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April 14, 2023

VIA ELECTRONIC FILING

Project No. 15229
Chandler Mountain Pumped Storage Project
Transmittal of the Notification of Intent and Pre-Application Document

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Dear Secretary Bose,

Alabama Power Company (Alabama Power), in accordance with the requirements of 18 Code of Federal Regulation (CFR) Section 5, herein electronically files with the Federal Energy Regulatory Commission (Commission or FERC) the Notification of Intent (NOI) and Pre-Application Document (PAD) for the original licensing of the Chandler Mountain Pumped Storage Project (Chandler Mountain Project) (FERC No. 15229). Alabama Power received a Preliminary Permit for the Chandler Mountain Project from FERC on March 24, 2022¹ (effective March 1, 2022) and filed its year one Preliminary Permit Progress Report on February 24, 2023².

The unconstructed Chandler Mountain Project would be located on Little Canoe Creek East in Etowah and St. Clair Counties, Alabama near the town of Steele, Alabama. The Chandler Mountain Project would be a pumped storage hydroelectric generating facility, which would involve the construction of new water storage, water conveyance, and generation facilities at locations where such facilities do not exist at this time. The Chandler Mountain Project is anticipated to provide 1,600 megawatts (MW) of generation capacity.

Pursuant to 18 CFR §4.38, §5.5(c), and §5.6(a), the NOI and PAD are being distributed electronically to appropriate resource agencies, Indian tribes, local governments, and members of the public likely to be interested in the project (Attachment 1). The NOI and PAD are available on the Project licensing website at www.chandlermountainpumpedstorage.com. Stakeholders may also request an electronic copy or hard copy of these documents from Alabama Power. The NOI, PAD, and PAD references are available for inspection at the offices of Alabama Power Company, 600 18th Street North, Birmingham, AL, 35203. A copy of the PAD was also distributed to the following public libraries near the Project: Rainbow City Public Library in Etowah County and Steele Public Library in St. Clair County.

¹ Accession No. 20230324-3041

² Accession No. 20230224-5137

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In accordance with 18 CFR §5.5(e), Section 7 of the Endangered Species Act and the joint agency regulations at 50 CFR part 402, Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act, and the implementing regulations at 50 CFR §600.920, Alabama Power hereby requests to be designated as the Commission's non-federal representative for the purposes of consultation under section 7 of the Endangered Species Act. Alabama Power also requests authorization to initiate consultation under section 106 of the National Historic Preservation Act and the implementing regulations at 36 CFR §8000.2(c)(4).

If there are any questions concerning the NOI or PAD, please contact Angie Anderegg at arsegars@southernco.com or 205-257-2251.

Sincerely,



Herbie Johnson
Hydro General Manager

Attachment 1 – Distribution List for Notification of Intent and Pre-Application Document

Attachment 2 – Notification of Intent

Attachment 3 – Pre-Application Document

Attachment 1

Distribution List for Notification of Intent and Pre-Application Document

Chandler Mountain Pumped Storage Project (P-15229)
Distribution List

Federal Agencies

Regional Director – Eastern Region
Bureau of Indian Affairs
U.S. Department of the Interior
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Nashville, Tennessee 37214

Kim Amendola
Deputy Regional Administrator
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National Marine Fisheries Service
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U.S. Army Corps of Engineers – Regulatory
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Vestavia Hills, Alabama 35216

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Mobile District
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Mobile, Alabama 36602

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Regional Environmental Officer – Atlanta
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Suite 1144
Atlanta, Georgia 30303

Maria Clark
NEPA Section – Region 4
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Rosemary Calli
Section Manager – Wetlands and Streams
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Atlanta, GA 30303

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Deputy Field Supervisor
U.S. Fish and Wildlife Service
Alabama Ecological Services Field Office
Southeast Region 4
1208-B Main Street
Daphne, Alabama 36532

Jeff Duncan
Regional Hydropower Coordinator
U.S. National Park Service
Southeast Region
100 Alabama Street SW
1924 Building
Atlanta, Georgia 30303

Chandler Mountain Pumped Storage Project (P-15229)
Distribution List

Tribes

Bryant Celestine
Tribal Historic Preservation Officer
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, Texas 77351

Wilson Yargee
Chief
Alabama-Quassarte Tribal Town
P.O. Box 187
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Elizabeth Toombs
Tribal Historic Preservation Officer
Cherokee Nation
P.O. Box 948
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Atmore, Alabama 36502

Benjamin Barnes
Chief
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P.O. Box 189
Miami, Oklahoma 74354

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Chief – Standards and Planning Section
Alabama Department of Environmental
Management
Division of Water
P.O. Box 301463
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Todd Fobian
Fisheries Section – Environmental
Coordinator
Alabama Department of Conservation and
Natural Resources
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Montgomery, Alabama 36130

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Alabama Department of Conservation and
Natural Resources
64 North Union Street
Montgomery, Alabama 36130

Alabama Department of Economic and
Community Affairs
Office of Water Resources
Tom Littlepage
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Montgomery, Alabama 36103

Amanda McBride
Program Head
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36104

Local Governments

Larry Means
Mayor
City of Attalla
612 4th St NW
Attalla, Alabama 35954

Etowah County Chamber of Commerce
1 Commerce Square
Gadsden, Alabama 35901

Etowah County Commission
800 Forrest Avenue
Gadsden, Alabama 35901

Etowah County Economic Development
Authority
1 Commerce Square
Gadsden, Alabama 35901

Etowah County Emergency Management
Authority
4610 Airport Road
Gadsden, Alabama 35904

Roger Adams
Mayor
City of Steele
4025 Pope Ave
Steele, Alabama 35987

St. Clair County Chamber of Commerce
1000 Bruce Etheredge Parkway
Suite 105
Pell City, Alabama 35125

St. Clair County Commission
165 5th Avenue
Suite 100
Ashville, Alabama 35953

St. Clair County Extension
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Suite 103/B04
Pell City, Alabama 35125

Vickey Wheeler
President
Friends of Big Canoe Creek
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Springville, Alabama 35146

St. Clair County Economic Development
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Daniel Tait
Chief Operating Officer
Energy Alabama
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Huntsville, Alabama 35807

St. Clair County Emergency Management
Authority
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Suite B-10
Pell City, Alabama 35125

Perrin de Jong
Staff Attorney
Center for Biological Diversity
P.O. Box 6414
Asheville, North Carolina 28816

**Non-Governmental Organizations and
Other Interested Parties**

Jack West
Policy and Advocacy Director
Alabama Rivers Alliance
2014 6th Avenue North
Suite 200
Birmingham, Alabama 35203

James Williams, Ph.D.
Biologist
4820 NW 15th Place
Gainesville, Florida 32605

Justinn Overton
Executive Director
Coosa Riverkeeper
102-B Croft Street
Mt. Laurel, Alabama 35242

Attachment 2

Notification of Intent

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Alabama Power Company

Project No. 15229

Notification of Intent to File an Application for License
for a Major Unconstructed Project, 10 Megawatts or More and Request for
Designation as Non-Federal Representative
Chandler Mountain Pumped Storage Project (FERC P-15229)

Pursuant to Section 5.5 of the Federal Energy Regulatory Commission's (FERC or Commission) regulations at Title 18 of the Code of Federal Regulations (CFR), Alabama Power Company (Alabama Power or Applicant), hereby notifies the Commission of its intention to file an Application for an Original License for the Chandler Mountain Pumped Storage Project (Chandler Mountain Project) (FERC Project No. 15229). Simultaneously, the Applicant is filing its Pre-Application Document (PAD) with the Commission and proposes to conduct pre-filing activities utilizing the Integrated Licensing Process (ILP). Alabama Power currently holds a preliminary permit for the proposed Chandler Mountain Project¹. Alabama Power filed its year one annual progress report pursuant to Article 4 of the preliminary permit on February 24, 2023².

The following information is provided in accordance the 18 CFR §5.5 (b):

1. Potential Applicant's Name and Address:

Alabama Power Company
600 North 18th Street
PO Box 2641
Birmingham, AL 35203

The Applicant requests that all correspondence and service of documents related to this notification and subsequent proceedings be addressed to:

¹ Accession No. 20220324-3041

² Accession No. 20230224-5137

Angie Anderegg
Chandler Licensing Project Manager
Alabama Power Company
600 North 18th Street
Birmingham, AL 35203
205-257-2251
Email: arsegars@southernco.com

2. Project Number:

FERC Project No. 15229

3. License Expiration Date, if any:

Not applicable. The Applicant does not possess a FERC license for the unconstructed Project. The existing preliminary permit for the Chandler Mountain Project expires March 1, 2026.

4. Unequivocal Statement of Intent:

Alabama Power hereby unequivocally declares its intent to file an Application for an Original License for the Chandler Mountain Project, P-15229. Alabama Power will utilize the ILP in support of this licensing.

Authorized Agent for Alabama Power:

Brandon Dillard, Senior Vice President
Alabama Power Company
600 North 18th Street
Birmingham, AL 35203
205-257-1000

5. Type of Principal Project Works Licensed, if any:

This Notification of Intent is for an unconstructed, unlicensed Project.

Preliminary Project Works:

As proposed³, the Chandler Mountain Project would consist of the following new facilities: (1) a dam with a crest elevation of approximately 1,373 feet mean sea level (msl), which would create an upper reservoir on Chandler Mountain with a normal maximum operating elevation of approximately 1,366 feet msl; (2) an upper reservoir intake structure; (3) an underground powerhouse containing four reversible pump-turbine unit(s) with a generating capacity of 400 MW each, for a total project capacity of 1600 MW; (4) four dam sections, each with a crest elevation of approximately 683 feet msl, that would create a lower reservoir located at the northern toe of Chandler Mountain, with a normal maximum operating elevation of approximately 667 feet msl; (5) a lower reservoir discharge structure; (6) water conveyance structure, and (7) transmission related structures and facilities to interconnect with the power grid.

6. Project Location:

State: Alabama
Counties: Etowah and St. Clair
Stream or body of water: Little Canoe Creek East⁴ and the upper portion of the Jake Creek watershed
Township or nearby town: Steele

7. Installed Plant Capacity:

The proposed installed plant capacity is 1,600 MW.

³ The Chandler Mountain Project is currently in the initial stages of design, permitting, and licensing, and exact specifications associated with the Chandler Mountain Project are considered preliminary and may change due to engineering and geotechnical feasibility or environmental considerations.

⁴ Little Canoe Creek is identified in two geographic locations as "Little Canoe Creek"; however, Little Canoe Creek West is located approximately 20 miles southwest of the proposed Chandler Mountain Project Area and would not be affected by the Chandler Mountain Project. A portion of Little Canoe Creek East would be impounded by the proposed Chandler Mountain Project.

8. The names and mailing address of:

- i. *Every county in which any part of the project is located, and in which any Federal facility that is used or to be used by the project is located:*

County Commission
Etowah County, Alabama
800 Forrest Avenue
Gadsden, AL 35901

County Commission
St. Clair County, Alabama
165 5th Avenue
Suite 100
Ashville, AL 35953

- ii. *Every city, town, or similar political subdivision:*

- A. *In which any part of the project is or is to be located and any Federal facility that is or is to be used by the project is located:*

The proposed Project would be located near the town of Steele, Alabama and the unincorporated community of Gallant, Alabama. Municipal support for the community of Gallant is provided by the city of Attalla, Alabama.

Roger Adams
Mayor
Town of Steele, Alabama
4025 Pope Avenue
Steele, Alabama 35987

Larry Means
Mayor
City of Attalla, Alabama
612 4th St NW
Attalla, AL 35954

Chandler Mountain Pumped Storage Project (FERC P-15229)
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- B. *That has a population of 5,000 or more people and is located within 15 miles of the existing or proposed project dam:*

City of Gadsden
City Hall
90 Broad St,
Gadsden, AL 35901

City of Attalla
612 4th St. NW
Attalla, AL 35954

City of Boaz
112 North Broad Street
Boaz, AL 35957

City of Glencoe
201 Chastain Boulevard West
Glencoe, AL 35905

City of Rainbow City
3700 Rainbow Drive
Rainbow City, AL 35906

City of Southside
2255 Highway 77
Southside, AL 35907

- iii. *Every irrigation district, drainage district, or similar special purpose political subdivision:*

- A. *In which any part of the project is or is proposed to be located and any Federal facility that is or is proposed to be used by the project is located:*

There is no irrigation district, drainage district, or similar special purpose political subdivision that is proposed to be used by the project. The Project would use no Federal facilities and occupy no Federal lands.

Chandler Mountain Pumped Storage Project (FERC P-15229)
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B. That owns, operates, maintains, or uses any project facility or any Federal facility that is or is proposed to be used by the project:

There is no irrigation district, drainage district, or similar special purpose political subdivision that would own, operate, maintain, or use any Project facility. The Project would use no Federal facilities and occupy no Federal lands.

iv. Every other political subdivision in the general area of the project or proposed project that there is reason to believe would be likely to be interested in, or affected by, the notification:

There are no other political districts or subdivisions that are likely to be interested in or affected by the notification.

v. Affected Indian Tribes:

The Licensee is not aware that the Project affects any Indian tribe. The following is a listing of Indian tribes that may have some level of interest in the area surrounding the Chandler Mountain Project and have been included on the licensing Distribution List:

Bryant Celestine
Tribal Historic Preservation Officer
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, Texas 77351

Wilson Yargee
Chief
Alabama-Quassarte Tribal Town
P.O. Box 187
Wetumka, Oklahoma 74883
Elizabeth Toombs
Tribal Historic Preservation Officer
Cherokee Nation
P.O. Box 948
Tahlequah, Oklahoma 74465

Chandler Mountain Pumped Storage Project (FERC P-15229)
Notification of Intent

Karen Brunso
Tribal Historic Preservation Officer
Chickasaw Nation
P.O. Box 1548
Ada, Oklahoma 74821

Karen Downen
Section 106 Reviewer
Choctaw Nation of Oklahoma
P.O. Box 1210
Durant, Oklahoma 74702

Kristian Poncho
Tribal Historic Preservation Officer
Coushatta Tribe of Louisiana
P.O. Box 10
Elton, Louisiana 70532

Stephen Yerka
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
Qualla Boundary Reservation
P.O. Box 455
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Paul Barton
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Cyrus Ben
Chief
Mississippi Band of Choctaw Indians
P.O. Box 2010
Choctaw, MS 36350

RaeLynn Butler
Historical and Cultural Preservation Manager
Muscogee (Creek) Nation
P.O. Box 580
Okmulgee, Oklahoma 74447

Larry Haikey
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road,
Atmore, Alabama 36502

Benjamin Barnes
Chief
Shawnee Tribe
P.O. Box 189
Miami, Oklahoma 74354

9. Designation for Non-federal Representative

In accordance with 18 CFR §5.5(e), Section 7 of the Endangered Species Act and the joint agency regulations at 50 CFR part 402, Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act, and the implementing regulations at 50 CFR §600.920, Alabama Power hereby requests to be designated as the Commission's non-federal representative for the purposes of consultation under section 7 of the Endangered Species Act. Alabama Power also requests authorization to initiate consultation under section 106 of the National Historic Preservation Act and the implementing regulations at 36 CFR §8000.2(c)(4).

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list in the captioned proceedings in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure, 18 CFR § 385.2010.



Brandon Dillard, Senior Vice President
April 14, 2023

Attachment 3

Pre-Application Document

PRE-APPLICATION DOCUMENT

CHANDLER MOUNTAIN PUMPED STORAGE
PROJECT

FERC No. 15229

Prepared for:

Alabama Power Company

Prepared by:

Kleinschmidt Associates

April 2023

Kleinschmidt

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ACRONYMS

A

A&I	Agricultural and Industrial Water Supply
ACT	Alabama-Coosa-Tallapoosa
ADCNR	Alabama Department of Conservation & Natural Resources
ADECA	Alabama Department of Economic and Community Affairs
ADEM	Alabama Department of Environmental Management
AHC	Alabama Historical Commission
Alabama Power	Alabama Power Company
ANHP	Alabama Natural Heritage Program
ANS	Aquatic Nuisance Species
AOI	Area of Interest
APE	Area of Potential Effects
ASSF	Alabama State Site File

B

BIA	Bureau of Indian Affairs
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C

°C	degrees Celsius
CEII	Critical Energy Infrastructure Information
cfs	cubic feet per second
CFR	Code of Federal Regulations
Chandler Mountain Project Commission	Chandler Mountain Pumped Storage Project Federal Energy Regulatory Commission
COVID	Coronavirus Disease 2019
CWA	Clean Water Act

D

DCH	Designated Critical Habitat
DLA	Draft License Application

E

EA	Environmental Assessment
ECOS	Environmental Conservation Online System
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental justice
ESA	Endangered Species Act
ETSZ	East Tennessee Seismic Zone

F

F	Fahrenheit
F&W	Fish and Wildlife
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FOIA	Freedom of Information Act
FPA	Federal Power Act
FPC	Federal Power Commission

G

GCN	Greatest Conservation Need
gpm	gallons per minute
GSA	Geological Survey of Alabama
GSU	generator step-up

H

hp	horsepower
HDMP	Historic Properties Management Plan

I

I/O	inlet/outlet
ILP	Integrated Licensing Process
IPaC	Information for Planning and Conservation
IPB	isolated phase bus
ISR	Initial Study Report

K

Kf	Erosion K-factor
Km	kilometers
kV	kilovolt

L

LIDAR	Light Detection and Ranging
LWF	Limited Warmwater Fishery

M

μ S/cm	microsiemens per centimeter
mgd	million of gallons per day
mg/L	milligram per liter
ml	milliliter
msl	mean sea level
M_w	moment magnitude
MW	megawatts
MWh	megawatt-hours
mya	million years ago

N

NA	Not applicable
NLCD	National Land Cover Database
NEPA	National Environmental Policy Act
Neely Henry Dam	H. Neely Henry Dam
Neely Henry Lake	H. Neely Henry Reservoir
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTU	Nephelometric turbidity unit
NWI	National Wetlands Inventory

O

OAR	Alabama Office of Archeological Research
OAW	Outstanding Alabama Water

P

PAD	Pre-Application Document
PDF	Portable Document Format
PLP	Preliminary Licensing Proposal
PME	Protection, Mitigation, and Enhancement
PMF	Probable Maximum Flood
psi	pounds per square inch
PWS	Public Water Supply
PVC	polyvinyl chloride

R

RCC	roller compacted concrete
RTE	rare, threatened, and endangered
RV	recreational vehicle

S

S	Swimming
SCORP	State Comprehensive Outdoor Recreation Plan
SD	Scoping Document
SD1	Scoping Document 1
SH	Shellfish Harvesting
SPD	Study Plan Determination
SSAZ	Southern Appalachian Seismic Zone
SWAP	State Wildlife Action Plan

T

TMDL	total maximum daily load
------	--------------------------

U

UK
USACE
U.S.C.
USFWS
USGS
USR

Unknown
U.S. Army Corps of Engineers
United States Code
U.S. Fish and Wildlife Service
U.S. Geological Survey
Updated Study Report

W

WOTUS

Waters of the United States

1.0 INTRODUCTION

Alabama Power Company (Alabama Power) is filing with the Federal Energy Regulatory Commission (FERC or Commission) its Notification of Intent (NOI) to file an application for an original license and the Pre-Application Document (PAD) for the unconstructed Chandler Mountain Pumped Storage Project (Chandler Mountain Project) (FERC No. 15229). Alabama Power completed initial feasibility investigations in the 1980s that identified Chandler Mountain as a well-suited site for a pumped storage hydro generation project. In 2021 and 2022, Alabama Power conducted more extensive analysis of the Chandler Mountain site that informed the decision to proceed with preparing a NOI and PAD.

Alabama Power received a Preliminary Permit for the Chandler Mountain Project from FERC on March 24, 2022¹. Alabama Power filed its year one Preliminary Permit Progress Report on February 24, 2023².

The Chandler Mountain Project would be located on Little Canoe Creek and the upper portion of the Jake Creek watershed in Etowah and St. Clair Counties, Alabama near the town of Steele, Alabama (Figure 1-1). Little Canoe Creek is identified in two geographic locations as “Little Canoe Creek;” however, Little Canoe Creek **West** is located approximately 20 miles southwest³ of the proposed Chandler Mountain Project Area and would not be affected by the Chandler Mountain Project. A portion of Little Canoe Creek **East** would be impounded by the proposed Chandler Mountain Project (Figure 1-2).

The proposed Chandler Mountain Project would provide reliable, long-duration energy storage to meet the needs of Alabama Power customers and balance the daily energy cycle. Pumped storage is a form of energy storage technology that utilizes two reservoirs located at different elevations. During periods of low energy demand, water is pumped from the lower reservoir to the upper reservoir and stored there until periods of high energy demand when it is released back to the lower reservoir through a powerhouse where electricity is generated. Energy storage projects such as the Chandler Mountain Project are used across the country to help ensure a reliable and resilient electricity system

¹ 178 FERC ¶ 61,209 (Accession No. 20220324-3041)

² Accession No. 20230224-5137

³ Measured from the proposed Lower Dam A to the headwater of Little Canoe Creek West.

that is increasingly integrating intermittent renewable forms of energy such as wind and solar.

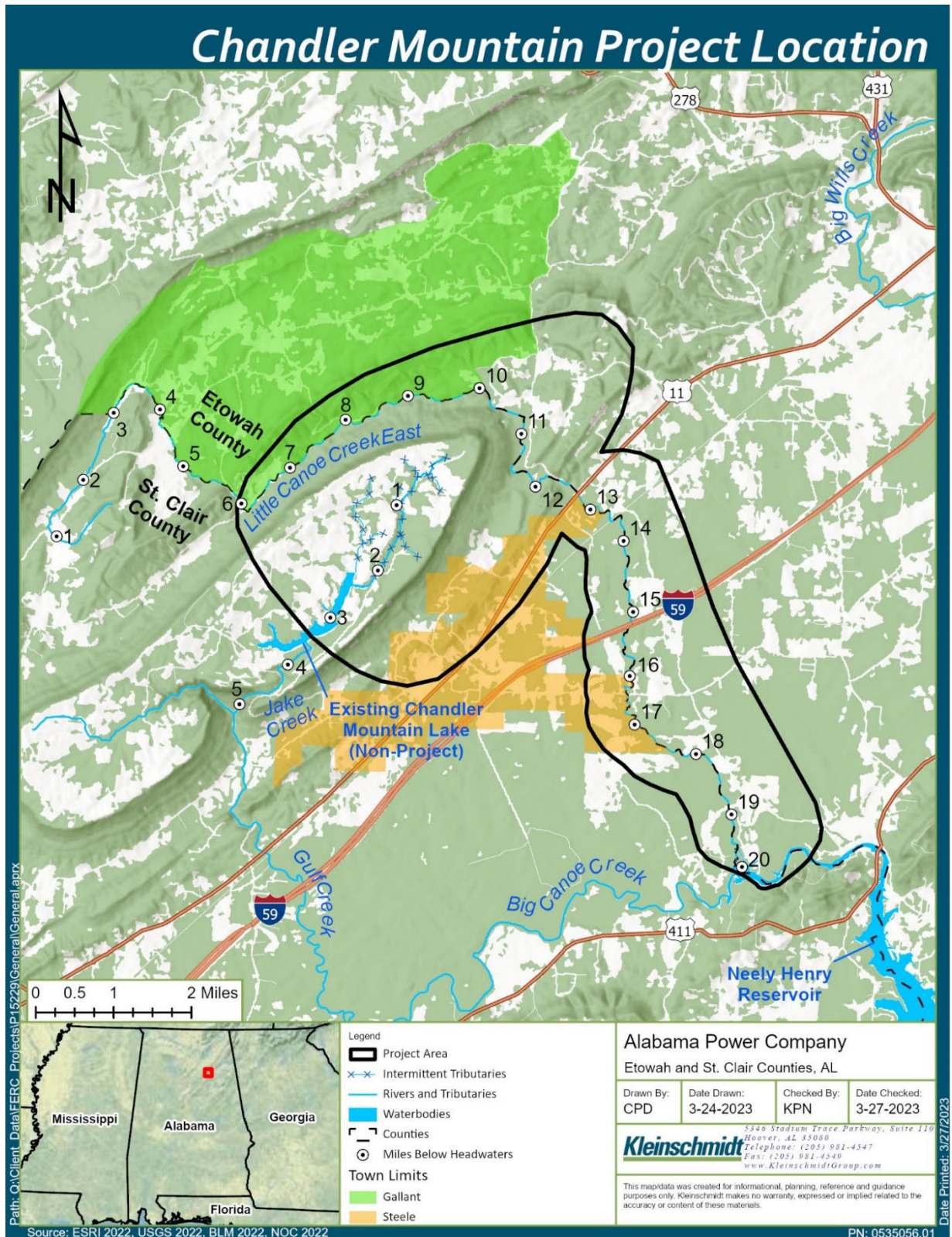


Figure 1-1 Proposed Chandler Mountain Project Location

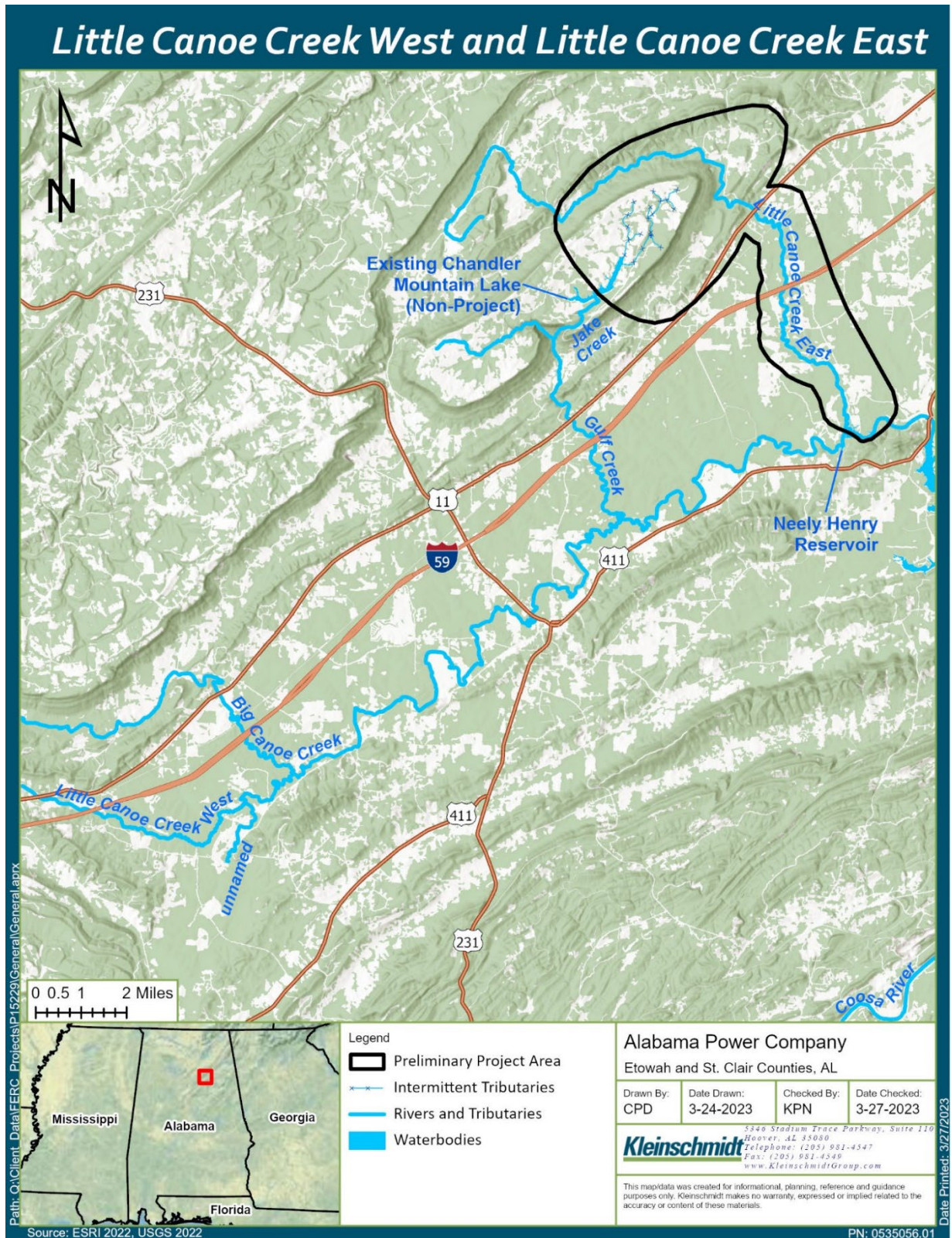


Figure 1-2 Little Canoe Creek West and Little Canoe Creek East

The proposed Chandler Mountain Project would be a pumped storage hydroelectric generating facility and is anticipated to provide 1,600 megawatts (MW) of generation capacity. The Chandler Mountain Project would include an upper dam (Upper Dam) that creates an approximate 526-acre lined upper reservoir; an upper reservoir intake structure; an underground powerhouse with four reversible pump turbines, each 400 MW; four dam sections (Lower Dam A, Lower Dam B, Lower Dam C, and Lower Dam D), including a discharge structure at Lower Dam A, that create the approximate 1,090-acre lower reservoir; an approximate 6-mile supplemental water source conveyance structure; and transmission related structures and facilities. The proposed Chandler Mountain Project area would not occupy any federal lands. Final acreage to be included in the FERC Project boundary will be determined during the licensing process.

1.1 Purpose of the Chandler Mountain Project PAD

Alabama Power provides this PAD as required by Sections 5.6 and 16.8 of Title 18 of the U.S. Code of Federal Regulations (CFR). The PAD provides the Commission and licensing stakeholders with existing information relevant to the proposed Project that can be obtained with the exercise of due diligence. The existing, relevant, and reasonably available information is distributed to stakeholders to enable them to identify issues and related information needs, develop study requests and study plans, and prepare documents analyzing any license application that may be filed. The PAD is also a precursor to the environmental analysis section of the Preliminary Licensing Proposal (PLP) or draft license application (DLA), Exhibit E of the final license application (FLA), and the Commission's scoping document(s) (SD) and environmental assessment (EA) or environmental impact statement (EIS) under the National Environmental Policy Act (NEPA). Alabama Power distributed this PAD and NOI simultaneously to federal and state resource agencies, local governments, applicable tribes, members of the public, and others identified as potentially interested in the licensing proceeding, as listed in the Distribution List. Alabama Power also filed a notice in local newspapers and distributed a copy of the PAD to appropriate public libraries near the Project: Rainbow City Public Library in Etowah County and Steele Public Library in St. Clair County.

The Chandler Mountain Project is currently in the initial stages of design, permitting, and licensing. Exact specifications associated with the Chandler Mountain Project as described herein are considered preliminary, and the Chandler Mountain Project is presumed to be "proposed." This PAD provides participants in the licensing process the information

necessary to help them understand the proposed Chandler Mountain Project and identify any potential issues relative to their specific interests.

1.2 Meetings

In preparing this PAD, Alabama Power met with federal and state resource agencies and other stakeholders to describe the Chandler Mountain Project and to request and obtain any existing information relevant to the resources potentially affected by construction, operation, and maintenance of the Project (Table 1-1). Documentation of consultation that occurred with stakeholders prior to filing the PAD is included in Appendix A.

Table 1-1 Stakeholder Meetings

Stakeholder	Meeting Date
Alabama Department of Conservation and Natural Resources	February 27, 2023
Alabama Department of Environmental Management	March 8, 2023
U.S. Fish and Wildlife Service	March 9, 2023
Alabama Historical Commission	March 13, 2023
Alabama Department of Economic and Community Affairs – Office of Water Resources	March 14, 2023
U.S. Army Corps of Engineers – Regulatory	March 16, 2023
Muscogee (Creek) Nation	March 17, 2023
U.S. Army Corps of Engineers – Water Management	March 20, 2023
Environmental Protection Agency	April 12, 2023
Alabama Rivers Alliance, Coosa Riverkeeper, Energy Alabama, Friends of Big Canoe Creek, Center for Biological Diversity, and Dr. Jim Williams ⁴	April 13, 2023

1.3 PAD Content

This PAD follows the content and form requirements of 18 CFR § 5.6 (c) and (d), with minor changes in form for enhanced readability. The PAD is organized as follows:

- Table of Contents; List of Tables; List of Figures; List of Appendices; Acronyms, and Abbreviations, and Definitions of Terms

⁴ Alabama Power contacted Alabama Rivers Alliance on March 6, 2023 to coordinate and schedule a meeting to discuss the Chandler Mountain Project. Per email dated March 23, 2023, Alabama Rivers Alliance requested a collective stakeholder meeting to include the intervenor groups who filed with Alabama Rivers Alliance as well other intervenor groups, specifically the Center for Biological Diversity and Dr. Jim Williams.

- Section 1.0 – Introduction and Purpose of the PAD
- Section 2.0 – Process Plan and Schedule, Communication Plan, per 18 CFR §5.6(d)(1)
- Section 3.0 – Proposed Project Location, Facilities, and Operations, per 18 CFR §5.6(d)(2)
- Section 4.0 – Existing Environment by Resource Area, per 18 CFR §5.6(d)(3)(ii)-(xiii)
- Section 5.0 – Potential Issues, Information Needs, and Studies by Resource, per 18 CFR §5.6(d)(3) and (4)
- Section 6.0 – Relevant Resource Management Plans
- Section 7.0 – PURPA Benefits
- Appendices:
 - Appendix A – Documentation of Consultation During Development of Pre-Application Document
 - Appendix B – Integrated Licensing Process Schematic
 - Appendix C - USFWS Information for Planning and Consultation (IPaC) Report and Alabama Natural Heritage Program Species Table

2.0 PROCESS PLAN AND SCHEDULE AND COMMUNICATION PLAN

2.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(1).

Alabama Power will use FERC's Integrated Licensing Process (ILP) for licensing the Chandler Mountain Project. The ILP provides an efficient and streamlined process while providing opportunity to evaluate all resources potentially affected by the Chandler Mountain Project. The ILP begins with early issue identification as well as implementation of FERC's study plan process to close information gaps, which help to ensure all necessary studies are identified and completed prior to filing the license application. The ILP encourages collaboration and integrates other stakeholders in the licensing process, including state and federal resource agencies, non-governmental organizations (NGOs), applicable tribes, and members of the public, early in the process. Alabama Power will document the licensing process, including any information received from stakeholders. Alabama Power will provide a licensing website to host Chandler Mountain Project documents as well as a calendar of events during the licensing process.

Alabama Power plans to submit a license application prior to the expiration of the existing Preliminary Permit term and any subsequent term approved by FERC⁵. In developing the draft Process Plan and Schedule, Alabama Power included timeframes for a Formal Dispute Resolution (18 CFR §5.14); however, study disputes may be resolved through informal dispute resolution. Following the filing of the PAD and NOI, FERC will issue Scoping Document 1 (SD1) within 60 days. Additionally, pursuant to 18 CFR §5.8(b)(3)(viii), FERC will provide public notice of Alabama Power's filing of the PAD and NOI, schedule a public Scoping Meeting, and participate in a site visit (if feasible) within 30 days of issuing SD1. Alabama Power will coordinate with FERC to determine the time and location of the Scoping Meeting. Stakeholders are required to file comments on the PAD, SD1, and any study requests within 60 days of NOI/PAD notice and issuance of SD1. Alabama Power will then follow the study plan process pursuant to 18 CFR §5.15. Following FERC's Study Plan Determination (SPD) and assuming no need for formal study dispute resolution, Alabama Power will conduct the first, and second, if necessary, seasons of study, followed

⁵ Per 18 CFR §4.82(a), a Permittee may file an application for amendment of its preliminary permit, including any extension of the term of the permit that would not cause the total term to exceed eight years.

by filing of the Initial Study Report (ISR) and Updated Study Report (USR), respectively. Finally, Alabama Power will prepare and file a PLP or DLA pursuant to 18 CFR §5.16, followed by the FLA pursuant to 18 CFR §5.17. FERC's ILP schematic, including the pre-application activities, is presented in Appendix B.

2.2 Authorized Agent

The following person is authorized to act as agent for Alabama Power pursuant to 18 CFR §5.6(d)(2)(i):

Mr. Brandon Dillard
Senior Vice President
Alabama Power Company
600 North 18th Street
Birmingham, AL 35203
205-257-1000

2.3 Draft Process Plan and Schedule

The draft Chandler Mountain Project Licensing Process Plan and Schedule⁶ outlines actions to be performed by FERC, Alabama Power, and other participants in the licensing process up to the filing of the FLA with FERC (Table 2-1). Alabama Power developed the draft Process Plan and Schedule using the timeframes set forth in 18 CFR §5. This draft Process Plan and Schedule assumes a NOI/PAD filing date of April 14, 2023; all subsequent dates are derived from the NOI/PAD filing date. Note that if a due date falls on a weekend or holiday, the due date for filing with FERC is the following business day.

The proposed dates consider FERC's timeline for the ILP milestones through the Updated Study Report. The schedule anticipates that Alabama Power will file for an extension on the Preliminary Permit prior to its March 1, 2026 expiration to allow for studies, and to prepare and file the PLP and FLA; therefore, the PLP and FLA filing dates are noted as target dates in the Process Plan and Schedule.

⁶ The Chandler Mountain Project Licensing Process Plan and Schedule is considered "draft" until approved by the FERC.

Table 2-1 Draft Pre-Filing Process Plan and Schedule for the Chandler Mountain Project

Task	Responsible Party	Schedule Milestones⁷	FERC Regulation
Existing Preliminary Permit term		3/1/2022 – 3/1/2026	
File NOI/PAD with FERC	Alabama Power	4/14/2023	§5.5; §5.6
<ul style="list-style-type: none"> Request FERC designate Alabama Power as non- federal representative for Section 106 consultation with the State Historic Preservation Office and for Endangered Species Act consultation 	Alabama Power	4/14/2023	§5.5(e)
<ul style="list-style-type: none"> Issue Notice of NOI/PAD 	Alabama Power	4/14/2023	§5.3(d)(2)
FERC Tribal Meeting (30 days after NOI notice)	FERC	5/14/2023	§5.7
FERC Notices NOI/PAD and Issues SD1	FERC	6/13/2023	§5.8(a)(c)
<ul style="list-style-type: none"> FERC designates applicant as non-federal representative 	FERC	6/13/2023	
FERC Holds Scoping Meeting and Site Visit	FERC	7/13/2023	§5.8(b)(viii)
Comments Due from all Stakeholders on NOI/PAD/SD1 and Study Requests	Stakeholders	8/12/2023	§5.9(a)(b)
FERC Issues SD2, if necessary (45 days from comments on NOI/PAD/SD1)	FERC		§5.10

⁷ Note that if a due date falls on a weekend or holiday, the due date is the following business day.

Task	Responsible Party	Schedule Milestones ⁷	FERC Regulation
Applicant Files Proposed Study Plan	Alabama Power	9/26/2023	§5.11(a)
<ul style="list-style-type: none"> Applicant Hosts Study Plan Meeting 	Alabama Power	10/26/2023	§5.11(e)
<ul style="list-style-type: none"> All Comments on Proposed Study Plan due 	Stakeholders	12/25/2023	§5.12
<ul style="list-style-type: none"> Applicant files Revised Proposed Study Plan 	Alabama Power	1/24/2024	§5.13(a)
<ul style="list-style-type: none"> All Comments on Revised Study Plan due 	Stakeholders	2/8/2024	§5.13(b)
FERC Study Plan Determination	FERC	2/23/2024	§5.13(c)
<ul style="list-style-type: none"> If disputes arise, refer to §5.14a – 5.14(l) 			§5.14a – 5.14(l)
Applicant Conducts First Study Season (no disputes)	Alabama Power	2/24/2024	§5.15(a)
Applicant Files Initial Study Report	Alabama Power	2/22/2025	§5.15(c)(1)
Applicant Hosts Initial Study Report Meeting	Alabama Power	3/9/2025	§5.15(c)(2)
<ul style="list-style-type: none"> Applicant files Initial Study Report Meeting Summary 	Alabama Power	3/24/2025	§5.15(c)(3)
<ul style="list-style-type: none"> Disputes on the Study Report Meeting Summary or requests to modify the Study Plan are due 	Stakeholders	4/23/2025	§5.15(c)(4)
<ul style="list-style-type: none"> Responses to disputes or request for modification of Study Plan due 	Alabama Power	5/23/2025	§5.15(c)(5)

Task	Responsible Party	Schedule Milestones ⁷	FERC Regulation
<ul style="list-style-type: none"> FERC resolves disagreements and amends the approved Study Plan, as appropriate 	FERC	6/22/2025	§5.15(c)(6)
Applicant Conducts Second Study Season, if needed	Alabama Power	2025-2026	§5.15(a)
Applicant Files Updated Study Report	Alabama Power	2/22/2026	§5.15(f)
Applicant Hosts Updated Study Report Meeting	Alabama Power	3/9/2026	§5.15(f)
<ul style="list-style-type: none"> Applicant files Updated Study Report Meeting Summary 	Alabama Power	3/24/2026	§5.15(f)
<ul style="list-style-type: none"> Disputes on the Study Report Meeting Summary or requests to modify the Study Plan are due 	Stakeholders	4/23/2026	§5.15(f)
<ul style="list-style-type: none"> Responses to disputes or request for modification of Study Plan due 	Alabama Power	5/23/2026	§5.15(f)
<ul style="list-style-type: none"> FERC makes SPD 	FERC	6/22/2026	§5.15(f)
Applicant files PLP	Alabama Power	No later than 150 days prior to filing the Final License Application ⁸ ; Target 2027	§5.16(a)

⁸ This ILP schedule assumes that studies begin when FERC issues its Study Determination and may continue for up to two years. The dates indicated for filing the Preliminary Licensing Proposal and Final License Application are estimates and assume that two full study seasons would be needed. If

Task	Responsible Party	Schedule Milestones⁷	FERC Regulation
Comments on PLP Due	Stakeholders	90 Days After Filing the PLP	§5.16(e)
Applicant Files FLA	Alabama Power	Target 2027	§5.17

a second study season is not needed, Alabama Power may file its Preliminary Licensing Proposal sooner; however, the Preliminary Licensing Proposal would need to be filed at least 150 days prior to filing the Final License Application.

2.3.1 Document Control and Communication Plan

Effective communication is essential when managing a multi-year, multi-party, licensing process. The licensing process is lengthy and involves large amounts of communication, including face-to-face meetings, virtual meetings, written documents, emails, and telephone conversations. To account for and manage Chandler Mountain Project communications, Alabama Power developed and will implement during the licensing process a document control and communication plan. Descriptions of the communication tools and procedures that may be used by Alabama Power are provided in the following sections.

2.3.2 Licensing Website

Alabama Power developed a Chandler Mountain Project licensing website at <https://www.chandlermountainpumpedstorage.com>. The website includes the following information:

- summary of the Chandler Mountain Project and ILP;
- meeting notices and schedules;
- final meeting summaries;
- licensing documents (e.g., NOI, PAD and appendices, draft documents, final study plans, draft and final study reports, DLA, PLP, and FLA); and
- links to relevant websites.

All stakeholders should use the website to obtain current information regarding the Chandler Mountain Project and the licensing process.

2.3.3 Document Control

Alabama Power will maintain copies of all public information including distribution lists, announcements, notices, communications, and other documents related to the Chandler Mountain Project licensing.

2.3.3.1 Mailing Lists

Alabama Power will compile a Distribution List of stakeholders including agencies, tribes, organizations, and individuals that have been identified as interested groups or who have requested to be included as licensing participants. The Distribution List will be maintained and updated by Alabama Power throughout the licensing process as new stakeholders

request to be added or as existing contact information changes. Any entity or individual may request to be added to or removed from Alabama Power's Distribution List by emailing chandlerpshlicensing@southernco.com. Alabama Power will utilize the list to notify stakeholders of public meetings and other milestone licensing communications.

2.3.3.2 Public Reference File and e-Library

Alabama Power will maintain a public reference file that contains a list of materials used to develop the PAD including background reference material, relevant studies, and data references. For a nominal copying fee, hard copies of these documents are available upon request⁹ at Alabama Power's office at 600 North 18th Street, Birmingham, Alabama 35203 during regular business hours. Appointments to view documents may be made by contacting chandlerpshlicensing@southernco.com.

FERC's Public Reference Room provides a place for the public to view official Commission documents¹⁰. The Public Reference Room, along with eLibrary, are the Commission's primary channels for disseminating information. Interested parties may use the public workstations to access FERC's website and to view FERC documents at no charge. Fees for printing and photocopying official documents are charged.

2.3.3.3 Restricted Documents

Certain Project-related documents may be restricted from public viewing for regulatory and statutory reasons. Critical Energy Infrastructure Information (CEII) (18 CFR §388.113) relates to the design and safety of dams and appurtenant facilities. Access to CEII documents is restricted to protect national security and public safety. Anyone seeking CEII information from FERC must file a CEII request. FERC's website at <https://www.ferc.gov/ceii-filing-guide> contains additional details related to CEII.

Information related to protecting sensitive information is also restricted from public viewing. Archaeological or other culturally important information is restricted under Section 106 of the National Historic Preservation Act (NHPA). Some endangered and

⁹Any copyrighted material must be viewed at the Alabama Power corporate office and is not permitted to be copied.

¹⁰ At the time of filing this PAD, the Commission has suspended access to the Commission's Public Reference Room due to the proclamation declaring a National Emergency concerning the Novel Coronavirus Disease (COVID-19), issued by the President on March 13, 2020. For assistance, contact FERC at FERCOOnlineSupport@ferc.gov or call toll free, (886) 208-3676 or TTY (202) 502-8659.

threatened species location information is protected by the federal Endangered Species Act (ESA) of 1973 (16 United States Code [U.S.C.] §§ 1531-1543, Public Law [P.L.] 93-205). While migratory birds are protected by the Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703-712, July 3, 1918, as amended) and eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250, as amended), specific species locations are not restricted. Anyone seeking this information from FERC must file a Freedom of Information Act (FOIA) request. Instructions for FOIA are available on FERC's website at <https://www.ferc.gov/foia>.

2.3.3.4 Document Distribution and Receipt

Alabama Power will distribute all documents, whenever possible, electronically in standard Microsoft Word format or portable document format (PDF). Alabama Power will use electronic filing for FERC documents and will post these documents on the Chandler Mountain Project licensing website. Alabama Power may distribute hard copies of documents for convenience or by request to accommodate individuals who do not have immediate access to email or computer. Alabama Power will provide email notification when items are posted to the licensing website. Distribution of information will follow the guidelines presented in Table 2-2.

Table 2-2 Document Distribution for the Chandler Mountain Pumped Storage Project

Document	Method
Public Meeting Notices	Email, Newspapers, U.S. Mail*
Meeting Agendas	Website, Email, or U.S. Mail*
Meeting Summaries	Website, Email, or U.S. Mail*
Process Plan and Schedule	Website
Major Documents: PAD and appendices, FERC SDs, Proposed and Final Study Plans, Study Reports, DLA, PLP, and FLA	Websites (FERC and Alabama Power), Email, and Alabama Power Corporate Office
PAD supporting documents	Alabama Power Corporate Office
Written communications	Email or U.S. Mail*

* U.S. Mail service by special request.

Alabama Power requests that it receive all documents electronically in either PDF or an appropriate format compatible with Microsoft Office (e.g., Microsoft Word, Excel). Documents may be emailed to chandlerpshlicensing@southernco.com. Hard copies may be mailed to Angie Anderegg, Chandler Mountain Pumped Storage Licensing Project Manager, Alabama Power Company, 600 North 18th Street, 16N-8180, Birmingham, Alabama 35203. In either case, all documents received become part of the licensing consultation record.

2.3.4 General Communications

Communications may be in the form of written hard-copy correspondence, emails, notes from single party or multi-party telephone calls, and/or face-to-face meetings. Alabama Power's goal is to maintain open communication during the licensing process and to facilitate stakeholder and public access to information related to the Chandler Mountain Project licensing.

2.3.4.1 Email

Alabama Power anticipates that communication among stakeholders will occur primarily through email. This may include, for example, coordination of meetings, distribution of draft and final documents, meeting summaries, schedule updates, and general correspondence. Stakeholders are requested to send all correspondence to Alabama Power using the licensing email at chandlerpshlicensing@southernco.com.

2.3.4.2 Telephone and Video Conference

Alabama Power anticipates using telephone and video conference (e.g., Microsoft Teams) for informal conversations and for hosting telephone conference calls. Most conversations will be treated informally with no written documentation required; however, in the event of a scheduled telephone or video conference call with stakeholders, Alabama Power will prepare and distribute meeting summaries and post to the licensing website. Prior to FERC's Notice of Acceptance of the license application, FERC will distribute summaries of any telephone conversations. Once the license application is accepted and intervenors are identified, FERC will provide public notice of all telephone phone calls in which it will participate so that all stakeholders may also participate should they choose.

2.3.4.3 Meetings

Alabama Power wants to ensure that stakeholders are meaningfully involved in the licensing process. Alabama Power will work with stakeholders to develop meeting schedules that accommodate most participants. These meetings will be scheduled between 9:00 AM and 5:00 PM Central Standard Time at least 2 weeks in advance, whenever possible. Alabama Power will provide the meeting agenda and any information relevant to the meeting on the Chandler Mountain Project licensing website. FERC regulations (18 CFR §5) require that specific ILP meetings be held during the licensing process. These meetings are identified in the draft Process Plan and Schedule (Table 2-1). Alabama Power anticipates that other meetings will be necessary, particularly during the development of the study plans and potential protection, mitigation, and enhancement (PME) measures.

2.3.5 Federal Energy Regulatory Commission Scoping Meeting

Approximately 90 days following distribution of the PAD, FERC staff will conduct a day and an evening Scoping Meeting, pursuant to NEPA. Scoping is the process used to identify issues, concerns, and opportunities associated with a federal agency's proposed action, such as the issuance of an original license for a hydropower project. The scoping process will likely include either an in-person or a virtual opportunity to tour the site location. FERC will confirm and notify the public of the date and location of the Scoping Meetings; Alabama Power will advertise the Scoping Meetings on its licensing website. A court reporter will record the Scoping Meetings; all statements provided at the meetings, both verbal and written, will become part of FERC's public record for the licensing. FERC will publish NEPA Scoping Meeting notices in local newspapers and in the Federal Register and will provide notice to its FERC Mailing List for Chandler Mountain Project No. 15229.

2.3.6 Study Requests

In developing the PAD, Alabama Power collected and summarized reasonably available information regarding the Chandler Mountain Project and potential effects on the human and natural environments. The PAD, however, may indicate areas where there is limited information related to areas of potential concern regarding the Chandler Mountain Project's construction and operation. In those cases, any party may request additional studies or investigations, as detailed below.

Comments on the PAD and FERC's SD1 must be filed with FERC within 60 days following FERC's notice issued pursuant to 18 CFR §5.8. Comments (including those from FERC) must be accompanied by any information gathering and study requests. Comments should include information and studies needed for consultation under Section 7 of the ESA and water quality certification under Section 401 of the Clean Water Act (CWA), as needed. As specified by 18 CFR § 16.8 (b)(4) of FERC's regulations, stakeholders requesting studies must include the following information:

- description of the goals and objectives of each study proposal and the information to be obtained;
- if applicable, explanation of the relevant resource management goals of the agencies or tribes with jurisdiction over the resource to be studied;
- if the requester is not a resource agency, explanation of any relevant public interest considerations regarding the proposed study;
- description of existing information concerning the subject of the proposal and the need for additional information;
- explanation of any nexus between Project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied and how the study results would inform the development of license requirements;
- explanation of how any proposed study methodology (including any preferred data collection and analysis techniques or objectively quantified information and a schedule including appropriate field season(s) and the duration) is consistent with the generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
- description of the considerations of the level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

FERC provides guidelines for understanding and applying the ILP study criteria at <https://ferc.gov/industries/hydropower/gen-info/guidelines/guide-study-criteria.pdf>. These guidelines will also be available on the Chandler Mountain Project licensing website. Alabama Power will meet with stakeholders to discuss proposed study plans during the 90-day period specified in CFR §5.12. This time is provided to clarify and resolve any outstanding issues regarding the proposed study plans. Tentative dates for study plan requests, modifications, and meetings can be viewed in the draft Process Plan and Schedule.

3.0 PROPOSED PROJECT LOCATION, FACILITIES, AND OPERATIONS

3.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(2). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in this section:

- (D) The number, length, voltage, and interconnections of any primary transmission lines proposed to be included as part of the project, including a single-line diagram showing the transfer of electricity from the project to the transmission grid or point of use; (UK) and
- (E) An estimate average monthly energy production in kilowatt hours (or mechanical equivalent); (UK)
- (E) (iv) Daily or seasonal ramping rates, flushing flows, and flood control operations; (UK)
- (v) In the case of an existing licensed project (NA);
 - (A) A complete description of the current license requirements; i.e., the requirements of the original license as amended during the license term; (NA)
 - (B) A summary of project generation and outflow records for the five years preceding filing of the pre-application document; (NA)
 - (C) Current net investment (NA); and
 - (D) A summary of the compliance history of the project, if applicable, including a description of any recurring situations of non-compliance. (vi) A description of any new facilities or components to be constructed, plans for future development or rehabilitation of the project, and changes in project operation (NA)

3.2 Project Overview

The Chandler Mountain Project would be a pumped storage hydroelectric generating facility, which would involve the construction of new water storage, water conveyance, and generation facilities at locations where such facilities do not exist at this time. Detailed descriptions of the facilities are provided in Section 3.4.

The Chandler Mountain Project is currently in the initial stages of design, permitting, and licensing, and exact specifications associated with the Chandler Mountain Project as described herein are considered preliminary and may change due to engineering and geotechnical feasibility or environmental considerations.

3.3 Project Location

The Chandler Mountain Project would be located in St. Clair and Etowah counties, north of Steele, Alabama, approximately 50 miles northeast of Birmingham, Alabama, approximately 10 miles southwest of Gadsden, Alabama, and approximately 15 miles from H. Neely Henry Dam (Neely Henry Dam¹¹). Figure 3-1 depicts the township, range, and section by state, county, river, river mile, and closest towns.

For purposes of this PAD, Project Boundary, Project Area, and Project Vicinity are defined as follows:

- Project Boundary refers to the area enclosing the land and waters necessary to operate a FERC-licensed hydroelectric Project;
- Project Area refers to the lands and waters in the Project Boundary and the area adjacent to the Project Boundary, such as adjoining land parcels or adjacent streams; and
- Project Vicinity refers to a larger geographic area near the hydroelectric project, such as the county or regional area.

Because the Chandler Mountain Project is in the early stages of design and development, the Project Boundary will be defined during the licensing process; therefore, environmental resources are described for the **Project Area** to provide a broader geographic context of the immediate area (lands and waters) surrounding the Project Boundary. It is anticipated that the construction limits of disturbance and any potential changes to the Project Boundary are likely to be located within the defined Project Area.

¹¹ The H. Neely Henry Development (Neely Henry) is part of the Coosa River Hydroelectric Project (FERC No. 2146).

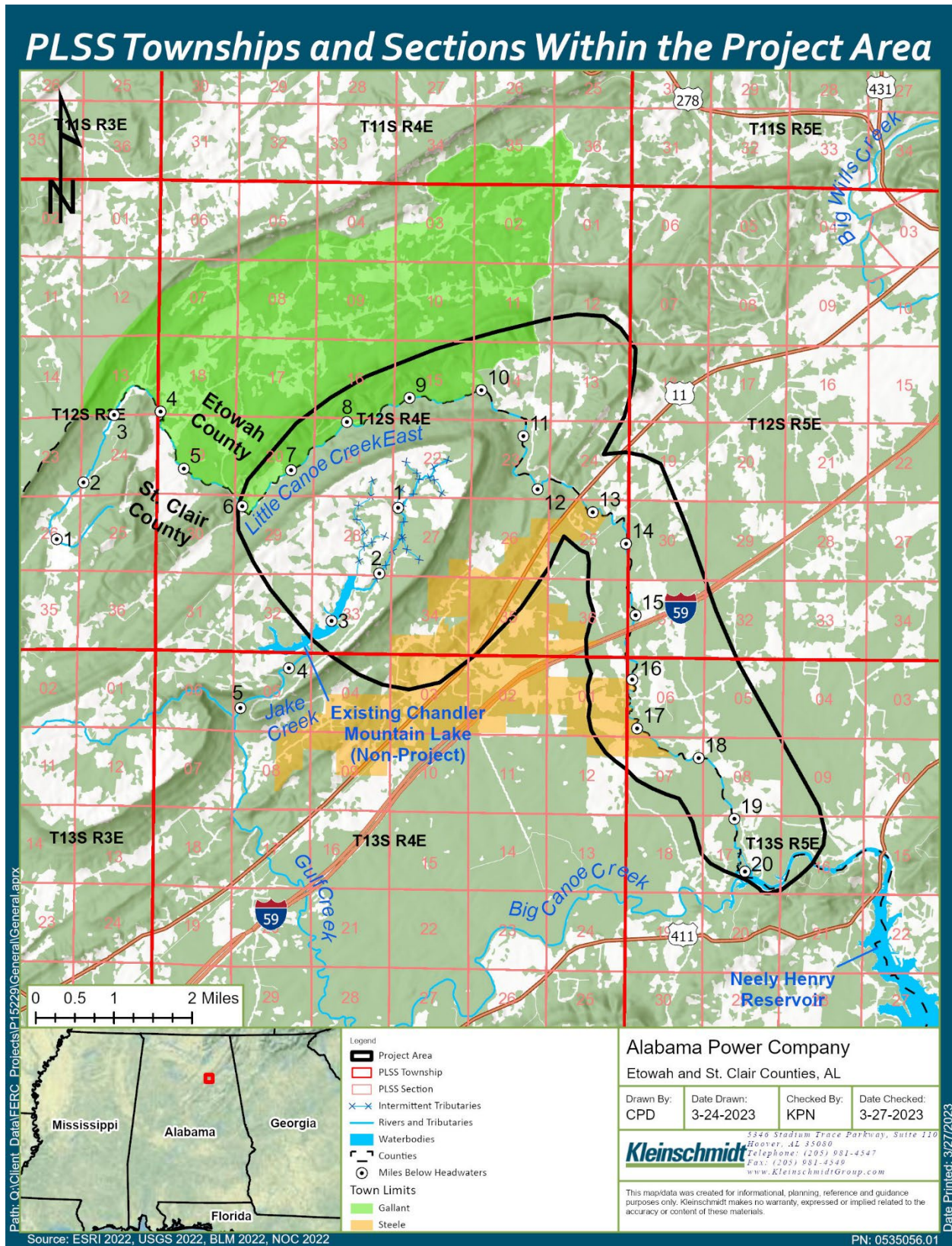


Figure 3-1 Chandler Mountain Project Area with Township and Range

3.3.1 Project Lands

Alabama Power currently owns approximately 2,500 acres of land within and adjacent to the Chandler Mountain Project Area. The extent of additional land to be purchased will be determined during the licensing process for inclusion in the Project Boundary. There are no federal or tribal lands within the Project Area.

3.4 Proposed Project Facilities

As proposed, the Chandler Mountain Project would consist of the following new facilities: (1) a dam with a crest elevation of approximately 1,373 feet mean sea level (msl), which would create an upper reservoir on Chandler Mountain with a normal maximum operating elevation of approximately 1,366 feet msl (Upper Dam); (2) an upper reservoir intake structure; (3) an underground powerhouse containing four reversible pump-turbine unit(s) with a generating capacity of 400 MW each, for a total project capacity of 1600 MW; (4) four dam sections (Lower Dam A, Lower Dam B, Lower Dam C, and Lower Dam D), each with a crest elevation of approximately 683 feet msl, that would create a lower reservoir located at the northern toe of Chandler Mountain, with a normal maximum operating elevation of approximately 667 feet msl; (5) a lower reservoir discharge structure; (6) water conveyance structure, and (7) transmission related structures and facilities to interconnect with the power grid¹². The proposed facilities are described below and proposed locations are shown in Figure 3-2. Note that the figures in the PAD were created based on U.S. Geological Survey (USGS) topographic maps; however, Alabama Power has collected Light Detection and Ranging (LIDAR) data in winter 2023 and more accurate depictions of the Project facilities and minimum and maximum reservoir levels will be developed for use in the study plan process.

¹²The final total installed capacity and site configuration will be determined through additional studies.

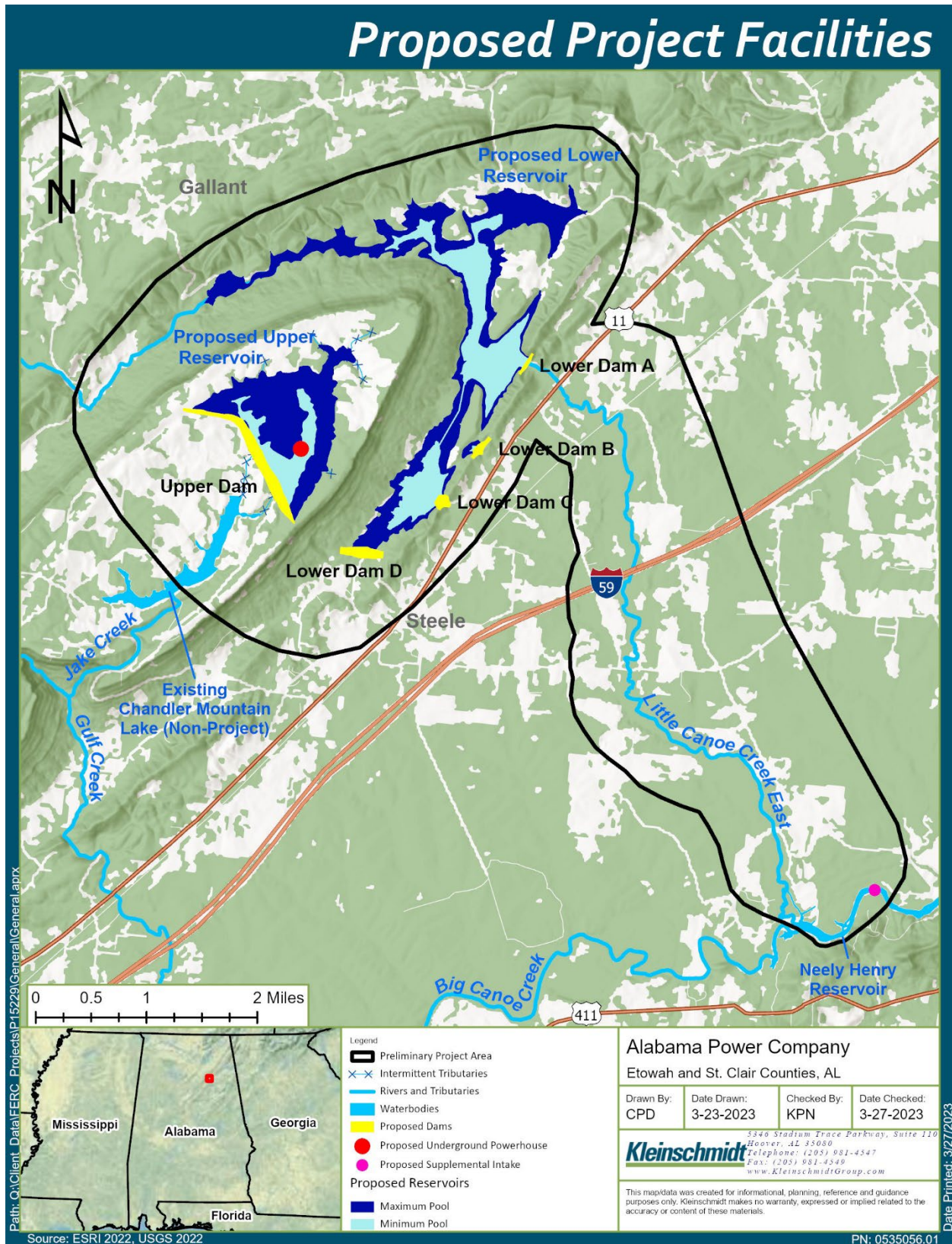


Figure 3-2 Chandler Mountain Project Proposed Facilities

3.4.1 Upper Dam and Reservoir

The upper reservoir would be impounded by a single, zoned rockfill dam (Upper Dam) with a crest elevation of approximately 1,373 feet msl. The 526-acre upper reservoir would have a normal maximum water surface elevation of approximately 1,366 feet msl and would be fully lined to reduce potential for leakage. The liner would extend up the west side of the rockfill embankment Upper Dam.

Note that the existing 30-foot-high, earthen structure known as Chandler Mountain Dam, which impounds a portion of Jake Creek, is not part of the proposed Chandler Mountain Project. Any potential effects from the proposed Chandler Mountain Project on the existing Chandler Mountain Dam and lake will be analyzed during the licensing process.

3.4.2 Powerhouse

The Chandler Mountain Project powerhouse would be located underground and sized to accommodate four, 400 MW reversible pump turbines (1600 MW total). The arrangement of the powerhouse would be based on similar existing facilities and promote efficient use of space, practical arrangement of equipment, and reduced construction costs. Design of the powerhouse will be based on unit dimensions, space required for construction and erection of the units, and space for unit disassembly and maintenance.

3.4.3 Lower Reservoir and Dams

The 1,090-acre lower reservoir would be formed by Lower Dams A, B, C, and D. Lower Dam A would be the primary structure that directly retains a portion of Little Canoe Creek East and would be fitted with outlet works to discharge normal and minimum instream flows and spillways to pass more extreme hydrologic events. Lower Dam A would likely be a roller compacted concrete (RCC) structure that allows for overtopping through (ungated) spillways. Lower Dams B, C, and D would be zoned rockfill dams with no discharge facilities.

The 1,090-acre lower reservoir is anticipated to be partially lined at the upstream faces of Lower Dams B, C, and D. The liner would extend into the reservoir for a limited distance to serve as a seepage control apron. Grout curtains may be required at Lower Dam D for additional seepage control.

3.4.4 Water Conveyances

Water conveyance tunnels and shafts will be sized to meet regulating stability guidelines as well as maximum water velocity criteria. For a 1,600 MW configuration, two headrace and tailrace tunnels would be required with diameters of approximately 34 feet. Preliminary transient modeling of the Chandler Mountain Project indicates that no high pressure (headrace tunnel) surge protection would be required. A tailrace tunnel surge chamber is anticipated to provide significant flexibility and response time benefits to the Chandler Mountain Project.

3.4.5 Power Delivery

Alabama Power anticipates the Chandler Mountain Project would connect to the grid at an on-site substation; therefore, there are no anticipated primary transmission lines included in the Project. The generator step-up (GSU) transformers (estimated at 18 to 500 kilovolts [kV]) would be located in the at-grade switchyard. An 18 kV (30,000 amp) isolated phase bus (IPB) would be used to connect the gas-insulated switchgear in the powerhouse to the GSU transformers in the switchyard. The IPB would be routed from the powerhouse cavern to the switchyard within an underground tunnel and shaft. The switchyard is envisioned as a breaker and half scheme with two 500-kV transmission circuit terminals and six single phase GSUs plus one single phase.

3.4.6 Initial Fill and Supplemental Water Supply System

Little Canoe Creek East is the primary source of water to support the Chandler Mountain Project. In advance of commissioning the Chandler Mountain Project, the lower reservoir would be filled to levels required for initial unit testing. The time required to complete the initial fill would be dependent on basin precipitation and streamflow, evaporation, reservoir leakage, and minimum instream flow requirements. Based on preliminary hydrologic assessment, the total initial fill volume is 33,700 acre-feet as shown in Table 3-1.

Table 3-1 Initial Fill Volume

Storage	Initial Fill Volume (acre-feet)
Lower Reservoir Inactive Storage	6,100
Upper Reservoir Inactive Storage	3,100
System Active Storage	24,300
Conveyance Volume	200
Total	33,700

Alabama Power anticipates using a supplemental water supply system that could provide up to 40 cubic feet per second (cfs) (approximately 18,000 gallons per minute [gpm]) to the lower reservoir for the initial fill and support of the system throughout the license term. Alabama Power identified a location for the supplemental water supply system in the upper regions of the H. Neely Henry Reservoir (Neely Henry Lake). This location, approximately 6-miles from Lower Dam A, is anticipated to have sufficient depth and discharge to support the system. The intake would be a "surface water collector well" type arrangement with passive intake screens located on Neely Henry Lake leading to a shoreline pump station. A 36-inch-diameter, polyvinyl chloride (PVC) pipeline, routed primarily along an existing right-of-way between Lower Dam A and Neely Henry Lake, is envisioned.

Use of the proposed supplemental water supply system would result in an estimated initial fill time of approximately 12 to 18 months.

3.5 Proposed Project Operations

The Chandler Mountain Project would operate as a pumped storage project that would use its storage in the upper reservoir to create energy by releasing that storage through the generating units to the lower reservoir. Water would then be pumped back from the lower reservoir to the upper reservoir to replenish the storage.

In a 24-hour operating cycle, the Chandler Mountain Project would have the capacity to generate energy for 10 hours a day, and pump water back from the lower reservoir to the upper reservoir for approximately 13 hours to accomplish the upper reservoir refill. During a 24-hour operating cycle, the upper reservoir may fluctuate up to 63 feet, from the maximum operating elevation of approximately 1366 feet msl to the minimum operating elevation of approximately 1303 feet msl, and the lower reservoir may fluctuate up to 27

feet, from the maximum operating elevation of approximately 667 feet msl to the minimum operation elevation of approximately 640 feet msl.

The Chandler Mountain Project would be capable of producing an estimated annual generation of 5,400,000 megawatt-hours (MWh). At that energy production level, pump-back operations will consume approximately 7,000,000 MWh of energy annually. Pumped storage projects are net consumers of energy due to hydraulic and electrical losses incurred in the cycle of pumping from lower to upper reservoirs. However, the value of pumped storage is that it is a dispatchable source of energy that can be deployed quickly during times of peak electricity demand, and then take excess energy off the grid by pumping water from the lower reservoir to the upper reservoir during times of low electricity demand. Actual daily energy production and reservoir fluctuations will depend on system conditions and the resulting need for utilizing the storage for energy production.

3.5.1 Drought Operations

The Chandler Mountain Project is being designed to operate during low flow conditions. Approximately 5,000 acre-feet of drought storage will be included in the lower reservoir, between elevation 640 feet msl and 631 feet msl, the absolute minimum lower reservoir operating level. The supplemental water supply system would be used to replenish losses in drought storage volume due to operations, leakage, and/or evaporation.

4.0 DESCRIPTION OF EXISTING ENVIRONMENT

4.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(xiii).

4.2 General Description of River Basin

4.2.1 River Basins and Sub-Basins Description

The Chandler Mountain Project would be located within the Alabama-Coosa-Tallapoosa (ACT) Basin that includes the Coosa River Basin and the Middle Coosa River Sub-basin. Extending approximately 330 miles, the ACT Basin drains approximately 22,800 square-miles in Alabama, Georgia, and Tennessee. The ACT Basin originates just north of the Tennessee/Georgia border, extends into central north Georgia, crosses the Georgia-Alabama state line into north Alabama, and continues across central and southern Alabama before terminating in Mobile Bay. The ACT Basin covers 32 counties in Alabama, 18 counties in Georgia, and 2 counties in Tennessee (USACE 2022).

The Coosa River Basin drains approximately 10,156 square-miles in Alabama, Georgia, and Tennessee (USACE 2022). The Middle Coosa River sub-basin located in northeast Alabama encompasses approximately 2,585 square-miles. Approximately 80 percent of the sub-basin is within Calhoun, St. Clair, Etowah, and Talladega counties, with the remaining 20 percent covering portions of seven other counties. Two mainstem reservoirs, Neely Henry and Logan Martin, inundate approximately 41 square-miles of the sub-basin (ADEM 2003).

4.2.2 River Basin Tributaries and Dams

The Coosa River is formed by the Etowah and Oostanaula Rivers in northwest Georgia and flows westerly, then southwesterly, and finally southerly for a total of approximately 268 miles to its confluence with the Tallapoosa River, forming the Alabama River. The Coosa River varies in width from 300 to 500 feet with banks 25 to 150 feet in height (USACE 2022).

There are a total of 17 large dams in the ACT River Basin. The U.S. Army Corps of Engineers (USACE) owns and maintains six projects in the ACT Basin, and Alabama Power owns and maintains 11 hydroelectric developments (seven dams on the Coosa River; four dams on

the Tallapoosa River). Of the 17 large dams, there are 9 hydroelectric dams within the Coosa River Basin. The USACE operates Allatoona Dam on the Etowah River and Carters Dam on the Coosawattee River. The USACE also operates a re-regulation dam below Carters Dam. Alabama Power owns and operates the seven remaining hydroelectric dams on the mainstem of the Coosa River: Weiss, Neely Henry, Logan Martin, Lay, Mitchell, Jordan, and Bouldin. The Coosa River dams are primarily operated for flood control, hydroelectric generation, and navigational flow augmentation. Recreation and environmental releases are significant aspects of the hydro developments' operations. The USACE also operates three lock and dam facilities on the Alabama River downstream of Jordan Dam: Claiborne, Millers Ferry, and R.F. Henry (Millers Ferry and R.F. Henry also provide hydroelectric generation) (USACE 2022).

The tributaries entering the Coosa River include the Chattooga River, Little River, and Cedar Creek (which flow into Weiss Lake); Big Wills, Terrapin, and Big Canoe Creeks (which flow into Neely Henry Lake); Choccolocco Creek (which flows into Logan Martin Lake); Yellowleaf, Kelly, and Waxahatchee Creeks (which flow into Lay Lake); and Weogufka and Hatchet Creeks (which flow into Mitchell Lake). Figure 4-1 provides the location of tributaries of the Coosa River Basin and Middle Coosa River Sub-basin and associated dams.

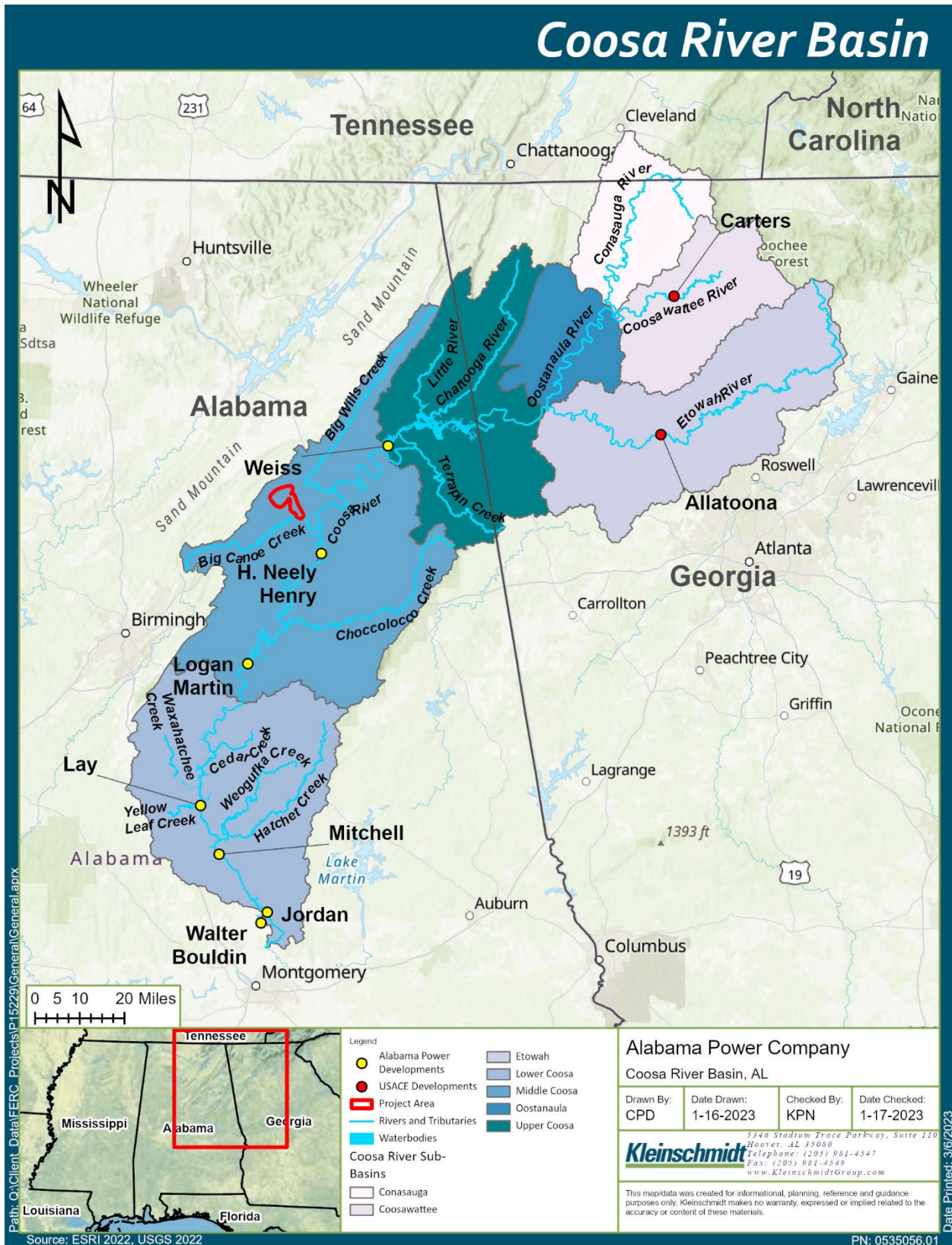


Figure 4-1 Dams and Tributaries within the Coosa River Basin

4.2.3 Major Land Uses

The ACT Basin is largely rural, containing a relatively small number of cities with populations greater than 25,000 persons scattered throughout the basin. The predominate land uses within the ACT Basin are developed land, agricultural land, forests and timber and water. Specifically, the ACT Basin is approximately 57 percent forested lands, 16 percent pasture and row crops, 9 percent shrubland, 8 percent developed or built up, 7 percent wetlands, and 3 percent water (USACE 2022). The topography of the Coosa River Basin varies greatly as it lies within several physiographic provinces, including the Cumberland Plateau (also referred to as the Appalachian Plateau), Valley and Ridge, Blue Ridge, Piedmont, and Eastern Gulf Coastal Plain. This includes steep mountainous terrain, narrow valleys, rolling hills, flat plateaus, and meandering flood plains (USACE 2022). The majority of the Middle Coosa River Basin is within the Valley and Ridge province and the Piedmont province, with varying topography from gently sloping valley land to steeply sloping mountain land. Approximately 64 percent of the Middle Coosa River Sub-basin is characterized as forest land (deciduous forest, herbaceous, evergreen forest, and mixed forest) with other land uses including cultivated crops (2 percent), hay or pasture (15 percent), developed (12 percent), open water (2 percent), and other uses (4 percent) (NLCD 2019).

4.2.4 Major Water Uses

Water resources within the ACT Basin have been managed for a variety of uses including navigation, hydroelectric power, flood control, water supply, water quality, and recreation. Such water resources also provide important habitat for fish and wildlife (USACE 2022). Table 4-1 provides groundwater and surface water use in the Middle Coosa River Sub-basin.

Table 4-1 Groundwater and Surface Water Use in the Middle Coosa River Sub-basin

Withdrawal Use	Surface Water	Groundwater (MGD)	Totals
Public Supply	27.70	36.18	63.88
Residential	0.00	2.75	2.75
Irrigation	10.84	0.54	11.38
Aquaculture	0.12	0.15	0.26
Livestock	0.87	0.70	1.57
Industrial	40.98	1.72	42.71
Mining	0.10	0.69	0.79
Thermoelectric	105.52	0.00	105.52
Total	186.13	42.73	228.86

¹MGD = millions of gallons per day

Source: ADECA 2015

4.2.5 Climate

The climate within the ACT Basin is classified as humid subtropical and characterized by hot humid summers and cool winters. Significant amounts of precipitation occur in all seasons in most areas. Winter rainfall (and sometimes snowfall) is associated with large storms steering from west to east. Most summer rainfall occurs during thunderstorms and an occasional tropical storm or hurricane. Factors controlling the climate of the ACT River Basin are its geographical position in the southern end of the Temperate Zone, its proximity to the Gulf of Mexico and the Atlantic Ocean, and its range in altitude from almost sea level at the southern end to over 3,000 feet in the Blue Ridge Mountains to the north. The proximity of the warm Atlantic Ocean and the semitropical Gulf of Mexico ensures a warm, moist climate. Extreme temperatures range from near 110 degrees Fahrenheit (°F) to values in the teens below zero. Severe cold weather rarely lasts longer than a few days. In the southern end of the basin the average maximum January temperature is 56 °F and the average minimum January temperature is 33 °F (USACE 2022).

The climate of the Coosa River Basin is characterized by long, warm, and humid summers with relatively short winters. Mean annual precipitation within the Coosa River Basin ranges from 52 to 64 inches and occurs primarily as late winter and early spring rainfall. On average the winter is the wettest season and March is the wettest month. The mean annual temperature is approximately 60 °F (GADNR 1998). Similarly, total annual precipitation for the Middle Coosa River Sub-basin is approximately 53 inches with March

being the wettest month and October the driest. Summer temperatures within the Middle Coosa River Sub-basin average 79 degrees F, with an average daily maximum of 90 degrees F. Winter temperatures average near 45 degrees F, with an average daily minimum of 34 degrees F (ADEM 2003).

4.2.6 References

Alabama Department of Economic and Community Affairs (ADECA). 2015. Estimated 2015 Water Use and Surface Water Availability in Alabama. Appendix C: Average Water Withdrawals by Subbasin. Available online at: <https://adeca.alabama.gov/wp-content/uploads/2015-Water-Use-Report-Appendix-C.pdf>. Accessed January 2023.

Alabama Department of Environmental Management (ADEM). 2003. Mid-Coosa River Basin Management Plan. Available online at: <https://www.adem.alabama.gov/programs/water/nps/files/MiddleCoosaBMP.pdf>. Assessed December 2022.

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National Land Cover Database (NLCD). 2019. Custom Land Cover Report for Middle Coosa River Basin. Available online at: <https://www.mrlc.gov/>. Accessed January 2023.

U.S. Army Corps of Engineers (USACE). 2022. Master Water Control Manual. Alabama-Coosa-Tallapoosa River (ACT) Basin. April 2022.

4.3 Geology and Soils

4.3.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(ii). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Geology and Soils section.

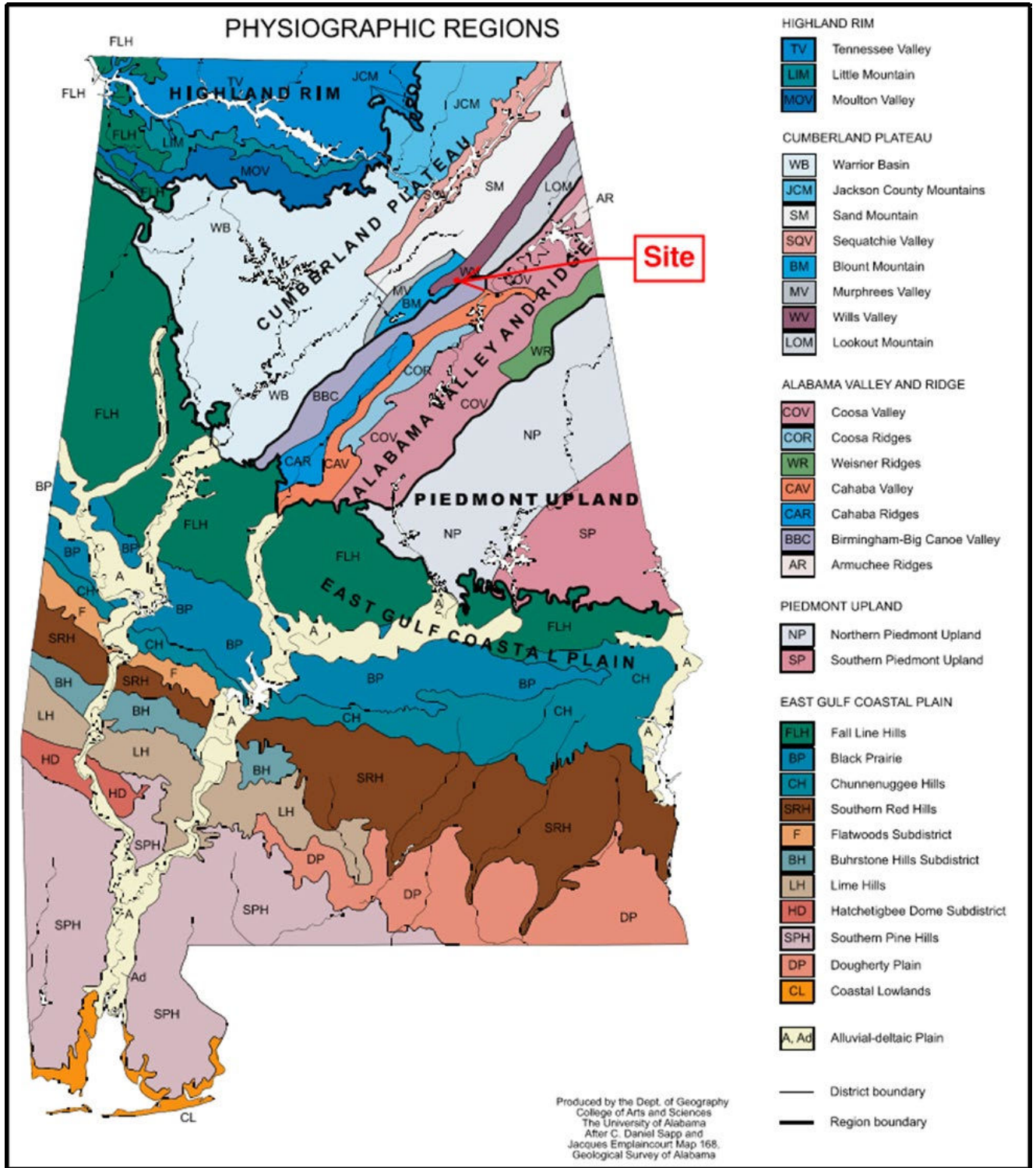
- (C)(1) A description of reservoir shorelines and streambanks, including: (1) Steepness, composition (bedrock and unconsolidated deposits), and vegetative cover (UK); and
- (C)(2) Existing erosion, mass soil movement, slumping, or other forms of instability, including identification of project facilities or operations that are known to or may cause these conditions. (UK)

4.3.2 Project Vicinity Overview

4.3.3 Topography

The Chandler Mountain Project would be located within the Cumberland Plateau physiographic province (also referred to as the Appalachian Plateau), bordering the Valley and Ridge province (Figure 4-2). The Cumberland Plateau is characterized by gently dipping strata, contrasting the folding and faulting that characterizes the Valley and Ridge province. The Cumberland Plateau landscape consists of flat-topped, high-elevation plateaus separated by deep, steep-sided valleys. The plateaus slope gently to the southwest (Neilson 2013a). The province is divided into eight districts, with the Chandler Mountain Project Area located within the Blount Mountain and Wills Valley districts. The Blount Mountain district separates the Murphrees Valley district from the Wills Valley and Birmingham-Big Canoe Valley districts. The Birmingham-Big Canoe Valley district is located within the adjacent Valley and Ridge Province. The district's shape resembles an elongated saucer that slopes to the southwest. Landforms of the district consist of sandstone and shales resulting in polygonal blocks separated by deep gullies. The Wills Valley district runs northeast to southwest. Its upland areas are characterized by deep narrow valleys, generally less than eight miles wide, with nearly vertical sides (Neilson 2013a). The Valley and Ridge province is characterized by long, even ridges of resistant rock with narrow, continuous valleys of less resistant rock and northwest-verging thrust

faulting and folding with steeply dipping strata at its western margin (i.e., Texas Ridge in the Project Vicinity) (Neilson 2013b).



Source: University of Alabama 2022

Figure 4-2 Physiographic Regions of Alabama

The maximum elevation on the northeast end of Chandler Mountain is approximately 1,490 feet msl with an elevation of 1,400 to 1,420 feet msl around the rim of the proposed upper reservoir. The minimum elevation of the Chandler Mountain Project site is approximately 650 feet msl in the footprint of Lower Dam D in the lower reservoir. Texas Ridge runs along the southeastern base of Chandler Mountain with maximum elevations from 860 to 960 feet msl from southwest to northeast. Maximum relief is approximately 840 feet (Figure 4-3).

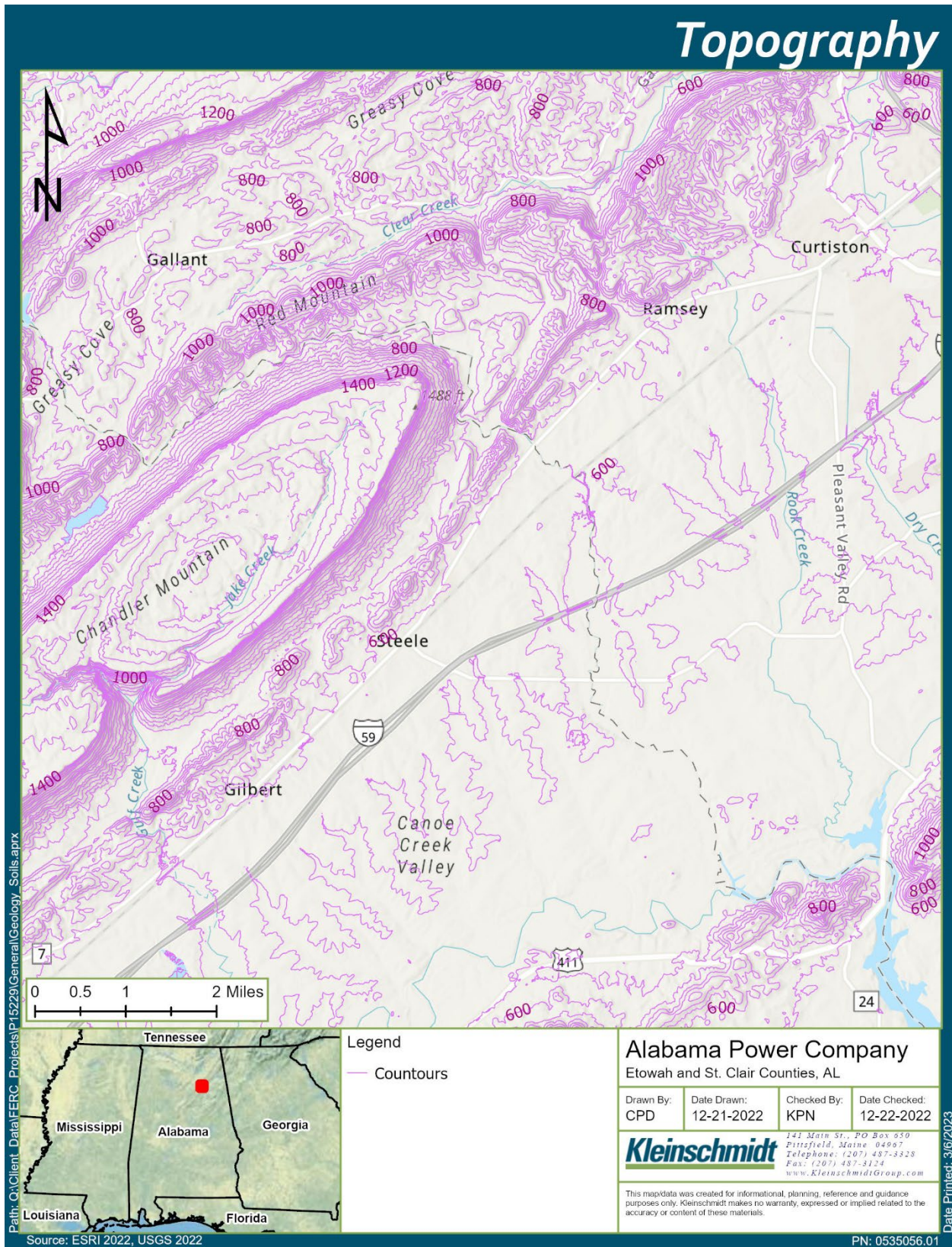


Figure 4-3 Topography of Chandler Mountain Project Vicinity

4.3.4 Bedrock and Surficial Geology

The Cumberland Plateau is underlain by Paleozoic sedimentary rocks. The Paleozoic sedimentary rocks are underlain by crystalline basement rock of Precambrian age. The Cumberland Plateau includes northeast-trending anticlines including the Sequatchie, Murphrees Valley, and Wills Valley. The Sequatchie and Wills Valley anticlines are symmetric to the northwest and include southeast-dipping thrust faults along parts of the northwest limbs. The Murphrees Valley anticline is asymmetric to the southeast and is bounded on the southeast side by the northwest-dipping Straight Mountain fault. Synclinal Sand, Lookout, and Blount mountains separate the anticlines. The Paleozoic sedimentary rocks dip southwestward into the Black Warrior basin beneath the coastal plain overlap (Raymond et al. 1988).

The Valley and Ridge province is underlain by a diverse sequence of shale, siltstone, sandstone, conglomerate, limestone, dolomite, and coal that are well-lithified. The rocks exhibit ubiquitous joints (most extensional with rare shear fracture; Engelder and Geiser 1980) and certain lithologies (generally the shales and siltstones) exhibit well-developed cleavage (Hatcher et al. 1989). The rocks have been strongly folded and faulted, but not extensively metamorphosed (Kulander and Dean 1986; Hatcher et al. 1989). The major faulting and folding of the Valley and Ridge rocks and the deformation in the adjacent Cumberland Plateau rocks occurred during the Alleghanian orogeny (330 to 265 million years ago [mya]; Hatcher 1989; Hatcher et al. 2007), which is the mountain-building event that formed the Appalachian Mountains.

A geologic map of the Chandler Mountain Project Vicinity is shown in Figure 4-4. The Project Vicinity is generally underlain by Paleozoic era sedimentary rocks with thrust faults located between Chandler Mountain and Canoe Creek Valley. A detailed description of rock formations and lithologies found in the Project Vicinity can be found in Table 4-2.

Table 4-2 Bedrock Stratigraphy and Lithology in the Project Vicinity

Stratigraphic Column of the Paleozoic Rocks in the Vicinity of the Chandler Mountain Site			
Age (ma)	Period	Formation	Description
315	Early Pennsylvanian	Pottsville Formation (P pv)	Light gray, thin- to thick-bedded quartzose sandstone and conglomerate containing interbedded dark gray shale, siltstone and coal. Thickness of the Formation on North Chandler Mountain is ~ 700 feet.
330			
350	Mississippian	Parkwood Formation and Floyd Shale (PM pwf)	Interbedded medium to dark gray shale and light to medium gray sandstone, locally contains lithic conglomerate, dusky-red and grayish-green mudstone, argillaceous limestone and dayey coal. The formations range in thickness from ~300 to ~385 feet. (Stratigraphic Equivalent to Pennington Formation).
		Bangor Limestone (Mb)	Medium gray bioclastic and oolitic limestone, containing interbeds of dusky red and olive green mudstone and calcareous shale in upper part. The thickness ranges from 0 to 750 feet in northeastern AL. Thickness at the site is ~550 to ~570 feet.
		Hartselle Sandstone (Mh)	Very light to light gray, medium- to coarse-grained, thin- to massive-bedded, locally fossiliferous, quartzose sandstone. The unit ranges from 0 to 150 feet. Thickness at the site is ~50 feet.
		Pride Mountain Formation (Mpmm)	Medium to dark gray shale with abundant siderite nodules and occasional pyrite, includes one to three layers of a variable combination of sandstone and limestone in the lower part, locally contains rare interbeds of dusky red and greenish gray mudstone. The thickness of the Pride Mountain Formation in northeastern AL ranges from 0 to 480 feet with the thickness in the site vicinity ranging from ~70 to ~150 feet.
		Monteagle Limestone (Mpmm)	Interbedded medium bluish gray to dark gray oolitic limestone and light gray bioclastic limestone locally contains nodules and stringers of dark gray chert. The Monteagle Formation interfingers with the Pride Mountain Formation and is mapped with it in the site vicinity. The thickness of the unit ranges from 0 to 300 feet and is ~30 to ~50 feet at the site.
		Tuscumbia Limestone (Mtfpm)	Light to dark gray, medium- to thick-bedded, bioclastic limestone locally containing chert nodules. Thickness of the formation ranges from 0 to 250 feet in northeastern AL and has an average thickness of ~150 feet at the site.
		Forte Payne Chert (Mtfpm)	Darn gray to light gray limestone with abundant irregular light-gray chert nodules and beds. Thickness
355			

Stratigraphic Column of the Paleozoic Rocks in the Vicinity of the Chandler Mountain Site			
Age (ma)	Period	Formation	Description
			ranges from 0 to 210 feet in northeastern AL and has an average thickness of ~100 to ~150 thick near the site.
360		Maury Formation (Mtfpm)	Greenish gray to grayish red phosphatic shale, fossiliferous in the upper part; commonly mapped with the Tuscumbia Limestone and Fort Payne Chert undifferentiated. The Formation thickness ranges from 2 to 8 feet.
UNCONFORMITY			
385	Late Devonian	Chattanooga Shale (Dc)	Dark gray to black, fissile carbonaceous shale and mudstone; thin beds of grayish black, fine- to medium-grained, partly pebbly sandstone is present at the base. The formation has a maximum thickness of ~80 feet and the thickness ranges from 0 to 30 feet near the site.
~395	Middle Devonian		
~430	UNCONFORMITY		
	Early Silurian	Red Mountain Formation (Sm)	Dark reddish brown to olive gray partly fossiliferous, mostly fine-grained sandstone interbedded with siltstone and shale; minor amounts of bioclastic limestone and conglomerate sandstone; included hematitic beds and beds of ferruginous sandstone outcrops in northeastern AL are finer grained and included more limestone. Unconformity between Ordovician and Silurian sequences. Thickness ranges from 95 to 590 feet in northeastern AL.
~435	UNCONFORMITY		
490?	Middle and Late Ordovician	Sequatchie Formation (Osc)	Grayish red, grayish green, and yellowish gray thin-bedded calcareous shale and calcareous mudstone containing interbedded fossiliferous limestone, and medium to gray to moderate red partly sandy and glauconitic, medium to coarse-grained bioclastic limestone. Thickness ranges from 0 to 200 feet in northeastern AL.
		Chickamauga Limestone (Osc)	Light to dark gray, thin- to medium- to thick-bedded, argillaceous, fossiliferous, and locally fenestral limestone; medium greenish gray, thin- to thick-bedded, poorly sorted sandstone containing rounded to angular chert. Thickness ranges from 260 to 100 feet in northeastern AL.

Stratigraphic Column of the Paleozoic Rocks in the Vicinity of the Chandler Mountain Site				
Age (ma)	Period	Formation	Description	
Texas Ridge THRUST FAULT				
500	Early Ordovician	Chepultepec Dolomite (O€ccr)	Knox Group (OGk)	Light gray to dark bluish gray thick-bedded dolomite and interbedded light-gray limestone; includes abundant chert. It is the lowest, completely Ordovician-age rocks in the Knox Group and thickness ranges from 0 to 1250 feet in northeastern AL.
	Late Cambrian	Copper Ridge Dolomite (O€ccr)		Light gray to dark bluish gray thick-bedded dolomite and interbedded light-gray limestone; included abundant chert. Thickness ranges from 1250 to 1800 in northeastern AL.
Big Canoe Valley THRUST FAULT				
525		Conasauga Formation (Cc)		Medium bluish gray fine-grained, thin-bedded argillaceous limestone and interbedded dark gray shale in varying proportions. The Formation has a thickness range of 500 to 2600 feet with a thickness of ~1400 feet near the site.
550	Middle Cambrian			
NOTE: Note to scale – Age or Stratigraphic Thickness.				

4.3.5 Soils

Soil types in the Chandler Mountain Project Area are depicted in Figure 4-5. The soil types and associated erosion factors are tabulated in Table 4-3 (NRCS 2022). Erosion K-factor (Kf) is based primarily on percentage of silt, sand and organic matter, the soil structure, and the saturated hydraulic conductivity. The higher the K value, the more susceptible the soil is to sheet and rill erosion by water, thus decreasing the quality of runoff water. Soils in the Chandler Mountain Project Area were predominantly derived from sedimentary rock.

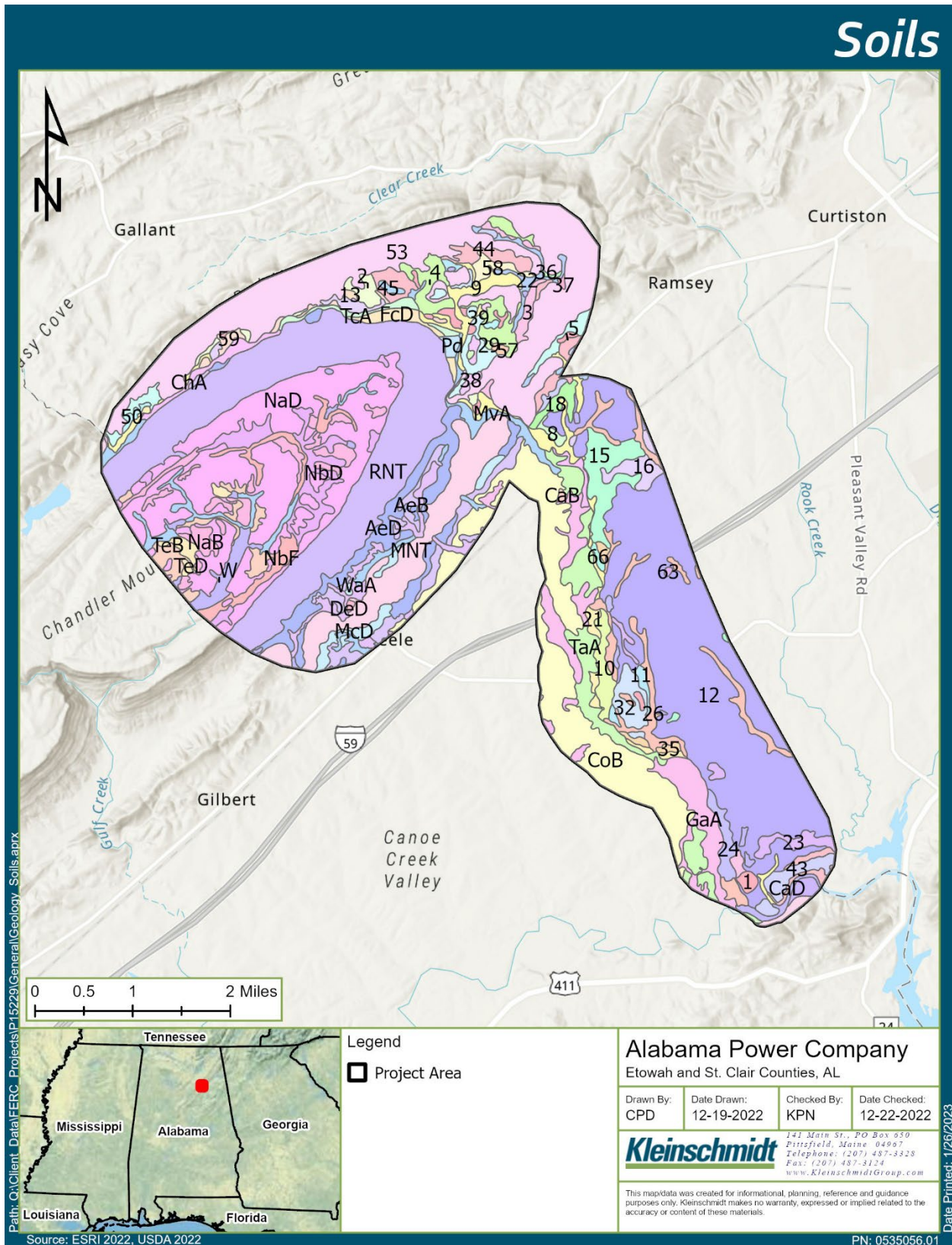


Figure 4-5 Mapped Soils in the Chandler Mountain Project Area

Table 4-3 NRCS Mapped Soils in the Chandler Mountain Project Area

Map Unit Symbol	Map Unit Name	Acres in Project Area	Percent of Project Area	K Factor
Etowah County, Alabama				
1	Allen fine sandy loam, 2 to 6 percent slopes	78.2	0.5%	0.20
2	Allen fine sandy loam, 6 to 10 percent slopes	65.1	0.4%	0.20
3	Allen gravelly fine sandy loam, 2 to 6 percent slopes	78.0	0.5%	0.20
4	Allen gravelly fine sandy loam, 6 to 10 percent slopes	204.7	1.3%	0.20
5	Allen sandy clay loam, 2 to 10 percent slopes, eroded	83.9	0.5%	0.20
8	Cedarbluff fine sandy loam	18.2	0.1%	0.28
9	Chewacla silt loam	276.0	1.7%	0.28
10	Chocolocco silt loam	85.9	0.5%	0.43
11	Cloudland loam, 0 to 3 percent slopes	36	0.2%	0.37
12	Conasauga loam, 1 to 5 percent slopes	2,489.8	15.7%	0.37
13	Conasauga loam, 5 to 15 percent slopes	6.5	0.0%	0.37
15	Conasauga-Rock outcrop complex, 2 to 6 percent slopes	214.8	1.4%	0.37
16	Conasauga-Rock outcrop complex, 6 to 25 percent slopes	124.6	0.8%	0.37
18	Dewey silt loam, 2 to 6 percent slopes	50.3	0.3%	0.37
21	Ellisville loam	57.8	0.4%	0.37
22	Ennis-Lobelville cherty loams	73.8	0.5%	0.24-0.28
23	Firestone loam, 2 to 6 percent slopes	91.4	0.6%	0.32
24	Firestone silt loam, 6 to 15 percent slopes	81.5	0.5%	0.37
26	Gaylesville silt loam	333.0	2.1%	0.37
29	Hartsells-Rock outcrop complex, 2 to 10 percent slopes	6.9	0.0%	0.20
32	Holston fine sandy loam, 1 to 5 percent slopes	102.1	0.6%	0.20
35	Leadvale silt loam, 1 to 5 percent slopes	33.9	0.2%	0.37
36	Leesburg gravelly sandy loam, 2 to 6 percent slopes	4.7	0.0%	0.20
37	Leesburg gravelly sandy loam, 6 to 15 percent slopes	4.6	0.0%	0.20
38	Linker fine sandy loam, 2 to 6 percent slopes	27.5	0.2%	0.20
39	Linker fine sandy loam, 6 to 15 percent slopes	79.1	0.5%	0.20

Map Unit Symbol	Map Unit Name	Acres in Project Area	Percent of Project Area	K Factor
43	Minvale cherty loam, 2 to 6 percent slopes	116.1	0.7%	0.28
44	Minvale cherty loam, 6 to 15 percent slopes	220.6	1.4%	0.28
45	Minvale-Bodine complex, 15 to 30 percent slopes	13.5	0.1%	0.37
50	Nella gravelly sandy loam, 10 to 25 percent slopes	21.5	0.1%	0.15
53	Nella-Allen association, steep	1,850.9	11.7%	0.15-0.20
57	Pits	9.5	0.1%	NA
58	Stemley cherty loam, 1 to 5 percent slopes	41.9	0.3%	0.32
59	Toccoa sandy loam	45.4	0.3%	0.15
63	Urban land	3.7	0.0%	NA
66	Wickham fine sandy loam, 2 to 6 percent slopes	11.1	0.1%	0.24
W	Water	37.7	0.2%	NA
Subtotals for Soil Survey Area		7,080.2	44.7%	
St. Clair County, Alabama				
AeB	Allen gravelly sandy loam, 2 to 8 percent slopes	247.0	1.6%	0.15
AeD	Allen gravelly sandy loam, 8 to 15 percent slopes	450.8	2.8%	0.15
CaB	Cane loam, 2 to 8 percent slopes	5.8	0.0%	0.28
CaD	Cane loam, 8 to 12 percent slopes	30.1	0.2%	0.28
ChA	Chocolocco silt loam, 0 to 2 percent slopes	90.1	0.6%	0.43
CoB	Conasauga and Firestone silt loams, 1 to 8 percent slopes	1,071.4	6.8%	0.37-0.43
DeD	Dewey loam, 8 to 15 percent slopes	4.7	0.0%	0.24
FcD	Firestone and Conasauga silt loams, 8 to 15 percent slopes	64.9	0.4%	0.37-0.43
GaA	Gaylesville silt loam, 0 to 2 percent slopes	468.6	3.0%	0.37
McD	Minvale cherty loam, 8 to 15 percent slopes	108.9	0.7%	0.28
MNT	Minvale-Nella-Townley association, steep	622.5	3.9%	0.15-0.37
MvA	Mooreville silt loam, 0 to 2 percent slopes	299.5	1.9%	0.37
NaB	Nauvoo sandy loam, 2 to 6 percent slopes	252.9	1.6%	0.15
NaD	Nauvoo sandy loam, 6 to 15 percent slopes	1,612.6	10.2%	0.15
NbD	Nauvoo-Rock outcrop complex, 2 to 15 percent slopes	267.1	1.7%	0.15

Map Unit Symbol	Map Unit Name	Acres in Project Area	Percent of Project Area	K Factor
NbF	Nauvoo-Rock outcrop complex, 15 to 30 percent slopes	170.8	1.1%	0.15
Pd	Pits and Dumps	20.2	0.1%	NA
RNT	Rock outcrop-Nella-Townley association, steep	2,014.5	12.7%	0.15-0.37
TaA	Tanyard silt loam, 0 to 2 percent slopes	382.0	2.4%	0.32
TcA	Toccoa sandy loam, 0 to 2 percent slopes	58.2	0.4%	0.10
TeB	Townley silt loam, 2 to 6 percent slopes	50.4	0.3%	0.37
TeD	Townley silt loam, 6 to 15 percent slopes	149.8	0.9%	0.49
W	Water	142.6	0.9%	NA
WaA	Wax loam, 0 to 3 percent slopes	161.8	1.0%	0.28
Subtotals for Soil Survey Area		8,747.2	55.3%	
Totals for AOI		15,827.4	100.0%	

Source: NRCS 2022

Etowah County soils encompass approximately 45 percent of the Chandler Mountain Project Area. Predominant soils units include the Allen, Chewacla, Conasauga, Gaylesville, Holston, Minvale, and Nella-Allen association. General soil characteristics for these units are provided below.

Allen: generally described as a well-drained loam derived from sedimentary rocks typically found on ridges.

Chewacla: generally described as a somewhat poorly drained loam derived from sedimentary rocks typically found in flood plains.

Conasauga: generally described as a moderately well drained loam derived from sedimentary rocks typically found on ridges and hillslopes.

Gaylesville: generally described as a somewhat poorly drained loam derived from sedimentary rock typically found in flood plains.

Holston: generally described as a well-drained loam derived from sedimentary rock typically found on stream terraces.

Minvale: generally described as a well-drained loam derived from sedimentary rock typically found on ridges.

Nella-Allen: generally described as a well-drained loam derived from sedimentary rock typically found on hillslopes.

St. Clair County soils encompass approximately 55 percent of the Chandler Mountain Project Area. Predominant soils units include the Allen, Conasauga and Firestone, Gaylesville, Minvale-Neela-Townley, Mooreville, Nauvoo, Rock outcrop-Nella-Townley, Tanyard, Townley, and Wax. General soil characteristics for these units are provided below.

Allen: generally described as a well-drained loam derived from sedimentary rocks typically found on ridges.

Conasauga and Firestone: generally described as a moderately well to well-drained loam derived from sedimentary rocks typically found on hillslopes.

Gaylesville: generally described as a somewhat poorly drained loam derived from sedimentary rocks typically found in flood plains.

Minvale-Neela-Townley: generally described as a well-drained loam derived from sedimentary rocks typically found on mountains.

Mooreville: generally described as a moderately well drained loam derived from sedimentary rocks typically found in flood plains.

Nauvoo: generally described as a well-drained loam derived from sedimentary rocks typically found on ridges and hillslopes.

Rock outcrop-Nella-Townley: generally described as a well-drained loam derived from sedimentary rocks typically found on mountains.

Tanyard: generally described as a moderately well drained loam derived from sedimentary rocks typically found in flood plains.

Townley: generally described as a well-drained loam derived from sedimentary rocks typically found in ridges.

Wax: generally described as a moderately well drained loam derived from sedimentary rocks typically found in flood plains.

4.3.6 Shorelines and Streambanks

Currently the Chandler Mountain Project is unconstructed and therefore has no associated shorelines. The Chandler Mountain Project upper and lower reservoirs will be fully or partially lined to serve as a primary seepage barrier. Existing streambanks that may be subject to erosion, soil movement, slumping, or other forms of instability will be identified and studied during the licensing process.

4.3.7 Regional and Project Area Seismicity

The Chandler Mountain Project Area would be located within the Southern Appalachian Seismic Zone (SSAZ) that extends from Roanoke, Virginia to central Alabama and is considered a zone of moderate risk. The largest earthquake in the SSAZ was the 1897 Giles County earthquake with an estimated moment magnitude (M_w) 5.5 to M_w 5.9. Within the larger SSAZ is the East Tennessee Seismic Zone (ETSZ), located northeast of the Project Area (Figure 4-6). It is one of the most active seismic zones in eastern North America and is located primarily in the Valley and Ridge province of Tennessee with a portion in the Valley and Ridge and Blue Ridge province of western North Carolina. The zone is

approximately 300 kilometers (km) long and 50 km wide, is southeast of the New York – Alabama lineament, and has not produced a damaging earthquake in historical time. The earthquakes occur at depths of 5 to 25 km within Precambrian crystalline basement rocks beneath the thrust sheets of Paleozoic sedimentary rocks of the Valley and Ridge. The structures likely responsible for the seismicity in the zone are reactivated Precambrian to Cambrian normal faults formed during the rifting (extension) that formed the Iapetus Ocean. These faults are located beneath the later accreted Appalachian thrust sheets, like the Giles County Seismic Zone in Virginia. The historical record of earthquakes in Alabama by county is shown in Figure 4-6.

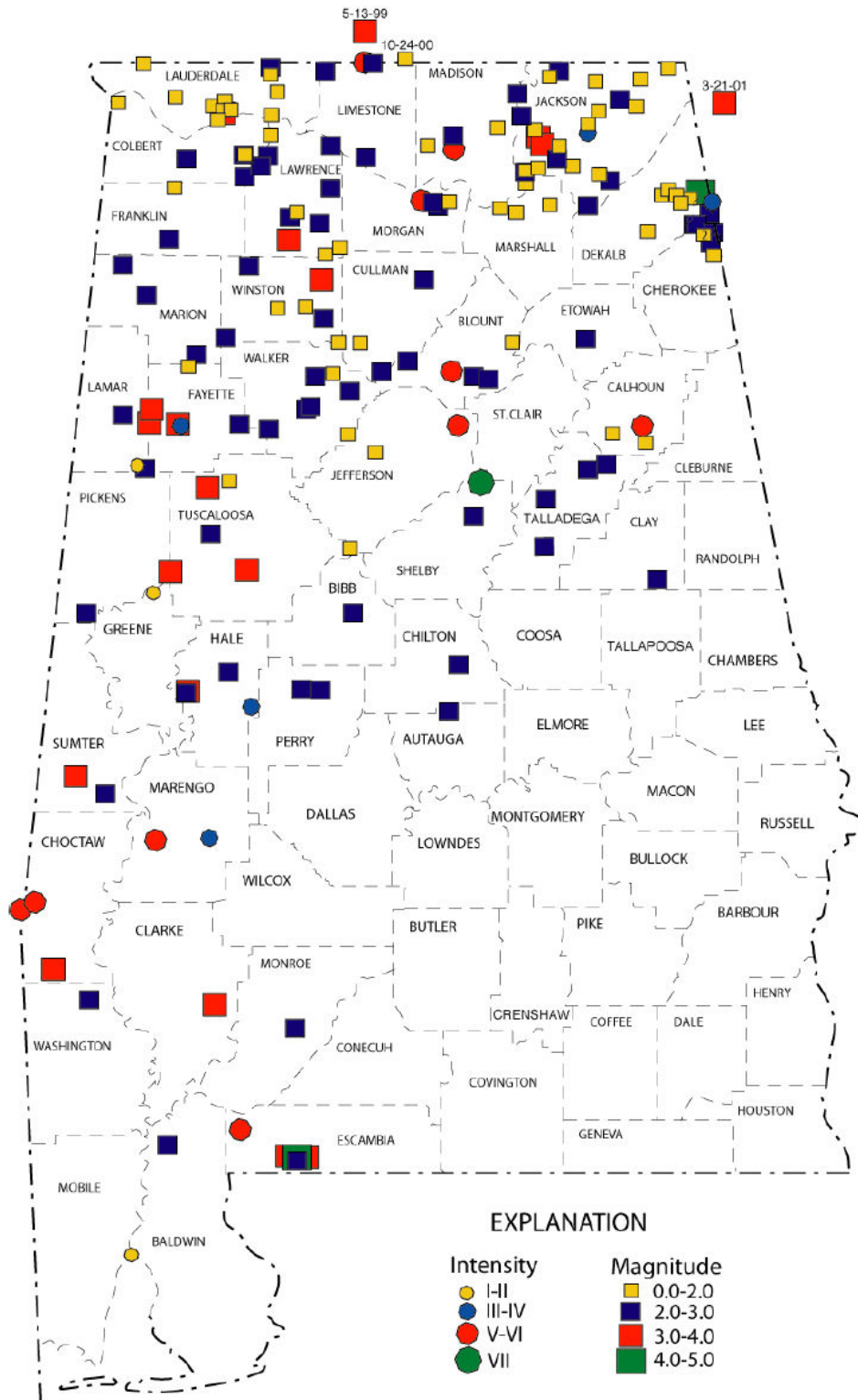


Figure 4-6 Historical Alabama Earthquakes

4.3.8 Preliminary Geological/Geotechnical Study

Alabama Power is currently completing a geological/geotechnical study in the Chandler Mountain Project Area to further inform initial investigations conducted at the site in the 1970s and early 1980s and to confirm the feasibility of the Chandler Mountain Project layout. This investigation involved a review of existing, relevant documents including Alabama Power's geologic and geotechnical investigations (corehole logs, auger hole logs, and water pressure tests data), geologic literature, and geologic maps relevant to the Project Area. A geologic reconnaissance site visit was performed from October 25-28, 2021. Additional work included drilling of one shallow core hole, one deeper core hole, down-hole testing, and laboratory testing. The coreholes are located on Alabama Power-owned land near Steele, Alabama. The coreholes are intended to provide subsurface information within the proposed upper and lower reservoirs, upper reservoir inlet/outlet (I/O) works, vertical intake shafts, high pressure headrace tunnels, and powerhouse. Soil and rock core samples will be selected for laboratory testing to assess engineering properties. Following completion of drilling, water pressure tests will be performed to measure the hydraulic conductivity of the bedrock. The boreholes will also have a suite of downhole geophysics performed.

The proposed upper reservoir is in the northern portion of the syncline forming Chandler Mountain. The proposed water conveyance alignment, including an underground powerhouse, would be located on the southeast flank of the mountain/syncline. The proposed lower reservoir located along the base of Chandler Mountain would abut Texas Ridge along the southeastern rim of the reservoir. Texas Ridge is a series of heavily folded, faulted and fractured sandstones, limestones, and shales. Further geotechnical investigations are required to further inform the Chandler Mountain Project design and ensure FERC dam safety requirements are met for the Project. Site geology characterization is summarized in Table 4-4.

Table 4-4 Site Geology Characterization

Site	Geology Characterization
Upper Reservoir Dam (Upper Dam)	Favorable/Moderate
Upper Reservoir Water Retention	Moderate
Water Conveyances	Moderate/Unfavorable
Powerhouse Cavern	Moderate
Lower Reservoir Dams	
Lower Dams A, B, and C	Favorable/Moderate

Site	Geology Characterization
Lower Dam D	Unfavorable
Lower Reservoir Water Retention	Moderate

4.3.9 References

Hatcher, R. D., B. R. Bream, and A. J. Merschat. 2007. Tectonic Map of the Southern and Central Appalachians: A tale of three orogens and a complete Wilson cycle. The Geological Society of America. Memoir 200.

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4.4 Water Resources

4.4.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Water Resources section:

- flushing rate, shoreline length, substrate composition (UK)

4.4.2 Drainage Area

The Little Canoe Creek East drainage area would overlap with the Chandler Mountain Project site. The drainage area of the lower reservoir is described for each dam. The drainage area upstream of proposed Lower Dam A on Little Canoe Creek East is approximately 22 square-miles. Lower Dam B would be located in a minor valley within Texas Ridge and is not expected to require significant water diversion. Lower Dam C would cross an unnamed creek with a drainage area of approximately 1.3 square-miles. Lower Dam D would be located at the upper reaches of the unnamed creek and is not expected to require significant water diversion (although a natural spring was identified relatively close to the dam). The Upper Dam would be located on the already impounded Jake Creek with a drainage area of approximately 2.1 square-miles. The northeastern portion of the mountain (the proposed location of the upper reservoir) flows into the upper portion of the Jake Creek watershed and has a series of impoundments including the existing non-Project Chandler Mountain Lake. The approximate 126-acre lake is formed by an earthen embankment owned by Chandler Mountain Lake Company. Jake Creek continues downstream of the existing non-Project Chandler Mountain Lake and joins Gulf Creek, which eventually flows into Big Canoe Creek.

4.4.3 Streamflow, Gage Data, and Flow Statistics

The USGS maintained a stream gage on Little Canoe Creek East at Highway 11, approximately 0.4 miles downstream of the proposed location of Lower Dam A, from April 1, 1982, to May 10, 1995 (USGS Station No. 02401470). Available data from this gage includes daily average streamflow. Excluding years with incomplete data (i.e., 1982 and 1995), the mean annual flow was 32 cfs. Flows were typically highest in February and March, and lowest from August to October (Table 4-5).

Table 4-5 Monthly Average, Minimum, and Maximum Discharge at Little Canoe Creek East USGS Gage No. 02401470

Month	Average Discharge (cfs)	Minimum Discharge (cfs)	Maximum Discharge (cfs)
Jan	53.3	3.7	669
Feb	69.8	6.9	2,100
Mar	67.7	9.6	953
Apr	47.6	5.6	458
May	27.1	3.9	913
Jun	12.9	3.7	258
Jul	18.9	2.9	586
Aug	7.8	2.0	38.9
Sep	10.8	1.1	819
Oct	9.7	1.6	606
Nov	22.0	1.2	312
Dec	44.6	1.0	1,310

Source: USGS 2022

4.4.4 Flow Duration Curves

Annual and monthly flow duration values were calculated using the data from the USGS gage on Little Canoe Creek East described in Section 4.4.3. Flow duration curves are presented in Figure 4-7 through Figure 4-19.

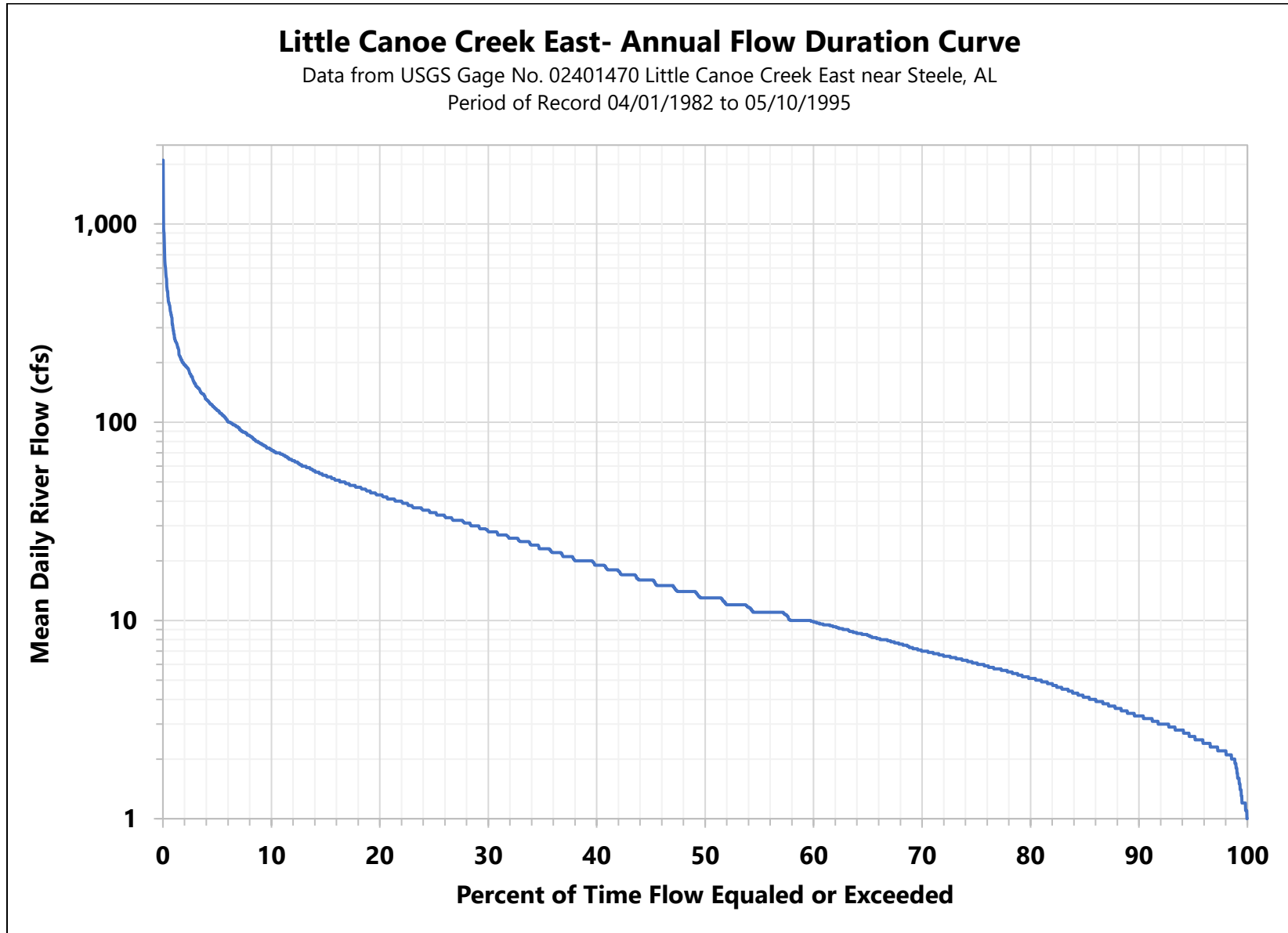


Figure 4-7 Annual Flow Duration Curve

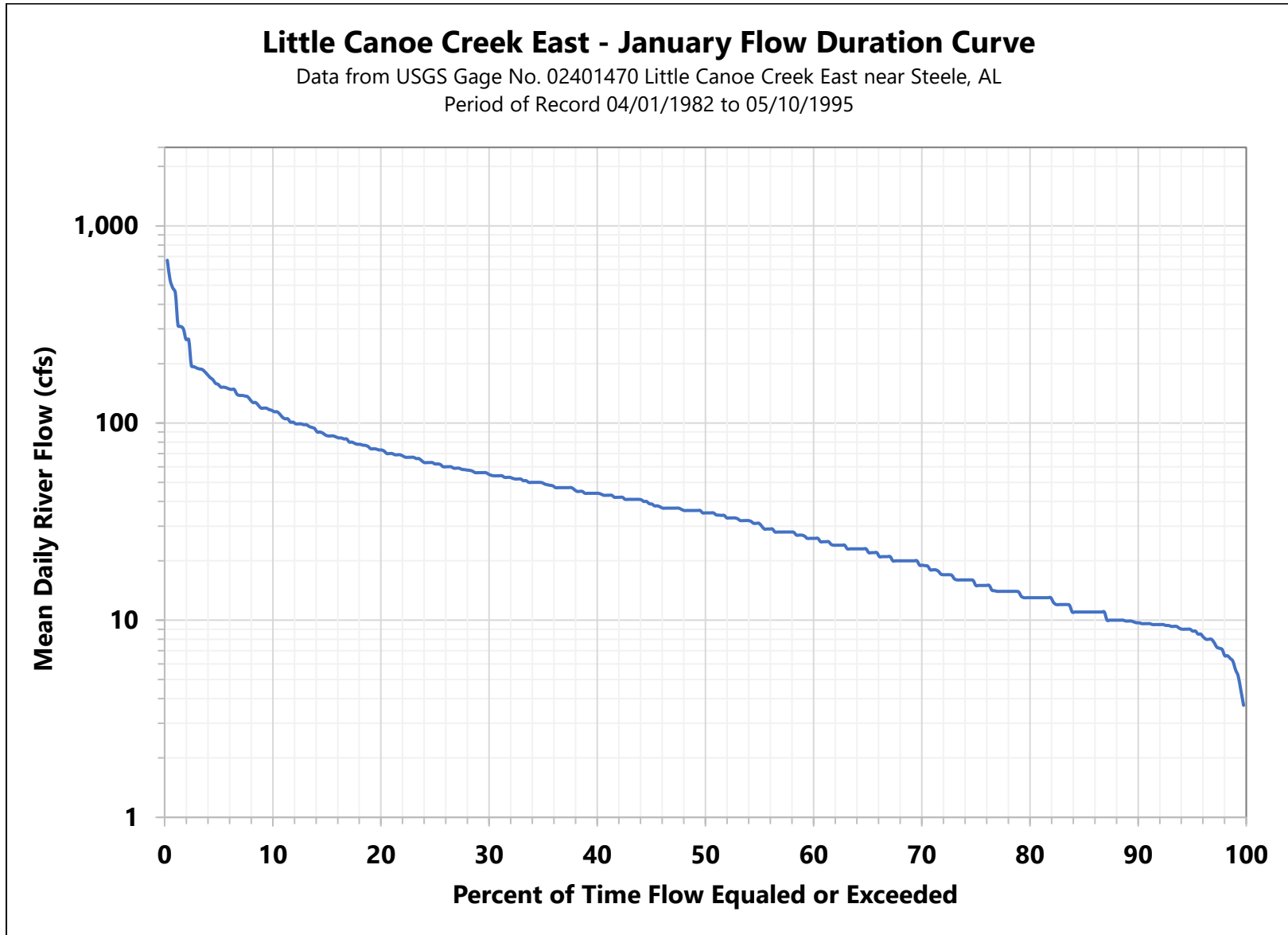


Figure 4-8 January Flow Duration Curve

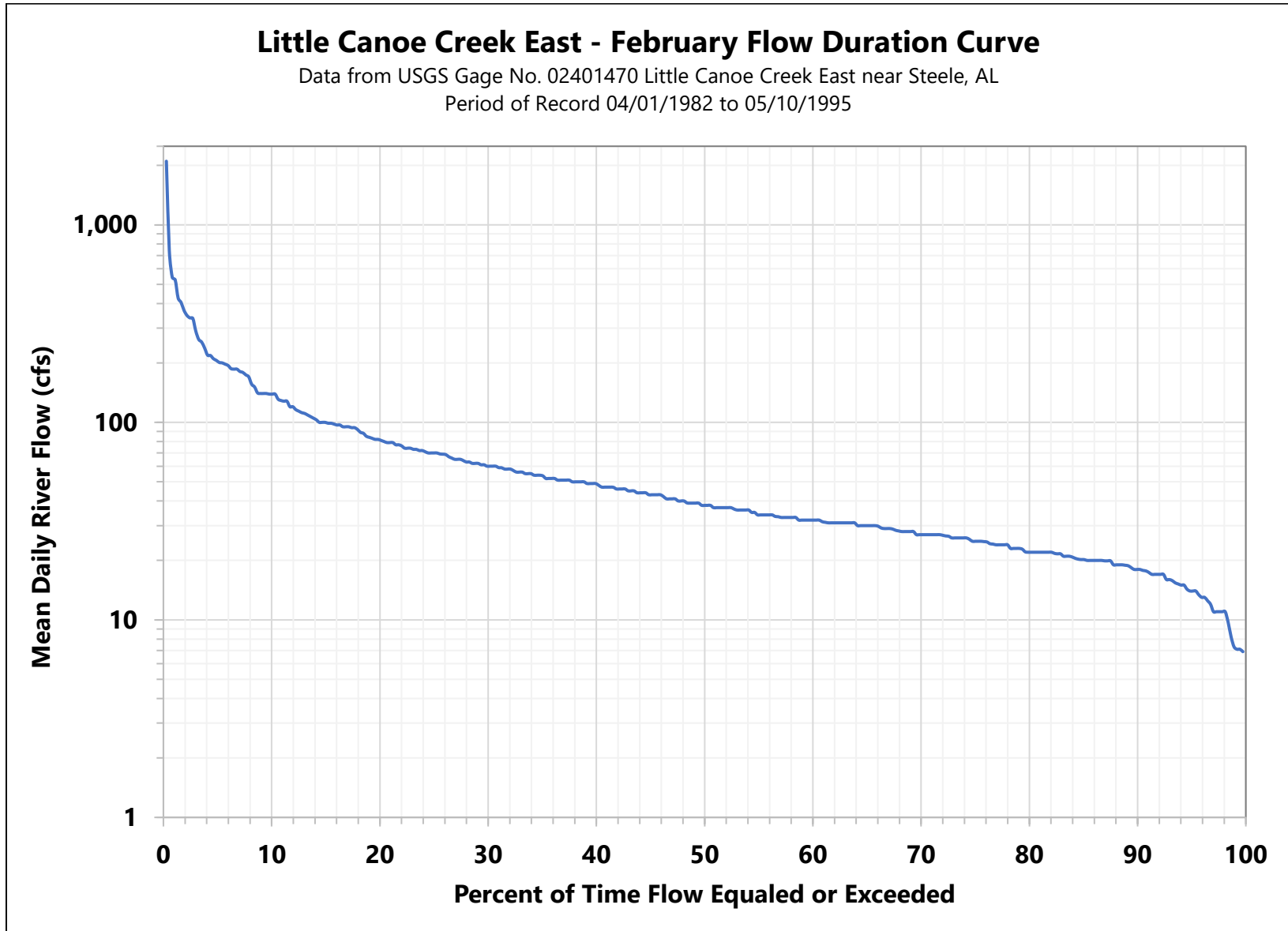


Figure 4-9 February Flow Duration Curve

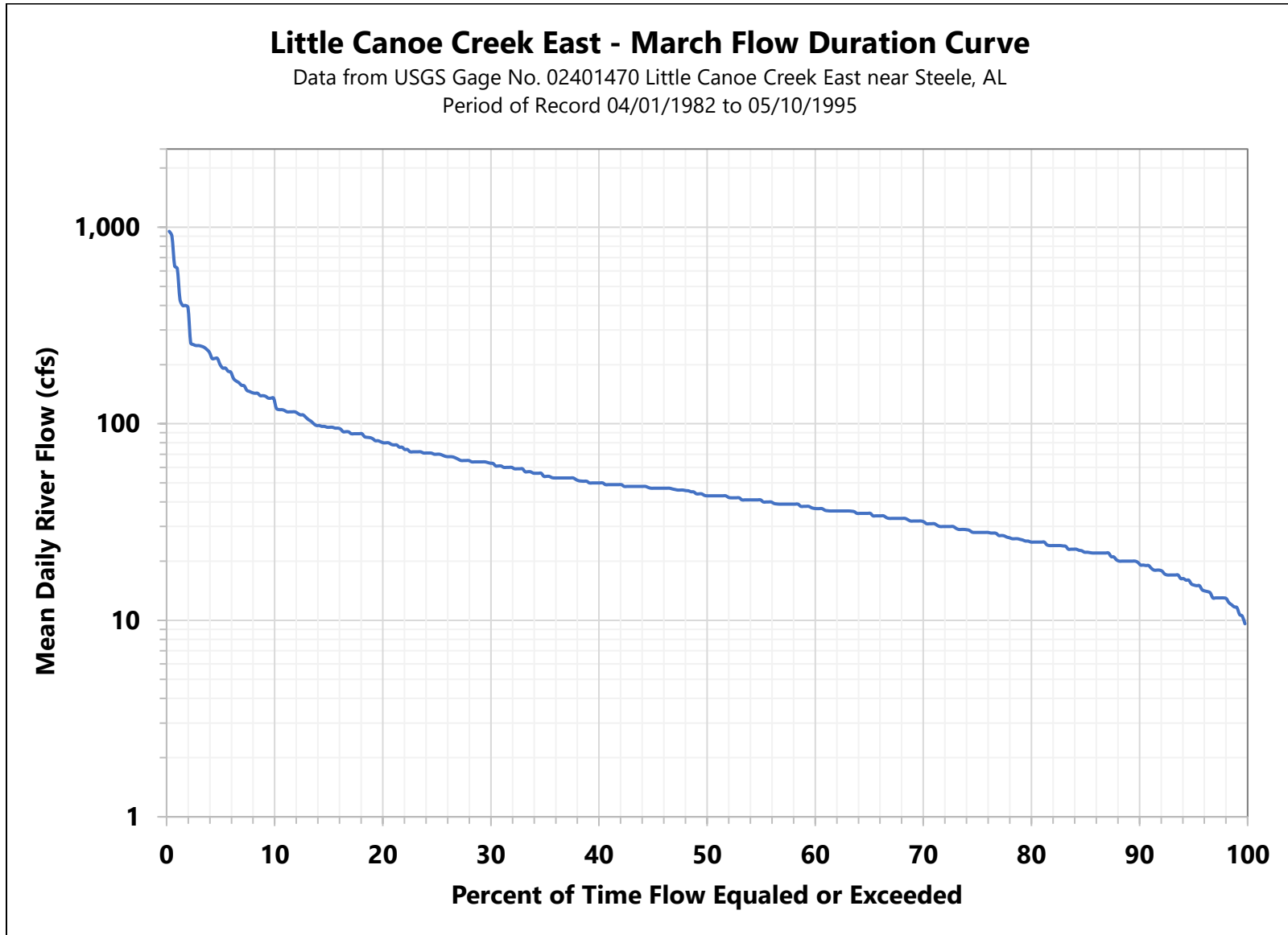


Figure 4-10 March Flow Duration Curve

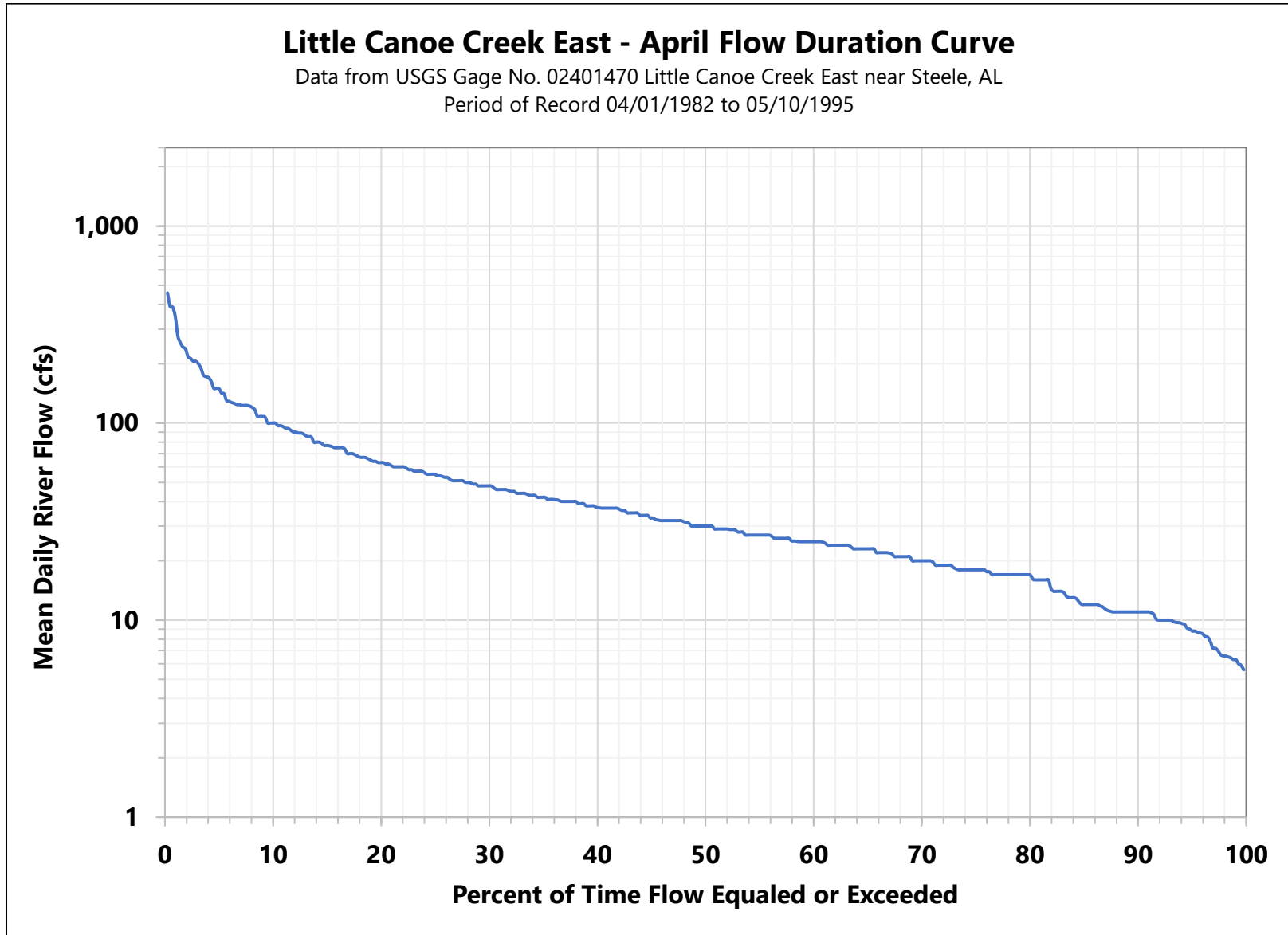


Figure 4-11 April Flow Duration Curve

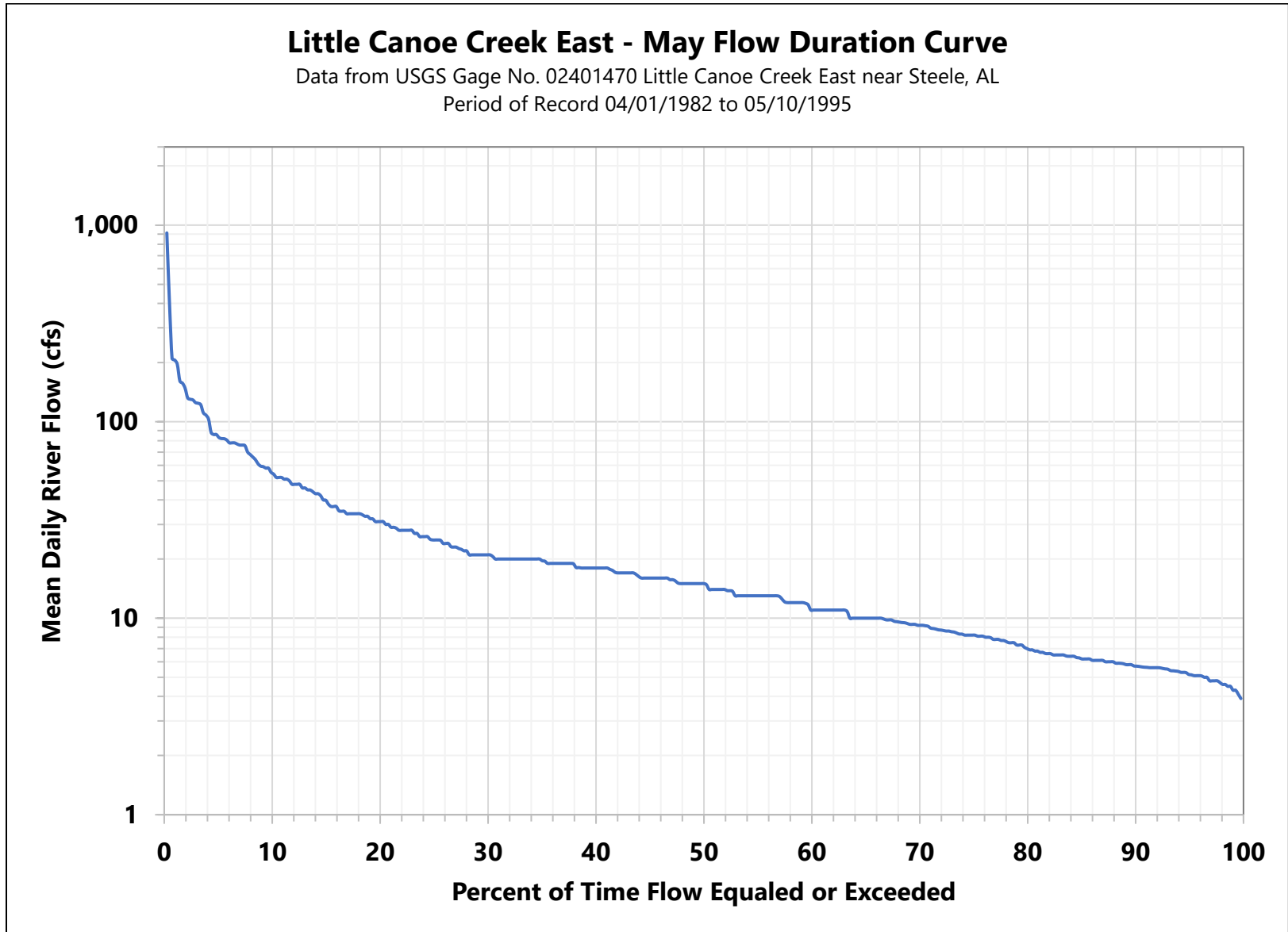


Figure 4-12 May Flow Duration Curve

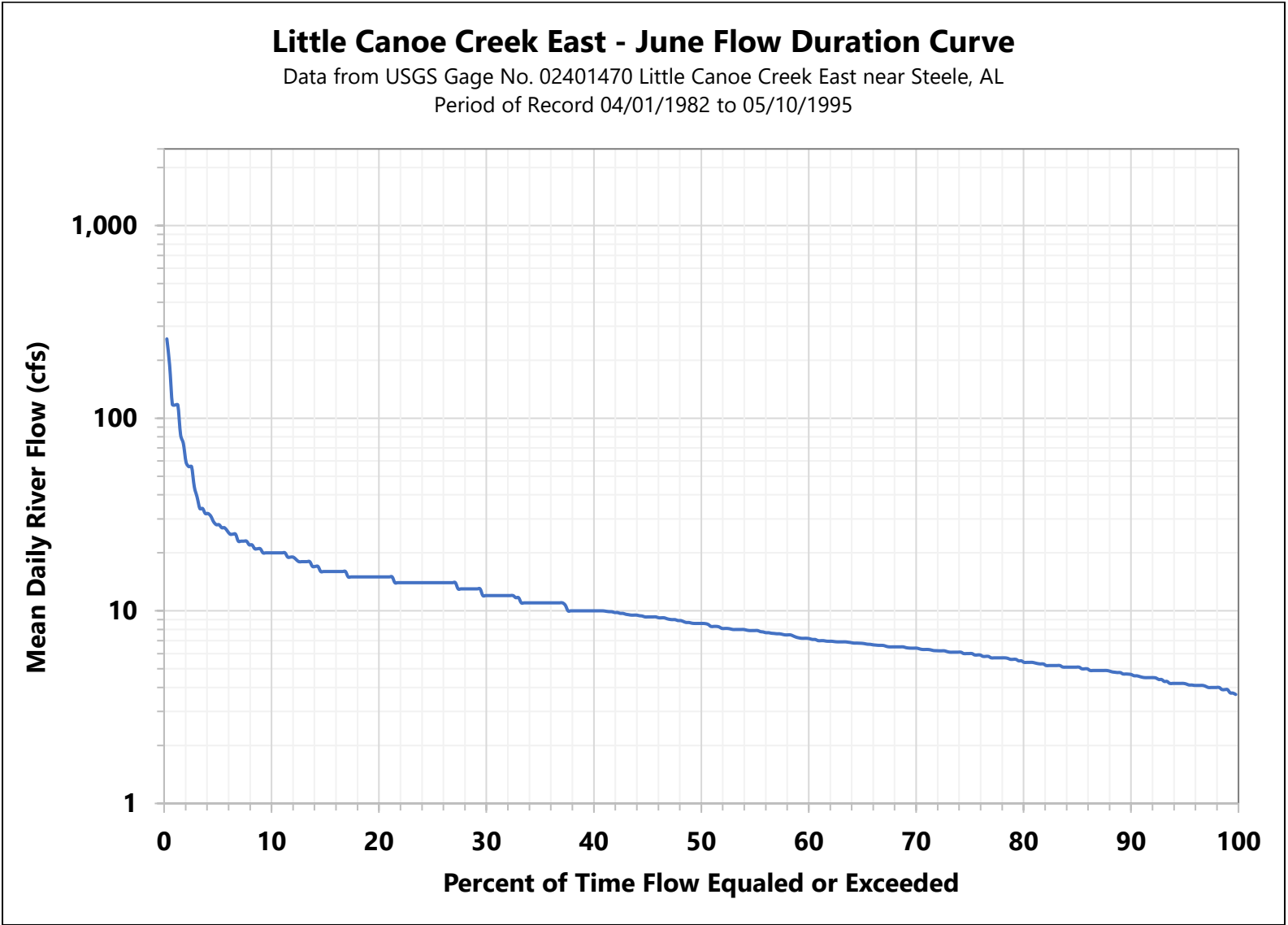


Figure 4-13 June Flow Duration Curve

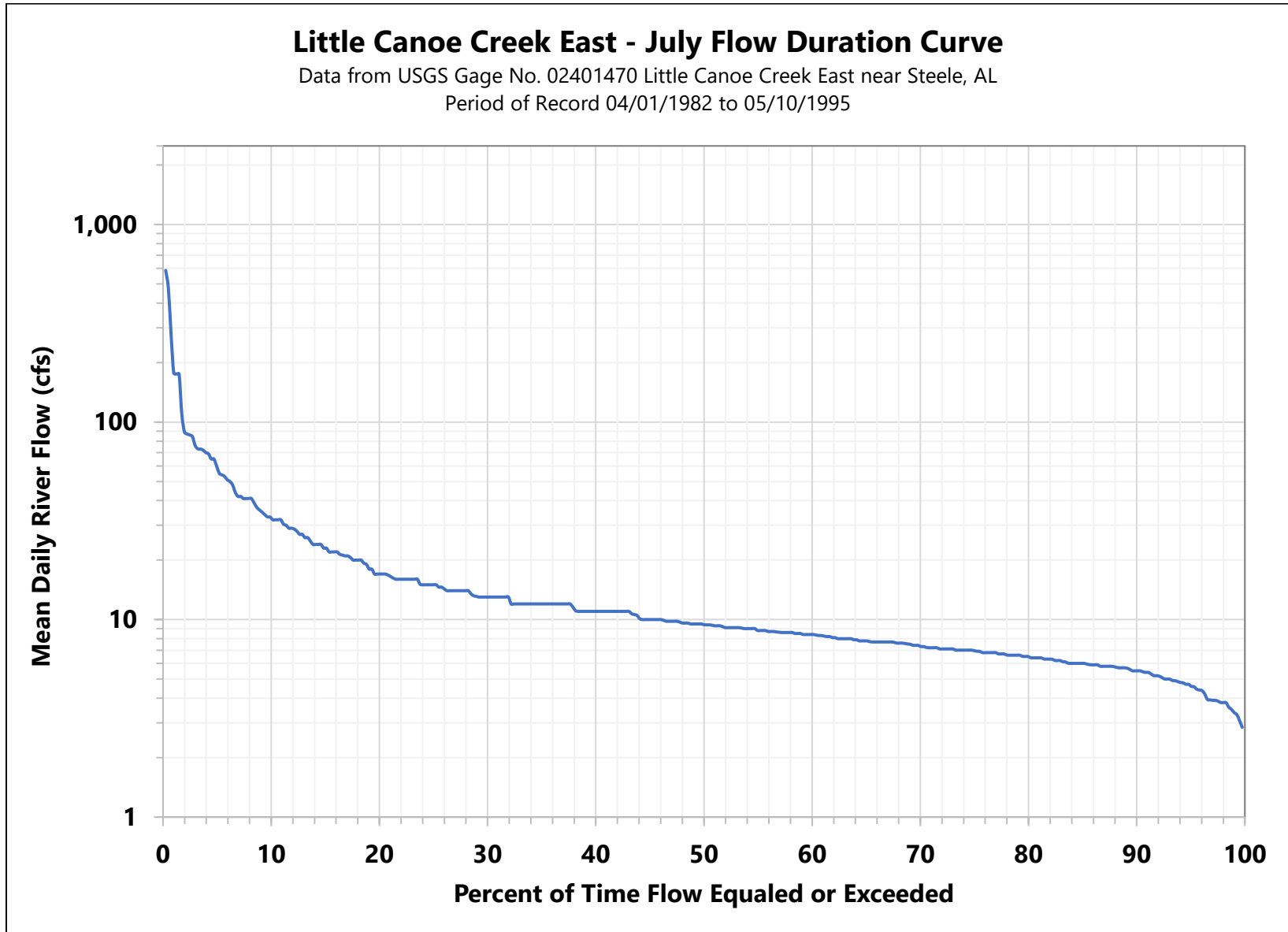


Figure 4-14 July Flow Duration Curve

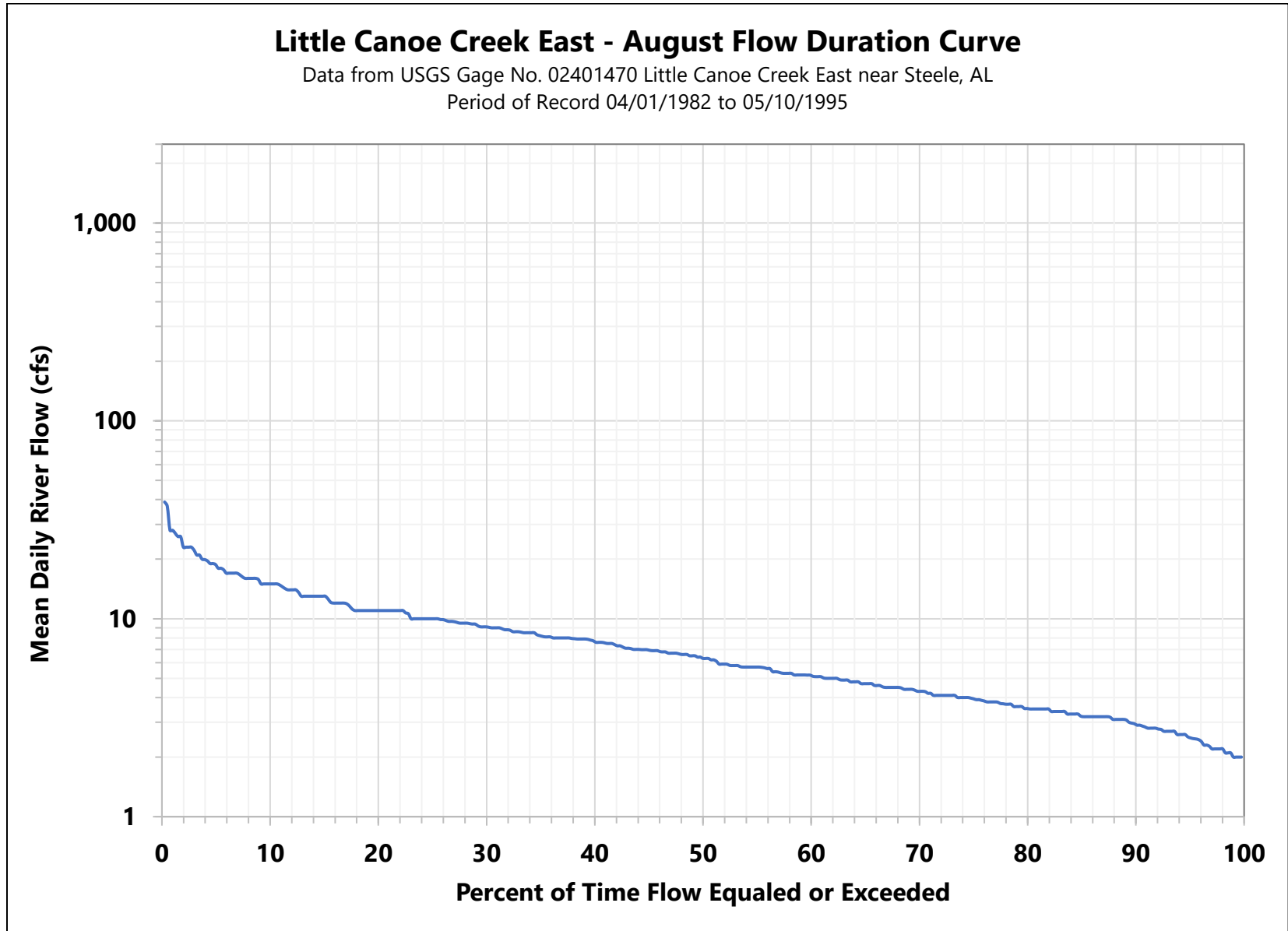


Figure 4-15 August Flow Duration Curve

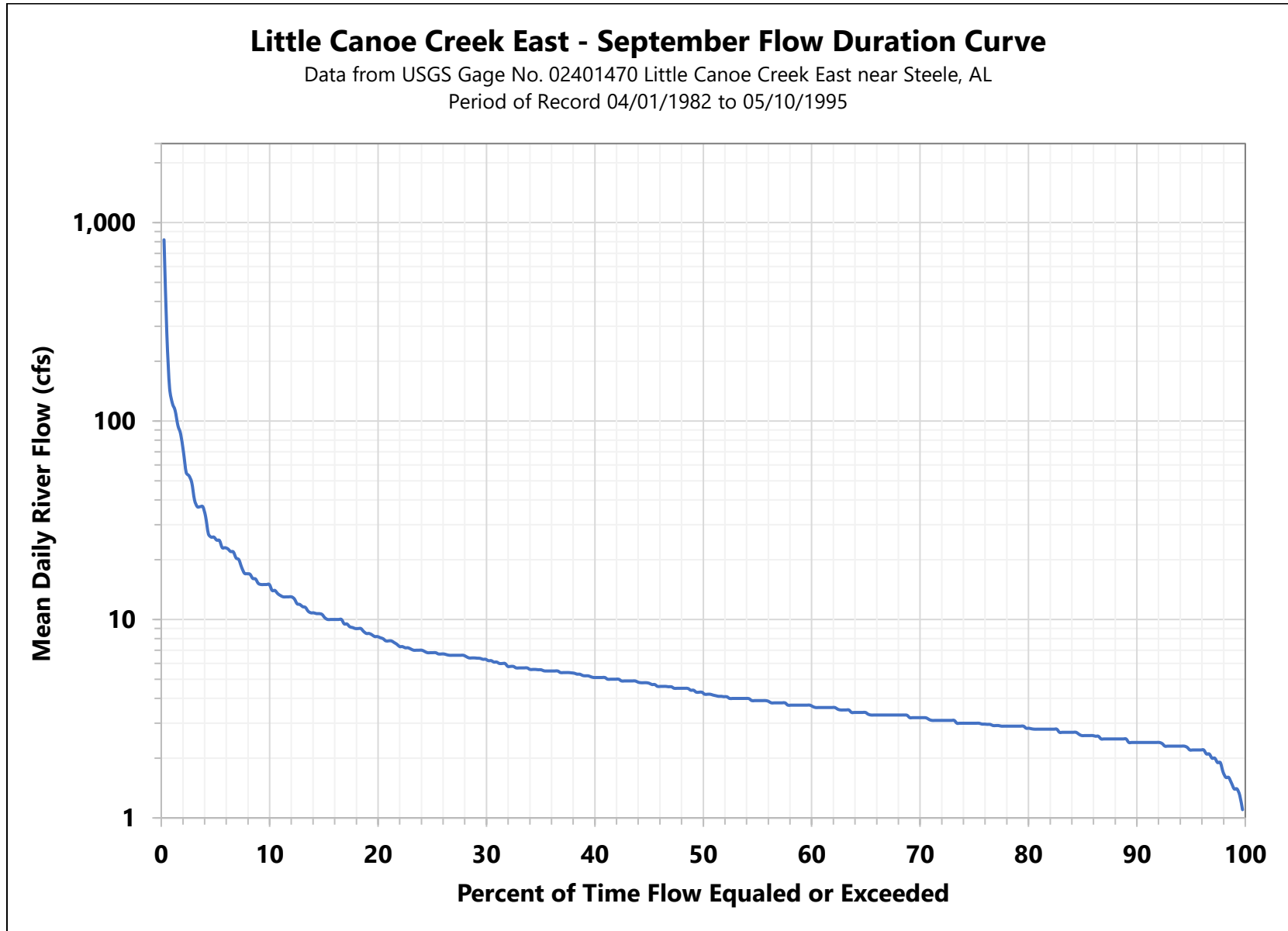


Figure 4-16 September Flow Duration Curve

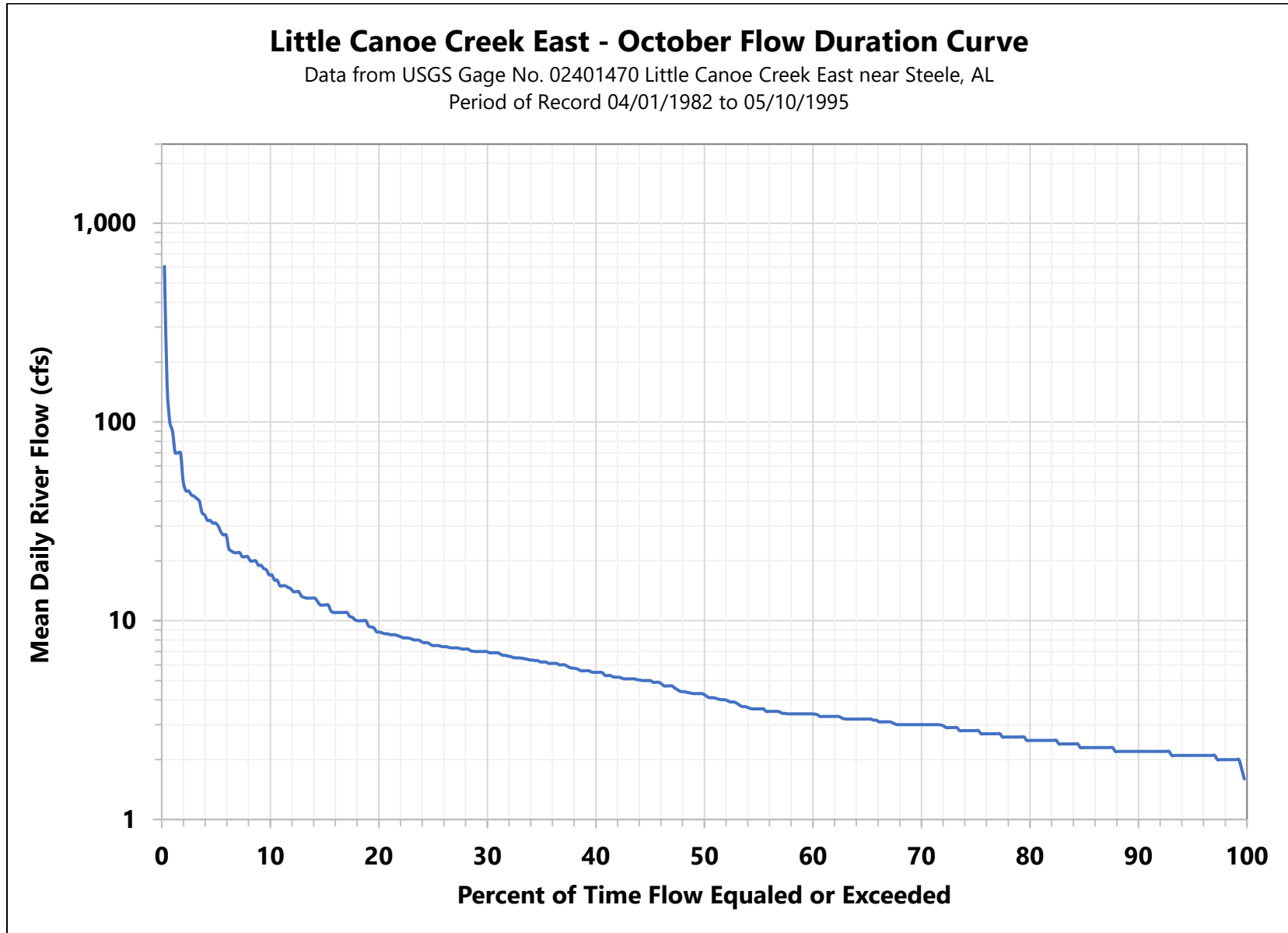


Figure 4-17 October Flow Duration Curve

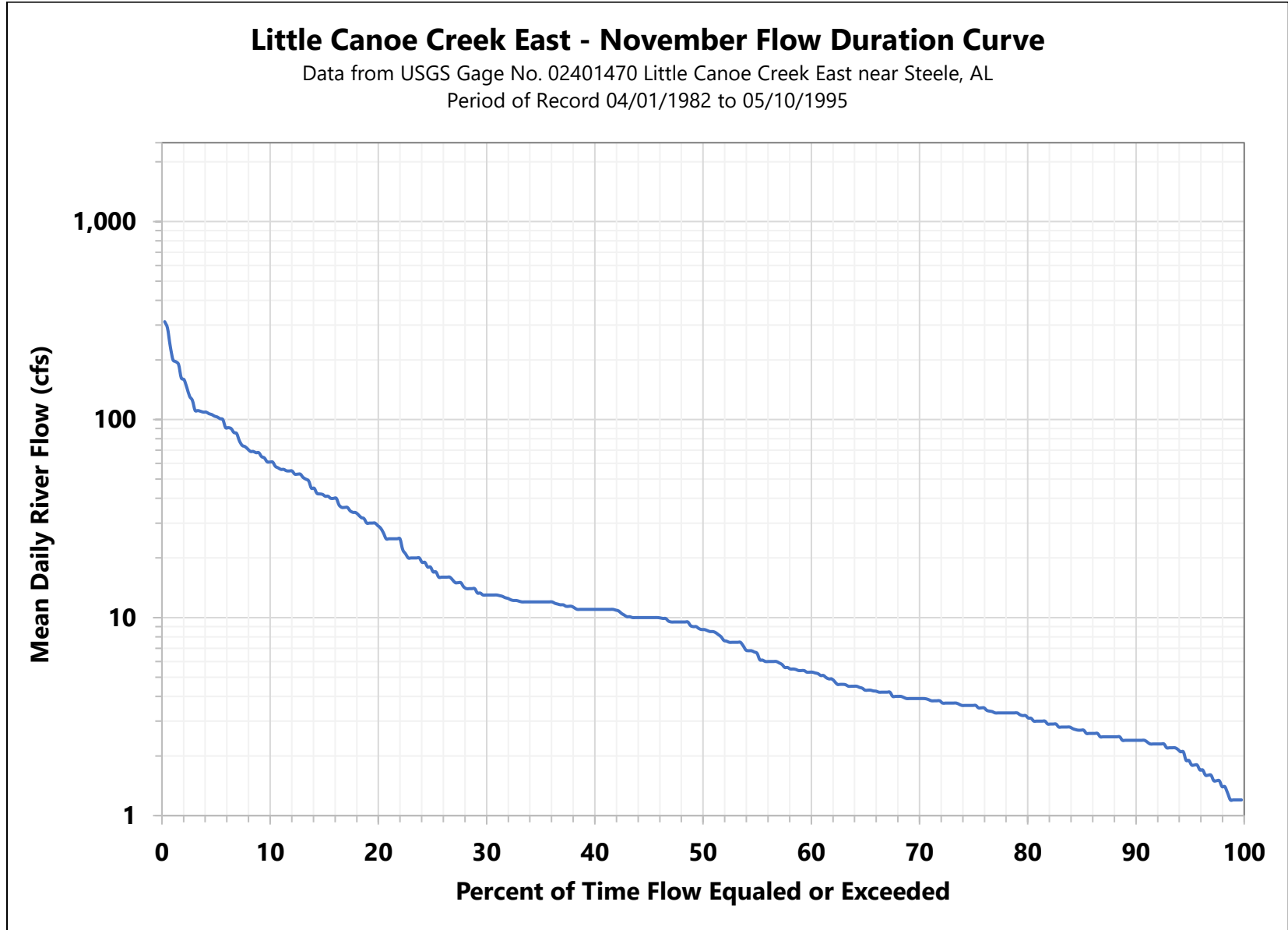


Figure 4-18 November Flow Duration Curve

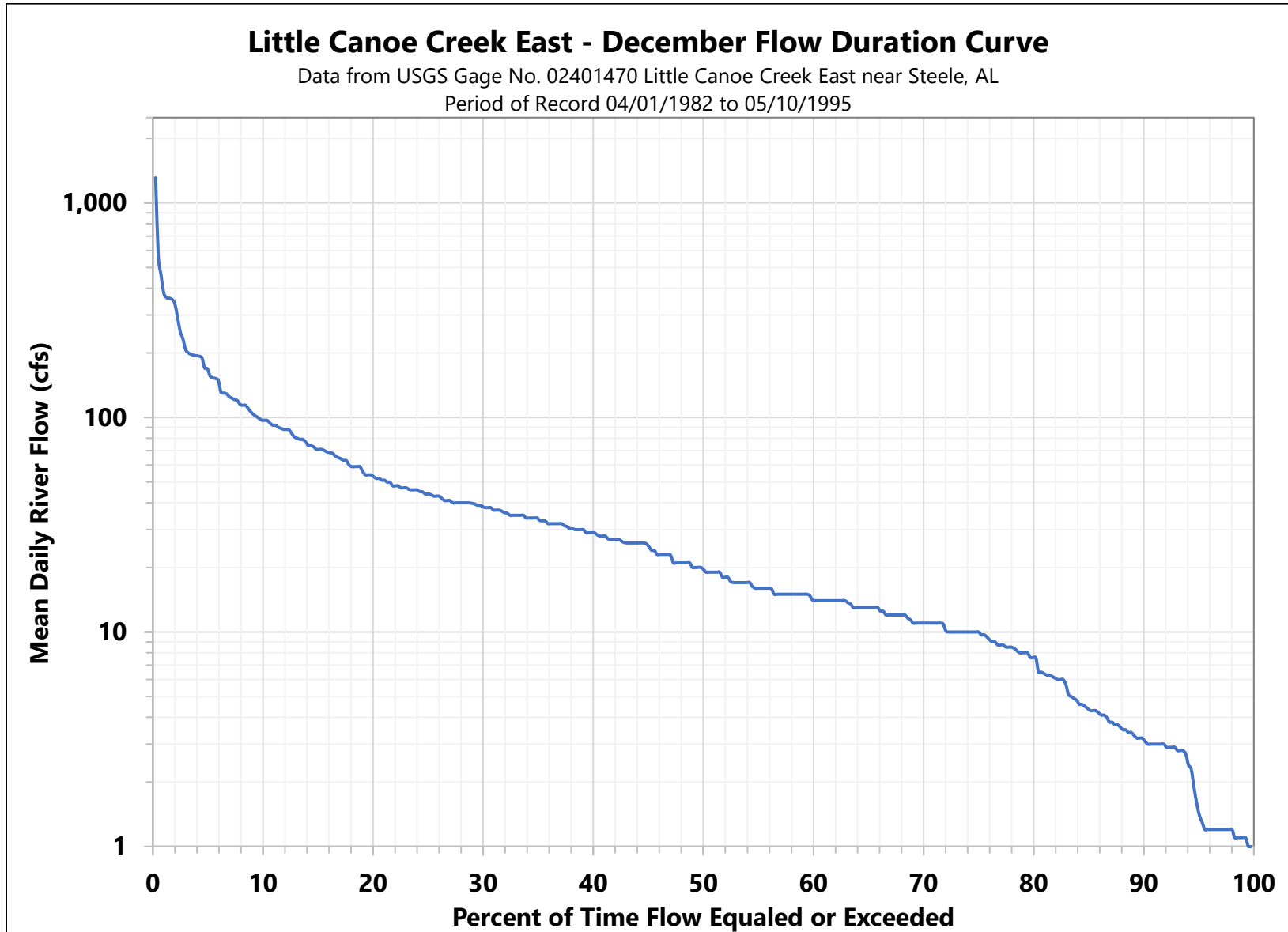


Figure 4-19 December Flow Duration Curve

4.4.5 Existing and Proposed Uses of Waters

Alabama Power proposes to use water from the upper reservoir to generate hydroelectric power during peak demand periods. Water in the lower reservoir would be pumped into the upper reservoir during off-peak periods when demand for electricity is low. Alabama Power proposes to release flows from Lower Dam A to protect downstream resources in Little Canoe Creek East. A supplemental intake located on Alabama Power's Neely Henry Lake is proposed for initial filling and for use during periods of drought.

4.4.6 Federally Approved Water Quality Standards

The CWA gives states the authority to set, implement, and enforce water quality standards. Specifically, Sections 303(d) and 305(b) of the CWA direct states to monitor and report the condition of their water resources. Alabama's assessment and listing methodology establishes a process to assess the status of surface waters in Alabama relative to the designated uses assigned to each waterbody (ADEM 2021). Water bodies not attaining set standards are placed on the state of Alabama's list of water bodies impaired pursuant to Section 303(d) of the CWA, and the state of Alabama designs a program which establishes total maximum daily loads (TMDLs) to bring water quality to within set criteria. Pursuant to Section 305(b) of the CWA, the state of Alabama provides biennial reports to the U.S. Congress as to the condition and status of statewide water quality, including a list of waters impaired pursuant to Section 303(d) of the CWA.

Additionally, Section 314(a)(2) of the CWA requires states to assess the water quality of publicly owned lakes and report the findings as part of the Biennial 305(b) Report to Congress. The state of Alabama classifies publicly owned lakes (including reservoirs) as water bodies that are managed for multiple-uses, publicly accessible, and exhibit physical/chemical characteristics typical of impounded waters (ADEM 2021).

Alabama's water quality standards consist of three components: designated uses, numeric and narrative criteria, and an antidegradation policy (ADEM 2021). Designated use is a classification system designed to identify the best uses of individual waterways. Alabama Department of Environmental Management (ADEM) Administrative Code r. 335-6-11 outlines seven designated uses, as follows:

1. Outstanding Alabama Water (OAW)
2. Public Water Supply (PWS)

3. Shellfish Harvesting (SH)
4. Swimming and Other Whole-Body Water-Contact Sports (S)
5. Fish and Wildlife (F&W)
6. Limited Warmwater Fishery (LWF)
7. Agricultural and Industrial Water Supply (A&I)

The primary designation for best use of Little Canoe Creek East is F&W (see ADEM Administrative Code r. 335-6-11-.02(11)) (ADEM 2021). Numeric and narrative criteria have been established for the state of Alabama to measure the degree to which the quality of waters is consistent with their designated uses. Narrative criteria generally describe minimum conditions necessary for all uses, and numeric criteria include pollutant concentrations or physical characteristics necessary to protect a specific designated use. The state of Alabama's narrative and numeric criteria are defined in ADEM Administrative Code r. 335-6-10 (ADEM 2021). Table 4-6 provides the specific water quality criteria that apply to state of Alabama waters with a F&W designation.

Table 4-6 Specific Water Quality Criteria for State of Alabama Waters with the Designation of Fish and Wildlife

Variable	Standard for Fish and Wildlife
pH	Between 6.0 and 8.5
Dissolved Oxygen	Not less than 5.0 mg/L* at a depth of 5 feet
Water Temperature	Not greater than 90 degrees F (32.2 degrees C)
Turbidity	Not greater than 50 NTUs**
Bacteria	E. coli: 548 colonies /100 ml*** geometric mean; 2507 colonies/100 ml in any sample

*mg/L = milligram per liter

**NTU = Nephelometric turbidity unit

*ml = milliliter

According to ADEM's 2022 305(b) report, Little Canoe Creek East meets all applicable water quality standards (ADEM 2022a).

4.4.7 Existing Instream Flow Uses

Little Canoe Creek East has been designated as F&W and there are no known water withdrawals or additional permitted uses.

4.4.8 Existing Water Quality Data

ADEM periodically collected water quality data in Little Canoe Creek East approximately 0.3 miles downstream of proposed Lower Dam A (ADEM Station LCNE-1; Figure 4-20). A summary of data collected between 1994 and 2005 is presented in Table 4-7. Dissolved oxygen concentrations averaged 8.53 mg/L and ranged from a low of 7.14 mg/L to a high of 11.75 mg/L, with the lowest values typically recorded during summer. Water temperature averaged 20.08 degrees Celsius (°C) and ranged from 11.00 °C to 26.56 °C, with the highest values typically recorded during the summer.

Alabama Power performed limited continuous monitoring at two locations on Little Canoe Creek East from August to November 2021. Measurements of specific conductance, dissolved oxygen, pH, turbidity, and water temperature were recorded at hourly intervals. Water temperatures at the upstream monitor ranged from 9.17-25.36 °C and dissolved oxygen ranged from 7.02-11.06 mg/L. Water temperatures at the downstream monitor ranged from 9.14-25.11 °C and dissolved oxygen ranged from 5.31-10.05 mg/L. A summary of the data is provided in Table 4-8.

Alabama Power's 2021 data ranges are slightly different compared to the ADEM data collected from 1994-2005 mentioned above. ADEM's data were single (discrete) measurements that were typically taken mid-day to afternoon, when dissolved oxygen would naturally be highest. Alabama Power collected continuous data that included periods when dissolved oxygen would be naturally lowest (night/early morning).

ADEM conducted recent water quality sampling at a station (NEES-8) in Neely Henry Lake approximately 5-stream miles downstream of the proposed supplemental intake location (Figure 4-20). ADEM collected monthly vertical profile measurements of water temperature, dissolved oxygen, conductivity, pH, and turbidity at one-meter intervals from April to October of 2016, 2019, and 2022. The vertical profile data indicate thermal stratification does not occur at this location, likely due to the shallow nature of the area (Figure 4-21). However, this location does experience low dissolved oxygen conditions during the summer months (Figure 4-22). ADEM also collected and analyzed water samples from the photic zone during those same periods for several constituents, including nutrients and bacteria (Table 4-9).

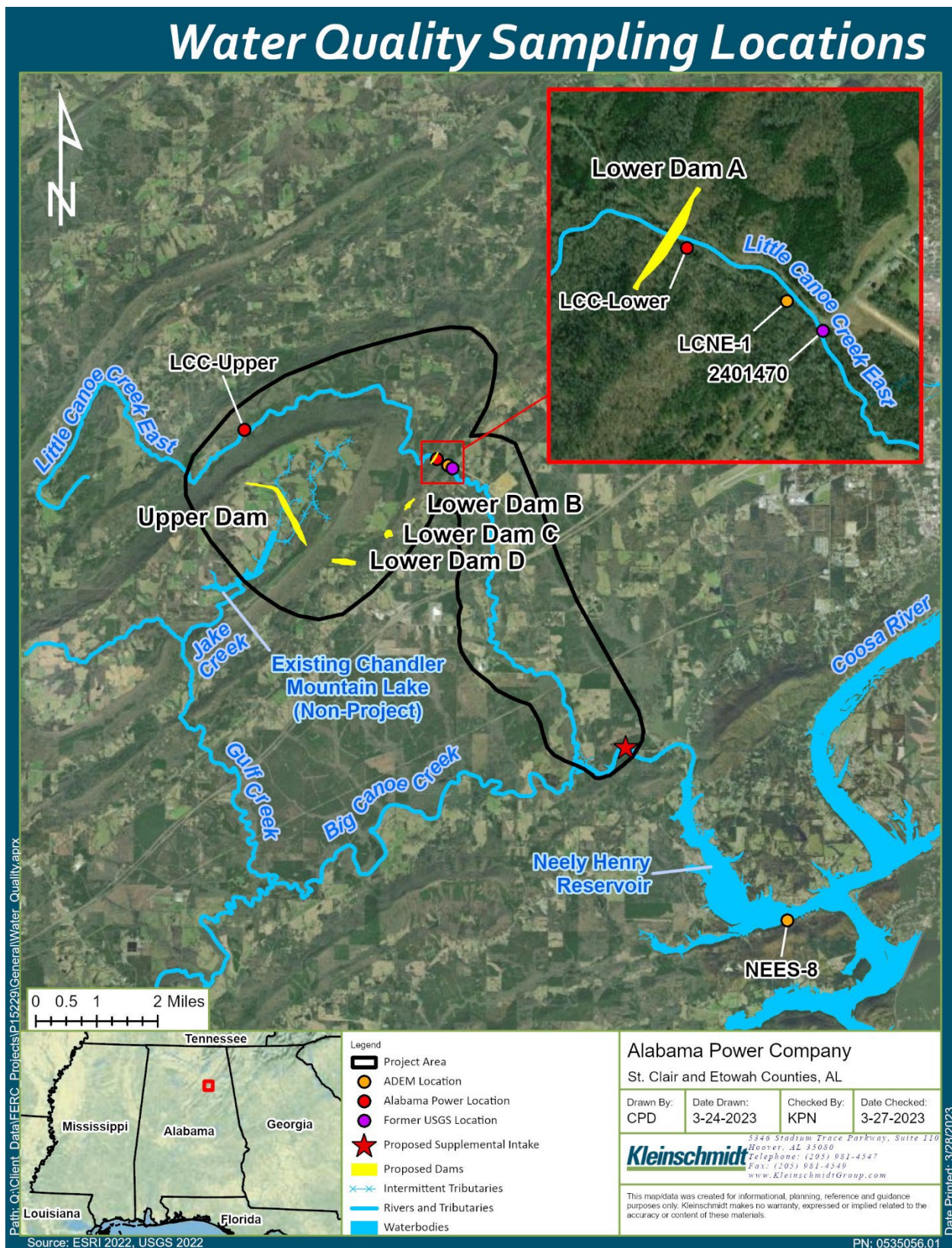


Figure 4-20 Water Quality Sampling Locations

Table 4-7 Summary of Water Quality Data Collected by ADEM at Little Canoe Creek East Station LCNE-1

Parameter	# of Samples	# of Samples with Detections	Avg	Min	Max	Units
Alkalinity	32	32	71	20	107	mg/L
Ammonia-nitrogen	38	8	0.081	0.016	0.178	mg/L
Biochemical oxygen demand	30	28	0.93	0.1	5.1	mg/L
Conductivity	26	26	166	57	293	us/cm
Dissolved oxygen	54	54	8.53	7.14	11.75	mg/L
Fecal Coliform	33	33	158	9	3240	MPN/100 mL
Flow	36	36	16.8	2.4	80.6	cfs
Hardness	35	35	75	26	114	mg/L
Kjeldahl nitrogen	39	24	0.405	0.1602	2.23	mg/L
Nitrate + Nitrite	39	38	0.183	0.015	0.46	mg/L
Orthophosphate	27	23	0.015	0.003	0.034	mg/L
Phosphorus	39	29	0.074	0.008	0.6	mg/L
Temperature, water	43	43	20.08	11	26.56	°C
Total dissolved solids	29	29	95	46	147	mg/L
Total suspended solids	35	34	9	1	112	mg/L
Turbidity	35	34	12.5	2.28	173.5	NTU

Source: ADEM 2022b

Table 4-8 Summary of Continuous Water Quality Data Collected by Alabama Power at Little Canoe Creek East from August to November 2021

Site		Specific Conductivity ($\mu\text{S}/\text{cm}$)*	DO (mg/L)	pH (pH)	Turbidity (NTU)	Temperature ($^{\circ}\text{C}$)
Upstream Monitor	Min	66.29	7.02	7.16	1.02	9.17
	Max	182.22	11.06	8.15	942.73	25.36
	Avg	152.13	8.31	7.84	26.75	19.51
Downstream Monitor	Min	89.66	5.31	7.35	0	9.15
	Max	196.56	10.05	7.99	719.68	25.11
	Avg	153.88	8.08	7.74	6.3	19.12

* $\mu\text{S}/\text{cm}$ = microsiemens per centimeter

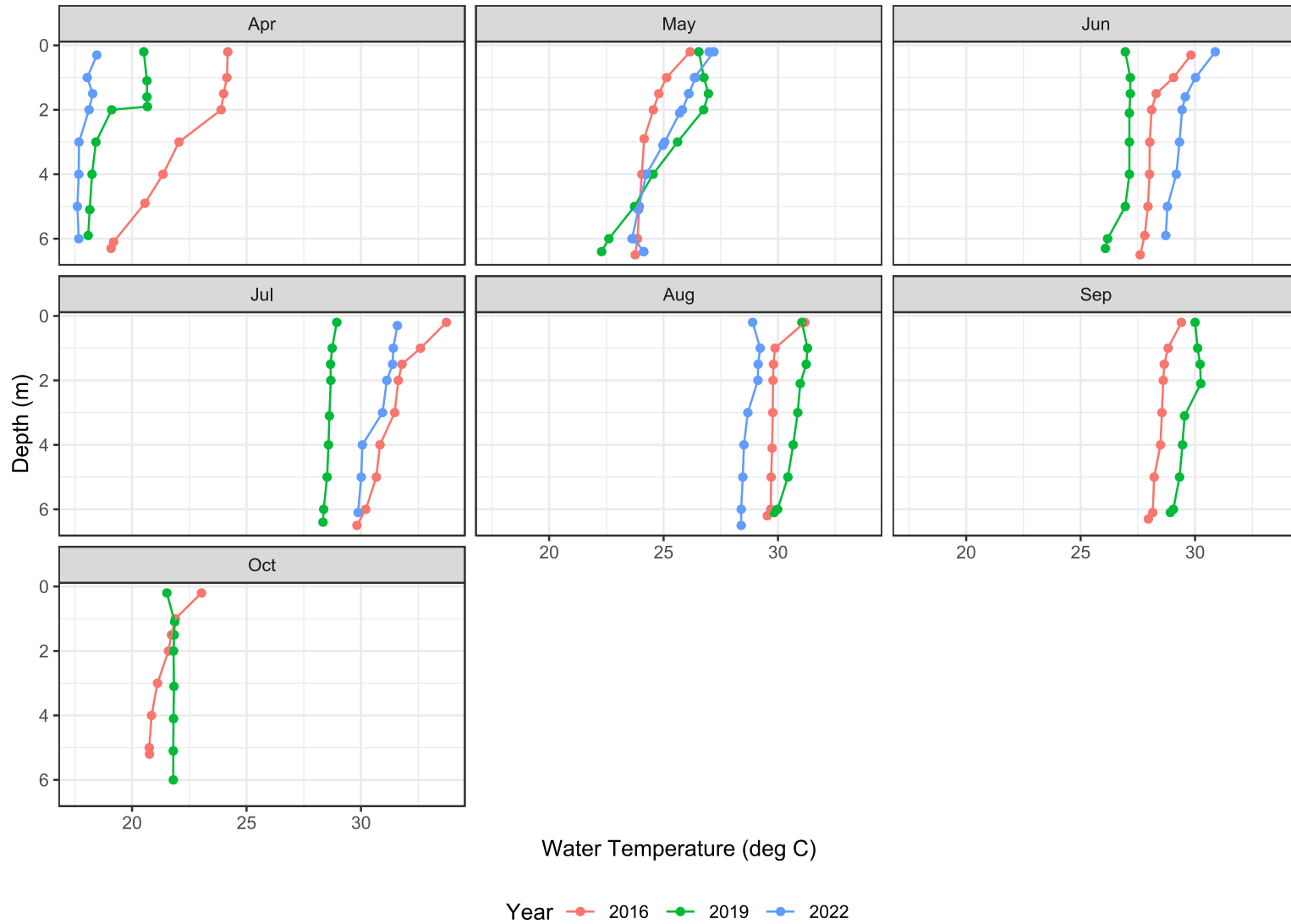


Figure 4-21 Vertical profile Measurements of Water Temperature Collected by ADEM at Station NEES-8 in Neely Henry Lake

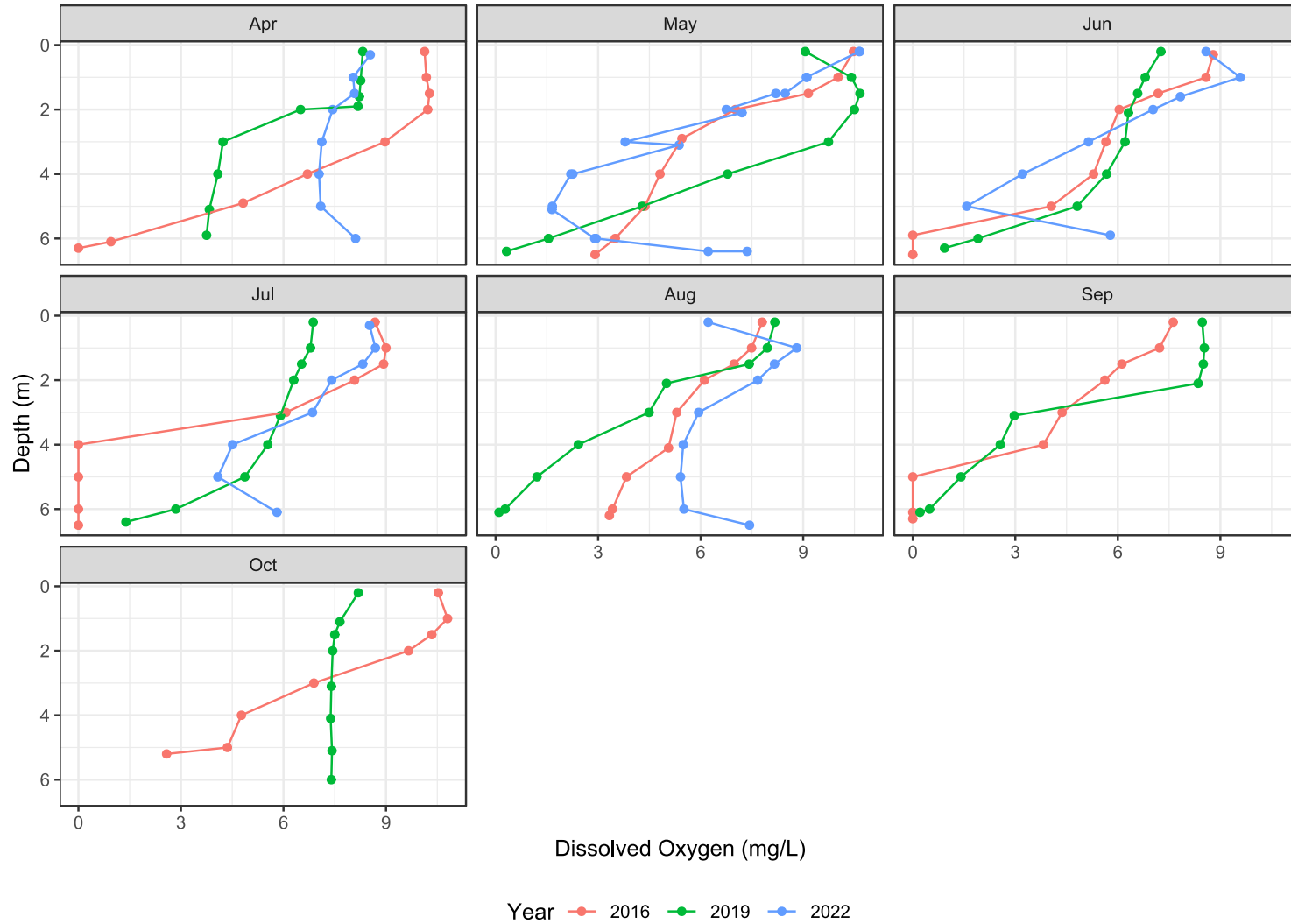


Figure 4-22 Vertical Profile Measurements of Dissolved Oxygen Collected by ADEM at Station NEES-8 in Neely Henry Lake.

Table 4-9 Discrete Chemistry Sample Results from Photic Zone Samples Collected by ADEM at Station NEES-8 in Neely Henry Lake

Parameter	# of Samples	# of Detection s	Avg	Min	Max	Units
Alkalinity, total	37	37	71.4	46	97.6	mg/L
Ammonia-nitrogen	37	8	0.045	0.016	0.140	mg/L
Biochemical oxygen demand	26	15	2.52	2.00	3.90	mg/L
Chlorophyll a	37	36	24.64	3.20	44.86	mg/m3
Depth, Secchi disk depth	37	37	0.82	0.48	1.32	m
Escherichia coli	14	14	3.6	1.0	32.7	MPN/100 mL
Hardness, Ca, Mg	23	23	73.0	50.0	89.2	mg/L
Nitrate + Nitrite	37	15	0.041	0.002	0.180	mg/L
Kjeldahl nitrogen	37	36	0.666	0.283	1.840	mg/L
Orthophosphate	34	16	0.006	0.003	0.014	mg/L
Phosphorus	37	36	0.044	0.022	0.084	mg/L
Total dissolved solids	37	37	97.8	29.0	172.0	mg/L
Total suspended solids	36	36	10.0	3.0	18.0	mg/L

Source: ADEM 2022b

4.4.9 Proposed Project Reservoirs

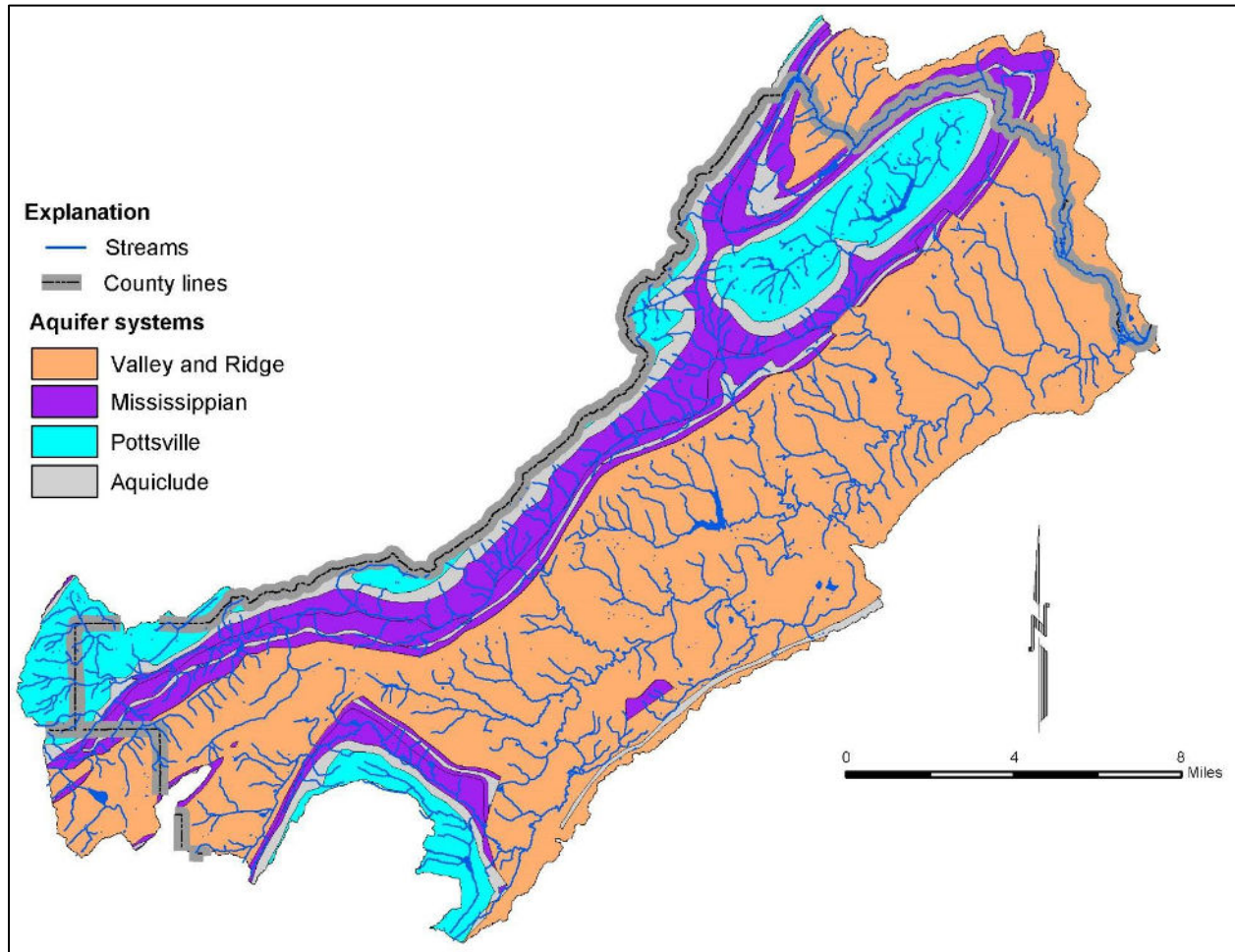
The Chandler Mountain Project would consist of an upper and lower reservoir. The surface area of the upper and lower reservoirs would be approximately 526 acres and 1,090 acres, respectively. The upper reservoir may fluctuate up to 63 feet from the maximum operating elevation of approximately 1366 feet msl to the minimum operating elevation of 1303 feet msl. The lower reservoir may fluctuate up to 27 feet from the maximum operating elevation of approximately 667 feet msl to the minimum operation elevation of approximately 640 feet msl. The absolute minimum operating level for the lower reservoir would be approximately 631 feet msl.

4.4.10 Gradient of Downstream Reaches

Alabama Power proposes to release flows from Lower Dam A to protect downstream resources in Little Canoe Creek East. From the Project release at Lower Dam A to the confluence with Neely Henry Lake, the stream descends at an average rate of approximately 5-feet per mile.

4.4.11 Groundwater

Aquifers within the Chandler Mountain Project Vicinity include the Valley and Ridge, Mississippian, and Pottsville (Figure 4-23). The Valley and Ridge and Mississippian aquifer systems represent reliable sources of large amounts of groundwater, while the Pottsville aquifer is not a good source for large groundwater withdrawals. Groundwater is the primary source of residential and public water supply in the Big Canoe Creek watershed in St. Clair County. West Etowah Water and Fire Pro Authority has an active public water supply well north of Little Canoe Creek East towards the northern boundary of the Project Area (AL0000582) that serves a population of approximately 6,760 (ADEM 2022c).



Source: Wynn et al. 2016

Figure 4-23 Aquifer Systems in the Big Canoe Creek Watershed

4.4.12 References

Alabama Department of Environmental Management (ADEM). 2022a. 2022 Integrated Water Quality Monitoring and Assessment Report. Water Quality Branch, ADEM, Montgomery, AL.

Alabama Department of Environmental Management (ADEM). 2022b. Water Quality Portal. Available at: <https://www.waterqualitydata.us/data/Result/search?organization=21AWIC&siteid=21AWIC-675&mimeType=csv&zip=yes&dataProfile=narrowResult&providers=NWIS&providers=STEWARDS&providers=STORET>. Accessed November 30, 2022.

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Wynn, Anne E., P.E. O'Neil, S.W. McGregor, J.R. Powell, and M. Gangloff. 2016. Watershed Assessment of the Big Canoe Creek System for Recovery and Restoration of Imperiled Aquatic Species. Geological Survey of Alabama, Tuscaloosa, Alabama.

4.5 Fish and Aquatic Resources

4.5.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(iv). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Fish and Aquatic Resources section:

- any known or potential upstream or downstream impacts of the project on the aquatic community (UK)

4.5.2 Existing Fish and Aquatic Communities

The Chandler Mountain Project would be within the Big Canoe Creek watershed of the Middle Coosa River Basin. Previous fish, mollusk, and macroinvertebrate community assessments have been performed within Big Canoe Creek and several of its named and unnamed tributaries. Little Canoe Creek is identified in two geographic locations as "Little Canoe Creek;" however, Little Canoe Creek **West** is located approximately 20 miles southwest¹³ of the proposed Chandler Mountain Project Area and would not be affected by the Chandler Mountain Project. A portion of Little Canoe Creek **East** would be impounded by the proposed Chandler Mountain Project.

Documented fish species within the Big Canoe Creek watershed are listed in Table 4-10. The Geological Survey of Alabama (GSA) collected fish samples in the Big Canoe Creek watershed from 2008 to 2013, yielding 55 species and some hybrid sunfishes (Wynn et al. 2016). Fifty-two percent of the total catch were cyprinids, the most common of which, Tricolor Shiner (*Cyprinella trichroistia*), comprised 18.2 percent of the total catch. Centrarchids were the second most abundant group at 16.1 percent of the total catch, the most common of which were Longear Sunfish (*Lepomis megalotis*) and Bluegill (*Lepomis macrochirus*) at 5.2 and 3.3 percent of total catch, respectively (Wynn et al. 2016). The third most common group were percids at 15 percent of the total catch, the most common of which were Greenbreast Darter (*Etheostoma jordani*) at 8.8 percent of total catch (Wynn et al. 2016).

¹³ Measured from the proposed Lower Dam A to the headwater of Little Canoe Creek West.

All fish collected by Wynn et al. (2016) were designated as lowest conservation concern (P5) except for Mountain Shiner (*Lythrurus lirus*), which is of low conservation concern (P4), and Coldwater Darter (*Etheostoma ditrema*) and Trispot Darter (*Etheostoma trisella*), which are of high conservation concern (P2). Mountain Shiners are distributed widely in the Coosa River system and prefer pools, riffles, and runs in clear, small to medium streams with sand and gravel substrates (Wynn et al. 2016). Coldwater Darters are endemic to the middle and upper Coosa River system. Some populations prefer habitat in the central Coosa River and others prefer spring habitat from Coldwater Spring¹⁴ and upstream into Georgia. Coldwater Darter stream habitat is vulnerable to nonpoint source pollution and spring habitat is highly vulnerable to the effects of development (Wynn et al. 2016). The Trispot Darter is classified as a P2 species due to its limited range. The Trispot Darter was rediscovered in the Big Canoe Creek system in 2008, more than 50 years since the last documented individual was collected in Alabama and has since been collected in Little Canoe Creek West and its tributaries (Johnson et al. 2008). It was listed as threatened in 2019 (see Threatened and Endangered Species, Section 4.8.3.1).

¹⁴ Coldwater Spring is located in eastern Calhoun County, Alabama.

Table 4-10 Documented Fish within the Big Canoe Creek Watershed

Family	Common Name	Scientific Name	Conservation Status ¹	Protection Status	Greatest Conservation Need (GCN)
Petromyzontidae (Lampreys)	Southern Brook Lamprey	<i>Ichthyomyzon gagei</i>			
	Least Brook Lamprey	<i>Lampetra aepyptera</i>			
Lepisosteidae (Gars)	Spotted Gar	<i>Lepisosteus oculatus</i>	P5		
	Longnose Gar	<i>Lepisosteus osseus</i>	P5		
Clupeidae (Herrings and Shads)	Gizzard Shad	<i>Dorosoma cepedianum</i>	P5		
	Threadfin Shad	<i>Dorosoma petenense</i>	P5		
Cyprinidae (Minnows and Carps)	Largescale Stoneroller	<i>Campostoma oligolepis</i>	P5		
	Stonerollers	<i>Campostoma sp.</i>			
	Goldfish	<i>Carassius auritus</i>	P5		
	Alabama Shiner	<i>Cyprinella callistia</i>	P5		
	Red Shiner	<i>Cyprinella lutrensis</i>			
	Tricolor Shiner	<i>Cyprinella trichroistia</i>	P5		
	Blacktail Shiner	<i>Cyprinella venusta</i>	P5		
	Lined Chub	<i>Hybopsis lineapunctata</i>			
	Striped Shiner	<i>Luxilus chrysocephalus</i>			
	Pretty Shiner	<i>Lythrurus bellus</i>	P5		
	Mountain Shiner	<i>Lythrurus lirus</i>	P5		
	Unnamed Chub ¹⁵	<i>Macrhybopsis cf. aestivalis</i>			
	Golden Shiner	<i>Notemigonus crysoleucas</i>			
	Burrhead Shiner	<i>Notropis asperifrons</i>			
	Rainbow Shiner	<i>Notropis chrosomus</i>	P5		
Silverstripe Shiner	<i>Notropis stilbius</i>	P5			

¹⁵ This information is from ADCNR's Heritage Data Collection (ADCNR 2022a). Other sources use different common names include the Coosa Chub, which is listed as state endangered in Georgia.

Family	Common Name	Scientific Name	Conservation Status ¹	Protection Status	Greatest Conservation Need (GCN)
	Mimic Shiner	<i>Notropis volucellus</i>			
	Coosa Shiner	<i>Notropis xaenocephalus</i>	P5		
	Riffle Minnow	<i>Phenacobius catostomus</i>	P5		
	Bluntnose Minnow	<i>Pimephales notatus</i>	P5		
	Fathead Minnow	<i>Pimephales promelas</i>	P5		
	Bullhead Minnow	<i>Pimephales vigilax</i>	P5		
	Blacknose Dace	<i>Rhinichthys atratulus</i>			
	Creek Chub	<i>Semotilus atromaculatus</i>	P5		
Catostomidae (Suckers)	Creek Chubsucker	<i>Erimyzon oblongus</i>			
	Alabama Hog Sucker	<i>Hypentelium etowanum</i>	P5		
	Spotted Sucker	<i>Minytrema melanops</i>	P5		
	Black Redhorse	<i>Moxostoma duquesnei</i>	P5		
	Golden Redhorse	<i>Moxostoma erythrurum</i>	P5		
	Blacktail Redhorse	<i>Moxostoma poecilurum</i>	P5		
	Black Bullhead	<i>Ameiurus melas</i>	P5		
	Yellow Bullhead	<i>Ameiurus natalis</i>	P5		
Ictaluridae (Catfishes)	Channel Catfish	<i>Ictalurus punctatus</i>	P5		
	Tadpole Madtom	<i>Noturus gyrinus</i>			
	Speckled Madtom	<i>Noturus leptacanthus</i>	P5		
	Flathead Catfish	<i>Pylodictis olivaris</i>	P5		
Esocidae (Pikes and Pickerels)	Chain Pickerel	<i>Esox niger</i>			
Fundulidae (Topminnows and Killifishes)	Blackspotted Topminnow	<i>Fundulus olivaceus</i>	P5		
	Southern Studfish	<i>Fundulus stellifer</i>	P5	NHS Watchlist	
Poeciliidae	Western Mosquitofish	<i>Gambusia affinis</i>	P5		

Family	Common Name	Scientific Name	Conservation Status ¹	Protection Status	Greatest Conservation Need (GCN)
(Livebearers)					
Cottidae (Sculpins)	Banded Sculpin	<i>Cottus carolinae</i>	P5		
	Coosa Banded Sculpin	<i>Cottus carolinae zopherus</i>			
Centrarchidae (Sunfishes)	Shadow Bass	<i>Ambloplites ariommus</i>	P5		
	Redbreast Sunfish	<i>Lepomis auritus</i>	P5		
	Green Sunfish	<i>Lepomis cyanellus</i>	P5		
	Hybrid Green and Longear Sunfish	<i>Lepomis cyanellus x L. megalotis</i>			
	Warmouth	<i>Lepomis gulosus</i>	P5		
	Orangespotted Sunfish	<i>Lepomis humilis</i>			
	Bluegill	<i>Lepomis macrochirus</i>	P5		
	Dollar Sunfish	<i>Lepomis marginatus</i>			
	Longear Sunfish	<i>Lepomis megalotis</i>	P5		
	Redear Sunfish	<i>Lepomis microlophus</i>	P5		
	Redspotted Sunfish	<i>Lepomis miniatus</i>	P5		
	Spotted Sunfish Hybrid	<i>Lepomis miniatus x L. punctatus</i>			
	Unidentified Sunfish	<i>Lepomis sp.</i>			
	Redeye Bass	<i>Micropterus coosae</i>			
	Alabama Bass	<i>Micropterus henshalli</i>	P5		
	Spotted Bass	<i>Micropterus punctulatus</i>			
	Largemouth Bass	<i>Micropterus salmoides</i>	P5		
White Crappie	<i>Pomoxis annularis</i>				
Black Crappie	<i>Pomoxis nigromaculatus</i>	P5			

Family	Common Name	Scientific Name	Conservation Status ¹	Protection Status	Greatest Conservation Need (GCN)
	Coosa Darter	<i>Etheostoma coosae</i>	P5		
	Coldwater Darter	<i>Etheostoma ditrema</i>	P2		
	Greenbreast Darter	<i>Etheostoma jordani</i>	P5		
	Johnny Darter	<i>Etheostoma nigrum</i>			
	Rock Darter	<i>Etheostoma rupestre</i>			
	Speckled Darter	<i>Etheostoma stigmaeum</i>	P5		
	Trispot Darter	<i>Etheostoma trisella</i>	P2		
	Coal Darter	<i>Percina breviceauda</i>		NHS Sensitive	2
	Mobile Logperch	<i>Percina kathae</i>	P5		
	Blackbanded Darter	<i>Percina nigrofasciata</i>	P5		
	Bronze Darter	<i>Percina palmaris</i>			
	River Darter	<i>Percina shumardi</i>	P5		
Scianidae (Drums)	Freshwater Drum	<i>Aplodinotus grunniens</i>	P5		

Source: ADCNR 2022a, Wynn et al. 2016

¹Conservation Status included where available; P1 = Highest conservation concern, P2 = High conservation concern, P3 = Moderate conservation concern, P4 = Low conservation concern, P5 = Lowest conservation concern

²Greatest Conservation Need (GCN): 1 = highest conservation concern (taxa critically imperiled and at risk of extinction/extirpation because of extreme rarity, restricted distribution, decreasing population trend/population viability problems, and specialized habitat needs/habitat vulnerability. Immediate research and/or conservation action required), 2 = high conservation concern (taxa imperiled because of three of four of the following: rarity; very limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Timely research and/or conservation action needed.), 3 = moderate conservation concern (taxa with conservation problems because of insufficient data or because of two of four of the following: small populations; limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Research and/or conservation action recommended).

4.5.3 Temporal and Spatial Distribution of Aquatic Communities

Seasonal movement of fish is generally attributed to spawning activities and correlations with water temperatures and available seasonal refuge. Some freshwater fish species exhibit migration patterns within their riverine environments. In the Coosa River and Alabama River, these include species of suckers (Catostomidae), White Bass (*Morone chrysops*), Blue Catfish (*Ictalurus furcatus*), Alabama Sturgeon (*Scaphirhynchus suttkusi*), and Paddlefish (*Polyodon spathula*).

Anadromous fish are species that, upon maturity, migrate from the ocean into freshwater environments to spawn. Historically, there were several species that migrated from Gulf Coast waters to inland Alabama rivers to spawn. The Alabama Shad (*Alosa alabamae*) and Striped Bass (*Morone saxatilis*) are anadromous fish species that are currently or historically known to use the Alabama River and lower portions of the Coosa River during this spawning migration (Mettee et al. 1996). However, use of the Coosa River by these species has been impeded and/or effectively blocked by the construction of USACE navigation projects on the Alabama River (Claiborne, Millers Ferry, and R.F. Henry), and the Alabama Power hydroelectric developments on the Coosa River. The Gulf Sturgeon (*Acipenser oxyrinchus desotoi*) is another anadromous species that occurs in the Mobile drainage but rarely migrates significant distances inland for spawning due to blockage by dams. Historically, this species was known to migrate to the Cahaba River and as far upstream as Wetumpka on the Coosa River (below Jordan Dam) (Mettee et al. 2009).

There have been no recent collections of Alabama Shad in the Coosa River, although Alabama Shad have been collected downstream of Claiborne and Millers Ferry. Striped Bass are present in each reservoir associated with the Coosa River Hydroelectric Project due to stocking efforts by the Alabama Department of Conservation and Natural Resources (ADCNR). There are two forms of Striped Bass present, the Gulf Coast (native) and Atlantic Coast strains. When overfishing nearly decimated the Gulf Coast strain in the early twentieth century, Atlantic Coast strain fish were aggressively stocked throughout Alabama. The ADCNR has stocked both strains in the Coosa Project reservoirs, except in Weiss reservoir, where only Atlantic Coast strains were stocked. In 1995, the ADCNR began to note huge increases in the abundance of Striped Bass in Weiss reservoir. Since Striped Bass were not stocked in Weiss after 1988, the ADCNR performed deoxyribonucleic acid (DNA) analysis to determine the source of this influx of fish. Their analysis revealed these fish were Atlantic Coast strain Striped Bass. Other research has documented natural reproduction by Striped Bass in the Oostanaula River, approximately 30-miles upstream

of Weiss reservoir. Studies have documented the presence of these naturally reproduced fish in each Coosa Project reservoir (Catchings et al. 1999). The Gulf Coast strain of Striped Bass still migrate inland from the Gulf as far upstream as Millers Ferry.

Catadromous fish are species that live most of their lives in freshwater environments and, upon reaching sexual maturity, migrate to the ocean to spawn. The juvenile offspring of catadromous fish migrate through the ocean to the mouths of rivers and move upstream to various habitats to live until adulthood. The American Eel (*Anguilla rostrata*) is the only catadromous species native to the Coosa River system (Mettee et al. 1996). As with anadromous fish species discussed above, upstream movements of American Eel into the Coosa River system are impeded by several USACE lock and dam projects and Alabama Power hydropower projects along the river system. American Eel have been observed in the lower portions of the Coosa River downstream of Jordan reservoir but are unlikely to occur within the Big Canoe Creek watershed.

4.5.4 Invasive and Nonindigenous Fish and Aquatic Species

The Alabama Aquatic Nuisance Species (ANS) Management Plan (ADCNR 2021) details the distribution and impacts of invasive aquatic species in the state of Alabama. The Alabama ANS Task Force ranked the threat level of each species using the Nature Conservancy's Threat Ranking System (Salzer 2007; ADCNR 2021). Invasive aquatic species known to occur in the Coosa River Basin according to ADCNR (2021), and therefore potentially in the Big Canoe Creek watershed, include species of fish, crustaceans, a clam, and several species of aquatic vegetation (Table 4-11).

The Grass Carp (*Ctenopharyngodon idella*) were introduced for aquatic vegetation control beginning in the 1960s (Nico et al. 2021). This modified native aquatic plant communities, causing intraspecific competition for food with invertebrates such as crayfish and plankton, and reductions in water quality and fish diversity (Pipalova 2006; Wittman et al. 2014). Common Carp (*Cyprinus carpio*) were introduced to temperate waters worldwide as ornamental and food fish and for angling (ADCNR 2021). Common Carp increase suspended solids and turbidity in the water column, reducing macrophyte coverage and habitat heterogeneity (Zambrano et al. 2006). Red Shiner (*Cyprinella lutrensis*) are mostly dispersed outside their native range in bait buckets and occasionally are released from aquariums (Moore et al. 1976), escape from aquaculture facilities (ADCNR 2021), and released as forage (Koehn 1965). They are very competitive with other species (ADCNR 2021) and may hybridize with other *Cyprinella* species (ADCNR 2021). Rudd (*Scardinius*

erythrophthalmus) were introduced to the United States as bait in the late 1800s and early 1900s and then again during the late 1960s and early 1970s (Courtenay and Williams 1992). Their impact is still largely unknown, but they are known to hybridize with native Golden Shiner (*Notemigonus crysoleucas*) in laboratory settings (Burkhead and Williams 1991).

The Rusty Crayfish (*Faxonius rusticus*) were most likely introduced by anglers as live bait. They can potentially destroy plant beds and reduce aquatic plant abundance and diversity (ADCNR 2021; Taylor and Redmer 1996). The Virile Crayfish (*Faxonius virilis*) were introduced by anglers as live bait, through stocking by state agencies as sportfish forage, and by escaping from laboratory ponds (DiStefano et al. 2015). They can potentially cause a decline or extirpation of native crayfish and impact biodiversity and macroinvertebrate abundance and community structure (ADCNR 2021).

The Asian Clam (*Corbicula fluminea*) was introduced to Alabama in the mid-1900s (ADCNR 2022b), presumably as a food source or from the importation of the Pacific Oyster (*Magallana gigas*) (ADCNR 2021). It is a small (less than 2 inches), round- to triangular-shaped clam that competes with native mussels for food and space. Smaller individuals are yellow in color while larger individuals appear black. Juveniles have a dark purple stripe on the umbo that extends ventrally, and the nacre is white to purple in color (ADCNR 2022b). Although abundance can vary due to regularly occurring large mortality events, the Asian Clam can self-fertilize and does not require a host, making them a strong competitor to native mussels. The Asian Clam can release more than 100,000 free-living larvae (veliger) in a lifetime, which mature in one to four years. Asian Clams can reach densities up to several hundred individuals per square-meter (ADCNR 2022b).

Invasive/nuisance aquatic vegetation occurs in the Chandler Mountain Project Vicinity. There are over 200 reported introduced plant species in Etowah and St. Clair counties, according to the Early Detection and Distribution Mapping System (EDDMapS 2022). These introduced species include 9 aquatic/wetland plants with varying degrees of infestations (AIPC 2012).

Table 4-11 Invasive Fish and Aquatic Species Likely to Occur within the Big Canoe Creek Watershed

Type	Common Name	Scientific Name	Alabama Distribution	AL ANS Task Force Rank ¹
Fish	Grass Carp	<i>Ctenopharyngodon idella</i>	Alabama, Black Warrior, Cahaba, Chattahoochee, Choctawhatchee, Conecuh, Coosa, Perdido, Sepulga, Sipsey, Tallapoosa, and Tombigbee River drainages; Tennessee River	2.4
	Common Carp	<i>Cyprinus carpio</i>	All major rivers of Mobile Basin; Conecuh and Choctawhatchee drainages	3.0
	Red Shiner	<i>Cyprinella lutrensis</i>	Coosa and Tombigbee River drainages; tributaries of the Chattahoochee River	2.8
	Rudd	<i>Scardinius erythrophthalmus</i>	First Creek in Lauderdale County; unnamed stream in St. Clair County	3.0
Crustaceans	Rusty Crayfish	<i>Faxonius rusticus</i>	Flat Tire Creek on the Cahaba River in Bibb County; Sandy Creek in the middle Coosa River in Calhoun County	3.0
	Virile Crayfish	<i>Faxonius virilis</i>	In watersheds of the Tennessee, Black Warrior, Cahaba, Coosa, and Tallapoosa Rivers	3.0
Mussels and Clams	Asian Clam	<i>Corbicula fluminea</i>	In all drainages except Perdido and Blackwater	3.0

Type	Common Name	Scientific Name	Alabama Distribution	AL ANS Task Force Rank ¹
Plants	Hydrilla	<i>Hydrilla verticillata</i>	Mobile Delta, Tombigbee, Tennessee, Chattahoochee, Black Warrior drainages; Tallapoosa River above Harris Reservoir; Coosa River in Jordan Reservoir and in Neely Henry Lake	2.9
	Water Hyacinth	<i>Eichhornia crassipes</i>	Throughout major drainages	2.8
	Alligator weed	<i>Alternanthera philoxeroides</i>	Throughout major drainages	2.6
	Lyngbya	<i>Lyngbya wollei</i>	Throughout the state; largest infestations in Coosa River impoundments	2.4
	Dotted Duckweed	<i>Landoltia punctata</i>	Throughout the state	2.3
	Eurasian Watermilfoil	<i>Myriophyllum spicatum</i>	Mobile-Tensaw Delta; reservoirs in the Tennessee, Black Warrior, Tombigbee, and Coosa River systems	2.3
	Parrotfeather	<i>Myriophyllum aquaticum</i>	Throughout major drainages	2.3
	Brittle Waternymph	<i>Najas minor</i>	Most drainages; most severely in small impoundments	2.1
	Water Lettuce	<i>Pistia stratiotes</i>	Coosa, Chattahoochee, Tombigbee, and Black Warrior river systems	2.1

Source: ADCNR 2021, Salzer 2007

¹1 = low, 2 = medium, 3 = high

4.5.5 Benthic Macroinvertebrates and Freshwater Mussels

Thirty-seven species of mussels or clams are believed to historically or presently inhabit the Big Canoe Creek watershed. Of these 37 species, Asian Clam is invasive, two are unidentified species from the genera *Pisidium* and *Pleurobema*, Southern Acornshell (*Epioblasma othcaloogensis*) is considered possibly extinct, and Georgia Pigtoe (*Pleurobema hanleyianum*) and Upland Combshell (*Epioblasma metastriata*) are possibly extirpated from Alabama (Wynn et al. 2016). The most recently discovered species, the Canoe Creek Clubshell (*Pleurobema atearnii*), was discovered in Big Canoe Creek between 1999 and 2002 (Gangloff et al. 2006) and was listed as Endangered in 2022. Table 4-12 lists mussels and clams documented within the Big Canoe Creek watershed.

Recent surveys for the endangered Canoe Creek Clubshell were conducted by ADCNR and GSA. In 2017, surveys were conducted at eight sites in Little Canoe Creek East, and live Canoe Creek Clubshell were found approximately 3.5 miles downstream of the Highway 11 bridge (Fobian et al. 2017). ADCNR collected Canoe Creek Clubshell again downstream of Steele Station Road in 2018. ADCNR discovered live specimens of the threatened Finelined Pocketbook (*Hamiota altilis*) and freshly dead specimens of the endangered Georgia Pigtoe (*Pleurobema hanleyianum*) downstream of Steele Station Road in 2018. The collection of freshly dead Georgia Pigtoe specimens, which were presumed extirpated (Wynn et al. 2016), suggests that the individuals may still persist in some locations.

GSA sampled mussels in the Coosa River from eight sites ranging from the Coosa River at the U.S. Highway 278/431 bridge in Gadsden to the Coosa River in Woods Bend near Ragland in July 2004. Samples yielded 18 mussel species, 8 of which were found only alive or freshly dead, 6 of which were found only weathered dead or as relics, and 4 of which were found both as alive/freshly dead and weathered/relict (McGregor and Garner 2004) (Table 4-13).

There are at least 12 documented gastropod species in the Big Canoe Creek watershed, including unidentified species from the genera *Elimia* and *Physella* (Table 4-14), and 11 documented crustacean species (Table 4-15).

ADCNR's Heritage Data Collection Web Application lists six documented aquatic or semi-aquatic insect species within the Big Canoe Creek watershed (Table 4-16), however many more have been documented by ADEM. ADEM conducted a benthic macroinvertebrate

survey using their Intensive Multi-habitat Bioassessment methodology (WMB-I) at one location in Little Canoe Creek East in 2005 and found seven genera of mayfly (Ephemeroptera), two genera of stonefly (Plecoptera), and seven genera of caddisfly (Trichoptera) (ADEM 2005). ADEM classified the macroinvertebrate community of Little Canoe Creek East as *fair* due to the low taxa richness of pollution intolerant organisms (Table 4-17) (ADEM 2005).

Table 4-12 Documented Mussels and Clams within the Big Canoe Creek Watershed

Common Name	Scientific Name	Protection Status ¹	GCN ³
Coosa Fiveridge	<i>Amblema elliottii</i>	NHS WatchList	3
Flat Floater	<i>Anodonta suborbiculata</i>		
Asian Clam	<i>Corbicula fluminea</i>		
Alabama Spike	<i>Elliptio arca</i>	State Protected NHS Sensitive	1
Delicate Spike	<i>Elliptio arctata</i>		
Elephantear	<i>Elliptio crassidens</i>		
Southern Acornshell	<i>Epioblasma othcaloogensis</i>	Endangered State Protected	
Gulf Pigtoe	<i>Fusconaia cerina</i>		
Finelined Pocketbook	<i>Hamiota attilis</i>	Threatened State Protected	2
Southern Pocketbook	<i>Lampsilis ornate</i>		
Southern Fatmucket	<i>Lampsilis straminea</i>		
Yellow Sandshell	<i>Lampsilis teres</i>		
Etowah Heelsplitter	<i>Lasmigona etowensis</i>		
Fragile Papershell	<i>Leptodea fragilis</i>		
Black Sandshell	<i>Ligumia recta</i>	State Protected NHS Sensitive	2
Alabama Moccasinshell	<i>Medionidus acutissimus</i>		
Washboard	<i>Megaloniaias nervosa</i>		
Three-Horn Wartyback	<i>Obliquaria reflexa</i>		
Alabama Hickorynut	<i>Obovaria unicolor</i>		
	<i>Pisidium sp.</i>		
Canoe Creek Clubshell	<i>Pleurobema athearni</i>	Endangered ²	
Southern Clubshell	<i>Pleurobema decisum</i>	Endangered State Protected NHS Sensitive	2
Southern Pigtoe	<i>Pleurobema georgianum</i>	Endangered State Protected NHS Sensitive	1
Georgia Pigtoe	<i>Pleurobema hanleyianum</i>	Endangered State Protected	1

Common Name	Scientific Name	Protection Status ¹	GCN ³
	<i>Pleurobema sp.</i>		
Rayed Kidneyshell	<i>Ptychobranthus foremanianus</i>	State Protected NHS Sensitive	1
Triangular Kidneyshell	<i>Ptychobranthus greenii</i>	Endangered State Protected NHS Sensitive	1
Giant Floater	<i>Pyganodon grandis</i>		
Alabama Orb	<i>Quadrula asperata</i>		
Monkeyface	<i>Quadrula metanevra</i>	State Protected NHS WatchList	2
Ridged Mapleleaf	<i>Quadrula rumphiana</i>		3
Pistolgrip	<i>Quadrula verrucosa</i>		
Alabama Creekmussel	<i>Strophitus connasaugaensis</i>		
Fawnsfoot	<i>Truncilla donaciformis</i>		
Paper Pondshell	<i>Utterbackia imbecillis</i>		
Little Spectaclecase	<i>Villosa lienosa</i>		
Alabama Rainbow	<i>Villosa nebulosa</i>	State Protected NHS WatchList	2
Coosa Creekshell	<i>Villosa umbrans</i>	State Protected NHS WatchList	2
Southern Rainbow	<i>Villosa vibex</i>		

Source: ADCNR 2022a, Wynn et al. 2016

¹Species protected by Regulation 220-2-.92 (Nongame Species Regulation), 220-2-.98 (Invertebrate Species Regulation), 220-2-.26(4) (Protection of Sturgeon), 220-2-.94 (Prohibition of Taking or Possessing Paddlefish), or 220-2-.97 (Alligator Protection Regulation).

²Federally endangered.

³Greatest Conservation Need (GCN): 1 = highest conservation concern (taxa critically imperiled and at risk of extinction/extirpation because of extreme rarity, restricted distribution, decreasing population trend/population viability problems, and specialized habitat needs/habitat vulnerability. Immediate research and/or conservation action required), 2 = high conservation concern (taxa imperiled because of three of four of the following: rarity; very limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Timely research and/or conservation action needed.), 3 = moderate conservation concern (taxa with conservation problems because of insufficient data or because of two of four of the following: small populations; limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Research and/or conservation action recommended).

Table 4-13 Mussels Collected by McGregor and Garner in Coosa River Mainstem Near the Big Canoe Creek Watershed

Common Name	Scientific Name	Conservation Priority ¹	Neely Henry Dam Tailwater (Stations 17-23) ²	Neely Henry Lake (Station 24) ²
Coosa Fiveridge	<i>Amblema elliotti</i>	P3	2	R
Flat Floater	<i>Anodonta suborbiculata</i>	P4		1
Butterfly	<i>Ellipsaria lineolata</i>	P4	R	R
Elephant ear	<i>Elliptio crassidens</i>	P5	R	1
Yellow Sandshell	<i>Lampsilis teres</i>	P5	R	
Alabama Heelsplitter	<i>Lasmigona c. alabamensis</i>	P3	1	R
Fragile Papershell	<i>Leptodea fragilis</i>	P5	3	R
Washboard	<i>Megaloniais nervosa</i>	P5	16	40
Threehorn Wartyback	<i>Obliquaria reflexa</i>	P5	30	31
Southern Clubshell	<i>Pleurobema decisum</i>	P5, E	R	
Bleufer	<i>Potamilus purpuratus</i>	P5		R
Southern Mapleleaf	<i>Quadrula apiculata</i>	P5	47	
Alabama Orb	<i>Quadrula asperata</i>	P5	2	12
Ridged Mapleleaf	<i>Quadrula rumphiana</i>	P4	W	R
Lilliput	<i>Toxolasma parvus</i>	P3	1	
Pistolgrip	<i>Tritogonia verrucosa</i>	P4	R	R
Fawnsfoot	<i>Truncilla donaciformis</i>	P3	1	
Paper Pondshell	<i>Utterbackia imbecillis</i>	P5	1	

Source: McGregor and Garner 2004

¹Conservation Priority: P1 = highest, P2 = high, P3 = moderate, P4 = low, P5 = lowest; E = federally listed endangered²Only live and freshly dead shells were included in species and specimen totals; R = relic, W = weathered dead

Table 4-14 Documented Gastropod Species within the Big Canoe Creek Watershed

Common Name	Scientific Name	Protection Status	GCN2
Spindle Elimia	<i>Elimia capillaris</i>	State Protected ¹	
Sharp-Crest Elimia	<i>Elimia carinifera</i>		
Fluted Elimia	<i>Elimia carinocostata</i>		
Prune Elimia	<i>Elimia chiltonensis</i>		3
Gladiator Elimia	<i>Elimia hydeii</i>	NHS Sensitive	3
Black Mudalia	<i>Elimia melanoides</i>	State Protected NHS WatchList	2
Coldwater Elimia	<i>Elimia modesta</i>		
	<i>Elimia sp.</i>		
Bugle Sprite	<i>Micromenetus dilatatus</i>		
	<i>Physella sp.</i>		
Brook Hornsnail	<i>Pleurocera vestita</i>	NHS WatchList	3
Pebblesnail	<i>Somatogyryus sp.</i>		

Source: ADCNR 2022a, Wynn et al. 2016

¹ Species protected by Regulation 220-2-.92 (Nongame Species Regulation), 220-2-.98 (Invertebrate Species Regulation), 220-2-.26(4) (Protection of Sturgeon), 220-2-.94 (Prohibition of Taking or Possessing Paddlefish), or 220-2-.97 (Alligator Protection Regulation).

² Greatest Conservation Need (GCN): 1 = highest conservation concern (taxa critically imperiled and at risk of extinction/extirpation because of extreme rarity, restricted distribution, decreasing population trend/population viability problems, and specialized habitat needs/habitat vulnerability. Immediate research and/or conservation action required), 2 = high conservation concern (taxa imperiled because of three of four of the following: rarity; very limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Timely research and/or conservation action needed.), 3 = moderate conservation concern (taxa with conservation problems because of insufficient data or because of two of four of the following: small populations; limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Research and/or conservation action recommended).

Table 4-15 Documented Crustacean Species within the Big Canoe Creek Watershed

Common Name	Scientific Name	Conservation Status	Protection Status	GCN Rank ²
Thornytail Crayfish	<i>Cambarus acanthura</i>	P4		
Coosa Crayfish	<i>Cambarus coosae</i>			
Variable Crayfish	<i>Cambarus latimanus</i>	P4		
Longnose Crayfish	<i>Cambarus longirostris</i>		State Protected ¹	2
Greensaddle Crayfish	<i>Cambarus manningi</i>	P2	State Protected NHS WatchList	2
Chattooga River Crayfish	<i>Cambarus scotti</i>	P4	NHS Sensitive	
Ambiguous Crayfish	<i>Cambarus striatus</i>	P5		
Reticulate Crayfish	<i>Orconectes erichsonianus</i>	P5		
Sharpnose Crayfish	<i>Procambarus acutissimus</i>			
Red Swamp Crawfish	<i>Procambarus clarkii</i>	P5		
White Tubercled Crayfish	<i>Procambarus spiculifer</i>	P5		

Source: ADCNR 2022a, Wynn et al. 2016

¹ Species protected by Regulation 220-2-.92 (Nongame Species Regulation), 220-2-.98 (Invertebrate Species Regulation), 220-2-.26(4) (Protection of Sturgeon), 220-2-.94 (Prohibition of Taking or Possessing Paddlefish), or 220-2-.97 (Alligator Protection Regulation).

² Greatest Conservation Need (GCN): 1 = highest conservation concern (taxa critically imperiled and at risk of extinction/extirpation because of extreme rarity, restricted distribution, decreasing population trend/population viability problems, and specialized habitat needs/habitat vulnerability. Immediate research and/or conservation action required), 2 = high conservation concern (taxa imperiled because of three of four of the following: rarity; very limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Timely research and/or conservation action needed.), 3 = moderate conservation concern (taxa with conservation problems because of insufficient data or because of two of four of the following: small populations; limited, disjunct, or peripheral distribution; decreasing population trend/population viability problems; or specialized habitat needs/habitat vulnerability. Research and/or conservation action recommended.)

Table 4-16 Aquatic or Semi-aquatic Insect Species within the Big Canoe Creek Watershed Documented in ADCNR's Heritage Database

Common Name	Scientific Name
Large Caddisfly	<i>Agrypnia vestita</i>
Widow Skimmer	<i>Libellula luctuosa</i>
Little-entrance Oxyethiran Microcaddisfly	<i>Oxyethira janella</i>
Novasota Oxyethiran Microcaddisfly	<i>Oxyethira novasota</i>
Eastern Amberwing	<i>Perithemis tenera</i>
Blue-faced Meadowhawk	<i>Sympetrum ambiguum</i>

Source: ADCNR 2022a

Table 4-17 Results of 2005 Benthic Macroinvertebrate Assessment in Little Canoe Creek East

Metrics	Results	Scores (0-100)	Rating
Taxa richness measures			
# Ephemeroptera (mayfly) genera	7	58	Fair (47-70)
# Plecoptera (stonefly) genera	2	33	Fair (32-49)
# Trichoptera (caddisfly) genera	7	58	Fair (45-66)
Taxonomic composition measures			
% Non-insect taxa	7	71	Fair (49.4-47.1)
% Non-insect organisms	3	92	Fair (62.7-93.9)
% Plecoptera	1	4	Very Poor (<6.56)
Tolerance measures			
Beck's community tolerance index	8	29	Poor (20.2-40.7)
WMBI-I Assessment Score		49	Fair (48-72)

Source: ADEM 2005

4.5.6 Essential Fish Habitat

There is no designated Essential Fish Habitat (EFH) near the Chandler Mountain Project Area (NOAA 2021).

4.5.7 References

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4.6 Terrestrial Wildlife and Botanical Resources

4.6.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(v). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Terrestrial Wildlife and Botanical Resources section:

- the project's transmission line corridor or right-of-way and a listing of plant and animal species that use the habitat(s) (NA)

4.6.2 Terrestrial Habitats in the Project Vicinity

The Chandler Mountain Project would be located at the intersection of the Ridge and Valley (67) and Southwestern Appalachians (68) Level III ecoregions. Further, the Chandler Mountain Project Vicinity includes three Level IV physiographic ecoregions including the Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f), Southern Shale Valleys (67g), and Southern Table Plateaus (68d) (Griffith et al. 2001). The Level III and IV ecoregions of Alabama are shown in Figure 4-24.

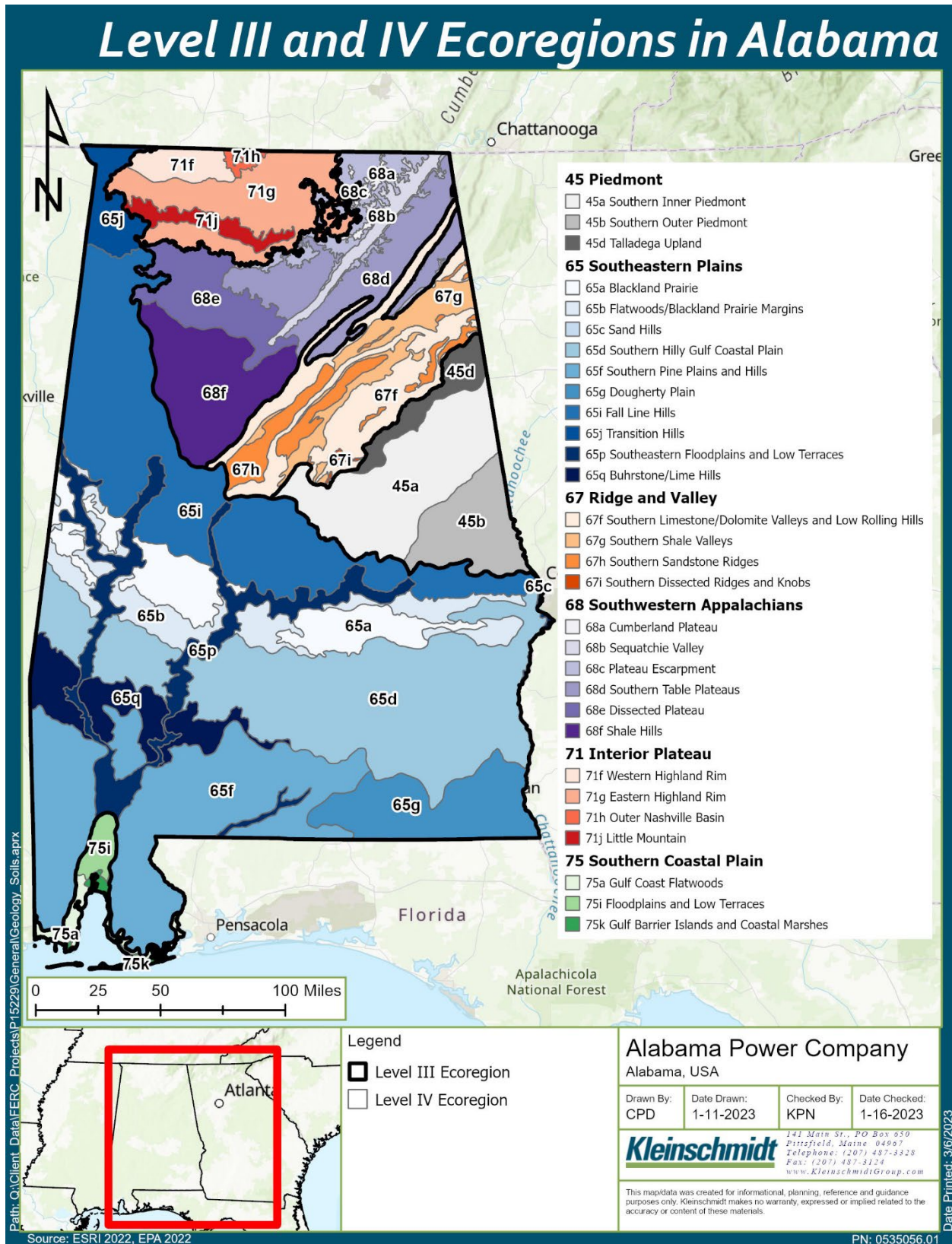


Figure 4-24 Level III and IV Ecoregions of Alabama

In Alabama, the Ridge and Valley (67) is the result of extreme folding and faulting events, and the roughly parallel ridges and valleys come in a variety of widths, heights, and geologic materials. Springs and caves are relatively numerous and land cover is mixed with present-day forests covering approximately 50 percent of the region. In general, the Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f) landforms are mostly undulating valleys and rounded ridges and hills, with many caves and springs throughout. Soils vary in their productivity, and land cover includes oak-hickory and oak-pine forests, pasture, intensive agriculture, and urban and industrial. The Southern Shale Valleys (67g) consist of undulating to rolling valleys and some low, rounded hills and knobs. The steeper slopes are used for pasture or have reverted to brush and mixed forest land. The natural vegetation within these ecoregions includes mixed oak forest, oak-hickory-pine forest, bottomland oak forest, and some cedar glades (Griffith et al. 2001).

The Southwestern Appalachians (68) contain low mountains and a mosaic of forest and woodland with some cropland and pasture. The mixed mesophytic forest is restricted mostly to the deeper ravines and escarpment slopes, and the summit or tableland forests are dominated by mixed oaks with shortleaf pine. The Southern Table Plateaus (68d) in Georgia is mostly forested, but elevations decrease to the southwest in Alabama with more cropland and pasture. Natural vegetative communities within this ecoregion are oak-hickory forest and mixed mesophytic forest. The mixed mesophytic forests consists of oak (*Quercus spp.*), elm (*Ulmus spp.*), hickory (*Carya spp.*), ash (*Fraxinus spp.*), maple (*Acer spp.*), blackgum (*Nyssa sylvatica*), pine (*Pinus spp.*), sweetgum (*Liquidambar styraciflua*), basswood (*Tilia americana*), and beech (*Fagus grandifolia*) (Griffith et al. 2001).

Based on aerial and satellite imagery, the plateau of Chandler Mountain is relatively flat and a large portion of the area is cleared of forest and converted for agriculture, including row crops. Some mixed forest remains in patches and along stream corridors or low-lying areas. The steep slopes of Chandler Mountain leading to valleys below are primarily mature deciduous forest. The Chandler Mountain Project Vicinity along the Little Canoe Creek East corridor is a mix of habitat types, including mixed forests, pasture, clearcuts, planted pines, and some low-density developments.

4.6.3 Terrestrial Wildlife Resources in the Project Vicinity

Common wildlife species that typically occur within the mixed oak, oak-pine-hickory, bottomland oak, and mixed mesophytic forests are anticipated to occur within the Chandler Mountain Project Vicinity. With the mix of agriculture, mixed age forest, and

deciduous forest, a variety of mammals, reptiles, amphibians, and migratory birds are expected to be present within the Project Vicinity. According to ADCNR, popular wildlife game species that potentially occur within the Chandler Mountain Project Vicinity include white-tailed deer (*Odocoileus virginianus*), squirrels (*Sciurus spp.*), rabbits (*Sylvilagus spp.*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), red and grey foxes (*Vulpes* and *Urocyon cinereoargenteus*, respectively), coyote (*Canis latrans*), bobcat (*Lynx rufa*), other furbearers, feral swine (*Sus scrofa*), eastern wild turkey (*Meleagris gallopavo silvestris*), mourning doves (*Zenaida macroura*), northern bobwhite quail (*Colinus virginianus*), American woodcock (*Scolopax minor*), American crow (*Corvus brachyrhynchos*), and various waterfowl (ADCNR 2022).

The Alabama Natural Heritage Program (ANHP) tracks certain species that are of conservation concern or rare, threatened, or endangered (RTE). Although many of these species are addressed in Section 4.8 – RTE, the ANHP reports known occurrences for 57 tracked terrestrial plant and animal species in Etowah and St. Clair counties (ANHP 2021). This includes 1 insect, 3 reptiles, 4 amphibians, and 49 plant species.

4.6.4 Invasive Plant Species

There are over 200 reported introduced species in Etowah and St. Clair counties, according to the Early Detection and Distribution Mapping System (EDDMapS 2022). These introduced species include a variety of plants, pest insects, diseases/pathogens, and animals of varying threat levels. In addition to the aquatic invasive plant species identified in Table 4-11, as of 2012, the Alabama Invasive Plant Council identified 10 trees, 18 scrubs, 10 vines, 8 grasses, and 9 forbs (AIPC 2012). Further, an additional 26 invasive plant species have been recently observed in Alabama that are sporadically occurring, are currently cultivated, or are on the watch list because of their occurrence in neighboring states (AIPC 2012).

4.6.5 References

Alabama Department of Conservation and Natural Resources (ADCNR). 2022. Choccolocco Wildlife Management Area (Talladega National Forest and Choccolocco State Forest) and Mountain Longleaf NWR Segment (USFWS) Calhoun and Cleburne Counties Hunting Regulations September 2022 – August 2023.

Alabama Invasive Plant Council (AIPC). 2012. Alabama Invasive Plant Council's 2012 List of Alabama's Invasive Plants by Land-Use and Water-Use Categories.

Alabama Natural Heritage Program (ANHP). 2021. Rare Species Occurrences by County. Available online: https://www.auburn.edu/cosam/natural_history_museum/alnhp/data/index.htm. Accessed November 3, 2022.

Early Detection and Distribution Mapping System (EDDMapS). 2022. Invasive species data for Etowah and St. Clair Counties, Alabama. Available online at: <https://www.eddmaps.org/tools/query/>. Query generated November 2022.

Griffith, G.E., J.M. Omernik, J.A. Comstock, S. Lawrence, G. Martin, A. Goddard, V.J. Hulcher, T. Foster. 2001. Ecoregions of Alabama and Georgia. Reston, Virginia, U.S. Geological Survey (map scale 1:1,700,000).

4.7 Wetlands, Riparian, and Littoral Habitat

4.7.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(vi). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Wetlands, Riparian, and Littoral Habitat section:

- List of plant and animal species using the habitats (UK)

4.7.2 Wetland Habitat

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) provides a publicly available resource of potential coverage and characteristics of wetlands. NWI data (USFWS 2022) indicate that 8 percent of the Chandler Mountain Project Area is considered a wetland feature (Figure 4-25). Over 64 percent of the NWI wetland features are considered freshwater forested or shrub wetlands (Table 4-18). Many of these forested and shrub wetlands are associated with stream corridors and floodplains of the stream systems (i.e., Little Canoe Creek East) within the Project Area. Other predominant NWI wetlands include riverine features such as named streams and their perennial and intermittent tributaries that eventually lead into the Coosa River/Neely Henry Lake. Many of the freshwater ponds and lakes are mostly associated with man-made ponds and impoundments on the plateau of Chandler Mountain.

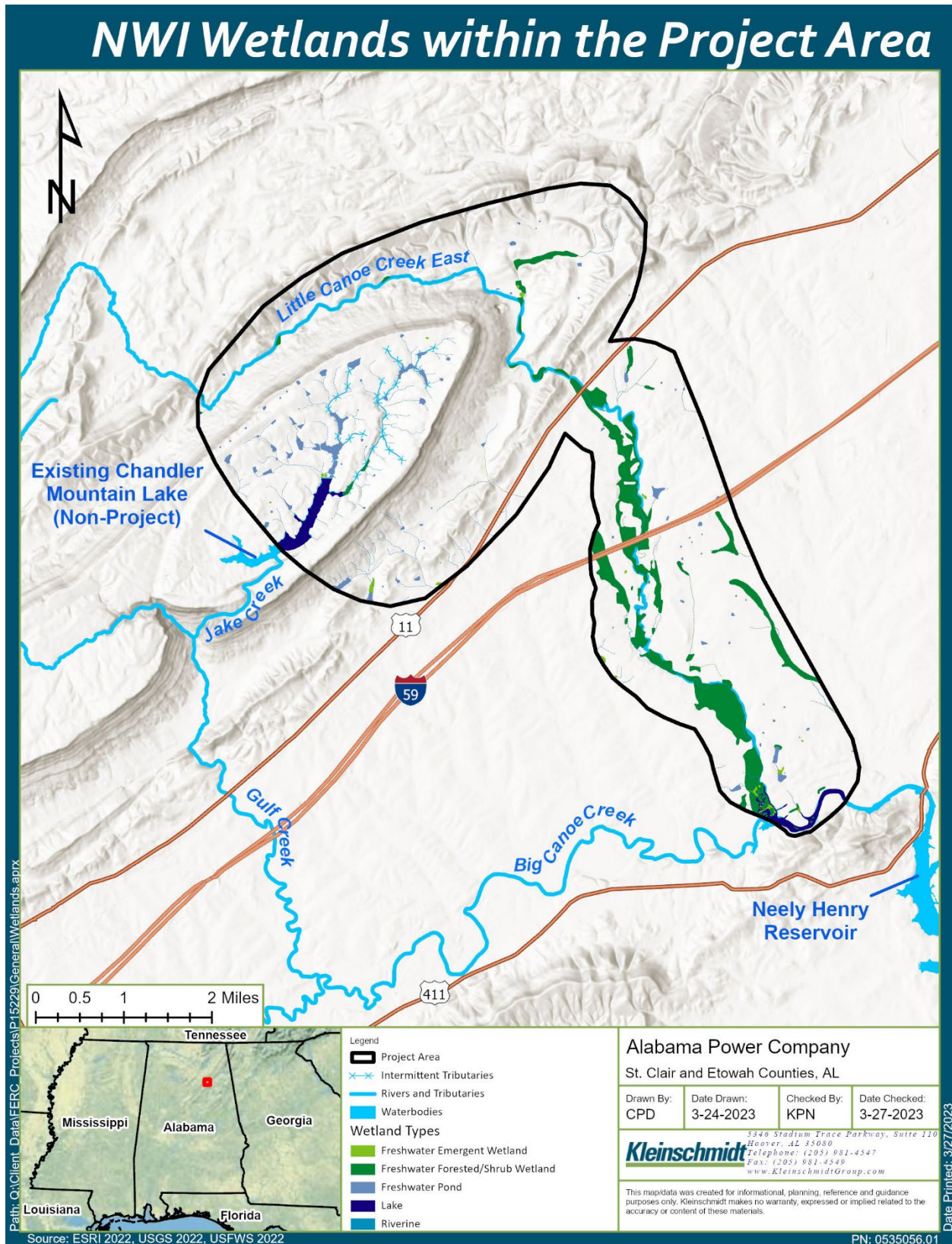


Figure 4-25 NWI Wetlands within the Project Area

Table 4-18 National Wetlands Inventory of the Chandler Mountain Project Area

Wetland Type	Class	Description	Total Area (acres)	%
Lake	L1UBHh	Lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked/impounded	148	11.3
	L2UBFh	Lacustrine, littoral, unconsolidated bottom, semipermanently flooded, diked/impounded		
	L2UBGh	Lacustrine, littoral, unconsolidated bottom, intermittently exposed, diked/impounded		
Freshwater Pond	PUBFh	Palustrine, unconsolidated bottom, semipermanently flooded, diked/exposed	161.7	12.2
	PUBFx	Palustrine, unconsolidated bottom, semipermanently flooded, excavated		
	PUBH	Palustrine, unconsolidated bottom, permanently flooded		
	PUBHh	Palustrine, unconsolidated bottom, permanently flooded, diked/impounded		
	PUBHx	Palustrine, unconsolidated bottom, permanently flooded, excavated		
Freshwater Emergent Wetland	PEM1/SS1Fh	Palustrine, emergent, persistent / Scrub-shrub, broad-leaved deciduous, diked/impoundment	29.4	2.2
	PEM1A	Palustrine, emergent, persistent, temporarily flooded		
	PEM1Ah	Palustrine, emergent, persistent, temporarily flooded, diked/impounded		
	PEM1C	Palustrine, emergent, persistent, seasonally flooded		
	PEM1Ch	Palustrine, emergent, persistent, seasonally flooded, diked/impounded		
	PEM1Cx	Palustrine, emergent, persistent, seasonally flooded, excavated		
	PEM1F	Palustrine, emergent, persistent, semipermanent flooded		
	PEM1Fh	Palustrine, emergent, persistent, semipermanent flooded, diked/impounded		
	PEM1Fx	Palustrine, emergent, persistent, semipermanent flooded, excavated		
	PEM1K	Palustrine, emergent, persistent, artificially flooded		
Freshwater Forested/Shrub Wetland	PFO1/EM1A	Palustrine, forested, broad-leaved deciduous / Emergent, persistent, temporarily flooded	855.1	64.7
	PFO1/SS1A	Palustrine, forested, broad-leaved deciduous / Scrub-shrub, broad-leaved deciduous, temporarily flooded		
	PFO1A	Palustrine, forested, broad-leaved deciduous, temporarily flooded		
	PFO1Ah	Palustrine, forested, broad-leaved deciduous, temporarily flooded, diked/impounded		
	PFO1C	Palustrine, forested, broad-leaved deciduous, seasonally flooded		
	PFO1Ch	Palustrine, forested, broad-leaved deciduous, seasonally flooded, diked/impounded		
	PFO1F	Palustrine, forested, broad-leaved deciduous, semipermanently flooded		
	PSS1A	Palustrine, scrub-shrub, broad-leaved deciduous, temporarily flooded		
	PSS1Ah	Palustrine, scrub-shrub, broad-leaved deciduous, temporarily flooded, diked/impounded		
	PSS1C	Palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded		
	PSS1Ch	Palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded, diked/impounded		
	PSS1F	Palustrine, scrub-shrub, broad-leaved deciduous, semipermanently flooded		
	PSS1Fh	Palustrine, scrub-shrub, broad-leaved deciduous, semipermanently flooded, diked/impounded		
Riverine	R2UBF	Riverine, lower perennial, unconsolidated bottom, semipermanently flooded	127.3	9.6
	R2UBH	Riverine, lower perennial, unconsolidated bottom, permanently flooded		
	R4SBA	Riverine, intermittent, streambed, temporarily flooded		
	R4SBC	Riverine, intermittent, streambed, seasonally flooded		
	R5UBH	Riverine, unknown perennial, unconsolidated bottom, permanently flooded		
Total NWI Wetlands within the Project Area (acres)			1,322.3	

Alabama Power completed a preliminary wetland assessment within portions of the Chandler Mountain Project Area where potential impacts due to the proposed project could occur. The wetland assessment involved comparing NWI wetland occurrence to field observations to examine accuracy of location, shape, and determine if additional wetlands that were not included in the NWI were present. In general, the field verification of wetlands indicated that the majority of NWI features were present on site. However, at least one feature was misclassified, one may not actually be considered a wetland, and many of the NWI features would likely need to be refined in size and shape. A wetland delineation was not part of the wetland assessment, and jurisdictional status of these wetlands has not been verified. Prior to construction within the Project Area, a delineation within the area of impact would be required to determine the extent of wetlands and other potential jurisdictional waters of the United States to determine impacts and permitting needs with the USACE.

4.7.3 Riparian and Littoral Habitat

Riparian habitat is located along streams, rivers, and lakes, and provides important ecosystem functions related to hydrology and flooding, nutrient cycling, and plant and wildlife habitat (Mitsch and Gosselink 2000). The riparian zones within the Chandler Mountain Project Vicinity along the streams, including Little Canoe Creek East and other tributaries to the Coosa River, are generally wooded and consist of bottomland hardwood species typical of the Southwestern Appalachian (Southern Table Plateaus) and Ridge and Valley (Southern Limestone/Dolomite Valleys and Low Rolling Hills and Southern Shale Valleys) ecoregions. The wooded riparian areas provide habitats for various flora and fauna, and provide travel corridors, shelter, and foraging areas for wildlife.

The littoral zone acts as an interface between the open water aquatic environment and the terrestrial environment. The size and extent of the littoral zone within a waterbody varies depending upon geomorphology and sedimentation within the aquatic system (Wetzel 2001). Littoral habitats are mostly limited to the ponds or small impoundments, which are numerous and distributed throughout the Chandler Mountain Project Area. The upper reaches and creek inlets within these impoundments have extensive littoral habitat, including backwaters, swamps, and patches of flooded hardwood forests. These littoral zones provide habitat for a variety of fishes, reptiles and amphibians, birds, and aquatic mammals.

4.7.4 References

Mitsch, W.J. and J.G. Gosselink. 2000. Wetlands. John Wiley & Sons, Inc, New York, New York. 920 pp.

U.S. Fish and Wildlife Service (USFWS). 2022. U.S. Fish and Wildlife Service National Wetlands Inventory. Surface waters and wetlands data mapper. Available: <https://www.fws.gov/wetlands/data/Mapper.html> Accessed: November 2022.

Wetzel, R.G. 2001. Limnology: Lake and River Ecosystems. Academic Press.

4.8 Rare, Threatened, and Endangered Species

4.8.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(vii).

4.8.2 Overview

Information on RTE species potentially occurring in Etowah and St. Clair Counties, Alabama, was obtained from rare species databases including the USFWS Environmental Conservation Online System (ECOS) and Information for Planning and Conservation (IPaC) tools and ANHP rare species databases (Appendix C). Additional information regarding RTE species, their ranges, and designated critical habitats were assessed used Federal Register Listings and the USFWS ECOS Critical Habitat Mapper. Little Canoe Creek is identified in two geographic locations as "Little Canoe Creek;" however, Little Canoe Creek **West** is located approximately 20 miles southwest¹⁶ of the proposed Chandler Mountain Project Area and would not be affected by the Chandler Mountain Project. A portion of Little Canoe Creek **East** would be impounded by the proposed Chandler Mountain Project.

Species addressed herein are federally listed and protected under the ESA of 1973 or protected by the state of Alabama. Designated Critical Habitats were assessed using data available on the USFWS ECOS Critical Habitat Mapper. Species addressed herein are federally listed and protected under the ESA of 1973 or protected by the state of Alabama.

The Chandler Mountain Project Area would be contained entirely within the Middle Coosa River watershed (HUC 03150106). The initial review of existing information on RTE species included the entirety of Etowah and St. Clair counties. Species were then excluded from further consideration if they did not occur within the portion of the Coosa River Basin that overlaps with those counties. For instance, the ANHP rare species database included several aquatic species whose potential range extends into Etowah and St. Clair counties but does not include the Coosa River drainage basin. Since these species do not exist in the Coosa River Basin and will not likely occur within the Project Area, they were excluded from further consideration. The RTE species addressed within this section are limited to those whose range is within the Project Area, whose potential range is within the Coosa

¹⁶ Measured from the proposed Lower Dam A to the headwater of Little Canoe Creek West.

River Basin, or whose habitat may be directly or indirectly affected by Project construction or operation.

According to the resources mentioned above, federally listed species occur or have the potential to occur within the Chandler Mountain Project Area (Table 4-19). An additional six species that are state protected in Alabama potentially occur within the Project Area (Table 4-19). Further, the ANHP database included known occurrences for 57 tracked terrestrial plant and animal species in Etowah and St. Clair counties (Appendix C). In total, the ANHP list includes 1 insect, 3 reptiles, 4 amphibians, and 49 plant species. Although this list is extensive, most of these species are not federally or state protected; rather, most of these species are those whose populations are being tracked or monitored, are state species of concern, or are listed as a State Wildlife Action Plan (SWAP) priority species.

Table 4-19 Federally Listed and State Protected Species Potentially Occurring within the Chandler Mountain Project Area

Common Name Scientific Name	Federal Status	State Status	Designated Critical Habitat near the Project Area
Fishes			
Trispot Darter <i>Etheostoma trisella</i>	Threatened	Protected	No
Coldwater Darter <i>Etheostoma ditrema</i>	None	Protected	No
Mussels			
Upland Combshell <i>Epioblasma metastrata</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Southern Acornshell <i>Epioblasma othcaloogensis</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Finelined Pocketbook <i>Hamiota altilis</i>	Threatened	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Coosa Moccasinshell <i>Medionidus parvulus</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East

Common Name Scientific Name	Federal Status	State Status	Designated Critical Habitat near the Project Area
Canoe Creek Clubshell <i>Pleurobema athearni</i>	Endangered	Protected	In Project Area within Little Canoe Creek East
Southern Clubshell <i>Pleurobema decisum</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Southern Pigtoe <i>Pleurobema georgianum</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Georgia Pigtoe <i>Pleurobema hanleyianum</i>	Endangered	Protected	No
Ovate Clubshell <i>Pleurobema perovatum</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Triangular Kidneyshell <i>Ptychobranhus greenii</i>	Endangered	Protected	At southern boundary of Project Area; in Big Canoe Creek at its confluence with Little Canoe Creek East
Coosa Creekshell (<i>Leunio [Villosa] umbrans</i>)	Petitioned	Protected	No
Alabama Hickorynut (<i>Obovaria unicolor</i>)	Petitioned	Protected	No
Mammals			
Gray Bat <i>Myotis grisescens</i>	Endangered	Protected	No
Northern Long-eared Bat <i>Myotis septentrionalis</i>	Endangered	Protected	No
Indiana Bat <i>Myotis sodalis</i>	Endangered	Protected	No
Tricolored Bat <i>Perimyotis subflavus</i>	Proposed for Listing	None	No
Insects			

Common Name Scientific Name	Federal Status	State Status	Designated Critical Habitat near the Project Area
Monarch Butterfly <i>Danaus plexippus</i>	Candidate	Not Specified	No
Herpetofauna			
Alligator Snapping Turtle <i>Macrochelys temminckii</i>	Proposed for Listing	Protected	No
Alabama Map Turtle <i>Graptemys pulchra</i>	Proposed for Listing	Protected	No
Northern Pine Snake <i>Pituophis melanoleucas</i>	None	Protected	No
Coal Skink <i>Plestiodon anthracinus</i>	None	Protected	No
Green Salamander <i>Aneides aeneus</i>	None	Protected	No
Seepage Salamander <i>Desmognathus aeneus</i>	None	Protected	No
Plants			
Alabama Leather Flower <i>Clematis socialis</i>	Endangered	Not Specified	No
Georgia Rockcress <i>Arabis georgiana</i>	Threatened	Not Specified	No
Green Pitcher-plant <i>Sarracenia oreophila</i>	Endangered	Not Specified	No
Tennessee Yellow-eyed Grass <i>Xyris tennesseensis</i>	Endangered	Not Specified	No

4.8.3 Fishes

4.8.3.1 Trispot Darter

The Trispot Darter (*Etheostoma trisella*) was listed as federally threatened in 2018. It is found in the middle to upper Coosa River Basin. Outside of the breeding season (from April to October), the Trispot Darter inhabits small to medium river margins and reaches of tributaries with slower velocities, often around detritus, logs and woody debris, and water willow (*Justicia americana*) over substrates of cobbles, pebbles, gravel, or fine silt. During the breeding season (approximately late November or early December to late April), the Trispot Darter moves from main channels to tributaries as precipitation causes water levels to rise. Breeding occurs in intermittent seepage areas and ditches with little or no flow, among leaf litter covering cobble, gravel, sand, and clay, a layer of soft silt over clay, and emergent vegetation (USFWS 2017).

Threats to the Trispot Darter are sedimentation, hydrologic changes, decreases in riparian vegetation, contaminants, reductions in connectivity, poultry litter, channel modification, urbanization, and weather events (USFWS 2017). There is no USFWS Five-year Review for the Trispot Darter at this time, but a Draft Recovery Plan (USFWS 2023a) is available, and critical habitat was designated for this species in 2020 (USFWS 2020a).

Trispot Darter did not appear on the USFWS IPaC review; however, the ANHP database identified known occurrences in Etowah or St. Clair counties. Further, Trispot Darter has been collected in Little Canoe Creek West and tributaries to Big Canoe Creek (ADCNR 2022a). The nearest designated critical habitat for Trispot Darter is located in Big Canoe Creek, approximately 10 linear miles southwest of the Project Area, near the species' more recent collections in Little Canoe Creek West. Trispot Darter has not been documented in Little Canoe Creek East.

4.8.3.2 Coldwater Darter

The Coldwater Darter (*Etheostoma ditrema*) is a state-protected fish species in Alabama. The Coldwater Darter typically inhabits limestone springs and spring runs in the Ridge and Valley ecoregion. This species is endemic to the Coosa River Basin and has a patchy distribution in Georgia, Alabama, and Tennessee (GDNR 1999, ADCNR 2022b). It is associated with aquatic plants, organic debris, and rarely collected in small streams or those without adequate aquatic plant coverage (GDNR 1999). Aquatic plants associated with this species are primarily water milfoil and aquatic moss, with aquatic moss being the

preferred substrate for spawning (GDNR 1999, ADCNR 2022b). Springs inhabited by Coldwater Darters are vulnerable to water supply development, recreational use and abuse, development, sedimentation and runoff, and herbicide use (GDNR 1999).

Suitable habitat for Coldwater Darter has not been assessed within the Chandler Mountain Project Area at this time.

4.8.4 Mollusks

4.8.4.1 Upland Combshell

The Upland Combshell (*Epioblasma metastrata*) was federally listed as endangered in 1993. It is a squarish-shaped mussel that rarely grows larger than 6 cm in length (USFWS 2000). Its distribution consists of the Black Warrior River, Cahaba River, and Coosa River and their tributaries. The Upland Combshell is restricted to shoals in rivers over substrates of sand, gravel, and cobble in moderate to fast currents (USFWS 2000). It is believed to release glochidia in late spring or early summer, but the host fish of this species are not known. The decline of the Upland Combshell is attributed primarily to habitat alteration, sedimentation, eutrophication, and decline in water quality (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000) and Five-year Review (USFWS 2018) for the Upland Combshell, and critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the Upland Combshell. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.2 Southern Acornshell

The Southern Acornshell (*Epioblasma othcaloogensis*) was federally listed as endangered in 1993. Historically, it occurred in the upper Coosa River system and in the Cahaba River above the fall line. The last recorded collection of Southern Acornshell was in 1973 from the Conasauga River in Georgia and from Little Canoe Creek East around the county line between Etowah and St. Clair counties, Alabama. Repeat surveys of historical habitat in the Coosa and Cahaba River systems have found neither living nor relic specimens of Southern Acornshell, and many recent publications have presumed the species is extinct. There is little information on habitat, life history needs, host fish, and management options of the Southern Acornshell (USFWS 2018).

The USFWS has both a Recovery Plan (USFWS 2000) and Five-year Review (USFWS 2018) for the Southern Acornshell, although recovery criteria are not specified due to the extent of the species' decline and continuing impacts to habitat at the time they were listed (USFWS 2018). Critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the Southern Acornshell. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.3 Finelined Pocketbook

The Finelined Pocketbook (*Hamiota altilis*) was federally listed as threatened in 1993. It is a suboval-shaped mussel that has a maximum length of approximately 3³/₈ inches (Mirarchi et al. 2004). This mussel lives in small to large streams, primarily above the fall line, with stable sand/gravel/cobble substrates and moderate to swift currents. The Finelined Pocketbook mussel releases glochidia as a super-conglutinate from March through June and confirmed host species include Blackspotted Topminnow (*Fundulus olivaceus*), Redeye Bass (*Micropterus coosae*)¹⁷, Spotted Bass (*Micropterus punctulatus*)¹⁸, Largemouth Bass (*Micropterus salmoides*), and Green Sunfish (*Lepomis cyanellus*) (Mirarchi et al. 2004). Historically, this mussel was found in the Alabama, Tombigbee, Black Warrior, Cahaba, Tallapoosa, and Coosa rivers, and their tributaries (USFWS 2000). The ADCNR and USFWS are currently reintroducing the Finelined Pocketbook into suitable historical habitats within the state (USFWS 2000).

Threats to the Finelined Pocketbook are the historic construction of dams and impoundments along large reaches of river channels. This species continues to be imperiled due to water withdrawals, water quality degradation including sedimentation released from dams and agricultural runoff, downstream flow alterations caused by hydropeaking dams, and climate change (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000) and a Five-Year Review (USFWS 2019b) for the Finelined Pocketbook, and critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the

¹⁷ Redeye Bass have been more recently been divided into multiple species based on drainage: Redeye Bass (found in the Coosa River drainage), Cahaba Bass (found in the Cahaba River drainage), Tallapoosa Bass (found in the Tallapoosa River drainage), Warrior Bass (found in the Warrior River drainage), and Chattahoochee Bass (found in the Chattahoochee River drainage) (Baker et al. 2013).

¹⁸ Spotted Bass were later described as two different species, Spotted Bass and Alabama Bass (Baker et al. 2008).

Finelined Pocketbook. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

Recent surveys within the Chandler Mountain Project Area were conducted by ADCNR and GSA. In 2018, surveys were conducted at eight sites in Little Canoe Creek East, and ADCNR collected live Finelined Pocketbook specimens downstream of Steele Station Road. This mussel species is considered extant within the Project Area.

4.8.4.4 Coosa Moccasinshell

The Coosa Moccasinshell (*Medionidus parvulus*) was federally listed as endangered in 1993. It occasionally exceeds 40 mm in length (USFWS 2000). It has a thin, elongate shell, and the periostracum is yellow-brown to dark brown in color, with fine green rays. The nacre is blue and sometimes has salmon-colored spots. The Coosa Moccasinshell is historically found in the Cahaba River, the Sipsey Fork of the Black Warrior River Basin, and the Coosa River and its tributaries. It inhabits sand, gravel, and cobble shoals with moderate to strong currents. Little is known about the life history of the Coosa Moccasinshell, but it is closely related to the Alabama Moccasinshell and is therefore presumed to spawn similarly. Host fish are presumed to be species of darters (i.e., genus *Etheostoma* and *Percina*) (USFWS 2000).

Threats to the Coosa Moccasinshell are habitat alteration, sedimentation, eutrophication, and decreased water quality. The Coosa Moccasinshell cannot tolerate impoundments or channelized reaches (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000), a Recovery Plan Amendment (USFWS 2019c), and a Five-Year Review (USFWS 2019b) for the Coosa Moccasinshell. The Chandler Mountain Project Area is within the current habitat range of the Coosa Moccasinshell, and critical habitat was designated in 2004 (USFWS 2004). Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.5 Canoe Creek Clubshell

The Canoe Creek Clubshell (*Pleurobema athearni*) was federally listed as endangered in 2022. It grows up to 97 mm in length and has a somewhat thick ovate to sub-ovate shell, which is tawny to brown in color and is not marked by rays (USFWS 2020b, Williams et al. 2008, Fobian et al. 2017). The Canoe Creek Clubshell is known to inhabit Big Canoe Creek

(USFWS 2020b) and Little Canoe Creek East (Fobian et al. 2017). It primarily inhabits shoals and prefers gravel substrates (Williams et al. 2008). Host fish species include Tricolor Shiner (*Cyprinella trichroistia*), Alabama Shiner (*Cyprinella callistia*), and Striped Shiner (*Luxilus chrysocephalus*) (Wynn et al. 2017). Threats to the Canoe Creek Clubshell are sedimentation, decreases in water quality, climate events such as drought, and decreases in river connectivity (USFWS 2020b).

Because Canoe Creek Clubshell is recently listed, neither a Recovery Plan nor Five-Year Review have been produced, but a Species Status Assessment is available (USFWS 2020b). Critical habitat was designated in 2022 and falls within the Chandler Mountain Project Area within Little Canoe Creek East.

Recent surveys for Canoe Creek Clubshell within the Project Area were conducted by ADCNR. In 2017, surveys were conducted at eight sites in Little Canoe Creek east, and live Canoe Creek Clubshell were located approximately 3.5 miles downstream of the Highway 11 bridge (Fobian et al. 2017). ADCNR collected Canoe Creek Clubshell again downstream of Steele Station Road in 2018. This mussel species is considered extant within the Project Area.

4.8.4.6 Southern Clubshell

The Southern Clubshell (*Pleurobema decisum*) was listed as endangered in 1993. It is typically 70 mm in length but can grow up to 93 mm (Williams et al. 2008) and has a thick shell with a heavy hinge plate and teeth. The shell is somewhat rectangular, and the periostracum is yellow to yellow brown in color. Sometimes young specimens have green rays or spots on the umbo¹⁹ (USFWS 2000). The Southern Clubshell was formerly known in every major stream system in the Mobile River Basin, excluding the Mobile Delta. It also occurs in the Alabama River, Tombigbee River, Black Warrior River, Cahaba River, and Coosa River and their tributaries, and in the Uphapee and Chewacla Creeks in the Tallapoosa River drainage (USFWS 2000). It inhabits sand, gravel, and cobble shoals and runs. Presumed fish hosts include Blacktail Shiner (*Cyprinella venusta*) and Striped Shiner (Williams et al. 2008).

¹⁹ An umbo is one of the lateral prominences just above the hinge of a bivalve shell.

Threats to the Southern Clubshell are habitat alteration, sedimentation, and decreased water quality. The Southern Clubshell cannot tolerate impoundments or channelized reaches (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000), which was amended in 2019 (USFWS 2019d), and a Five-Year Review (USFWS 2019b) for the Southern Clubshell, and critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the Southern Clubshell. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.7 Southern Pigtoe

The Southern Pigtoe (*Pleurobema georgianum*) was federally listed as endangered in 1993. It grows up to 65 mm in length (Williams et al. 2008) and has an elliptical to oval-shaped shell that is somewhat compressed. It has small, well-developed pseudocardinal teeth. The periostracum is yellow to yellow-brown in color and the nacre is white. There are many dark brown growth lines on the shell, and small individuals may have green spots on the growth lines along the posterior ridge and near the umbo (USFWS 2000). It is known historically to inhabit the Coosa River and its tributaries (USFWS 2000), but its current habitat range and critical habitat reach beyond the Coosa River Basin into other drainages. Its habitat consists of sand, gravel, and cobble shoals and runs. Presumed fish host species include Alabama Shiner, Tricolor Shiner, and Blacktail Shiner (Williams et al. 2008).

Threats to the Southern Pigtoe are habitat alteration, sedimentation, eutrophication, and decreased water quality. The Southern Pigtoe cannot tolerate impoundments (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000), which was amended in 2019 (USFWS 2019c) and a Five-Year Review (USFWS 2019b) for the Southern Pigtoe, and critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the Southern Pigtoe. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.8 Georgia Pigtoe

The Georgia Pigtoe (*Pleurobema hanleyianum*) was federally listed as endangered in 2010. It grows up to 65 mm in length and has oval to elliptical-shaped shell that is somewhat inflated. The posterior ridge and anterior end are rounded. The periostracum is yellowish-tan to reddish-brown in color and sometimes has green, concentric rings. The interior shell is white to dull bluish white (USFWS 2021a, Williams et al. 2008). It is known historically to inhabit large creeks and rivers of the Coosa River Basin. The habitat and life history information of the Georgia Pigtoe are largely unknown. Threats to the Georgia Pigtoe are point and non-point source pollution and channel alterations such as impoundments (USFWS 2014a). The USFWS has both a Recovery Plan (USFWS 2014a), which was amended in 2019 (USFWS 2019e), and a Five-Year Review (USFWS 2021a) for the Georgia Pigtoe, and critical habitat was designated in 2010 (USFWS 2010). Historically, this species was collected in the lower reaches of Big Canoe Creek as well as Little Canoe Creek East (USFWS 2010).

The Chandler Mountain Project Area is within the current habitat range of the Georgia Pigtoe. Recent surveys were conducted by ADCNR in 2018 at eight sites in Little Canoe Creek East. ADCNR collected fresh dead Georgia Pigtoe specimens downstream of Steele Station Road. This mussel species is considered extant within the Project Area.

4.8.4.9 Ovate Clubshell

The Ovate Clubshell (*Pleurobema perovatum*) was federally listed as endangered in 1993. It grows up to 60 mm in length (Williams et al. 2008) and has an oval to elliptical-shaped shell with nearly terminal, inflated umbos (USFWS 2000). The periostracum color varies from yellow to dark brown in color, sometimes has broad green rays that can cover most of the umbo and posterior ridge, and the nacre is white to bluish white in color. Its historic range consists of the Tombigbee River, Black Warrior River, Cahaba River, and Coosa River and their tributaries as well as the Chewacla, Uphapee, and Opintlocco Creeks in the Tallapoosa River Basin and the Alabama River. Its habitat consists of sand and gravel shoals and runs. The life history and host fish of Ovate Clubshell are currently unknown. Threats to the Ovate Clubshell are habitat alteration, sedimentation, eutrophication, and decreased water quality. The Ovate Clubshell cannot tolerate impoundments or channelization (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000), which was amended in 2019 (USFWS 2019f), and a Five-Year Review (USFWS 2019b) for the Ovate Clubshell, and critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the Ovate Clubshell. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.10 Triangular Kidneyshell

The Triangular Kidneyshell (*Ptychobranthus greenii*) was federally listed as endangered in 1993. It grows up to 85 mm in length (Williams et al. 2008) and has a moderately compressed shell that may be flattened ventral to the umbos. It has heavy pseudocardinal teeth, and the periostracum is tawny to brown, often without rays. When rays are present, they are thin and sparse and usually confined to the posterior slope (Williams et al. 2008). Its historic range consists of the Black Warrior River and Coosa River and their tributaries and the Cahaba River. Its habitat consists of sand, gravel, and cobble substrate in shoals and runs. Spawning was observed in March 1994 revealing glochidia conglutinated to mimic dipteran larvae (USFWS 2000). Known host fish are the Warrior Darter (*Etheostoma bellator*), Tuskaloosa Darter, Blackbanded Darter, and Mobile Logperch (*Percina kathae*) (USFWS 2000).

Threats to the Triangular Kidneyshell are habitat alteration, sedimentation, eutrophication, and decreased water quality. The Triangular Kidneyshell cannot tolerate impoundments (USFWS 2000).

The USFWS has both a Recovery Plan (USFWS 2000), which was amended in 2019 (USFWS 2019g), and a Five-Year Review (USFWS 2019b) for the Triangular Kidneyshell, and critical habitat was designated in 2004 (USFWS 2004). The Chandler Mountain Project Area is within the current habitat range of the Triangular Kidneyshell. Designated critical habitat is located at the southern boundary of the Project Area in Big Canoe Creek at its confluence with Little Canoe Creek East.

4.8.4.11 Coosa Creekshell

Coosa Creekshell (*Leaunio [Villosa] umbrans*) is a mussel species with a relatively thin, elliptical to irregularly oval shell. The species is endemic to the Coosa River drainage in Georgia, Alabama, and Tennessee and was requested for inclusion during USFWS consultation during PAD development. Coosa Creekshell is typically found in medium

rivers to small creeks with moderate currents (GDNR 2021). Occupied areas are mixtures of sand, gravel, and cobble, but may be found in silt/clay mixtures and along bank margins. Similar to other mussel species, population declines are attributed to excess sedimentation resulting from inadequate riparian buffer zones, development, and agriculture, as well as degraded water quality from industrial effluents, sewage treatment, and agricultural practices (GDNR 2021).

Coosa Creekshell was petitioned for federal listing in 2011 and is a protected species in Alabama. The species has been collected in Etowah and St. Clair Counties, including Rock Creek at Steele Station Road (ANHP 2023), which is immediately adjacent to the Chandler Mountain Project Area. Further, Coosa Creekshell has been documented in Little Canoe Creek East, with a live individual collected immediately upstream of Hwy 11, and fresh dead shells collected at several locations downstream of Hwy 11 (Fobian et al. 2017). This species is considered extant within the Project area.

4.8.4.12 Alabama Hickorynut

Alabama Hickorynut (*Obovaria unicolor*) is a protected mussel species in Alabama and was petitioned for federal listing in 2011. In general, this species is restricted to large streams in the western portions of the Mobile Basin (ADCNR 2023a, Cordeiro 2004) and was requested for inclusion during USFWS consultation during PAD development. The species is usually found in sand/gravel substrate, in streams just below the Fall Line, but can be found in a variety of habitats including swift gravel shoals, sandy runs, silty banks margins, pools, and sloughs (Mirarchi et al. 2004). In Alabama, remaining populations are usually small, widely scattered, and isolated with the exception of the Sipsey River (Mirarchi et al. 2004). The species also can be found in the Tombigbee River, Cahaba River, and their tributaries, but are generally rare in areas other than the Sipsey River (ADCNR 2023a, ANHP 2023). There are not any known occurrences in Etowah or St. Clair Counties. Because of its rarity, sporadic distribution in river systems outside of the Sipsey River, Alabama Hickorynut is not likely to occur within the Chandler Mountain Project Area.

4.8.5 Mammals

4.8.5.1 Gray Bat

The Gray Bat (*Myotis grisescens*) was federally listed as endangered in 1976. The Gray Bat is distinguished from other bats by the uni-colored fur on its back. This species molts in the summer, when its dark gray fur turns to a chestnut brown (USFWS 1997). This species

can be found in caves year-round, using them both in the summer roosting and winter hibernating periods. Typically, these caves are scattered along rivers or lakes where the Gray Bat feeds on flying aquatic and terrestrial insects (USFWS 1997). Breeding takes place in the fall, with a single pup born in late May or early June (Mirarchi 2004, USFWS 1997). The main threat to Gray Bat populations is human disturbance in unprotected caves (USFWS 2009). The USFWS has both a Recovery Plan (USFWS 1982) and a Five-Year Review (USFWS 2009) for the Gray Bat.

The Chandler Mountain Project Area is within the potential range of Gray Bat but is restricted to caves. Steep stone bluffs are present along Chandler Mountain's toe-of-slope at its base near Little Canoe Creek East, which may contain limestone caves or other structures (i.e., Chandler Rock Bridge²⁰) suitable for bats. Further, the upper rocky rim of Chandler Mountain contains numerous rocky crags and crevasses. These areas may need to be investigated for potential caves or winter hibernacula if land-clearing activities are proposed. in the immediate vicinity of these potential roosting or wintering habitats.

4.8.5.2 Indiana Bat

The Indiana Bat (*Myotis sodalis*) was federally listed as endangered in 1976. Habitat conducive to the Indiana Bat is in the central to north and eastern portions of Alabama. This species hibernates in caves, mostly in tight clusters. In the summer, females form small maternity colonies in tree hollows and behind loose bark. A single pup is born in June or early July and weaned in 25-35 days. The diet of this species includes small, soft-bodied insects, including moths, flies, and beetles (Mirarchi 2004). The Indiana Bat is vulnerable to extinction due to habitat loss and White Nose Syndrome, a fungal disease. The USFWS has both a Draft Recovery Plan (USFWS 2007) and a Five-Year Review (USFWS 2019h) for Indiana Bat, and critical habitat was designated in 1977 (USFWS 1977).

Suitable habitat for Indiana Bat is present within the Chandler Mountain Project Area, but the occurrence of the species within the Project Area is unknown. Suitable roosting habitats for Indiana Bat are likely within the mature hardwood forests throughout the Project Area. Steep stone bluffs are present along Chandler Mountain's toe-of-slope at its base near Little Canoe Creek East, which may contain limestone caves or other structures (i.e., Chandler Rock Bridge) suitable for bats. Further, the upper rocky rim of Chandler

²⁰ Chandler Natural Bridge (locally known as "Rock Bridge") is located on private land (owned by Alabama Power) on Little Canoe Creek East within the Project Area, specifically in the northwestern area of the proposed lower reservoir.

Mountain contains numerous rocky crags and crevasses. These areas may need to be investigated for potential caves or winter hibernacula if land-clearing activities are proposed within the immediate vicinity of these wintering habitats. Similarly, areas containing potential maternity roost or summer roosting may require investigation prior to land-disturbing activities in these areas.

4.8.5.3 Northern Long-eared Bat

The Northern Long-eared Bat (*Myotis septentrionalis*) was federally listed as threatened in 2015, with a final rule published in the Federal Register in 2016. On April 27, 2016, the USFWS determined that the designation of critical habitat for the species was not prudent; therefore, critical habitat has not been established for the Northern Long-eared Bat (USFWS 2016). On November 30, 2022, the USFWS published a final rule reclassifying the Northern Long-eared Bat as endangered, effective January 30, 2023. On January 26, 2023, the USFWS delayed the effective date of the final rule to March 31, 2023 (USFWS 2023b). On March 31, 2023, Northern Long-eared Bat was reclassified as endangered. The Northern Long-eared Bat was historically distributed statewide. The Northern Long-eared Bat feeds on invertebrates and is known to glean prey from vegetation and water surfaces. The bat winters in groups in underground caves and cave-like structures but in the summers, it roosts singularly or in small colonies in cavities, under bark, or in hollows of live and dead trees typically greater than 3 inches in diameter. Suitable roosting trees possess exfoliating bark, cavities, or cracks (USFWS 2016). The Northern Long-eared Bat has a single pup born in late spring or early summer with the offspring weaned approximately 1 month after birth (Mirarchi 2004).

The primary threat to the Northern Long-eared Bat is White Nose Syndrome, a fungal disease (USFWS 2016). The USFWS does not have a Recovery Plan, Five-Year Review, or designated critical habitat for the Northern Long-eared Bat.

Suitable habitat for Northern Long-eared Bat is present within the Chandler Mountain Project Area, but the occurrence of the species within the Project Area is unknown. Suitable roosting habitats for Northern Long-eared Bat can be found within the mature hardwood forests throughout the Project Area. Further investigation in these areas may be required if tree-clearing in the pupping season is proposed.

4.8.5.4 Tricolored Bat

The Tricolored Bat (*Perimyotis subflavus*) is one of the smallest North American bat species, with a distribution from eastern Canada, most of the eastern U.S., and south through Mexico and into Central America. The species is common throughout Alabama (ADCNR 2023b). Although the species is widespread, concerns regarding white-nose syndrome, along with wind-energy-related mortality, habitat loss, and climate change, the USFWS proposed to list Tricolored Bat as endangered on September 14, 2022 (USFWS 2022a).

The Tricolored Bat feeds on a variety of insects including moths, beetles, mosquitoes, night midges, flies, and ants. The species occupies a variety of habitats in Alabama and can be found in caves, mines, and rock crevasses in winters, and caves, tree hollows, under tree bark, brush piles, and occasionally in buildings and bat boxes (ADCNR 2023b). Because of the species' diverse habitat use and widespread distribution in Alabama, Tricolored Bat may be present within the Chandler Mountain Project Area, but the occurrence of the species within the Project Area is unknown.

4.8.6 Insects

4.8.6.1 Monarch Butterfly

The Monarch Butterfly (*Danaus plexippus*) was federally listed as a candidate species in 2020. The species has large, orange wings with a black border and veins. The border is marked by two rows of white spots. The Monarch Butterfly's life cycle can vary depending on geographic location. Monarch Butterflies breed year-round in many regions, but individual butterflies in temperate climates like eastern and western North America migrate long distances and live for an extended period due to reproductive diapause (USFWS 2020c). Monarch Butterflies in eastern and western North America begin migrating to their overwintering locations in the fall. Adult Monarch Butterflies require a diversity of blooming sources of nectar during breeding and migration (spring through fall) and utilize a variety of roosting trees along the fall migration route. They require milkweed for oviposition and larval feeding, and the timing of both the Monarch Butterfly's breeding and the availability of nectar and milkweed is important for survival. In non-migratory populations, individuals require nectar and milkweed year-round (USFWS 2020c).

Primary threats to the species include the loss and degradation of habitat from conversion of grasslands to agriculture, widespread use of herbicides, exposure to insecticides, land-clearing activities in overwintering sites, urban development, and general loss of milkweed and nectar sources across the species' range from various land development activities (USFWS 2020c). The USFWS does not have a Recovery Plan, Five-Year Review, or designated critical habitat for the Monarch Butterfly. The presence of this species and suitable habitat containing the host milkweed plants within the Chandler Mountain Project Area is unknown.

4.8.7 Herpetofauna

4.8.7.1 Alligator Snapping Turtle

The Alligator Snapping Turtle (*Macrochelys temminckii*) is a state-protected reptile species in Alabama and is proposed for federal listing under the ESA. The Alligator Snapping Turtle is the largest freshwater turtle in the world, with adults reaching 150 to 175 pounds with some reaching 220 pounds. The species is generally confined to the Gulf of Mexico drainages with a range that extends from Georgia and northwest Florida to eastern Texas, with northernmost extents into southeast Kansas, southeast Iowa, Illinois, and Indiana (ADCNR 2022c). The species usually inhabits slow moving waters in river and deeper tributaries, sloughs, oxbows, canals, swamps, bayous, and ponds near these areas. Alligator Snapping Turtle was presumably confined to the Coastal Plain, although some populations have been discovered in the Piedmont (GDNR 2007a). Although the Alligator Snapping Turtle has not been observed in Etowah or St. Clair counties, the current distribution in Alabama is assumed to be statewide (ADCNR 2022c); the USFWS IPaC report (Appendix C) also suggests the species' potential range is within the Chandler Mountain Project Area.

Although the Project Area may be within the potential range of Alligator Snapping Turtle, suitable habitat appears to be limited to the larger bodies of water (i.e., the Coosa River and Neely Henry Lake) that reside immediately adjacent to the Project Area. However, backwater areas, deeper tributaries, sloughs, and swamps may be present in the southern portion of the Chandler Mountain Project Area.

4.8.7.2 Alabama Map Turtle

The Alabama Map Turtle (*Graptemys pulchra*) is a state-protected reptile in Alabama. In 2021, the USFWS proposed listing Alabama Map Turtle – along with three other map turtle

species – as threatened due to its similarity of appearance to the Pearl River Map Turtle (*Graptemys gibbonsi*), which is proposed for listing as well (USFWS 2021b). Final rulings for Pearl River Map Turtle proposed listing and the subsequent listing of other map turtle species for similarity of appearance have not been determined. As its name suggests, Alabama Map Turtles are nearly endemic to Alabama, where they are widespread. However, some have been observed in neighboring states. This species prefers rivers and streams with sandy or muddy bottoms but has been found in fast-moving waters with rocky bottoms (ADCNR 2022d). Basking sites such as logs, treetops, and stumps with adequate sunlight are important and must be part of the overall habitat. Alabama Map Turtle has been documented in Etowah County, Alabama. Suitable habitat and the species itself may potentially occur at the southern boundary of the Chandler Mountain Project Area at Big Canoe Creek and its confluence with Little Canoe Creek East.

4.8.7.3 Northern Pine Snake

The Northern Pine Snake (*Pituophis melanoleucus melanoleucus*) is a state-protected reptile in Alabama and is not federally listed. The range of Northern Pine Snake is from New Jersey to South Carolina and Georgia, westward to Kentucky, Tennessee, and Alabama. In Alabama, the species is very localized in the Ridge and Valley, Appalachian Plateau, and Interior Plateau (ADCNR 2022e). The species is primarily found in open areas with early successional vegetation, especially those subject to periodic fire. Habitat is usually dry, forested or partially forested, with soils that are loose, sandy, or gravelly. Occupied habitats in the Coastal Plain is usually dominated by longleaf pine (*Pinus palustris*) and scrub oak forests, whereas sites above the Fall Line are dry, pine or pine-hardwood mixtures (ADCNR 2022e).

Potentially suitable habitat for Northern Pine Snake may be present within the Chandler Mountain Project Area.

4.8.7.4 Coal Skink

The Coal Skink (*Plestiodon anthracinus*) is a state-protected reptile in Alabama and is not federally listed. In Alabama, most species records are from the Coastal Plain; however, populations are in the Southwestern Appalachians and Ridge and Valley ecoregions as well. Within Alabama, populations of Southern Coal Skink (*P.a. plavialis*) and intergrades between the Southern and the Northern Coal Skink (*P.a. anthracinus*) are present. This species is infrequently encountered and whether this is the result of its cryptic nature and

secretive behavior, or its rarity is unknown (ADCNR 2022f). In northern Alabama, habitats are usually hilly mesic sites with mixed pine hardwood forest, where individuals are found in rotting logs, under rocks, or in leaf litter. Coal Skinks are rarely found far from streams (ADCNR 2022f) and are usually associated with moist or wet pine flatwoods, bogs, and seepage streams (GDNR 2018).

Coal Skink has been observed in St. Clair County and its potential range is within the Chandler Mountain Project Area. Suitable habitat for this species may be present within the Project Area but location and extent is unknown.

4.8.7.5 Green Salamander

The Green Salamander (*Aneides aeneus*) is a state-protected amphibian in Alabama. Although not federally listed, the Green Salamander is a rare species with scattered populations in hilly and mountainous areas from northeastern Mississippi to southern Pennsylvania (GDNR 2007b). Habitat includes moist cracks and crevasses along cliff faces, rock outcrops, and caves in mesic hardwood forests, as well as occasionally fallen tree bark, rotten logs, and stumps (ADCNR 2022g). The species has declined since the 1970s, presumably from a combination of climatic factors, habitat loss, disease, habitat modification, land conversion, and over-collecting (GDNR 2007b).

Green Salamander was observed within St. Clair County, Alabama, and the Chandler Mountain Project Area is within the range of Green Salamander. Suitable habitat is likely within the Project Area, and Green Salamander may potentially occur within those habitats.

4.8.7.6 Seepage Salamander

The Seepage Salamander (*Desmognathus aeneus*) is a state-protected amphibian in Alabama. The species' range is from west-central Alabama, through Georgia, and into extreme northwestern South Carolina, western North Carolina, and two counties in southeastern Tennessee (Jones 1982). Suitable habitats include moist seepage areas in deciduous or semi-deciduous forests (Harrison 1992). These areas are sometimes adjacent to streams where moisture originates from underground sources, and most sites include deciduous leaf litter, mosses, and an assemblage of herbaceous plants (ADCNR 2022h). The decline in Seepage Salamander populations is associated with anthropogenic changes, primarily destructive forest practices in seepage habitats, including clear-cutting, conversion from hardwoods to pines, and rapid flooding and sedimentation following

these practices (ADCNR 2022h). Additional declines have been attributed to road construction, urbanization, and over-collecting.

Seepage Salamander was documented in Etowah County, and seepage habitats suitable for this species likely occur within the Chandler Mountain Project Area.

4.8.8 Botanical Resources

4.8.8.1 Georgia Rockcress

The Georgia Rockcress (*Arabis georgiana*) was listed as threatened in 2014. It has basal, oblanceolate leaves (lance-shaped, broadest above the middle and tapering towards the base). The basal leaves form a rosette that is typically present through the fruiting season, from May into early July. The flowering season is from March to April. It grows in soils with neutral to slightly basic pH in the Lower Gulf Coastal Plain, Upper Gulf Coastal Plain, Red Hills, Black Belt, Piedmont, and the Ridge and Valley physiographic provinces (USFWS 2021c). Georgia Rockcress can grow in dry areas such as shallow soil on rocky bluffs. It can be found in mesic woods but not in heavy shade. It favors moderately high to high light intensities, generally under a mature canopy typically comprised of Eastern Red Cedar (*Juniperus virginiana*), American Hophornbeam (*Ostrya virginiana*), Chinquapin Oak (*Quercus muehlenbergii*), White Ash (*Fraxinus americana*), Southern Sugar Maple (*Acer barbatum*), and Eastern Redbud (*Cercis canadensis*) (USFWS 2021c).

The USFWS has a Recovery Plan Outline (USFWS 2020d) and a Five-Year Review (USFWS 2021d) for the Georgia Rockcress, and critical habitat was designated in 2014 (USFWS 2014b). The Project Area is within the current range of Georgia Rockcress and potentially suitable habitats may be present.

4.8.8.2 Alabama Leather Flower

The Alabama Leather Flower (*Clematis socialis*) was listed as endangered in 1986. It is a member of the Ranunculaceae family and has variable leaves from the base of the apex to the stem. The lowermost leaves are triangular and generally less than one cm in length, the median leaves are mostly elliptic-linear and 4-12 cm in length, and the upper leaves are 3 to 5 foliolate and shaped like the median leaves (USFWS 1989). As of 2004, there are seven known occurrences in Alabama, within Cherokee, Etowah, and St. Clair Counties (NatureServe 2023). The St. Clair County population is on land owned by the Nature Conservancy. Specimens typically occur on roadside and transmission line rights-of-way

(USFWS 1989) in mesic flats approximately 15 to 30 meters from intermittent creeks in silty-clayey Conasauga soils (USFWS 1989). This species has been found in full-sun along roadsides, rights-of-way, or openings within woodlands or recently harvested pine stands in silt and clay alluvium (NatureServe 2023).

Threats to the Alabama Leather Flower are destruction and modification of habitat, little knowledge of their biology and habitat management, and limited number of populations (USFWS 1989). In addition, habitat loss would also result from the closure of the hardwood canopy and competition from other plants. Other threats include the use of herbicides, mowing, mechanical scraping, road maintenance, logging, and practices that directly impact the rhizome system (NatureServe 2023).

The USFWS has both a Recovery Plan (USFWS 1989) and a Five-Year Review (USFWS 2022b) for the Alabama Leather Flower. With known occurrences in Etowah and St. Clair Counties, this species could potentially occur within the Project Area.

4.8.8.3 Green Pitcher-plant

The Green Pitcher-plant (*Sarracenia oreophila*) was listed as endangered in 1979. It is a carnivorous plant with two types of leaves: pitchers and phyllodia. The pitcher leaves are green to yellow-green in color, tube-shaped, and from 20-75 cm in length with a 6-10 cm circumference at the orifice. When in direct sunlight, pitchers can appear to have maroon or purple blotches at the orifice. Pitcher leaves wither by the end of summer and are replaced by flat phyllodia leaves, which remain until the next season. Flowers have yellow petals (USFWS 1994a). The Green Pitcher-plant is known to occur in Cherokee, DeKalb, Etowah, Jackson, and Marshall counties, Alabama. Most populations are in the Coosa Valley and Plateau Regions of the Cumberland Plateau in northeast Alabama (USFWS 1994a). Green Pitcher-plant habitats vary, with some populations found in moist upland areas and some along boggy, sandy streambanks. Soils in upland habitats are sandy clays or loams. The upland sites have two sub-categories: mixed oak flatwoods and seepage bogs. Flatwood sites are areas of flat relief with poor drainage and are characterized by a high water table in winter, with canopies of oaks (*Quercus* spp.) and pines (*Pinus* spp.). The seepage bogs have moderate to steep slopes and are moist throughout the year. The soils in streambank sites are almost purely sand. Streambank sites are all found in the Lookout Mountain area and are dominated by alders (*Alnus* spp.), Mountain Laurel (*Kalmia latifolia*), Red Maple (*Acer rubrum*), and sometimes *Rhododendron* spp. Green

Pitcher-plants at streambank sites grow approximately 2 feet above the average summer water level (USFWS 1994a).

The primary threat to Green Pitcher-plant is habitat loss from clearing and alteration of land for residential, agricultural, silvicultural, and industrial purposes. Impoundments may have inundated some populations. Other threats include over-collecting by botanists and commercial dealers and fire suppression (USFWS1994a). The USFWS has both a Recovery Plan (USFWS 1994a) and a Five-Year Review (USFWS 2020e) for Green Pitcher-plant. No documented occurrences of Green Pitcher-plant have occurred within the Chandler Mountain Project Area although the Project Area is within the current habitat range.

4.8.8.4 Tennessee Yellow-eyed Grass

Tennessee Yellow-eyed Grass (*Xyris tennesseensis*) was listed as endangered in 1991. It is a perennial plant that grows in clumps of few to many bulbous-based individuals. The bases are composed of small, dark outer scales and fleshy white to rose or purple-colored inner scales. All leaves are basal; the outer leaves are short and scale-like, and the others are linear and 9-45 cm long and 0.15-1.0 cm wide. The leaf blades are bright green, taper at the base and apex, and overlap each other in the basal one-eighth to one-third of their length. They often have pink, red, or purple coloration in this overlapping region and pale, thin margins and papillose surfaces. The flowers are yellow and have three petals (USFWS 1994b). The most widespread distribution in Alabama appears to occur in the Ridge and Valley physiographic province extending from Calhoun to Bibb counties. All known sites are characterized by permanent moisture regimes, open and sunny areas, and calcareous bedrock (shale, limestone, dolomite) or thin calcareous soils. The five known sites in Bibb County are all along small to medium-sized streams on beds of exposed dolomite. The population in Franklin County is on a gentle slope and wet ditch near a highway and the two Calhoun County sites are open, wet, and disturbed habitats. Associated herbs are often American Water-willow (*Justicia americana*), Blue Mistflower (*Conoclinium coelestinum*), Anglestem Beaksedge (*Rhynchospora caduca*), Mingled Beaksedge (*Rhynchospora mixta*), Miterwort (*Cynoctonum mitreola*), Blunt Spikerush (*Eleocharis obtusa*), *Ludwigia macrocarpa*, *Lycopus* sp., Axilflower (*Mecardonia acuminata*), Stiff Cowbane (*Oxypolis rigidior*), Largeleaf Grass of Parnassus (*Parnassia grandifolia*), Dwarf St. Johnswort (*Hypericum mutilum*), *Cyperus strigosus*, Hairy Umbrella-sedge (*Furiena squarrosa*), *Phlox glaberrima*, and Cutleaf Coneflower (*Rudbeckia laciniata*) (USFWS 1994b).

Threats to Tennessee Yellow-eyed Grass include impacts by off-road vehicles, timbering, herbicide spraying, impoundment of wetlands, drainage of wetlands, and establishment of agricultural fields (USFWS 1994b). The USFWS has both a Recovery Plan (USFWS 1994b) and a Five-Year Review (USFWS 2021e) for Tennessee Yellow-eyed Grass. The Chandler Mountain Project Area is within the current habitat range.

4.8.9 Designated Critical Habitat

As mentioned in the species profiles above, Designated Critical Habitat (DCH) has been established for species within the Chandler Mountain Project Area and in areas downstream of the Project Area that may be affected by Project construction or operations upstream. Designated Critical Habitat for Canoe Creek Clubshell was established within Little Canoe Creek East, which is within the Project Area.

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4.9 Recreation and Land Use

4.9.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(viii). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Recreation and Land Use section:

- (B) Current recreational use of project lands and waters compared to facility or resource capacity; (NA)
- (C) Existing shoreline buffer zones within the project boundary; (NA)
- (E) If the potential applicant is an existing licensee, its current shoreline management plan or policy, if any, with regard to permitting development of piers, boat docks and landings, bulkheads, and other shoreline facilities on project lands and waters (NA)

4.9.2 Recreation

4.9.2.1 Recreation in the Project Area

The land within the Chandler Mountain Project Area is privately-owned with limited public recreation opportunities. Current recreation in the Project Area likely includes hiking, nature-viewing, hunting, and camping. Chandler Mountain Lake (further described in Aesthetics Section 4.10.3) is within the Project Area and is a private, approximate 126-acre reservoir that provides limited recreation opportunities, including bank fishing and wildlife viewing. Chandler Natural Bridge (locally known as "Rock Bridge") is located on private land (owned by Alabama Power) on Little Canoe Creek East within the Project Area, specifically in the northwestern area of the proposed lower reservoir. Although Rock Bridge is located on privately-owned land that is not intended for public access, the area is frequently visited by local residents. The Rock Bridge is on Alabama Power land currently leased for hunting.

4.9.2.2 Regional Recreation Opportunities in the Project Vicinity

There are numerous regional recreation opportunities in the Chandler Mountain Project Vicinity. Big Canoe Creek Nature Preserve, located approximately 20 miles west of the Project Area, is a 422-acre Forever Wild property owned by ADCNR that offers public

recreation opportunities such as hiking, horseback riding, bird watching, mountain biking, paddling, canoeing, and kayaking (BCC Preserve 2022). ADCNR and the City of Springville have partnered to develop recreational trails at the Big Canoe Creek Nature Preserve (Alabama Forever Wild 2020). Palisades Park, located approximately 12-miles northwest of the Project Area, is a 100-acre park managed by Blount County that offers public recreation opportunities such as rock climbing, rappelling, hiking, and picnicking (Exploring AL 2015). There are abundant recreation opportunities in the nearby city of Gadsden, Alabama. Noccalula Falls Park is a public park managed by the City of Gadsden Parks and Recreation Department and located approximately 10-miles east of the Project Area. Noccalula Falls Park features a 90-foot waterfall and includes paved walking and biking trails, a petting zoo, picnic pavilions, playground, souvenir shop, miniature golf course, and a campground (with primitive and recreational vehicle [RV] camping sites, swimming pool, picnic pavilions, rec room, and playground) (Gadsden IDA 2022, NFP 2022). The Black Creek Trail system, near Noccalula Falls Park, includes eight trails offering walking, running, hiking, and bicycling opportunities with guided tours available (Greater Gadsden 2022). Tigers for Tomorrow is a federally licensed exotic animal park and rescue preserve for tigers, lions, cougars, and leopards. The James D. Martin Wildlife Park and Heronry (part of the Alabama Birding Trails) is located on the 300-acre Lake Gadsden in the center of the city. The park offers a boardwalk, pavilions, and bicycle and pedestrian trails. The diverse habitat of the park offers nature/wildlife viewing opportunities of waterfowl, songbirds, birds of prey, amphibians, fish, small mammals, insects, and native plants (Gadsden IDA 2022).

Neely Henry Lake is an approximate 11,200-acre reservoir owned by Alabama Power that offers public recreation opportunities on the Coosa River. Neely Henry Lake, formed by Neely Henry Dam, is immediately southeast of the Chandler Mountain Project Area and is part of the Coosa River Hydroelectric Project (FERC No. 2146). In addition to numerous non-Project recreation sites (such as privately-owned marinas), there are five FERC-required Project recreation sites at the Neely Henry Development (Croft's Ferry, Ten Islands Historic Park, Tillison's Bend Boat Launch, Neely Henry Tailrace Facilities – West Side, and Neely Henry Tailrace Facilities – East Side). Neely Henry Lake also has a wildlife park with maintained trails in a natural area that is operated by the city of Gadsden, and informal areas that support bank fishing and boat launching activities (Alabama Power 2005). The privately-owned Canoe Creek Marina is the closest facility to the Chandler Mountain Project Area, approximately 3-miles south, and offers a multi-lane boat launch,

parking lot, aluminum piers, boathouse, covered pavilion, and restrooms (St. Clair COPR 2022).

Horse Pens 40 is a privately owned, 115-acre outdoor park located on Chandler Mountain approximately 4-miles west from the Chandler Mountain Project Area (AL Tourism Department 2023a). The park includes rock formations 600 million to 1.3 billion years old (AL Tourism Department 2023b). Public recreation opportunities at the park include bouldering, hiking, and camping (primitive and cabin). The park often hosts cultural events, including music festivals and Civil War reenactments (AL Tourism Dept 2023a).

Camp Sumatanga United Methodist (campground), located near the town of Gallant, is approximately 1-mile west from the Chandler Mountain Project Area and includes a 55-acre lake. Camp Sumatanga provides camping, hiking, canoeing, paddle boating, fishing, and swimming opportunities (Sumatanga 2023).

The location of the recreation opportunities within the Chandler Mountain Project Vicinity are shown on Figure 4-26.

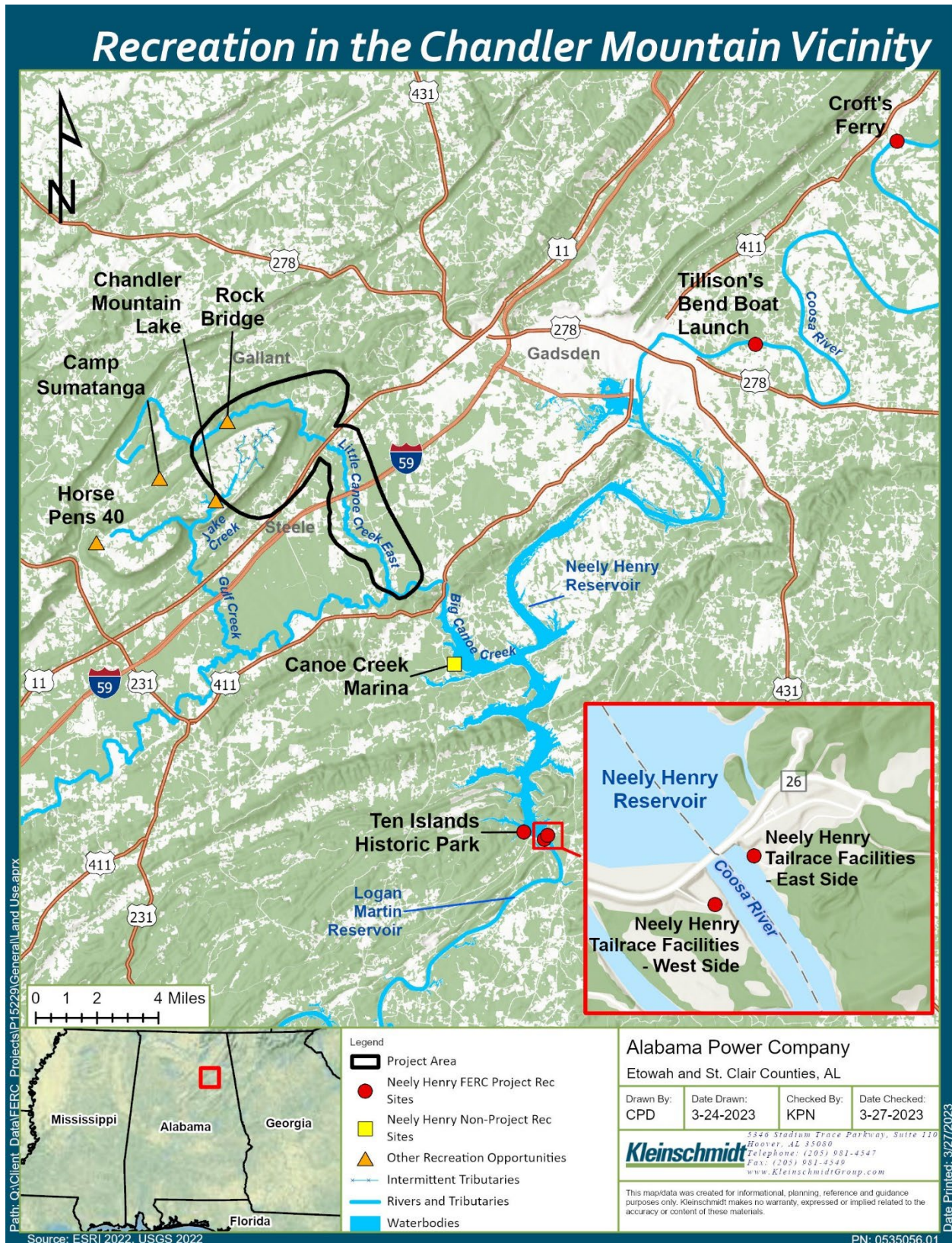


Figure 4-26 Recreation in the Chandler Mountain Project Vicinity

4.9.2.3 Recreation Needs Identified in Management Plans

The Alabama 2021 State Comprehensive Outdoor Recreation Plan (SCORP) provides information regarding the use and demand for outdoor recreation facilities and trails within Alabama and guides the planning and development of an outdoor recreation system that meets the needs of Alabama residents. The SCORP identified seven goals to guide the development of enhanced access to outdoor recreation opportunities in Alabama (ADECA 2021):

1. Promote the conservation and stewardship of natural and cultural resources;
2. Increase physical accessibility to outdoor recreation facilities through universal design;
3. Increase and sustain funding resources for outdoor recreation facility maintenance and development, particularly for underserved communities;
4. Enhance diversity, equity, and inclusion of outdoor recreation facilities and programs;
5. Enhance public awareness and engagement in outdoor recreation;
6. Connect outdoor recreation assets and communities; and
7. Improve the effectiveness of partnerships to develop and maintain outdoor recreation facilities.

The Alabama Department of Economic and Community Affairs (ADECA), as part of the 2021 SCORP update, conducted online surveys, formed a SCORP working group, and utilized an online research panel to obtain information about resident participation, unmet demand, opinions, and experiences associated with outdoor recreation. The SCORP identified recreation needs both statewide and within the planning regions, and in summary, found the following statistics (ADECA 2021):

- Fifty-six percent of Alabama residents consider outdoor recreation to be important or very important to their household.
- Three-quarters of Alabama residents support more public funding for outdoor recreation and want to see more recreational opportunities in the state.
- Alabama's public lands experienced an average usage increase of 30 percent during the first year of the Coronavirus Disease 2019 (COVID) pandemic.

- Half of Alabama's cities lack sufficient resources to care for existing outdoor recreation infrastructure.

Of the 1,103 survey responses received in Alabama, 65.6 percent of all households had at least one person participate in outdoor recreation in the past year and 31.6 percent indicated a desire for additional outdoor recreational opportunities. An "unmet demand index" was calculated to reflect the need of a given facility by multiplying the respondent request rate by the average days the respondent would use the facility. For the statewide assessment, the top additional outdoor recreation facilities requested by Alabama residents was for: paved walking/jogging paths; hiking trails; interpretive/nature trails (education-focused); water parks/splash pad areas; outdoor swimming pools; paved bicycle paths (off-street); dog parks/off-leash dog areas; and botanical gardens/arboretums (ADECA 2021).

For the planning region assessment, the SCORP indicated regional needs for the 12 regional planning councils that are affiliated with the Alabama Association of Regional Councils. The Chandler Mountain Project would be located within both Planning Region 3 (Regional Planning Commission of Greater Birmingham)²¹ and Planning Region 4 (East Alabama Regional Planning and Development Commission)²². Of the 257 survey responses received within Planning Region 3, 72.4 percent noted someone in the household participated in outdoor recreation activities within the past year and 76.7 percent indicated a desire for additional outdoor recreational opportunities. Paved walking/jogging paths, paved bicycle paths (off-street), and botanical gardens/arboretums were identified in Planning Region 3 as having the highest unmet demand among all outdoor recreation facility types listed in the survey. Of the 106 survey responses received within Planning Region 4, 63.2 percent noted someone in the household participated in outdoor recreation activities within the past year and 73.6 percent indicated a desire to for additional outdoor recreational opportunities. Similar to the state assessment, paved walking/jogging paths, hiking trails, and interpretive/nature trails (education-focused) were identified in Planning Region 4 as having the highest unmet demand among all outdoor recreation facility types listed in the survey (ADECA 2021).

²¹ Region 3 includes Blount, Chilton, Jefferson, St. Clair, Shelby, and Walker counties.

²² Region 4 includes Calhoun, Chambers, Cherokee, Clay, Cleburne, Coosa, Etowah, Randolph, Talladega, and Tallapoosa counties.

4.9.3 Land Use

The Chandler Mountain Project would be located within the Coosa River Basin and the Middle Coosa River Sub-basin. Approximately 64 percent of the Middle Coosa River Sub-basin is characterized as forest land (deciduous forest, herbaceous, evergreen forest, and mixed forest) with other land uses including cultivated crops (2 percent), hay or pasture (15 percent), developed (12 percent), open water (2 percent), and other uses (4 percent) (NLCD 2019a). The Chandler Mountain Project Area is located within Etowah and St. Clair counties, Alabama. There are no land use plans available for Etowah or St. Clair counties, Alabama. In 2017, Etowah County had 817 farms encompassing 89,345 acres, with the average farm consisting of 109 acres. Top crops included forage (hay/haylage) (12,219 acres), soybeans for beans (2,397 acres), cotton (2,075 acres), corn for grain (1,068 acres), and vegetables harvested (378 acres) (USDA 2017a). In 2017, St. Clair County had 490 farms encompassing 58,795 acres, with the average farm consisting of 120 acres. Top crops include forage (hay/silage) (9,638 acres), vegetables harvested (616 acres), tomatoes in the open (582 acres), sod harvested (acreage data withheld to avoid disclosing individual operations), and corn for grain (55 acres) (USDA 2017b).

The Chandler Mountain Project Area contains approximately 15,800 acres within Etowah and St. Clair counties, Alabama. Lands within the Chandler Mountain Project Area are privately-owned and there are no federal or tribal lands in the Project Area. The general region surrounding the Project Area is primarily deciduous forest and hay/pasture (NCLD 2019b). Figure 4-27 depicts the land use classifications in the Chandler Mountain Project Area.

Table 4-20 summarizes the percentages of land use by classifications derived from the National Land Cover Database (NCLD) for the Chandler Mountain Project Area.

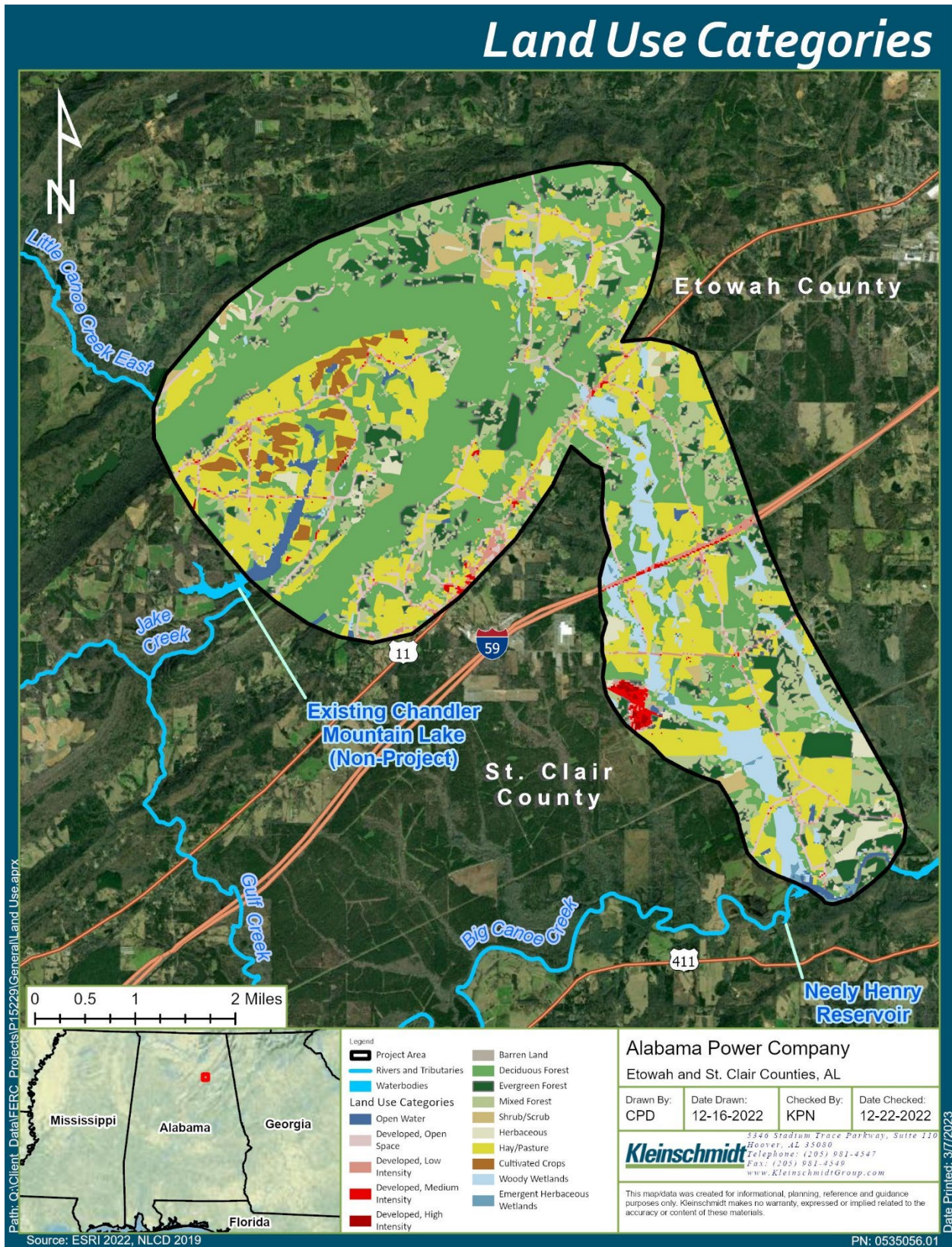


Figure 4-27 Land Use Classifications in the Chandler Mountain Project Area

Table 4-20 Percentages of Land Use Classifications in the Chandler Mountain Project Area

Description	Acreage in Project Area	Percent of Project Area (%)
Open Water	219.61	1.39
Developed, Open Space	566.15	3.58
Developed, Low Intensity	287.60	1.82
Developed, Medium Intensity	100.07	0.63
Developed, High Intensity	23.47	0.15
Barren Land	17.29	0.11
Deciduous Forest	6,141.44	38.80
Evergreen Forest	1,193.31	7.54
Mixed Forest	1,938.19	12.25
Shrub/Scrub	356.70	2.25
Herbaceous	346.81	2.19
Hay/Pasture	3,530.83	22.31
Cultivated Crops	243.43	1.54
Woody Wetlands	818.85	5.17
Emergent Herbaceous Wetlands	42.89	0.27
Total	15,826.64	100.00

Source: NLCD 2019b

4.9.4 Protected River Segments

There are no national wild and scenic or state protected river segments within or adjacent to the Chandler Mountain Project, nor are there any under study for such designations (NWSRS 2022).

4.9.5 National Trails System and Wilderness Areas

There are no National Scenic Trails or Byways, National Historic Trails, or Wilderness Areas within or adjacent to the Chandler Mountain Project, nor are there any under study for such designations (NPS 2022). The closest Wilderness Areas are the Cheaha Wilderness and the Dugger Mountain Wilderness, both located within a 2-hour's drive of the Chandler Mountain Project.

4.9.6 References

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4.10 Aesthetic Resources

4.10.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(ix). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Aesthetic Resources section:

- a description of the dam, natural water features, and other scenic attractions of the project (UK)

4.10.2 Chandler Mountain Project Vicinity

The Coosa River provides Etowah County abundant natural resource attractions and highlight the county's natural beauty (ECTB 2022a). The Coosa River (Photo 4-1) and Neely Henry Lake (Photo 4-2) provide scenic river, lake, and mountain views (ECTB 2022b). The Black Creek Trail system offers over 5 miles of scenic trails, including a 1.7-mile trail along the Black Creek Gorge (NFP 2022). Lookout Mountain Parkway traverses 93-miles from Lookout Mountain at Noccalula Falls, Alabama through the northeastern corner of Georgia to Chattanooga, Tennessee. Several scenic attractions exist along the Parkway including waterfalls, canyons, scenic vistas, unique towns and villages, state and national parks, and preserves (Photo 4-3) (ECTB 2022c).



Source: ECTB 2022b

Photo 4-1 Coosa River near Gadsden, Alabama



Source: Neely Henry Lake Org 2022

Photo 4-2 Neely Henry Lake



Source: Visit Lookout Mountain Parkway 2022

Photo 4-3 Scenic Vista along Lookout Mountain Parkway

St. Clair County is home to the 422-acre Big Canoe Creek Nature Preserve and Chandler Mountain. The Big Canoe Creek Nature Preserve offers views of the meandering Big Canoe Creek surrounded by lush forests, ridges, mountains, and valleys (Photo 4-4) (BCC Nature Preserve 2022). Located on top of Chandler Mountain (the third highest mountain in Alabama), Horse Pens 40 offers spectacular scenic mountain views and unique rock formations (ECTB 2022d) (Photo 4-5).



Source: BCC Nature Preserve 2022

Photo 4-4 Big Canoe Creek Nature Preserve



Source: HP 40

Photo 4-5 Rock Formations at Horse Pens 40

4.10.3 Chandler Mountain Project Area

The Chandler Mountain Project Area provides views of agricultural fields, man-made lakes/ponds, forested land, steep mountain ridges, rock bluffs, and meandering creeks. Photo 4-6 through Photo 4-15 depict the general aesthetics of the Project Area.



Photo 4-6 Top of Chandler Mountain



Photo 4-7 Agricultural Fields on Top of Chandler Mountain



Photo 4-8 View from Top of Chandler Mountain Looking East into Valley



Photo 4-9 View from Top of Chandler Mountain Looking West in area of Proposed Upper Reservoir



Photo 4-10 Rock Formations on the Northeastern Rim of the Proposed Upper Reservoir



Photo 4-11 General Topography of Proposed Lower Reservoir



Photo 4-12 Rock Bluff along Little Canoe Creek East in area of Proposed Lower Reservoir



Photo 4-13 Natural Bridge ("Rock Bridge") on Little Canoe Creek East



Photo 4-14 View from the Top of the Natural Bridge looking Downstream at Little Canoe Creek East



Photo 4-15 Preliminary Location of the Supplemental Water Supply Intake on Neely Henry Lake

4.10.4 References

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4.11 Cultural Resources

4.11.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(x). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Cultural Resources section:

- (C) Identification of Indian tribes that may attach religious and cultural significance to historic properties within the project boundary or in the project vicinity; as well as available information on Indian traditional cultural and religious properties, whether on or off of any federally-recognized Indian reservation (UK)

4.11.2 Prehistoric Context

Archaeological evidence suggests that Paleoindian groups reached Alabama at least 13,000 years ago. North Alabama contains numerous sites dating to this stage, however there is little documentation regarding Paleoindian sites in the Coosa Valley (Alabama Power 2006).

The Paleoindian Stage may be separated into Early (13,450 to 12,900 cal B.P.), Middle (12,900 to 12,600 cal B.P.), and Late (12,600 to 11,450 cal B.P.) periods. The presence of Paleoindian groups in Alabama is more prominent during the Middle Paleoindian Period. Populations appear to have increased in Alabama during the Late Paleoindian Period as they did elsewhere. These groups adapted to their local environments and expanded into new environmental zones, especially the uplands where they took advantage of an expanded array of lithic resources. Subsistence during this time period relied upon hunting a wide variety of animals, fishing, and harvesting wild plants, nuts and fruits. The tool assemblage of the Late Paleoindian Period was even more diverse and includes the Dalton projectile point type in the Coosa Valley and Cumberland Plateau (Alabama Power 2006).

The beginning of the Archaic Stage (11,450 to 3,150 cal B.P.) corresponds with the beginning of the Early Holocene and is marked by a dramatic shift in the regional climate and a resulting change in local environments. These major changes within the Eastern Woodlands are reflected in the pollen studies that show the transition to arboreal forests.

The Archaic Stage is divided into Early (11,450 to 8,900 cal B.P.), Middle (8,900-4,950 cal B.P.), and Late (4,950-3,150 cal B.P.) periods (Alabama Power 2006).

Hunting and gathering remained the primary subsistence strategy during the Early Archaic. Sites related to this period have been identified across Alabama (Alabama Power 2006). Faunal and botanical data indicate that a wide array of resources were being exploited, similar to the end of the Paleoindian, including both large and small mammals, birds, fish, as well as nut and fruits. Settlement patterns reflect use of both riverine and upland localities. It is suspected that the uplands and the river valleys were utilized at different times of the year depending on the availability of resources (Alabama Power 2006).

The Middle Archaic is marked by a post-glacial, global warming trend. The climate became warmer and drier, resulting in decreased rainfall and changes from cool, temperate mixed hardwood forests to oak- hickory, mixed hardwood, and southern pine forests. Settlement patterns and subsistence strategies remained similar to the previous period, although there seems to have been an increase in population and sedentism. Large shell midden sites are found throughout the larger river valleys originating during the late Middle Archaic. Long-distance trade appears to have played an important role in the economy. There were additional advances in technology, like the introduction of the atlatl and an array of ground stone tools (Alabama Power 2006).

The Late Archaic coincides with a climatic regime similar to the present day. Settlement patterns indicate a marked increase in sedentism and territoriality. Large base camps are common along the major river valleys evidenced by massive shell midden deposits (Alabama Power 2006). Large storage pits are common features on Late Archaic base camp sites. There is an increased reliance upon aquatic resources and different wild plant foods which served as a diversified food supply for the larger, more sedentary populations. The beginnings of horticulture are apparent during the Late Archaic including container crops such as bottle gourds and hard-rind squash and evidence of intentional burning to promote certain vegetation species. Technological advances include pecked and ground stone axes, weights, plummets, ornamental items, and stone bowls made from soapstone or sandstone. Aspects of economic and social complexity became even further developed during this period (Alabama Power 2006) with the introduction of monumental earthworks in the region. More extensive trade networks had evolved, focusing on steatite, marine shell, and high-quality lithic resources.

The Gulf Formational Stage (3,150 to 2,050 cal B.P.) began with the advent of pottery. These earliest ceramics usually occurred along the Coastal Plain and extend into the Tennessee Valley of the Cumberland Plateau but in the Coosa Valley, the ceramics typically attributed to the Gulf Formational traditions are limited and instead, pottery traditions of the Early Woodland of the Appalachians begin to appear around the end of the Gulf Formational. The cultural patterns show a shift in population trends with occupations near swamps and backwater environments being common and shell midden deposits changing to indicate greater fluvial variability.

The Woodland Stage occurs from approximately 2,050 to 850 cal B.P. in the Coosa River Valley and is marked by several important technological developments including the introduction of the bow and arrow, an increase in horticulture, larger and more permanent villages, and the building of earthen and stone mounds. Trade was of great importance and was probably essential to the spread of social, political, and religious ideas (Alabama Power 2006).

The Mississippian Stage appears within the Coosa River Valley from 950 to 450 cal B.P. and is characterized by a complex hierarchical society supported by an agrarian economy based on the cultivation of maize, beans, and squash. Mound centers serve as a social and religious hub with farmsteads and villages distributed throughout the river valleys. The Late Mississippian begins with the ceramic transition from shell tempered ceramics to sand/grit tempered ceramics of the Lamar cultures and ends with the Spanish entrada of the DeSoto and DeLuna expeditions of A.D. 1540 and A.D. 1560, respectively.

4.11.3 Historic Context

The Coosa Valley is well known for the aboriginal occupation during historic times. The early historic period is marked by shifting settlement locations. By 1630, Mvskoke settlements existed in the vicinity of present-day Gadsden. With increasing influence from the European traders and interactions with the Cherokee to the north, Mvskoke settlements shifted south around 1670 and included the Woods Island sites located in the lower segments of Neely Henry Lake and the upper segments of Logan Martin reservoirs. This occupation had the first contact with British traders (Alabama Power 2006).

By the eighteenth century, both the historic Cherokee and the Mvskoke occupations were present in the general area. Cherokee towns were situated primarily along the Upper Coosa and Tennessee river valleys and the Mvskoke settlements were scattered

throughout the area to the south. These historic Indian groups experienced constant cultural pressures throughout the eighteenth century as European settlers, traders, and missionaries encroached on their lands as early as the 1700s (Alabama Power 2006).

The Coosa River served as a transportation and cultural conduit for Indians, European traders, and early settlers. Forced migration came to the area in 1830 with the passage of the Indian Removal Act. By the late 1830s, both Mvskoke and Cherokee people were forced from their homes to Indian Territory in Oklahoma. The Trail of Tears effected the region dramatically and changed the demographics of the region until the present.

The descendant of the Mississippian cultures near Chandler Mountain continued to occupy the region into the Colonial and post-Colonial period. The Project Area lies in the area traditionally considered part of the Mvskoke homeland and referred to, in at least the eighteenth and nineteenth centuries, as part of the lands controlled by the Upper Creek. Their occupation of what later became northern St Clair County is invariably linked with Cherokee incursion into the region during the historic period. In the eighteenth and nineteenth centuries both Nations signed multiple treaties with the United States with the intent of maintaining peace, but continuous illegal intrusions by settlers and the eventual Indian Removal Act of 1830 forced these people from their homelands and both became participants in the terrible tragedy of the Trail of Tears.

Prior to forced removal, both the Mvskoke and Cherokee had ceded lands to the United States government in the early nineteenth century — the Mvskoke in the Treaty of Fort Jackson (Kappler 1904) following the Battle of Horseshoe Bend and the Cherokee in the Treaty of Turkey Town ratified December 30, 1816 (United States 1816). Almost two years after the Battle of Horseshoe Bend (March 27, 1814) on January 22, 1816, Major John Coffee, who had been appointed to survey the boundary of the lands ceded by the “Creeks” interviewed Spokehajo who noted that their lands extended from the Tombigbee River east with the understanding that it continued into present day Georgia.

Pathkiller, as Principal Chief of the Cherokee Nation, signed the Treaty of Turkeytown. The treaty states:

“The Cherokee nation acknowledge the following as their western boundary: South of the Tennessee river, commencing at Camp Coffee, on the south side of the Tennessee river, which is opposite the Chickasaw Island running from thence a due south course to the top of the dividing ridge between the waters of the Tennessee

and Tombigby²³ rivers, thence eastwardly along said ridge, leaving the head waters of the Black Warrior to the right hand, until opposed by the west branch of Well's Creek, down the east bank of said creek to the Coosa river, and down said river.”

By the early to mid-nineteenth century, James Lafferty, a shipbuilder from Ohio, built a steamboat, appropriately named her the Coosa and made the maiden Coosa River voyage in 1845. Use of the river dwindled after the Civil War as new modes of transportation, namely the railroad, were established. In 1889, the federal government appropriated money to develop a system of navigation to connect the Coosa with the Alabama River; however, only three locks were completed before it was decided that navigation in the lower Coosa would not be feasible. Alabama Power began to investigate the possibilities of establishing hydroelectric projects on the river (Alabama Power 2006).

On December 2, 1955, Alabama Power applied to the Federal Power Commission (FPC)²⁴ for a license for development of the Coosa River in accordance with the provisions of a 1954 Act of Congress (P.L. 83-436). FERC issued a license to Alabama Power on September 4, 1957, for the construction, operation, and maintenance of Project 2146 (Alabama Power 2006).

4.11.4 Archaeological and Architectural Review

Between November 1983 and January 1984, the University of Alabama Office of Archeological Research (OAR) conducted a cultural resources survey of the area to identify archaeological sites that were potentially eligible for inclusion in the National Register of Historic Places (NRHP). Prior to the 1983-1984 field investigations, OAR performed a literature review of the Chandler Mountain location and surrounding region. Review of the Alabama State Site Files (ASSF) revealed no previously recorded sites, and no NRHP-eligible nominations were identified. Field surveys were limited to areas where a permit granting access had been acquired from the respective property owner. The survey examined 5,188 acres.

To date, no comprehensive systematic cultural resources survey of the entire area has been performed. For preparation of this PAD, Alabama Power reviewed the Alabama

²³ Later changed spelling to “Tombigbee”

²⁴ The Federal Power Commission was established in June 1920 under the authority of the Federal Water Power Act. The commission was terminated on August 4, 1977, and its functions were transferred to the Federal Energy Regulatory Commission.

Cultural Resources Online Database, housed at the OAR and consisting of the National Archaeological Database Bibliography, the ASSF (Alabama Power 2023a), and the Alabama Phase I Surveys Website (Alabama Power 2023b) to identify previous surveys and known archaeological sites within the sections, townships, ranges that intersect the Chandler Mountain Project Area. The review identified 8 previous surveys and 74 sites within the “archeological preliminary review area” shown in Figure 4-28. Of the 80 total sites, 6 sites are considered potentially eligible for listing to the NRHP, 23 sites are listed as undetermined with regard to NRHP eligibility, and 51 are considered not eligible for listing to the NRHP.

In 2022, OAR performed an archaeological review for two tracts of land in St. Clair County prior to the installation of an access road and bore hole in each tract²⁵. The review included a 0.33-acre tract located in Township 12S, Range 4E of Section 27 and a 0.17-acre tract located in Township 12S, Range 4E of Section 27, with a small portion of the access road and pad area extending west into Section 28. The northern half of the larger tract (0.33-acre tract) bisects Site 1Sc130 that was previously recorded in 1983 by OAR and was determined to be ineligible for NRHP listing. OAR performed a visual inspection of the two survey tracts and shovel testing along the proposed access road and pad area for the bore hole drilling equipment. No cultural material was identified in either of the survey areas and OAR recommended a finding of “no properties” for this undertaking (Koors 2022).

²⁵ The 2022 archaeological review for the two tracts is not yet included in the Alabama Cultural Resources Online Database search results and would be in addition to the 8 previous surveys.

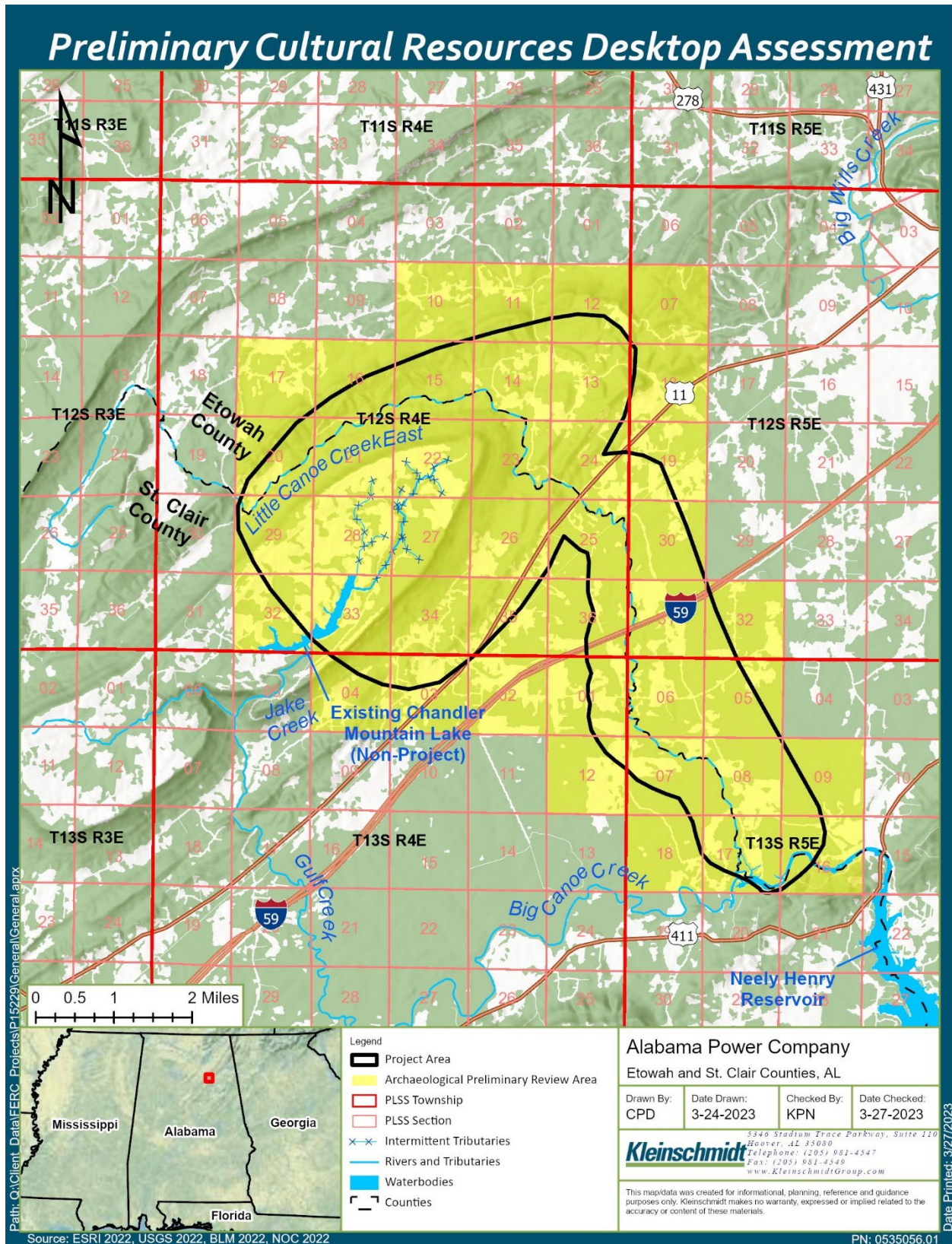


Figure 4-28 Preliminary Cultural Resources Desktop Assessment

In addition, Alabama Power reviewed the Historic Preservation Map (2023) provided by the Alabama Historical Commission (AHC) to identify known architectural sites within the sections, townships, and ranges that intersect the Chandler Mountain Project Area. The Historic Preservation Map (2023) provides details of structures on private property from the following databases: Alabama Register of Landmarks and Heritage, Historic African American Schools, Black Heritage Council Markers, the National Register of Historic Places, Preservation Easements, Alabama Historic Rehabilitation Tax Credit Program, AHC County Surveys, Alabama Historic Cemetery Register, Places in Peril, and AHC Historic Markers. The search identified 21 properties within the Preliminary Project Area. Three of these properties are identified/named (Robinson House, Chandler Mountain Cemetery, and the Willingham Hotel); the other properties are classified as "house, not named." Of the three properties, only the Willingham Hotel was identified by the St. Clair County 2002 Historic Sites Survey as potentially eligible for the NRHP.

4.11.5 References

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4.12 Socioeconomic Resources and Environmental Justice

4.12.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(x).

The Chandler Mountain Project would be located within the Coosa River Basin (the Middle Coosa River Sub-basin) on Little Canoe Creek East in Etowah and St. Clair counties, Alabama. The Chandler Mountain Project would be located between the communities of Steele, Alabama (located south of the Chandler Mountain Project Area) and Gallant, Alabama (located north of the Chandler Mountain Project Area), approximately 10 miles southwest of Gadsden, Alabama and approximately 50 miles northeast of Birmingham, Alabama. The following sections describe socioeconomic conditions in the Chandler Mountain Project Vicinity (including the towns of Steele and Gallant²⁶, cities of Gadsden and Birmingham, Etowah and St. Clair counties, and the state of Alabama) to provide context to the census tracts that intersect the Chandler Mountain Project Area (including census tracts 103.00 and 104.02 of Etowah County and census tracts 404.01 and 404.02 of St. Clair County shown in Figure 4-29).

²⁶ A portion of the Chandler Mountain Project Area is within the city limits of Steele and Gallant, Alabama.

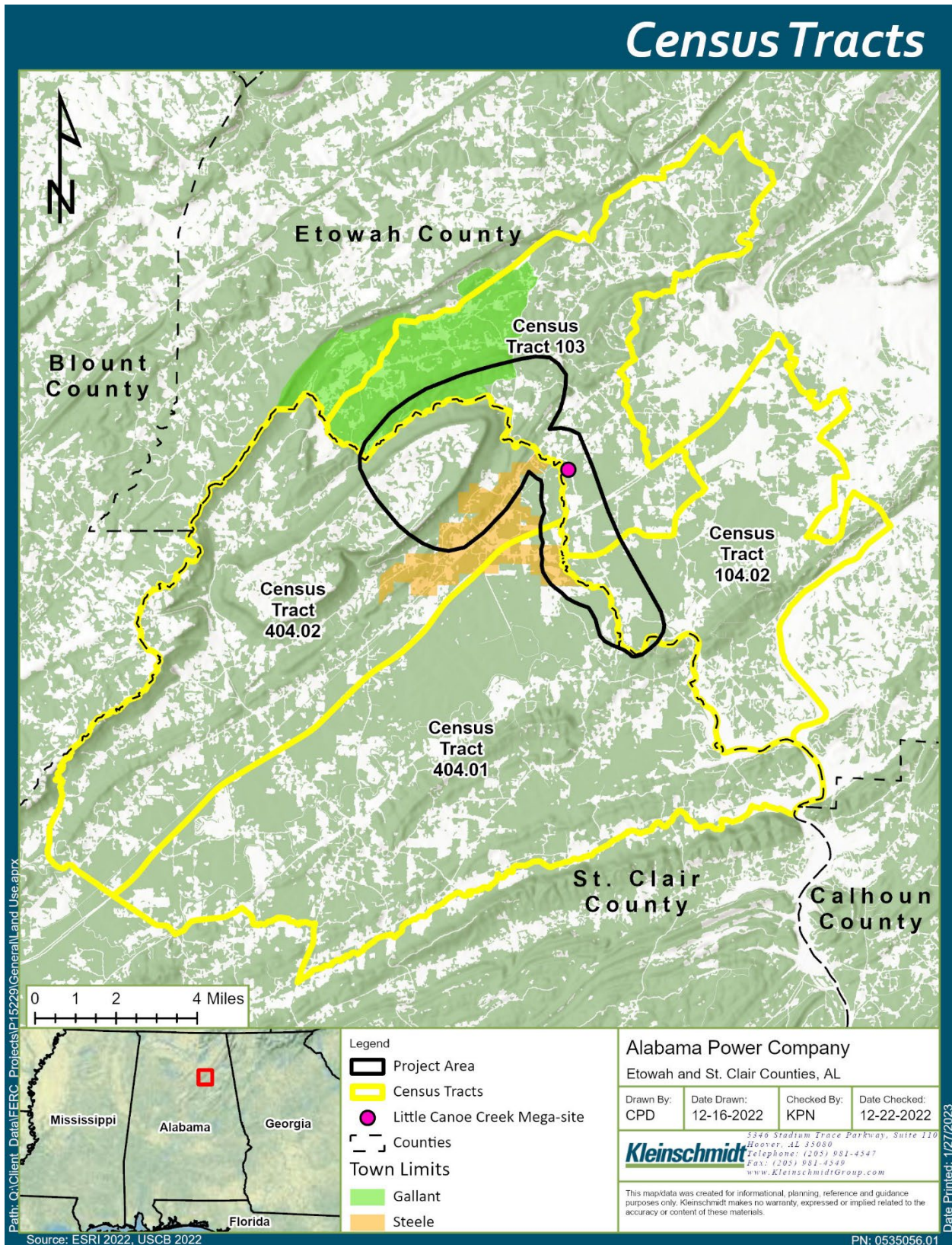


Figure 4-29 Census Tracts in the Chandler Mountain Project Area

4.12.2 General Land Use Patterns

Encompassing approximately 535 square-miles, land cover in Etowah County is primarily forested (deciduous, evergreen, and mixed) and hay/pasture. The Little Canoe Creek Mega-Site is being developed as an industrial park by Etowah County Economic Development and is located between Interstate 59 and the Southern Railroad east of Little Canoe Creek East (Photo 4-16) (Etowah County Economic Development 2019). Encompassing over 1,000 acres, the Etowah County-owned site is within the Chandler Mountain Project Area and is the largest tract of land in North Alabama currently designated as an “Alabama AdvantageSite” with its due diligence completed (Etowah County Economic Development 2019). An Alabama AdvantageSite is a voluntary industrial site preparedness program created to make the state more competitive for companies considering a location in Alabama (EDPA 2021). Targeted industrial sectors of the Little Canoe Creek Mega-Site include automotive, aerospace, food processing, metalworking, and plastics and chemicals.



Source: Etowah County Economic Development 2019

Photo 4-16 Etowah County Little Canoe Creek Mega-Site

St. Clair County consists of approximately 632 square-miles and is primarily forested (deciduous, evergreen, and mixed) and hay/pasture. Farming was the primary occupation in St. Clair County into the twentieth century. Originally, corn and cattle were the county's

major agricultural products. St. Clair County's current main agricultural products are beef cattle, hay, tomatoes, poultry, and sod (Siebenthaler 2007).

The town of Steele within St. Clair County, Alabama was founded in 1850 and incorporated in 1952 (Town of Steele 2022). Industries in Steele range from agriculture to product distribution centers and automotive suppliers (Town of Steele 2022). Chandler Mountain extends from the southwest to the northeast for approximately 8 miles and consists of rugged, mountain terrain with a plateau on top. The Chandler Mountain plateau is conducive to agriculture offering fertile soil, ample water supply, and benefits related to elevation (Discover 2015). The primary agriculture product of Chandler Mountain is tomatoes.

4.12.3 Population Patterns

Etowah County is approximately 535 square-miles and St. Clair County is approximately 632 square-miles (U.S. Census Bureau 2022). Based on population estimates from 2020, Etowah County's population density was 193.3 people per square-mile and St. Clair County's population density was 144.2 people per square-mile, both of which were higher than the state average density of 99.2 people per square-mile (U.S. Census Bureau 2022). Based on the April 1, 2020 census, the estimated population of Etowah County, Alabama, was 103,436 representing a 0.9 percent decrease from the April 1, 2010 census (U.S. Census Bureau 2022). The estimated population of St. Clair County, Alabama was 91,103, representing a 6.4 percent increase from the April 1, 2010 census (U.S. Census Bureau 2022). Census tract 103.00 within Etowah County, Alabama experienced a 2.4 percent decrease in population from 2010 to 2020, while tract 104.02 experienced a 7.7 percent increase (Data Central 2020a). Applicable census tracts within St. Clair County, Alabama (tracts 404.01 and 404.02) experienced a 7.3 and 5.5 percent increase in population, respectively, from 2010 to 2020 (Data Central 2020b). The town of Steele's population of 1,133 in 2020 represented a 1.39 percent decrease in population from 2019; while the town of Gallant's population of 877 in 2020 represented a 5.28 percent increase in population from 2019 (Data USA 2022a, 2022b).

Table 4-21 summarizes the population estimates for census tracts that intersect the Chandler Mountain Project Area, towns of Steele and Gallant, cities of Gadsden and Birmingham, Etowah and St. Clair counties, and the state of Alabama.

Table 4-21 Estimated Population of Applicable Census Tracts, Towns of Steele and Gallant, Cities of Gadsden and Birmingham, Etowah and St. Clair Counties, and the State of Alabama

Census Tract/ City/ County/ State	2010 Census	2020 Census	Percent Change 2010-2020	2021* Estimates	Percent Change 2020-2021*
Census Tract 103.00 ¹	2,780	2,849	-2.4%	-	-
Census Tract 104.02 ¹	5,675	6,148	7.7%		
Census Tract 404.01 ²	4,707	5,078	7.3%	-	-
Census Tract 404.02 ²	3,707	3,923	5.5%	-	-
Steele, AL ³	-	1,133	-	-	-
Gallant, AL ⁴	-	877	-	-	-
Gadsden, AL ⁵	36,856	33,945	-7.9%	33,769	-0.9%
Birmingham, AL ⁵	212,237	200,733	-5.4%	197,575	-1.6%
Etowah County, AL ⁵	104,430	103,436	-0.9%	103,162	-0.3%
St. Clair County, AL ⁵	85,593	91,103	6.4%	92,748	1.8%
Alabama ⁵	4,779,736	5,024,279	5.1%	5,039,877	0.3%

Source: Data Central 2020a¹; Data Central 2020b²; Data USA 2022a³; Data USA 2022b³; US Census Bureau 2022⁵

*2021 population estimates or associated percent changes were not available for census tracts or for the towns of Steele and Gallant, Alabama.

4.12.4 Economic Indicators and Employment

The 2016-2020 estimated median household income was \$44,934 for Etowah County, \$62,531 for St. Clair County, \$34,062 for Gadsden, and \$38,832 for Birmingham (U.S. Census Bureau 2022). The 2020 poverty rate was 15.6 percent in Etowah County, 10.5 percent in St. Clair County, 26.7 percent in Gadsden, and 24.7 percent in Birmingham. Table 4-22 provides the household and family distribution for Etowah and St. Clair counties, cities of Gadsden and Birmingham, and the state of Alabama.

Table 4-22 Household Distribution for Etowah and St. Clair Counties, Cities of Gadsden and Birmingham, and the State of Alabama

	Etowah County, AL	St. Clair County, AL	Gadsden, AL	Birmingham, AL	Alabama
2016-2020 Number of Households	38,765	32,765	13,740	91,598	1,888,504
2016-2020 Approximate Number of Persons per Household	2.62	2.65	2.49	2.20	2.53
2016-2020 Percentage of Population in Civilian Labor Force	54.9%	59.0%	53.8%	59.1%	57.2%
2016-2020 Median Household Income	\$62,531	\$44,934	\$34,062	\$38,832	\$52,035
2020 Population Below Poverty Level	15.6%	10.5%	26.7%	24.7%	16.1%

Source: US Census Bureau 2022

Between 2019 and 2020, the median household income for the town of Steele increased from \$35,125 to \$60,408, representing a 72 percent increase (Data USA 2022a). The town of Gallant had a median household income of \$54,844 in 2019²⁷ (Data USA 2022b). The largest employment industries in 2020 in Steele, Alabama were manufacturing, health care and social assistance, and agriculture/forestry/fishing/hunting (Data USA 2022a). The largest industries in 2020 in Gallant, Alabama were educational services, wholesale trade, and retail trade (Data USA 2022b). Table 4-23 provides data on employment industry distribution in the towns of Steele and Gallant compared to Etowah and St. Clair counties, Alabama.

Table 4-23 Top Employment Sectors for the Towns of Steele and Gallant, and Etowah and St. Clair Counties, Alabama, 2020

Employment Sector	Steele, AL ¹ (%)	Gallant, AL ² (%)	Etowah County ³ (%)	St. Clair County ⁴ (%)
Manufacturing	21.4	3.96	17.4	15.6
Health Care & Social Assistance	11.7	11.2	16.4	13.5
Agriculture, Forestry, Fishing & Hunting	11.3	6.12	0.44	0.262
Retail Trade	10.6	11.2	12.6	9.39
Construction	9.77	6.83	6.91	10.1
Educational Services	8.7	14.7	7.68	6.34
Accommodation and Food Services	-	8.63	8.87	5.88
Wholesale Trade	2.55	13.3	2.18	5.07
Public Administration	8.7	-	4.95	4.43
Transportation & Warehousing	2.97	5.04	3.65	3.77
Utilities	-	5.76	0.993	2.23
Administrative & Support and Waste Management Services	2.76	6.83	2.96	4.51

Source: Data USA 2022a¹; Data USA 2022b²; Data USA 2022c³; Data USA 2022d⁴

4.12.5 Environmental Justice

Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations

²⁷ 2020 household income information is not available for the town of Gallant, Alabama.

and Low Income Populations, as amended, requires federal agencies to consider if impacts on human health or the environment would be disproportionately high and adverse for minority and low-income populations in the surrounding community resulting from the programs, policies, or activities of federal agencies. The term “environmental justice (EJ) community” includes disadvantaged communities that have been historically marginalized and overburdened by pollution. EJ communities include but may not be limited to minority populations, low-income populations, or indigenous peoples. Census block groups are statistical divisions of census tracts that generally contain between 600 and 3,000 people and the thresholds used for populations meeting EJ status are as follows:

- For minority populations, the meaningfully greater analysis method was used, where the minority population in a block group is at least 10 percent greater than that of the same population for the county.
- The “low-income threshold criteria” was used to identify environmental justice communities based on income level, where the percent of low-income population in the identified block group is equal to or greater than that of the county.

The Chandler Mountain Project Area was screened for EJ communities using the methods described above. Figure 4-30 depicts the census blocks groups that intersect the Chandler Mountain Project Area screened for EJ (Block Groups 2 and 3 in census tract 103.00, Block Group 2 in census tract 104.02, Block Group 4 in census tract 404.01, and Block Groups 2 and 3 in census tract 404.02). Table 4-24 provides associated race and ethnicity data, as well as data on households in poverty of applicable block groups, counties, and state of Alabama. Block group 2 in census tract 103.00 of Etowah County meets EJ status due to the poverty level being higher than the respective county poverty level. The St. Clair County block groups that intersect the Project Area were all identified as EJ communities. Race and ethnicity data identified Block Group 3 within census 404.02 of St. Clair County as meeting EJ status since the minority population exceeds the established threshold. In addition, all block groups screened in St. Clair County meet EJ status due to poverty levels being higher than the respective county poverty level (U.S. Census Bureau 2020).

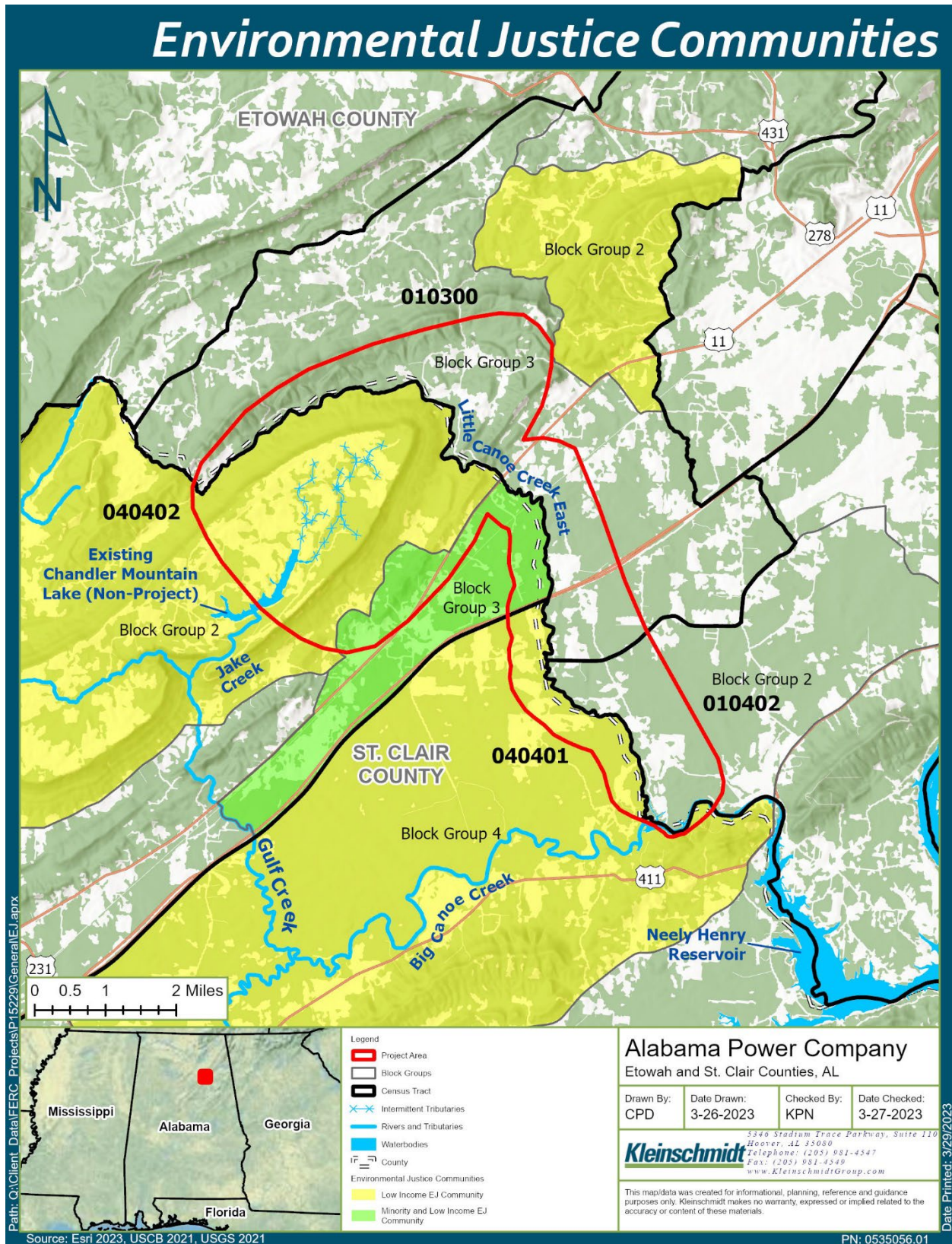


Figure 4-30 Census Block Groups Screened for Environmental Justice

Table 4-24 Minority Populations by Race and Ethnicity and Low-income Populations within the Project Area

Geographic Area	Race and Ethnicity Data										Low-Income Data	Language Data
	Total Population (count)	White Alone, not Hispanic (count)	African American/ Black (count)	Native American/ Alaska Native (count)	Asian (count)	Native Hawaiian & Other Pacific Islander (count)	Some Other Race (count)	Two Or More Races (count)	Hispanic or Latino (count)	Total Minority Population (%)*	Below Poverty Data (%)	Non-English Speaking Persons Aged 5 Years and Greater (%)
Alabama	4,893,186	3,192,147	1,292,950	21,297	67,317	1,887	9,779	94,858	212,951	35%	16%	0%
Etowah County	102,721	79,697	16,056	337	808	3	72	1,561	4,187	22%	16%	0%
Census Tract 010300, Block Group 2	476	422	27	0	0	0	0	27	0	11%	26%	0%
Census Tract 010300, Block Group 3	1,227	1,207	0	0	0	0	0	20	0	2%	11%	0%
Census Tract 010402, Block Group 2	594	551	43	0	0	0	0	0	0	7%	0%	0%
St. Clair County	88,929	76,137	8,391	439	668	18	91	1,008	2,177	14%	11%	0%
Census Tract 040401, Block Group 4	1,185	1,028	122	7	0	0	0	0	28	13%	14%	0%
Census Tract 040402, Block Group 2	952	827	0	0	0	0	0	0	125	13%	21%	0%
Census Tract 040402, Block Group 3	1,018	706	0	2	0	0	0	82	228	31%	20%	0%

*Calculated the percent total minority population by subtracting the percentage of "White Alone Not Hispanic" from 100 percent for any given area.

*Blue shaded cells with red text indicate EJ community (low-income or minority populations exceeding the established thresholds).

Source: U.S. Census Bureau 2020

4.12.6 References

- Data Central. 2020a. 2020 Decennial Census for Census Tract 404.01, St. Clair County, Alabama. Available online at: <https://data.sj-r.com/census/total-population/total-population-change/census-tract-40401-st-clair-county-alabama/140-01115040401/>. Accessed December 2022.
- Data Central. 2020b. 2020 Decennial Census for Census Tract, 103 Etowah County, Alabama. Available online at: <https://data.rgj.com/census/total-population/total-population-change/census-tract-103-etowah-county-alabama/140-01055010300/>. Accessed December 2022.
- Data USA. 2022a. Steele, AL. Available online at: <https://datausa.io/profile/geo/steele-al>. Accessed November 2022.
- Data USA. 2022b. Gallant, AL. Available online at: <https://datausa.io/profile/geo/gallant-al>. Accessed December 2022.
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U.S. Census Bureau 2022. Quickfacts: Alabama; St. Clair County, Alabama; Etowah County, Alabama; Birmingham city, Alabama; Gadsden city, Alabama. Available online at: <https://www.census.gov/quickfacts/fact/table/AL,stclaircountyalabama,etowahcountyalabama,birminghamcityalabama,gadsdencityalabama/PST045221>. Accessed November 2022.

U.S. Census Bureau. 2020. American Community Survey 5-year data. Retrieved March 1, 2023, from https://www2.census.gov/geo/tiger/TIGER_DP/2020ACS/.

4.13 Tribal Resources

4.13.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(3)(xii). Because the Chandler Mountain Project is unconstructed and not operational, some regulatory requirements are either not applicable (NA) or currently unknown (UK); therefore, the following are not included in the Tribal Resources section:

- (A) Identification of information on resources specified in paragraphs (d)(2)(ii)–(xi) of this section to the extent that existing project construction and operation affecting those resources may impact tribal cultural or economic interests, e.g., impacts of project-induced soil erosion on tribal cultural sites; (UK) and
- (B) Identification of impacts on Indian tribes of existing project construction and operation that may affect tribal interests not necessarily associated with resources specified in paragraphs (d)(3)(ii)–(xi) of this Section, e.g., tribal fishing practices or agreements between the Indian tribe and other entities other than the potential applicant that have a connection to project construction and operation (UK)

There are no tribal lands in the Chandler Mountain Project Area. Alabama Power identified the tribes listed in Table 4-25 as having the potential to have interest in the Chandler Mountain Project. The Distribution List for the licensing process includes these tribes in addition to the Bureau of Indian Affairs (BIA). Of the tribes identified, the Poarch Band of Creek Indians is the only federally recognized tribe for the state of Alabama. The Muscogee (Creek) Nation commented on Alabama Power's Preliminary Permit²⁸ noting that the Chandler Mountain Project is within their historic area of interest. FERC will provide the official, comprehensive tribal consultation list for the Chandler Mountain Project.

²⁸ Accession No. 20210920-5072

Table 4-25 Tribes included in Chandler Mountain Project Distribution List

Tribes
Alabama Coushatta Tribe of Texas
Alabama-Quassarte Tribal Town
Cherokee Nation
Chickasaw Nation
Choctaw Nation of Oklahoma
Coushatta Tribe of Louisiana
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Mississippi Band of Choctaw Indians
Muscogee (Creek) Nation
Poarch Band of Creek Indians
Shawnee Tribe

5.0 POTENTIAL ISSUES, INFORMATION NEEDS, AND STUDIES BY RESOURCE

5.1 Section Content

The content herein complies with the requirements of 18 CFR §5.6(d)(4)(i-ii).

Alabama Power used existing information and initial pre-PAD consultation with stakeholders/agencies to identify data-gaps or issues that may require further study. The following provides a summary of potential data-gaps and issues pertaining to specific resources. Alabama Power will prepare Proposed and Revised Study Plans with specific study activities and methodologies in consultation with agencies and stakeholders in the licensing process. Each study will include a geographic scope (i.e., "study area") for inclusion in the Proposed and Revised Study Plans.

5.2 Operations Modeling

Alabama Power proposes to conduct operations modeling that will inform resource studies. These efforts will include, but may not be limited to:

- Evaluating effects on the upper portion of the Jake Creek watershed and the Little Canoe Creek East watershed.
- Evaluating effects on Neely Henry operations during initial fill and supplemental use, including evaluating impacts on Neely Henry reservoir during drought operations.
- Evaluating effects of the minimum flow for Little Canoe Creek East (discharge at Lower Dam A) on Project operations.

5.3 Geology and Soils

The Chandler Mountain Project is currently in the initial stages of design, permitting, and licensing and exact specifications associated with the Chandler Mountain Project are considered preliminary and may change due to engineering and geotechnical feasibility or environmental concerns. As discussed in Section 4.3.8, Alabama Power has completed geological/geotechnical investigations. Alabama Power proposes to conduct studies to address effects on geological and soil resources. These efforts will include, but may not be limited to:

- Geotechnical: Alabama Power will provide the results of the geotechnical investigations as described above and will use the results to inform any additional geotechnical analysis.
- Baseline Erosion and Stream Conditions study to assess the baseline erosion and stream conditions in Little Canoe Creek East.

5.4 Water Resources

Alabama Power proposes to develop a study to evaluate the effect of the Chandler Mountain Project on hydrology, water quality, and water quantity in the reservoirs and streams upstream and downstream of the immediate Chandler Mountain Project Area. This effort will include reinstalling the former USGS gage on Little Canoe Creek East at Highway 11 to collect additional flow data as well as temperature and dissolved oxygen data.

5.5 Fish and Aquatic Resources

Alabama Power is proposing to conduct studies to evaluate the effects of the Chandler Mountain Project on fish and aquatic resources. These efforts will include, but may not be limited to:

- Fish community surveys in Little Canoe Creek East above and below the proposed Lower Dam A and in the upper portion of the Jake Creek watershed above the proposed Upper Dam.
- Freshwater mollusks surveys in Little Canoe Creek East and the upper portion of the Jake Creek watershed above the proposed Upper Dam.
- Desktop Entrainment and Mortality assessment of fish at the supplemental intake for all fish and for key families and genera under proposed operations and by season.
- Evaluating the minimum flow for Little Canoe Creek East (discharge at Lower Dam A).

5.6 Terrestrial Wildlife and Botanical Resources

Construction, operation, and maintenance of the Chandler Mountain Project may affect vegetation and wildlife habitats. Alabama Power is proposing to conduct studies to characterize terrestrial, wildlife, and botanical resources, and associated habitat. These efforts will include, but may not be limited to:

- Habitat Assessment
 - Develop ground-truthed mapping of vegetation cover classes and land use in the study area, including assessments of habitat structure and condition.
 - Characterize habitat types.
 - Observe and record biological inventory during habitat assessment, which will include a running list of encountered wildlife, wildlife spore, and dominate vegetative species. This will include raptor and raptor nests.

5.7 Wetlands, Riparian, and Littoral Resources

Alabama Power is proposing to conduct studies to characterize wetlands, riparian, and littoral resources. These efforts will include, but may not be limited to:

- Wetland and stream delineation: assess the nature and degree of the Project's potential effects on areas subject to Section 404 of the CWA. This information will then be used in the license application and the USACE 404 permitting process to assist in the assessment of the Project's potential impacts to Waters of the United States (WOTUS).

5.8 Rare, Threatened, and Endangered Species

As described in Section 5.5 above, aquatic resources surveys are proposed at several locations within the study area. With known occurrences of RTE mussel species within Little Canoe Creek East, additional survey locations may be proposed by USFWS during the ESA Section 7 consultation process.

In addition, the results of the Habitat Assessment described in Section 5.6 will help inform the need for specific RTE species surveys for several species of concern. If habitats supportive of RTE species are noted as occurring within the study area during the assessment, the need for additional surveys may be determined. Based on pre-PAD consultation with USFWS, Alabama Power proposes to conduct the following surveys for RTE species:

- Canoe Creek Clubshell, Georgia Pigtoe, and Finelined Pocketbook
- Trispot Darter in Little Canoe Creek East
- Alabama Leather Flower

- Green Pitcher-plant
- Rare, threatened, and federally protected bats

5.9 Recreation and Land Use

Alabama Power is proposing to conduct studies to characterize recreation and land use resources. These efforts will include but may not be limited to:

- Conduct an inventory and assessment of existing recreation facilities in the study area.
- Analyze the potential effects of Project operation on existing recreation facilities in the study area.
- Conduct a land use evaluation, including review of existing land management plans and ordinances with a nexus to Project construction and/or operation and evaluate land use impacts associated with the construction, operation, and maintenance of the project.

5.10 Aesthetic Resources

Alabama Power is proposing to conduct studies to characterize aesthetics resources. These efforts will include, but may not be limited to:

- Conduct an aesthetics inventory including photographing key viewing locations and developing photo-simulation of proposed Project facilities.
- Conduct a viewshed and visual resource assessment.

5.11 Cultural Resources

As described in Section 4.11, Alabama Power performed a preliminary review of architectural and archaeological sites near the Chandler Mountain Project Area, but to date, no comprehensive systematic cultural resources survey of the area has been performed. Alabama Power is proposing to conduct studies to characterize cultural resources. These efforts will include, but may not be limited to:

- Identify the Area of Potential Effects (APE) in consultation with the SHPO and applicable tribes.
- Conduct additional literature search in the APE. This additional review will result in detailed information on previously recorded sites, survey areas, and historic

standing structures in the specified area. The additional review is intended to verify known sites within the APE and provide information that is critical to the review of the area subject to Section 106 consultation. Following the results of the additional archaeological and historical review, Alabama Power will consult with the SHPO and applicable tribes to determine if field survey is necessary.

- Conduct a cultural resources inventory/study to determine the potential effects of project construction, operation, and maintenance on archeological resources and historic structures that are included in or eligible listing on the NRHP.

5.12 Socioeconomic Resources and Environmental Justice

Alabama Power is proposing to conduct studies to characterize socioeconomic resources and EJ communities. These efforts will include, but may not be limited to:

- Conduct a socioeconomic study that examines the short-term and long-term economic impacts to the Chandler Mountain Project Vicinity.
- Conduct an environmental justice study to define the potential effects of Project operations, including construction and operation on environmental justice communities that may be present in the study area.

5.13 Noise, Air Quality and Traffic

Construction of the Chandler Mountain Project may have a temporary effect on noise, air quality, and traffic during construction. Alabama Power proposes to conduct various analyses to address the following:

- Effects of construction and operation on noise levels in the project area.
- Effects of construction activities, including construction-related dust, on air quality.
- Effects of construction on traffic and road networks in the project area during and post-construction.

5.14 Tribal Resources

There are no tribal lands in the Chandler Mountain Project Area, and Alabama Power does not anticipate that the Project will impact Tribal resources. Alabama Power has identified twelve tribes that could have potential interest in the Chandler Mountain Project and included these tribes on the Project Distribution List.

6.0 RELEVANT RESOURCE MANAGEMENT PLANS

6.1 Section Content

The content herein complies with the requirements of 18 CFR 5.6(d)(4)(iii-iv).

6.2 Relevant Qualifying Federal and State or Comprehensive Waterway Plans

Section 10(a)(2)(A) of the Federal Power Act (FPA), 16 U.S.C. § 803(a)(2)(A), requires FERC to consider the extent to which a Project is consistent with Federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways potentially affected by the Chandler Mountain Project. On April 27, 1988, FERC issued Order No. 481-A revising order No. 481, issued October 26, 1987, establishing that FERC will accord FPA Section 10(a)(2)(A) comprehensive plan status to any Federal or state plan that:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;
- Specifies the standards, the data, and the methodology used; and
- Is filed with the Secretary of the Commission.

FERC currently lists 19 comprehensive plans for Alabama (FERC 2022). Of these listed plans, 7 are potentially relevant to the Chandler Mountain Project, as listed below (Table 6-1). These plans may be useful in the licensing proceeding for characterizing desired conditions.

Table 6-1 List of Qualifying Comprehensive Plans Potentially Relevant to the Project

Resource	Comprehensive Plan
Wildlife Resources	Alabama Department of Conservation and Natural Resources. 1990. Wildlife Lands Needed for Alabama. Montgomery, Alabama. October 1990.
Recreation and Land Use	Alabama Department of Economic and Community Affairs. 2008. Alabama Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2012. Montgomery, Alabama. ²⁹
Wildlife Resources	Alabama Department of Conservation and Natural Resources. n.d. Alabama's Comprehensive Wildlife Conservation Strategy. Montgomery, Alabama.
Recreation and Land Use	National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.

²⁹ Kleinschmidt Associates referenced the updated 2021 SCORP when preparing this document.

Resource	Comprehensive Plan
Fish and Aquatic Resources	U.S. Fish and Wildlife Service. n.d. Fisheries USA: The Recreational Fisheries Policy of the U.S. Fish and Wildlife Service. Washington, D.C.
Fish and Aquatic Resources	U.S. Fish and Wildlife Service. n.d. Aquatic Resource Management Plan for the Alabama River Basin. Department of the Interior, Daphne, Alabama.
Wildlife Resources	U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American Waterfowl Management Plan. Department of the Interior. Environment Canada. May 1986.

Source: FERC 2022

6.3 References

Federal Energy Regulatory Commission (FERC). 2022, August. List of Comprehensive Plans. Office of Energy Projects, 20426. Washington, D.C. Available online: <https://cms.ferc.gov/media/list-comprehensive-plans>. Accessed: December 2022.

7.0 PURPA BENEFITS

Alabama Power is not seeking benefits under PURPA (Pub.L. 95-617, 92 Stat. 3117, enacted November 9, 1978) for the Chandler Mountain Project.

APPENDIX A

**DOCUMENTATION OF CONSULTATION DURING DEVELOPMENT OF PRE-APPLICATION
DOCUMENT**

**Presentation for Stakeholder One on One Meetings During
PAD-Development**



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

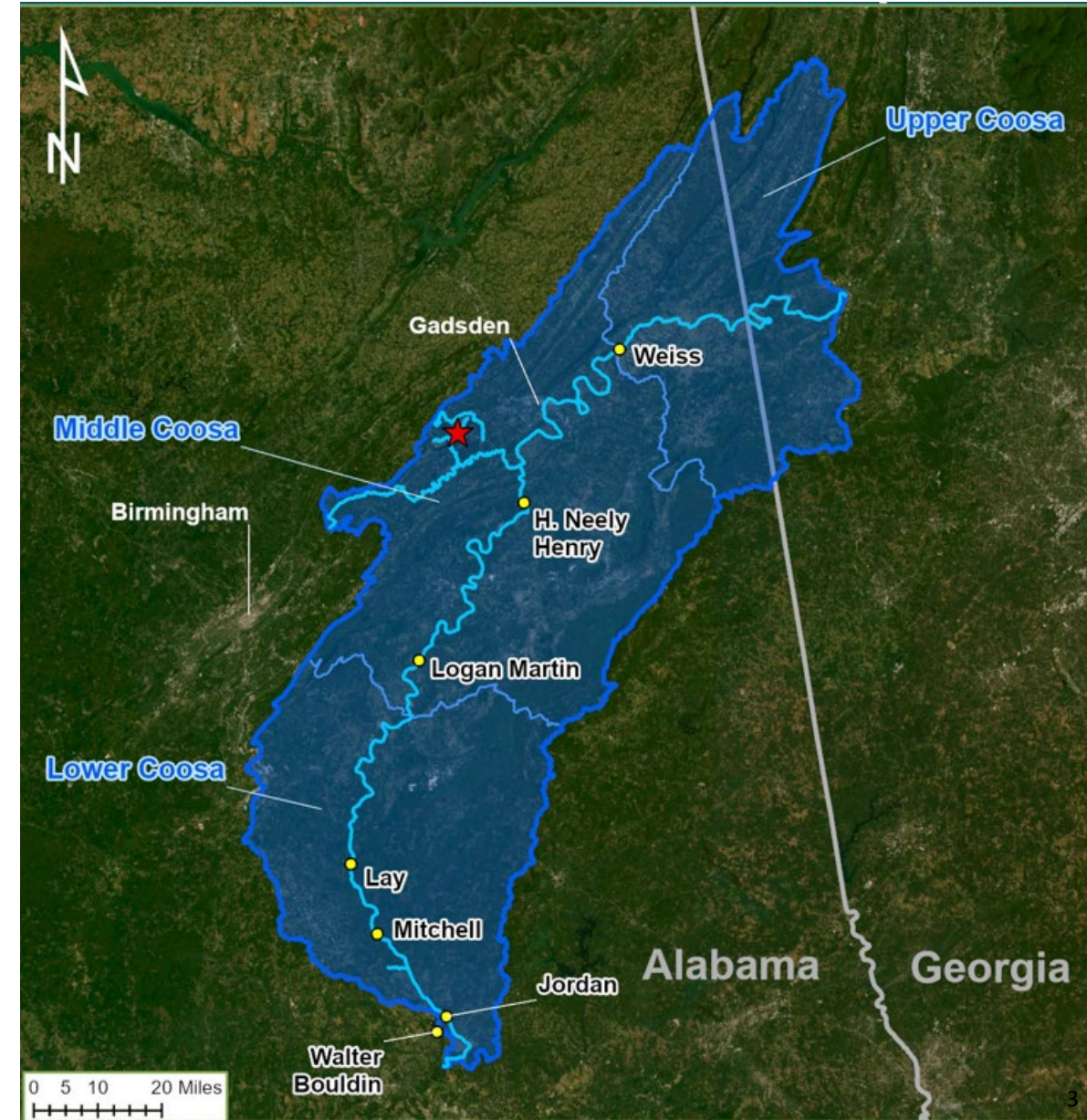
Agenda

- Introductions
- Chandler Mountain PS Project Overview
- How a Pumped Storage Project Works
- Integrated Licensing Process Overview & Schedule
- Project Team
- Licensing Communication
- Questions and Next Steps

Project Location

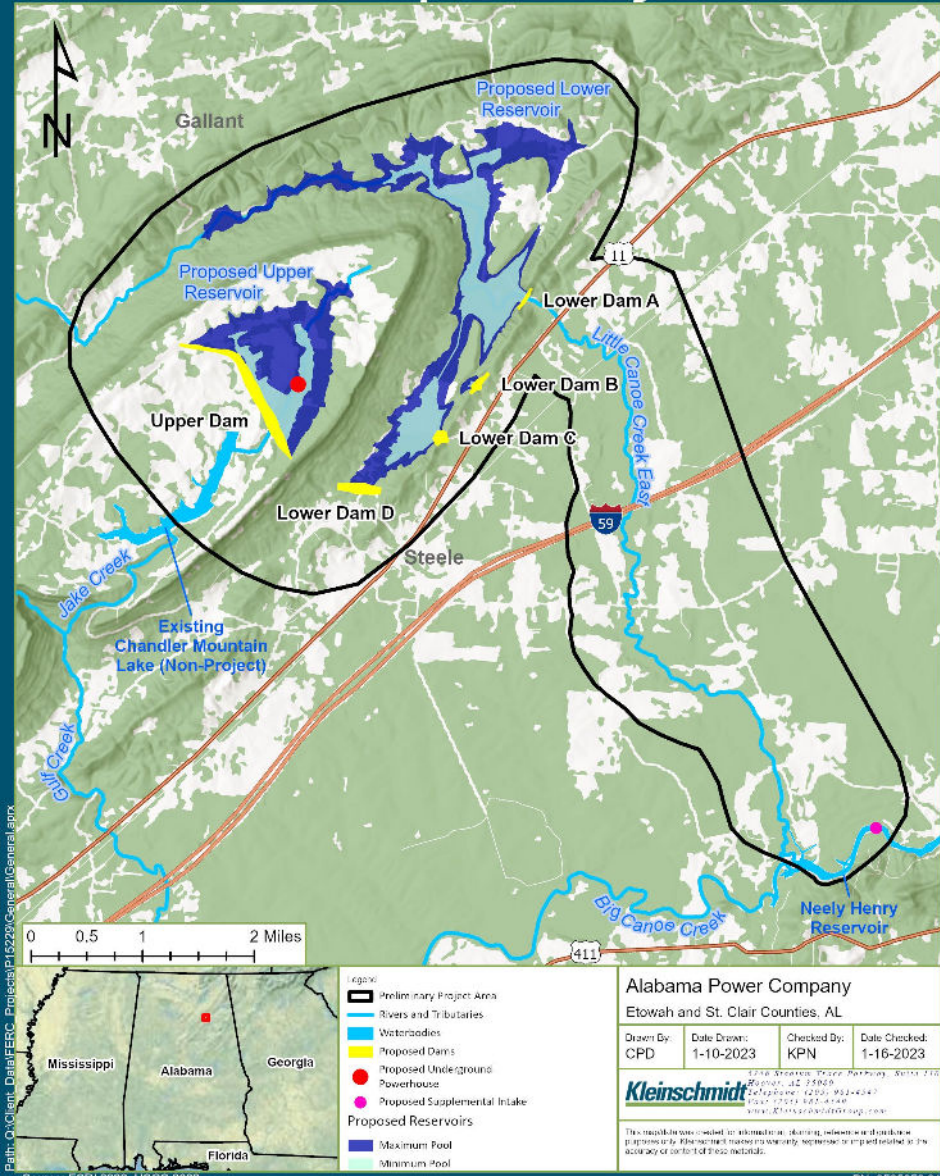


- St. Clair and Etowah County, north of Steele, AL
 - ~50 miles NE of Birmingham
 - ~10 miles SW of Gadsden
 - ~15 miles from Neely Henry Dam
- Within the Coosa River Basin



Proposed Chandler Mountain Project Works

Proposed Project Facilities

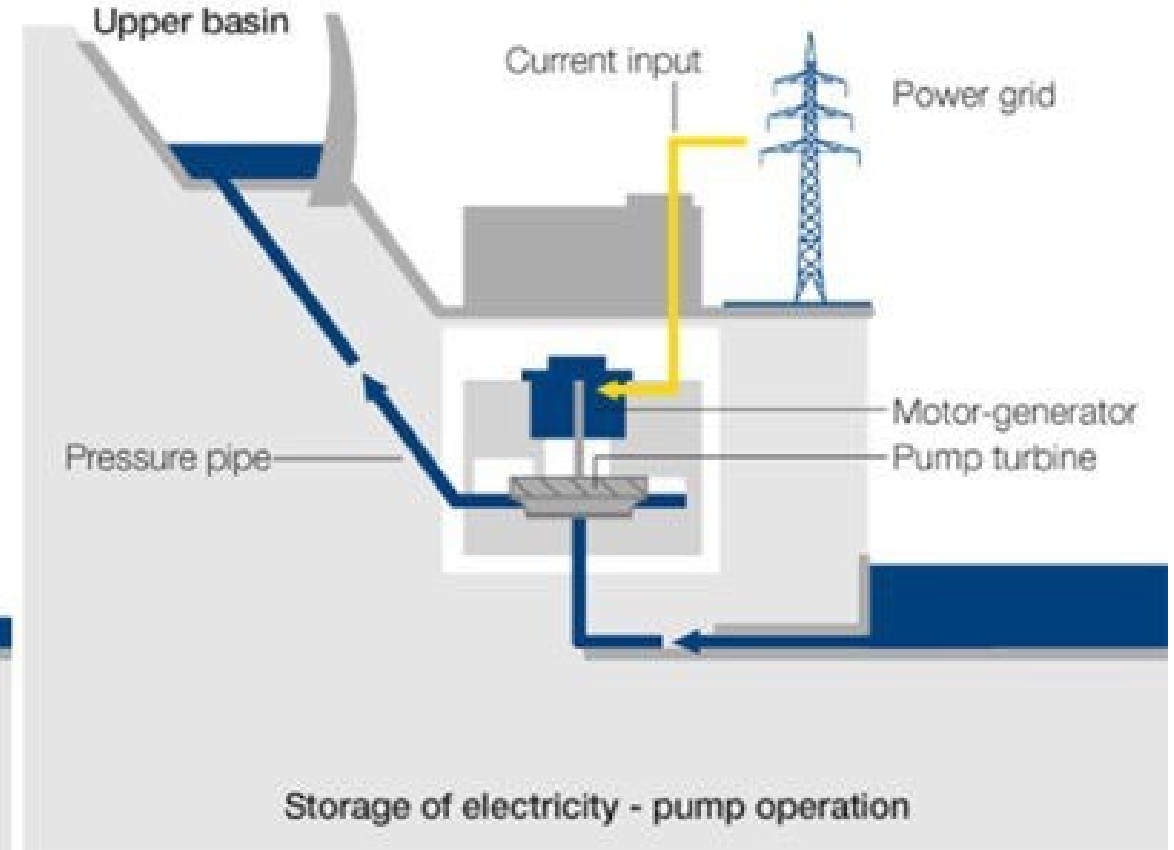
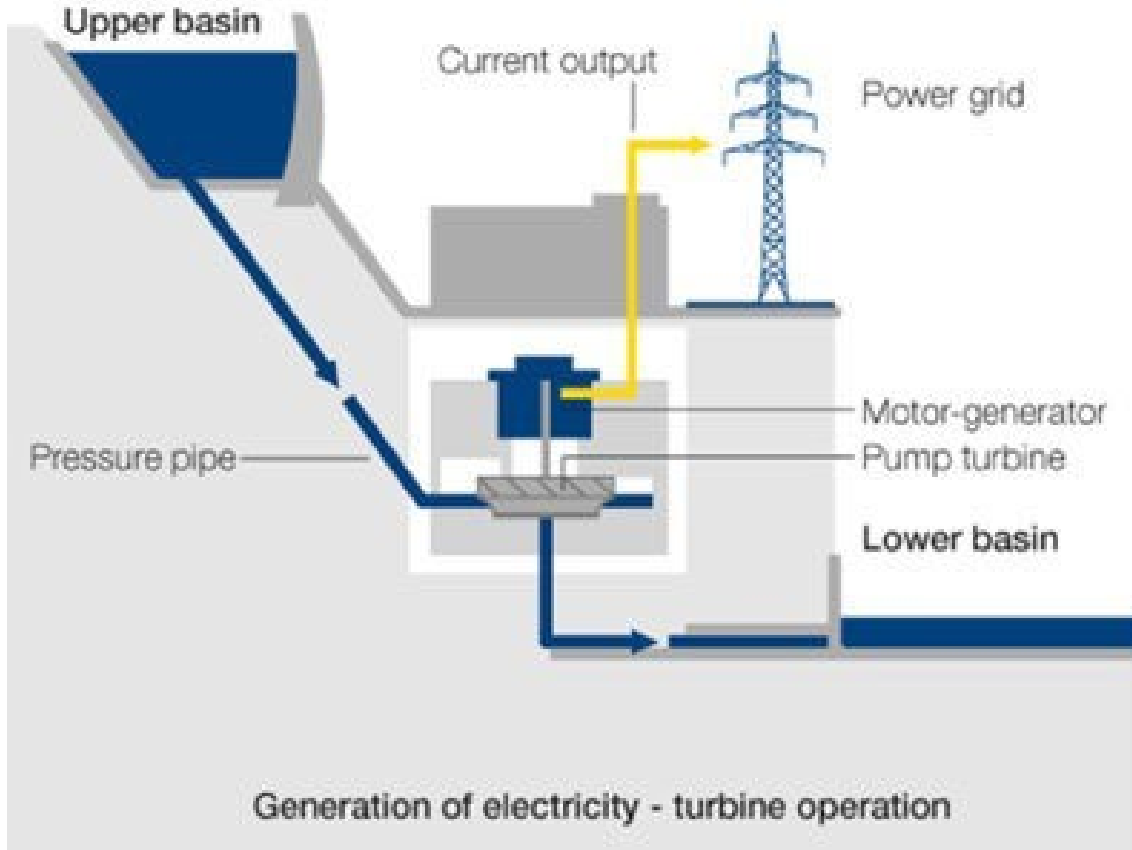


- Dam creating 526-acre upper reservoir
- Upper reservoir intake structure
- Underground powerhouse w/ reversible pump turbines (4x400 MW)
- Four dam sections that create the 1,090-acre lower reservoir
- Lower reservoir discharge structure
- Supplemental water source conveyance structure
- Transmission-related structures and facilities



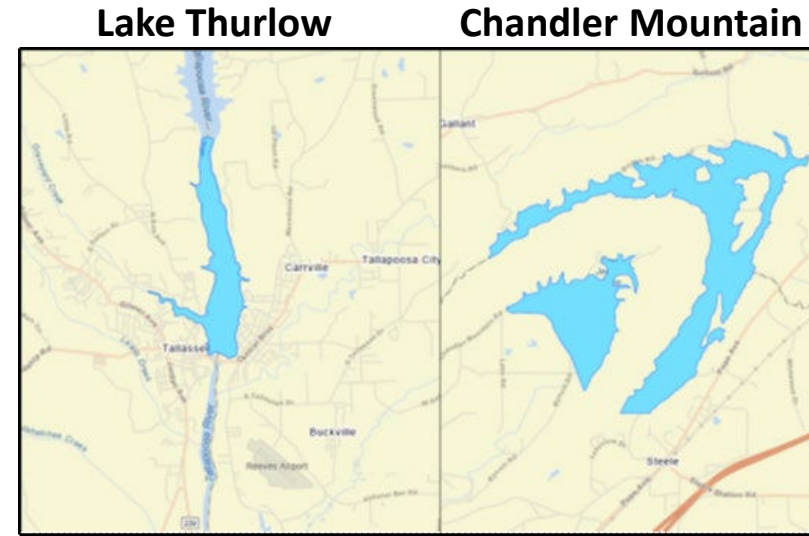
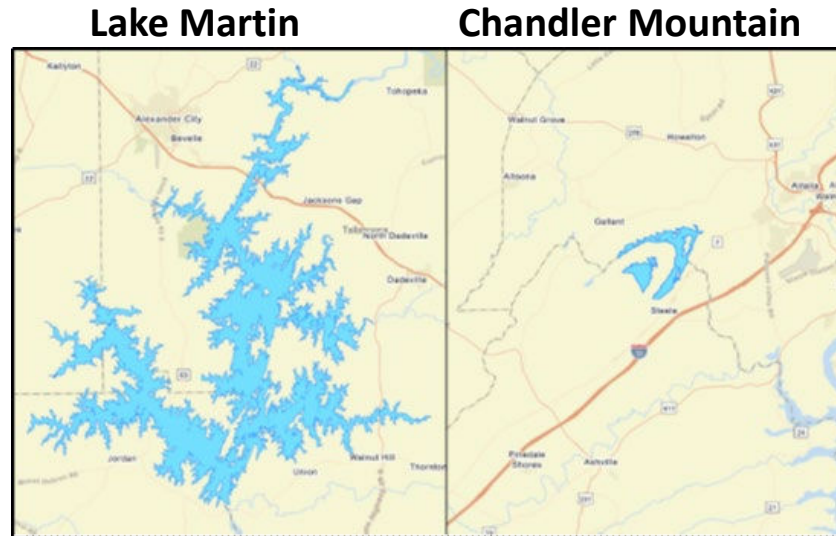
CHANDLER MOUNTAIN
PUMPED STORAGE HYDRO LICENSING

How Chandler Mountain Pumped Storage Would Work



Comparison to Existing APC Conventional Hydro Projects

Project	Surface Area (acres)	Usable Storage Capacity (acre-ft)	Installed Capacity (MW)
Chandler Mountain (Upper and Lower)	1,616	24,000	1,600 (Planned)
Martin	41,150 (largest)	1,200,000	191
Thurlow	574 (smallest)	6,090	81



Note: these maps are to scale for comparison

Chandler Mountain Preliminary Permit

- **July 27, 2021** – Alabama Power filed the Preliminary Permit Application
- **August 13, 2021** – FERC Issued Public Notice
- **October 12, 2021** – Motions to Intervene & Comments
- **March 24, 2022** – FERC issues Preliminary Permit; effective March 1, 2022 (available on FERC's e-library)
- **February 24, 2023** - Filed Preliminary Permit Progress Report (available on FERC's e-library)
- **March 1, 2026** – FERC Preliminary Permit expires (file for EOT if haven't filed license application by this time)

Integrated Licensing Process

- **What is the ILP?**
- FERC's default licensing process
- Same process used for Harris Dam relicensing

- **ILP Characteristics and Process Steps**
- NEPA is front-loaded
- Study plan process and approval from FERC

CHANDLER LICENSING SCHEDULE - MAJOR STEPS

DUE DATES

2023

Official Start of FERC Licensing Process – APC files NOI and Pre-Application Document (PAD)	April 14, 2023
FERC notices NOI/PAD and issues Scoping Document 1	June 13, 2023
FERC holds Scoping Meetings/Site Visit	July 13, 2023
Stakeholders file comments on NOI, PAD, SD1, and Study Requests	August 12, 2023
APC files proposed Study Plan	September 26, 2023
APC holds Study Plan Meeting(s)	October 26, 2023
Stakeholders file comments on Proposed Study Plan	December 25, 2023

2024

APC files revised proposed Study Plan	January 24, 2024
Director's Study Plan Determination	February 23, 2024
First Study Season	2024 study season (~March-October)

CHANDLER MOUNTAIN LICENSING MAJOR STEPS

DUE DATES

2025

APC files Initial Study Report

February 22, 2025

APC holds Initial Study Report Meeting

March 9, 2025

Second Study Season (as needed)

2025 Study Season (~March-October)

2026

APC files Updated Study Report

February 22, 2026

APC holds Updated Study Report Meeting

March 9, 2026

APC files Preliminary Licensing Proposal

Target 2027

Stakeholder file comments on Preliminary Licensing Proposal

90 days after PLP filing

APC files Final License Application

Target 2027

Licensing Project Team

- Hydro Licensing & Compliance
 - **Angie Anderegg** – Licensing Project Manager and point of contact
- Environmental Affairs
- Reservoir Management
- Corporate Real Estate
- Dam Safety
- Generation Planning and Development
- Engineering

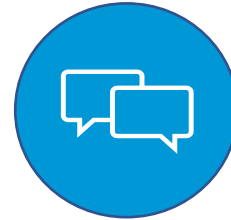
Licensing Communication

- www.chandlermountainpumpedstorage.com
- Licensing events, schedule and documents
- Licensing meetings, including telephone and video conference
- All communications to **Angie Anderegg** at arsegars@southernco.com or chandlerpshlicensing@southernco.com
- Meeting locations

Questions and Next Steps



**Other Existing
Information Sources**



Issues



**Information
Needs**



**Point of Contact for
Each Agency/Group**



Alabama
Power

Stakeholder One on One Meeting PAD Questionnaires



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 2/27/2023

TIME: 1PM Central

LOCATION: ADCNR Headquarters

1. Organization and Point of Contact

Organization: Alabama Department of Conservation and Natural Resources

Division(s): Wildlife and Freshwater Fisheries

Meeting Attendees:

ADCNR - Todd Fobian, Carrie Threadgill, Matt Marshall

Alabama Power - Angie Anderegg, Dave Anderson, Jeff Baker, Jason Carlee, Keith Chandler, Ashley McVicar, Alan Peeples

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|--|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input checked="" type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input checked="" type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input checked="" type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input checked="" type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

Possibly has speleological society cave data
2017-2018 data below Hwy 11

4. Areas where agency/organization feels additional information will be needed during licensing process.

Gage data with temperature for Little Canoe Creek East



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- Red eye bass brood stock
- What will be the depth of the reservoirs?
- See comments that ADCNR filed on preliminary permit application for complete list of resource concerns
- Where are the stream gages located? There is one on Big Canoe Creek in Asheville
- ADCNR is looking for existing terrestrial studies
- Red eye bass studies
- Tri-spot darter work?
- Any fish data from the GSA?
- Asked about other pumped storage plans – how does it integrate with solar
- Does Alabama Power own the land within the project boundary- will they purchase or claim land through eminent domain
- Recent Surveys? High level phase 1
- Ashley discussed the 404 permit process that would run concurrent with the licensing process; ADCNR asked about the timeline for the 404
- On lands owned by APC, still going through normal timber management
- Should be looking for caves during timber management
- ADCNR asked about supplemental water intake
- No terrestrial studies?
- Other agency meetings?
- Will there be GSA involvement? Especially for geological resources



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/8/2023

TIME: 9 AM

LOCATION: ADEM Headquarters

1. Organization and Point of Contact

Organization: Alabama Department of Environmental Management (ADEM)

Division(s): Water Quality

Meeting Attendees:

ADEM - Chris Johnson, Jennifer Haslbauer, David Moore, Seth Wood – Field Ops

Alabama Power - Dave Anderson, Angie Anderegg, Jason Carlee, Keith Chandler, Ashley McVicar, Alan Peeples; Kelly Schaeffer (Kleinschmidt)

Did not attend, but ADEM requested to be included in contact list:

Scott Hughes – ash@adem.alabama.gov

Richard Hulcher – rjh@adem.alabama.gov

Fred Leslie - fal@adem.alabama.gov

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input checked="" type="checkbox"/> Other resource information |



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Describe "Other": Interested in the Integrated Resource planning process- what other energy sources are being considered (i.e., other renewables, hydrogen fuel cell technology)

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

All available water quality data for Little Canoe Creek is on the ADEM portal

4. Areas where agency/organization feels additional information will be needed during licensing process.

ADEM recommends reinstalling/reactivating the USGS gage at Highway 11

Thermal effects of the liners chosen for upper and lower reservoirs



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- Overall question on who or what department at Alabama Power drives the generation mix? Alan responded that Alabama Power has an Integrated Resource Planning process driven by federal regulations, economics, etc.
- Chris was interested in the new LIDAR information being collected for Chandler Mountain
- Jennifer asked about Dam B because it visually looks like it is separated from the lower reservoir. Angie explained that the preliminary project design includes an excavated channel between Dam B and Dam C.
- Interested in where the discharge would occur – Keith indicated that the discharge would be from Dam A into Little Canoe Creek but no discharge from the Upper Dam.
- ADEM asked about recreation on the upper and lower reservoirs and wanted some examples of other Southeast pumped storage projects (Bad Creek, Parr-Fairfield, Wallace and Oconee, Rocky Mountain, Raccoon Mountain).
- Will reservoirs be gated?
- Inquired about whether Alabama Power would need to purchase property and when in the process would that occur.
- How much water would be needed for the supplemental water intake? Ashley noted that with the current design, it is approximately 40 cfs and would only be used to fill initially and in drought conditions.
- Any discharge will be designed to meet 5.0 mg/l dissolved oxygen.
- Chris noted that monitoring of the upper and lower reservoirs will be challenging and different compared to conventional hydro.
- ADEM asked when the presentation would be made available. Angie noted that the presentation will be included with the Pre-Application Document that is scheduled for filing on April 14, 2023.
- ADEM noted that Field Ops group typically handles the 404 process requirements.



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/9/2023

TIME: 7:30 AM

LOCATION: USFWS- Daphne Field Office

1. Organization and Point of Contact

Organization: U.S. Fish and Wildlife Service (USFWS)

Division(s): Alabama Ecological Services Field Office

Meeting Attendees:

USFWS: Jeff Powell, Evan Collins, Erin Padgett, Jennifer Grunewald

Alabama Power: Dave Anderson, Angie Anderegg, Jeff Baker, Keith Chandler, Ashley McVicar, Alan Peoples

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input checked="" type="checkbox"/> Fish and aquatic resources | <input checked="" type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input checked="" type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

GSA Bulletin and Fobian study from 2017

4. Areas where agency/organization feels additional information will be needed during licensing process.

Potential need for trispot darter surveys (even though USFWS recognizes they are outside of the known range)

Flow modeling for Little Canoe Creek

Sediment transport in Little Canoe Creek

Plant surveys – Alabama leather flower, pitcher plant (TNC notes pitcher plant bog on Neely Henry)



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- Discussed overall energy storage and generation.
- What is the geology of Chandler Mountain?
- Property ownership
- Keith reiterated that all the of the continuing forest management occurs on property Alabama Power owns in the proposed project area.
- Asked about the megasite and its location relative to proposed project area.
- Ashley briefly discussed the 404 permit projects.
- Cultural resources and geologic features on the site
- Discussed biological assessment/biological opinion and what that would cover in a new project.
- There is critical habitat below highway 11.
- Discussed flows and modeling and data for Little Canoe Creek-asked about the minimum flow mechanism but it has not yet been determined.
- Sediment transport in Little Canoe Creek
- Jeff noted that the project area was not in the current range of the trispot darter but may need surveys.
- Existing information is available in the GSA bulleting and Fobian research.
- USFWS has five year reviews.
- USFWS has 2 petition species for listing: Coosa Creekshell (*Villosa umbrans*) and the Alabama Round Hickorynut (*Obovaria subrotunda*)



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/13/2023

TIME: 9:30 AM

LOCATION: AHC Headquarters

1. Organization and Point of Contact

Organization: Alabama Historical Commission (AHC)

Division(s): _____

Meeting Attendees:

AHC: Amanda McBride, Eric Sipes

Alabama Power: Angie Anderegg, Dave Anderson, Amanda Fleming, Bill Gardner, Ashley McVicar, Kelly Schaeffer (Kleinschmidt)

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input checked="" type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input checked="" type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

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4. Areas where agency/organization feels additional information will be needed during licensing process.

Will need to re-do the 1980s investigations due to changes in the guidelines (survey methods)

Viewshed impacts

Transmission line impacts

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CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- AHC will want to add an architectural reviewer at AHC to the contact list for the Chandler Mountain Project
- Noted that the studies previously conducted in the 1980s are good info to start but would need to be redone according to the new guidelines for study methods.
- AHC will want to understand the history of the Chandler Mountain area; Eric noted that Springville has a historic district.
- Studies of the viewsheds may be needed – “rural landscape.”
- AHC wanted to know if Alabama Power had done any tribal consultation – Alabama Power noted that it was consulting with the Muscogee Nation
- AHC will send Alabama Power the email of a historian to add to the mailing list.



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/14/2023

TIME: 10:00 AM

LOCATION: VIA MS Teams

1. Organization and Point of Contact

Organization: AL Department of Economic and Community Affairs

Division(s): Office of Water Resources

Meeting Attendees:

OWR

Tom Littlepage
Mary Blackman
Dow Johnston
Michael Harper

Alabama Power

Angie Anderegg
Dave Anderson
Alan Peebles
Kleinschmidt
Kelly Schaeffer
Sandra Wash

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

Water Withdrawals and discharges in area of proposed Chandler Mountain Project

4. Areas where agency/organization feels additional information will be needed during licensing process.

Hydrologic analysis – flows associated with drought conditions
Look at ADCNR's minimum flow policy



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- OWR noted that the benefits of pumped storage are apparent and that Tom has visited the Raccoon Mountain Pumped Storage Project (TVA); OWR is interested in how load management will change in the future.
- This would be the first new reservoir project OWR has seen in a long time.
- Asked whether a FERC project and overlap another FERC project boundary.
- Interested in the water withdrawal out of Neely Henry Lake
- OWR was interested in the property procurement process and in what stage Alabama Power is in that process. Angie discussed Alabama Power's current property ownership.
- How will Alabama Power host future public meetings? Virtual or in-person
- Tom asked if the proposed Chandler Mountain PS Project would be used for flood control purposes; Alan responded that this project would not be used for flood control or provide flood storage.
- Alabama Power asked OWR to provide any information on the existing West Etowah Water Authority withdrawal NE of the proposed Chandler Mountain PS Project
- Any information that OWR has will be sent to Angie.
- With regard to the existing Chandler Mountain lake, OWR noted that it may have been permitted or authorized by the NRCS.
- OWR noted that it does not regulate reservoirs and no authority when it comes to this proposed project. OWR is working on a safe dams inventory process as Alabama does not have a state dam permitting or dam safety program.



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/16/2023

TIME: 10 AM

LOCATION: USACE -Regulatory Office

1. Organization and Point of Contact

Organization: U.S. Army Corps of Engineers

Division(s): Regulatory Division

Meeting Attendees:

USACE: Leslie Turnery, Courtney Shea

Alabama Power: Angie Anderegg, Dave Anderson, Keith Chandler, Amanda Fleming, Carl Hubbert (Cahaba Consulting), Ashley McVicar, Tina Mills

2. Resource area(s) discussed during the one-on-one meeting:

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|--|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input checked="" type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

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4. Areas where agency/organization feels additional information will be needed during licensing process.

Will need identification of all jurisdictional wetlands in upper and lower project area

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CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- Alabama Power noted that they are using the tribal list from Coosa for Section 106 consultation.
- Alabama Power is targeting 2024/2025 for delineation.
- USACE confirmed no 408 process.
- USACE preliminarily noted that Alabama Power would need a lot of compensatory mitigation (permittee responsible or existing mitigation banks)
- Discussed 404b1 analysis.
- Alabama Power asked if USACE would get involved in the engineering aspects of Chandler Mountain Project
 - Not anticipated
- USACE encouraged early conversations on alternatives and project purpose.
- Assume alternatives with less impacts or upland alternatives.
- Is Blount Mountain an alternative?
- First delineation will be the key step.
- USACE will use as much of FERC's EIS as they can.
 - Big outlier is 404b1
 - USACE asked about the inflow into the existing Chandler Mountain Lake



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/18/2023

TIME: 9 AM

LOCATION: Microsoft Teams

1. Organization and Point of Contact

Organization: Muscogee Creek Nation

Division(s): _____

Meeting Attendees:

Muscogee Creek Nation - Raelynn Butler, Robin Soweka Jr.

Alabama Power - Angie Anderegg, Dave Anderson, Amanda Fleming, Bill Gardner, Ashley McVicar, Kelly Schaeffer (Kleinschmidt), Sandra Wash (Kleinschmidt)

Did not attend, but Muscogee Creek Nation request to be included in contact list:

section106@muscogeenation.com

thunt@muscogeenation.com

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input checked="" type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input checked="" type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

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4. Areas where agency/organization feels additional information will be needed during licensing process.

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Where will the transmission line be located?

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Would like to have GIS shapefiles of the Area of Potential Effect (APE) to Robin once Alabama Power has this

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Need to have a thorough history of the region/project area – especially the tribal history (RaeLynn noted this should come from OAR)

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Will need to re-do the previous archaeological studies according to the guidelines

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CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- Raelynn asked to have two additional contacts put on the project mailing list: section106@muscogeenation.com; thunt@muscogeenation.com
- Raelynn emphasized that Alabama Power needs to have the tribal history of the project area included in the PAD -the Muscogee Creek Nation wants that information provided to the public.
- She felt that OAR would be the people to provide this information.
- Raelynn noted that having a virtual option for meetings is preferred.
- Regarding the list of tribes to contact, Raelynn noted that the TDAT is not accurate regarding the counties of interest and the tribal points of contact.
 - She advised that Bureau of Indian Affairs (BIA) is a good source as is Alabama Department of Transportation (ALDOT)
 - Laura Wood is the contact for ALDOT.



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 3/20/2023

TIME: 9:30 AM

LOCATION: Microsoft Teams

1. Organization and Point of Contact

Organization: U.S. Army Corps of Engineers

Division(s): Water Management Division; Planning Division

Meeting Attendees:

USACE - Cindy Donald, Troy Ephriam, James Hathorn, Jody Huang, Mike Malsolm

Alabama Power - Angie Anderegg, Dave Anderson, Lisa Martindale, Christy Nix, Alan Peeples, Kelly Schaeffer (Kleinschmidt), Sandra Wash (Kleinschmidt)

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input checked="" type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input checked="" type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

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Fish Passage Study on Millers Ferry and Claiborne

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4. Areas where agency/organization feels additional information will be needed during licensing process.

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Nothing as of yet

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CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- James asked about the location of the discharge. Alan explained that the powerhouse and draft tubes are underground. The discharge would be at Dam A into Little Canoe Creek.
- James asked about the time it will take to fill the reservoir. Angie responded that it would take an estimated 12-18 months.
 - Alan noted that Neely Henry will be used for the initial fill.
- Mike asked about the T&E species in the area and whether the design included fish passage?
 - Mike noted that the USACE is studying fish passage at Millers Ferry and Claiborne
 - The current design of Chandler does not include fish passage.
- James also asked about the current water withdrawals on Neely Henry.
 - Alan noted that there are a couple: City of Gadsden and a golf course.
- James noted that Mike Malsolm and James Hathorn should be on the stakeholder list.
- James asked if it would impact any current conventional hydro operations?
 - Alan stated that the Chandler Mountain Project would not affect the conventional hydro fleet.
- James asked about the upper and lower spillways – are these controlled or uncontrolled?
 - Alan stated that the upper and lower spillways are uncontrolled.



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 4/12/23

TIME: 8:30 AM

LOCATION: Microsoft Teams

1. Organization and Point of Contact

Organization: Environmental Protection Agency
Division(s): _____

Meeting Attendees:

EPA - Maria Clark, Kyle Corcoran, Rosemary Calli, Ntale Kajumba, Lydia Mayo

Alabama Power - Angie Anderegg, Dave Anderson, Jason Carlee, Keith Chandler, Amanda Fleming, Carl Hubbert (Cahaba Consulting), Ashley McVicar, Alan Peebles, Kelly Schaeffer (Kleinschmidt)

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|--|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input checked="" type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

4. Areas where agency/organization feels additional information will be needed during licensing process.

Make sure to define Purpose and Need



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

5. Discussion/Comments

- 1) Recommends that Alabama Power clearly define the purpose and need for the project from a NEPA perspective
- 2) What does it mean to "Double the capacity" of Alabama Power's hydro fleet? Will Alabama Power be co-locating wind and solar?
- 3) Will Alabama Power hold additional meetings with stakeholders? EPA strongly encourages public outreach and participation in the process.
- 4) If residents will be displaced, EPA recommends early consultation.
- 5) EPA would like to be involved in USACE 404 meetings; EPA recommends following the 404b1 guidelines and provide as much specificity as possible.
- 6) Security and operation of the Chandler Mountain Pumped Storage
- 7) Availability of existing information (i.e., Geotech investigations, existing ecological and hydrologic data)



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

Pre-Application Document Information Chandler Mountain Pumped Storage Project, FERC No. 15229

DATE: 4/13/2023

TIME: 10 AM

LOCATION: Microsoft Teams

1. Organization and Point of Contact

Organization: Alabama Rivers Alliance (ARA), Energy Alabama, Center for Biological Diversity (CBD), Coosa Riverkeeper, Dr. James Williams, Friends of Big Canoe Creek

Division(s): _____

Meeting Attendees:

Friends of Big Canoe Creek - Bill Deutsch, Vicky Wheeler
 Alabama Rivers Alliance - Cindy Lowry, Jack West, Victoria Miller
 Energy Alabama - Sheree Martin
 Center for Biological Diversity - Taylor McKinnon
 Coosa Riverkeeper - Justinn Overton
 Stakeholder - Dr. Jim Williams

Alabama Power Angie Anderegg, Dave Anderson, Jason Carlee, Keith Chandler, Ashley McVicar, Alan Peeples, Kelly Schaeffer (Kleinschmidt Associates), Sandra Wash (Kleinschmidt Associates)

2. Resource area(s) discussed during the one-on-one meeting:

- | | |
|---|--|
| <input type="checkbox"/> Geology and soils | <input type="checkbox"/> Recreation and land use |
| <input checked="" type="checkbox"/> Water resources | <input type="checkbox"/> Aesthetic resources |
| <input checked="" type="checkbox"/> Fish and aquatic resources | <input type="checkbox"/> Cultural resources |
| <input type="checkbox"/> Wildlife and botanical resources | <input type="checkbox"/> Socio-economic/EJ resources |
| <input type="checkbox"/> Wetlands, riparian, and littoral habitat; terrestrial info | <input type="checkbox"/> Tribal resources |
| <input checked="" type="checkbox"/> Rare, threatened & endangered species | <input type="checkbox"/> Other resource information |

Describe "Other":



CHANDLER MOUNTAIN

PUMPED STORAGE HYDRO LICENSING

3. Does agency/org have existing available documents for use in developing the PAD? List any possible sources.

4. Areas where agency/organization feels additional information will be needed during licensing process.

Will need to understand how the upper reservoir affects the existing Chandler Mountain Lake and the Big Canoe Creek watershed

Understanding the cost per kwh for the pumped storage project

Will need a robust alternatives analysis – who does this and when in the process does this occur

Hydrology will be a big issue; watershed data, need to have information on dissolved oxygen and hydrology disruptions

5. Discussion/Comments

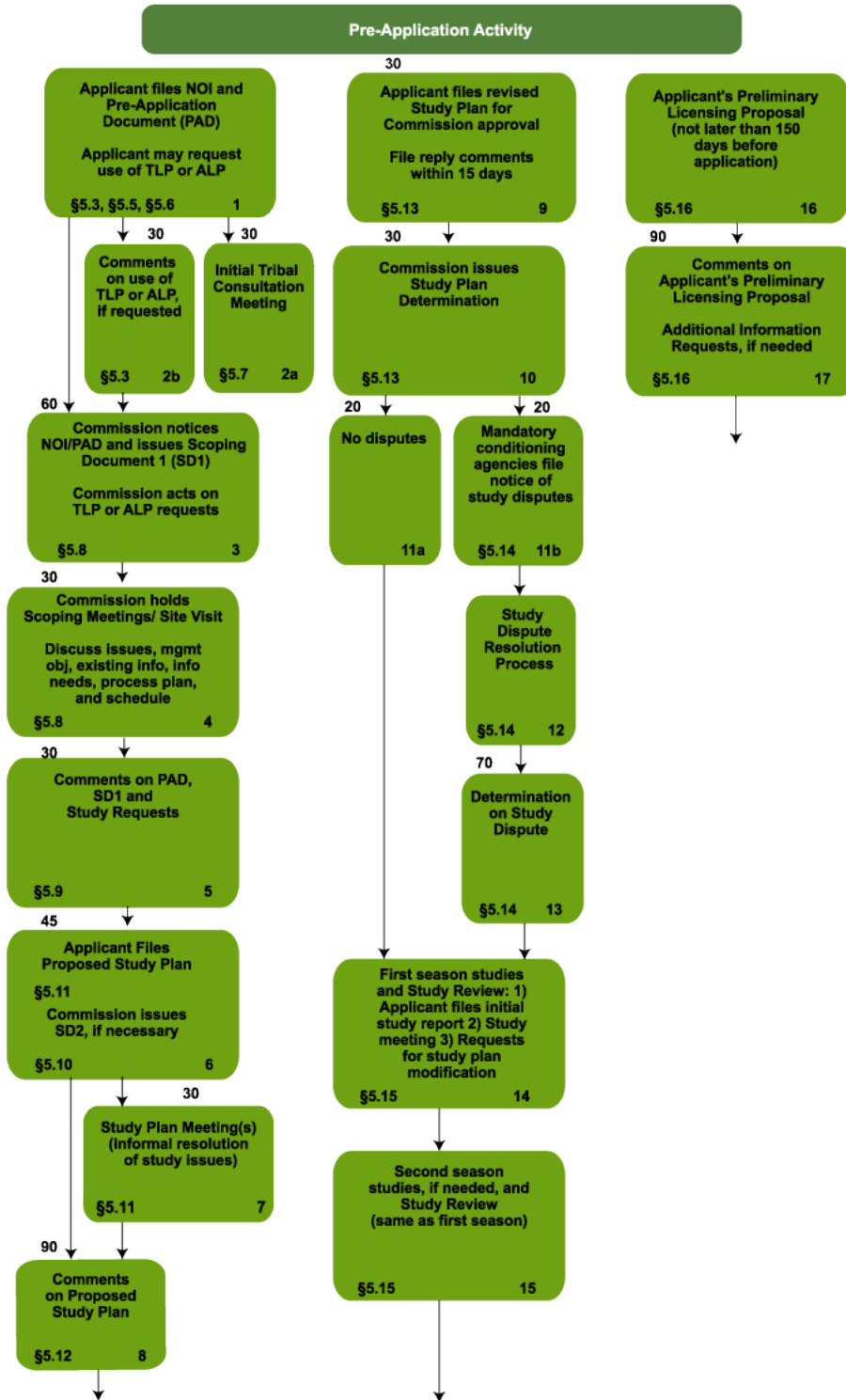
- Discussed that while Alabama Power has not built a pumped storage project, Southern Company has built the Rocky Mountain Project in GA and Georgia Power’s Wallace Dam Project
- Discussed whether the proposed Chandler Mountain is open or closed loop?
- Center for Biological Diversity is concerned with the siting of the project due to the number of T&E species and designated critical habitat
- What is the history of sampling in these creeks; when will Alabama Power have more up to date engineering drawings?
- What studies have been performed to date?
- ARA recommends that Alabama Power cast a wide net for public participation and include anyone that wants to participate
- Has APC looked at floating solar for conventional hydro? Battery storage technology? Iron Flow technology?

APPENDIX B

INTEGRATED LICENSING PROCESS SCHEMATIC

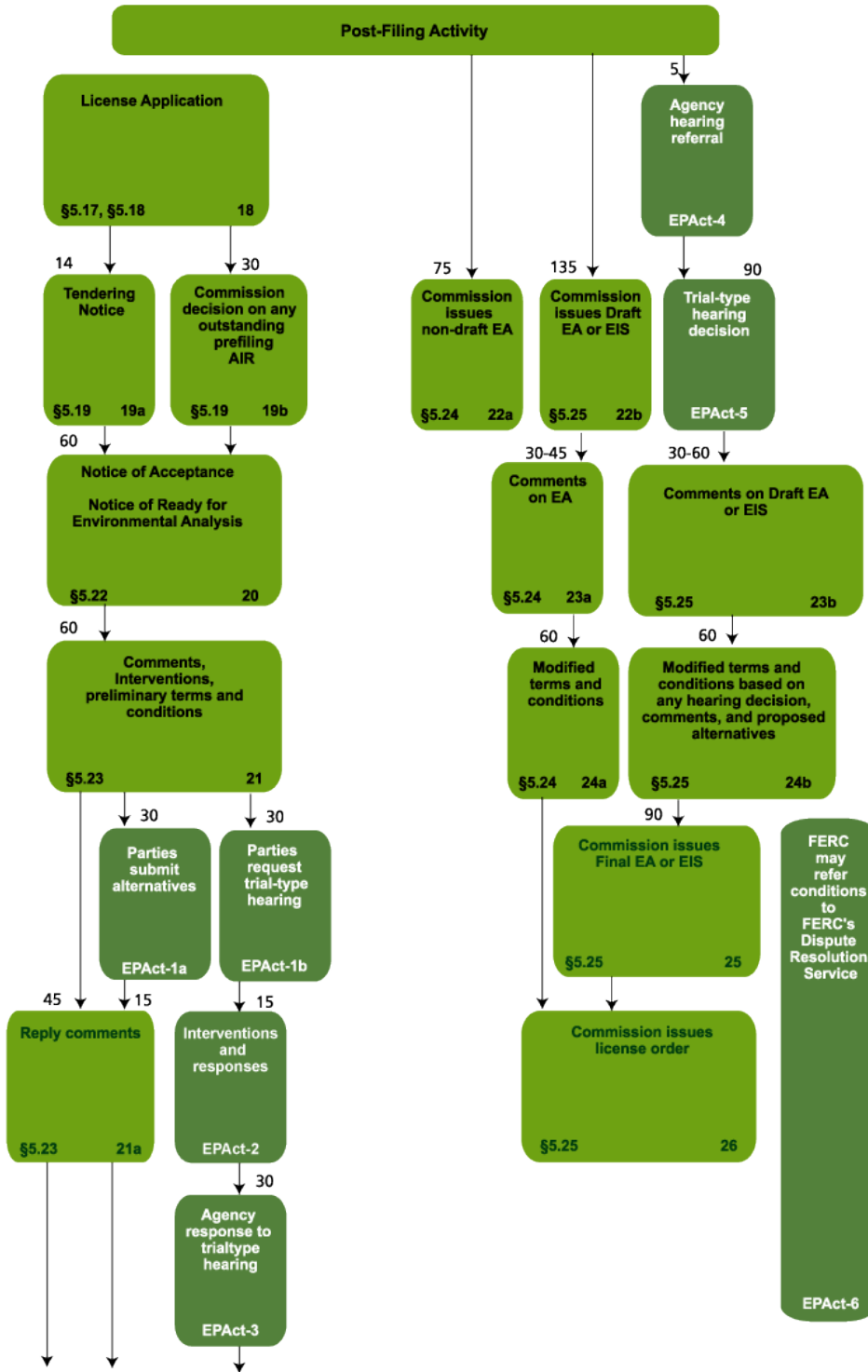
PROCESSES FOR HYDROPOWER LICENSES
Integrated Licensing Process (ILP)

5.5-5 years before expiration for relicense



PROCESSES FOR HYDROPOWER LICENSES
Integrated Licensing Process (ILP)

2 years before expiration for relicense



References:

Federal Energy Regulatory Commission (FERC). 2020. Processes for Hydropower Licenses: Integrated Licensing Process (ILP). Available online at: <https://www.ferc.gov/media/3508>. Accessed January 2023.

APPENDIX C

USFWS INFORMATION FOR PLANNING AND CONSULTATION (IPAC) REPORT AND ALABAMA NATURAL HERITAGE PROGRAM SPECIES TABLE

USFWS IPaC Report



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Alabama Ecological Services Field Office
1208 B Main Street
Daphne, AL 36526-4419
Phone: (251) 441-5181 Fax: (251) 441-6222
Email Address: alabama@fws.gov

In Reply Refer To:
Project Code: 2023-0027951
Project Name: Chandler Mountain

December 22, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Project consultation requests may be submitted by mail or email (Alabama@fws.gov). **Ensure that the Project Code in the header of this letter is clearly referenced in any request for consultation or correspondence submitted to our office.**

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered

species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see <https://www.fws.gov/birds/policies-and-regulations.php>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Ensure that the Project Code in the header of this letter is clearly referenced with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Alabama Ecological Services Field Office

1208 B Main Street

Daphne, AL 36526-4419

(251) 441-5181

Project Summary

Project Code: 2023-0027951
Project Name: Chandler Mountain
Project Type: Power Gen - Hydropower - FERC
Project Description: TBD
Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@33.95096265,-86.21734514992681,14z>



Counties: Etowah and St. Clair counties, Alabama

Endangered Species Act Species

There is a total of 19 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat <i>Myotis grisescens</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

Reptiles

NAME	STATUS
Alligator Snapping Turtle <i>Macrochelys temminckii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

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Clams

NAME	STATUS
Canoe Creek Clubshell <i>Pleurobema athearni</i> There is final critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4693	Endangered
Coosa Moccasinshell <i>Medionidus parvulus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2575	Endangered
Finelined Pocketbook <i>Hamiota attilis</i> There is final critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1393	Threatened
Georgia Pigtoe <i>Pleurobema hanleyianum</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6494	Endangered
Ovate Clubshell <i>Pleurobema perovatum</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5430	Endangered
Southern Acornshell <i>Epioblasma othcaloogensis</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8469	Endangered
Southern Clubshell <i>Pleurobema decisum</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6113	Endangered
Southern Pigtoe <i>Pleurobema georgianum</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1520	Endangered
Triangular Kidneyshell <i>Ptychobranthus greenii</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4396	Endangered
Upland Combshell <i>Epioblasma metastriata</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/317	Endangered

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Alabama Leather Flower <i>Clematis socialis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6300	Endangered
Georgia Rockcress <i>Arabis georgiana</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4535	Threatened
Green Pitcher-plant <i>Sarracenia oreophila</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2896	Endangered
Tennessee Yellow-eyed Grass <i>Xyris tennesseensis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6010	Endangered

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Canoe Creek Clubshell <i>Pleurobema atearnii</i> https://ecos.fws.gov/ecp/species/4693#crithab	Final
Finelined Pocketbook <i>Hamiota altilis</i> https://ecos.fws.gov/ecp/species/1393#crithab	Final

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern \(BCC\) list](#) or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Aug 31
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20

NAME	BREEDING SEASON
Kentucky Warbler <i>Oporornis formosus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Prairie Warbler <i>Dendroica discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

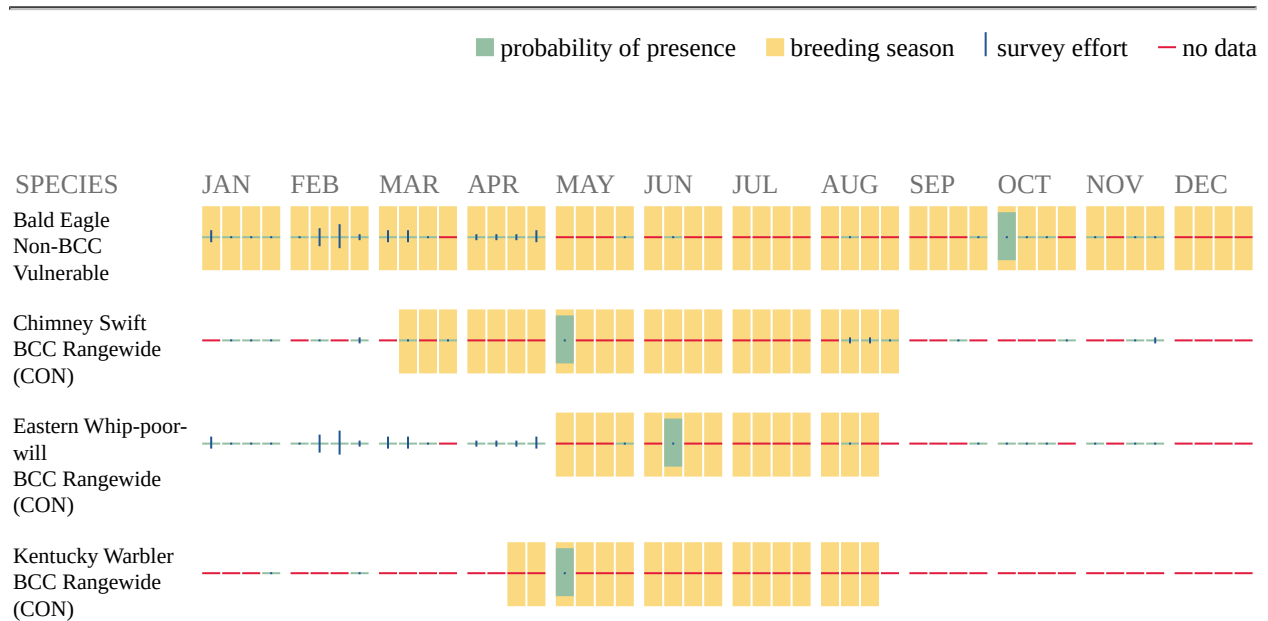
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

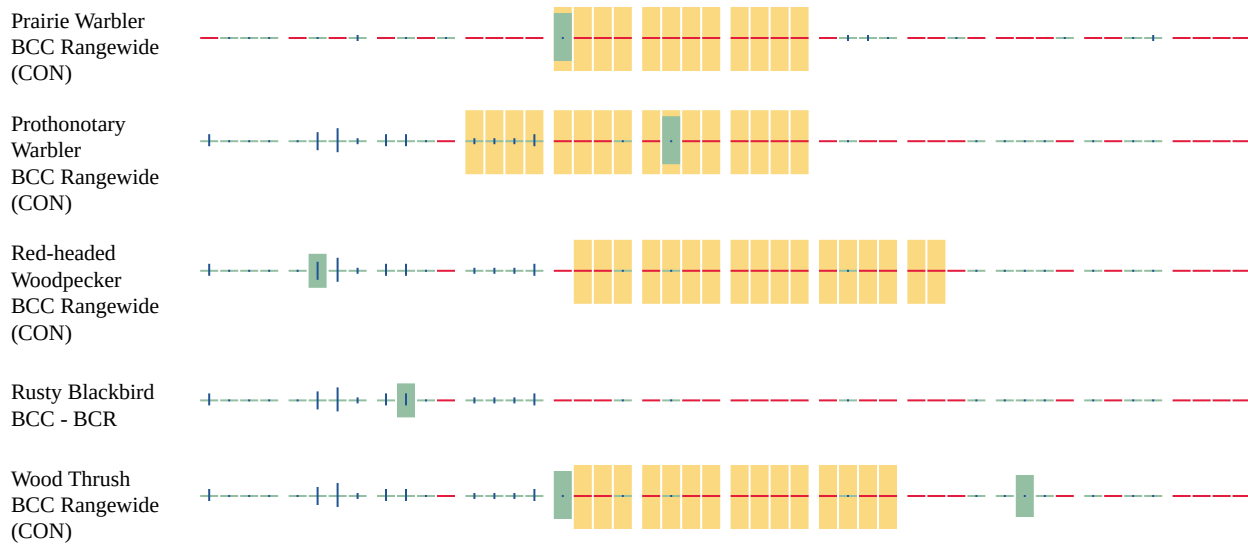
No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as

warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- [PEM1C](#)
- [PEM1/SS1Fh](#)
- [PEM1Fh](#)
- [PEM1Fx](#)
- [PEM1K](#)
- [PEM1Cx](#)
- [PEM1A](#)
- [PEM1F](#)
- [PEM1Ch](#)

FRESHWATER POND

- [PUBHx](#)
- [PABHh](#)
- [PUBFx](#)
- [PUBHh](#)
- [PUBH](#)
- [PUBFh](#)

FRESHWATER FORESTED/SHRUB WETLAND

- [PFO1C](#)
 - [PFO1/EM1A](#)
 - [PFO1Ch](#)
 - [PSS1A](#)
 - [PSS1Fh](#)
 - [PSS1C](#)
 - [PSS1Ch](#)
 - [PFO1/SS1A](#)
 - [PSS1Ah](#)
-

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- [PSS1F](#)
- [PFO1F](#)
- [PFO1Ah](#)
- [PFO1A](#)

RIVERINE

- [R4SBC](#)
- [R2UBH](#)
- [R5UBH](#)
- [R4SBA](#)
- [R2UBF](#)

LAKE

- [L1UBHh](#)
-

IPaC User Contact Information

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Alabama Natural Heritage Program – Rare Species Occurrence by County

Alabama Natural Heritage Program - Rare Species Occurrences by County (updated October 2021)

Accessed November 3, 2022. Available online at: https://www.auburn.edu/cosam/natural_history_museum/alnhp/data/index.htm

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Priority	Tracked Species	County with Known Occurrence
<i>Aneides aeneus</i>	Green Salamander	G3G4	S3	Under Review	Protected	P2	Yes	St. Clair
<i>Desmognathus aeneus</i>	Seepage Salamander	G3G4	S2	Under Review	Protected	P2	Yes	Etowah
<i>Desmognathus ocoee</i>	Ocoee Salamander	G5	S2	-	-	P3	Yes	Etowah
<i>Plethodon websteri</i>	Webster's Salamander	G3G4	S3	-	-	-	No	Etowah
<i>Speyeria diana</i>	Diana	G2G3	S2	-	-	-	Yes	Etowah
<i>Protophila cahabensis</i>	Cahaba Saddle-case Caddisfly	G1	S1	-	-	-	Yes	St. Clair
<i>Cambarus ludovicianus</i>	Painted Devil Crayfish	G5	S2	-	-	-	Yes	St. Clair
<i>Aralia racemosa</i>	American Spikenard	G5	S1	-	-	-	Yes	Etowah
<i>Bigelovia nuttallii</i>	Nuttall's Rayless Goldenrod	G3G4	S3	-	-	-	Yes	Etowah
<i>Celastrus scandens</i>	Climbing Bittersweet	G5	S1	-	-	-	Yes	Etowah
<i>Clematis socialis</i>	Alabama Leather-flower	G1	S1	Endangered	-	-	Yes	Etowah & St. Clair
<i>Coreopsis pulchra</i>	Woodland Tickseed	G2	S2	-	-	-	Yes	Etowah
<i>Cuscuta harperi</i>	Harper's Dodder	G2G3	S2	-	-	-	Yes	Etowah
<i>Delphinium alabamicum</i>	Alabama Larkspur	G3	S3	-	-	-	Yes	Etowah & St. Clair
<i>Dicentra cucullaria</i>	Dutchman's Breeches	G5	S2	-	-	-	Yes	Etowah
<i>Euonymus atropurpureus</i>	Wahoo	G5	S3	-	-	-	W	Etowah
<i>Fothergilla major</i>	Mountain Witch-alder	G3	S2	-	-	-	Yes	St. Clair
<i>Helenium brevifolium</i>	Little Leaf Sneezeweed	G4	S1	-	-	-	Yes	Etowah
<i>Helianthus longifolius</i>	Longleaf Sunflower	G3	S1S2	-	-	-	Yes	Etowah
<i>Lathyrus venosus</i>	Smooth Veiny Peavine	G5	S1	-	-	-	Yes	St. Clair
<i>Leavenworthia exigua</i> var. <i>lutea</i>	Pasture Glade-cress	G4T1	S1	-	-	-	Yes	St. Clair
<i>Lindernia monticola</i>	Piedmont Pimpernel	G4	S3	-	-	-	W	Etowah
<i>Lysimachia fraseri</i>	Fraser's Loosestrife	G3	S1	-	-	-	Yes	St. Clair
<i>Marshallia mohrii</i>	Mohr's Barbara's Buttons	G3	S3	-	-	-	Yes	Etowah
<i>Monarda clinopodia</i>	Basil Bee-balm	G5	S2	-	-	-	Yes	Etowah
<i>Orobanche uniflora</i>	One-flowered Broomrape	G5	S2	-	-	-	Yes	Etowah
<i>Ptilimnium costatum</i>	Eastern Bishop-weed	G4	S1	-	-	-	Yes	St. Clair
<i>Quercus boyntonii</i>	Boynton's Sand Post Oak	G1	S1	-	-	-	Yes	Etowah & St. Clair
<i>Quercus georgiana</i>	Georgia Oak	G3	S2	-	-	-	Yes	St. Clair
<i>Rudbeckia auriculata</i>	Eared Coneflower	G2	S2	-	-	-	Yes	St. Clair
<i>Sabatia capitata</i>	Rose Gentian	G2	S2	-	-	-	Yes	St. Clair
<i>Sarracenia oreophila</i>	Green Pitcher Plant	G2	S2	Endangered	-	-	Yes	Etowah
<i>Scutellaria alabamensis</i>	Alabama Skullcap	G2	S2	-	-	-	Yes	St. Clair
<i>Silene ovata</i>	Ovate Catchfly	G3	S2	-	-	-	Yes	St. Clair
<i>Silphium pinnatifidum</i>	Prairie-dock	G3Q	S2	-	-	-	Yes	Etowah
<i>Silphium trifoliatum</i> var. <i>latifolium</i>	Threelobed Rosinweed	G4?T4?	S3	-	-	-	W	St. Clair
<i>Solidago buckleyi</i>	Buckley's Goldenrod	G4	S1	-	-	-	Yes	St. Clair
<i>Symphotrichum georgianum</i>	Georgia Aster	G3	S3	-	-	-	Yes	Etowah & St. Clair
<i>Symphotrichum pratense</i>	Barrens Silky Aster	G4?	S1	-	-	-	Yes	Etowah
<i>Triosteum angustifolium</i>	Yellowleaf Tinker's-weed	G5	S1	-	-	-	Yes	Etowah
<i>Viburnum bracteatum</i>	Limerock Arrowwood	G1G2	S1	-	-	-	Yes	Etowah
<i>Etheostoma ditrema</i>	Coldwater Darter	G2	S2	-	Protected	P2	Yes	Etowah
<i>Etheostoma phytophilum</i>	Rush Darter	G1	S1	-	Protected	P1	Yes	Etowah
<i>Etheostoma trisella</i>	Trispot Darter	G1	S1	Threatened	Protected	P2	Yes	Etowah & St. Clair
<i>Notropis asperifrons</i>	Burrhead Shiner	G4	S4	-	-	-	No	Etowah & St. Clair
<i>Elimia cahawbensis</i>	Cahaba Elimia	G4	S4	-	-	-	Yes	St. Clair
<i>Elimia capillaris</i>	Spindle Elimia	GX	SX	-	-	-	No	St. Clair
<i>Elimia carinocostata</i>	Fluted Elimia	G4Q	S4	-	-	-	No	St. Clair
<i>Elimia chiltonensis</i>	Prune Elimia	G2	S2	-	-	-	Yes	St. Clair
<i>Elimia clara</i>	Riffle Elimia	G3	S3	-	-	-	Yes	St. Clair
<i>Elimia modesta</i>	Coldwater Elimia	G5	S5	-	-	-	No	St. Clair
<i>Pleurocera showalteri</i>	Upland Hornsnail	G2Q	S2	-	-	-	Yes	St. Clair
<i>Tulotoma magnifica</i>	Tulotoma Snail	G2	S2	Threatened	Protected	P2	Yes	St. Clair
<i>Asplenium bradleyi</i>	Bradley's Spleenwort	G4	S2	-	-	-	Yes	Etowah
<i>Asplenium ruta-muraria</i>	Wall Rue Spleenwort	G5	S1	-	-	-	Yes	Etowah
<i>Asplenium trichomanes</i>	Maidenhair Spleenwort	G5	S2S3	-	-	-	Yes	Etowah
<i>Trichomanes petersii</i>	Dwarf Filmy-fern	G4G5	S2	-	-	-	Yes	Etowah
<i>Aplectrum hymale</i>	Puttyroot	G5	S2	-	-	-	Yes	Etowah
<i>Croonia pauciflora</i>	Croonia	G3	S3	-	-	-	No	Etowah
<i>Erythronium umbilicatum</i>	Dimpled Fawn-lily	G5	SNR	-	-	-	No	Etowah
<i>Isotria verticillata</i>	Large Whorled Pogonia	G5	S2	-	-	-	Yes	Etowah
<i>Lilium canadense</i>	Canada Lily	G5	S2	-	-	-	Yes	Etowah & St. Clair
<i>Listera australis</i>	Southern Twayblade	G4	S3	-	-	-	No	Etowah
<i>Schoenolirion wrightii</i>	Texas Sunnyside	G3	S1	-	-	-	Yes	Etowah
<i>Trillium decumbens</i>	Decumbent Trillium	G4	S3S4	-	-	-	W	Etowah & St. Clair
<i>Trillium flexipes</i>	Nodding Trillium	G5	S2S3	-	-	-	Yes	Etowah & St. Clair
<i>Trillium lancifolium</i>	Narrow-leaved Trillium	G3	S2S3	-	-	-	Yes	St. Clair
<i>Trillium rugelii</i>	Southern Nodding Trillium	G4	S2?	-	-	-	Yes	St. Clair
<i>Pituophis melanoleucus melanoleucus</i>	Northern Pinesnake	G4T4	S3	Species of Concern	Protected	P2	Yes	St. Clair
<i>Plestiodon anthracinus</i>	Coal Skink	G5	S3	-	Protected	P2	Yes	St. Clair
<i>Graptemys pulchra</i>	Alabama Map Turtle	G4	S3	Under Review	Protected	P3	Yes	Etowah

Global/State Rank Definition

GX/SX Presumed Extinct - Not located despite intensive searches and virtually no likelihood of rediscovery.

Possibly Extinct - Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct or eliminated throughout its range.

G1/S1 Critically Imperiled - At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.

G2/S2 Imperiled - At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

G3/S3 Vulnerable - At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

G4/S4 Apparently Secure - At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

G5/S5 Secure - At very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

NR Unranked - Rank not yet assessed.

? Inexact Numeric Rank - Denotes inexact numeric rank.

Questionable taxonomy that may reduce conservation priority - Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.

Intraspecific Taxon (trinomial) - The status of intraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be GST1. A T subrank cannot imply the subspecies or variety is more abundant than the species, for example, a G1T2 subrank should not occur. A vertebrate animal population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an intraspecific taxon and given a T rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

SWAP Priority Definition

P1 Priority 1/Highest Conservation Concern: taxa critically imperiled and at risk of extinction/extirpation because of extreme rarity, restricted distribution, decreasing population trend/population viability problems, and specialized habitat needs/habitat vulnerability due to natural/human-caused factors. Immediate research and/or conservation action required

P2 Priority 2/High Conservation Concern: taxa imperiled because of three of four of the following: rarity; very limited, disjunct, or peripheral distribution; decreasing population trend/population viability

P3 Unknown/Under review

Tracked Species Definition

W Unknown/Under review

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