Prepared by

MACTEC

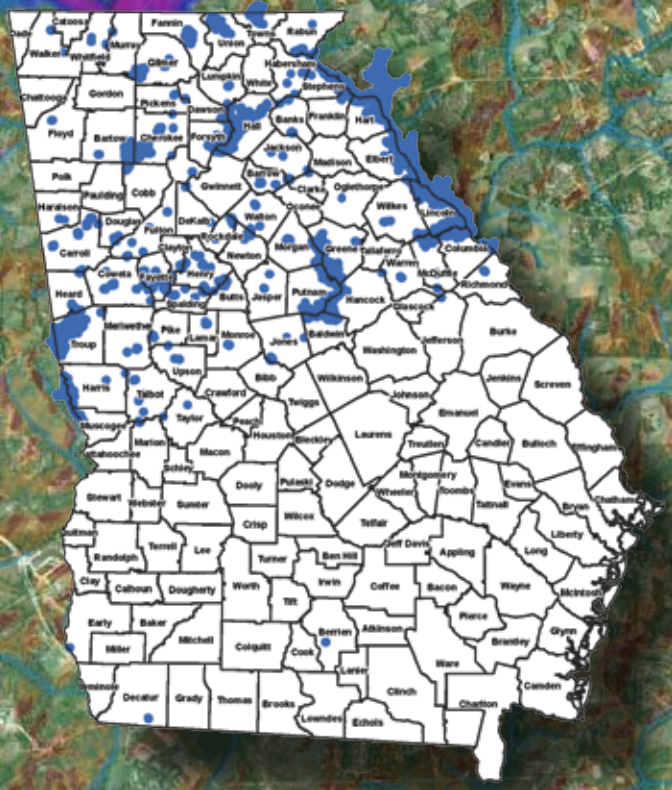
MACTEC Engineering and Consulting, Inc.

Georgia

Project No. 6110-08-0257

Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs

October 31, 2008



In Association With

Tommy Craig & Associates

Joe Tanner & Associates

Schnabel Engineering

B&E Jackson Engineers

Eco South

Prepared for

Georgia Environmental Facilities Authority

GEORGIA INVENTORY AND SURVEY OF FEASIBLE SITES FOR WATER SUPPLY RESERVOIRS

REPORT TO THE GEORGIA ENVIRONMENTAL FACILITIES AUTHORITY

Prepared for:

GEORGIA ENVIRONMENTAL FACILITIES AUTHORITY

Atlanta, Georgia

Prepared by:

MACTEC ENGINEERING AND CONSULTING, INC.
Kennesaw, Georgia

IN ASSOCIATION WITH

Tommy Craig & Associates

Joe Tanner & Associates

Schnabel Engineering

B&E Jackson 20 • YEARS

Eco South

October 31, 2008
MACTEC Project 6110-08-0257

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MACTEC Project 6110-08-0257

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EXECUTIVE SUMMARY

In response to one of its mandates under the Georgia Water Supply Act of 2008 (O.C.G.A.) 12-5-470 (the Act), the Georgia Environmental Facilities Authority (GEFA) engaged the MACTEC Team to inventory and survey feasible sites for multi-jurisdictional drinking water supply reservoirs in Georgia. This report presents the work-in-progress results of that initial work with recommendations and a "road map" for future reservoir siting analysis in Georgia. The report is intended to provide information and preliminary analysis that can support decisions by local governments and Regional Planning Councils on how best to augment local water supply. The study should complement the analyses conducted under the State Water Plan.

STUDY METHODOLOGY

With the funding and time constraints faced by GEFA, the scope of work for this report is limited to readily available, existing information. No field visits were conducted; however, extensive experience of the Georgia Environmental Protection Division (EPD) and the MACTEC Team (including Joe Tanner & Associates; Tommy Craig, LLC; Schnabel Engineers; B&E Jackson Engineers; and EcoSouth) provided significant information for this report. The combined effort of the MACTEC Team with coordination by Georgia EPD and GEFA personnel resulted in the following key findings to help address the legislative mandate of the Act.

The need for drinking water supply reservoirs in Georgia is sharply divided by geology at the fall line. Below the fall line (81 counties), groundwater aquifers are the principal source of public water supply and large underground aquifers function as their own natural water supply storage reservoirs. Above the fall line (78 counties), surface water is the principal source of public water supply and man-made reservoirs are essential for water supply storage, as there are no natural lakes in Georgia. Therefore, this report is focused on the 78-county area above the fall line.

A total of 4,435 reservoirs was screened down to 190 by selecting only those with a designated use of water supply. These 190 existing water supply reservoirs were screened further by eliminating from consideration privately owned sites, dropping the total to 161. These 161 reservoirs, as shown in Figure ES-1, were inventoried and surveyed using GIS methods and existing data sources. This GIS screening pinpointed those reservoirs that had limited development in the surrounding area and total storage volumes greater than 1 billion gallons or a surface area greater than 100 acres.

Some 114 other potential water supply reservoir sites or general site areas (not formally proposed) have been identified and inventoried from available prior studies and published reports, as shown in Figure ES-2.

The study also looked at the issue of current and future water supply needs. Due to the 2007 drought, the North Georgia area was considered a priority to be served by expanded existing reservoirs or new regional reservoirs. The study summarizes existing water supply need forecasts and examines population growth trends for the 16 counties in the North Georgia Planning District. The State Water Plan analysis will provide a definitive picture of this need for the remainder of North Georgia. This analysis is scheduled to be completed in 2009.

CONCLUSIONS

Progress has been made in Georgia over the last decade to develop cost-effective additional supply capacity. Over the last decade, 17 reservoirs have been permitted; 13 of these permitted reservoirs are in operation and 4 are under construction.

Reservoirs are only one tool to increase water supply. Consideration should first be given to conservation and efficiency. Communities should also examine interconnectivity to other systems, as well as the potential for drilling wells.

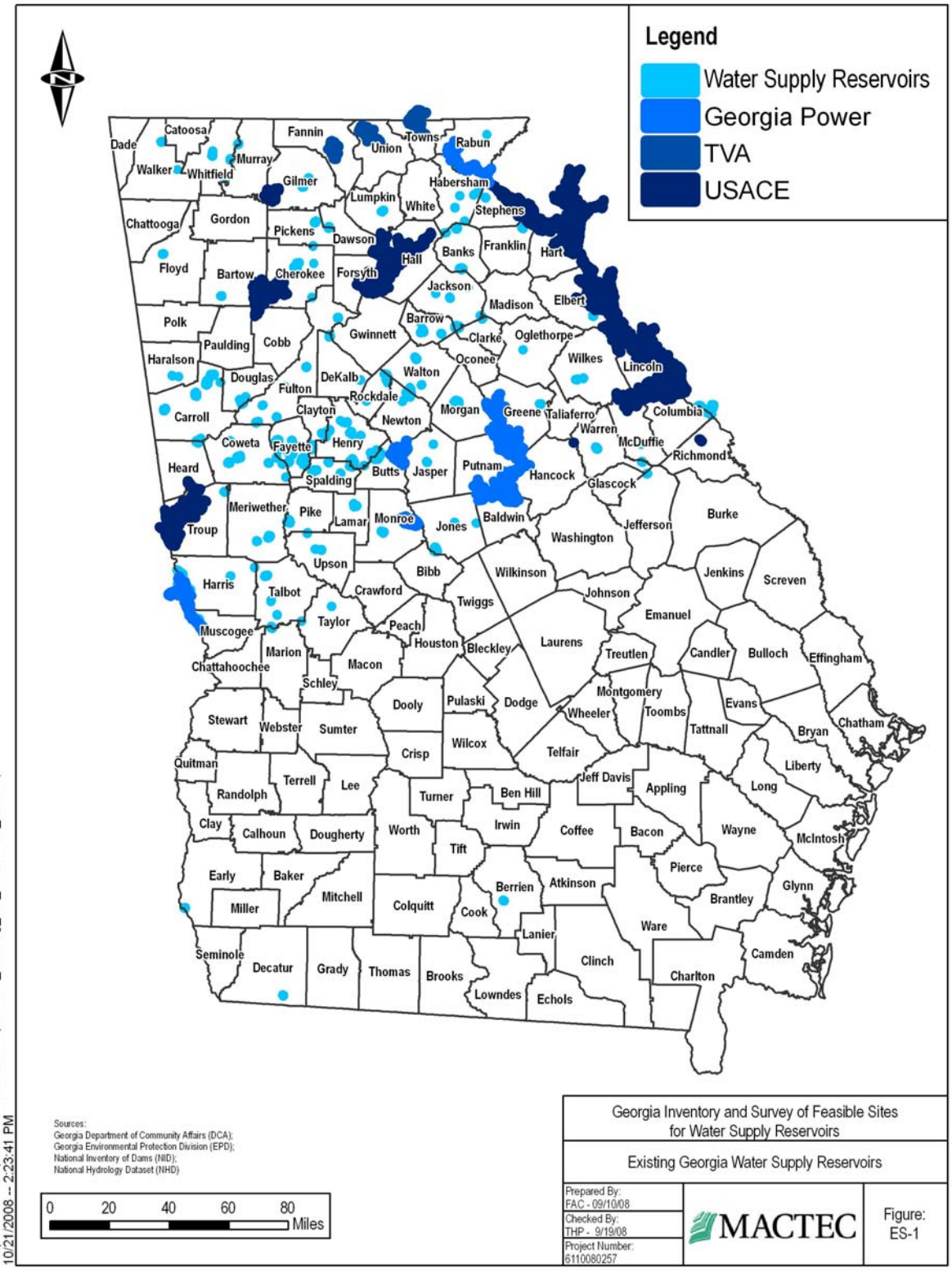
Of all options, reservoirs are the most costly, environmentally sensitive, and time-consuming. Therefore, when a region or community determines that a reservoir is the best alternative, priority should be given to the expansion of existing ones, then to development of regional reservoirs, and finally to single-jurisdiction facilities. Rather than proposing reservoirs on large streams, communities should seek opportunities to build impoundments on smaller streams, supplemented by pumping from large streams.

There are opportunities to expand existing reservoirs and evaluate existing and proposed projects for their ability to serve multiple jurisdictions.

- Following an expansion-potential screening process, 16 existing reservoirs, as shown in Figure ES-3, have significant potential for increased water supply yield by raising the existing dam to provide more storage volume in combination with supplemental pumping from a nearby stream for reservoir filling. Information should be supplied to those local governments for their consideration.

- At least two new water supply reservoirs are under development (permitted and may be under construction) in Georgia, and six proposed reservoirs are in various stages of permitting, as shown in Figure ES-4. These new projects have not yet been screened for expansion potential, as the necessary screening data were not readily available.

Georgia has placed a high priority, as studies indicate, on progress toward increasing water supply. When the State Water Plan and the Regional Water Plans are completed, we will have better data to guide water supply planning that is consistent with needs analysis.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Georgia Environmental Protection Division (EPD);
National Inventory of Dams (NID);
National Hydrology Dataset (NHD)
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Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
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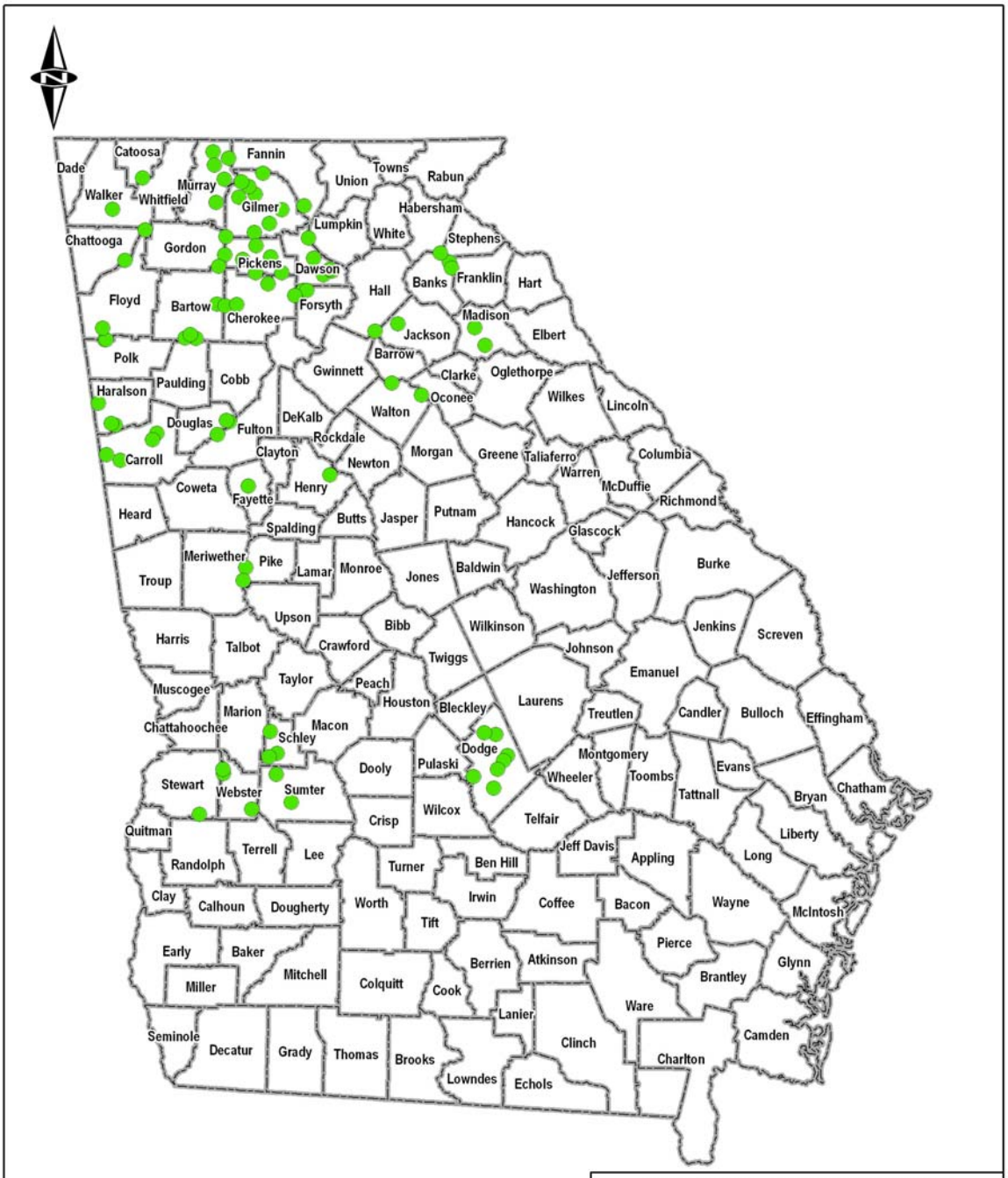
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Georgia Environmental Protection Division (EPD);
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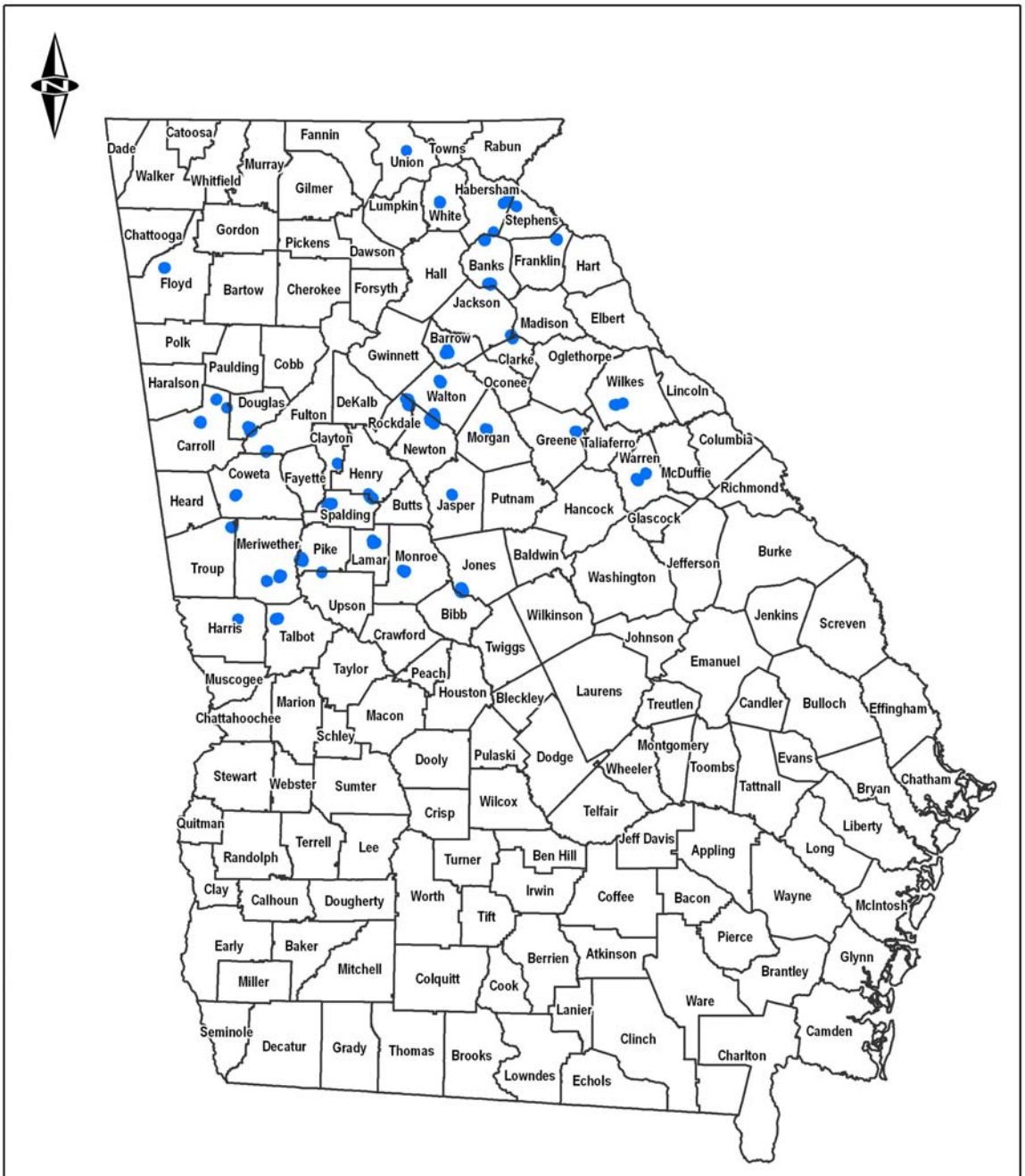
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Georgia Soil and Water Conservation Commission. Inventory and Assessment of USDA Soil and Water Conservation District Watershed Dams Finding Report. December 27, 2007.
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MACTEC
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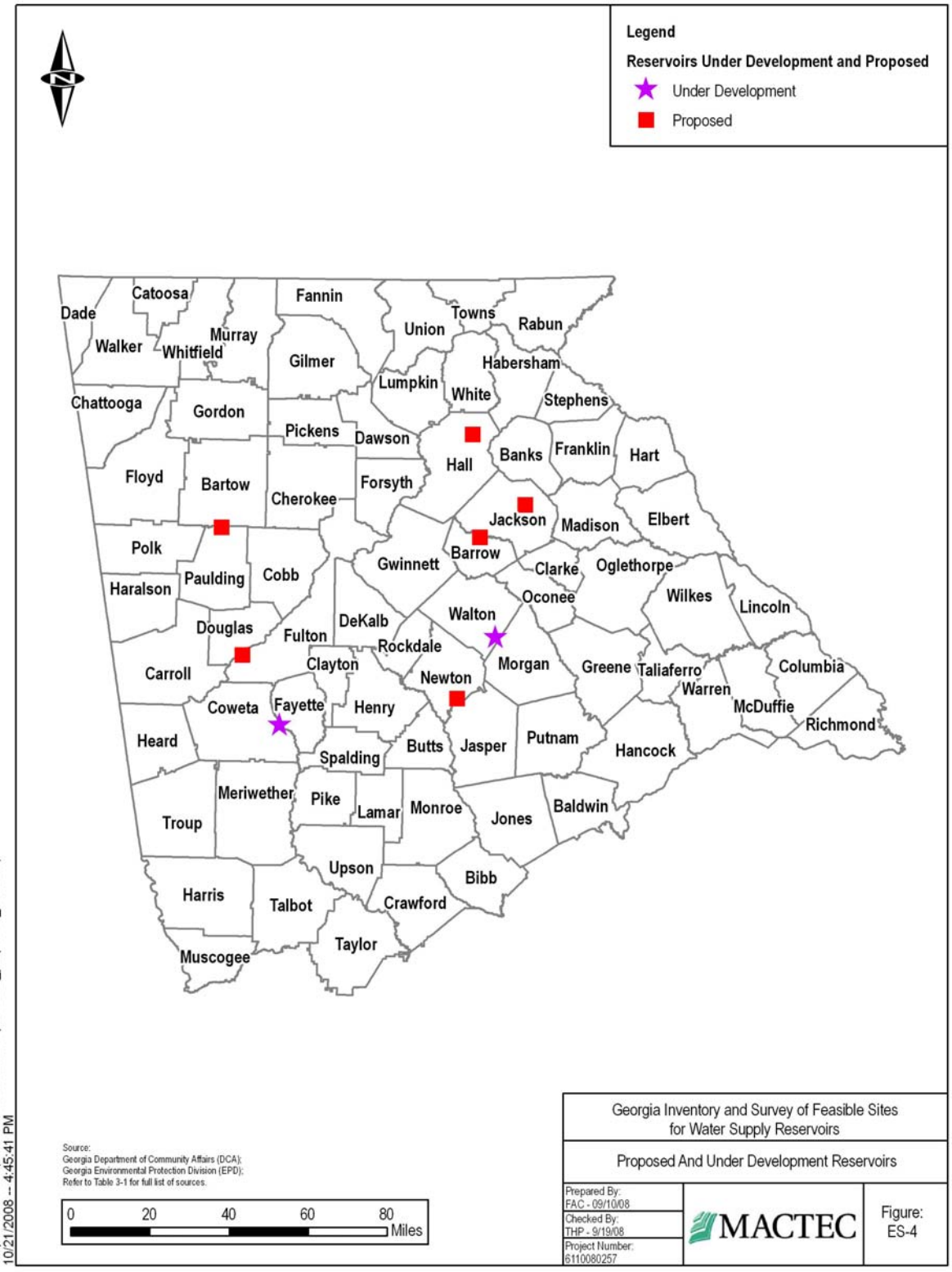
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Georgia Department of Community Affairs (DCA);
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Prepared By: FAC - 09/10/08
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Project Number: 6110080257
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Figure: ES-4

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(continued)

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(continued)

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1.0 INTRODUCTION

While still in the grip of record-setting drought conditions across much of Georgia, the 2008 Georgia legislature recognized the critical need for increased water supply storage capacity as part of a solution to the state's growing water supply needs. This led to passage of the Georgia Water Supply Act of 2008 (O.C.G.A. § 12-5-470 *et seq*., hereinafter referred to as the Act) that, among other things, created a new Division within the Georgia Environmental Facilities Authority (GEFA). With respect to water supply storage capacity, the Act directs GEFA and the Division to "…take all reasonable steps at the earliest practicable date to inventory and survey feasible sites for water reservoirs within the State of Georgia" and calls for a progress report to the Water Supply Act Legislative Oversight Committee not later than October 1, 2008. MACTEC Engineering and Consulting, Inc. (MACTEC), in association with Tommy Craig & Associates, Joe Tanner & Associates, Schnabel Engineering, B&E Jackson, and Eco-South, Inc, was engaged by GEFA in August 2008 to support the new Division and assist with the initial inventory and survey of feasible sites for water reservoirs. This report presents the work-in-progress results of the mandated inventory and survey and provides the basis for GEFA's first report to the Legislative Oversight Committee.

1.1 BACKGROUND

According to the U.S. Census Bureau (USCB), the population of Georgia was 6.5 million in 1990 (USCB 2005). By 2000, the population had grown to 8.2 million, and by 2007 it was estimated at 9.5 million (USCB 2008). Projecting forward to 2030, the population of Georgia is expected to surpass 12 million, an 86 percent increase over the 1990 population. As population growth continues, the demand for reliable water supplies in Georgia is growing at a similar pace. Historically, local governments and water authorities have been primarily responsible for securing their own water supplies. The passage of the Act signals the State's intention to take a more active role in evaluating the sufficiency of Georgia's future water supply and identifying future water supply alternatives.

The sources of water supply and water storage requirements in Georgia are divided by geology at the fall line. North of the fall line, surface water is the principal source of municipal water supply due to the underlying crystalline rock geology that yields and stores only small amounts of groundwater. Despite abundant average precipitation, this region of Georgia is vulnerable to severe drought, as was especially evident in 2007 and 2008. Episodic droughts have profound impacts on the availability of water supplies, and having sufficient water supply storage capacity is essential for maintaining reliable water supplies through prolonged drought periods. Because the majority of Georgia's current and projected population resides or will reside north of the fall line, man-made water storage

reservoirs are essential for providing reliable water supplies into the future. South of the fall line, groundwater is the principal source of public water supply, as the underlying porous sedimentary strata yield substantial amounts of groundwater and that region's aquifers serve as large, natural storage reservoirs. The aquifer system continues to provide a reliable source of water supply to this portion of Georgia, even during drought years; therefore, the need to develop water supply reservoirs below the fall line is not anticipated. In addition, following the specific directives of the Act, this study does not address water impoundments for other uses. For these reasons, this initial inventory and survey of feasible sites for drinking water supply reservoirs in Georgia is limited to consideration of areas north of the fall line.

1.2 WATER SUPPLY RESERVOIRS

The most common method for storing water for subsequent water supply use is creating a surface reservoir, or "bowl," behind a constructed dam. Traditional reservoirs are sited on flowing streams and are filled directly by inflow from the contributing upstream watershed. To provide sufficient water for a regional or multi-jurisdictional water supply reservoir, such a reservoir would have to be located on a large river. As a practical matter, it is unlikely that new water supply reservoirs in Georgia will be built on large rivers because the environmental impacts and costs of large, main-channel reservoirs are prohibitive. In contrast, pumped storage reservoirs are typically sited on much smaller or intermittent streams, or completely off-stream, where only a portion of needed inflow is provided by the tributary drainage area. Supplemental water to fill and maintain such a reservoir must be diverted by pumping from a larger nearby stream. Examples of pumped storage water supply reservoirs in Georgia include the City of Canton and Cobb County-Marietta Water Authority's Hickory Log Creek, the Macon Water Authority's Town Creek, and the Upper Oconee Basin Water Authority's Bear Creek.

In addition to the development of new water storage reservoirs, it may be feasible to convert existing reservoirs (built for other purposes such as power generation, flood control, or conservation) for water supply use. Further, existing water supply reservoirs may have potential for expansion to increase water supply yield by raising the dam or by pumping supplemental flow from a larger nearby stream. One advantage of converting or expanding an existing reservoir is that environmental impacts are typically reduced compared to the development of a new reservoir site; however, impacts to the human environment may be substantial due to existing development surrounding the reservoir.

2.0 CATALOG OF EXISTING WATER SUPPLY RESERVOIRS IN GEORGIA

This section presents an inventory of existing reservoirs with a designated use of "water supply." The existing water supply reservoirs were screened for their potential for expansion to serve regional or multi-jurisdictional water needs. This initial screening was based on readily available information; no project-specific evaluation or field work was conducted. More information was available for some sites than for others. Where sufficient information was available, quantitative screening criteria were used to compare sites and, where quantitative information was not readily available, qualitative evaluation and professional reasoning were used for the initial screening. Sites not retained for consideration as regional projects due to small storage capacity may still be candidates for local consideration.

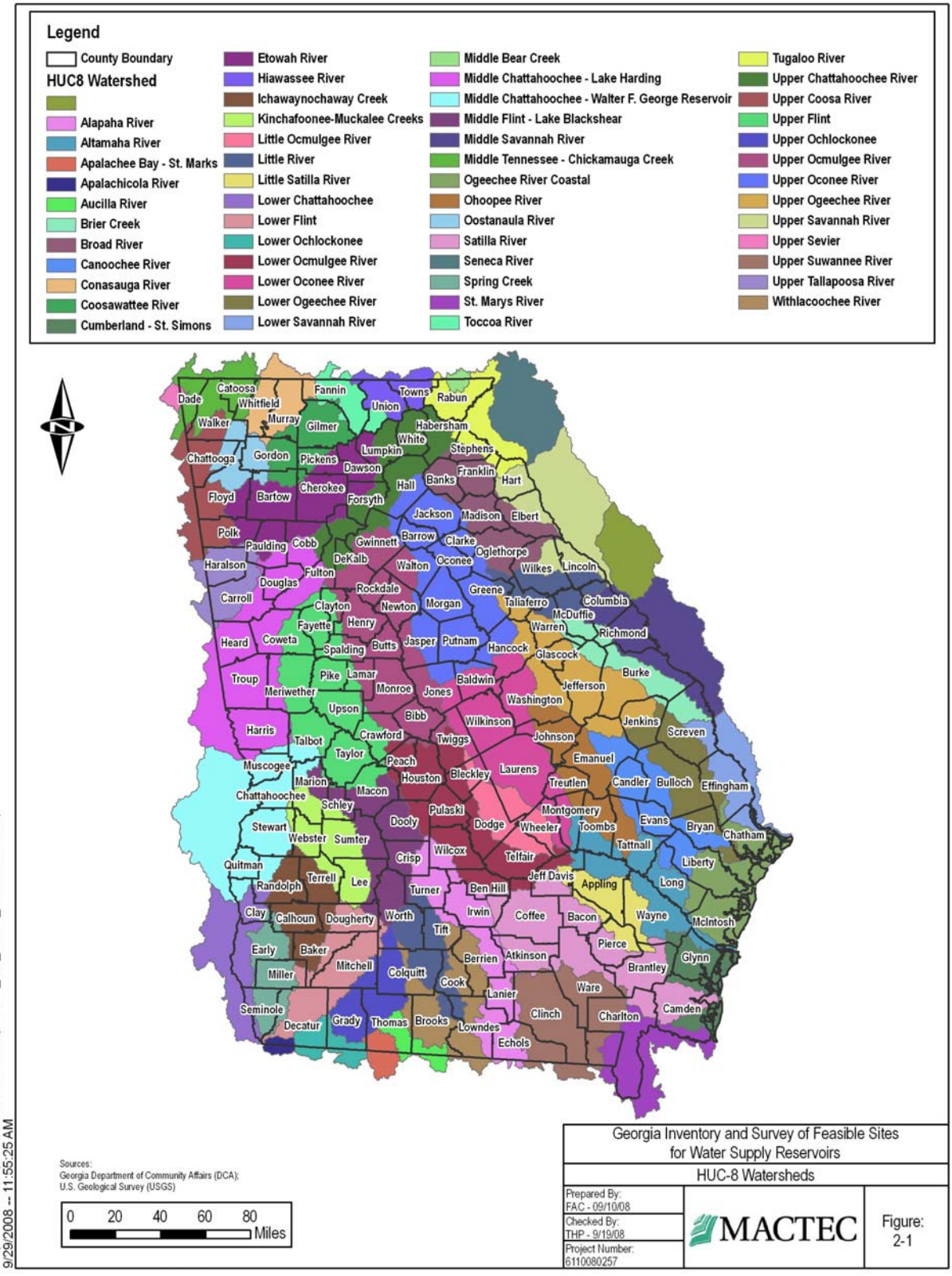
Background geographic information system (GIS) data gathered from various sources and available from the Georgia GIS Clearinghouse (GA GIS Clearinghouse, 2008) were used to develop GIS base map data layers. These data layers include:

- Ten- and 8-digit hydrologic unit codes (HUCs) produced by the U.S. Geological Survey (USGS), with HUC-8 watersheds shown in Figure 2-1
- County boundaries produced by the Department of Community Affairs (DCA)
- The 2007 aerial imagery produced by the National Agriculture Imagery Project (NAIP)
- Imagery from the U.S. Department of Agriculture (USDA) Farm Service Agency Aerial Photography Field Office
- Digital elevation models (DEMs) for Watersheds of Georgia prepared by USGS and published in 1999, designated to be used at a scale of 1:24,000 or greater

2.1 INVENTORY OF IDENTIFIED RESERVOIRS

The following sources were used to prepare a catalog of Georgia's existing water supply reservoirs:

- GIS data from the Georgia Environmental Protection Division (EPD)
- The U.S. Environmental Protection Agency's (EPA) National Inventory of Dams (NID)
- *Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams: Finding Report* of the Georgia Soil and Water Conservation Commission (GSWCC)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County Boundary
HUC8 Watershed
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Altamaha River
Apalachee Bay - St. Marks
Apalachicola River
Aucilla River
Brier Creek
Broad River
Canoochee River
Conasauga River
Coosawattee River
Cumberland - St. Simons
Etowah River
Hiawassee River
Ichawaynochaway Creek
Kinchafoonee-Muckalee Creeks
Little Ocmulgee River
Little River
Little Satilla River
Lower Chattahoochee
Lower Flint
Lower Ochlockonee
Lower Ocmulgee River
Lower Oconee River
Lower Ogeechee River
Lower Savannah River
Middle Bear Creek
Middle Chattahoochee - Lake Harding
Middle Chattahoochee - Walter F. George Reservoir
Middle Flint - Lake Blackshear
Middle Savannah River
Middle Tennessee - Chickamauga Creek
Ogeechee River Coastal
Ohoopee River
Oostanaula River
Satilla River
Seneca River
Spring Creek
St. Marys River
Toccoa River
Tugaloo River
Upper Chattahoochee River
Upper Coosa River
Upper Flint
Upper Ochlockonee
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Sources:
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
0 20 40 60 80
Miles
Map Document: (G:\GEFA\mxds\final report\2-1_GA_HUC8_Watershed.mxd)
9/29/2008 -- 11:55:25 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
HUC-8 Watersheds
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-1

2.1.1 Information Received from Georgia EPD (GIS Data)

A GIS "shapefile" of existing water supply reservoirs provided by Georgia EPD contained spatial and tabular data for 85 existing water supply reservoirs known to be associated with water withdrawal permits issued by Georgia EPD.

2.1.2 Information Extracted from EPA National Inventory of Dams

The EPA NID in BASINS for Georgia was used to supplement the EPD data (GA GIS 2008). The NID data were published in 1998 by the EPA Office of Water. These data consisted of a GIS point shapefile and tabular data of dams in Georgia. The NID file consisted of 4,435 records. The dataset was queried to show dams that included "water supply" as a listed purpose or one of its listed purposes. This screening eliminated reservoirs intended solely for agricultural or industrial purposes, such as small farm ponds and mine tailings ponds. Of the 4,435 NID-listed records, 68 records were duplicates of EPD data. EPD data were preferred over NID data; therefore, the EPD reservoir data for the 68 records were used and not NID data. After duplication screening, 98 records of NID water supply dams (in addition to the 85 EPD-identified water supply reservoirs known to be associated with EPD water withdrawal permits) remained for further screening.

The high-resolution National Hydrology Dataset (NHD) was used to assign shapes to the NID sites. The NHD was prepared by USGS and is frequently updated. If data points from the NID coincided with outlines of water bodies from the NHD, then the outlines were captured and attributed with the tabular information from the NID. During this process, 14 dams from the NID were identified that had no coincidental NHD outlines and no visible water body on the 2007 aerial imagery. The volumes associated with the points in the tabular data were very small; therefore, these 14 dams were eliminated from further screening for this study.

2.1.3 Information Received from GSWCC

Nineteen reservoirs were identified from the *Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams: Finding Report* of GSWCC. Seven of those reservoirs were not captured in the NID or EPD databases.

2.1.4 Initial Inventory of Existing Reservoirs

A total of 190 existing water supply reservoirs were identified from the above data sources.

This number is the sum of the 85 Georgia EPD, 7 GSWCC, and 98 NID reservoirs (as shown in Figure 2-2).

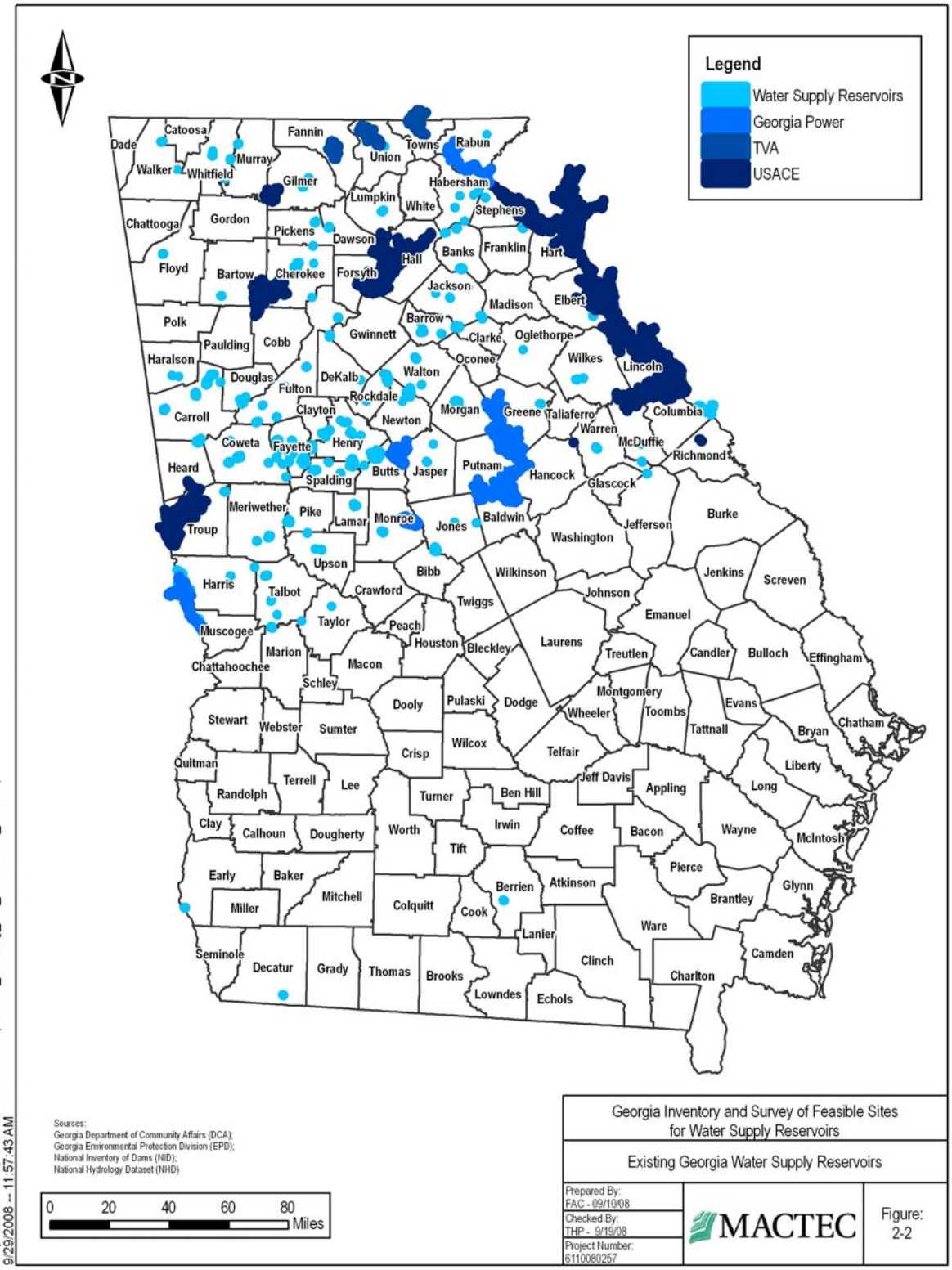
2.2 ANALYSIS OF EXISTING RESERVOIRS

Once the existing water supply reservoirs were identified, they were screened for expansion potential.

Large, multi-function, federally owned reservoirs such as Lake Allatoona, Lake Lanier, Carters Lake, and Lake Hartwell, among others, have substantial surrounding development. These 14 reservoirs were removed from further consideration for physical expansion by dam raising due to the tremendous impact expanding these reservoirs would have on the human environment. These large reservoirs were retained for consideration in Section 5.5, which addresses maximizing water supply yields from existing reservoirs.

Reservoirs flagged by EPD or NID as being privately owned and that listed an individual under the heading “owner” were also removed; these reservoirs are very small and have limited potential to provide multi-jurisdictional or regional water supply. If a reservoir was listed as being privately owned but listed a municipality, corporation, or water authority as the owner, it was retained for additional screening. At this stage, 29 privately owned reservoirs were removed from further screening; 147 existing reservoirs were retained for additional screening.

For the next phase of screening, the DEMs were converted from meters to 10-foot contours. The 10-foot contours were extracted from each DEM and overlaid with the NAIPs and the remaining 147 existing reservoirs. Each reservoir and surrounding location was visually inspected using aerial photographs. False flooding was conducted in 10-foot topographic increments to assess the areas and number of residences or business that might be inundated by expanding the storage volume. Limits for expansion of the storage volume were related to the number of residences (20 residences were used as the initial screening number) that might be inundated and the presence of schools, government complexes, and large commercial or industrial developments to reduce the impact to the human environment and associated acquisition and relocation costs. If further evaluation was deemed warranted, the outermost contour of the potential expansion area was captured and converted to an outline to represent the potential expanded extent of the reservoir. Using these screening criteria, 43 existing reservoirs had apparent potential for physical expansion as shown in Figure 2-3. The existing reservoirs that were screened out at this step were retained in the dataset for possible future consideration.


Legend
Water Supply Reservoirs
Georgia Power
TVA
USACE
N
Dade
Catoosa
Fannin
Towns
Rabun
Walker
Whitfield
Murray
Union
Gilmer
Habersham
Lumpkin
White
Stephens
Chattooga
Gordon
Pickens
Dawson
Hall
Banks
Franklin
Hart
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Polk
Barrow
Gwinnett
Clarke
Oglethorpe
Paulding
Cobb
Haralson
Oconee
Wilkes
Lincoln
Douglas
DeKalb
Walton
Fulton
Rockdale
Carroll
Clayton
Newton
Morgan
Greene
Taliaferro
Columbia
Warren
McDuffie
Coweta
Fayette
Henry
Richmond
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Burke
Troup
Washington
Jefferson
Upson
Bibb
Wilkinson
Jenkins
Screven
Harris
Talbot
Crawford
Twiggs
Johnson
Emanuel
Taylor
Peach
Muscogee
Houston
Bleckley
Laurens
Treutlen
Candler
Bulloch
Effingham
Marion
Chattahoochee
Macon
Schley
Montgomery
Dooly
Pulaski
Dodge
Wheeler
Toombs
Evans
Stewart
Webster
Sumter
Tattnall
Bryan
Chatham
Wilcox
Crisp
Telfair
Quitman
Liberty
Terrell
Jeff Davis
Appling
Long
Randolph
Lee
Turner
Ben Hill
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Pierce
Early
Baker
Berrien
Atkinson
Glynn
Miller
Mitchell
Colquitt
Cook
Brantley
Ware
Lanier
Seminole
Decatur
Grady
Thomas
Brooks
Clinch
Camden
Charlton
Lowndes
Echols
Sources:
Georgia Department of Community Affairs (DCA);
Georgia Environmental Protection Division (EPD);
National Inventory of Dams (NID);
National Hydrology Dataset (NHD)
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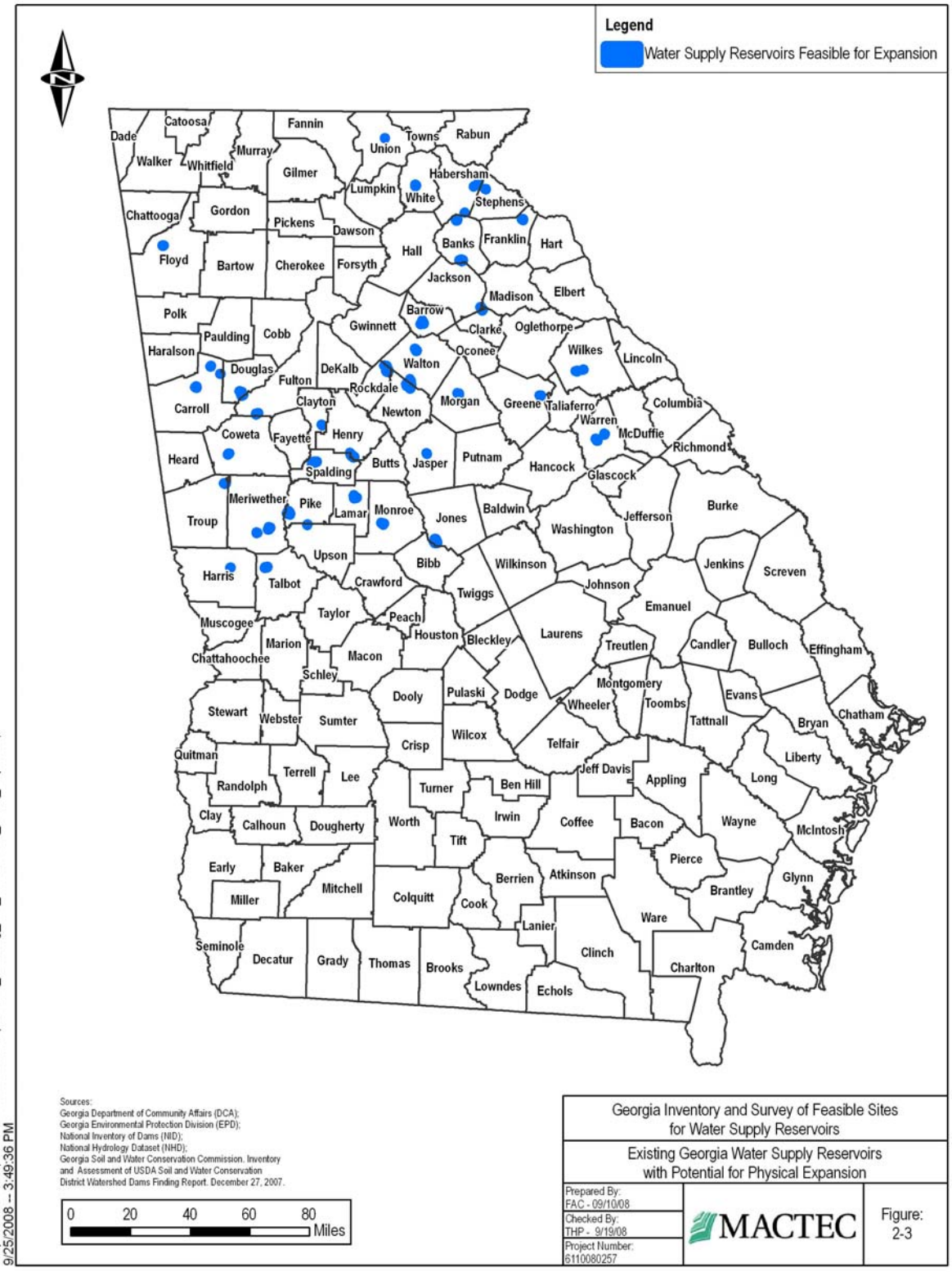
Map Document: (G:\GEFA\mxds\final report\2-2_Existing_GA_Reservoirs_All.mxd)
9/29/2008 -- 11:57:43 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Existing Georgia Water Supply Reservoirs
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-2


Legend
Water Supply Reservoirs Feasible for Expansion
N
Catoosa
Dade
Walker
Whitfield
Murray
Fannin
Union
Towns
Rabun
Gilmer
Habersham
Lumpkin
White
Stephens
Chattooga
Gordon
Pickens
Dawson
Banks
Franklin
Hart
Floyd
Bartow
Cherokee
Forsyth
Hall
Jackson
Madison
Elbert
Polk
Paulding
Cobb
Barrow
Gwinnett
Clarke
Oglethorpe
Haralson
Douglas
Fulton
DeKalb
Walton
Oconee
Wilkes
Lincoln
Carroll
Clayton
Rockdale
Newton
Morgan
Greene
Taliaferro
Warren
Columbia
Coweta
Fayette
Henry
McDuffie
Richmond
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Washington
Jefferson
Burke
Troup
Upson
Bibb
Wilkinson
Jenkins
Screven
Harris
Talbot
Crawford
Twiggs
Johnson
Taylor
Peach
Houston
Bleckley
Laurens
Emanuel
Muscogee
Marion
Macon
Treutlen
Candler
Bulloch
Effingham
Chattahoochee
Schley
Dooly
Pulaski
Dodge
Montgomery
Evans
Stewart
Webster
Sumter
Wheeler
Toombs
Tattnall
Bryan
Chatham
Crisp
Wilcox
Telfair
Quitman
Terrell
Lee
Jeff Davis
Appling
Liberty
Randolph
Turner
Ben Hill
Long
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Early
Baker
Berrien
Atkinson
Pierce
Glynn
Miller
Mitchell
Colquitt
Cook
Brantley
Ware
Lanier
Seminole
Decatur
Grady
Thomas
Brooks
Clinch
Camden
Charlton
Lowndes
Echols
Sources:
Georgia Department of Community Affairs (DCA);
Georgia Environmental Protection Division (EPD);
National Inventory of Dams (NID);
National Hydrology Dataset (NHD);
Georgia Soil and Water Conservation Commission. Inventory and Assessment of USDA Soil and Water Conservation District Watershed Dams Finding Report. December 27, 2007.
0 20 40 60 80 Miles
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Existing Georgia Water Supply Reservoirs with Potential for Physical Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-3
Map Document: (G:\GEFA\mxds\final report\2-3_Existing_GA_Reservoirs_Feas_Exp.mxd)
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The final phase of screening for potential expansion of existing reservoirs was based on the reported existing size of the reservoir. A reservoir that had a reported existing top of dam storage volume of approximately 1 billion gallons (BG) or greater or a surface area of approximately 100 acres or larger was selected as a reservoir with the potential to serve as a regional or multi-jurisdictional reservoir after expansion. Sixteen reservoirs were retained for additional evaluation (Figure 2-4). Figure 2-5 shows a flow diagram that represents the existing water supply reservoir screening process.

For the 16 existing reservoirs retained for additional evaluation, the reservoir outlines were converted to three-dimensional shapes to calculate the potential expansion volumes in BG. Potential expansion volumes are listed in Table 2-1 and shown in Figures 2-6 through 2-21. These existing reservoirs should be evaluated in more detail to better estimate their potential for expanded storage capacities, possible service areas, and water supply yields. Further assessments of potential human and environmental impacts are also needed, as well as determinations of the costs associated with enlarging the reservoirs.

TABLE 2-1

Potential Expansion Volumes for Existing Reservoirs

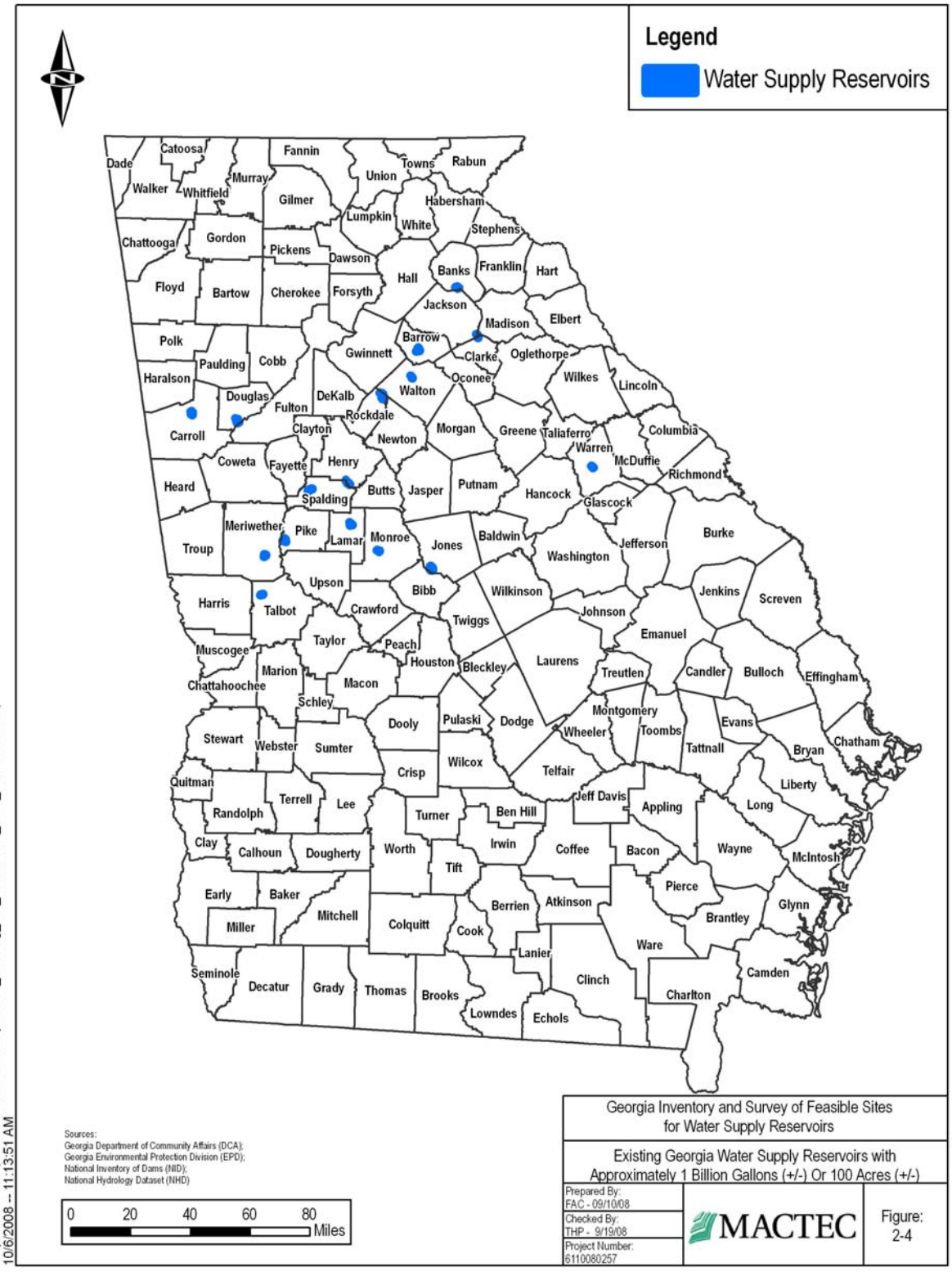
Name	County	Existing Reservoir Top of Dam Volume (BG)	Volume of Proposed Expansion or Final Volume (BG)	Final Volume (BG)
Big Haynes Creek Reservoir	Rockdale	4.9*	5.4	10.3
Cane Creek Structure Number Two	Meriwether	1.1	3.44	4.54
Dog River Reservoir	Douglas	1.28	4.16	5.44
Edie Creek-Barnesville	Lamar	0.4	2.5	2.9
Heads Creek Reservoir	Spalding	2.5	1.5	4.0
John T Briscoe Reservoir	Walton	0.99	3.19	4.18
Long Branch Reservoir	Henry	ISD	4.19	ISD
Reservoir 51	Banks	3.9	1.3	5.2
Rocky Comfort Creek-Warrenton	Warren	1.3	2.17	3.47
Rush Creek Reservoir	Talbot	0.8*	2.1	2.9
Sandy Creek Reservoir	Clarke	1.9	2.03	3.93
Sharpe's Creek Reservoir	Carroll	1.63	1.1	2.73
Still Branch Reservoir	Pike	1.5*	2.7	4.2
Tobesofkee Creek Reservoir	Monroe	0.26	9.68	9.94
Town Creek Reservoir	Jones	8.7	3.25	11.95
Yargo Lake Reservoir	Barrow	ISD	2.98	ISD

Acronyms:
BG – Billion gallons
ISD – Insufficient data

PREPARED/DATE: THP 09-17-08
CHECKED/DATE: MET 09-17-08

Note:
* Data were not included in the databases obtained from the Georgia Environmental Protection Division and National Inventory of Dams and were calculated using geographic information system (GIS) 3-Dimensional Analyst.

Sources:
Georgia Geographic Information System Clearinghouse. https://gis1.state.ga.us/index.asp. 2008.
U.S. Environmental Protection Agency Office of Water Georgia GIS Clearinghouse. Environmental Protection Agency National Inventory of Dams in BASINS for Georgia. https://gis1.state.ga.us/index.asp. Downloaded August 13, 2008.


Legend
Water Supply Reservoirs
N
Dade
Catoosa
Fannin
Towns
Rabun
Walker
Whitfield
Murray
Union
Gilmer
Habersham
Lumpkin
White
Stephens
Chattooga
Gordon
Pickens
Dawson
Hall
Banks
Franklin
Hart
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Polk
Barrow
Gwinnett
Clarke
Oglethorpe
Paulding
Cobb
Haralson
Oconee
Wilkes
Lincoln
Douglas
DeKalb
Walton
Fulton
Rockdale
Carroll
Clayton
Newton
Morgan
Greene
Taliaferro
Columbia
Warren
McDuffie
Coweta
Fayette
Henry
Richmond
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Burke
Troup
Washington
Jefferson
Upson
Bibb
Wilkinson
Jenkins
Screven
Harris
Talbot
Crawford
Twiggs
Johnson
Emanuel
Taylor
Peach
Muscogee
Houston
Bleckley
Laurens
Treutlen
Candler
Bulloch
Effingham
Marion
Chattahoochee
Macon
Schley
Montgomery
Dooly
Pulaski
Dodge
Evans
Stewart
Webster
Sumter
Wheeler
Toombs
Tattnall
Bryan
Chatham
Crisp
Wilcox
Telfair
Quitman
Liberty
Terrell
Lee
Jeff Davis
Appling
Long
Randolph
Turner
Ben Hill
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Pierce
Early
Baker
Berrien
Atkinson
Glynn
Mitchell
Brantley
Miller
Colquitt
Cook
Ware
Lanier
Seminole
Decatur
Grady
Thomas
Brooks
Clinch
Camden
Charlton
Lowndes
Echols
Sources:
Georgia Department of Community Affairs (DCA);
Georgia Environmental Protection Division (EPD);
National Inventory of Dams (NID);
National Hydrology Dataset (NHD)
0 20 40 60 80
Miles
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Existing Georgia Water Supply Reservoirs with Approximately 1 Billion Gallons (+/-) Or 100 Acres (+/-)
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-4
Map Document: (G:\GEFA\mxds\final report\2-4_Existing_GA_Reservoirs_1BG_100Acres.mxd)
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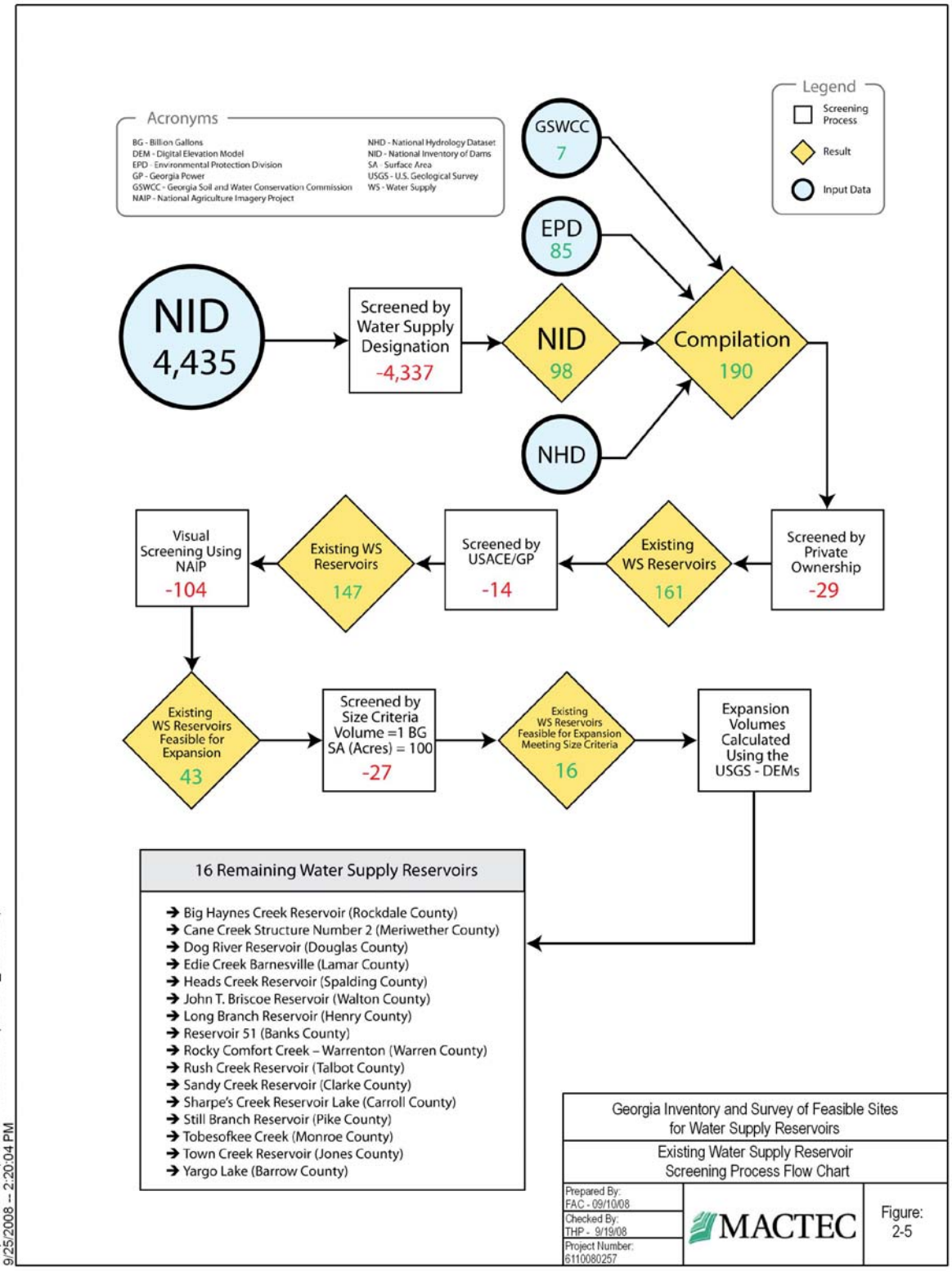
Acronyms
BG - Billion Gallons
DEM - Digital Elevation Model
EPD - Environmental Protection Division
GP - Georgia Power
GSWCC - Georgia Soil and Water Conservation Commission
NAIP - National Agriculture Imagery Project
NHD - National Hydrology Dataset
NID - National Inventory of Dams
SA - Surface Area
USGS - U.S. Geological Survey
WS - Water Supply
Legend
Screening Process
Result
Input Data
GSWCC 7
EPD 85
NID 4,435
Screened by Water Supply Designation -4,337
NID 98
NHD
Compilation 190
Screened by Private Ownership -29
Existing WS Reservoirs 161
Screened by USACE/GP -14
Existing WS Reservoirs 147
Visual Screening Using NAIP -104
Existing WS Reservoirs Feasible for Expansion 43
Screened by Size Criteria Volume =1 BG SA (Acres) = 100 -27
Existing WS Reservoirs Feasible for Expansion Meeting Size Criteria 16
Expansion Volumes Calculated Using the USGS - DEMs
16 Remaining Water Supply Reservoirs
Big Haynes Creek Reservoir (Rockdale County)
Cane Creek Structure Number 2 (Meriwether County)
Dog River Reservoir (Douglas County)
Edie Creek Barnesville (Lamar County)
Heads Creek Reservoir (Spalding County)
John T. Briscoe Reservoir (Walton County)
Long Branch Reservoir (Henry County)
Reservoir 51 (Banks County)
Rocky Comfort Creek – Warrenton (Warren County)
Rush Creek Reservoir (Talbot County)
Sandy Creek Reservoir (Clarke County)
Sharpe's Creek Reservoir Lake (Carroll County)
Still Branch Reservoir (Pike County)
Tobesofkee Creek (Monroe County)
Town Creek Reservoir (Jones County)
Yargo Lake (Barrow County)
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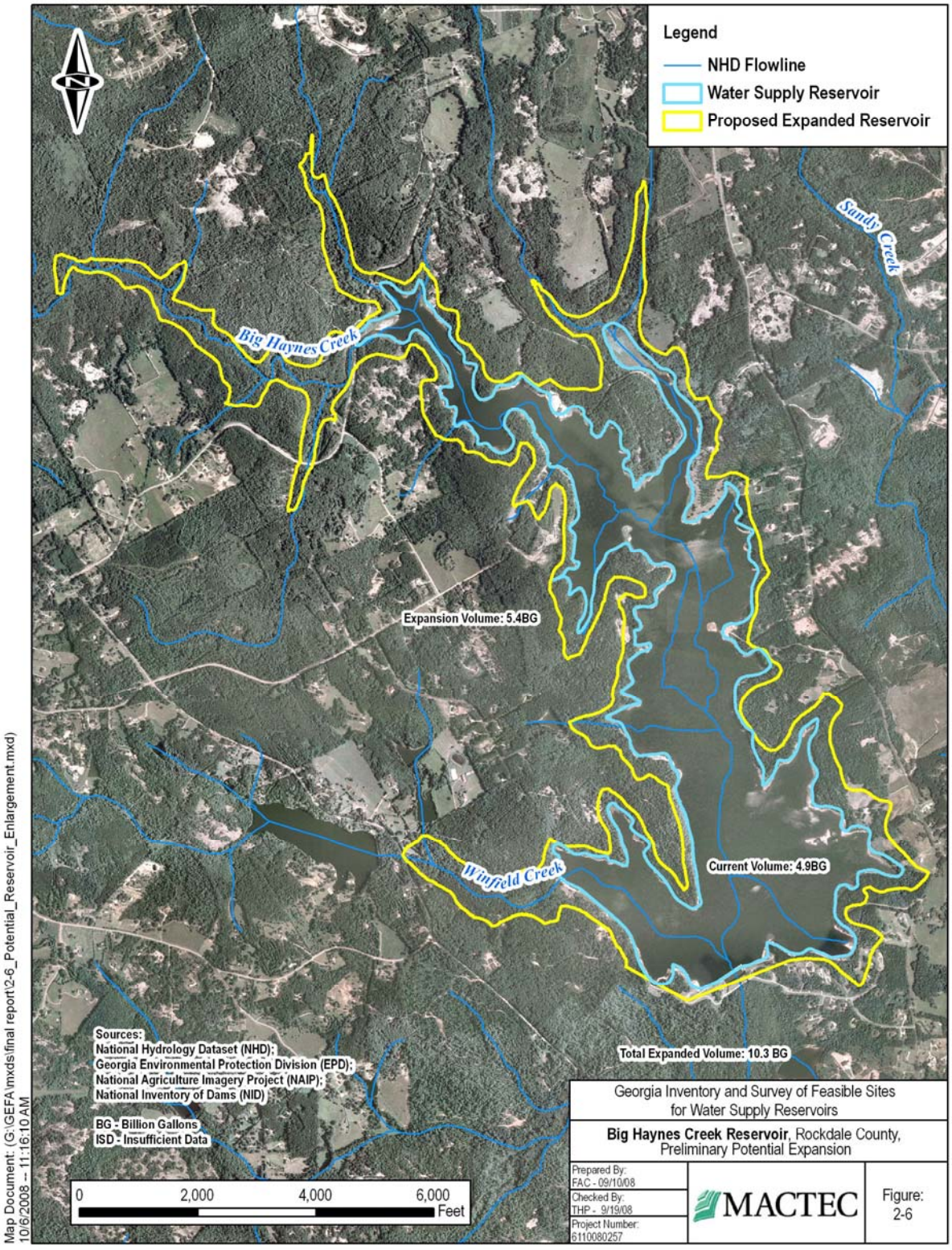
9/25/2008 -- 2:20:04 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Existing Water Supply Reservoir Screening Process Flow Chart
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-5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NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Big Haynes Creek
Sandy Creek
Winfield Creek
Expansion Volume: 5.4BG
Current Volume: 4.9BG
Total Expanded Volume: 10.3 BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
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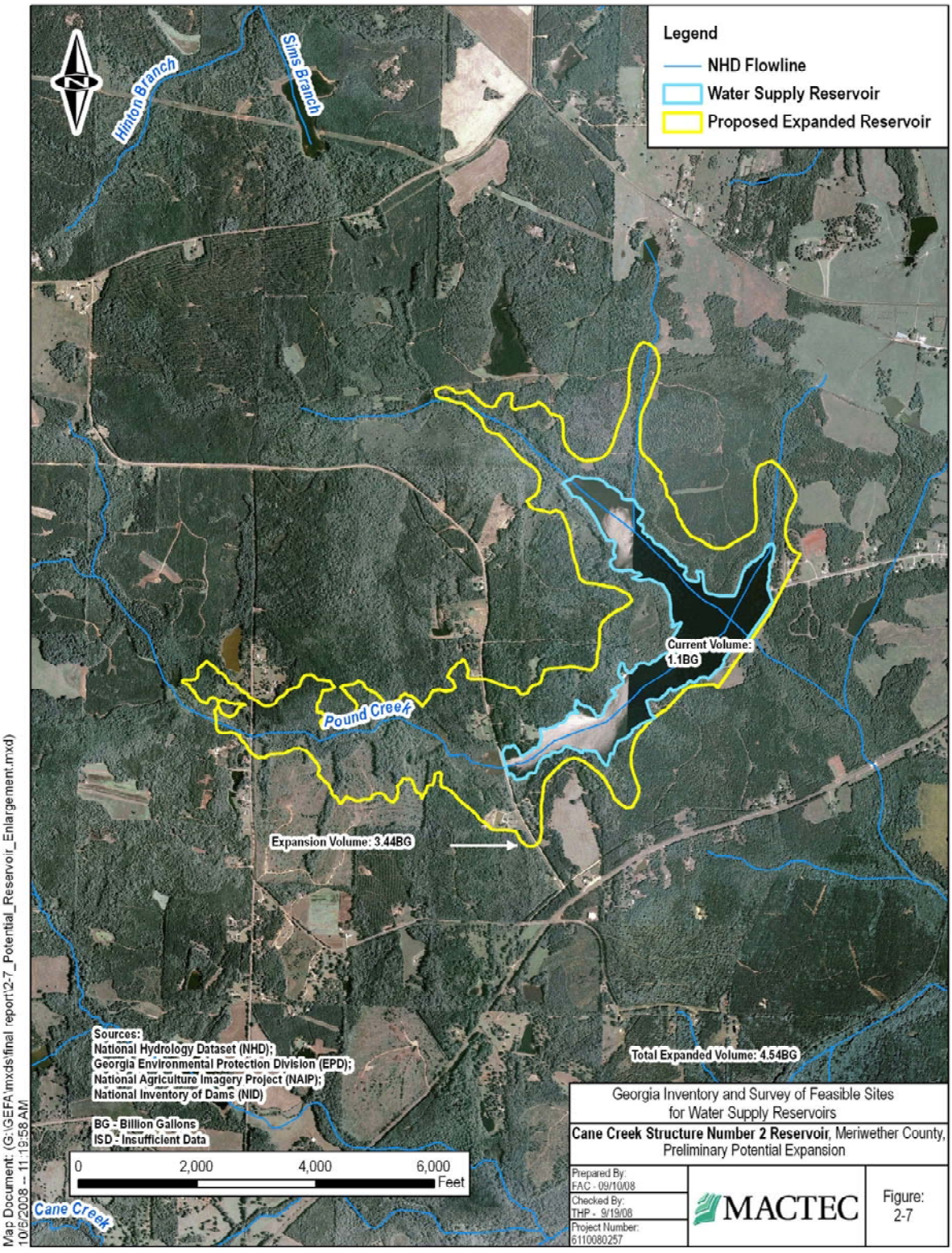
10/6/2008 -- 11:16:10 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Big Haynes Creek Reservoir, Rockdale County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-6


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Hinton Branch
Sims Branch
Pound Creek
Cane Creek
Current Volume: 1.1BG
Expansion Volume: 3.44BG
Total Expanded Volume: 4.54BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
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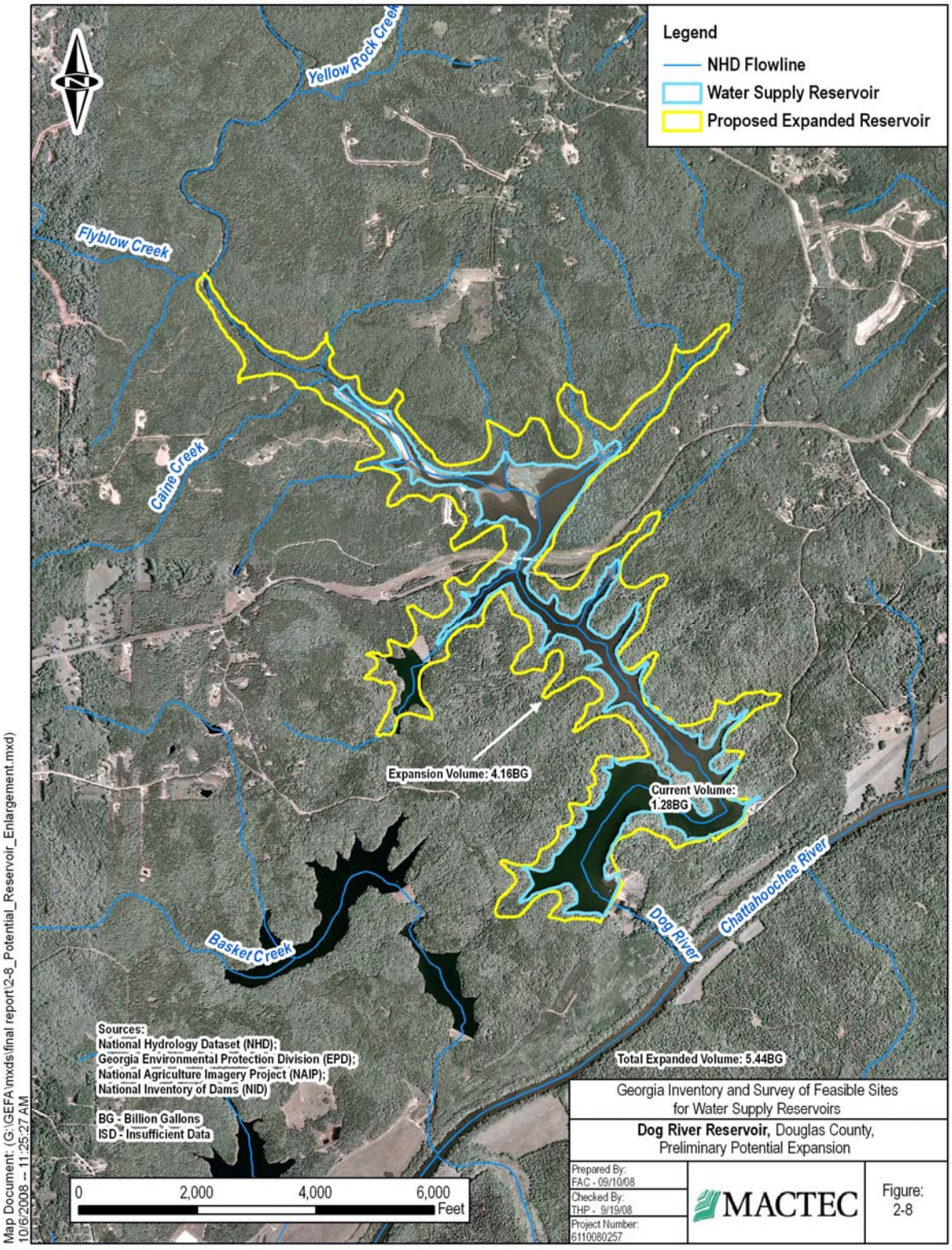
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Cane Creek Structure Number 2 Reservoir, Meriwether County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-7


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Yellow Rock Creek
Flyblow Creek
Caine Creek
Basket Creek
Dog River
Chattahoochee River
Expansion Volume: 4.16BG
Current Volume: 1.28BG
Total Expanded Volume: 5.44BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
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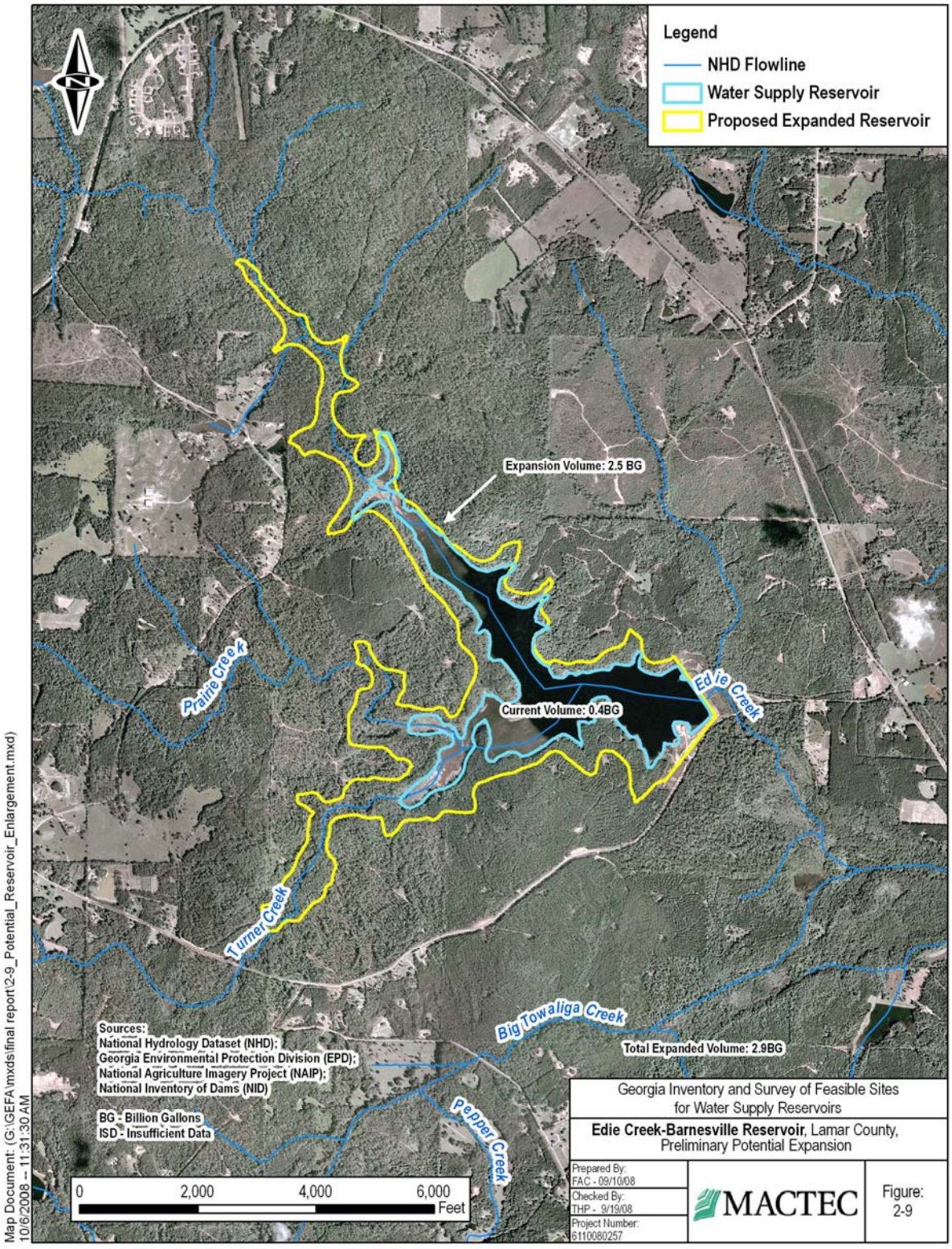
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Dog River Reservoir, Douglas County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-8


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Expansion Volume: 2.5 BG
Current Volume: 0.4BG
Total Expanded Volume: 2.9BG
Prairie Creek
Edie Creek
Turner Creek
Big Towaliga Creek
Pepper Creek
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
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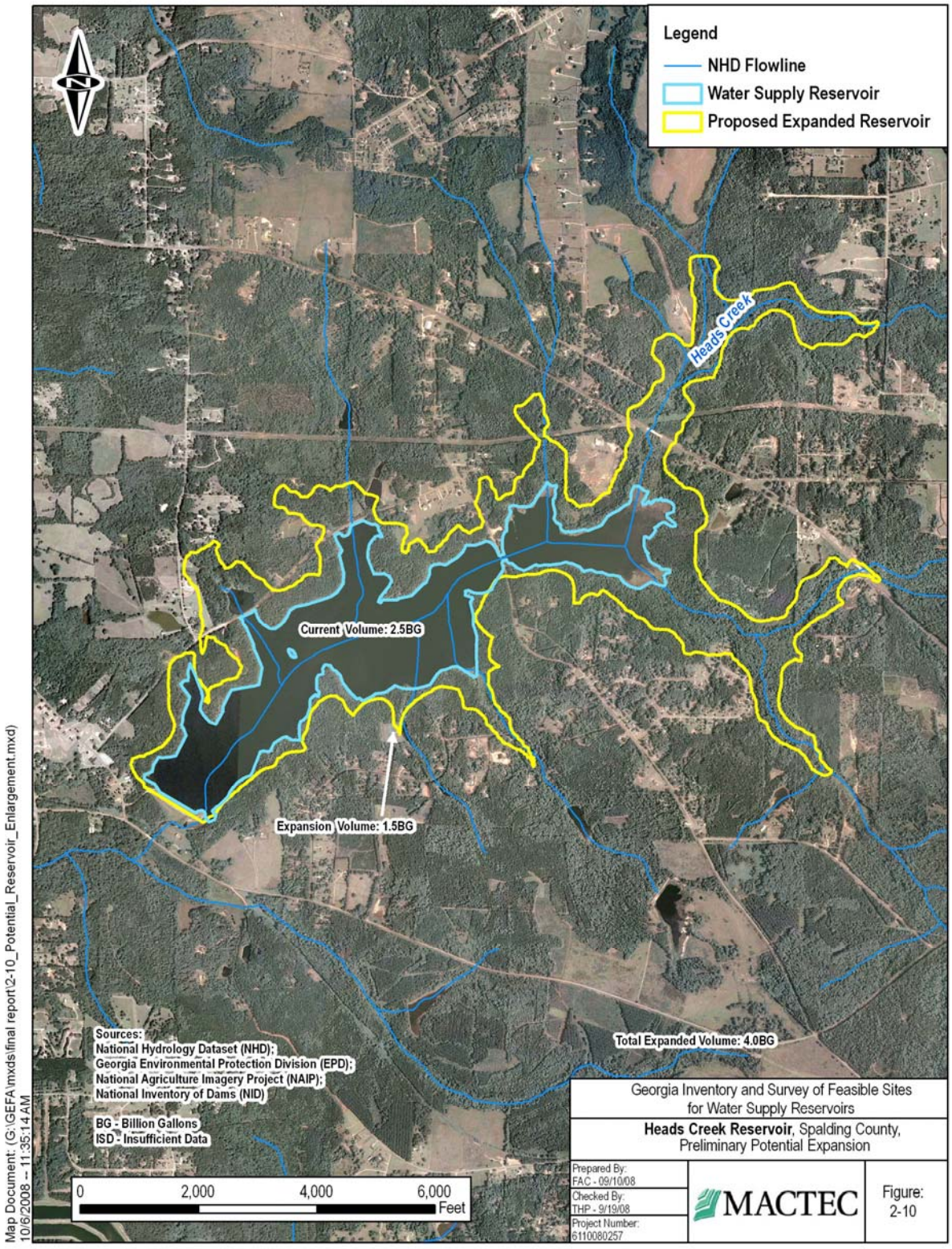
10/6/2008 -- 11:31:30 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Edie Creek-Barnesville Reservoir, Lamar County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-9


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Heads Creek
Current Volume: 2.5BG
Expansion Volume: 1.5BG
Total Expanded Volume: 4.0BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
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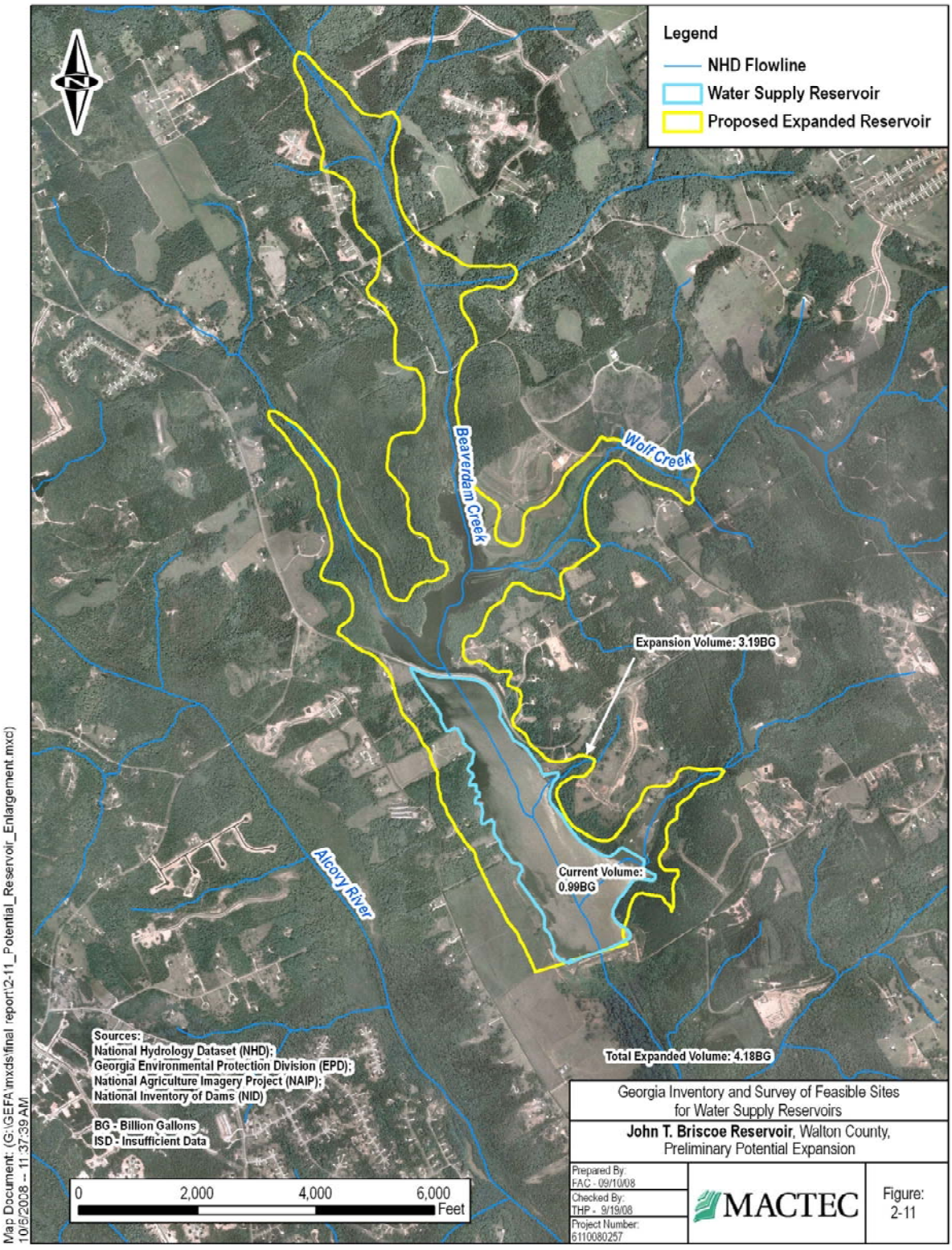
Map Document: (G:\GEFA\mxds\final report\2-10_Potential_Reservoir_Enlargement.mxd)
10/6/2008 -- 11:35:14 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Heads Creek Reservoir, Spalding County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-10


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Beaverdam Creek
Wolf Creek
Expansion Volume: 3.19BG
Current Volume: 0.99BG
Alcovy River
Total Expanded Volume: 4.18BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-11_Potential_Reservoir_Enlargement.mxd)
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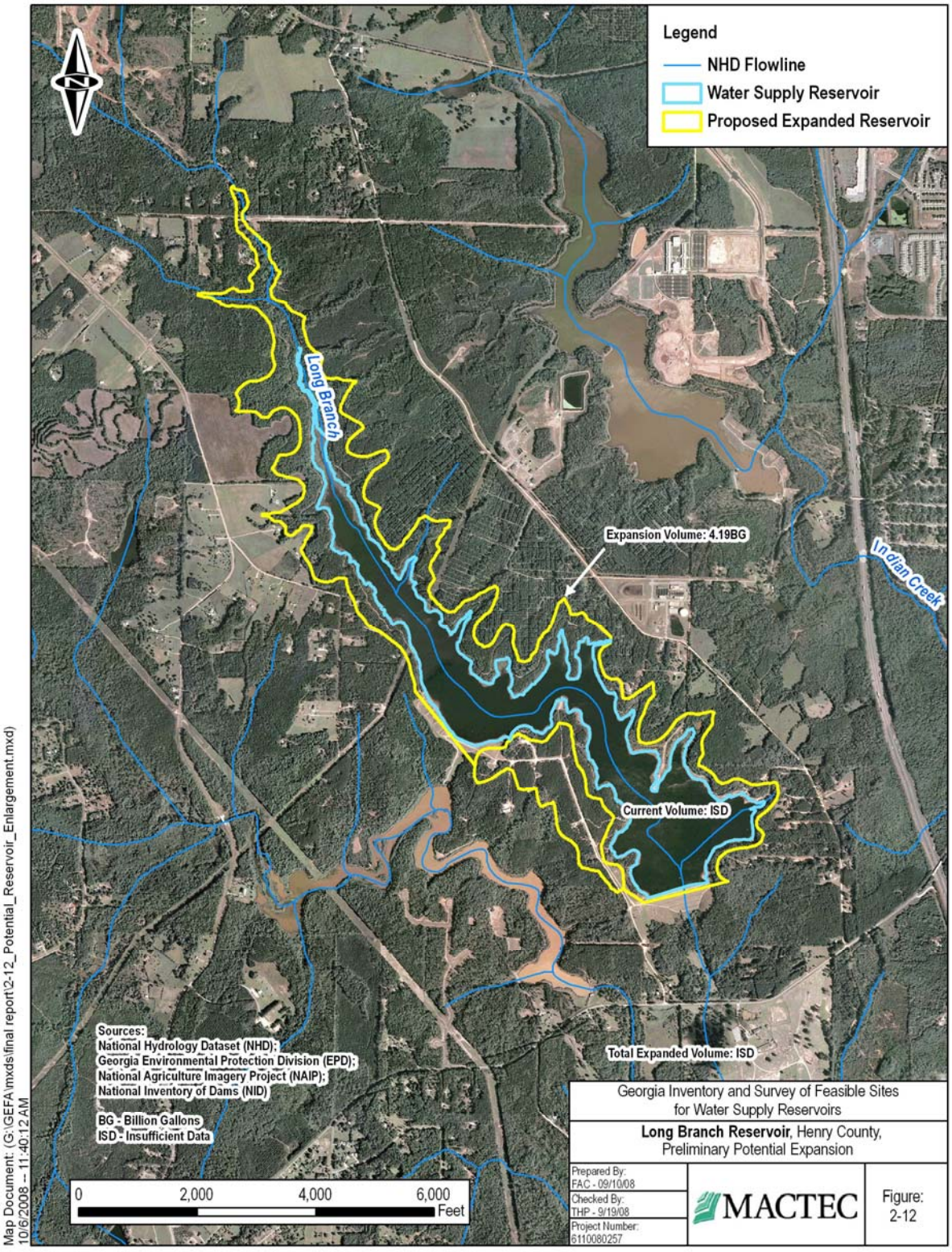
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
John T. Briscoe Reservoir, Walton County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-11


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Long Branch
Expansion Volume: 4.19BG
Indian Creek
Current Volume: ISD
Total Expanded Volume: ISD
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
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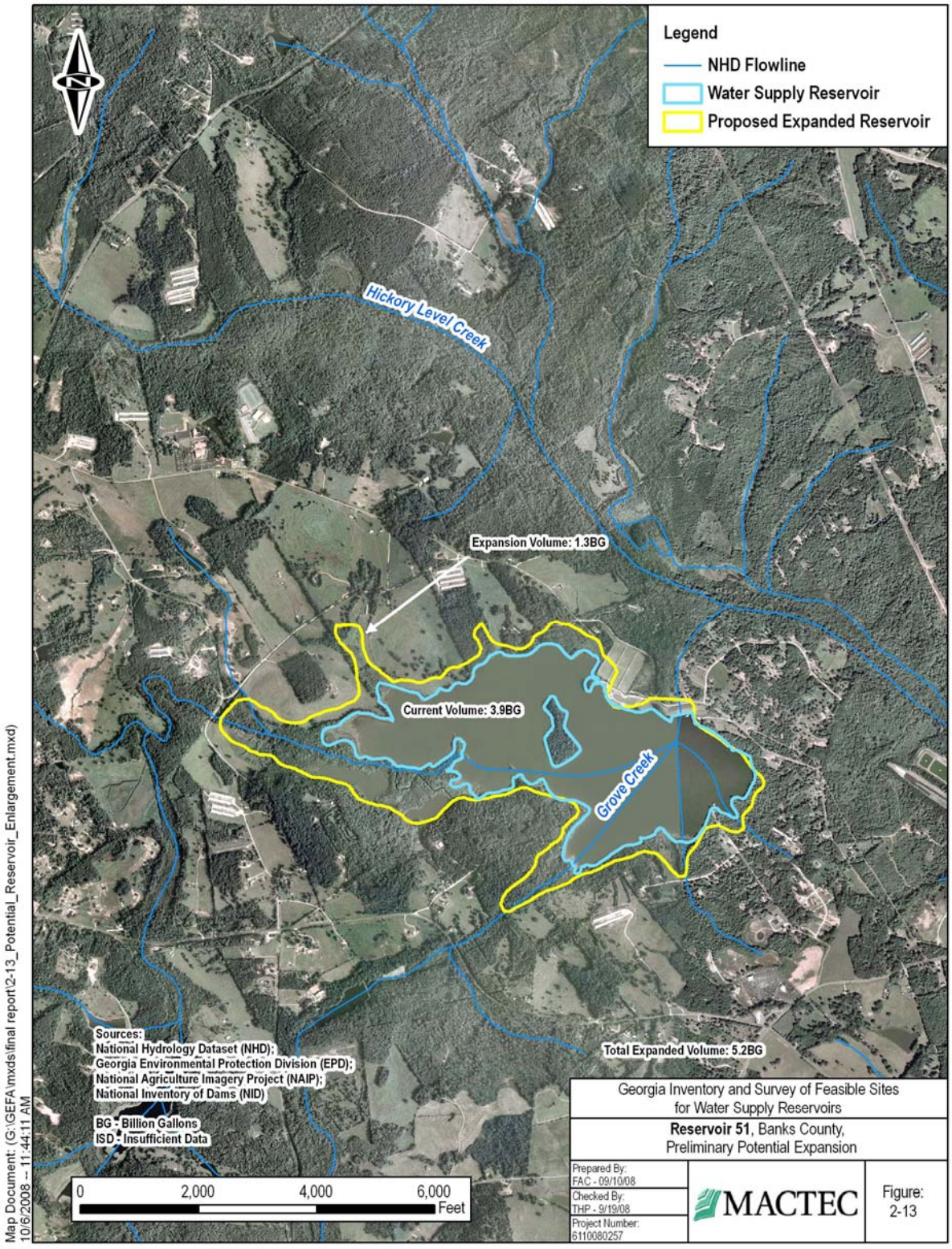
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Long Branch Reservoir, Henry County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-12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NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Hickory Level Creek
Expansion Volume: 1.3BG
Current Volume: 3.9BG
Grove Creek
Total Expanded Volume: 5.2BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
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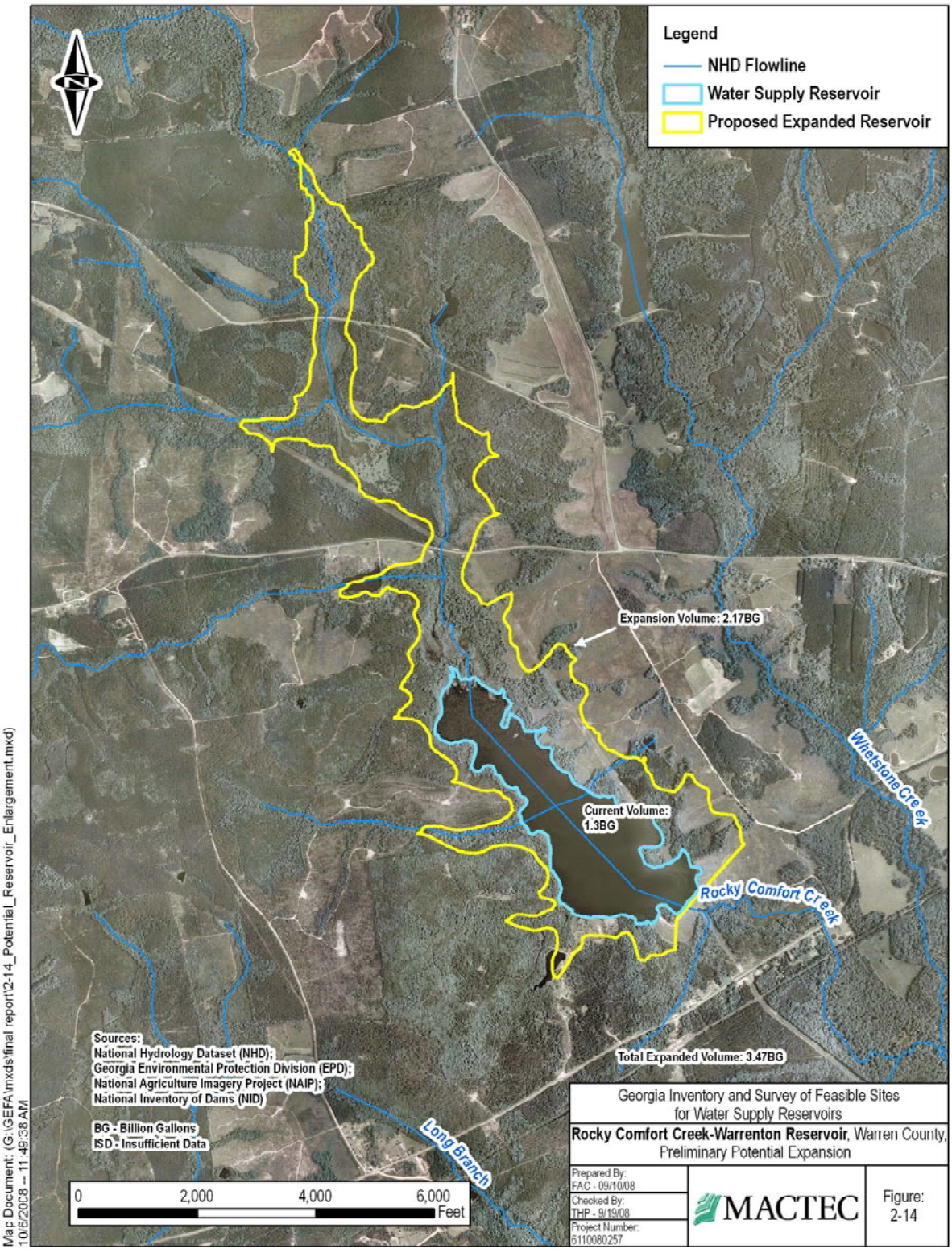
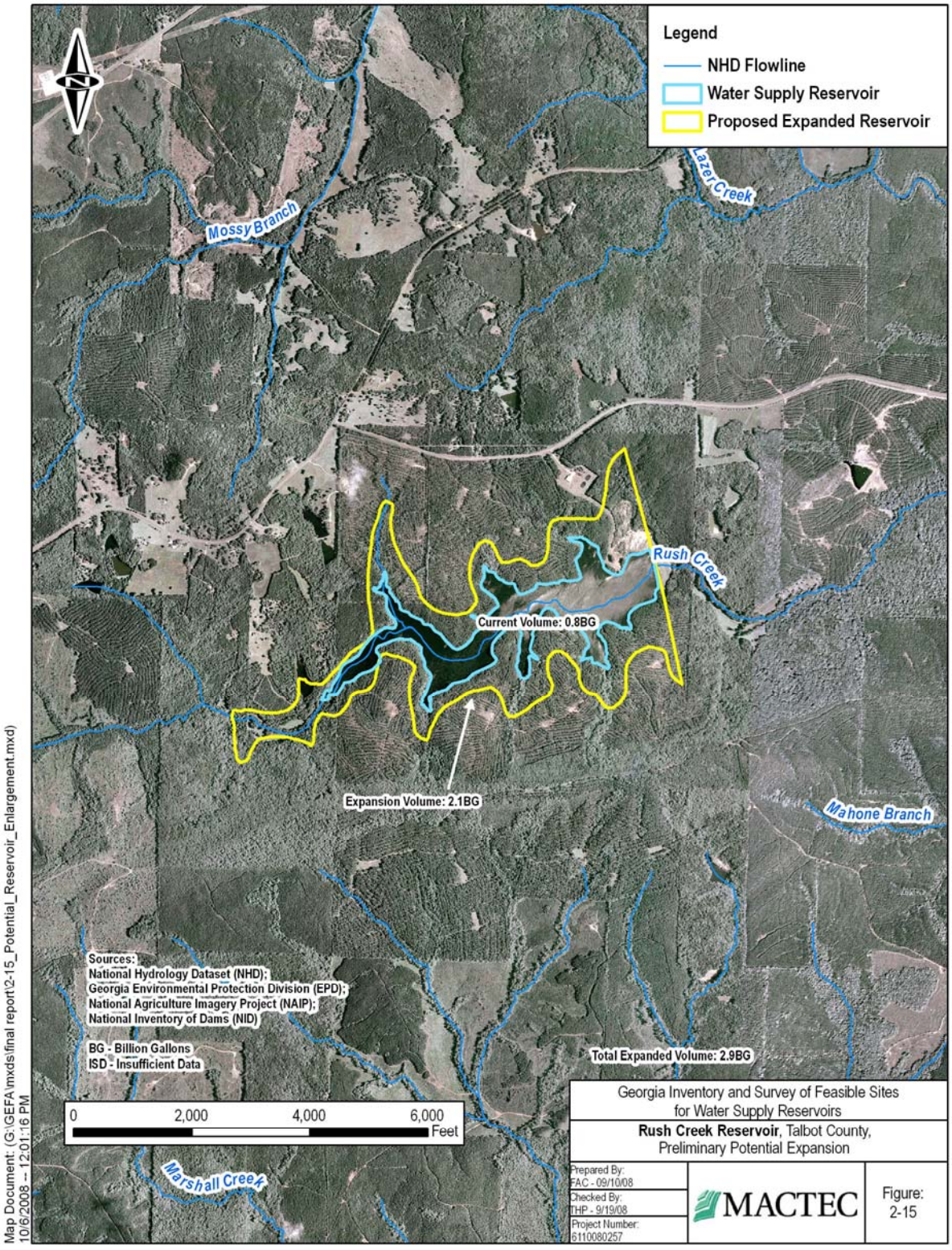
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Reservoir 51, Banks County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-13


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Expansion Volume: 2.17BG
Current Volume: 1.3BG
Total Expanded Volume: 3.47BG
Whetstone Creek
Rocky Comfort Creek
Long Branch
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-14_Potential_Reservoir_Enlargement.mxd)
10/6/2008 -- 11:48:38 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Rocky Comfort Creek-Warrenton Reservoir, Warren County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-14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NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Mossy Branch
Lazer Creek
Rush Creek
Current Volume: 0.8BG
Expansion Volume: 2.1BG
Mahone Branch
Marshall Creek
Total Expanded Volume: 2.9BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-15_Potential_Reservoir_Enlargement.mxd)
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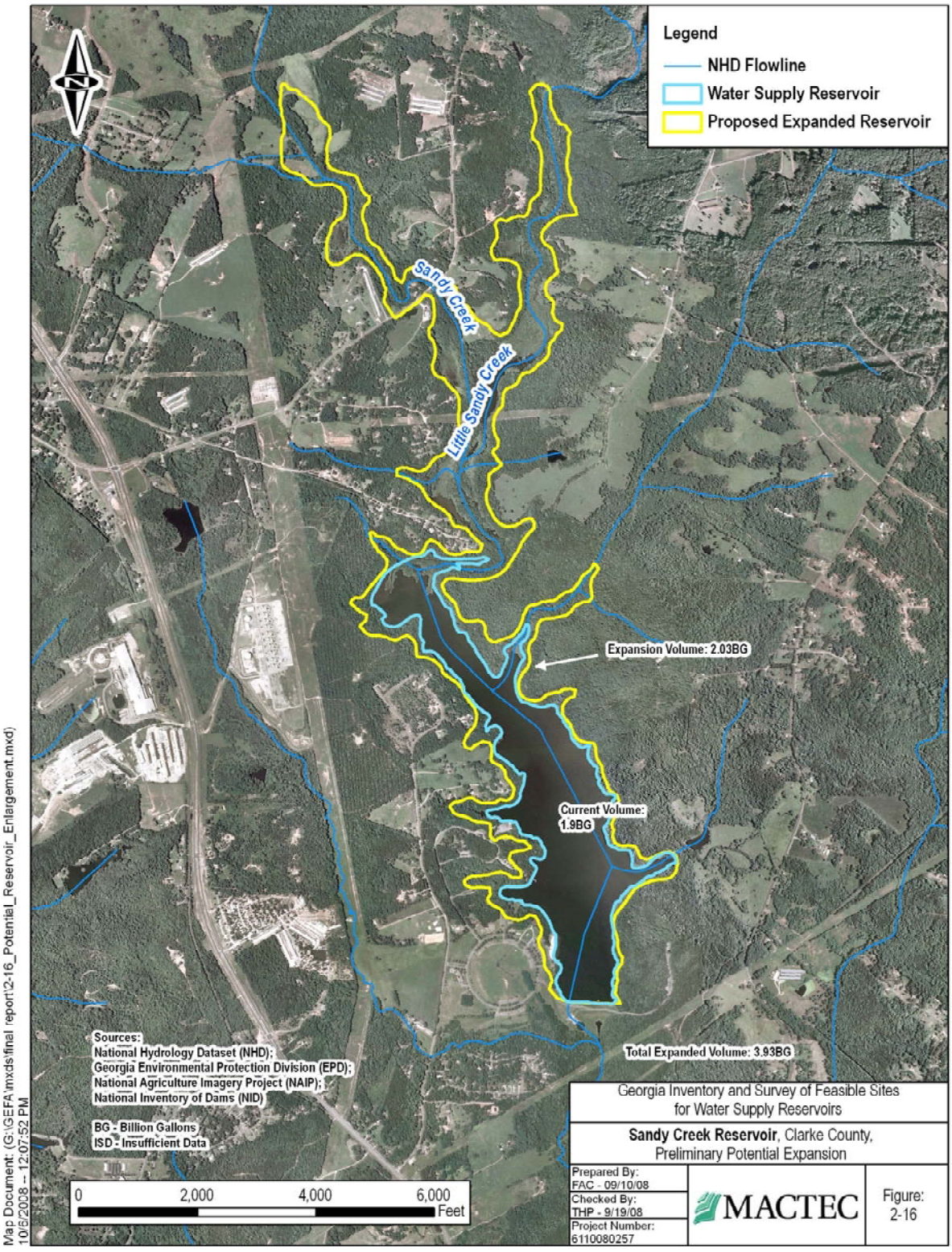
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Rush Creek Reservoir, Talbot County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-15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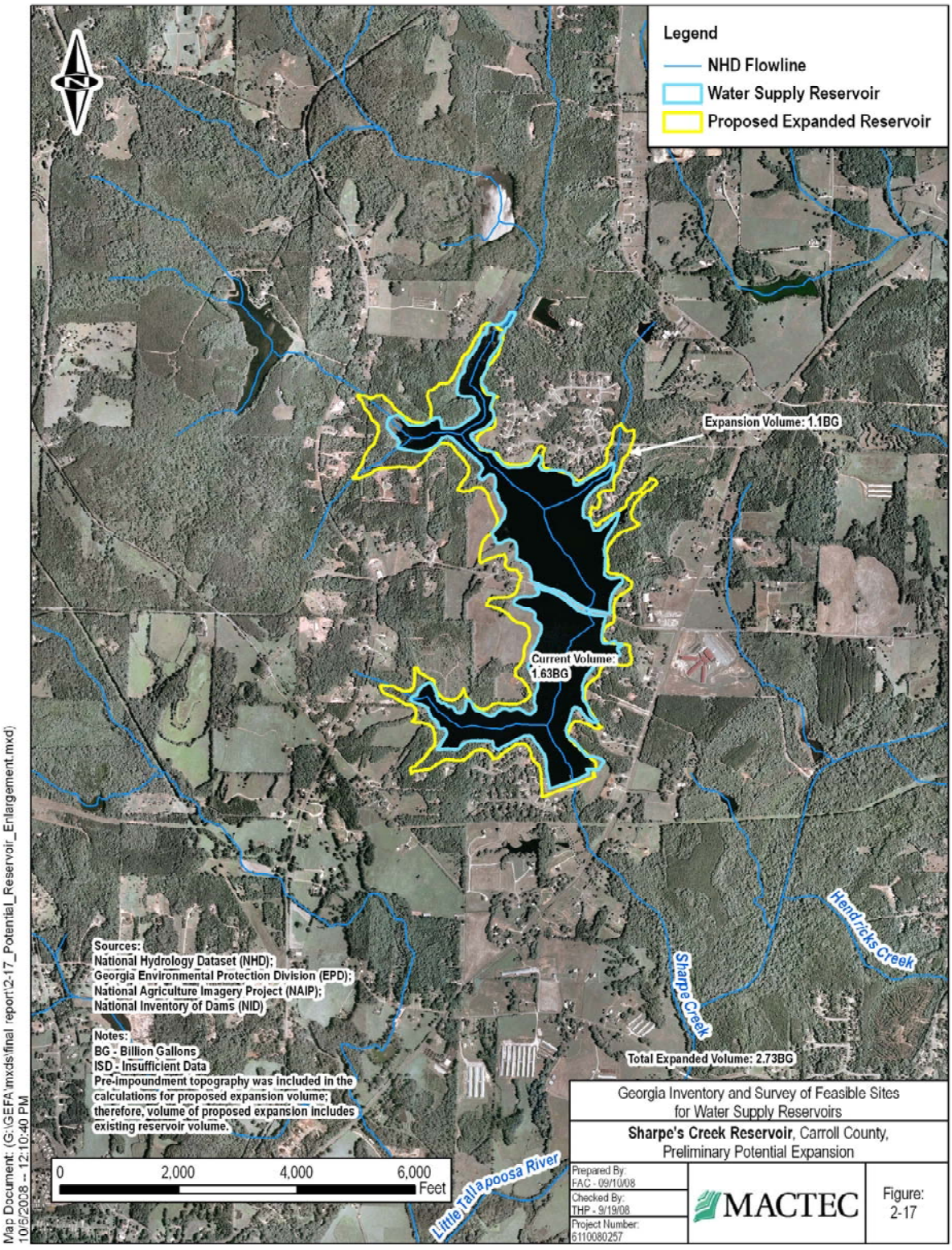
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Sandy Creek
Little Sandy Creek
Expansion Volume: 2.03BG
Current Volume: 1.9BG
Total Expanded Volume: 3.93BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-16_Potential_Reservoir_Enlargement.mxd)
10/6/2008 -- 12:07:52 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Sandy Creek Reservoir, Clarke County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-16


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
N
Expansion Volume: 1.1BG
Current Volume: 1.63BG
Total Expanded Volume: 2.73BG
Sharpe Creek
Hendricks Creek
Little Tallapoosa River
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
Notes:
BG - Billion Gallons
ISD - Insufficient Data
Pre-impoundment topography was included in the calculations for proposed expansion volume; therefore, volume of proposed expansion includes existing reservoir volume.
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-17_Potential_Reservoir_Enlargement.mxd)
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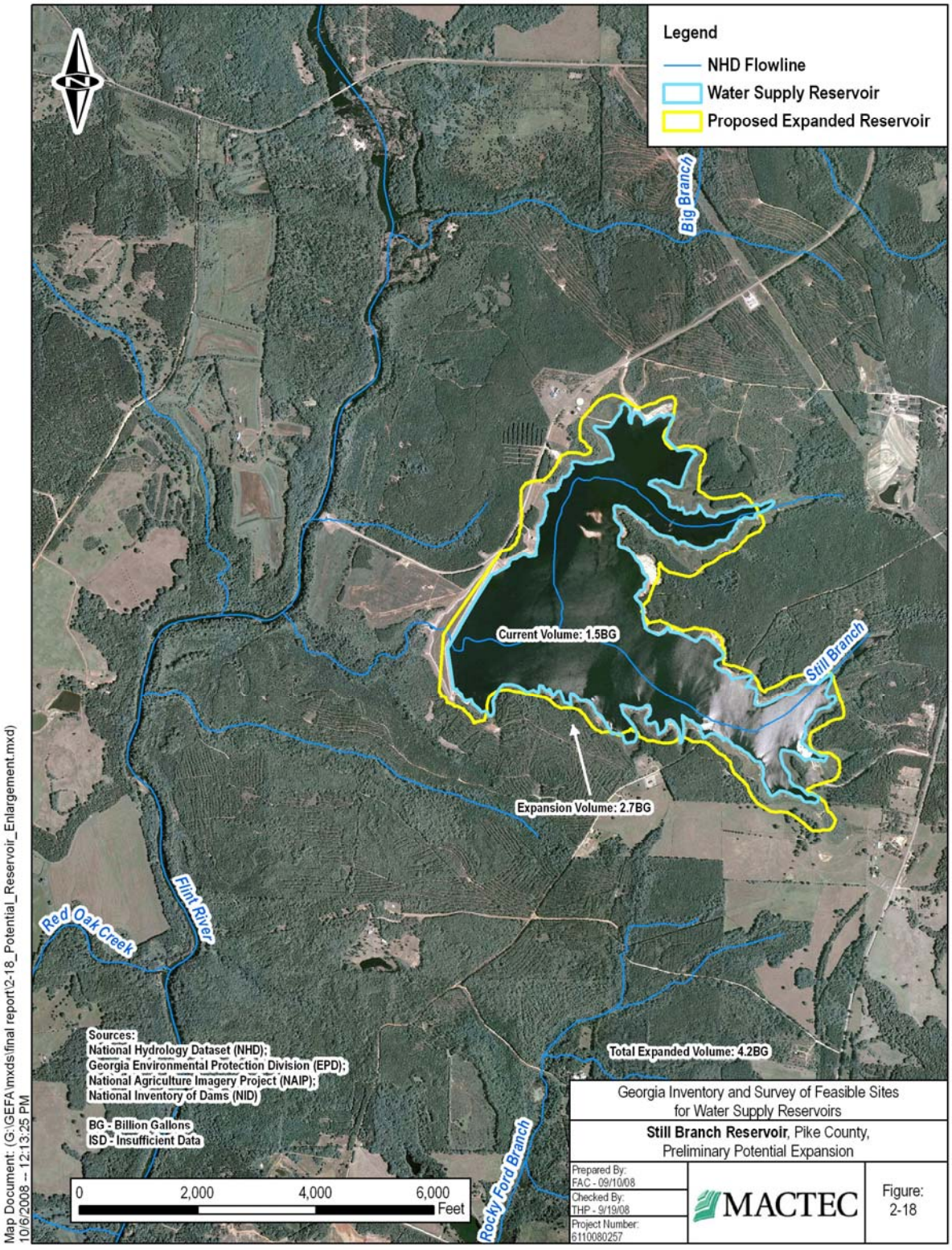
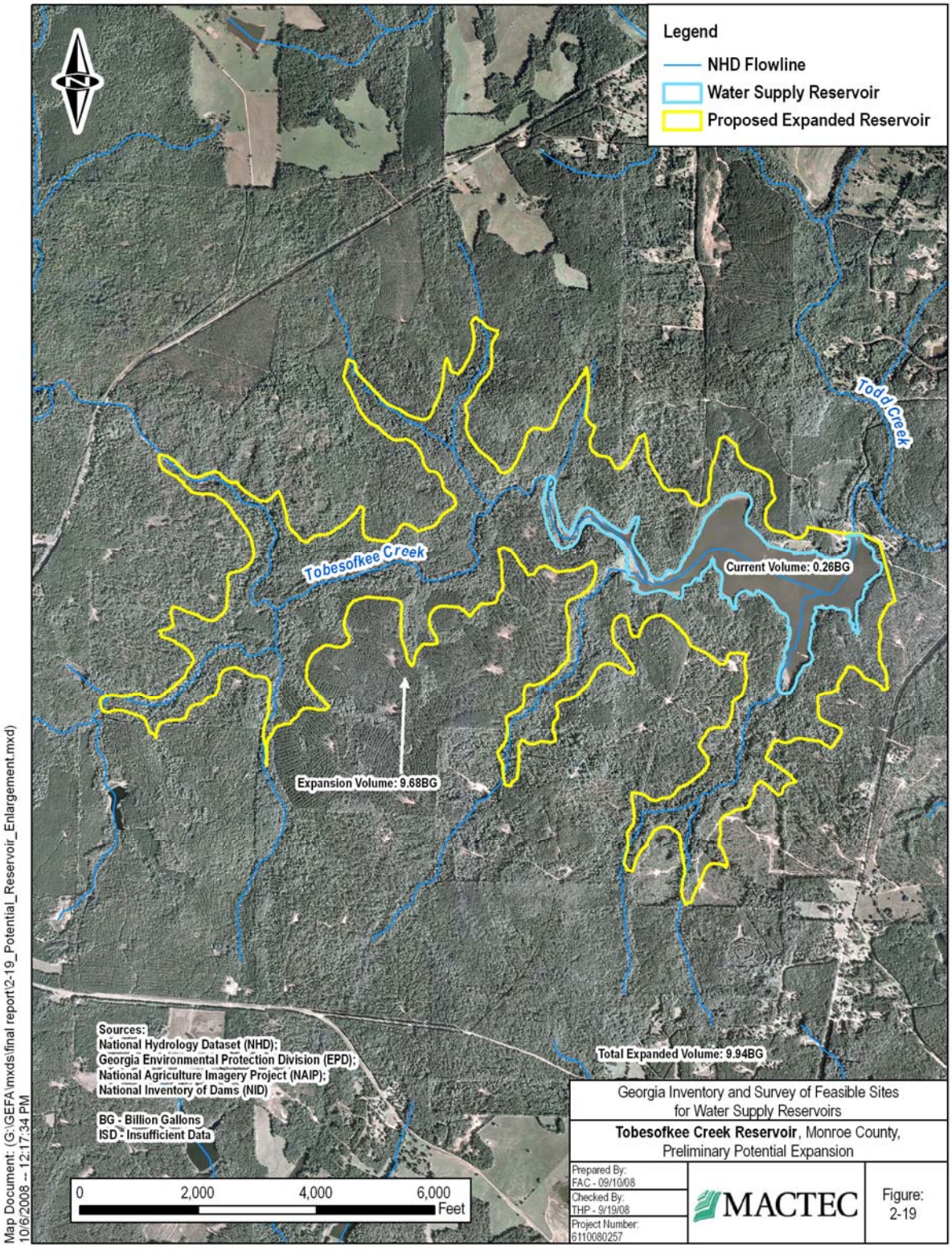
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Sharpe's Creek Reservoir, Carroll County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-17


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Big Branch
Current Volume: 1.5BG
Still Branch
Expansion Volume: 2.7BG
Flint River
Red Oak Creek
Rocky Ford Branch
Total Expanded Volume: 4.2BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-18_Potential_Reservoir_Enlargement.mxd)
10/6/2008 -- 12:13:25 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Still Branch Reservoir, Pike County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-18


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Tobesofkee Creek
Todd Creek
Current Volume: 0.26BG
Expansion Volume: 9.68BG
Total Expanded Volume: 9.94BG
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-19_Potential_Reservoir_Enlargement.mxd)
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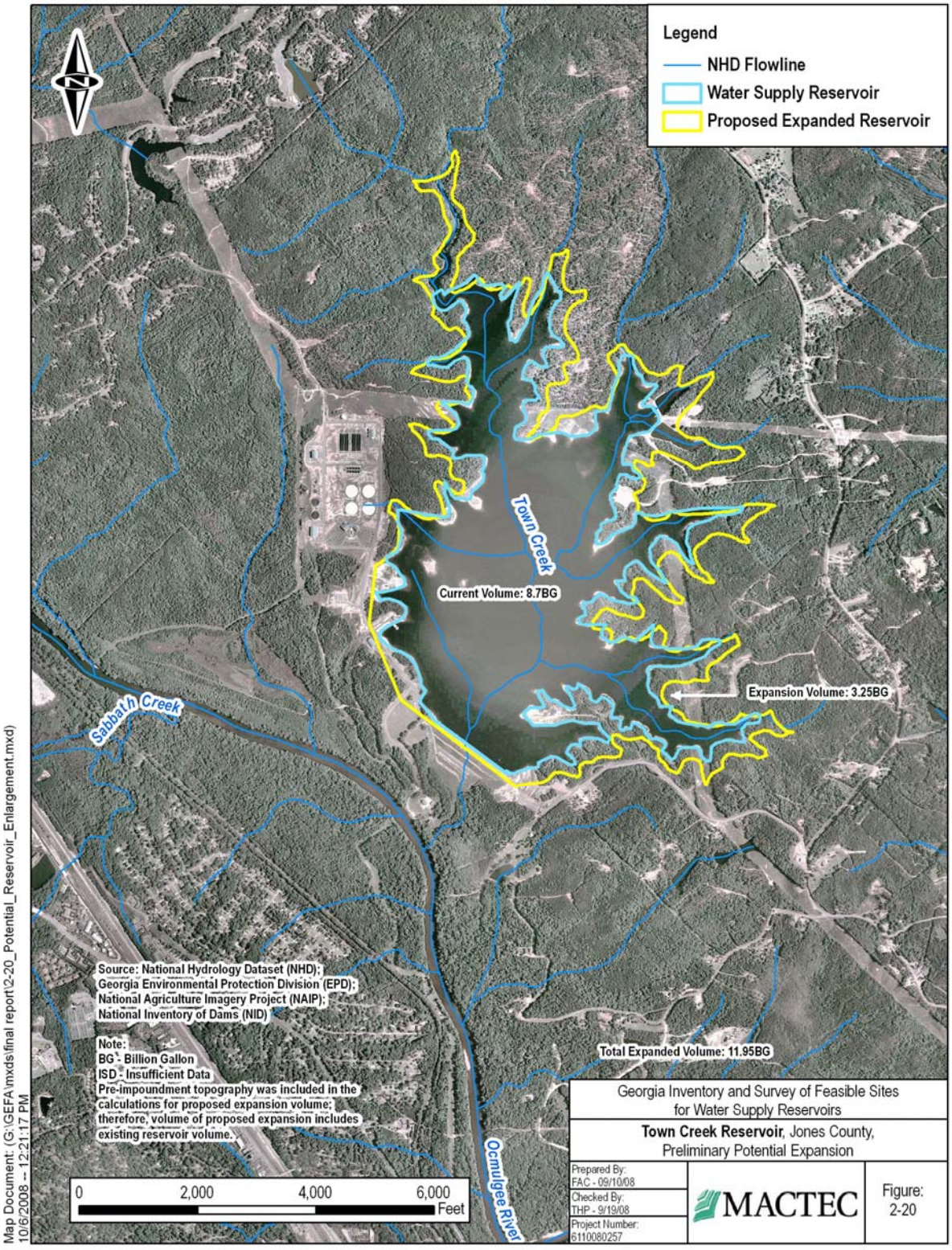
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Tobesofkee Creek Reservoir, Monroe County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-19


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Town Creek
Current Volume: 8.7BG
Expansion Volume: 3.25BG
Total Expanded Volume: 11.95BG
Sabbath Creek
Ocmulgee River
Source: National Hydrology Dataset (NHD); Georgia Environmental Protection Division (EPD); National Agriculture Imagery Project (NAIP); National Inventory of Dams (NID)
Note:
BG - Billion Gallon
ISD - Insufficient Data
Pre-impoundment topography was included in the calculations for proposed expansion volume; therefore, volume of proposed expansion includes existing reservoir volume.
0 2,000 4,000 6,000 Feet
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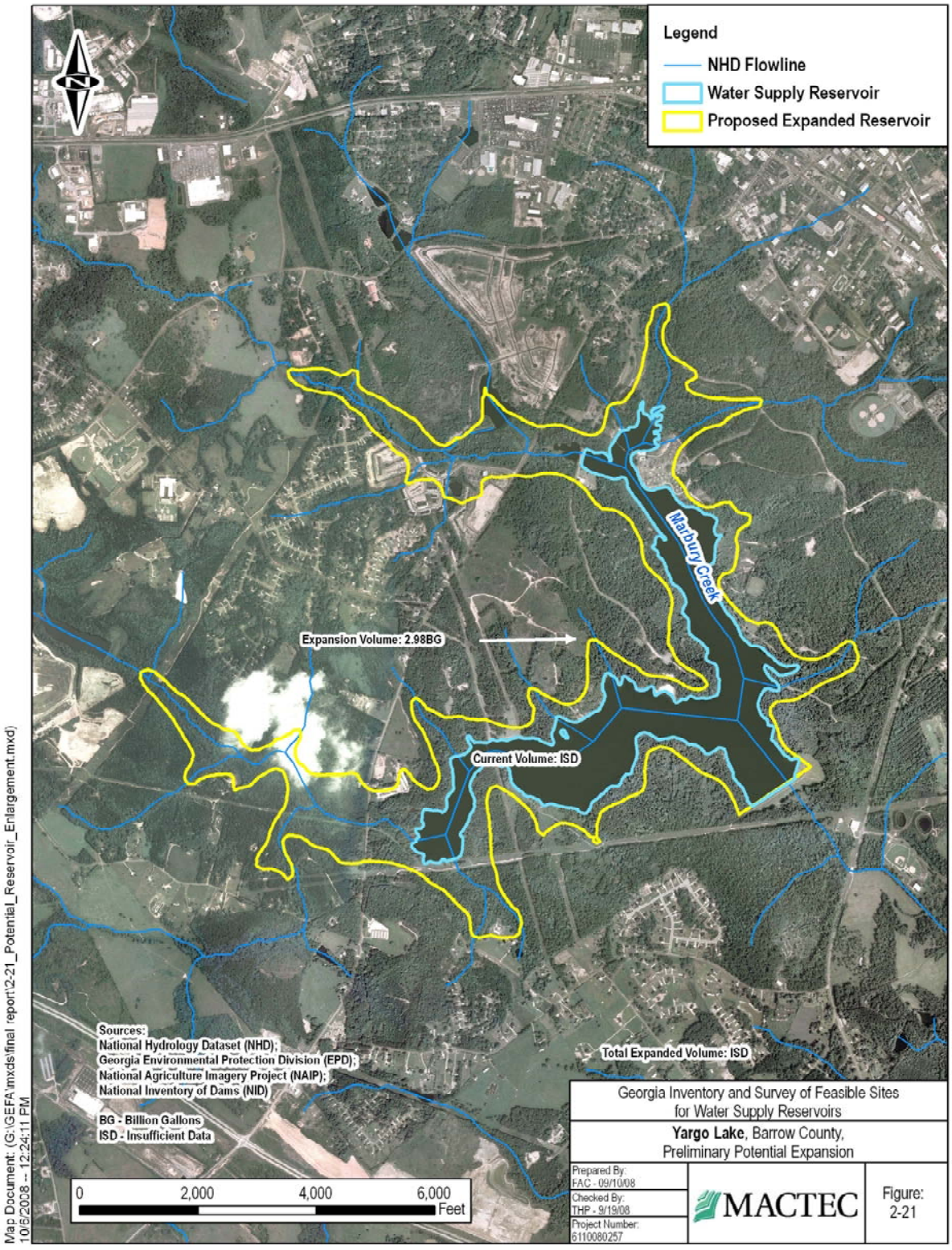
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Town Creek Reservoir, Jones County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-20


Legend
NHD Flowline
Water Supply Reservoir
Proposed Expanded Reservoir
Marbury Creek
Expansion Volume: 2.98BG
Current Volume: ISD
Total Expanded Volume: ISD
Sources:
National Hydrology Dataset (NHD);
Georgia Environmental Protection Division (EPD);
National Agriculture Imagery Project (NAIP);
National Inventory of Dams (NID)
BG - Billion Gallons
ISD - Insufficient Data
0 2,000 4,000 6,000 Feet
Map Document: (G:\GEFA\mxds\final report\2-21_Potential_Reservoir_Enlargement.mxd)
10/6/2008 -- 12:24:11 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Yargo Lake, Barrow County, Preliminary Potential Expansion
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 2-21

3.0 CATALOG OF WATER SUPPLY RESERVOIRS UNDER DEVELOPMENT, PROPOSED RESERVOIRS, AND PREVIOUSLY IDENTIFIED POSSIBLE RESERVOIR SITES

This section presents an inventory of reservoirs with a designated use of "water supply" that are under development and proposed, along with possible reservoir sites identified in prior studies. For the purposes of this report, these reservoirs are categorized as follows:

- "Reservoirs under development" have been issued all necessary state and federal permits (including a Section 404 permit by the U.S. Army Corps of Engineers (USACE). These projects are either in the land acquisition stage or are under construction.
- "Proposed reservoirs" have permit applications pending with Georgia EPD and USACE.
- "Possible reservoir sites" are sites previously identified or discussed in the information sources listed in this section and Appendix A.

The initial screening was based on readily available information; no project-specific evaluation or field work was conducted. More information was available for some sites than for others. This section deals only with previously identified possible reservoir sites from prior studies, and no "new" sites were added to the inventory.

3.1 INVENTORY OF RESERVOIRS UNDER DEVELOPMENT, PROPOSED RESERVOIRS, AND POSSIBLE RESERVOIR SITES

The first phase of this process was to collect available data from Georgia EPD, GEFA, and existing studies. This information was supplemented by direct knowledge of individuals involved in reservoir permitting or planning.

3.1.1 Information Received from Georgia EPD

Information received from Georgia EPD (listed below) identifies reservoirs under development, proposed reservoirs, and reservoirs known by EPD to be in the initial stages of permitting. Appendix A provides a more detailed synopsis of this information.

1. Information in "Georgia Regional Reservoirs" (EPD 1990) reflects a regional, "broad brush" analysis indicating areas where reservoirs are needed. As information in this document is very general, if the locations were not duplicates of other data sources, they were catalogued as possible reservoir sites.

2. "Appendix D: Future Reservoirs" (EPD 1999b) lists future water supply impoundments by basin. Specific reservoir location information was not provided; therefore, the information contained in this document was used to augment other data catalogued.

3. "Status of Proposed Reservoirs" (EPD 2008e) and "Status of Developing Reservoir Projects in Georgia" (EPD 2008d) list reservoirs under construction and proposed and considered reservoirs and their permitting status. For example, Hickory Log Creek Reservoir has been constructed and is currently being filled, so it was moved to the "existing reservoir" category.

3.1.2 Information Received from GEFA

Information received from GEFA includes a list of reservoirs in the Georgia Water Supply Grant Program. There is substantial overlap with data from other sources (Kelly 2008). Data were used to augment existing data. Appendix A provides a more detailed synopsis of this information.

3.1.3 Existing Studies

The following studies were reviewed. The findings of these studies are briefly summarized. Refer to Appendix A for a more detailed synopsis of the information.

1. The "Water Supply and Water Conservation Management Plan" (Metropolitan North Georgia Water Planning District [MNGWPD] 2003) discusses eight proposed reservoirs. Of those eight, Hickory Log Creek Reservoir has been constructed and is being filled, and has been reclassified as an "existing reservoir." Information provided for the reservoirs includes reservoir name, owner/operator using resource, basin, estimated size, and yield; however, no specific location information was provided.

2. The "Preliminary Draft – Water Supply and Water Conservation Management Plan" (MNGWPD 2008) discusses four potential/proposed reservoirs to serve 2035 water supply needs and 21 potential reservoirs for post-2035 needs. Information provided includes reservoir names, served counties, and stream name. While no precise information was provided regarding dam location, the descriptions of some reservoirs were sufficient to allow latitude and longitude to be ascertained so that a rough location could be determined.

3. Eighteen of the original 30 reservoirs discussed in the "Preliminary Water Supply Study Technical Memorandum" (Northwest Georgia Regional Water Resources Partnership [NGRWP] 2008) were identified as potential candidates for physical expansion based on the criteria discussed in Section 2.

4. "Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams: Finding Report" (GSWCC 2007). This report evaluated which, if any, of the existing flood control dams designed and constructed under federal laws Public Law (PL) 544 and PL 566 could be modified to serve as water supply reservoirs. Because this report evaluated only

existing reservoirs, available data were used to supplement EPD and NID data. GIS outlines and latitude and longitude information were determined.

5. The "Reservoir Report to the GA Soil and Water Conservation Commission" (Albany State University [ASU] 2003) provided an overview of processes and methodologies to evaluate pros and cons of reservoir construction, evaluated one case study, and evaluated potential reservoir sites (by topography and geology only). The geographic focus of this report was southwest and south central Georgia; the potential reservoir sites contained therein were south of the fall line. The reservoirs were included in the list of possible reservoir sites for this report.

3.2 ANALYSIS OF RESERVOIRS UNDER DEVELOPMENT, PROPOSED RESERVOIRS AND POSSIBLE RESERVOIR SITES

After collection, data were cataloged for analysis to determine whether the identified sites offered opportunities for expansion or regional/multi-jurisdictional water supply. Although the sources contained data of varying quantity and quality, some overlap existed, allowing augmentation of data. While data gaps still exist, the necessary fields have been developed to allow additional information to be incorporated as it becomes available.

3.2.1 Reservoirs under Development

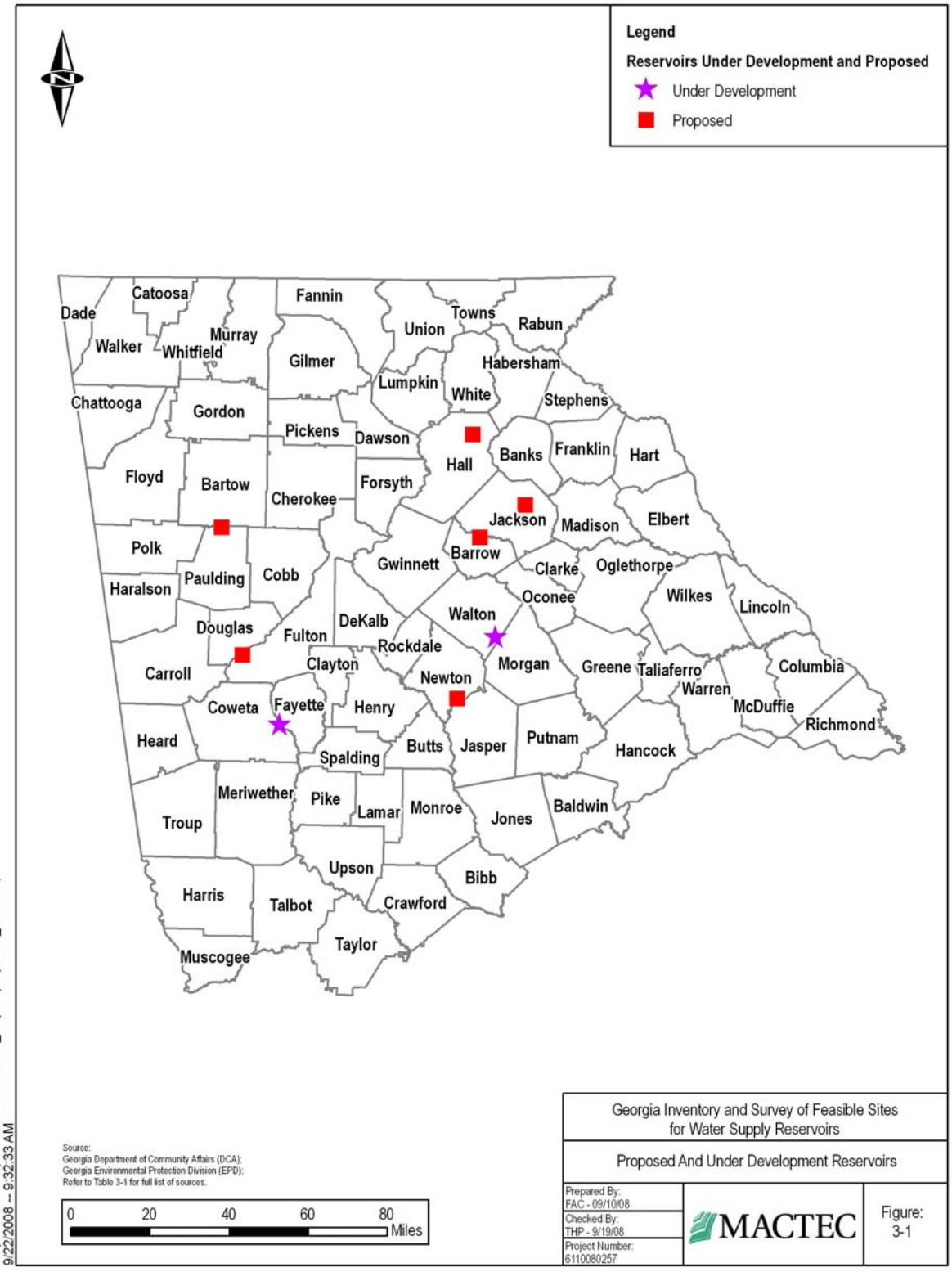
An inventory of two reservoirs under development was compiled. Reservoirs under development are shown in Figure 3-1. Table 3-1 lists the reservoirs catalogued as under development.

TABLE 3-1

Catalog of Reservoirs under Development

Dam/Reservoir Name	County(ies) Served	Stream Name
Hard Labor Creek Reservoir	Walton, Oconee	Hard Labor Creek / Apalachee River
Lake McIntosh	Fayette	Line Creek

PREPARED/DATE: MJL 10-30-08
CHECKED/DATE: MLR 10-30-08


Legend
Reservoirs Under Development and Proposed
Under Development
Proposed
Dade
Catoosa
Fannin
Towns
Union
Rabun
Walker
Whitfield
Murray
Gilmer
Habersham
Lumpkin
White
Stephens
Chattooga
Gordon
Pickens
Dawson
Hall
Banks
Franklin
Hart
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Polk
Barrow
Gwinnett
Clarke
Oglethorpe
Haralson
Paulding
Cobb
Oconee
Wilkes
Lincoln
Douglas
Fulton
DeKalb
Walton
Rockdale
Carroll
Clayton
Morgan
Greene
Taliaferro
Columbia
Newton
Warren
Coweta
Fayette
Henry
McDuffie
Richmond
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Troup
Upson
Bibb
Harris
Talbot
Crawford
Taylor
Muscogee
Source:
Georgia Department of Community Affairs (DCA);
Georgia Environmental Protection Division (EPD);
Refer to Table 3-1 for full list of sources.
0 20 40 60 80 Miles
Map Document: (G:\GEFA\mxds\Draft_Report\proposed_res.mxd)
9/22/2008 -- 9:32:33 AM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Proposed And Under Development Reservoirs
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 3-1

3.2.2 Proposed Reservoirs

An inventory of six proposed reservoirs was compiled. Proposed reservoirs are shown in Figure 3-1. Table 3-2 lists the reservoirs catalogued as proposed reservoir sites.

TABLE 3-2

Catalog of Proposed Reservoirs

Dam/Reservoir Name	County(ies) Served	Stream Name
Bear Creek Reservoir - Fulton	Fulton	Bear Creek
Bear Creek Reservoir - Newton	Newton	Bear Creek / Alcovy River
Braselton Reservoir	Gwinnett, Jackson, Barrow	Mulberry River
Glades Reservoir	Hall	Flat Creek
NWGP25	Paulding	Richland Creek
Parks Creek Reservoir	Jackson	Parks Creek

PREPARED/DATE: MJL 10-10-08
CHECKED/DATE: MLR 10-23-08

3.2.3 Possible Reservoir Sites

An inventory of 114 possible reservoir sites was compiled. Reservoirs with available map coordinate information are shown in Figure 3-2. Table 3-3 lists the reservoirs catalogued as possible reservoir sites.

TABLE 3-3

Catalog of Possible Reservoir Locations from Prior Studies

Dam/Reservoir Name	County(ies) Served	Stream Name
Alcovy River	Walton	Alcovy River / Big Flat Creek
Anneewakee Creek	Douglas	Anneewakee Creek
Apalachee River 1	Morgan	Apalachee River
Apalachee River 2	ISD	Indian Creek / Apalachee River
Apalachee River 3	Walton, Barrow	Apalachee River
Apalachee River 4	Walton, Oconee	Apalachee River
Bannister Creek Reservoir	Forsyth	Bannister Creek
Bellwood Quarry	ISD	ISD
Big Branch	Pike	Big Branch Creek
Big Cedar Creek	Polk, Floyd	Big Cedar Creek
Blacks Creek	Banks, Franklin, Madison	Blacks Creek
Boston Creek	Cherokee	Boston Creek
Cartecay River 01	Gilmer	Cartecay River 01
Clayton Reservoir Project	Rabun	ISD

Dam/Reservoir Name	County(ies) Served	Stream Name
Ellijay River 01	Gilmer	Ellijay River 01
Etowah River 01	Forsyth	Etowah River 01
Etowah River 10	Dawson	Etowah River 10
Flint River Reservoir 1	Pike	Flint River
Flint River Reservoir 2	ISD	Flint River
Fulton County Etowah Watershed Reservoir	Fulton	ISD
Future Reservoir	Coweta	ISD
Future Reservoir	Heard	ISD
Gab Creek	Dawson	Gab Creek
Hogansville Reservoir	Troup	Hogansville Creek
ISD	Webster	Kinchafoonee Creek
ISD	Webster	Christmas Branch
ISD	Webster	Unnamed Tributary - Slaughter Creek
ISD	Schley	Little Muckalee Creek
ISD	Schley	Owens Creek
ISD	Schley	Unnamed Tributary - Buck Creek
ISD	Stewart	Little Creek/Wards Mill Branch
ISD	Sumter	Ninemile Branch
ISD	Sumter	Bear Branch
ISD	Dodge	Gum Swamp Creek/Walton Creek
ISD	Dodge	Ready Branch
ISD	Dodge	Gum Swamp Creek/Little Creek/Granny Branch
ISD	Dodge	Sugar Creek
ISD	Dodge	ISD
ISD	Dodge	Big Branch
ISD	ISD	Walton Creek
Little Tallapoosa River 19	Carroll	Little Tallapoosa River 19
Little Tallapoosa River 20	Carroll	Little Tallapoosa River 20
Lower Little Tallapoosa River 14	Carroll	Lower Little Tallapoosa River 14
Lower Little Tallapoosa River 19	Carroll	Lower Little Tallapoosa River 19
Middle Fork Broad River 28	Banks	Middle Fork Broad River 28
Middle Fork Broad River 30	Banks	Middle Fork Broad River 30
Middle Fork Broad River 44	Habersham, Stephens, Banks	Middle Fork Broad River 44
Middle Oconee-Walnut Creek 06	Jackson	Middle Oconee-Walnut Creek 06
Nancy Town Creek	Habersham	Nancy Town Creek
New River Reservoir	Coweta	New River
North Oconee River	Jackson	ISD
NWGP1	Walker	Allen Creek
NWGP10	Gilmer	Davis Creek
NWGP11	Gilmer	East Mountaintown Creek
NWGP12	Gilmer	Fightingtown Creek
NWGP13	Fannin	Noontoola Creek
NWGP14	Gilmer	Talona Creek / Fausett Creek
NWGP15	Pickens	Four Mile Creek

Dam/Reservoir Name	County(ies) Served	Stream Name
NWGP16	Pickens	Long Swamp Creek
NWGP17	Pickens	Rock Creek
NWGP18	Pickens	Pinhook Creek
NWGP19	Gordon, Pickens, Bartow	Salacoa Creek
NWGP2	Walker	Rocky Branch
NWGP20	Bartow	Stamp Creek
NWGP21	Walker, Floyd	Johns Creek
NWGP22	Chattooga, Floyd	Little Armuchee Creek
NWGP23	Floyd, Polk	Cedar Creek
NWGP24	Floyd	Big Cedar Creek
NWGP26	Haralson	Little Creek
NWGP27	Haralson	Walker Creek
NWGP28	Haralson	Limestone Creek
NWGP29	Bartow	Boston Creek
NWGP3	Catoosa, Whitfield	Dry Creek
NWGP30	Gordon, Gilmer, Pickens	Talking Rock Creek
NWGP4	Murray	North Prong Sumac River
NWGP5	Murray	Conasauga River-Upper
NWGP6	Murray	Mill Creek
NWGP7	Murray	Holly Creek
NWGP8	Murray	Rock Creek
NWGP9	Gilmer	Barnes Creek
Oconee River Reservoir	Hall	Oconee River
Pea Creek Reservoir	Fulton	Pea Creek Reservoir
Pecks Mill Creek	Lumpkin	Pecks Mill Creek
Pelham Creek Reservoir	Fayette	Pelham Creek / Whitewater Creek
Pigeon Creek	Dawson	Pigeon Creek
Pink Creek/ Little Taylor Creek	Heard	Pink Creek
Pumpkinvine Creek 02	Bartow	Pumpkinvine Creek 02
Raccoon Creek 07	Bartow, Paulding	Raccoon Creek 07
Raccoon Creek 08	Bartow	Raccoon Creek 08
Reservoir In Tennessee Basin	Dade	ISD
Reservoir-Land Acquisition	Forsyth	ISD
Rose Creek	Upson	Rose Creek
Russell Creek	Dawson	Russell Creek
Settingdown Creek	Cherokee, Forsyth	Settingdown Creek
Sharp Mountain Creek	Cherokee	Sharp Mountain Creek
Shoal Creek - Option 1	Cherokee	Shoal Creek
Shoal Creek - Option 2	Dawson	Shoal Creek / Etowah River
South River 27	Madison	South River 27
South River 29	Madison	South River 29
Sweetwater Creek - Option 1	Douglas	Sweetwater Creek
Sweetwater Creek - Option 2	Douglas	Sweetwater Creek / Western Trib. To Sweetwater Ck.
Talking Rock Creek 02	Pickens	Talking Rock Creek 02

Dam/Reservoir Name	County(ies) Served	Stream Name
Talking Rock Creek 13	Pickens	Talking Rock Creek 13
Trib To Hudson River	Banks	Tributary To Hudson River
Tugaloo Reservoir	Habersham	Tugaloo
Unawatti Creek	Franklin	Unawatti Creek
Unnamed Trib To Palmer Creek	Dawson	Unnamed Trib To Palmer Creek
Upper Mulberry River 08	Hall, Jackson	Upper Mulberry River 08
Walnut Creek Reservoir 2	Henry	Walnut Creek
Ward Creek	Bartow, Paulding, Cobb	Pumpkinvine Creek
West Georgia / Tallapoosa River	Haralson	Tallapoosa River
West Georgia Beech Creek	Haralson	Beech Creek / Tallapoosa River
Whitewater Creek Reservoir	Fayette	Whitewater Creek
Whooping Creek Reservoir	Carroll	Whooping Creek

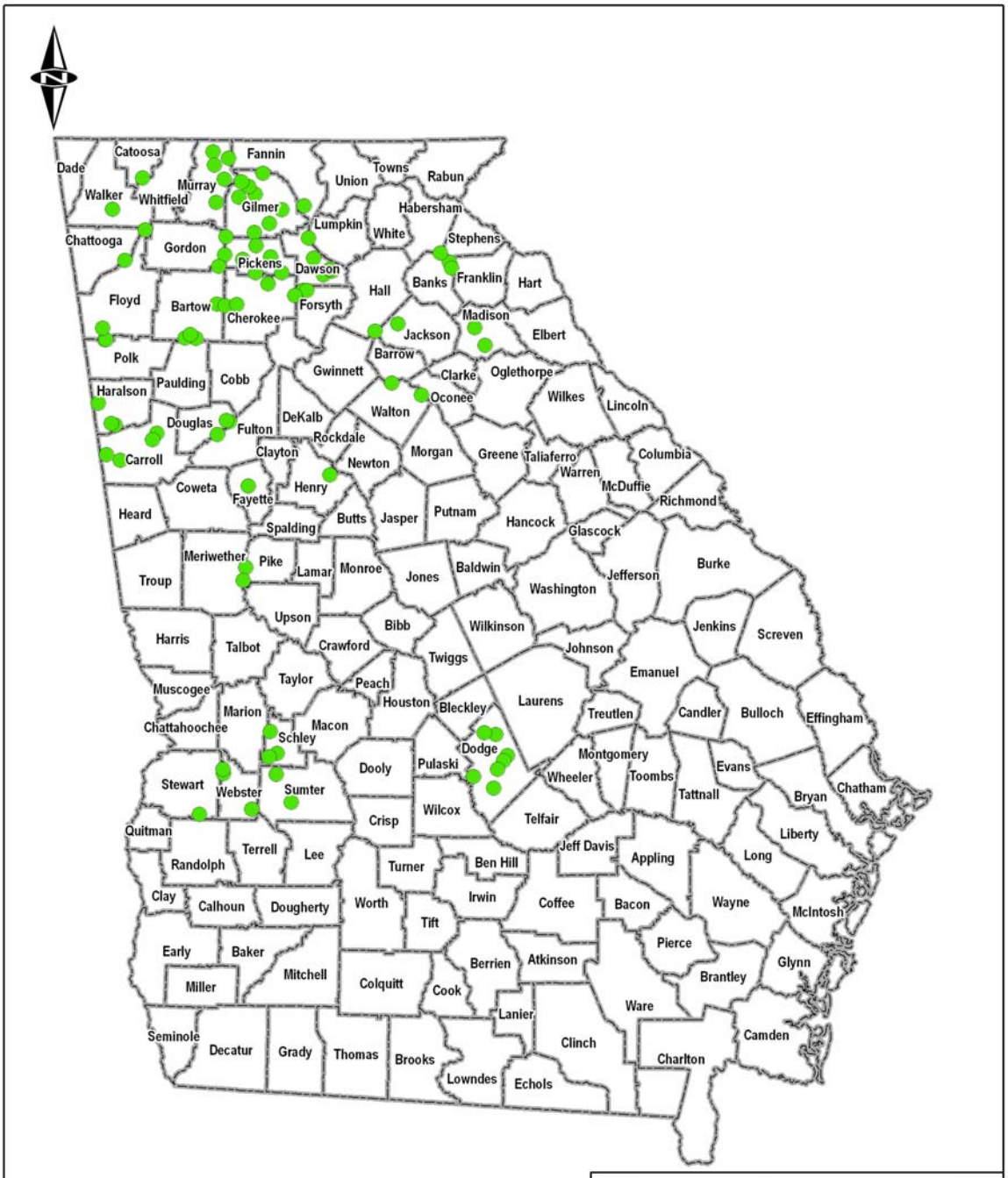
Acronym:
ISD – Insufficient Data

PREPARED/DATE: MJL 10-30-0
CHECKED/DATE: MLR 10-30-08

Sources:

Albany State University Flint River Water Planning and Policy Center. Reservoir Report to the GA Soil and Water Conservation Commission. September 2003.
E mail communication from Kevin Kelly at the Georgia Environmental Facilities Authority. Subject: Prospective reservoir projects. August 29, 2008.
Georgia Environmental Protection Division. Georgia Regional Reservoirs. 1990.
Georgia Environmental Protection Division. Appendix D: Future Reservoirs. 1999.
Georgia Environmental Protection Division. Status of Proposed Reservoirs. August 15, 2008.
Georgia Soil and Water Conservation Commission. Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams Finding Report. December 27, 2007.
Metropolitan North Georgia Water Planning District. Water Supply and Water Conservation Management Plan. September 2003.
Metropolitan North Georgia Water Planning District. Preliminary Draft – Water Supply and Water Conservation Management Plan. July 2008.
North Georgia Regional Water Supply Needs Assessment. Georgia Department of Natural Resources. August 2003.
Northwest Georgia Regional Water Resources Partnership. Preliminary Water Supply Study Technical Memorandum. January 2008.

For most of the possible reservoir sites, available data were insufficient to assess site-specific limitations for expansion or regional/multi-jurisdictional water supply opportunities. In some cases, latitude and longitude coordinates were given for a particular site. This was sufficient information to find the location of the reservoir, but not detailed enough to analyze site feasibility for expansion. For example, the readily available data for the possible reservoir at Pumpkinvine Creek included latitude and longitude, but key data such as the proposed dam height, impoundment elevation, and proposed storage capacity were not given. Other available information included data such as stream name and county location. In these cases, a long stream segment where the reservoir site might be located was identified.


N
Catoosa
Fannin
Dade
Towns
Union
Rabun
Walker
Murray
Whitfield
Gilmer
Habersham
Lumpkin
White
Chattooga
Gordon
Stephens
Pickens
Dawson
Banks
Franklin
Hart
Floyd
Bartow
Forsyth
Hall
Cherokee
Madison
Jackson
Elbert
Polk
Barrow
Gwinnett
Clarke
Oglethorpe
Haralson
Paulding
Cobb
Oconee
Wilkes
Lincoln
Douglas
Fulton
DeKalb
Walton
Rockdale
Clayton
Morgan
Greene
Taliaferro
Columbia
Carroll
Newton
Warren
McDuffie
Coweta
Fayette
Henry
Richmond
Heard
Spalding
Butts
Jasper
Putnam
Hancock
Glascock
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Burke
Troup
Washington
Jefferson
Upson
Bibb
Wilkinson
Jenkins
Screven
Harris
Talbot
Crawford
Twiggs
Johnson
Taylor
Emanuel
Muscogee
Peach
Houston
Bleckley
Laurens
Treutlen
Candler
Bulloch
Effingham
Marion
Chattahoochee
Macon
Schley
Dodge
Montgomery
Dooly
Pulaski
Evans
Stewart
Webster
Sumter
Wheeler
Toombs
Tattnall
Bryan
Chatham
Crisp
Wilcox
Telfair
Quitman
Terrell
Lee
Jeff Davis
Appling
Liberty
Randolph
Turner
Ben Hill
Long
Clay
Calhoun
Dougherty
Worth
Irwin
Coffee
Bacon
Wayne
McIntosh
Tift
Early
Baker
Pierce
Berrien
Atkinson
Glynn
Miller
Mitchell
Colquitt
Cook
Brantley
Ware
Lanier
Seminole
Decatur
Grady
Thomas
Brooks
Clinch
Camden
Lowndes
Echols
Charlton
Source:
Georgia Department of Community Affairs (DCA);
Georgia Environmental Protection Division (EPD);
Refer to Table 3-1 for full list of sources.
0 20 40 60 80
Miles
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Possible Reservoirs Identified in Previous Studies
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 3-2
Map Document: (G:\GEFA\mxds\final report\3-2_Considered_res.mxd)
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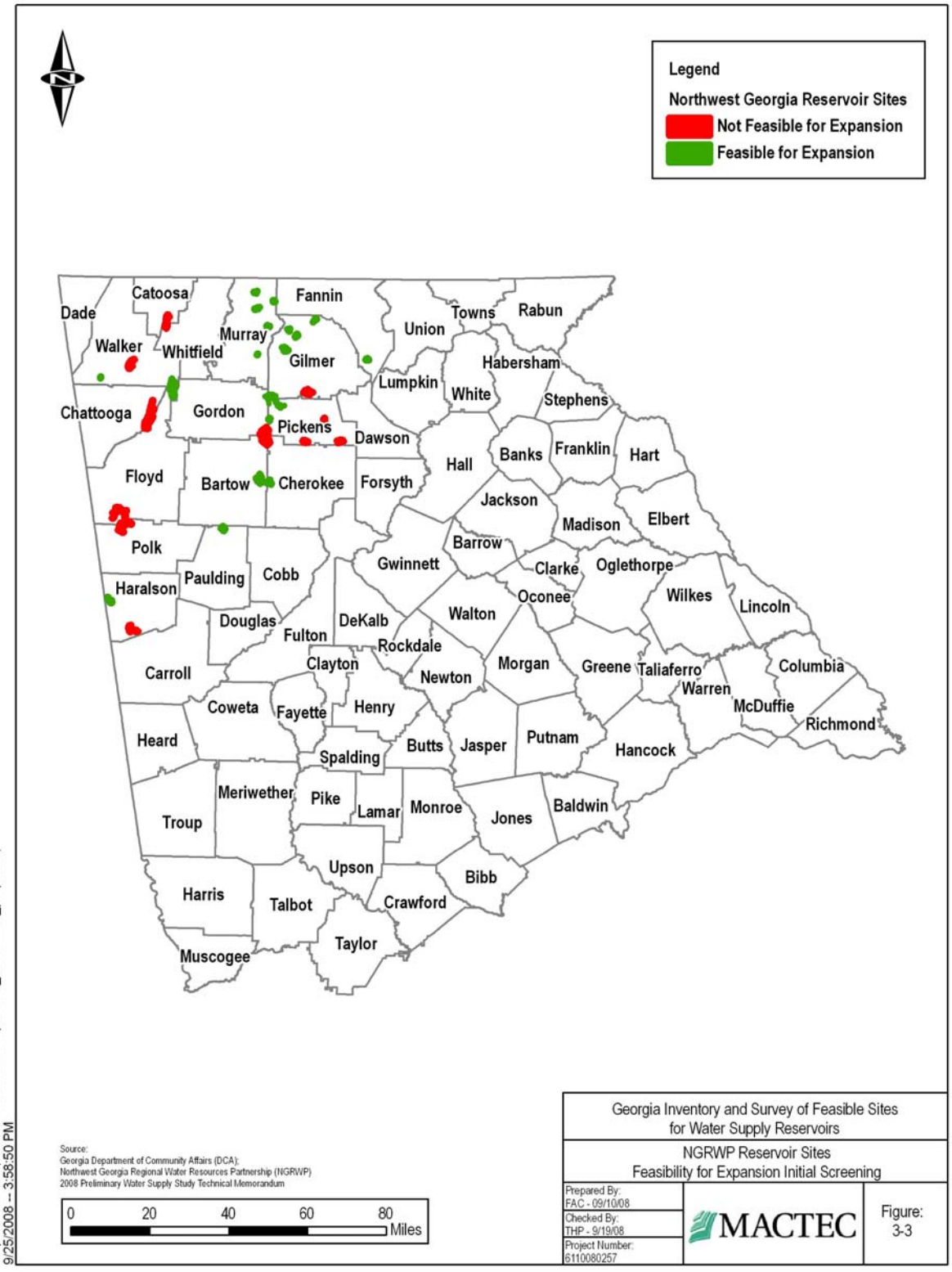
One study in particular, the Northwest Georgia Regional Water Resources Partnership (NGRWP) Preliminary Water Supply Study Technical Memorandum (NGRWP 2008), supplied proposed shapes of reservoirs based on contours, which included volumes and yields. The 30 reservoir sites in the study were visually screened against the 2007 NAIP imagery to determine whether they could be expanded from their originally proposed sizes. During this initial screening, surrounding areas were assessed for impacts to the natural and human environment using the same initial screening criteria as for the existing reservoirs (see Figure 3-3). After screening, 29 of the 30 reservoir sites were catalogued as possible; NWGP25 on Richland Creek in Paulding County was catalogued as proposed as shown in Tables 3-2 and 3-3.

3.2.4 Further Analysis

To complete the screening analysis, additional data will need to be gathered, including exact locations of the proposed dams, dam height and width, pool elevations, storage volumes, water yield, and diversion sources and capacities. Outlines of impoundments will need to be developed using the location information in conjunction with the dam height information. These outlines will allow an analysis of topography and aerial imagery to determine the level of impact the potential expansions would have on the natural and human environment. For reservoirs under development and proposed reservoirs, additional information should be available from existing sources such as reservoir permit applications and reservoir plans. Direct communications with reservoir planners may be needed as well.


Legend
Northwest Georgia Reservoir Sites
Not Feasible for Expansion
Feasible for Expansion
Catoosa
Dade
Fannin
Towns
Rabun
Union
Walker
Whitfield
Murray
Gilmer
Habersham
Lumpkin
White
Stephens
Chattooga
Gordon
Pickens
Dawson
Banks
Franklin
Hart
Hall
Floyd
Bartow
Cherokee
Forsyth
Jackson
Madison
Elbert
Barrow
Polk
Gwinnett
Clarke
Oglethorpe
Haralson
Paulding
Cobb
Oconee
Wilkes
Lincoln
Douglas
DeKalb
Walton
Fulton
Rockdale
Carroll
Clayton
Morgan
Greene
Taliaferro
Columbia
Newton
Warren
Coweta
Fayette
Henry
McDuffie
Richmond
Heard
Butts
Jasper
Putnam
Hancock
Spalding
Meriwether
Pike
Lamar
Monroe
Jones
Baldwin
Troup
Upson
Bibb
Harris
Talbot
Crawford
Taylor
Muscogee
Source:
Georgia Department of Community Affairs (DCA);
Northwest Georgia Regional Water Resources Partnership (NGRWP)
2008 Preliminary Water Supply Study Technical Memorandum
0 20 40 60 80
Miles
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
NGRWP Reservoir Sites
Feasibility for Expansion Initial Screening
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 3-3
Map Document: (G:\GEFA\mxds\final report\3-3_NWGWSP_prop.mxd)
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4.0 WATER SUPPLY CHALLENGED AREAS

This section utilizes readily available information to identify areas that have recently experienced water supply challenges during drought conditions. These water supply challenged areas include (1) areas served by reservoirs that were identified as experiencing significant drinking water yield constraints and (2) public drinking water systems that were identified as experiencing water supply challenges during 2007 drought conditions.

Historic population and population projection estimates were obtained from various available sources, such as the USCB census, the *North Georgia Regional Water Supply Needs Assessment Report (Needs Assessment Report)*, and DCA population projections. These data were plotted to show historic and future growth trends in the 63 counties north of the fall line (excluding the 15 counties in the MNGWPD, which are separately reported).

4.1 IDENTIFICATION OF AREAS CURRENTLY FACING WATER SUPPLY CHALLENGES

4.1.1 Information Provided by EPD

Georgia EPD provided a list of reservoirs that experienced significant water yield constraints and water systems that experienced water supply challenges during the 2007 drought (Farrell 2008). These EPD-identified water supply reservoirs and systems include the following:

Reservoirs:

- City of Jefferson (Jackson County) Curry Creek Reservoir
- City of Monticello (Jasper County) Reservoir
- Upper Oconee Basin Water Authority (Athens-Clarke County) Bear Creek Reservoir

Water Systems:

- City of Eatonton (Putnam County)
- City of Ellijay (Gilmer County)
- City of Jasper (Pickens County)
- City of Thomaston (Upson County)
- City of Winder (Barrow County)
- Etowah Water and Sewer Authority (Dawson County)
- Gilmer County
- Habersham County – southern jurisdictions
- Haralson County
- Heard County
- White County

Although these and other systems experienced significant concerns over water availability in 2007, conservation and water sharing efforts within the state and among communities and systems resulted in an adequate amount of water to meet demands. In addition, the Governor created the Drought Response Unified Command (DRUC) Group in 2007, which included, among others, EPD, GEFA, the Georgia Emergency Management Agency, and the Division of Public Health. These agencies worked together to coordinate a common set of incident objectives and strategies, share information, maximize the use of available resources, and enhance the efficiency of the State's drought response. The DRUC Group implemented systematic means of assessing and responding to the drought emergency. The coordinated interagency response ensured that, during the historic 2007 drought, no communities ran out of public supply water. Some of these challenged areas are already undertaking efforts to better provide for future water supply needs.

For example, Pickens County, Gilmer County, the City of Calhoun/Gordon County, and City of Chatsworth/Murray County have formed the Coosawattee Water Authority (Authority) under House Bill 801. This Authority is developing an interconnection network to provide water throughout the 4-county area. The Authority also is assessing potential reservoir sites, investigating a potential water withdrawal from Carter's Lake, and purchasing additional water supply from other neighboring counties to meet the estimated 2060 water demand of 67 million gallons per day (MGD; Pope 2008).

In addition, the Parks Creek Reservoir, listed in Table 3-2, which serves the City of Jefferson's service area is currently in the permitting stages. EPD has received a surface water withdrawal permit application for the project and review is ongoing. The 404 permit application has been submitted to USACE and is under review (Farrell 2008).

Further, the City of Thomaston has purchased the reservoir formerly used by the now-closed Thomaston Mills. The city is deepening the reservoir and building a higher dam that will enable it to hold more water (Duncan 2008). This would increase by 50 percent the amount of water available to the city with its existing Hannah's Mill Reservoir.

4.1.2 Information Provided by Existing Studies

The *Needs Assessment Report* (Department of Natural Resources [DNR] 2003) identifies water supply needs based on a comparison of the projected water demand and available water supply for aggregated counties or water supply management areas in North Georgia. This study concludes that, assuming additional water supply allocations will not be available from Lake Allatoona or Lake Lanier, the water demands for the Coosa-Tallapoosa (Bartow, Carroll,

Cherokee, Dawson, Floyd, Haralson, Paulding, Pickens, and Polk) and Upper Chattahoochee (Forsyth, Habersham, Hall, Lumpkin, and White) Management Areas were projected to exceed the limit of available water supplies before 2030. The Broad River, Upper Flint, and Upper Ocmulgee–Upper Oconee Management Areas are expected to have sufficient water supplies through 2030 if water can be efficiently distributed to satisfy water demands throughout each management area. The Metro Atlanta Core/Middle Chattahoochee Management Area is also estimated to have adequate water supplies through 2030 if a moderate level of conservation is implemented. Baseline water demand projections indicate that localized water supply shortfalls may occur in the following river basins within the 2030 forecast period: Upper Ocmulgee (includes portions of Gwinnett, Walton, DeKalb, Henry, Clayton, Newton, and Fulton Counties, and all of Rockdale County) and Chattahoochee (includes portions of Cobb, Coweta, DeKalb, Douglas, Forsyth, Fulton, Gwinnett, Hall, and Paulding Counties). The study also indicates that localized water shortages may occur in counties within the Metro Atlanta Core/Middle Chattahoochee, Upper Ocmulgee-Upper Oconee, and Upper Chattahoochee Management Areas.

The *2008 Preliminary Water Supply Study Technical Memorandum* (NGRWP 2008) identifies future long-term water supply needs for northwest Georgia using a watershed-based approach. In this study, the largest water demand is expected to be in the Etowah River Basin, with significant water supply needs in the Conasauga, Coosawattee, and the Oostanaula River Sub-basins as well. The study shows that in these areas water demand will either exceed or equal the current permitted water supply by 2030. In contrast, little additional water supply development appears to be warranted in the Hiawassee, Toccoa, and the Upper Sevier River Sub-basins.

4.1.3 Information from Metropolitan North Georgia Water Planning District (MNGWPD)

The MNGWPD currently consists of 15 (formerly 16) counties in the metropolitan Atlanta area. In 2003, MNGWPD prepared a Water Supply and Water Conservation Management Plan (MNGWPD 2003) that includes water use projections for the year 2030. The MNGWPD water needs as shown in the 2003 Water Supply and Water Conservation Management Plan for the year 2030 are 1,081 MGD; the 2001 water use was 643 MGD. Therefore, between 2001 and 2030, an additional water use of 438 MGD is expected in the 15-county metropolitan Atlanta area. The projected water needs discussed in the 2003 Water Supply and Water Conservation Management Plan for the counties in the MNGWPD are shown in Table 4-1.

TABLE 4-1

Projected Public Water Supply Needs
for 15 Counties in the Metropolitan North Georgia Water Planning District

County	Estimated Population 2007	2001 Public Water Supply (MGD)	Current Permitted Monthly Average (MGD)	2001 Water Use (gpcd)	2030 Population Projection	2030 Water Needs Projection (MGD)	2030 Supply/ Deficit Projection (MGD)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bartow	92,834	20	24	254	307,100	43	19
Cherokee	204,363	18	36	122	398,800	40	4
Clayton	272,217	32	48	133	375,700	42	-
Cobb	641,905	85	165	139	921,200	113	-
Coweta	118,936	13	21	146	232,100	29	8
DeKalb	737,093	97	140	150	1,061,700	128	
Douglas	124,495	11	25	118	229,700	24	
Fayette	106,144	13	32	137	212,300	25	-
Forsyth	158,914	16	32	157	349,500	57	25
Fulton	992,137	186	283	215	1,325,700	254	
Gwinnett	776,380	90	154	149	1,154,900	165	
Hall	180,175	26	33	182	321,200	49	16
Henry	186,037	18	27	146	302,800	41	14
Paulding	127,906	8	0	95	254,800	27	*
Rockdale	82,052	11	22	158	196,700	25	3

Acronyms:
gpcd – Gallons per capita per day; MGD – Million gallons per day PREPARED/CHECKED DATE: Joe Tanner & Associates 10/13/08

Sources:
(1) U.S. Census.
(2), (4), (5), and (6) Water Supply and Water Conservation Management Plan. Metropolitan North Georgia Water Planning District. September 2003

Notes:
(3) This column slightly overstates (less than 10%) the permitted withdrawal capacities since some permits are for emergencies, redundancies, or are coupled to have a "not to exceed" total.
(3) Water utilities in Cobb and Fulton counties sell water to communities outside their counties. Their permits therefore exceed the water demands within their counties.
(7)* The Paulding deficit was adjusted to reflect out-of-county water purchase.
Counties are listed in alphabetical order.

The MNGWPD prepared a draft update to the Water Supply and Water Conservation Management Plan in July 2008. The draft update includes water use projections for each of the 15 counties in the MNGWPD area for the years 2035 and 2050, which show an increase in the water demands beyond that previously projected for the year 2030. The draft plan also includes an inventory of potential water supply reservoirs. This information is summarized below:

Potential New Reservoir	Potential Yield (MGD)
Glades – Hall County	6
Bear Creek – Fulton County	15
Etowah River Watershed – Fulton County	30
Richland Creek – Paulding County	35

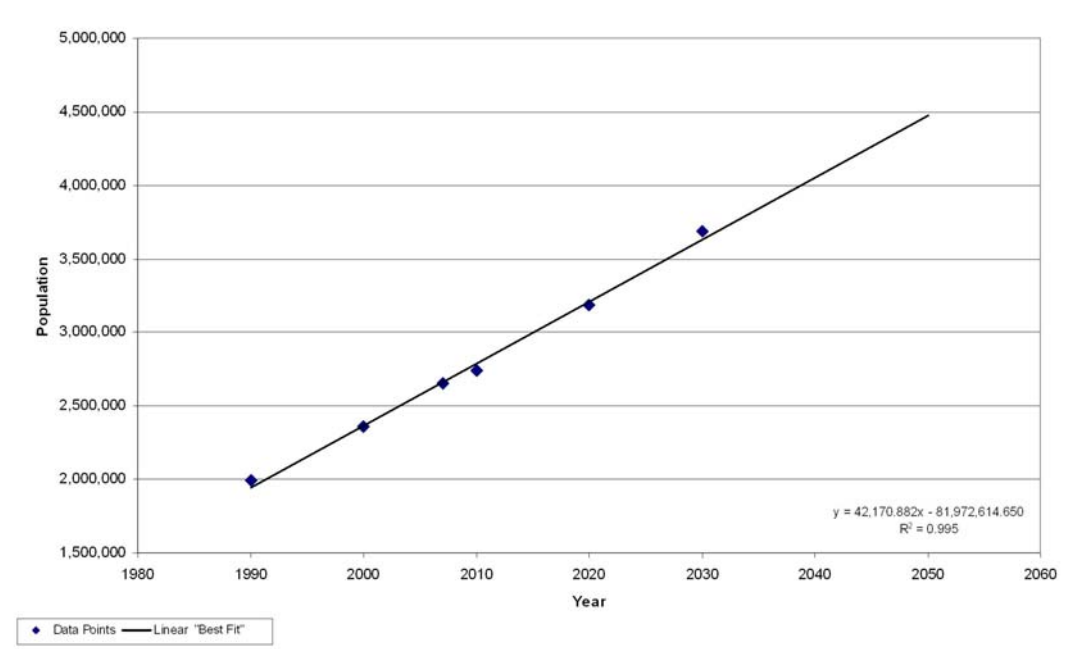
The MNGWPD also identified 21 potential reservoir options for further evaluation to help meet the projected year 2050 water needs. These options include new reservoirs, expansions of existing reservoirs, and a new withdrawal from an existing reservoir.

Because the MNGWPD is thoroughly evaluating potential reservoir options, the scope of this report does not include an independent evaluation of potential new reservoirs within the 15-county MNGWPD area. However, as discussed in Section 5, existing water supply reservoirs within this area were assessed for expansion potential.

4.2 IDENTIFICATION OF AREAS LIKELY TO EXPERIENCE FUTURE WATER SUPPLY CHALLENGES

Historic population data for 1990 and 2000 and 2007 population estimates were obtained from the USCB; population projections for counties above the fall line (excluding the 15 counties in the MNGWPD) were obtained from a variety of sources. The *Needs Assessment Report* (DNR 2003) prepared for Georgia DNR provides population projection estimates through the year 2030. The population projections for this report were based on data from the Georgia Office of Planning and Budget, several Regional Development Centers, Woods & Poole, and DNR data sources. For counties not included in this report, population projections were supplemented with county projections generated by Georgia DCA. The DCA population projections consider 1980 through 2000 growth trends recorded by USCB.

The trend-line population data and available population projections for the 63 counties north of the fall line (excluding the 15 counties in the MNGWPD) are as follows: the 1990 and 2000 USCB census, the USCB population estimates for 2007, and the *Needs Assessment Report* and DCA population projections for 2010, 2020, and 2030. These time trend points were used to develop a best-fit linear extrapolation to the year 2050. The 2050 estimates were made by extending the best fit trend line through the available historic population and existing projected population estimates. The resulting population trend for the 63 Georgia counties above the fall line and excluding the 15 counties in the MNGWPD is shown in Figure 4-1. These interim projections are preliminary estimates only and will subsequently be superseded by more detailed population forecasts under the State Water Plan.



MNGWPD – Metropolitan North Georgia Water Planning District

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Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs		
Georgia Population and Projections for the 63 Counties Above the Fall Line (Excluding the 15 Counties in the MNGWPD)		
Prepared By: MLR - 09/10/08 Checked By: MET - 9/19/08 Project Number: 6110080257	MACTEC	Figure: 4-1

Based on the foregoing, the 63 counties evaluated (excluding the 15 counties in the MNGWPD) will require development of significant additional public water supply sources and associated reservoir storage capacity to meet the projected 2050 population shown in Figure 4-1. Because certain counties will have more imminent water supply needs than others, counties approaching or exceeding their current permitted capacity will need to begin development of additional water supplies in the near future. In addition, areas with higher population density and more rapid recent growth rates are expected to consume their currently available surplus supply capacity more quickly; additional water supply development should be a priority in these projected-growth counties.

5.0 INCREASING WATER SUPPLY YIELDS FROM EXISTING RESERVOIRS

This section analyzes the expansion potential of the 16 existing reservoirs identified in Section 2 by first assessing increasing the storage volume of each reservoir by raising the dam and then by utilizing pumping from another source to maximize the yield of each existing reservoir.

In addition to the 16 existing reservoirs for expansion consideration, an inventory of 2 reservoirs under development, 6 proposed reservoirs, and 114 possible reservoirs were compiled from EPD and GEFA information and prior published studies. Expansion feasibility for these proposed and possible reservoir sites was not determined due to a lack of readily available information.

5.1 STORAGE VOLUME INCREASE POTENTIAL

Section 2 of this report provides an inventory of existing reservoirs with a designated use of "water supply." During the evaluation of existing reservoirs, 16 reservoirs were identified as having potential for expansion. As discussed in more detail in Section 2, qualifying reservoirs were required to have an existing top of dam storage capacity of at least 1 BG or an existing surface area of at least 100 acres. In addition, limits for expansion of the storage volume were related to the number of residences (20 residences were used as the initial screening number) that might be inundated and the presence of schools, government complexes, and large commercial or industrial developments to reduce the impact to the human environment and associated acquisition costs. Reservoirs identified as possible candidates for expansion are listed below in alphabetical order:

- Big Haynes Creek Reservoir (Rockdale County)
- Cane Creek Structure Number 2 (Meriwether County)
- Dog River Reservoir (note that this dam is currently being raised) (Douglas County)
- Edie Creek Barnesville (Lamar County)
- Heads Creek Reservoir (Spalding County)
- John T. Briscoe Reservoir (Walton County)
- Long Branch Reservoir (Henry County)
- Reservoir 51 (Banks County)
- Rocky Comfort Creek – Warrenton (Warren County)
- Rush Creek Reservoir (Talbot County)
- Sandy Creek Reservoir (Clarke County)
- Sharpe's Creek Reservoir (Carroll County)
- Still Branch Reservoir (Pike County)
- Tobesofkee Creek Reservoir (Monroe County)
- Town Creek Reservoir (Jones County)

- Yargo Lake (Barrow County)

Using a reservoir's existing pool elevation and the potential maximum water surface elevation after expansion, the volume of earthfill required to raise each dam was approximated. The volume of earthfill required was estimated using the following assumptions:

- The work will be performed downstream of the centerline of the existing dam.
- The existing and proposed slopes have been and will remain at 3 horizontal to 1 vertical grade.
- The cross-sectional area of earthfill between the existing and proposed dam slopes was multiplied by the length of the proposed dam crest.

A schematic of the proposed concept for the dam raising is shown in Figure 5-1.

Each dam was evaluated according to the volume of earthfill required to raise the dam to the specified elevation. As no hydrology, hydraulic, geotechnical, or other engineering analyses were performed, the evaluation of the dams was based solely on the volume of the required earthfill. In an effort to reduce bias, the cross-sectional area of earthfill was computed using several methods. The results of the calculations indicate that the volume of earthfill, and thus the evaluation of the dams on a construction effort basis, was not controlled by the method of calculation but rather by the amount the dam was raised and the length of the dam crest. Table 5-1 contains a list of the 16 dams screened for potential raising listed from "lowest" construction effort (i.e., least amount of earthwork) to the "greatest" construction effort (i.e., most amount of earthwork).

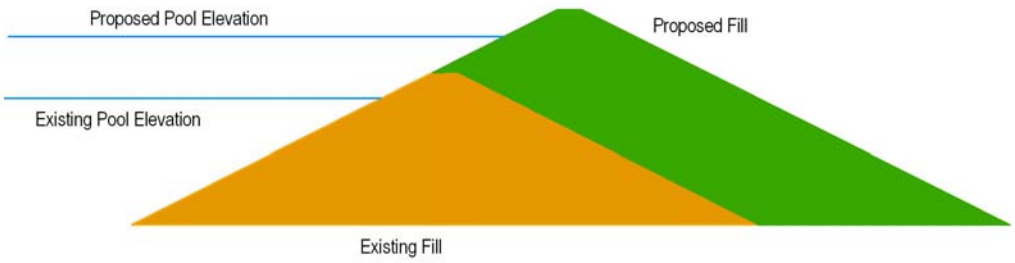
TABLE 5-1

Potential Dam Modifications of 16 Existing Reservoirs Considered for Expansion

Dam Name	Existing Pool Elevation*	Existing Dam Height*	Existing Dam Toe Elevation*	Proposed Pool Elevation**	Proposed Dam Crest Length	Proposed Amount of Dam Raising	Cross-Sectional Area of Fill***	Volume of Earthfill
	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(square feet)	(cubic yards)
Big Haynes Creek	740	43	697	760	3,100	20	11,341	1,302,078
Cane Creek Structure	740	44	696	770	2,675	30	19,981	1,979,619
Dog River Reservoir	750	40	710	780	1,300	30	18,901	910,055
Edie Creek Barnesville	620	8	612	640	2,625	20	5,040	490,030
Heads Creek Reservoir	770	32	738	780	1,175	10	3,780	164,510
John T. Briscoe	760	32	728	790	1,600	30	16,741	992,060
Long Branch Reservoir	720	70	650	740	3,500	20	16,201	2,100,127
Reservoir 51	700	38	662	710	700	10	4,320	112,007
Rocky Comfort Creek -	450	38	412	470	2,225	20	10,441	860,385
Rush Creek Reservoir	760	52	708	790	4,100	30	22,141	3,362,203
Sandy Creek Reservoir	660	50	610	670	875	10	5,400	175,011
Sharpe's Creek	1,030	42	988	1,040	950	10	4,680	164,677
Still Branch Reservoir	750	75	675	760	2,675	10	7,650	757,962
Tobesofkee Creek	500	20	480	540	2,300	40	21,601	1,840,111
Town Creek Reservoir	380	110	270	390	4,850	10	10,801	1,940,117
Yargo Lake	830	50	780	850	1,475	20	12,601	688,375

Notes:
* Based on GIS information provided by MACTEC.
** Proposed maximum water surface elevation provided by MACTEC (assumed to be normal pool for this evaluation).
*** Assumes dam raised with earth fill as depicted on Figure 5-1.
Volume computed assuming a rectangle of fill placed on downstream slope of existing dam.
Reservoirs are listed alphabetically.

PREPARED/CHECKED DATE: Schnabel Engineering, LLC 09/16/08



Map Document: (G:\GEFA\mxds\Draft_Report\dam_schematic.mxd)
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Source: Schnabel Engineering, LLC

Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs		
Proposed Dam Raising Schematic		
Prepared By: FAC - 09/10/08 Checked By: THP - 9/19/08 Project Number: 6110080257	MACTEC	Figure: 5-1

5.2 SUPPLEMENTAL WATER SOURCE DIVERSION POTENTIAL

The 16 existing reservoirs were also screened for potential supplemental pumped diversion facilities as shown in Figures 5-2 through 5-17. The following two assumptions were made regarding the streams/rivers from which the source water would be pumped:

1. The stream flow should be large enough so that pump diversion would not result in a significant adverse impact to the environment or water demands downstream. In addition, the minimum drainage area criterion was approximately 200 square miles (mi^2).
2. The distance from the water intake locations to the potential expansion reservoirs should be as short as possible. As the length of the pipe increases, cost effectiveness decreases. The maximum distance to the water intake location was assumed to be approximately 10 miles.

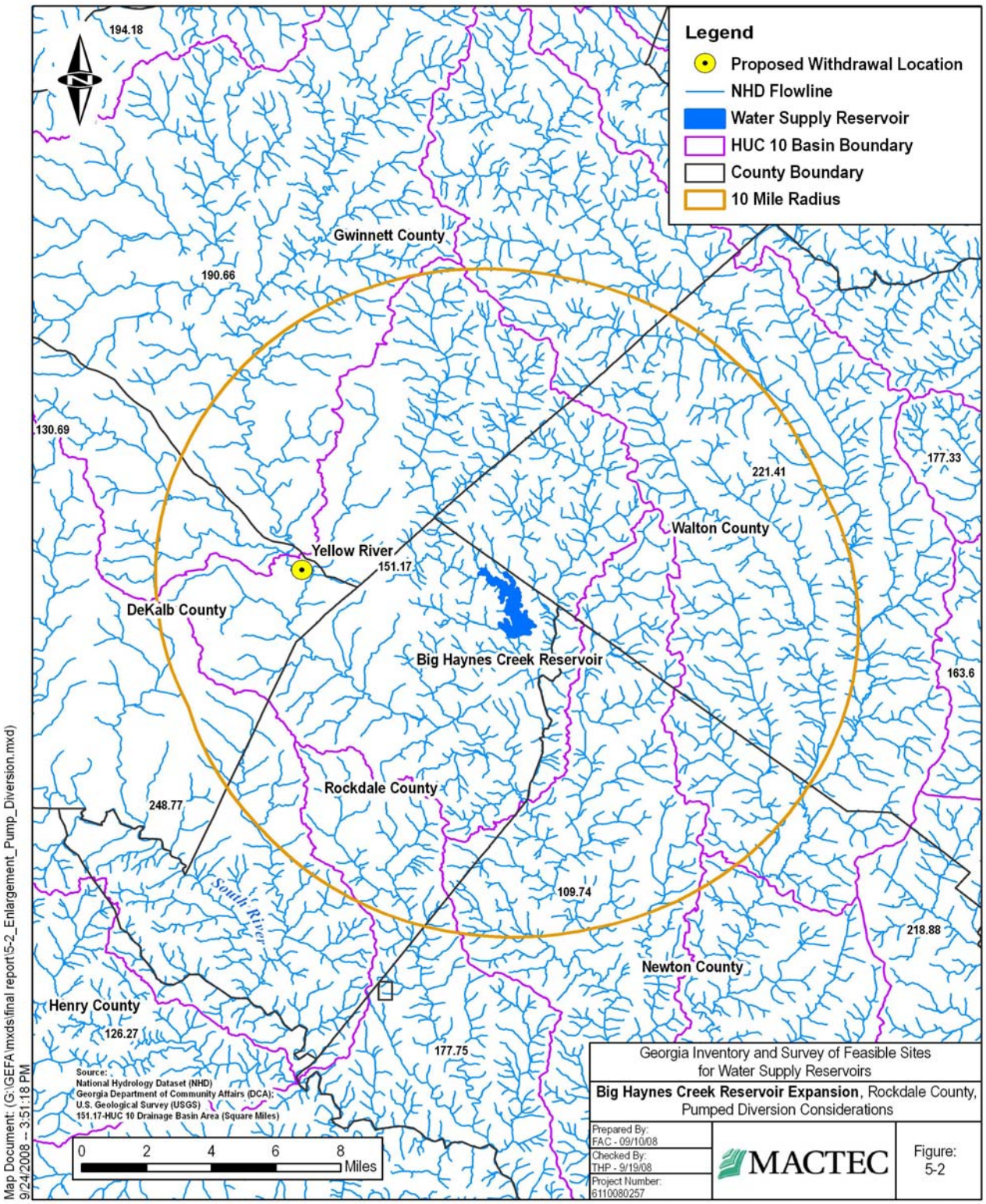
Based on available data, the 16 existing reservoirs are suitable for further screening; however, further data will need to be gathered, including exact locations of the proposed dams, dam height and width, pool elevations, storage volumes, water supply yield, and diversion sources and capacities.

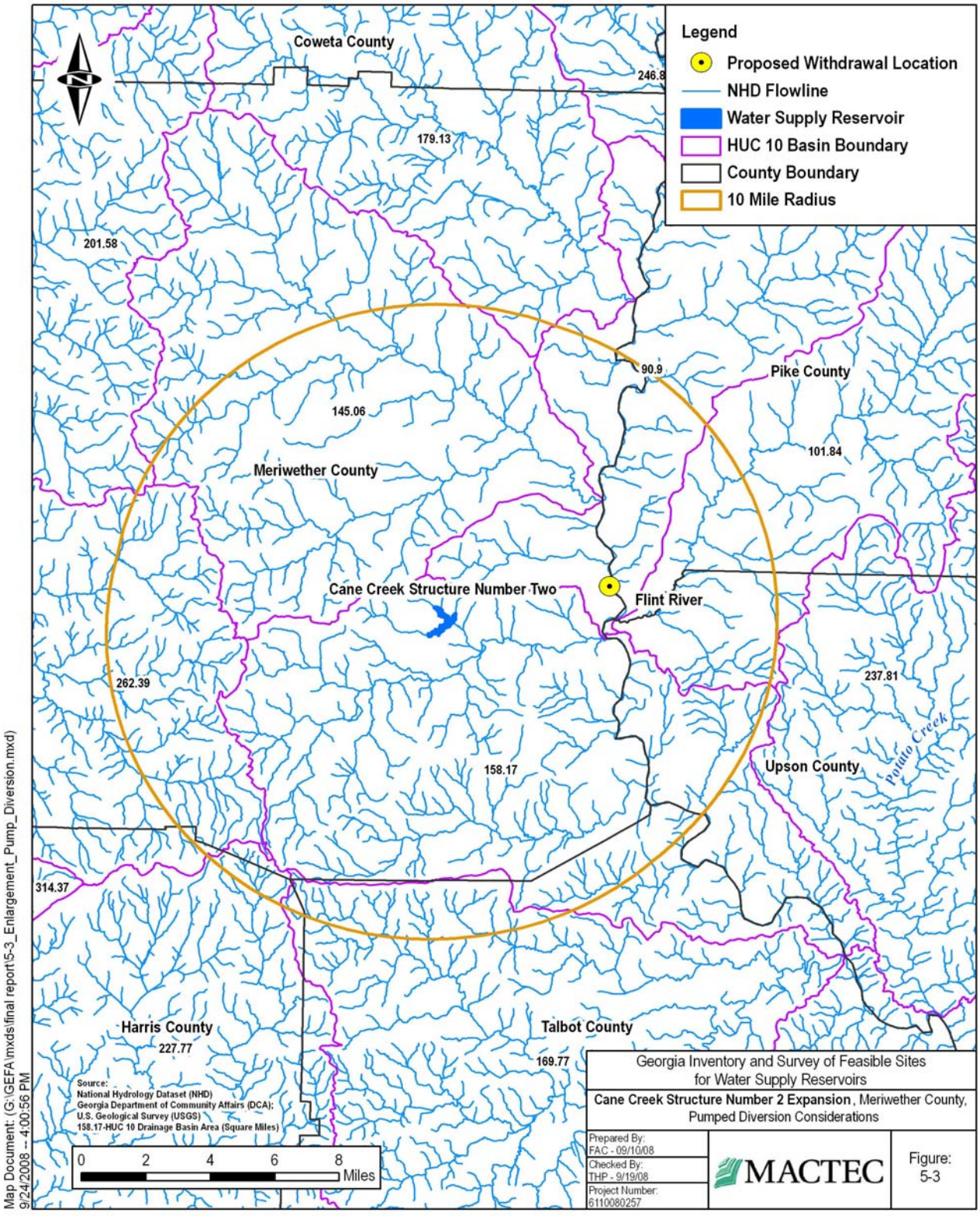
5.2.1 Pumping Flow Rates

Initial analysis of the raw water intake pumping flowrates for each existing reservoir was performed based on the following assumptions:

1. The effective volume of the additional volume obtained from raising the dam can be filled within 1 year (allowable in terms of reservoir operation) and that sufficient annual stream flow is available for filling. Some streams may not yield sufficient pumped flow to fill within 1 year and will require hydrologic analysis.
2. The effective useful volume is 70 percent of the additional volume achieved from raising the dam elevation.
3. Pumping operation will be limited to the “wet months,” 6 months (or 182 days) per year.
4. Daily pumping operation can be arranged to avoid the peak duration of power demand to reduce electrical cost. Assumed pumping operation duration is 8 hours per day (hr/d), 12 hr/d, or 16 hr/d, etc.

The results of the flow rate analyses are presented in Table 5-2a. Table 5-2a compares the pumping flow rates for each pumping duration scenario (8 hr/d, 12 hr/d, 16 hr/d, and 24 hr/d). Very high pumping flow rates are required for the 8-hr/d and 12-hr/d pumping scenarios; therefore, these scenarios will incur high capital costs and high operating costs. The 24-hr/d scenario does not meet the fourth assumption stated above for reducing electrical cost. Therefore, the rest of analysis in this section will be based on the daily flow rates for the 16-hr/d scenario.


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
194.18
190.66
130.69
177.33
221.41
163.6
218.88
248.77
109.74
177.75
126.27
Gwinnett County
Walton County
Yellow River
151.17
DeKalb County
Big Haynes Creek Reservoir
Rockdale County
South River
Newton County
Henry County
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA)
U.S. Geological Survey (USGS)
151.17-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-2_Enlargement_Pump_Diversion.mxd)
9/24/2008 -- 3:51:18 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Big Haynes Creek Reservoir Expansion, Rockdale County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-2


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Coweta County
246.8
179.13
201.58
90.9
Pike County
145.06
101.84
Meriwether County
Cane Creek Structure Number Two
Flint River
262.39
237.81
158.17
Upson County
Potato Creek
314.37
Harris County
227.77
Talbot County
169.77
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
158.17-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-3_Enlargement_Pump_Diversion.mxd)
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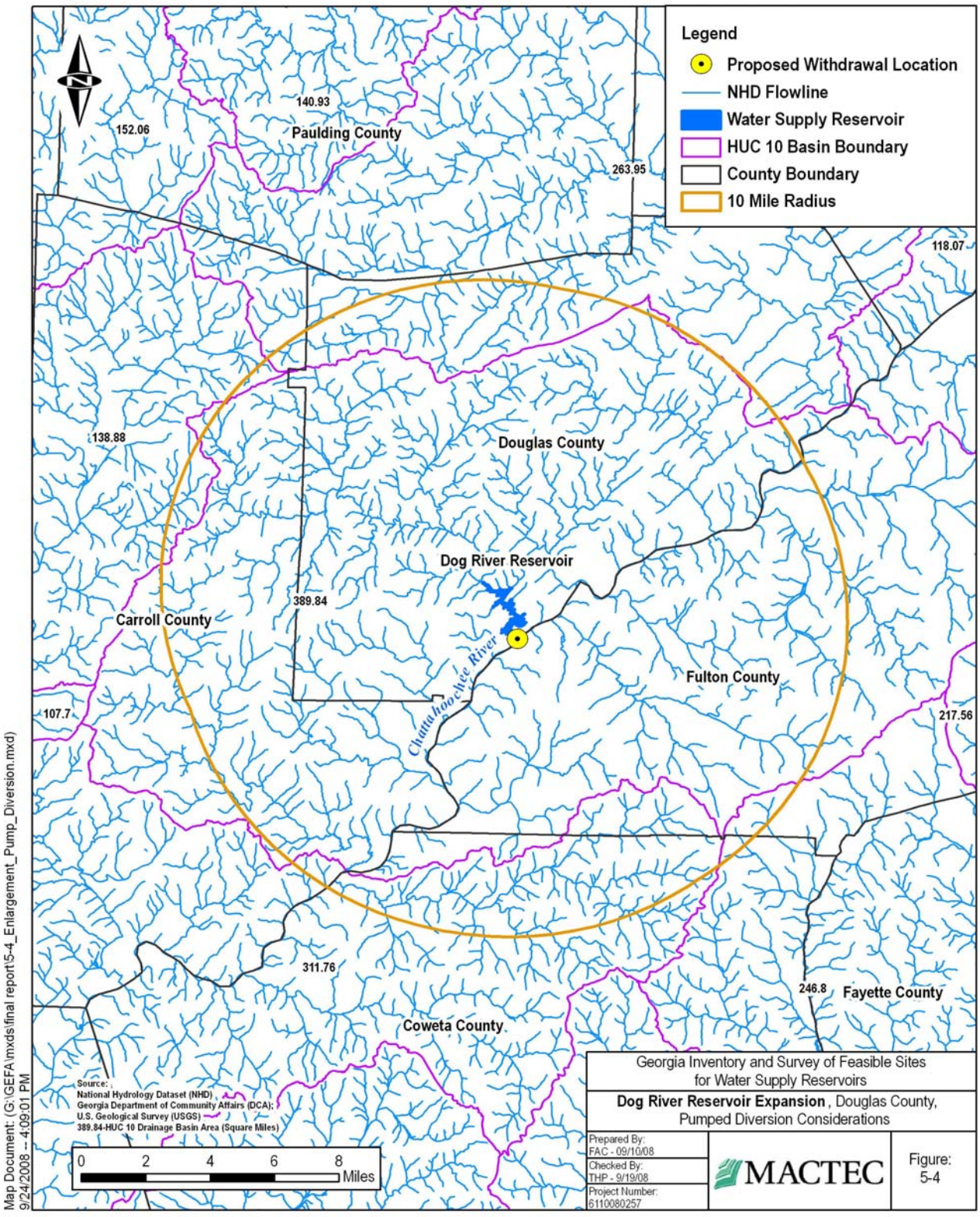
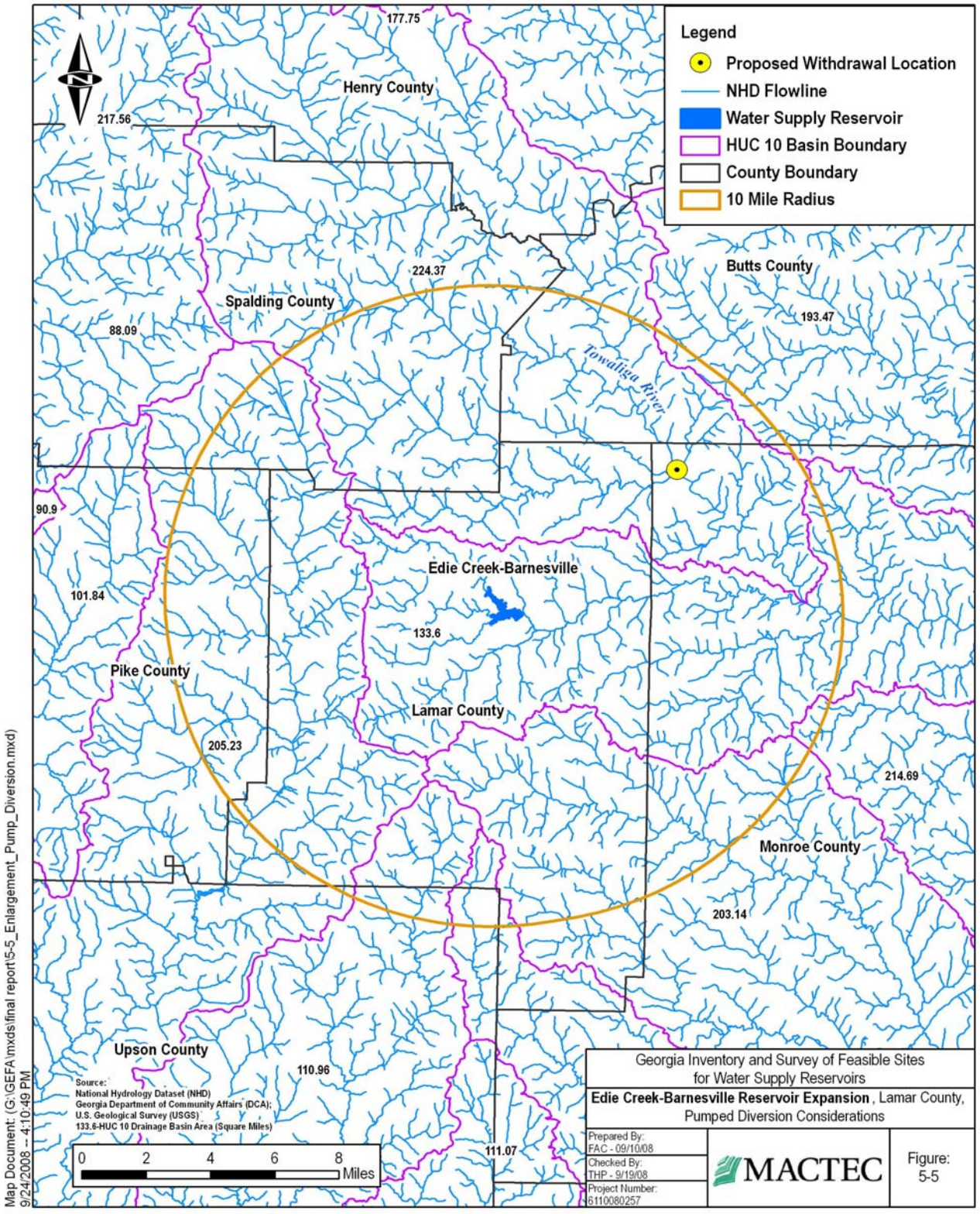
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Cane Creek Structure Number 2 Expansion, Meriwether County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-3


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
140.93
152.06
Paulding County
263.95
118.07
138.88
Douglas County
Dog River Reservoir
389.84
Carroll County
Chattahoochee River
Fulton County
107.7
217.56
311.76
246.8
Fayette County
Coweta County
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
389.84-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-4_Enlargement_Pump_Diversion.mxd)
9/24/2008 -- 4:09:01 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Dog River Reservoir Expansion, Douglas County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-4


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
177.75
Henry County
217.56
224.37
Butts County
Spalding County
193.47
88.09
Towaliga River
90.9
Edie Creek-Barnesville
101.84
133.6
Pike County
Lamar County
205.23
214.69
Monroe County
203.14
Upson County
110.96
111.07
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
133.6-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-5_Enlargement_Pump_Diversion.mxd)
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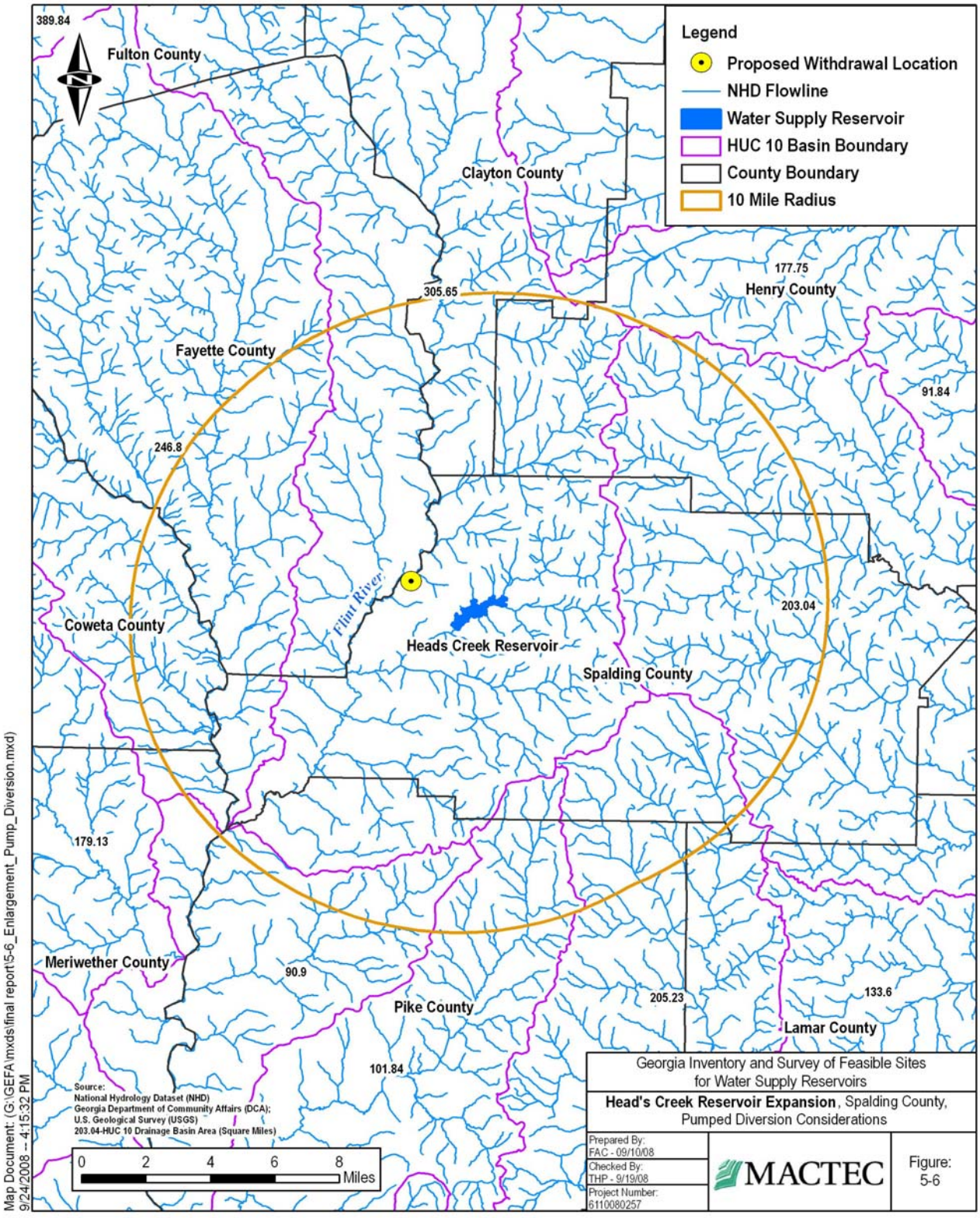
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Edie Creek-Barnesville Reservoir Expansion, Lamar County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-5


389.84
Fulton County
Clayton County
177.75
Henry County
305.65
Fayette County
91.84
246.8
Coweta County
Flint River
Heads Creek Reservoir
203.04
Spalding County
179.13
Meriwether County
90.9
Pike County
205.23
133.6
Lamar County
101.84
Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
203.04-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-6_Enlargement_Pump_Diversion.mxd)
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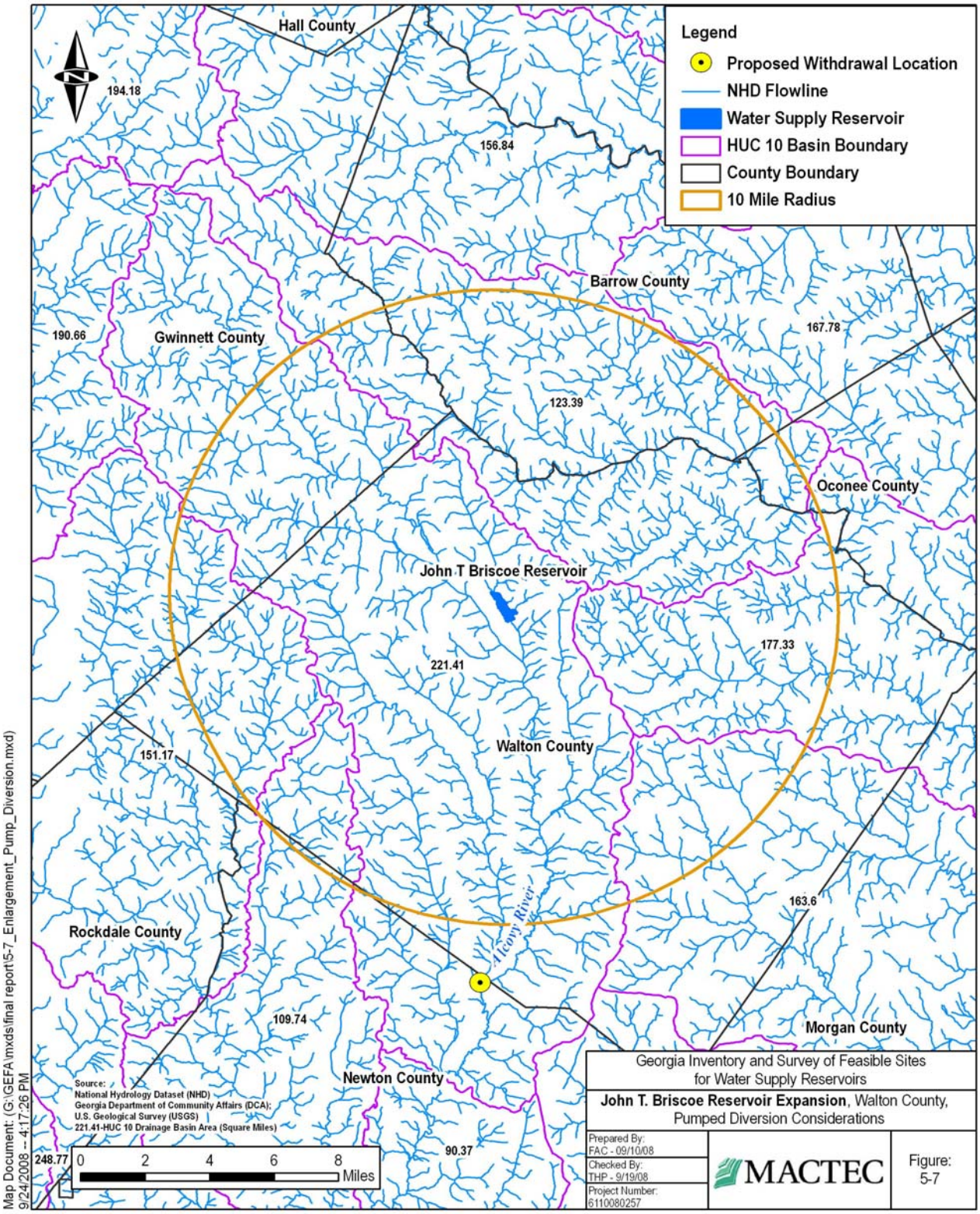
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Head's Creek Reservoir Expansion, Spalding County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-6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Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Hall County
Gwinnett County
Barrow County
Oconee County
Walton County
Rockdale County
Newton County
Morgan County
John T Briscoe Reservoir
Alcovy River
194.18
156.84
190.66
167.78
123.39
177.33
221.41
151.17
163.6
109.74
90.37
248.77
0 2 4 6 8 Miles
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
221.41-HUC 10 Drainage Basin Area (Square Miles)
Map Document: (G:\GEFA\mxds\final report\5-7_Enlargement_Pump_Diversion.mxd)
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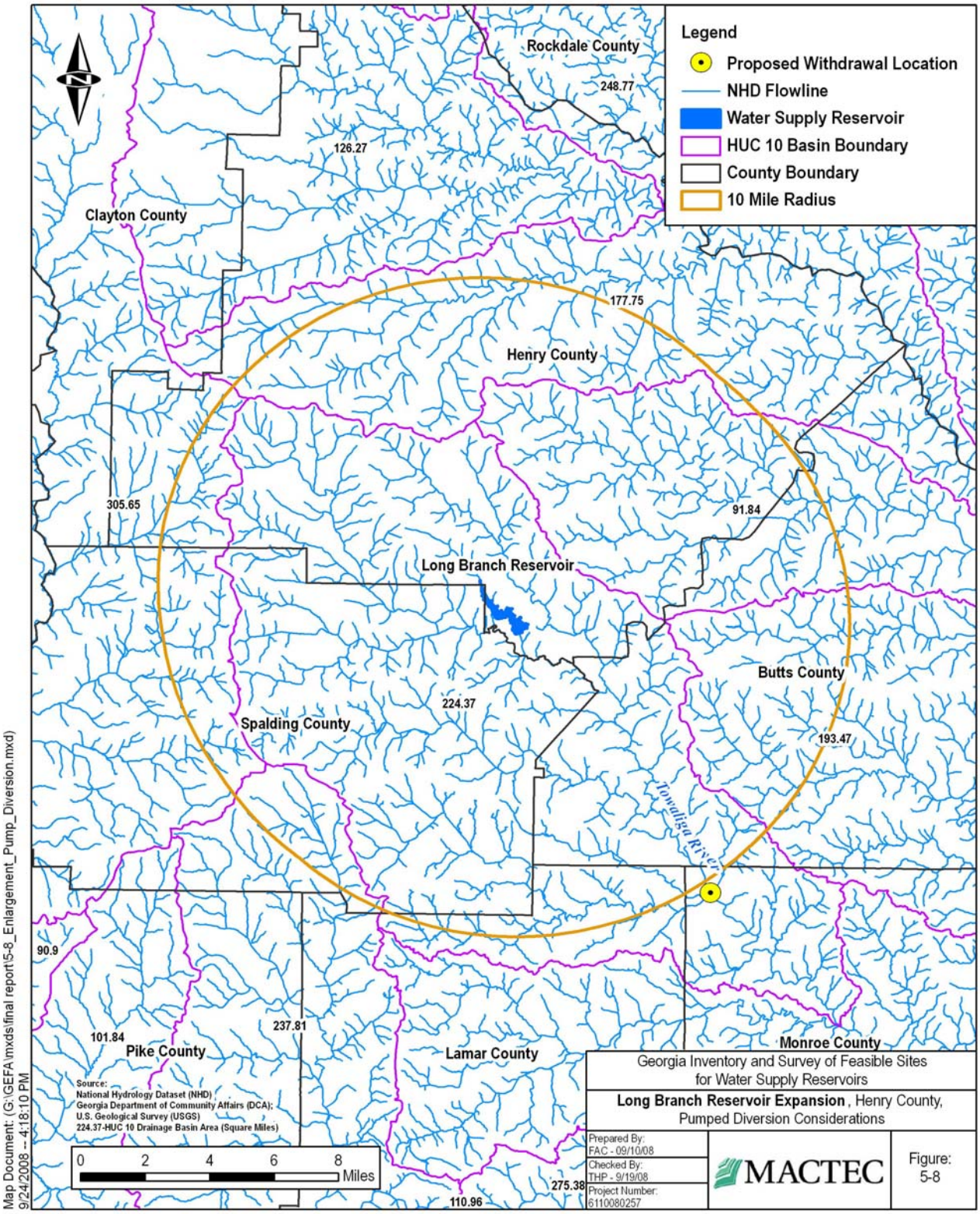
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
John T. Briscoe Reservoir Expansion, Walton County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-7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Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Rockdale County
248.77
126.27
Clayton County
177.75
Henry County
305.65
91.84
Long Branch Reservoir
Butts County
224.37
Spalding County
193.47
Towaliga River
90.9
237.81
101.84
Pike County
Lamar County
Monroe County
275.38
110.96
0 2 4 6 8 Miles
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
224.37-HUC 10 Drainage Basin Area (Square Miles)
Map Document: (G:\GEFA\mxds\final report\5-8_Enlargement_Pump_Diversion.mxd)
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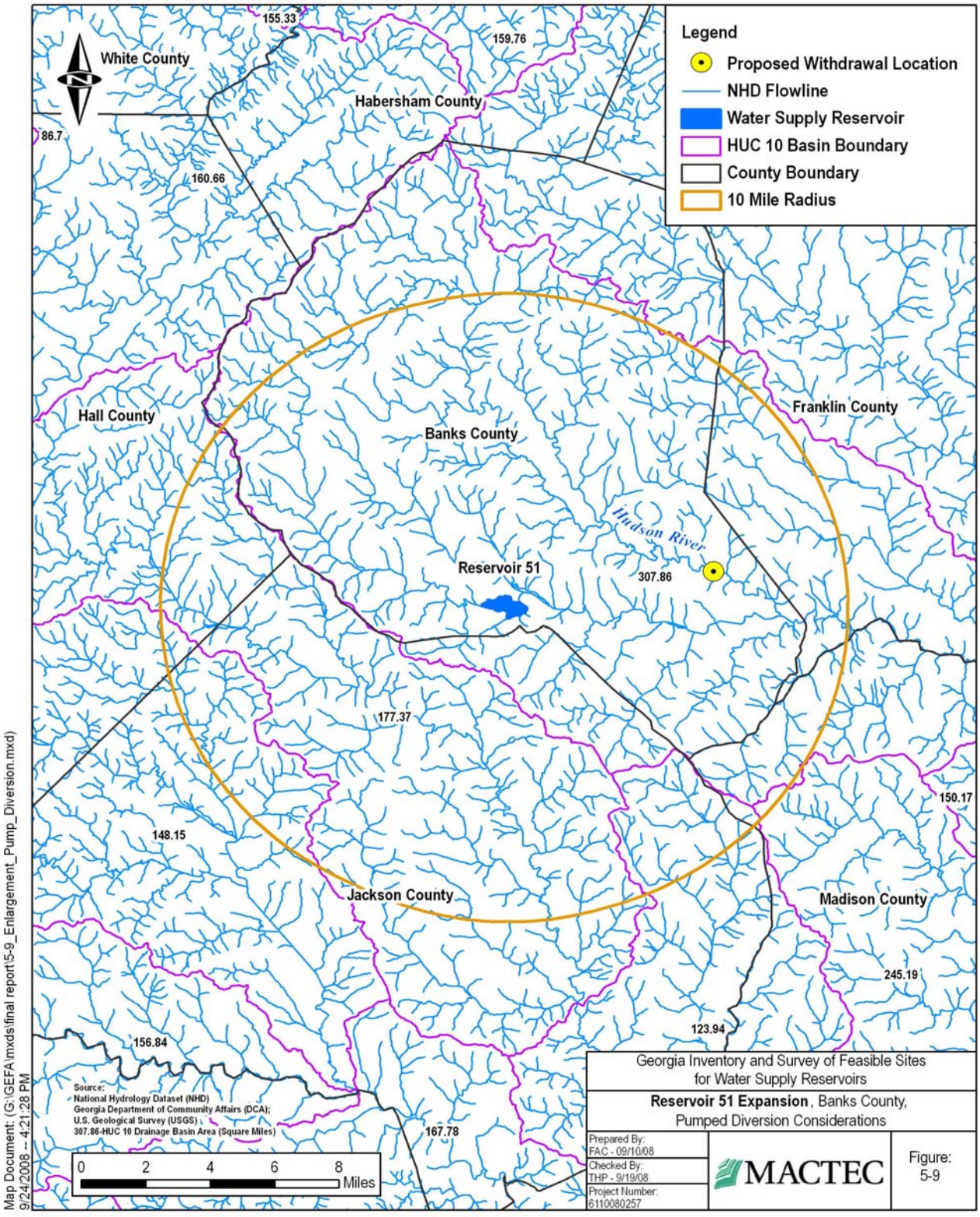
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Long Branch Reservoir Expansion, Henry County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-8


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
White County
Habersham County
Hall County
Banks County
Franklin County
Jackson County
Madison County
Reservoir 51
Hudson River
155.33
159.76
86.7
160.66
307.86
177.37
148.15
150.17
245.19
123.94
156.84
167.78
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
307.86-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-9_Enlargement_Pump_Diversion.mxd)
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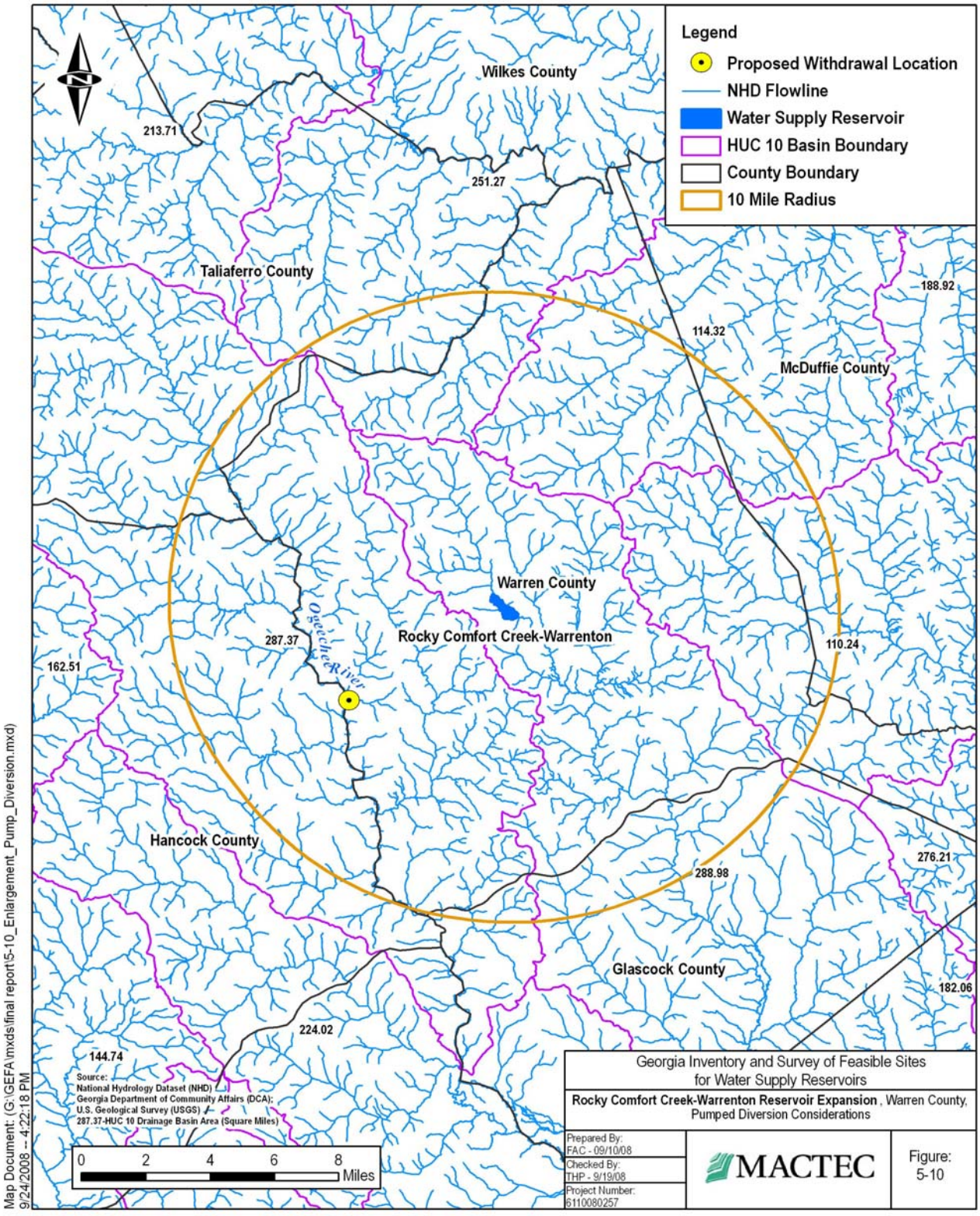
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Reservoir 51 Expansion, Banks County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-9


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
N
Wilkes County
213.71
251.27
Taliaferro County
188.92
114.32
McDuffie County
Warren County
Ogeechee River
287.37
Rocky Comfort Creek-Warrenton
110.24
162.51
Hancock County
276.21
288.98
Glascock County
182.06
224.02
144.74
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
287.37-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-10_Enlargement_Pump_Diversion.mxd)
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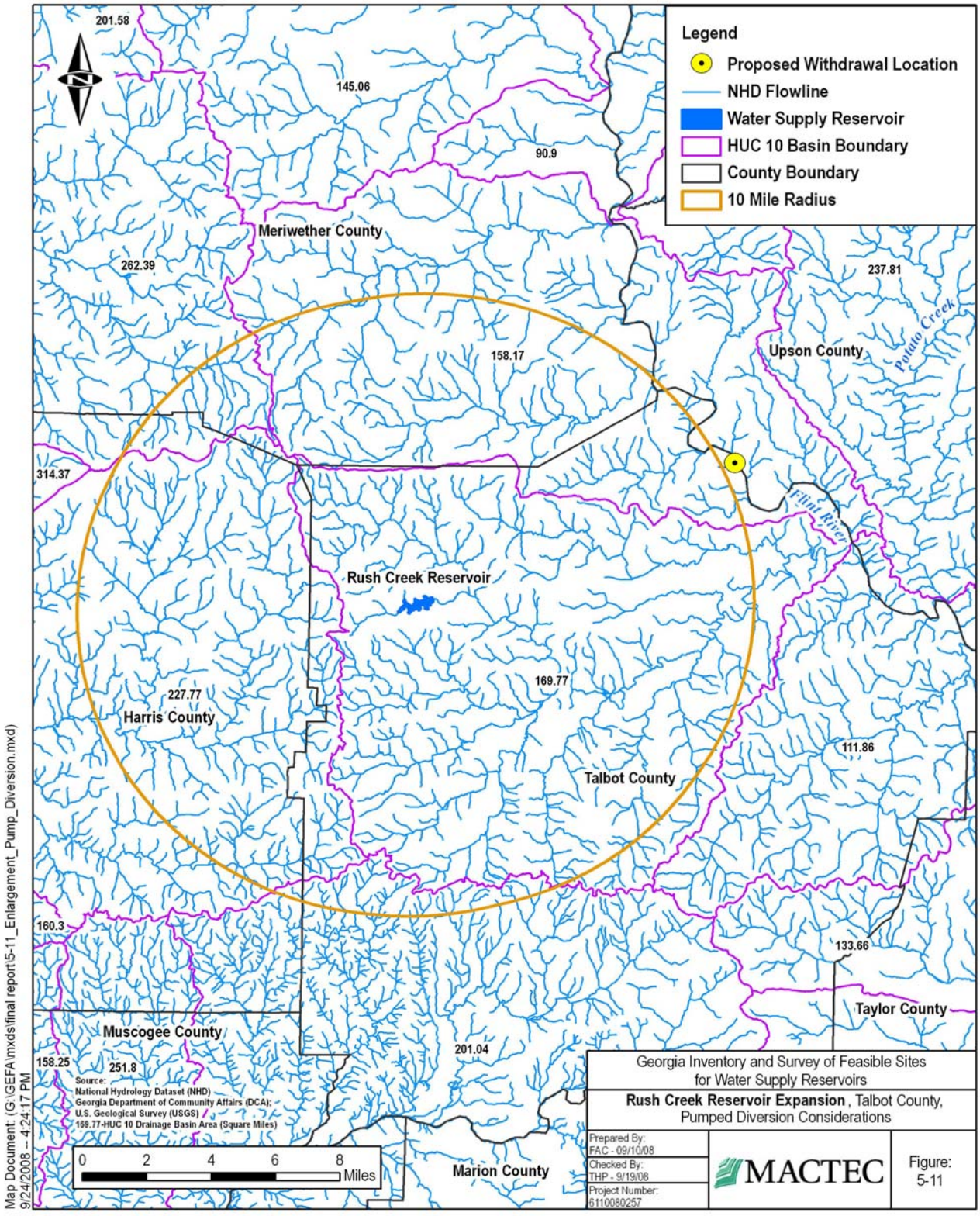
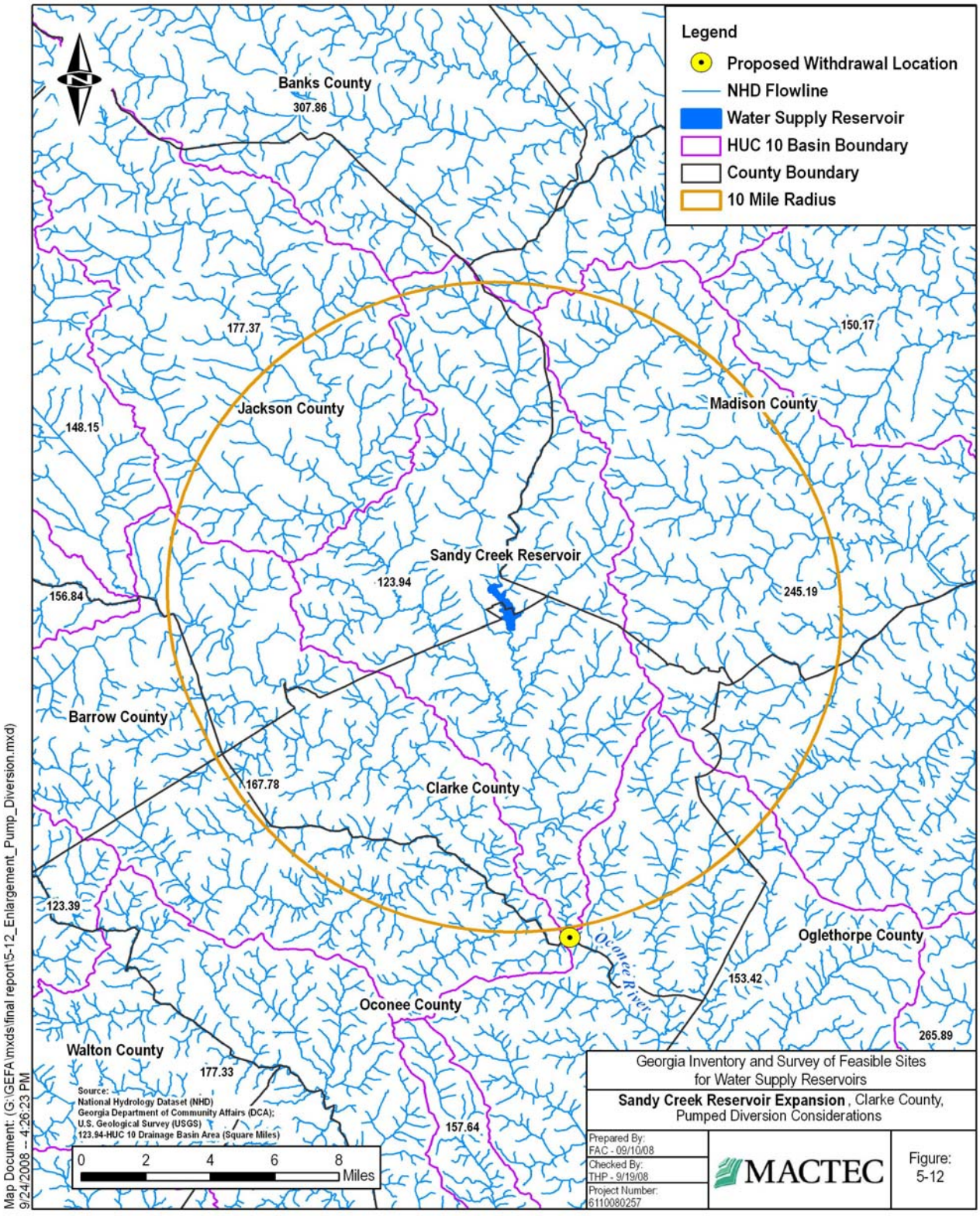
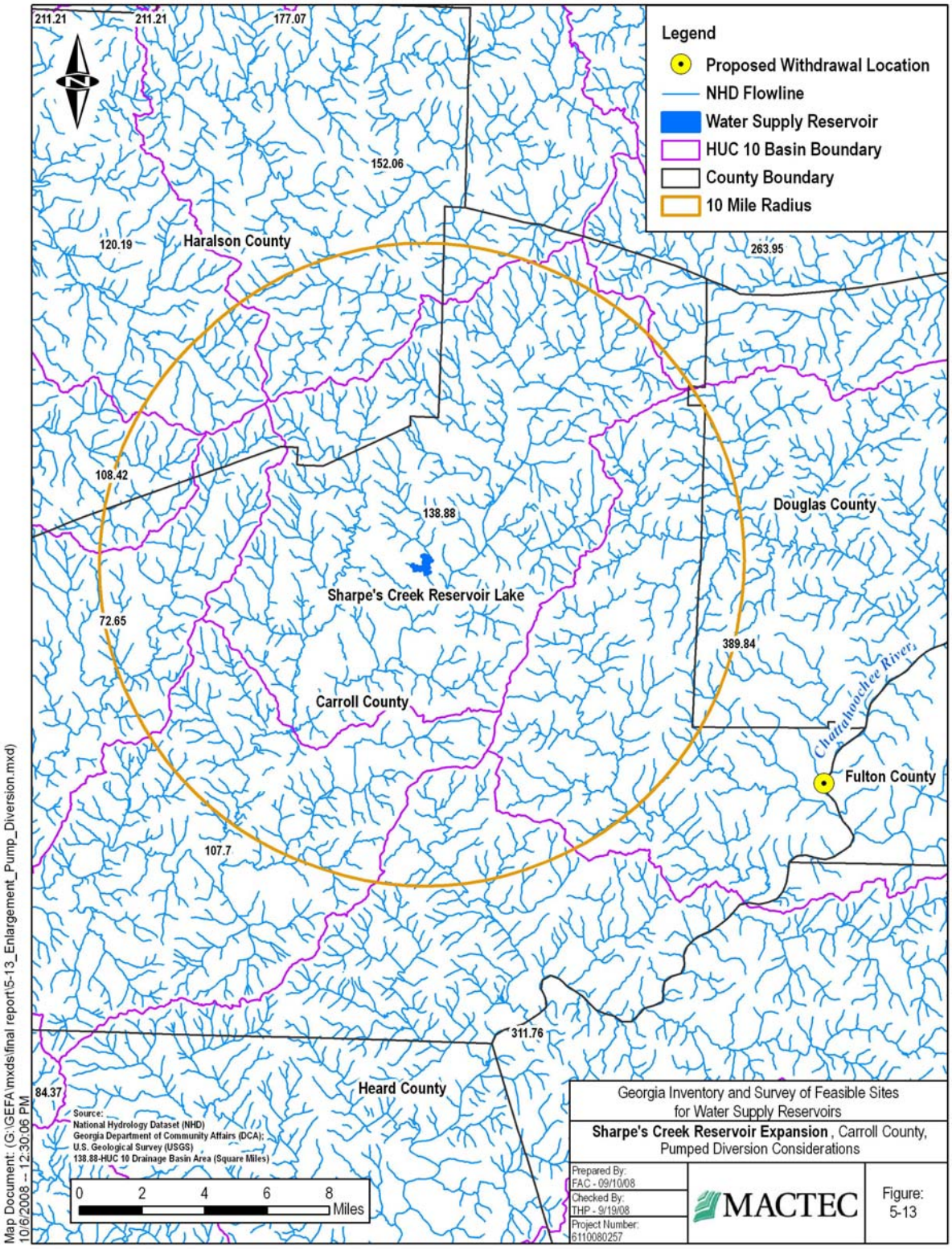
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Rocky Comfort Creek-Warrenton Reservoir Expansion, Warren County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-10


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
201.58
145.06
90.9
Meriwether County
262.39
237.81
Upson County
Potato Creek
158.17
314.37
Flint River
Rush Creek Reservoir
169.77
227.77
Harris County
111.86
Talbot County
160.3
133.66
Taylor County
Muscogee County
158.25
251.8
201.04
Marion County
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
169.77-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-11_Enlargement_Pump_Diversion.mxd)
9/24/2008 -- 4:24:17 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Rush Creek Reservoir Expansion, Talbot County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-11


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Banks County
307.86
177.37
150.17
Jackson County
Madison County
148.15
Sandy Creek Reservoir
123.94
245.19
156.84
Barrow County
167.78
Clarke County
123.39
Oglethorpe County
Oconee River
153.42
Oconee County
265.89
Walton County
177.33
157.64
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
123.94-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-12_Enlargement_Pump_Diversion.mxd)
9/24/2008 -- 4:26:23 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Sandy Creek Reservoir Expansion, Clarke County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-12


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
211.21
211.21
177.07
152.06
120.19
Haralson County
263.95
108.42
138.88
Douglas County
Sharpe's Creek Reservoir Lake
72.65
389.84
Carroll County
Chattahoochee River
Fulton County
107.7
311.76
84.37
Heard County
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
138.88-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8
Miles
Map Document: (G:\GEFA\mxds\final report\5-13_Enlargement_Pump_Diversion.mxd)
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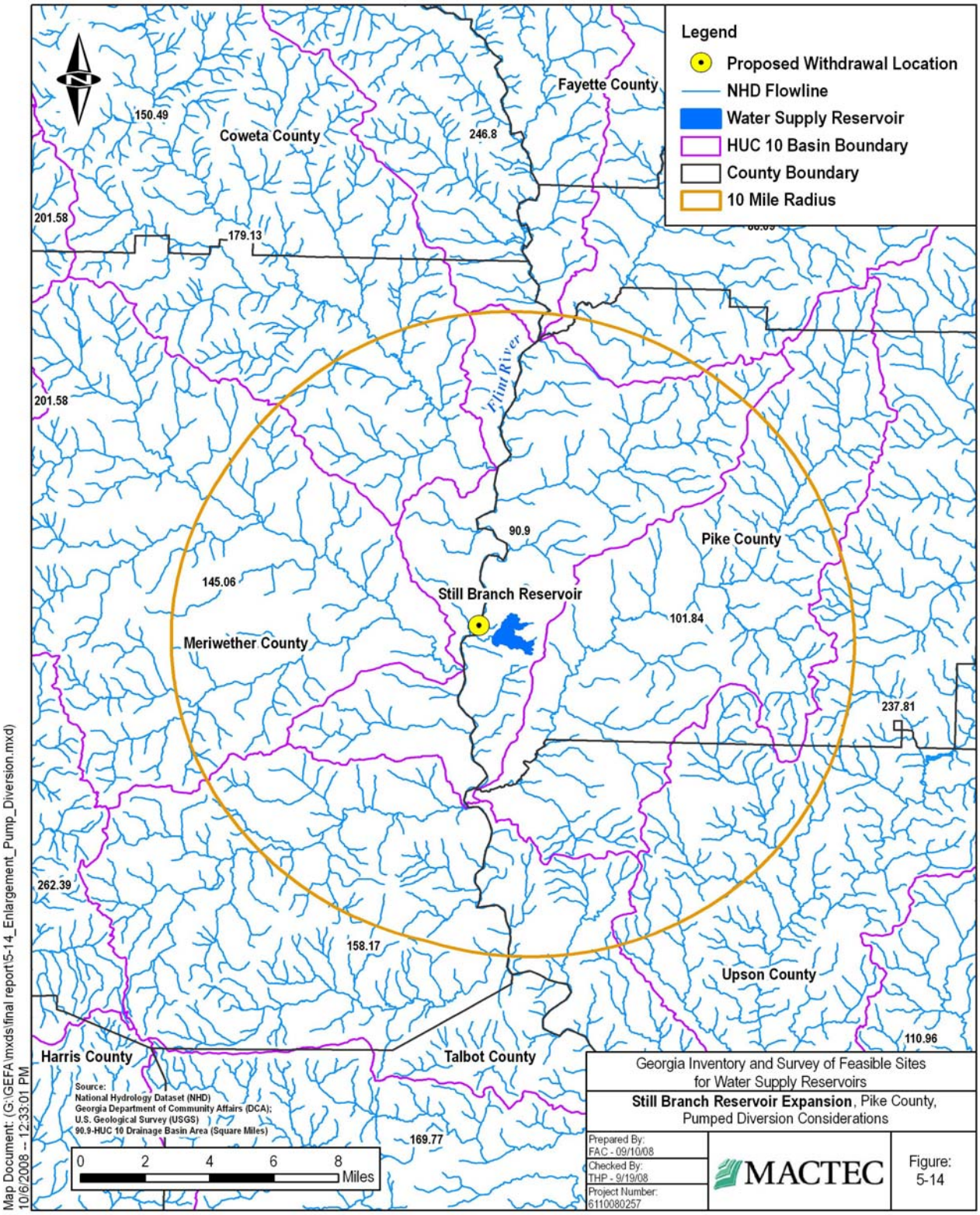
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Sharpe's Creek Reservoir Expansion, Carroll County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-13


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Fayette County
Coweta County
Pike County
Meriwether County
Upson County
Harris County
Talbot County
Still Branch Reservoir
Flint River
150.49
246.8
201.58
179.13
201.58
90.9
145.06
101.84
237.81
262.39
158.17
110.96
169.77
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
90.9-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-14_Enlargement_Pump_Diversion.mxd)
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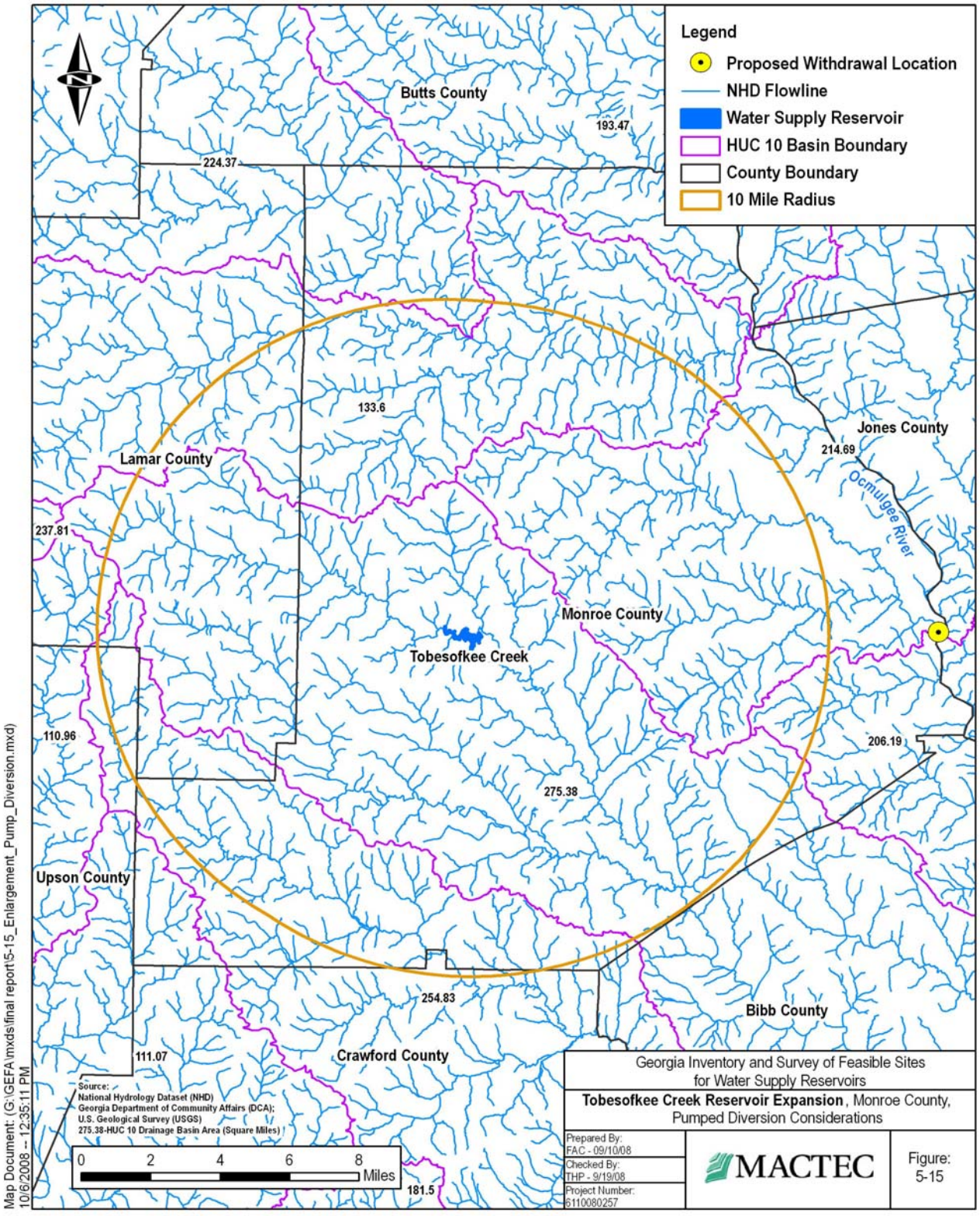
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Still Branch Reservoir Expansion, Pike County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-14


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Butts County
193.47
224.37
133.6
Lamar County
237.81
Jones County
214.69
Ocmulgee River
Monroe County
Tobesofkee Creek
110.96
206.19
275.38
Upson County
254.83
Bibb County
111.07
Crawford County
181.5
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
275.38-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
Map Document: (G:\GEFA\mxds\final report\5-15_Enlargement_Pump_Diversion.mxd)
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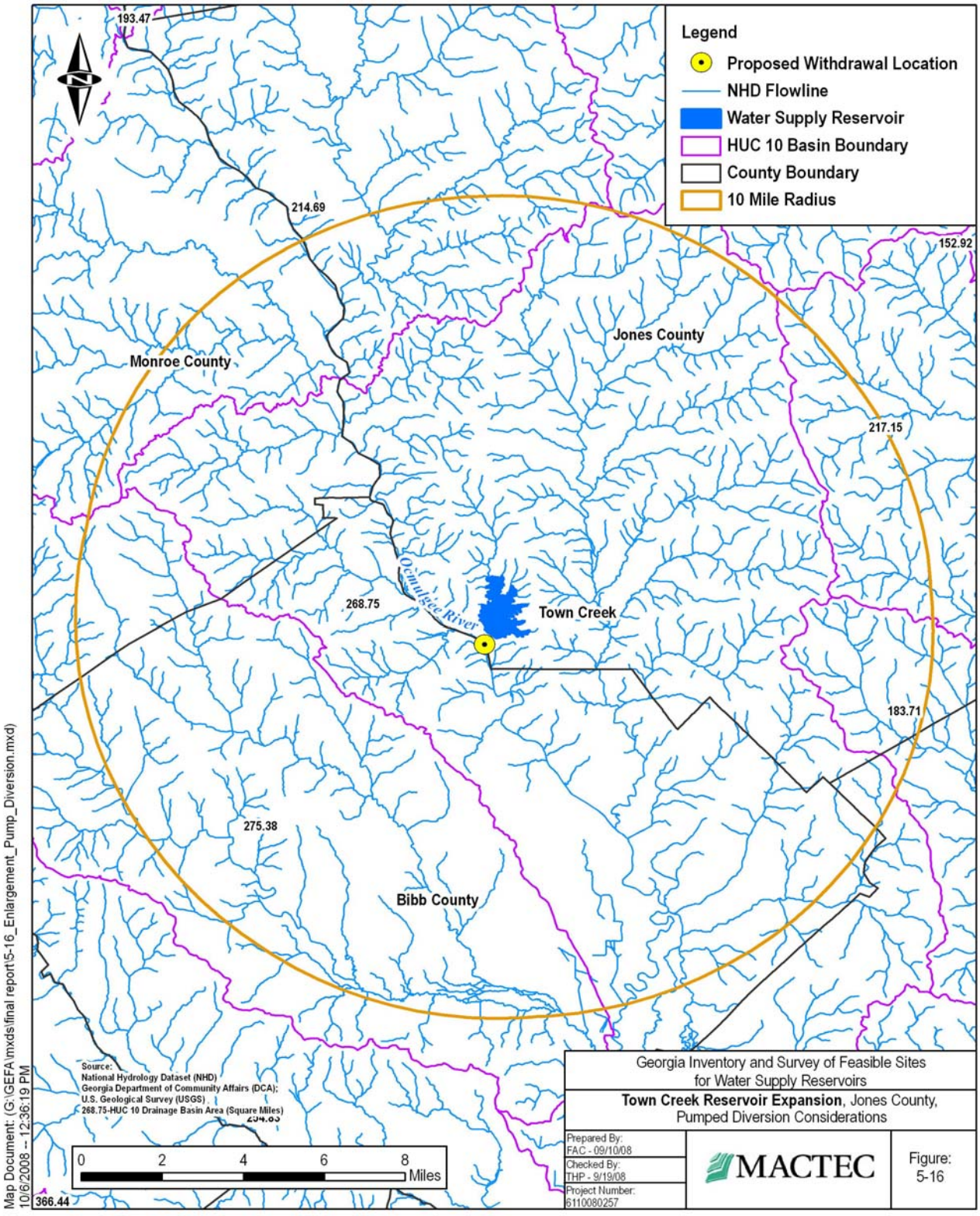
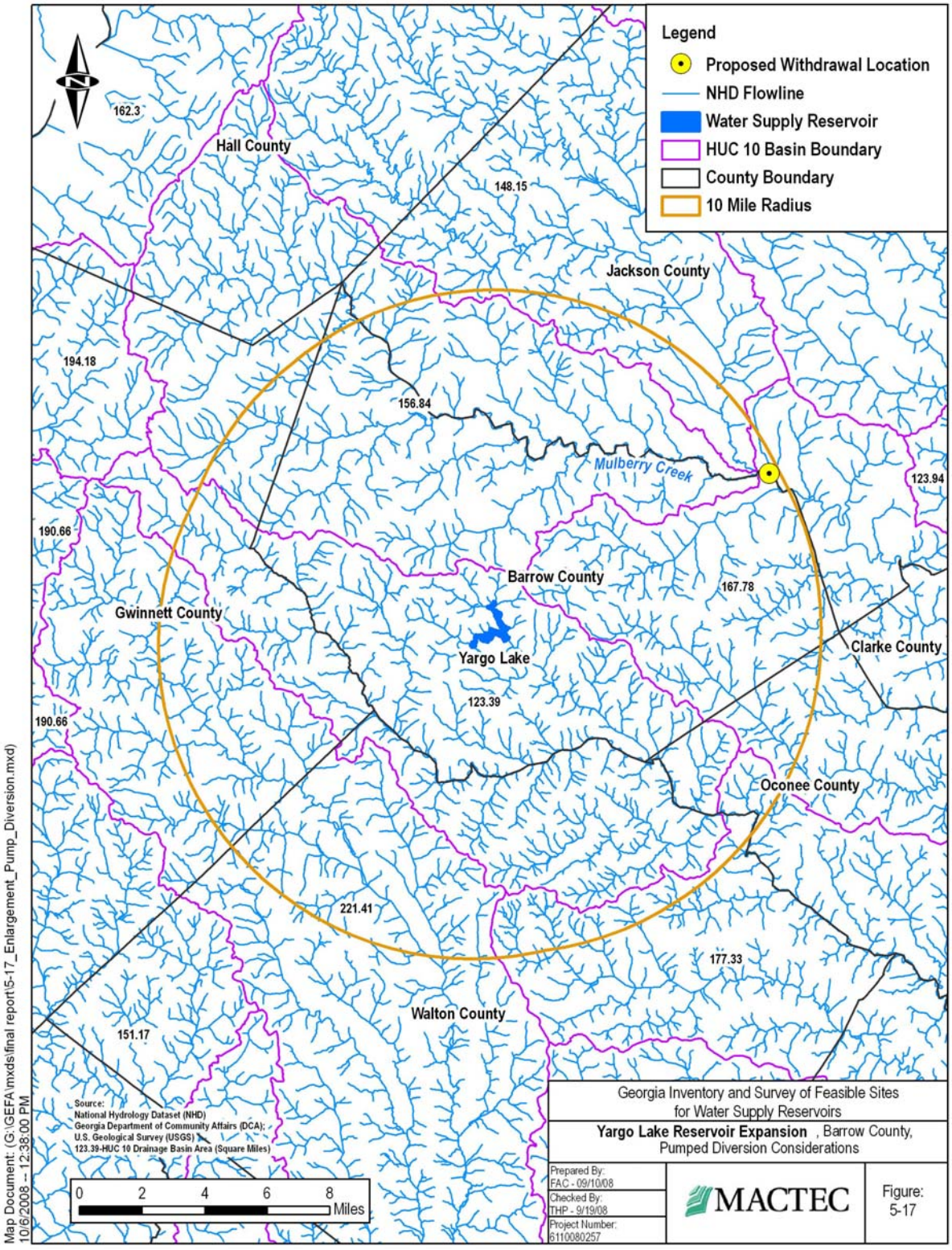
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Tobesofkee Creek Reservoir Expansion, Monroe County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-15


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
193.47
214.69
152.92
217.15
183.71
275.38
366.44
268.75
Monroe County
Jones County
Bibb County
Ocmulgee River
Town Creek
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
268.75-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8
Miles
Map Document: (G:\GEFA\mxds\final report\5-16_Enlargement_Pump_Diversion.mxd)
10/6/2008 -- 12:36:19 PM
Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Town Creek Reservoir Expansion, Jones County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-16


Legend
Proposed Withdrawal Location
NHD Flowline
Water Supply Reservoir
HUC 10 Basin Boundary
County Boundary
10 Mile Radius
Hall County
Jackson County
Barrow County
Gwinnett County
Clarke County
Oconee County
Walton County
Yargo Lake
Mulberry Creek
162.3
148.15
194.18
156.84
123.94
190.66
167.78
123.39
190.66
221.41
177.33
151.17
Source:
National Hydrology Dataset (NHD)
Georgia Department of Community Affairs (DCA);
U.S. Geological Survey (USGS)
123.39-HUC 10 Drainage Basin Area (Square Miles)
0 2 4 6 8 Miles
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Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs
Yargo Lake Reservoir Expansion , Barrow County, Pumped Diversion Considerations
Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257
MACTEC
Figure: 5-17

TABLE 5-2a

Pumping Flowrate Analysis of 16 Existing Reservoirs Considered for Expansion

Name of Reservoir	Intake River Name	County	Potential Expanded Storage	70%Effective Storage	Average Daily Pumping Rate when Filling (MGD)*			
			BG	*BG*	*24-hr*	*16-hr*	*12-hr*	*8-hr*
Big Haynes Creek Reservoir	Yellow River	Rockdale	5.4	3.78	20.8	31.15	41.6	62.4
Cane Creek Structure Number Two	Potato Creek	Meriwether	3.44	2.41	13.23	19.85	26.46	39.69
Dog River Reservoir	Chattahoochee River	Douglas	5.44	3.81	20.92	31.38	41.85	62.77
Edie Creek-Barnesville	Towaliga River	Lamar	2.5	1.75	9.62	14.42	19.23	28.85
Heads Creek Reservoir	Flint River	Spalding	1.5	1.05	5.77	8.65	11.54	17.31
John T Briscoe Reservoir	Alcovy River	Walton	4.18	2.93	16.08	24.12	32.15	48.23
Long Branch Reservoir	Towaliga River	Henry	4.19	2.93	16.12	24.17	32.23	48.35
Reservoir 51	Hudson River	Banks	1.3	0.91	5	7.5	10	15
Rocky Comfort Creek-Warrenton	Ogeechee River	Warren	2.17	1.52	8.35	12.52	16.69	25.04
Rush Creek Reservoir	Flint River	Talbot	2.1	1.47	8.1	12.12	16.16	24.24
Sandy Creek Reservoir	Oconee River	Clarke	2.03	1.42	7.81	11.71	15.62	23.42
Sharpe's Creek Reservoir	Chattahoochee River	Carroll	3.03	2.12	11.65	17.48	23.31	34.96
Still Branch Reservoir	Flint River	Pike	2.7	1.89	10.4	15.6	20.8	31.1
Tobesofkee Creek Reservoir	Ocmulgee River	Monroe	9.68	6.78	37.23	55.85	74.46	111.69
Town Creek Reservoir	Ocmulgee River	Jones	11.95	8.37	45.96	68.94	91.92	137.88
Yargo Lake	Middle Oconee River	Barrow	2.98	2.09	11.46	17.19	22.92	34.38

Acronyms:
BG – Billion gallons
hr -– Hour
hr/d – Hour(s) per day

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Notes/Assumptions:
* Based on a 1-year time-to-fill scenario. Some reservoirs will require multiple years to fill. For those reservoirs, total estimated water withdrawals will decrease.
1) Pumping flow rates are determined to fill the effective storage in one year; the effective storage volume accounts for 70% of the additional storage.
2) Pumping operation will be limited to the wet months of the year, 6 months or 182 days per year.
3) Pumping will be conducted during the off-peak hours each day, 8 hr/d, 12 hr/d or 16 hr/d, depending on the target volume.
Reservoirs are listed alphabetically.
Table developed for preliminary screening purposes; values are conceptual.

5.2.2 Size of Raw Water Transmission Mains

Pipeline is the biggest investment component of pumped storage reservoirs. The cost of pipeline is directly associated with its route length and the change in elevation. A detailed pipeline route study for each reservoir is necessary to determine length and the associated pipeline cost with accuracy so that the most economical and feasible route can be selected. With very limited available information, the route length and elevation change were estimated based on the following assumptions:

1. Pipeline route length is 30 percent greater than the straight distance between the potential raw water intake location and the target reservoir.
2. Elevation rise criteria are 250 feet (ft) for a pipeline that is 5 to 10 miles long in straight distance and 350 ft for a straight line distance over 10 miles. The elevation rise criterion is adjusted for cases with a straight distance shorter than 5 miles.

The Hazen Equation was used to size the raw water transmission main. Pipe material was assumed to be steel pipes or ductile iron pipe. The calculated pipe sizes are listed in Table 5-2b.

TABLE 5-2b

Raw Water Transmission Main Analysis of 16 Existing Reservoirs Considered for Expansion

Reservoir Name	Intake River Name	County	Flowrate*	Distance	Route Length	Elevation Rise	Slope	Proposed DIP Diameter*
			MGD	Mile	Mile	Feet	Feet/Feet	Inches
Big Haynes Creek Reservoir	Yellow River	Rockdale	31.15	6	7.8	250	0.0060703	36
Cane Creek Structure Number Two	Flint River	Meriwether	19.85	5	6.5	200	0.0058275	30
Dog River Reservoir	Chattahoochee River	Douglas	31.38	0.3	0.39	50	0.0242813	24
Edie Creek-Barnesville	Towaliga River	Lamar	14.42	7	9.1	250	0.0052031	24
Heads Creek Reservoir	Flint River	Spalding	8.65	2	2.6	150	0.0109266	18
John T Briscoe Reservoir	Alcovy River	Walton	24.12	12	15.6	350	0.0042492	30
Long Branch Reservoir	Towaliga River	Henry	24.17	11	14.3	350	0.0046355	30
Reservoir 51	Hudson River	Banks	7.50	6	7.8	250	0.0060703	18
Rocky Comfort Creek-Warrenton	Ogeechee River	Warren	12.52	6	7.8	250	0.0060703	24
Rush Creek Reservoir	Flint River	Talbot	12.12	11	14.3	350	0.0046355	24
Sandy Creek Reservoir	Oconee River	Clarke	11.71	10	13	250	0.0036422	24
Sharpe's Creek Reservoir	Chattahoochee River	Carroll	17.48	14	18.2	350	0.0036422	30
Still Branch Reservoir	Flint River	Pike	15.58	0.5	0.65	50	0.0145688	24
Tobesofkee Creek Reservoir	Ocmulgee River	Monroe	55.85	13	16.9	350	0.0039224	48
Town Creek Reservoir	Ocmulgee River	Jones	68.94	0.3	0.39	50	0.0242813	36
Yargo Lake	Mulbery River	Barrow	17.19	10	13	250	0.0036422	30

Acronyms/Definitions:
DIP – Ductile iron pipe
MGD – Million gallons per day
Hazen Equation: Q = Flowrate (MGD) = 0.279*C*D2.63*S0.54
C = Hazen roughness coefficient, C = 130 for new pipe
D = Pipe diameter, feet
S = Slope of energy gradient, ft/ft
TBD = To be determined

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Assumptions:
* Based on a 1-year time-to-fill scenario. Some reservoirs will require multiple years to fill. For those reservoirs, estimated pipe diameters and flowrates will decrease. Detailed site specific hydrologic analysis will be needed to assess acceptable water withdrawal from the source water.
1) Pipeline route length is 30 percent greater than the straight distance.
2) Elevation rise criteria: 250 feet for 6 to 10 mile distance, 350 feet for distances over 10 miles. Criteria are adjusted for shorter distances.
3) Hazen C is assumed to be 130
Reservoirs are listed alphabetically.
Table developed for preliminary screening purposes; values are conceptual.

5.3 SECTION 404 PERMIT CONSIDERATIONS

Any reservoir expansion will require a Section 404 Permit from USACE. During the permit process, the burden will be on the project sponsor to demonstrate that it has selected the least environmentally damaging, practicable alternative capable of satisfying the project purpose. Consideration must first be given to alternatives that avoid impacts to jurisdictional waters. Avoidance alternatives include use of groundwater, water conservation, water recycling and reuse, and use of existing supply sources. If satisfactory

avoidance alternatives are not available, the analysis continues with the identification of surface-water alternatives and the means of reducing the environmental impact of surface-water alternatives. The following factors are utilized for the analysis of alternatives.

5.3.1 The Ability of the Alternative to Supply the Identified Need

For any alternative to be practicable, it must meet the threshold requirement of being capable of supplying the identified need during drought conditions. In most cases, groundwater, water conservation, and water recycling and reuse will be insufficient to provide a reliable source of water to meet future demand. However, it will be necessary to evaluate whether existing surface water supplies are sufficient to meet the identified need. In addition, it will be necessary to demonstrate that a proposed expansion alternative can supply all, or a substantial portion of, the identified need.

5.3.2 Water Quality Considerations

Alternatives must be evaluated for water quality concerns using EPA's BASINS system to survey the watershed for areas of environmental concern. Since the watersheds of existing water supply reservoirs are protected by state law, water quality considerations are not expected to play a significant role in the decision to expand an existing reservoir.

5.3.3 Instream Flow Protection

Alternatives are assessed to determine whether minimum in-stream flows can be maintained while achieving the required water supply yield. Georgia's current instream flow protection requirements for surface water withdrawals are established under EPD Rule 391-3-6-.07, and are further subject to the DNR-approved 2001 Interim Instream Flow Protection Strategy. These requirements include provisions to maintain specified minimum flows at points of water withdrawal or to release specified minimum flows from water supply reservoirs. The 2001 Interim Strategy allows a permit applicant to choose from three instream flow protection options: (1) monthly minimum seven-day, ten-year flow minimum flow option, (2) site-specific instream flow study option, or (3) mean annual flow (minimum percentage) options. Additional minimum flow releases may be required to ensure availability of water to other downstream water users. This total instream minimum flow requirement, known as the non-depletable flow, is normally calculated by adding the instream flow requirement at the point of withdrawal or impoundment to the pro

rata share of the downstream withdrawal using the drainage area ratio method. As more water withdrawals are made from a stream, the upstream non-depletable flow requirements increase accordingly.

In addition to minimum instream flow protection requirements that are applied at the point of withdrawal or impoundment, the State Water Plan includes provisions for establishing instream "flow regime" requirements that can also affect design and operation of future water supply reservoirs. Overall, if instream flow or flow regime requirements are increased, the amount of reservoir storage capacity needed will be increased to maintain the required instream flows or flow regime and still provide the necessary water supply yield.

5.3.4 Impacts to Jurisdictional Waters

Alternatives must be evaluated for impacts to jurisdictional waters, including wetlands and streams. Typically, expansion of an existing reservoir will result in fewer jurisdictional impacts than the development of a new water supply reservoir; however, it will be necessary to accurately determine the impacts to jurisdictional waters associated with each potential expansion. If pumping is proposed, any impacts associated with the intake site and raw water pipeline route must be determined as well.

5.3.5 Impacts to Threatened and Endangered Species

Alternatives are assessed for occurrence of any State or federally protected species or habitat. The presence of a federally protected species or habitat potentially affected by the project will necessitate that USACE request "formal consultation" with the U.S. Fish and Wildlife Service concerning the listed species. In general, rare mussels and fishes are known from the following drainages: the Conasauga, Chattooga, Coosawattee, Oostanaula, Coosa, Etowah, Tallapoosa, the middle Chattahoochee, and the upper and middle Flint Rivers. Some larger tributaries of these rivers may also harbor such species, and even small streams can support rare darters. Of the 16 existing reservoir sites, 13 have no known federally listed aquatic species, or federally listed aquatic species are known from the larger rivers that will not be impounded. Three potential reservoir sites, Big Haynes Creek Reservoir, Rush Creek Reservoir, and Cane Creek Structure Number Two Reservoir, are in areas that harbor federally protected plants, mussels, or fishes within the general river drainage. Based on available data, the 16 reservoir sites are suitable for further screening; however, individual site surveys will be necessary to

determine whether protected species in the particular stream or stream reach would be affected.

5.3.6 Impacts to Cultural Resources

To comply with the National Historic Preservation Act, background studies and surveys must be conducted for the presence of cultural and historic resources in the reservoir sites and the areas of potential effect.

5.3.7 Impacts on the Human Environment

Alternatives are evaluated for potential impacts on the human (developed) environment, including impacts to existing residential, commercial, governmental, and industrial buildings and structures and utilities such as roads, power lines, and pipelines. The initial screening that led to the selection of the 16 reservoirs with potential for expansion included a preliminary evaluation of impacts to the human environment; however, these 16 alternatives will need to be reviewed in greater detail.

5.3.8 Cost

The present worth cost of alternatives must be estimated. The cost estimates should include permitting, mitigation, land acquisition, construction, maintenance, and operating costs.

The cost of reservoir storage is variable and site-specific, making it difficult to provide “typical” costs for reservoir projects. The costs can vary significantly depending on location, land and relocation costs, siting and permitting, engineering requirements, environmental impacts and mitigation, difficulty of construction, and the type of reservoir constructed (e.g., on-stream versus pumped storage or raising an existing dam versus building a completely new project).

In general, the cost per unit of usable storage volume (e.g., cost per billion gallons) tends to be higher for small reservoirs and lower for large reservoirs. Also, projects to construct new dams tend to cost more than raising existing dams for volume expansion. Costs for pumped storage tend to be higher than for conventional reservoirs with the same volume. Nonetheless, a pumped storage project can significantly increase the water supply yield from the same reservoir storage volume. Given these variables and the site-specific nature of reservoir costs, contemporary experience in Georgia indicates a total cost ranging from approximately 4 to 10 million dollars per MGD of water

supply yield provided for construction of new reservoirs and reservoir expansions. This cost estimate includes land acquisition, mitigation, engineering, and construction costs.

In the future, construction costs of these types of projects are expected to rise due to the increased cost of construction materials. Currently, mitigation costs are approximately 10 to 15 percent of the total cost of the project, stream mitigation being the most costly item; however, mitigation costs are expected to rise because of increased competition for suitable sites drives up the price of floodplain land.

As community water needs grow and water distribution systems expand, the benefits of pipeline interconnections with other nearby supply systems enhances the opportunity to share capacity on a multijurisdictional basis while improving reliability for the interconnected systems. An interconnection strategy can also facilitate the development of a single larger regional reservoir, rather than multiple smaller reservoirs in the same region, to reduce overall costs and environmental impacts on a larger regional basis.

The biggest investment component for implementing a water supply interconnection strategy is pipeline, with the cost directly associated with the route length and any pressure boost that may be required over longer distances.

Water conservation is a very important consideration in planning for water supply and associated reservoir storage requirements. A successful long-term water conservation program can help reduce average per capita water withdrawals and thereby slow the rate of increase in overall water supply demands. Successful water conservation programs further hold the promise of helping to delay or slow the rate of capital expenditures for added water supply capacity, particularly where growth in overall water demand is slowing and existing storage capacity and yield is proven sufficient to meet projected demands during the design drought. However, where population growth and associated water demand growth surpasses the actual water savings realized from conservation measures, delay of long-term capital expenditures for added storage capacity runs the significant risk of not meeting all reasonable water supply demands during the next drought of record.

Historically, Georgia communities have used a variety of financing mechanisms to secure funding necessary for reservoir and other water supply projects. These include revenue bonds, general obligation (GO) bonds, special purpose local option sales taxes (SPLOST), participation in the revolving loan fund operated by GEFA, and, to a lesser extent, receipt of federal “earmark” grants designated for specific reservoir projects. “Revenue bonds” are bonds on which the debt service is payable mainly from revenue generated by the project being financed, or from

other non-property tax sources. Revenue bonds account for the majority of water-related infrastructure financing carried out in Georgia each year. These bonds are especially useful when the issuer has a developed water system with a large customer base and the ability to offer lenders attractive debt coverage when the system's annual revenues are compared to its annual debt service requirements. Revenue bond financing is a less attractive alternative for smaller or emerging water systems. These emerging systems, although they are projected to experience high growth, often lack the necessary customer base to make pure revenue bond financing feasible. In these cases, water systems, particularly county water authorities, often call upon county government to "guarantee" repayment of the revenue bonds by pledging the county's credit toward repayment of the bonds if system revenues prove inadequate. When revenue bonds are issued with county backing, larger sums can be borrowed, marketability of the bonds is enhanced, and interest rates are customarily lower. The advantages that county-backed revenue bonds enjoy are sometimes offset by county resistance to issuing guarantees on bonds where any shortfall in revenues would require the county to call upon its ad valorem tax-based general fund to make up the difference. GO bonds are backed with the guarantee that the issuing government will use its taxing power to repay them. GO bonds are generally regarded by investors as safer than revenue bonds issued by a single water system and they usually enjoy lower interest rates. Voter approval by referendum is frequently required before GO bonds may be issued. The ability to avoid the uncertainty and delay associated with GO bond referenda is a key factor in the preference many communities have for the county-backed revenue bond. Georgia's SPLOST has seen limited use in the area of paying for needed water system improvements. SPLOST's main attraction lies in the fact that it provides "cash up front" to pay for capital improvements and avoids strapping water systems with periodic debt service requirements.

In Georgia, water system improvements have historically been financed for the most part by local initiative. That fact is likely to change as the State is required to play a larger role in providing future financial assistance to local governments. Reservoir projects, particularly those that are large enough to be classified as "regional," now require levels of funding that are beyond the means of all but Georgia's largest water utilities. In addition, large reservoirs, by their very nature, are most likely to be placed in locations where population is sparse as opposed to dense. In sparsely populated areas where water resources are available and untapped, revenue customer bases and local tax digests are small and cannot support the capital borrowing needed to carry out regional water supply projects on the scale needed to successfully address Georgia's future water supply needs.

5.3.9 Selection of a Preferred Alternative

At the completion of the analysis, the project sponsor reviews the available alternatives and selects its preferred alternative, the least environmentally damaging practicable alternative. Impacts to jurisdictional waters of the preferred alternative must be accurately determined, and an acceptable wetland and stream mitigation plan must be developed to address those impacts. Once the mitigation plan is complete, the 404 permit application is processed.

Each reservoir expansion opportunity identified must be able to withstand the rigors of the Section 404 permitting process.

5.4 OTHER EXPANSION OPPORTUNITIES

5.4.1 Existing Large, Multi-Purpose Reservoirs

The largest reservoirs in Georgia are owned by Georgia Power, USACE, and the Tennessee Valley Authority (TVA). These large, multi-purpose reservoirs were not considered for expansion during the initial screening addressed in Section 2 of this report due to large areas of surrounding development that would be impacted. Twenty-five reservoirs were identified that fit this category, including 15 owned by Georgia Power and 10 owned by USACE. The names of these reservoirs were identified from Georgia Power and USACE Web sites. The shapes were then copied from the respective NHD dataset and compiled into a single dataset. These reservoirs are listed and mapped on Figure 5-18.

Georgia Power operates 15 reservoirs in Georgia that serve as sources of hydropower. Any withdrawal of water for municipal or industrial consumption must be approved by Georgia Power. Historically, Georgia Power permitted several small withdrawals from these lakes; however, over the past decade Georgia Power has maintained the position that additional water supply withdrawals would reduce the availability of water to pass through the dams, thereby adversely impacting hydropower capabilities. For this reason, Georgia Power lakes were not retained for further analysis in this initial expansion screening.

Existing federal reservoirs have various authorized purposes with many demands on available water. USACE controls the largest reservoirs in the state. These multi-purpose reservoirs, constructed in the mid-1900s, provide for flood control, navigation, hydropower, and recreation. Existing water supplies allocated from federal reservoirs may

be subject to further restrictions based on future federal water allocation decisions. Due to the uncertainty of future allocations, the USACE lakes were not retained for further expansion analysis.

TVA owns and operates two hydroelectric dams, Blue Ridge in Fannin County and Nottely in Union County. A portion of the Chatuge reservoir is also located in Georgia. Water supply withdrawals would require approval from TVA.

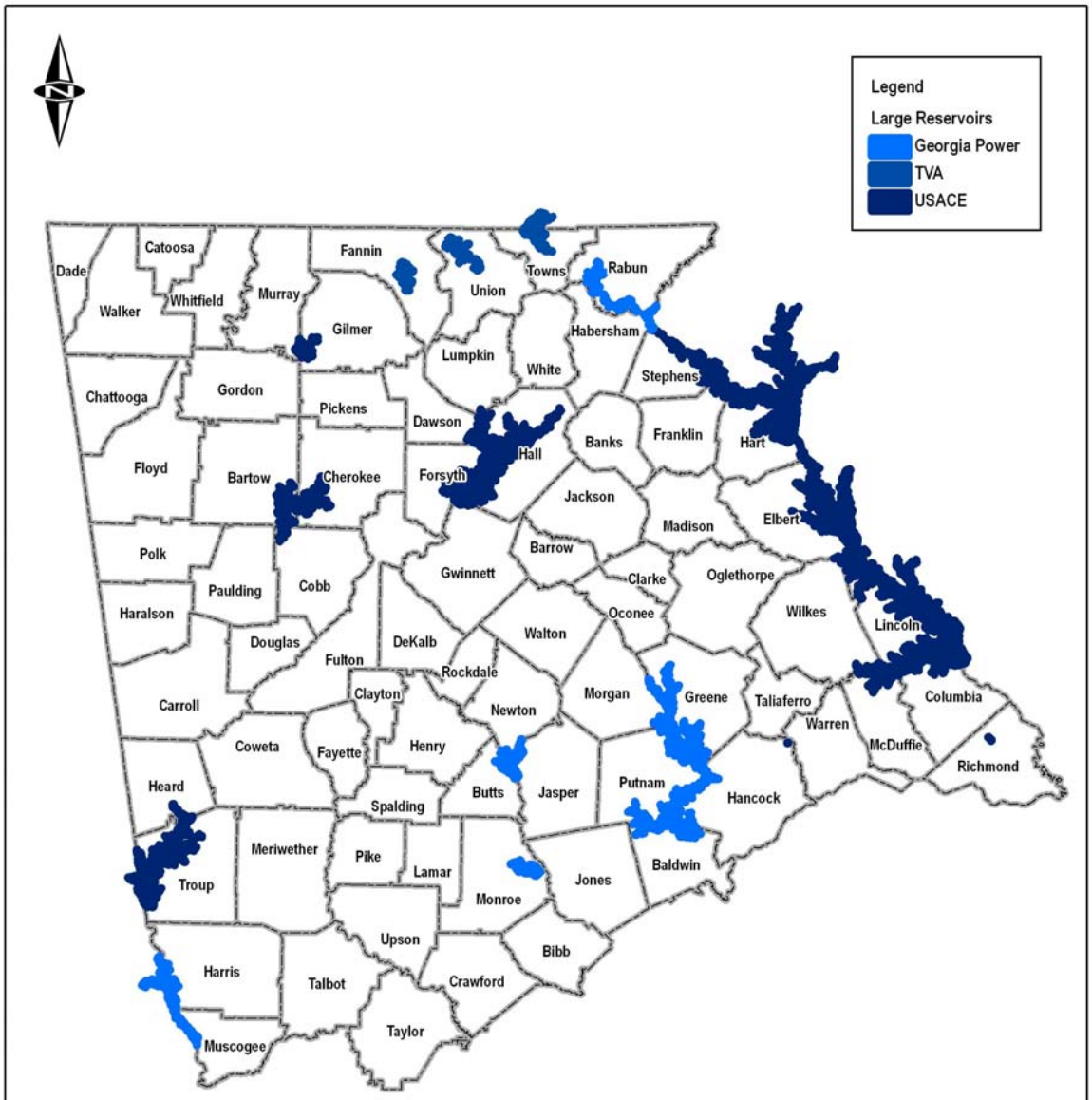
One potential for storage expansion of such large reservoirs is the addition of pumped storage reservoirs on side-stream tributaries, such as the new Hickory Log Creek reservoir that can augment water supply storage in nearby Lake Allatoona.

5.4.2 Reservoirs under Development, Proposed Reservoirs and Possible Reservoir Sites

In addition to the 16 existing reservoirs for expansion consideration, an inventory of 2 reservoirs under development, 6 proposed reservoirs, and 114 possible reservoir sites were identified in Section 3 of this report. Expansion potential for these sites was not determined due to a lack of readily available information. As the necessary location and size information is compiled, these reservoir projects will be subjected to the initial screening for regional expansion potential and environmental feasibility that was done for the existing reservoirs.

5.5 ANALYSIS

It is necessary to determine whether the reservoirs identified in this inventory are located close to areas with identified water supply needs, as these areas may be priority candidates for assistance. In Section 4 of this report, the population trend is presented for the 63 counties north of the fall line (excluding the 15 counties in the MNGWPD).



NAME		NAME	
Goat Rock Lake	Georgia Power	Blue Ridge Lake	TVA
Jackson Lake	Georgia Power	Chatuge Lake	TVA
Lake Burton	Georgia Power	Nottely Lake	TVA
Lake Harding	Georgia Power	Butler Creek - Fort Gordon	USACE
Lake Juliette	Georgia Power	Butler Reservoir	USACE
Lake Oconee	Georgia Power	Carters Lake	USACE
Lake Oliver	Georgia Power	Hartwell Lake	USACE
Lake Rabun	Georgia Power	J. Strom Thurmond Reservoir	USACE
Lake Sinclair	Georgia Power	Lake Allatoona	USACE
Lake Yonah	Georgia Power	Lake Russell	USACE
North Highland Lake	Georgia Power	Lake Sidney Lanier	USACE
Seed Lake	Georgia Power	West Point Lake	USACE
Tallulah Falls Lake	Georgia Power		
Tugalo Lake	Georgia Power		

Source:
Georgia DCA; Georgia EPD;
National Inventory of Dams (NID);
National Hydrology Dataset (NHD)

Georgia Inventory and Survey of Feasible Sites for Water Supply Reservoirs Above the Fall Line

Georgia Power, TVA, and USACE Reservoirs

Prepared By: FAC - 09/10/08
Checked By: THP - 9/19/08
Project Number: 6110080257

MACTEC

Figure: 5-18

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6.0 A "ROAD MAP" FOR FUTURE RESERVOIR SITING ANALYSIS IN GEORGIA

Georgia currently relies on a number of water supply reservoirs for a portion of its water needs. Although additional reservoirs are in the planning and permitting stages, it is clear that more reservoir capacity will be needed as Georgia's population and economy continue to grow. The initial inventory and survey mandated by the Georgia Water Supply Act provides a starting point for the identification of additional water supplies. The preliminary results of this inventory and survey include 16 existing reservoirs with the potential to expand to serve regional/multi-jurisdictional areas, 2 reservoirs under development, 6 proposed reservoirs, and 114 possible reservoir sites identified in prior studies and reports. In addition, 14 regional cities/counties/areas with water supply needs that might be met by reservoirs were identified. It is also expected that additional reservoir sites will be explored by local and regional government entities in the future.

The Georgia Water Supply Act of 2008 (the Act) highlights the need for additional water supply reservoirs and calls for GEFA to take a strong role in helping the State of Georgia and local governments identify and develop new water supply storage capacity. The Act specifically directs GEFA to chart a course for new water supplies and to identify obstacles to reservoir development. The Act also requires GEFA to:

1. Provide quarterly reports
2. Identify specific tracts of land for acquisition
3. Identify the "barriers" (legal, statutory, etc.) in further detail
4. Participate in the development of projects

The development of new or enhanced water supply reservoirs in Georgia will be neither rapid nor inexpensive. Several key obstacles will need to be addressed as development of water supplies in Georgia proceeds:

1. Funding
2. Permitting delays and unknowns such as presence of threatened or endangered species, limitations related to mitigation, cultural resources discoveries, geology of the area, aquifer recharge considerations, etc.
3. Information gaps

This report contains recommendations for GEFA to overcome these obstacles and to continue to implement the provisions of the Act for the development of additional water supply reservoirs and the enhancement of existing reservoirs to maximize water supply yields. The sections of the Act that direct specific action by GEFA are provided

below. Specific road map recommendations for these actions are provided with an implementation schedule for the road map actions. When the Act mentions the "division," this refers to the Water Supply Division of GEFA and when the Act mentions the "director," this refers to the director of the Water Supply Division or the GEFA Executive Director. The "authority" refers to GEFA and "project" to any water supply project, including reservoirs.

6.1 ROAD MAP RECOMMENDATION FOR GEFA TECHNICAL ASSISTANCE

The Act contains key provisions for GEFA to provide assistance to local governments in the planning, permitting, design, construction, and operation of water supply reservoirs. These provisions include:

> "12-5-472.1 (c) The division shall be designated as the principal state agency to cooperate with the Environmental Protection Division of the department, the United States Army Corps of Engineers, and all other federal agencies or instrumentalities in the planning and execution of projects in this state."
>
> "12-5-476 (d) The division shall coordinate with the Environmental Protection Division of the department and local governments for the purpose of producing appropriate and necessary needs analyses for projects. In the event that the director, with the approval of the authority, determines that construction of a project is in the best interests of the people of this state but any affected county or municipality is willing but unable to engage in an appropriate needs analysis, the division may conduct such analysis for and on behalf of such county or municipality with respect to such project for all purposes. Such needs analysis shall be consistent with water demand projections provided by an applicable regional water development and conservation plan developed pursuant to Article 8 of this chapter, if available."
>
> "50-23-27 The division shall have the authority and responsibility to:
>
> (6) Design and implement programs to assist local governing authorities and other entities in implementing water supply projects."

The following road map recommendation is provided for GEFA to fulfill its responsibilities to provide drinking water reservoir technical assistance to local governments:

1. Provide technical assistance to local governments involved in reservoir planning, permitting, and design. This assistance should include, but not be limited to:
    a. Inform local governments of the potential for working with GEFA to enhance an existing reservoir, participate in a new reservoir project, or obtain water from a multi-jurisdictional project.
    b. Establish a process to help local governments quantify their water supply needs over the next 50 years.

c. Implement a process to develop timely, effective, and efficient procedures with USACE, EPD, and other agencies for permitting reservoir projects. Establish an active participation network of appropriate agencies to facilitate timely permitting.

d. Establish procedures for a local government to utilize GEFA's assistance with the planning, design, acquisition, construction, operation, management, and maintenance of a project.

e. As appropriate, produce timely and necessary needs analysis for reservoir projects in coordination with EPD and regional water planning authorities.

f. Authorize the GEFA consulting team to prepare the appropriate documents to implement items (a through e above).

6.2 ROAD MAP RECOMMENDATION FOR GEFA'S DEVELOPMENT OF MITIGATION BANKS

The Act contains a provision for the development of wetland and stream mitigation banks:

> "12-5-472 (d) The division may take all reasonable and practicable steps, in consultation with the Environmental Protection Division of the department, the Department of Transportation, and other appropriate agencies, to create a wetlands mitigation bank or banks and stream mitigation bank or banks for the purpose of facilitating the construction of projects. Costs and expenses of such bank or banks shall constitute costs of projects and shall be allocated to projects when appropriate."

The following recommendation is provided for GEFA to evaluate the establishment of wetland and stream mitigation banks:

1. Support continued coordination of key state agencies to develop a comprehensive wetlands mitigation strategy for the state.

6.3 SPECIFIC ROAD MAP RECOMMENDATIONS FOR LOCAL GOVERNMENTS

1. Continue to promote and implement water conservation.
2. Continue to protect current reservoirs, paying special attention to the control of nonpoint source pollution.
3. Commission updated safe yield analyses of their existing reservoirs, since recent droughts have proven to be more severe than the droughts used in the past to design reservoirs.
4. Local governments involved in new local reservoir projects should seek the assistance and guidance of EPD and GEFA.

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
the Act	Official Code of Georgia Annotated 12-5-470 (2008) Georgia Water Supply Act of 2008
ASU	Albany State University
AWWA	American Water Works Association
BG	Billion gallons
DCA	Department of Community Affairs
DEM	Digital elevation model
DNR	Department of Natural Resources
DRUC	Drought Response Unified Command
EPA	U.S. Environmental Protection Agency
EPD	Environmental Protection Division
ft	Foot/feet
GEFA	Georgia Environmental Facilities Authority
GIS	Geographic Information System
GO	General Obligation
GSWCC	Georgia Soil and Water Conservation Commission
HUC	Hydrologic Unit Code
hr/d	Hour(s) per Day
MACTEC	MACTEC Engineering and Consulting, Inc.
MGD	Million gallons per day
mi^2	Square miles
MNGWPD	Metropolitan North Georgia Water Planning District
NAIP	National Agriculture Imagery Project
NHD	National Hydrology Dataset
NID	National Inventory of Dams
NGRWP	Northwest Georgia Regional Water Resources Partnership
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
O.C.G.A.	Official Code of Georgia Annotated

Acronym or Abbreviation	Definition
PL	Public Law
SPLOST	Special Purpose Local Option Sales Taxes
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
TVA	Tennessee Valley Authority

APPENDIX A

SYNTHESIS OF FINDINGS FROM PRIOR STUDIES

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SYNTHESIS OF FINDINGS FROM PRIOR STUDIES

Existing Literature and Research Provided by Georgia Environmental Protection Division (EPD)

1. "Representative List of Local Government Reservoirs in Georgia." This document lists 24 Georgia reservoirs in table format. Data includes basin, county, and reservoir owner. Reservoirs with an initial minimum surface area of at least 100 acres or initial maximum top of dam storage volume of at least 1 billion gallons (BG) were analyzed for feasibility of expansion using geographic information system (GIS) technology. The date of the document is not shown. Figure 2-4 of the Georgia Environmental Facilities Authority (GEFA) Inventory and Survey of Feasible Sites for Water Reservoirs Report (the Report) shows the reservoirs with initial maximum top of dam storage of 1 BG or greater.

2. "Georgia Regional Reservoirs." This document lists 13 potential Georgia reservoirs in table format, a map showing their general location, and a 2-page document with a brief discussion of each reservoir. Data include basin, county/name of stream, surface area (acres), and potential yield (million gallons per day [MGD]). EPD indicated that the document was generated in 1990 and provided very rough information. The information contained in this document was used only for regional, "broad-brush" analysis.

3. "Appendix C: Existing Reservoirs." This document is a table of current water supply impoundments per basin. Basins listed are the Upper Chattahoochee, Coosa, Upper Flint, Upper Ocmulgee, Upper Oconee, Upper Savannah, Tallapoosa, and Tennessee. Data include county, facility name, reservoir name, reservoir ownership, 1999 annual average (MGD), safe yield (MGD), and year demand exceeded. EPD indicated that the document was generated in 1999. Figure 2-2 of the Report shows locations of existing EPD reservoirs arranged by basin.

4. "Appendix D: Future Reservoirs." This document lists potential water supply impoundments per basin in table format. Basins listed are the Upper Chattahoochee, Coosa, Upper Flint, Upper Ocmulgee, Upper Oconee, Upper Savannah, and Tallapoosa (Tennessee not listed). Data include participating governments, reservoir ownership, reservoir name, safe yield/max day (MGD), year demand exceeded, and location. EPD indicated that the document was generated in 1999.

5. "Status of Proposed Reservoirs." This document lists proposed reservoirs in a table sorted by projects in the Metropolitan North Georgia Water Planning District (MNGWPD) and projects outside the MNGWPD. Data include the name and status of each project. EPD indicated that the Braselton Reservoir is missing from the list and information on it would be provided later. Date stated is August 15, 2008.

6. "Surface Water Systems with Reservoirs other than Holding Ponds Beside the Water Plant." Data include facility, low flow augmentation (Yes or No), additional water supply (Yes or No), pumps in reservoir (Y or N), ownership, watershed protection (Yes or No), and comments. Date stated is August 2008.

7. "List of Drinking Water Supply Reservoirs (43) Built in the Last Twenty Years or More in Georgia." Data include county, facility name, reservoir name, basin, county, surface area (acres), volume (acre-feet), cost estimate (millions), and 1999 design annual average yield (MGD). Date stated is August 15, 2008.

8. "Municipal Surface Water Withdrawal Permit Holders." This document lists 170 surface water withdrawal permits in table format. Data includes basin, county, owner, permit number, source water, and contact information. The list must be cross-referenced with another list to obtain the reservoir name. Date stated is August 2008.

Existing Literature and Research Provided by Others:

1. "Reservoir Report to the GA Soil and Water Conservation Commission" prepared by the Albany State University Flint River Water Planning and Policy Center on September 2003. This document is divided into three parts. Part 1 provides background on processes, techniques, and methodologies for evaluating environmental, economic, and social implications of potential dam and reservoir projects. Projects are evaluated using several criteria: environmental quality, regional economic development, national economic development, and other social effects. Part 2 is a general review of the 1972–1975 proposal for a dam and reservoir on Kinchafoonee Creek. The evaluation concludes that information and data provided in documents prepared early in the 1970s are no longer adequate to meet current regulations and requirements for a full evaluation of the project and alternatives to that project. Part 3 lists 16 potential reservoir sites, selected by topography and geology alone.

2. "Preliminary Draft – Water Supply and Water Conservation Management Plan," prepared for the Metropolitan North Georgia Water Planning District, submitted by METCALF & EDDY|AECOM on July 2008. This document provides regional water demand forecasts with the benefit of water conservation and identifies potential future water supplies in the 15-county MNGWPD (formerly 16 counties). The Water Supply and Water Conservation Management Plan prescribes strategies and recommendations for effective water supply management. This document is organized as follows:

    - Summary of the current water supply and treatment conditions of water supplies and water treatment facilities
    - Methodology and results for water demand forecasts based on population and employment projections
    - Summary of the development and evaluation of water conservation options
    - Outline of the water conservation program measures that communities are required to implement
    - Identification of surface water supply sources to meet future water demands and additional water sources that may be needed beyond 2035
    - Overview of reuse alternatives opportunities and challenges and the recommended infrastructure improvements and water system interconnections
    - Description of the role and requirements for local water master plans
    - Summary of the water supply issues and limitations considered in development of the Water Supply and Water Conservation Management Plan
    - Summary of the recommendations for various state and regional agencies to help advance watershed protection in the MNGWPD
    - Outline of public education and outreach efforts at the regional and local levels
    - Implementation plan that includes the specific tasks, milestones, and responsibilities for implementation of the recommended Water Supply and Water Conservation Management Plan, with funding mechanisms for local water providers
    - Summary of metrics for future evaluation of the Water Supply and Water Conservation Management Plan

    Information regarding the reservoir names, served counties, and stream name for four potential reservoirs for the 2035 Water Supply Sources was catalogued. While no precise information was provided regarding dam location,

the description of some reservoirs was sufficient to allow approximate latitude and longitude to be ascertained. Table A1 lists the four potential reservoirs.

Table A-1: Potential Reservoir Locations from the MNGWPD Water Supply and Water Conservation Management Plan

Dam/Reservoir Name	County(ies) Served	Stream Name
Glades Reservoir	Hall	Flat Creek
Bear Creek Reservoir	Fulton	Bear Creek
Fulton County Etowah Watershed Reservoir	Fulton	
Etowah River/Richland Creek	Paulding	Etowah River/Richland Creek

Source: Metropolitan North Georgia Water Planning District. Preliminary Draft – Water Supply and Water Conservation Management Plan. July 2008.

PREPARED/DATE: MJL 09-16-08
CHECKED/DATE: MLR 09-16-08

In addition to these 4 reservoirs, information for 21 potential reservoirs for the post-2035 water supply options was included. Like the preceding four reservoirs, no precise information was provided in this report regarding dam location. Nonetheless, the description of some of the reservoirs' locations was sufficient to allow approximate latitude and longitude to be ascertained. Potential reservoirs for the post-2035 water supply need were entered into the proposed/possible reservoir database.

3. "Preliminary Water Supply Study Technical Memorandum" – Prepared for Northwest Georgia Regional Water Partnership (NGRWP) by Brown & Caldwell and MACTEC Engineering and Consulting, Inc. (MACTEC) on January 2008. This document presents the results of a Preliminary Water Supply Study for the Partnership's 15-county region, which comprises parts of the Tennessee, Coosa, Chattahoochee, and Tallapoosa River Basins and spans the Appalachian Plateau, Valley and Ridge, Blue Ridge, and Piedmont physiographic provinces. The document is organized as follows:

    - Description of the setting and existing water use in the study area
    - Summary of the methodology used and results of the preliminary water needs assessment
    - Identification of the potential water supplies, potential constraints to water supply development, and estimation of yields
    - Presentation of the preliminary evaluation of identified water sources
    - Conclusions and recommendations

    Preliminary water need projections were developed for Northwest Georgia by developing population projections through 2060 and projecting future water use patterns, long-term water demands, and deficits. Future unmet needs for potable water supply were calculated as the difference between projected future water demand and available water supplies. The total projected water demand was calculated as the product of the projected population, the percent of the population served by centralized water, and the per capita water use. Water withdrawal permits were used to determine existing water supply capacity. The study concluded that Northwest Georgia will require development of significant additional water supply sources to meet the 2060 water need.

Potential water supplies were identified, and a list of 30 potential reservoir sites was developed with reservoir parameters such as reservoir volume, dam height, drainage area, and stream name. The 30 reservoir sites were ranked in four-tier priority groups (Tier 1 through Tier 4) for additional investigation. Tier 1 represents potential reservoir locations with the fewest initial impediments relative to the ranking criteria for the initial screening. Tier 4 represents reservoir sites having the most potential impediments. Four potential reservoir sites were eliminated in Phase 1 of the screening process due to geological unsuitability. Three of the Tier 1 reservoir sites were eliminated because maximum storage top-of-dam volume was less than approximately 1 BG. The remaining 23 potential reservoir sites are listed in this study according to the four-tier ranking system. The study did not consider pumped storage potential.

The NGRWP 2008 Preliminary Water Supply Study Technical Memorandum supplied proposed shapes of reservoirs for the evaluation of proposed reservoirs in the Report. The 30 reservoir sites in the study were visually screened against the 2007 National Agriculture Imagery Project imagery to determine whether they could be expanded from their originally proposed sizes. The criteria were the same as the expansion screening carried out for the existing reservoirs in Section 2 of the Report. The analysis showed that 18 of the 30 proposed reservoir sites had expansion potential, as shown in Table A2.

Table A-2: Potential Reservoir Locations from NGRWP Preliminary Water Supply Study Technical Memorandum

Dam / Reservoir Name	Tier	County(ies) Served	Stream Name	Maximum Storage Volume (BG)
NWGP20	4	Bartow	Stamp Creek	16
NWGP7	4	Murray	Holly Creek	4
NWGP5	4	Murray	Conasauga River-Upper	2
NWGP12	4	Gilmer	Fightingtown Creek	1
NWGP6	3	Murray	Mill Creek	3
NWGP4	3	Murray	North Prong Sumac River	1
NWGP14	2	Gilmer	Talona Creek / Fausett Creek	21
NWGP30	2	Gordon, Gilmer, Pickens	Talking Rock Creek	9.6
NWGP3	2	Catoosa, Whitfield	Dry Creek	13
NWGP28	2	Haralson	Limestone Creek	5
NWGP16	2	Pickens	Long Swamp Creek	3
NWGP15	2	Pickens	Four Mile Creek	2
NWGP9	2	Gilmer	Barnes Creek	1
NWGP17	2	Pickens	Rock Creek	1
NWGP22	1	Chattooga, Floyd	Little Armuchee Creek	29
NWGP10	1	Gilmer	Davis Creek	6
NWGP26	1	Haralson	Little Creek	3
NWGP27	1	Haralson	Walker Creek	1
NWGP27	1	Haralson	Walker Creek	1
NWGP25	1	Paulding	Richland Creek	1

Source: Preliminary Water Supply Study Technical Memorandum. Northwest Georgia Regional Water Resources Partnership. January 2008.

Acronyms:
BG – Billion Gallons

PREPARED/DATE: MJL 09-15-08
CHECKED/DATE: MLR 09-15-08

4. "State of Georgia Water Resources Management Strategy" – Summary document prepared by the State of Georgia Office of the Governor Joe Frank Harris on January 12, 1987. The purpose of this document is to briefly describe Georgia's water resources management strategy and to identify the activities of the Environmental Protection Division of the Department of Natural Resources in implementing the strategy. The document lists water availability and uses tabular data that includes river basins, drainage area, permitted surface and groundwater withdrawals, and number of permitted facilities with capacities of at least 0.10 MGD. These data, which were compiled in 1987, are considered outdated. The document also contains a map depicting very general locations where multi-county water supply lakes may be needed, and denoting which counties need local water supply lakes. The information in this document is generalized, with no specific locations identified. It was not possible to correlate the potential locations specified in this document with actual geographical locations due to lack of specificity.

5. "North Georgia Regional Water Supply Needs Assessment" – Prepared for the Georgia Department of Natural Resources by CH2M Hill on August 2003. The document evaluates the need for additional regional water supplies that would serve multiple counties by grouping or aggregating counties into water supply management areas for estimating water demand, potential water conservation savings, available water supply, and water supply needs. The overall approach and methodology associated with the water supply needs assessment can be summarized in the following steps:

    - Identification of the study area and level of detail required for data collection and water demand/supply projections
    - Development of population and employment projections, based on historical trends and existing county and regional projections
    - Development of water demand projections, based on population and available water production and billing data
    - Estimation of potential water conservation savings, using groupings of water conservation measures or programs to represent multiple levels of conservation from low to high
    - Estimation of available water supply, based on an inventory of existing and proposed future permitted capacity
    - Identification of areas with water supply shortages, based on a comparison of net demand (baseline demand minus conservation savings) and available water supply

    Baseline population and employment forecasts (by county) were compiled and aggregated to water supply management areas. Population projections indicate that growth associated with the metro Atlanta economy will continue to dominate population increases in the 44-county study area. Over the forecast period (2001 to 2030), population increases will extend well beyond the current metropolitan area, resulting in more than a doubling of population in the Coosa-Tallapoosa, Upper Chattahoochee, and Upper Ocmulgee-Upper Oconee Management Areas. The 44-county population projections were used in the Report for the development of the 2030 water demand projections for those counties north of the fall line.

    A Demand Side Management Least Cost Planning Decision Support System model was created for the six water supply management areas to summarize the average daily demand projections for each area. Water consumption was evaluated from the base year, 2001, through the year 2030. Permitted water withdrawals for municipal and industrial permits and proposed future water supply projects within each water supply management area were inventoried and adjusted to consider the intended use and available capacity in existing reservoirs above the permit limit. The water supply needs were based on a comparison of the projected water demand and available water supply for each water supply management area.

6. "Inventory and Assessment of United States Department of Agriculture (USDA)/Soil and Water Conservation District Watershed Dams: Finding Report" – Georgia Soil and Water Conservation Commission prepared by Jordan, Jones & Goulding and Schnabel Engineering South, LLC on December 27, 2007. The Georgia Soil and Water Conservation Commission (GSWCC) in partnership with the Natural Resources Conservation Service (NRCS) and the Georgia Department of Natural Resources EPD retained a team of consultants to evaluate which, if any, of the flood control dams designed and constructed under federal laws Public Law (PL) 544 and PL 566 could be modified to serve as water supply reservoirs. To reduce the number of dams evaluated, GSWCC performed an initial assessment of the 357 watershed dams that were constructed in Georgia since the federal programs began in 1957. The initial assessment was based on proximity to heavily developed areas and size of the drainage basin or watershed contributing runoff to the lake impounded by the dam. Dams in densely populated areas or with contributing drainage basin areas of less than 4 square miles were eliminated from consideration as potential water supply reservoirs because of the likelihood of being unable to readily acquire land for the raised reservoir, impacting many structures, or low reservoir yield.

The document evaluates the raising of 166 identified watershed dams (shown on Figure A-1) to provide storage for untreated drinking water. The structures were evaluated based on environmental impacts, infrastructure impacts, and estimated potential yield. To provide parity between the projects and reduce study cost, GSWCC established the following boundary conditions:

1. The top of dam or crest elevation was raised to the topographic maximum such that only one saddle dam with a height of no more than one contour interval would be required.

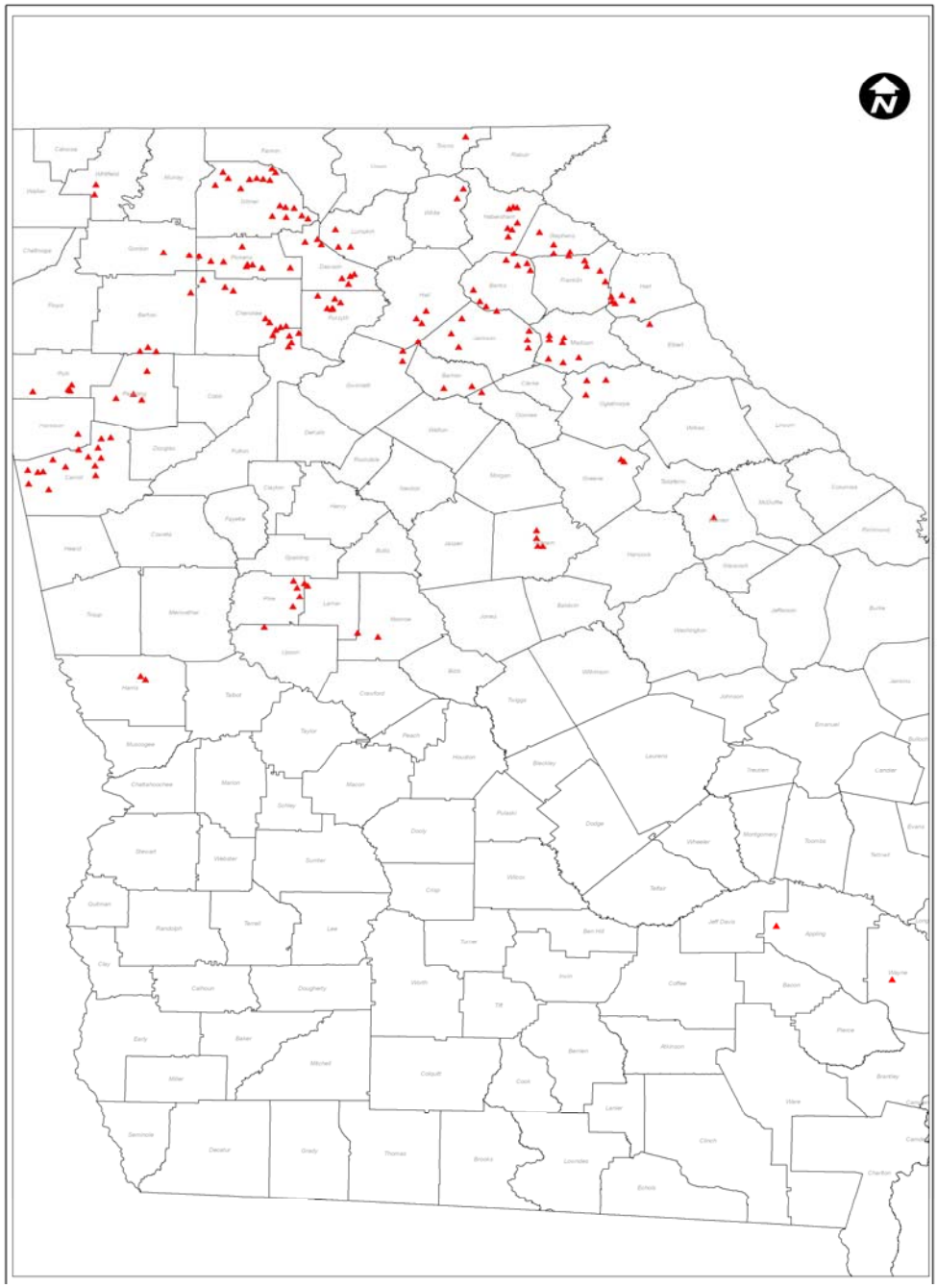
2. The proposed dam crest elevation did not impact major infrastructure projects, such as U.S. Interstate Highways, hospitals, schools, or military bases.

3. The normal pool of the reservoir was established by providing the same volume of flood storage (acre-feet) to the raised reservoir as was provided in the original design.

4. Pump diversion was considered if the dam/structure was within 2 miles of a stream/river with a watershed area of at least 50 square miles.

Figure A-1

Watershed Dams
GSWCC Inventory and Assessment of USDA Soil and Water Conservation District Watershed Dams: Finding Report



Source: Schnabel Engineering, LLC

Following the preliminary evaluation, 37 impounding structures were identified for further evaluation based on estimated potential yields exceeding 1 MGD and refill times of less than 5 years. The 37 structures identified for further evaluation were reduced to 20 based on the following criteria:

- Projects located in region with limited demand for water
- Projects located on primary trout streams
- Projects located in region with new water supply projects under consideration
- Potential permit issues (i.e., excessive environmental impact)

The 20 identified projects were further evaluated using the following criteria:

- More detailed yield analyses
- More detailed environmental impact evaluations
- Identification of properties/parcels that would be impacted by proposed dam raising
- Preliminary opinions of cost to raise the dam
- Preliminary opinions of cost for construction pipelines and pump stations
- Preliminary opinions of cost for environmental mitigation
- Preliminary opinions of cost to acquire land

The study, which assessed the potential to utilize the federal flood control projects as water supply reservoirs, provides a useful summarized data set and preliminary estimates of project size, yield, impact, and costs. The results can be used in the initial planning phases of water supply projects as long as the costs and yields are identified as preliminary and suitable only for conceptual planning.

The results of the study were impacted by numerous constraints that could be removed to better identify candidates for expansion/enlargement. Such constraints and reassessment considerations to remove the constraints are listed on Table A3.

Table A-3: Constraints and Reassessment Considerations of Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams: Finding Report

Constraint	Reassessment Consideration
191 dams not considered in the preliminary evaluation based on location or watershed with no consideration for supplemental pumping	Revisit the initial screening process to evaluate whether these projects could be expanded or yield increased based on supplemental pumping. Land acquisition related to numerous properties surrounding lakes in urbanized areas will impede potential dam raising.
During the initial screening process of the 166 dams included in this study, proposed dam crests were raised to topographic maximum. Refill times were not limited. However, refill times were limited to no more than 5 years for the top 20 structures. .	During the revised screening process, the proposed dam raising needs to balance initial storage volume with evaporation losses, refill times, and other considerations that may impact yield.
Proposed dam crest elevation limited by number and size of saddle dikes	Proposed dam crest should be established based on computed yield and refill time with considerations for infrastructure impact.
Distance from dam to pump diversion limited to 2 miles	This distance could be increased to 5 or 10 miles where a large storage reservoir can be paired with a major stream or river.
Preliminary yield analyses for the initial screening process of the 166 dams included in this study were estimated using regional data and USGS quadrangle maps.	Yield analyses could be refined by performing project specific studies using more detailed topography. Revised yield may decrease or increase.

Source: Georgia Soil and Water Conservation Commission. Inventory and Assessment of USDA/Soil and Water Conservation District Watershed Dams: Finding Report. December 27, 2007.

Acronyms:
USGS – United States Geological Survey

PREPARED BY/CHECKED BY: Schnabel Engineering, LLC

Electronic Communications

1. E-mail communication from Kevin Kelly (kkelly@gefa.ga.gov), sent Friday, August 29, 2008, 9:39 am to Margaret Tanner of MACTEC, Subject: Prospective reservoir projects. This message contains a short list of potential reservoir projects attached in a Microsoft Excel spreadsheet entitled “List of potential projects based on GWSCGP 08.29.08.xls.” The information relates to grant request amounts for various reservoir projects. The spreadsheet does not contain location information.

2. E-mail communication from Kevin Farrell (Kevin.farrell@dnr.state.ga.us), sent Tuesday, August 19, 2008, 11:46 am to Monique Latalladi and Theodore Parks of MACTEC, Subject: Re: Inventory and Survey of Feasible Sites. This message contains a list of communities and reservoirs that fall into two categories. The first category is defined as reservoirs that have been pushed close to the maximum of their yield potential in recent droughts, such as the 2007 to 2008 drought. The second category is defined as water systems that saw water supply challenges last year.