Summary Report

Ocmulgee River Flow Regime Pilot Study Stakeholder Group
Meeting Two
November 13, 2018

The Ocmulgee River Flow Regime Pilot Study stakeholders group convened on November 13, 2018 for a presentation on a pilot study of alternative flow regimes for the Ocmulgee River basin. In attendance were: Mark Wyzalek, Macon Water Authority; Tony Dodd and Courtenay O'Mara, Georgia Power Company; Jared Godin and Skip Davis, Jackson Lake Association; Kathleen O'Neal, Altamaha Riverkeeper and Ocmulgee Outdoor Expeditions; Sherri Wood, Ocmulgee Water Trail Project; George McMahon and Brian Bandy, Arcadis; Ken Watson, HSW Engineering; and Marcus Zokan, Paula Marcinek, and Brandon Baker, Georgia DNR – WRD. Representing Georgia DNR - EPD were Gail Cowie, Veronica Craw, Hailian Liang, Jennifer Welte, and Wei Zeng.

Following introductions, stakeholders were presented with a brief review of the project background (see Appendix A). Exploring alternative flow regimes was based on the Middle Ocmulgee Regional Water Planning Council's recommendation that alternatives be considered for the flow threshold used in the Surface Water Availability Resource Assessment. The Surface Water Availability Resource Assessment used for the 2017 Middle Ocmulgee Regional Water Plan focuses on low flow conditions using a threshold drawn from the State's interim instream flow policy. In choosing an alternative flow regime, two questions were considered: what services do we want to plan for this river basin to provide now and in the future; and how can these services be expressed in flow levels for the streams in the basin? These questions were discussed in the first stakeholder meeting and services such as recreation and habitat were discussed, as well as water supply and power generation. (See Appendix B for the first stakeholder meeting summary.)

Wei Zeng of Georgia EPD then presented an update on the Ocmulgee Basin Flow Regime Pilot Study (Appendix C), and highlighted the study approach, including collection of data from myriad sources; surveys, studies, and reports that informed the model; and current operations of hydropower, water intake, and water outfalls that impact flows. The presentation detailed three assessments of flow-related services: recreational accessibility, wetland inundation, and wetted perimeter (an indicator of available aquatic habitat). The model outputs provide the Middle Ocmulgee Regional Water Planning Council with additional tools to assess stream-specific or site-specific services and potential impacts to those services. The Council can use these additional tools to consider relative impacts in its water planning process. Importantly, additional data may lead to more reliable results from the model. This isn't a fixed answer, rather a dynamic process where information will continue to be collected.

Following the presentation, several questions were raised.

Q1: Can the model take in seasonality? Yes – the daily time step model can be tailored to specific season(s) and can compare certain months.

Q2: Which elevation datum is used? NAVD88

Note: Georgia Power commented that the Lloyd Shoals Project Federal Energy Regulatory Commission (FERC) relicensing process will look upstream and downstream of Lake Jackson and information regarding this modeling effort could be considered in the relicensing process .

Stakeholders were then given an opportunity to select one of two small group discussions to participate in: technical flow regime methodologies; or resource assessment process. The group divided and a presentation hand-out was given to the resource assessment group (see Appendix D) while a discussion was held amongst the methodologies group.

As discussions wrapped up, stakeholders were asked to note their interest in continuing to stay engaged on this topic as the Middle Ocmulgee Regional Water Planning Council considers to the tools and information from the pilot study in their planning process. There was significant interest among the stakeholder group in remaining engaged and informed as this work continues. Representatives from Georgia EPD thanked the participants for their interest, their input, and their time.

Appendix A

Project Background

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Ocmulgee Basin Flow Regime Pilot Study

WHY ARE WE HERE?

- **Middle Ocmulgee Regional Water Planning Council recommended that the flow threshold used in the Surface Water Availability Resource Assessment be evaluated.**
  - The flow threshold in that assessment focused on low flow conditions using a threshold drawn from the State's interim instream flow policy.

WHAT DOES THAT MEAN?

- **Surface Water Availability Resource Assessment**
  - Modelled analysis that estimates the water left in the stream after offstream demands are fully met
  - That amount is compared against a low flow threshold chosen as an indicator of potential regional or local impacts
  - Stakeholder input will inform the Council's evaluation of other (alternative) flow regimes

HOW DO WE CHOSE AN ALTERNATIVE?

- **First, think about services of water body to be assessed – what does it provide?**
  - Safe and adequate drinking water
  - Water of the right quality for industrial or agricultural production
  - Dilution and transport of treated wastewater
  - Hydroelectric energy
  - Recreational opportunities
  - Habitat for fish and wildlife
  - Aesthetic benefits

HOW DO WE CHOSE AN ALTERNATIVE?

- **Considering the services, there are two questions that should be answered to begin identifying an alternative flow regime**
  - What services do we want to plan for this river basin to provide now and in the future?
  - How can these services be expressed in flow levels for the streams in the basin?

HOW DO WE ANSWER THE FIRST QUESTION?

- **What services do we want to plan for this river basin to provide now and in the future?**
  - Identified potential user groups and stakeholders
  - Convened to discuss and identify **how** the water resources are used and **where** they are used

HOW DO WE ANSWER THE SECOND QUESTION?

- **How can these services be expressed in flows for the streams in the basin?**
  - Where the first question was best answered by those who live in the basin, this one is more technical
  - EPD and its contractors took input provided and have draft results to share with you today. As it's presented, think about:
    - How the Council might use these results?
    - How stakeholders might use these?
    - How you might use this information?

Appendix B

Meeting One Summary Report

Ocmulgee River Flow Regime Pilot Study

Central Georgia Technical College
Building I, Quad A, 2nd Floor
3300 Macon Tech Drive Macon, Georgia 31206

Wednesday, May 16, 2018
1:00pm to 5:00pm

Agenda

Part 1

Welcome and Introductions

Purpose of Project

Mapping River Uses

- How and where do you use the river?
- What river conditions, season, timing, etc. are ideal for your activity?
- Are there times or river conditions that prohibit your enjoyment or minimize how you can use the river?
- Are there river uses that are not available under certain conditions?

Mapping Discussion and Debrief

Wrap up and Next Steps for Stakeholders

BREAK

Part 2

Resource Expert Discussion

- Resource specific technical input
- Refinement/enhancement of Part 1 results

Wrap Up and Next Steps for Resource Experts

OCMULGEE RIVER FLOW REGIME PILOT STUDY

In its Regional Water Plan, the Middle Ocmulgee Regional Water Planning Council recommended that the minimum instream flow assumptions in the Surface Water Availability Resource Assessment be evaluated. The minimum flow assumptions in that assessment focused on low flow conditions, using a threshold drawn from the State's interim instream flow policy. The Middle Ocmulgee Regional Water Plan recommends evaluating that approach, including looking at alternatives to the specific threshold used in the assessment.

In response to the Council's recommendation, EPD is working with contractors to identify alternatives to the flow regime used in the surface water assessments. EPD has also learned from researchers at the University of Georgia who have worked with a process very similar to the one we envision.

When thinking about alternative flow regimes, it helps to start with the set of services provided by the rivers, streams or lakes to be assessed. A river basin, with its flowing water in streams and perhaps stored water in reservoirs, provides a variety of services to people in and near the basin and to other living organisms. Services may include safe and adequate drinking water, water of the right quality for industrial or agricultural production, dilution and transport of treated wastewater, hydroelectric energy, recreational opportunities, habitat for fish and wildlife, and aesthetic scenery, among others.

These services are produced by interactions of five basic characteristics of a river basin: the amount and timing of flow; the physical form of stream channels and any lakes; interconnections between streams, rivers, and lakes and between water bodies and the land around them; water quality; and biological processes. The amount and timing of flow in a river basin links the other four together, and a flow regime generally shows the amount and timing of flow at a particular location in a basin. Conceivably, there can be multiple locations within a river system that have different flow regimes.

For a specific river basin, the identification of alternative flow regimes starts by answering two questions. First, what services do we want to plan for this river basin providing now and in the future? Second, how can these services be expressed in flows or reservoir levels for the streams and lakes in the basin?

The first question is best answered by those who live in a particular river basin and rely upon its resources. The second question is more of a technical question, and EPD and our contractors are prepared to determine answers to that question – once we have input from the Council and others in the basin about the important services from the water resources of Ocmulgee River basin.

The project is scheduled to be completed in 2018, and participating stakeholders and the Water Planning Council will be given updates about project status and results.

Mapping River Uses

DNR Map - System wide

American Shad Restoration Plan

Sturgeon Critical Habitat Designation (down river of east Juliette Dam)

Recreational Access and Use

Robust Red Horse and other species of concern

Sport fisheries

Habitat, water quality, connectivity

Data: side imaging sonar and substrate classification (shoals, etc.) 40 Acre Island to Confluence; Recreational access GIS data; Fish sample data (game and nongame); spawning locations and seasons

1BB – Jackson Lake Sport Fishery

2BB- Shoal Bass below Jackson Dam to Macon; the species is found below Macon but most of the fishing occurs between dam and Macon

Blue 1 – 3: (Paula M.) – Robust Redhorse spawning habitat

Sportfish, wildlife, game – whole river is critical from WRD's perspective; myriad conservation initiatives; no bad time to fish in Georgia, really just weather dependent; depths where access is difficult or dangerous – want to connect that to USGS gauge locations

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KON (Kathleen O'Neal)

Dot 1 – Highway 83 Boat ramp – River access

Dot 2 – Wise Creek boat ramp - river access; *rebar in the river creates hazard*

Dot 3 – Popes Ferry – river access

Lack of boat ramp

County destruction – sediment, habitat impact

Dot 4 – Amerson Park – river access, north and south launches

Dot 5 – Spring street boat ramp – river access

Dot 6 – Juliette Dam – blow the damn thing up

Dot 7 – Towaliga River – want additional access

Dot 8 – Outfall pipe from Georgia Power – pollution

Dot 9 – Camping facilities between Highway 83 and Macon – would like

1) River Access means physical access – ability to easily launch and collect boats

2) Flow also important – both rain water and Lake Jackson dam release

3) Ideal condition at 2nd Street gauge is 9'; too low at 5'; barely runnable between 5 and 6 feet

Livelihood depends on access; run shuttle year round and rent boats in warmer weather; May/June/July are biggest times of year; close trips if below 5 feet at 2nd street gauge; Amerson is the best thing ever; would love to see more camping facilities; lots of folks are accessing river at Dames Ferry (lots of recreation use);

MB – (Mike Bilderback)

MB1 – Raw water intake location for Filter Plant owned now by Monroe County Commission, formerly permitted to Dan River Textiles. It was permitted for 5.3 MGD (max daily). Forsyth and Monroe County have identified it as a future water source.

Ideal conditions – calm, mild weather

Timing – Continuous

What minimize Use – turbidity, turnover allocation issues by EPD

Prohibit Use – Extreme low flow

MB2 – Popes Ferry boat ramp is in the process of renovation by DNR and Monroe County Board of Commissioners. This is a busy put in/take out for fishermen and kayakers.

Ideal season – usually spring is the longest sustained moderate flow

Timing – day, dusk to dark

Prohibit Use – low flow causes shoals to be an obstacle

Not available – pathogen concerns

MB3 – Hydroelectric plant located in Juliette, Monroe County. Potential user has approached Monroe County Commissioners informing them of interest in generating power. The requirement of a fish ladder is a concern

Ideal conditions – generous, sustained flow

Timing – continuous

Prohibit/not available – low flows

SD (Sara Dusenberry)

SD1 – Amerson Park – float route dependent on water depth; predominately used from May – September; Used for floating; heavy rainfall affects safety and lack of rainfall affects enjoyment; low depth requires wading through the water

Value – predominately user attraction, heavily used stretch, 8 foot depth prohibiting limit

SD2 – Spring Street Landing – connects to Amerson Park Landings; longer floats; less commonly used by tubers; paddled to more often; dependent on depth; also used as swimming area

SD3 & 4 – noted as possible areas of attraction for Twiggs County in Comp Plan; underutilized at the moment; landings not clear; dependent on similar depth conditions as other landings

There have also been high flows that have prevented use; use typically in summer by depth impacts use

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VC: High Falls Lake (state park) – deep enough to launch kayaks, paddle and not hit bottom

SW (Sherri Wood)

SW1: Bullard Landing – deep enough to launch boats (Twiggs County)

SW2: West Lake Landing – deep enough to launch boats (Twiggs County)

SW3 and 4: possible future landings to break up the distance between Amerson Park in Macon and Bullard Landing in Twiggs County (aspirational)

SP (Sam Perren)

SP1 – Hawkinsville – 3 landings, boat landing at Mile Branch Park is major tourism draw; it is difficult to put boats on river at less than 4 feet (need to compare this to USGS gauge); city of Hawkinsville releases wastewater at 2 points; variability in depth restricts releases; overall, community would like less variable, deeper flow; *activity mostly in the summer*

SP2 – Ocmulgee Water Trail Partnership advertises several boat landings on their map (map file attached)

MW (Macon Water Authority)

MW1 – Lucas Lake – Ocmulgee River – MWA intake

MW2 – Lower poplar WRF MWA – discharge

MW3 – Rocky Creek WRF MWA – discharge

MW4 – Lucas Lake Watershed – MWA

MW5 – Amerson River Park – recreation (walking, hiking, biking, kayaking; largest park in Macon-Bibb)

MW6 – Spring Street Boat Ramp - Ocmulgee Heritage Trail

MW7 – Highway 18 IMZ (Inner-Management zone) – MWA Source Water Protection Plan

MW8 – Lloyd Shoals dam release

MW9 – Lake Tobesofkey Dam – Wei – Drought indicator – level used to determine if drought will be declared

MW10 – Highway 83 OMZ (Outer Management Zone)– MWA SWPP

MW11 – Bond Swamp/Ocmulgee National Monument/River Trail – long term plans to bring trail from Amerson to here

Adequate flows for assimilative capacity critical

Georgia Power Company

GPC1- Lloyd Shoals Project – Lake Jackson (Melissa Crabbe is contact): dam relicensing process begins in July 2018 with a public scoping meeting in fall of 2018; operate boat ramp about a mile below the dam – hydroelectric generation – 18MW capacity; regulated by FERC; license expires 12/31/23; minimum flow 400cfs or inflow (whichever is less); did get down to 250 cfs during drought

GPC2- Lake Juliette/Plant Scherer (George Martin/Courtney O'Mara): pumping from lake and Ocmulgee River

Boulders of Juliette – people jumping off rocks along shore of Juliette, along highway 18 and 23/87 (about ½ mile from this intersection)

OF NOTE: Georgia Power collects recreation use data at all of its FERC licensed recreation amenities for the Form 80 filing every six years. The data in this form was collected in 2014 and

filed with FERC in 2015. During the FERC relicensing process of the Lloyd Shoals Project, I expect Georgia Power will conduct a more detailed Recreation Use study. That may occur as early as next year. The 2015 Form 80 is included as an attachment.

Discussion Notes:

Significant homeowner presence at Lake Jackson (homeowner's association was invited to attend)

Are there water withdrawal permits on the lake?

Are there any water quality issues at Lake Jackson?

Are there any water quality issues caused by Warner Robins base?

Are there any gaps in the Middle Oconee Region?

> No, there aren't.

Will this flow regime output be compared to the status quo?

> Don't know, as we don't know what it will look like.

Is a new flow regime better or not as good – uses come and go, conditions change, so dynamic…

> This is what we are looking at – is it better? Not as good?

The planning process – data, uses, values, assumptions, scenarios? What do you want to pan towards? This is a planning process.

> We have a baseline (current conditions) and we will try to quantify values, services, and those flow regimes/numbers. If we deviate from the baseline, will we be able to notice the impact? Are there marginal changes and are those changes acceptable?

Why are we looking at a new flow regime?

> Comes out of the water council just exploring the possibility; the interim instream flow policy is designed for permitting decisions. We are looking to see if we can quantify the values and services to model a flow regime.

OCMULGEE WATER TRAIL
MACON TO ALTAMAHA RIVER

1 Amerson Waterworks Landing 1 — CITY OF MACON — River Mile 194.7

DIRECTIONS: 2600 Riverview Road. From Hwy 23 – Riverside Drive – turn onto Pierce Ave (I-75 N Entrance Ramp) – drive approximately 400 feet and turn right onto N. Pierce Ave. Continue on this road to yellow gate just before railroad track. Cross tracks and take paved road to left and immediately look for gravel road to left with sign for canoe launch. Turn left at sign and travel to 1st right turn. Turn right to canoe launch parking area.

COORDINATES: 32° 52′ 53″N — 83° 39′ 30″W

FACILITIES: • Canoe launch–paved single ramp. • Open Wed.–Sun. 9 am until 7 pm. • Parking/overnight: no overnight parking allowed. Daylight access only. • Camping–NO. • Parking Fees–NO. • Restrooms–porta-potties • Picnic Pavilion / Playground Porter Pavillion / Hiking Trails.

2 Spring Street Landing — CITY OF MACON — River Mile 198.7

DIRECTIONS: Boat ramp on east side of the river, accessible off of Spring Street (Hwy 129) exit from I-16 in Macon. First right to parking and boat ramp.

COORDINATES: 32° 50′ 47″N — 83° 37′ 37″W

FACILITIES: • Canoe launch–paved single ramp. Open daylight hours. • Parking: Paved parking. No overnight parking allowed. Daylight access only. • Camping–NO. • Parking Fees–NO. • Restrooms–porta-potties. • Playground / direct access to Ocmulgee Heritage Multi-Use Trail.

3 Bullard Landing — TWIGGS COUNTY — River Mile 167.1

DIRECTIONS: From I-16, take exit 18, Bullard Road west. Continue west on Bullard Road after crossing US 23/Alt.129, to the intersection with New Bullard Road/CR 81. Cross CR 81 and continue west–now on a dirt road– approximately 2 miles to the river.

COORDINATES: 32° 37′ 32.62″N — 83° 32′ 33.79″W

FACILITIES: • Single concrete boat ramp & concrete block side walls. • Parking area: grass area for about 20 vehicles/trailers. • No camping, no water, no other facilities. • Private land surrounds the ramp and parking area.

4 Knowles Landing — HOUSTON COUNTY — River Mile 157.4

DIRECTIONS: Landing at SR 96 bridge at the river. Located on south side of Highway 96 Bridge on west side of river with vehicular access to the ramp on eastbound lane of Highway 96.

COORDINATES: 32° 32′ 31.66″N — 83° 32′ 14.15″W

FACILITIES: • Double concrete boat ramp • Paved parking area and unpaved overflow area. • No restrooms, no camping, no dock.

5 Westlake Landing — TWIGGS COUNTY — River Mile 149.4

DIRECTIONS: Access to the landing is a dirt road that is often impassable depending on weather conditions. From the intersection of US23/Alt 129 and SR 96: West on SR 96 to West Lake Road. South on West Lake Road. Cross transmission line corridor and parallel railroad. Continue south to East West Lake. Turn right (west) and follow to river.

COORDINATES: 32° 29′ 08.79″N — 83° 29′ 17.81″W

FACILITIES: • Dirt ramp. • Parking area: grass area for about 20 vehicles/trailers. • No restrooms, camping, water or other facilities. • Private land surrounds the ramp and parking area. • Very remote location. Do not leave valuables in the car.

6 J.Dykes Memorial Park Landing — BLECKLEY COUNTY — River Mile 141.0

DIRECTIONS: From the intersection of US Highway 129 Alt. (GA 87) and GA 26 in Cochran. Go northwest on 129 Alt. approximately 0.9 miles and turn left on Porter Rd. Cross railroad and follow Porter Rd. for the next 4.3 miles to Centenary Rd. Turn right on Centenary Rd. and go 4.0 miles to James Dykes Landing.

COORDINATES: 32° 24′ 50.547″N — 83° 28′ 57.594″W

FACILITIES: • One concrete ramp to river with canoe steps. • Located inside the Ocmulgee Wildlife Management Area (WMA). • Parking area of crushed, packed gravel. • Tent and RV camping areas. No fees • Covered pavilion with tables and trash cans. • No restrooms or drinking water. • Remote location.

7 Uchee Shoals Landing — PULASKI COUNTY — River Mile 128.3

DIRECTIONS: From Commerce Street/GA 27, on the west side of the bridge, turn onto N. Florida Avenue and drive down to the river.

COORDINATES: 32° 17′ 01.42″N — 83° 27′ 44.92″W

FACILITIES: • Single concrete boat ramp. Located on west side of river. • Parking area: gravel parking area for 7 vehicles with trailers. • Trash cans, picnic tables. • No restrooms or drinking water.

8 Mile Branch Park — PULASKI COUNTY — River Mile 127.2

DIRECTIONS: From Commerce Street in Hawkinsville, turn south onto S. Jackson Street/GA 11/US129. Proceed 0.9 mile and turn into the Park.

COORDINATES: 32° 16′ 14.67″N — 83° 27′ 40.12″W

FACILITIES: • Double concrete boat ramp. • Parking area: paved parking for 22 vehicles without trailers and 25 vehicles with trailers. Overnight parking allowed. • Tent camping sites. No reservations. • Picnic shelters, trash cans, picnic tables, cooking grills. • Restrooms, some electricity, hot showers & drinking water. For restrooms and hot showers call in advance to the County Commisioner's office at 478-783-4154. • Nature trail.

9 Sandy Hammock Landing — PULASKI COUNTY — River Mile 113.0

DIRECTIONS: Drive east out of Hawkinsville over the bridge on US341, then turn south on GA230 and travel about 11 miles, then right onto Sandy Hammock Road (dirt) for about 1.5 miles. Located on GA230, east side of the river.

COORDINATES: 32° 08′ 23.51″N — 83° 22′ 03.93″W

FACILITIES: • Double concrete ramp. • Parking area is dirt with limited spaces. Overnight allowed. • No restrooms or water. • Primitive camping. No facilities or services nearby. Remote location.

10 Dodge County Landing — DODGE COUNTY — River Mile 101.4

DIRECTIONS: US280 W from Rhine, turn north on GA 87, left on GA 230, go 1.4 miles, left on River End Rd. and follow to landing. From Eastman: from the intersection of Golden Isles Parkway (GA27/341 Bypass) and GA Hwy 117/87 travel south 1 mile and turn right onto GA 87 (Abbeville Hwy.). Travel 9 miles, turn right onto GA 230 (Lower River Road), travel 1.4 miles and turn left onto River End Road, travel 0.6 mi. to the landing.

COORDINATES: 32° 04′ 29.347″N — 83° 17′ 43.997″W

FACILITIES: • One 30-foot wide concrete ramp. • Well for potable water and one picnic table. • Unpaved parking. 15-20 vehicles. Cars can remain overnight.

11 Half Moon Landing — WILCOX COUNTY — River Mile 92.8

DIRECTIONS: Follow US 280 E from Abbeville for 0.2 miles, left onto Half-Moon Rd., follow to landing. The landing is in Abbeville, close to downtown.

COORDINATES: 32° 0′ 3.168″N — 83° 17′ 44.520″W

FACILITIES: • Paved access road. • Concrete ramp, 2 lanes. • No Fees • Restrooms: NO • Camping: NO • Parking: paved; Capacity: 25.

12 Statham Shoals Landing — WILCOX COUNTY — River Mile 87.4

DIRECTIONS: US 129 S from Abbeville for 2 miles, left onto CR 183, first left, immediate right, follow to landing.

COORDINATES: 31° 58′ 6.284″N — 83° 16′ 47.155″W

FACILITIES: • Single 12-foot wide concrete boat ramp. • One picnic table. • Unpaved parking. • Unpaved access road.

13 McCranie Landing — DODGE COUNTY — River Mile 83.6

DIRECTIONS: From Rhine. Follow GA 117 south from Rhine for 1 mile; right onto Hopewell Church Road for 1.5 miles until pavement ends. After pavement ends, follow dirt road 1.5 miles to landing.

COORDINATES: 31° 57′ 6.045″N — 83° 14′ 10.827″W

FACILITIES: • 18-foot wide concrete ramp. • Access road to the ramp is not paved. • No restrooms, no camping, no dock or additional amenities. • Unpaved parking; space is also limited.

14 Dodge's Lake Landing — TELFAIR COUNTY — River Mile 72.1

DIRECTIONS: From Jacksonville, GA: Travel 12.2 miles North on GA Hwy 117. Turn left on County Road 15.

COORDINATES: 31° 52′ 32.279″N — 83° 10′ 31.623″W

FACILITIES: • A single 21 foot wide concrete ramp. River vegetation at ramp that impedes good access from the ramp to the river. • The unpaved access road goes to the landing. • Random unpaved parking for about 20 vehicles with boat trailers. • Privately-owned dirt landing located nearby. • NO restrooms, NO camping, NO dock.

15 Mobley Bluff Landing — BEN HILL COUNTY — River Mile 52.0

DIRECTIONS: US 319 S from Jacksonville for 5 miles, right onto Mobley Bluff Rd., follow to landing.

COORDINATES:

FACILITIES: • Fee: NO. • Concrete ramp, with 2 lanes Dock: NO. • Restrooms: Flush- with handicap access + hot shower. • Camping: Improved. • Parking: Unpaved; Capacity: 20. Steep ramp, HC parking, dumpster, Picnic Tables, Shelter, Bait Store, Restrooms, Grills.

16 Barr's Bluff Landing — COFFEE COUNTY — River Mile 42.2

DIRECTIONS: US 441 S from Jacksonville for 3 miles to US 107 E, go 6 miles, left onto Barr's Bluff Rd., follow to landing.

COORDINATES:

FACILITIES: • Double concrete ramp. • Unpaved parking; shelter, no other amenities.

DNR suggested paddling times: Allow about an hour of float time for each mile of river. GA Canoeing Association: 1 hour of average flatwater paddling = 2-3 miles of river.

TABLE 1
Mileage between Existing Landing Sites: sources: 1997 DNR Fishing Guide to the Lower Ocmulgee River; 2011 Multi-Region River Corridor Feasibility Study by Middle Georgia Regional Commission, Heart of Georgia Altamaha Regional Commission, and Southern Georgia Regional Commission.

	Access-Landing Name	County	River Mile	Distance Between
1.	Amerson Park-#1	Bibb	194.7	0
2.	Spring Street	Bibb	198.7	4.0
3.	Bullard	Twiggs	167.1	31.6
4.	Knowles	Houston	157.4	9.7
5.	Westlake	Twiggs	149.4	8
6.	James Dykes Park**	Bleckley	141	8.4
7.	Uchee Shoals	Pulaski	128.3	12.7
8.	Mile Branch Park**	Pulaski	127.2	1.1
9.	Sandy Hammock **	Pulaski	113	14.2
10.	Dodge County	Dodge	101.4	11.6
11.	Half Moon	Wilcox	92.8	8.6
12.	Statham Shoals	Wilcox	87.4	5.4
13.	McCranie	Dodge	83.6	3.8
14.	Dodge's Lake	Telfair	72.1	11.5
15.	Mobley Bluff **	Ben Hill	52.0	20.1
16.	Barr's Bluff	Coffee	42.2	9.8
17.	Flat Tub	Coffee	35.0	7.2
18.	Rocky Hammock	Jeff Davis	27.5	7.5
19.	Stave	Telfair	??	??
20.	Burkett's Ferry	Jeff Davis	19.6	7.9
21.	McRae's	Telfair	15.0	4.9
22.	Lumber City	Telfair	11.6	3.4
23.	Hinson	Jeff Davis	4.1	

*** camping allowed*

17 Flat Tub Landing — COFFEE COUNTY — River Mile 35.0

DIRECTIONS: US 441 S from Jacksonville for 3 miles to GA 107 E, take left and go 7 miles to Flat Tub Rd. on left, follow to landing.

COORDINATES:

FACILITIES: • Concrete ramp at end of dirt road (conditions may require 4 wheel drive after rain). Site in fair condition; ramp is in a slough, so may not be usable in high water conditions. • No other facilities.

18 Rocky Hammock — JEFF DAVIS COUNTY — River Mile 27.5

DIRECTIONS:

COORDINATES: 31° 48′ 52.588″N — 82° 49′ 25.728″W

FACILITIES: • One 15′ curbed concrete ramps with low water access. • Unpaved parking area • Dirt access road.

19 Stave Landing — TELFAIR COUNTY — River Mile 27.5

DIRECTIONS: From Jacksonville, GA: Travel 8.2 miles South on GA Hwy 117. Turn right on County Road 213 (dirt road). Landing is 2.4 miles. Located approximately ten miles east of Jacksonville.

COORDINATES: 31° 49′ 57.915″N — 82° 48′ 20.893″W

FACILITIES: • Single 21-foot wide curbed concrete ramp and parking area. • A dirt access road leads to the landing.

20 Burkett's Ferry Landing — JEFF DAVIS COUNTY — River Mile 19.6

DIRECTIONS: US 221 S in Hazlehurst, to Latimer St and go west 8 miles, take right at Burkett's Ferry Rd., follow to landing.

COORDINATES: 31° 52′ 4.712″N — 82° 45′ 5.531″W

FACILITIES: • Single curbed concrete ramp 21-feet wide. • Parking: Dirt access road to dirt parking area. • No restrooms, no camping, no dock.

21 McRae's Landing — TELFAIR COUNTY — River Mile 15.0

DIRECTIONS: From Lumber City: Travel 2 miles North on GA Hwy 117. Turn left on County Road 185 (McRae Landing Road). Landing is .3 miles.

COORDINATES: 31° 54′ 13.908″N — 82° 42′ 0.568″W

FACILITIES: • Single concrete ramp 20-feet wide. • Random unpaved parking for estimated 10-12 vehicles with boat trailers. • The access road is dirt. • No restrooms, no camping, no dock.

22 Lumber City Landing — TELFAIR COUNTY — River Mile 11.6

DIRECTIONS: From Lumber City: Travel 1.2 miles South on US Hwy 341. Turn right on landing approach road (paved).

COORDINATES: 31° 55′ 12.713″N — 82° 40′ 29.655″W

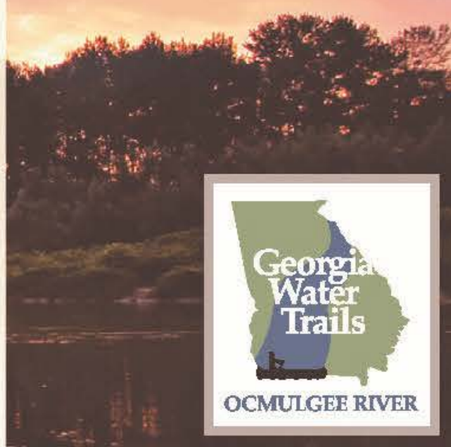
FACILITIES: • One 21 foot wide curbed concrete ramp. • Paved access road. • Parking area beside the access road and under the bridge. • NO amenities.

23 Hinson Landing — JEFF DAVIS COUNTY — River Mile 4.1

DIRECTIONS: Take US 221N from Hazlehurst for 2 miles. Turn left on Hallspur Rd. for 2 miles. Turn left on Nath Hall Road for 0.7 miles. Go right on County Road 235 to landing.

COORDINATES: 31° 56′ 5.064″N — 82° 35′ 21.984″W

FACILITIES: • Dirt road access. • One 21 foot wide curbed concrete ramp. Low water accessible. • Parking available; not paved. Space for 10-15 vehicles with trailers. • NO amenities available. • 5 adjacent acres owned by county but no improvements.



Federal Energy Regulatory Commission (FERC)
FERC Form 80

Licensed Hydropower Development Recreation Report

Form Approved
OMB No. 1902-0106
Expires: 09/30/2016
Burden 3.0 hours

General Information:
This form collects data on recreation amenities at projects licensed by FERC under the Federal Power Act (16 USC 791a-825r). This form must be submitted by licensees of all projects except those specifically exempted under 18 CFR 8.11 (c). For regular, periodic filings, submit this form on or before April 1, 2015. Submit subsequent filings of this form on or before April 1, every 6th year thereafter (for example, 2021, 2027, etc.). For initial Form No. 80 filings (18CFR 8.11(b)), each licensee of an unconstructed project shall file an initial Form No. 80 after such project has been in operation for a full calendar year prior to the filing deadline. Each licensee of an existing (constructed) project shall file an initial Form No. 80 after such project has been licensed for a full calendar year prior to the filing deadline. Filing electronically is preferred. (See http://www.ferc.gov for more information.) If you cannot file electronically, submit an original and two copies of the form to the: Federal Energy Regulatory Commission, Office of the Secretary, 888 First St., NE, Washington, DC 20426.

The public burden estimated for this form is three hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing the collection of information. Send comments regarding the burden estimate or any aspect of this collection of information, including suggestions for reducing burden, to: FERC via e-mail DataClearance@ferc.gov; or mail to 888 First Street NE, Washington, DC 20426 (Attention: Information Clearance Officer) and Office of Management and Budget (OMB), via e-mail to oira_submission@omb.eop.gov; or mail to OMB, Office of Information and Regulatory Affairs, Attention: Desk Officer for FERC, Washington, DC 20503. Include OMB Control Number 1902-0106 as a point of reference. No person shall be subject to any penalty for failing to comply with a collection of information if the collection of information does not display a valid control number (44 U.S.C. § 3512 (a)).

Instructions:
a. All data reported on this form must represent publicly available recreation amenities and services located within the project boundary.
b. To ensure a common understanding of terms, please refer to the Glossary on page 3.
c. Report actual data for each item. If actual data are unavailable, then please estimate.
d. Submit a completed form for each development at your project.

Schedule 1. General Data

1. Licensee Name: GEORGIA POWER CO
2. Project Name: LLOYD SHOALS
3. Project Number: 2336
4. Development Name: LLOYD SHOALS

States Development/Project Traverses (List state with largest area within the development/project boundary first):

5. State #1: GA
6. State #2:

7. Type of Project License: (check one) Major ☐ Minor ☐

Complete the following for each development if more than one.

8. Reservoir Surface Area at Normal Pool (acres): 4,750.00
9. Shoreline Miles at Normal Pool: 135.00
10. Percent of Shoreline Available for Public Use: 2.00

11. Data Collection Methods (enter percent for each method used; total must equal 100%):

40.00 traffic count/trail count
40.00 attendance records
10.00 staff observation
_____ visitor counts or surveys
10.00 estimate (explain)

For 2014, enter only the licensee's annual recreational construction, operation, and maintenance costs for the development (project). Also, enter the annual recreational revenues for that year.

Item	Licensee's Annual Recreation Costs and Revenues (In Whole Dollars)	
	Construction, Operation and Maintenance Costs	Recreation Revenues for Calendar Year
12. Dollar Values	$66,156.00	$50,989.70

13. Length of Recreation Season: Summer: From (MM/DD) 5/1 To 10/31 Winter: From (MM/DD) 11/1 To 4/30

Period	Number of visits to all recreational areas at development/project (in Recreation Days)	
	Annual Total	Peak Weekend Average (see Glossary)
14. Daytime	70,309	4,661
15. Nighttime	3,917	345

Respondent Certification: The undersigned certifies that he/she examined this report; and to the best of his/her knowledge, all data provided herein are true, complete, and accurate.

Joseph Charles	Hydro License Coordinator	(404) 506-2337
Legal Name	Title	Area Code/Phone No.
	03/31/15	2014
Signature	Date Signed	Reporting Year Ending

Title 18 U.S.C.1001 makes it a crime for any person knowingly and willingly to make to any Agency or department of the United States any false, fictitious or fraudulent statement or misrepresentation as to any matter within its jurisdiction.

Schedule 2. Inventory of Publicly Available Recreation Amenities Within the Project Boundary

16. Enter data for each Recreation Amenity Type (a). For User Free (b) and User Fee (c) enter the number of publicly available recreation amenities, located within the project boundary, regardless of provider. For FERC Approved (d) enter the number of amenities identified under User Free (b) and User Fee (c) for which the licensee has an ongoing responsibility for funding or maintenance (see Glossary for further detail). For Capacity Utilization(f), of the total publicly available amenities (b) + (c), compare the average non-peak weekend use (see Glossary) for each recreation amenity type (during the recreation season, with the highest use, reported on Schedule 1, Item 13) with the total combined capacity of each amenity type and enter a percentage that indicates their overall level of use. For example, if all public boat launches are used to half capacity during the non-peak weekend days, enter 50% (should use exceed capacity for an amenity type, enter the appropriate percentage above 100).

Recreation Amenity Type (a)	Number of Recreation Amenities			Total Units (e)	Capacity Utilization (%) (f)
	User Free (b)	User Fee (c)	FERC Approved (d)		
Boat Launch Areas. Improved areas having one or more boat launch lanes (enter number in column e) and are usually marked with signs, have hardened surfaces, and typically have adjacent parking.	1	6	7	13 Lanes	35
Marinas. Facilities with more than 10 slips on project waters, which include one or more of the following: docking, fueling, repair and storage of boats; boat/equipment rental; or sell bait/food (see Glossary FERC approved).		5	5	N/A	35
Whitewater Boating. Put-ins/Take-outs specifically designated for whitewater access.				N/A	
Portages. Sites designed for launching and taking out canoes/kayaks and the improved, designated, and maintained trails connecting such sites (enter length of trail in column e).	1		1	2640 Feet	5
Tailwater Fishing. Platforms, walkways, or similar structures to facilitate below dam fishing.	1	1	1	N/A	30
Reservoir Fishing. Platforms, walkways, or similar structures to facilitate fishing in the reservoir pool or feeder streams.		1	1	N/A	30
Swim Areas. Sites providing swimming facilities (bath houses, designated swim areas, parking and sanitation facilities).		1	1	2 Acres	75
Trails. Narrow tracks used for non-automobile recreation travel which are mapped and designated for specific use(s) such as hiking, biking, horseback riding, snowmobiling, or XC skiing (excludes portages, paths or accessible routes; See Glossary).	2		2	2 Miles	30
Active Recreation Areas. Playground equipment, game courts/fields, golf/disc golf courses, jogging tracks, etc.				Acres	
Picnic Areas. Locations containing one or more picnic sites (each of which may include tables, grills, trash cans, and parking).	2	1	3	6 Sites	35
Overlooks/Vistas. Sites established to view scenery, wildlife, cultural resources, project features, or landscapes.	1		1	15 Acres	10
Visitor Centers. Buildings where the public can gather information about the development/project, its operation, nearby historic, natural, cultural, recreational resources, and other items of interest.				N/A	
Interpretive Displays. Signage/Kiosks/Billboards which provide information about the development/project, its operation, nearby historic, natural, cultural, recreational resources, and other items of interest.				N/A	N/A
Hunting Areas. Lands open to the general public for hunting.				Acres	
Winter Areas. Locations providing opportunities for skiing, sledding, curling, ice skating, or other winter activities.				Acres	
Campgrounds. Hardened areas developed to cluster campers (may include sites for tents, trailers, recreational vehicles [RV], yurts, cabins, or a combination, but excludes group camps).				Acres	N/A
Campsites. Sites for tents, trailers, recreational vehicles [RV], yurts, cabins, or a combination of temporary uses.		24		N/A	35
Cottage Sites. Permanent, all-weather, buildings rented for short-term use, by the public, for recreational purposes.				N/A	
Group Camps. Areas equipped to accommodate large groups of campers that are open to the general public (may be operated by public, private, or non-profit organizations).				Sites	
Dispersed Camping Areas. Places visitors are allowed to camp outside of a developed campground (enter number of sites in clmn. e).				Sites	
Informal Use Areas. Well used locations which typically do not include amenities, but require operation and maintenance and/or public safety responsibilities	1				1
Access Points. Well-used sites (not accounted for elsewhere on this form) for visitors entering project lands or waters, without trespassing, for recreational purposes (may have limited development such as parking, restrooms, signage).				N/A	
Other. Amenities that do not fit in the categories identified above. Please specify (if more than one, separate by commas):					

Glossary of FERC Form 80 Terms

Data Collection Methods. (Schedule 1, Item 11) – If a percentage is entered for the estimate alternative, please provide an explanation of the methods used (if submitted on a separate piece of paper, please include licensee name, project number, and development name)

Development. The portion of a project which includes:
(a) a reservoir; or
(b) a generating station and its specifically-related waterways.

Exemption from Filing. Exemption from the filing of this form granted upon Commission approval of an application by a licensee pursuant to the provisions of 18 CFR 8.11(c).

General Public. Those persons who do not have special privileges to use the shoreline for recreational purposes, such as waterfront property ownership, water-privileged community rights, or renters with such privileges.

Licensee. Any person, state, or municipality licensed under the provisions of Section 4 of the Federal Power Act, and any assignee or successor in interest. For the purposes of this form, the terms licensee, owner, and respondent are interchangeable *except where:*
(a) the *owner* or licensee is a subsidiary of a parent company which has been or is required to file this form; or
(b) there is more than one owner or licensee, of whom only one is responsible for filing this form. Enter the name of the entity that is responsible for filing this report in Schedule 1, Item 2.1.

Major License. A license for a project of more than 1,500 kilowatts installed capacity.

Minor License. A license for a project of 1,500 kilowatts or less installed capacity.

Non-Peak Weekend. Any weekend that is not a holiday and thus reflects more typical use during the recreation season.

Number of Recreation Amenities. Quantifies the availability of natural or man-made property or facilities for a given recreation amenity type. This includes all recreation resources available to the public within the development/project boundary. The resources are broken into the following categories:

User Free (Schedule 2, column b) - Those amenities within the development/project that are free to the public;

User Fee (Schedule 2, column c) - Those amenities within the development/project where the licensee/facility operator charges a fee;

FERC Approved (Schedule 2, column d) – Those amenities within the development/project required by the Commission in a license or license amendment document, including an approved recreation plan or report. Recreation amenities that are within the project boundary, but were approved by the licensee through the standard land use article or by the Commission through an application for non-project use of project lands and waters, are typically not counted as FERC approved, unless they are available to the public, but may be counted as either user free or user fee resources. The total FERC approved amenities column does not necessarily have to equal the sum of user free and user fee amenities.

Peak Use Weekend. Weekends when recreational use is at its peak for the season (typically Memorial Day, July 4th & Labor Day). On these weekends, recreational use may exceed the capacity of the area to handle such use. Include use for all three days in the holiday weekends when calculating Peak Weekend Average for items 14 & 15 on Schedule 1.

Recreation Day. Each visit by a person to a development (as defined above) for recreational purposes during any portion of a 24-hour period.

Revenues. Income generated from recreation amenities at a given project/development during the previous calendar year. Includes fees for access or use of area.

Total Units (Schedule 2, column e) – Provide the total length, or area, or number that is appropriate for each amenity type using the metric provided.

Trails. Narrow tracks used for non-automobile recreation travel which are mapped and designated for specific use(s) such as hiking, biking, horseback riding, snowmobiling, or XC skiing. Trails are recreation amenities which provide the opportunity to engage in recreational pursuits, unlike paths (means of egress whose primary purpose is linking recreation amenities at a facility) or accessible routes (means of egress which meets the needs of persons with disability and links accessible recreation amenities and infrastructure at a facility).

Appendix C

Update on the Ocmulgee Basin Flow Regime Pilot Study

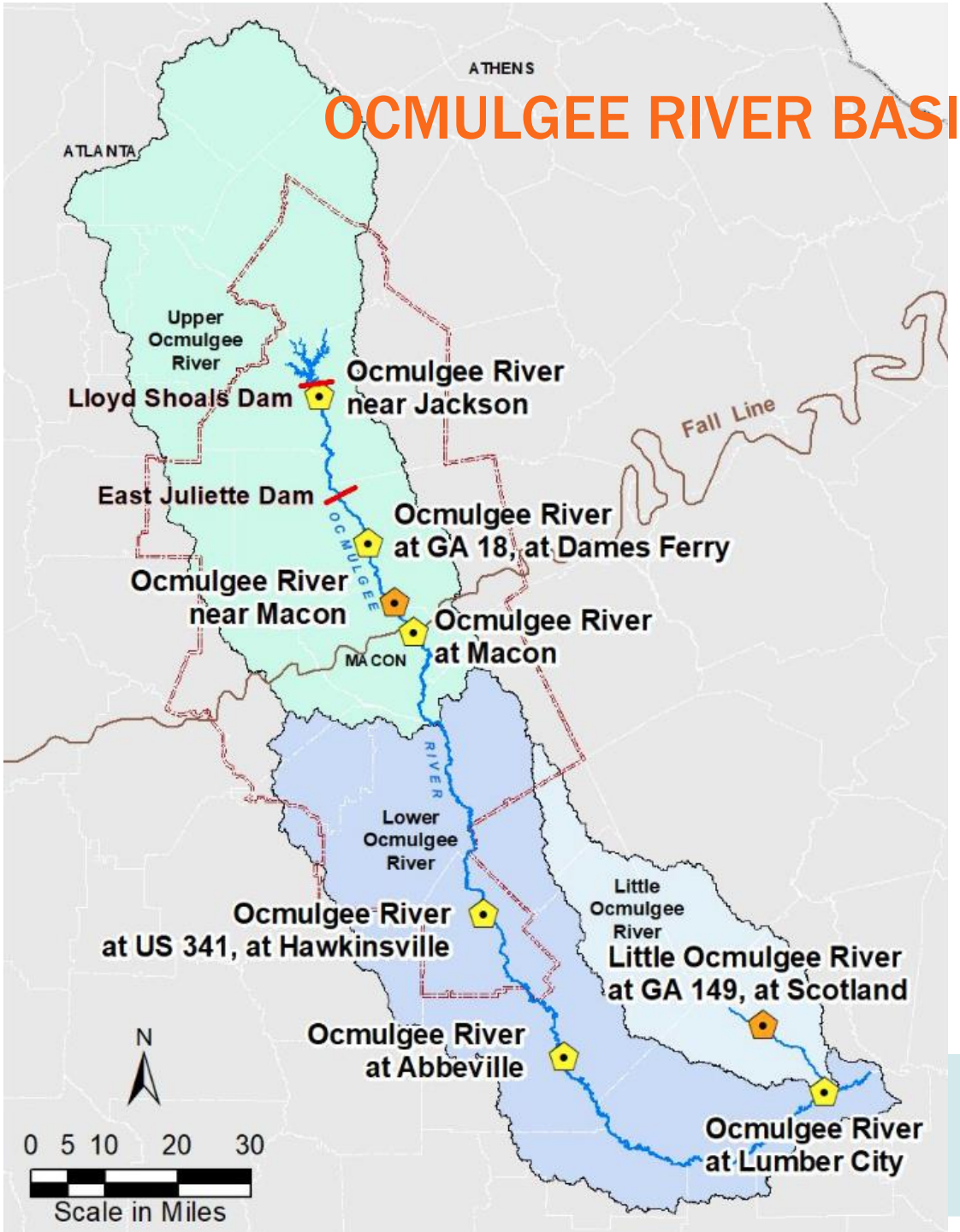
GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Status Report: Ocmulgee Basin Flow Regime Pilot Study

COUNCIL RECOMMENDATIONS TO THE STATE:

- "Consider alternative minimum instream flow policy such as stream-specific instream flow values instead of the current monthly 7Q10 requirement (especially for ecologically sensitive streams)."
  - Section 7.4 Recommendations to the State (Table 7-3), Middle Ocmulgee Regional Water Plan, June 2017 (and September 2011 version)

OCMULGEE RIVER BASIN

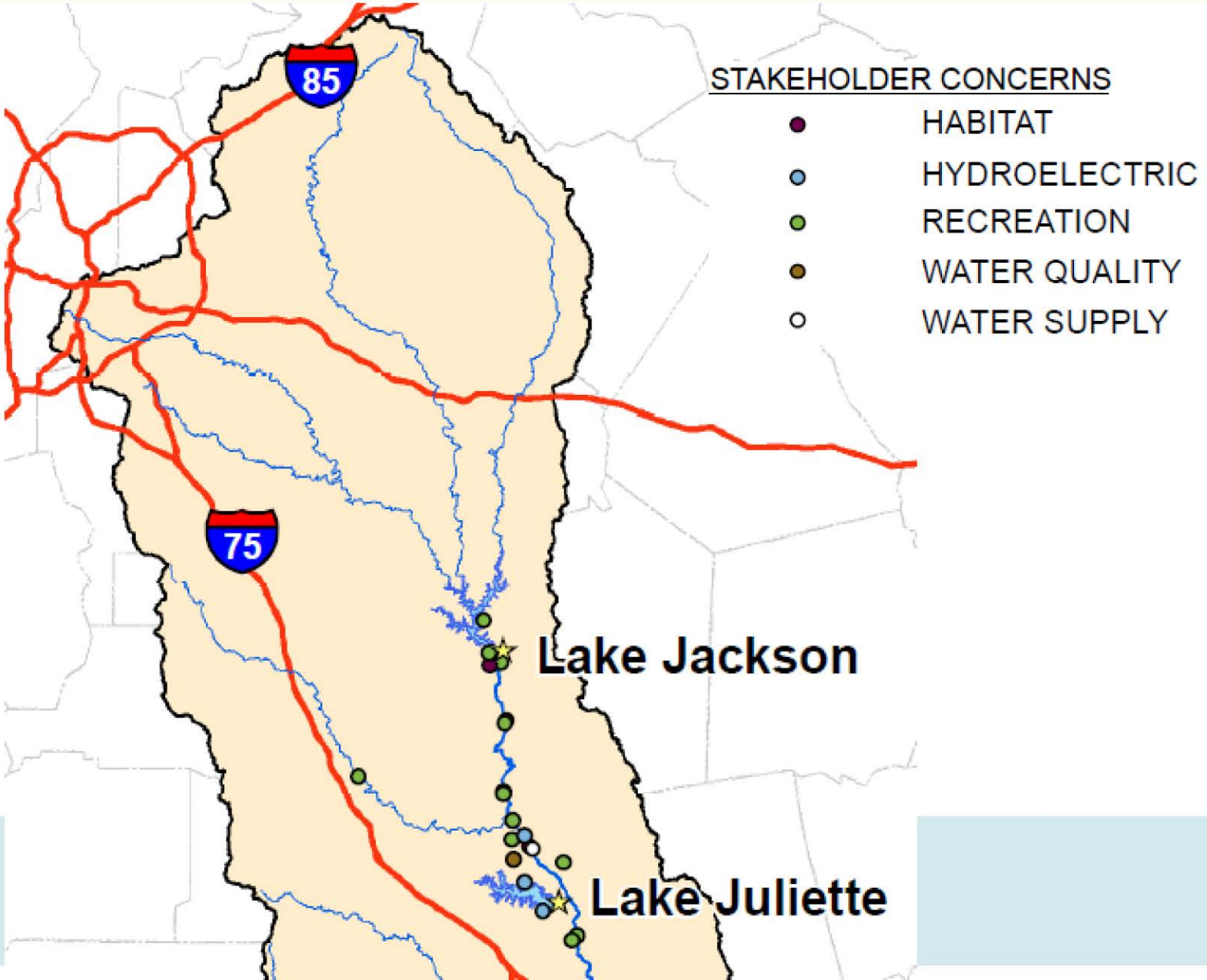


- Red bars – dams
- Pentagons – USGS gages
- Blue lines – Rivers or streams
- Brown curve – Fall line
- Double-dotted line – Region boundary

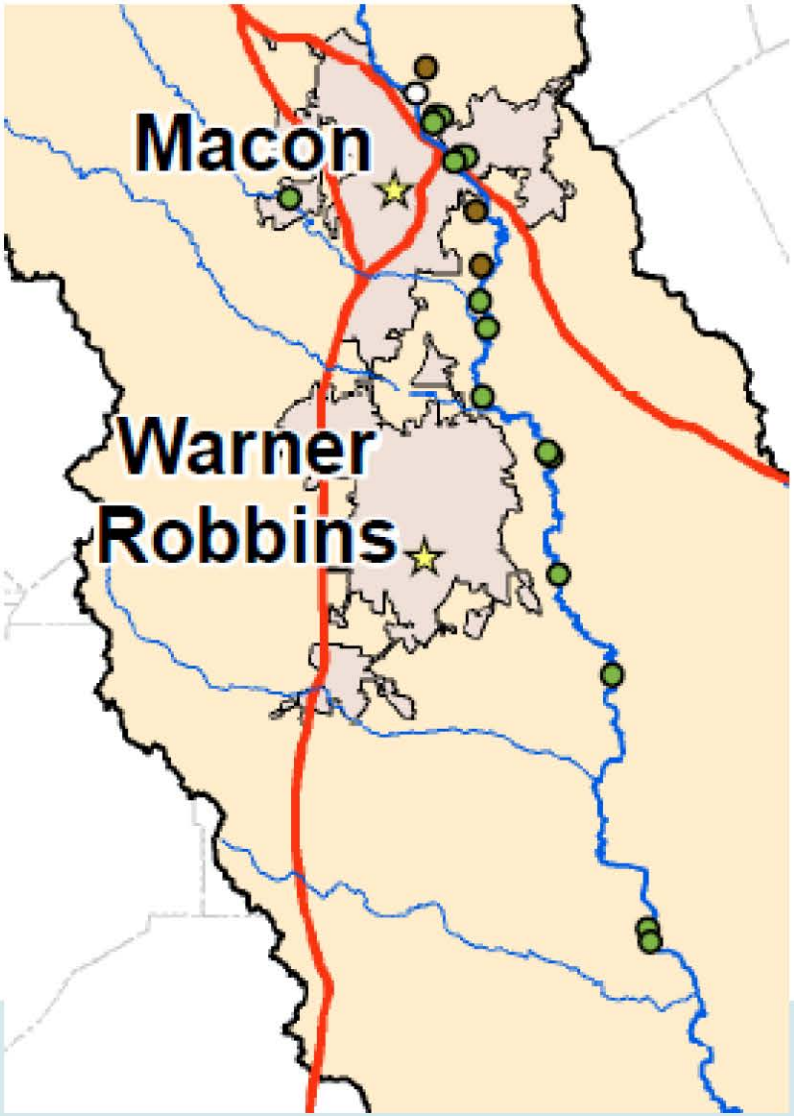
STUDY APPROACH:

- **Determination of services provided by the Ocmulgee River**
  - Held river user meeting to solicit input on services provided
  - Received inputs in recreation, water supply, water quality, wildlife management

STUDY APPROACH (CONTINUED):



STUDY APPROACH (CONTINUED):



STAKEHOLDER CONCERNS

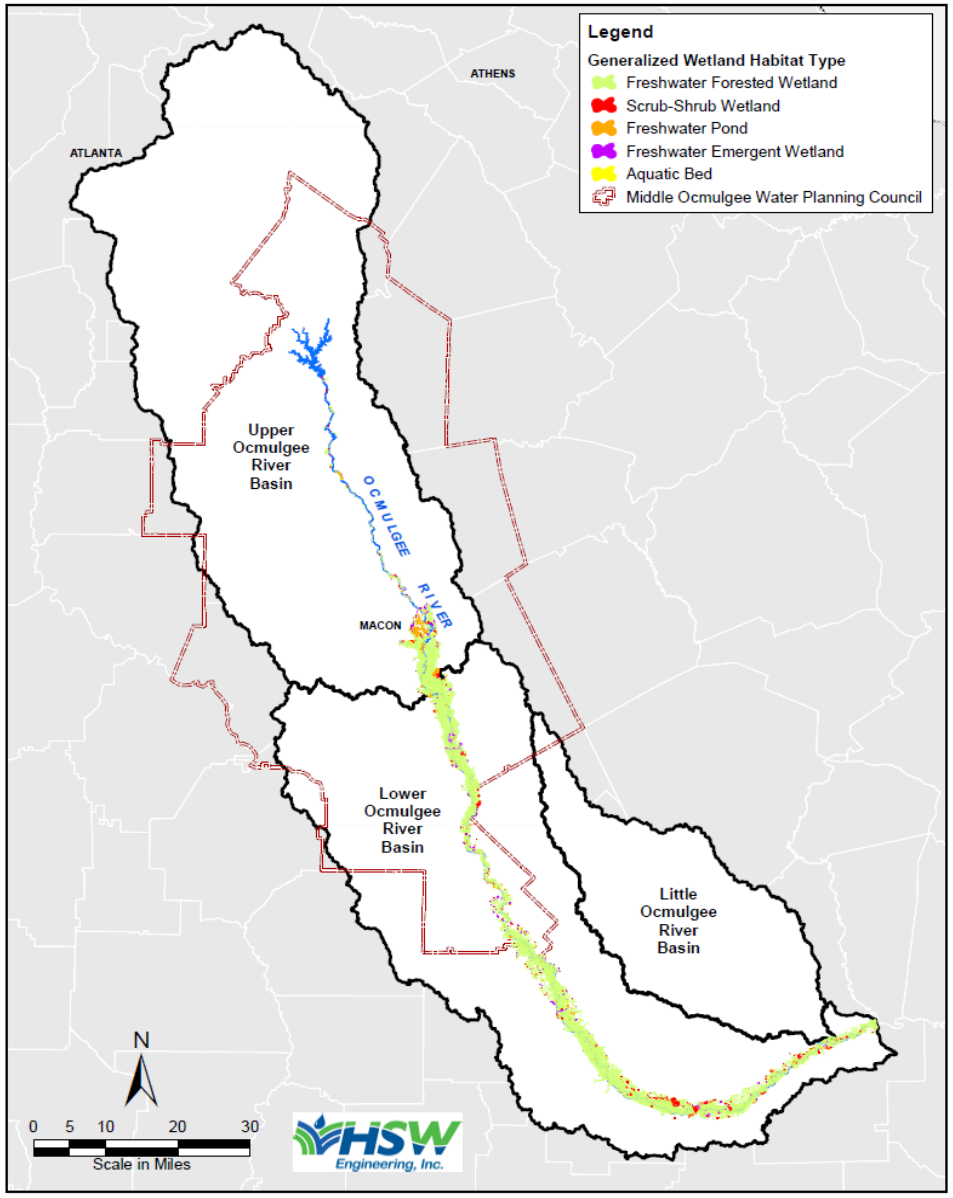
- HABITAT
- HYDROELECTRIC
- RECREATION
- WATER QUALITY
- WATER SUPPLY

STUDY APPROACH (CONTINUED):

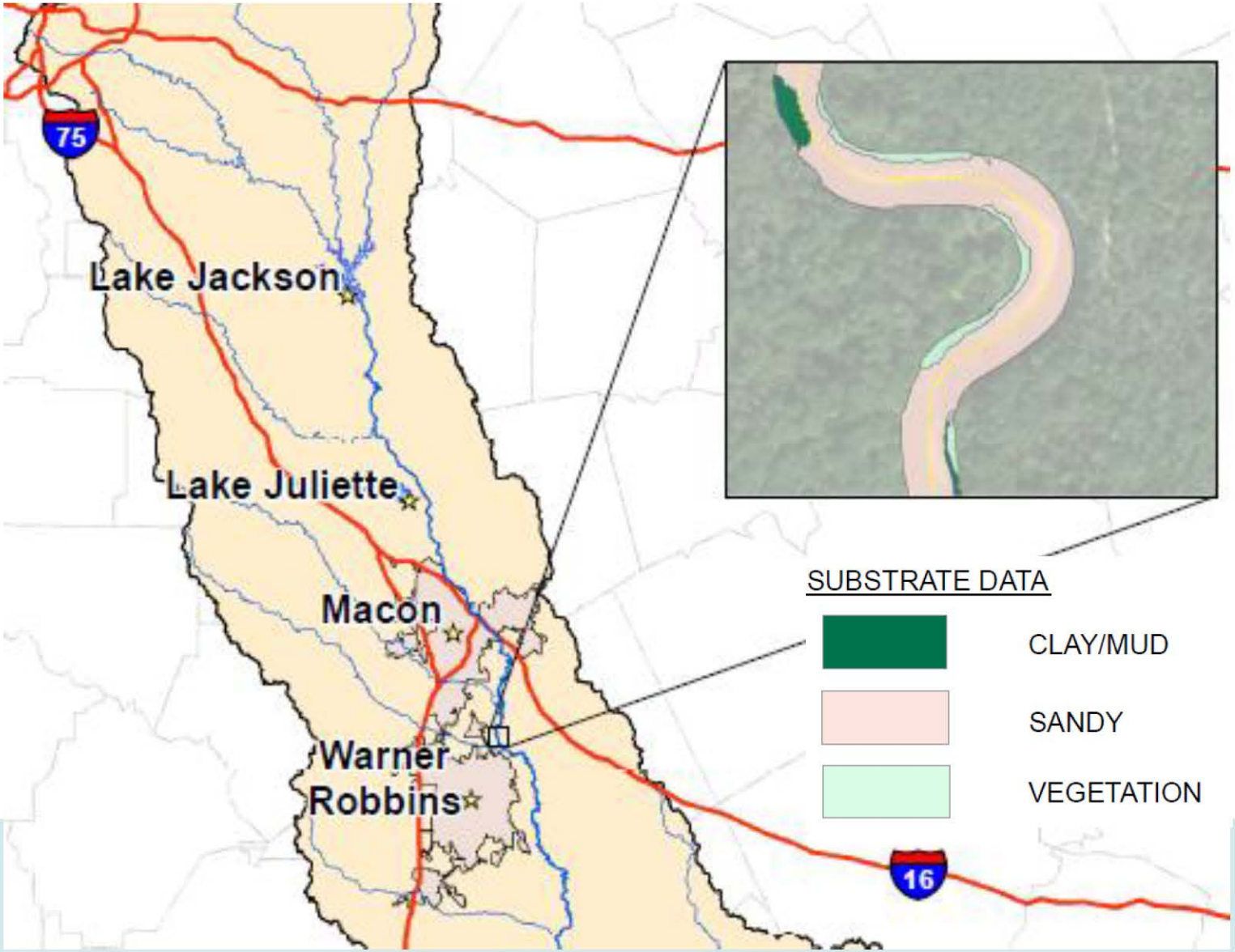
- **Collection of data**
  - Historical flow – USGS
  - Climatic data – identified source
  - River morphology – from 30 miles downstream of Lake Jackson to Altamaha confluence
  - Wetland - available
  - Fish habitat – some substrate information
  - Land use – available if needed
  - Operational data – needs further coordination with Georgia Power on Lloyd Shoals (Lake Jackson) operations

SURVEYS, STUDIES AND REPORTS

- National Wetland Inventory
- NRCS Soil Surveys



STUDY APPROACH (CONTINUED):



STUDY APPROACH (CONTINUED):

Macon Water Authority operations

- Ocmulgee River intake for water treatment plant and reservoir – size and depth
- Maximum and average withdrawal limits on permit
- Minimum flow requirements at river intake and at USGS gage 0221300
- River withdrawal normally fills Town Creek (Lucas Lake)
- In emergency, the permit allows for pumping directly to Amerson Water Treatment Plant

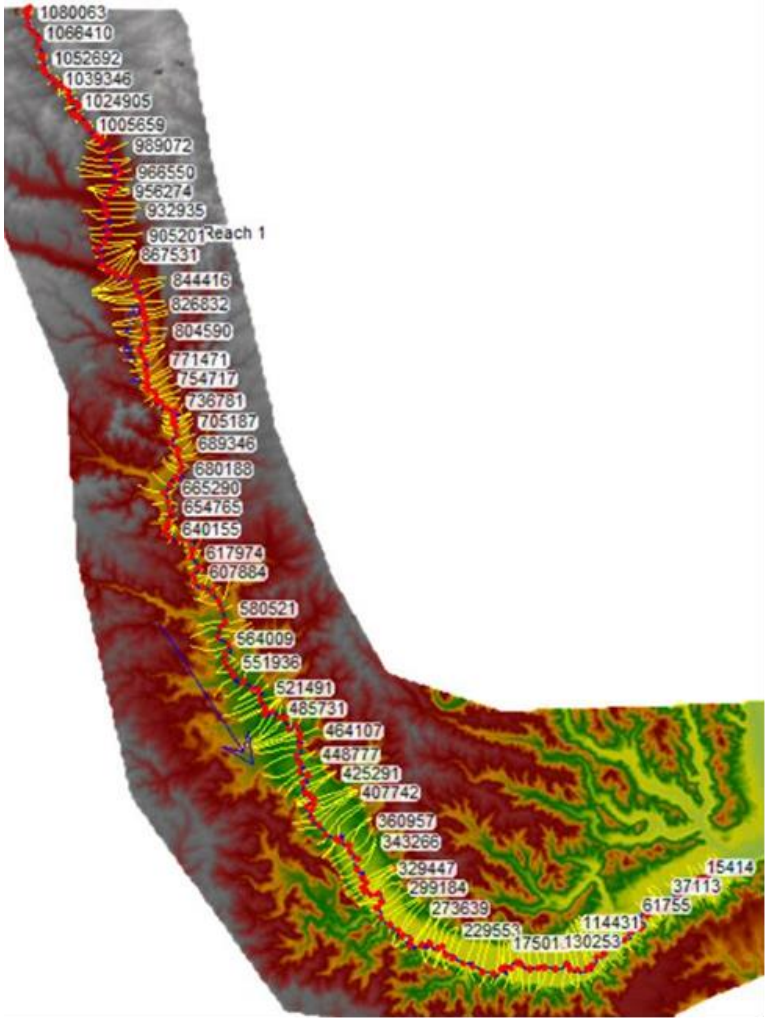
STUDY APPROACH (CONTINUED):

Development/availability of models

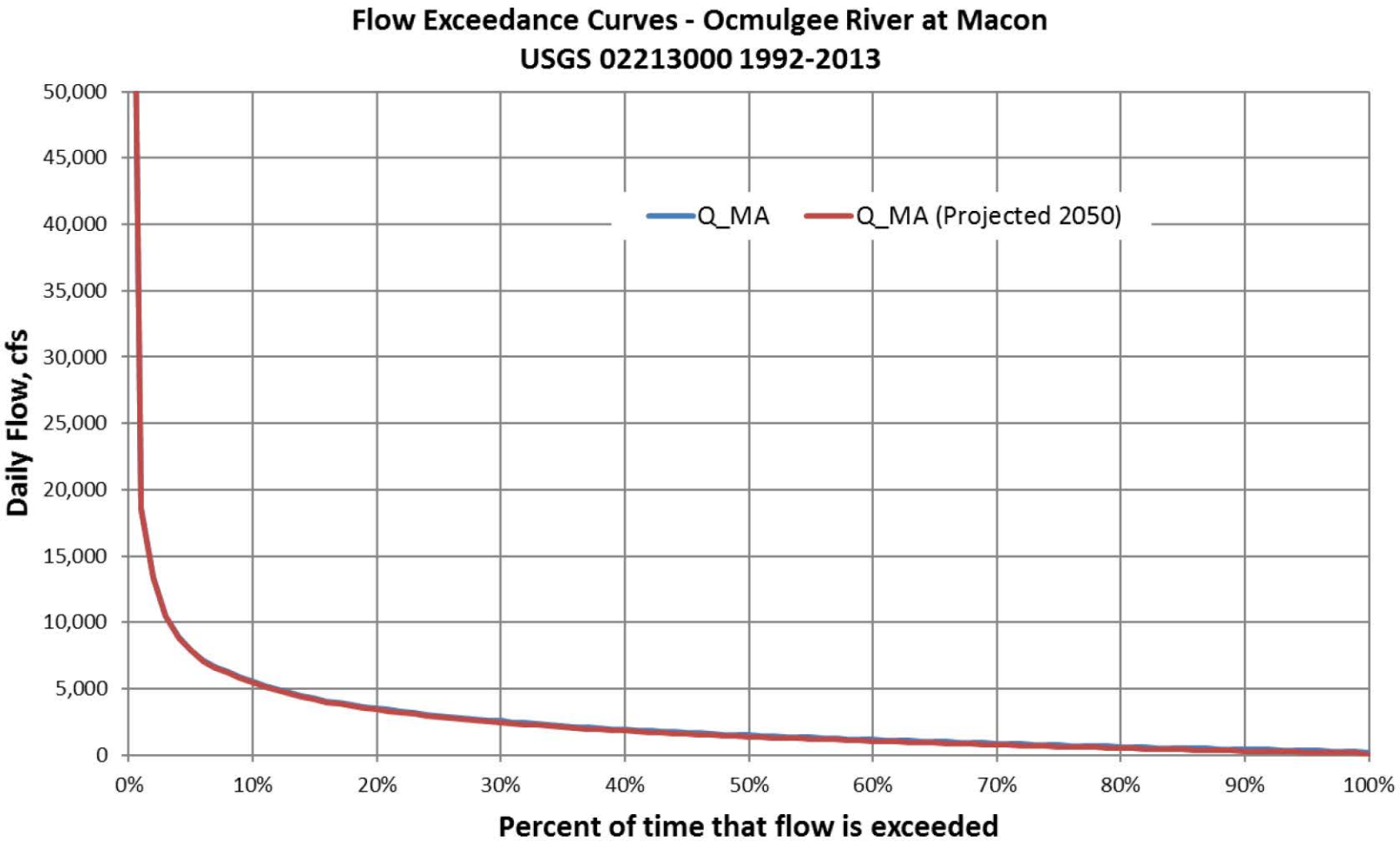
- Model reflecting Lake Jackson operation and basin water use (HEC-ResSim)
- Model simulating river surface elevation, velocity, and inundation (HEC-RAS)
- Model simulating potential aquatic habitat suitability curves (SEFA) (being developed by ARCADIS and HSW)
- Other habitat data and model (wetted perimeter, HEC-EFM)

OCMULGEE RIVER HEC-RAS MODEL

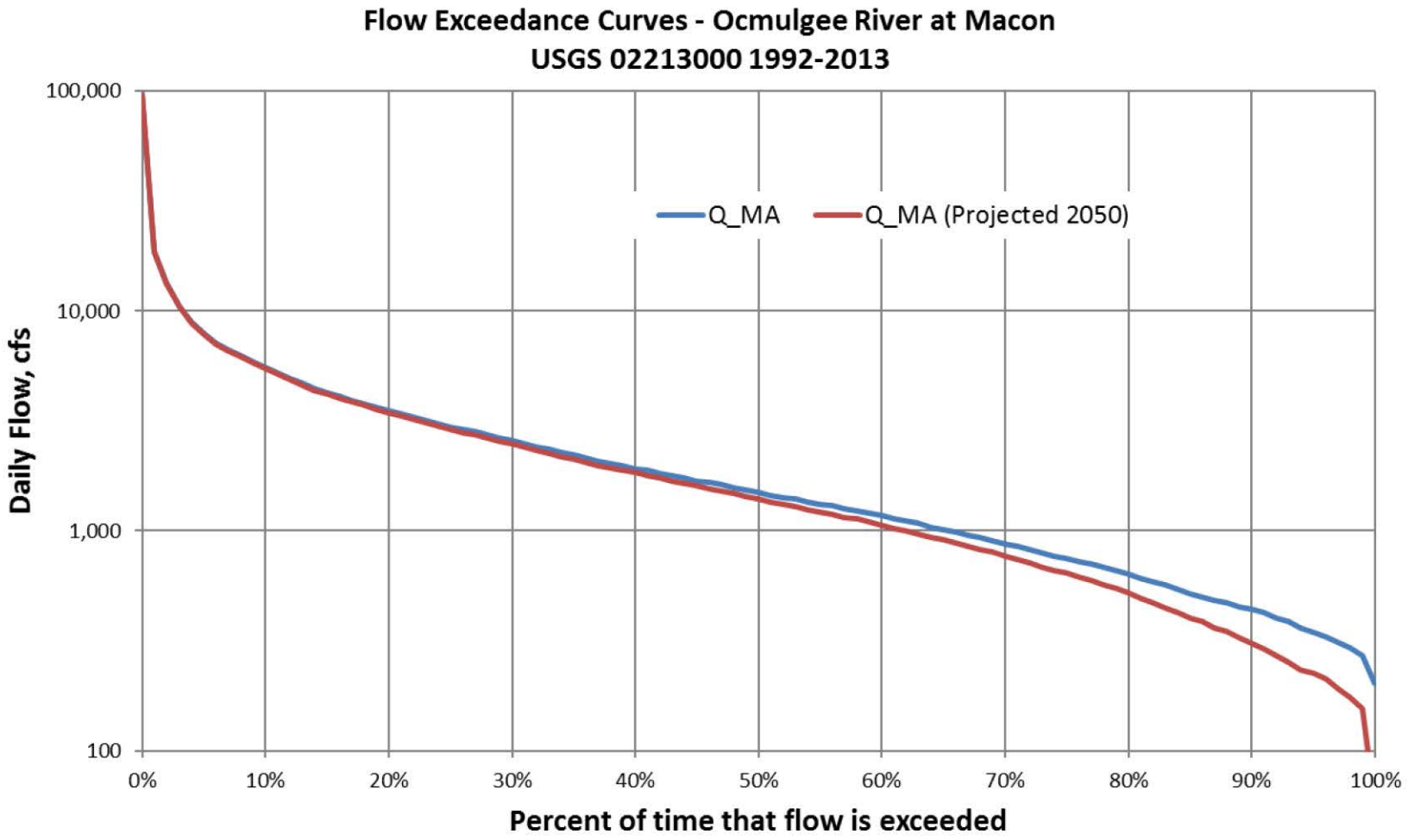
- Hydraulic model (water surface, flow, and inundation, i.e. HEC-RAS model)
- Nearly 200 miles of river channel captured
- Built using models previously developed by UGA, EPD, and ARCADIS
- New quasi-unsteady flow simulation capabilities enables long-term hydraulic modeling (1939-2013)



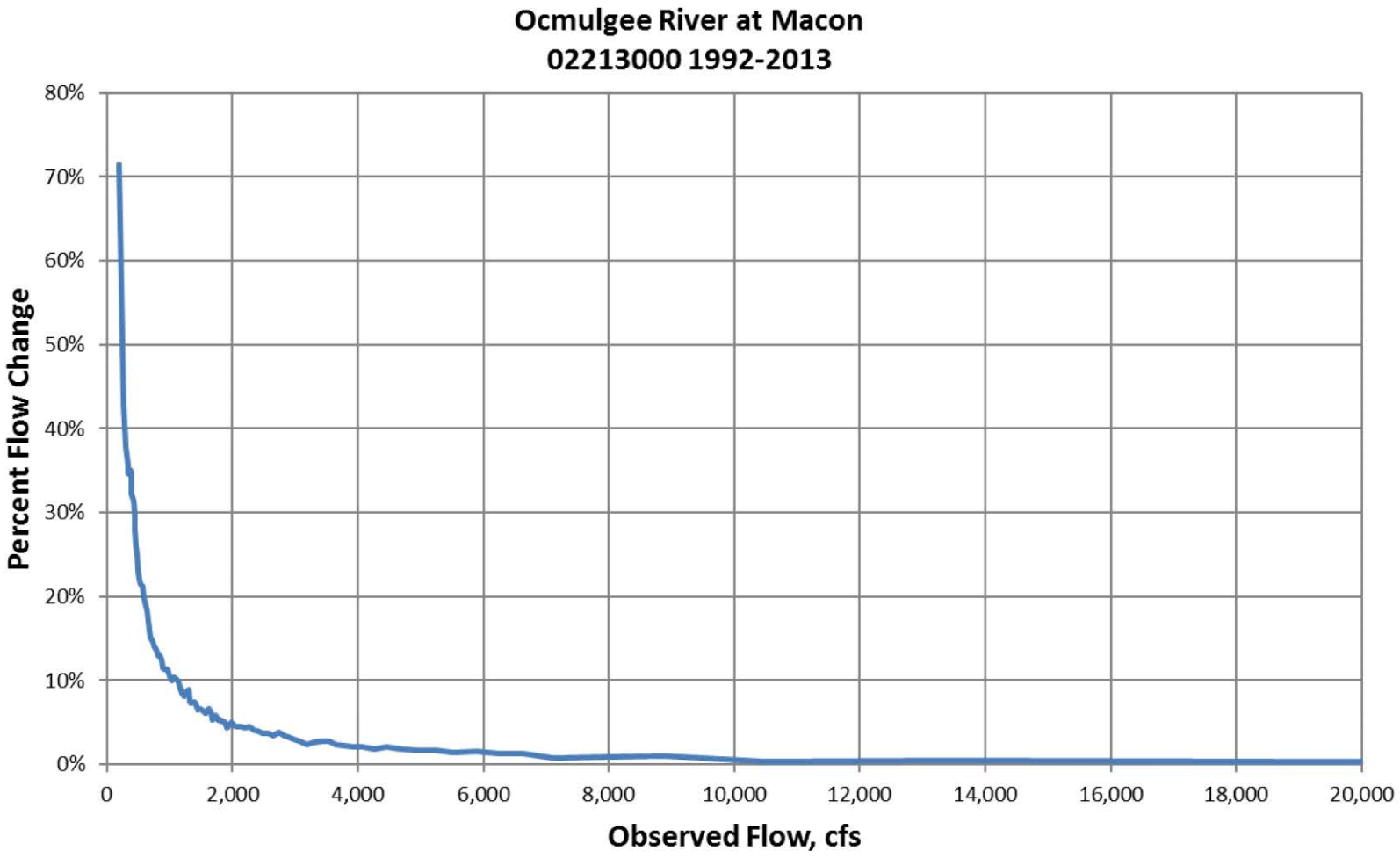
PRELIMINARY RESULTS – FLOW EXCEEDANCE



PRELIMINARY RESULTS – FLOW EXCEEDANCE



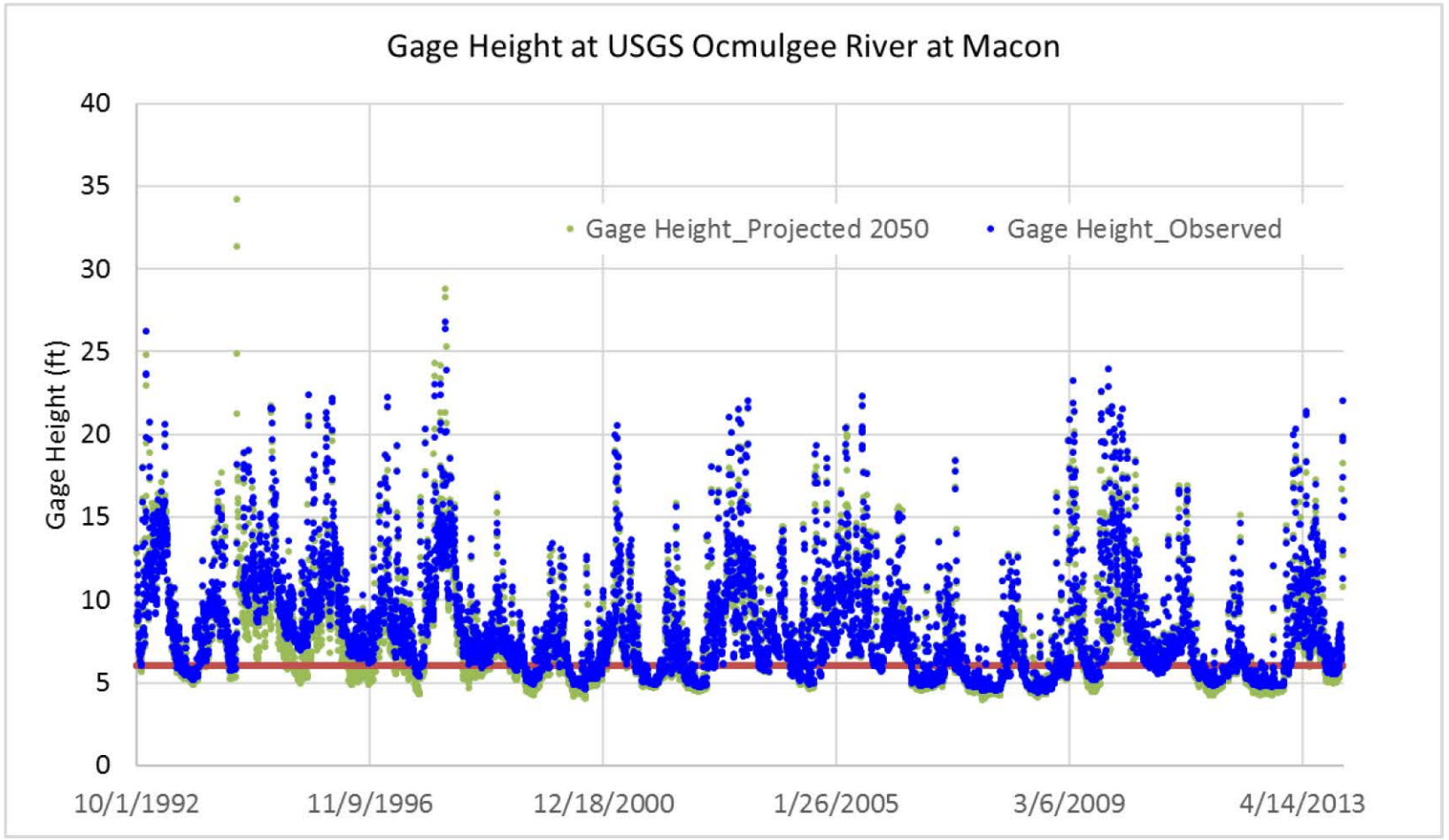
PRELIMINARY RESULTS – CHANGES IN FLOW



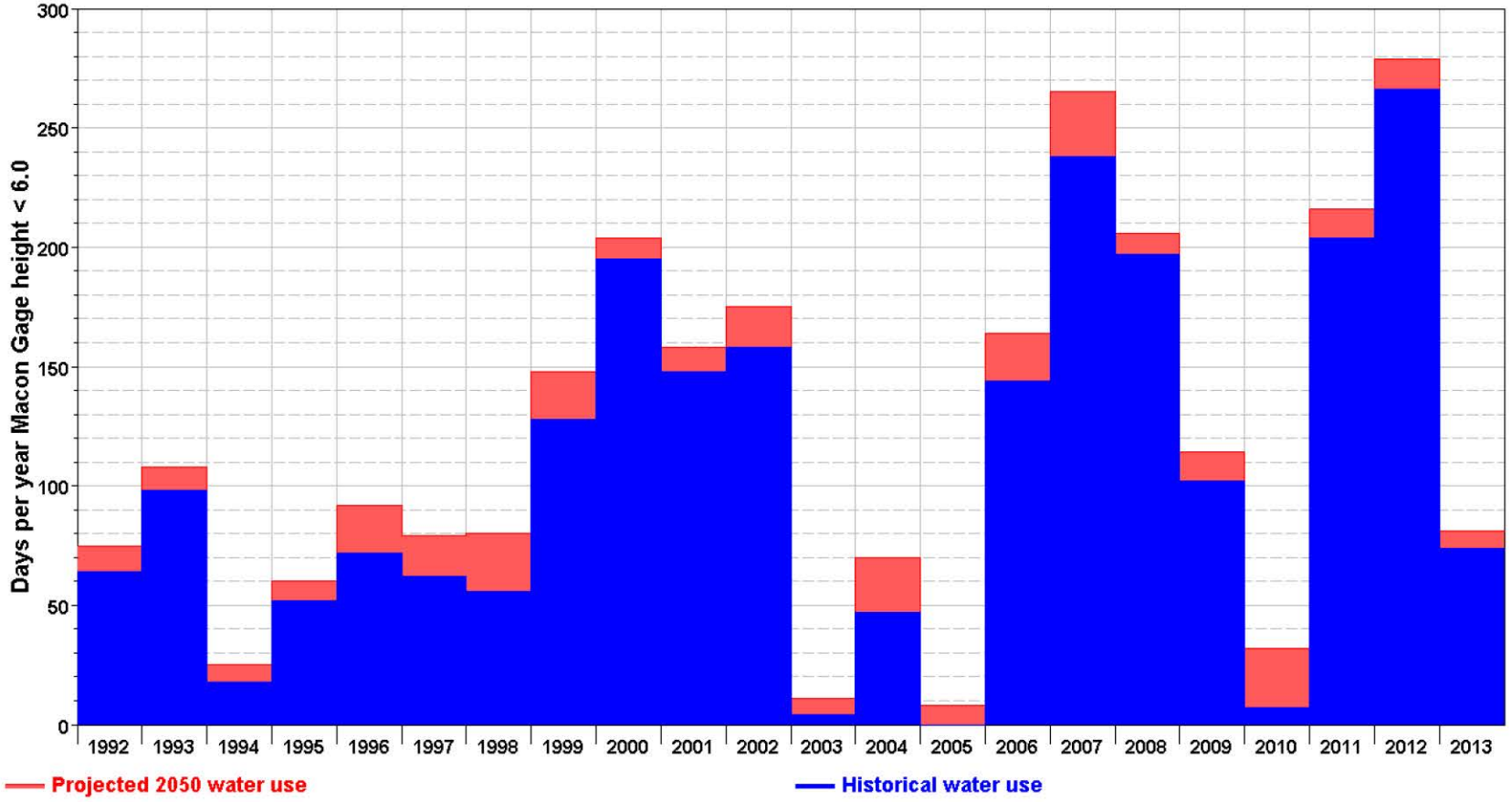
PRELIMINARY RESULTS - RECREATION

- **Assessment of flow-related services**
  - Recreational accessibility – when and for how long, especially under low flow conditions

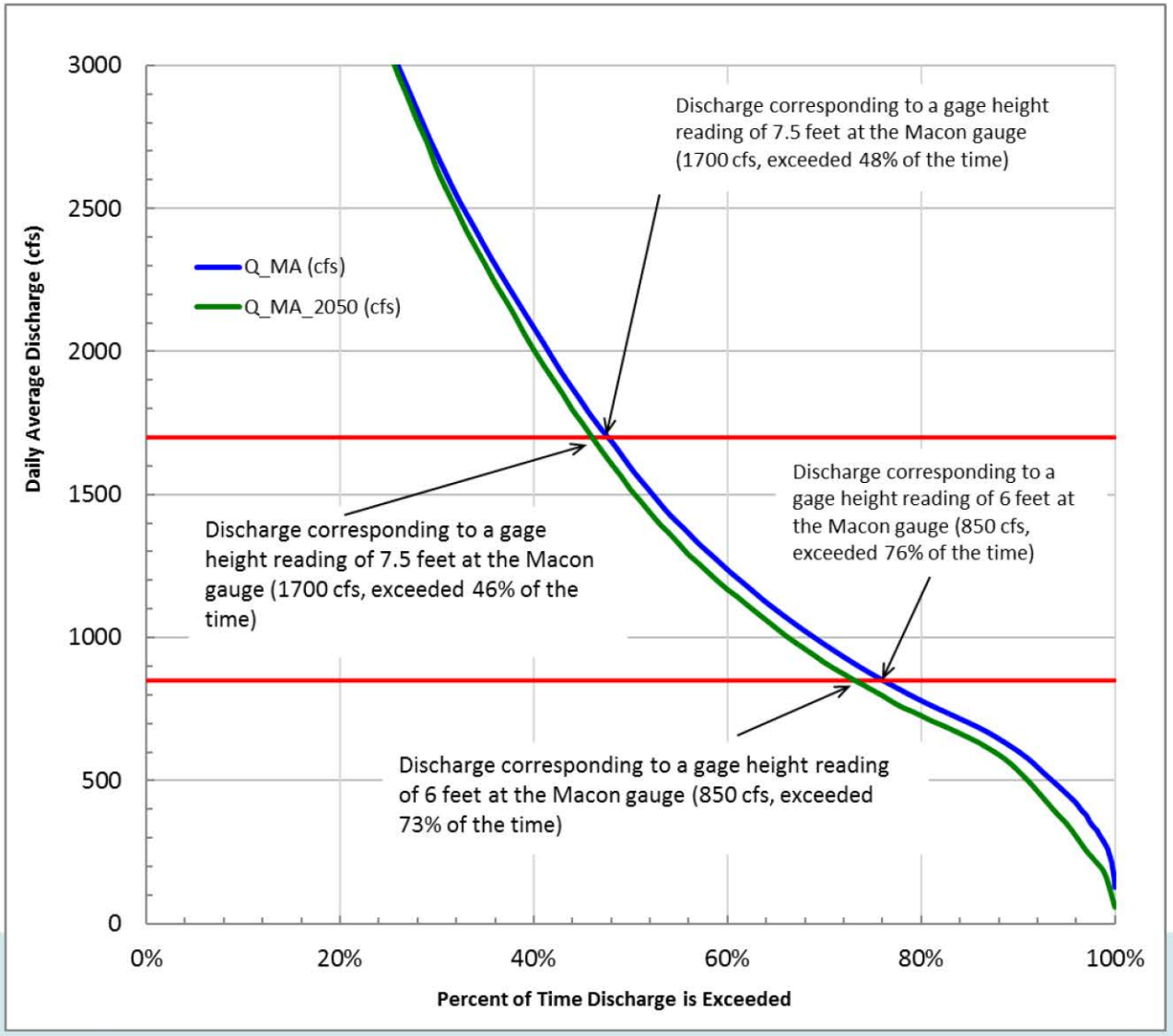
PRELIMINARY RESULTS - RECREATION



PRELIMINARY RESULTS - RECREATION

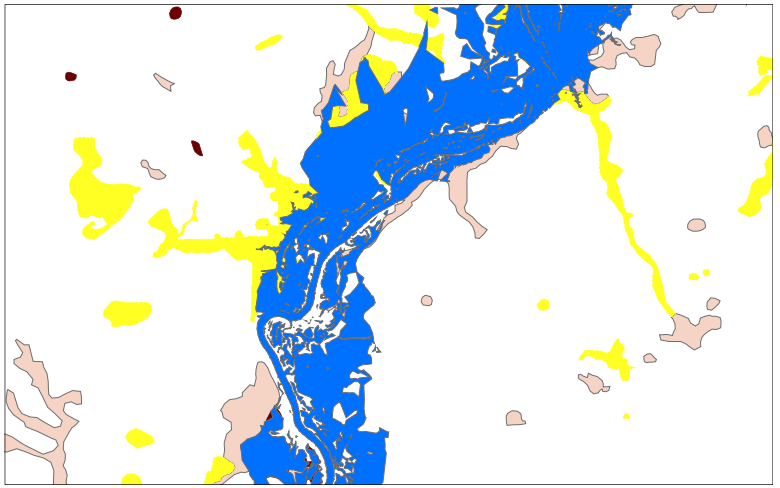


PRELIMINARY RESULTS - RECREATION



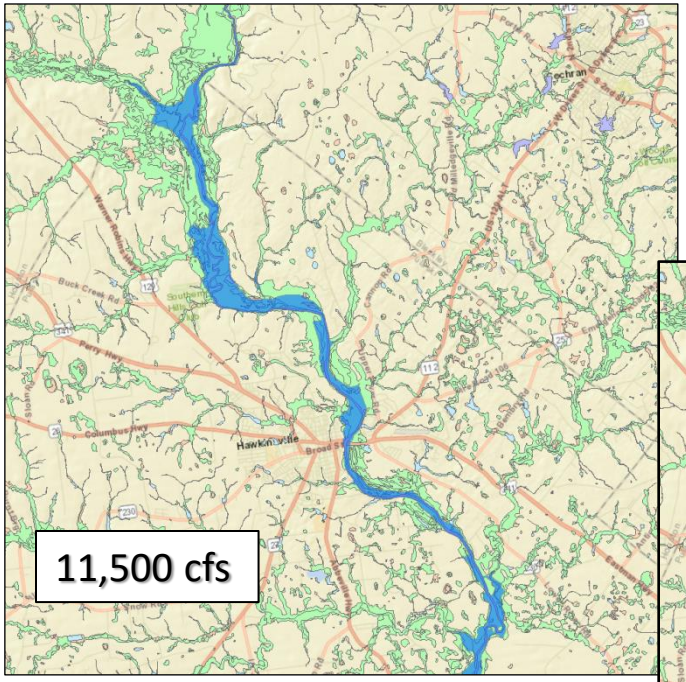
PRELIMINARY RESULTS – WETLAND INUNDATION

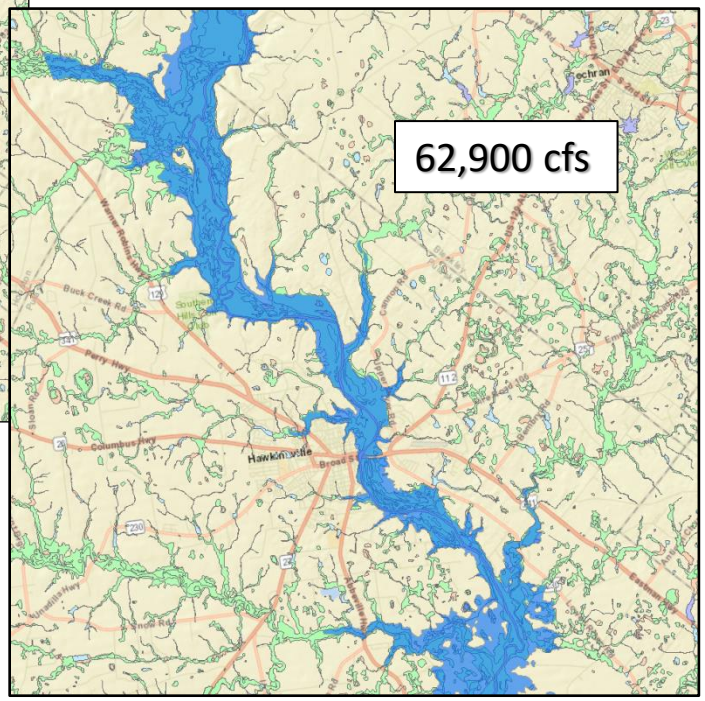
- **Assessment of flow-related services**
  - Wetland inundation – when and for how long, especially under high-flow conditions



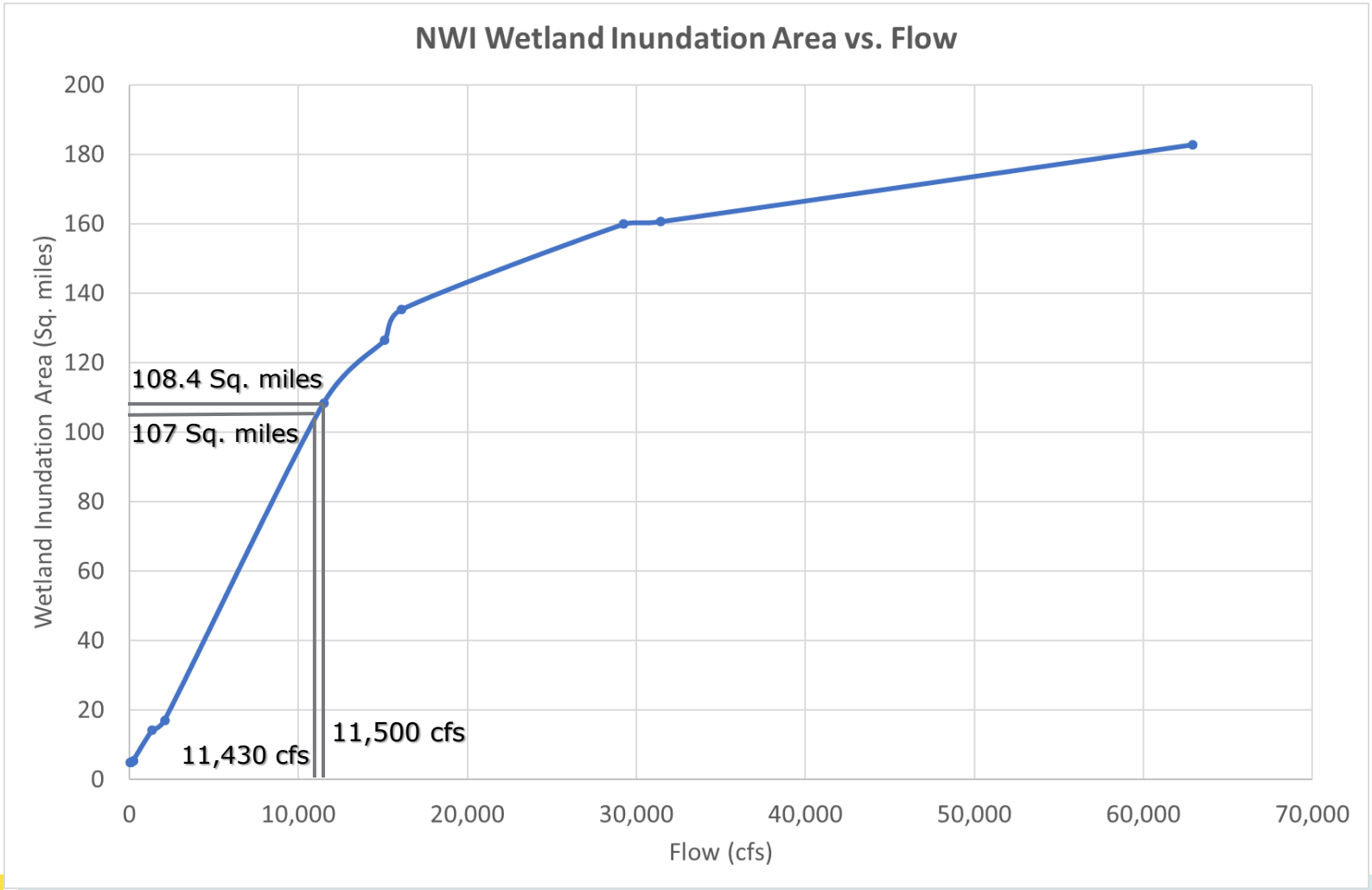
PRELIMINARY RESULTS – WETLAND INUNDATION

Flow change	change in wetlands inundation area



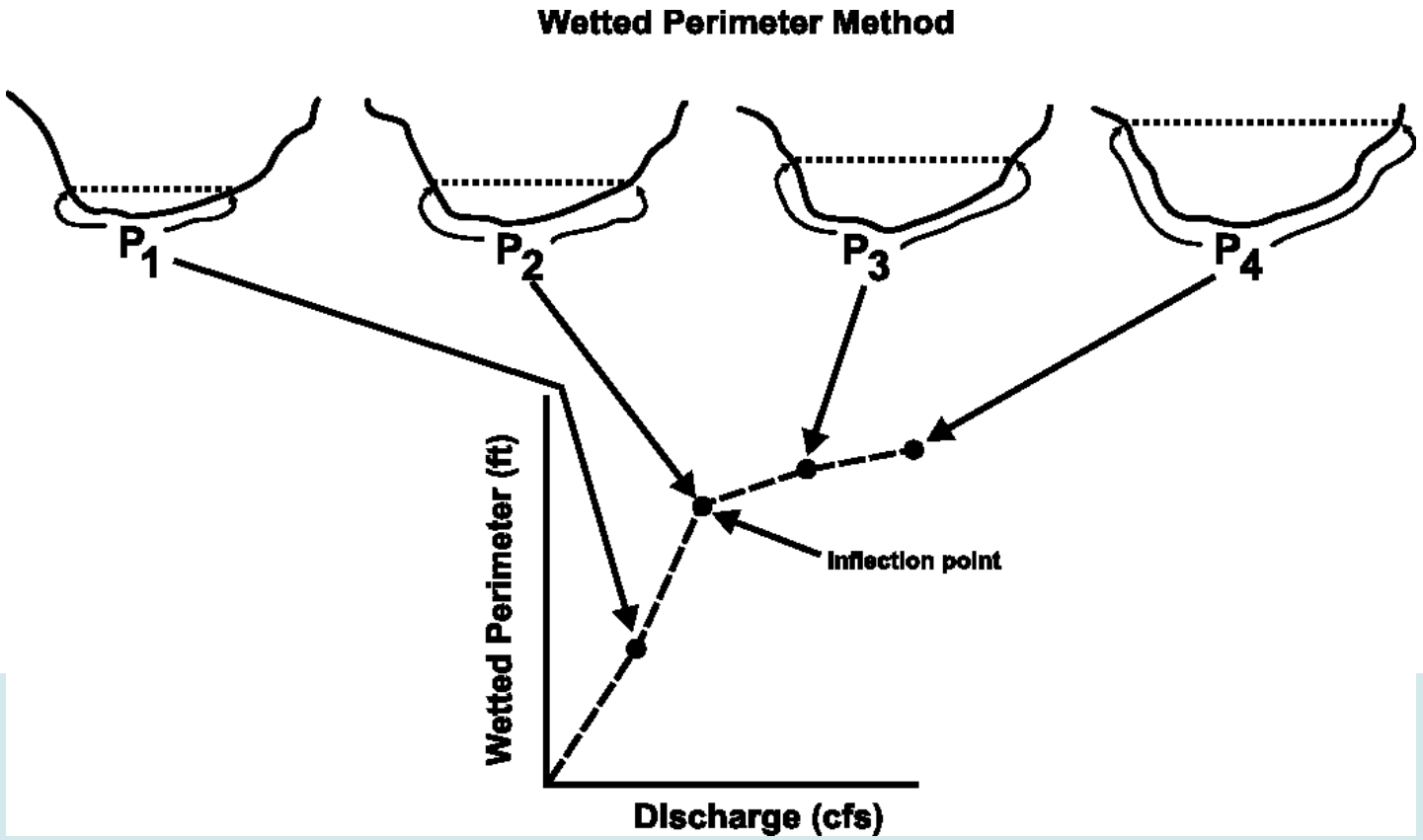


PRELIMINARY RESULTS – WETLAND INUNDATION

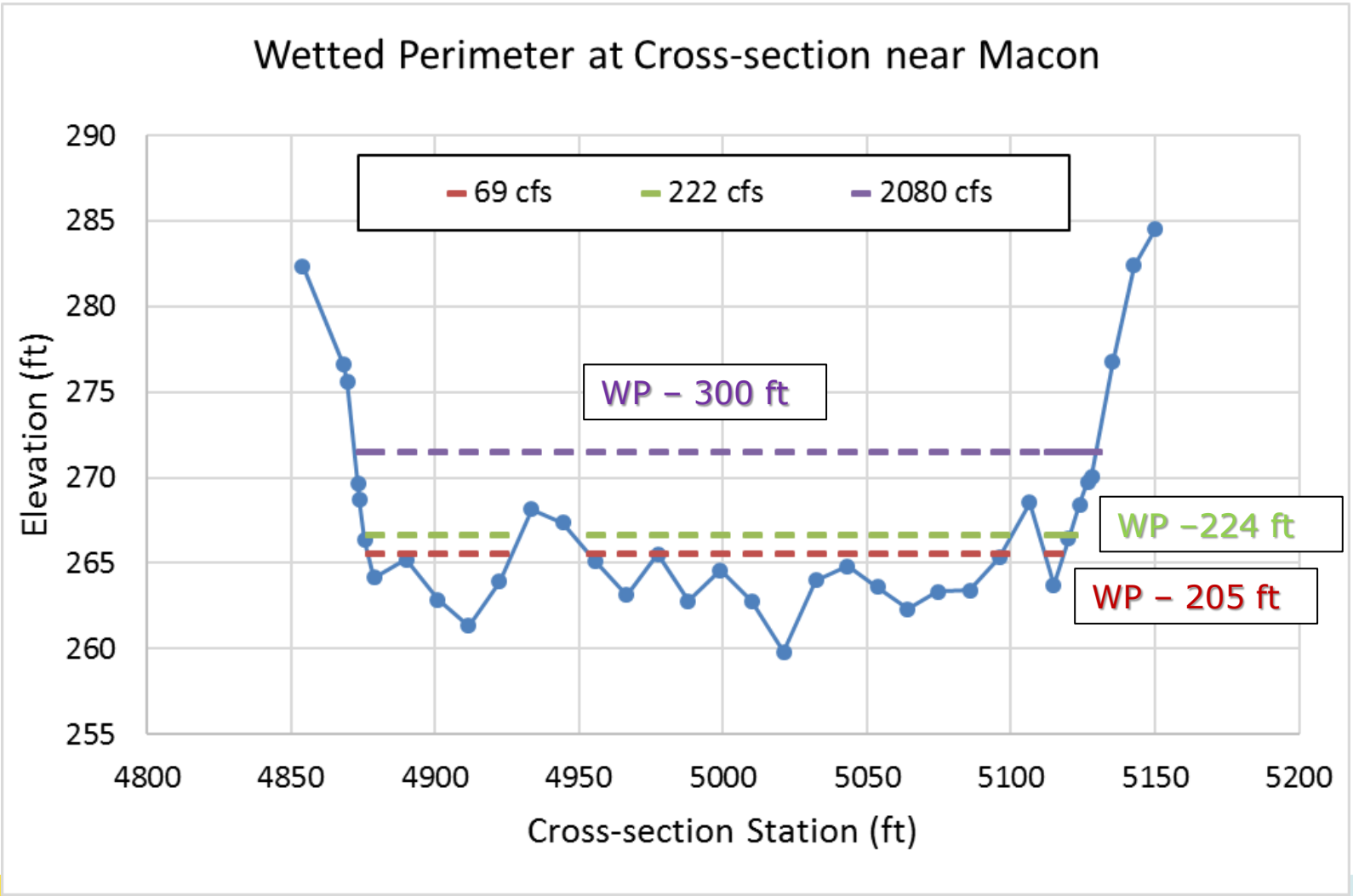


PRELIMINARY RESULTS – WETTED PERIMETER

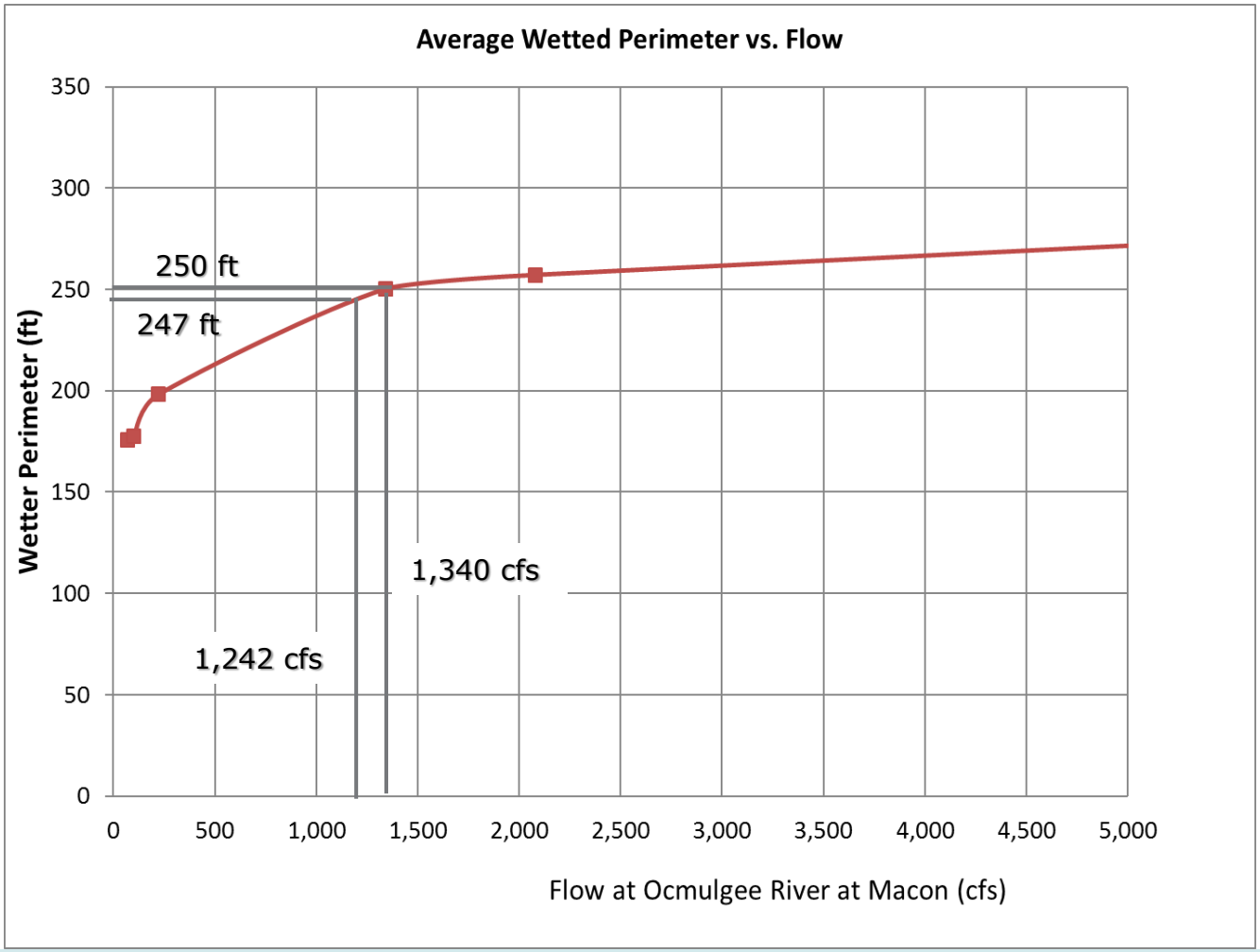
- **Assessment of flow-related services**
  - Wetted perimeter – an indicator of available aquatic habitat



PRELIMINARY RESULTS – WETTED PERIMETER



PRELIMINARY RESULTS – WETTED PERIMETER



PRELIMINARY RESULTS – SUMMARY

River Service	Service Metric	Historical Average No.of Non-viable Days	2050- Average No.of Non-viable Days
Paddling	Paddling during low water conditions (stage < 6 ft)	88	98
Boating	Boating during low water conditions (stage < 7.5 ft)	192	197
		Historical -Wetted Perimeter at 1,340 cfs	Projected 2050– Wetted Perimeter at 1,242 cfs
Instream Habitat	Wetted Perimeter (ft)	250	247
		Historical-Wetland Inundation at 11,500 cfs	Projected 2050– Wetland Inundation at 11,430 cfs
Floodplain Habitat	Wetland Inundation Area (Sq. miles)	108.4	107

NEXT STEPS AND EXPECTATIONS:

- EPD and contractor developing stream-specific or site-specific information regarding services provided by the Ocmulgee River

- EPD and contractor analyzing relative impacts between water use scenarios (may also be applied to Lake Jackson operational scenarios)

NEXT STEPS AND EXPECTATIONS:

- In effect, EPD and contractor to provide the Council additional tools to assess stream-specific or site-specific services and potential impacts to such

- Council to use these additional tools to consider relative impacts in its Regional Water Planning process, perhaps with help from experts on river services

CAUTION:

- Establishing a framework under which tools have been developed and new tools can/will be developed to address stream-specific or site-specific river services and impacts to such

- Additional collection of data may improve tools for more reliable results.
  - River bathymetry of higher density
  - Species-specific habitat

QUESTIONS, DISCUSSION

Special-interest discussions:

- Technical drill-down – alternative flow regime methodologies
- Resource assessment process used by Water Planning Council

Appendix D

Resource Assessment Process

State Water Plan
Surface Water Availability Resource Assessment

August 2016

Agenda:

- Resource Assessment Objectives
- New Information and Tools
- Assessment Approach
- Assessment Results

Resource Assessment Objectives

- Assess current availability of surface water resource by answering the following:
  - How much water have we received from Mother Nature?
  - How much water have we used (off-stream needs)?
  - How much water do we potentially need to leave in the streams (in-stream needs)?
  - Do we potentially have an issue meeting both?

Resource Assessment Objectives

- Identify and quantify potential gaps between currently available resource and combined current needs
  - Unregulated Basins: potential shortage of water to meet both off-stream and in-stream needs (frequency and depth)
  - Regulated Basins: potential shortage of water to meet both off-stream needs and flow needs as identified by reservoir regulations

New Information and Tools

- Consumptive water use data through 2013
- Extended UIF data through 2013 for SO, OOA, OSSS, and TN Basins, and extended UIF data through 2011 for ACF and ACT Basins
- Agricultural metering data
- Farm ponds surveyed in Flint, Ogeechee, and Suwannee Basins
- Carsonville, Macon 2 and Lumber 2 nodes added
- ResSim and HEC-5 models developed

Assessment Approach

- Development of consumptive water use data
- Development of unimpaired flow data (UIF data)
- Development of computer models simulating water management and reservoir operations
  - Simple mass balance in unregulated basins
  - Reservoir operation part of regulated basins
- Post-simulation processing to help identify potential issues

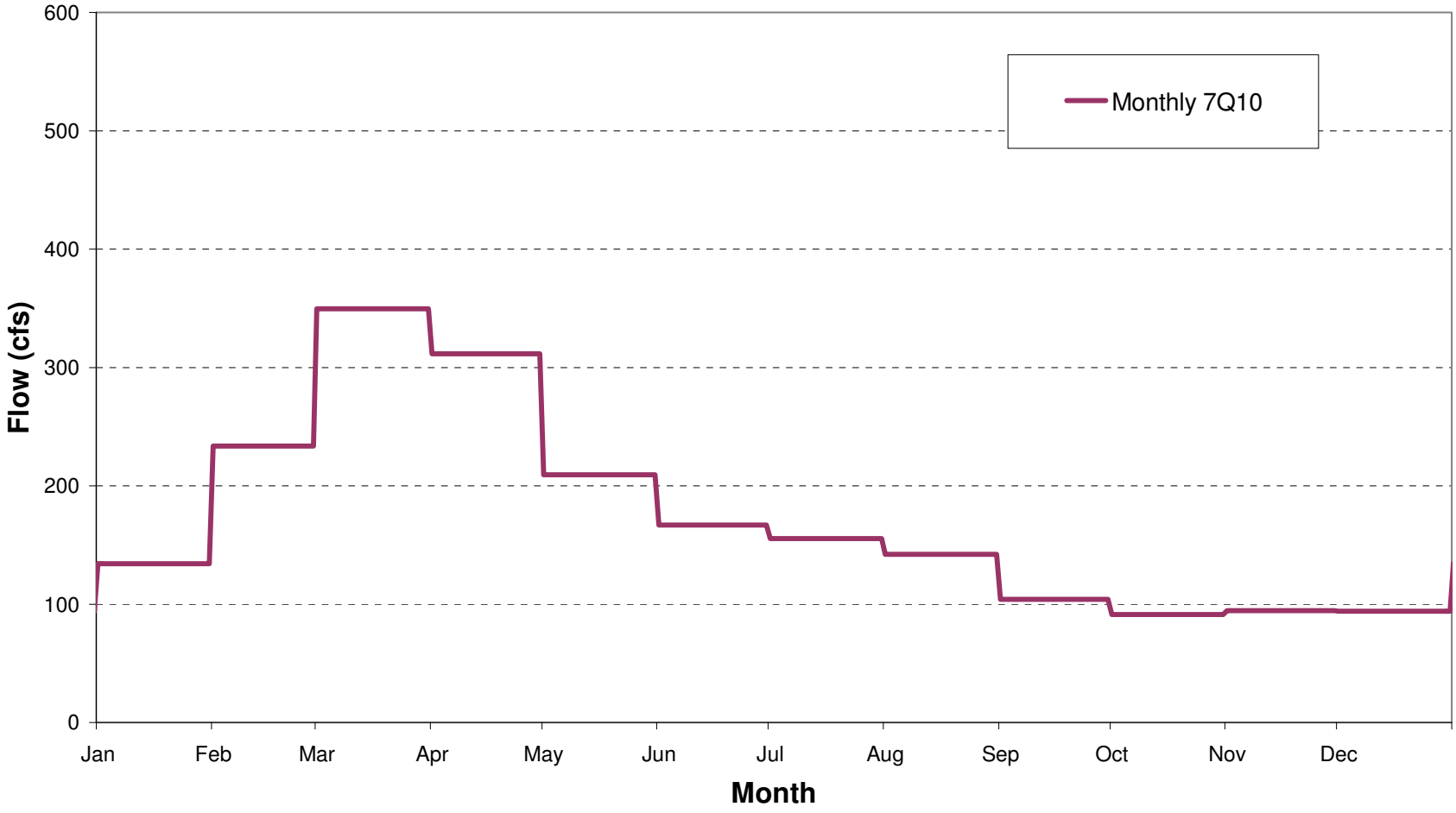
Assessment Approach Limitations

- Regional planning level resolution
  - Results at 70+ basic nodes and 40+ planning nodes
- Models used for broad scale regional planning, not for individual permitting decisions

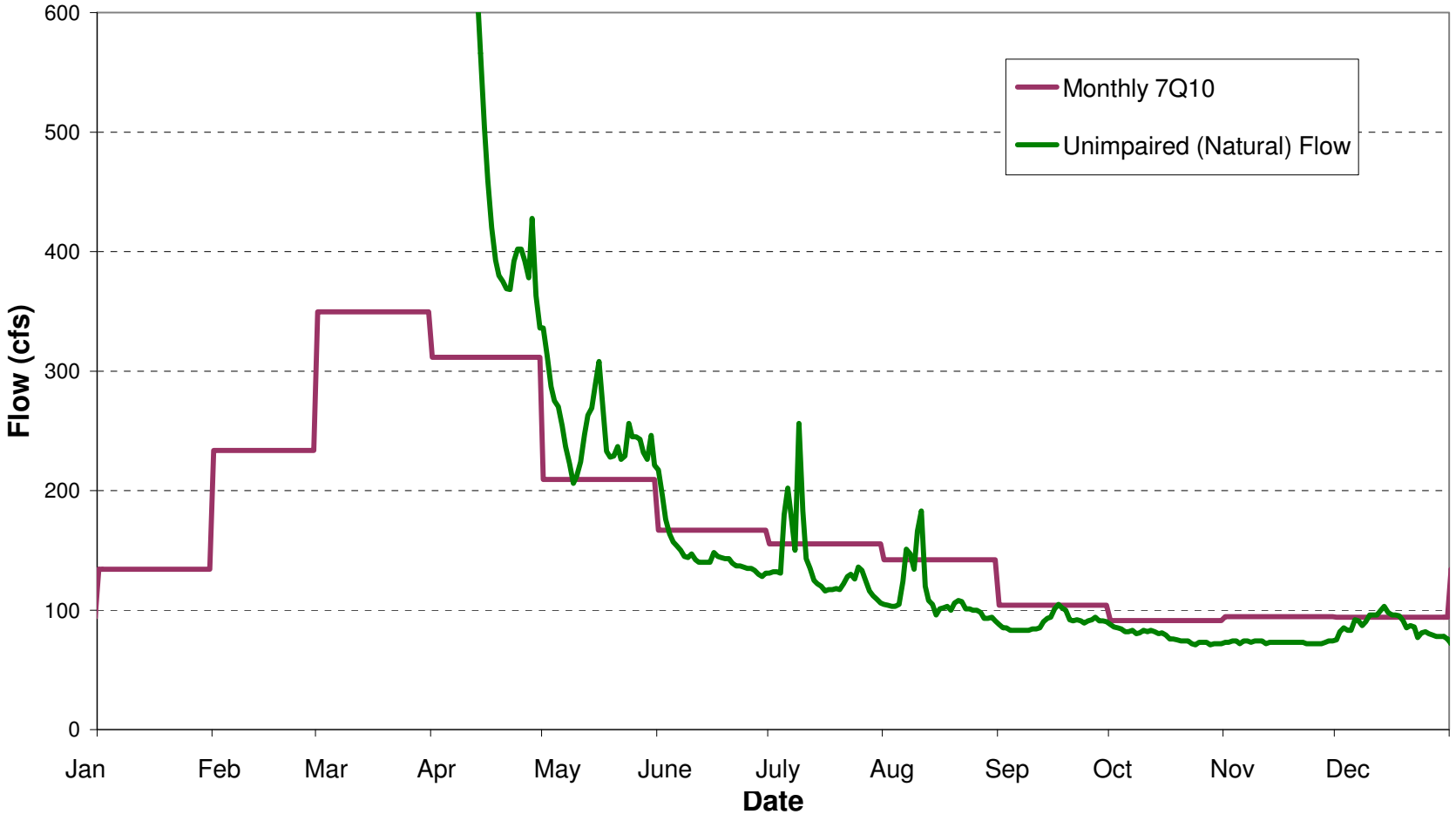
Identifying Potential Resource Gaps (Unregulated)

- Step 1 – Determine monthly 7Q10 for each of the unregulated Planning Nodes
- Step 2 – Determine unimpaired or “natural” flow for a node by removing man-made effects on flow observed at that node for the 70 year period
- Step 3 – Develop Flow Regime by taking the less of the two
- Step 4 – Identify gaps between availability and demand by comparing the Flow Regime to modeled stream flow assuming all water demands are being met

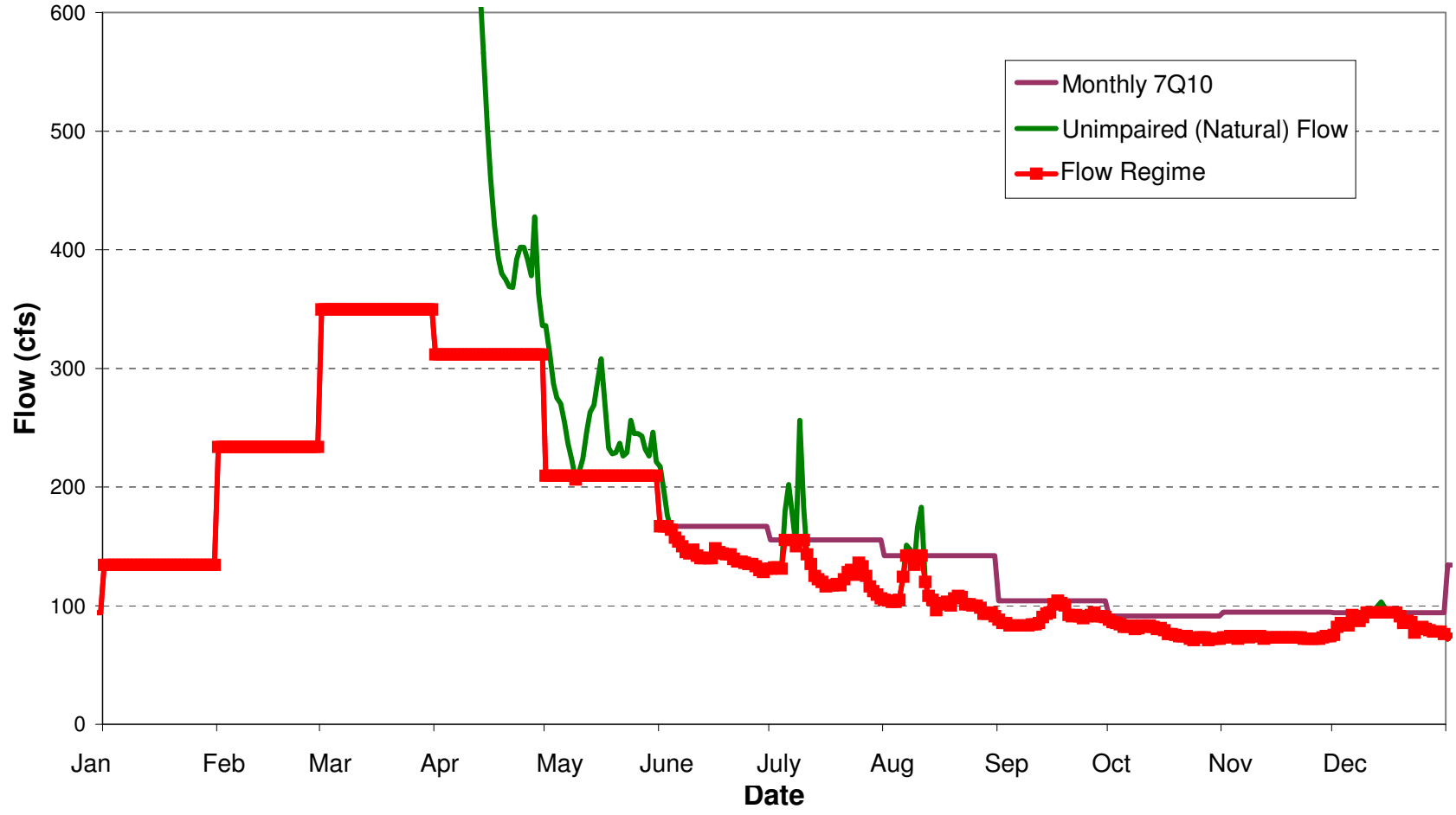
Step 1 – Determine Monthly 7Q10



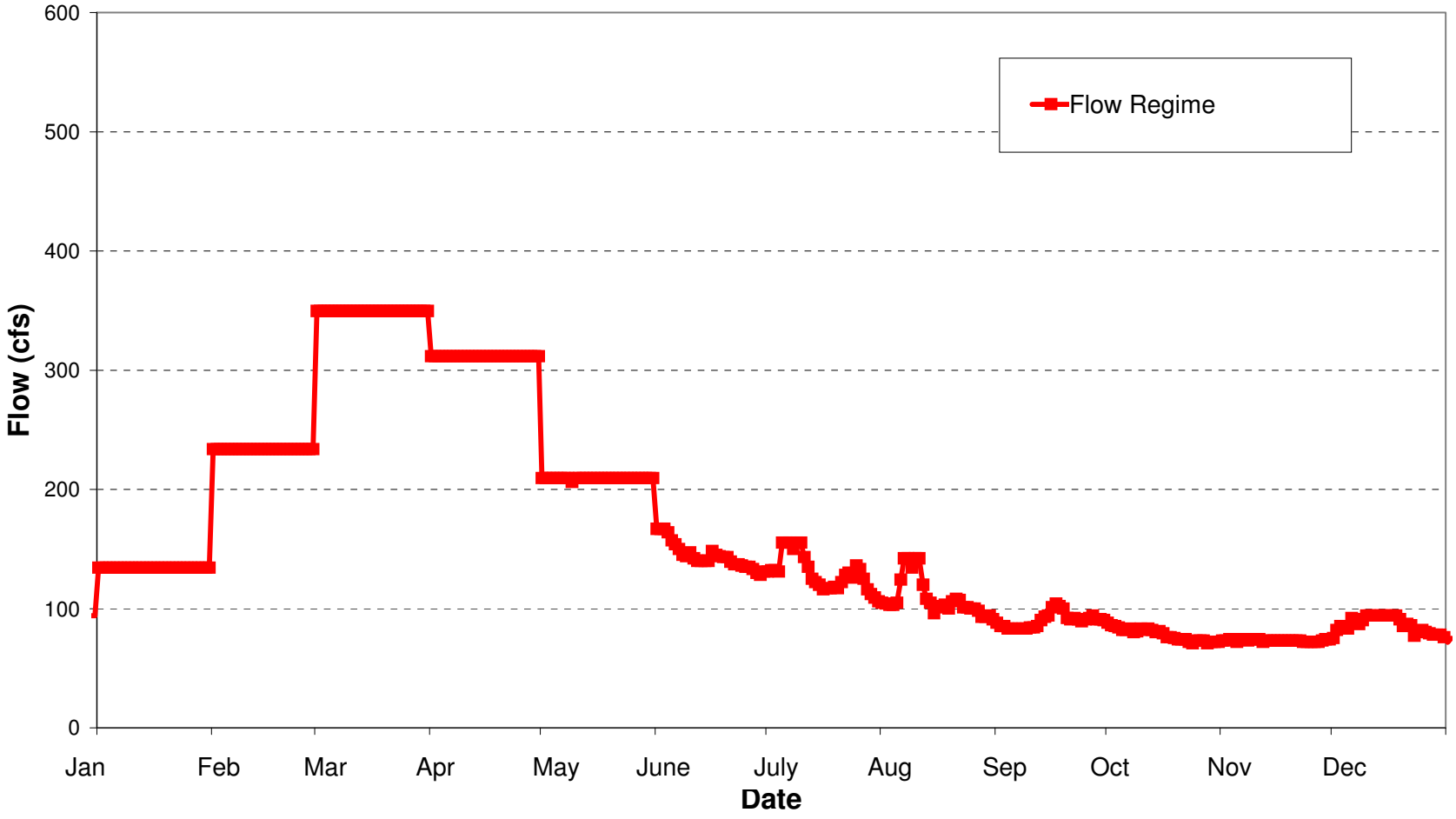
Step 2 – Determine Unimpaired Flow



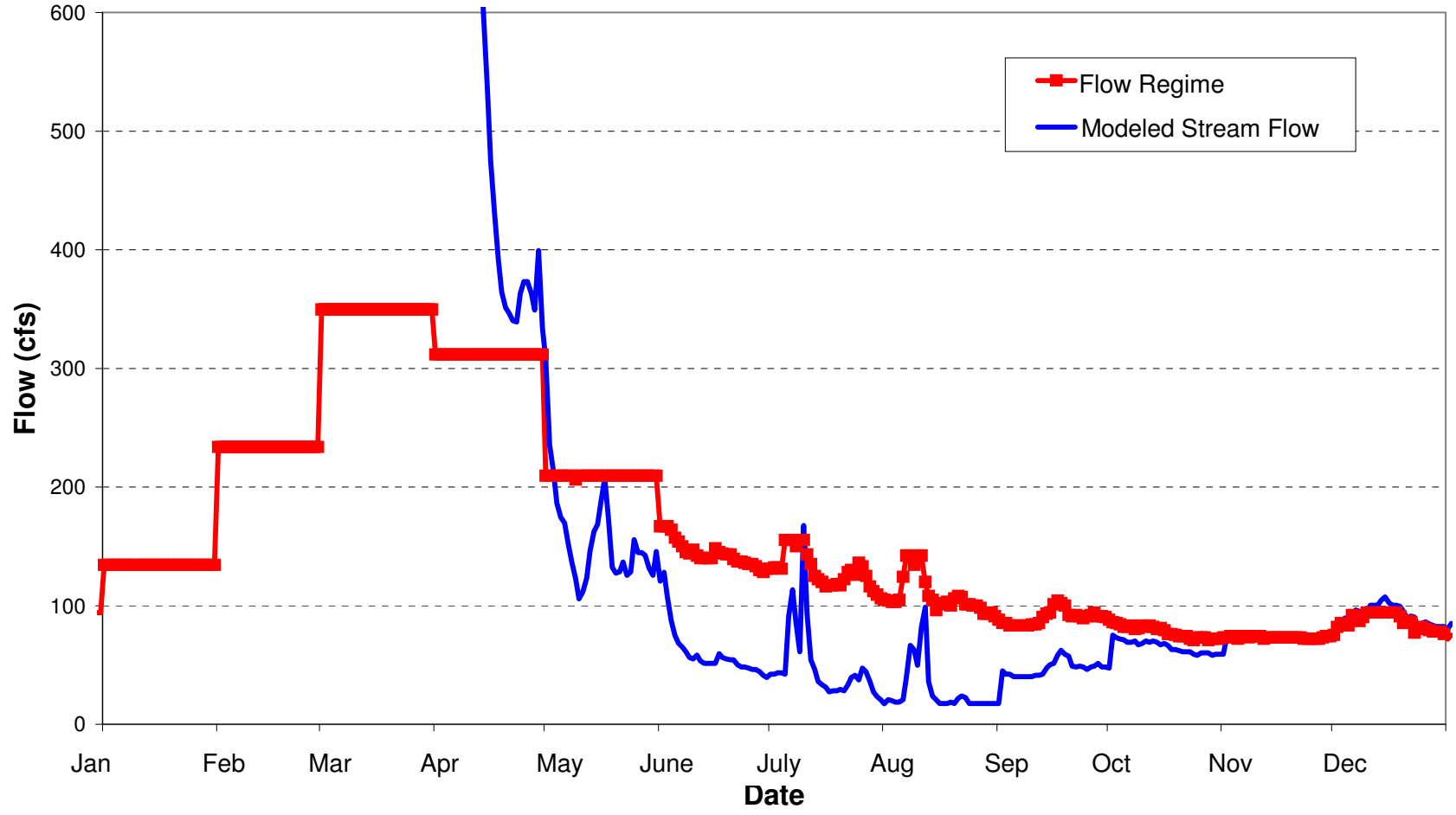
Step 3 – Take Monthly 7Q10 or Natural Flow, Whichever is Lower…



Step 3 – …to Develop Flow Regime



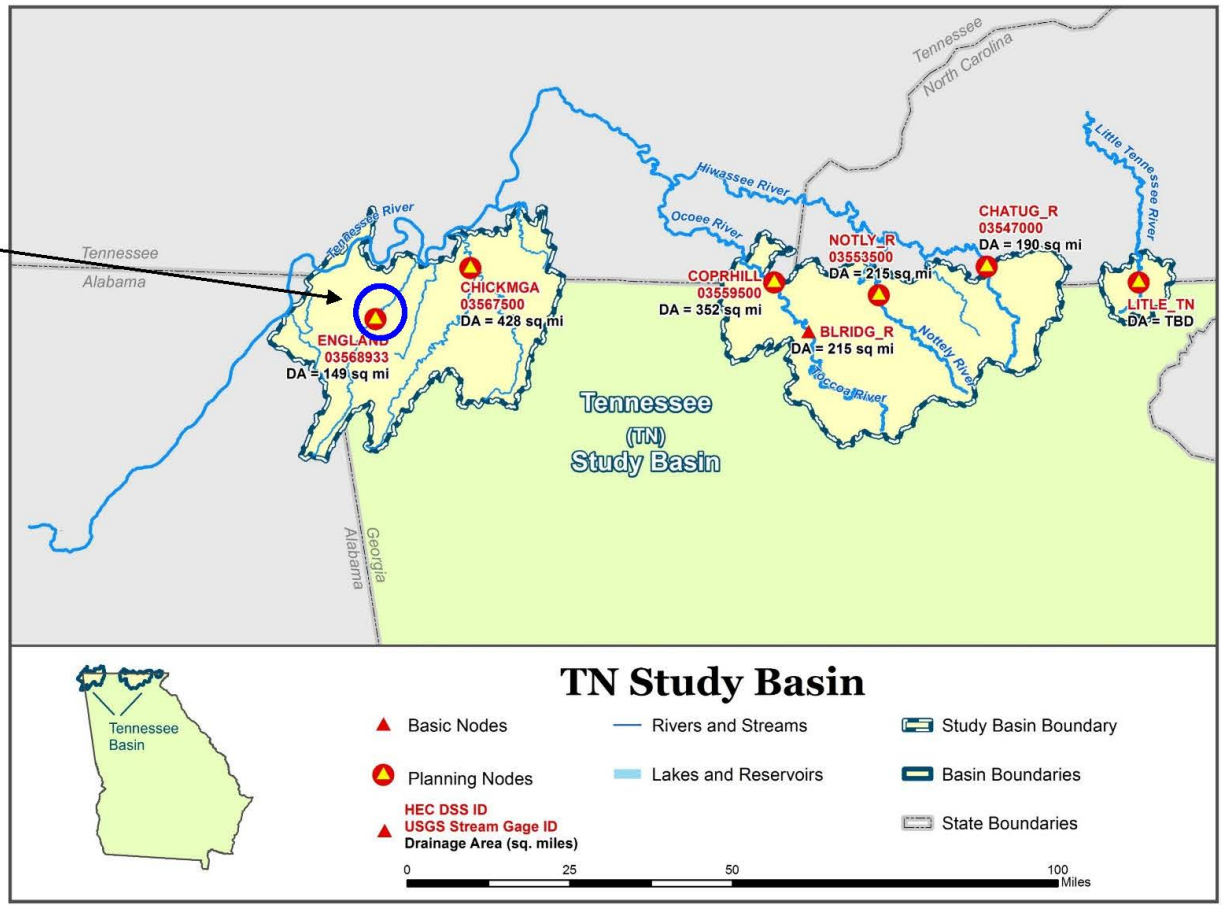
Step 4 – Identify Gaps by Comparing Modeled Stream Flow to Flow Regime



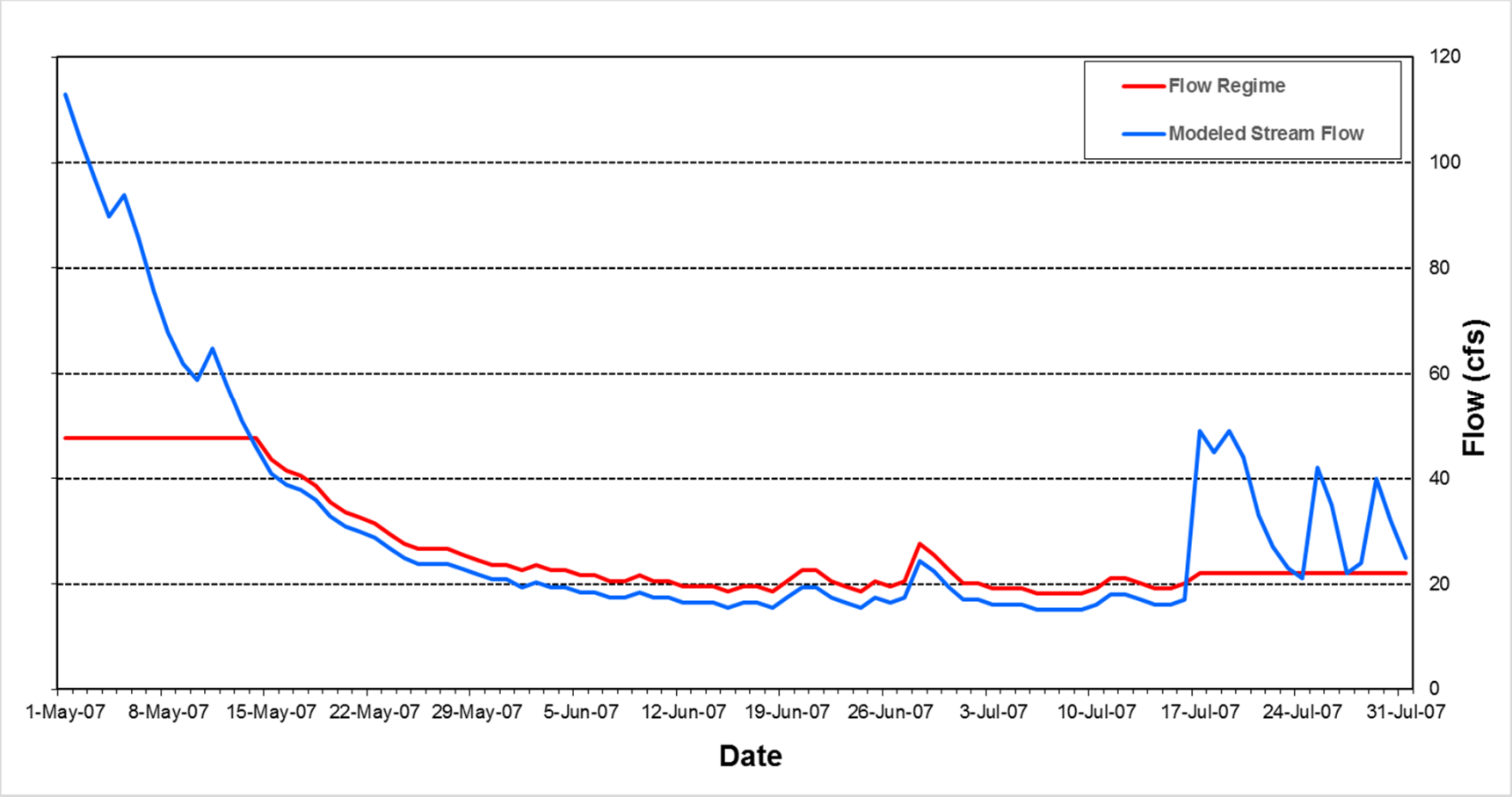
Modeled Stream Flow Assumes Water Demand Fully Met

New England in the Tennessee River Basin

New England



Potential Gap at New England in the Tennessee River Basin



Modeled Stream Flow Assumes Water Demand Fully Met

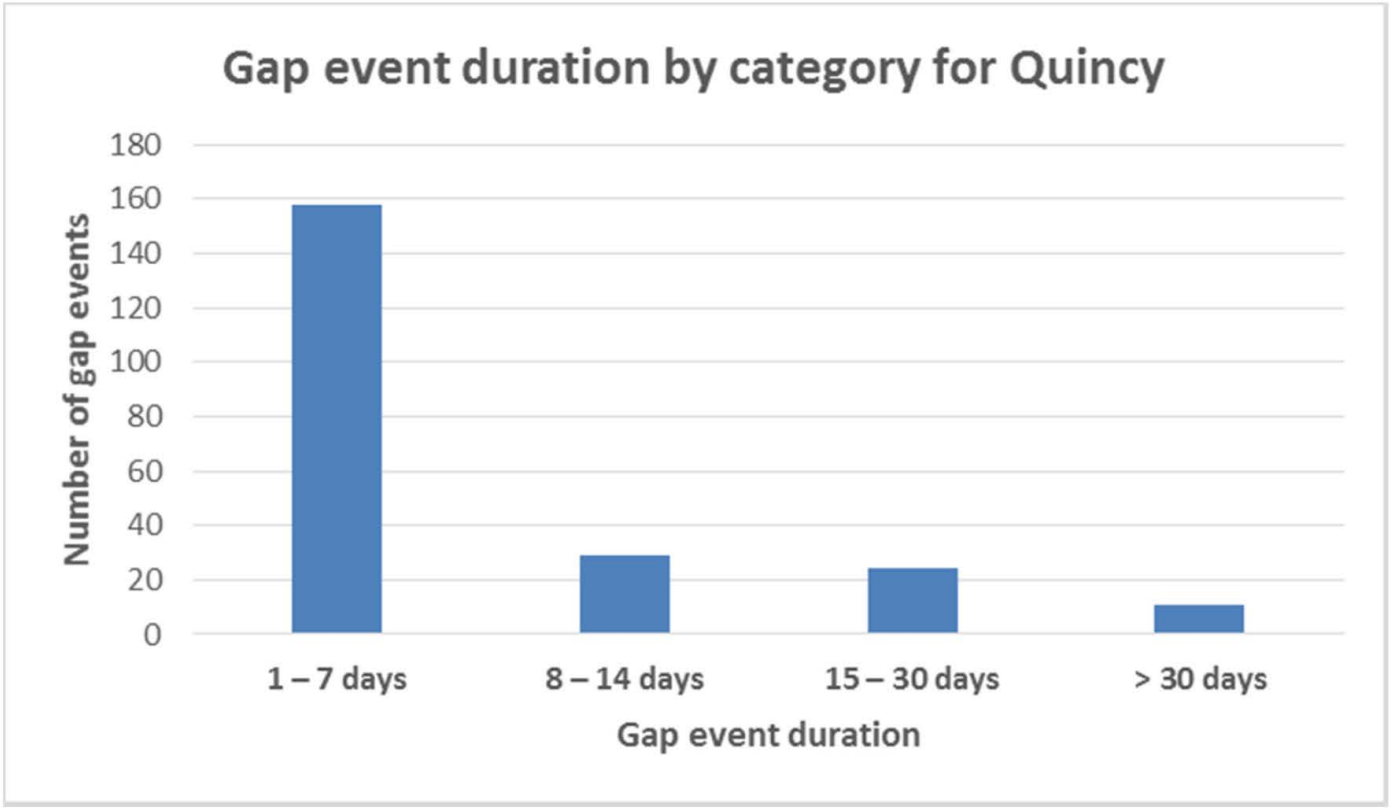
Potential Gaps at New England in the Tennessee River Basin

	Length of Gap (% of time)	Average Gap (cfs)	Long-term Average Flow (cfs)	Maximum 1 -day Gap (cfs)	Corresponding Flow Regime (cfs)
Round 1 (1939 – 2007)	7	3	249	4	12
Round 2 (1939 – 2013)	6	2	250	4	12

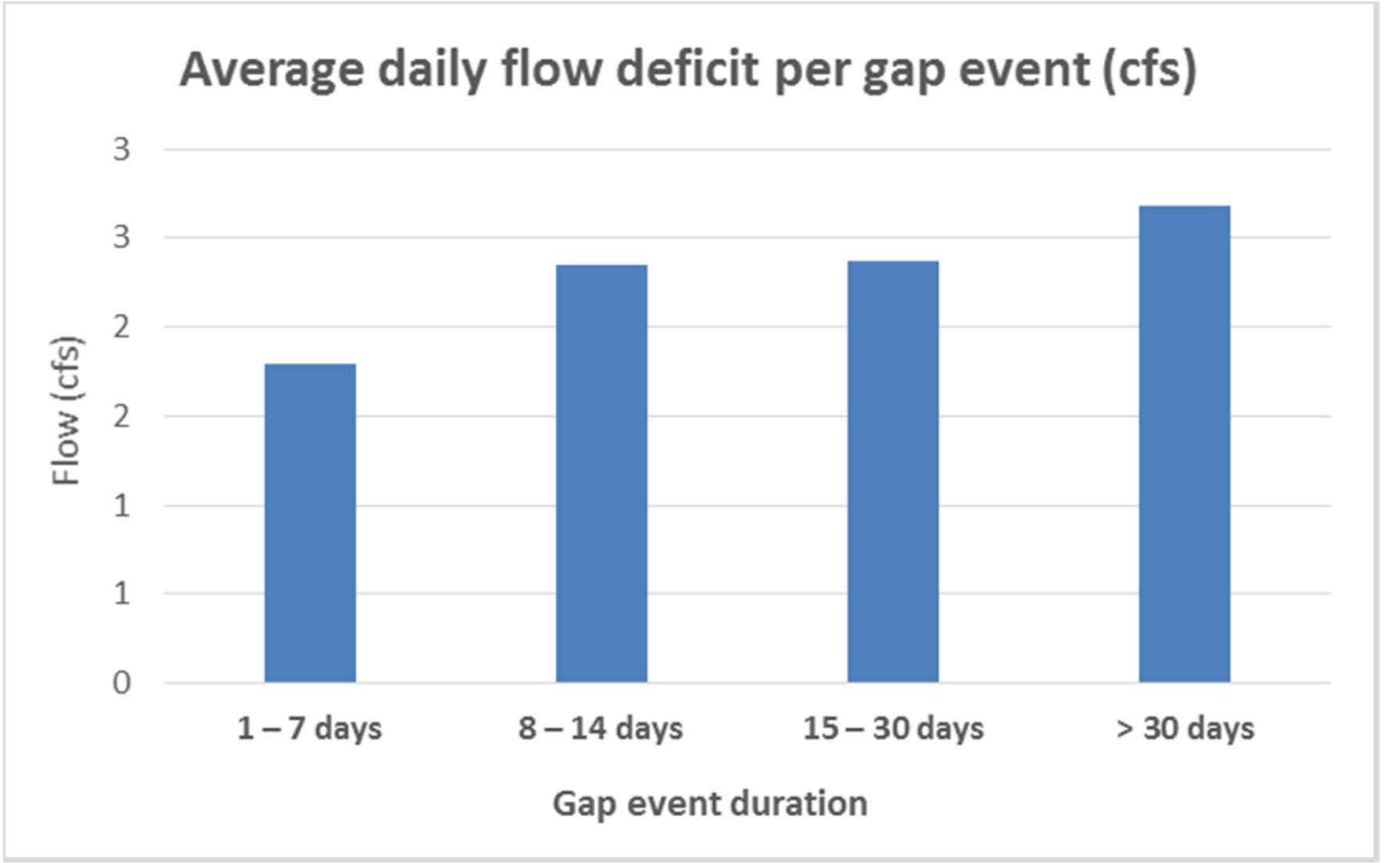
Characteristics of Potential Gaps at New England in the Tennessee River Basin

Gap event duration by category for New England	Number of gap events		Total gap days by category, 1939-2013		Average daily flow deficit per gap event (cfs)	Average cumulative flow deficit per gap event (cfsd)
1 – 7 days	158	(71.2%)	447	(1.6%)	2	5
8 – 14 days	29	(13.1%)	290	(1.1%)	2	24
15 – 30 days	24	(10.8%)	483	(1.8%)	2	48
> 30 days	11	(5.0%)	468	(1.7%)	3	115
Totals (∑)	222	(100.0%)	1688	(6.2%)		

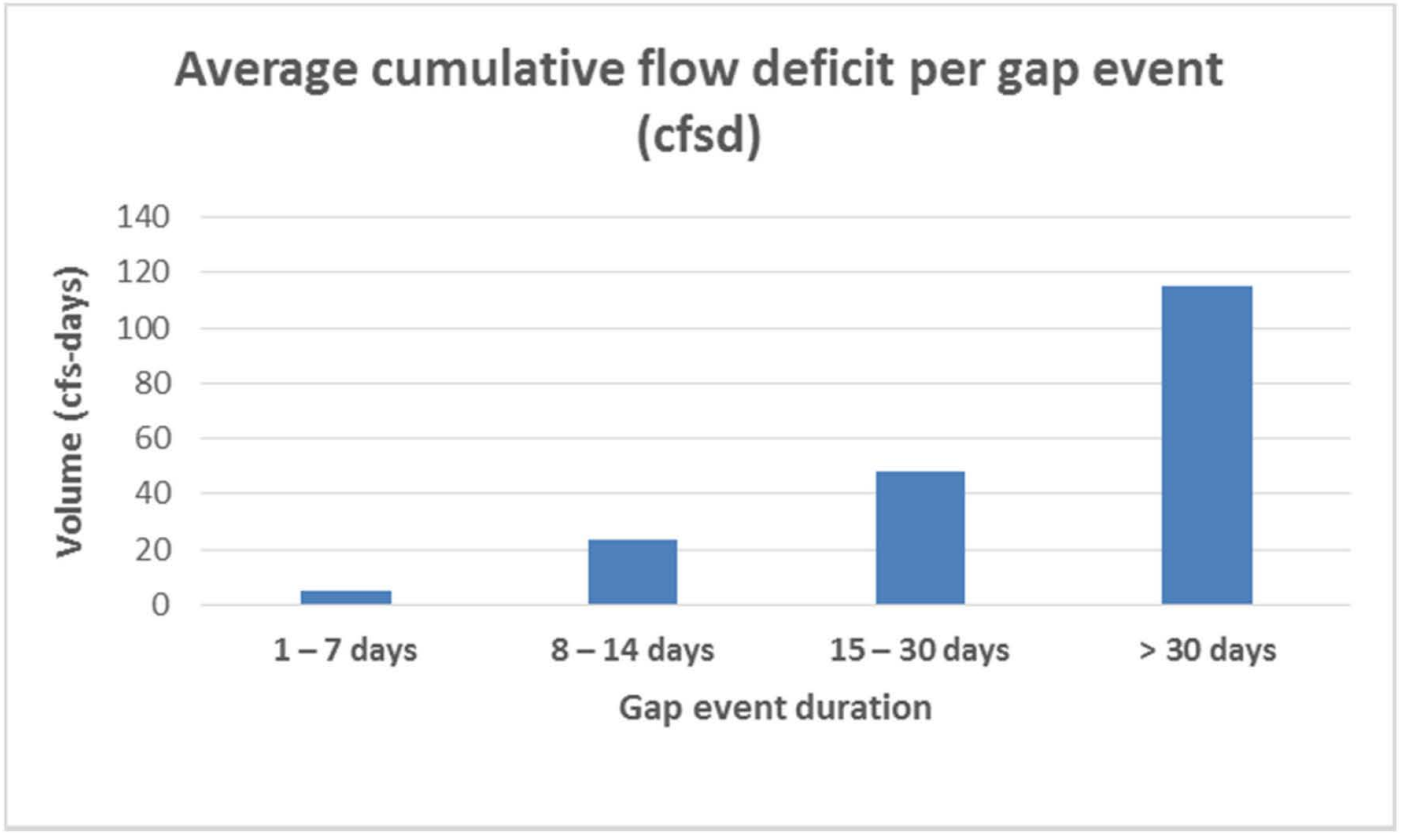
Characteristics of Potential Gaps at New England in the Tennessee River Basin



Characteristics of Potential Gaps at New England in the Tennessee River Basin



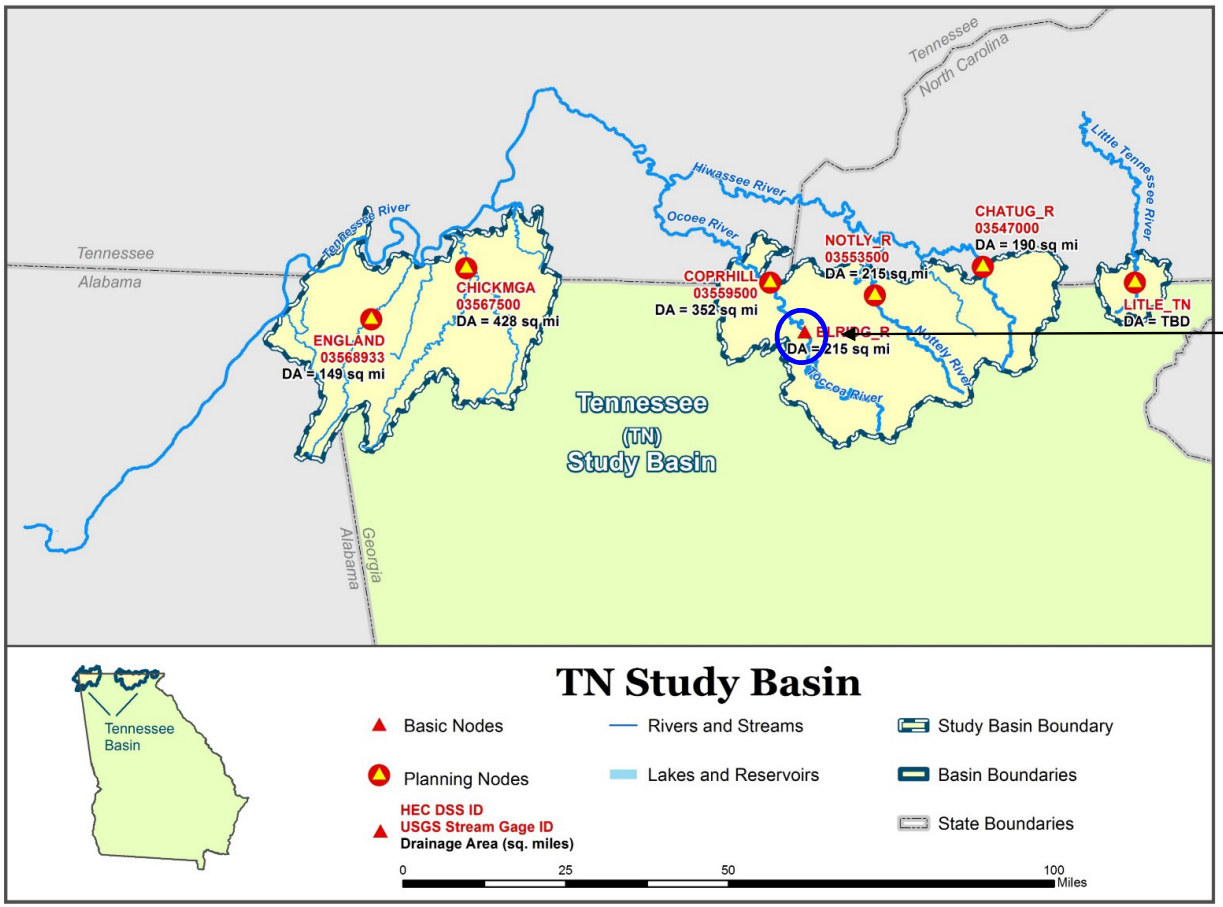
Characteristics of Potential Gaps at New England in the Tennessee River Basin



Identifying Potential Resource Gaps (Regulated)

- Step 1 – Run reservoir operation models in regulated river basins simulating existing operating plans by Corps, Georgia Power, TVA
- Step 2 – Determine whether consumptive demands placed in basin are met
- Step 3 – Determine whether flow targets prescribed by operating plans are met
- Step 4 – Evaluate whether upstream conservation storage has been exhausted through critical period

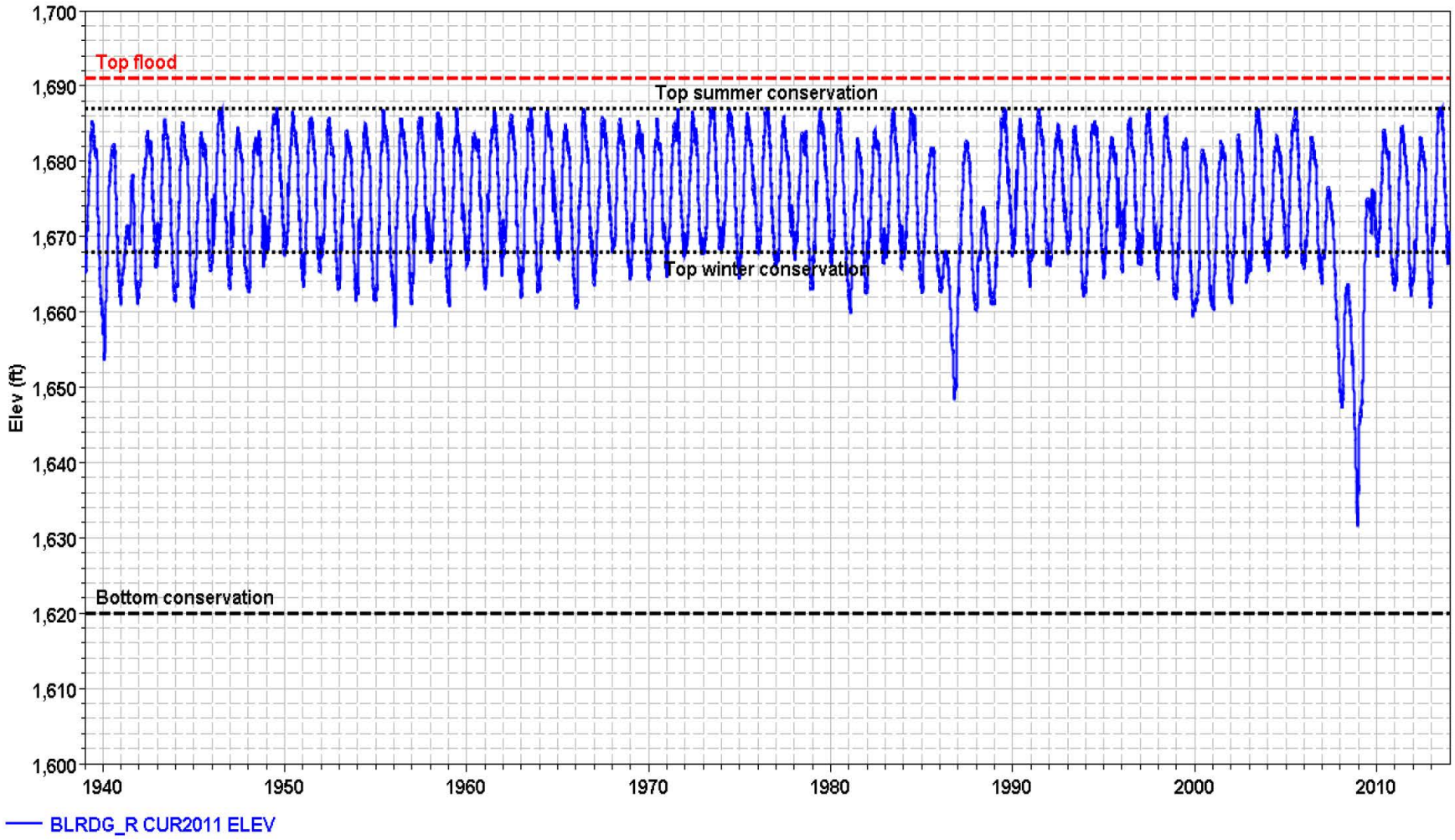
Blue Ridge Reservoir (Current)



Blue Ridge Reservoir

Conservation Storage Capacity 144,097 acre-feet

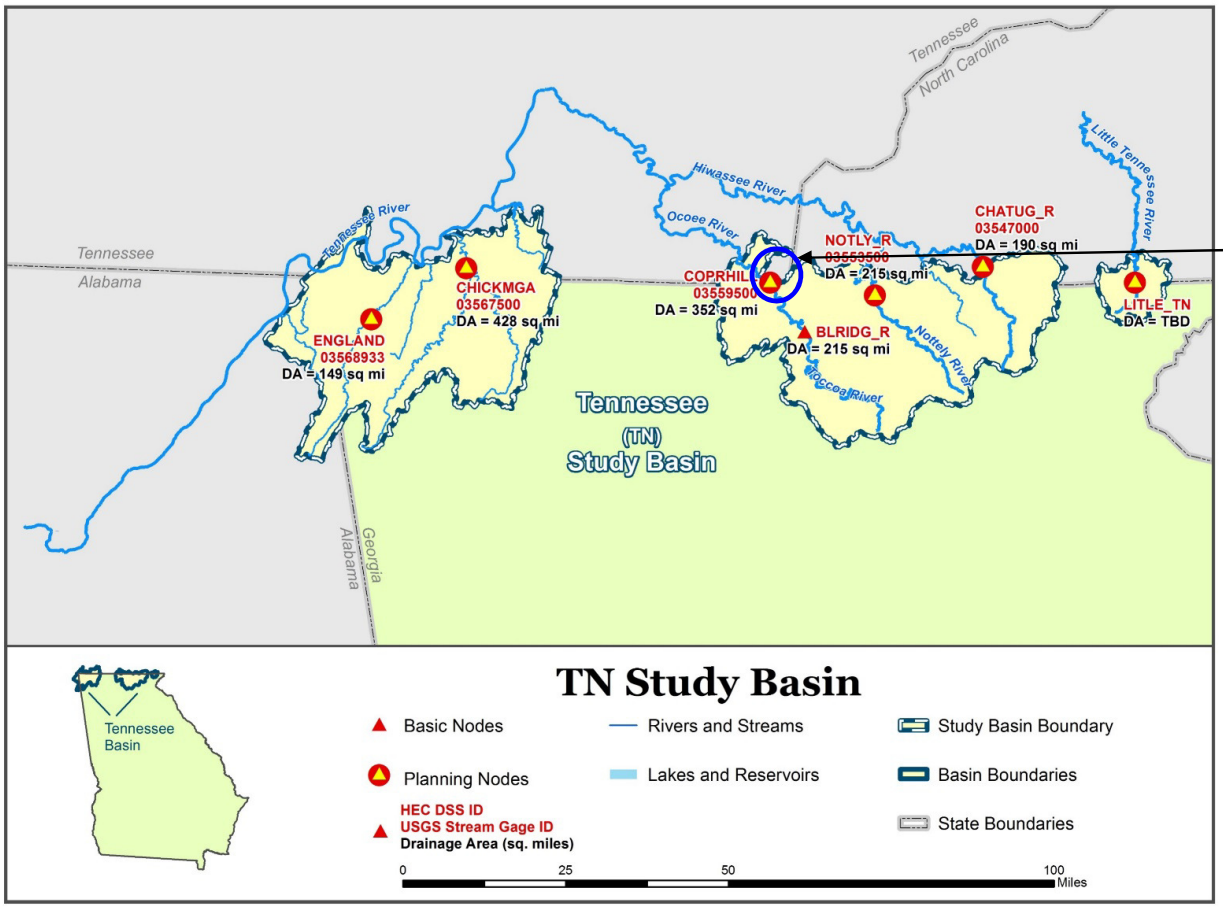
Blue Ridge Reservoir Elevation (1939-2013)



RA Results at Blue Ridge Reservoir

Demand shortage (cfs)	At-site flow requirement shortage (cfs)	Minimum conservation storage remaining (acre-feet)	Minimum percentage of conservation storage remaining (%)	Basin-wide flow requirement shortage
0	0	15,453	11%	N/A

Copper Hill (Current)



Copper Hill

RA Results at Copper Hill

Demand shortage (cfs)	Minimum flow requirement (cfs)	Minimum flow requirement shortage (cfs)	Minimum upstream conservation storage remaining (acre-feet)	Minimum percentage of upstream conservation storage remaining
0	0	0	15,453 at Blue Ridge	11% at Blue Ridge

Questions