R.L. Harris Dam Relicensing
FERC No. 2628

Adaptive Management of Downstream Flows

January 31, 2018
Stakeholder Informational Meeting

Agenda

- Harris Project Overview
- Harris Original License History
- Harris Adaptive Management Timeline

R.L. Harris Project Overview

Alabama Power

Alabama Power Company's Hydroelectric Developments

14 Developments

Warrior River

Coosa River

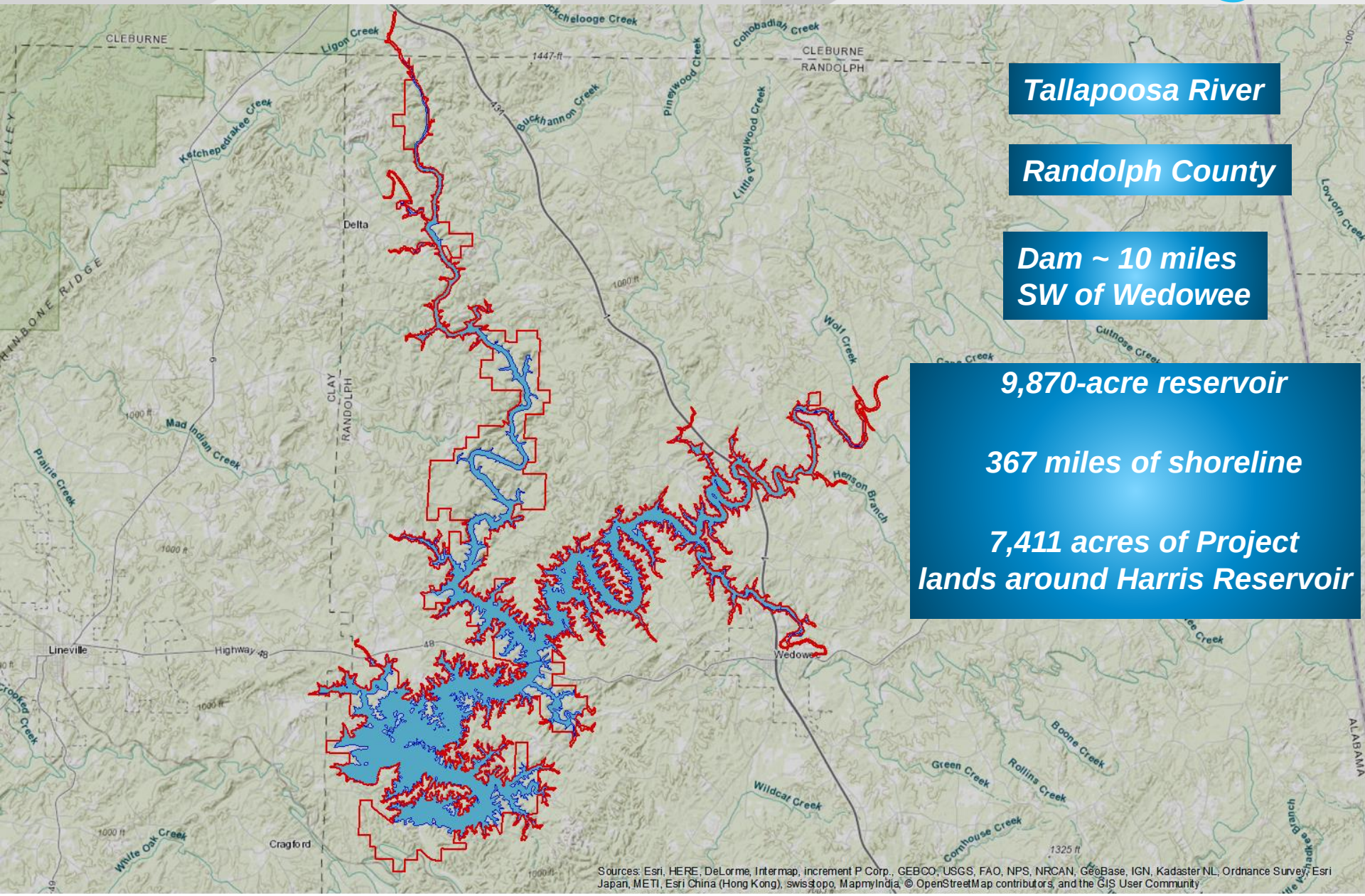
Tallapoosa River

Generation – 1,600 MW
Project Waters – 155,700 Acres
Project Lands – 119,500 Acres
Shoreline – 3,100 Miles
River Miles – 430 Miles

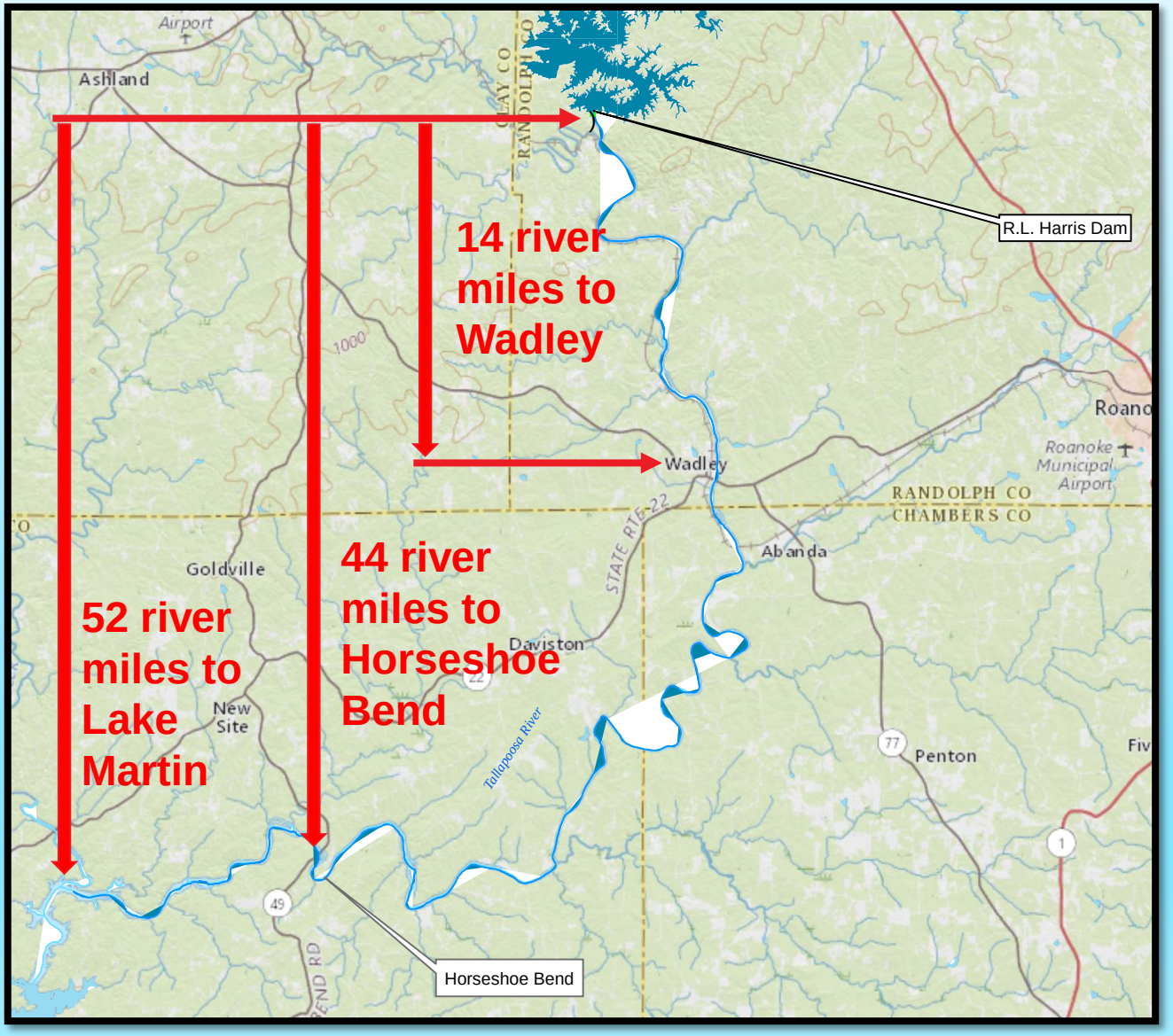
*All numbers approximate

Harris Project Overview

HARRIS DAM RELICENSING



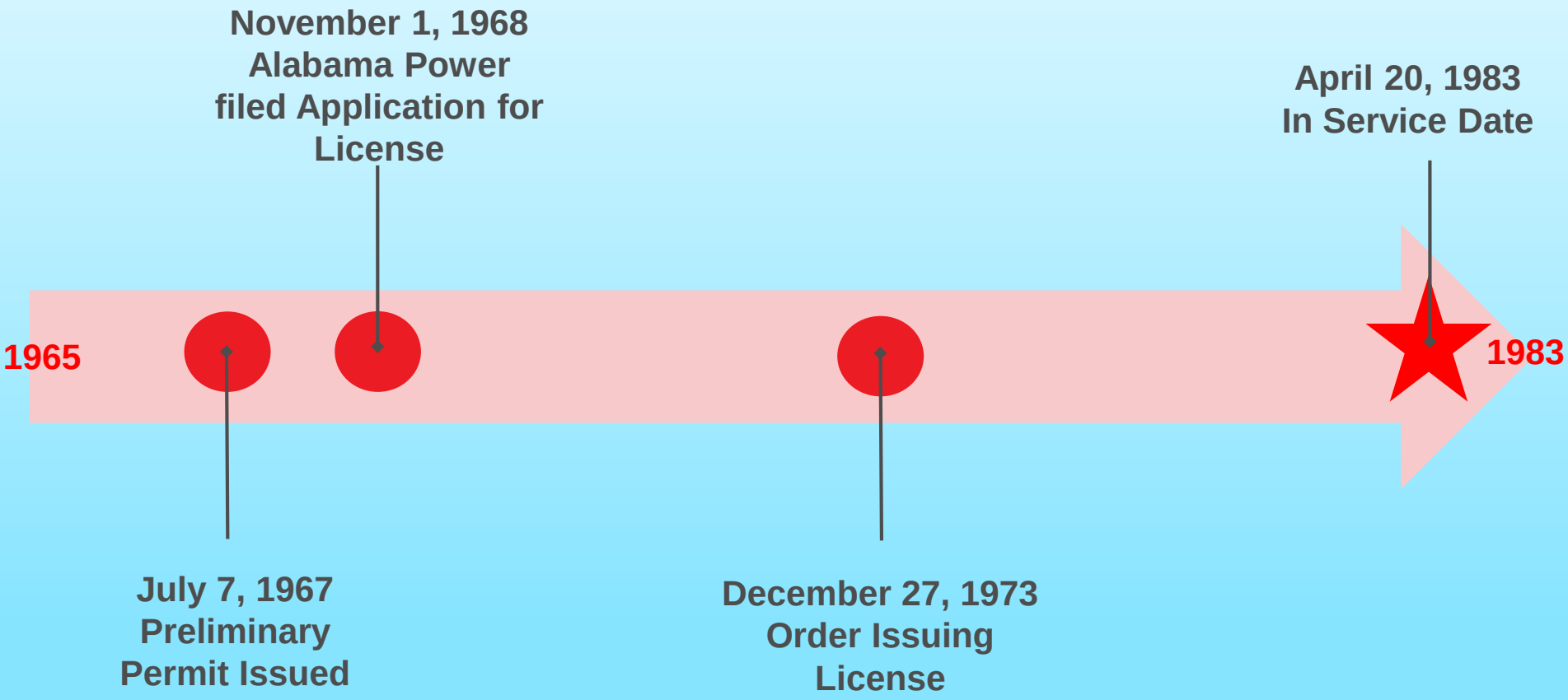
Distances


14 river miles to Wadley
44 river miles to Horseshoe Bend
52 river miles to Lake Martin
R.L. Harris Dam
Horseshoe Bend
Wadley
Goldville
Daviston
Abanda
Penton
Ashland
Airport
Roanoke Municipal Airport
RANDOLPH CO
CHAMBERS CO
CLAY CO
STATE RTE-22
Tallapoosa River
New Site

License Timeline

Alabama Power

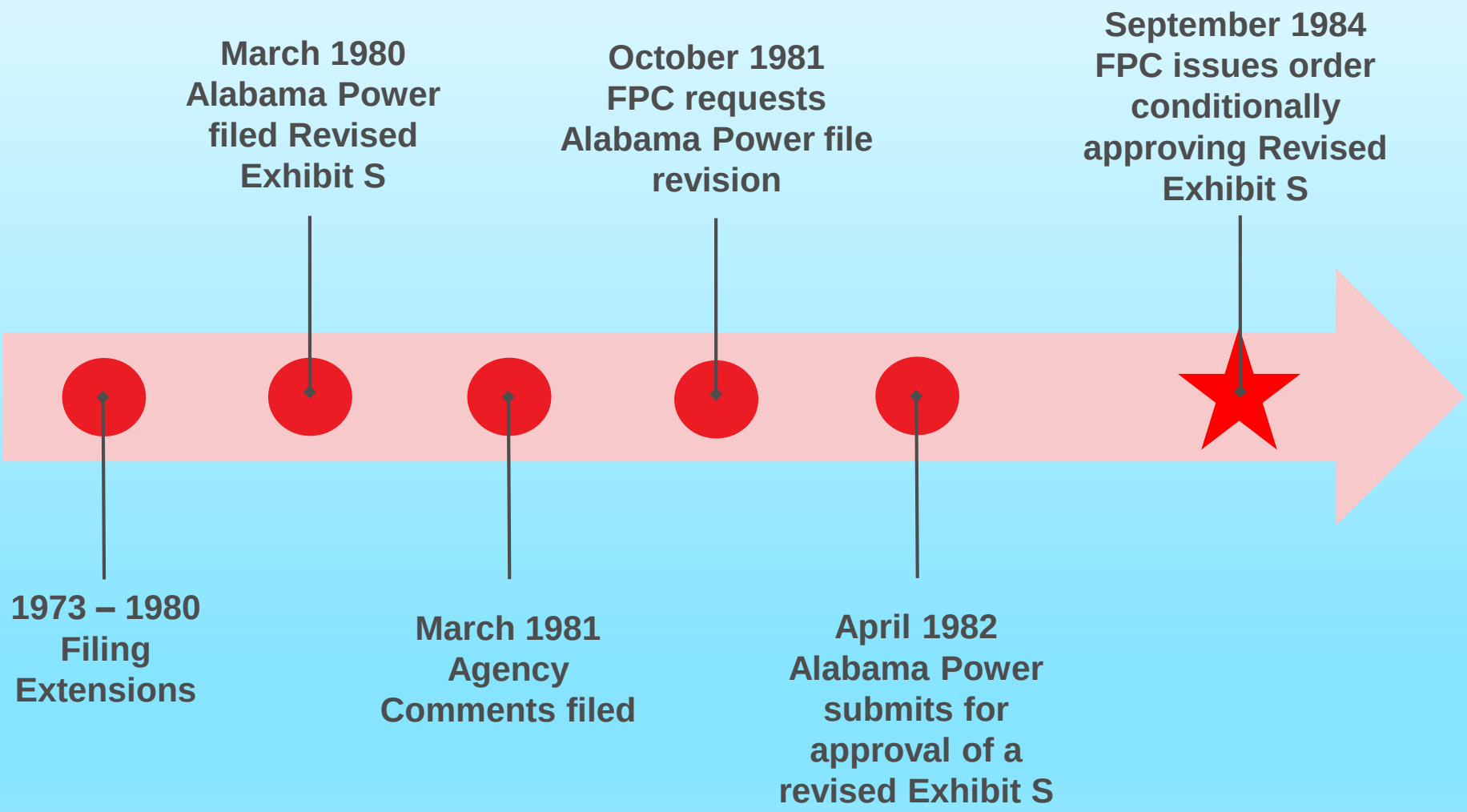
Harris Original License Timeline



Order Issuing License – December 27, 1973

In another issue relating to reservoir operating procedures, three agencies, the Environmental Protection Agency, the Alabama Department of Conservation and Natural Resources, and the U.S. Army Corps of Engineers, in letters to the Commission made inquiries and recommendations concerning the need to maintain adequate river flows. In addition, the Alabama Water Improvement Commission (AWIC) requested certain license conditions to insure that the construction and operation of the project would not contravene State water standards and recommended that a minimum continuous flow in the Tallapoosa River at the Wadley Gage be not less than 45 cfs. The AWIC water quality certificate issued to the Company included a provision for maintenance of this amount of flow. The Company has agreed to a minimum continuous flow of 45 cfs. We are requiring a minimum continuous flow of 45 cfs as measured at the Wadley Gage located several miles below the proposed dam.

Revised Exhibit S



Adaptive Management Timeline
1998 - 2004

Alabama Power

Timeline: 1998 - 2004

Talks Begin
ADCNR and Alabama Power begin discussions about downstream flows

1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004

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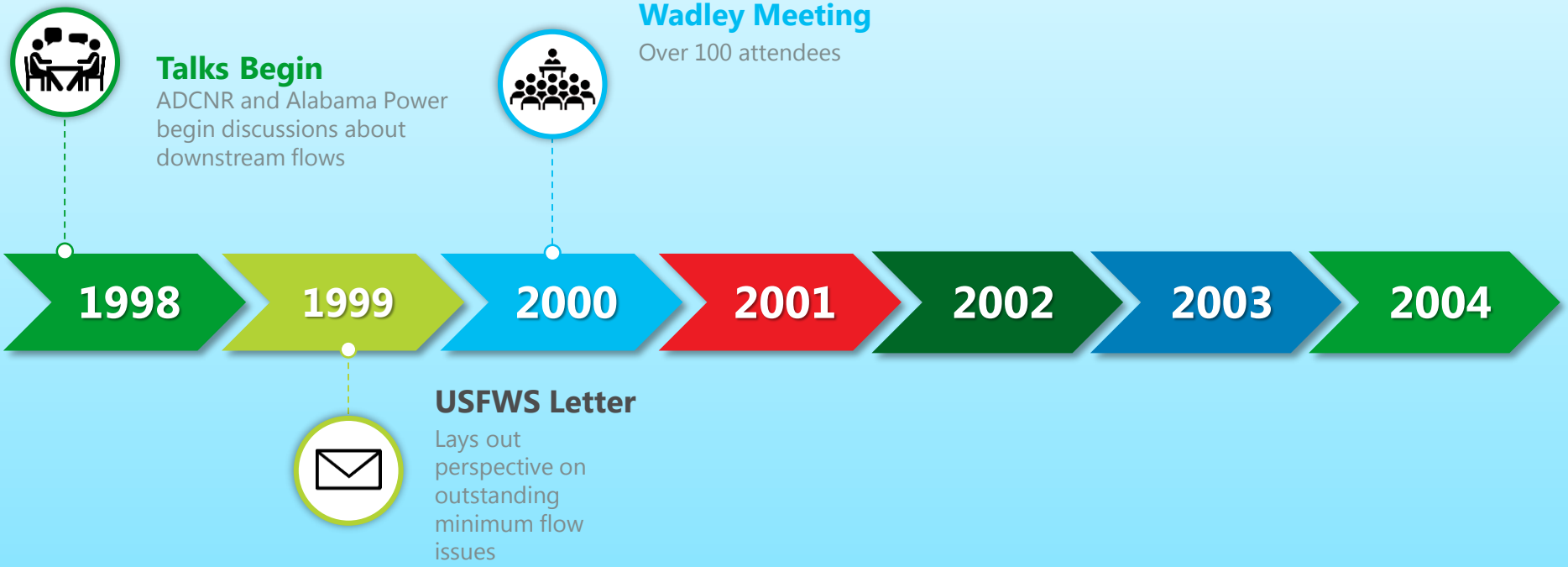
USFWS Letter
Lays out perspective on outstanding minimum flow issues

Initial Discussions

- Re-regulation dams
- Geotubes
- House turbine
- Spillway gate modifications
- Pulsing operations

Timeline: 1998 - 2004



Public Meeting on August 8, 2000

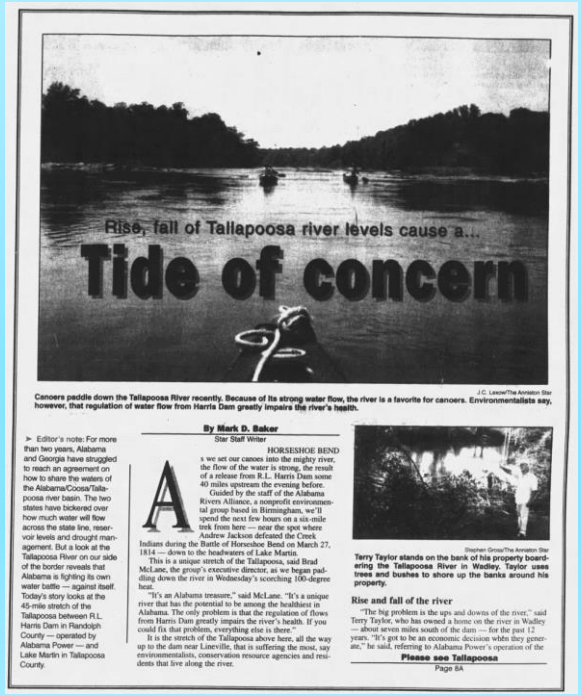
- Organized and facilitated by ADCNR
- FERC attended – encouraged collaboration
- Elise Irwin (ALCFWRU) presented Adaptive Flow Management concept.
- APC presented proposal for building a re-regulation dam within a seven-mile stretch below Harris Dam.

PUBLIC NOTICE OF TALLAPOOSA RIVER FLOW MEETING

A public meeting concerning flows in the Tallapoosa River below R. L. Harris Dam will be held on August 8th, 2000 at 7:00 p.m. in the Braseal Auditorium on the campus of Southern Union Community College, Wadley, Alabama. Representatives from the Alabama Department of Conservation and Natural Resources, Alabama Power Company and the United States Fish and Wildlife Service will be present to discuss Tallapoosa River flow issues below R. L. Harris Dam and the process that will be used to resolve these issues. All interested stakeholders are invited and will be given an opportunity to express their concerns.

For further information contact
The District II Fisheries Office at 256-831-6860.

Anniston Star August 20, 2000



Rise, fall of Tallapoosa river levels cause a...

Tide of concern

J.C. Lasche/The Anniston Star

Canoers paddle down the Tallapoosa River recently. Because of its strong water flow, the river is a favorite for canoers. Environmentalists say, however, that regulation of water flow from Harris Dam greatly impairs the river's health.

By Mark D. Baker
Star Staff Writer

➤ Editor's note: For more than two years, Alabama and Georgia have struggled to reach an agreement on how to share the waters of the Alabama/Coosa/Tallapoosa river basin. The two states have bickered over how much water will flow across the state line, reservoir levels and drought management. But a look at the Tallapoosa River on our side of the border reveals that Alabama is fighting its own water battle — against itself. Today's story looks at the 45-mile stretch of the Tallapoosa between R.L. Harris Dam in Randolph County — operated by Alabama Power — and Lake Martin in Tallapoosa County.

HORSESHOE BEND

As we set our canoes into the mighty river, the flow of the water is strong, the result of a release from R.L. Harris Dam some 40 miles upstream the evening before.

Guided by the staff of the Alabama Rivers Alliance, a nonprofit environmental group based in Birmingham, we'll spend the next few hours on a six-mile trek from here — near the spot where Andrew Jackson defeated the Creek Indians during the Battle of Horseshoe Bend on March 27, 1814 — down to the headwaters of Lake Martin.

This is a unique stretch of the Tallapoosa, said Brad McLane, the group's executive director, as we began paddling down the river in Wednesday's scorching 100-degree heat.

"It's an Alabama treasure," said McLane. "It's a unique river that has the potential to be among the healthiest in Alabama. The only problem is that the regulation of flows from Harris Dam greatly impairs the river's health. If you could fix that problem, everything else is there."

It is the stretch of the Tallapoosa above here, all the way up to the dam near Lineville, that is suffering the most, say environmentalists, conservation resource agencies and residents that live along the river.

Stephen Gross/The Anniston Star

Terry Taylor stands on the bank of his property boardering the Tallapoosa River in Wadley. Taylor uses trees and bushes to shore up the banks around his property.

Rise and fall of the river

"The big problem is the ups and downs of the river," said Terry Taylor, who has owned a home on the river in Wadley — about seven miles south of the dam — for the past 12 years. "It's got to be an economic decision when they generate," he said, referring to Alabama Power's operation of the

Please see Tallapoosa

TIDE OF CONCERN

Tallapoosa: *River's inconsistency has eaten away shorelines*

Timeline: 1998 - 2004

Talks Begin
ADCNR and Alabama Power begin discussions about downstream flows

Wadley Meeting
Over 100 attendees

1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004

USFWS Letter
Lays out perspective on outstanding minimum flow issues

Journal Article
Proposal for Adaptive Management to Conserve Biotic Integrity in a Regulated Segment of the Tallapoosa River, Alabama, U.S.A

Conservation Biology – February 2002 (Vol. 11, No. 1)

Proposal for Adaptive Management to Conserve Biotic Integrity in a Regulated Segment of the Tallapoosa River, Alabama, U.S.A.

ELISE R. IRWIN* AND MARY C. FREEMAN†

*Alabama Cooperative Fish and Wildlife Research Unit, U.S. Geological Survey, 108 M. White Smith Hall, Auburn University, AL 36849, U.S.A., email eirwin@acesag.auburn.edu
†Patuxent Wildlife Research Center, U.S. Geological Survey, University of Georgia, Athens, GA 30602, U.S.A.

- Low fish abundance and diversity
- Low mussel species richness
- Caused by
  - Depleted low flow – limits habitat suitability
  - Flow instability – reduces reproductive success and recruitment
  - Thermal regime alteration – delays spawning, reduces hatching success and slows larval development

Adaptive Management Process

1. Develop and agree to management objectives

2. Model hypothesized relations between dam operations and management objectives

3. Implement changes in dam operations

4. Evaluate biological responses and other stakeholder benefits

Timeline: 1998 - 2005

Talks Begin
ADCNR and Alabama Power begin discussions about downstream flows

Wadley Meeting
Over 100 attendees

Auburn Workshop
44 individuals from 21 organizations

1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004

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Proposal for Adaptive Management to Conserve Biotic Integrity in a Regulated Segment of the Tallapoosa River, Alabama, U.S.A

2003 Workshop Participants

AL Dept. Conservation & Natural Resources

AL Coop. Fish and Wildlife Research Unit

Alabama Power Company

Alabama Rivers Alliance

Coalition of Associations at Lake Martin

Conservation Unlimited

Emerald Triangle Commission

Environmental Insight

Federal Energy Regulatory Commission

GA Coop. Fish and Wildlife Research Unit

GA Department of Natural Resources

Lake Wedowee Property Owners Association

Mobile Bay Watch

Mobile Register

OK Coop. Fish and Wildlife Research Unit

Randolph County Commission

Tennessee Valley Authority

University of Georgia

Upper Tallapoosa Watershed Committee

United States Fish and Wildlife Service

United States Geological Survey

2003 Workshop Topics

Maximize

- Economic development
- Diversity of flora and fauna
- Reservoir water levels
- Water quality in reservoir and downstream
- Boating and angling opportunities
- Operational flexibility

Minimize

- Downstream bank erosion
- River fragmentation
- Cost to APC
- Consumptive uses

Timeline: 1998 - 2005

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ADCNR and Alabama Power begin discussions about downstream flows

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Stakeholder Meetings
May, June, August, & November

1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004

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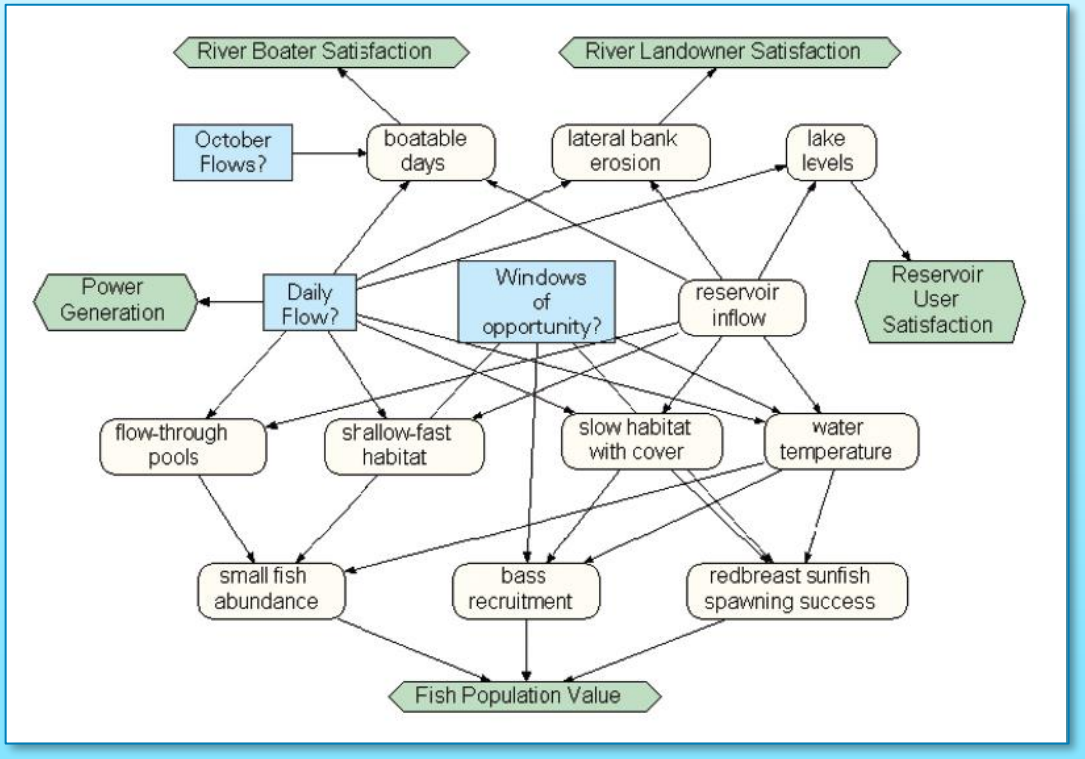
2003 Stakeholder Meetings

- Continuous Minimum flows
- Re-regulation Dams
- Geotubes
- House Turbine
- Models/NETICA
- Model components



Timeline: 1998 - 2005

Talks Begin
ADCNR and Alabama Power begin discussions about downstream flows

1998

1999

USFWS Letter
Lays out perspective on outstanding minimum flow issues

Wadley Meeting
Over 100 attendees

2000

2001

2002

Journal Article
Proposal for Adaptive Management to Conserve Biotic Integrity in a Regulated Segment of the Tallapoosa River, Alabama, U.S.A

Auburn Workshop
44 individuals from 21 organizations

Stakeholder Meetings
May, June, August, & November

2003

2004

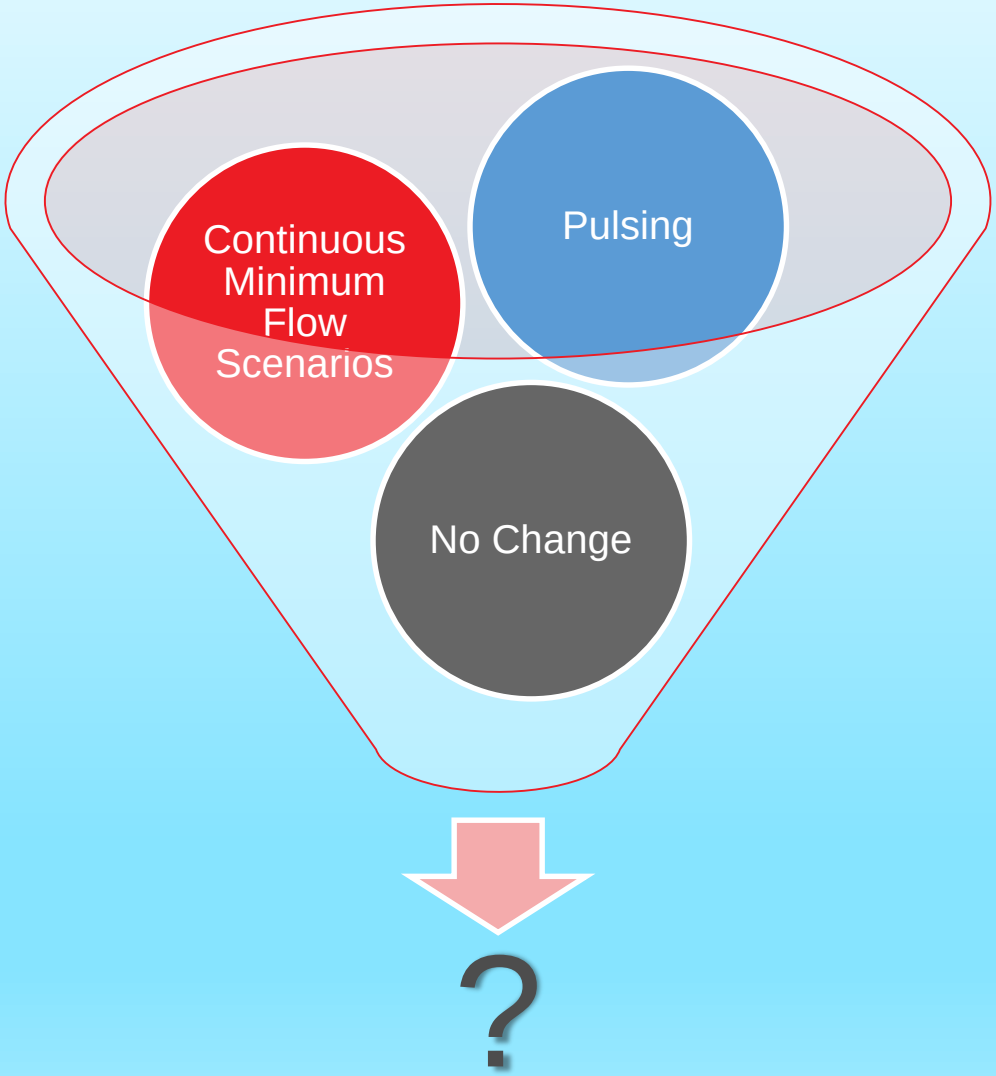
Stakeholder Meeting
December

December 2004 Stakeholder Meeting

- Alabama Power presents activities since November 1, 2003

Item Evaluated	Outcome
Trash Gate Modifications	Not capable of passing less than 500 cfs
Penstock Drain System	Insufficient space for piping and valves.
Penetration Through Headworks Structure	Not possible due to location of concrete piers and construction joints.
East Non-Overflow Structure Siphon	Not possible to west. Possible to east. Could deliver 150 cfs via 4-ft pipe; but had significant financial implications
Geotubes & Re-regulation dam(s)	Ruled out due to stakeholder opposition and lack of benefits to resources

Ongoing Discussions



Adaptive Management Timeline 2005 - 2010

Alabama Power

Timeline

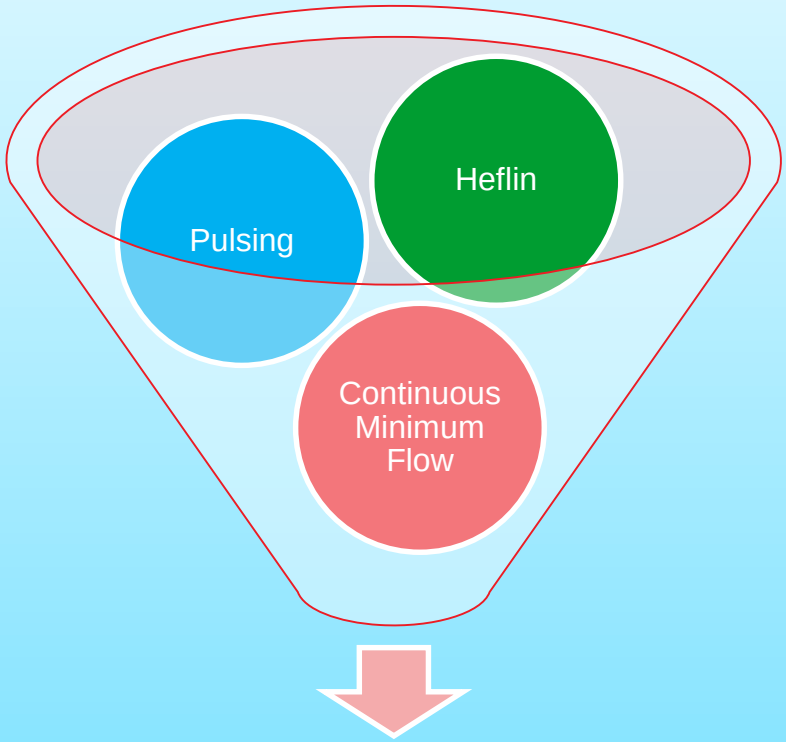
Stakeholder Meetings

January & August

2005 2006 2007 2008 2009 2010

2005 Meetings

- Decision Model presented
- Technical Committee formed*
- Green Plan selected
- Draft monitoring plan discussed
- Funding discussed



Pulsing based on Heflin

*ACFWRU, ADCNR, USFWS, Alabama Power

Timeline

Stakeholder Meetings
January & August

Green Plan Implemented
March

2005 | 2006 | 2007 | 2008 | 2009 | 2010

The Green Plan – Daily Release Schedule

Prior Day's Heflin Flow (DSF)	Generation @ 6 AM	Generation @ 12 PM	Generation as needed	Total Machine Time	Total Harris Discharge (DSF)
0 – 150	10 min	10 min	10 min	30 min	133
150 – 300	15 min	15 min	30 min	1 hr	267
300 – 600	30 min	30 min	1 hr	2 hrs	533
600 – 900	30 min	30 min	2 hrs	3 hrs	800
>900	30 min	30 min	3 hrs	4 hrs	1,067

DSF = day second feet

The **volume** of water represented by a flow of 1 cubic foot per second for 24 hours; equal to 86,400 cubic feet and approximately 2 acre feet.

The Green Plan – Hourly Release Schedule

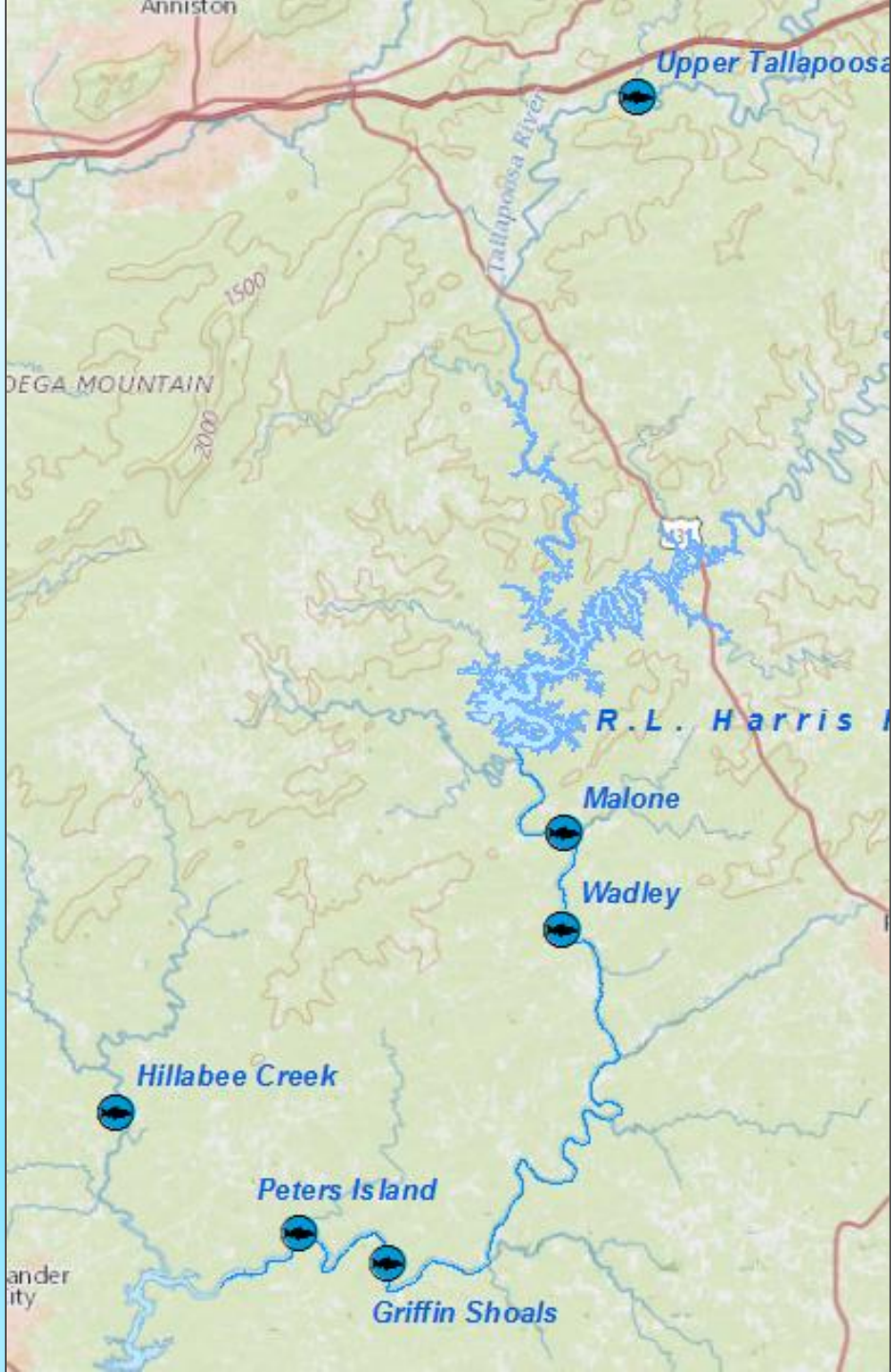
Total Scheduled Generation	Generation @ 6 AM	Generation @ 12 PM	Generation as needed	Total Machine Time	Total Harris Discharge (DSF)
1 machine hr	15 min	15 min	30 min	1 hr	267
2 machine hrs	30 min	30 min	1 hr	2 hrs	533
3 machine hrs	30 min	30 min	2 hrs	3 hrs	800
4 machine hrs	30 min	30 min	3 hrs	4 hrs	1067
5+ machine hrs			all		

Study Reaches

- Upper Tallapoosa @ Heflin
- Malone
- Wadley
- Griffin Shoals
- Peters Island
- Hillabee Creek

Study Components

- Spring and Fall fish sampling
- Fall benthic macroinvertebrate sampling
- Habitat measurements (substrate, depth, velocity, temperature, etc.)



Timeline: 2005 - 2010

Stakeholder Meetings
January & August

Green Plan Implemented
March

2005 | 2006 | 2007 | 2008 | 2009 | 2010

Stakeholder Meeting
Some preliminary results presented

August 2007 – Stakeholder Meeting

Results of 2005 Monitoring
for Adaptive Management of the Tallapoosa River below R.L. Harris Dam

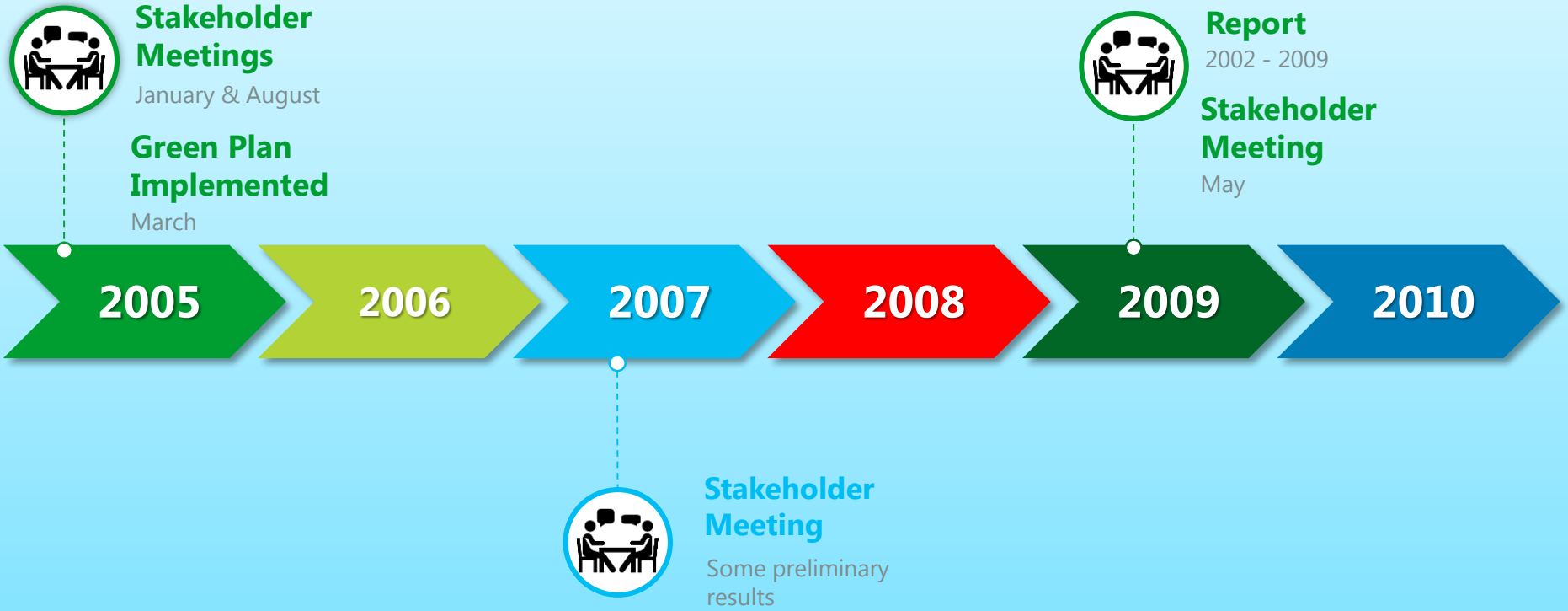
Elise Irwin
USGS

Kathryn Mickett Kennedy
Alabama Cooperative Fish and Wildlife Research Unit

Alabama Power Company's
Review of the RL Harris 'Green Plan'

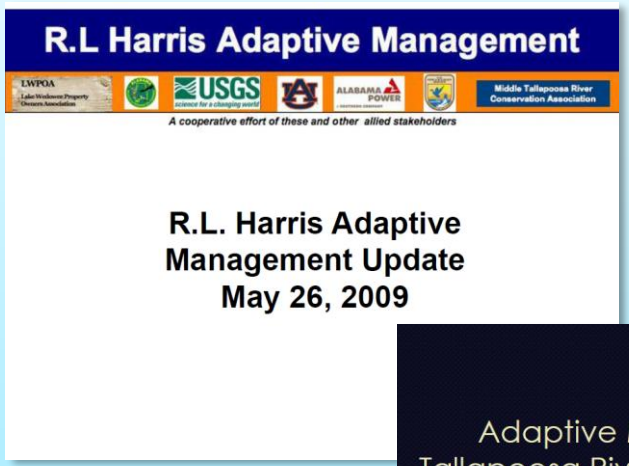
R L Harris Adaptive Management Meeting
Alexander City, AL
August 2, 2007

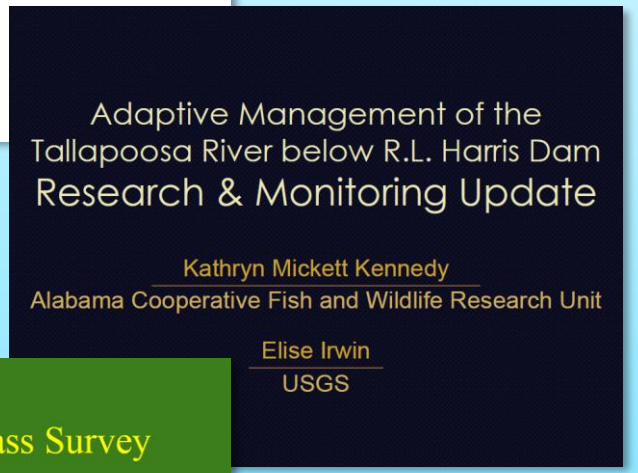
Timeline: 2005 - 2010

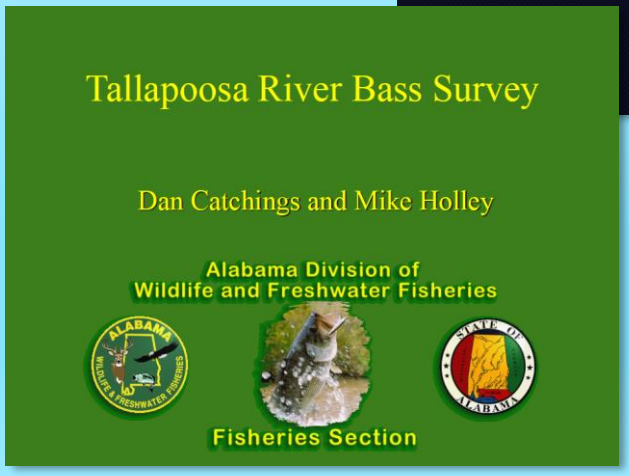


May 2009 Stakeholder Meeting

- Alabama Power provided update on flow management
- ADCNR summarized results of the Tallapoosa sport fish study
- ALCFWRU presented a research and monitoring update







Adaptive Management Timeline 2011 - 2017

Alabama Power

Timeline: 2011 - 2017

Report

Report on
2005-2010

2011 2012 2013 2014 2015 2016 2017

2011 Report

Adaptive management and monitoring for restoration and faunal recolonization of Tallapoosa River shoal habitats.

Prepared by:

Elise Irwin, Kathryn Mickett Kennedy,
Taconya Piper Goar, Benjamin Martin, and Molly Moore Martin
Alabama Cooperative Fish and Wildlife Research Unit

- IBI scores lower at regulated sites, but varied widely
- Fish assemblages vary considerably, in regulated and unregulated reaches
- Stable flows may enhance spawning

Lipstick Darter (*Etheostoma chuckwachatte)*

Timeline

Report

Report on
2005-2010

Technical Committee Meeting

Focus on temperature

2011 2012 2013 2014 2015 2016 2017

2013 Technical Committee Meeting

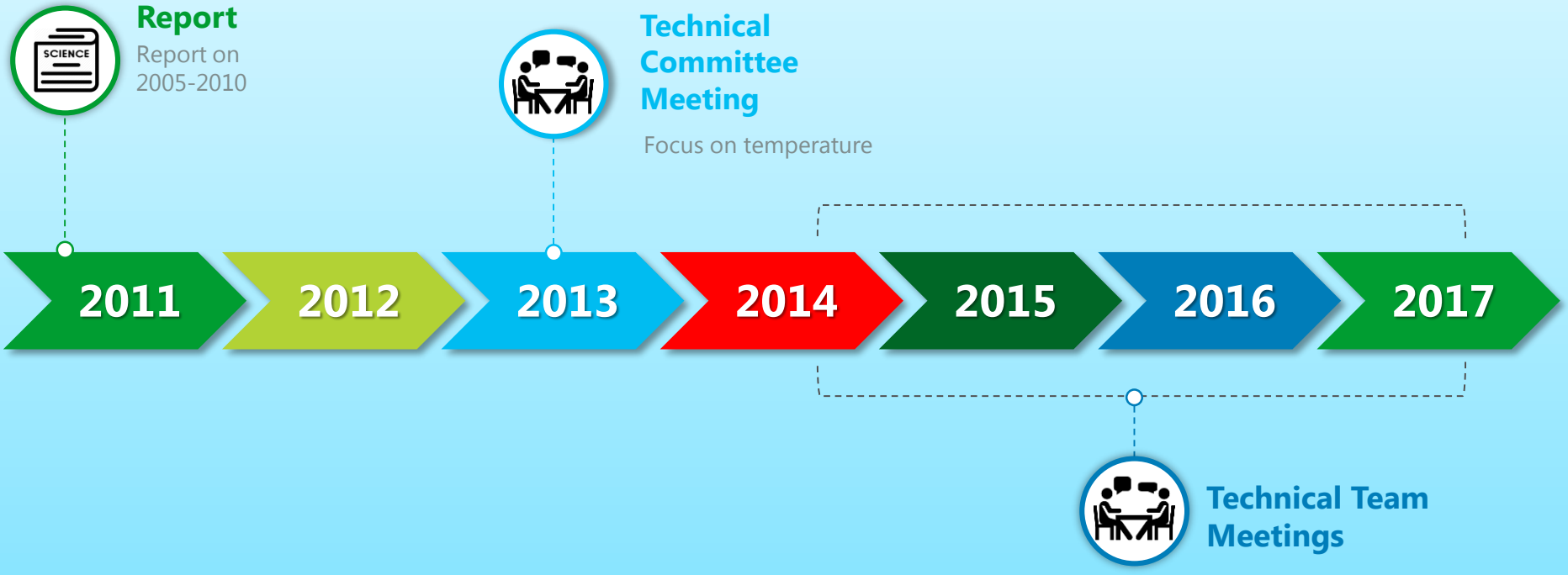
Increased habitat diversity and positive ecosystem response to Green Plan

Temperatures can be “too cold” for certain fish

Formation of technical team – modelers and biologists

Reconvene when technical committee formulates proposal for addressing temperature issue

Timeline


SCIENCE
Report
Report on
2005-2010
Technical
Committee
Meeting
Focus on temperature
2011
2012
2013
2014
2015
2016
2017
Technical Team
Meetings

2013 - 2017 Technical Meetings

- Focused on temperature below dam
- Participants note that Green Plan has improved habitat
- Proposed and discussed variations to pulse timing and effects on temperature
- Macroinvertebrate processing and analysis
- Alabama Power samples fish via 30+2 methodology
- Discussion of potential future creel studies

Alabama Shiner (*Cyprinella callistia)*

Bronze Darter (*Percina palmaris)*

Largescale Stoneroller
(*Campostoma oligolepis)*

Summary

- 20+ years of collaboration
- 13 years of implementation, research, monitoring, & evaluation

HARRIS DAM RELICENSING

2018 – 2021: Relicensing Process