



Upper Flint River Resiliency Action Plan

October 2014



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Notes and Acknowledgements

As described in the Introduction, the contents of this Action Plan are the product of ongoing collaboration between American Rivers and numerous other organizations, agencies, individuals and entities in the upper Flint River basin. Its contents reflect the engagement and efforts of the various partners listed under each and every action item in this document, and of all of the participants in the Upper Flint River Working Group. For their assistance, their time and their insights, they all have the author's sincere appreciation and gratitude.

Devin Dotson, Jenny Hoffner and Chris Williams at American Rivers provided input and assistance that was critical to the production of this Action Plan. Additional assistance producing the document came from Ken Mirvis at The Writing Company. The maps that appear in this document benefit greatly from data layers depicting ponds, lakes and reservoirs of all sizes created by Amber Ignatius at the University of Georgia Department of Geography, who shared her data layers freely and gave generously of her time to update them.

The author is responsible for any factual errors. The views expressed herein are those of American Rivers and do not necessarily reflect the views of our funders, advisory council members, or those who provided input or review.

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Executive Summary

This Action Plan aims to guide work by a variety of stakeholders to restore drought resilience to the upper Flint River system of west-central Georgia. It follows on discussions and efforts of the Upper Flint River Working Group that began in 2013 and on the report *Running Dry: Challenges and Opportunities in Restoring Healthy Flows in Georgia's Upper Flint River Basin*, published in 2013 by American Rivers and Flint Riverkeeper. Designed to be a “living document,” it charts a plan of work that will be updated and expanded in future years as collaborative efforts in the river basin progress.

This Action Plan seeks to outline specific strategies to restore resilience to some of the most stressed portions of the river basin, along with highlighting key needs in the areas of policy, research and information. It includes a focus on preserving existing natural resources of value in the basin. This plan charts collaborative, transparent and practical efforts by the full range of individuals, communities, businesses, organizations and public entities that have a stake in the long-term health of the upper Flint River.

The plan identifies five initial priority stream reaches and sub-watersheds. Two of them have run completely dry in recent droughts. Two others are clearly suffering from the impacts of urbanization. The last—the main stem of the river in the Pine Mountain area—represents a remarkable and largely intact natural resource in need of preservation. Each of these sites presents different challenges in the quest to restore resilience to the basin.

These five locations are:

- The Source of the Flint in Clayton and Fulton counties, and at and near Hartsfield-Jackson Atlanta International Airport
- Flat Creek in Peachtree City
- Line Creek on the Coweta/ Fayette county line
- White Oak Creek on the east side of Newnan
- The Flint River in the Pine Mountain region.

The plan also highlights three basin-wide policy and research initiatives:

- A basin-scale forum for drought response communications among water utilities
- A basin-wide land protection strategy to preserve and restore hydrology that is healthy enough for the river to continue to support fisheries, water supplies, recreation and ecosystems
- Groundwork laid for comprehensive environmental flow study of the basin that takes into account increasing extremes in weather (including the addition of stream gauges in key sub-watersheds of the basin).

These five places and three initiatives hold particular potential for restoration. In each case, efforts to restore and preserve land and water resources could have tangible impacts in the local area and help to restore drought resilience to the river system basin-wide for years to come. Without doubt, there are more places in the river basin where restoration efforts can be targeted that may lend even more insight

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to the task of restoring the basin as a whole. In its current form, this document is a starting point only. What will be important in the years to come will be to continue working toward an integrated, basin-scale, science-based, consensus-driven and practical approach to restoration throughout the upper Flint River basin.

Introduction

The upper Flint River of west-central Georgia, which is extraordinary for its history, landscapes and ecology, is rapidly becoming extraordinary for another reason: in one of the most water rich regions of the world, it is now a case study in water scarcity. Fortunately, there is a great deal that those who have a stake in the Flint River can do to slow or reverse this trend. Doing so, however, will require work and collaboration among a broad array of stakeholders.

This Action Plan follows on work that American Rivers, Flint Riverkeeper and others have undertaken since 2011, and in particular it follows on activities of the Upper Flint River Working Group in 2013 and 2014. In April 2013, American Rivers and Flint Riverkeeper published the report *Running Dry: Challenges and Opportunities in Restoring Healthy Flows in Georgia's Upper Flint River Basin* (available online at www.AmericanRivers.org/RunningDry). The report documents the strains on water resources in the upper Flint River basin, analyzes their causes, and begins to point the way toward restoring drought resilience to the river system.

Beginning in June of 2013, American Rivers has convened the Upper Flint River Working Group (henceforth called the “Working Group”; participants are listed at right) and coordinated a series of meetings and site visits throughout the river basin. These meetings have provided an open forum about the challenges facing the river basin among water utility leaders, non-profit community organizations and other entities interested in restoring resilience to the upper Flint River basin. The meetings have included in-depth discussion sessions on the challenges facing water utilities in the area, information-sharing on environmental issues in the different portions of the river basin, technical sessions with national experts such as the Alliance for Water Efficiency, and site visits to places throughout the basin such as the Flat Creek Nature Area in Peachtree City and the Gerald Lawhorn Scouting Base on the river in Upson County.

The Working Group’s discussions on a variety of topics and locations have informed this Action Plan. With this publication, American Rivers seeks to capitalize on the efforts of the Working Group over the past year. This document outlines specific plans of action to restore resilience to some of the most stressed portions of the basin, along with highlighting key needs in the areas of policy, research and information. It also includes a focus on preserving existing natural resources of value in the basin. It charts collaborative, transparent and practical efforts by the full range of individuals, communities, businesses, organizations and public entities with a stake in the long-term health of the upper Flint River.

INTRODUCTION

The Action Plan is intended to be a “living document.” In its current form, it is a starting point only. Indeed, the *Running Dry* report referenced many areas of opportunity for restoration, all of which must be explored in the future, whereas only certain first initiatives are outlined here. What will be important in the years to come will be to work toward an integrated, basin-scale, science-based, consensus-driven and practical approach to restoration in the upper Flint River basin. American Rivers anticipates that the efforts underlying this Action Plan will mature and transform in future years to continue to inform the multi-faceted, adaptive efforts of a broad array of partners in the upper Flint basin.

Why is this work important?

A river is not just a flow of water through the landscape. It is a dynamic system that supports public water supplies, industry, agriculture, recreation, wildlife and more. A strain placed on a river does not just affect a single location; it ripples across everything downstream.

The Flint River begins just south of Atlanta, fed by urban streams at and around Hartsfield-Jackson Atlanta International Airport. As Atlanta has grown to the south, a growing population has come to rely more and more heavily on the Flint and its tributary streams.

As detailed in the *Running Dry* report, recent droughts have driven the river to low streamflows that are unprecedented in the historical record on the Flint. Even in the absence of drought, the river’s baseflow—that water that soaks through the ground and steadily feeds streams and the river—is declining. Over the past four decades, all measures of low flows in the upper Flint show declines. Key information presented in the *Running Dry* report on the recent hydrology of the upper Flint includes the following critical points:

- Low flows during drought are now 70% lower in the mainstem Flint River than they were as recently as the 1980s.
- Major headwater tributaries such as Line Creek and Whitewater Creek ran completely dry in the drought of 2010-2012. Line Creek, for example, registered flows at the Peachtree City stream gauge of less than one cubic foot per second for roughly half of calendar year 2012.
- Annual average flows in the river since 1975 are 18% lower than prior to 1975.
- The “normal low flows” of the late summer and fall of non-drought years are now roughly half of their historical levels.

As detailed in the *Running Dry* report, there is no single predominant driver of the changes in the hydrology of the upper Flint River system. Although droughts have always struck the Flint, those droughts have been frequent and severe in recent years. At the same time, various human activities have stripped away the river’s resilience to drought. Among them are:

- Demands on the river system for public water supply have increased in recent decades. There are now 22 municipal surface water withdrawal permits in the Piedmont portion of the Flint River basin, with 12 reservoirs used for public water supply purposes in the basin.

- Only approximately 25-30% of water withdrawn from the river returns directly to it, due to interbasin transfers, land application of treated wastewater, high rates of landscape irrigation (including “purple pipe” reuse irrigation with treated wastewater), and un-sewered residential areas.
- Urbanization and associated land use changes have made the landscape throughout the Flint’s headwaters more impervious to rainwater. In the Flint’s upper headwaters (in Clayton, Coweta, Fayette, Fulton and Henry counties), 43% of the land area was developed as of 2007, according to Atlanta Regional Commission statistics.¹
- Wetland acreage has declined due to urbanization and a growing number of ponds, lakes and reservoirs, which also serve to increase total evaporation.

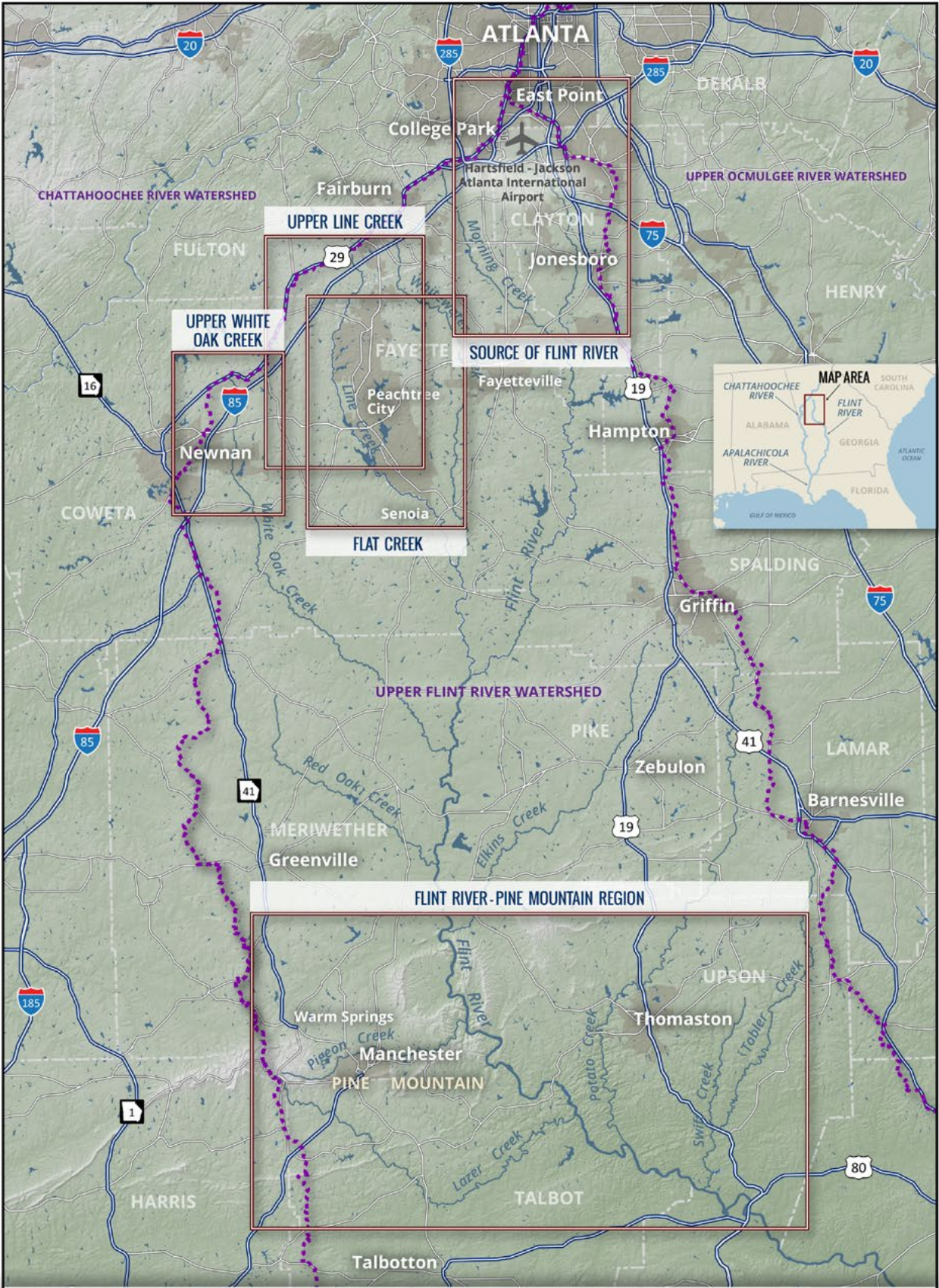
The Action Plan does not dwell on the problems of past practices as much as it looks forward to restoration actions. All stakeholders must work together to reexamine the ways we use and manage the waters of the upper Flint in order to ensure its health for ourselves and future generations.

Goal of this Action Plan

The goal of this plan is not to restore the upper Flint to a pristine condition, but rather to enable the river to do the work of supporting people, the economy and its own unique ecology into the future. Any plan to restore a degree of natural hydrology to the basin cannot aim to recreate a pre-development condition. Doing so would be unrealistic and unattainable. Nevertheless, much can be done to restore a hydrology that is healthy enough for the river to continue to support fisheries, water supplies, recreation and ecosystems. Some of these efforts include 21st-century stormwater management, infrastructure maintenance and repair to minimize leakage, and land protection. In addition, the basin’s water resources can be managed more sustainably through such activities as limiting interbasin transfers, adjusting water withdrawals from the river and streams, adjusting reservoir operations, and reducing opportunities for evaporation. Because the factors that alter flows in the upper Flint are many and multi-faceted, there is no one silver bullet for restoring resilience to the system.

Despite these complexities, this plan aims to provide a framework for actions, cooperation and research needed to restore drought resilience to the upper Flint River basin. It will help communities work together to better manage the basin’s water resources, sustaining not only the river and its ecosystem, but also the communities themselves. It will call out tools—commonly referred to as “green infrastructure”—that will allow even developed land to handle water more like nature by promoting infiltration into the ground. It will build on the growing relationships among water utilities, water users and community stakeholders across the basin. It will encourage the smart management of water, wastewater and stormwater on a basin scale irrespective of political jurisdictions or planning district boundaries. It will point the way toward a better understanding of the river system’s hydrology and the degree of restoration that is possible. It will acknowledge the complexity of managing river flows, seeking to avoid the unsustainable practice of focusing only on low flows or minimum flows in favor of the wiser, science-based practice of focusing on the full dynamic range of flows, from low to high and everything in between.

¹ Metropolitan North Georgia Water Planning District, Watershed Management Plan, May 2009



UPPER FLINT RIVER WATERSHED

- - - - RIVER BASIN BOUNDARY
- = INTERSTATES & HIGHWAYS
- = MAJOR ROADS
- TOWNS, CITIES & DEVELOPED AREAS
- COUNTY BOUNDARIES



MAP PRODUCED BY BioGeoCreations biogeocreations.com

INTRODUCTION

Building the Action Plan's Foundation

Since June 2013, following the publication of the *Running Dry* report, American Rivers has convened the Upper Flint River Working Group. The group has provided a forum for open discussion of the challenges facing the Flint River ecosystem, as well as the challenges facing the region's public water utilities and other stakeholders. Its purpose was encapsulated in September 2013 at a Working Group meeting held at the Gerald Lawhorn Scouting Base in Upson County:

The Upper Flint River Working Group's purpose is to keep the upper Flint River and its tributary streams flowing to protect the social, ecological, recreational and economic values the river system provides. Through this voluntary Working Group, diverse stakeholders come together to share information, identify barriers, seek common ground, and proactively pursue opportunities to restore and protect the river system and its flows.

This Action Plan focuses the activities of Working Group participants and other stakeholders on specific places within the upper Flint basin, where efforts at the local level can make a difference. It is American Rivers' hope that this Plan will move the conversation from one of identifying problems to addressing them.

Most activities to implement this plan will occur locally, in communities throughout the basin, with water managers and other stakeholders considering the circumstances of every stream reach, section of river, sub-watershed, public water system or impoundment. These activities will build on and expand upon the collaborative foundation of the Upper Flint River Working Group. The Action Plan seeks to chart an agenda of restoration and broad stakeholder collaboration.

Any actions aimed at restoration will have greater likelihood of success if local community leaders and elected officials have a stake in their development and implementation. This is important especially because infrastructure improvements all come with public financial costs. Certain past infrastructure investments may need to be reexamined with an eye toward resilience, but equity, fairness and the long-term interests of ratepayers and taxpayers in all communities of the basin must always be considered as well.

The Initial Focus: Priority Stream Reaches and Watersheds

This Action Plan focuses on five priority locations: the source of the Flint, the Flat Creek watershed, the Line Creek sub-basin, White Oak Creek, and the Flint River itself in the Pine Mountain region (*see map on page 6*). Two of those locations—Flat Creek and Line Creek—have run totally dry in recent droughts. Two others—the source of the Flint and White Oak Creek—are clearly suffering from the impacts of urbanization. The last—the main stem of the river near Pine Mountain—supports recreation and an economically and ecologically valuable fishery; unlike the other two pairs of places, it represents a remarkable and intact natural resource in need of preservation. Each of these sites presents different challenges in the quest to restore resilience to the basin. In many cases, the specific action steps outlined here represent critical initial steps toward achieving long-term goals. Setting these activities into motion is very important regardless of the length of the path to the goals identified in any given location.

1. The Source of the Flint in Clayton and Fulton Counties, at and around Hartsfield-Jackson Atlanta International Airport and in nearby headwater watersheds in Clayton County. (*see map on page 9*)

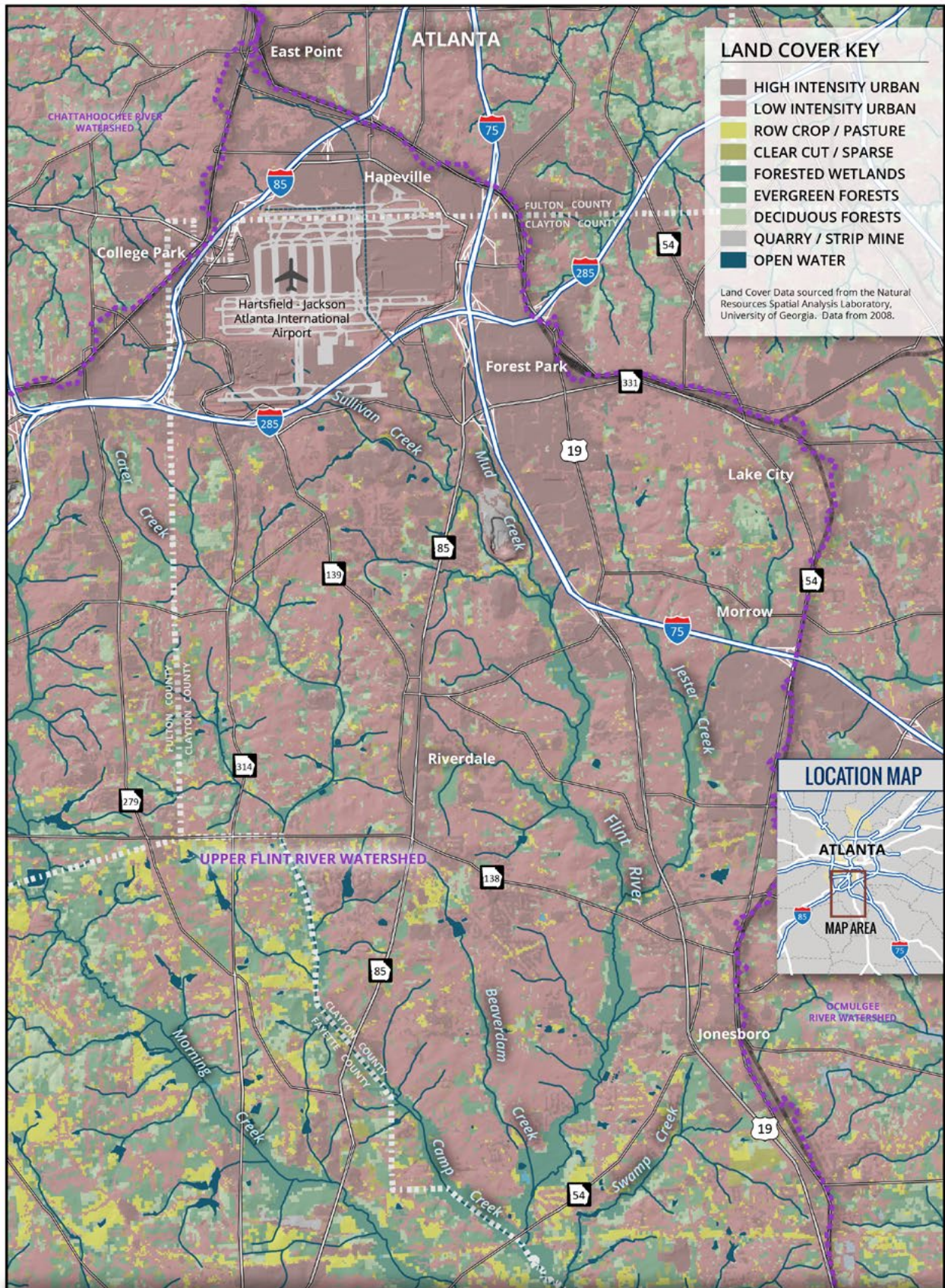
The Flint River begins in the city of East Point, Georgia, in an urban area roughly one mile up-gradient from Hartsfield-Jackson Atlanta International Airport.

THE PROBLEM

In addition to the airport itself, there are thousands of acres of impervious surfaces—pavement and rooftops—throughout the Flint’s uppermost headwaters. These impervious surfaces disconnect the natural water cycle, meaning headwater streams don’t receive the benefit of rainwater that would otherwise soak slowly through the ground and enter the streams as baseflow. This decline in baseflow diminishes the steady flow of water to downstream public water supplies and degrades the river’s ecosystems and recreational opportunities. When there is little or no rain, baseflow constitutes a critical source of water for the river and its tributary streams. When extended droughts arrive, baseflow is the only water flowing in the river.

The landscape at the Flint’s source is so heavily urbanized—more than the headwaters of any other Georgia river—that it begs for work that will address the water quantity impacts of landscape urbanization. Restoring more natural water flows will start small, with each sub-watershed targeted, and decades may pass before a more natural hydrograph can be mimicked or restored on a large scale.

Using low-impact development techniques and green infrastructure to infiltrate rainwater into the ground at the Flint’s source can help recharge groundwater, support baseflow and restore flows to downstream communities throughout the basin. While some communities and water utilities across the country engage in sourcewater protection to take advantage of the water quality and quantity benefits of forested landscapes, the water utilities in the upper Flint basin are not so fortunate. They must deal with the challenges of drawing water from a developed watershed. Protecting water supplies under a paradigm of “sourcewater restoration” will go a long way in helping to restore resiliency. Rather than sourcewater protection per se, “sourcewater restoration” means restoring or mimicking some measure of natural hydrology in the watersheds upon which water utilities depend for water supply.



LAND COVER KEY

- HIGH INTENSITY URBAN
- LOW INTENSITY URBAN
- ROW CROP / PASTURE
- CLEAR CUT / SPARSE
- FORESTED WETLANDS
- EVERGREEN FORESTS
- DECIDUOUS FORESTS
- QUARRY / STRIP MINE
- OPEN WATER

Land Cover Data sourced from the Natural Resources Spatial Analysis Laboratory, University of Georgia. Data from 2008.

LOCATION MAP



SOURCE OF THE FLINT RIVER

Mainstem Headwaters Area

- RIVER BASIN BOUNDARY
- INTERSTATES
- MAJOR ROADS
- RAILROADS
- COUNTY BOUNDARIES



MAP PRODUCED BY BioGeoCreations biogeocreations.com

SOURCE OF THE FLINT

RESTORATION GOALS

In the near term, reducing the impacts of impervious surfaces to restore some degree of natural hydrology (with a smaller peak of stormflow runoff) will incrementally benefit stream habitat and the consistency of flows for public water supplies in the Flint's heavily developed uppermost headwaters. Streamflow monitoring could increase the value of these efforts by helping assess the degree to which baseflow can be restored with green stormwater infrastructure and informing our collective understanding of flow regimes in headwater watersheds.

RESTORATION STRATEGIES

- *Incorporate green infrastructure into Hartsfield-Jackson Atlanta International Airport planning.*
Conduct a site-wide suitability study for green stormwater infrastructure at the 4,800-acre airport, and use this study to identify appropriate locations and best management practices to restore baseflow and a more natural hydrograph in the Flint River's uppermost headwaters. These locations can become pilot projects for strategies to be employed in a facility-wide approach in future years. As the world's busiest airport, Hartsfield-Jackson has a distinct opportunity to be a leader in sustainability practices. Building on its work in energy conservation, waste reduction, and water conservation, the airport can also model best practices in green stormwater infrastructure. In so doing, it will provide a real and measurable benefit to communities throughout the Flint basin.
- *Develop and initiate a multi-faceted green infrastructure approach to restoring healthy hydrology in Clayton County, the county containing the bulk of the river's urbanized headwaters.*
Develop a green infrastructure strategic plan for Clayton County Water Authority's stormwater utility to (a) incorporate green infrastructure into the authority's capital improvement plans for stormwater infrastructure projects, (b) effectively incentivize green infrastructure installations and retrofits on private property county-wide, and (c) adjust local ordinances in Clayton County and its six cities to better enable the use of green infrastructure. These actions can serve as a basis for enabling the use of green infrastructure in new development and re-development, both public and private, throughout the county in the future.
- *Improve monitoring and research related to green stormwater infrastructure.*
Lay groundwork with multiple partners at the state and local government levels for monitoring and research to accompany green stormwater infrastructure retrofits, ideally applied on a watershed basis, in order to begin assessing the potential of such retrofits to restore baseflow to headwater streams. Demonstrating the multiple benefits to be gained through these efforts may help give momentum to undertaking more widespread retrofits in the future.
- *Educate municipal and institutional leaders.*
Educate municipal and institutional leaders throughout the Flint River's uppermost headwaters on the benefits of green stormwater infrastructure with the goal of laying a foundation for a holistic, watershed-scale approach to replicating natural hydrology at the Flint's source.

PROPOSED PARTNERS: Hartsfield-Jackson Atlanta International Airport, Georgia Environmental Protection Division, Clayton County Water Authority, Metropolitan North Georgia Water Planning District, and other area institutions, industries and/or municipal stormwater management agencies.

2. Flat Creek in Peachtree City *(see map on page 12)*

Flat Creek, a major tributary of Line Creek, runs through the heart of Peachtree City, draining most of the city's land area. Dams on Flat Creek form two artificial reservoirs known as Lake Peachtree (built in 1957) and Lake Kedron (built in 1987), which are centerpieces of Peachtree City. Below Lake Peachtree, Flat Creek flows through a wide, wooded floodplain with extensive wetlands to its confluence with Line Creek. The Flat Creek Nature Area makes much of this forested floodplain accessible to the public.

THE PROBLEM

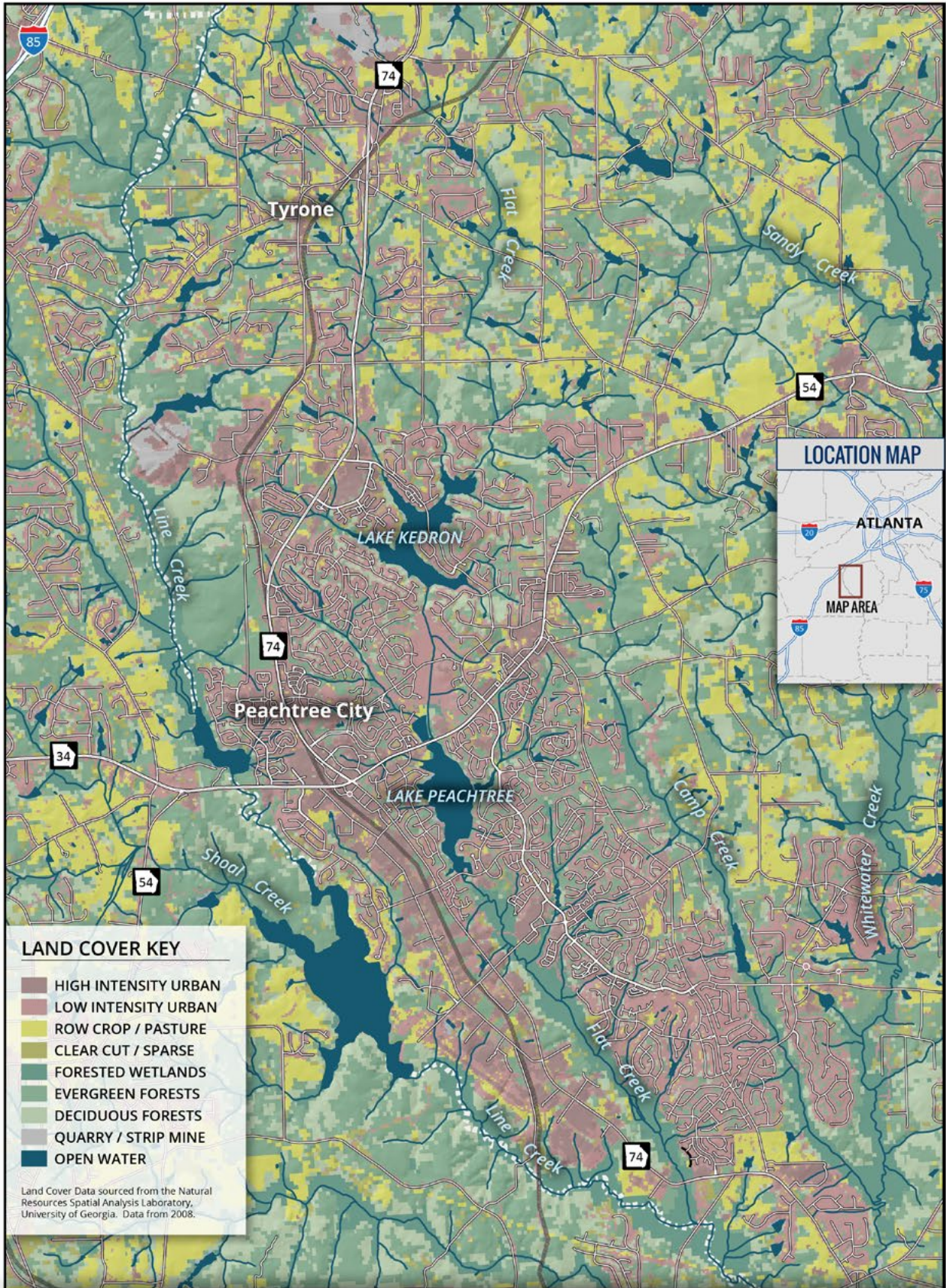
The portion of Flat Creek below Lake Peachtree is often dewatered during droughts, including the recent drought of 2010-2012. Not only does this condition deny water to the significant forested wetlands of the Flat Creek Nature area—at such times, Flat Creek becomes stagnant for roughly two miles throughout the 500-acre nature area—it also means that Flat Creek contributes less water to Line Creek and the Flint River downstream. Unlike most reservoirs that provide public water supply in Georgia, Lake Peachtree currently has no policy regulating its outflow.

The Fayette County Water System holds water withdrawal permits from the Georgia Environmental Protection Division (EPD) for Lakes Peachtree and Kedron. Since Lake Peachtree is a recreational amenity for Peachtree City (its owner), the water system releases water from Lake Kedron into Lake Peachtree to keep the lower lake full, while also withdrawing water from it for the public water supply. The Georgia EPD permit for the water withdrawal from Lake Peachtree, however, does not require a release from the Lake Peachtree dam. As a result, sometimes no water is released from Lake Peachtree, causing Flat Creek to run dry. A different management protocol could keep water flowing in Flat Creek.

Managing water demand effectively in the Fayette County Water System through efficiency and conservation measures would help ease the challenges of managing the two lakes. The Fayette County Water System's summer peak demand is double its baseline demand. This seasonal peak comes at just the time that Flat Creek and other streams are most strained for water. Better managing this peak demand will provide flexibility in the management of Lake Peachtree.

RESTORATION GOALS

The near-term goal is to cease the dewatering of Flat Creek, meaning it will have consistent flow below Lake Peachtree at all times. Installing stream gauges throughout the Flat Creek watershed will provide information on inflow and outflow to and from Lakes Kedron and Peachtree, which will help inform efforts to quantify desirable and achievable flows in Flat Creek. Goal-setting in the longer-term can be informed by investigations of flows needed to support native mussel and fish populations, as well as the significant forested wetlands in Flat Creek's floodplain.



LAND COVER KEY

- HIGH INTENSITY URBAN
- LOW INTENSITY URBAN
- ROW CROP / PASTURE
- CLEAR CUT / SPARSE
- FORESTED WETLANDS
- EVERGREEN FORESTS
- DECIDUOUS FORESTS
- QUARRY / STRIP MINE
- OPEN WATER

Land Cover Data sourced from the Natural Resources Spatial Analysis Laboratory, University of Georgia. Data from 2008.

FLAT CREEK
Flint River Basin, Georgia

- RIVER BASIN BOUNDARY
- RAILROADS
- INTERSTATES
- COUNTY BOUNDARIES
- MAJOR ROADS



MAP PRODUCED BY BioGeoCreations biogeocreations.com

FLAT CREEK

RESTORATION STRATEGY

Implement water conservation and efficiency practices in the Fayette County Water System, with a focus on reducing high summer demand peaks.

This effort will require collaboration among the Fayette County Water System, water users, and community groups to expand the water system's current water conservation and efficiency efforts. There are numerous best practices to be gleaned from the experiences of other water utilities that have encountered similar challenges across the country. The San Antonio Water System (SAWS) in Texas, for example, has implemented multiple initiatives in order to better manage peak water demand, benefitting water resources in the area as well as the water system's revenue stability. Initiatives can include targeted outreach and education, especially focusing on efficient landscape irrigation; rebates, coupons and other incentives; and rate structures that cover utility costs while equitably distributing the costs for meeting expensive peak demand. Since peak demand levels typically represent the "most expensive water" that a water system produces, reducing peak demand typically has tremendous financial benefits for water systems.

PROPOSED PARTNERS: Fayette County Water System and community stakeholders

3. **Line Creek** on the Coweta/ Fayette County line, west of Peachtree City (see map on page 15)

Line Creek starts in south Fulton County, near the towns of Fairburn and Palmetto. As it flows southward, it forms the county line between Coweta and Fayette counties. It is a major tributary to the Flint, and under normal hydrologic conditions it generally contributes as much flow as the nominal “Flint River” itself where the two streams join.

THE PROBLEM

Like Flat Creek, a portion of Line Creek often runs completely dry in periods of drought, and since it is such a major tributary, this lack of flow affects the entire main stem river downstream.

Two municipal utilities withdraw water from Line Creek for public supplies: Newnan Utilities near Peachtree City and the Fayette County Water System at Lake McIntosh. When the creek runs dry, it does so just above these intakes, in the reach between Wynn’s Pond and Lake McIntosh on the west side of Peachtree City. Under normal conditions, Line Creek is a significant stream at this location, but for roughly half of calendar year 2012, the USGS stream gauge at the Georgia Highway 34/54 bridge measured the stream’s flow at less than one cubic foot per second—essentially dry. These conditions have a negative impact locally and downstream, since under these conditions Line Creek contributes very little flow to the Flint River at their confluence.

Beyond lack of rainfall in drought years, explanations for Line Creek’s tendency to run dry are not completely clear. There are five state-issued permits for small water withdrawals in the upper portions of the watershed, as well as several ponds. The creek’s uppermost headwaters drain several subdivision housing developments, a large rail yard, and small but dense zones of commercial development along Interstate 85. None of those factors alone could account for the creek’s reduced flow. Line Creek, in other words, is a microcosm of much of the upper Flint River basin: it too is suffering a death by a thousand cuts, with many factors likely contributing to its decline.

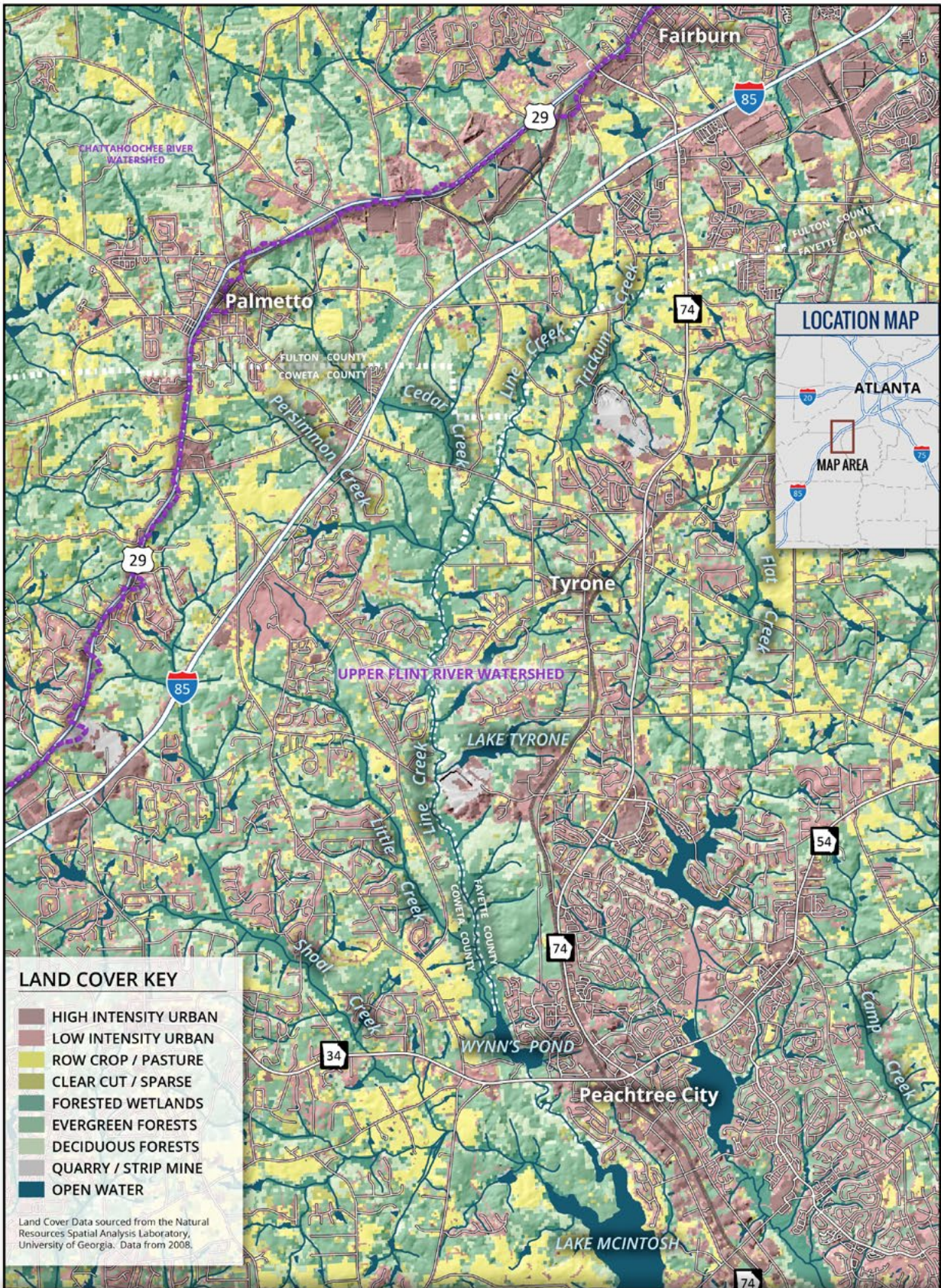
RESTORATION GOAL

As with Flat Creek, the near-term goal is to halt the dewatering of Line Creek and ensure that it flows in the reach between Wynn’s Pond and Lake McIntosh. Flow here will in turn ensure flow below Lake McIntosh, per Fayette County’s water withdrawal permit, and downstream toward the Flint River. In the longer term, quantifying the creek’s approximate “unimpaired flow” and assessing the degree to which the historic flow can or should be restored will be important, especially in light of the large area of the Flint’s headwaters that drains to Line Creek.

RESTORATION STRATEGY

Enlist a collaboration of water users and landowners to gather more information and identify ways to prevent the dewatering of Line Creek in future droughts. Examine overall community water use in the watershed, including permitted withdrawals under farm or industrial permits, small private withdrawals, domestic and residential use, golf courses, and industrial sites. Begin discussions with all water users about water use practices to help keep Line Creek flowing during drought.

PARTNERS TO BE IDENTIFIED



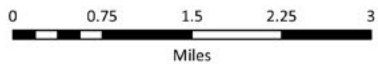
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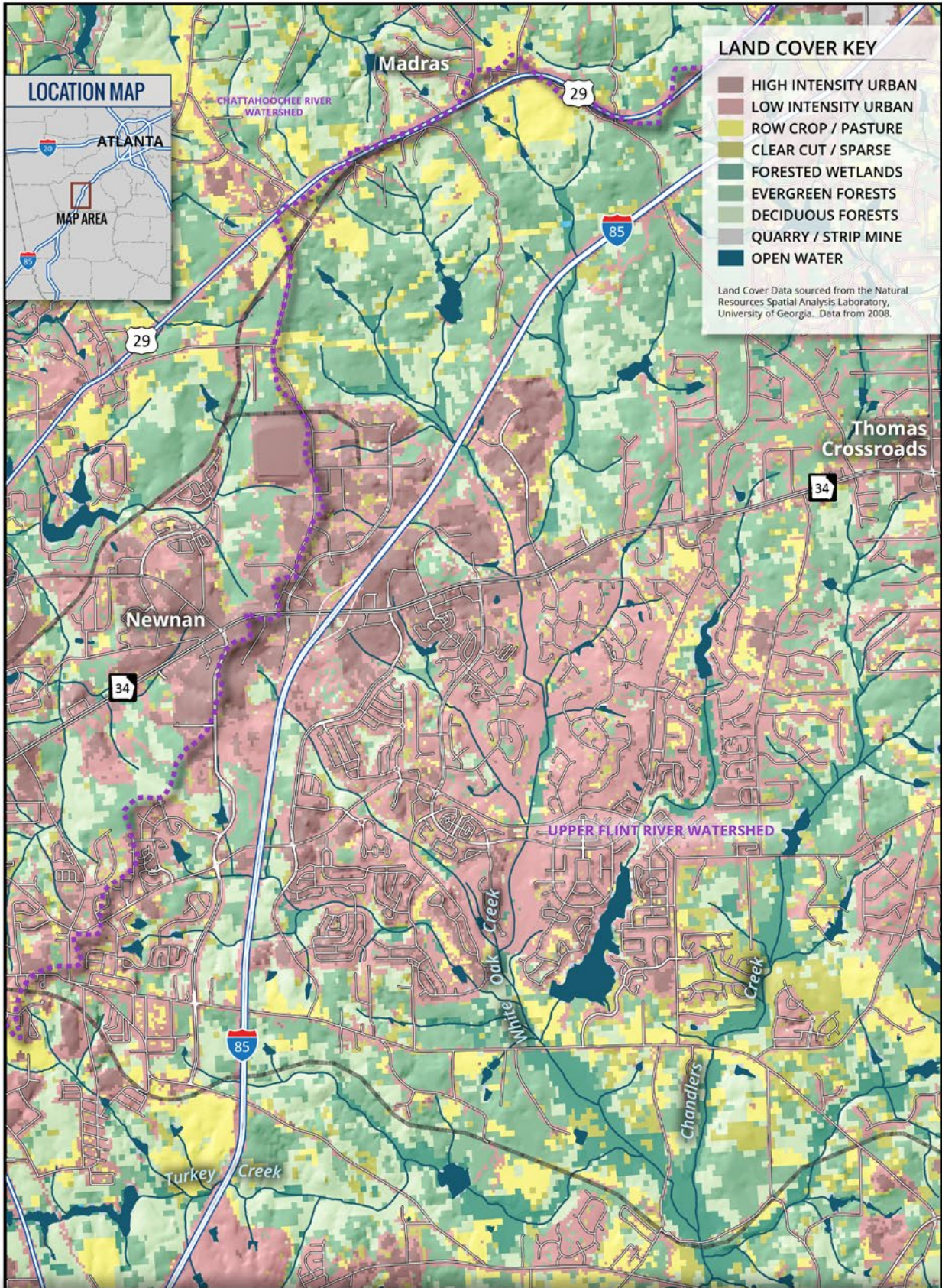
Land Cover Data sourced from the Natural Resources Spatial Analysis Laboratory, University of Georgia. Data from 2008.

UPPER LINE CREEK
Flint River Basin, Georgia

- RIVER BASIN BOUNDARY
- INTERSTATES & HIGHWAYS
- MAJOR ROADS
- RAILROADS
- COUNTY BOUNDARIES



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UPPER WHITE OAK CREEK

Flint River Basin, Georgia

- RIVER BASIN BOUNDARY
- RAILROADS
- INTERSTATES & HIGHWAYS
- MAJOR ROADS



4. White Oak Creek on the east side of Newnan (see map on page 16)

White Oak Creek is a major tributary that drains much of the eastern half of Coweta County. It joins the Flint in the Joe Kurz Wildlife Management Area in northeastern Meriwether County, near Alvaton. The upper section of the creek provides one of three raw water sources for Newnan Utilities' water system.

THE PROBLEM

Land development and the associated increase in impervious surface cover in the headwaters area to the east and northeast of Newnan have altered the flow characteristics of White Oak Creek. The changes in White Oak Creek appear similar to those in the Flint River's uppermost headwaters: land development in the stream's headwaters has changed the flow of the stream, degrading habitat quality and making for a less steady flow of water for public water supply systems. The creek's flow has become more sensitive to the influence of stormwater running off developed areas: it rises higher and faster in rainy weather than it did in the past, and in dry times it is lower, with lower baseflow.

White Oak Creek represents a case of landscape urbanization affecting the timing and amount of water available for public water supply. Solving problems like those affecting White Oak Creek would provide a framework for solving other similar problems throughout the Flint basin and numerous other basins as well. For that reason alone, it is a challenge well worth facing.

RESTORATION GOAL

The overall goal in the upper White Oak Creek watershed is to restore a more stable hydrograph with higher baseflows than currently exist. If green infrastructure retrofits in developed areas east of Newnan can make the stream flow more steadily and mimic some portion of its natural hydrology, then the stream should not only provide a more consistent source of water supply, but it should also flow more naturally downstream to the Flint River. In times of drought, White Oak Creek would contribute more flow to the Flint than it does now, perhaps at rates that are closer to its historic drought flows.

Because there is no USGS stream gauge on White Oak Creek, a first step will be assessing its flow regime to the degree possible in Newnan Utilities' data from the water intake at Poplar Road. This information will help provide quantifiable goals for restoring baseflow in the creek. Further steps will involve prioritizing green stormwater infrastructure efforts in the watershed to reduce the impacts of impervious surfaces on the stream and its tributaries.

RESTORATION STRATEGY

Retrofit developed areas with green infrastructure to restore a more natural hydrology and a hydrograph similar to the more stable, consistent one that existed prior to land development in White Oak Creek's headwaters.

As with efforts at the "source of the Flint," the goal will be to employ the appropriate building and landscape practices to infiltrate rainwater into the ground where it falls as much as possible (rain gardens, bioswales and bio-infiltration basins are examples), in order to reduce the negative impacts of impervious surfaces on streams. This effort would improve flow reliability at the Newnan Utilities water intake on the creek and incrementally benefit the entire downstream basin.

PROPOSED PARTNERS: Newnan Utilities and community stakeholders

5. The Flint River in the Pine Mountain region of the lower Piedmont (see map on page 19)

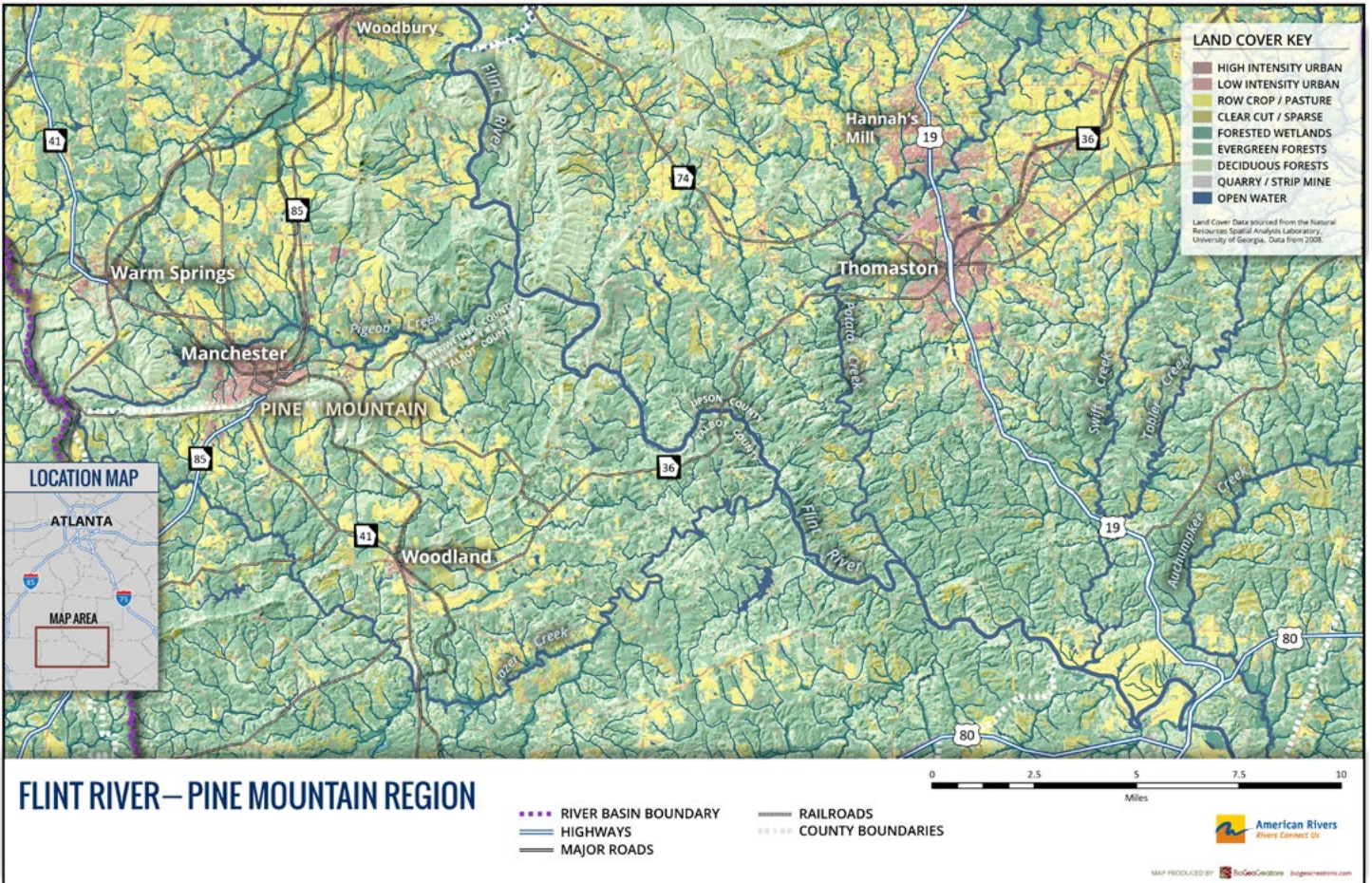
In the lower Piedmont of west-central Georgia, in the largely rural region between Macon and Columbus, the Flint River runs through the heart of some of Georgia's most scenic landscapes. Here, the Pine Mountain ridges rise above the Piedmont's low, rolling hills, and the river and its tributaries travel through gorges and ravines cut straight through the mountain ridges. Ecologically, the area is home to a unique mix of flora and fauna from Georgia's mountains and coastal plain, and the river's many sets of fast-moving shoals support its treasured shoal bass fishery along with rare species such as the recently discovered Halloween Darter. The shoal bass, an exciting sport fish found naturally only in the Apalachicola-Chattahoochee-Flint river basin—and most abundant in the Flint—relies on the clear, swift water where the river drops over wide swaths of bedrock. The recreational economy here is significant, and the river is central to the community fabric in Thomaston, Manchester, and other communities of Upson, Talbot, Pike and Meriwether counties.

THE PROBLEM

Although the Flint in the Pine Mountain region is a treasure of the Georgia outdoors, the river and its surrounding landscape face threats that could spoil this natural resource for local residents, visitors from elsewhere, and all Georgians. Over the years, there have been repeated proposals for dams on the Flint River at Sprewell Bluff and other locations in the vicinity. These dams would destroy miles of free-flowing river and inundate the scenic wooded valleys where the Flint cuts through the Pine Mountain ridges. More recently, the value of the resource has been undermined by the low flows that have plagued the river over the past 15 years. Among many other effects, the increasing frequency of low flows means that the canoeing and kayaking season often ends by early summer rather than early fall, undermining the value of the natural resource for this recreational use. The Flint is the centerpiece of this landscape, and its recent unprecedented low flows threaten this treasure of the Georgia outdoors.

RESTORATION/PROTECTION GOALS

Fundamental to protecting the Flint River in this region is protecting the landscape around the river as well as the flows in the river itself. Affirming the recreational, economic and community value of the Flint in the Pine Mountain region will underscore the important reasons to restore and protect its flows. In recent decades, flows in the river have become far less favorable for canoeing and kayaking. An approximate flow of at least 600 cubic feet per second as measured at the Carsonville stream gauge is needed for canoeing or kayaking the river, but the river is more often below this water level now. As detailed in the *Running Dry* report, during the warm months of the year the river is at or above this water level only half as often as it was 40 years ago. Restoring some greater frequency of flows suitable for river recreation is a worthwhile step in healing the river's altered hydrology. It will also be important to seek to restore the flows needed to support the Flint's unique ecosystems and prized shoal bass fishery. Complementing these goals is the important goal of protecting land along the river from development pressure in order to preserve the iconic landscapes of the Flint for future generations.



RESTORATION/PROTECTION STRATEGIES

- *Develop a land protection prioritization strategy in partnership with The Conservation Fund, Southern Conservation Trust and Flint Riverkeeper.*
This strategy should provide a road map for protecting undeveloped land and its hydrologic function in concert with efforts to restore hydrologic function in developed areas via green infrastructure. It will identify the highest-priority areas of undeveloped land, especially along stream corridors, where land protection efforts should be focused.
- *Create a recreation-oriented map and related public-access information.*
This effort will demonstrate the river's immense value to the area's visitors and communities, enhancing its value as a recreational resource in the lower Piedmont.
- *Develop and implement a public education initiative to help people learn to love and appreciate this remarkable aesthetic and recreational resource and to help ensure its health into the future.*
Environmental education efforts will help develop an ethic of water stewardship and will fit in well with current programming goals by the Flint River Council of the Boy Scouts of America for the Lawhorn Scouting Base at Camp Thunder. Doing so will not only provide benefits in the short-term, it will also broaden the constituency of people who see the need to conserve the resource, helping to secure its future.

PROPOSED PARTNERS: Flint River Council – Boy Scouts of America, The Conservation Fund, Southern Conservation Trust, Flint Riverkeeper, Georgia Interfaith Power & Light

Basin-Wide Policy and Research

In addition to the five priority locations described above, there are certain needs in the realms of policy, research and information that are basin-wide in scope. Described below, they are important to address now as work to restore drought resilience to the upper Flint River basin moves forward.

A Basin-Scale Forum for Drought Response Communications

Over nearly the past 15 years, several severe droughts have struck the upper Flint basin. Local economies, water utility finances and river health have been affected. In the future, water users will likely continue to share an increasingly precious and scarce resource. Responses to these events cannot take place in just one local area or sub-watershed. They must happen across the basin, even though efforts by water utilities will differ depending on the characteristics of each water system.

Enhanced communication regarding drought response would be especially important for utilities that do not have existing communications links, such as between utilities that are part of the Metropolitan North Georgia Water Planning District and those that are not. With enhanced communication, each individual water utility might be better able to plan its own drought response actions proactively while ensuring the sharing of a dwindling resource across the basin. These communication efforts would likely take the form of a regularly scheduled telephone conference call coordinated by American Rivers (initially, at least) and taking place as long as any portion of the upper Flint basin is designated as being in drought. These efforts will occur at the basin scale, regardless of other planning or jurisdictional boundaries.

Successful results might include the mitigation or elimination of severe low-flow events such as those that have occurred in the mainstem river during the droughts of the past 15 years. Of course, this effort will not ensure that the river stays filled with water completely during drought. Rather, it might mean that streamflows look more like they did during pre-21st-Century droughts.

PROPOSED PARTNERS: Water Providers in the Upper Flint Basin

Water Providers that have participated in the Working Group and related discussions to date are: Clayton County Water Authority, City of Concord Water System, City of Fayetteville Water System, City of Griffin Water System, City of Manchester Water System, City of Thomaston Water System, City of Warm Springs Water System, City of Woodbury Water System, City of Zebulon Water System, Coweta County Water Authority, Fayette County Water System, Meriwether County Water Authority, Pike County Water Authority, Newnan Utilities, Talbot County Water System, Upson County Water System

Land Protection

Land and water are part of the same equation: protecting water resources requires protecting land resources as well. In its current heavily developed state, the land in the Flint River's headwaters can no longer play its role in replenishing groundwater and baseflow in tributaries of the river. Instead, much of the rainwater rushes off of hard surfaces quickly and runs downstream through these urban and suburban streams. When the rain stops, the water is no longer there to filter through the ground and feed the streams slowly and steadily as it would under undeveloped conditions. With a reduced volume of water entering the system as baseflow, water quality declines, and the entire habitat—including recreational lands—suffers, as do the municipal water supplies on which so many people depend.

As part of the long-term effort outlined in this action plan, it will be important to pursue strategic land protection efforts along the riparian areas of the Piedmont Flint basin. In addition to aesthetics, recreation and improved water quality, such an effort would help preserve natural hydrology in the basin, thus supporting long-term drought resilience. Land protection to *preserve* natural hydrology in the rural areas of the lower Piedmont can work with green infrastructure to *restore* natural hydrology in the Flint's urban and suburban headwaters, hence the basin-wide scope of this initiative.

To achieve these goals, American Rivers, Southern Conservation Trust, Flint Riverkeeper and The Conservation Fund will establish a partnership to produce a GIS-based land protection strategy. This strategy will focus on a systematic, practical approach to land protection and restoration and create the opportunity for additional leverage, such as state funding and other resources, to expand land protection efforts.

PARTNERS: The Conservation Fund, Flint Riverkeeper, Southern Conservation Trust

Research and Information

As efforts to restore drought resilience to the basin move forward, stakeholders would benefit from an improved collective understanding of the relationship between the region's ecology and the flow of the river. Adequate data do not currently exist for understanding the flow regimes needed to support the system's special species (protected species or sport fish such as shoal bass) or the overall maintenance of water quality and fundamental ecosystem processes. While restoration actions such as those described in this plan can restore baseflow and mitigate extreme low flows during drought, they will not necessarily bring about an ecological flow regime—a dynamic range of flows that supports the Flint's unique ecology and maintains the health of the river for the variety of uses it supports.

The time is ripe to lay the groundwork for a comprehensive and applicable assessment of environmental flows in the basin that takes into account increasing extremes in weather. This kind of assessment would provide much-needed information to everyone concerned with flows in the upper Flint. Building on the *Running Dry* report and assessing the full range of flows (not just low flows), this effort would do well to rely on up-to-date studies from academic and government sources such as the Auburn University researchers investigating shoal bass population dynamics, the

USGS WaterSMART program, and the ACF Stakeholders process. In addition, such an effort might benefit from the expertise of The Nature Conservancy (TNC) on the science and policy of environmental flows and degrees of flow alteration. TNC's collaborative methods of assessing environmental flows in places such as the Savannah River basin in Georgia, along with many other locations nationally and internationally, could be of great value if applied to the special challenges of the upper Flint basin.

In addition, although the U.S. Geological Survey operates 11 stream gauges in the upper Flint basin, there are portions of the basin where streamflow data are lacking. Efforts to better understand the basin's hydrology would benefit from the installation of stream gauges in several locations. To date, discussions among Working Group members on this topic have yielded several suggestions for where to install additional stream gauges:

- *The Flint River at the Georgia Highway 36 bridge at the line of Upson and Talbot Counties*
This location had a stream gauge in the past, but it was discontinued in 1992.
- *The Whitewater Creek and Flat Creek sub-basins in Fayette County*
Stream gauges here would generate much-needed data on inflow and outflow to and from some of the Fayette County Water System's water supply reservoirs: Lake Kedron, Lake Peachtree and Starr's Millpond.
- *Upper White Oak Creek*
The flow of upper White Oak Creek in Coweta County has been observed to be more influenced by stormwater flows from developed areas in recent years, peaking at higher flows after rain events and exhibiting lower baseflow in dry times. A stream gauge on the creek east of Newnan could help confirm this increasing variability and provide insight about the hydrology of the watershed.
- *Lower Potato Creek in Upson County*
Potato Creek has only one stream gauge, in its uppermost headwaters. Nevertheless, it is a major Flint River tributary and has suffered extreme low-flow events in recent droughts that have not been quantified. An additional gauge or gauges on the lower reaches of Potato Creek in Upson County, somewhere in the vicinity of Thomaston, would provide useful data on this major sub-basin.

PROPOSED PARTNERS: Flint Riverkeeper; U.S. Geological Survey; academic researchers at Auburn University, the University of Georgia and elsewhere; and potentially The Nature Conservancy

Updates: Return Flow Opportunities

The *Running Dry* report (pp. 30-31) included return flows as an area of opportunity for restoring drought resilience to the basin. Currently, much of the water withdrawn from the Flint River system is discharged as treated wastewater to the Ocmulgee or Chattahoochee river basins rather than the Flint. Much of the wastewater that is discharged within the Flint basin reenters the environment via land-application technologies, including non-potable water reuse, so not all of it makes its way back to the river. Direct discharge of highly treated wastewater into the river system would improve flow reliability. As the basin developed, these high levels of treatment were not always available or feasible. Today, they are proven and ready for use.

In April 2014 the Clayton County Water Authority (CCWA) applied to the Georgia Environmental Protection Division for a modification to its NPDES permits, proposing to discharge up to 6.6 million gallons per day of treated wastewater to the Flint River. Because this discharge would be high quality water and would return water withdrawn from the Flint River back to the Flint, it represents an important and positive opportunity to restore flow.

It is not clear when CCWA will make use of this proposed discharge. However, Georgia EPD's 2013 granting of a wasteload allocation associated with the discharge was a positive step. The proposed modification of the discharge permit would be a positive step, as well.

Other specific opportunities to return flow to the Flint are also under consideration, though they have not moved forward like the Clayton County effort. For example, the City of Griffin's wastewater master plan outlines the potential to discharge treated wastewater into Shoal Creek in the Flint River basin. There is also the possibility of returning the Town of Tyrone's wastewater flows to either Flat Creek or Line Creek via treatment by the Peachtree City Water and Sewer Authority; the feasibility of this proposal should be assessed promptly, as it could benefit streamflow in the Flint basin. In addition, non-potable water reuse (or "purple pipe") systems in the basin (such as those in Peachtree City, Coweta County and Spalding County) should be re-evaluated in light of their impacts on streamflow, especially in times of drought.

Looking Ahead

American Rivers intends to work with local entities or ‘task force’ groups to take on the work for each priority stream reach or watershed identified in this Action Plan. As appropriate to each place, collaborations will include the diverse mix of stakeholders who will need to be at the table to address the needs of a given stream reach or watershed. Some of those stakeholders will be experienced professionals who have worked on water resource issues in the past. Others will be engaging in these conversations for the first time. All of their voices will be critical to identifying and implementing solutions.

For this Action Plan to be implemented, American Rivers envisions that these groups will meet several times each year. American Rivers will participate actively in these efforts, providing knowledge, guidance, motivation, facilitation and resources. We expect that the full Upper Flint River Working Group will meet in person two to four times yearly to share updates on the various projects underway in the basin and to continue building on the knowledge-sharing and discussions on policy issues that began in 2013.

This Action Plan highlights these stream reaches and initiatives because of their particular potential for restoration of flows and resilience. In each case, efforts to restore and preserve land and water resources can have a tangible impact in the local area and help to restore resilience to the river system basin-wide for years to come. Without doubt, there are more places in the river basin where restoration efforts can be targeted that may lend even more insight to the task of restoring the basin as a whole.

American Rivers intends to ensure that this plan is a living document, working with partners throughout the basin to lead the process of updating material on the actions charted here, as well as adding new components to this plan of work, as frequently as needed. It is critical that this plan of work evolve alongside on-the-ground, stakeholder-driven, collaborative, transparent and practical efforts to restore resilience to the Flint River basin.



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