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The Atchafalaya River Basin: Control, Controversy and Natural Capital in the Largest U.S. Swamp

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The Atchafalaya River Basin: Control, controversy and natural capital in the largest U.S. swamp



NSF-IGERT: Watershed Science and Policy

*Aaron Nickolotsky, Justin Kozak, Anne Hayden,
Kelley Fritz, Micah Bennett*

The Atchafalaya Basin

- Tributary of Mississippi River (all or part of 31 states & part of 2 Canadian Provinces)
- Receives discharge from Red River



Source: Yvonne Allen, Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers

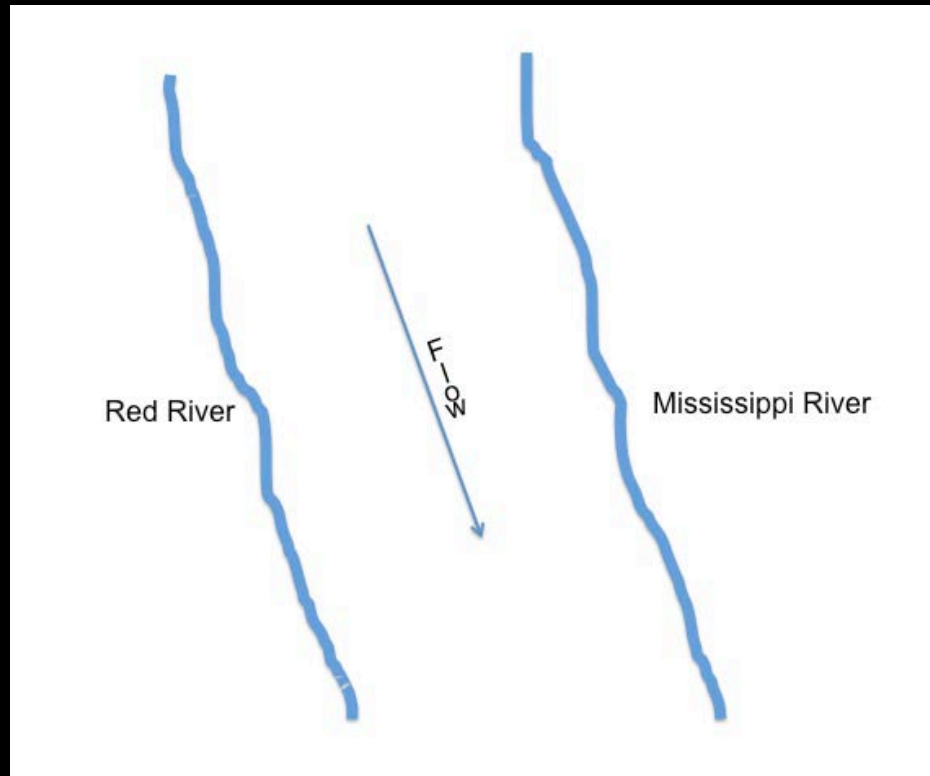
The Atchafalaya Basin

- 200 km long
- Drainage area=8,345 km² (historical basin-natural boundaries)



Source: U.S. Geological Survey

History of development



Red and Mississippi

Turnbull's Bend

Acadien Settlement

Logjam

Shreve's Cutoff

"Levees Only"

Old River

Flood

Jadwin Plan

Stop Capture

Prior to 1500's

Mid 1500's

Mid 1700's

Early 1800's

Mid 1800's

1861

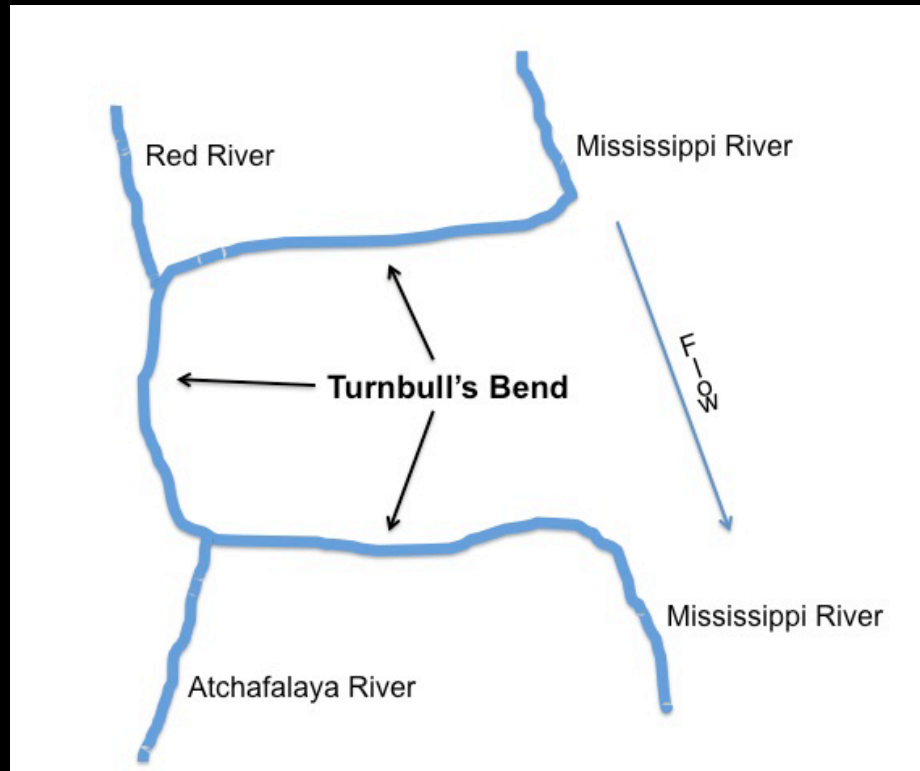
Late 1800's

1927

1928

1950's

History of development



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Mississippi

Turnbull's
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History of development



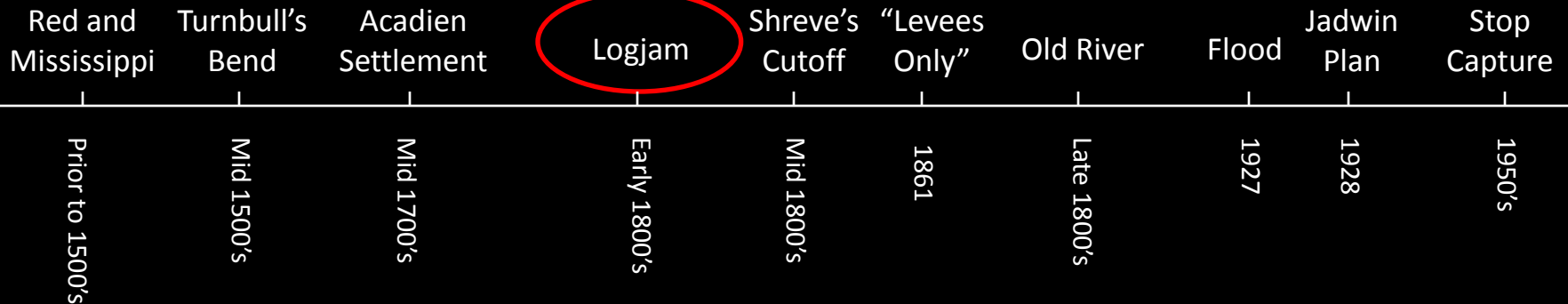
Source: Wikipedia



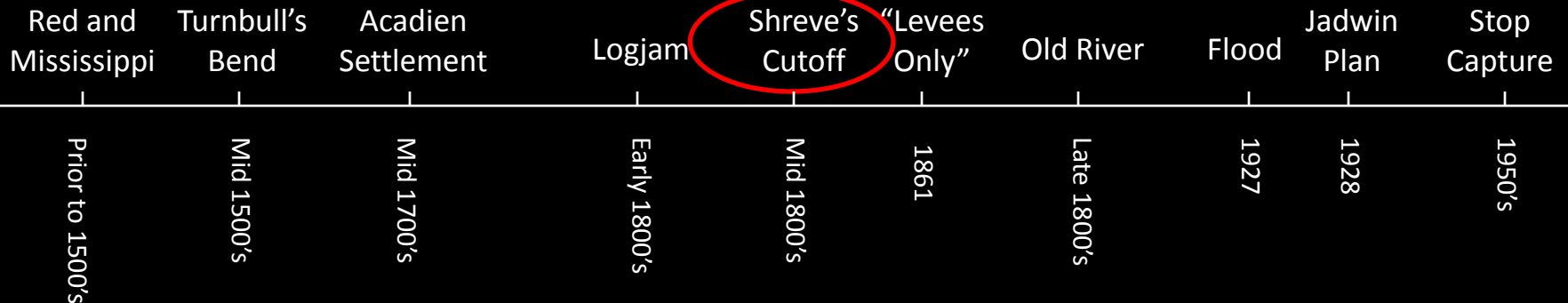
History of development



Source: U.S. Army Corps of Engineers New Orleans District



History of development



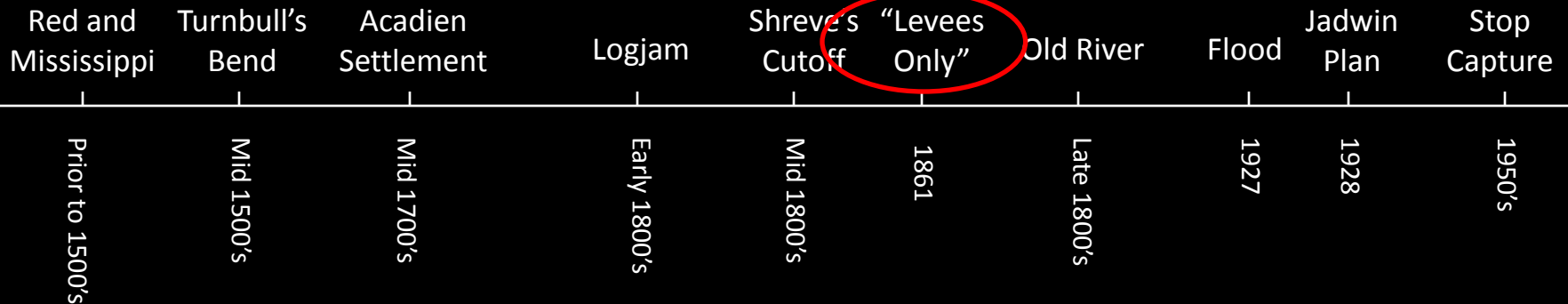
History of development



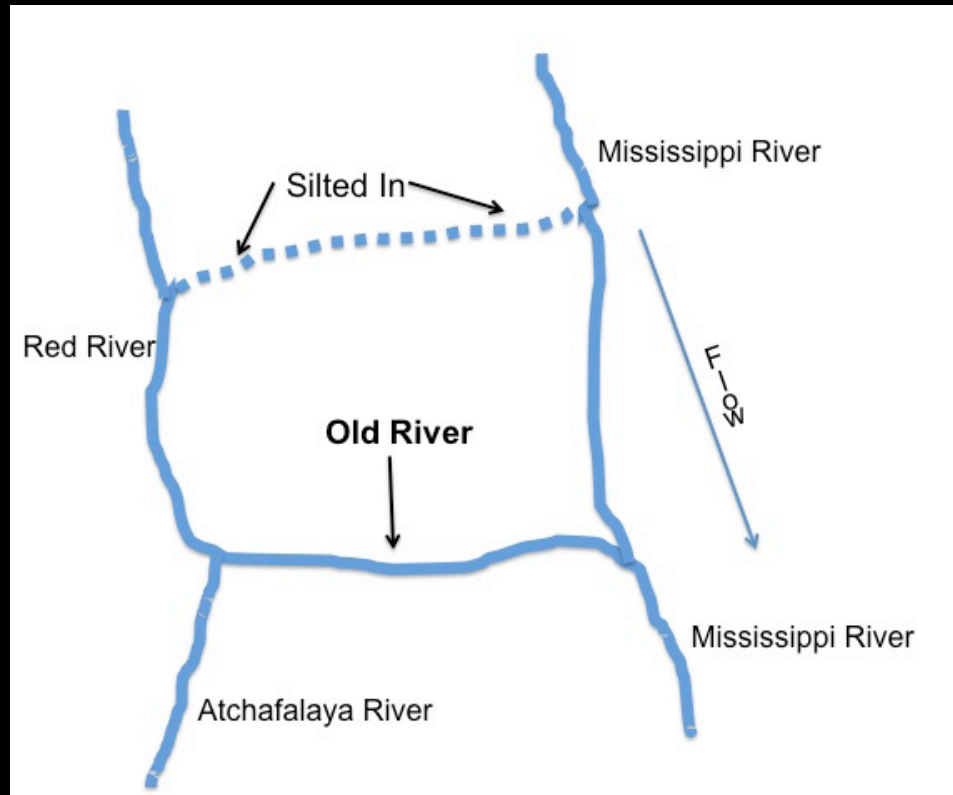
Source: U.S. Army Corps of Engineers



Source: U.S. Army Corps of Engineers New Orleans District



History of development



History of development



Source: U.S. Army Corps of Engineers New Orleans District



Source: U.S. Army Corps of Engineers New Orleans District



History of development



Major General Edgar Jadwin, Chief of Engineers, 1926-1929

Source: ERDC, U.S. Army Corps of Engineers



Victims of the 1927 Mississippi River flood seek refuge on a levee

Source: ERDC, U.S. Army Corps of Engineers



History of development



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1928

Stop
Capture

1950's

Current state of operation



Distance to Gulf

- Mississippi R.
~500 km
- Atchafalaya R.
~230 km

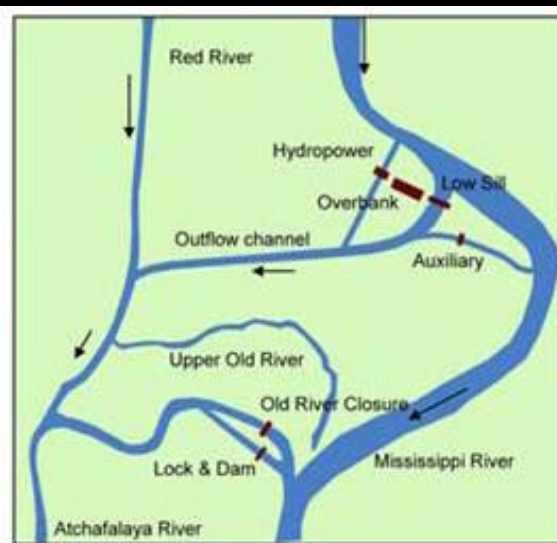
Imagery obtained from esri World Imagery

Timeline of ORCS

1950

1963

present



Congressional authorization; Construction begins

Original structures complete

Major floods

Rehabilitation complete; Construction begins - Auxiliary Structure

Construction begins - hydroelectric plant Auxiliary structure completed

Hydroelectric plant operational

Major floods

1954 and 1955

1963

1973

1981

1985

1986

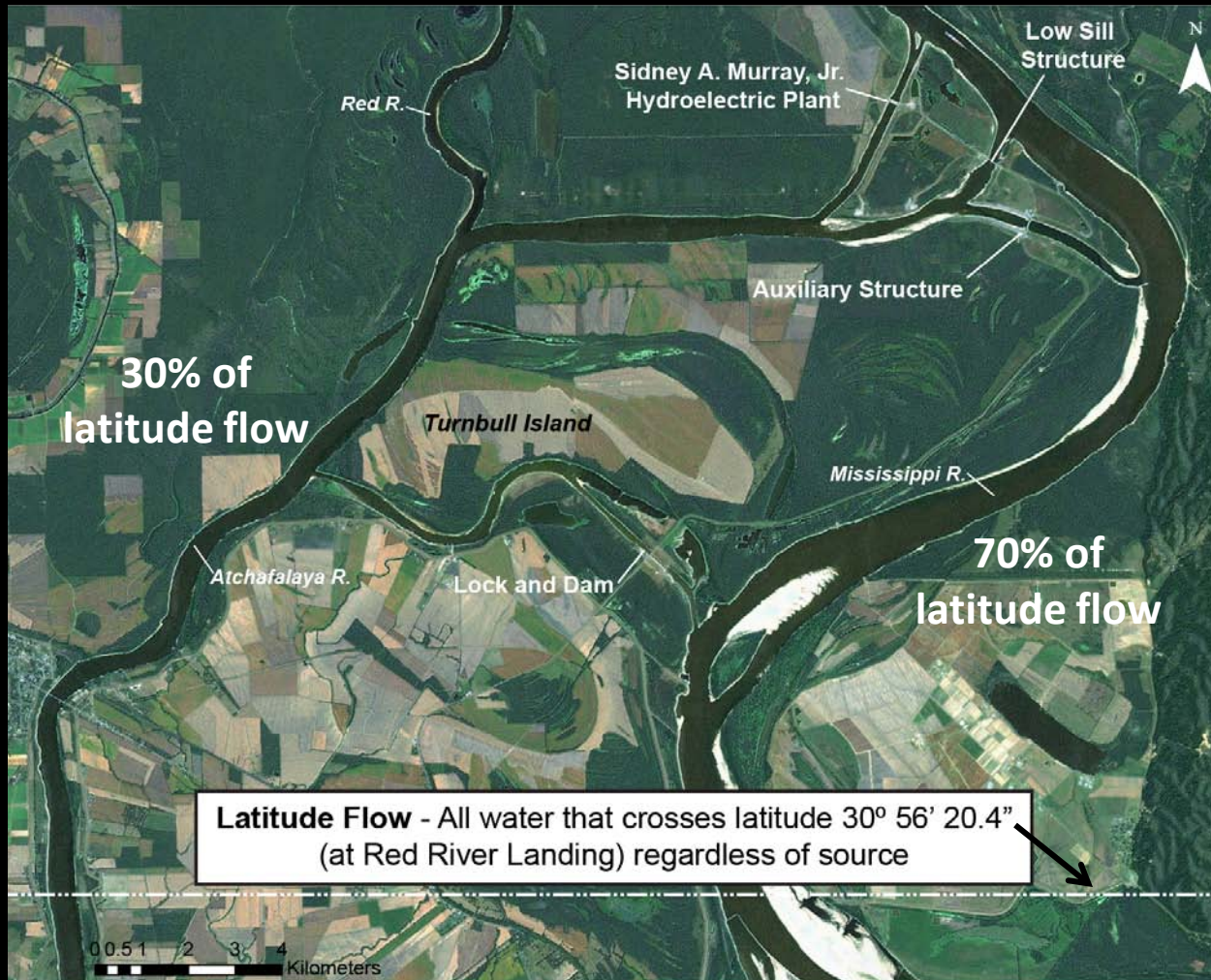
1990

2011

Source: U.S. Army Corps of Engineers

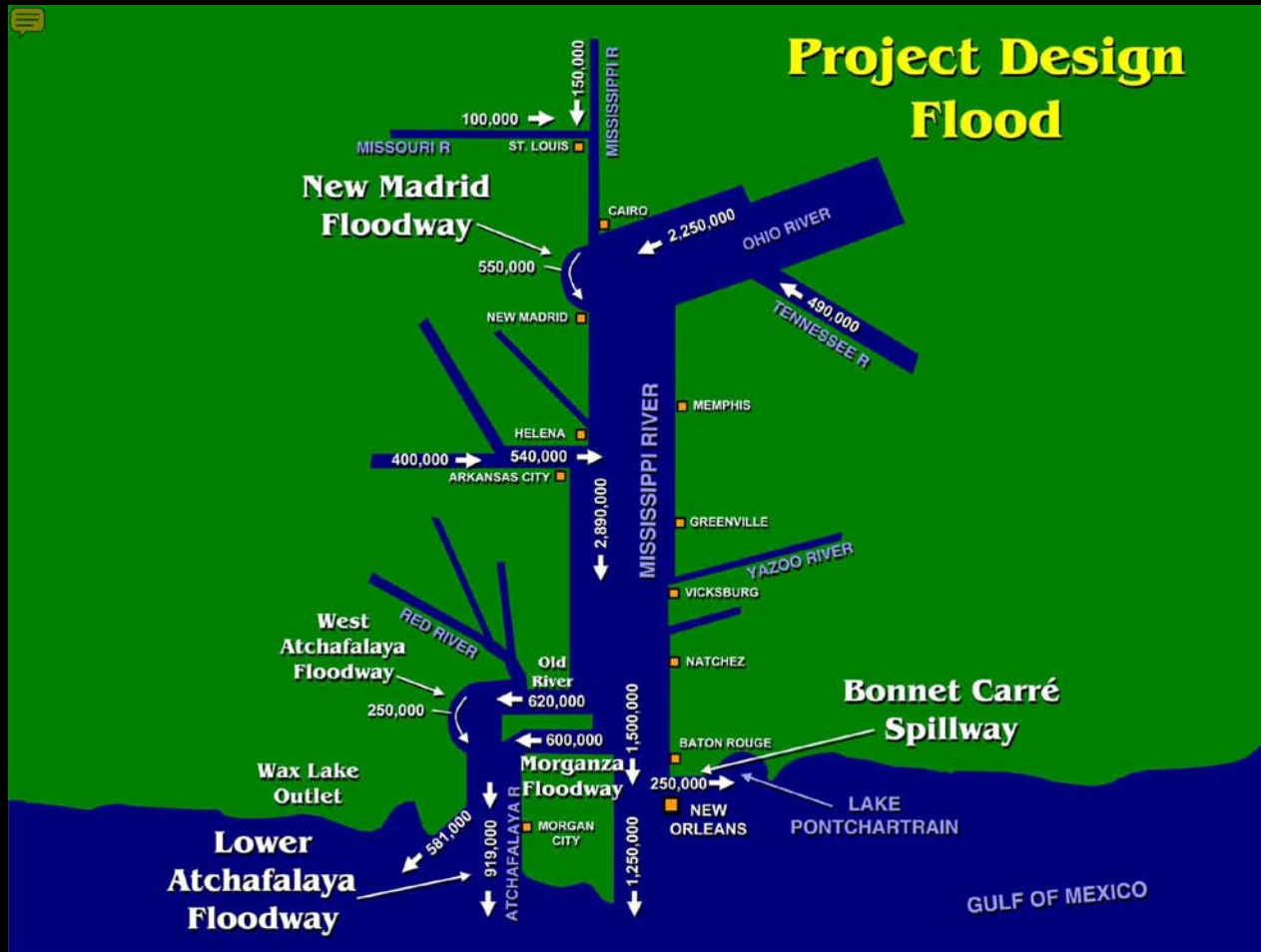


Timeline of ORCS



Imagery obtained from earth World Imagery

Project flood



Source: U.S. Army Corps of Engineers

Identified issues & challenges

- Water Management
- Water Quality
- Sedimentation
- Stakeholder Diversity



Water management

- Unnaturally extended flooding creates problems for ecosystems
 - E.g., Cypress-tupelo forests



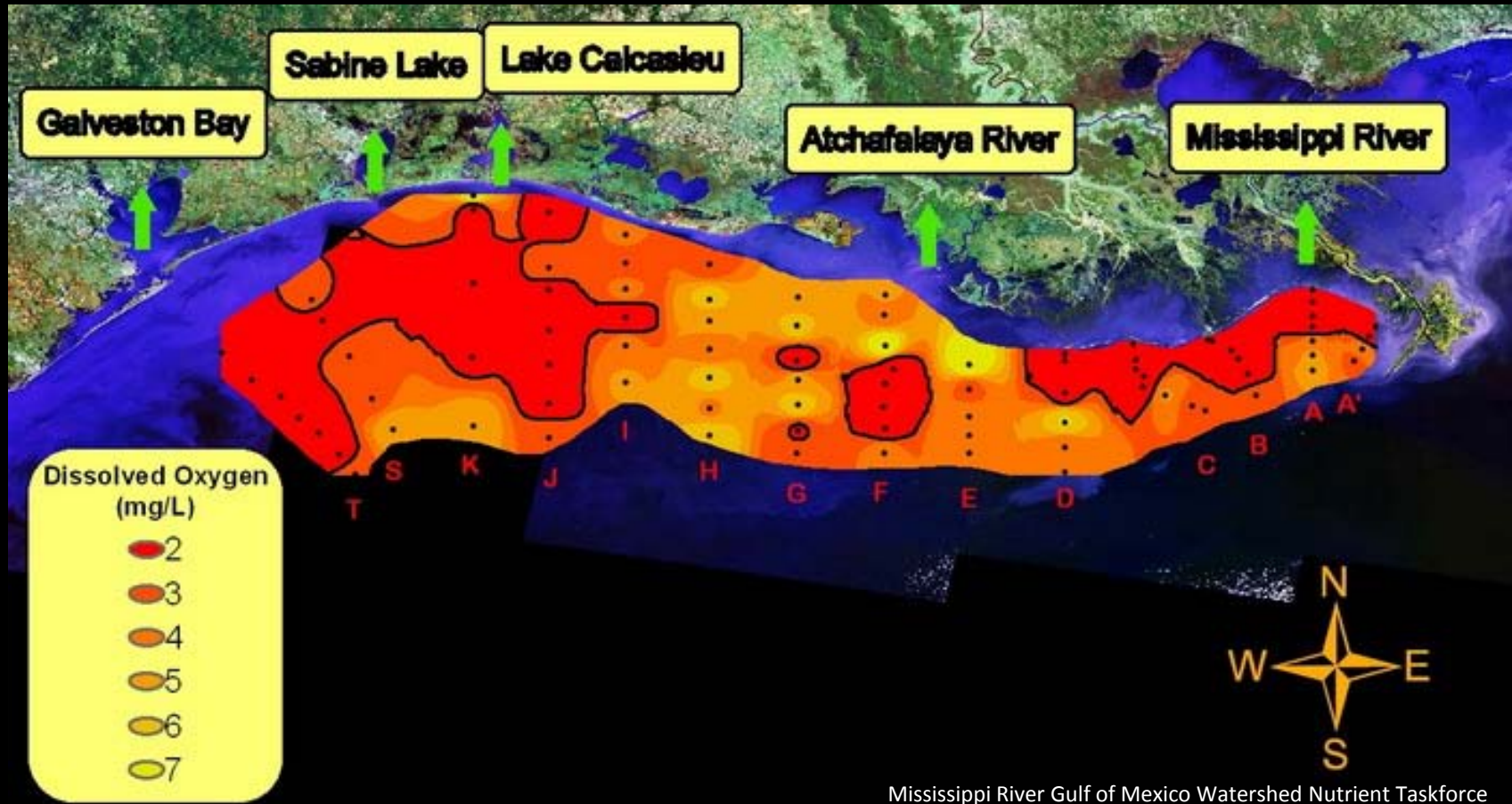
L. Parent

Water quality

Fish kill – Henderson Lake, Aug. 2008



Water quality

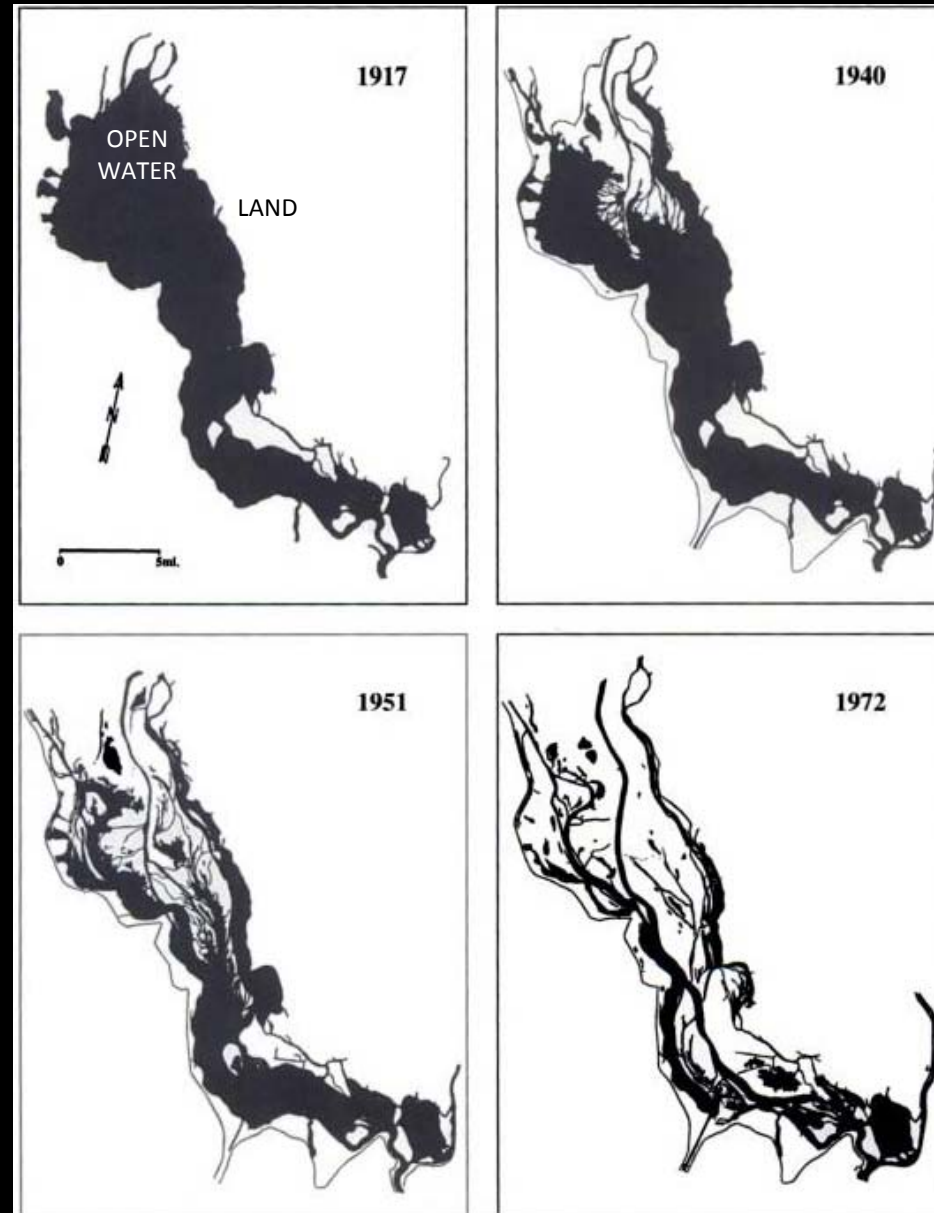


- Atchafalaya is major source of nutrient input in Gulf of Mexico

Sediment control

- Atchafalaya receives all sediment from the Red River and a portion of Mississippi R. sediment
- Gradual filling-in of deep water habitats

Land accretion – Grand Lake



From: M. Reuss, *Designing the Bayous*

Sediment control

- Most sediment now moves to delta – combats coastal erosion and sea-level rise



Source: U.S. Geological Survey

Stakeholder diversity

Crayfish fishers



Fishers



NGOs



Recreationists
& birders



Visualphotos.com

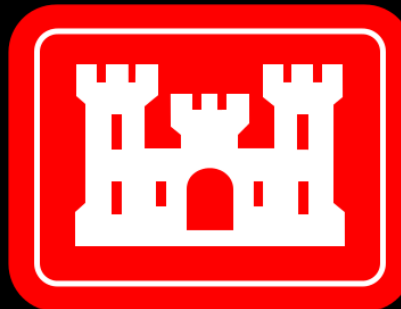


State & federal agencies

Onepennysheet.com



Oil & gas



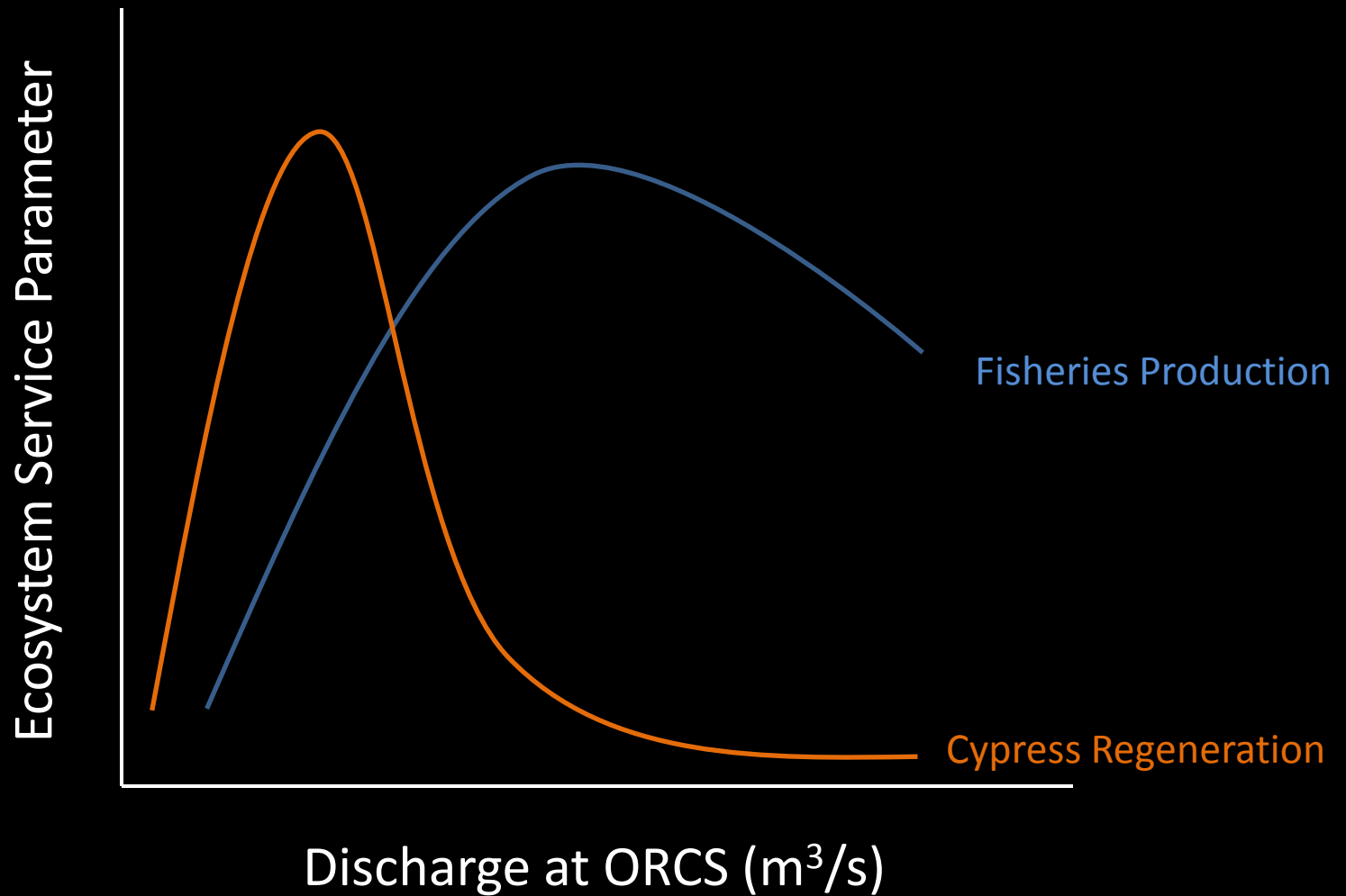
Atchafalaya Basinkeeper



Proposed decision support tool

- Need for scientific information to evaluate potential management options
- Trade-offs among ecosystem services and areas of common interests among stakeholders
- Data from literature to develop model parameters relating ecosystem services to flow release

Proposed decision support tool





Thank You

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