Coosa River Modeling Project

2006 Field Study Plan
Module 4
Chlorophyll *a* Sampling

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Environmental Protection Division
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Introduction

The primary objective of this module is to install, operate and maintain three continuous chlorophyll monitors and periodically collect chlorophyll data on the mainstem and tributaries of the Coosa River Basin. These data will be used to calibrate the river and lake models being developed.

Continuous Chlorophyll Monitors

The United States Geological Survey (USGS) will maintain three continuous water quality monitors equipped with chlorophyll and turbidity sensors. These monitors will be operated by the USGS during the study period. Table 4-1 provides a list of the USGS continuous chlorophyll monitors.

Table 4-1. Location of Coosa River Basin USGS Continuous Chlorophyll Monitors

Mainstem	Location	USGS Station ID
Coosawattee Sub-Basin		
Coosawattee River	at Carters, GA (US Hwy 411)	02382500
Upper Coosa Sub-Basin		
Coosa River	near Rome, GA (Mayo's Bar)	02397000
Coosa River	near Coosa, GA (State Line)	02397530

Chlorophyll Sampling

In vivo field chlorophyll measurements will be collected at nineteen sites throughout the Coosa River Basin. Field chlorophyll measurements will be taken using Hydrolab DS4aCHLOR chlorophyll sensors. In addition, dissolved oxygen (DO), temperature, pH, specific conductivity, and turbidity measurements will be taken.

Chlorophyll *a* naturally absorbs blue light and emits, or fluoresces, red light. The chlorophyll probes measure the amount of florescence detected from chlorophyll *a* in living algal cells in water, or in vivo.

In vivo measurements will provide information on the relative distribution of chlorophyll concentration in the Coosa River Basin. Data will be collected at the fifteen sampling sites in the riverine portion of the basin, and the four sampling sites in the lake portion of the basin. Table 4-2 provides a list of the tributary and mainstem chlorophyll *a* monitoring locations.

Table 4-2. Location of Coosa River Basin Chlorophyll *a* Sampling Locations

Mainstem/Tributary	Location	USGS Gage No	Sampling Period	Number of Samples	Analytical Laboratory
Conasauga Sub-Basin					
Conasauga River	near Eton, GA (Hwy 286)	02384500	June 15-Oct 15	8	EPA Athens
Coahulla Creek	near Dalton, GA (Keith Mill Rd)	02385170	June 15-Oct 15	8	EPA Athens
Holly Creek	below Chatsworth, GA (SR 225)	02386100	June 15-Oct 15	8	EPA Athens
Conasauga River	at Tilton, GA (Tilton Rd Bridge)	02387000	June 15-Oct 15	8	EPA Athens
Coosawattee Sub-Basin					
Coosawattee River	at Carters, GA (US 411)	02382500	June 15-Oct 15	8	EPA Athens
Salacoa Creek	near Redbud, GA (CR 29 - Lovebridge Road)	02383180	June 15-Oct 15	8	EPA Athens
Coosawattee River	near Pine Chapel, GA (Owens Gin Rd)	02383500	June 15-Oct 15	8	EPA Athens
Coosawattee River	near Calhoun, GA (SR 225)	02383540	June 15-Oct 15	8	EPA Athens
Oostanaula Sub-Basin					
Oostanaula River	near Calhoun, GA (SR 136 connector)	02387530	June 15-Oct 15	8	EPA Athens
Oostanaula River	near Calhoun, GA (Reeves Station Rd)	02387670	June 15-Oct 15	8	EPA Athens
Armuchee Creek	near Rome, GA (Old Dalton Rd)	02388350	June 15-Oct 15	8	EPA Athens
Oostanaula River	near Rome at the Water Intake	02388520	June 15-Oct 15	8	EPA Athens
Etowah Sub-Basin					
Etowah River	near Euharlee, GA (Hardin Bridge Rd)	02394980	June 15-Oct 15	8	EPA Athens
Euharlee Creek	near Stilesboro, GA (CR 32)	02394958	June 15-Oct 15	8	EPA Athens
Etowah River	at GA Loop 1, near Rome, GA	02395980	June 15-Oct 15	8	EPA Athens
Upper Coosa Sub-Basin					
Coosa River	near Rome, GA (Mayo's Bar)	02397000	April-Oct	14	EPA Athens
Coosa River	at SR 100	02397100	April-Oct	14	EPA Athens
Coosa River	near Coosa, GA (State Line)	02397530	April-Oct	14	EPA Athens
Cedar Creek	near Cedartown, GA (Cave Springs Rd)	02397500	April-Oct	14	EPA Athens

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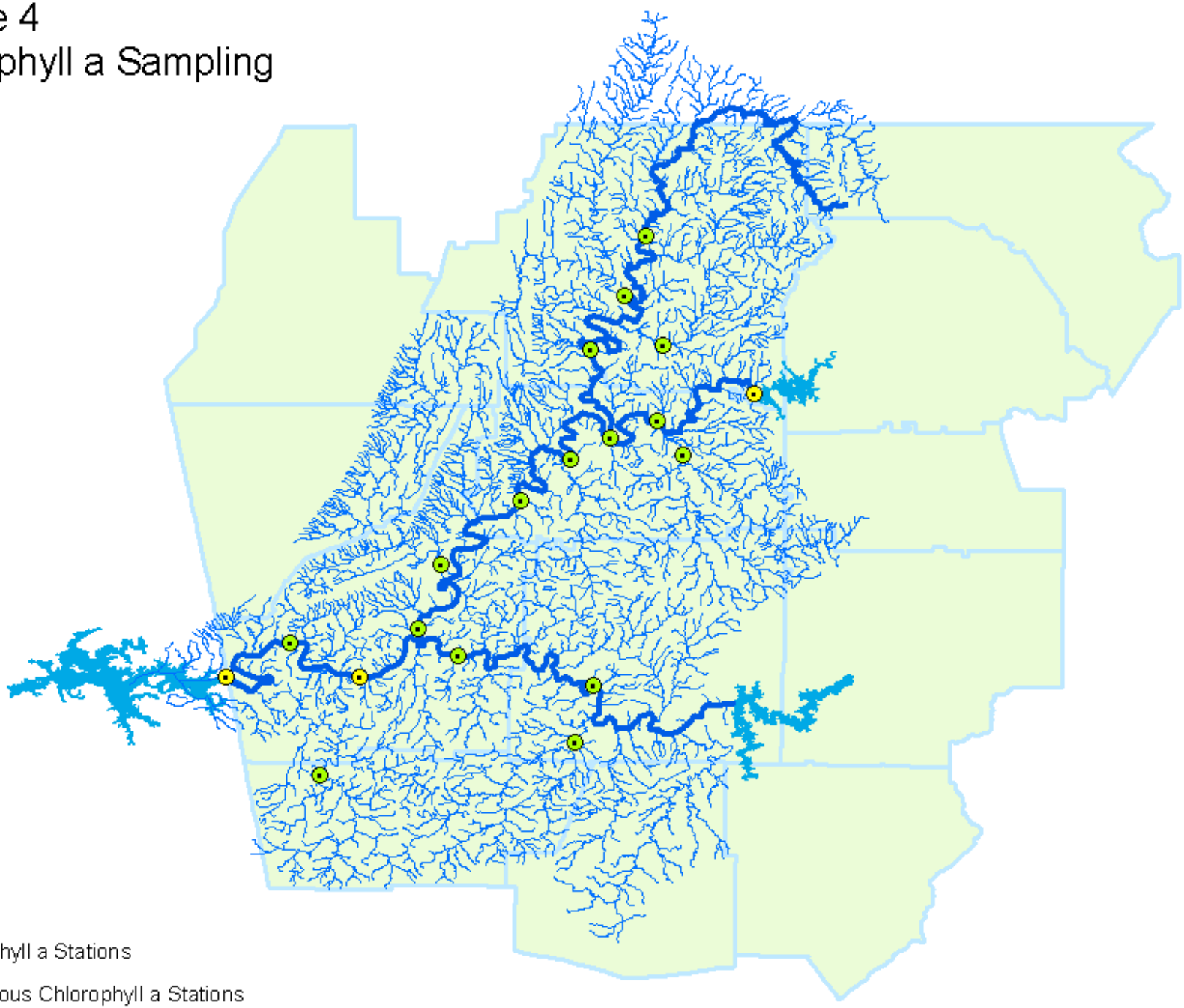

Legend

- Chlorophyll a Stations
- Continuous Chlorophyll a Stations

Several factors make the in vivo measurements semi-quantitative at best, including environmental parameters, physiology, morphology, light history and the presence of interfering materials such as turbidity. Therefore, every time an in vivo chlorophyll measurement is made by probe, a water sample will be collected and filtered for laboratory chlorophyll analysis.

In the lake portion of the Coosa River Basin, a photic zone composite sample will be collected. The photic zone will be determined by a Li-Cor photometer. Samples will be collected using a bilge pump lower and raised throughout the photic zone.

Samples collected in the riverine portion of the Coosa River Basin will be collected using a vertical Van Dorn sampler. These will be vertically intergrated, subsurface grab samples collected from the centroid of flow. The fifteen riverine samples will be collected within the top meter of water.

All samples will be filtered in the field as soon after collection as possible and will be stored on wet ice. The processed filters will be shipped to the lab on dry ice. The samples have a 22-day holding time.

Schedule

Samples in the riverine portion of the Coosa River Basin will be sampled from mid June through mid October approximately every two weeks. Samples in the lake portion of the Coosa River Basin will be sampled during the growing season from April through October approximately every two weeks.

Personnel

Sampling will be conducted by personnel from the Intensive Surveys Unit (ISU) of the Georgia Environmental Protection Division. EPA Athens Laboratory will perform the analyses on samples collected in the riverine and lake portion of the basin.

Quality Control

Maintenance and calibration of the field instrumentation will be performed as outlined in the manufacturer's instruction manual. Each day, a field-equipment blank will be run with deionized water prior to filtering any field samples. A field duplicate will be performed for QA/QC purposes after every tenth filter is processed for the lake samples. The field duplicate will involve a complete duplication of the sampling procedures. A split sample will be performed for QA/QC purposes after every tenth riverine filter is processed. The split sample will involve processing duplicate filters on the same water sample. The laboratory analyses will be conducted using approved test methods described *in Standard Methods for the Examination of Water and Wastewater* and the *EPA Methods for Chemical Analysis* Method 446.0. All data will be entered and maintained in the Watershed Protection Branch's Water Resources Data-Base (WRDB).

Safety

The Environmental Protection Division Safety Manual will be utilized to ensure the safety of personnel during the study. Each EPD vehicle and/or boat will be equipped with a first aid kit and orange safety vests. Special care will be taken when working off narrow bridges or near heavy traffic areas.