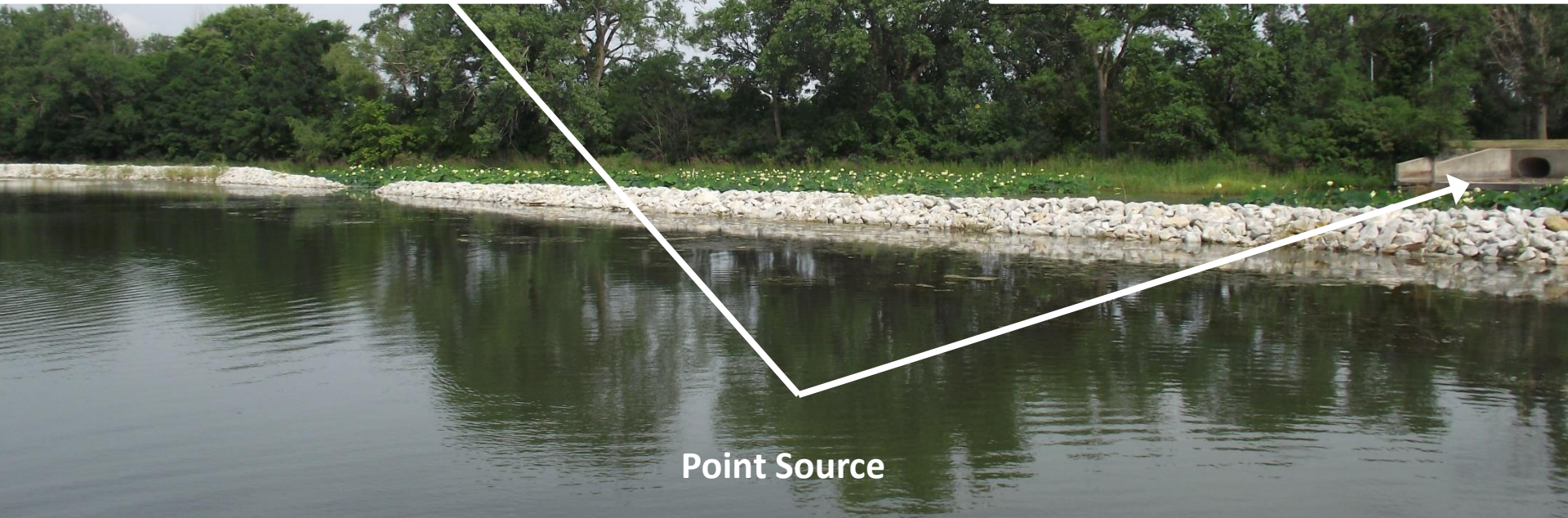
Inlet

Outlet

Off-channel retention ponds

Channel stabilizer

Reservoir Measures

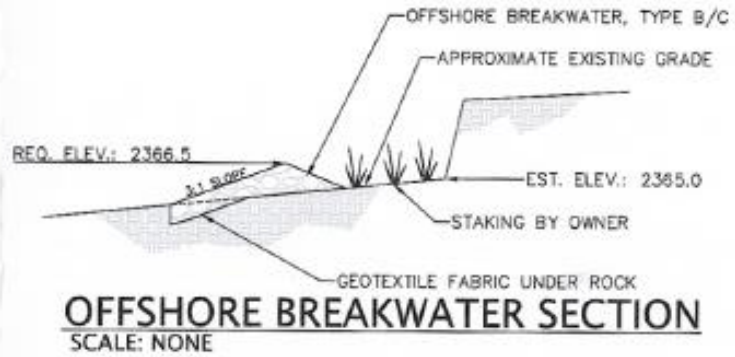


Point Source

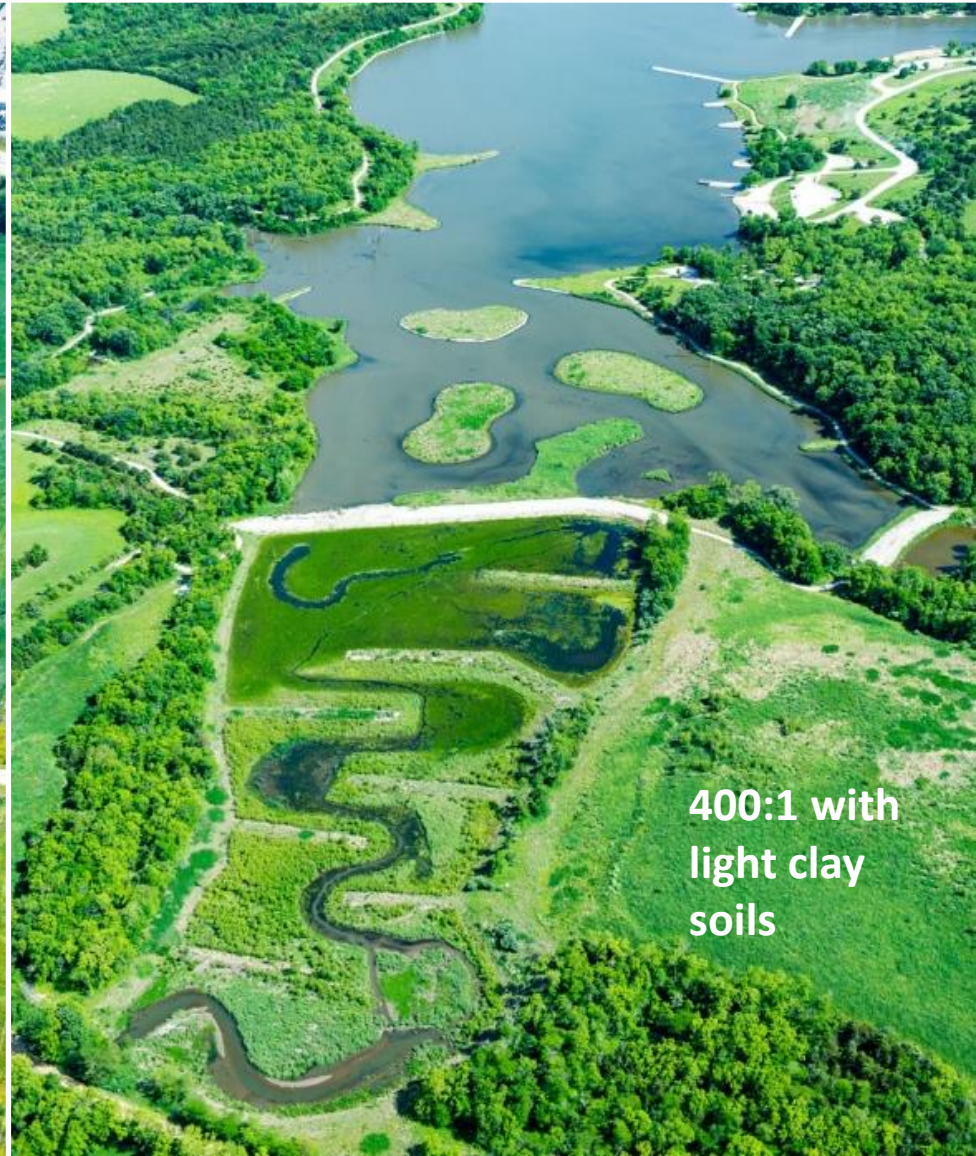
Reservoir Measures



Stop shoreline erosion

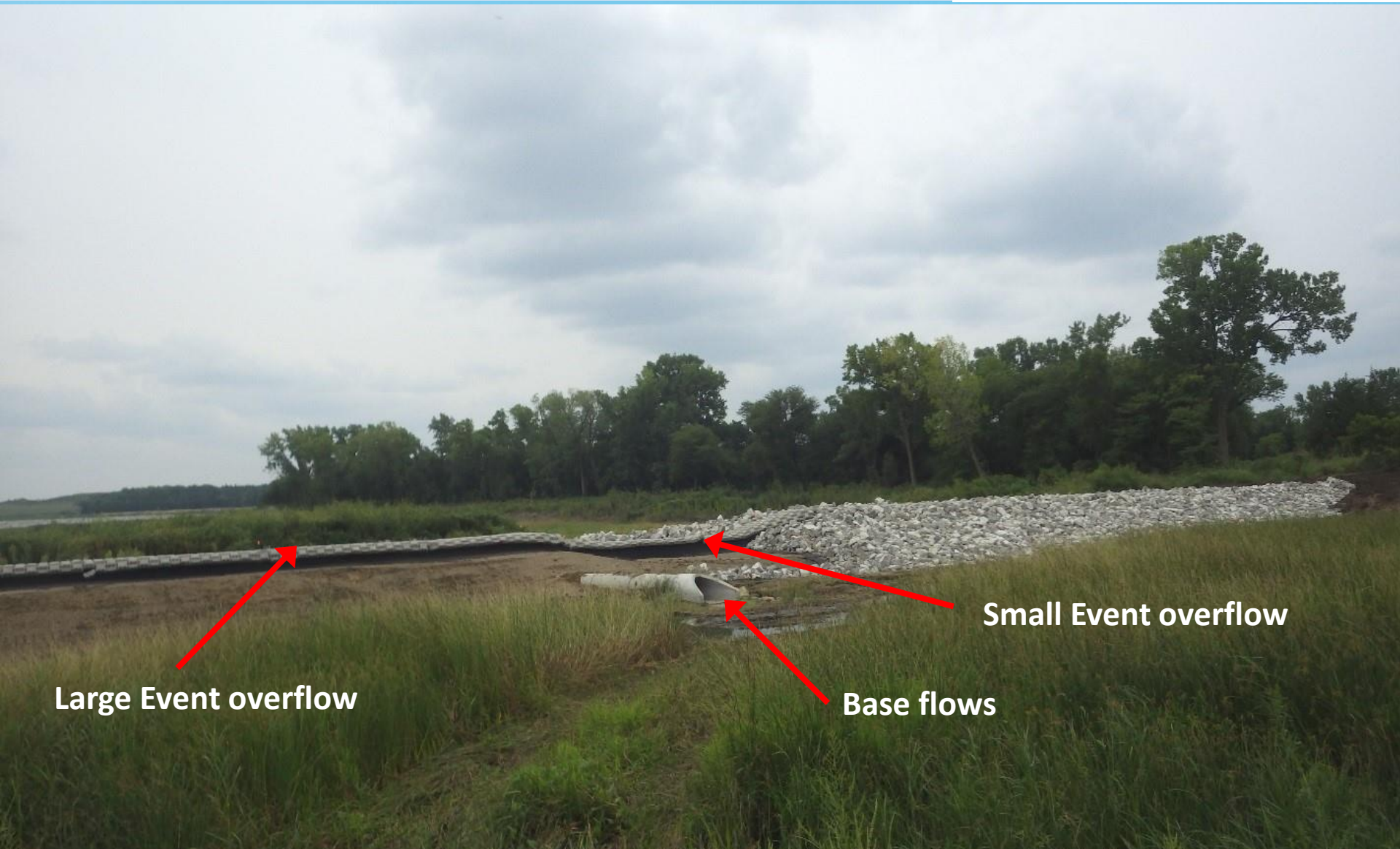


Examples



400:1 with
light clay
soils

Example

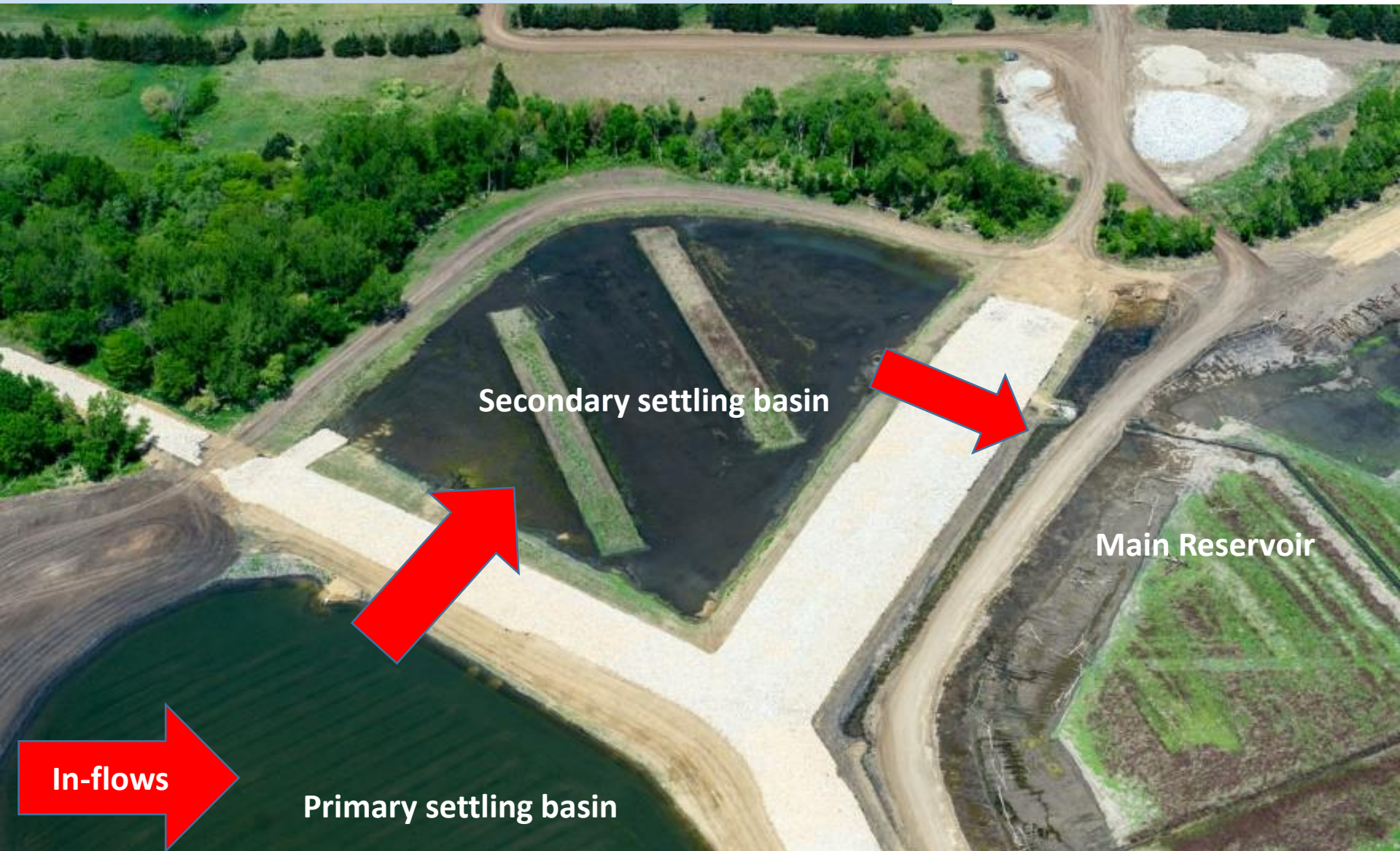


Large Event overflow

Base flows

Small Event overflow

Lessons learned



Secondary settling basin

Main Reservoir

In-flows

Primary settling basin

Reservoir Measures



2003

Lessons learned



2014

Example timeline



Rehabilitation “work”



Fall 2017

Completed retention basin



April 2018

Summary



Combating reservoir sedimentation

- Gather information on the watershed and reservoir
 - What kind, how much and where is it coming from?
- Partner to build awareness and coalitions
 - Promote BMP's
 - Seek cost-share for work
- Install protective measures
 - Prevent or slow mobilization within the watershed if possible
 - Divert/trap as much as possible before reaching reservoir
 - Minimize impacts to reservoir habitat with measures that trap at entrance point, and can be easily maintained.

Questions?



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