Citizen's Guide to the Stekoa Creek Watershed Management Plan

Stekoa Creek

Stekoa Creek gets its name from the historic Cherokee village of "Stecoe," which was located somewhere in present day Clayton, Georgia.

Photo by Peter McIntosh *www.mcintoshmountains.com*

The purpose of the *Citizen's Guide to the Stekoa Creek Watershed Mangement Plan* is to present information that can improve water quality in the Stekoa Creek watershed, to help sustain and improve the economic value of Rabun County's natural resources, and aid in securing the well-being of the community for generations to come.

Contents

This report was produced in cooperation with the Georgia Mountains Regional Commission, and the Georgia Environmental Protection Division, Watershed Protection Branch, Nonpoint Source Program.

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Executive Summary

Historically, and in spite of the "issue fatigue" about Stekoa Creek's persistent water pollution problems, the public has rallied in support of having cleaner water in the Stekoa Creek watershed. The purpose of the Citizen's *Guide to the Stekoa Creek Watershed Mangement Plan* is to present information that can help improve water quality in Stekoa Creek, and streams within its watershed. This information is drawn from the comprehensive content of the *Stekoa Creek Watershed Management Plan*.

To move from existing conditions in the Stekoa Creek watershed, towards protection and restoration of impaired (polluted) waters, will require widespread application of these practices and actions:

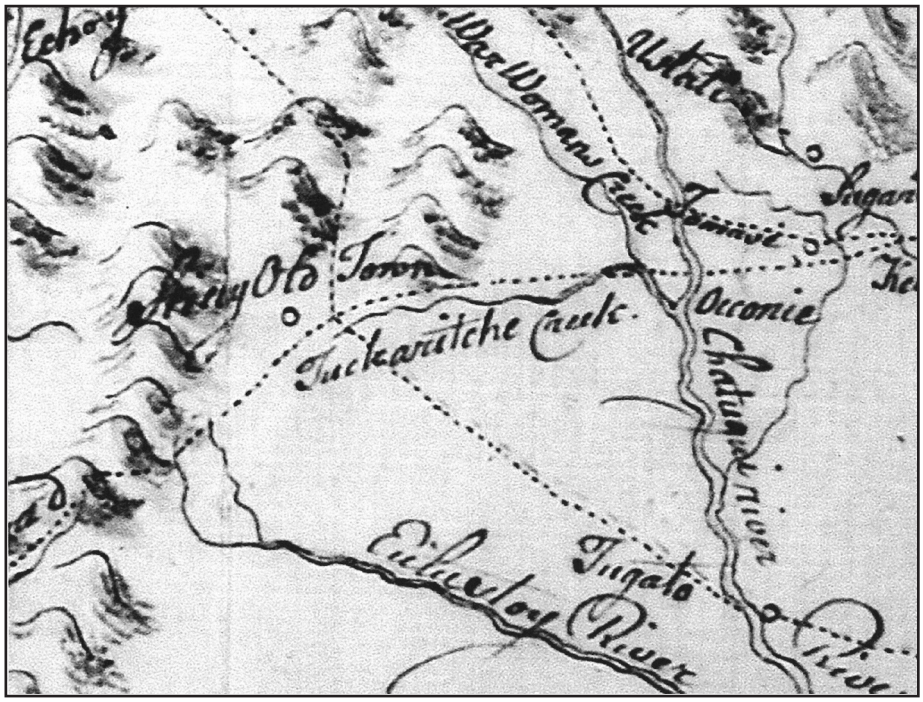
- ***Using "Best Management Practices" (BMPs) for a wide variety of land disturbing actions, to help protect and restore water quality;***
- ***Effective enforcement of erosion and sedimentation laws/codes; and,***
- ***Mitigation of fecal coliform / E. coli pollution and sediment sources.***

The strategies for restoring clean water in the Stekoa Creek watershed are straightforward. Implementation requires willing municipal partners, voluntary involvement from property owners, a local stakeholder group able to take ownership of this process, and sufficient project funding. With completion of the *Stekoa Creek Watershed Management Plan* (October 2015), water quality improvement projects in the Stekoa watershed are now eligible to receive grants and competitive state and federal funding.

Community collaboration and support for restoring clean water for the use and enjoyment of the community is critical for success. Acting now to restore and protect Stekoa Creek and its tributaries will help sustain and improve the economic value of Rabun County's natural resources, and will aid in securing the well-being of the community for generations to come.

A Historically Important Stream

Stekoa Creek gets its name from the historic Cherokee village of "Stecoe" (other spellings include Sticoe, Stecoah, Stecoy, etc.) which, according to numerous old maps and historic accounts, was located in present day Clayton, Georgia, in an area somewhere on the west side of Stekoa Creek about ½ mile above its confluence with Scott Creek. The village was of extreme cultural importance for both Native Americans and traders of European origin, as it served as the confluence of 5 major trading trails. It was also a final destination before reaching the "Passover" (current day Mountain City, GA), a town straddling the Eastern Continental Divide at a deep gap in the Blue Ridge Mountain front that was heavily used when travelling over the Blue Ridge Mountains.



Map of the Cherokee country by John Stuart, 1764. "Stecoy Old Town" is shown just left of center.

Stecoe village was abandoned sometime during the late 1600s—early 1700s, but remained famous for many years to come. The renowned botanist and explorer William Bartram came upon the ruins of Stecoe village during his 1775 expedition, and described it in his writings as: *"...the ancient famous town of Sticoe. Here was a vast Indian mount or tumulus and great terrace, on which stood the council house, with banks encompassing their*

circus; here were also Peach and Plumb orchards; some of the trees appeared yet thriving and fruitful."

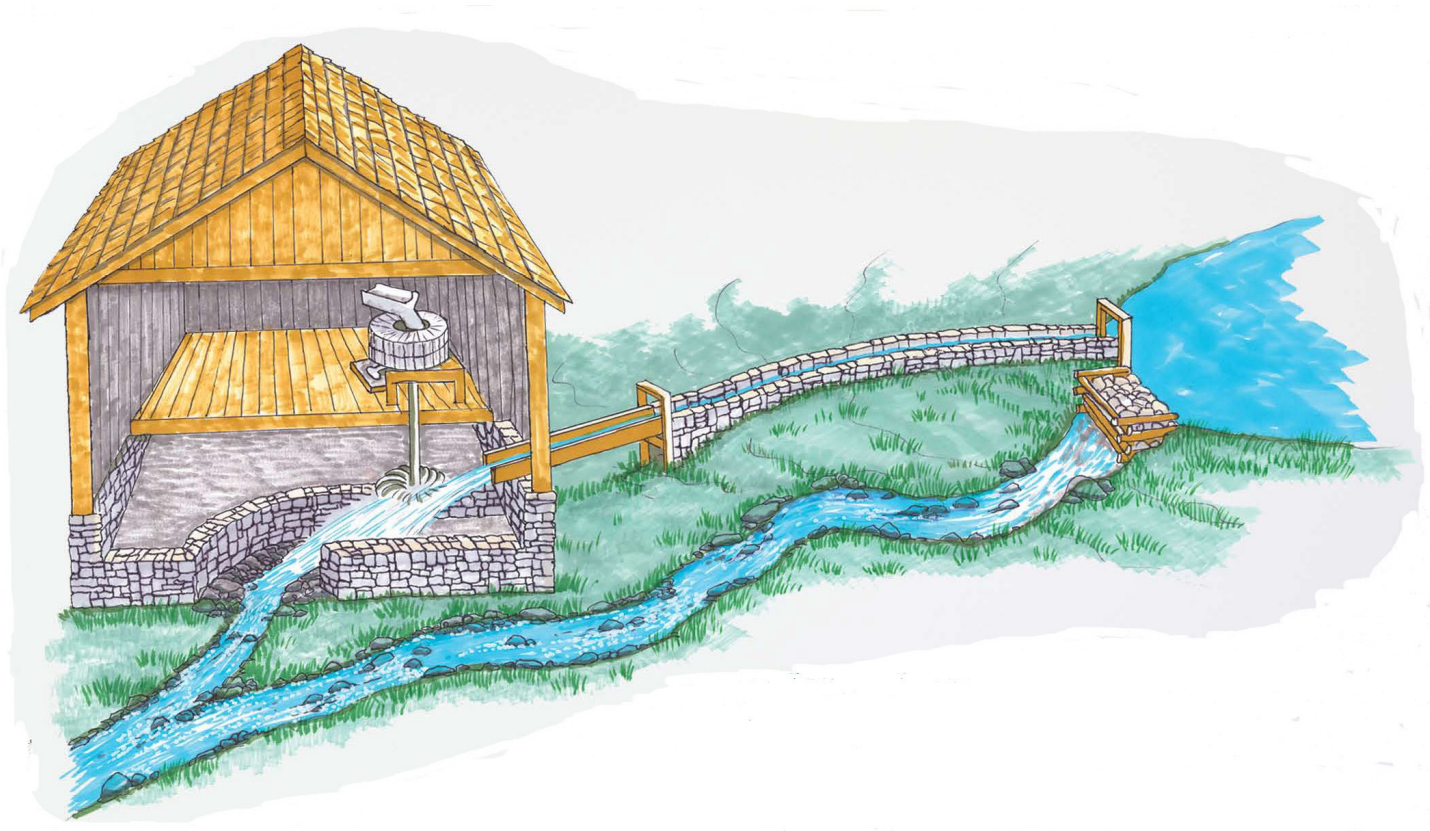
More recently, streams in the Stekoa Creek watershed have served as vital ecological, cultural and economic resources for the citizens of Rabun County, Georgia. Stekoa Creek and its tributaries have been widely utilized for fishing, providing clean water for recreation and agriculture uses, and even for hydro power generation for milling such as one site known as the historic Brewer Grist Mill, remnants of which can be found today at Stekoa Creek Park adjacent to State Highway 441. The streams in the Stekoa Creek watershed have long provided for residents along their banks.

Today, Stekoa Creek Watershed Is Imperiled

For the past 50 years Stekoa Creek has been plagued by a well-documented record of polluted water, which is unsafe for recreational contact due to the risk of contracting bacteriological infections from excessive levels of fecal coliform / E. coli bacteria. The U.S. Environmental Protection Agency (EPA) and the Georgia Department of Natural Resources, Environmental Protection Division (EPD), have classified Stekoa Creek as well as 4 of its major tributaries, specifically Scott Creek, Chechero Creek, Saddle Gap Branch, and She/Pool Creek, as impaired under Section 303(d) of the Federal Clean Water Act, for not meeting their designated use of fishing due to excessive levels of fecal coliform, E. coli and/or sediment. Cutting Bone Creek, another significant tributary to Stekoa, is not 303(d) listed; however, the EPA has recommended that Cutting Bone Creek be put on a "watch list" for sediment impairment in particular.

What Makes Stekoa Creek and Its Major Tributaries "Impaired" (Polluted)?

Every two years, each state is required to assess and describe the quality of its waters under Section 305(b) of the Clean Waters Act. To create the 305(b) List of Waters, the State of Georgia compares water quality data collected throughout the state to the State Water Quality Standards. Based on this comparison, each water



Hand-hewn timbers submerged in Stekoa Creek were part of an old mill pond dam that provided water to run the historic Brewer Grist Mill that was located downstream. The remnants of the mill pond dam were discovered during construction of Stekoa Creek Park in Clayton, Georgia.

body (stream, river, lake, etc.) is grouped into one of three categories: 1) supporting its designated use; 2) not supporting its designated use; or, 3) assessment pending. If a stream is ***not supporting its designated use***, that means it is impaired, or polluted.

✧ **Stekoa Creek** is polluted with fecal coliform from Clayton to the Chattooga River (14 miles), and is polluted with sediment from upstream of Clayton to the Chattooga River (18 miles).
✧ **Scott Creek** is polluted with sediment and fecal coliform (3.5 miles).
✧ **Chechero Creek** is polluted with sediment and fecal coliform (1.5 miles).
✧ **Saddle Gap Branch** is polluted with sediment and fecal coliform (3.5 miles).
✧ **Chechero Creek** is polluted with sediment and fecal coliform (1.5 miles).
✧ **She Creek** is polluted with sediment and fecal coliform from Lake Toccoa to Stekoa Creek (3 miles).
✧ **Pool Creek** (tributary to She Creek) is polluted with sediment (1.6 miles).

Georgia State Water Quality Standards for ***Fecal Coliform*** are:

•May-October (summer): a minimum of 4 water samples collected within a 30-day period resulting in a geometric mean of ≤ 200 colony forming units (cfu) per 100 mL.

•November-April (winter): a minimum of 4 water samples collected within a 30-day period resulting in a geometric mean of ≤ 1,000 cfu per 100 mL.

Georgia State Water Quality Standards for biota (macroinvertebrates) due to ***Sediment*** are:

•GA EPD has established narrative criteria for sediment that applies to all waters of the State of Georgia. The purpose of the narrative standard is to prevent objectionable conditions that interfere with legitimate water uses, as stated in Georgia Regulation 391-3-6-.03(5)(c):

All waters shall be free from material related to municipal, industrial or other discharges which produce turbidity, color, odor or other objectionable conditions which interfere with legitimate water uses (GA EPD, 2004).

Polluted Waters Can Be Restored

About 50 years ago, the Cuyahoga River in Cleveland, Ohio, caught fire because it was so polluted. Everyone knew the river was polluted—this was just one of the realities of the city—so it was no surprise. But the publicity that followed help to galvanize the municipality and its citizens to actively work to clean up the Cuyahoga River. Today, you can bike, hike and even paddle along the meandering river. Over the years, the Cuyahoga River has been transformed from a polluted waterway, soiled by sewage and other toxins, to a place for recreation. Restoration of water quality in this stream is now contributing the city's burgeoning tourism business.

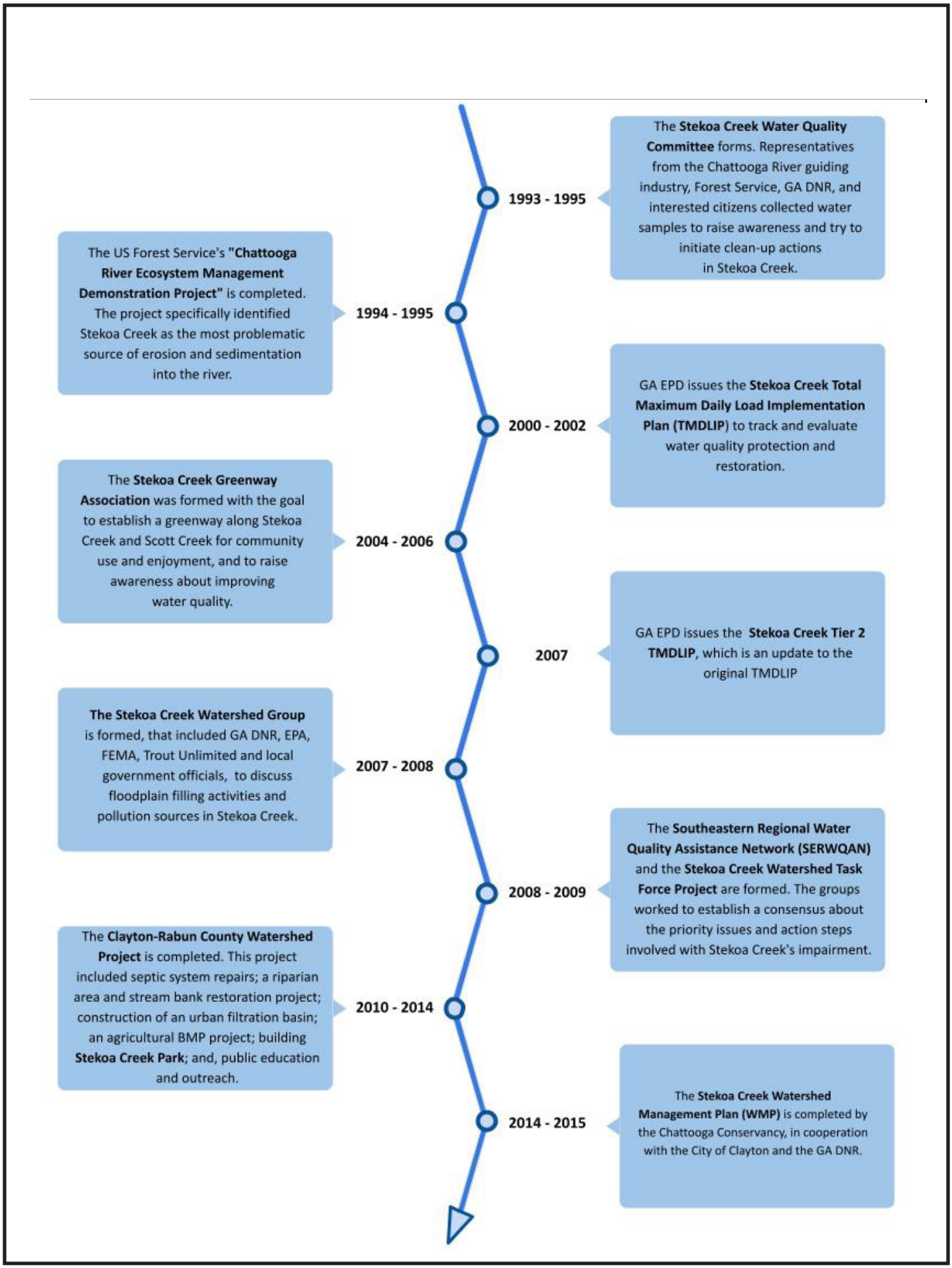
Much closer to Rabun County is the Soque River, a prized trout stream in Habersham County, Georgia. The Soque River is another success story of cleaning up a formerly polluted river. Here, projects and initiatives implemented over several years, and fueled by the cooperation and involvement of civic entities, nongovernmental organizations and private landowners, has resulted in the entire Soque River watershed being removed from the Georgia EPD's list of impaired waters for fecal coliform.

Georgia EPD has placed a high priority on improving water quality in the Stekoa Creek watershed. With completion of the *Stekoa Creek Watershed Management Plan* (October 2015), water quality improvement projects in the Stekoa watershed are now eligible to receive competitive state and federal funding. These watershed restoration and protection projects require the focused cooperation and commitment of local governments, institutions, nongovernmental organizations, decision-makers, and citizens.

History of Initiatives for Improving Stekoa Creek's Water Quality

Over the last 30 years, numerous stakeholder groups have formed and advanced initiatives aimed at improving Stekoa Creek's water quality. Stakeholder group initiatives have addressed flood plain management, fecal coliform / *E. coli* pollution, sewer system repair financing, storm water management, and enforcement of erosion and sedimentation laws. Yet these efforts have yielded inadequate progress on Stekoa Creek's water quality issues.

The following timeline on page 6 shows these initiatives:


1993 - 1995
The **Stekoa Creek Water Quality Committee** forms. Representatives from the Chattooga River guiding industry, Forest Service, GA DNR, and interested citizens collected water samples to raise awareness and try to initiate clean-up actions in Stekoa Creek.
1994 - 1995
The US Forest Service's **"Chattooga River Ecosystem Management Demonstration Project"** is completed. The project specifically identified Stekoa Creek as the most problematic source of erosion and sedimentation into the river.
2000 - 2002
GA EPD issues the **Stekoa Creek Total Maximum Daily Load Implementation Plan (TMDLIP)** to track and evaluate water quality protection and restoration.
2004 - 2006
The **Stekoa Creek Greenway Association** was formed with the goal to establish a greenway along Stekoa Creek and Scott Creek for community use and enjoyment, and to raise awareness about improving water quality.
2007
GA EPD issues the **Stekoa Creek Tier 2 TMDLIP**, which is an update to the original TMDLIP
2007 - 2008
The Stekoa Creek Watershed Group is formed, that included GA DNR, EPA, FEMA, Trout Unlimited and local government officials, to discuss floodplain filling activities and pollution sources in Stekoa Creek.
2008 - 2009
The **Southeastern Regional Water Quality Assistance Network (SERWQAN)** and the **Stekoa Creek Watershed Task Force Project** are formed. The groups worked to establish a consensus about the priority issues and action steps involved with Stekoa Creek's impairment.
2010 - 2014
The **Clayton-Rabun County Watershed Project** is completed. This project included septic system repairs; a riparian area and stream bank restoration project; construction of an urban filtration basin; an agricultural BMP project; building **Stekoa Creek Park**; and, public education and outreach.
2014 - 2015
The **Stekoa Creek Watershed Management Plan (WMP)** is completed by the Chattooga Conservancy, in cooperation with the City of Clayton and the GA DNR.

Fortunately, however, these past stakeholder initiatives have shown consistent, strong agreement on a set of goals and objectives that could clean up streams in the Stekoa Creek watershed, for the use and enjoyment of the community. Further, many of the objectives involve actions that are eligible for federal and state grants for implementation. If these goals, objectives and actions are pursued, this would successfully reduce pollution loads in the Stekoa Creek watershed.

Defining the Stekoa Creek Watershed

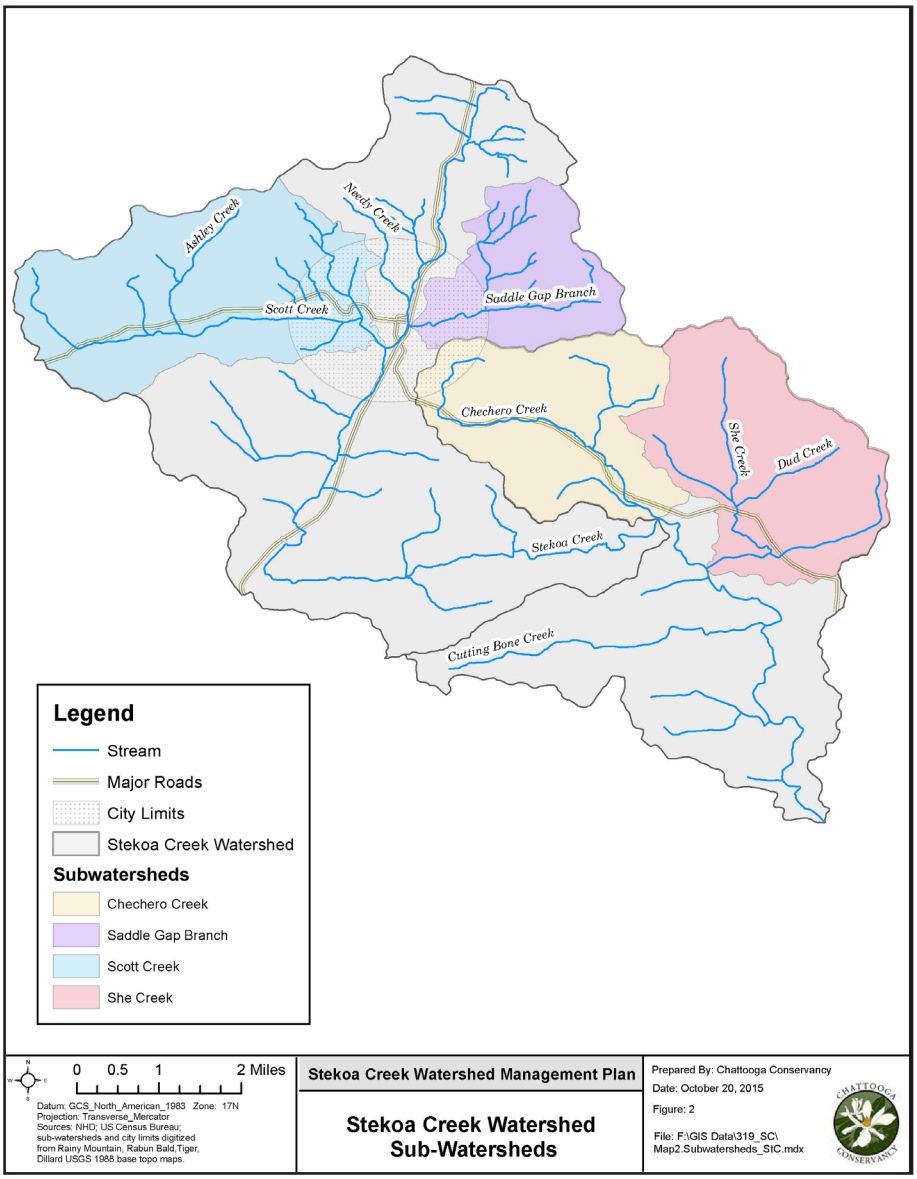
A watershed, also referred to as a drainage basin or catchment, is all of the land that channels water to the same creek, stream or river. The size of a watershed can range from a few square miles to thousands of square miles. Watershed boundaries generally follow ridges and geographic high points, but low topography can sometimes make boundaries less obvious.

The Stekoa Creek watershed is located entirely within Rabun County, and covers approximately 45 square miles encompassing 26,058 acres. Scott Creek, Saddle Gap Branch, Chechero Creek, She/Pool Creek, and Cutting Bone Creek are all primary tributaries to Stekoa Creek.

Stekoa Creek and its tributaries are classified as trout waters by the GA DNR. However, the severity of impairment in Stekoa Creek makes the stream completely dependent on the DNR's stocking program to maintain its trout populations.

Stekoa Creek originates close to the Eastern Continental Divide at about 2,240 feet above sea level, near Cox Lake in Mountain City, GA. From its source in Mountain City, Stekoa Creek flows for 18 miles primarily south, then east, before emptying into the National Wild & Scenic Chattooga River. About 84% of the Stekoa watershed is private land. The remaining 16% is public land, contained in the Chattahoochee National Forest, with its management under the jurisdiction of the Chattooga River Ranger District located in Lakemont, GA.

As Stekoa Creek passes through Mountain City and Clayton, and through additional unincorporated portions of Rabun County, it is in close contact with Highway 441, urban and residential developments, sewage system infrastructure, agricultural operations, and numerous other impacts from human activity. This proximity makes Stekoa Creek an important resource for the citizens of Rabun County—but has also contributed to serious and long-term water quality issues.



The Stekoa Creek watershed is 26,058 acres. Scott Creek, Saddle Gap Branch, Chechero Creek, She/Pool Creek and Cutting Bone Creek are primary tributaries to Stekoa Creek.

Additionally, the area's high annual rainfall, high volumes of runoff, and highly erosive soils may exacerbate factors that contribute significant sedimentation into Stekoa Creek and its tributaries.

Due to the cumulative negative impact of all of these factors, the ecological health and vitality of Stekoa Creek, and most of its feeder streams, is imperiled. Stekoa Creek's poor water quality also imperils the health of the Chattooga River. In fact, when the Chattooga River was protected under the Wild & Scenic Rivers Act in 1974, the section below the Stekoa/Chattooga confluence was only included under the provision that the City of Clayton and the State of Georgia would work to improve Stekoa Creek's water quality.

Stekoa Creek - Chattooga River Confluence
Stekoa Creek is known for carrying excessive levels of sediment and/or E. coli bacteria into the Chattoga River.

Water Quality Data

In collaboration with the GA DNR, City of Clayton, Clayton Wastewater Treatment Plant and North Georgia Technical College, the Chattooga Conservancy collected water samples throughout the Stekoa Creek watershed from September 2013 to September 2014, as part of completing the *Stekoa Creek Watershed Management Plan.* Water samples were collected, on average, every 2 weeks, and each was tested for *E. coli* and turbidity. Results of the sampling showed that many of the sites exceeded the Georgia State Water Quality standard for *E. coli* of 200 cfu/100 mL (geometric mean). The highest average for a single site was 975.2 cfu/100 mL, or 387.6% higher than the accepted standard, and several individual samples collected throughout the year were "too numerous to count," which is 2,419.6 cfu/ 100 mL.

All of the data collected during this time period can be viewed in the Appendices of the *Stekoa Creek Watershed Management Plan,* which can be viewed at: **www.chattoogariver.org**

Water Quality Issues

♦ *Point Soutce & Non-Point Source Pollution*

We talk about two types of pollution sources: *point source and non-point source.* A point source of pollution is a single, identifiable source, like a pipe or drain. Factory or sewage treatment plant discharges are examples of point sources. A non-point source is less direct, generally involving pollution that is spread over a wide area and difficult to trace to a single source. Pollutants from these sources are typically carried into water bodies as storm water runoff, or through the soil. Non-point sources of pollution are often associated with specific land uses, including agriculture, forestry, and urban or residential development.

♦ *Fecal Coliform and E. coli*

Fecal coliform are bacteria associated with fecal material of humans and other warm-blooded animals. *Escherichia coli*, or *E. coli*, is a type of fecal coliform that can cause intestinal illness. The presence of fecal coliform in aquatic environments indicates that the water has been contaminated by human or animal fecal matter, which may also carry other pathogens or viruses. Some examples of waterborne pathogenic diseases include gastroenteritis, hepatitis A, and typhoid fever.

♦ *Sediment*

Sediment is loose sand, silt, clay, and soil that enters a body of water through soil erosion or decomposition of plants and animals. It is listed by the EPA as the most common pollutant in rivers, streams, lakes and reservoirs.

Sediment can be produced naturally by erosion, but human land use activities greatly increase the rate at which it is produced. Numerous issues are associated with excessive sedimentation in water bodies, including:

- Murky water prevents aquatic animals from seeing food;
- Sediment can clog fish gills;
- Growth of natural vegetation in the water is decreased;
- Sediment covers stream beds, destroying microorganism habitat, which disrupts the food chain and harms fish populations, including fish reproduction; and,
- Other pollutants, such as fertilizers and oil, can be carried into the water on sediment particles.

Sources of Water Pollution

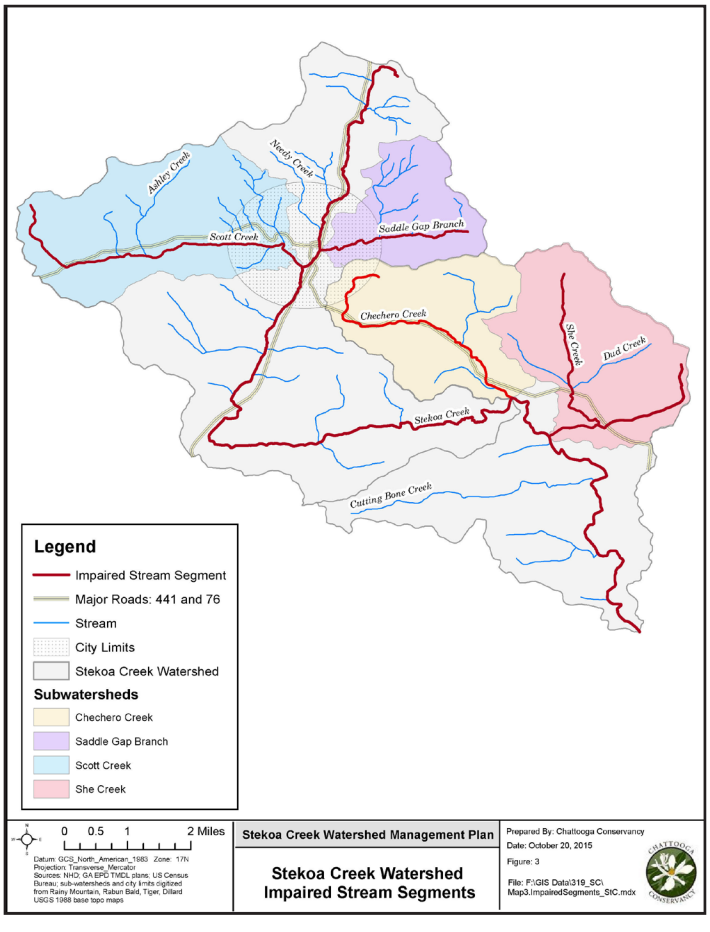
Floodplain Filling Floodplains, or the typically low-lying land directly adjacent to waterways, are extremely vital to the ecological health of a watershed. Floodplains are critical to the filtering out sediment and other contaminants before the pollutants reach waterways, as well as absorbing and "recharging" excess groundwater that occurs during heavy rain events.

Much of Stekoa Creek's floodplain lies along the State Highway 441 corridor, and has been graded and filled. Development of other areas in the floodplain has resulted in expansive, impervious surfaces directly next to streambanks; mounds of fill dirt and rocks next to the creek; concrete and/or rip-rap stream embankments in places; and, massive piles of fill dirt upon which sit commercial and residential developments. These filling activities have severely reduced the effectiveness of Stekoa Creek's floodplain, and have also contributed very large quantities of sediment into the main stem of Stekoa Creek, causing substantial negative ecological impacts in situ and downstream.

Sewage Collection Infrastructure & On-site Waste Disposal (Septic Systems) The City of Clayton's sewage collection infrastructure has persistently contributed to chronic water quality problems in the Stekoa watershed. Heavy rain events at times overwhelm the aging sewage collection infrastructure, and hinder the Clayton Wastewater Treatment Plant's ability to properly treat water before discharging it back into Stekoa Creek. Leaking sewage collection infrastructure, sometimes referenced as inflow and infiltration (I & I) problems, periodically lead to sewer overflows that result in bacterial pollution in waterways. Many homes in unincorporated Rabun County are also served by septic systems; however, there are no ordinances in place that require these septic systems be maintained on a regular basis. Failing septic systems have been identified as a contributor to degradation of water quality in the Stekoa Creek watershed.

Roads The Stekoa Creek watershed includes approximately 176 miles of roads. Impervious paved roads and parking lots, as well as gravel and dirt roads located within stream buffer zones, contribute large volumes of polluted storm water, and also cause chronic non-point sources of erosion and sedimentation during rain events.

Land Clearing & Development Timber harvesting and clearing land for development have the potential to produce heavy erosion and sedimentation into



Stekoa Creek and 4 of its major tributaries are impaired from excessive levels of fecal coliform and/or sediment.

waterways. Erosion and sedimentation laws are in place for these practices, but inadequate enforcement of these laws is an ongoing concern.

Agricultural Operations Lacking Best Management Practices Certain agricultural practices close to waterways contribute to degrading water quality. It is a common practice to allow livestock access to creeks and streams as a source of drinking water. This practice erodes stream banks and denudes riparian zones, and facilitates the discharge of sediment and fecal matter directly into streams.

What Can We Do to Improve Water Quality in the Stekoa Creek Watershed?

Community Action There are many ways that pollution may enter surface waters, some of which may be hard to control. However, a coordinated effort at the local level can effectively eliminate or reduce many pollution sources. Pollution sources identified and prioritized through observation and/or by routine water sampling can be addressed with targeted, site-specific best management practices (BMPs). The cooperation and involvement of both public entities and private property owners is necessary to design and install appropriate BMPs, and to monitor water quality over time.

Citizens worked together to clean up trash along a tributary to the Chattooga River. Coordinated efforts at the local level can eliminate or reduce many pollution sources.

The *Stekoa Creek Watershed Management Plan* provides a roadmap for how to restore and protect water quality in Stekoa Creek and other polluted streams in the Stekoa watershed. The plan features a comprehensive list of BMPs that can be implemented to remediate sources of pollution in the watershed. The S*tekoa Creek Watershed Management Plan* also includes potential funding sources, and state and federal grants, that can help implement BMPs for improving water quality. Watershed restoration and protection requires the focused cooperation of local governments, institutions, decision-makers, and citizens.

The full list of BMPs can be found in the *Stekoa Creek Watershed Management Plan*, which is available online at www.chattoogariver.org Several of these practices require large-scale efforts that are often challenging to implement due to cost. However, with completion of the *Stekoa Creek Watershed Management Plan*, water quality improvement projects in the watershed are now eligible to receive competitive state and federal funding.

Individual Action Citizens can engage in priority actions to help improve water quality, including:

Septic System Maintenance

If you own a septic system, make sure your system is in good working order. It is recommended that septic tanks are pumped out every 3-5 years. This will help prevent bigger and more expensive issues in the future.

Agricultural BMPs

Restore riparian buffer areas with vegetation, to help filter storm water that drains from fields. Install fencing and an alternative water source (in the form of wells, troughs with gravity feed from streams, improved stream crossings, etc.) to keep livestock out of waterways. This will cut down on erosion of the stream bank and an influx of sediment and fecal coliform into the stream, and will also prevent animals from consuming potentially contaminated water.

Land Management/Development

When clearing or developing land, install adequate silt fencing and ground cover to mitigate soil movement during rain events. Follow BMPs and city/county ordinances for permitting, and for storm water management. Avoid working with heavy machinery during or following rain.

Outdoor Recreation

Practice *Leave No Trace* principles. When recreating in undeveloped areas without toilet facilities, find a spot at least 200 feet from any waterway, dig a small hole, and bury your waste. Use existing trails and campsites, and pack out all garbage.

Citizen Action

- ✓ If you see heavy sedimentation coming from land disturbing activities, report it to the City of Clayton and/or Rabun County Marshal's office. Document with pictures if possible and allowed. Request a site visit and enforcment actions. Follow up on your complaint.
- ✓ Report any sewage leaks or any illegal polluting activities that you witness.
- ✓ Support local leaders who will prioritize enforcment of erosion and sedimentation laws and best management practices, and improvements to sewage collection and treatment infrastructure in the City of Clayton, and in greater Rabun County.

Acting now to restore and protect water quality in Stekoa Creek and its tributaries will help sustain the economic value of Rabun County's natural resources, and will aid in securing the well-being of the community for generations to come.

Conclusion

The Stekoa Creek watershed has a long history of water quality issues that continue to this day. Pollution in Stekoa Creek and its tributaries poses a public health risk in the community, harms aquatic species and their habitat, and has similar negative impacts downstream in the National Wild & Scenic Chattooga River.

Restoring these valuable streams is possible, and would benefit all who live and recreate in Rabun County and the surrounding area. Waters free of sediment and fecal coliform / *E. coli* bacteria would enable swimming, fishing, and enjoyable stream-side recreation. A healthy watershed means healthy aquatic ecosystems, which would bolster trout populations as well as and other aquatic organisms.

The strategies for restoring clean water in the Stekoa Creek watershed are straightforward. Implementation requires willing municipal partners, voluntary involvement from property owners, a local stakeholder group able to take ownership of this process, and sufficient project funding. With completion of the *Stekoa Creek Watershed Management Plan* (October 2015), water quality improvement projects in the Stekoa Creek watershed are now eligible to receive grants and competitive state and federal funding. Successful remediation of polluted waterways requires cooperation between citizens, visitors, local governments, businesses, and organizations. The collaboration of local partners will be critical for the likelihood of success in restoring clean water in Rabun County's impaired streams.

Acting now to restore and protect Stekoa Creek and its tributaries will help sustain the economic value of Rabun County's natural resources, and will aid in securing the well-being of the community for generations to come.