Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Georgia

Fecal Coliform Levels Decline after Photographs and Stream Walks Help Pinpoint Failing Septic Systems

Waterbodies Improved

Bacteria from failing septic tanks and runoff from animal agriculture and urban areas caused Georgia's Jacks, Hopkins and Cedar creeks to exceed water quality standards for fecal coliform bacteria. As a result, Georgia's Department of Natural Resources (DNR) added three 4-mile-long segments—one each on the three creeks—to Georgia's Clean Water Act (CWA) 2002 section 303(d) list of impaired waters. Using CWA section 319 funds, the Gwinnett County Department of Public Utilities (Gwinnett County) conducted a color infrared (CIR) aerial photography survey of the county. This CIR survey identified actively failing septic systems, which were referred to the Gwinnett County Environmental Health Department for enforcement action. As a result of those efforts, all three 4-mile-long segments showed decreased levels of fecal coliform bacteria, prompting Georgia DNR to remove them from the state's list of impaired waters for fecal coliform in 2008.

Problem

The three impaired creeks flow through Gwinnett County in north-central Georgia. Jacks Creek is a tributary of the Yellow River, while both Hopkins and Cedar creeks flow into the Alcovy River, just east of the Yellow River (Figure 1). All three creeks are in the Southern Outer Piedmont Ecoregion, which has lower elevations and less precipitation than other ecoregions to the north.

Monitoring data collected in 1999 show that Jacks, Hopkins and Cedar creeks violated water quality standards for fecal coliform in two of four geometric mean sampling sets. The standard requires that fecal coliform levels not exceed a geometric mean (four samples collected over a 30-day period) of 200 colony forming units (cfu) per 100 milliliters (mL) in the summer and 1,000 cfu/100 mL in the winter. Because the three creeks failed to meet criteria supporting their fishing designated uses (Georgia's most stringent classification), Georgia DNR added the three 4-mile-long creek segments to Georgia's 2002 CWA section 303(d) list of impaired waters for high fecal coliform levels. Georgia DNR identified the primary sources of fecal coliform as failing septic systems and animal waste from agricultural and urban runoff.

Georgia DNR conducted a total maximum daily load (TMDL) study for pathogen loads in the Ocmulgee River watershed; the U.S. Environmental Protection Agency approved the TMDL in 2002. The TMDL determined that the pathogen loads must be reduced into Jacks Creek (by 15 percent), Hopkins Creek (by 53 percent) and Cedar Creek (by 52 percent) to meet water quality requirements for fishing.

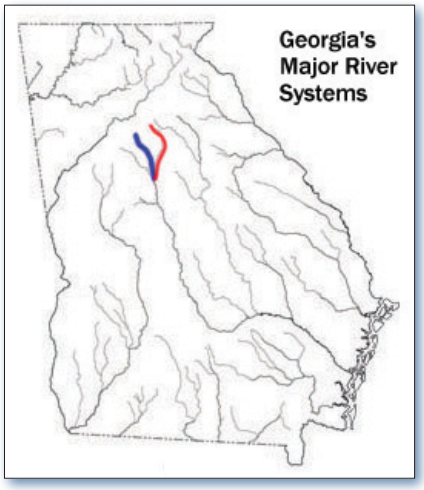

Figure 1. Jacks Creek flows into the Yellow River (noted in blue), and Hopkins and Cedar creeks flow into Alcovy River (noted in red).

Project Highlights

To accomplish the necessary reductions, Gwinnett County implemented a countywide CIR septic survey and developed a watershed improvement plan (WIP) for the Yellow River watershed. As a headwater tributary of the Yellow River, Jacks Creek

was included in the WIP. One of the elements of the WIP was to determine stream conditions and characteristics through field stream survey inventories. During the stream survey for Jacks Creek, Gwinnet County identified nine water quality concerns, including one illicit discharge, one failing septic system, five incidents of livestock in the stream and two kennels with uncontrolled runoff. As a supplement to this project, Gwinnett County addressed the sources by referring them to the appropriate regulatory agency or internal department.

The county's CIR septic survey used aerial photography to identify actively failing septic systems. The photographic analysis process involves visually examining and comparing many components of individual photographs, including shadow, tone, color, texture, shape, size, pattern and landscape. The photographic analyst identified signatures associated with specific environmental conditions or events. After an analyst identified possible failure sites through CIR, county staff members completed ground verification inspections to identify areas of surfacing effluent from failing septic systems (Figure 2). That effort helped to identify 18 failing septic systems in the Jacks Creek watershed and a combined 19 failing systems in the Hopkins Creek and Cedar Creek watersheds. The county's Environmental Health Department worked with homeowners to repair the failing systems and educated them about maintenance to prevent future failures. Those activities occurred between 2003 and 2007.

Figure 2. Two photographs of the same site in the Jacks Creek watershed indicate a failing septic system. The standard photo (top) shows an isolated area of thick green grass. The red area seen in the infrared photo (bottom), shows that the isolated grassy area is also warmer than the area surrounding it.

Results

Georgia DNR collected monitoring data on Jacks, Hopkins and Cedar creeks in 2006, as part of a larger effort to update the Ocmulgee River fecal coliform TMDL. The data show that all segments of Jacks, Hopkins and Cedar creeks now meet water quality standards for bacteria (Table 1). On the basis of the data, Georgia DNR removed all three segments of Jacks, Hopkins and Cedar creeks from the state's list of impaired waters in 2008.

Table 1. Data from 2006 show that Jacks, Hopkins and Cedar creeks meet water quality standards for fecal coliform bacteria (< 1,000 cfu/100 mL in winter and < 200 cfu/100 mL in summer)

Waterbody	Geometric mean (cfu/100 mL)	
	January 2006	July 2006
Jacks Creek	116	198
Hopkins Creek	32	123
Cedar Creek	57	106

Partners and Funding

Partners implemented projects with support from CWA section 319 funding, including $114,866 in the Jacks Creek watershed, $1,558 in the Hopkins Creek watershed and $1,964 in the Cedar Creek watershed. Gwinnett County provided the remaining 40 percent of project costs for a total of $191,444 in Jacks Creek, $2,597 in Hopkins Creek and $3,273 in Cedar Creek. Key partners in this effort were the Gwinnett County Department of Public Utilities and Gwinnett County Department of Environmental Health. The partners provided technical expertise, labor and enforcement of regulations when necessary.

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For additional information contact:

Jeff Linzer, II
Georgia Environmental Protection Division
404-675-1643 • Jeffrey_Linzer@dnr.state.ga.us

Laurie J. Hawks
Gwinnett County
678-376-6939 • laurie.hawks@gwinnettcounty.com