Jackson County Comprehensive Plan

NATURAL RESOURCES

A Chapter of the Technical Appendix
Community Assessment

Revised November 16, 2009

Prepared For:

Jackson County Board of Commissioners
c/o Department of Public Development

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NATURAL RESOURCES

INTRODUCTION

This analysis summarizes information from the county's prior comprehensive plan (adopted 1998), the natural resources element of the regional comprehensive plan for the Northeast Georgia Region (2004) and other sources, with regard to the natural resources of Jackson County.

Accompanying this text (at the end of this document) is a Natural Resources Map Series. Some of the maps were initially prepared by the Northeast Georgia Regional Development Center (now Regional Commission) as a part of the 1998 comprehensive plan. All maps presented here have been refined and produced by Jackson County's Geographic Information Systems Department. The Natural Resources Map Series includes the following, which are reproducible in color at a sheet size of 11" x 17":

Wetlands
Groundwater Recharge Areas
Small and Large Water Supply Watersheds
Floodplains
Floodplains (Newly Released Update – Unofficial)
Steeply Sloping Soils
Prime Farmland
Scenic Resources

PHYSIOGRAPHY AND TOPOGRAPHY

Jackson County is located on the upper fringes of the Piedmont Plateau, characterized by gently rolling ridges and valleys. Relief ranges from a low of approximately 640 feet above mean sea level, along the North Oconee River near the Clarke County line, to 1,100 above mean sea level west of Talmo near the Chestnut Mountain area of Hall County.

Jackson County is bisected by two broad ridges that run northwest to southeast, extending the entire length of the county from Hall County to Athens-Clarke County. About half the county between these two ridges slopes inward to the Middle Oconee River. Outside these ridges, land in Jackson County drains west to the Mulberry River and east to the North Oconee River.

LAND COVER AND NATURAL VEGETATION

The natural vegetation covers in the Northeast Georgia region are pine, pine-hardwood mix, and hardwood. Almost none of the habitat in the Midland Piedmont Province, in which Northeast Georgia lies, is pristine. Most of the land in the region was agricultural land that has returned to forest, though not the same forests that were there prior to the habitat disruption. Habitat in the region demonstrates all successional states: weed to grass shrub, pine (dominant), mixed pine-hardwoods, and hardwoods.

There are locally important areas of rock outcrops. Outcrops larger than 1.5 acres are eligible for the National Landmarks program (Northeast Georgia Regional Development Center, Regional Water Resources Study 2004).

ENVIRONMENTAL PLANNING CRITERIA

Environmental Planning Criteria were promulgated by the Georgia Department of Natural Resources immediately following adoption of the Georgia Planning Act of 1989. The original set of criteria included water supply watersheds, groundwater recharge areas, and wetlands. Pursuant to the Mountain and River Corridor Protection Act of 1991, protected mountains and protected river corridors were added as components to the environmental planning criteria. Jackson County includes all of these types of areas except for protected mountains. The details of these criteria are summarized in this assessment in sections that follow.

WETLANDS

Defined

Wetlands are areas that are flooded or saturated by surface or groundwater often and long enough to grow vegetation adapted for life in water-saturated soil. A wetland does not have to be flooded or saturated for more than one week of the year in order to develop the vegetation and soil characteristics that qualify it as a wetland.

Functions and Importance

Wetlands serve many functions and have a number of values. Wetlands temporarily store flood waters, thereby preventing flood damage, and they can also protect lands from erosion by reducing the velocity of water currents. They serve as pollution filters by helping to remove sediment, absorb chemicals and nutrients, and produce oxygen. Wetlands have important environmental values including improving water quality by intercepting stormwater runoff, preventing eutrophication of natural waters, and supporting delicate aquatic ecosystems (nutrient retention and removal, food chain support, migratory waterfowl usage, providing other wildlife habitat, etc.). Many wetlands are areas of groundwater recharge, and they also can provide a source of recreation (hunting and fishing), aesthetics, and scientific research.

Inventory

Approximately 4.4 percent of the northeast Georgia region is classified as wetlands. Wetlands are not always coterminous with flood plains, but most of them are contained within flood plains. Some of the major rivers support extensive and valuable riparian wetlands. However, some wetlands in the region are located around seeps and springs (Northeast Georgia Regional Development Center, Regional Water Resources Study 2004).

The following river and stream corridors (in their entirety) contain wetlands of special significance, in part for their wildlife habitat and wildlife corridor value (see also the section titled “habitat”): Middle Oconee River; North Oconee River; Curry Creek, and Little Curry Creek.

Wetland Regulation

Wetland regulatory approaches are generally designed to require an evaluation of a proposed use in order to permit those uses which will not adversely alter the wetland resources and to deny uses which will have a significant adverse effect. In light of the particularity of different wetland environments, this will require identification of the values inherent in specific wetlands,

the potential effect of a proposed activity upon those values, and the alternative available to mitigate or prevent the adverse consequences of the proposed use.

The primary regulatory tool used to protect and preserve wetlands is the U.S. Army Corps of Engineers' §404 program. Current §404 regulatory policy focuses on wetland restoration and creation as the primary means of compensating for unavoidable wetland impacts. However, most wetland restoration and creation projects are inefficient; restoration efforts are often expensive, confined to small parcels, not coordinated with regional conservation plans, and of questionable functional value. In contrast, preserving existing wetlands is a cost-effective means of maintaining and enhancing a wide variety of aquatic ecosystem function, and can be more easily directed within the framework of a statewide resource protection plan (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

In addition to the §404 program, the Georgia Forestry Commission developed Best Management Practices (BMPs) to protect and enhance important wetland functions on most sites while permitting silvicultural operations. The functions of wetlands include: water quality, timber production, fish and wildlife habitat, recreation, education, research and scenic beauty. More specifically, these BMPs are designed for silvicultural operations where sustained timber production is anticipated. However, it is acknowledged that some wetland sites are not suitable for commercial timber production and that on extremely sensitive sites more stringent measures may be required (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

Wetlands are supposed to be protected under Georgia's *Rules for Environmental Planning Criteria* and a local implementing ordinance that meets this state mandate. Protection ordinances are only supposed to allow those land uses that will not impair the wetland function long-term, such as: timber production and harvesting, wildlife and fisheries management, wastewater treatment, recreation, natural water quality treatment or purification, or other uses permitted under Section 404 of the Clean Water Act. Specifically, the following criteria for alteration of wetlands are supposed to be integrated into local comprehensive plans:

Any proposal for development involving the alteration of, or an impact on, wetlands should be evaluated according to the following (based on Ga. DNR Rule 391-3-16-.03):

- Whether impacts to an area would adversely affect the public health, safety, welfare, or the property of others.
- Whether the area is unique or significant in the conservation of flora and fauna including threatened, rare, or endangered species.
- Whether alteration or impacts to wetlands will adversely affect the function, including the flow or quality of water, cause erosion or shoaling, or impact navigation.
- Whether impacts or modification by a project would adversely affect fishing or recreational use of wetlands.
- Whether an alteration or impact would be temporary in nature.
- Whether alteration of wetlands would have measurable adverse impacts on adjacent sensitive natural areas.

Where wetlands have been created for mitigation purposes under Section 404 of the Clean Water Act, such wetlands shall be considered for protection.

Impacts on Wetlands and Additional Regulatory Efforts

In the northeast Georgia region, there has been relatively little impact on wetlands due to urban development. Most conversion of wetlands in the past is probably attributable to agricultural activities. However, wetlands can be threatened in the future by increasing development pressures, a general disregard for natural resources protection, and failure to utilize the comprehensive plan in zoning decisions. The Regional Plan recommends public education on wetland issues and stricter than minimum regulatory controls on wetlands (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

Wetland Mitigation Banks

Wetland mitigation banks are an alternative method to restoring or maintaining wetlands. They allow developers to replace wetlands in one location with wetlands that are bought through credits from another person or agency on another site. In principle if not in practice, a wetland in a mitigation bank is supposed to equal the wetland that has been lost or damaged, thus meeting federal policy that there should be no net loss of wetlands (reference, Clean Water Act, Sec. 404).

GROUNDWATER RECHARGE AREAS

Recharge areas are defined by the Georgia Department of Natural Resources as any portion of the earth's surface where water infiltrates into the ground to replenish an aquifer. "Significant recharge areas" are also defined in DNR rules based on outcrop area, lithology, soil type and thickness, slope, density of lithologic contacts, geologic structure, the presence of karst, and potentiometric surfaces. In the Piedmont, the significant recharge areas are those with thick soils and slopes of less than eight percent.

In Georgia there are relatively limited areas where aquifers are recharged and thus where groundwater is most susceptible to pollution. The Environmental Planning Criteria for groundwater recharge areas established state policy for protecting significant groundwater recharge areas. In support of those criteria, the Georgia Department of Natural Resources (DNR) produced a map titled "Hydrologic Atlas 18," that shows significant groundwater recharge areas in the state. The atlas maps each area according to its pollution susceptibility potential.

Inventory

Aquifers in the Piedmont region of Northeast Georgia are relatively small, unconfined aquifers consisting of horizontal and vertical fractures in crystalline, non-porous rock. They commonly generate 1 to 25 and rarely exceed 500 gallons per minute. These aquifers in the northeast Georgia region are generally underutilized and remarkably free of contamination.

Threats of Contamination

Aquifers in the Piedmont are largely unconfined, meaning that pollutants can travel long distances, thus making pollution sources difficult to identify (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element). Contamination threats to groundwater recharge areas include naturally occurring sources and man-made sources. Mineral salts (i.e., high total dissolved solids, manganese, and iron) are the

most extensive contamination source, but there are also radioactive minerals that are common rock constituents in many Georgia aquifers. Contaminants introduced from non-natural activities include bacteria and viruses, nitrates, pesticides, herbicides, solvents, minerals, chloride, sodium, and metals (especially lead, arsenic, and aluminum). The sources of these various groundwater contamination threats are varied, and include agricultural activities (insecticides and herbicides), residences (e.g., septic systems, household use of fertilizers and other chemicals) and non-residential development (e.g., dry cleaning establishments, auto repair shops, hazardous waste disposal, hazardous materials use, underground storage tanks, and landfills).

Nitrates have become the most common groundwater contaminant. Nitrates are generated by septic systems, municipal waste water treatment plants, and livestock feedlots. However, it is believed that the constant application of synthetic fertilizer has the most profound effect on groundwater. It is estimated that more than one-half of the nitrogen fertilizer applied to fields dissolves and runs into surface streams or groundwater (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

State Environmental Protection Criteria and Protection Measures

In order to protect groundwater supplies, the state's environmental planning criteria urge local governments with significant groundwater resources to adopt and implement groundwater recharge protection ordinances. State-specified protection measures include a prohibition on hazardous waste disposal facilities and new sanitary landfills without synthetic liners and leachate collection systems, increased lot sizes for dwellings served by individual septic systems, and secondary containment for new above ground chemical or petroleum storage tanks. In more detail but still paraphrased, within any significant groundwater recharge area:

1. Sanitary landfills should not be permitted. If permitted, the Georgia Department of Natural Resources (DNR) will not issue permits for sanitary landfills not having synthetic liners and leachate collection systems.

2. Land disposal of hazardous waste should be prohibited, and DNR shall not issue any permits for said use. Any treatment, storage or disposal of hazardous waste should take place only on an impermeable pad having a spill and leak collection system.

3. To prevent oil from polluting groundwater, new above-ground storage tanks for chemicals or petroleum for non-agricultural uses should only be permitted if secondary containment for 110 percent of the tank's volume (or the largest tank in a cluster of tanks) is provided, as presently required by rules of the U.S. Environmental Protection Agency.

4. New agricultural waste impoundment sites should be discouraged. Clay liners should be installed as approved by the U.S. Soil Conservation Service (now Natural Resources Conservation Service) if an agricultural waste impoundment site is located in a significant groundwater recharge area.

5. New dwellings, including mobile/manufactured homes, if served by septic tank/drain field systems, must be located on a lot size of from 110% to 150% of the size of the minimum lot area required by the zoning district in which it is located, depending upon the pollution susceptibility of the area in question. Existing lots of record are exempted.

6. Permanent stormwater infiltration basins should be discouraged and should not be constructed in an area with high pollution susceptibility.

7. Wastewater treatment basins should have liners if constructed in an area of high pollution susceptibility, and wastewater spray irrigation systems in high pollution susceptibility areas should only be permitted subject to approval by DNR.

RIVERS AND STREAMS

Jackson County is located primarily within the Oconee River Basin, with a small portion of northeastern Jackson County located within the Savannah River Basin.

Middle Oconee River

The Middle Oconee River is formed by the confluence of Pond Fork, Opossum Creek, and Allen Creek in Jackson County. It flows south, 20 miles to the Barrow County line, where it then flows through Clark County on the west side of Athens and joins the North Oconee River south of Athens to form the Oconee River. The Middle Oconee River form 1.8 miles of the northern boundary of Jackson County.

The Middle Oconee River averages approximately one to 3 feet deep and 50 to 75 feet in width. The river has a slow to moderate flowing form in some areas, with isolated riffles and in other areas is rapidly flowing with an abundance of small falls, riffles and pools. The floodplain is narrow and the banks of the river are steep and well vegetated with overhanging trees and shrubs (verbatim from the 1998 comprehensive plan).

Mulberry River

Several creeks join to form the Mulberry River in Hall County. The river then flows through Gwinnett County and is the border between Barrow and Jackson Counties until it flows into the Middle Oconee River north of Athens. The river forms 21.3 miles of the southwest boundary of Jackson County.

The river is about 15 to 20 feet wide and has a narrow floodplain for a majority of its length. Some sections have been channelized and some sections have been dammed by beavers. The river flows through forests, pastures, and croplands; as of 1997 there were no urbanized areas in the floodplain (verbatim from the 1998 comprehensive plan).

North Oconee River

The headwaters of Curry Creek are in Jackson County, in Jefferson. Curry Creek joins the North Oconee River in Jackson County, flows through the northeastern side of the county for 29 miles and then flows through the northeastern side of the City of Athens until it joins the Middle Oconee River to form the Oconee River south of Athens. The floodplain of Curry Creek is fairly narrow and shoals and rapids are numerous. Beaver dam ponds are also common (verbatim from the 1998 comprehensive plan).

PROTECTED RIVERS

O.C.G.A. §12-2-8 required the Department of Natural Resources to develop minimum planning standards and procedures for the protection of river corridors in the state, and rules adopted pursuant to that statute required local governments to use the state's minimum standards in developing and implementing local comprehensive plans. The primary method mandated for the protection of river corridors is the establishment of natural vegetative buffer areas alongside each protected river. Local governments are required to develop river corridor protection plans that will maintain the integrity of this buffer area. The minimum standards call for a one hundred-foot buffer on each side of the river channel; however, nothing prohibits local governments from establishing standards that are more restrictive than the minimum standards established by the Department of Natural Resources. A "protected river" includes any perennial river or watercourse with an average annual flow of 400 cubic feet per second as determined by the U.S. Geological Survey. In Jackson County, the Middle Oconee River is designated as a protected river according to the state's environmental planning criteria.

While not officially a protected river, the Mulberry River has been identified as a valuable resource needing particular attention (flood plains and swampy areas). The 1998 comprehensive plan indicates that since the Mulberry River serves as a water source for cities in Jackson, Clarke, and Barrow Counties, it should be afforded the same status in terms of "protected rivers" as the Middle Oconee River, even though it does not officially meet the definition of a "protected river" and thus is not required by state policy to be protected as such.

There are readily apparent opportunities for joint county river corridor assessments and planning. Also, Jackson County, Athens-Clarke County, and Oconee County all have active groups planning and promoting river-related greenways. There is an obvious opportunity for cooperation in linking these efforts into a regional greenways effort. The local groups are in contact with each other, although as of 2004 there was no formal inter-governmental approach under way (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

The Northeast Georgia Regional Development Center (2004) has observed that many developments along stream corridors in the region do not provide for an adequate vegetative buffer, and that several developments have cleared all vegetation to the stream bank. Furthermore, it finds that many local governments are experiencing storm water management problems related to uncontrolled growth, and that few jurisdictions have ordinances limiting post-development runoff to pre-development runoff rates or volumes.

WATER SUPPLY WATERSHEDS

The Georgia Department of Natural Resources has established minimum watershed protection criteria for watersheds associated with municipal drinking water intakes or reservoirs. The criteria differentiate between large watersheds (greater than 100 square miles) and small watersheds (less than 100 square miles). In a large water supply watershed, the perennial streams seven miles upstream of a reservoir are protected through maintenance of a 100-foot vegetative buffer, limitation of impervious surfaces, and restricted location of septic tanks and their drain fields. No restrictions are placed on land beyond seven miles. Within a small water supply watershed the criteria require maintenance of a 100-foot vegetative buffer, a prohibition on impervious surfaces within 150 feet of the streams and septic tank drain fields. Beyond the seven-mile limit, a 50-foot vegetative buffer is required and impervious surfaces, and septic tank

drain fields are prohibited within 75 feet of the stream. The criteria require local governments to identify existing and future water supply watersheds and adopt water supply watershed protection plans as part of their planning process (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

There are three "large" water supply watersheds in Jackson County according to the criteria: the Middle Oconee River watershed (Athens-Clarke County), the North Oconee River watershed (Athens-Clarke County), and the Mulberry River watershed (City of Winder). There are five "small" water supply watersheds in Jackson County: Curry Creek (Jefferson), Little Curry Creek (Jefferson proposed), Sandy Creek Watershed (Athens-Clarke County), Grove Creek Reservoir (Banks County), and Bear Creek Reservoir (Upper Oconee Basin Water Authority serving multiple jurisdictions) (1998 comprehensive plan).

The Bear Creek water supply watershed (a small water supply watershed) spans county lines (Jackson and Barrow). As of 2004, the Upper Oconee Basin Water Authority (serving Barrow, Athens-Clarke, Jackson, and Oconee Counties) was in the process of developing a comprehensive watershed protection plan in lieu of the minimum standards for water supply watersheds (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

FLOOD PLAINS

Flood plains in the county are mapped. These areas are regulated by the county's flood plain management ordinance.

FOREST RESOURCES

Forest resources are important in the region for their aesthetic, recreational, habitat, and economic value. One important resource in particular in Jackson County is the University of Georgia's Thompson Mills Forest (318 acres of forest), located in western Jackson County, which has been designated the State Arboretum by the Georgia General Assembly. This forest serves as a site for the study of trees and natural plant communities (1998 comprehensive plan).

The primary threat to forest resources is development and clear-cutting. Not only do these activities destroy the forest, they impact soil erosion, water quality, and habitat.

Protection of forest resources is largely voluntary, lacking much regulatory guidance from state and local governments. There are no state regulations regarding timber harvesting. Most local governments in the northeast Georgia have identified the need to protect forest resources, particularly urban ones, but there are no locally adopted mechanisms designed to prevent widespread destruction of forests. Loggers and landowners are asked to comply with Georgia's Recommended Best Management Practices (Georgia Forestry Commission). However, unless there is a change in development practices within the region, forest resource destruction will continue (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

MINERAL RESOURCES

Jackson County is underlain predominantly by biotitic gneiss, schist, and granite gneiss. Other minerals known to exist in the county include asbestos, beryl, granite, and related rock outcrops (Northeast Georgia Regional Development Center, 1998 comprehensive plan).

Jackson County is not among the major mineral-producing counties in the Northeast Georgia region. However, there are quarries located in Jackson County, and opposition by local residents and environmentalists to mining operations (especially crushed stone quarries), continues to be a major regulatory issue in Georgia, with protests concerning noise, dust, traffic, and damage from blasting (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

SOILS

Detailed information about soils in Jackson County is available from the Soil Survey for Barrow, Hall, and Jackson Counties (U.S. Department of Agriculture, Soil Conservation Service, 1977). Also, the 1998 comprehensive plan provides (Table 4-1) a detailed listing of soils, there extent of coverage (land area) in Jackson County, and whether they are prime farmland, contain steep slopes, or pose limitations for on-site septic tanks. There is no requirement to reiterate that table here, but the analysis of soils and their relationship to these topics is provided in this assessment under other sections.

PRIME AGRICULTURAL LANDS

Prime agricultural lands are high quality farming soils, those best suited for producing food, feed, forage, fiber, and oilseed crops. In Jackson County, there are six specific soil types that are considered prime farmland: Altavista sandy loam, 2 to 6 percent slopes (AlB) (960 acres); Appling sandy loam, 2 to 6 percent slopes (ApB) (2,690 acres); Cecil sandy loam, 2 to 6 percent slopes (CeB) (24,390 acres); Hiwassee loam, 2 to 6 percent slopes (HsB) (780 acres); Madison sandy loam, 2 to 6 percent slopes (MdB) (1250 acres); and Wickham sandy loam, 2 to 6 percent slopes (WhB) (1720 acres) (Table 4-1, 1998 comprehensive plan). Collectively, these prime farmland soil types comprise approximately 13.2 percent of the total county land area.

According to the regional plan (2004), Jackson County is not among the leading counties in terms of significant amounts of prime agricultural lands. The most common use for farm land in Northeast Georgia is for poultry and pasturing cattle, which are not dependent on locations with prime agricultural soils (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element). Only 1.3 percent of the county's agricultural income historically has been derived from crop production, which is dependent on prime agricultural soils (1998 comprehensive plan).

This does not mean agricultural land preservation in Jackson County is unimportant, however. Agricultural lands have converted and will continue to convert to more urban land uses during the planning horizon (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

Farmland protection has come to be recognized as a key ingredient in the overall effort to manage growth. Protection of agriculture is an issue in determining future growth patterns in the county. Agricultural zoning has become popular as a low-cost approach to protecting

agricultural lands. Other potential tools include purchase of development-rights (PDR) and transfer of development rights (TDR) programs.

Between 1987 and 1992, Jackson County witnessed a decrease in the number of farms and the number of acres in farms. The chief threat to prime agricultural lands in Jackson County recognized in the 1998 comprehensive plan was the conversion of A-2 zoned lands from agriculture to residential development in the southwestern portion of the county near the cities of Braselton and Hoschton. Secondly, the 1998 plan indicates that open space protection in the Middle Oconee River watershed (north of I-85 between State Routes 82 and 98) should be considered.

STEEP SLOPES

Steep slopes can be determined on the basis of the published soil survey. From the 1998 comprehensive plan (Table 4-1), there are eight soil types that correspond with steep slopes. These steeply sloping soils are mapped here in this community assessment, technical appendix. Steep slopes typically require substantial alteration for building development and pose severe limitations to septic tank drain fields. Alterations of steep slopes also changes the natural landform and character of the area and can create serious erosion problems (1998 comprehensive plan).

PLANT AND ANIMAL HABITAT

As already noted under forest resources, the University of Georgia's Thompson Mills Forest (318 acres of forest) is located in western Jackson County and has been designated the State Arboretum by the Georgia General Assembly. This forest includes more than 100 indigenous species in addition to some 80 native trees grown from seeds collected from throughout the state (1998 comprehensive plan).

The 1998 comprehensive plan recognized the value of the Middle Oconee, Mulberry, and North Oconee Rivers. Deer, beaver, and wood ducks have been cited along the Middle Oconee River. The Mulberry River provides habitat for deer, squirrel, rabbit, quail, woodcock, various songbirds and some turkeys; it is considered especially good habitat for waterfowl. The North Oconee River is considered good wildlife habitat for deer, squirrel, cottontail rabbit, swamp rabbit, raccoon, mink, muskrat, and beaver. The hardwood swamps and beaver ponds of the North Oconee River are considered excellent waterfowl wintering areas. Many resident and migratory birds use the riverine area, including, mourning doves, hawks, owls, quail, kingfishers, woodpeckers, and many species of songbirds (1998 comprehensive plan).

The DNR Natural Heritage Program maintains a database on rare natural systems and species in the state. Data collected come from a variety of sources, including museum and herbarium records, literature, and reports from individuals and organizations, as well as field surveys by staff biologists. Most jurisdictions in Northeast Georgia believe that federal and state regulations are adequate for protection of endangered and threatened species. However, since the exact location of habitats is not available through DNR, nor is there an on-site survey of properties, the extent of destruction of the habitat of endangered or threatened species is unknown. No local government in the region has or is planning to undertake any habitat inventory, nor do any participate in a habitat conservation plan. Development decision-making does not include consideration of habitat issues. As development pressures increase, the habitat for species will be reduced and fragmented so that there are insufficient contiguous habitats to support species. Because there is a large amount of forested and agricultural land in

the region, the importance of habitat conservation is overlooked. For these reasons, the Northeast Georgia Regional Development Center has recommended an Inventory of important (not necessarily endangered) habitats, consideration of habitat communities in development decisions, maintenance of habitat diversity, and development of a regional habitat conservation plan (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

The DNR Natural Heritage Program maintains a database on rare natural systems and species in the state. Data collected come from a variety of sources, including museum and herbarium records, literature, and reports from individuals and organizations, as well as field surveys by staff biologists. In most cases the information is not the result of an on-site survey. Many areas in Georgia have never been surveyed thoroughly. Therefore, the Georgia Natural Heritage Program can only occasionally provide definitive information on the presence or absence of rare species or natural communities on a specific site. An on-site field survey by a competent biologist is the only way to determine the presence or absence of rare species (Northeast Georgia Regional Development Center, Regional Water Resources Study 2004).
Table 1, "Aquatic and Partially Aquatic Species and Ecosystems of Concern Found in the Northeast Georgia Study Area," in the Northeast Georgia Regional Development Center's, Regional Water Resources Study (2004) does not list any such species and ecosystems of concern in Jackson County. A map of rare aquatic species and habitats in that same source, however, does show one area along the southernmost part of the Barrow-Jackson County line as a rare aquatic habitat which may contain rare species (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

Jurisdictional waterways could potentially serve as habitat for two (2) protected species. The USFWS County Listing of Threatened and Endangered Species in Jackson County and the Georgia Department of Natural Resources (GDNR) County Listing of Locations of Special Concern Animals, Plants, and Natural Communities were reviewed. Based on this information, one (1) federally-protected species and one (1) state-protected species are known to occur in Jackson County, the Bald Eagle (*Haliaeetus leucocephalus*) and the Altamaha shiner (*Cyprinella xaenura*). Potential habitat may exist within the study area for each of these species. Large waterways such as the Middle Oconee River, Mulberry River, North Oconee River, and Hills Lake may provide suitable nesting and foraging habitat for the Bald Eagle. Although the Bald Eagle is no longer listed on USFWS's protected species list, it is still afforded protection under the Bald and Golden Eagle Protection Act (Moreland Altobelli Associates, Inc., 2009 Draft. I-85 Corridor Study Report, Jackson County, Georgia)

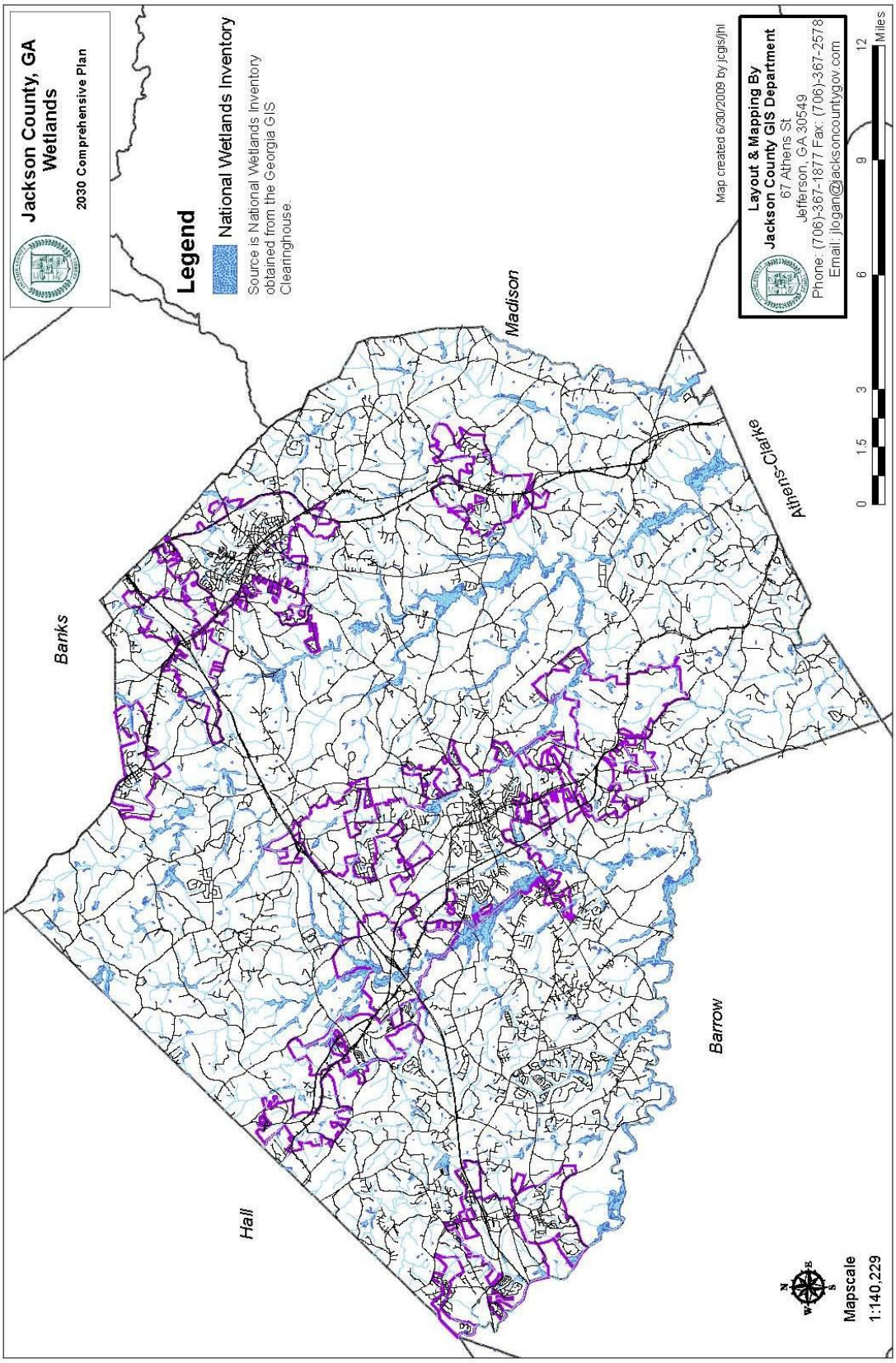
OPEN SPACES AND SCENIC RESOURCES

Open spaces and scenic viewsheds continue to be lost to development in the region. Some local zoning ordinances require open space in certain developments, but usually only in planned unit developments. Furthermore, there is typically no requirement to associate the open space with specific natural resources and no evaluation of the quality of the open space. Also, there are few if any local ordinances in the region that require scenic area protection. The regional commission recommends a survey of potential regionally significant scenic areas in order to identify the viewsheds so that detailed strategies can be implemented by local governments (Northeast Georgia Regional Development Center, 2004, Regional Comprehensive Plan, Natural Resources Element).

The 1998 comprehensive plan specifically identifies and maps 32 scenic views and sites in Jackson County. They are listed below.

Hurricane Shoals Park	Donald Child Farm	North Oconee River
Crow's Lake	Aaron McKinney Farm	Price Mountain
Georgia Forestry Arboretum	Wayne Miller Farm	Barbara Lizenby Farm
Booker Farm	Allen Creek	John Long Farm
Sell's Mill	Walnut Creek	John Braezeale Farm
Middle Oconee River Swamp	Chetham Farm/Parks Farm	Doug Makemson Property
Jimmy Johnson Farm	Craven Land	Walter Harris Property
Terry Farm	McMullen Farm	Trip Rodgers Property
4-W Farm	Minix (Blackwitch) Farm	Sheilds-Ethridge Farm
Mulberry River	Bob Wood (Hallelujah) Farm	Williamson-Maley-Turner Farm
Indian Creek Area	Braswell Farm	

In addition to these 32 sites, the 1998 plan identified scenic road corridors.


Jackson County, GA
Wetlands
2030 Comprehensive Plan
Legend
National Wetlands Inventory
Source is National Wetlands Inventory obtained from the Georgia GIS Clearinghouse.
Map created 6/30/2009 by jcgis/jhl
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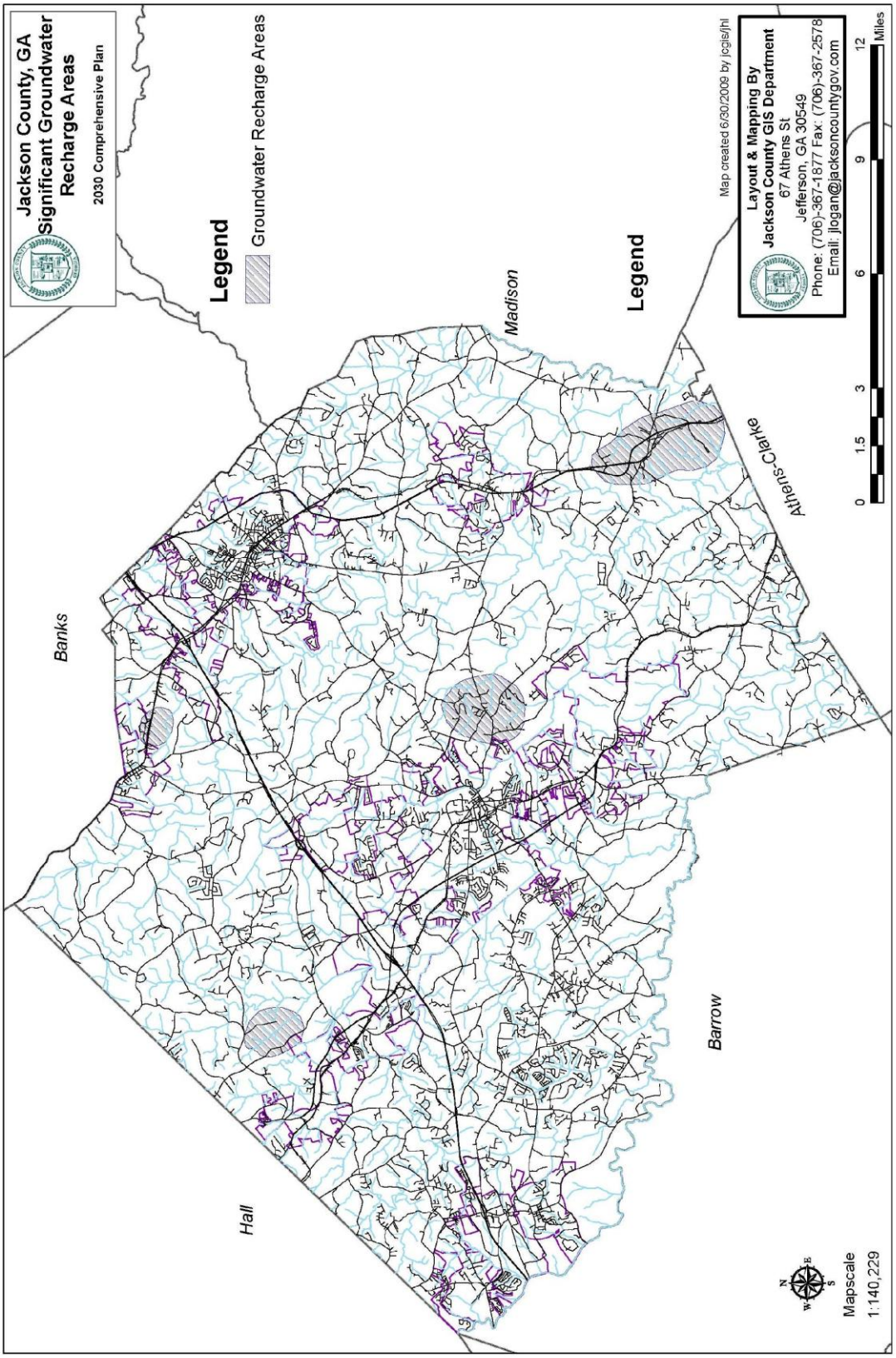
Jackson County, GA
Significant Groundwater Recharge Areas
2030 Comprehensive Plan
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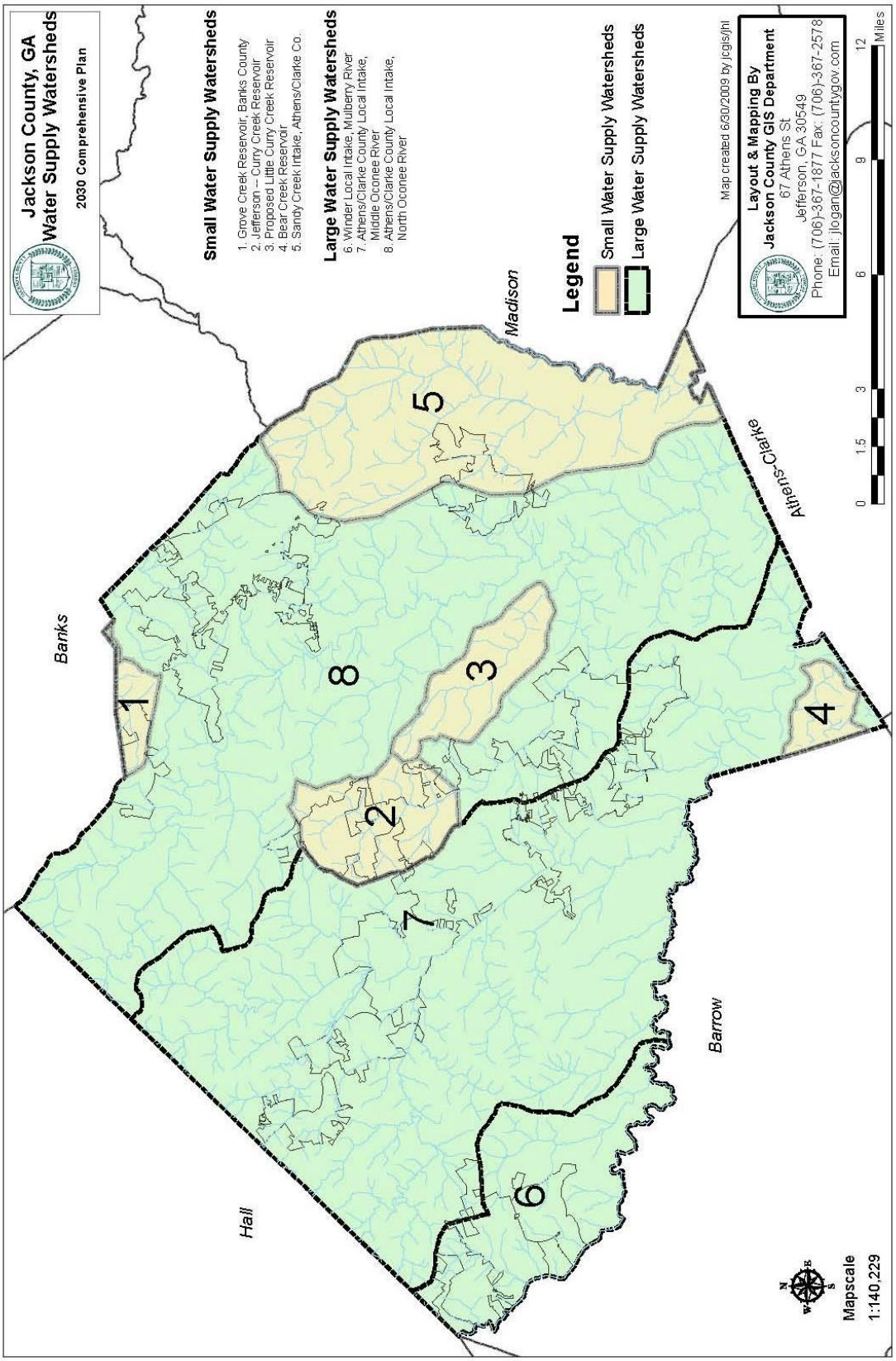
Jackson County, GA
Water Supply Watersheds
2030 Comprehensive Plan
Small Water Supply Watersheds
1. Grove Creek Reservoir, Banks County
2. Jefferson -- Curry Creek Reservoir
3. Proposed Little Curry Creek Reservoir
4. Bear Creek Reservoir
5. Sandy Creek Intake, Athens/Clarke Co.
Large Water Supply Watersheds
6. Winder Local Intake, Mulberry River
7. Athens/Clarke County Local Intake, Middle Oconee River
8. Athens/Clarke County Local Intake, North Oconee River
Legend
Small Water Supply Watersheds
Large Water Supply Watersheds
Map created 6/30/2009 by jcgis/jhl
Layout & Mapping By
Jackson County GIS Department
67 Athens St
Jefferson, GA 30549
Phone: (706)-367-1877 Fax: (706)-367-2578
Email: jlogan@jacksoncountygov.com
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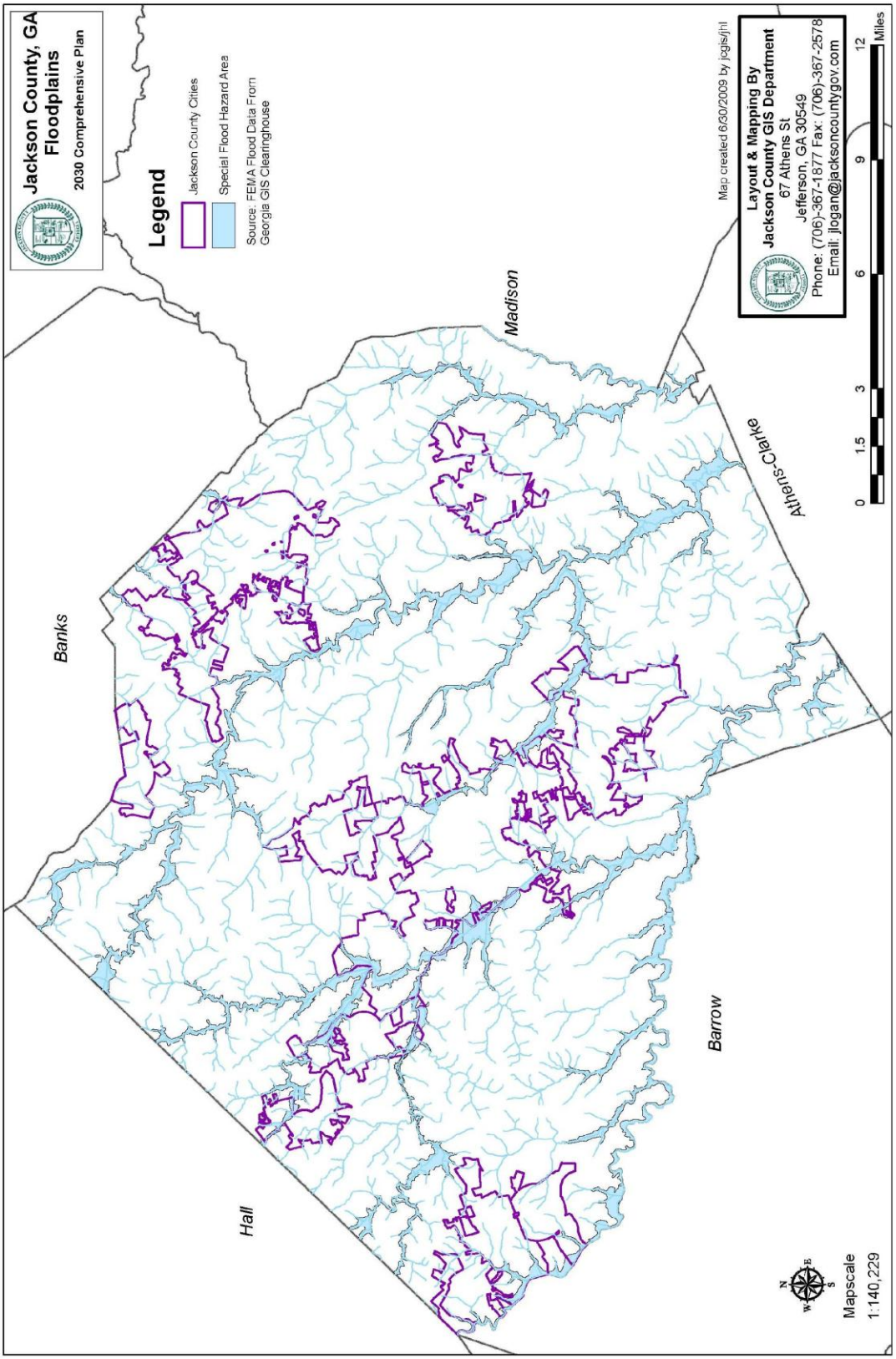
Jackson County, GA
Floodplains
2030 Comprehensive Plan
Legend
Jackson County Cities
Special Flood Hazard Area
Source: FEMA Flood Data From
Georgia GIS Clearinghouse
Map created 6/30/2009 by jgis/jhl
Layout & Mapping By
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67 Athens St
Jefferson, GA 30549
Phone: (706)-367-1877 Fax: (706)-367-2578
Email: jlogan@jacksoncountygov.com
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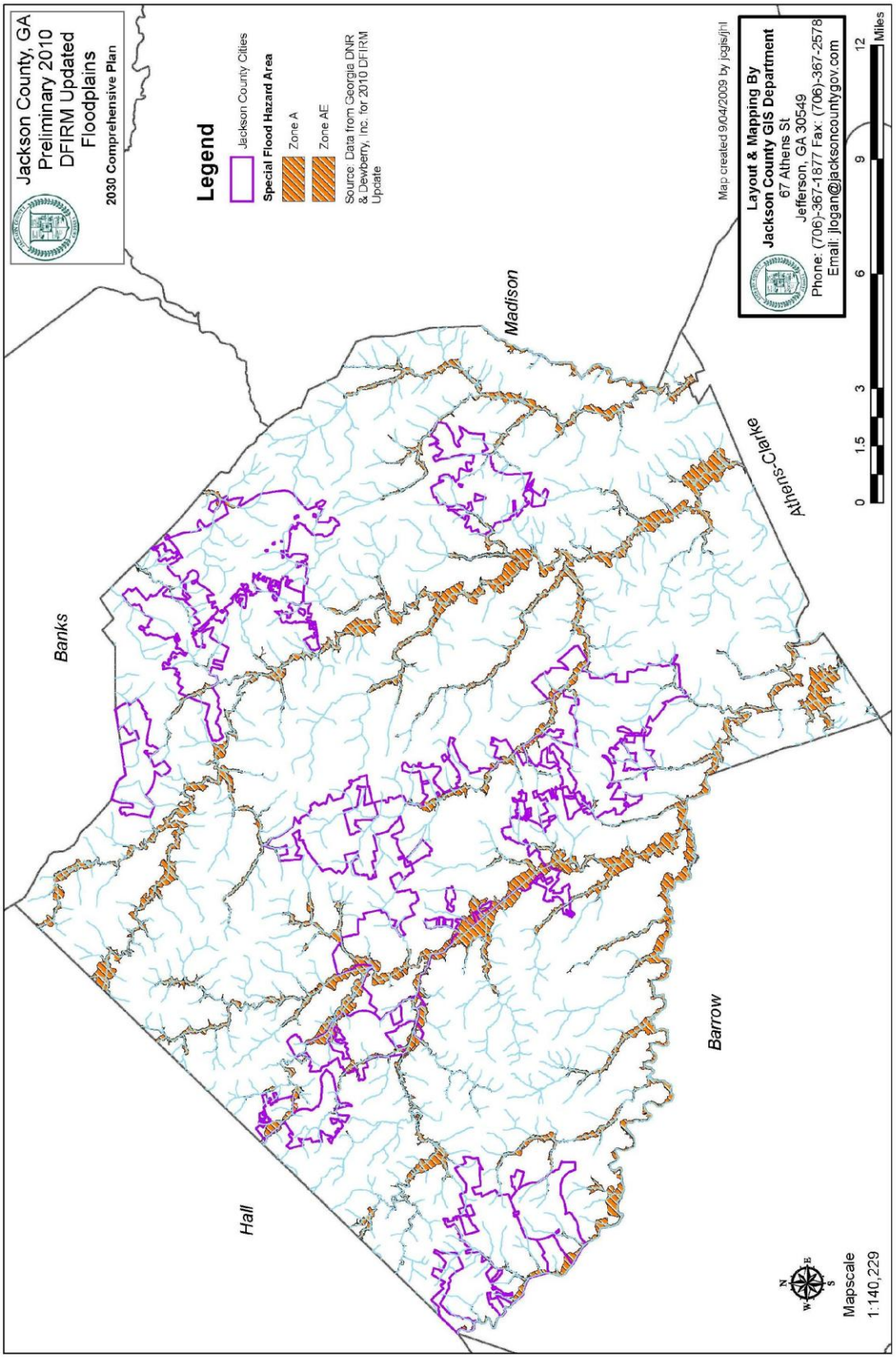
Jackson County, GA
Preliminary 2010
DFIRM Updated
Floodplains
2030 Comprehensive Plan
Legend
Jackson County Cities
Special Flood Hazard Area
Zone A
Zone AE
Source: Data from Georgia DNR & Dewberry, Inc. for 2010 DFIRM Update
Map created 9/04/2009 by jcgis/jhl
Layout & Mapping By
Jackson County GIS Department
67 Athens St
Jefferson, GA 30549
Phone: (706)-367-1877 Fax: (706)-367-2578
Email: jlogan@jacksoncountygov.com
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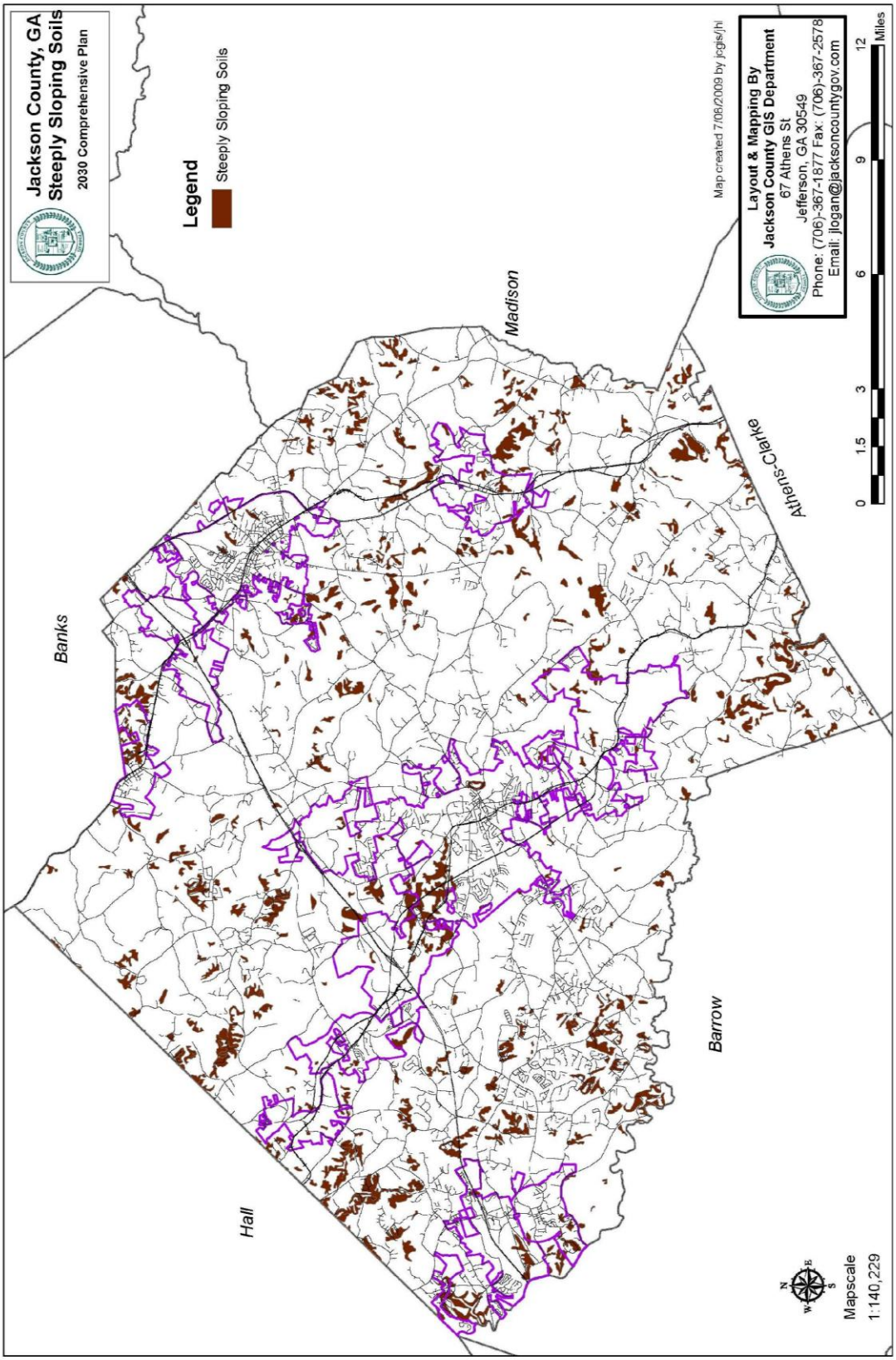
Jackson County, GA
Steeply Sloping Soils
2030 Comprehensive Plan
Legend
Steeply Sloping Soils
Map created 7/08/2009 by jcgis/jhl
Layout & Mapping By
Jackson County GIS Department
67 Athens St
Jefferson, GA 30549
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Email: jlogan@jacksoncountygov.com
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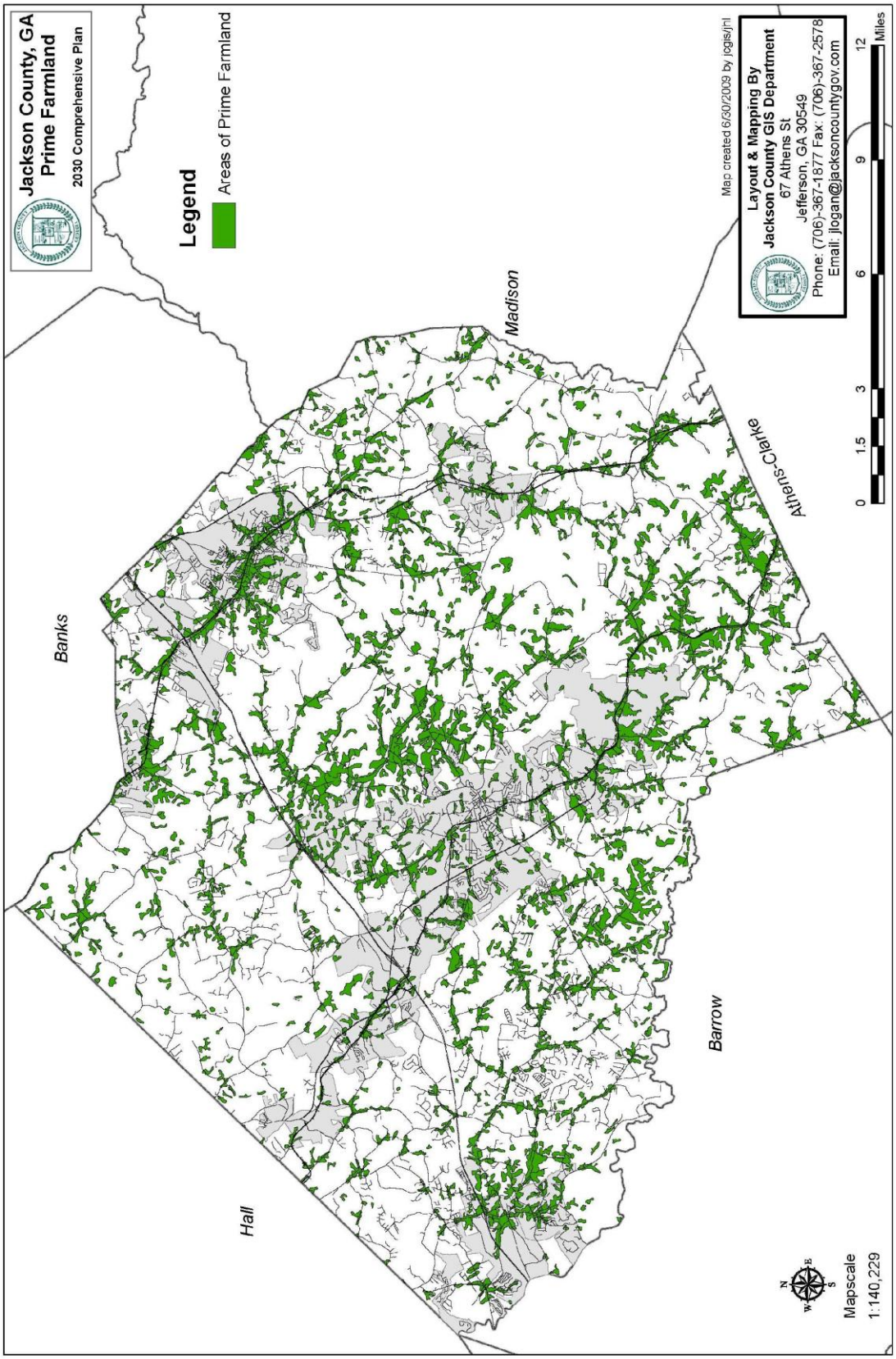
Jackson County, GA
Prime Farmland
2030 Comprehensive Plan
Legend
Areas of Prime Farmland
Map created 6/30/2009 by jogis/jnl
Layout & Mapping By
Jackson County GIS Department
67 Athens St
Jefferson, GA 30549
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Email: jlogan@jacksoncountygov.com
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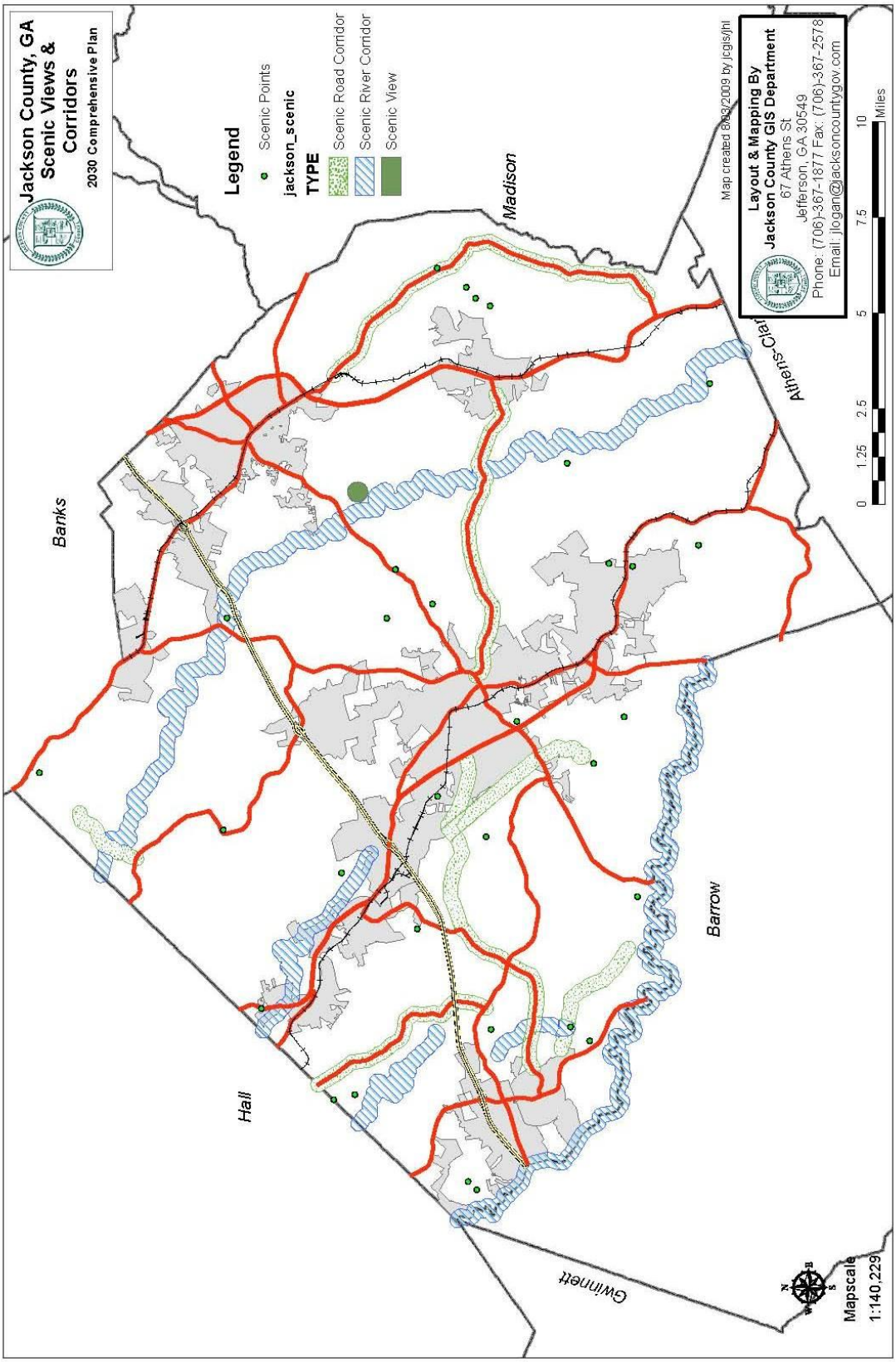
Jackson County, GA
Scenic Views & Corridors
2030 Comprehensive Plan
Legend
Scenic Points
jackson_scenic
TYPE
Scenic Road Corridor
Scenic River Corridor
Scenic View
Map created 8/3/2009 by jcgis/jhl
Layout & Mapping By
Jackson County GIS Department
67 Athens St
Jefferson, GA 30549
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