



NPDES Phase I Permit and storm water pollution issues. Gwinnett County received a Phase I NPDES Municipal Separate Storm Sewer System (MS4) Discharge Permit in April 1994. In 1995, Gwinnett's management realized that a more coordinated approach was needed and all four storm water responsibilities, (plan review, engineering, maintenance and water quality protection) should be in one section. The staff and budgets were consolidated in the DOT because the DOT had the most employees working on storm water issues. It soon became evident, however, that the importance of water quality protection was becoming a dominant driving force in storm water and the group was moved to DPU in 1999. This was done because many of the water and sewer environmental issues are tied to storm water and non-point pollution issues. Three years later the group was elevated to a Division status in DPU.

#### UNION OF THE STORM WATER MANAGEMENT PROGRAM AND THE WPP

In 1998, the storm water functions in the DOT and DPU were still separate and it was not yet recognized that the missions of the two departments supported and reinforced one another. The two departments independently started projects that greatly affected storm water management. The DOT was working on a Storm Water Design Manual. A design manual was a requirement of Gwinnett's NPDES Phase I storm water discharge permit to require Best Management Practices (BMPs) that address water quality impacts from new development. It was also felt that the existing regulations were not adequately addressing water quantity issues to protect the public and the environment from the adverse impacts of new development. These requirements were being reviewed and updated as well with the new water quality BMP provisions. During the same time, DPU started a Watershed Assessment to determine the health of the streams and develop a WPP. This study was a requirement of the Georgia Environmental Protection Division in order to increase capacity of a wastewater reclamation plant, the F. Wayne Hill Water Reclamation Center. The goal of the WPP was to mitigate the impact of existing and future development that would utilize the capacity of the plant expansion. The supporting nature of these two projects was recognized and it was determined to incorporate the results of the WPP in the design manual and the SWMP.

The WPP has played a significant role in providing direction for the SWMP. The SWMP as developed by the DOT had a planning component to deal with quantity and quality issues in a design manual. When DPU added the Watershed Assessment and the WPP, the SWMP definition of planning grew to include stream habitat and biology. This provided significant help in defining the water quality goals of the Design Manual. The WPP clarified the impact of development in existing developed areas and helped define the need for individual basin plans to address this impact (CH2M Hill, 2000). It also provided the documentation needed to tie water quality degradation to development, which supported the idea of post-construction water quality BMPs. The WPP developed a total suspended solids loading rate goal for individual watershed basins and for each new development which was added to the Design Manual and the development regulations (Jones, 2001). Gwinnett County completed our watershed assessment in March of 2000 and adopted a WPP in May of 2000. In the last three years, we have incorporated the implementation of the WPP in our SWMP.

#### STORM WATER MANAGEMENT PROGRAM

Gwinnett's SWMP has eight elements - Public Education, Public Participation, Water Quality Protection, Construction Site Pollution Control, Post-construction Storm Water Management, Operation and Maintenance, Planning, and Monitoring. The activities of the program have been grouped into the six minimum control measures of the Phase II NPDES permit that many may be familiar with, and two additional elements of planning and monitoring. The SWMP has grown by developing new activities in Public Utilities and by recognizing the efforts of other divisions, departments and agencies working in Gwinnett. We are doing water bill inserts and have improved our web site for the Public Education element. We also started working with Adopt-A-Stream that already has a successful program in Public Utilities. For the Public Participation element, we created public advisory committees and worked with Planning and Development, which has several public committees such as the Growth Issues Steering Committee and Livable Centers Initiative. We also collaborated with the Community Services Department that had a committee working on the Open Space and Greenways Master Plan. The Storm Water Management Division was able to participate in these committees to discuss storm water issues. In the Water

Quality Protection element, an inventory program and an industry inspection program has been initiated. The Construction Site Pollution Control element includes erosion control plan review and development site inspections. To address the Post-Construction Storm Water Management element, our development regulations now include water quality regulations (Chastant, 2001) and we have a strong BMP inspection program. The regulations were developed as a part of the Design Manual and WPP. For the Operation and Maintenance element, staff performs system inspections, engineering design, maintenance and construction to insure our drainage systems operates properly. The first major effort in the Planning element was the Watershed Assessment and WPP. The WPP is being followed up with individual basin plans. The Monitoring element samples water quality throughout the year at 12 long-term trend monitoring stations located at the perimeter of the County and at randomly selected storm water outfalls.

#### IMPLEMENTING THE WATERSHED PROTECTION PLAN IN EXISTING AREAS

The WPP, which was developed as part of the Watershed Assessment, identified the need to address new development and existing development. We revised our development regulations to address impacts of new development in accordance with the WPP. We are addressing impacts of existing development through implementation of five major action plans. The action plans fit into the Planning, Water Quality Protection, and Operation and Maintenance elements of the SWMP. Three action plans being implemented countywide on a basin by basin process are master planning, system inventory, and flood studies. We combined these three action plans into one basin contract in the first watershed, but split them up in subsequent basins. We found that the work was too diverse for one consultant and we had more flexibility in selecting the consultants for the individual tasks by breaking the work into three contracts. The other action plans are Natural Resources Conservation Service (NRCS) watershed dam upgrades and a constructed wetlands demonstration project.

The Basin Master Planning action plan consists of developing a Capital Improvement Program (CIP) for stream restoration and retrofitting or constructing new storm water facilities. The WPP identifies increased flows and decreased time of concentration as changes in the stream hydrology and hydraulics. These changes caused stream scour and sedimentation that degraded

the aquatic habitat. The plan also identified adverse impacts to stream water quality from pollutants washed into the streams. Basin master planning is underway in five of Gwinnett's 19 watersheds. The main elements of the master plan are 1) performing stream walks to identify problems with habitat and erosion, 2) identifying existing BMP retrofits and new BMPs to improve habitat and water quality, and 3) developing a CIP with water quality enhancement projects prioritized based on having the best benefit/cost ratio and being most likely to succeed. (King, 2002) (Hawks, 2003).

Gwinnett is using consultants and internal staff to inventory our storm drainage system. Inventory is underway in seven of Gwinnett's 19 watersheds. The inventory process includes 1) locating the system structures using a Global Positioning System, 2) determining size, condition, age, and several other attributes, 3) delivering a connected map that will download into our Graphic Information System, and 4) identifying maintenance projects and a CIP with projects that replace damaged or undersized pipes based on field observations. Consultants are hired to inventory pipes 24" and larger and pipes on major roads. Internal staff inventory the remaining smaller system and new system additions. The inventory is used to 1) develop the storm water system value to respond to the recent federal accounting regulation, General Accounting System Board rule 34, 2) identify BMPs for use in the basin master planning, 3) help in response to pollution service requests, and 4) ultimately to help us be proactive in maintenance instead of reactive.

The third action plan is to determine the 100-year floodplain. Gwinnett's floodplain maps are being updated to protect the citizens and provide the best guidance we can to development. New studies were needed because 1) most streams were studied in 1984 before the rapid development started, 2) individual studies by developers often do not match adjacent studies, 3) rapid development is still occurring, and 4) our regulations were revised to regulate the future floodplain. Our development regulations were revised in April of 1999 to require that development protect the floodplain based on the 100-year flow calculated using the land use plan projected for the year 2020. This regulation recognizes the inability of on-site detention to maintain the existing 100-year flood plain. Flood studies for six basins have been sent to the Federal Emergency Management Agency for review.

Gwinnett's 14 NRCS dams lost their exemption from the Georgia Safe Dams Act in 2000. The upgrade of these dams to meet Category I standards is the fourth

action plan. Seven of the dams have been identified as Category I dams meaning that there is a probable lost of life if the dam were to fail. Since the dams were originally designed, 1) the size of the design storm has doubled from 15 inches to 30 inches, 2) flow into the reservoir has increased due to significant development in the upstream basin and 3) development has occurred downstream in the breach zone of the dams. Five of the 7 Category I dams are currently under design. Three are being designed by consultants under contract to the county and two are being designed by the NRCS. Two of the 7 Category I dams already meet Safe Dam standards. Three of the remaining 7 dams are under preliminary study to determine their safety category and the other four are to be studied soon. Construction of one of the dam improvements will begin this winter with the assistance from a federal grant.

The fifth action plan is using an EPA grant to build a constructed wetlands demonstration project in the Big Haynes Creek watershed as a water quality BMP. The Big Haynes Creek watershed is a small water supply watershed and falls under special Environmental Planning Criteria of the Georgia Department of Natural Resources (Camp Dresser & McGee, 1995). The basin area draining to the Rockdale Water Supply Reservoir is less than 100 square miles. Gwinnett was able to obtain Federal funding to try innovative ideas to protect and improve the water quality of the stream because 1) it is a small water supply reservoir, 2) development is beginning to swiftly change the rural nature of the basin, and 3) the creek is on the 303d list for not supporting its designated use because of fecal coliform. Golder and Associates was hired as the prime consultant to identify, prioritize, select, design, and supervise the construction of wetlands. These wetlands will be off-stream and return treated stream water to the creek. Currently we are proceeding with the purchase of two sites. Monitoring the constructed wetlands for four years to determine their efficiency is part of the grant.

## SUMMARY

As local governments implement their NPDES programs, they should approach the implementation as a unified storm water management program, not independent program elements administered by different government units. Consolidating staff and programs that deal with storm water management has worked well in Gwinnett. Second, local governments should determine which agencies have elements of their programs that affect and support the storm water

mission in the jurisdiction and form alliances with them. Different agencies have non-storm water management reasons to perform tasks that also help keep storm water clean such as street sweeping, hazard response, public-planning efforts, septic tank inspections, and litter control. Third, a watershed assessment and protection plan can be the basis for consolidating storm water functions from different departments and implementing a unified approach to storm water management. With Gwinnett's management reorganizations and five action plans, Gwinnett continues to implement the WPP to protect and improve stream water quality in the county.

## SELECTED REFERENCES

- Camp Dresser & McGee. January, 1995. *Big Haynes Creek Watershed Management Plan Study*. Prepared for Big Haynes Project Team
- Chastant, David. October, 2001. Storm Water Regulations Grow with Environmental Concerns in Gwinnett County, Georgia. *Proceedings of the 2001 WEFTEC Annual Conference*. Atlanta, Georgia.
- CH2M Hill, JJ&G, Inc., Tetra Tech, Inc, and R&D Environmental, Inc. March 2000. *Gwinnett County Watershed Protection Plan*. Prepared for Gwinnett County, Georgia.
- Hawks, L., C. Goodwin, D. Jones, A. Lewallen, P. Wright, and D. Chastant. April, 2003. Development of A Storm Water Master Plan for the Upper Yellow River and Sweetwater Creek Watersheds in Gwinnett County, Georgia. *Proceedings of the 2003 Georgia Water Resources Conference at the University of Georgia*. Kathryn J. Hatcher, Editor, Institute of Ecology, the University of Georgia, Athens, Georgia.
- Jones, Dale, James Scarbrough, David Chastant, Ken Hall, and Farhan Shaikh. March, 2001. Creative Watershed Performance Requirements for New Development. *Proceedings of the 2001 Georgia Water Resources Conference at the University of Georgia*. Kathryn J. Hatcher, Editor, Institute of Ecology, The University of Georgia, Athens Georgia.
- King, Stephen, Phil Sacco, Paige Baker, Pete Wright, and David Chastant. February, 2002. Implementing Watershed Management Recommendations Through Stormwater Master Planning In Gwinnett County, Georgia. *Proceedings of the 2002 WEF Watershed Conference*.