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

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NSF-IGERT: Watershed Science and Policy
Aaron Nickolotsky, Justin Kozak, Anne Hayden, Kelley Fritz, Micah Bennett
The Atchafalaya Basin

- Distributary 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

- **Mid 1700's**: Turnbull's Bend Acadien Settlement
- **Early 1800's**: Logjam
- **Mid 1800's**: Shreve's Cutoff "Levees Only"
- **1861**: Old River
- **Late 1800's**: Flood
- **1927**: Jadwin Plan
- **1928**: Stop Capture
- **1950's**: Stop Capture

Prior to 1500's
- Red and Mississippi Bend
- Acadian Settlement
- Red River
- Atchafalaya River
- Mississippi River
History of development

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

- **Mid 1700’s:** Turnbull’s Bend
- **Early 1800’s:** Acadien Settlement
- **Mid 1500’s:** Red and Mississippi
- **Late 1800’s:** Shreve’s Cutoff
- **1861:** “Levees Only” Old River Flood
- **Jadwin Plan:** Stop Capture
- **1927:** Old River
- **1928:** Silted In
- **1950’s:** Mississippi River
- **1928:** Red River
- **Prior to 1500’s:** Atchafalaya River
- **Mid 1800’s:** Mississippi River
- **Mid 1800’s:** Late 1800’s
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History of development

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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

<table>
<thead>
<tr>
<th>Event</th>
<th>Time Period</th>
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</thead>
<tbody>
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<td>Red and Mississippi</td>
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</table>
Current state of operation

Distance to Gulf

- Mississippi R.  
  ~500 km

- Atchafalaya R.  
  ~230 km
Timeline of ORCS

Source: U.S. Army Corps of Engineers
Timeline of ORCS

30% of latitude flow

70% of latitude flow

Latitude Flow - All water that crosses latitude 30° 56' 20.4" (at Red River Landing) regardless of source
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
Water quality

Fish kill – Henderson Lake, Aug. 2008

M. Kaller - LSU
• 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

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**
- **Commerce & transportation industries**
- **Oil & gas**
- **State & federal agencies**
- **Oyster fishers**
- **Recreationists & birders**
- **NGOs**
  - Audubon
  - The Nature Conservancy
- **Timber industry**
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

Discharge at ORCS (m³/s)

Ecosystem Service Parameter

Fisheries Production

Cypress Regeneration
Thank You

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