SOURCE WATER PROTECTION IN THE SOQUE RIVER WATERSHED

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Abstract. The Soque Source Water Project was initiated to assess the effectiveness of Georgia's current drinking water protection measures, focusing on the Upper Soque River watershed in northeast Georgia. Project goals include developing an assessment of sediment sources in the Soque watershed, evaluating the effectiveness of state regulations in protecting drinking water in Clarkesville, Georgia, educating Soque watershed residents concerning drinking water protection options, and designing a comprehensive watershed management plan.

INTRODUCTION

The Upper Chattahoochee Riverkeeper (Riverkeeper) has been awarded a grant by the Environmental Protection Agency to evaluate Georgia's current drinking water protection methods. The Soque River, a major tributary to the Chattahoochee north of Lake Lanier, has been targeted by Riverkeeper for water quality improvements, and was chosen as the focal point of this project. The Soque is the drinking water supply for the City of Clarkesville, Georgia, serving approximately 1600 customers. Existing regulations required by the state and adopted by Habersham County in 1992 designate the Soque as a "water supply watershed". As such, the Soque River watershed is afforded certain protections such as impervious surface setbacks. The purpose of this project is to provide a comprehensive evaluation of current drinking water supply protection measures as a baseline from which to propose specific improvements to the local community and to provide feedback to the Georgia Department of Natural Resources and Department of Community Affairs regarding the effectiveness of their Part V Environmental Planning Criteria. This paper provides an overview of the ongoing project.

PROJECT AREA BACKGROUND

The Soque River begins in the Tray Mountain Wilderness in the Chattahoochee-Oconee National Forest where it is classified as a primary trout stream and then flows on to the City of Clarkesville before joining the Chattahoochee River. Land use in the watershed includes poultry farming, agriculture, pastureland, and residential development. In Clarkesville, water is withdrawn for drinking, and treated wastewater is discharged back into the river. Despite the largely rural nature of the watershed, even the Soque is not immune to drinking water problems. The Soque currently faces excess sediment problems. A 1997 EPA study showed that the Soque delivered to the Chattahoochee the highest sediment load of any tributary between the Chattahoochee's headwaters and Highway 384 (above Lake Lanier) (U.S. EPA 1997). This sedimentation may be an effect of current or historic land uses practices. The economic impacts of excess sediment can be severe. Sediment can cause drinking water treatment problems such as clogged filters, resulting in higher treatment costs. Although the City of Clarkesville does not currently report treatment problems due to sediment, projected future growth rates in the area are cause for concern.

PROJECT OBJECTIVES

Project Goal 1: Watershed Assessment

The Soque Source Water Project has several project goals to evaluate current drinking water protection measures for the Soque River. The first goal is to develop a detailed assessment of the sediment sources in the Upper Soque River watershed. In conjunction with Gainesville College, Riverkeeper is using a digital GIS database to create maps identifying the areas contributing the most sediment to the Soque. The database is based on color infrared photographs and was developed by the Tennessee Valley Authority as part of the 1996 Lake Lanier Clean Lakes Study. Land use and land cover, livestock and poultry operations, road conditions, and septic conditions are detailed in the database. These features will be combined with rainfall amounts and runoff values, pollution and soil loss coefficients to provide a comprehensive model of nonpoint source pollution, focusing on sediment, by land use for the watershed.

Project Goal 2: Evaluation of State Drinking Water Protection Criteria

Georgia's water supply watershed designation (Part V criteria) requires local governments to adopt an ordinance with certain restrictions for land use based on the distance from the intake (either less than or greater than seven miles). Perennial streams within seven miles of intakes are required to have a natural stream buffer of 100-feet and an impervious surface and septic tank setback of 150-feet. Additionally, Best Management Practices (BMPs) are mandatory for agriculture and forestry operations. Beyond seven miles from the intake, these requirements are lessened (Department of Community Affairs 1989). Riverkeeper will use two means to meet the second project goal of evaluating the effectiveness of Part V criteria in protecting Clarkesville's drinking water supply. First, Riverkeeper will catalog all new developments and farm and forestry operations that have occurred since Habersham County adopted the Part V criteria in 1992 to determine if they are in compliance with regulations. Riverkeeper will also review local records to examine how many variances have been granted and violations of the regulations. This "on-the-ground" assessment will be used to determine the consistency of enforcement of the water supply watershed regulations. Second, Riverkeeper has begun water quality sampling in the Upper Soque River watershed to document differences in sediment yields between subwatersheds to determine if Part V criteria are effective.

Sampling Methods. Twelve streams, selected with the use of GIS, are being sampled for a ten-month period (August 2000-May 2001). The sites are located throughout the Upper Soque River watershed and represent both the main-stem and tributaries of the river. Base-flow samples are being taken once a month from each site. Suspended sediment tends to be more concentrated near the riverbed and decreases toward the water surface (Meade, Yuzyk, and Day 1990). Therefore, Riverkeeper is using a depth integrated sediment sampler (DH-48) and following standard sampling procedures as described in Edwards and Glysson 1988. Additionally, floods occurring between January and April 2001 will be sampled using automatic rising-stage samplers designed by the U.S. Geological Survey and modified by Dr. Todd Rasmussen of the University of Georgia (Groszman 1997).

Water samples are being analyzed for both turbidity (insitu, measured as NTU), which is a measure of the clarity of the water, and total suspended solids (TSS), which measures the portion of mineral and organic particles that remain in suspension in the water column until water velocity decreases, when it is then deposited on the stream bottom (Barnes, Meyer, and Freeman, 1996, Kundell and Rasmussen 1995). Both turbidity and TSS measurements are indications of how much sediment is present in a stream. Data will also be used to determine a TSS:NTU relationship for the Soque River.

TSS is a strongly correlated with discharge (Holmbeck-Pelham and Rasmussen 1997) and therefore, discharge is being measured at each sampling location using the velocity-area method (Wahl, Thomas and Hirsch 1995). Using this method, the width of each stream is divided into increments containing no more than 10% of total discharge, and at each increment stream depth and current velocity is measured. A Marsh McBirney current meter is used to measure velocity. Discharge for the stream is equal to the total of each incremental discharge (Wahl, Thomas and Hirsch 1995). To account for changes or lack of changes due to the natural erosion of the stream banks, discharge is measured every time a site is sampled.

Project Goal 3: Education of Watershed Residents Concerning Drinking Water Protection

Riverkeeper is working with the Soque River Watershed Association (SRWA), a local community group based in Clarkesville, to complete the third project goal of developing protection strategy outreach materials for watershed residents. An "awareness survey" is being distributed to approximately 1800 watershed residents to determine local knowledge of the water supply watershed regulations. Survey results will identify knowledge gaps, and this information will be used to design two workshops to educate watershed residents concerning source water protection options.

Project Goal 4: Development of a Comprehensive Watershed Management Plan

As the fourth project goal, Riverkeeper will work with the Georgia Mountains Regional Development Center, using data and results from the first three project goals, to develop a comprehensive watershed protection plan to serve as a model regulation, for both the City of Clarkesville and other rural water supply watersheds in northeast Georgia. Results from the sediment evaluation will be used to write a plan that will address specific controls needed to protect

Clarkesville's drinking water supply as well as enforcement mechanisms necessary to ensure uniform adoption of any new criteria. This strategy will be presented in several formats including modifications to current Part V criteria as well as an entirely new set of regulations.

CONCLUSIONS

Sprawling development, increased water demands, and high population growth rate projections all threaten the quality of drinking water in Georgia. Riverkeeper believes that safe drinking water must be linked with source water protection and that it is much less costly to protect the sources of our drinking water than it is to treat polluted water. The Soque Source Water Project will undoubtedly shed some light on strategies for source water protection in a rural watershed as well as provide a needed evaluation of the effectiveness of current regulations.

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