

SWEETWATER CREEK FLOOD RISK MANAGEMENT FEASIBILITY STUDY Draft Integrated Feasibility Report and Environmental Assessment



**US Army Corps
of Engineers®
Mobile District**

APRIL 2018

**FINDING OF NO SIGNIFICANT IMPACT
FOR
SWEETWATER CREEK FLOOD RISK MANAGEMENT STUDY
INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT
SWEETWATER CREEK WATERSHED, COBB COUNTY, GEORGIA**

1. PROPOSED ACTION. The Tentatively Selected Plan (TSP) consists of buying out and removing twenty structures whose first floor elevations are lower than the anticipated water surface elevation of the 10% Annual Chance of Exceedance (ACE) floodplain throughout Cobb County, the City of Austell, and the City of Powder Springs.

2. ALTERNATIVES.

a. No Action Alternative: The future without project condition (FWOP), or No Action Alternative, is the anticipated future for a given resource if no action is taken or implemented. The FWOP for the Sweetwater Creek Flood Risk Management study would not implement any structural or non-structural alternatives. Flooding within the study area would increase at a rate of less than 1% for the 1% ACE flood event in the FWOP conditions.

b. Alternative 2: Brown Road Detention Alternative: Alternative 2 consists of an in-line dry detention facility on Sweetwater Creek, located just upstream of Brown Road in Cobb County, creating up to 9,000 acre-feet of flood storage. The facility would consist of a 1,400 feet long, 33 feet high structure built approximately perpendicular to Sweetwater Creek and its adjoining floodplain. The outlet works of the structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

c. Alternative 4: Austell Channel Modification. Alternative 4 consists of a channel modification from near the C.H. James Parkway to the rapids in Sweetwater Creek State Park near the historic mill site (14.2 miles). The channel would be widened to 80 feet and would have 2V:1H side slopes. The length of the channel modification is approximately 74,000 linear feet and would remove approximately three million cubic yards of material from the channel. Dredged material would be placed at city approved disposal areas within four miles of the project.

d. Alternative 5H: Multiple Detention Structures on Sweetwater Creek. Alternative 5H consists of two in-line dry detention structures on Sweetwater Creek. The detention sites would be dry within 24 hours after an event. The first is a 10-foot high structure upstream of Bakers Bridge Road in Paulding County near the Douglas and Paulding County line. The second is a 33-foot high structure upstream of Brown Road in Cobb County near the Paulding County line. These structures would provide a combined 18,900 acre-feet of flood storage in the basin. The outlet works on each structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

e. Alternative 5D: Multi-Subbasin Detention. Alternative 5D consists multiple inline dry detention structures with three on Sweetwater Creek, one on Powder Springs Creek, one on Ollie Creek, and one on Mill Creek. All the detention sites would be dry within 24 hours after an event. The first on Sweetwater Creek is a 24-foot high structure creating approximately 400-acre detention upstream of Bakers Bridge Road in Paulding County near the Douglas and Paulding County line. The second on Sweetwater Creek is a 15-foot high structure creating approximately 250-acre detention upstream of Highway 92 in Paulding County. The third on Sweetwater Creek is a 33-foot high structure creating approximately 900-acre detention upstream of Brown Road in Cobb County near the Paulding County line. The one on Powder Springs Creek is a 25-foot high structure creating approximately 400-acre detention upstream of C.H. James Parkway in Cobb County near the Cobb and Paulding County line. The structure on Ollie Springs Creek is a 29-foot high structure creating approximately 250-acre detention upstream of Flint Hill Rd Southwest in Cobb County. The structure on Mill Creek is a 20-foot high structure creating approximately 300-acre detention upstream of Morningside Drive in Paulding County. These structures would provide a combined 25,040 acre-feet of flood storage. The outlet works on each structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

f. Alternative 5J: South Paulding High Detention Short. This alternative is an in-line dry detention facility on Sweetwater Creek, located approximately one mile upstream of Bakers Bridge Road in Paulding County, creating up to 7,660 acre-feet of flood storage. The structure would consist of a 1,500 feet long, 19-foot high structure built approximately perpendicular to Sweetwater Creek and its adjoining floodplain. The outlet works of the structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

3. FACTORS CONSIDERED IN DETERMINING THAT NO ENVIRONMENTAL IMPACT STATEMENT IS REQUIRED. Based on the Integrated Feasibility Report and Environmental Assessment prepared for this project, I have determined that this flood risk management action does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, the action does not require the preparation of a detailed statement under Section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.). My determination was made considering the following factors discussed in the Integrated Feasibility Report and Environmental Assessment to which this document is attached:

- a. The proposed action would no effect on any Federally listed threatened or endangered species potentially occurring in the project area.
- b. No significant cumulative or secondary impacts would result from implementation of this action.
- c. The USACE, Mobile District proposes to fulfill the requirements of Section 106 of the National Historic Preservation Act by conducting a historic architecture survey of all structures to be demolished and archaeological survey of all areas impacted by demolition activities under the TSP. The resulting cultural resources reports will be

coordinated with the Georgia State Historic Preservation Officer (SHPO) and any interested Federally Recognized Indian Tribes. If any cultural resources eligible for listing on the National Register of Historic Places are identified as a result of these surveys and in consultation with the SHPO and Tribes, a Memorandum of Agreement (MOA) will be developed to mitigate adverse effects to historic properties.

- d. The proposed action would result in no significant impacts to air or water quality.
- e. The proposed action would result in no significant adverse impact to fish and wildlife resources.
- f. The proposed action will not cause any environmental health risks or safety risks that may disproportionately affect children and complies with Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks."
- g. The proposed action will not cause any disproportionately high and adverse human health or environmental effects on minority populations and low-income populations and complies with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations."

4. CONCLUSIONS. The environmental analysis supports the conclusion that the TSP will not significantly impact healthy and the human environment; consequently, an Environmental Impact Statement is not required. The requirements of the National Environmental Policy Act and the Council on Environmental Quality (CEQ) regulation have been satisfied.

DATE: _____

JAMES A. DELAPP
COL, EN
Commanding

Table of Contents

1.0 Introduction	1
1.1 Study Area	1
1.2 Project Sponsor	2
1.3 Purpose and Need.....	2
1.4 Study Authority	3
1.5 Related Documents and Studies	3
1.6 Other Projects in Study Area	3
1.7 Tentatively Selected Plan and Evaluated Alternatives.....	3
1.8 NEPA Considerations	3
2.0 Existing and Future Without-Project Conditions (No Action Alternative)	4
2.1 Topography, Geology, and Soils.....	4
2.1.1 Existing.....	4
2.1.2 FWOP	4
2.2 Air Quality and greenhouse gases.....	6
2.2.1 Existing.....	6
2.2.2 FWOP	6
2.3 Land Use	6
2.3.1 Existing.....	6
2.3.2 FWOP	6
2.4 Water Resources	8
2.4.1 Sweetwater Creek and Tributaries	8
2.4.2 Surface Water quality	9
2.4.3 Groundwater	11
2.5 Biological Resources	12
2.5.1 Vegetation	12
2.5.2 Fish and Wildlife Resources.....	14
2.5.3 Waters of the U.S. including Wetlands.....	14
2.5.4 Special Status Species	17
2.5.5 Wildlife Corridors.....	18
2.6 Cultural Resources	19
2.6.1 Existing.....	19
2.6.2 FWOP	25
2.7 Sociological Resources	25

2.7.1 Flooding and Flood Damages	25
2.7.2 Hazardous Toxic Radiological Waste.....	29
2.7.3 Noise	30
2.7.4 Aesthetic	30
2.7.5 Navigation	31
2.7.6 Socioeconomics	31
2.7.7 Public Safety	33
2.7.8 Recreation.....	33
3.0 Plan Formulation	33
3.1.1 Problems	33
3.1.2 Opportunities.....	34
3.1.3 Objectives	34
3.1.4 Constraints	34
3.2 Management Measures	34
3.2.1 Screening of General Measures.....	35
3.3 Site Specific Measures and Screening	36
3.3.1 Channel Modification.....	36
3.3.2 Diversion	36
3.3.3 Retention Areas	37
3.3.4 Structure Relocation/Evacuation (buyout).....	38
3.3.5 Flood Warning System	38
3.4 Final Array of Alternatives.....	39
3.4.1 Alternative 1: Relocation/Evacuation of Structures (Buy Outs)	39
3.4.2 Alternative 2: Brown Road Detention Alternative	39
3.4.3 Alternative 4: Austell Channel Modification	39
3.4.4 Alternative 5H: Multiple Detention Structures on Sweetwater Creek.....	40
3.4.5 Alternative 5D: Multi-Subbasin Detention.....	40
3.4.6 Alternative 5J: South Paulding High Detention Short	41
3.4.7 Final Alternative Array Summary.....	41
3.5 Comparison of Final Alternatives	43
3.5.1 Completeness	44
3.5.2 Effectiveness.....	44
3.5.3 Acceptability	46
3.5.4 Efficiency.....	46

3.6 Plan Selection.....	48
4.0 Tentatively Selected Plan.....	48
4.1 Sites required and Area of Effect.....	48
4.2 Cost	49
5.0 Environmental Impacts of the Tentatively Selected Plan.....	49
5.1 Topography, Geology, and Soils.....	51
5.2 Air Quality and Greenhouse Gases	51
5.3 Land Use	52
5.4 Water Resources	52
5.4.1 Sweetwater Creek and Tributaries	52
5.4.2 Surface Water quality	52
5.4.3 Groundwater	54
5.5 Biological Resources	54
5.5.1 Vegetation	54
5.5.2 Fish and Wildlife Resources.....	54
5.5.3 Waters of the U.S. including Wetlands.....	54
5.5.4 Special Status Species	54
5.5.5 Wildlife Corridors.....	55
5.6 Cultural Resources	55
5.6.1 Cultural Resource Identification	55
5.7 Sociological Resources	55
5.7.1 Flooding and Flood Damages	55
5.7.2 Hazardous Toxic Radiological Waste.....	56
5.7.3 Noise	57
5.7.4 Aesthetic	57
5.7.5 Navigation	58
5.7.6 Socioeconomics	58
5.7.7 Public Safety	58
5.7.8 Recreation.....	58
6.0 Environmental Compliance	59
6.1 Coordination	60
6.1.1 Fish and Wildlife Coordination Act	61
7.0 References.....	62

List of Tables

Table 1: Future Structure Counts	8
Table 2: 2014 303d Listed Waters	9
Table 3: Federally Listed Species – Cobb, Douglas, Paulding Counties.....	17
Table 4: NRHP listed properties within the study area.	21
Table 5: Previously Recorded Archaeological Sites within in a mile radius of all Alternatives.	21
Table 6: Previously Recorded Archaeological Sites within in a mile radius of the proposed parcel locations for the Recommended Plan.....	25
Table 7: Total Depreciated Replacement Value of Study Area	26
Table 8: Existing Condition Mean Expected Annual Damages (x 1,000, 2017 Prices) .	27
Table 9: Existing vs. Future Mean Expected Annual Damages (x 1,000, 2017 Prices).	29
Table 10: Study Area Demographics.....	31
Table 11: Study Area Housing	31
Table 12: Study Area Income.....	32
Table 13: Study Area Occupation	32
Table 14: Study Area Industry.....	32
Table 15: Measures Considered	35
Table 16: Structures for Purchase by Annual Chance of Exceedance	39
Table 17: Measures in Final Array Summary	42
Table 18: Measures in Alternatives	42
Table 19: Alternatives Equivalent Annual Damages Reduced(x1000, 2017 Prices)	44
Table 20: Reduce Number of Structures Impacted	45
Table 21: Reduced Response Times Qualitative Summary	45
Table 22: Reduced Response Times Qualitative Summary	46
Table 23: Alternative Project Costs	46
Table 24: Cost and Benefit Comparison.....	47
Table 25: Benefit Uncertainty Analysis.....	47
Table 26: Number of Structure in Tentatively Selected Plan by Reach.....	49
Table 27: Tentatively Selected Plan Parcel IDs	49
Table 28: Environmental Impacts Summary.....	51
Table 29: Tentatively Selected Plan Identified Properties and Nearby USEPA 303(d) Listed Waterbodies.....	53
Table 30: Tentatively Selected Plan Identified Properties and Likelihood of Nearby State Waters	53
Table 31: TSP Identified Properties and Age of Structures	56
Table 32: Public Law Environmental Compliance Status	59
Table 33: Coordination	61

List of Figures

Figure 1: Study Area	1
Figure 2: USGS Sweetwater below Austell, Georgia historic river crests.....	2
Figure 3: USEPA Level IV Ecoregions of the continental U.S.	5
Figure 4: Sweetwater Creek Watershed National Land Cover Database Overview.....	7
Figure 5: USEPA Listed Impaired Waters within the Study Area	10
Figure 6: Approximate Location of Sweetwater Creek Watershed within USFS Ecoregions of the U.S.	13
Figure 7: Sweetwater Creek Watershed Wetland Types.....	16
Figure 8: Location Map of Previously Recorded Archaeological Sites and NRHP Listed Properties within in a mile radius of all project alternative work sites.	23
Figure 9: Location Map of Previously Recorded Archaeological Sites within in a mile radius of all proposed buyout locations.	24
Figure 10: 2% Annual Chance of Exceedance Floodplain Extents	28
Figure 11: Channel Modification and Diversion Measures	37
Figure 12: Possible Retention Sites	38
Figure 13: Measures in Final Array	43
Figure 14: 1 st and 3 rd Quartile Uncertainty for Economically Justified Alternatives.....	48
Figure 15: Tentatively Selected Plan.....	50

Appendices

Appendix A: Economics
Appendix B: Engineering
Appendix C: Cost Estimation
Appendix D: Real Estate
Appendix E: Environmental
Appendix F: Federal and State Agency Coordination
Appendix G: Public and Agency Comments

Acronyms

ACE	Annual Chance of Exceedance
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
CAA	Clean Air Act
CWA	Clean Water Act
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FRM	Flood Risk Management
FWCA	Fish and Wildlife Coordination Act
FWOP	Future Without Project
GEPD	Georgia Environmental Protection Division
GIS	Geographic Information System
GNAHRGIS	Georgia's Natural, Archaeological, and Historic Resources GIS
HEC-FDA	Hydrologic Engineering Center Flood Damage Reduction Analysis
HEC-RAS	Hydrologic Engineering Center River Analysis System
HTRW	Hazardous, Toxic, and Radiological Waste
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NED	Net Economic Development
NEPA	National Environmental Policy Act
NFS	Non-Federal Sponsor
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
RECs	Recognized Environmental Conditions
SHPO	State Historic Preservation Officer
T & E	Threatened and/or endangered
TMDL	Total Maximum Daily Loads
TSP	Tentatively Selected Plan
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 Introduction

1.1 Study Area

The Sweetwater Creek Watershed (Figure 1) encompasses 264 square miles in Paulding, Douglas, and Cobb Counties in Georgia. The main stem of Sweetwater Creek is 45.6 miles long and begins in Paulding County. As it flows eastward towards Cobb County other tributaries join the main stem before it empties into the Chattahoochee River in Douglas County at the Fulton County line. The creek passes through Sweetwater Creek State Park just before its confluence with the Chattahoochee River.

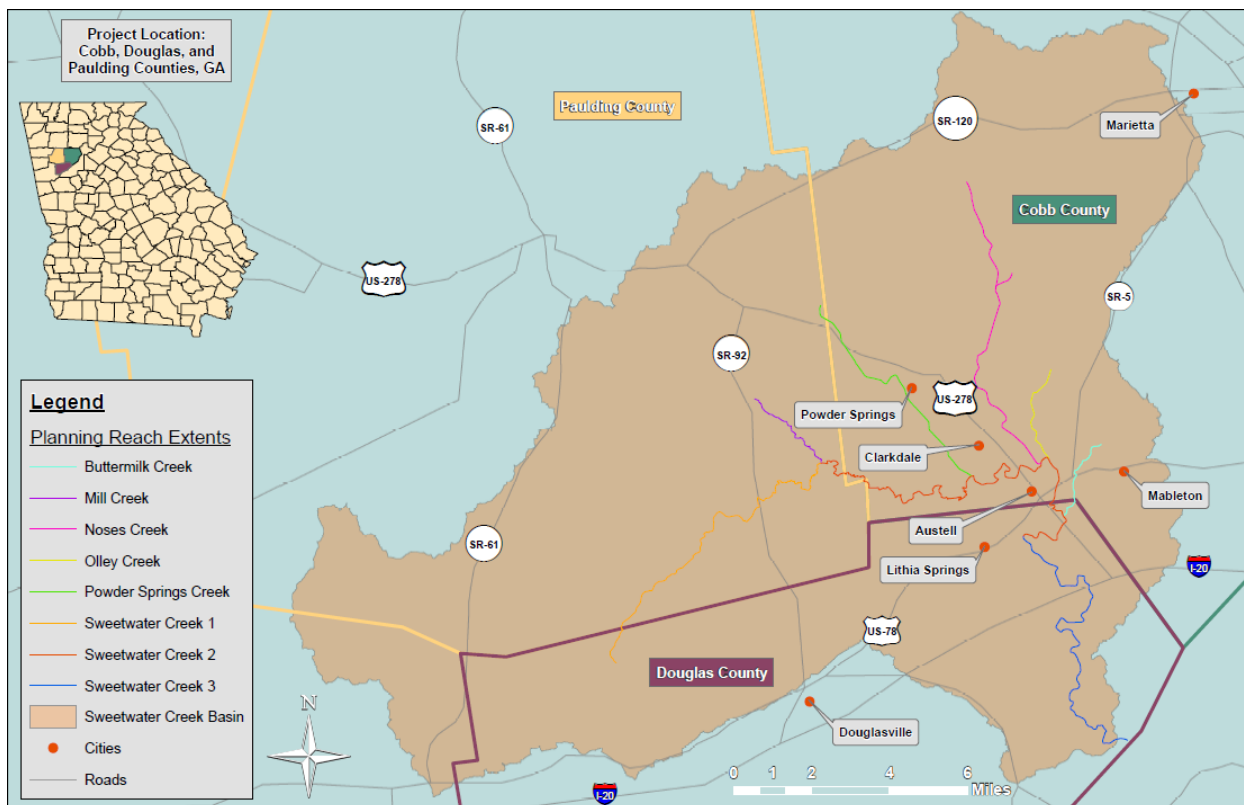


Figure 1: Study Area

The study area encompasses the entire Sweetwater Creek Watershed. The watershed is a mixed watershed that is mostly rural with multiple developed urban areas. The rural areas make up most of the headwaters and it becomes more urban the closer to Sweetwater Creek State Park in the southeastern portion of the watershed.

The majority of the urban areas and flood risk are within Cobb County, Georgia. The portion within Cobb County, Georgia is the intended area of flood risk improvement. The Cobb County portion includes the cities of Marietta, Austell, and Powder Springs as well as a portion of unincorporated Cobb County, Georgia. Located inside the study area are 14 public schools, 7 senior care facilities, and 1 hospital. The City of Hiram, City of Douglasville, and community of Lithia Springs are within the study area.

1.2 Project Sponsor

Cobb County, Georgia is the Non-Federal Sponsor (NFS) for the Sweetwater Creek Flood Risk Management (FRM) Study.

1.3 Purpose and Need

The purpose of the study is to investigate the Federal interest and feasibility of a FRM project to address flooding in the Sweetwater Creek Watershed specifically, inside Cobb County, Georgia. The historic recorded crests of the U.S. Geological Survey (USGS) gauge on Sweetwater Creek below Austell, Georgia, from 1937 to 2015 are shown below. Major floods are 17 feet or greater crest, while moderate floods 13 to 17, and minor floods have 10 to 13 feet crest. The highest recorded crest is 30.82 feet, which occurred in September 2009, and had a stream flow of 31,500 cubic feet per second.

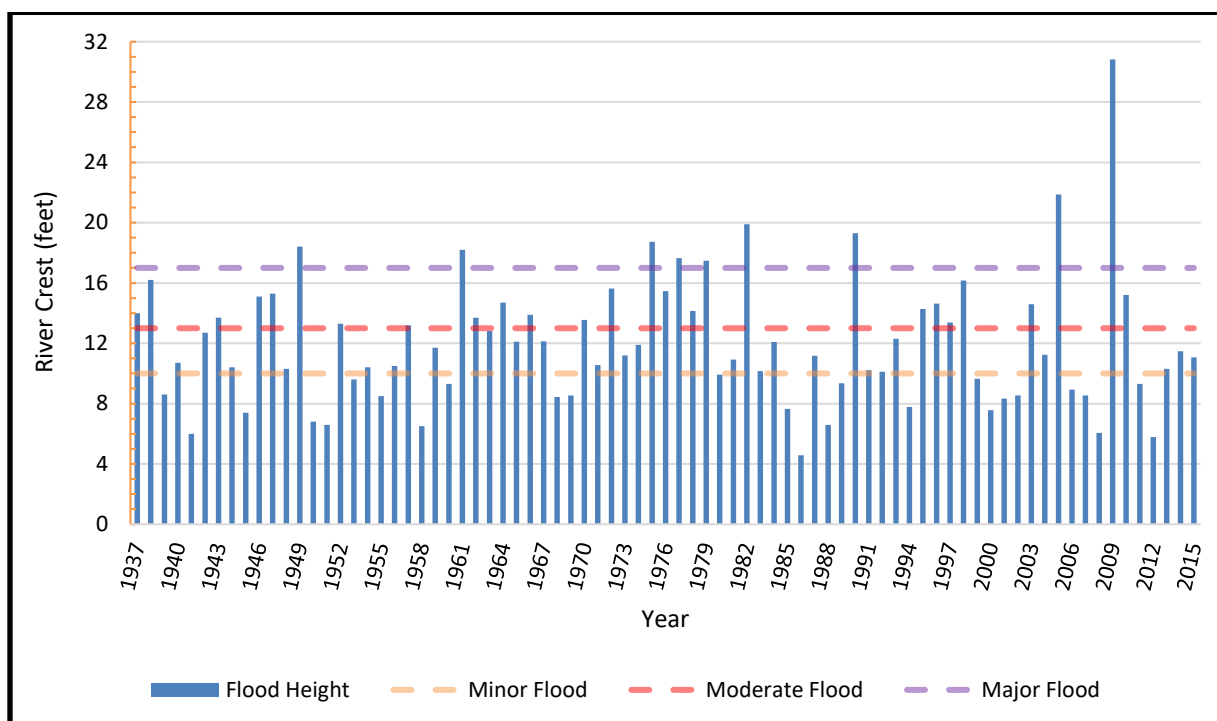


Figure 2: USGS Sweetwater below Austell, Georgia historic river crests

In September 2009, catastrophic flooding impacted the Atlanta metropolitan area as a result of multiple days of prolonged rainfall. According to the rain gauge at Douglas County Water and Sewer Authority the maximum 24-hour rainfall total for September 20-21 was 21.03 inches, which represents a 0.01% annual chance of exceedance (ACE). Historic flash flooding resulted, with flooded river basins remaining swollen for weeks which resulted in numerous flood records were set. Some locations observed conditions exceeding the 0.2% chance of occurrence in a given year. Two of the public schools in the City of Austell flooded or were surrounded by water and one was flooded to the roof line.

1.4 Study Authority

The project is authorized by House Resolution 2445 of the Committee on Public Works and Transportation of the United States House of Representatives adopted 28 September 1994 which reads:

*...the interest of environmental quality, water quality, water supply, **flood damage reduction**, and other purposes including a comprehensive, coordinated watershed master plan for metropolitan Atlanta, Georgia. Such studies should address water quality and flooding associated with stormwater runoff in Nancy Creek, Utoy Creek, North Peachtree Creek, South Peachtree Creek, and other Watersheds in the Fulton, and DeKalb County area, including identification and evaluation of environmental infrastructure and resource protection needs; flood control needs of the Flint River Basin; and water supply needs of the northwest Georgia area.*

The above authority pertains to the area that is part of the master plan for metropolitan Atlanta, Georgia. The study area is mostly in Cobb and Douglas Counties, Georgia which are part of the 10 counties that make up the Metropolitan Atlanta Master Plan, as set forth by the Atlanta Regional Commission. Further, any FRM effects would directly or indirectly impact a portion of one or both of these counties. This study is an interim response to the authority since it only addresses the FRM in the Sweetwater Creek Basin and does not assess FRM in other portions of the metropolitan Atlanta area.

1.5 Related Documents and Studies

The Flood-Inundation Maps for Sweetwater Creek from Above the Confluence of Powder Springs Creek to the Interstate 20 Bridge, Cobb and Douglas counties, Georgia prepared by Cobb county with the U.S. Department of the Interior and U.S. Geological Survey (USGS) documented the extents of the September 2009 flood.

1.6 Other Projects in Study Area

In the last 3 years the Federal Emergency Management Agency (FEMA) flood maps for the three counties that comprise the Sweetwater Creek basin have been updated. A Georgia Silver Jackets study created a real-time flood inundation map for the cities of Austell and Powder Springs.

1.7 Tentatively Selected Plan and Evaluated Alternatives

The Tentatively Selected Plan (TSP) consists of buying out and removing twenty structures whose first floor elevations are lower than the anticipated water surface elevation of the 10% ACE floodplain throughout Cobb County, the City of Austell, and the City of Powder Springs. Other alternatives that were evaluated were dry retention sites, channel widening and deepening, bridge modification, levees, raising buildings, and channel diversions. More information on the evaluation of the alternatives is contained in Section 3.0 Plan Formulation.

1.8 NEPA Considerations

Environmental conditions evaluated during the FRM study included water, biological, and cultural resources. Resources of concern in relation to this study centered on water

quality, federally protected species, and cultural resources. See *Section 2.0 Existing and Future Without-Project Conditions (No Action Alternative)* and *Section 5.0 Environmental Impacts of the* for an in-depth analysis.

2.0 Existing and Future Without-Project Conditions (No Action Alternative)

The existing condition is a baseline from which all of the future conditions are based. The future without project condition (FWOP) is the anticipated future for a given resource if no action is taken or implemented. The FWOP also sets the baseline to which action alternatives are compared. Details on both the existing and FWOP condition are detailed in the following sections.

2.1 Topography, Geology, and Soils

2.1.1 Existing

Topography

Since 1987 the U.S. Environmental Protection Agency (USEPA) has defined ecoregions throughout the conterminous United States for the use of classifying habitat ecosystems based on physiological characteristics such as varying topography, geology, and soils (Omernik 1987). As shown in *Figure 3: USEPA Level IV Ecoregions of the continental U.S.*, Sweetwater Creek Watershed lies within the Southern Inner Piedmont portion of the Piedmont Ecoregion of the State of Georgia. The Piedmont Ecoregion is considered non-mountainous foothills of the Appalachian Mountain Range and transitions to the relatively flat coastal plain in the direction of northeast to southwest. It is comprised of numerous shallow streams, granite outcrops, flat to rolling terrain, and narrow valleys.

Geology

Sweetwater Creek Watershed is a tributary to the Chattahoochee River which runs parallel to the Brevard Fault Zone which a prominent geologic feature of the Southeast United States formed through seismic activity (Vauchez 1987). Bedrock in the USEPA defined Piedmont Ecoregion consists of Precambrian and Paleozoic metamorphic and igneous rocks such as granite, gneiss, and marble (GWRD 2001).

Soils

Soils of the USEPA defined Piedmont Ecoregion are comprised of fine grained saprolites and ultisols which are chemically weathered rocks and leached acidic sandy or loams soils respectively. Ultisols of the Piedmont Ecoregion range in color from bright red or reddish-yellow to orange or pale yellow-brown. Due to 19th century farming practices, topsoil erosion has led to the exposure of these soils which were formed through the weathering of igneous and metamorphic bedrock.

2.1.2 FWOP

No changes to topography would occur under future without project conditions.

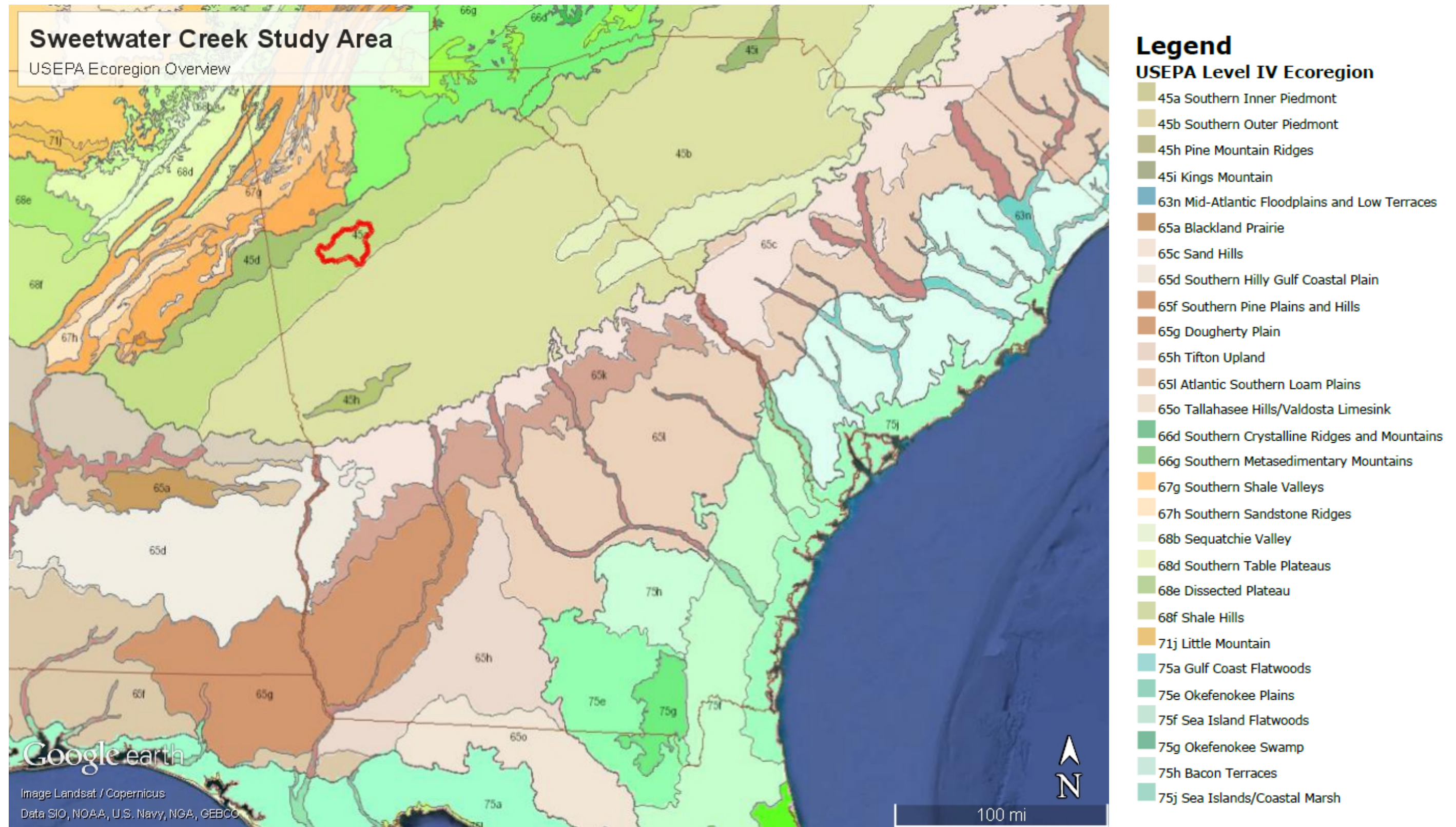


Figure 3: USEPA Level IV Ecoregions of the continental U.S.

2.2 Air Quality and greenhouse gases

2.2.1 Existing

The USEPA sets National Ambient Air Quality Standards (NAAQS) in accordance with the Clean Air Act (CAA) “for pollutants considered harmful to public health and the environment.” The Clean Air Act identifies two types of NAAQS: primary and secondary. Primary standards provide public health protection and Secondary standards provide public welfare protection. The USEPA has set NAAQS for six principal pollutants, which are called criteria air pollutants: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and particulate matter (PM10 and PM25).

The *General Conformity Rule* published by the USEPA on November 30, 1993 designates and implements Section 176(c) of the CAA for geographic areas in CAA non-attainment areas for criteria pollutants and in those attainment areas subject to maintenance plans required by CAA Section 175(a). The CAA General Conformity Rule applies to Federal actions.

The study area is not located in any designated nonattainment areas for any criteria air pollutants.

2.2.2 FWOP

Local air quality would continue fluctuating trends but overall would remain consistent with current levels.

2.3 Land Use

2.3.1 Existing

In June 2017, parcels within the 500 year floodplain for Sweetwater Creek and its tributaries within Cobb, Douglas and Paulding Counties were surveyed for use in a FRM study. Parcel data was obtained by each county’s tax assessor’s office and used to build a geographic information system (GIS) database for identifying which parcels were located within the FEMA 500 year floodplain. The structure inventory survey identified 2,230 structures within 1,902 parcels not including vacant lots. More details on the structure inventory and how it was used can be found in Appendix A: Economics

The setting of the Sweetwater Creek study area is mostly rural and suburban with small cities such as Austell and Powder Springs, which have developed near the floodplains of Sweetwater Creek and Powder Springs Creek respectively. Data obtained from the Multi-Resolution Land Characteristics Consortium 2011 National Land Cover Database (NLCD), depicted in Figure 4: Sweetwater Creek Watershed National Land Cover Database Overview, provides a visual representation of the land use overview throughout the entire study area.

2.3.2 FWOP

According to Georgia residential population projections, the population of the counties within the study area (Cobb, Douglas and Paulding) are expected to increase by approximately 34.89% by the year 2050.

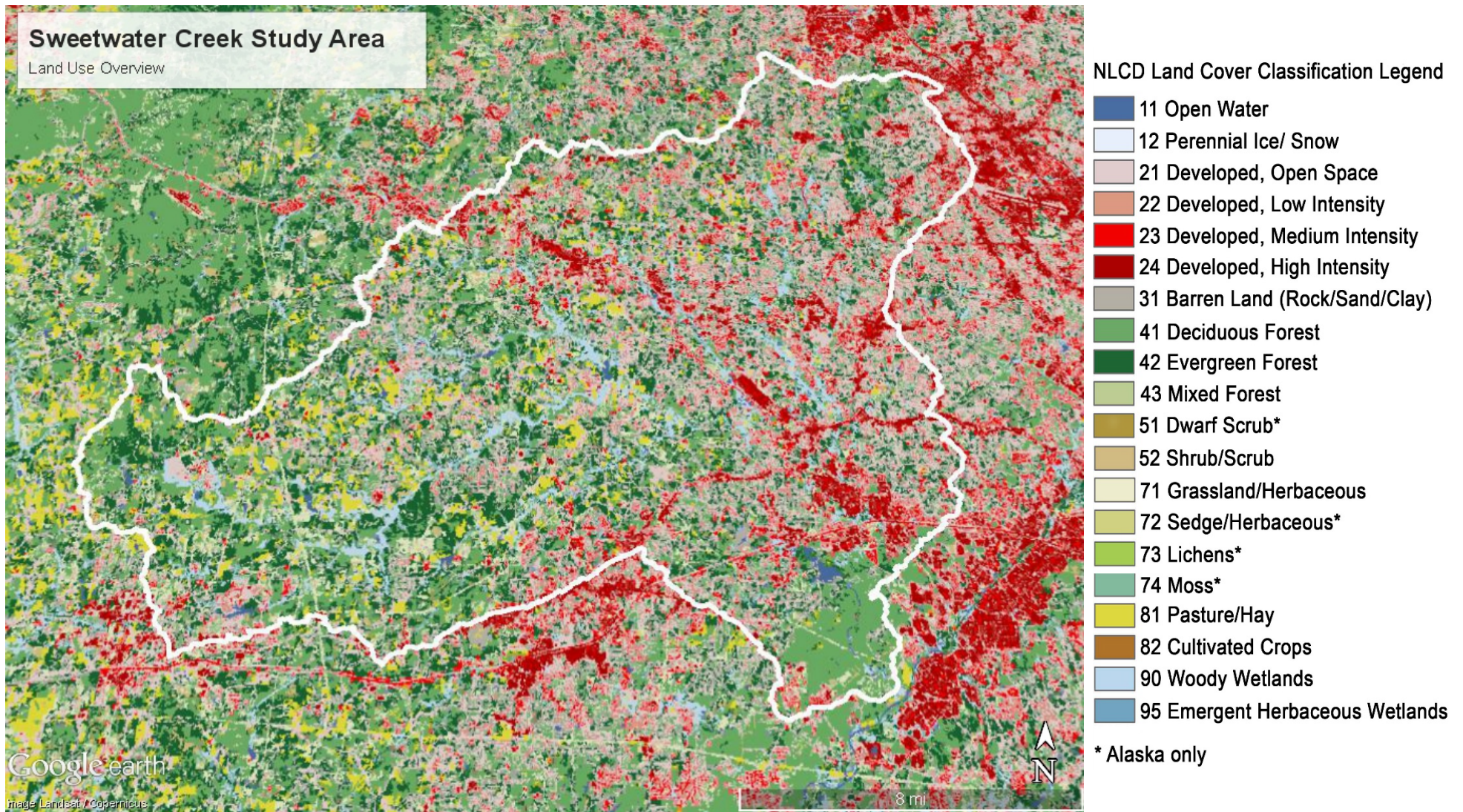


Figure 4: Sweetwater Creek Watershed National Land Cover Database Overview

The average household size in the state of Georgia is 2.73 persons. Dividing the percent increase by 2.73 households estimates the expected increase in households in the year 2050 is 12.78%. This is represented by the addition of 213 residential structures in the 2050 analysis year, located above of the 1% ACE exceedance event floodplain. These structures were added to the year 2050 structure inventory in proportion to the number of structures within each reach. The number of structures for *Table 1: Future Structure Counts* differs from overall structure count due to counting multi-structure parcels as one, resulting in a difference of 286. It is assumed that by the year 2050 the floodplain will be fully developed and no future development will occur.

Table 1: Future Structure Counts

Reach	Analysis Year 2020 Number of Structures	Percent of Residential Structures	Future Structures Added	Analysis Year 2070 number of structures
Buttermilk	46	2.75%	6	52
Mill	62	3.71%	8	70
Noses	589	35.2%	75	664
Olley	116	6.93%	15	131
Powder Springs	189	11.30%	24	213
Sweetwater	671	40.11%	85	756
Total:	1,673	100%	213	1,886

2.4 Water Resources

2.4.1 Sweetwater Creek and Tributaries

2.4.1.1 Existing

The Sweetwater Creek watershed encompasses 264 square miles in Paulding, Douglas, and Cobb Counties in Georgia. The main stem of Sweetwater Creek is 45.6 miles long and begins in Paulding County. As it flows eastward towards Cobb County, other tributaries join the main stem before it empties into the Chattahoochee River in Douglas County at the Fulton County line. The creek passes through Sweetwater Creek State Park just before its confluence with the Chattahoochee River. The Study Area encompasses the entire Sweetwater Creek watershed; however, the portion within Cobb County, Georgia is the intended area of flood risk improvement. The Cobb County portion includes the cities of Marietta, Austell and Powder Springs as well as a portion of unincorporated Cobb County, Georgia.

Buttermilk Creek, Mill Creek, Noses Creek, Olley Creek, and Powder Springs Creek are all tributaries of Sweetwater Creek and are predominantly located in Cobb County, Georgia. See *Figure 1: Study Area* for the location of each tributary.

2.4.1.2 FWOP

Flooding within the study area would increase at a rate of less than 1% for the 1% ACE flood event in the FWOP conditions.

2.4.2 Surface Water quality

2.4.2.1 Existing

Section 401 of the Clean Water Act (CWA) prohibits the discharge of any fill material into navigable waters of the United States. The USEPA delegates authority under this act to the States for monitoring and maintaining clean water standards.

Every two years the USEPA will review and approve the State's listing of impaired or threatened bodies of water (e.g. stream/river segments, lakes), termed 303(d) list. States are required to submit their list for USEPA approval every two years. For each waterbody on the list, the state identifies the pollutant causing the impairment, when known. In addition, the state assigns a priority for development of Total Maximum Daily Loads (TMDL) based on the severity of the pollution and the sensitivity of the uses to be made of the waters, among other factors (40 C.F.R. §130.7(b)(4))."

The nearest 303d listed bodies of water within or near the study area are Buttermilk Creek, Olley Creek, and a portion of Sweetwater Creek. Those reaches identified within Buttermilk and Olley Creek located in the headwaters to Sweetwater Creek in Cobb County. All locations are listed as not supporting its designated use either due to Fecal Coliform Bacteria, Urban Runoff/Urban Effects, and/or Biota Impacted Fish or Macroinvertebrate Community.

See Table 2 and Figure 5 for listed streams not supporting designated uses within the study area obtained from the Georgia Department of Natural Resources, Environmental Protection Division (GEPD) 2014 303d listed waters for streams and rivers.

Table 2: 2014 303d Listed Waters

Reach Name/ID	Reach Location / County	Use	Cause / Source	Size
Buttermilk Creek / R031300020209	Headwaters to Sweetwater Creek / Cobb	Fishing	FC/UR	4 miles
Olley Creek/ R031300020204	Headwaters to Sweetwater Creek / Cobb	Fishing	Bio M, FC/UR	11 miles
Sweetwater Creek / R031300020217	Unnamed Tributary approximately 0.25 miles u/s of I-20 to the Chattahoochee River / Douglas	Fishing	FC/UR	8 miles
Tributary to Mud Creek/ R031300020207	Cobb County / Cobb	Fishing	FC/UR	3 miles
Mud Creek / R031300020202	Ga. Hwy. 120 to Noses Creek / Cobb	Fishing	FC/UR	5 miles
Noses Creek / R031300020215	Headwaters to Ward Creek / Cobb	Fishing	Bio F / NP	7 miles
Ward Creek / R031300020208	Headwaters to Noses Creek / Cobb	Fishing	FC, Bio F / UR	6 miles
Cracker Creek / R031300020210	Headwaters to Gothard's Creek / Douglas	Fishing	FC/UR	3 miles

Key 2: Bio M = Biota Impacted (Macroinvertebrate Community); Bio F = Biota Impacted (Fish Community); FC = Fecal Coliform Bacteria ; NP = Nonpoint Sources/Unknown Sources; UR = Urban Runoff/Urban Effects

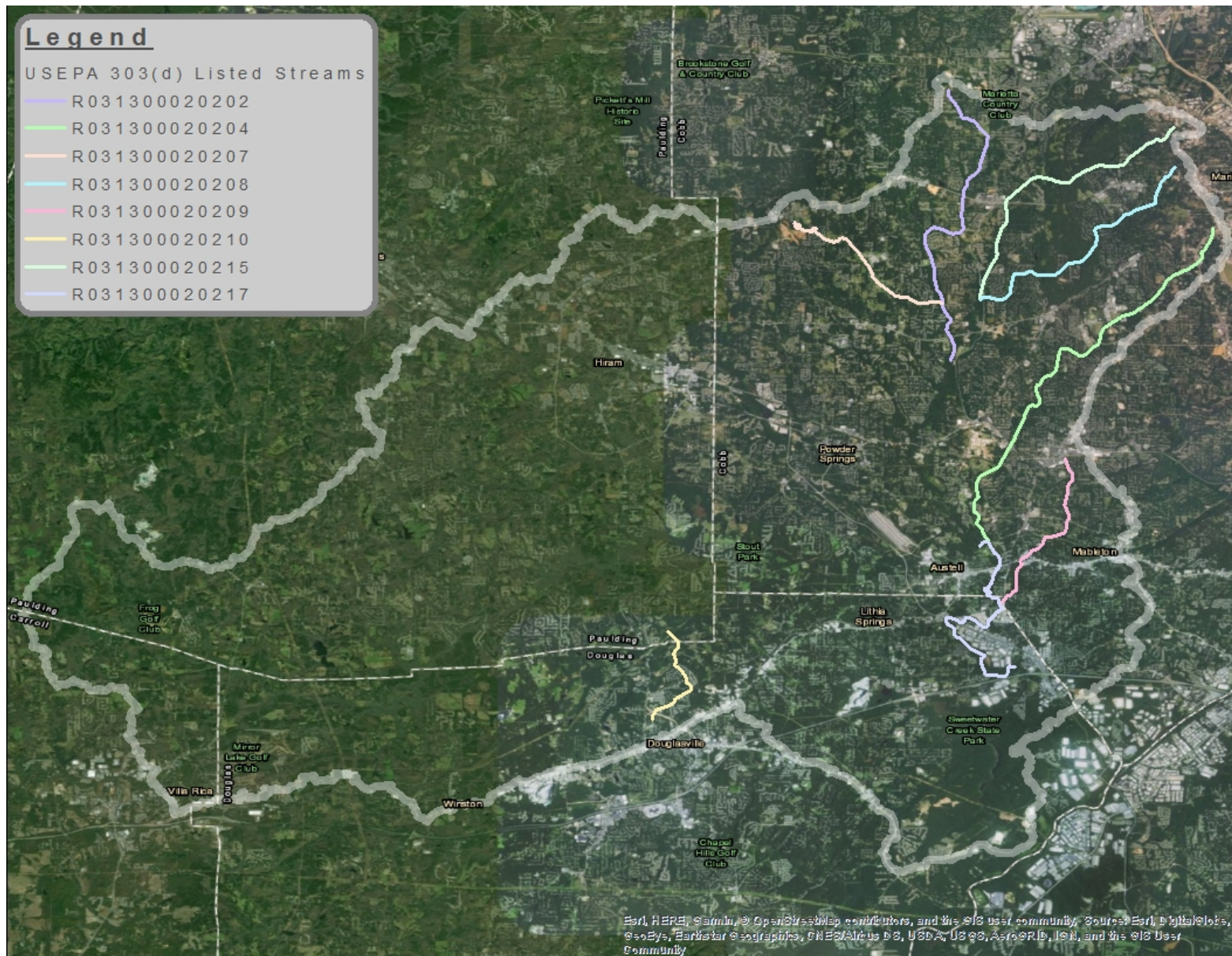


Figure 5: USEPA Listed Impaired Waters within the Study Area

Cobb County Water System maintains a stream monitoring program which evaluates chemical conditions, fish and macroinvertebrate diversity, as well as geomorphology to determine habitat quality. The county has collected this data for over 30 years. Recent data collections obtained from Cobb County Water System and personnel communications are included in Appendix E.

The USEPA requires that “State waters” are maintained and regulated by State governments for the protection and conservation of land and water resources through the use of riparian/stream buffer zones. These buffer zones have been shown to reduce nitrogen leaching into groundwaters and streams (Mayer et. al 2005). The GEPD *Field Guide for Determining the Presence of State Waters That Require a Buffer* defines “State waters” as

Any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells, and other bodies of surface or subsurface water, natural and artificial, lying within or forming a part of the boundaries of the State which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation, except as may be defined in O.C.G.A. 12-7-17(8) (O.C.G.A. 12-7-3(16)).

For warm water streams a buffer zone of 25 feet must be maintained. For trout streams a 50 foot buffer zone must be maintained. Stream buffer zones are measured from the point of “wrested vegetation” based on stream type. “Wrested vegetation” is defined as: “the point at which visible demarcation between vegetation and water flow”. No extensive surveys have been completed to identify stream characteristics within the study area.

2.4.2.2 FWOP

FWOP conditions show an increase of less than 1% increase in flooding for the 1% ACE flood event. Continued localized flooding would lead to decreased water quality, as sediments and debris runoff enter waters.

2.4.3 Groundwater

2.4.3.1 Existing

Groundwater recharge potential within the Piedmont region, in which the Sweetwater Creek Watershed lies, is low due to the geology of the region. Sporadic groundwater sources in the crystalline rocks of the Piedmont Physiographic Province inhibits the use of groundwater as a major water supply (USGS 2017). However, the GEPD Watershed Protection Branch is evaluating the potential to supplement water supply sources in this region by using groundwater (GEPD 2017). Additionally, the USGS is studying how regional water availability is affected by water withdrawals in areas where ground water resources exist.

2.4.3.2 FWOP

Groundwater supply would remain consistent with existing levels under the future without project conditions.

2.5 Biological Resources

2.5.1 Vegetation

2.5.1.1 Existing

The U.S. Forest Service (USFS) has defined ecological regions of the United States through a hierarchical assessment of domains, divisions, and provinces. Based on the USFS Ecoregion Map provided in *Figure 6: Approximate Location of Sweetwater Creek Watershed within USFS Ecoregions of the U.S.*, the study area lies within the south eastern mixed forest province of the continental United States (Bailey 1995).

Since extensive cultivation practices during the 19th century, much of the Piedmont Ecoregion has reverted to pine and hardwood woodlands. Vegetation within the Southern Mixed Forest Province ranges from medium to tall forests of broadleaf deciduous trees and evergreen pine trees (Bailey 1995). Existing habitat within the study area ranges from heavily disturbed areas to forested riparian settings. Dominant native plant species throughout the study area include tulip poplar (*Liriodendron tulipifera*), white oak (*Quercus alba*), northern red oak (*Q. rubra*), black oak (*Q. velutina*), post oak (*Q. stellata*), hickories (*Carya glabra*, *C. tomentosa*, and *C. cordiformis*), American beech (*Fagus grandifolia*), loblolly pine (*Pinus taeda*), Virginia pine (*Pinus virginiana*), sweetgum (*Liquidambar styraciflua*), black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), box elder (*Acer negundo*), and eastern red cedar (*Juniperus virginiana*). Invasive plant species include greenbriar (*Smilax spp.*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and tall goldenrod (*Solidago altissima*).

Invasive plant species throughout the area include Japanese arrowroot (*Pueraria montana var. lobata*), cogongrass (*Imperata cylindrical*), yellow iris (*Iris pseudacorus*), Japanese honeysuckle (*Lonicera japonica*), star-of-Bethlehem (*Ornithogalum umbellatum*), garlic mustard (*Alliaria petiolate*), and Chinese wisteria (*Wisteria sinensis*). Cobb County currently operates a lawn care maintenance plan through frequent property mowing which prevents the growth of invasive plant species. No formalized invasive species control plans exist within the study area.

2.5.1.1 FWOP

Existing vegetation in the study area would be subject to local municipality land use. However should no development occur vegetation would experience a less than 1% increase of flooding within the 1% ACE storm event, which could have the potential to disrupt the existing balance of the riparian habitat. Increased flooding has been shown to alter plant biomass as a result of a change in soil chemical composition and transportation of seeds throughout the riparian zone (Garsen et. al 2017). Consequently, the potential for an increased transport of invasive plant species throughout the area would exist under the FWOP.

2.5.2 Fish and Wildlife Resources

2.5.2.1 Existing

Wildlife species vary throughout the Southern Mixed Forest Province. Their presence depends on age and thickness of timber stands, percent of deciduous trees, proximity to clearings, and bottom-land forest types (Bailey 1995). The habitat in the study area is diverse as it passes through undeveloped portions of Cobb, Douglas, and Paulding Counties to sparsely rural residential areas and more developed or urbanized territories. The variety of species found within portions of the study area are dependent on the level of development. More developed areas, such as the City of Austell contain species that are tolerant of human development activities. Conversely, undeveloped portions of the study area such as unincorporated Cobb County and the Sweetwater Creek State Park, contain habitat supporting a wider variety of wildlife.

Common species found throughout the study area include white-tailed deer (*Odocoileus virginianus*), eastern wild turkey (*Meleagris gallopavo silvestris*), cottontail rabbit (*Sylvilagus spp.*), raccoon (*Procyon lotor*), nine-banded armadillo (*Dasypus novemcinctus*), bats (*Chiroptera spp.*), opossum (*Didelphis virginiana*), red fox, (*Vulpes vulpes*), fox squirrel (*Sciurus niger*), gray squirrel (*Sciurus carolinensis*), river otter (*Lontra canadensis*), mourning dove (*Zenaida macroura*), blue jay (*Cyanocitta cristata*), cardinal (*Cardinalidae spp.*), summer tanager (*Piranga rubra*), American crow (*Corvus brachyrhynchos*), mockingbird (*Mimus polyglotus*), starling (*Sturnus vulgaris*), Carolina wren (*Thryothorus ludovicianus*), ruby-throated hummingbird (*Archilochus colubris*), osprey (*Pandion haliaetus*), pine warbler (*Setophaga pinus*), eastern bluebird (*Sialia sialis*), hooded warbler (*Setophaga citrina*), northern bobwhite (*Colinus virginianus*), wood thrush (*Hylocichla mustelina*), eastern towhee (*Pipilo erythrophthalmus*), osprey (*Pandion haliaetus*), tufted titmouse (*Baeolophus bicolor*), cottonmouth moccasin (*Agkistrodon piscivorus*), copperhead (*Agkistrodon contortrix*), rough green snake (*Opheodrys aestivus*), coachwhip (*Masticophis flagellum*), speckled kingsnake (*Lampropeltis getula holbrooki*), eastern fence lizard (*Sceloporus undulatus*), glass lizard (*Ophisaurus spp.*), northern slimy salamander (*Plethodon glutinosus*), and gopher frog (*Rana capito*).

Invasive wildlife species throughout the area include starling (*Sturnus vulgaris*), Africanized honeybee (*Apis mellifera scutellata*), wild boar (*Sus scrofa*), and brown tree snake (*Boiga irregularis*). No formalized invasive species control plans exist within the study area.

2.5.2.2 FWOP

No changes to fish and wildlife resources are anticipated under the future without project conditions.

2.5.3 Waters of the U.S. including Wetlands

2.5.3.1 Existing

Section 404 of the CWA requires that impacts to wetlands should be 1) avoided, 2) minimized, or 3) compensated; in that order of priority. The CWA prohibits the discharge of dredged or fill material into U.S. waters, including wetlands, if any practicable

alternative exists. Section 404 of the CWA defines a wetland as meeting all three criteria: soil, vegetation, and hydrology. Wetlands generally include swamps, marshes, bogs, and similar areas.

The U.S. Fish and Wildlife Service (USFWS) adopted the USFS hierarchical description of ecoregions for the contiguous United States to regionalize specific inland wetland types based on wetland ecology and likelihood of geological location (Cowardin 1992). The topography of the USEPA defined 'Piedmont Ecoregion' and the USFS defined 'Southern Mixed Forest Province' allows for the preponderance of streams and wetland development. Streams within these regions are numerous with slower velocity which aids in the creation of marshes and swamps (Bailey 1995).

No extensive surveys have been conducted as part of this FRM study to delineate the locations of jurisdictional wetlands within the boundaries of the study area. A review of the USFWS National Wetland Inventory Wetlands Mapper indicates that the presence of various biological wetlands exist within the study area. *Figure 7: Sweetwater Creek Watershed Wetland Types* shows the potential presence for wetlands within the study area, generally occurs surrounding the tributaries.

Predominance of the study area by wetland types include freshwater forested and shrub wetland and freshwater emergent wetland along the riparian zones of the tributaries. Forested and shrub wetland is described as woody wetlands such as forested swamps or shrub bogs. Freshwater emergent wetlands include herbaceous marches, fens, swales, or wet meadows.

2.5.3.2 FWOP

The greatest national threat to riparian zone wetlands results from infrastructure development; however Cobb County's floodplain management limits the likelihood of development within these areas. As such, potential wetlands throughout the study area would remain functional in the near future without project conditions; however, the study area would experience a less than 1% increase in flooding events over the 1% ACE storm event. Over a long term period, an increase in flooding frequency could have the potential to alter the three components of wetland habitat: soil, hydrology, and vegetation. As stated in Section 2.5.1 Vegetation, an increase in flooding events has the potential to alter chemical composition of soils. In addition, increased flooding frequency would stress existing wetland habitats by disrupting hydrologic intervals necessary to maintain a functional wetland (Erwin 2008). A change to hydric soils combined with the altered hydrology could alter the stable plant ecology suited to wetland habitats. Therefore, under long term FWOP conditions a decrease in wetland habitat could occur within the study area.

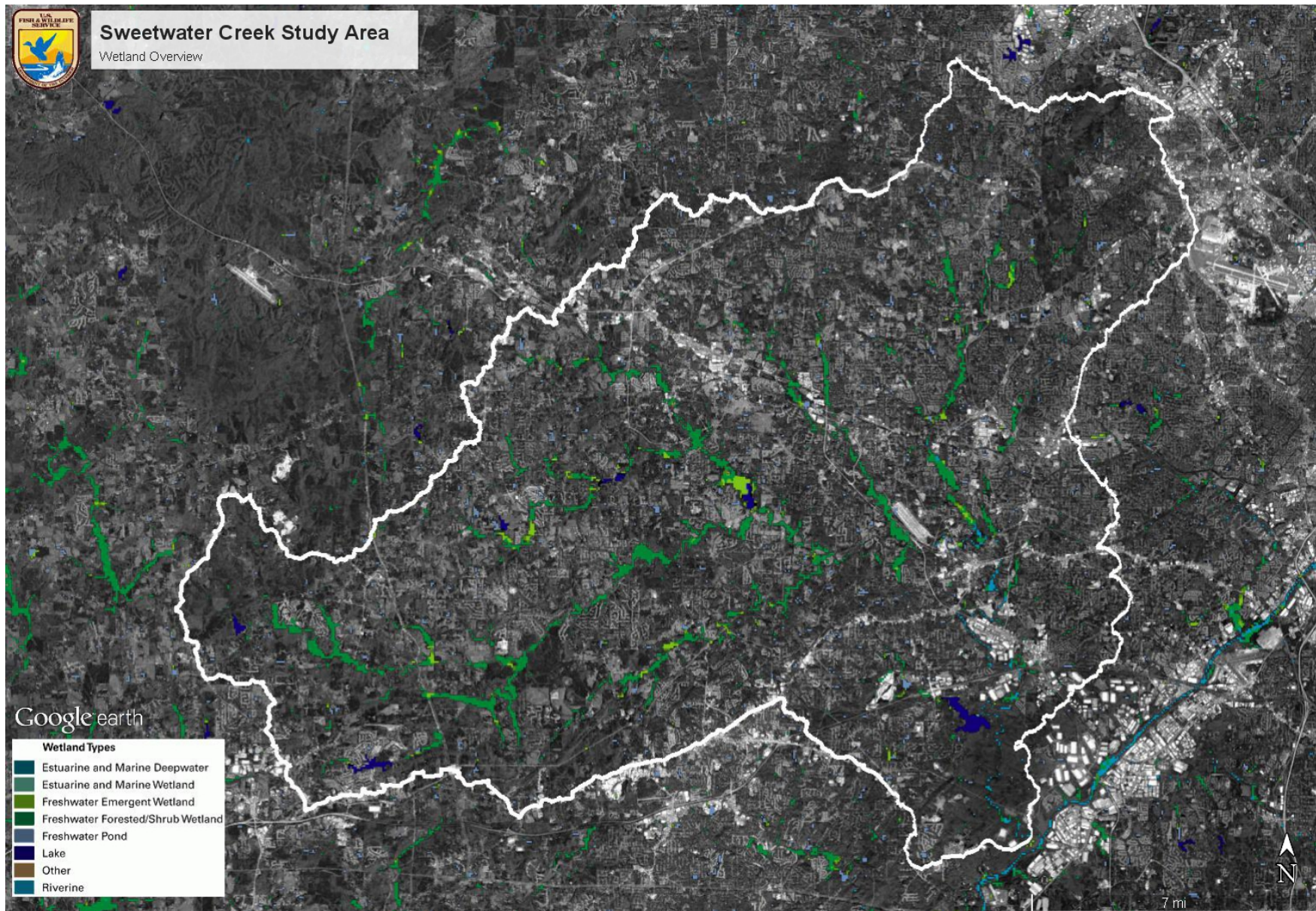


Figure 7: Sweetwater Creek Watershed Wetland Types

2.5.4 Special Status Species

2.5.4.1 Existing

2.5.4.1.1 Endangered Species Act

The Endangered Species Act (ESA) “provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend.” The ESA makes it illegal to “take” a federally-listed species, such as threatened and/or endangered species [T&E], without a permit. “Take” is defined by the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct.” The USFWS has statutory authority for the assessment of federally-listed or petitioned species. According to the USFWS ESA Overview, “A species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range or threatened if it is likely to become an endangered species within the foreseeable future.”

Within Cobb, Paulding and Douglas Counties there are eight federally-listed threatened and endangered species, three of which have a high likelihood to occur in the study area. The most likely listed species are the Northern Long-eared Bat (*Myotis septentrionalis*) and two plant species, Michaux’s Sumac (*Rhus michauxii*) and Little Amphianthus (*Amphinathus pusillus*). All study efforts assessing FRM will consider the possible presence and protection of these species and their habitat.

A list of federally-listed species within the study area is included as Table 3.

Additionally, the ESA designates critical habitat believed to be essential for federally-listed species conservation. No designated critical habitat for these species exist within the study area.

Table 3: Federally Listed Species – Cobb, Douglas, Paulding Counties

Common Name	Scientific Name	Status	County		
			Cobb	Paulding	Douglas
Indiana Bat	<i>Myotis sodalist</i>	E			X
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	T	X	X	X
Cherokee Darter	<i>Etheostoma scotti</i>	T	X		X
Etowah Darter	<i>Etheostoma etowahae</i>	E			X
Finelined Pocketbook	<i>Lampsilis altilis</i>	T			X
Little Amphianthus	<i>Amphinathus pusillus</i>	T	X	X	
Michaux’s Sumac	<i>Rhus michauxii</i>	E	X		
White Fringeless Orchid	<i>Platanthera integrilabia</i>	T	X		

Key 1: T=Threatened; E=Endangered; X=listed

2.5.4.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) makes it illegal to “take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter” a species identified in 50 CF 10.13. The USFWS has statutory authority and responsibility for enforcing the MBTA under 16 U.S.C. 703-712. Migratory species protected by the MBTA are internationally protected through conventions between the U.S. and Canada, Mexico, Japan, and Russia. Any species protected through one or more of the four

international conventions is qualified for protection under the MBTA. The final rule for the revised list of migratory birds is included in Appendix E.

Sweetwater Creek River Basin is situated in the Atlantic Flyway Zone. No stopover sites are known to occur within the study area; however migratory birds, such as the American oystercatcher (*Haematopus palliatus*), black-throated blue warbler (*Setophaga caerulescens*), grouse (*Centrocercus spp*), least tern (*Sternula antillarum*), mottled duck (*Anas fulvigula*), swallow-tailed kite (*Elanoides forficatus*), and the tricolored blackbird (*Agelaius tricolor*), occasionally utilize the study area as a resource.

2.5.4.1.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) prohibits the “taking” of bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*) as defined in 16 U.S.C. 668-668c. “Take” is defined by the BGEPA as to “pursue, shoot, shoot at, poison, wound, kill capture, trap, collect, molest or disturb.” “Disturb” is further defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.” The BGEPA extends to activities occurring near nests when eagles are not present.

According to the National Bald Eagle Management Guidelines dated May 2007, included in Appendix E, bald eagles primarily nest near aquatic habitat in mature or dead trees. Man-made structures such as powerpoles and communication towers also serve as nesting sites for some bald eagles. Bald eagle nests are distinctly large at four to six feet in diameter and three feet deep weighing more than 1,000 pounds. Nests are generally constructed with large sticks and lined with soft and pliable greenery such as moss, grass, or lichens. No surveys have been conducted as part of this FRM study to identify eagles and/or their nests within the study area.

2.5.4.2 FWOP

The USFWS continually assesses federally-protected species under the ESA and MBTA. Species may be listed, down-listed, or de-listed from the T & E species list and/or added or removed from the migratory bird list. Wildlife habitat under future without project conditions would remain the similar to existing conditions.

2.5.5 Wildlife Corridors

2.5.5.1 Existing

Wildlife corridors act as links between fragmented habitats to provide important routes of migration for a variety of wildlife, including terrestrial, aquatic and airborne animals. The Sweetwater Creek River Basin is comprised of forested and riparian zones with few isolated habitats. Areas within the more developed portions of the study area show pockets of degraded habitat.

2.5.5.2 FWOP

Wildlife corridors within the study area under the future without project condition would be subject to local municipality land use; however no changes in corridor connectivity would occur as a result of the less than 1% increase in flooding frequency for the 1% ACE storm in FWOP conditions.

2.6 Cultural Resources

As per the requirements outlined in Section 106 of the National Historic Preservation Act (NHPA), the lead Federal agency must consider the effects of the proposed action on historic properties. The USACE, Mobile District is also required to assess both direct and indirect effects of the action on historic and cultural resources under the National Environmental Policy Act (NEPA) as defined in 40 CFR 1508.8.

In order to take into consideration potential impacts to historic properties (i.e., archaeological sites, buildings, structures, objects, or districts) listed on or eligible for the National Register of Historic Places (NRHP) Mobile District Archaeologists conducted archaeological background research of the study alternatives and recommended plan. Background research sources included Georgia's Natural, Archaeological, and Historic Resources GIS (GNAHRGIS) and previous cultural resources reports on file at the USACE, Mobile District office.

2.6.1 Existing

2.6.1.1 Cultural Resource Setting

2.6.1.1.1 Prehistoric Period

Several archaeological sites and historic properties are present within Cobb, Douglas, and Paulding Counties that are important to local, regional, and national history. There are numerous sites and properties recorded within these three counties including prehistoric and historic archaeological sites. While the prehistoric occupation in Georgia began in the Paleoindian Period, the earliest archaeology sites identified within the Sweetwater Creek watershed study area date to the Early Archaic period showing that this area has been occupied since at least 6000 B.C. The majority of prehistoric archaeological sites are identified as lithic scatters and other limited occupation sites, with the exceptions of archaeological site 9PA64, a possible mound and historic burial site, and 9DO66, a multi-component village site. Sweetwater Town (9DO66) is a multi-component village site, with documented occupations in the Early Archaic to Late Woodland periods. The village was also occupied by the Cherokee during the historic period.

2.6.1.1.2 Historic Period

The state of Georgia, particularly the area surrounding the City of Atlanta was one of the main stages for some of the most important battles of the Civil War. The Atlanta Campaign is considered a huge turning point in the Civil War. Due to the study area's proximity to known major Civil War sites, the area has great potential for Civil War resources. . Of particular interest is the Sweetwater Manufacturing Company, a mill located along Sweetwater Creek within the study area. This mill was raided and burned by Union soldiers during the war in an attempt to hinder the operation of Confederate

soldiers. After it's burning the mill was never rebuilt.. Currently it stands as a partial five story building with remnants of foundations of over a dozen buildings.x. It is one of the main attractions of Sweetwater Creek State Park.

2.6.1.1.3 Historic Structures

In the course of the cultural resources background review, it was found that the state of Georgia and two of the counties within the study area commissioned three separate historic resources surveys including: the GA Historic Resources Survey commissioned in 1997, the Historic Resource Survey of unincorporated Cobb County commissioned in 2005, and the "FindIt" Paulding County Survey commissioned in 2006. These surveys produced results that showcase the agricultural nature of the study area with the majority of structures consisting of domestic residential structures showing elements of agriculture including but not limited to field systems, livestock, and chicken coops. The style of structures vary from craftsman, to colonial revival, to Victorian. The oldest structure in the study area was constructed in 1834 and the newest structure on this inventory list was constructed in 1959. Paulding County showcases more diversity with a number of business offices, cemeteries, stores, and historic districts. Paulding County also contains a masonic lodge dating back to 1890. Douglas County had the least amount of structures with 2 structures included in the inventory; a residence built around 1844 and a doctor's office built around 1879. None of these structures are within the buyout parcels.

One of the most predominate existing historic structures in the area is the Sweetwater Manufacturing Mill or New Manchester Mill (9DO10) located in Douglas County. The remnants of the 19th century mill can be seen and visited along Sweetwater Creek at the Sweetwater State Park. The mill is significant in showcasing the past industrial complex in the Atlanta area around the 1850s. In addition to 9DO10 multiple 19th to 20th century structures, sites, and farmsteads have been identified within the study area. Including archaeological site 9PA56, a late 19th to mid-20th century farmstead which has been previously identified as eligible for listing on the NRHP. Being that the study area has rural and undeveloped areas with limited cultural resources survey coverage there is a high potential for the presence of additional un-recorded archaeological sites.

There are a number of properties listed on the NRHP within Douglas, Cobb, and Paulding Counties (Table 4). These include: the Clarkdale Historic District, the Israel Causey House, the Butner-McTyre General Store and the New Manchester Mill (9DO10). The Clarkdale Historic District characterizes the industrial complex that was prevalent in the era in the late 19th and early 20th centuries. The historic district consists of a textile factory and mill and the associated village that includes residential and community buildings such as a ball field, tennis court, and swimming pool. Another regionally and nationally important structure listed on the NRHP is the Israel Causey House. This structure is one of the few remaining structures of the plain style in Georgia. It was constructed during the Gold Rush and was inhabited by Cobb County's pioneer settlers. The house is surrounded by Sweetwater Town (9DO66) and is associated with Cherokee removal in the 1830s. One other NRHP structure within the

study area is the Butner-McTyre General Store. This general store is one of the last standing structures of its type from its time period (late 19th century) in the state of Georgia. None of these listed historic properties are located within the recommended plan.

Table 4: NRHP listed properties within the study area.

Resource Name/Site Trinomial	County	NRHP Status	Type of Site
Israel Causey House	Cobb	Listed	Dwelling
Butner-McTyre General Store	Cobb	Listed	Store
Clarkdale Historic District	Cobb	Listed	Historic District
Sweetwater Manufacturing Company/9DO10	Douglas	Listed	Mill

2.6.1.2 Results of Background Research

The primary source for background research conducted for this project was GNAHRGIS as well as cultural resources assessment reports on file at the USACE, Mobile District office. During the background research the Mobile District archaeologists documented numerous previously identified resources in within a mile radius of all proposed work areas within the project alternatives. These previously recorded archaeological sites are summarized in Table 5 and site locations are provided in Figure 8. While several of these archeological sites are located within the work areas associated with the alternatives examined in the study, none are located within the recommended plan. A total of seven previously recorded archaeological sites are located within a mile of the parcels included in the recommended plan. These archaeological sites are summarized in Table 6 and site locations are provided in Figure 9.

Table 5: Previously Recorded Archaeological Sites within in a Mile Radius of All Alternatives.

Site Number	Component(s)	Eligibility
9DO66	Mid archaic, early woodland, protohistoric multicomponent village	Eligible
9PA56	Late 19th to mid-20th century rural farmstead	Eligible
9CO132	Late archaic lithic scatter	Ineligible
9CO141	Archaic lithic scatter	Ineligible
9CO740	Prehistoric lithic scatter	Ineligible
9CO503	Undetermined prehistoric	Ineligible
9DO175	Undetermined prehistoric lithic scatter, 19th-20th century	Ineligible
9DO176	Middle archaic lithic scatter	Ineligible
9PA128	Prehistoric lithic scatter	Ineligible
9PA129	Mid-20th century	Ineligible
9PA130	Prehistoric lithic scatter	Ineligible
9PA136	Prehistoric lithic and historic artifact scatter	Ineligible
9PA137	Undetermined prehistoric lithic scatter late- 19th early 20th century artifact scatter	Ineligible
9PA292	Woodland lithic scatter	Ineligible
9PA293	Undetermined prehistoric lithic scatter	Ineligible

9PA506	Lithic scatter/pottery scatter	Ineligible
9PA506	Prehistoric lithic scatter	Ineligible
9PA507	Lithic scatter, isolated historic artifact	Ineligible
9PA53	Prehistoric lithic scatter	Ineligible
9PA57	Undetermined prehistoric	Ineligible
9PA61	Early to mid-20th century wood frame house	Ineligible
9PA62	Early to mid-20th century brick house	Ineligible
9CO716	Middle archaic lithic scatter	Ineligible
9CO295	Prehistoric lithic scatter	Undetermined
9CO304		Undetermined
9CO305	Lithic scatter	Undetermined
9CO409	Campsite, early archaic, late archaic and woodland	Undetermined
9CO410	Historic dump, 19th and 20th century	Undetermined
9CO423	Early archaic and 20th century lithic scatter	Undetermined
9CO430	Archaic lithic scatter	Undetermined
9CO449	Late archaic lithic scatter	Undetermined
9CO451	Archaic-woodland campsite	Undetermined
9CO474	Archaic Mississippian lithic scatter	Undetermined
9CO480	Archaic lithic scatter	Undetermined
9CO526	Archaic lithic scatter	Undetermined
9DO69	Lithic and ceramic scatter, late woodland/Mississippian	Undetermined
9PA28	Prehistoric lithic scatter	Undetermined
9PA29	Prehistoric lithic scatter	Undetermined
9PA30	Prehistoric lithic scatter	Undetermined
9PA51	Prehistoric upland with lithic and ceramics	Undetermined
9PA54	Abandoned historic cemetery	Undetermined
9PA55	Historic farmstead	Undetermined
9PA58	Limited occupation site, woodland/Mississippian	Undetermined
9PA59	Undetermined prehistoric	Undetermined
9PA63	Early 20th century steel bridge	Undetermined
9PA64	Possible mound with potential historic graves	Undetermined

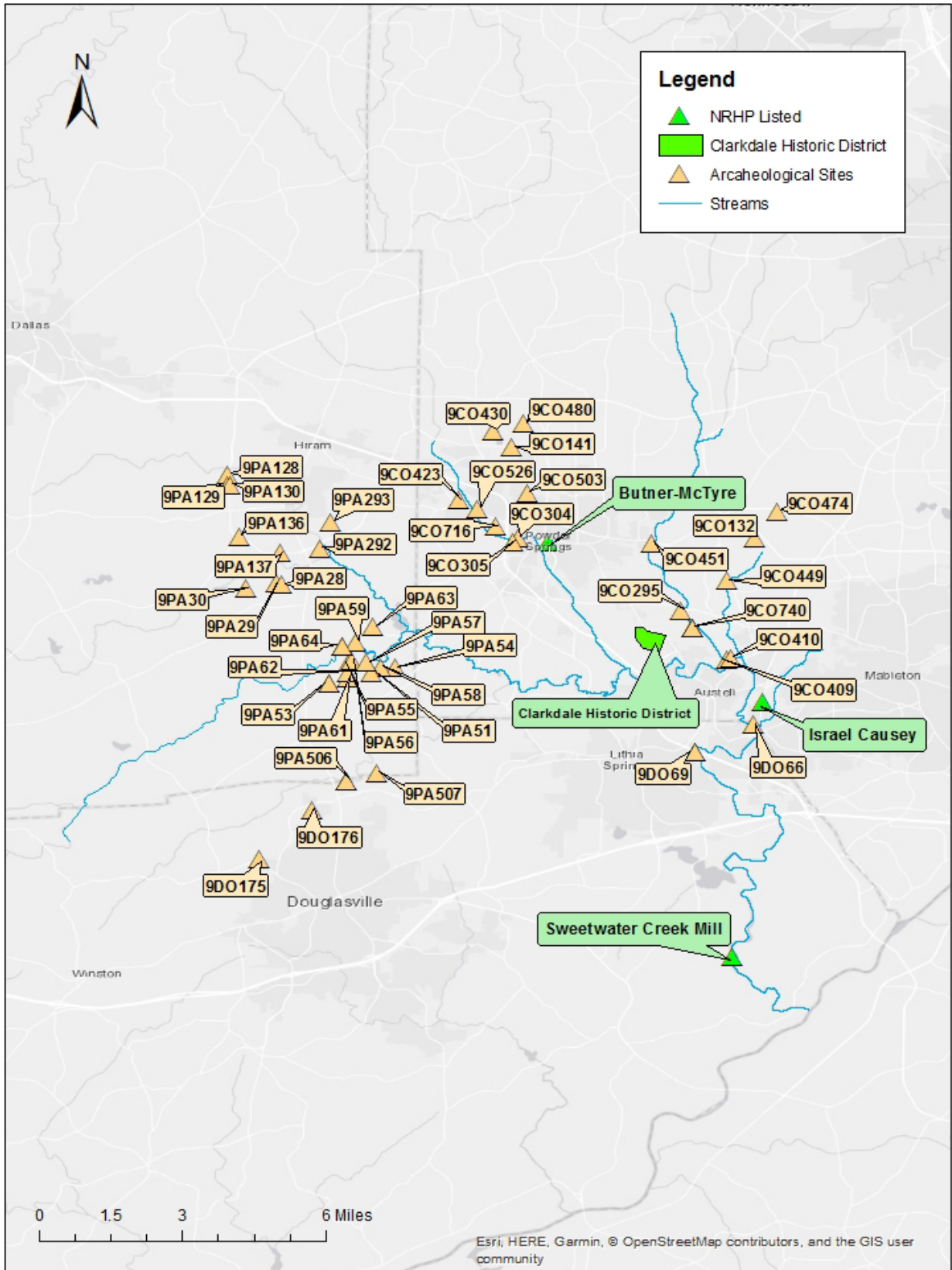


Figure 8: Location Map of Previously Recorded Archaeological Sites and NRHP Listed Properties within in a mile radius of all project alternative work sites.

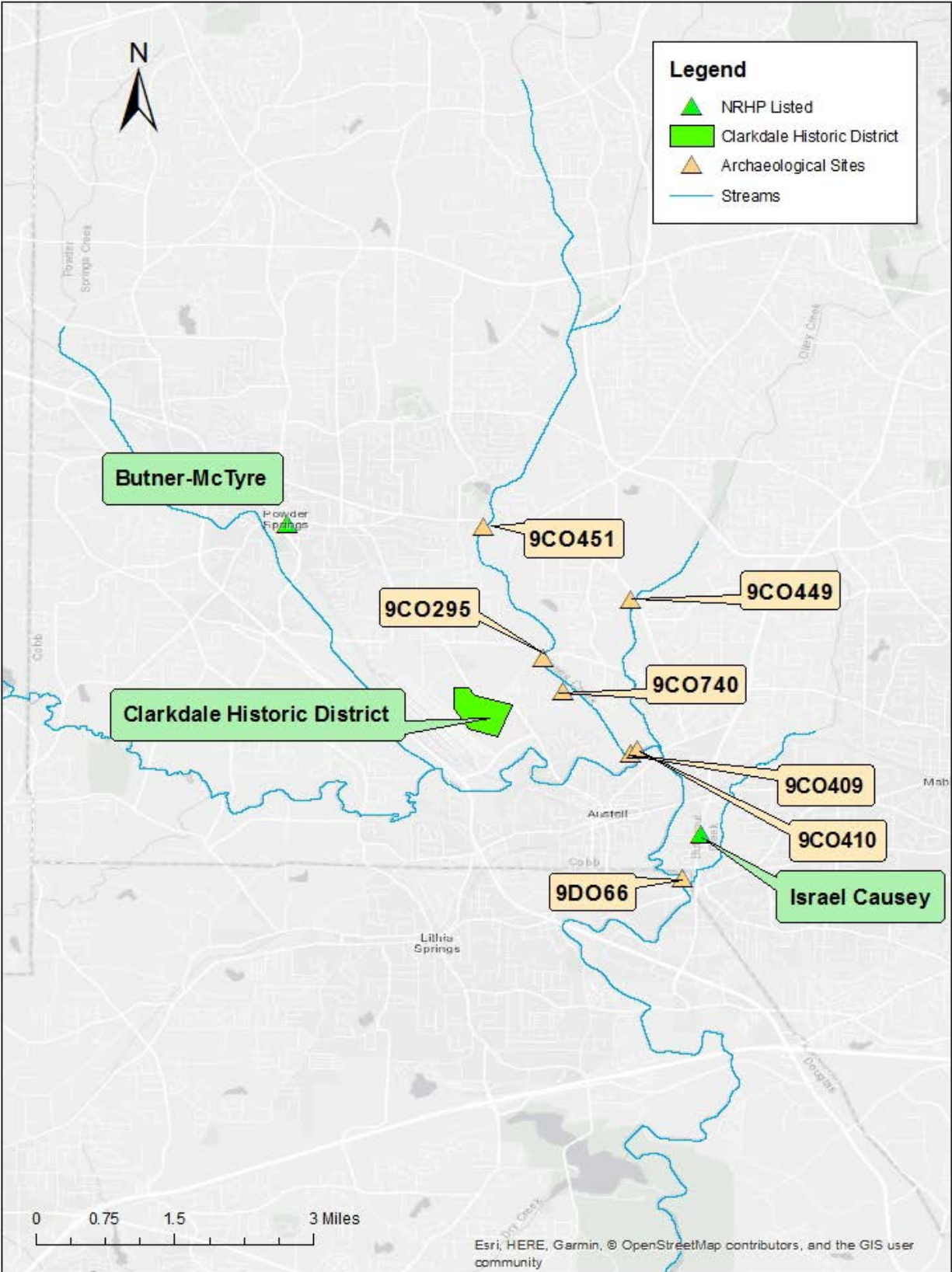


Figure 9: Location Map of Previously Recorded Archaeological Sites within in a mile radius of all proposed buyout locations.

Table 6: Previously Recorded Archaeological Sites within in a Mile Radius of the Proposed Parcel Locations for the Recommended Plan.

Site Number	Component(s)	NRHP Eligibility
9DO66	Possible village and mound site	Eligible
9CO740	Prehistoric lithic scatter	Ineligible
9CO295	Prehistoric lithic scatter	Undetermined
9CO409	Campsite, early archaic, late archaic and woodland	Undetermined
9CO410	Historic dump, 19th and 20th century	Undetermined
9CO449	Late archaic lithic scatter	Undetermined
9CO451	Archaic-woodland campsite	Undetermined

2.6.2 FWOP

Previously unidentified cultural resources within the study area under the future without project condition would be subject to continued flooding; which has the potential to impact the NRHP eligibility of resources.

2.7 Sociological Resources

2.7.1 Flooding and Flood Damages

2.7.1.1 Existing

2.7.1.1.1 Existing Flooding

Updated floodplains delineation, to include the floods of late 2009 to present, are part of the existing and future without project condition. Conditions in relation to flood risks are anticipated to slightly deteriorate with less than a 1% increase in peak runoff. Sedimentation from the 2009 flood reduced the channel capacity of Sweetwater Creek and future sediment accretion is possible from another large storm. Furthermore, development in the area with land use changes will continue, affecting the movement of sediment into and down the stream. Local stormwater management regulations will prevent the quantity of overland flow from changing. However, hydrologic timing resulting of the local runoff from developed sites may result in higher peak flow elevations, increasing the height and extent of the floodplain.

2.7.1.1.2 Existing Flood Damages

The existing structure inventory within the floodplain contains 2,230 structures on 1,902 parcels. Residential structures account for 1,959 of structures, with the remaining 271 being nonresidential. 62 structures are located within the Buttermilk reach; 69 structures within the Mill Creek reach; 632 structures within the Noses Creek reach; 133 structures within the Olley Creek reach; 220 structures within the Powder Springs Creek reach; and 1,114 structures within the Sweetwater Creek reaches.

Table 7 and Table 8 summarize the number of structures in each reach along with their depreciated replacement cost and vehicle depreciated replacement cost in FY 2017 dollars. For more detail on how this was developed see Appendix A.

Table 7: Total Depreciated Replacement Value of Study Area

Reach	Structures			Total Structure Value	Total Content Value	Total Vehicle Value	Total Value
	Residential	Non-Residential	Total				
Buttermilk Creek	46	16	62	\$9,010	\$5,588	\$475	\$15,073
Mill Creek	62	7	69	\$6,242	\$6,030	\$641	\$12,913
Noses Creek	589	43	632	67171	\$64,093	\$6,077	\$137,341
Olley Creek	116	17	133	\$35,570	\$15,798	\$1,199	\$52,567
Powder Springs Creek	189	31	220	\$50,829	\$32,430	\$1,912	\$85,171
Upper Sweetwater Creek	63	2	65	\$6,493	\$6,439	\$651	\$13,583
Middle Sweetwater Creek	725	86	811	\$79,103	\$58,847	\$5,054	\$143,004
Lower Sweetwater Creek	169	69	238	\$181,229	\$79,509	\$1,220	\$261,958
Total	1,959	271	2,230	\$435,647	\$268,734	\$17,229	\$721,610

Table 8: Existing Condition Mean Expected Annual Damages (x 1,000, 2017 Prices)

Reach	Structure Type	Expected Damages
Buttermilk Creek	Residential	\$6
	Nonresidential	\$1
	Total	\$7
Mill Creek	Residential	\$68
	Nonresidential	\$0
	Total	\$68
Noses Creek	Residential	\$499
	Nonresidential	\$0
	Total	\$499
Olley Creek	Residential	\$41
	Nonresidential	\$11
	Total	\$52
Powder Springs Creek	Residential	\$20
	Nonresidential	\$1
	Total	\$21
Upper Sweetwater Creek	Residential	\$23
	Nonresidential	\$6
	Total	\$29
Middle Sweetwater Creek	Residential	\$327
	Nonresidential	\$96
	Total	\$422
Lower Sweetwater Creek	Residential	\$161
	Nonresidential	\$96
	Total	\$257
Total	Residential	\$1,144
	Nonresidential	\$211
	Total	\$1,355

2.7.1.2 FWOP

2.7.1.2.1 FWOP Flooding

In 2016, USACE issued Engineering and Construction Bulletin No. 2016-25 (hereafter, ECB 2016-25), which stipulated that climate change be considered for all federally funded projects in planning stages. A qualitative analysis of historical climate trends, as well as assessment of future projections was provisioned by ECB 2016-25. Even if climate change does not appear to be an impact for a particular region of interest, the formal analysis outlined in ECB 2016-25 results in better informed planning and engineering decisions.

The qualitative climate change assessment showed an increase in flooding frequency at a rate of less than 1% change in flows for the 1% ACE event (Appendix B), however a

literature review on climate change in the southeast indicates the potential for more extreme storms in the future. The future 2% ACE Floodplain is shown in Figure 10.



Figure 10: 2% Annual Chance of Exceedance Floodplain Extents

2.7.1.2.2 FWOP Flood Damages

Changes in the structure inventory as stated in Section 2.3.2 contribute to increased flood damages. Table 9 shows how the average annual damages change between the existing and FWOP.

Table 9: Existing vs. Future Mean Expected Annual Damages (x 1,000, 2017 Prices)

Reach	Structure Type	Existing Damages	FWOP Damages	Change in Damages
Buttermilk Creek	Residential	\$6	\$6	\$0
	Nonresidential	\$1	\$1	\$0
	Total	\$7	\$7	\$0
Mill Creek	Residential	\$68	\$76	\$8
	Nonresidential	\$0	\$0	\$0
	Total	\$68	\$76	\$8
Noses Creek	Residential	\$499	\$515	\$16
	Nonresidential	\$0	\$0	\$0
	Total	\$499	\$515	\$16
Olley Creek	Residential	\$41	\$41	\$0
	Nonresidential	\$11	\$11	\$0
	Total	\$52	\$53	\$1
Powder Springs Creek	Residential	\$20	\$21	\$1
	Nonresidential	\$1	\$1	\$0
	Total	\$21	\$22	\$1
Upper Sweetwater Creek	Residential	\$23	\$339	\$316
	Nonresidential	\$6	\$7	\$1
	Total	\$29	\$32	\$3
Middle Sweetwater Creek	Residential	\$327	\$308	-\$19
	Nonresidential	\$96	\$26	-\$70
	Total	\$422	\$335	-\$87
Lower Sweetwater Creek	Residential	\$161	\$170	\$9
	Nonresidential	\$96	\$99	\$3
	Total	\$257	\$270	\$13
Total	Residential	\$1,144	\$1,194	\$50
	Nonresidential	\$211	\$220	\$9
	Total	\$1,355	\$1,413	\$58

2.7.2 Hazardous Toxic Radiological Waste

2.7.2.1 Existing

An Environmental Site Assessment (ESA) was conducted for the Sweetwater Creek FRM Feasibility Study for the presence of Hazardous, Toxic, and/or Radiological Waste (HTRW) sites within the study area. The intent of the ESA was to evaluate areas for the

presence of environmental contamination as described in *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

Available environmental records and databases were reviewed to identify known areas of hazardous material/waste storage or disposal within the entire watershed area. An environmental database search identified 177 properties, with complete address information, within 1000 feet of the stream centerlines for each area. Sites with incomplete addresses, coordinates or other database information were not plotted. A site inspection was completed to visually inspect each of the alternative study areas for evidence of recognized environmental conditions (RECs). Properties were photographed to document conditions at the time of the inspection and interviews were completed to document conditions in the area known by local residences, officials, and workers.

Observations of RECs are available in the USACE “Phase I Environmental Site Assessment for Sweetwater Creek Feasibility Study, Douglas, Paulding, and Cobb Counties, Georgia” report. An abbreviated version of this report can be found in Appendix E. The full version will be made available upon request.

2.7.2.2 FWOP

No additional HTRW sites are anticipated to be introduced as a result of continued localized flooding.

2.7.3 Noise

2.7.3.1 Existing

Ambient noise of the study area is consistent with rural and suburban zones. The study area is located 12 miles west of the City of Atlanta where heavy traffic, construction, and community events contribute to higher levels of steady noise. Increased noise levels occur within the more developed portions of the study area, i.e. near the City of Austell.

2.7.3.2 FWOP

As local populations increase, noise levels would increase incrementally. Rural sections within the study area would not experience the level of ambient noise that the more urbanized portions of the study area undergo.

2.7.4 Aesthetic

2.7.4.1 Existing

Environmental aesthetics is a philosophical approach to assign appreciation of natural environments. The general aesthetics of the study area comprise of intermittent forested and riparian habitat interspersed with residential, commercial, and communal structures.

2.7.4.2 FWOP

Local aesthetics of the study area for future without project conditions would remain the same.

2.7.5 Navigation

2.7.5.1 Existing

There is no commercial navigation within the study area. The nearest navigable waterway is considered the Chattahoochee River below Walter F. George Lock and Dam. The USACE, does not maintain a navigation channel in the Chattahoochee River below Lake Sidney Lanier.

2.7.5.2 FWOP

Future without project conditions would resemble existing conditions. No dredging activities within the Chattahoochee River would occur in the near future.

2.7.6 Socioeconomics

2.7.6.1 Existing

Based on the 2016 American Survey by the U.S. Census, a breakdown of the socioeconomics within the study area is included in Table 10: Study Area Demographics, Table 11: Study Area Housing, Table 12: Study Area Income, Table 13: Study Area Occupation, and Table 14: Study Area Industry.

Table 10: Study Area Demographics

Subject	Cobb County	Douglas County	Paulding County	Georgia	United States
Total population	748,150	142,224	155,825	10,310,371	323,127,515
Male	48.30%	48.40%	48.60%	48.70%	49.20%
Female	51.70%	51.60%	51.40%	51.30%	50.80%
Median age (years)	36.5	36	36.4	36.5	37.90
White	58.70%	47.30%	74.30%	58.70%	72.60%
Black or African American	27.00%	47.40%	22.10%	31.60%	12.70%
American Indian and Alaska Native	0.40%	N	N	0.40%	0.80%
Asian	5.30%	1.60%	N	3.90%	5.40%
Native Hawaiian and Other Pacific Islander	N	N	N	0.10%	0.20%
Hispanic or Latino (of any race)	12.90%	9.40%	6.10%	9.30%	17.80%
Some other race	4.90%	N	N	2.90%	5.10%
Two or more races	3.50%	1.70%	N	2.50%	3.20%

Table 11: Study Area Housing

Subject	Cobb County	Douglass County	Paulding County	Georgia	United States
Total housing units	297,399	52,194	54,840	4,219,103	135,702,775
Total households	277,949	48,901	53,249	3,686,135	118,860,065
Average household size	2.66	2.88	2.91	2.73	2.65

Table 12: Study Area Income

Subject	Cobb County	Douglass County	Paulding County	Georgia	United States
Median household income (dollars)	70,947	62,445	60,856	53,559	\$57,617
Median family income (dollars)	87,542	75,046	68,825	65,018	\$71,062
Per capita income (dollars)	35,722	28,004	25,730	28,183	\$31,128
Population below the poverty line	9.60%	12.50%	8.70%	16.00%	14.00%

Table 13: Study Area Occupation

Subject	Cobb County	Douglass County	Paulding County	Georgia	United States
Civilian employed population 16 years and over	392,106	70,398	74,892	8,085,411	152,571,041
Management, business, science, and arts occupations	45.00%	35.40%	33.10%	36.40%	37.60%
Sales and office occupations	23.90%	24.40%	26.70%	24.10%	23.30%
Service occupations	15.90%	16.10%	18.20%	16.70%	18.10%
Production, transportation, and material moving occupations	8.20%	14.80%	11.30%	13.30%	12.20%
Natural resources, construction, and maintenance occupations	7.10%	9.30%	10.70%	9.40%	8.80%
Unemployment Rate	4.50%	7.50%	3.00%	6.00%	5.80%

Table 14: Study Area Industry

Subject	Cobb County	Douglass County	Paulding County	Georgia	United States
Educational services, and health care and social assistance	17.60%	19.00%	17.10%	20.20%	23.00%
Retail trade	11.60%	12.10%	13.90%	11.90%	11.50%
Professional, scientific, and management, and administrative and waste management services	16.70%	9.60%	11.40%	12.10%	11.40%
Manufacturing	6.80%	8.50%	9.40%	10.60%	10.10%
Arts, entertainment, and recreation, and accommodation and food services	10.60%	9.80%	8.50%	9.80%	9.80%
Finance and insurance, and real estate and rental and leasing	9.40%	5.50%	8.00%	6.20%	6.60%
Construction	6.80%	8.00%	11.40%	6.70%	6.40%
Transportation and warehousing, and utilities	5.40%	9.90%	6.20%	6.20%	5.20%
Other services, except public administration	5.30%	5.70%	5.80%	4.90%	4.90%
Public administration	3.20%	5.20%	4.70%	5.00%	4.60%
Wholesale trade	3.30%	4.10%	2.30%	3.00%	2.70%
Information	3.10%	2.60%	1.20%	2.30%	2.10%
Agriculture, forestry, fishing and hunting, and mining	0.20%	0.00%	0.10%	1.10%	1.70%

2.7.6.2 FWOP

There was no anticipated change to the socioeconomics between the existing and FWOP condition.

2.7.7 Public Safety

2.7.7.1 Existing

Public safety with regards to flood risk within the study area experiences increased demand during localized flooding events. Emergency vehicles can expect delays reaching 30 minutes due to the need to avoid impacted roads during flooding events.

2.7.7.2 FWOP

Public safety with regards to flood risk under future without project conditions would continue to decline as the frequency of localized flooding increases.

2.7.8 Recreation

2.7.8.1 Existing

Local recreational parks throughout the study area include sports fields and municipal playgrounds. At the southern end of the study area lies Sweetwater Creek State park which encompasses 2,549 acres of land and 215 acres of the George Sparks Reservoir lake surface. According to the Georgia Department of Natural Resources State Parks and Historic Sites, Sweetwater Creek State Park is the most visited recreational park in the State of Georgia and received approximately 770,000 visitors in 2017 (personal communication, February 2, 2018). The State Park is open yearlong and accommodations within the State Park include yurts, tent campsites, picnic shelters, playgrounds, fishing docks, boat ramp, a seasonal bait shop, an event room and visitor center. A sample of outdoor activities include birding, fishing, hiking, picnicking, geocaching, family reunions, kayaking, canoeing, paddle-boarding, and weddings.

2.7.8.2 FWOP

Future without project conditions would result in more frequent flooding. Flooding events would result in temporary closures of affected areas which in turn would result in lost revenue.

3.0 Plan Formulation

Problems, opportunities, and constraints were identified based on the existing conditions and the FWOP. Objectives were developed from the identified problems and opportunities in the study area.

3.1.1 Problems

The existing problems in the study area include:

- Routine rainfall events cause flooding along Sweetwater Creek increasing flood risk and damaging residential and commercial structures throughout Cobb County
 - The Cities of Austell and Powder Springs and the surrounding areas experience the most extensive and frequent flooding in the study area
- Emergency services disrupted during routine flood events

- Reduced channel conveyance from continual sedimentation from erosion and run-off

3.1.2 Opportunities

The existing opportunities in the study area include:

- Reduce flood damages along Sweetwater Creek and its tributaries within Cobb County
- Reduce impacts to emergency services during flood events
- Reduce stream bank erosion
- Improve flood risk communication among stakeholders
- Address environmental degradation of the channel and its habitat for the creatures therein

3.1.3 Objectives

The planning objectives for the 50-year period of analysis from 2023 to 2073, within the Sweetwater Creek watershed inside Cobb County, are:

1. Reduce average annual flood damages
2. Reduce number of structures impacted
3. Reduce response times for emergency services during flood events
4. Increase access to emergency services during flood events

3.1.4 Constraints

Impacts to the below planning constraints should be avoided when able, minimized where possible, and mitigated if there are any resulting impacts.

1. Induced flooding in developed areas
2. Impacts to cultural resources
3. HTRW sites
4. Impacts to T & E species

3.2 Management Measures

A number of non-structural and structural measures were considered for alternative plan development. The measures considered were based on local input, local conditions, and professional judgment. The measures considered for Sweetwater Creek consisted are shown in Table 15.

Table 15: Measures Considered

	Measure	Various Methods to Develop Measure
Non-Structural Measures	Structure Relocation/Evacuation (Buyouts)	
	Elevating Structures	
	Flood Proofing Structures	
	Flood Warning System	
	Flood Plain Regulation	
Structural Measures	Modifying Channel Capacity	Clearing and snagging, Channel deepening and/or widening, Modifying bridge crossings and culverts
	Retention/Attenuation	In-channel/Off-channel, Rehabilitation/Modification of existing dams
	Levees/Floodwalls	
	Diversion	High flow, Full flow, Channelized tunnel

3.2.1 Screening of General Measures

The criteria for screening the initial measures by using professional judgment included: 1) was it implementable, 2) not likely to induce flooding, 3) meet the project objectives and 4) relative effectiveness to other measures.

Many measures were eliminated because they were not able to be implemented. Elevating structures and flood proofing were removed because the type of construction (i.e. slab on grade foundations) in the flood prone areas does not allow for elevating the structures. Flood plain regulation, or regulating the development in floodplains, has already been implemented by the NFS and so was not carried forward.

Other measures would not meet the project objectives so they were not carried forward. Clearing and snagging would only meet project objectives for a single event, after which it would be required again. Therefore, it was eliminated because it did not meet the project objectives. A flood warning system would not meet project objectives, but could be coordinated to support the success of any alternative carried forward.

Finally levees and floodwalls were not considered effective when compared to other alternatives. Floodwalls and levees alignments would only be able to reduce the flood risk for one to three structures from a single structure.

3.3 Site Specific Measures and Screening

After screening the initial measures, the USACE, Mobile District developed multiple alternative plans from the remaining measures. These plans included: channel modifications, diversions, retention areas, relocation/evacuation (buyout), and flood warning systems.

3.3.1 Channel Modification

The channelization of Sweetwater Creek would begin upstream of the City of Austell and in order to not induce flooding would need to extend downstream to the rapids in Sweetwater Creek State Park. The objective of the measure is to increase channel conveyance through the creation of a more optimal channel design that will reduce flood elevations and concurrently provide a more stable channel.

Clearing and snagging would only provide flood risk relief for a single event so it was eliminated since it would not achieve the project objectives without constant maintenance. Modifying bridges and culverts was removed since the ponding that occurs on the upstream side of the structures does not appear to be causing damages to adjacent property owners.

Sweetwater Creek has a small elevation change from the Cobb/Paulding County line to Sweetwater Creek State Park. In the 44,000 feet of creek the elevation drops by only 20 feet. Because of the small elevation change, the channel deepening and/or widening would need to extend to the rapids and falls in Sweetwater Creek State Park in order to not induce flooding. The location of the channel modification is shown in Figure 11.

3.3.2 Diversion

Diversion channel alternatives were investigated. Alignments included connecting tributaries, such as Noses and Ollie Creek, as well as bypassing developed areas on Sweetwater Creek itself. One alignment would require a tunnel under the City of Austell that would be 3 12x12 foot culverts in order to pass sufficient flow. The diversion alignments are shown in Figure 11.

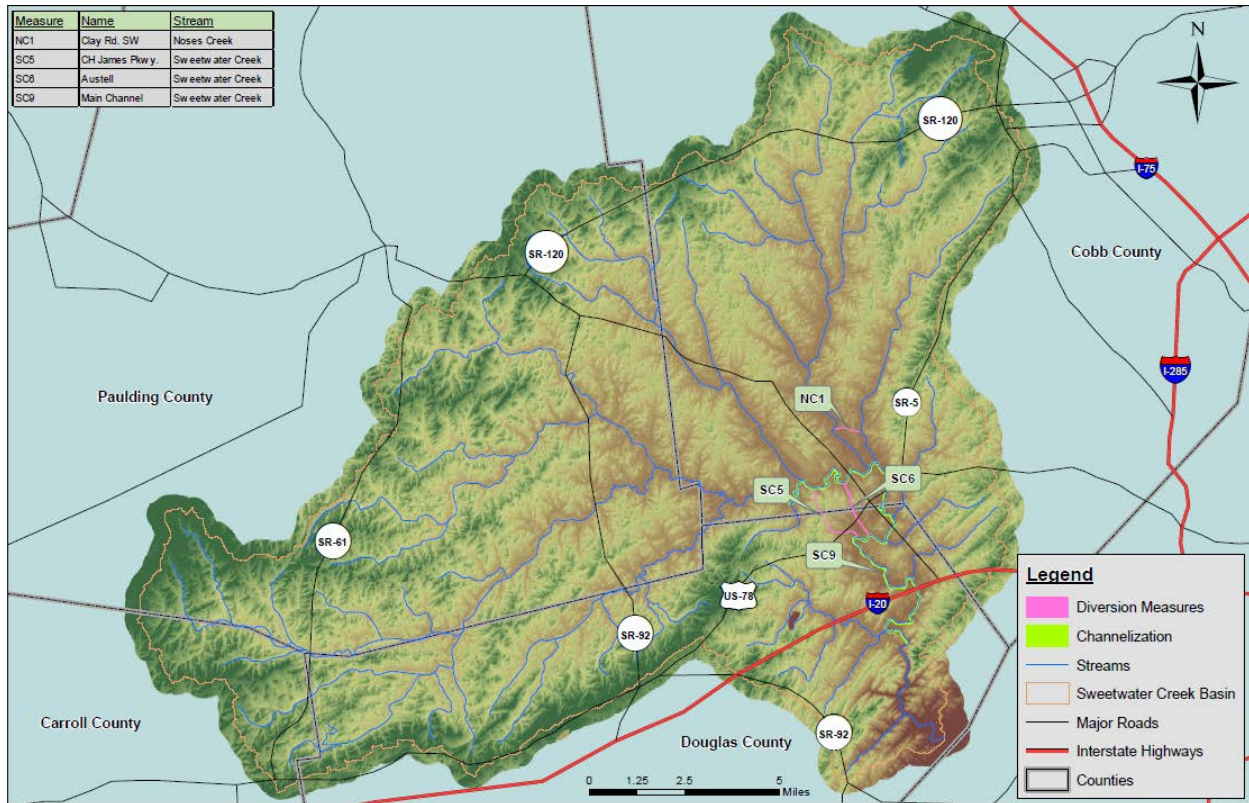


Figure 11: Channel Modification and Diversion Measures

Full flow diversion was eliminated since it could negatively affect T&E species potentially occurring within the area, while a high flow diversion could achieve the same benefits without the T&E species risk. The high hydrologic and hydraulic connectivity in the basin before Powder Springs Creek joins Sweetwater Creek make diversions in this portion of the basin have negligible impacts on the floodplain. After further investigation into the topography and geotechnical data, diversions were fully eliminated because it would require pumps or extensive excavation in order to develop the needed grade for water to flow from upstream to downstream.

3.3.3 Retention Areas

No off-line retention sites were identified that would provide a measurable hydrologic or hydraulic change in the flood affected areas. In-line sites of various sizes and locations on Sweetwater Creek and its tributaries were identified. The locations of the retention measures are shown in Figure 12.

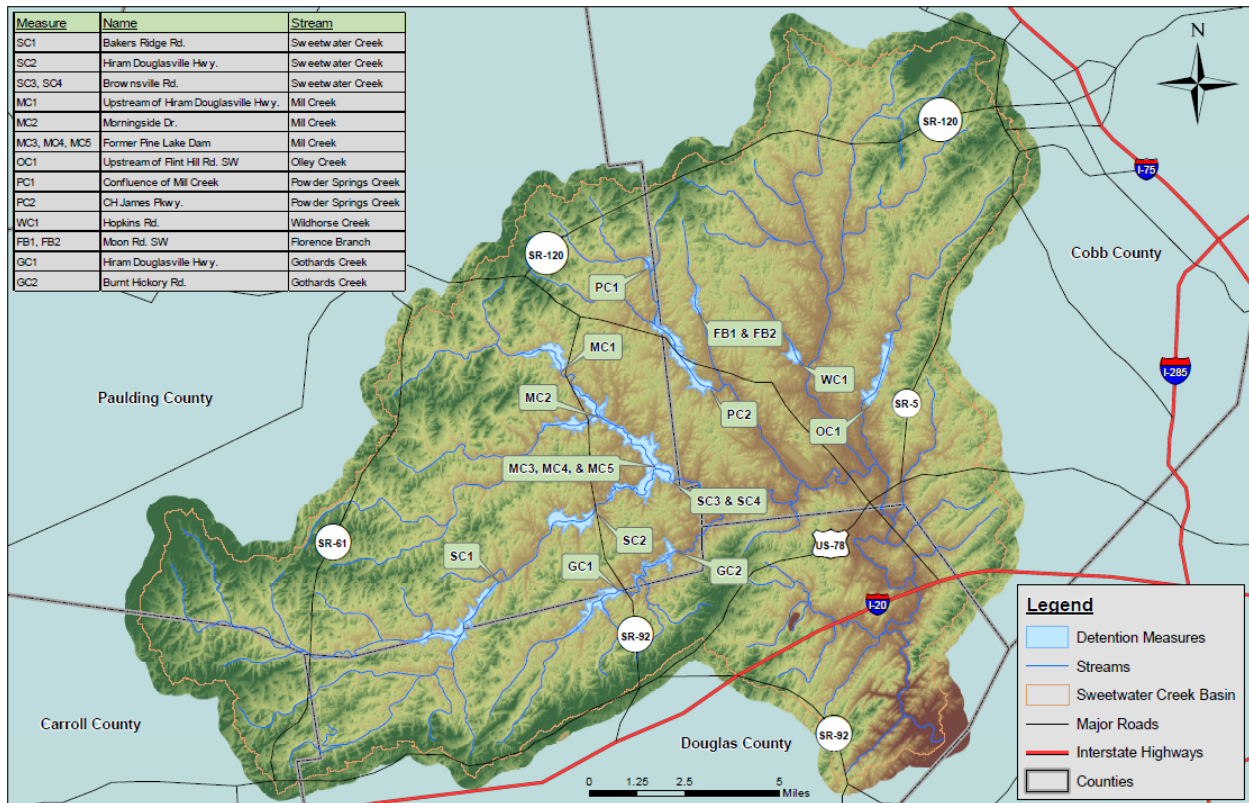


Figure 12: Possible Retention Sites

Some of the sites were small and not close enough to flood damages to affect any measurable change even when combined with other measures and retention sites. Other retention sites, when the retention structure was made large enough to affect a change, could not be tied into high ground. Those sites were removed from further consideration.

3.3.3.1 Retention Site Combinations

Combinations of retention sites were developed as part of capturing additional benefits through modified designs of the same structure. One retention combination was to combine all the sites to determine a relative maximum effect from retention.

3.3.4 Structure Relocation/Evacuation (buyout)

Relocation/Evacuation is purchasing residential and commercial structures affected by flooding at various probable ACEs. After the structures are purchased they would be demolished and the site would be left undeveloped. Owners who are affected by the buyouts would be offered relocation benefits as part of this measure. The floodplains used for the possible by outs ranged from the 10% to the 1% ACE.

3.3.5 Flood Warning System

A reverse 911 style flood warning system, that could send a text to a cell phone, would help alert those in the area to the potential for a flood event. Sweetwater Creek, Powder Springs Creek, Noses Creek, and Olley Creek all have USGS stream gauges that could be used to trigger the notifications for an area while allowing time for those in

the area to avoid the flood waters. However, this has been implemented by Cobb County so was not carried forward.

3.4 Final Array of Alternatives

The alternatives carried forward for the final array are detailed in the following sections.

3.4.1 Alternative 1: Relocation/Evacuation of Structures (Buy Outs)

The evaluation of Alternative 1 included four levels of relocation/buyouts based on the annual percent chance of exceedance floodplain in order to identify the most justifiable level of buyouts. Alternative 1 through 1.3 were purchasing structures with first floor elevations lower than the floodplains for the 10, 4, 2, or 1 percent ACE storms. Table 16 shows the number of structures that would be purchased as part of each alternative based on the ACE floodplain buyout.

Table 16: Structures for Purchase by Annual Chance of Exceedance

Alternative	Percent ACE	Number of Structures
1	10	20
1.1	4	26
1.2	2	66
1.3	1	117

3.4.2 Alternative 2: Brown Road Detention Alternative

Alternative 2 consists of an in-line dry detention facility on Sweetwater Creek, located just upstream of Brown Road in Cobb County, creating up to 9,000 acre-feet of flood storage. The objective of the alternative is to temporarily detain floodwaters from the approximately 100 square miles that drain to the facility location. By temporarily detaining floodwaters, the facility will reduce the peak downstream discharges. This alternative would reduce flood risk along a section of Sweetwater Creek and along the Tributaries of Mill Creek, Power Springs Creek, Noses Creek, Olley Creek and other small tributaries which experience backwater flooding from Sweetwater Creek. The facility would consist of a 1,400 feet long, 33-foot high structure built approximately perpendicular to Sweetwater Creek and its adjoining floodplain. The outlet works of the structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

3.4.3 Alternative 4: Austell Channel Modification

Alternative 4 consists of a channel modification from near the C.H. James Parkway to the rapids in Sweetwater Creek State Park near the historic mill site (14.2 miles). The channel would be widened to 80 feet and would have 2V:1H side slopes. The length of the channel modification is approximately 74,000 linear feet and would remove approximately 3 million cubic yards of material from the channel. The objective of Alternative 4 is to increase channel conveyance through the creation of a more optimal channel design that will reduce flood elevations and concurrently provide a more stable channel. Dredged material would be placed at city approved disposal areas within 4 miles of the project.

3.4.4 Alternative 5H: Multiple Detention Structures on Sweetwater Creek

Alternative 5H consists of two in-line dry detention structures on Sweetwater Creek. The detention sites would be dry within 24 hours after an event. The first is a 10-foot high structure upstream of Bakers Bridge Road in Paulding County near the Douglas and Paulding County line. This approximately 400 acre detention site would hold water in both Paulding and Douglas Counties. The second is a 33-foot high structure upstream of Brown Road in Cobb County near the Paulding County line. This approximately 900 acre detention site would hold water in both Paulding and Douglas Counties. These structures would provide a combined 18,900 acre-feet of flood storage in the basin. The objective of the alternative is to temporarily detain floodwaters along Sweetwater Creek. By temporarily detaining floodwaters, the facility will reduce the peak downstream discharges. The outlet works on each structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure. The outlet works for the site upstream of Brown Road would allow a reduced flow when compared to the structure in Alternative 2 to further reduce downstream water surface elevations.

3.4.5 Alternative 5D: Multi-Subbasin Detention

Alternative 5D consists multiple inline dry detention structures with three on Sweetwater Creek, one on Powder Springs Creek, one on Ollie Creek, and one on Mill Creek. All the detention sites would be dry within 24 hours after an event. The first on Sweetwater Creek is a 24-foot high structure upstream of Bakers Bridge Road in Paulding County near the Douglas and Paulding County line. This approximately 400 acre detention site would hold water in both Paulding and Douglas Counties. The second on Sweetwater Creek is a 15-foot high structure upstream of Highway 92 in Paulding County. This approximately 250 acre detention site would hold water in Paulding and Douglas Counties. The third on Sweetwater Creek is a 33-foot high structure upstream of Brown Road in Cobb County near the Paulding County line. This approximately 900 acre detention site would hold water in both Paulding and Douglas Counties. The one on Powder Springs Creek is a 25-foot high structure upstream of C.H. James Parkway in Cobb County near the Cobb and Paulding County Line. This approximately 400 acre detention site would hold water in Cobb County. The structure on Ollie Springs Creek is a 29-foot high structure upstream of Flint Hill Rd Southwest in Cobb County. This approximately 250 acre detention site would hold water in Cobb County. The structure on Mill Creek is a 20-foot high structure upstream of Morningside Drive in Paulding County. This approximately 300 acre detention site would hold water in Paulding County. These structures would provide a combined 25,040 acre-feet of flood storage. The objective of the alternative is to temporarily detain floodwaters along Sweetwater Creek. By temporarily detaining floodwaters, the facility will reduce the peak downstream discharges. The outlet works on each structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

3.4.6 Alternative 5J: South Paulding High Detention Short

This alternative is an in-line dry detention facility on Sweetwater Creek, located approximately 1 mile upstream of Bakers Bridge Road in Paulding County, creating up to 7,660 acre-feet of flood storage. The objective of the alternative is to temporarily detain floodwaters from the approximately 42 square miles that drain to the facility location. By temporarily detaining floodwaters, the facility will reduce the peak downstream discharges in addition to delaying the timing of the hydrograph peak. The delaying of the hydrograph at the site will have the additional benefit of allowing Mill Creek, which confluences with Sweetwater Creek approximately 7.5 miles downstream of the site, to drain longer before the peak discharge of Sweetwater Creek reaches the confluence, resulting in less coincidental peaks and reducing the combined peak downstream of the confluence for most flood events. This Alternative would reduce flood risk along a section of Sweetwater Creek and along the tributaries of Mill Creek, Powder Springs Creek, Noses Creek, Olley Creek and other small tributaries which experience backwater flooding as a result of Sweetwater Creek flooding. The structure would consist of a 1,500 feet long, 19-foot high structure built approximately perpendicular to Sweetwater Creek and its adjoining floodplain. The outlet works of the structure would consist of a multi-stage concrete slot with vertical side walls discharging into a stilling basin downstream of the structure.

3.4.7 Final Alternative Array Summary

Table 17 shows a brief summary of each of the measure in an alternative and Table 18 shows the Measures that make up each alternative. The location of the measures is shown in Figure 13.

Table 17: Measures in Final Array Summary

Measure	Description
10% ACE Buyouts (20 Structures)	Buyout of structures with 1 st floor elevation lower than 10% ACE storm
4% ACE Buyouts (26 Structures)	Buyout of structures with 1 st floor elevation lower than 25% ACE storm
2% ACE Buyouts (66 Structures)	Buyout of structures with 1 st floor elevation lower than 2% ACE storm
1% ACE Buyouts (117 Structures)	Buyout of structures with 1 st floor elevation lower than 1% ACE storm
SC1	A 24-foot high structure upstream of Bakers Bridge Road in Paulding County near the Douglas and Paulding County line
SC1s	A 19-foot high structure upstream of Bakers Bridge Road in Paulding County near the Douglas and Paulding County line
SC2	A 15-foot high structure upstream of Highway 92 in Paulding County
SC6	A 33-foot high structure upstream of Highway 92 upstream of Brown Road in Cobb County
SC6LF	A 33-foot high structure upstream of Highway 92 upstream of Brown Road in Cobb County with a smaller outfall structure
MC2	A 20-foot high structure upstream of Morningside Drive in Paulding County
PC2	A 25-foot high structure upstream of C.H. James Parkway in Cobb County near the Cobb and Paulding County Line
OC2	A 29-foot high structure upstream of Flint Hill Rd Southwest in Cobb County
Channel Modification	A channel modification from near the C.H. James Parkway to the rapids in Sweetwater Creek State Park near the historic mill site (14.2 miles)

Table 18: Measures in Alternatives

Alternative	SC1s	SC1	SC2	SC6LF	SC6	MC2	PC1	OC1	Channelization	Buyouts
Future Without Project (No Action)										
Alternative 1										✓
Alternative 2					✓					
Alternative 4									✓	
Alternative 5D		✓	✓	✓		✓	✓	✓		
Alternative 5H		✓		✓						
Alternative 5J	✓									

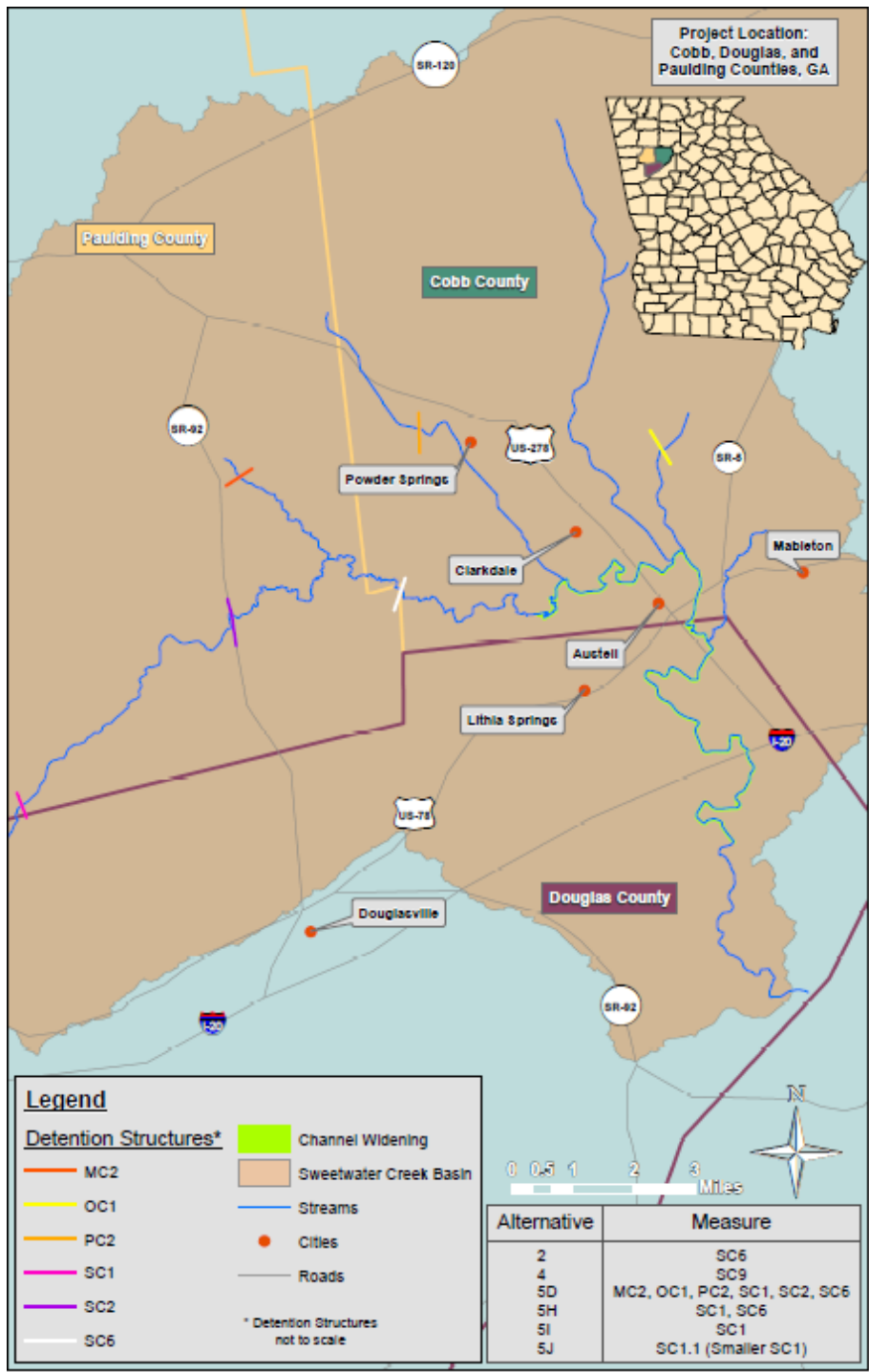


Figure 13: Measures in Final Array

3.5 Comparison of Final Alternatives

Alternatives were screened based on how well an alternative plan 1) accounts for all the required work in order to ensure project objectives (Completeness); 2) achieves the planning objectives (Effectiveness); 3) complies with laws, regulation, and public policy (Acceptability); and 4) achieves the planning objectives in relation to costs (Efficiency).

3.5.1 Completeness

All alternatives included the required work needed to ensure that the project objectives were achieved. This includes assessing if any additional structures should be bought out if all avenues of egress were cut off by the flood event water surface level used for an alternative. For all alternatives, this included determining likelihood of cultural and natural resources that would need to be protected as part of a projects implementation.

3.5.2 Effectiveness

3.5.2.1 Reduce Average Annual Flood Damages

Average Annual Benefits were used to determine how well an alternative met the objective of reducing flood damages. The benefits were developed using the USACE certified Hydrologic Engineering Center (HEC) River Analysis System (HEC-RAS) and HEC-Flood Damage Reduction Analysis (FDA) models, for hydraulics and economics respectively. The results of the evaluation are shown in Table 19.

Table 19: Alternatives Equivalent Annual Damages Reduced(x1000, 2017 Prices)

Reach	Damage Category	FWOP	Alt 1	Alt 1.1	Alt 1.2	Alt. 1.3	Alt 2	Alt 4	Alt 5D	Alt 5H	Alt 5J
Buttermilk Creek	Residential	\$0	\$0	\$3	\$3	\$3	\$1	\$3	\$1	\$2	\$1
	Nonresidential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Total	\$0	\$0	\$3	\$3	\$3	\$1	\$3	\$1	\$2	\$1
Mill Creek	Residential	\$0	\$0	\$0	\$0	\$0	-\$3	\$0	-\$4	\$0	\$0
	Nonresidential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Total	\$0	\$0	\$0	\$0	\$0	-\$3	\$0	-\$4	\$0	\$0
Noses Creek	Residential	\$0	\$197	\$202	\$224	\$241	\$4	\$34	\$8	\$12	\$8
	Nonresidential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Total	\$0	\$197	\$202	\$224	\$241	\$4	\$34	\$8	\$12	\$8
Olley Creek	Residential	\$0	\$7	\$11	\$23	\$29	\$1	\$1	\$1	\$2	\$2
	Nonresidential	\$0	\$4	\$4	\$4	\$4	\$0	-\$2	\$0	\$0	\$0
	Total	\$0	\$12	\$15	\$28	\$33	\$1	\$1	\$1	\$2	\$2
Powder Springs Creek	Residential	\$0	\$0	\$0	\$2	\$7	\$1	\$2	\$2	\$3	\$2
	Nonresidential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Total	\$0	\$0	\$0	\$2	\$7	\$1	\$2	\$2	\$3	\$2
Upper Sweetwater Creek	Residential	\$0	\$0	\$0	\$0	\$0	-\$2	\$0	\$3	\$8	\$10
	Nonresidential	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2	\$3	\$3
	Total	\$0	\$0	\$0	\$0	\$0	-\$2	\$0	\$5	\$11	\$13
Middle Sweetwater Creek	Residential	\$0	\$267	\$272	\$278	\$282	\$6	\$29	\$23	\$42	\$30
	Nonresidential	\$0	\$54	\$65	\$74	\$78	\$1	\$16	\$7	\$12	\$11
	Total	\$0	\$320	\$336	\$351	\$360	\$8	\$45	\$31	\$53	\$41
Lower Sweetwater Creek	Residential	\$0	\$0	\$0	\$2	\$2	\$7	\$35	\$30	\$29	\$17
	Nonresidential	\$0	\$0	\$0	\$3	\$6	\$7	\$25	\$22	\$23	\$12
	Total	\$0	\$0	\$0	\$5	\$7	\$14	\$59	\$52	\$52	\$29
Total for Stream	Residential	\$0	\$471	\$488	\$530	\$564	\$14	\$104	\$64	\$98	\$71
	Nonresidential	\$0	\$58	\$69	\$82	\$88	\$8	\$39	\$31	\$38	\$25
	Total	\$0	\$530	\$556	\$612	\$651	\$22	\$142	\$95	\$135	\$97

All levels of buyouts produced more flood damage reduction benefits than the structural alternatives. Channel modification produced the largest benefits from a structural solution. For more information on the benefits and how they were calculated see Appendix A: Economics.

3.5.2.2 Reduce Number of Structures Impacted

Due to uncertainty in the analysis of structures impacted, especially with the structural alternatives, this objective was evaluated based on a qualitative assessment of if an alternative was likely to remove structures from the 1% ACE flood event. The results of that qualitative analysis are shown in Table 20.

Table 20: Reduce Number of Structures Impacted

Alternative	Likely to Remove Structures
Future Without Project	Yes
1	Yes
1.1	Yes
1.2	Yes
1.3	Yes
2	Yes
4	Yes
5H	Yes
5D	Yes
5J	Yes

3.5.2.3 Reduce Response Times for Emergency Services during Flood Events

The qualitative assessment of whether an alternative would reduce response time was used to assess this objective. For the buyout alternative, it was determined that having less people working and living in floodplains would reduce the calls for emergency services in hard to reach places and thus reduce the response times for the study as a whole. Structural alternatives were assessed like the buyout alternatives, but also looked to see if the avenues of egress to an area increased. A summary of these results is found in Table 21.

Table 21: Reduced Response Times Qualitative Summary

Alternative	Would the Change Reduce Response Times
Future Without Project	No
1	Yes
1.1	Yes
1.2	Yes
1.3	Yes
2	Yes
4	Yes
5H	Yes
5D	Yes
5J	Yes

3.5.2.4 Increase Access to Emergency Services during Flood Events

The qualitative assessment of whether an alternative would increase access to emergency services was used to assess this objective. For the buyout alternative, it was determined that having less people working and living in floodplains would increase access since they would relocate to areas that do not experience as frequent of flooding. Structural alternatives were assessed like the buyout alternatives, but also looked to see if the avenues of egress to an area increased. A summary of these results is found in Table 22.

Table 22: Reduced Response Times Qualitative Summary

Alternative	Would the Change Increase Emergency Services Access
Future Without Project	No
1	Yes
1.1	Yes
1.2	Yes
1.3	Yes
2	Yes
4	Yes
5H	Yes
5D	Yes
5J	Yes

3.5.3 Acceptability

All of the alternatives in the final array complied with laws, regulations, and public policy. This effort includes a qualitative assessment of climate change for the area, as well as a qualitative assessment on how climate change will affect the resiliency of the recommended action. The qualitative climate change analysis shows no impact on the evaluated alternatives nor a change in resiliency from one alternative to the other.

3.5.4 Efficiency

Average Annual Net Benefits, which is the average annual benefits minus the average annual costs, was used to determine the efficiency of the alternatives.

Table 23: Alternative Project Costs

Alternative	Project First Cost	Construction Period (months)	Interest During Construction	Total Cost	Annual O&M Cost	Total Average Annual Cost
1	\$4,669,100	36	\$189,764	\$4,858,864	\$0	\$179,978
1.1	\$5,674,100	48	\$312,534	\$5,986,634	\$0	\$221,751
1.2	\$15,708,300	60	\$1,096,202	\$16,804,502	\$0	\$622,455
1.3	\$23,028,400	72	\$1,951,896	\$24,980,296	\$0	\$925,294
2	\$22,653,000	12	\$284,124	\$22,937,124	\$20,000	\$869,612
4	\$134,178,600	30	\$4,497,869	\$138,676,469	\$0	\$5,136,705
5H	\$33,141,000	17	\$606,903	\$33,747,903	\$26,000	\$1,267,053
5D	\$152,267,600	29	\$4,924,478	\$157,192,078	\$36,000	\$5,858,539
5J	\$8,631,000	9	\$78,552	\$8,709,552	\$18,000	\$340,610

Table 24: Cost and Benefit Comparison

Alternative	Description	Average Annualized Benefits	Average Annualized Costs	First Cost	Net Benefits
1	10 Year Buyouts (20 Structures)	\$531,210	\$179,978	\$4,669,100	\$351,232
1.1	25 Year Buyouts (26 Structures)	\$558,210	\$221,751	\$5,674,100	\$336,459
1.2	50 Year Buyouts (66 Structures)	\$614,680	\$622,455	\$15,708,300	-\$7,775
1.3	100 Year Buyouts (117 Structures)	\$654,780	\$925,294	\$23,028,400	-\$270,514
2	SC6	\$22,640	\$869,612	\$22,653,000	-\$846,972
4	Channelization	\$142,100	\$5,136,705	\$134,178,600	-\$4,994,605
5H	SC1, SC6LF	\$135,770	\$1,267,053	\$33,141,000	-\$1,131,283
5D	All Detention	\$160,540	\$5,858,539	\$152,267,600	-\$5,697,999
5J	SC1S	\$98,450	\$340,610	\$8,631,000	-\$242,160

Alternative 1 reasonably maximizes net benefits and is therefore the National Economic Development (NED) plan.

3.5.4.1 Benefit Uncertainty Analysis

There is uncertainty in the benefits calculated to identify the NED plan. The uncertainty is shown in Table 25 and also in Figure 14.

Table 25: Benefit Uncertainty Analysis

Alternative	Equivalent Annual Damages Reduced (2017 prices \$1000)	Probability Net Benefits Exceeds Indicated Values (2017 price levels \$1000) given the Annual Cost			Annual Costs (2017 price levels \$1000)	Mean Net Benefits (2017 price levels \$1,000)
		0.75	0.50	0.25		
1	528	306	348	387	180	348
1.1	555	277	330	382	222	333
1.2	610	(101)	(24)	63	622	(12)
1.3	649	(390)	(298)	(182)	925	(276)
2	22	(866)	(854)	(831)	870	(848)
4	141	(5,033)	(5,015)	(4,970)	5,137	(4,996)
5H	135	(1,186)	(1,156)	(1,095)	1,267	(1,132)
5D	158	(5,764)	(5,730)	(5,655)	5,859	(5,701)
5J	97	(279)	(257)	(218)	341	(244)

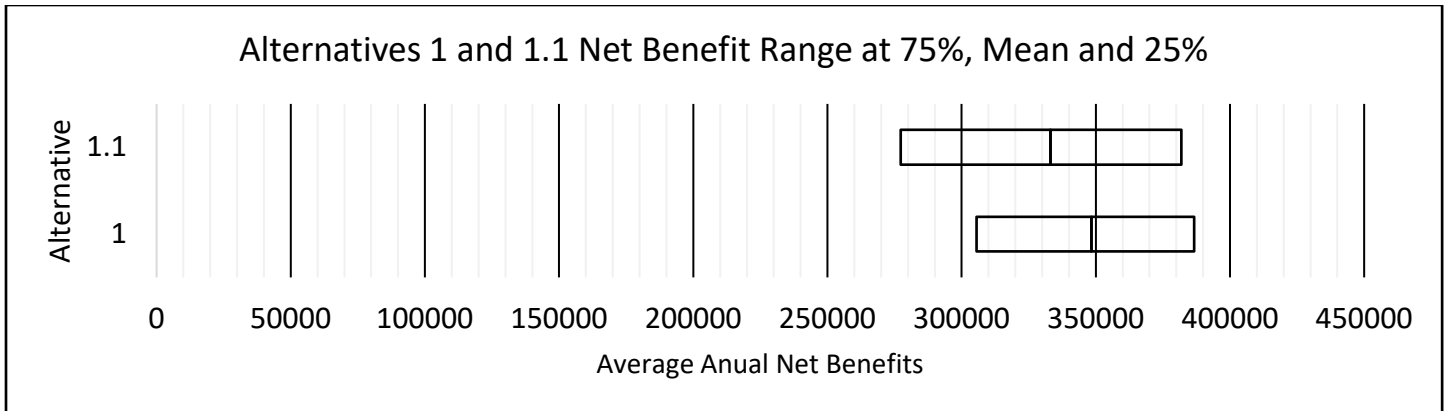


Figure 14: 1st and 3rd Quartile Uncertainty for Economically Justified Alternatives

The uncertainty does show that all the structural alternatives have less than a 25% probability of being justified and should not be selected. The uncertainty of the 10% ACE buyouts is the least of the economically justified alternatives and it has the highest possible net benefits at the 25% likelihood of exceedance scenario. This further supports the selection of Alternative 1.0 as the NED and TSP.

3.6 Plan Selection

Alternative 1.0 is the NED plan that reasonably maximizes net benefits. Further, of the two justified alternatives, it has the least uncertainty in benefits with the highest possible net benefits of all the plans. There is no critical infrastructure or life safety concerns addressed by Alternative 1.1 that is not also addressed by Alternative 1.0. Therefore Alternative 1.0, the 10% annual chance exceedance buyout, is the TSP.

4.0 Tentatively Selected Plan

Alternative 1.0 is the NED Plan and the TSP, or the With Project condition. This feature consists of buying out structures whose first floor elevations are lower than the anticipated water surface elevation of the 10% ACE floodplain; this totals 20 structures throughout Cobb County, the City of Austell, and the City of Powder Springs.

4.1 Sites required and Area of Effect

The 20 structures in the 1% ACE buyout plan are on 20 different parcels. The parcels are found throughout the Sweetwater Creek Basin. A breakdown of the number of structures to be purchased as part of the relocation/evacuation of the 10% ACE floodplain are shown in Table 26. Of the structures identified in Table 26, a list of all parcels selected for relocation/evacuation in the study area and the associated naming convention, or Parcel ID, is included in Table 27.

Table 26: Number of Structure in Tentatively Selected Plan by Reach

Reach	Number of Structures
Buttermilk Creek	0
Mill Creek	0
Noses Creek	7
Olley Creek	0
Powder Springs Creek	7
Upper Sweetwater Creek	3
Middle Sweetwater Creek	3
Lower Sweetwater Creek	0

Table 27: Tentatively Selected Plan Parcel IDs

Reach	Parcel ID	Structure Type
Upper Sweetwater Creek	PID_SCa	Residence
	PID_SCb	Residence
	PID_SCc	Residence
Middle Sweetwater Creek	PID_SCd	Service Station
	PID_SCe	Residence
	PID_S Cf	Business
Powder Springs Creek	PID_PCa	Residence
	PID_PCb	Residence
	PID_PCc	Residence
	PID_PCd	Residence
	PID_PCe	Residence
	PID_PCf	Residence
	PID_PCg	Residence
Noses Creek	PID_NCa	Residence
	PID_NCb	Auto Repair
	PID_NCc	Residence
	PID_NCd	Residence
	PID_NCe	Residence
	PID_NCf	Residence
	PID_NCg	Residence

4.2 Cost

The costs developed for the TSP included the cost to acquire all the structures and the parcels they sit on, relocation expenses for the residence or business proprietor, and demolition costs for each of the structures. The first costs for implementation of the TSP are \$4,669,100.

5.0 Environmental Impacts of the Tentatively Selected Plan

As shown in *Figure 15*: the buyout of structures with first floor elevations 10% ACE floodplain comprises a small portion of the entire study area. As such, the potential for adverse environmental impacts are minimal. *Table 28: Environmental Impacts*

Summary lists the effects of the TSP on all environmental resources evaluated within Section 2.0 Existing and Future Without-Project Conditions (No Action Alternative).

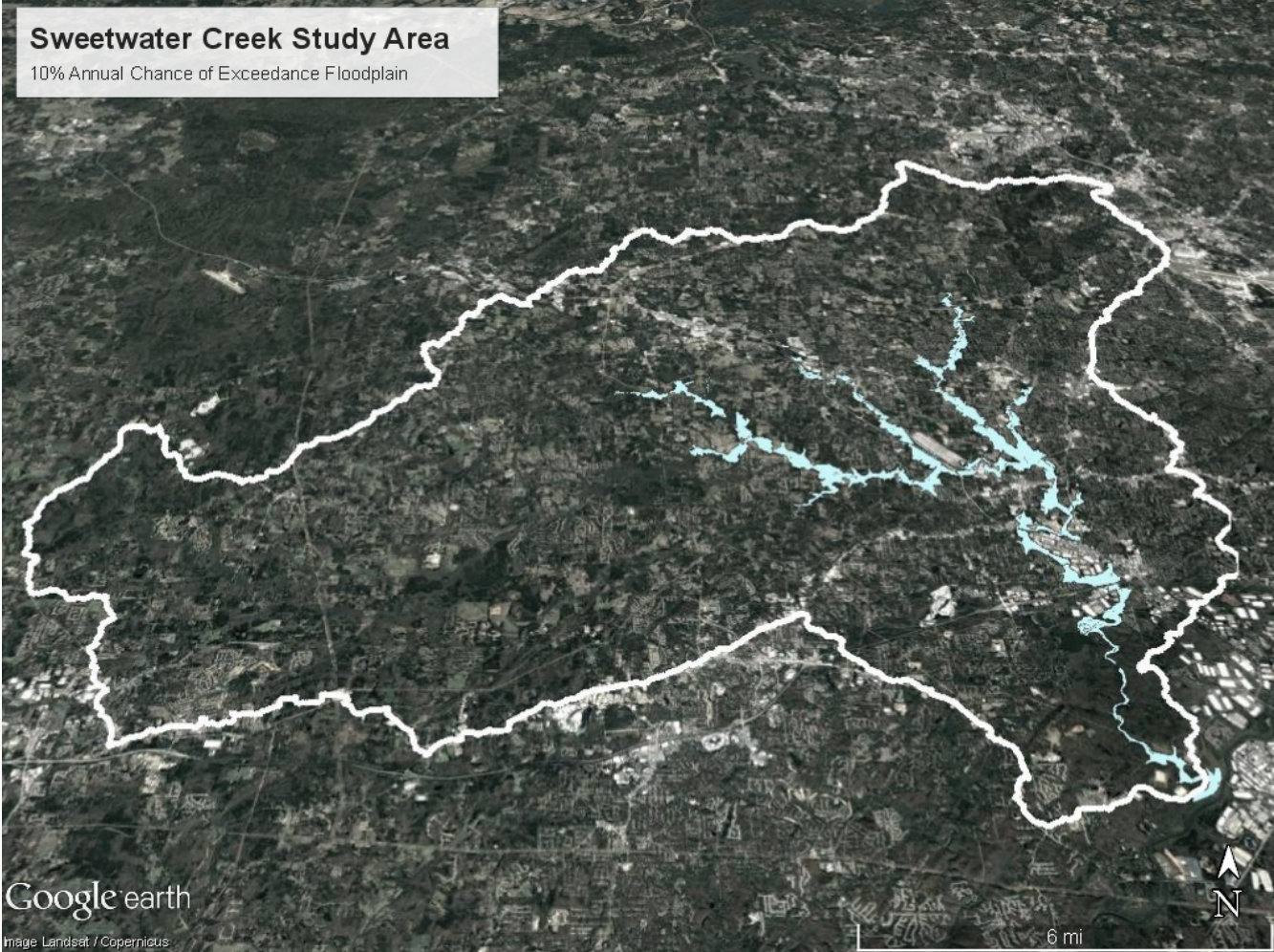


Figure 15: Tentatively Selected Plan

Table 28: Environmental Impacts Summary

Resource		Impact	
Section	Sub-section	No Action	Recommended Action
Topography, Geology and Soils		NE	NE
Air Quality		NE	NE
Land Use		NE	NE
Water Resources		NE	NE
	<i>Sweetwater Creek and Tributaries</i>	NE	NE
	<i>Surface Water Quality</i>	NE	NE
	<i>Groundwater</i>	NE	NE
Biological Resources		NE	NE
	<i>Vegetation</i>	NE	PB
	<i>Fish and Wildlife</i>	NE	PB
	<i>Wetlands</i>	NE	NE
	<i>Special Species</i>	NE	NE
	<i>Wildlife Corridors</i>	NE	PB
Cultural Resources		<i>Pending</i>	<i>Pending</i>
Sociological Resources		NE	NE
	<i>Flooding and Flood Damages</i>	NE	NE
	<i>HTRW</i>	NE	NE
	<i>Noise</i>	NE	NE
	<i>Aesthetic</i>	NE	PB
	<i>Navigation</i>	NE	NE
	<i>Socioeconomics</i>	AE	PB
	<i>Public Safety</i>	AE	PB
	<i>Recreation</i>	AE	AE

Key 1: NE = No Effect; AE = Adverse Effect; PB = Positive Benefit

5.1 Topography, Geology, and Soils

Common construction practices for structural buildings involve the use of red clay to set structural foundations. Because the TSP involves the demolition of existing structures it is assumed that no unique topography, geology, or soils exist within the footprint of each location. Each structure would be demolished and the footprint of each site would be re-graded to match surrounding terrain. Therefore, no adverse effects to topography, geology, or soils are anticipated as a result of this TSP.

5.2 Air Quality and Greenhouse Gases

The potential for existing structures to contain hazardous materials is moderate. The oldest existing structure dates to 1942. All existing structures would be inspected for the presence of asbestos, toxic mold, and other environmental hazards that could impact air quality as a result of demolition. Should any existing structures contain toxic materials, licensed contractors from the State of Georgia would remove the materials consistent with USEPA and Occupational Safety and Health Administration (OSHA) guidelines.

Demolition activities would contribute to a localized temporary increase in dust particles. All demolition activities would be in accordance with Georgia's Best Management Practices (BMPs) to minimize and contain small particles. Equipment used for demolition would be in accordance with state standards. Equipment emissions during demolition would be minor and localized.

Upon completion of all demolition activities any localized minor increases in dust or emissions would revert to pre-demolition levels. Therefore, the TSP would have no effect on air quality.

5.3 Land Use

The TSP would result in the conversion of 20 structures with first floor elevations below the 10% ACE floodplain in Cobb County, Georgia shown in *Figure 15*: from residential use to vacant use. As shown in *Figure 4: Sweetwater Creek Watershed National Land Cover Database Overview*, the locations of these structures lie within low to medium intensity developed areas. The demolition of each parcel would neither individually or cumulatively adversely affect the surrounding land use of the study area.

5.4 Water Resources

5.4.1 Sweetwater Creek and Tributaries

No construction or demolition activities would be implemented within Sweetwater Creek or its tributaries; therefore no impacts to the resources are anticipated.

5.4.2 Surface Water quality

Table 29 lists parcels adjacent to the USEPA 303(d) listed streams identified in Section 2.4.2 Surface Water quality. Prior to demolition a National Pollutant Discharge Elimination System (NPDES) stormwater permit would be obtained. All demolition activities would incorporate BMPs to minimize and contain runoff.

Though no surveys have been completed to identify State waters within the Study Area, sites identified for the TSP and referenced in *Table 30: Tentatively Selected Plan Identified Properties and Likelihood of Nearby State Waters*, demolition activities within parcels PC2, PC3, PC4, and PC5 have the highest likelihood of encroaching within a GEPD stream buffer zone. Aerial examination of all other sites show structure locations well beyond the maximum GEPD stream buffer zone; however all parcels will be surveyed for the presence and/or classification of State waters prior to implementation. Should the surveys show the potential for the TSP to encroach on the GEPD stream buffer zone, a stream buffer variance will be obtained prior to implementation. Therefore, no impacts to surface-water quality are anticipated.

Table 29: Tentatively Selected Plan Identified Properties and Nearby USEPA 303(d) Listed Waterbodies

Reach	Parcel ID	Structure Type	Nearby 303(d) Reach ID
Middle Sweetwater Creek	PID_SCe	Residence	R031300020217
	PID_SCf	Business	R031300020217
Noses Creek	PID_NCa	Residence	R031300020204
	PID_NCb	Auto Repair	R031300020204

Table 30: Tentatively Selected Plan Identified Properties and Likelihood of Nearby State Waters

Reach	Parcel ID	Structure Type	Within/Near Stream Buffer Zone
Upper Sweetwater Creek	PID_SCa	Residence	No
	PID_SCb	Residence	No
	PID_SCc	Residence	No
Middle Sweetwater Creek	PID_SCd	Service Station	No
	PID_SCe	Residence	No
	PID_SCf	Business	No
Powder Springs Creek	PID_PCa	Residence	No
	PID_PCb	Residence	Yes
	PID_PCc	Residence	Yes
	PID_PCd	Residence	Yes
	PID_PCe	Residence	Yes
	PID_PCf	Residence	No
	PID_PCg	Residence	No
Noses Creek	PID_NCa	Residence	No
	PID_NCb	Auto Repair	No
	PID_NCc	Residence	No
	PID_NCd	Residence	No
	PID_NCe	Residence	No
	PID_NCf	Residence	No
	PID_NCg	Residence	No

5.4.3 Groundwater

No seepage would occur as a result of the recommended action therefore no effects to groundwater would occur.

5.5 Biological Resources

5.5.1 Vegetation

No activities under the TSP would involve the removal of vegetation. Following demolition and grading of the existing structures, locally sourced native seed may be used to prevent further runoff. Long term benefits may occur as a result of the TSP through establishment of a more natural floodplain. Each location may experience the regrowth of forested habitat after years of vacancy. Therefore the TSP may result in beneficial impacts to vegetation.

5.5.2 Fish and Wildlife Resources

Each existing structure identified for demolition currently is inhabited. It is assumed that each structure is devoid of wildlife infestation, such as bats or rodents. Prior to demolition each structure would be inspected. Should inspection show signs of wildlife infestation measures will be taken to safely remove the creatures.

The TSP would result in the conversion of residential structures to vacant lots which may benefit local wildlife species in the long term. Years of vacancy may result in a reestablishment of forested habitat suitable for common species within the area. In accordance with *Executive Order 13112 Safeguarding the Nation from the Impacts of Invasive Species* the areas selected for evacuation/relocation incentives will reseed each site with native species. The further prevention of invasive species growth will be realized through the existing Cobb County property maintenance program once the project is turned over to the non-federal sponsor.

5.5.3 Waters of the U.S. including Wetlands

Prior to demolition each parcel identified for buyout will be surveyed by a qualified wetland biologist to delineate any jurisdictional wetlands that may exist within the demolition radius. Demolition crews would be instructed to avoid staging or access activities within delineated wetland areas. Therefore, the TSP would not result in negative impacts to waters of the United States including wetlands.

5.5.4 Special Status Species

5.5.4.1 Endangered Species Act

No impacts to federally-protected species would result from the TSP. No suitable habitat for federally-listed threatened or endangered species exists within the identified parcels for buyout. Therefore no disturbances through a temporary increase in noise levels as a result of demolition activities would affect federally-protected migrant species within each parcel.

5.5.4.2 Migratory Bird Treaty Act

The 20 parcels are situated in moderately developed portions of the study area. Any migratory birds inhabiting the 20 parcels would most likely occupy areas of least disturbance. Demolition may result in localized and temporary noise level increases, however these increases would be minor and would revert to pre-demolition levels upon completion. Therefore, the TSP would have little to no effect on any migratory bird within the 20 parcels.

5.5.4.3 Bald and Golden Eagle Protection Act

The TSP would have no effect on bald or golden eagles. Prior to demolition activities, each parcel would be inspected by a qualified wildlife biologist for the presence of bald or golden eagle nests. Demolition of structures within parcels which contain eagle nests will maintain a buffer zone in accordance with the USFWS National Bald Eagle Management Guidelines dated May 2007 and included in Appendix E. No impacts would occur as a result of noise interference. Therefore, the TSP would have no effect on bald or golden eagles within the study area.

5.5.5 Wildlife Corridors

The conversion of the structures to vacant lots may benefit wildlife corridors by allowing the regeneration of vegetation throughout each area. Tree regrowth would connect fragmented habitats between the parcels and surrounding habitats. Therefore the TSP may have a beneficial impact to wildlife corridors within the study area.

5.6 Cultural Resources

5.6.1 Cultural Resource Identification

The TSP would have no impact on any previously identified cultural resources but their remains the possibility that unknown cultural resources eligible for listing on the NRHP are located within the project area. The USACE, Mobile District proposes to fulfill the requirements of Section 106 of the NRHP and NEPA by conducting a historic architecture survey of all structures to be demolished and archaeological survey of all areas impacted by demolition activities under the TSP. The resulting cultural resources reports will be coordinated with the Georgia State Historic Preservation Officer (SHPO) and any Interested Federally Recognized Indian Tribes. If any cultural resources eligible for listing on the NRHP are identified as a result of these surveys and in consultation with the SHPO and Tribes, an MOA will be developed to mitigate adverse effects to historic properties.

5.7 Sociological Resources

5.7.1 Flooding and Flood Damages

The TSP would result in the removal of structures affected by frequent flooding within Cobb County leading to a reduction in the quantity of structures experiencing flood damages. Therefore the TSP would have a beneficial impact on the study area.

5.7.2 Hazardous Toxic Radiological Waste

The TSP would not result in an increase in HTRW within the 20 parcels. *Table 31: TSP Identified Properties and Age of Structures* lists the properties with identified RECs and shows the potential for the presence of harmful substances based on the age of each structure.

Table 31: TSP Identified Properties and Age of Structures

Reach	Parcel ID	Structure Type	Year Built*
Upper Sweetwater Creek	PID_SCa	Residence	1942
	PID_SCb	Residence	1988
	PID_SCc	Residence	2002
Middle Sweetwater Creek	PID_SCd	Service Station	1945
	PID_SCe	Residence	1958
	PID_SCf	Business	Unknown
Powder Springs Creek	PID_PCa	Residence	1959
	PID_PCb	Residence	1973
	PID_PCc	Residence	1973
	PID_PCd	Residence	1973
	PID_PCe	Residence	1973
	PID_PCf	Residence	1973
	PID_PCg	Residence	1984
Noses Creek	PID_NCa	Residence	1971
	PID_NCb	Auto Repair	1971
	PID_NCc	Residence	1993
	PID_NCd	Residence	1995
	PID_NCe	Residence	1995
	PID_NCf	Residence	1997
	PID_NCg	Residence	1998

*based on tax data

Of the 20 properties, two properties with RECs were identified in the initial review. The property within PID_SCd appears to be an abandoned service station which sits adjacent to a former auto salvage business. The concern for such a property would

primarily be improperly abandoned underground fuel storage tanks or improperly disposed of waste oil products, which could lead to soil and/or groundwater contamination. Additional assessment is needed to confirm historical property usage, as well as the status of any possible cleanup activities.

The property within PID_NCb sits within the Noses Creek reach and appears to house a home auto repair/salvage business on the back/northern portion of the property. This property was not identified by the environmental database search, but was identified during the inspection of potential buyout properties. The concern for this property would primarily be improper disposal of waste oil products. Additional assessment is needed to determine the potential for existence of any contamination.

Additional assessment of property within PID_SCf, which appears to be a horse stable, is needed to determine the likelihood of RECs within the stable area.

Each site would be further inspected for the presence of HTRW substances prior to implementation through a Supplemental Phase I Environmental Site Assessment to determine if a Phase II HTRW assessment is necessary. Should site inspections reveal contamination, Cobb County would remediate any harmful substances. The USACE would reimburse Cobb County solely for property purchase once an inspection following remediation procedures shows no contamination.

The remaining 17 residential structure would be inspected prior to demolition for signs of lead based paint, asbestos, toxic mold, or other harmful substances. Structures built prior to 1980 have a higher likelihood of containing lead based paint, asbestos, toxic mold, or other harmful substances. The removal of harmful substances would be accomplished through State licensed contractors and would abide by USEPA and OSHA requirements.

Considering the above mitigation measures, the TSP is likely to have no adverse effects on the environmental as a result of HTRW related substances.

5.7.3 Noise

The 20 parcels identified for buyouts with first floor elevations below the 10% ACE floodplain identified in *Figure 15*: are located in low to moderate intensity developed portions of the study area as shown in *Figure 4: Sweetwater Creek Watershed National Land Cover Database Overview*. These areas experience relatively low to moderate ambient noise levels compared to heavily urbanized cities. Localized and temporary increases in noise levels would occur as a result of demolition equipment and activities. These increases would be minor and would revert to pre-demolition levels upon completion. Therefore, the TSP would have no adverse impacts on ambient noise levels.

5.7.4 Aesthetic

Following removal of structures at each parcel, immediate effects of the TSP would result in vacant and barren appearances at each site. Aesthetics would improve upon

the establishment of the seeded areas. Long term benefits may occur as the establishment of vegetation changes to a more natural floodplain. Therefore the TSP would result in slightly beneficial improvements.

5.7.5 Navigation

No activities would occur within navigable waterways as a result of the TSP. Therefore no effects to navigation would occur.

5.7.6 Socioeconomics

Socioeconomics of the study area would experience an increased benefit as a result of the TSP. Homeowners experiencing frequent flooding would benefit from relocation incentives which would provide homeowners with the opportunity to move to less flood prone areas. The entire study area would benefit from local economic stimulus as a result of increased job opportunities for local contractors and businesses as evidenced by the Regional Economic Development model in Appendix A. Therefore there would be an increased benefit as a result of the recommended action.

5.7.7 Public Safety

Increased public safety would occur through the buyout of each parcel. Local emergency operatives would benefit because they would not need to visit those parcels experiencing frequent flooding. Relocated homeowners and families would benefit physically and emotionally by moving to less flood prone areas. Therefore the TSP would result in an increased benefit to the study area.

5.7.8 Recreation

Because the TSP would not involve activities occurring at or near recreation sites, effects resulting from the TSP would be similar to the Future Without Project Conditions as analyzed in *Section 2.7.8 Recreation*. Therefore, the TSP would have minor adverse effects, such as temporarily inaccessible recreation facilities, to recreation within the study area.

5.8 Cumulative Impacts

Cumulative impacts analysis considers the potential environmental consequences resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). USACE guidance in considering cumulative impacts affirms this requirement, stating that the first steps in assessing cumulative impacts involve defining the scope of the other actions and their interrelationship with a proposed action. The scope must consider other projects that coincide with the location and timetable of a proposed action and other actions. Cumulative impacts analyses must also evaluate the nature of interactions among these actions.

The scope of the cumulative impacts analysis involves both timeframe and geographic extent in which impacts could be expected to occur and a description of what resources

could be cumulatively affected. For the purposes of this analysis, the geographic area for consideration of cumulative impacts is the Sweetwater Creek Watershed.

Cobb County has conducted buyouts of residences and commercial buildings for several years. Numerous structures were removed from the 10% ACE, otherwise known as the 10 year floodplain. The majority of the previous buyouts were with FEMA assistance. As a result of the Cobb County implemented buyout plan, the Sweetwater Creek FRM study has only identified 20 structures for buyouts at the 10% ACE. With the inclusion of the TSP and the continued floodplain management by Cobb County, the resulting cumulative impacts result in a long term restoration of the 10% ACE floodplain hydrology; thus proving beneficial to the surrounding environment.

6.0 Environmental Compliance

Federal laws and Executive Orders applicable to the USACE TSP, their applicability to the proposed project, and, if applicable, their status is presented in Table 32 below:

Table 32: Public Law Environmental Compliance Status

STATUS	PUBLIC LAW (US CODE)/EXECUTIVE ORDER
N/A	Abandoned Shipwreck Act of 1987 (43 U.S.C. 2101)
N/A	American Indian Religious Freedom Act (42 U.S.C. 1996)
N/A	Agriculture and Food Act (Farmland Protection Policy Act) of 1981 (7 U.S.C. 4201)
N/A	American Folklife Preservation Act of 1976, As Amended (20 U.S.C. 2101)
N/A	Anadromous Fish Conservation Act of 1965, As Amended (16 U.S.C. 757a et seq)
C	Archeological and Historic Preservation Act of 1974, As Amended (16 U.S.C. 469)
N/A	Archeological Resources Protection Act of 1979, As Amended (16 U.S.C. 470)
P	Bald and Golden Eagle Protection Act (16 U.S.C. § 668 et seq)
N/A	Civil Rights Act of 1964 (Public Law 88-352) (42 U.S.C. 1971)
C	Clean Air Act of 1972, As Amended (42 U.S.C. 7401 et seq)
C	Clean Water Act of 1972, As Amended (33 U.S.C. 1251 et seq)
N/A	Barrier Resources Act of 1982 (16 U.S.C. 3501-3510)
N/A	Coastal Zone Management Act of 1972, As Amended (16 U.S.C. 1451 et seq)
N/A	CERCLA of 1980 (42 U.S.C. 9601)
N/A	Conservation of Forest Lands Act of 1960 (16 U.S.C. 580)
N/A	Copeland Anti-Kickback (18 U.S.C. 874)
N/A	Davis-Bacon Act (40 U.S.C. 1341)
N/A	Deepwater Port Act of 1974, As Amended (33 U.S.C. 1501)
N/A	Emergency Flood Control Funds Act of 1955, As Amended (33 U.S.C. 701m)
N/A	Emergency Wetlands Resources Act (16 U.S.C. 3901-3932)
C	Endangered Species Act of 1972 (16 U.S.C. 1531)
C	EO 11988, Floodplain Management
C	EO 11990, Protection of Wetlands
C	EO 12898, Environmental Justice
N/A	Estuary Protection Act of 1968 (16 U.S.C. 1221 et seq)

N/A	Farmland Protection Policy Act (7 U.S.C. 4201 et seq)
N/A	Federal Environmental Pesticide Act of 1972 (7 U.S.C. 136 et seq)
STATUS	PUBLIC LAW (US CODE)/EXECUTIVE ORDER
P	Fish and Wildlife Coordination Act of 1958, As Amended (16 U.S.C. 661)
N/A	Hazardous Substance Response Review Act of 1980, As Amended (26 U.S.C.4611)
N/A	Historic and Archeological Data Preservation (16 U.S.C. 469)
C	Historic Sites Act of 1935 (16 U.S.C. 461) Note: Superseded by NHPA, Section 106
N/A	Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601)
N/A	Magnuson Fishery Conservation and Management Act (16 U.S.C. 1801)
N/A	Marine Mammal Protection Act of 1972, As Amended (16 U.S.C. 1361)
N/A	Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1401)
N/A	Migratory Bird Conservation Act of 1928, As Amended (16 U.S.C. 715)
C	Migratory Bird Treaty Act of 1918, As Amended (16 U.S.C. 703)
C	NEPA of 1969, As Amended (42 U.S.C. 4321 et seq)
C	National Historic Preservation Act of 1966, As Amended (16 U.S.C. 470)
C	National Historic Preservation Act Amendments of 1980 (16 U.S.C. 469a)
N/A	Native American Religious Freedom Act of 1978 (42 U.S.C. 1996)
N/A	Native American Graves Protection and Repatriation Act (25 U.S.C. 3001)
N/A	National Trails System Act (16 U.S.C. 1241)
N/A	Noise Control Act of 1972, As Amended (42 U.S.C. 4901 et seq)
N/A	Rehabilitation Act of 1973 (29 U.S.C. 794)
N/A	Reservoir Salvage Act of 1960, As Amended (16 U.S.C. 469)
N/A	Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901-6987)
N/A	River and Harbor Act of 1888, Section 11 (33 U.S.C. 608)
N/A	River and Harbor Act of 1899, Sections 9, 10, 13 (33 U.S.C. 401-413)
N/A	River and Harbor and Flood Control Act of 1962, Section 207 (16 U.S.C. 460)
N/A	River and Harbor and FC Act of 1970, Sects 122, 209 and 216 (33 U.S.C. 426 et seq)
N/A	Safe Drinking Water Act of 1974, As Amended (42 U.S.C. 300f)
N/A	Submerged Lands Act of 1953 (43 U.S.C. 1301 et seq)
N/A	Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 9601)
N/A	Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201-1328)
N/A	Toxic Substances Control Act of 1976 (15 U.S.C. 2601)
N/A	Policy Act of 1970, As Amended (43 U.S.C. 4601)
N/A	Wild and Scenic River Act of 1968 (16 U.S.C. 1271 et seq)

Key: N/A = Non-applicable; C = In compliance; P = Compliance pending

Assuming that the proposed project does not expand beyond the scope described in this draft report, the TSP is in compliance with NEPA.

6.1 Coordination

This feasibility study was coordinated with the USFWS Athens Field Office, Georgia SHPO, and Federally recognized tribes. Cooperating agency letters dated December

20, 2017 were mailed to affected state and Federal agencies and are included in Appendix F – Federal and State Agency Coordination. Electronic correspondence for participation of the USACE TSP Milestone Meeting was submitted to each agency identified in *Table 33: Coordination*.

Table 33: Coordination

Federal	State
Department of Interior	Georgia Department of Natural Resources
Department of Interior Atlanta Region	Georgia Department of Natural Resources Environmental Protection Division
Environmental Protection Agency Region 4	Georgia Department of Natural Resources Wildlife Resources Division
Federal Emergency Management Agency Region 4	Georgia Department of Public Safety
U.S. Fish and Wildlife Service Athens Field Office	Georgia Department of Transportation
U.S. Fish and Wildlife Service Southeast Region	Georgia Emergency Management Agency
U.S. Geological Survey Southeast Region	Georgia Secretary of State
	Georgia Soil and Water Conservation Commission

6.1.1 Fish and Wildlife Coordination Act

According to the *Water Resources Development Under the Fish and Wildlife Coordination Act* (FWCA) report dated November 2004, “The FWCA provides a basic procedural framework for the orderly consideration of fish and wildlife conservation and enhancement measures in Federally constructed, permitted, or licensed water development projects. The FWCA provides that, whenever any water body is proposed to be controlled or modified “for any purpose whatever” by a Federal agency or by any “public or private agency” under a Federal permit or license, the action agency is required first to consult with the wildlife agencies, “with a view to the conservation of fish and wildlife resources in connection with that project.”

The Sweetwater Creek FRM feasibility study is considered a Federal project for the purpose of evaluating the manipulation of a body of water. USACE coordinated closely with the USFWS Athens Field Office regarding the study and subsequent development of the Fish and Wildlife Coordination Act Report, Appendix F – Federal and State Agency Coordination.

FWCAR Recommendation:

“The anticipated cost of the proposed buyout/demolition of 20 structures in the Sweetwater Creek basin’s floodplain is \$4,858,864, a large portion of which will be Federal share cost. The Corps’ March 2018 Sweetwater Creek Flood Risk Management Study Integrated Feasibility Report and Environmental Assessment estimates that another 213 residential structures will be constructed in the Sweetwater Creek basin’s floodplain by 2050, an almost 13% increase over the number of structures currently in the floodplain. We strongly recommend that, contingent on receiving providing this large sum of Federal money, Cobb County, at a minimum, require future

development in the floodplain, including structures and utilities, be elevated to 1 foot above the 500-year flood level.”

FWCAR Summary and Service Position:

“With implementation of the conservation measures above, the project is not likely to adversely affect fish and wildlife resources and may provide limited benefit to downstream aquatic resources.”

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