

Watershed Protection & Water Quality Monitoring Workplan

*Prepared
for*

Rockdale County, Georgia

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APPENDICES

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Appendix B	Water Quality Monitoring Map
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1. INTRODUCTION

Rockdale County (County) has operated an on-going long-term water quality monitoring program that was intended to evaluate water quality trends and determine the effectiveness of the County's Watershed Management Plan. This monitoring program was designed to meet requirements associated with the County's Water Withdrawal Permits and NPDES Wastewater Discharge Permits (outlined in the table below.)

Table 1. NPDES Wastewater Discharge Permitted Facilities in Rockdale County

Facility	Permitted Flow (MGD)
Quigg Branch WRF	6.0
Almand Branch WWTP	1.25
Scott Creek WPCP	0.22
Honey Creek WPCP	0.30
Snapping Shoals WPCP	0.45

The existing monitoring program (including monitoring locations and activities) were originally established in the Watershed Monitoring Plan for Rockdale County (Monitoring Plan) prepared by Tetra Tech, Inc. (July, 2002). The County's Monitoring Plan was developed based on the findings of the Watershed Characterization and Impact Assessment Report for Rockdale County performed by Tetra Tech (2001).

In addition to the monitoring requirements associated with the County's existing permits, the County is now required to meet monitoring requirements established by the Metropolitan North Water Planning District (District). The overall goal of the District-wide Watershed Management Plan is to meet and maintain water quality standards and designated uses of streams and other waterbodies within the District. Monitoring of local streams for long-term ambient trends provides a means of demonstrating progress toward water quality goals as the District's Watershed Management Plan is implemented. These data will also be used to help refine future management strategies to address watershed management and water quality protection within the District.

In anticipation of the new requirement, the County has elected to amend the current long-term monitoring program, to meet requirements of the District Watershed Management Plan as well as the NPDES Wastewater Discharge Permits and Water Withdrawal Permits. The County contracted with Integrated Science & Engineering, Inc. (ISE) to review the existing monitoring plan and make recommendations that would be acceptable to EPD, meet all applicable regulatory requirements, and ensure cost effective implementation for Rockdale County. County staff, ISE and EPD met on February 27, 2007 to review the recommended modifications, and finalize the future long-term water quality monitoring program. In addition, the EPD verbally agreed to allow the County to suspend the ongoing monitoring work for a period of six months. Documentation of this is provided in a letter from Rockdale County to EPD included in **Appendix A**.

This document contains a description of Rockdale County’s Long-Term Water Quality Monitoring Program. This program will be implemented in compliance with EPD requirements and all applicable regulatory programs beginning in August 2007.

2. STREAM IMPAIRMENTS & POLLUTION SOURCES

The stream impairments, wastewater facilities, and drinking water intake identified below are shown on the map in **Appendix B**.

2.1 303(d) Listed/Impaired Waterways

The Draft Georgia 2006 305(b)/303(d) list of impaired waterways identifies 10 stream segments within Rockdale County as not fully supporting (partially or not-supporting) their designated uses. Impairments are due to fecal coliform, pH, and biota impacts attributable to urban runoff, nonpoint sources, and combined sewer overflow.

Table 2. Rockdale County Monitory Sites

Stream/River	Evaluation	Criterion Violated	Potential Cause(s)	TMDL Monitoring Location ⁽¹⁾
Almand Branch	Not Supporting	Fecal Coliform pH	Urban Runoff	Highway 138 Crossing
Big Haynes Creek	Partially Supporting	Fecal Coliform	Urban Runoff	Downstream from the confluence of Little Haynes Creek
Boar Tusk Creek	Partially Supporting	pH	Urban Runoff	Unknown
Carr Branch	Partially Supporting	Biota Impacted	Nonpoint Sources	Hi Roc Road Crossing
Honey Creek	Not Supporting	Fecal Coliform	Nonpoint Sources	Highway 212 Crossing
Little Haynes Creek	Partially Supporting	Fecal Coliform pH	Urban Runoff	None
McClain Branch	Not Supporting	Fecal Coliform	Urban Runoff	Troop Bridge Rd.
Snapping Shoals Creek	Not Supporting	Fecal Coliform Biota Impacted	Urban Runoff	Honey Creek Rd.
South River	Not Supporting	Fecal Coliform	Urban Runoff/Combined Sewer Overflow	Unknown
Yellow River	Not Supporting	Fecal Coliform	Urban Runoff	Conyers Drinking Water Intake

(1) Locations within Rockdale County where water quality data was collected for establishing stream impairments and TMDLs.

2.2 Municipal Wastewater Facilities

The NDPEs permitted municipal facilities in Rockdale County are listed below.

Table 3. Municipal Wastewater Facilities in Rockdale County

Permit Number	Facility ⁽¹⁾	Permitted Flow (MGD)
GA0047678	Quigg Branch WRF	6.0
GA0021610	Almand Branch WWTP	1.25
GA0026239	Scott Creek WPCP	0.22
GA0022659	Honey Creek WPCP	0.30
GA0023035	Snapping Shoals WPCP	0.45
GAG640000	Rockdale County WTP	--

(1) Water Reclamation Facility (WRF), Waste Water Treatment Plant (WWTP), Water Pollution Control Plant (WPCP), Water Treatment Plant (WTP)

2.3 Drinking Water Intakes

There is one drinking water intake within Rockdale County. This intake is located on Big Haynes Creek downstream of the Big Haynes Creek Reservoir. The County is permitted by EPD to withdraw 22.1 MGD based on the Permit to Withdraw, Divert, or Impound Surface Water (Permit No. 122-0407-01) issued March 22, 2002.

3. REGULATORY REQUIREMENTS

Rockdale County has developed the long-term monitoring program presented herein in compliance with the following three regulatory programs, summarized below:

- Metropolitan North Georgia Water Planning District Watershed Management Plan
- NPDES Wastewater Discharge Permit
- EPD Water Withdrawal Permit

3.1 Metropolitan North Georgia Water Planning District (District)

The District has developed a Watershed Management Plan which includes a plan for monitoring water quality throughout the District. The purpose of the monitoring plan is to assess water quality and to evaluate the effectiveness of the District Watershed Management Plan.

The District's Water Quality Monitoring Plan includes the following program elements to be implemented by local governments including Rockdale County:

- Long-term Ambient Trend Monitoring
- Dry Weather Illicit Discharge Screening
- Commercial/Industrial Inspections
- Monitoring for Assessing TMDL Implementation and Delisting
- Biological and Habitat Assessments

The District has developed a technical reference to be used as a guide by local governments in implementing monitoring activities within their jurisdictions. This document is titled “*Standards and Methodologies for Surface Water Quality Monitoring*” and was released April, 2007. A summary of the contents of the District’s monitoring plan is provided in **Appendix C**.

3.2 Rockdale County NPDES Wastewater Discharge Permit.

On November 1, 2001, EPD issued Rockdale County an NPDES Permit (GA0047678) for the Quigg Branch Water Pollution Control Plan (WPCP) authorizing a discharge of 6.0 MGD. This permit required the County to develop and receive EPD approval for a Watershed Protection Plan. Rockdale County developed a Watershed Protection Plan in 2002 which included a Watershed Monitoring Plan establishing a strategy for monitoring water quality throughout the County. These plans were required by EPD before it would allow the County to expand its drinking water supply or wastewater treatment capacity.

The County’s Watershed Monitoring Plan established a long-term monitoring program to monitor water quality as watershed conditions change in the future as well as gauge the effectiveness of the County’s Watershed Protection Plan. The long-term monitoring program established monitoring activities for physical, chemical, and biological parameters at locations within each major watershed within the County.

In an effort to streamline sampling efforts and to be fully compliant with all regulatory requirements, Rockdale County is updating the Watershed Monitoring Plan in association with the approved Watershed Protection Plan. Rockdale County has met with EPD to discuss proposed amendments and has developed the long-term monitoring plan outlined herein.

3.3 EPD Permit to Withdraw, Divert, or Impound Surface Water

The County has been issued a Permit to Withdraw, Divert, or Impound Surface Water (Withdrawal Permit) for a withdrawal from Big Haynes Creek of 22.1 MGD for municipal water supply. The Withdrawal Permit requires the County to measure and record flow within Big Haynes Creek below the Big Haynes Creek Reservoir and near the raw water intake. The flow rate of Big Haynes Creek at these locations must be determined in cubic feet per second (cfs) on a daily basis. The permit requires that 7Q10 flow be maintained within Big Haynes Creek immediately below the reservoir and at the intake. Rockdale County is under contract with the USGS to monitor stream flow at this location and four other locations throughout the County.

4. WATER QUALITY MONITORING PROGRAM

The following section describes Rockdale County’s water quality monitoring program and outlines the specific monitoring locations and procedures to be utilized to ensure that the program is compliant with all applicable regulatory programs.

4.1 Monitoring Sites

Water quality monitoring will be performed at 15 locations throughout Rockdale County. Since monitoring locations were selected for specific objectives, monitoring activities will vary between sites. The location of each site is shown on the map in **Appendix B**. The table below identifies the type of sampling that will be performed at each site.

Table 4. Monitoring Sites Sampling Types

Site	Long-Term Monitoring	Bacteria	Biologic	Hydrologic	Nutrients	Drinking Water
1	X	X	X			X
2	X					
3	X					X
4	X	X	X			
5	X	X	X			
6	X	X				
7	X					
8	X		X			
9	X		X			
10			X		X	
A		X				
B		X				
C			X		X	
D				X		X
E				X		

4.2 Long-Term Ambient Trend Monitoring

4.2.1 Purpose

Long-term monitoring will be performed to monitor water quality as watershed conditions change in the future primarily as a result of growth and development. Monitoring data will help determine if the existing watershed protection measures currently implemented by the County are sufficient. Long-term monitoring will include chemical and physical water quality monitoring that will be performed according to protocol established in the District Monitoring Plan.

4.2.2 *Monitoring Locations*

Long-term monitoring will be performed at nine locations. Location information and rationale for each site is provided below.

Table 5. Long-Term Monitoring Locations

Site ID	Stream	Location	Rationale
1	Big Haynes Creek	Costley Mill Site (Bowman Property)	This site is located downstream of the Big Haynes Creek Reservoir and the associated drinking water intake. Additionally, it is also downstream of the listed segment of Little Haynes Creek.
2	Yellow River	Gees Mill Road	This site is located upstream of the Yellow River water intake. It also captures information related to water quality in the Yellow River upstream of the 303(d) listed segment as the river flows out of Rockdale County.
3	Big Haynes Creek	Highway 20	This site is upstream of the Big Haynes Creek reservoir and will capture data related to water quality in Big Haynes Creek as it flows into Rockdale County.
4	Almand Branch	Highway 138	This sampling location is upstream of the wastewater discharge points on Almand Branch. It is located directly downstream of the City of Conyers and is located on the 303(d) listed segment of Almand Branch.
5	Snapping Shoals Creek	Honey Creek Road	This sampling location is downstream of the wastewater discharge points on Almand Branch/Snapping Shoals Creek. Sites 4 & 5 will give a good upstream/downstream indication of any potential impact for the wastewater discharge along these segments.
6	Honey Creek	Scott Highway (Highway 212)	This monitoring station is located downstream of the confluence of McClain Branch and Honey Creek. Rockdale County operates a WPCP that discharges to McClain Branch and both stream segments are 303(d) listed for fecal coliform violations.
7	South River	Highway 138	This monitoring location is located on the 303(d) listed stream segment of South River and also represents one of the five major HUC 12 watersheds located mostly within Rockdale County.
8	Carr Branch	Hi Roc Road	This monitoring location is located on a segment of Carr Branch, which is on the 303(d) list for partially supporting its intended use for biota. This site was added in an attempt to determine the cause of the impairment.
9	Honey Creek	Hurst Road	This monitoring location is located on the 303(d) listed stream segment of Honey Creek and also represents one of the five major HUC 12 watersheds located mostly within Rockdale County.

NOTE: These sites were included in the previous water quality monitoring program and have a wealth of historical data for baseline comparison.

NOTE: The District Monitoring Plan requires that long-term monitoring be performed at a minimum of two locations in Rockdale County.

4.2.3 Parameters

During wet and dry sampling events, a field water quality meter will be utilized to take *in-situ* (in place) measurements for the following parameters:

- Temperature
- Dissolved Oxygen
- Conductivity
- pH
- Turbidity

Laboratory analysis of wet and dry weather water samples will be performed for the following parameters:

- Biochemical Oxygen Demand (BOD₅)
- Chemical Oxygen Demand (COD)
- Total Phosphorus (TP)
- Orthophosphate
- Total Kjeldahl Nitrogen (TKN)
- Nitrate-Nitrite Nitrogen (NO₃-NO₂)
- Ammonia (NH₃)
- Total Dissolved Solids (TDS)
- Total Suspended Solids (TSS)
- Hardness
- Total/Dissolved Recoverable Metals (cadmium, copper, lead, zinc)

Any EPA-approved analysis method (40 CFR Part 136) can be used for analyzing long-term ambient trend monitoring samples. Recommended methods and detection limits are provided below.

Table 6. Recommended Water Quality Sampling Methods & Detection Limits

Constituent	Analytical Method	Detection Limits
Biochemical Oxygen Demand (BOD ₅)	EPA 405.1	2.0 mg/L *
Chemical Oxygen Demand (COD)	EPA 410.1 or 410.2	25 mg/L
Total Suspended Solids (TSS)	EPA 160.2	4.0 mg/L
Total Dissolved Solids (TDS)	EPA 160.1	10.0 mg/L
Total Phosphorus/Orthophosphate	EPA 365.2	0.01 mg/L
Nitrate+Nitrite Nitrogen	EPA 353.1 or 353.2 or EPA 353.3	0.10 mg/L or 0.05 mg/L or 0.01 mg/L
Total Kjeldahl Nitrogen (TKN)	EPA 351.2	0.1 mg/L
Ammonia (NH ₃)	EPA 350.1 or 350.3	0.01 mg/L or 0.1 mg/L

Constituent	Analytical Method	Detection Limits
Total Hardness	EPA 130.2	10 mg/L
Zinc	EPA 200.	0.002 mg/L
Cadmium	EPA 200.	0.001 mg/L
Lead	EPA 200.	0.005 mg/L
Copper	EPA 200.	0.002 mg/L

* Required by EPD

4.2.4 Sampling Frequency

Long-term monitoring will include sampling during wet and dry weather to monitor the effects of stormwater runoff as well as baseflow conditions.

Single grab samples will be collected six times per year for wet weather events. Three of these samples are to be collected in the summer (May-October) season and three in the winter (November-April) season. Representative wet weather events require a minimum precipitation of 0.3 inch. Additionally, a minimum period of 72 hours is required between each wet weather event sampled to ensure that the events are discrete and the water quality parameters are associated with the event sampled.

Baseflow samples will be collected twice per year during dry weather. One of these samples is to be collected in the summer (May-October) season and one in the winter (November-April) season. Dry weather is defined as a period prior to sampling of at least 72 hours (three days) receiving less than 0.1 inches of precipitation per day.

4.2.5 Sampling Methods

Water samples will be collected manually as single, grab samples. The County will attempt to collect wet weather grab samples on the rising limb of the hydrograph and as close to the peak as possible to more accurately estimate pollutant loadings during wet weather events. Sample collection and handling will be performed as described in Section 2B.3 of the District's "Standards and Methodologies for Surface Water Quality Monitoring," April, 2007 (District Monitoring Plan).

4.2.6 Quality Assurance/Quality Control

The purpose of quality assurance/quality control (QA/QC) is to help ensure that collected data are of good quality. Field QA/QC will include collecting field blanks and field duplicates.

Field Blanks

Field blanks will be collected to determine potential sample contamination that may occur during sample collection, handling, shipment, storage, or laboratory analysis or handling. Field blanks will be collected once per year at each sampling location during a dry weather event by filling pre-labeled sample bottles with reagent-grade water in the field for the following parameters:

- Total phosphorus
 - Orthophosphorus *
 - TKN
 - Nitrate-Nitrite Nitrogen
 - Total recoverable metals (cadmium, copper, lead, and zinc)
- * *Field blank should be filtered prior to preservation*

Field Duplicates

Field duplicates are collected by taking duplicate samples at the same location to assess the representativeness of sampling procedures in addition to the normal uncertainty associated with analysis. Field duplicates will be collected once per year at each sampling location for all parameters during a dry weather event. The sample is to be split in two after the sample collection.

4.3 Bacteria Monitoring

4.3.1 Purpose

Bacteria monitoring will be performed to monitor indicators of disease causing bacteria in surface water that may result from local pollution sources.

4.3.2 Monitoring Locations

Table 7. Bacteria Monitoring Sites

Site ID	Stream	Location/Stream Crossing	Rationale
1 *	Big Haynes Creek	Downstream from the confluence of Little Haynes Creek	Both Little Haynes Creek and Big Haynes Creek are listed for fecal coliform violations. This site will monitor the success of related TMDL implementation plans.
4 *	Almand Creek	Highway 138	This site is directly downstream of Conyers on the listed segment of Almand Creek, which is listed for fecal coliform. Sampling at this location will allow the County to determine if the source of the violation is in Conyers or the County. This site also measures bacteria levels directly upstream of the WTP discharges.
5 *	Snapping Shoals Creek	Honey Creek Road	This site measures bacteria levels directly downstream of the WTP discharges and on the listed segment of Snapping Shoals Creek.
6 *	Honey Creek	Scott Highway	This site measures bacteria levels downstream of the confluence of two listed segments, Honey Creek and McClain Branch.
A *	McClain Branch	Troupe Smith Road	This site measures bacteria levels directly downstream from the discharge of the County's WTP on McClain Branch.
B	Yellow River	Loganville Highway	This site measures bacteria levels along a listed segment of the Yellow River, at the same location monitored by EPD during the original list of the stream segment.

* *Monitoring location is the same site where data was originally collected to establish stream impairment and TMDL.*
 NOTE: *The District Monitoring Plan requires that bacteria monitoring be performed at a minimum of two sites within Rockdale County.*

4.3.3 Parameters

Bacteria sampling will include fecal coliform and *E. coli*. Recommended methods and detection limits are provided below.

Table 8. Recommended Bacteria Sampling Methods & Detection Limits

Constituent	Analytical Method	Detection Limits
Fecal Coliform	SM 9221 E or 9222D	2 MPN/100ml
<i>E. coli</i>	SM 9221B.1	2 MPN/100ml

4.3.4 Sampling Frequency

Four geomeans for fecal coliform and *E. coli* will be collected on an annual basis. Each geomean will include four samples taken over a 30-day period (at intervals not less than 24 hours.) One geomean will be collected during each of the following quarters: May-July, August-October, November-January, and February-April. Each set of four samples will be used to calculate a geometric mean, per State guidelines. One field blank for fecal coliform and *E. coli* bacteria should be collected for each geometric mean.

4.4 Biological Monitoring

4.4.1 Purpose

Biological monitoring involves collecting and evaluating biological data to gauge the ecological health of aquatic ecosystems and identify trends in the integrity of the stream and watershed.

4.4.2 Monitoring Locations

The District Monitoring Plan requires that biologic monitoring be performed in each HUC 12 watershed within the County. The five HUC 12 watersheds within Rockdale County are listed below as well as shown in **Figure 1**.

Table 9. Rockdale County HUC 12 Assignments

River Basin	HUC 12 Number
Big Haynes Creek	030701030505
Yellow River	030701030502
Snapping Shoals Creek	030701030304
Honey Creek	030701030106
South River	030701030107

Figure 1. Map of Rockdale County Biologic Monitoring Sites

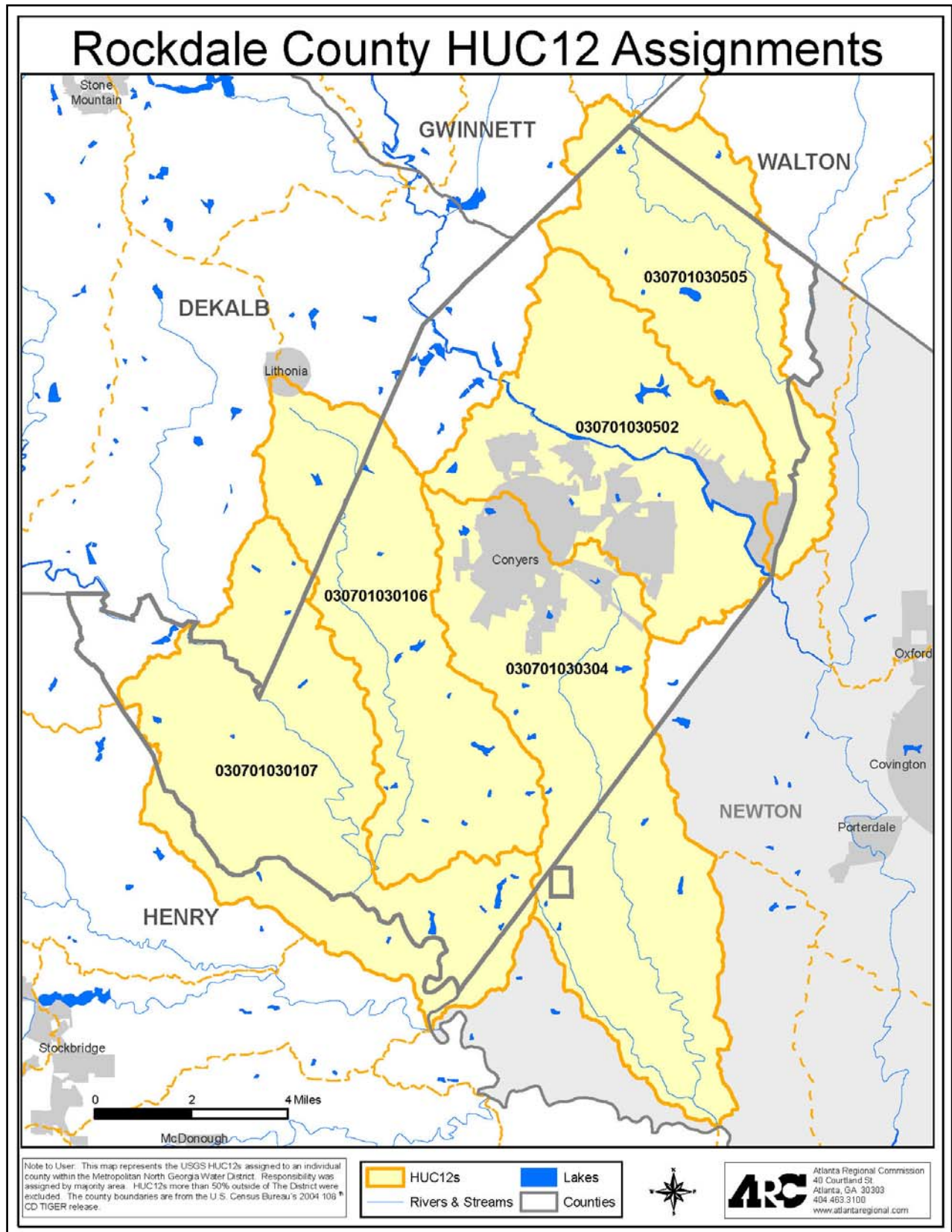


Table 10. Rockdale County Biological Monitoring Sites

Sites	HUC 12 River Basin	Stream	Location	Rationale
1	Big Haynes Creek	Big Haynes Creek	Downstream from the confluence of Little Haynes Creek	Monitoring location for HUC 12 watershed
4	Snapping Shoals	Almand Creek	Highway 138	Monitoring location for HUC 12 watershed
5	Snapping Shoals	Snapping Shoals Creek	Honey Creek Road	Located on non-supporting stream segment listed for biota impacts
8	Yellow River	Carr Branch	Hi Roc Road	Located on partially-supporting segment listed for biota impacts; Monitoring location for HUC 12 watershed 303
9	Honey Creek	Honey Creek	Smyrna Road	Monitoring location for HUC 12 watershed
10	South River	Jackson Creek	Mill Stream Lane	Monitoring location for HUC 12 watershed
C	Yellow River	Boar Tusk Creek	Boar Tusk Road	Monitoring location for HUC 12 watershed

4.4.3 Sampling & Assessment Methods

Biologic monitoring and assessment will include the following tasks:

- Assessment of available habitats
- Sampling and analysis of benthic macroinvertebrates
- Fish sampling

Biologic monitoring will be performed according to protocol established in the District Monitoring Plan.

Habitat & Macroinvertebrates

Macroinvertebrate sampling and assessment will be performed according to the most recent standard operating procedures (SOP) developed by the Georgia Department of Natural Resources (DNR). Currently DNR's SOP is "*Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia*" dated March 2007. Standardized semi-quantitative sampling for macroinvertebrates will be conducted at each site for a variety of habitat types, including riffles, undercut banks/roots, woody debris, sand, leaf packs, snags and submerged macrophytes. Sampling will be based on the prioritized list of habitat types for moderate to high gradient streams. Each sample will included a specified number of jabs with the dip net for a linear distance of one meter. The index period for the benthic macroinvertebrate assessment is November through February.

"D" frame dip nets with a 595-micron mesh will be used for all sampling. All habitat type samples will be composited into a single container at each site for preservation and transport to the laboratory. Analysis and data evaluation will be conducted in the laboratory following LAB (GERS) 014. All macroinvertebrates will be taxonomically identified and enumerated.

Under the GBP, assessment scoring is based on a variety of metrics and is ecoregion-specific. Rockdale County is located within the Southern Outer Piedmont (45b) Ecoregion and the scoring will be based on the Ecological Condition Worksheet for that ecoregion.

Habitat assessments will be conducted at all monitoring stations and the reference sites in accordance with the *Ecoregions Reference Sites Project* protocol. The protocol requires visual evaluation of physical habitat parameters, including instream cover, substrate, channel morphology and flow, bank stability and vegetation, and riparian zone condition. The worksheet has ten Habitat Parameters (HPs). Assessing habitat allows the quality of the structure of the surrounding habitat that influences water quality and condition of the aquatic biota to be evaluated and may aid in identifying non-water quality affiliated factors of biological impairment, if present.

Fish Sampling

Fish sampling and assessments will be performed according to protocol established in EPD's "*Standard Operating Procedures for Conducting Biomonitoring on Fish Communities in Wadeable Streams in Georgia*" dated 2005. Fish sampling results shall be scored based on "*Part II: Scoring Criteria for the Index of Biotic Integrity and the Index of Well-Being to Monitor Fish Communities in Wadeable Streams in the Piedmont Ecoregion of Georgia.*"

Fish sampling will be performed where possible as determined by a staff biologist. To conduct fish sampling, the stream must be wadeable (not too deep) and have sufficient flow to support fish communities (i.e. the streams must not be too large or small).

4.4.4 In-Situ Water Quality Measurements

The *In-situ* parameters of water temperature, dissolved oxygen, pH, specific conductivity, and turbidity will be collected using a field water quality meter. These parameters, when combined with other biological parameters, aid in developing a comprehensive understanding of water quality at the time samples were collected.

4.4.5 Sampling Frequency

Biologic monitoring will be performed at each site every other year.

4.5 Hydrologic Monitoring

4.5.1 Purpose

The purpose of this monitoring is to ensure that adequate flow within Big Haynes Creek is maintained to support the permitted withdrawal. The County's Withdrawal Permit (Permit No. 122-0407-01) requires 7Q10 flow be maintained below the reservoir (7Q10 = 1.9 cfs) and at the intake (7Q10 = 4.9 cfs).

4.5.2 *Monitoring Locations*

Streamflow measurements will be performed at the two locations on Big Haynes Creek listed below.

Table 11. Streamflow Measurements Monitoring Sites

Site ID	Stream	Location	Rationale
D	Big Haynes Creek	Old Hightower Trail	Located immediately downstream of reservoir. Withdrawal permit requires County to pass a minimum flow equal to 7Q10 (1.9 cfs) here.
E	Big Haynes Creek	Intake near Costley Mill Rd crossing	Located at raw water intake. Withdrawal permit requires County to pass a minimum flow equal to 7Q10 (4.9 cfs) here.

4.5.3 *Parameters*

Hydrologic monitoring will include measurements of stream stage, streamflow, and precipitation.

4.5.4 *Sampling Frequency*

Auto sampling equipment capable of monitoring hydrologic parameters hourly will be utilized.

Note: Flow data must be recorded and kept on file.

4.6 **Nutrient Monitoring**

4.6.1 *Purpose*

Nutrient monitoring will be performed at those monitoring locations where biological monitoring will be performed but no long-term monitoring is planned. This is because long-term monitoring includes nutrient sampling and since long-term monitoring will not be performed at several sites, no nutrient data would otherwise be collected.

4.6.2 *Monitoring Locations*

Table 12. Nutrient Monitoring Sites

Site ID	Stream	Location	Rationale
10	Jackson Creek	Mill Stream Lane	Biological monitoring will be performed at this location but no long-term monitoring.
C	Boar Tusk Branch	Boar Tusk Road	Biological monitoring will be performed at this location but no long-term monitoring.

4.6.3 Parameters

Nutrient monitoring will include sampling and analysis of the following parameters:

- Nitrate-Nitrite Nitrogen
- Ammonia (NH₃)
- Total Kjeldahl Nitrogen (TKN)
- Total Phosphorus (TP)
- Orthophosphate

4.6.4 Sampling Frequency

Nutrient sampling will be performed a total of four times per year. Samples will be collected during two dry weather days and two wet weather days per year.

4.7 Drinking Water Source Monitoring

4.7.1 Purpose

Monitoring will be performed upstream of the drinking water intake to monitor water quality of the County's drinking water supply.

4.7.2 Monitoring Locations

Monitoring of the drinking water source water will occur at the following three locations.

Table 13. Drinking Water Source Monitoring

Site ID	Stream	Location	Rationale
1	Big Haynes Creek	Downstream from the confluence of Little Haynes Creek	Site will monitor water quality upstream of the intake below the confluence with an impaired segment (fecal coliform and pH) of Little Haynes Creek.
3	Big Haynes Creek	Just off of Matthews Park Drive	Site will monitor water quality within Big Haynes Creek prior to flow entering Rockdale County.
D	Big Haynes Creek	Old Hightower Trail	Site will monitor water quality at the Big Haynes Creek Reservoir.

4.7.3 Parameters

Drinking water source monitoring will include sampling and analysis of the following parameters:

- Chlorophyll a
- Dissolved Oxygen (DO)
- Fecal Coliform Bacteria
- Temperature
- pH
- Total Organic Carbon

4.7.4 Sampling Frequency

Drinking water source sampling will be performed a total of four times per year. Samples will be collected during two dry weather days and two wet weather days per year. *Note: drinking water source sampling will be performed according to the same schedule as the nutrient sampling.*

4.8 Monitoring for Assessing TMDL Implementation & Delisting Impaired Waterbodies

4.8.1 TMDL Implementation Plans

Based on the 2006 305(b)/303(d) list, there are ten impaired stream segments within or bordering Rockdale County as listed below. Impairments are related to fecal coliform, pH, and biologic impacts.

Table 14. Impaired Stream Segments within Rockdale County

Stream/River	Criterion Violated	TMDL Implementation Plan (YES/NO)	Rockdale County Monitoring Sites *
Almand Branch	Fecal Coliform pH	YES (FC)	4
Big Haynes Creek	Fecal Coliform	YES (FC)	1
Boar Tusk Creek	pH	NO	C
Carr Branch	Biota Impacted	NO	8
Honey Creek	Fecal Coliform	YES	6
Little Haynes Creek	Fecal Coliform pH	NO	**
McClain Branch	Fecal Coliform	YES	A
Snapping Shoals Creek	Fecal Coliform Biota Impacted	NO	5
South River	Fecal Coliform	YES	**
Yellow River	Fecal Coliform	NO	B

* Monitoring at each site includes the parameter identified as the "Criterion Violated" for each impaired stream segment.

** Monitoring for the "Criterion Violated" is not performed on this impaired stream because the original EPD location for TMDL monitoring was located outside the County.

The list above identifies TMDL Implementation Plans (TMDL IP) developed for each impaired stream. The TMDL IPs do not require Rockdale County to perform additional water quality monitoring. However, the monitoring strategy outlined in this Monitoring Workplan incorporates monitoring of impaired/TMDL stream segments. Monitoring sites were selected on each impaired stream segment to correspond to the original sites where monitoring data were collected to assess the stream and develop the TMDL. Sampling at these sites includes the

parameter identified as the cause (criterion violated) of the impairment for each segment. The monitoring sites for each impaired segments is identified above in Table 14.

4.8.2 *Delisting Impaired Waterbodies*

Removing impaired stream segments from the 305(b)/303(d) list (delisting) requires that a Sampling and Quality Assurance Plan (SQAP) be developed and submitted to EPD for approval prior to initiating monitoring. The monitoring activities required to delist a stream are likely to differ from the monitoring outlined in this plan. For any stream segments the County desires to have delisted, the County must develop and submit a SQAP to EPD for approval.

For additional monitoring requirements for assessing TMDL implementation and delisting of impaired waters, please refer to Part 4 of the District Plan.

4.9 Boar Tusk Creek Streamwalk/Outfall Screening Program

Boar Tusk Creek is identified on EPDs 303(d) list as partially supporting its designated use due to low pH attributed to urban runoff. This stream drains the northern portion of the City of Conyers located within the Yellow River Basin.

To help identify the source(s) of the low pH, the County will conduct streamwalks and perform dry weather screening of outfalls discharging into this stream. Dry weather screening will be performed in accordance with the County's Phase II NPDES MS4 stormwater permit.

To help identify potential pollutant sources, the County will develop an inventory of industries within the Boar Tusk Creek Basin. Outfall screening results can then be evaluated in relation to the industrial inventory to narrow potential sources responsible for lowering the pH in these waters.

4.10 Monitoring Plan Implementation Summary

The table below summarizes the District monitoring requirements and additional monitoring that must be implemented within Rockdale County.

Table 15. Monitoring Plan Implementation Summary

Monitoring Activity	Parameters	Number of Sites	Frequency
Long-Term Ambient Trend Monitoring	<ul style="list-style-type: none"> • BOD5 • COD • TSS • TDS • NO2-NO3 N • TKN • Ammonia • Hardness • Total Phosphorus • Orthophosphate • Total/Dissolved Metals (Cd, Cu, Zn, Pb) 	9 Sites	Annually: Six wet sample days; Two dry sample days
Bacteria	<ul style="list-style-type: none"> • Fecal Coliform • E. Coli 	6 Sites	Annually: Four geomeans performed quarterly
Biologic	<ul style="list-style-type: none"> • Habitat Assesment • Benthic Macroinvertebrates • Fish Sampling 	7 Sites	Once every five years
Hydrologic	<ul style="list-style-type: none"> • Flow • Stage • Precipitation 	2 Sites	Hourly
Nutrients	<ul style="list-style-type: none"> • NO2-NO3 N • TKN • Ammonia • Total Phosphorus • Orthophosphorus 	2 Sites	Annually: Two wet sample days; Two dry sample days
Drinking Water	<ul style="list-style-type: none"> • Chlorophyll a • Dissolved Oxygen • Fecal Coliform • Temperature • pH • Total Organic Carbon 	3 Sites	Annually: Two wet sample days; Two dry sample days

4.11 Reporting

4.11.1 NPDES Wastewater Permit Annual Report

The County will submit a progress report to EPD by June 30th each year. The annual progress report should summarize the monitoring activities implemented within the past year and describe any modifications to the monitoring program that may have occurred. The summary of monitoring results will include all chemical and biologic monitoring as well as outfall screening and streamwalk findings from Boar Tusk Creek. Water quality data collected over the past year will be submitted on an electronic spreadsheet (CD-ROM) to EPD with this report.

4.11.2 *NPDES Wastewater Permit Five-Year Report*

Every five years, the County will prepare and submit to EPD a more comprehensive progress report including a trend analysis of water quality results evaluation of the overall health of monitored streams in the County. Water quality results should be evaluated in relation to established water quality standards or target levels. Trends or changes in water quality should be identified as well as sources of water quality impairments.

4.11.3 *District Annual Report*

The County will submit an annual report to the District by December 31st of each year. The report will include the results of the monitoring as presented in the NPDES Wastewater Permit Annual Report as well as the results of the illicit discharge and detection and industrial inspection programs as required by the Phase II NPDES MS4 Permit and the District Watershed Management Plan.

APPENDIX

A

February 28, 2007

Georgia Department of Natural Resources
Environmental Protection Division
Watershed Protection Branch
Attention: Ms Elizabeth Booth
4220 International Parkway
Suite 101
Atlanta, GA 30354

Subject: Rockdale County Watershed Protection Plan Sampling Requirements

Dear Ms Booth:

Thank you for taking the time to meet with us yesterday regarding reducing the County's Watershed Protection Plan sampling requirements and consolidating this plan with sampling required by the Metropolitan North Georgia Water Planning District. The assistance provided by you and your staff in working out the details of the revised and consolidated sampling plan was especially beneficial and should serve to greatly reduce our sampling expense.

Our consultant, Integrated Science & Engineering, will provide you with a drawing identifying the location of all sampling points associated with the revised plan. The following table specifies the agreed sampling requirements for each sampling point:

Sampling Point	Long Term Monitoring	Bacteria	Biological	Stream Flow Monitoring
Existing Sampling Point Locations:				
1	√	√	√	
2	√			
3	√			
4	√	√	√	
5	√	√	√	
6	√	√		
7	√			
8	√		√	
9	√		√	
10			√	
Proposed Sampling Point Locations:				
A		√		
B		√		
C			√	
D				√
E				√

In addition to the requirements listed in the above table, we also agreed that the County would sample for nutrients at Sampling Point 10 and perform a special study, including pH monitoring at Sampling Point C, in an effort to determine the source of low pH readings in Boar Tusk and Almond Branch.

We also agreed that the County would suspend sampling for six months to allow time for completion of the following tasks:

- Time as required for Integrated Science & Engineering to formalize the revise and submit the sampling plan to EPD;
- Time as required for EPD to review, comment and approve the revised sampling plan;
- Time as required for Rockdale County to advertise, bid and award a new contract for sampling work associated with the revised plan.

Finally, we agreed that Rockdale County could approach EPD about extending the six month sampling suspension if the actual time to complete the above tasks exceeds the budgeted time estimate.

Thank you again for your assistance, and we look forward to working with you and your staff to complete this project.

Sincerely,

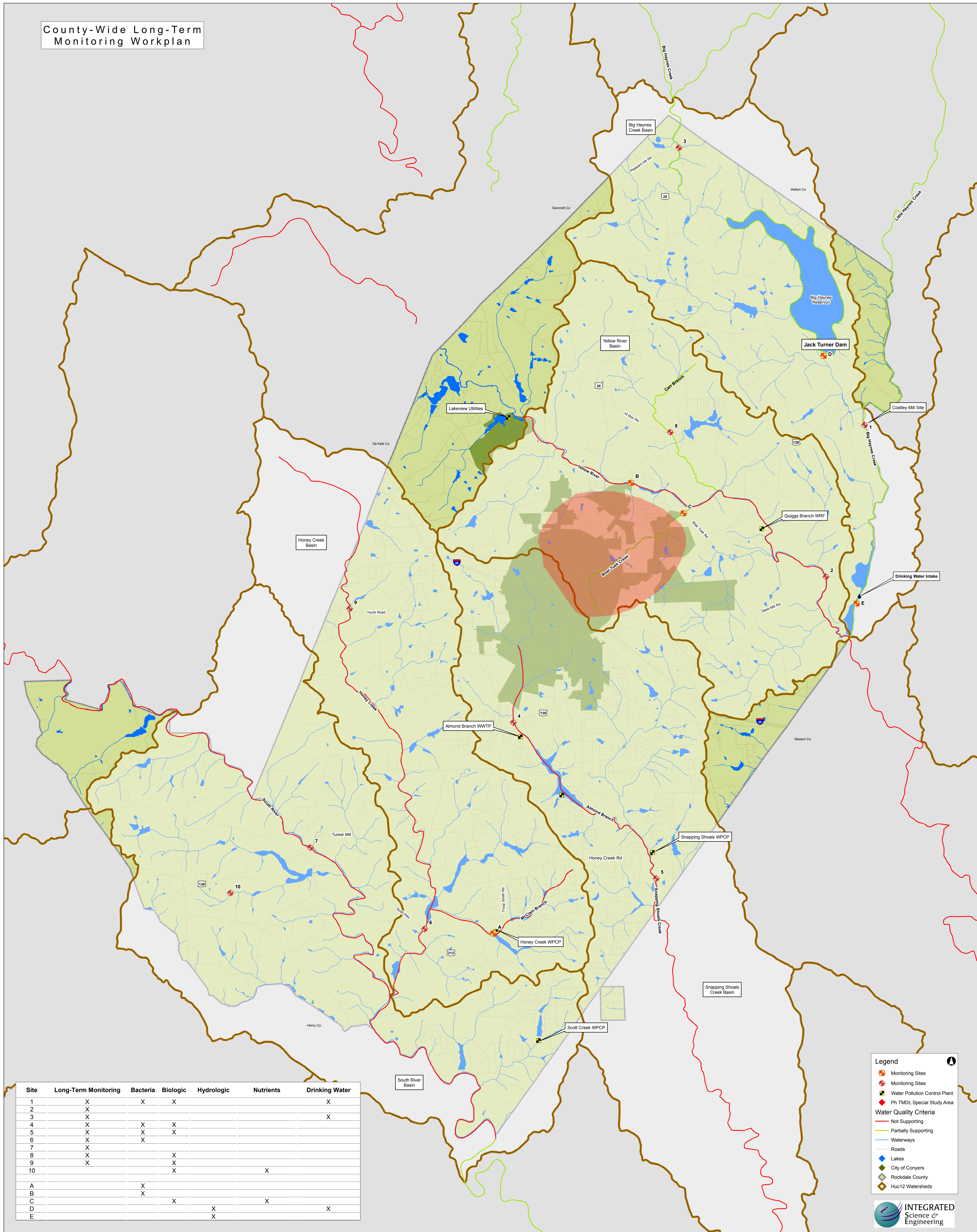
Thomas M. Kohler, P.E.
Deputy Director
Rockdale Water Resources

cc: Roy Middlebrooks
Julie Mills
Holly Bowie
Dwight Wicks
Steve Cole
Courtney Power, Integrated Science & Engineering
Ron Feldner, Integrated Science & Engineering

APPENDIX

B

County-Wide Long-Term Monitoring Workplan



Site	Long-Term Monitoring	Bacteria	Biologic	Hydrologic	Nutrients	Drinking Water
1	X	X	X			X
2	X					
3	X					
4	X	X	X			X
5	X	X	X			
6	X	X				
7	X					
8	X		X			
9	X		X			
10			X		X	
A		X				
B		X				
C			X		X	
D				X		X
E				X		

Legend

- Monitoring Sites
- Monitoring Sites
- Water Pollution Control Plant
- Ph TMDL Special Study Area

Water Quality Criteria

- Not Supporting
- Partially Supporting

Waterways
Roads
Lakes
City of Conyers
Rockdale County
Huc12 Watersheds

APPENDIX

C

SUMMARY OF WATER QUALITY MONITORING REQUIREMENTS

Metropolitan North Georgia Water Planning District
April 25, 2007

This document provides a summary of the water quality monitoring established by the Metropolitan North Georgia Water Planning District (District) as described in the District's "*Standards and Methodologies for Surface Water Quality Monitoring*" (April, 2007).

1. LONG-TERM AMBIENT TREND MONITORING

The overall goal of the District-wide Watershed Management Plan is to meet and maintain water quality standards and designated uses of streams and other waterbodies within the District. Monitoring of local streams for long-term ambient trends provides a means of demonstrating progress toward water quality goals as the Plan is implemented. This data will also be used to help refine future management strategies to address watershed management and water quality protection within the District.

1.1 Monitoring Locations

The sampling station locations will serve to provide information on long-term ambient trends in waters affected by both point source discharges and nonpoint source impacts. The selected location of long-term trend monitoring sites take into consideration a number of factors including: watershed size; watershed land use; existing water quality conditions; stream characteristics; riparian ownership; accessibility; and proximity to point source and stormwater discharges, water supply intakes, solid waste facilities (landfills), land application systems, and septic service areas. The District Monitoring Plan establishes a minimum number of permanent sampling stations for each county based on population. Within each county, one long-term trend station is required for every 50,000 persons, with a minimum of two stations per county.

1.2 Sampling Frequency

Water samples must be collected eight times per year including six samples collected during wet weather conditions and two samples during dry weather conditions. Bacteria sampling will be performed to calculate four geometric means each year. Each geometric mean will involve collecting four samples over a 30-day period.

1.3 Sampling Parameters

Both wet and dry water quality samples will be analyzed for the following parameters:

- Biochemical Oxygen Demand (BOD5)
- Chemical Oxygen Demand (COD)
- Total Phosphorus (TP)
- Orthophosphate
- Total Kjeldahl Nitrogen (TKN)
- Nitrate-Nitrite Nitrogen (NO₃-NO₂)
- Ammonia (NH₃)
- Total Dissolved Solids (TDS)
- Total Suspended Solids (TSS)
- Hardness
- Total/Dissolved Recoverable Metals (cadmium, copper, lead, zinc)

Bacteria samples will be analyzed for:

- Fecal coliform
- *E. Coli*

2. DRY WEATHER ILLICIT DISCHARGE SCREENING

Illicit discharges are unpermitted, non-stormwater flows to the stormwater system that contain pollutants or pathogens. Illicit discharges enter receiving waters directly (e.g., dumping into storm drains, ditches, or stream channels) or indirectly (e.g., storing pollutants in areas where leaking containers flow into the stormwater drainage system). Illegal connections are physical connections, such as pipes, that allow illicit discharges to drain directly into the stormwater system (e.g., cross connections between storm drains and sanitary sewers). Illicit discharges are a major source of water quality impairment, and an illicit discharge detection and elimination program is a required component of both Phase I and II NPDES MS4 Stormwater Permits. Screening of stormwater outfalls for illicit discharges is performed during periods of dry weather to avoid the screening flow resulting from stormwater.

2.1 Dry Weather Outfall Screening

To address potential pollution from illicit/illegal connections, dry weather screening is performed at stormwater outfalls. When dry weather flow is observed at an outfall, the following series of procedures is performed on the flow:

1. Field observations and measurements – Site descriptions and qualitative (mainly visual) observations of physical and biological conditions at the site.
2. Field monitoring and analysis – Measurement of several in-situ water quality parameters.

3. Grab samples – Collection of water quality samples for a more extensive laboratory analysis (when indicated by field observations, measurements and/or monitoring).

The District requires dry weather screening be performed at a minimum number of sites within each County according to population.

2.2 Streamwalk Surveys

As an alternative to dry weather outfall screening, local jurisdictions can implement a program to conduct streamwalk surveys of local streams and rivers. Streamwalks must include at least 10 percent of the streams miles within the local government's jurisdiction annually. Streamwalks should be conducted during dry weather and include an inventory of all pipes, outfalls, and ditches. If an illicit discharge or illegal connection is discovered, field screening procedures should be implemented as would be for dry weather outfall screening.

2.3 Commercial/Industrial Inspections

Commercial and industrial inspections must be performed at industrial sites within the County to identify illicit discharges and illegal connections. Illicit discharges from businesses and industry may come from a variety of sources, including exposed materials, wash waters, process wastewater and sanitary wastewater. To ensure that only stormwater is being discharged into the local stormwater system from a commercial/industrial site, site inspections will be performed and follow-up sampling will be performed as necessary. Visual inspections will include locating discharges to the MS4 or local waters using visual observation and drainage schematics. The inspection/monitoring process will be documented through an inspection checklist and will be recorded in an industrial inspection log that includes information regarding the location of any identified illicit connections, the date of inspection, and the method used to remove the connection. The District requires that 5 percent of all industrial facilities be monitored on an annual basis.

3. MONITORING FOR ASSESSING TMDL IMPLEMENTATION & DELISTING OF IMPAIRED WATERS

3.1 Monitoring for TMDL Implementation

The Clean Water Act requires that each state establish TMDLs for the pollutants of concern in accordance with a priority ranking for impaired waterbodies as listed on the 303(d) list. Specifically, for waterbodies on the 303(d) list, states, territories, and authorized tribes must develop TMDLs that will achieve water quality standards, allowing for seasonal variations and an appropriate margin of safety.

Water quality monitoring is an important component of the TMDL process because it provides the information necessary to make adjustments to the overall assessment and numeric targets and to assess progress towards attainment of the desired future conditions

as expressed by the numeric targets. Sampling protocols and frequency of sampling will vary depending on the pollutant and watershed conditions. The objectives of TMDL monitoring include:

- Determine compliance with regulations. Identify how much higher the actual loads are than the target loads (sometimes referred to as “tolerable loads”)
- Identify the sources of major loadings, if the waterbody is not in compliance
- Determine if BMPs are needed and if existing BMPs are working to bring the waterbody back into compliance

TMDL Implementation Plans are being developed through a collaborative effort between EPD, Regional Development Centers, and local stakeholders. Local governments are responsible for initiating the recommended water quality monitoring activities included in these plans.

3.2 Delisting of Impaired Waters

EPD has developed protocol for listing and delisting impaired waterways to ensure the consistency and quality of data used in evaluating compliance with State water quality standards. EPD’s protocol for delisting streams is provided in Part 4 of the District Monitoring Plan.

Water quality monitoring data to be utilized by EPD to assess TMDL listed stream segments must meet the requirements outlined in “*Guidance for Submitting Water Quality Data to the Georgia EPD in 305(b)/303(d) Listed Assessments.*” In accordance with this document, a Sampling and Quality Assurance Plan (SQAP) must be prepared and submitted to EPD for approval prior to initiating monitoring activities. Required elements of the SQAP include:

- Study Objectives
- Sampling Plans
- Quality Assurance Plan

4. BIOLOGICAL ASSESSMENT

The approach to biological monitoring is to collect and evaluate biological data using standard metrics that are appropriate for Georgia streams to identify trends in the integrity of the stream and watershed. Sampling will be performed in all 12-digit HUC watersheds within each County over a 5-year period. Since many watersheds within the District cross county boundaries, the District has assigned specific watersheds to each member county. Biologic monitoring will be performed in at least one location per watershed. Biologic assessments will include an evaluation of:

- Habitats
- Benthic Macroinvertebrates
- Fish

Macroinvertebrate sampling and assessment will be performed according to the most recent standard operating procedures (SOP) developed by the Georgia Department of Natural Resources (DNR). Currently DNR's SOP is "*Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia*" dated March 2007.

Fish sampling and assessments will be performed according to protocol established in EPD's "*Standard Operating Procedures for Conducting Biomonitoring on Fish Communities in Wadeable Streams in Georgia*" dated 2005. Fish sampling results shall be scored based on "*Part II: Scoring Criteria for the Index of Biotic Integrity and the Index of Well-Being to Monitor Fish Communities in Wadeable Streams in the Piedmont Ecoregion of Georgia.*"