APPENDIX H

SUMMARY OF MONITORING FOR THE ALCOVY RIVER WATERSHED ASSESSMENT

The 1999-2000 data collection period for the Alcovy Watershed Assessment coincided with extreme drought conditions in North Georgia. Daily precipitation amounts for stormflow sampling events ranged from 0.1 to 1.15 inches. Stream levels were extremely low during the summer of 2000. In fact, stormflow levels for the final stormflow sampling in July were lower than normal baseflow levels. Thus, more data collected over normal and high flow periods is necessary to adequately represent the range in watershed response to variable climatic conditions.

Streamflow Monitoring

Flow monitoring was conducted to provide site-specific hydrologic data for model calibration. Stream velocity and channel measurements were made during baseflow and stormflow conditions. Storm flow events were defined as any rainfall event > 0.10 inches in a two-hour period or > 0.25 inches in a twelve-hour period that caused the stream to rise at least three tenths of a foot, as indicated on staff gages erected for this purpose. In addition, the sampling plan required that total rainfall in the 72-hours prior to a storm not exceed a total of 0.10 inches. Manual flow monitoring was conducted at each site; therefore, only instantaneous stage and velocity were obtained for each site for a given site visit. (Utilization of automated flow monitoring equipment was tested in the field but was not feasible on main stem sites due to problems with maintenance and sediment clogging. Automated samplers may be manageable for tributary streams.) A channel cross-section location was also established and marked with surveying stakes at each monitoring station to serve as the permanent location for flow monitoring and channel cross-sectional measurements.

Water Quality Monitoring

Chemical water quality sampling was conducted 1) to provide multiple "snapshots" of water quality across the watershed and 2) to provide site-specific data for model calibration. Monitoring occurred in the Alcovy over a 10-month period from October 1999 to July 2000. Fifteen sites were identified for water quality and hydrologic monitoring (Table H-1). Flow data and water quality samples were collected during both 8 baseflow and 4 stormflow events to capture stream response and identify the variable concentrations of water quality constituents. Samples were analyzed for a suite of standard analytes to determine various nutrient, sediment and bacterial concentrations. A subset of sites was

selected for non-standard analytes, which included dissolved metals and priority pollutants. Another subset of sites was selected for biological monitoring, which included habitat assessments and macroinvertebrate and fish sampling. A reference vs. study site approach was necessary for biological assessments, and therefore two additional sites were selected outside of the watershed for this purpose.

Five grab samples were collected per site during storm events. A first flush grab sample was collected when the stream had risen approximately two-inches above base flow levels. Four additional grab samples were collected during the storm, one on the rising limb, one at the peak, and two on the falling limb of the hydrograph. Often, best judgment was used to determine exactly when each sample was taken. Not all 15 monitoring sites received full-hydrograph sampling. Sites AR-1, AR-2, AR-3, AR-4, AR-10, AR-11 and AR-13 drain small watersheds, and thus rise and fall very quickly following a rain event. It was not feasible for sample crews to arrive in time to catch these smaller sites across their full hydrograph. Furthermore, rainfall was typically not uniform across the watershed. Therefore, tributaries in some parts of the watershed may have not received sufficient rainfall in their drainage area to warrant sample collection. It is strongly recommended that stormflow data be collected from these sites as part of the long term monitoring plan for the Alcovy.

Table H-1. Monitoring Station Locations – Alcovy Watershed Protection Project

Station Designation and Stream Location	Drainage Area (mi^2)	Land Use and Rationale for Selection	Stage/Flow Monitoring	Standard Chemical Monitoring	Non-Standard Chemical Monitoring	Habitat/ Benthic Macro	Fish IBI
AR-1: Rocky Creek at Rocky Creek Road	2.5	Land use consists primarily of forest and pasture land; limited sites in Jasper County	√	√			
AR-2: Alcovy River at Newton Factory Mill Road	257	Estimate pollutant load from entire Alcovy River system to Lake Jackson; not meeting designated use criteria (fecal coliform); Longitudinal trend analysis of Alcovy River	Stage Only	√		√	
AR-3: East Bear Creek at Poplar Hill Road	7	Land use consists primarily of forest and agricultural lands, some residential development; City of Mansfield in headwaters	√	√	√		
AR-4: West Bear Creek at Highway 213	8	Development along I-20 corridor in the headwaters; Land use consists primarily of forest and agricultural lands	√	√		√	√
AR-5: Alcovy River at Highway 278	226	USGS gauging station; longitudinal trend analysis of Alcovy River	Stage Only	√			
AR-6: Alcovy River at County Line Road	141	Upstream of water supply intake; longitudinal trend analysis of Alcovy River	√	√			
AR-7: Cornish Creek at Lower Jersey Road	10	Estimate pollutant load into Lake Varner; upstream of water supply intake	√	√	√	√	√
AR-8: Big Flat Creek at Monroe-Jersey Road	30	Upstream of water supply intake; Longitudinal trend analysis of Big Flat Creek	√	√			
AR-9: Alcovy River at Monroe Jersey Road	110	Upstream of water supply intake; Longitudinal trend analysis of Alcovy River	√	√	√		
AR-10: Mountain Creek at McDaniel Street	5	Directly downstream of the City of Monroe	√	√		√	√
AR-11: Beaverdam Creek at Stock Gap Road	4	Upstream of Briscoe Reservoir	√	√	√	√	√

Table 13.1. Monitoring Station Locations – Alcovy Watershed Protection Project							
AR-12: Alcovy River at New Hope Church Road	83	Upstream of water supply intake; longitudinal trend analysis of Alcovy River	√	√			
Station Designation and Stream Location	Drainage Area (mi^2)	Land Use and Rationale for Selection	Stage/Flow Monitoring	Standard Chemical Monitoring	Non-Standard Chemical Monitoring	Habitat/ Benthic Macro	Fish IBI
AR-13: Big Flat Creek at Old Zion Cemetery Road	4	Stream is partially supporting designated use criteria (DO, Tox.); City of Loganville WPCP discharge located upstream; Primarily urban land use; Longitudinal trend analysis of Big Flat Creek	√	√	√	√	√
AR-14: Alcovy River at Highway 81	59	Visible sediment load in stream; Longitudinal trend analysis of Alcovy River	√	√	√	√	√
AR-15: Alcovy River at New Hope Road	31	Gwinnett County monitoring station; Provides correlation between Gwinnett County model and Alcovy model	√	√			

Use of Existing Data

Existing data was also utilized for watershed characterization and model calibration. Sources of data included:

- Precipitation Data,
- Temperature Data,
- USGS Gaging Station Water Quality and Flow Data,
- Water Treatment Plant Data,
- Loganville Water Reclamation Facility (WRF) Data, and
- Data from past water quality studies and investigations.

Climatic and hydrologic data were needed both as inputs to the model and also for calibration targets. The BASINS/HSPF model required climatic data including hourly precipitation, evapotranspiration and temperature. Hourly precipitation data were collected from a National Climatic Data Center (NCDC) monitoring station in Monroe, Georgia, as well as from five stations established by Brown and Caldwell and another station in Watkinsville, Georgia. Precipitation data from the Monroe station were used in the model, with missing values being replaced with hourly data from a nearby station. Daily maximum and minimum temperature data were obtained from a weather station located in Monticello, Georgia. Temperature data were converted to hourly values using the computer program WDMUtil. Hourly open pan evaporation was measured at a station in Watkinsville, Georgia; however, due to some problems with the device, evapotranspiration (soil evaporation and plant evaporation) was calculated using the Priestly-Taylor equation. The values for pan evaporation and calculated evapotranspiration were similar.

Hydrologic data needed for the modeling included upstream flows from Gwinnett County as well as in-stream flow measurements. Flow from Gwinnett was obtained by running the CH_2M Hill BASINS model using climatic data from Monroe for 1995-2000. Other continuous daily flow data were obtained from two USGS gauges located on the Alcovy River (stations 02208450 and 02208150).

Point source discharge and withdrawal data were also needed for the model. The location of the Loganville Water Reclamation Facility (WRF), as well as the location of each of the four water withdrawals were identified and entered into the model. Measured flows as well as water quality data were obtained and used in the model to simulate the impact of loads from

the Loganville WRF. Additionally, daily water withdrawal records from the Cornish Creek Water Treatment Facility (WTF), the Monroe Water Works intake, the Social Circle Water Works intake and the Williams Street WTF intake were obtained to accurately characterize water losses from the Alcovy River system. Estimates of future water withdrawals and discharges were also input to the model for future scenario modeling.

Finally, existing water quality data was obtained from several USGS gauging stations, the various water treatment and reclamation facilities, as well as from past EPD water quality investigations.

Further details of monitoring methods and results are given in the Alcovy River Watershed Assessment, Chapter 6: Water Quality Monitoring and Sub-basin Analysis. Details of model inputs are given in Chapter 7: Watershed Modeling, of the same report.