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# Application of the BATHTUB Model to Selected Southeastern Reservoirs

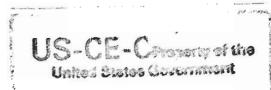
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Final report

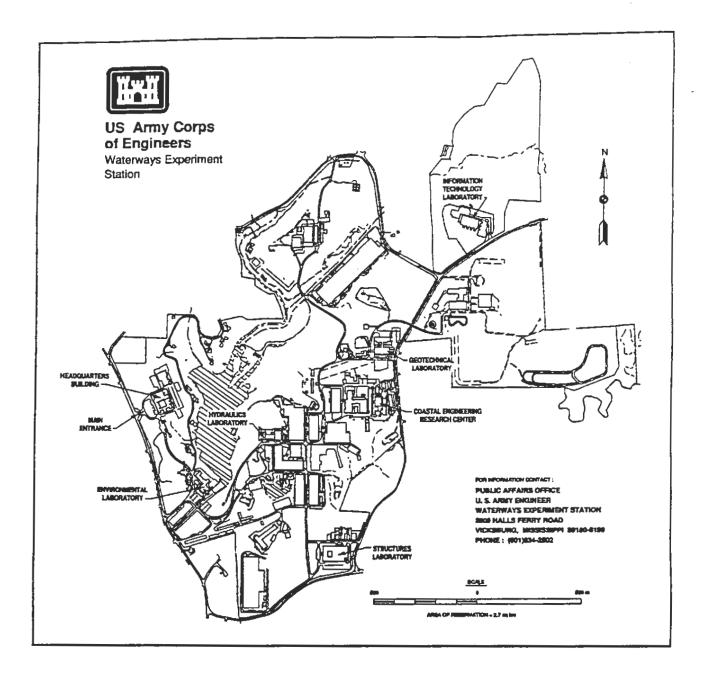
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# **Preface**

The work described herein was conducted under a Military Interdepartmental Purchase Request by the U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, MS, for the U.S. Army Engineer District, Mobile.

This report was prepared by Dr. Robert H. Kennedy of the Environmental Processes and Effects Division (EPED), Environmental Laboratory (EL), WES. Ms. Kelly Johnson and Ms. Laura Scott, AScI Corporation, Alexandria, VA, and Ms. Katherine Long, EPED, assisted with site descriptions, data compilation, and selected analyses.

The work was performed under the general supervision of Dr. Richard E. Price, Acting Chief, Ecosystem Processes and Effects Branch, EPED; Mr. Donald L. Robey, Chief, EPED; and Dr. John W. Keeley, Director, EL.

At the time of publication of this report, Director of WES was Dr. Robert W. Whalin. Commander was COL Bruce K. Howard, EN.

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# 1 Introduction

Eutrophication is the natural, long-term process by which lakes become enriched with nutrients, organic matter, and sediment. Symptomatic of the occurrence of this process are decreased water clarity, excessive algal production, reduced dissolved oxygen in bottom waters during stratified periods, and decreased volume. For lakes impacted by human activity in the watershed, this process is often greatly accelerated. Since reservoirs are commonly constructed on rivers and streams draining relatively large and often extensively developed watersheds, they receive elevated loads of nutrients and sediment and are, therefore, highly susceptible to accelerated eutrophication (Kennedy, Thornton, and Ford 1985).

The U.S. Army Corps of Engineers has erected dams in the Chatta-hoochee and Coosa river basins creating a series of large impoundments. These include Lake Sidney Lanier, West Point Lake, Walter F. George Lake (Chattahoochee River basin), and Allatoona Lake (Coosa River basin). The Chattahoochee River basin includes Atlanta, a large and growing population center, as well as extensive agricultural lands, both of which contribute significantly to accelerated eutrophication of these impoundments. Further, urban centers now place high demand on water, power, and recreation resources. The Coosa River basin above Allatoona Lake, while still relatively rural, has undergone significant development in recent years. This trend is expected to continue as increases in population associated with growth in and around Atlanta result in a northward expansion of metropolitan and residential areas.

Reallocating water in the Chattahoochee and Coosa river basins has been proposed as a means to better meet water demands of the area. Since such reallocations would impact water quantity, concerns over the potential for impacts to water quality have been raised. Water quality concerns related to population growth and resultant increases in the potential material loadings to both rivers have also been the subject of great debate.

Results of applying the empirical model BATHTUB to predict eutrophication responses of Lake Sidney Lanier, West Point Lake, Walter F. George Lake, and Allatoona Lake to a variety of conditions thought to affect nutrient levels and corresponding algal growth are summarized herein. Included are estimates of responses to changes in nutrient loading

and water residence time. These responses to prescribed conditions could serve as decision-making aids to managers charged with optimizing the use of these valuable resources.

# 2 Site Description

## **River Basins**

#### Chattahoochee River basin

The Chattahoochee River flows approximately 400 km from its headwaters in the Blue Ridge Mountains in northeast Georgia, to its confluence with the Flint River to form the Appalachicola River at Lake Seminole near Chattahoochee, FL. Draining approximately 19,500 km<sup>2</sup>, the river flows southwest past Atlanta, to the Georgia-Alabama border before turning south. Along this course, waters are impounded by a total of 14 dams constructed to meet a variety of water uses. Included among these are Buford Dam (Lake Sidney Lanier), West Point Dam (West Point Lake), and Walter F. George Lock and Dam (Walter F. George Lake; Figure 1), all of which are operated by the U.S. Army Corps of Engineers (CE).

The drainage basin crosses three distinct physiographic regions. The Mountain region slopes steeply from the crest of the Blue Ridge Mountains (ca. 1,220 m NGVD) to the vicinity of Atlanta (ca. 305 m NGVD). The Piedmont Plateau region extends from the foothills of the Blue Ridge Mountains near Atlanta to the fall line just north of Columbus, GA. The remainder of the basin is located in the Upper Coastal Plain, a region characterized by low-lying and gently rolling topography. Average precipitation across the basin is high, ranging from 1.27 to 1.37 m. The underlying bedrock is igneous and metamorphic, and the waters of the Chattahoochee River are typically soft with low mineral content.

#### Coosa River basin

The Coosa River, a tributary of the Alabama River, arises in northeast Georgia with the confluence of the Etowah and Oostamaula rivers near Rome. Headwater areas are in the Appalachian Plateau and Valley physiographic regions (Wharton 1977), which exhibit steeply to moderately sloping topography. The area is currently sparsely populated, and

natural areas are dominated by a mix of hardwood and coniferous forests. The CE has constructed two reservoirs in this portion of the basin; Carters Lake on the Coosawattee River and Allatoona Lake to the south on the Etowah River (Figure 1).

### Reservoirs

### Lake Sidney Lanier

Buford Dam and Lake Sidney Lanier is the uppermost CE water resource project on the Chattahoochee and Chestatee rivers. Authorized project purposes include flood control, hydropower, recreation, wildlife development, and streamflow regulation. Buford Dam, completed in 1957, is a 720-m-long, rolled, earth-filled structure with a top elevation of 337 m NGVD. The lake has an average surface area of 156 km<sup>2</sup> and a volume of 2,411 hm<sup>3</sup>.

Watershed land uses include woodland (71 percent), pasture (12 percent), water (6 percent), crop (3 percent), and urban and developed land (9 percent). Potential direct sources of pollution are discharges from municipal sewage treatment plants on Flat Creek, animal food processing plants located to the north, and erosion from shorelines, haul forest roads, and construction sites. The soils are iron-stained clays, which make suspended sediments highly visible.

#### **West Point Lake**

Authorized project purposes for West Point Dam and Lake include flood control, hydropower, recreation, fish and wildlife development, and streamflow regulation for downstream navigation. West Point Dam is located nearly 8 miles north of West Point, GA; Walter F. George Lock and Dam is located 121 km downstream.

West Point Dam, a gravity-type structure 2,211 m long and 29.6 m high, combines a penstock intake section and powerhouse, a concrete overflow section, and earthen embankments. The maximum power pool elevation is 194 m NGVD in the summer and 191 m NGVD during winter. During summer, the surface area and volume average 104.8 km<sup>2</sup> and 746 hm<sup>3</sup>, respectively; shoreline length averages 840 km (Georgia Department of Natural Resources 1991).

Water loads from the Chattahoochee River account for over 90 percent of the water budget. Other tributaries include Yellowjacket, Wehadkee, Whitewater, Potato, and Maple creeks, and New River. Impoundment resulted in the creation of several large embayments, particularly in the floodplains of Yellowjacket and Wehadkee creeks.

Land uses in the West Point Lake drainage basin include forest (79 percent), rural (17 percent), and urban (4 percent). Original vegetation was mainly oak-hickory forest, little of which is left. At the time of the construction of West Point Dam, 50 percent of the city of Atlanta's effluent was being discharged into the Chattahoochee River between Lake Sidney Lanier and the West Point dam site. In the mid to late 1980s, there was an increase of phosphorus in point source discharges. In 1989, a regional phosphorus detergent ban reduced the phosphorus concentration of effluent by 50 percent. In 1991, a statewide phosphorus detergent ban was instituted (Georgia Department of Natural Resources 1991).

### Walter F. George Lake

The Walter F. George Lock and Dam project was developed by the CE to provide or improve flood control, navigation, and hydroelectric power. It has become an important recreation resource as well, with some 7 million visitors annually.

The project, fully operational since May 1963, impounds a lake along the reach of the Chattahoochee River from the dam site near Columbus, GA, upstream to Phoenix City, AL. The average slope from the upper reaches of the pool to the dam is 0.19 m/km. The area acquired by the CE for project construction consists of level to undulating floodplain characterized by alluvial soils. The mean annual temperature of the region is 18.9 °C, while summer temperatures range from 30 to 40 °C. Average annual evaporation is 0.97 m/year, and average annual precipitation is 1.27 m/year, much of which occurs in winter and spring.

Walter F. George Lock and Dam is 4,141 m in length and has a maximum height of 34.7 m. The outlet structure consists of 14 tainter gates, with dimensions of 12.8 by 8.8 m, and four generating units. Each unit has the capacity of 32,500 kW, with the average annual production of 436 million kilowatts. The lock section has a total width of 50 m with inside chamber dimensions of 25 by 137 m, and its maximum lift is 26.8 m. The area of the lake at normal pool level (57.9 m NGVD) is 182.8 km<sup>2</sup>; the volume at this elevation is 1,152.6 hm<sup>3</sup>.

#### Allatoona Lake

Allatoona Dam and Lake, the oldest CE multipurpose reservoir in the southeast, provides flood control, power, and recreation in the Coosa River drainage basin. Allatoona Dam is located approximately 78 km upstream from Rome, GA, and 8 km due east of Cartersville, GA. The area of the drainage basin upstream of the impoundment is 2,845 km<sup>2</sup>. The dam is a concrete gravity-type structure on a curved axis with an overall length of 311 m and a height of 58 m. The spillway is controlled by 11 tainter gates, 9 of which measure 12.2 by 7.9 m and 2 of which measure 6 by 7.9 m. Structures associated with power generation, which allow

release of hypolimnetic water, are located on the left bank. Two units have a 36,000-kW capacity each, and one unit has a 2,000-kW capacity. Because of the relatively small size of the lake, power generation can cause lake surface levels to fluctuate widely; daily fluctuations of 1 m or more are not uncommon.

At normal pool elevation (256 m msl), the reservoir has a surface area of 48 km<sup>2</sup> and a volume of 453.4 hm<sup>3</sup>. Mean and maximum depths are 9.4 and 44.2 m, respectively. A shoreline development ratio of 17.7 reflects the irregularity of the 432-km shoreline, which includes many coves and embayments. Allatoona Lake has two main arms, the streambeds of the Etowah River and Allatoona Creek, respectively. Bethany Bridge near the dam across the Allatoona Creek embayment and Knox Bridge across the Etowah River at the upper reach of the lake, with their associated abutments, somewhat constrict the reservoir at these locations.

Land uses in the 2,845-km<sup>2</sup> drainage area above Allatoona Dam include cropland and pasture, woodland, and forest. The closest large urban center is Atlanta, GA, 24 km outside the basin and about 72 km from the dam. Small urban areas within the basin include the towns of Canton, Jasper, Dawsonville, and Acworth, GA.

# 3 Modeling Approach

The empirical reservoir water quality model BATHTUB (Walker 1987) was used to address water quality concerns at the lakes in this study. Although based on theoretical concepts, such as mass balance and nutrient limitation of algal growth, the model does not attempt to simulate explicitly the dynamics of a reservoir in either space or time. Instead, BATHTUB produces spatially and temporally averaged estimates of reservoir water quality conditions.

BATHTUB, developed from a CE-wide database, models water quality conditions in a two-stage procedure involving two model types. First, nutrient concentrations are estimated based on nutrient loads, morphometry, and hydrology. Second, a eutrophication response model is executed to relate pool nutrient concentrations to chlorophyll concentrations and transparency. These models produce estimates of steady-state, long-term (growing season or annual), water quality conditions in the epilimnion and are not intended to predict or describe short-term, event-related dynamics in reservoirs or to generate vertical profiles of water quality conditions.

Three phases are involved in applying BATHTUB:

- a. Analysis and reduction of tributary water quality data.
- b. Analysis and reduction of pool water quality data.
- c. Model implementation.

The first phase can be performed using the data reduction routine FLUX (Walker 1987). This program uses tributary flow and nutrient concentration data to estimate nutrient loadings. The second phase can be carried out using either PROFILE (Walker 1987), a data reduction routine for pool water quality data, or any statistical analysis software package. In the third phase, implementation of the BATHTUB model, descriptions of nutrient loads, and expected lake responses are evaluated and compared with observed data. Resulting model descriptions, appropriately calibrated and verified against an independent data set, can then be used to evaluate expected responses to selected management decisions. Further

details of the development, assumptions, and use of these programs and empirical models can be found in Walker (1981, 1982, 1985, 1987).

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# 4 Data Compilation and Analysis

### Introduction

Data describing eutrophication response and nutrient loads were compiled, assessed, and summarized for each lake and its tributaries, respectively. Nutrient and water loads for major tributaries were, in general, determined using data describing daily flow conditions and water chemistry. Variables sought when compiling water chemistry data included total nitrogen, total phosphorus, soluble reactive phosphorus, nitrate and nitrite nitrogen, and ammonium nitrogen. Paired observations of flow and nutrient concentration and continuous flow measurements were assessed to identify a calculation method providing the best estimate of average load over the summer-growing season. In most cases, this was accomplished using the FLUX program (Walker 1987), which allows the user to address variability associated with changes in concentration, flow, and season. For tributaries lacking continuous flow data, simple flow-weighted averages were computed. In the absence of original data, loading estimates from other sources were evaluated and adopted.

Nutrient loads from nonpoint sources were estimated based on average concentrations determined for gauged tributaries, runoff coefficients, and drainage areas. Runoff from ungauged watershed areas was estimated from water export rates from gauged tributaries or published values. Drainage areas were delineated on maps, measured planimetrically, and proportionalized to reported drainage area data. In several instances, published nutrient export rates were evaluated and adopted.

Eutrophication response data were summarized for the upper, mixed-layer for the growing season (generally, April-October). Mixed-layer depths were determined based on review of temperature profiles. Independent summary values were obtained for individual model segments. For segments containing two or more sample stations, data were averaged. The location and size of segments were determined based on number and location of sampling sites, physical constrictions, location of streams, and longitudinal patterns in water chemistry. Eutrophication response

#### Allatoona Lake

Allatoona Lake water quality data were obtained for 1973 and 1992. Sources for these data were, respectively, the U.S. Environmental Protection Agency's (USEPA) National Eutrophication Survey (NES) (USEPA 1978) and the USEPA-sponsored Clean Lake Phase I - Diagnostic/ Feasibility Study (CLDFS) conducted for the State of Georgia by Kennesaw State College (Dirnburger, Rascati, and Msimanga 1993). NES data were retrieved from the USEPA's STORET database, while the CLDFS data were provided by Kennesaw State College. Station descriptions and their designated association with particular model segments (see Chapter 5) are presented in Table 1. NES data were collected on three occasions during the period June-November 1973; CLDFS data were collected approximately bimonthly during 1992.

Mean, mixed-layer, growing-season total phosphorus and nitrogen concentrations, chlorophyll a concentrations, and Secchi disk transparency values were computed for all model segments for which data were available. In cases where two or more stations were located in a single segment, data were averaged across stations. Data summaries (mean and coefficient of variation or CV) for 1973 and 1992 are presented in Tables 2 and 3. With the exception of total nitrogen concentrations, which were considerably higher in 1992, values obtained were similar for both years.

Given the lack of marked change in other water quality variables, observed differences in total nitrogen concentrations between years were unexpectedly large. Results of a review of water quality characteristics for other Georgia impoundments, as well as data for other CE reservoirs included in this study (Table 4), support the suggestion that reported total nitrogen concentrations for 1992 may be erroneous.

Mean flow and nutrient concentrations for selected tributaries to the lake and for contiguous land-use areas were computed for both study years. Seven tributary streams, including the Etowah River and the discharge from Lake Acworth, were sampled during the NES study in 1973. Flow and nutrient concentration data for these streams were adopted from NES (USEPA 1978) and are presented in Table 5. Data needed to compute

Personal Communication, 1993, Harold McGinnis, Director, A. L. Burruss Institute of Public Service, Kennesaw State College, Marietta, GA.

CV values were not available. Noonday Creek and Little River, both of which were potentially impacted by discharges from sewage treatment facilities, exhibited the highest nutrient concentrations for inflowing streams.

Mean flow and nutrient concentrations for eleven tributary streams were computed for 1992 (Table 6). In addition to those identified in the 1973 study, tributary streams sampled in 1992 included Tanyard Creek, Kellog Creek, Owl Creek, and Rowland Creek. Since daily flow values were not available, nutrient concentrations for the modeling period were computed as flow-weighted means based on paired observations of concentration and flow.

Mean flows for contributing land-use areas for 1973 were calculated using a runoff coefficient of 0.31 m/year. This value was based on discharge and drainage area relationships for gauged tributary streams. In the absence of information describing land-use patterns in 1973, nutrient concentrations for contributing land-use areas were set equal to the average value for Allatoona Creek and Shoal Creek (Table 7). Conditions in these subbasins were assumed to be representative of conditions in ungauged portions of the basin. Computed values for total phosphorus and nitrogen were  $36 \mu g$  P/L and  $544 \mu g$  N/L, respectively.

Mean flows for contributing land-use areas for 1992 were calculated using a runoff coefficient of 0.26 m/year and the same computational approach discussed above for 1973. Estimated flows from contributing areas to each segment are presented in Table 8. Also presented in Table 8 are mean total phosphorus concentrations for contributing land-use areas. Because of considerations discussed above, total nitrogen concentrations were not computed.

Total phosphorus concentrations were estimated for four assumed land-use types in 1992. Land-use types were defined based on differences in tributary stream concentrations and the location of gauged streams. For areas assumed to be relatively unimpacted, the average of flow-weighted mean concentrations for Tanyard Creek, Allatoona Creek, and Shoal Creek was applied. Since marked differences were observed for Owl Creek and Kellog Creek (see Table 6), the total phosphorus concentration for contributing areas to model segment 7 was computed as the average of mean concentrations for each creek. Mean total phosphorus concentrations for Tanyard Creek and Rowland Creek were used for model segments 2 and 5, respectively. It was assumed that concentrations for these tributary streams were representative for concentrations in runoff from these subbasins.

### Walter F. George Lake

Water quality data for Walter F. George Lake were collected as part of an USEPA-sponsored Clean Lakes Phase I -Diagnostic/Feasibility Study (CLDFS) performed by Auburn University. Data included selected nutrient concentrations, in situ values, and chlorophyll concentrations for multiple stations for the period May-October 1992. Station names and locations are presented in Table 9. Because of the limited number of stations sampled during other years and the lack of reasonable information for the estimation of nutrient loads (see below), additional water quality descriptions sufficiently detailed for model evaluation were not available.

The existence of backwater areas upstream from Walter F. George Lake precluded computation of nutrient loads for the Chattahoochee River using paired observations of nutrient concentration and gauged flow. Instead time-weighted mean nutrient concentrations for the lake water quality sampling station located near Bluff Creek Park were used to estimate inflow nutrient concentrations. Mean flow was estimated from operations records<sup>2</sup> as the mean of differences in daily pool volume and discharge. Since a majority of the water load to Walter F. George Lake is associated with the Chattahoochee River, and since information required for estimating land-use nutrient contributions from contiguous areas was lacking, the Chattahoochee River inflow was assumed to be the sole source of water and nutrient loads.

Mean, mixed-layer total phosphorus and nitrogen concentrations, chlorophyll a concentrations, and Secchi disk transparency values were computed for the growing season for all model segments (Table 10). In general, nutrient concentrations declined with distance downstream. Chlorophyll a concentrations, however, were relatively unchanged across segments.

#### Lake Sidney Lanier

Water quality data for Lake Sidney Lanier were obtained only for 1973. Efforts to include data collected more recently were complicated by the limited number of stations sampled (often a single near-dam station), infrequent sample collection, or the lack of appropriate eutrophication response variables. Data collected as part of a USEPA-sponsored CLDFS performed by the University of Georgia<sup>3</sup> were not available at the time this study was conducted.

Personal Communication, 1993, David Bayne, Department of Fisheries and Allied Aquaculture, Auburn University, Auburn, AL.

Personal Communication, 1993, Diane Findley, Planning Division, U.S. Army Engineer District, Mobile, Mobile, AL.

<sup>&</sup>lt;sup>3</sup> Personal Communication, 1993, Kathryn J. Hatcher, Institute of Natural Resources, University of Georgia, Athens, GA.

Data for 1973 were collected as part of the USEPA NES study (USEPA 1978). Stations for which data were available and the segments with which they were associated for the purpose of this study are listed in Table 11. Mean concentrations and associated CV values for total phosphorus, total nitrogen and chlorophyll a concentrations, and Secchi depths are presented in Table 12.

Low nutrient and chlorophyll a concentrations indicate that at the time of sample collection, Lake Sidney Lanier was oligotrophic to mesotrophic. A notable exception was segment 14, which was clearly influenced by excessive nutrient inputs from waste treatment facilities located on Flat Creek, a major tributary to this portion of the lake (see also below). Nutrient concentrations were also higher in the upstream portions of the Chattahoochee River arm (segment 16) and the Chestatee River arm (segment 4).

Mean streamflows and total phosphorus and nitrogen concentrations for major tributaries, also obtained from the NES study, are listed in Table 13. While similarities were apparent for most streams, Limestone Creek and, especially, Flat Creek exhibited markedly elevated total phosphorus concentrations. Total nitrogen concentrations for Flat Creek were also elevated. These observations were related to the existence of significant point and nonpoint nutrient sources. Values for nonpoint source inputs from contiguous watershed areas were based averaged values for selected gauged streams. Resulting values for total phosphorus and total nitrogen concentrations were 52 µg P/L and 850 µg N/L, respectively.

#### West Point Lake

Water quality data for West Point Lake were obtained for 1990 and 1991. Data describing water quality conditions at six stations located along the major axis of the Chattahoochee River portion of the lake were collected by the Georgia Department of Natural Resources (GDNR) (GDNR 1991). These data were collected as part of a GDNR intensive monitoring program conducted during the period April through October 1990.

Water quality data collected as part of an extensive survey conducted for the U.S. Army Engineer District, Mobile, by the U.S. Army Engineer Waterways Experiment Station (Kennedy et al. 1994) were used to estimate conditions during 1991. This study involved the collection of selected water quality data for 56 stations distributed throughout major portions of the lake, including embayments and large coves. Names of stations identified in the original data sets for each year and the model segment with which they were associated are presented in Table 14.

Mean, mixed-layer summaries of total nitrogen, total phosphorus, and chlorophyll a concentrations, and Secchi disk transparency were computed for each model segment for the growing season of each year. Station means were averaged for segments having multiple stations. Data

summaries (mean and CV) for 1990 and 1991 are presented in Tables 15 and 16, respectively.

Nutrient and water loads for 1990 were computed based on information for the Chattahoochee River reported by the U.S. Geological Survey (USGS) (Stokes, McFarlane, and Buell 1990). Similar data for secondary tributaries were not available. Unfortunately, nutrient-loading information was limited to total phosphorus; appropriate data for computing total nitrogen loads were not collected for sites located reasonable distances upstream from the lake. Total phosphorus loads were computed using FLUX and total phosphorus concentrations observed at the USGS gauge site located at Franklin, GA. Since this area is frequently influenced by fluctuating lake levels, the USGS does not collect coincident discharge data. Therefore, flows were estimated based on observed flows at the USGS gauge at Whitesburg, GA. This was accomplished by estimating the rate of increase in flow between successive gauge sites and extrapolating observed flows at Whitesburg to Franklin. Mean flow and total phosphorus concentration determined for the growing season for 1990 were 3,926 hm<sup>3</sup>/year ( $10^6$  m<sup>3</sup>/year) and 178.8 µg P/L, respectively.

In addition to flow and total phosphorus concentration data for 1991 for the Chattahoochee River at Franklin, GA, which were summarized using methods described above for 1990, data were also collected for selected secondary tributaries to the lake (Kennedy et al. 1994). Staff gauges were installed on Yellowjacket, Shoal, and Beech creeks, and observed weekly coincident with water sample collection. Stage-discharge relations, based on periodic measurement of streamflow, channel cross section, and stage by the USGS, were used to estimate flow from stage elevation. Continuous (daily) flow records were established by comparing observed flows with those recorded at the USGS gauge located on New River; resulting relations were used to generate daily records for each tributary based on daily flows in New River.

Estimates of discharge for Whitewater Creek were obtained using a small rotating bucket flowmeter. Multiple measurements were area-averaged using cross-section geometry (Kennedy et al. 1994). Flow measurements and the collection of water samples occurred weekly. Total phosphorus load for this tributary was computed as the product of the flow-weighted average total phosphorus concentration and average flow.

Nutrient load estimates were obtained from estimated flows and observed nutrient concentrations using FLUX. While nitrogen loads were computed for each of the sampled secondary tributaries, a similar estimate was not computed for the Chattahoochee River for reasons discussed above. Mean tributary flows and total phosphorus concentrations for 1991 are presented in Table 17.

The contribution of water and total phosphorus from ungauged areas contiguous with the lake for both 1990 and 1991 were based on estimated runoff and tributary nutrient data for 1991. In doing so, it was assumed

(a) that data for tributaries selected for sampling in 1991 were representative of land-use contributions and (b) that land use was unchanged. Resultant estimates and the model segment with which they are associated are presented in Table 18.

# 5 Model Application

### Introduction

The empirical model BATHTUB (Walker 1987) was employed to describe eutrophication-related characteristics and to assess potential trophic responses to selected changes in loading. Data summarizing growing-season conditions were used to calibrate the model for each reservoir. Since these reservoirs exhibited marked spatial heterogeneity, calibration was based on regional groupings of model segments. In general, main stem segments were grouped to best describe longitudinal gradients in nutrient and chlorophyll a concentrations. Additionally, descriptions of segments located in major embayments were improved by regional calibration. Default model coefficients were applied to segments lacking observed data and a logical association with other regional groupings.

Calibrated models were verified by comparison of predicted and observed responses following application to an independent data set. As mentioned in Chapter 4, appropriate verification data sets were not available for Lake Sidney Lanier and Walter F. George Lake. Evaluations of model performance are presented in the following section.

# Results

#### Allatoona Lake

A total of 10 model segments distributed across four regions were identified for Allatoona Lake based on morphometric, land-use, and water quality considerations (Figure 2, Table 19). Major regions included Allatoona Creek embayment (region 1), Little River embayment (region 2), Stamp Creek embayment (region 3), and the main portion of the pool extending from the Etowah River inflow to the dam (region 4). While region 2 and 3 consisted of a single segment each, region 1 and 4 consisted of 3 and 5 segments, respectively. The assignment of sampling stations and associated water quality summaries to model segments and regions were presented previously in Tables 1-3.

BATHTUB input files were constructed for 1973 and 1992 (see Appendix A). Since a greater number of stations were sampled during 1992, this year was used for model calibration. However, the lack of reasonable total nitrogen data in 1992 (see Chapter 4) precluded the use of a chlorophyll response model based on composite nutrient (sensu Walker 1985) concentration. Instead, a model incorporating the effects of phosphorus concentration, light, and flushing rate was used to describe chlorophyll response. Changes in pool total phosphorus concentration were described as a second-order reaction.

Comparisons of observed water quality conditions in 1992 and those predicted based on application of BATHTUB employing default coefficients are presented in Figure 3. While reasonable patterns of change in total phosphorus concentration were obtained, concentrations were poorly predicted for segments 1, 4, 6, and 7 (underpredicted) and segment 5 (overpredicted). Despite this, predictions of chlorophyll and Secchi disk responses were reasonable.

Model calibration by region greatly improved model prediction for all response variables (Figure 4). This process involved computation of calibration coefficients providing minimum differences between predicted and observed values across segments within each region. Resulting calibration factors are presented in Table 19.

It was noted that calibration factors for total phosphorus for regions 2 (factor = 6.912) and 3 (factor = 0.123) were unusually distant from a value of 1.0. These extreme deviations resulted from differences in concentration between tributary streams and the receiving lake segment. For Stamp Creek embayment, calculated mean inflow total phosphorus concentration was 24.4  $\mu$ g P/L, while the mean mixed-layer total phosphorus concentration for segment 5, the segment into which Stamp Creek flows, was 33.8  $\mu$ g P/L. Assuming both concentrations to be correct, such differences would suggest that other, unsampled sources of total phosphorus led to the observed total phosphorus concentration in Stamp Creek embayment. Thus, predictions for Stamp Creek embayment may be unreliable.

Differences between the mean total phosphorus concentrations for Noonday Creek and Little River (150.0  $\mu g$  P/L and 50.0  $\mu g$  P/L, respectively), and Noonday Creek embayment (segment 4) suggest that phosphorus losses because of sedimentation were high for this region of the lake. Alternatively, failure to use a sedimentation model addressing partitioning of phosphorus between particulate and dissolved forms inflated the calibration factor. However, assuming that conditions in this portion of the lake and basin remain relatively unchanged, reasonable predictions for this segment should be possible.

Applicability of the calibrated BATHTUB model for Allatoona Lake was verified by application using loading information for 1973. Comparisons between predicted and observed response variables (Figure 5) indicate that the model performs relatively well. While total phosphorus

concentration was underpredicted for segments 6 and 8, water quality predictions for other segments and those for chlorophyll and Secchi disk were not significantly different from observed conditions. Performance of the model for regions 2 and 3 could not be evaluated because of lack of observed data (see Appendix A for BATHTUB input files).

### Walter F. George Lake

Seven model segments were defined for Walter F. George Lake (Figure 6). These segments were associated as a single, linear region extending from a point near Bluff Creek Park to the dam. As indicated above, water quality data for the lake station at Bluff Creek Park were used for estimation of inflow conditions and were not included with observed lake water quality data for this application.

Since both nitrogen and phosphorus data were available for 1992, model options involving the prediction of chlorophyll response based on changes in composite nutrient concentration were evaluated. Comparison with model results in which chlorophyll responses were estimated based solely on total phosphorus concentration led to a decision to include both nutrients in subsequent model applications. The model estimated changes in chlorophyll based on the combined effects of composite nutrient concentration, light, and flushing. In the absence of information concerning nutrient partitioning, the availability factors for total nitrogen and phosphorus were set to a value of 1.0. Changes in total nitrogen and phosphorus were described as a second-order reaction.

Comparisons of observed and predicted water quality responses for 1992 based on application of BATHTUB employing default coefficients and the above model assumptions are presented in Figures 7 and 8. Total nitrogen and phosphorus concentrations were estimated reasonably well in mid and uplake segments, but underestimated in downstream segments. Chlorophyll concentrations and Secchi disk transparency were poorly estimated by the uncalibrated model.

Model calibration against observed data for 1992 greatly improved model predictions (Figures 9 and 10). During initial calibration attempts, accounting for the shape of longitudinal changes in water quality resulted in improved predictions for downstream segments but poor predictions for segment 1. This result was due to similarities in water quality conditions in segment 1 and those at the station used for describing inflow conditions. To compensate for this shortcoming, calibration factors for segment 1 were set to default values for all response variables. Resultant calibration factors are presented in Table 20 (see Appendix B for BATHTUB input files).

# Lake Sidney Lanier

Morphologic and water quality features for Lake Sidney Lanier were addressed by delineating 21 model segments (Figure 11). Features addressed included embayments associated with the inflow of the Chestatee and Chattahoochee rivers, both of which exhibited longitudinal gradients; embayments associated with Wahoo Creek and neighboring tributaries; a series of small embayments associated with the main portion of the lake but receiving inflows from several secondary tributaries; and the area proximal to the confluence of the lake with Flat Creek, a tributary with markedly higher nutrient concentrations because of the influence of point sources.

Water quality and loading data collected in 1973 as part of an NES study were used for model evaluation and calibration. Since both nitrogen and phosphorus data were available, a response model incorporating the effects of composite nutrient concentration was applied (see Appendix C for BATHTUB input files). Initial application of the model using default coefficients indicated a reasonable correspondence between predicted and observed values (Figures 12 and 13).

Large differences were apparent, however, for nutrient concentrations for selected segments (Figure 12). Total nitrogen concentration was greatly overpredicted for segments 11 and 12. This observation may be related to overestimation of inflow nitrogen concentrations, which were based on a basin-wide summary, or the potentially long retention time in Young Deer and Bald Ridge embayments. Predicted total phosphorus concentrations were markedly below observed concentrations for segment 4 (Yellow Creek) and segment 9 (Four Mile Creek and Six Mile Creek embayment). While loading data were available for Four Mile Creek, potentially inaccurate estimates for Yellow Creek and Six Mile Creek may have led to poor predictions for these two segments. Reasonable predictions of chlorophyll concentration were obtained for most segments (Figure 13). Noteworthy is the two-fold overprediction for segment 16, located immediately downstream from the inflow of the Chattahoochee River.

Regional calibration greatly improved performance of the model (Figures 14 and 15). Segment associations for calibration were based on review of observed water quality data and iterative evaluation of model performance using alternative associations. Regional calibration groups and corresponding calibration factors are presented in Table 21. As discussed in Chapter 4, shortcomings in other data sets precluded verification of calibration values based on 1973 data.

#### **West Point Lake**

Twenty-two model segments were delineated for the application of BATHTUB to West Point Lake (Figure 16). The number and location of segments were based on recent assessments of patterns in water quality (Kennedy et al. 1994) and lake geometry. The Chattahoochee River portion of the lake was represented by 13 segments, while the two major embayments, Yellowjacket and Wehadkee Creek embayments, were each represented by a single segment each. Additional segments were added for major coves and other important embayment areas. These include Potato, Wolf, and Brush Creek embayments, New River and Maple Creek embayments, and Whitewater and Thompson Creek embayment.

Data for 1991 were used for initial model evaluation and for subsequent model calibration; verification of model calibration was performed using data for 1990 (see Appendix D for BATHTUB input files). As indicated in Chapter 4, the absence of adequate data describing total nitrogen loads to the lake from the Chattahoochee River precluded consideration of nitrogen in evaluations of models for describing or predicting chlorophyll a concentration. While this shortcoming could impact predictions in upstream reaches of the Chattahoochee River portion of the lake, where nitrogen to phosphorus ratios indicate the potential for limitation by phosphorus (Kennedy et al. 1994), highly turbid conditions and excessive nutrient concentrations suggest that other factors would control algal responses here.

Mixed-layer total phosphorus concentrations in 1991 decreased with increasing distance from the Chattahoochee River inflow (segments 12, 13, and 15), but were relatively unchanged in downstream portions of the lake (segments 17, 18, and 20-23). In general, total phosphorus concentrations for selected coves and embayments (segments 2, 5, and 7-9) were similar to or less than those observed in the downstream portion of the lake. Initial model application using default calibration resulted in overprediction of concentrations throughout the Chattahoochee River portion of the lake; predictions for cove and embayment sites were similar to those observed (Figure 17).

While predicted chlorophyll a concentrations were in reasonable agreement with those observed for the downstream portion of the lake and for coves and embayments, those for upstream segments were nearly double those observed (Figure 17). This latter difference was potentially related to the effects of nonalgal turbidity and inflow processes on expected relations between nutrient concentration and algal response.

Despite the above differences in chlorophyll a concentrations, marked differences between observed and predicted Secchi depth were not apparent for most upstream segments (Figure 17). Exceptions were segments 15 and 16, both of which are located near the region of transition from riverine to lake-like conditions. Since prediction of Secchi disk depth is based on the combined effects of predicted chlorophyll a concentrations

and observed nonalgal turbidity, predicted values would be determined to a great extent by the presence of nonalgal particulates.

Model calibration greatly improved model performance (Figure 18). Longitudinal gradients in the main stem were well described, as were responses for major tributary embayments. Model calibration values and the assignment of model segments to regions are presented in Table 22.

Subsequent application of BATHTUB to observed data for 1990 provides independent evidence of model performance (Figure 19). As was noted for 1991, longitudinal gradients in the main stem were well described. Since data were not available for segments located in tributary embayments, verification of model performance in these areas of the lake was not possible.

# 6 Water Quality Response Assessment

# Introduction

Two different loading scenarios, both of which are relevant to current management issues, were evaluated for each reservoir. In the first, observed inflow nutrient concentrations were increased and decreased by 50 percent while holding average water loads constant. Such changes would be expected if processes controlling nutrient contributions alone were affected by watershed activities. These would include, for example, decreased nutrient contributions from point sources following management efforts to increase wastewater treatment efficiencies or increases because of increased demands on existing waste treatment facilities. The second evaluation scenario involved similar changes in water inflow rates while holding nutrient concentrations constant. Although such changes result in 50-percent changes in nutrient mass loads (i.e., mass of nutrient delivered to the lake during the summary period), model assumptions are based on inflow nutrient concentrations; therefore, this scenario allows evaluation of changes in flushing rate. Such changes could occur if processes affecting change in the quantity of water delivered to the lake were modified. While other scenarios could be developed, these two provide a reasonable evaluation of the possible-direction and magnitude of lake response given changes in nutrient concentration or water loading. Results of these evaluations are presented in the following sections.

# Results

#### Allatoona Lake

Changes in the average inflow total phosphorus concentration from the Etowah River markedly impacted mixed-layer total phosphorus concentrations in the upstream portion of the main stem of the lake (Figure 20). However, concentration changes in more downstream segments and, in

particular, near the dam were proportionally smaller (± 15 percent). Sedimentary losses in upper to midlake regions would account for such differences. Increases in water retention time (i.e., decreased water inflow rate), while reducing total phosphorus concentrations throughout, did not result in marked longitudinal changes.

Trophic response to changes in inflow total phosphorus concentrations were pronounced in upstream segments because of increased nutrient availability (Figure 21). Like changes in mixed-layer nutrient concentrations, the magnitude of changes in chlorophyll eoncentration decreased with increasing distance downstream. Changes in Secchi depth, which are determined in the model by the combined effects of fixed values of nonalgal turbidity and predicted changes in chlorophyll concentration, were less pronounced. Changes in trophic response following changes in water inflow rate were minimal (Figure 22). Such a result would be expected given the small changes in nutrient levels and the fact that retention times are long relative to algal growth rates.

### Walter F. George Lake

Changes in nutrient and trophic responses reflect the narrow morphometry and advective characteristics of Walter F. George Lake. As was noted from observed data, this impoundment exhibits marked gradients in water quality. Nutrient concentrations decrease dramatically through the transition from riverine to lake-like conditions in the upstream half of the lake, but are relatively unchanged in downstream areas. A similar pattern is predicted for potential changes in nutrient levels following changes in inflow nutrient concentrations (Figure 23). Because of the advective nature of the upstream reaches of the lake, changes in mixed-layer nutrient levels because of selected changes in water inflow rate are predicted only for downstream segments (Figure 23).

Predicted trophic responses (Figure 24) reflect the combined influences of longitudinal changes in mixed-layer nutrient concentrations and in-lake flow regime. Changes in chlorophyll concentration were greatest in upstream segments; concentrations declined sharply in midlake. It is interesting to note the possible downstream shift in chlorophyll maximum when inflow nutrient concentration was reduced by 50 percent. Changes in chlorophyll concentration in upstream areas were unchanged by changes in flow evaluated in this study. This would be expected since algal standing crop here is likely controlled by flushing rate. Secchi depths, while relatively unchanged at upstream locations, were greatly increased in downstream areas with a 50-percent decline in inflow nutrient concentrations.

### Lake Sidney Lanier

Observed and predicted mixed-layer nutrient concentrations for model segments for the two major tributary arms of Lake Sidney Lanier are presented in Figure 25. Sharp declines in mixed-layer nutrient levels reflect sedimentary losses as channel dimensions and water residence increase. As a result, little change was predicted for downstream areas of the lake. Similar conclusions follow assessment of nutrient changes in response to changes in water inflow rates.

Few changes in trophic response are predicted for selected (±50 percent) changes in either inflow nutrient concentration or water load (Figure 26). This outcome is related, in part, to the small ratio of water load to lake volume. With the exception of the riverine-dominated portions of the lake, chlorophyll concentrations are low and nearly uniform across model segments.

Since Lake Sidney Lanier is morphologically complex, lake trophic responses were summarized for individual lake regions (Figure 27). Downstream regions of the lake and associated embayments (region 1) would be expected to change little following the changes in nutrient or water inputs chosen for this evaluation. However, moderate changes would be expected for the Chattahoochee and Chestatee River arms (region 3 and 4, respectively). Changes would be minimal for the Flat Creek area (region 2) and the Wahoo Creek embayment (region 5). Such a result would be expected since these areas are relatively isolated from inflows from the major tributaries. While data availability precluded realistic assessments of the Wahoo Creek embayment, manipulations of nutrient concentrations for Flat Creek markedly influenced trophic response in the Flat and Balus Creek embayment.

#### **West Point Lake**

West Point Lake exhibits strong longitudinal gradients in water quality. As documented by Kennedy, Thornton, and Gunkel (1982) and Kennedy et al. (1994), these gradients are related to mixing and flow regimes, high nutrient levels, and the influence of nonalgal turbidity on algal productivity. In general, nutrient and nonalgal turbidity levels decline sharply as riverine influences lesson with increased distance from the Chattahoochee River inflow. As nonalgal turbidity levels decrease (and light levels increase) because of sedimentation, algal production increases. This often results in a mid-lake maxima in the region immediately upstream from the Yellowjacket Creek confluence.

Nutrient and trophic responses predicted here are consistent with past observations of water quality patterns. While changes in inflow rate (±50 percent) had little effect on in-pool total phosphorus levels, marked changes followed changes in inflow total phosphorus concentration

(Figure 28). However, relative differences decreased with increased distance, and nutrient conditions near the dam changed little.

Changes in inflow nutrient concentration greatly influenced trophic response in mid and downlake regions (Figure 29). While the location of the chlorophyll maxima was unchanged, expected concentrations were markedly impacted. However, increases and decreases in inflow rate shifted the location of the chlorophyll maxima downstream and upstream, respectively (Figure 30). This result is anticipated since algal standing crop in this region of the lake is controlled in large part by flushing rate. Since the BATHTUB model does not predict nonalgal turbidity, such changes could not be directly assessed. However, it is possible that changes could accompany efforts to reduce loading from nonpoint sources. Such changes would change the light regime, thus dramatically influencing the distribution and quantity of algal biomass, particularly in the upper reaches of the lake. Kennedy et al. (1994) reached a similar conclusion after evaluating algal and nutrient data for the lake. Lakewide trophic responses to the combined effects of incremental changes in inflow rate and nutrient concentration are presented in Figure 31.

# 7 Summary

The BATHTUB model provides a means for assessing the potential effects of a variety of management alternatives involving changes in nutrient and/or water inputs to reservoirs. This report documents efforts to apply the model to Allatoona Lake, Walter F. George Lake, Lake Sidney Lanier, and West Point Lake. Underlying assumptions are discussed in the context of data reduction and model application.

Changes discussed here were limited to 50-percent increases and decreases in inflow nutrient concentration and discharge rate. The intent was to demonstrate application of the model and to delineate general directions of potential change in lake trophic response. Calibrated models developed here (see model input data sets in Appendices A-D) provide lake managers with the opportunity to assess additional or future management alternatives.

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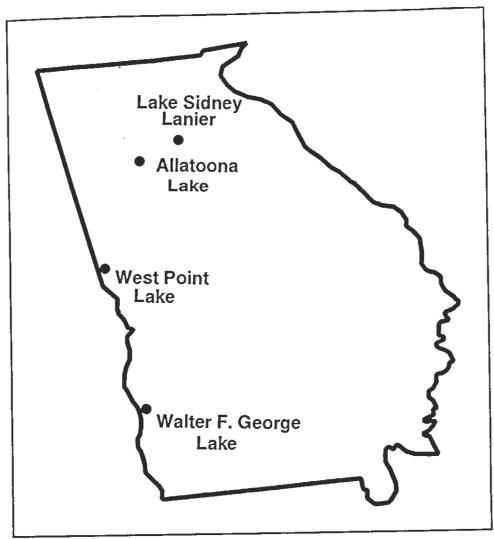


Figure 1. Map of study area indicating the locations of Allatoona Lake (Coosa River basin) and Lake Sidney Lanier, West Point Lake, and Walter F. George Lake (Chattahoochee River basin)

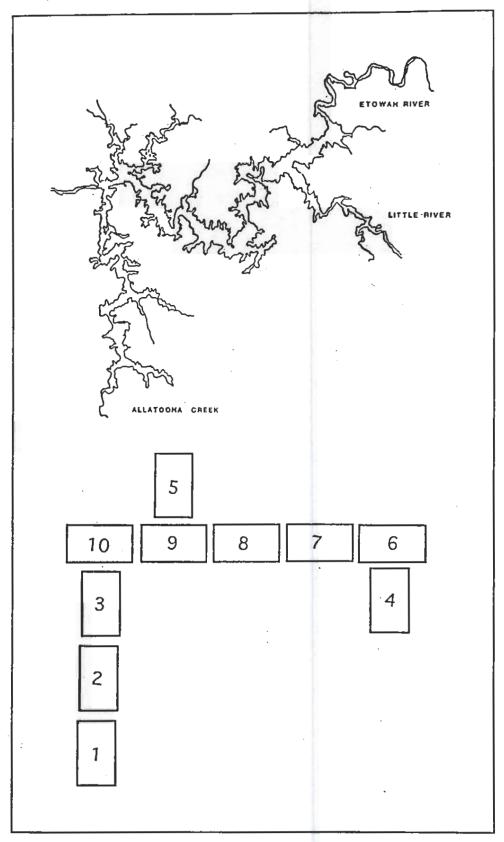


Figure 2. Map of Allatoona Lake (top) and assigned locations of model segments (bottom). Contiguous segments are hydraulically linked

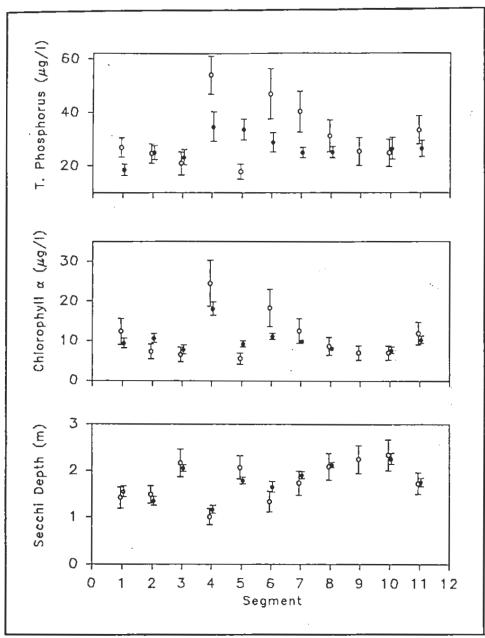


Figure 3. Observed (solid circles) and predicted (open circles) total phosphorus concentrations, chlorophyll a concentrations, and Secchi depths for modeled segments of Allatoona Lake for 1992. Predicted values based on default calibration factors. Vertical bars represent observed and predicted variability. Segment 11 represents the lakewide, weighted average

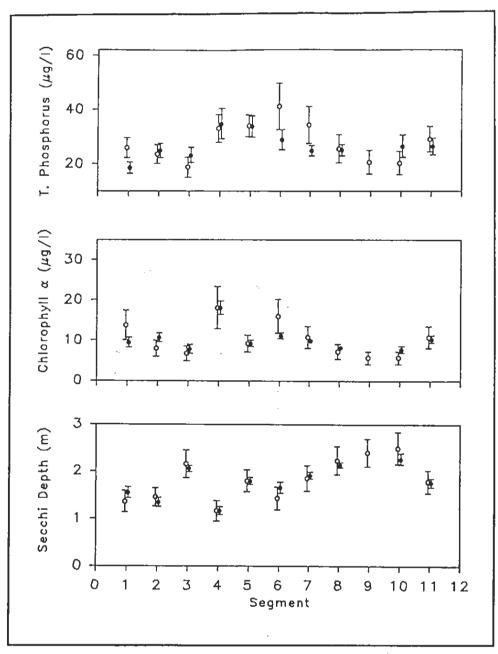


Figure 4. Observed (solid circles) and predicted (open circles) total phosphorus concentrations, chlorophyll a concentrations, and Secchi depths for modeled segments of Allatoona Lake for 1992. Predicted values based on computed calibration factors. Vertical bars represent observed and predicted variability. Segment 11 represents the lakewide, weighted average

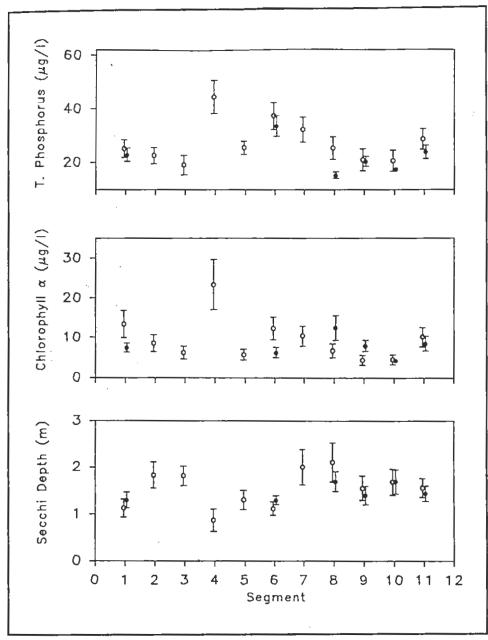


Figure 5. Observed (solid circles) and predicted (open circles) total phosphorus concentrations, chlorophyll a concentrations, and Secchi depths for modeled segments of Allatoona Lake for 1973. Predicted values based on computed calibration factors for 1992. Vertical bars represent observed and predicted variability. Segment 11 represents the lakewide, weighted average

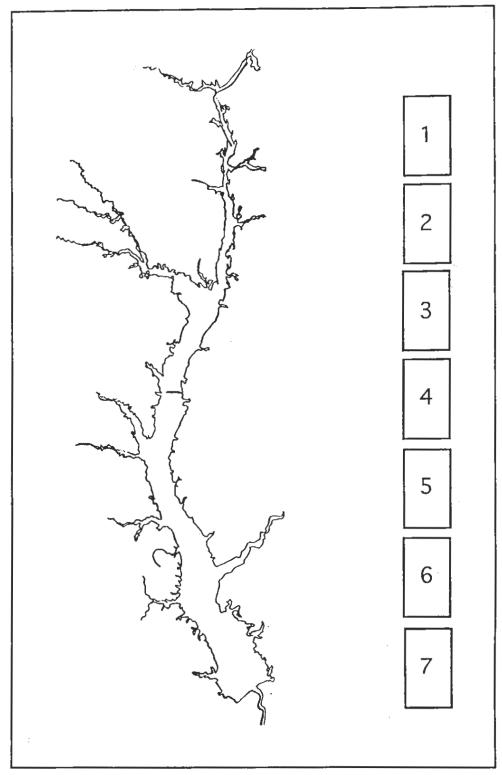


Figure 6. Map of Walter F. George Lake (left) and assigned locations of model segments (right). Contiguous segments are hydraulically linked

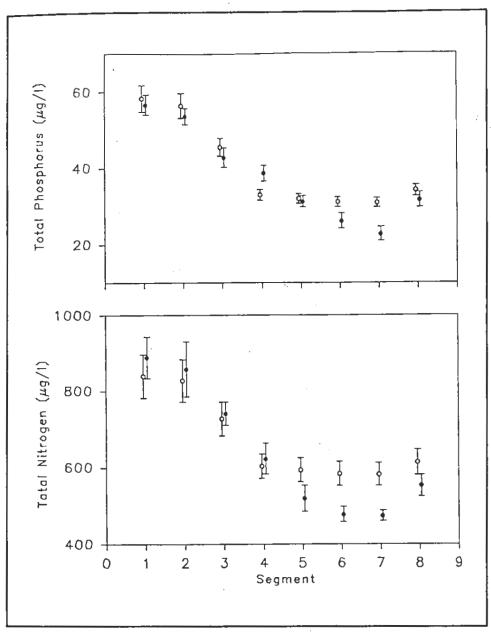


Figure 7. Observed (solid circles) and predicted (open circles) total phosphorus and total nitrogen concentrations for modeled segments of Walter F. George Lake for 1992. Predicted values based on default calibration factors. Vertical bars represent observed and predicted variability. Segment 8 represents the lakewide, weighted average

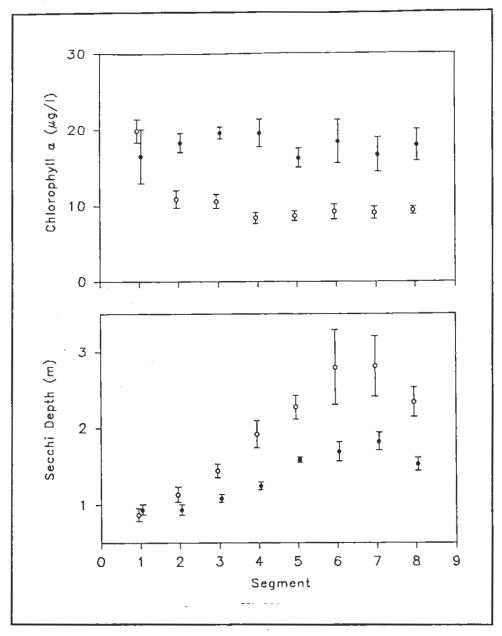


Figure 8. Observed (solid circles) and predicted (open circles) chlorophyll a concentrations and Secchi depths for modeled segments of Walter F. George Lake for 1992. Predicted values based on default calibration factors. Vertical bars represent observed and predicted variability. Segment 8 represents the lakewide, weighted average

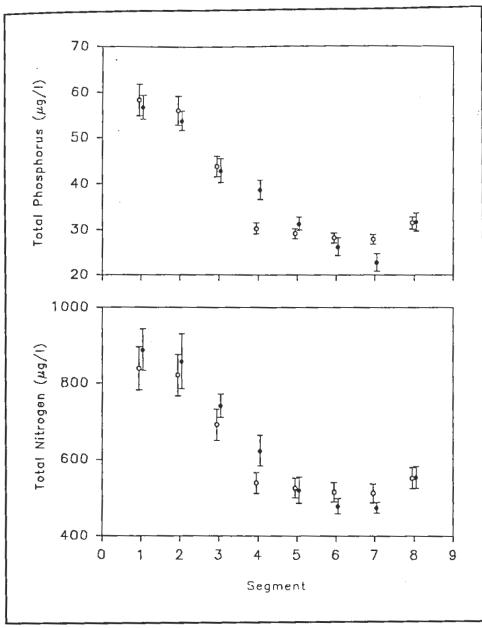


Figure 9. Observed (solid circles) and predicted (open circles) total phosphorus and total nitrogen concentrations for modeled segments of Walter F. George Lake for 1992. Predicted values based on computed calibration factors. Vertical bars represent observed and predicted variability. Segment 8 represents the lakewide, weighted average

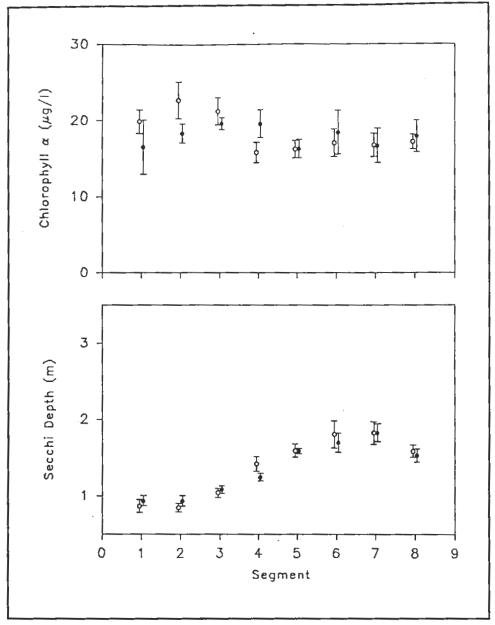
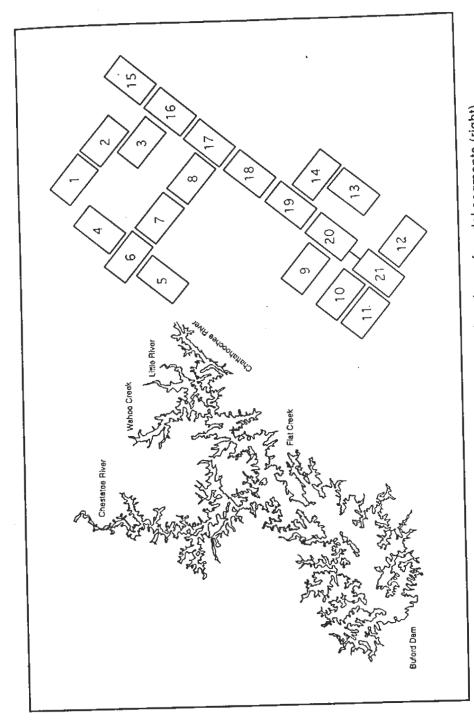


Figure 10. Observed (solid circles) and predicted (open circles) chlorophyll a concentrations and Secchi depths for modeled segments of Walter F. George Lake for 1992. Predicted values based on computed calibration factors. Vertical bars represent observed and predicted variability. Segment 8 represents the lakewide, weighted average



Map of Lake Sidney Lanier (left) and assigned locations of model segments (right). Contiguous segments are hydraulically linked Figure 11.

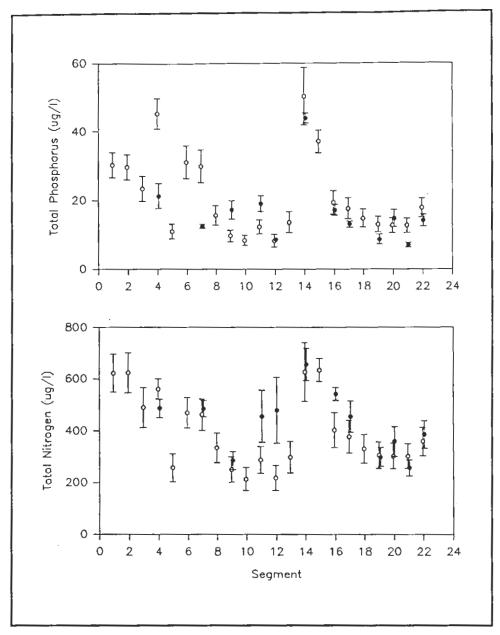


Figure 12. Observed (solid circles) and predicted (open circles) total phosphorus and total nitrogen concentrations for modeled segments of Lake Sidney Lanier for 1973. Predicted values based on default calibration factors. Vertical bars represent observed and predicted variability. Segment 22 represents the lakewide, weighted average

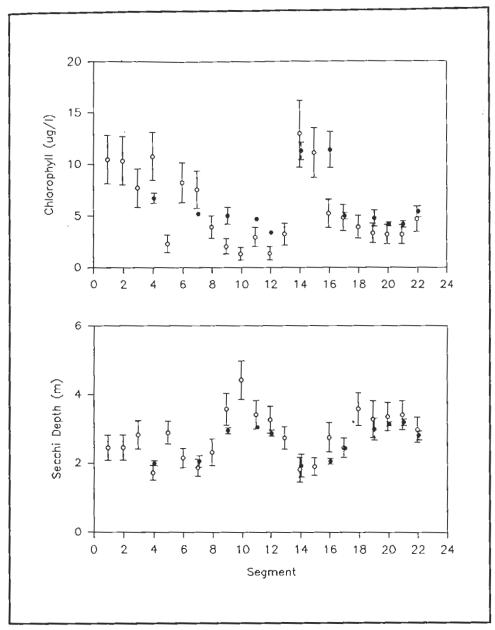


Figure 13. Observed (solid circles) and predicted (open circles) chlorophyll a concentrations and Secchi depths for modeled segments of Lake Sidney Lanier for 1973. Predicted values based on default calibration factors. Vertical bars represent observed and predicted variability. Segment 22 represents the lakewide, weighted average

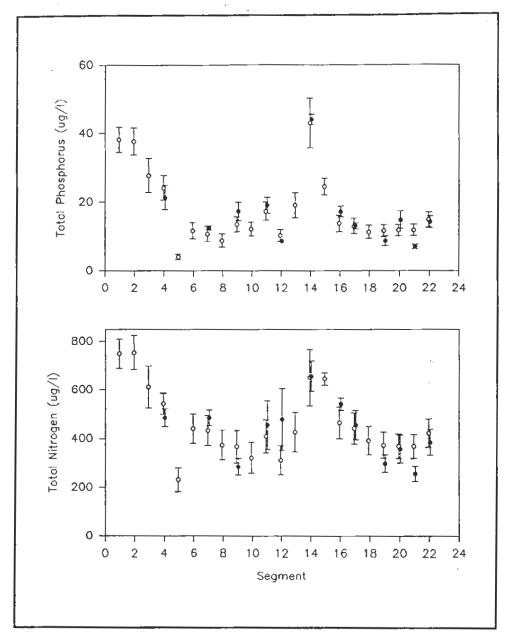


Figure 14. Observed (solid circles) and predicted (open circles) total phosphorus and total nitrogen concentrations for modeled segments of Lake Sidney Lanier for 1973. Predicted values based on computed calibration factors. Vertical bars represent observed and predicted variability. Segment 22 represents the lakewide, weighted average

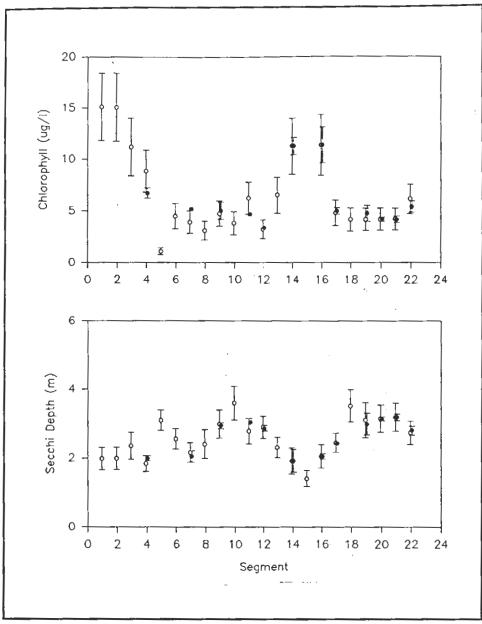
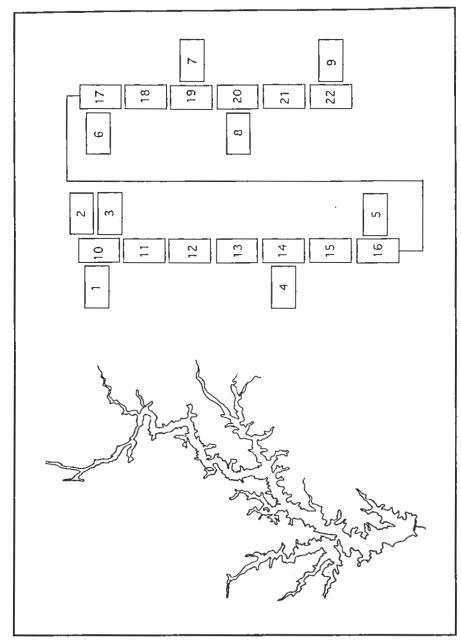


Figure 15. Observed (solid circles) and predicted (open circles) chlorophyll a concentrations and Secchi depths for modeled segments of Lake Sidney Lanier for 1973. Predicted values based on computed calibration factors. Vertical bars represent observed and predicted variability. Segment 22 represents the lakewide, weighted average



Map of West Point Lake (left) and assigned locations of model segments (right). Contiguous segments are hydraulically linked Figure 16.

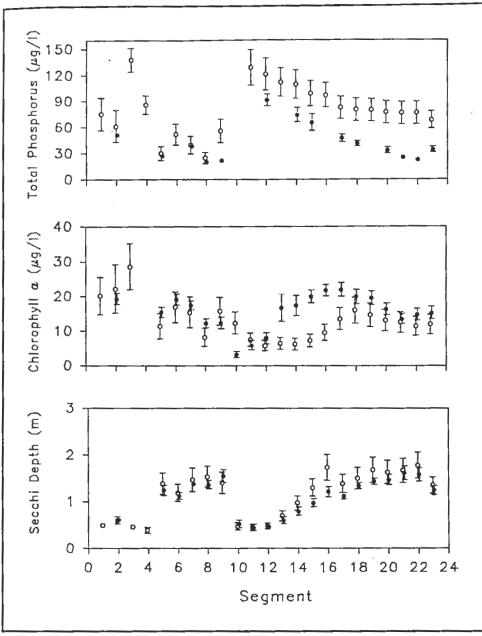


Figure 17. Observed (solid circles) and predicted (open circles) total phosphorus concentrations, chlorophyll a concentrations, and Secchi depths for modeled segments of West Point Lake for 1991. Predicted values based on default calibration factors. Vertical bars represent observed and predicted variability. Segment 23 represents the lakewide, weighted average

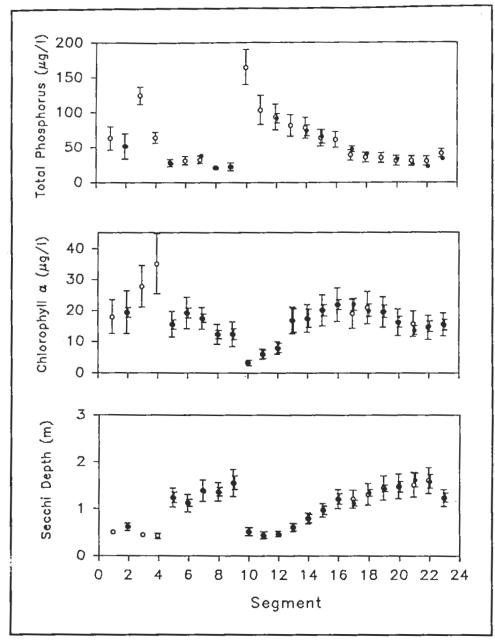


Figure 18. Observed (solid circles) and predicted (open circles) total phosphorus concentrations, chlorophyll a concentrations, and Secchi depths for modeled segments of West Point Lake for 1991. Predicted values based on computed calibration factors. Vertical bars represent observed and predicted variability. Segment 23 represents the lakewide, weighted average

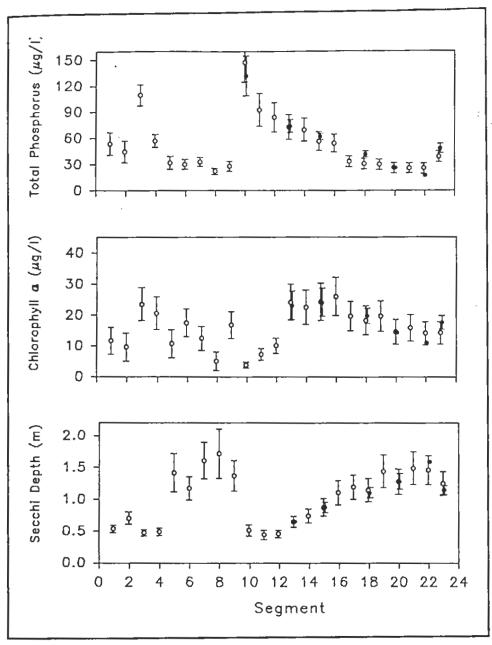


Figure 19. Observed (solid circles) and predicted (open circles) total phosphorus concentrations, chlorophyll a concentrations, and Secchi depths for modeled segments of West Point Lake for 1990. Predicted values based on computed calibration factors for 1991. Vertical bars represent observed and predicted variability. Segment 23 represents the lakewide, weighted average

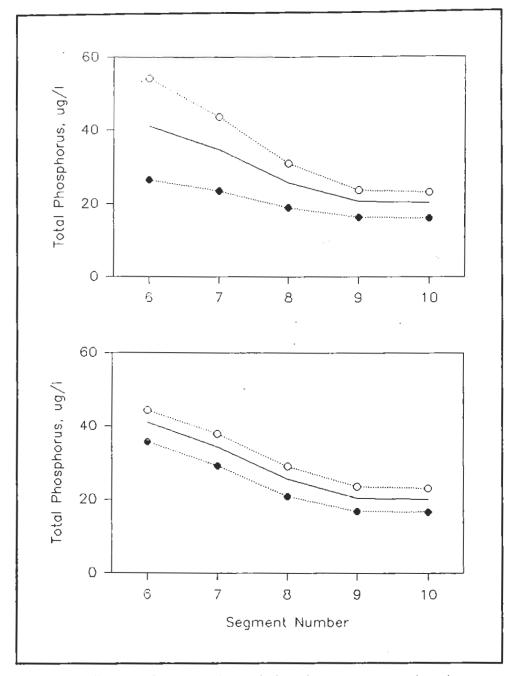


Figure 20. Predicted changes in total phosphorus concentrations in Aliatoona Lake associated with changes in inflow nutrient concentration (upper) and inflow volume (lower). Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data (solid line)

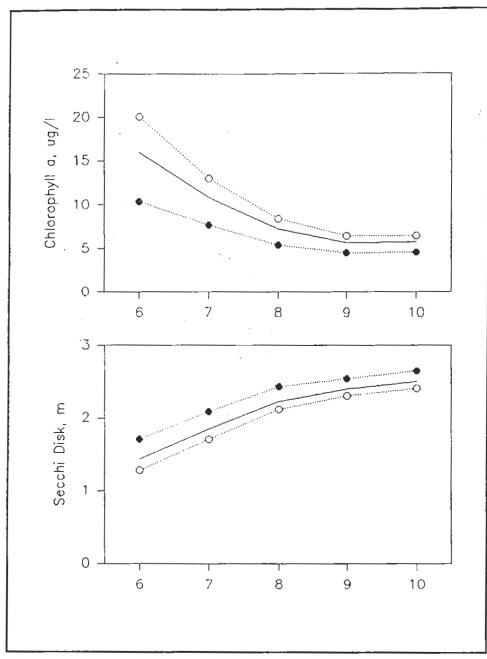


Figure 21. Predicted changes in chlorophyll a concentrations (upper) and Secchi depths (lower) in Allatoona Lake associated with changes in inflow nutrient concentration. Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data (solid line)

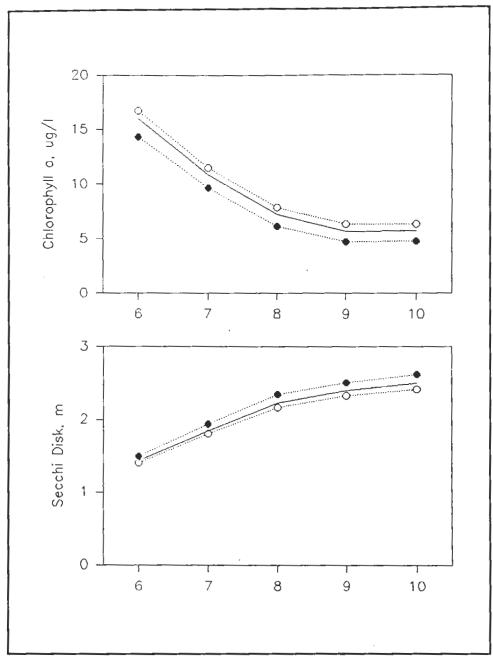
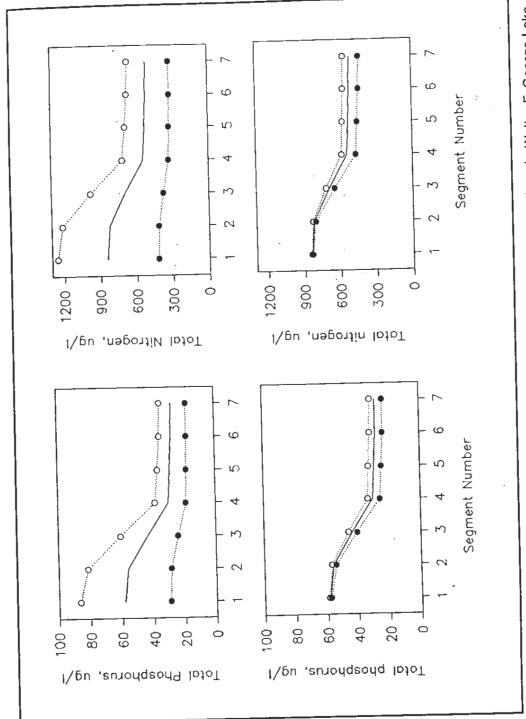
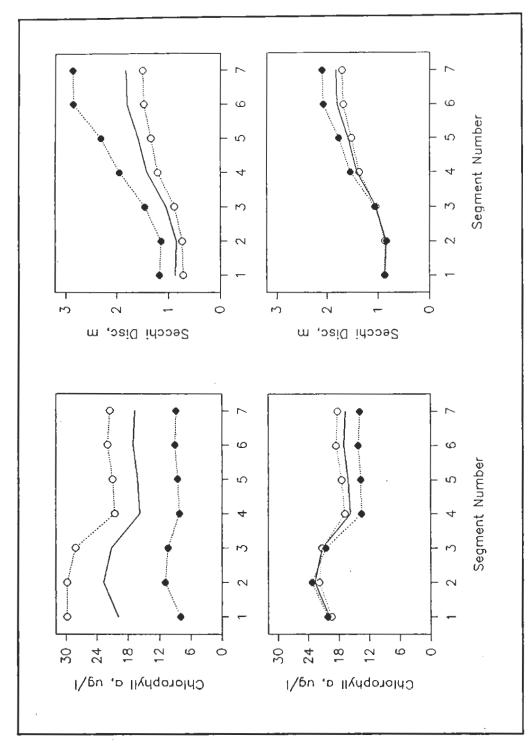


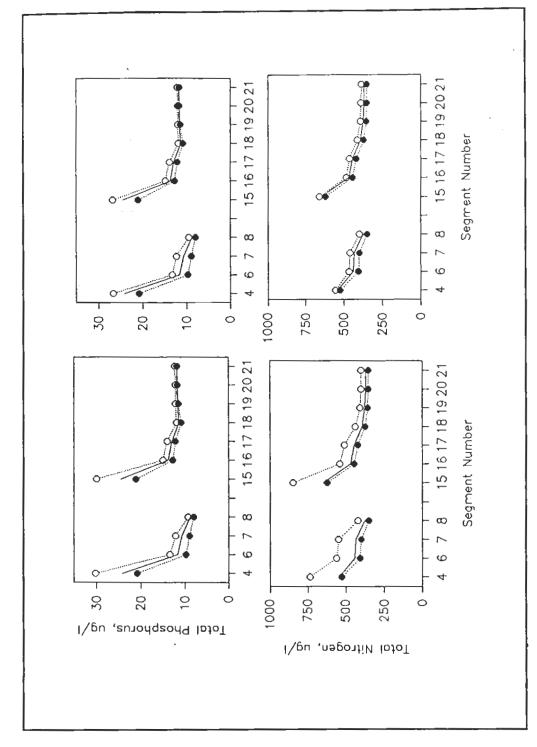
Figure 22. Predicted changes in chlorophyll a concentrations (upper) and Secchi depths (lower) in Allatoona Lake associated with changes in inflow volume. Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data (solid line)



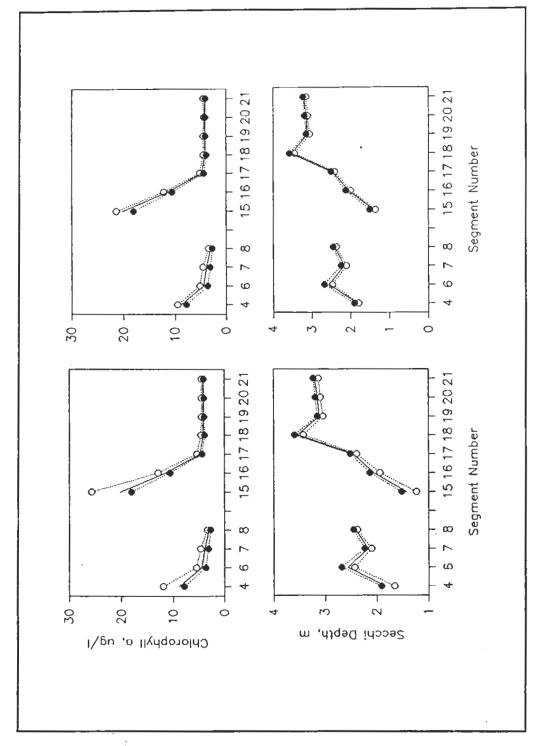
Predicted changes in phosphorus (left) and nitrogen (right) concentrations in Walter F. George Lake associated with changes in inflow nutrient concentration (upper) and inflow volume (lower). Predictions for Increases of 50 percent (closed circles) are compared with observed data Figure 23.



Predicted changes in chlorophyll a (left) and Secchi depth (right) in Walter F. George Lake associated increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data with changes in inflow nutrient concentration (upper) and inflow volume (lower). Predictions for Figure 24.



associated with changes in inflow nutrient concentration (left) and inflow volume (right). Predictions for increases of 50 percent (closed circles) and decreases of 50 percent (closed circles) are compared Predicted changes in phosphorus (upper) and nitrogen (lower) concentrations in Lake Sidney Lanier with observed data Figure 25.



associated with changes in inflow nutrient concentration (left) and inflow volume (right). Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared Predicted changes in chlorophyll a (upper) and Secchi depths (lower) in Lake Sidney Lanier with observed data Figure 26.

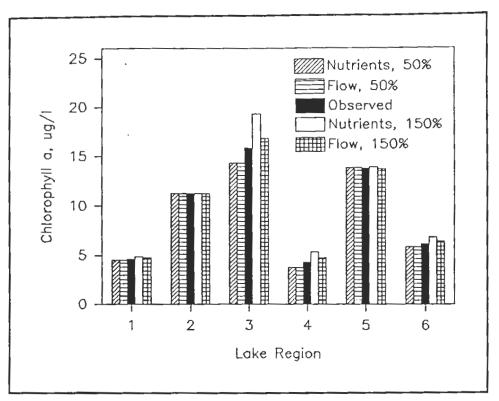


Figure 27. Trophic responses (i.e., changes in chlorophyll a concentrations) of major limnological regions (1-5) of Lake Sidney Lanier to changes in nutrient inflow concentrations and inflow volume. Region 6 is a lakewide summary of predicted responses

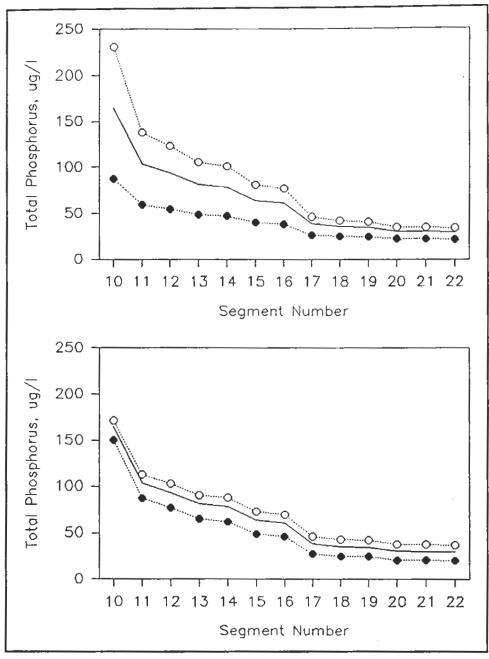


Figure 28. Predicted changes in total phosphorus concentrations in West Point Lake associated with changes in inflow nutrient concentration (upper) and inflow volume (lower). Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data (solid line)

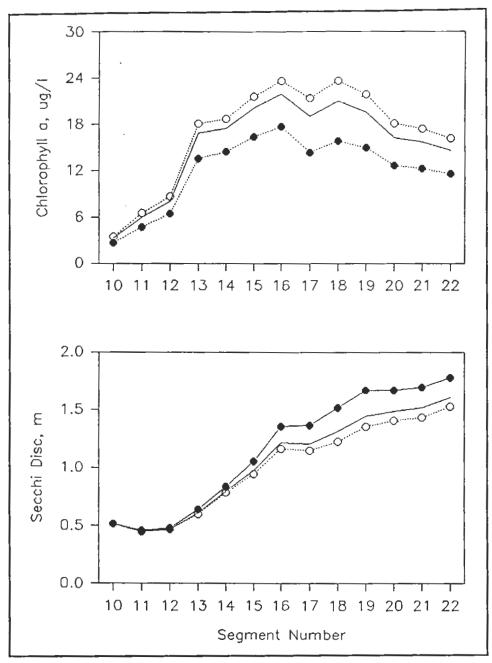


Figure 29. Predicted changes in chlorophyll a concentrations (upper) and Secchi depths (lower) in West Point Lake associated with changes in inflow nutrient concentration. Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data (solid line)

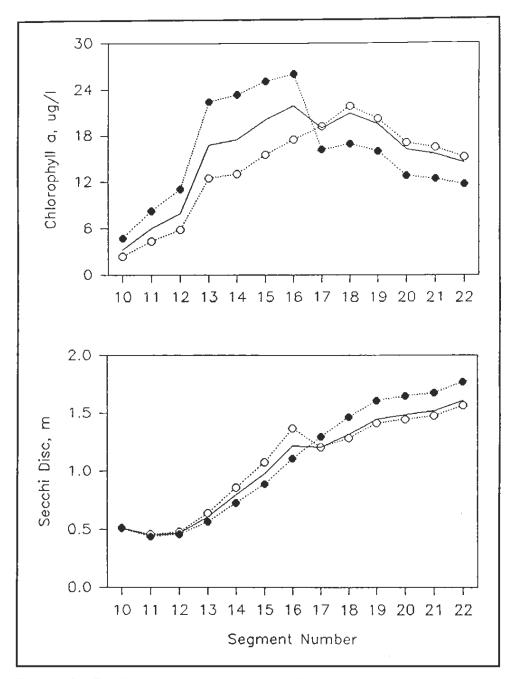


Figure 30. Predicted changes in chlorophyll a concentrations (upper) and Secchi depths (lower) in West Point Lake associated with changes in inflow volume. Predictions for increases of 50 percent (open circles) and decreases of 50 percent (closed circles) are compared with observed data (solid line)

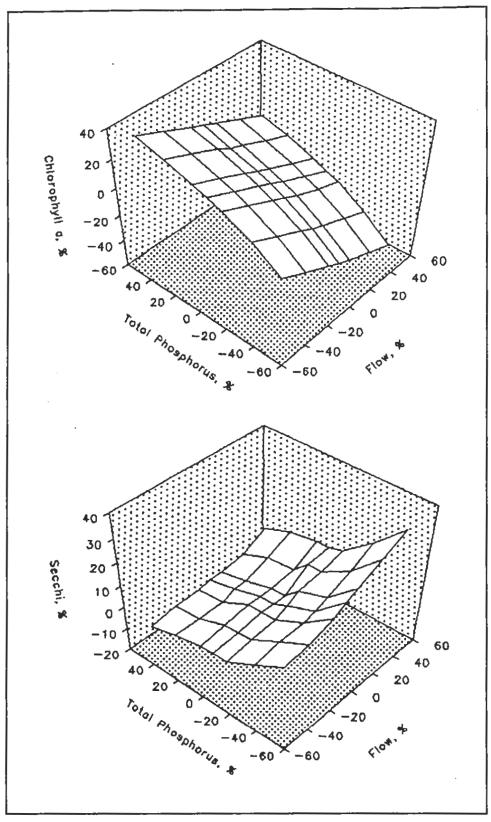


Figure 31. Predicted lakewide trophic response (i.e., changes in chlorophyll a concentrations and Secchi depths) of West Point Lake relative to changes in inflow nutrient concentration and inflow volume

Table 1
Water Quality Sampling Stations Associated with BATHTUB Model
Segments for Allatoona Lake for Calibration (1992) and Verification
(1973) Years (Station descriptions are those identified in the
original data)

	Station Descriptions			
Segment	1973	1992		
1	313	28A Marker		
2	_	Tanyard Creek Embayment		
3		8A-10A Marker		
4	_	Little River Embayment		
5	-	Carter Creek Embayment Stamp Creek Embayment		
6	315 316	44E-45E Marker		
7	_	Kellog/Owl Creek Embayment 39E Marker		
8	314	9E Marker 13E Marker 18E-19E Marker		
9	312	_		
10	311	1E Marker		

Table 2
Mean, Mixed-Layer (i.e., depth < 6 m) Water Quality Conditions,
Including Associated CV Values, for Allatoona Lake, May-October
1973 (CV values calculated as the standard error divided by the
mean)

Segment		Total Phosphorus μg P/L	Total Nitrogen μg N/L	Chlorophyll a μg/L	Secchi, m
1	Mean CV	22.9 0.12	648.5 0.14	7.5 0.17	1.3 0.15
2	Mean CV		_		_
3	Mean CV	=	_	_	_
4	Mean CV	=	_		_
5	Mean CV		_	_	_
6	Mean CV	33.7 0.13	561.6 0.12	6.3 0.27	1.3 0.08
7	Mean CV	_	_	_	
8	Mean CV	15.4 0.09	490.0 0.18	12.5 0.34	1.7 0.14
9	Mean CV	20.4 0.10	677.0 0.23	8.0 0.20	1.4 0.16
10	Mean CV	17.5 0.04	547.3 0.27	4.3 0.06	1.7 0.18

Table 3
Mean Mixed-Layer Water Quality Conditions and Associated CV
Values for Allatoona Lake, May-October 1992 (CV values calculated as the standard error divided by the mean)

Segment		Total Phosphorus μg P/L	Total Nitrogen µg N/L	Chlorophyll a μg/L	Secchi, m
1	Mean	18.5	1,346.7	9.4	1.5
	CV	0.13	0.10	0.15	0.08
2	Mean	24.9	1,560.0	10.7	1.4
	CV	0.12	0.18	0.11	0.08
3	Mean	23.2	2,007.1	7.8	2.1
	CV	0.14	0.21	0.17	0.04
4	Mean	34.8	1,871.1	18.1	1,2
	CV	0.19	0.12	0.10	0.08
5	Mean	33.8	1,617.5	9.2	1.8
	CV	0.13	0.19	0.09	0.04
6	Mean	28.9	1,711.4	11.2	1.7
	CV	0.15	0.29	0.07	0.08
7	Mean	24.9	2,497.9	9.9	1.9
	CV	0.08	0.29	0.05	0.04
8	Mean	25.1	1,653.8	8.3	2.1
	CV	0.09	0.19	0.05	0.03
9	Mean CV	_	_		_
10	Mean	26.5	2,425.0	7.8	2.3
	CV	0.18	0.25	0.12	0.06

Table 4 Median Water Quality Characteristics of Selected Georgia Impoundments and of Those Included in This Study

				The state of the s	
Impoundment	Total Phosphorus μg P/L	Total Nitrogen μg N/L	Chlorophyll a	Secchi, m	Source
Clobert	30	440	15.3	0.9	USEPA
Commerce	70	785	29.3	0.4	USEPA
Chapman	20	470	10.8	1.4	USEPA
Olgethorpe	20	430	10.0	1.5	USEPA
Union Point	30	560	11.1	1.1	USEPA
Blalock	40	1,320	22.9	1.1	USEPA
Shamrock	50	1,020	29.8	1.0	USEPA
Brantley	35	800	22.6	0.6	USEPA
Clarks Hill	24	430	6.7	1.5	NES
Chatuge	14	330	6.3	3.0	NES
Burton	7	270	2.7	3.4	NES
Blackshear	35	690	1.9	0.8	NES
Blue Ridge	10	240	3.1	2.7	NES
Harding	114	880	7.4	0.8	NES
High Falls	47	830	15.1	1.0	NES
Jackson	94	980	14.6	1.0	NES
Nottely	15	325	6.7	2.4	NES
Allatoona 1973 1992	22 25	585 1,682	7.7 10.3	1.5 1.8	NES KSC
W. F. George 1992	39	573	17.9	1.3	AU
Lanier 1973	16	460	5.4	2.6	NES
West Point 1990 1991	52 39	734 797	18.6 14.5	1.1 1.1	GDNR USAEWES

Note: The following codes indicate data source: USEPA -U.S. Environmental Protection Agency (1993), Region IV, Environmental Services Division, Athens, GA.

Division, Athens, GA.

NES -USEPA National Eutrophication Survey.

KSC - Kennesaw State College, Marietta, GA.

AU - Auburn University, Auburn, AL.

GDNR - Georgia Department of Natural Resources (1991), Atlanta, GA.

USAEWES - U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Table 5
Mean Flows and Flow-Weighted Mean Total Phosphorus and Total
Nitrogen Concentrations for 1973 for Selected Tributary Streams
Entering Allatoona Lake (Based on data collected during the
National Eutrophication Survey (U.S. Environmental Protection
Agency 1978), May-October 1973)

Tributary Name	Flow, m <sup>3</sup> /sec	Total Phosphorus µg P/L	Total Nitrogen µg N/L
Etowah River	34.59	51.0	587.0
Allatoona Creek	0.713	35.0	572.0
Acworth Lake Discharge	0.700	49.0	537.0
Noonday Creek	1.800	244.0	1,105.0
Little River	5.000	88.0	1,020.0
Shoal Creek	2.600	36.0	515.0
Stamp Creek	0.458	24,0	401.0

Table 6
Mean Flows and Flow-Weighted Mean Total Phosphorus
Concentrations, Including Associated CV Values, for 1992 for
Selected Tributary Streams Entering Allatoona Lake (Based on
data collected by Kennesaw State College, May-October 1992. CV
values were calculated as the standard error divided by the mean)

Tributary Name		Flow, m <sup>3</sup> /sec	Total Phosphorus μg P/L
Etowah River	Mean	27.65	65.6
	CV	0.123	0.328
Allatoona Creek	Mean	0.305	44.5
	CV	0.187	0.219
Acworth Lake Discharge	Mean	0.131	22.4
	CV	0.123	0.089
Tanyard Creek	Mean	0.432	44.6
	CV	0.969	0.961
Kellog Creek	Mean	0.014	59.5
	CV	0.297	0.410
Owl Creek	Mean	0.025	133.8
	CV	0.156	0.275
Noonday Creek	Меал	1.577	150.0
	СV	0.194	0.205
Little River	Mean	4.068	50.0
	CV	0.184	0.200
Shoal Creek	Меал	1.518	37.9
	СV	0.130	0.127
Stamp Creek	Mean	0.346	24.4
	CV	0.087	0.190
Rowland Creek	Mean	0.026	65.0
	CV	0.265	0.285

Table 7
Contributing Area and Estimated Flow and Total Phosphorus and Nitrogen Concentrations for Ungauged Local Land-Use Areas for Allatoona Lake for 1973

Model Segment	Contributing Land-use Area km²	Estimated Mean Flow <sup>1</sup> hm <sup>3</sup> /year	Total Phosphorus <sup>2</sup> μg P/L	Total Nitrogen <sup>2</sup> μg N/L
1	46.18	14.32	36.0	544.0
2	95.18	29.51	36.0	544.0
3	11.65	3.61	36.0	544.0
4	62.65	19.42	36.0	544.0
5	29.72	9.21	36.0	544.0
6	36.14	11.20	36.0	544.0
7	62.65	19.30	36.0	544.0
8	39.76	12.33	36.0	544.0
9	11.65	3.61	36.0	544.0
10	96.38	29.88	36.0	544.0

<sup>&</sup>lt;sup>1</sup> Estimated discharge for ungauged land-use areas based on an estimated runoff of 0.31 m/year.

<sup>2</sup> Total phosphorus and total nitrogen concentration estimated as the average of 1992 flow-weighted concentrations for Allatoona Creek and Shoal Creek.

Table 8 Contributing Areas and Estimated Flow and Total Phosphorus Concentrations for Ungauged Local Land-Use Areas for Allatoona Lake for 1992

Model Segment	Contributing Land-use Area km <sup>2</sup>	Estimated Mean Flow <sup>1</sup> hm <sup>3</sup> /year	Mean Total Phosphorus μg P/L	Remark <sup>2</sup>
1	46.18	12.01	42.3	1
2	95.18	24.75	44.6	2
3	11.65	3.03	42.3	1
4	62.65	16.29	42.3	1
5	29.72	7.73	65.0	3
6	36.14	9.40	42.3	1
7	62.65	16.29	52.0	4
8	39.76	10.34	42.3	1
9	11.65	3.03	42.3	1
10	96.38	26.06	42.3	1

<sup>&</sup>lt;sup>1</sup> Estimated discharge for ungauged land-use areas based on an estimated runoff of 0.26 m/year.
<sup>2</sup> Estimates of total phosphorus concentration obtained from the following sources and/or methods:

<sup>1.</sup> Average of 1992 flow-weighted concentrations for Tanyard Creek, Allatoona Creek, and Shoal Creek.

<sup>2.</sup> Flow-weighted concentration for Tanyard Creek for 1992.

<sup>3.</sup> Flow-weighted concentration for Rowland Creek for 1992.

4. Average of 1992 flow-weighted concentrations for Owl Creek and Kellog Creek.

Table 9
Water Quality Sampling Stations Associated with BATHTUB Model
Segments for Walter F. George Lake for 1992 (Station descriptions
are those identified in the original data)

Segment	Station	Station Descriptions	
1	.7	Railroad Bridge near Omaha, GA (RM 120.3) <sup>1</sup>	
2	6	Off Florence Marina State Park (RM 112.7)	
3	5	Near Confluence of Cowikee Creek (RM 101.7)	
4	4	Upstream from Highway 82 (RM 94.9)	
5	3	Off Cheneyhatchee Creek embayment (RM 89.5)	
6	2	Off Pataula Creek embayment (RM 82.3)	
7	1	Waiter F. George Forebay (RM 75.4)	

<sup>&</sup>lt;sup>1</sup> RM indicates approximate river mile.

Table 10
Mean Mixed-Layer Water Quality Conditions and Associated CV
Values for Walter F. George Lake, May-October 1992 (CV values
calculated as the standard error divided by the mean)

Segment		Total Phosphorus µg P/L	Total Nitrogen μg N/L	Chlorophyll a	Secchi, m
1	Mean	56.7	889.0	16.5	0.9
	CV	0.05	0.06	0.27	0.08
2	Mean	53.7	858.0	18.3	0.9
	CV	0.04	0.09	0.08	0.08
3	Mean	42.8	742.0	19.6	1.1
	CV	0.06	0.04	0.04	0.05
4	Mean	38.7	624.0	19.6	1.3
	CV	0.06	0.07	0.10	0.04
5	Mean	31.3	521.0	16.3	1.6
	CV	0.05	0.07	0.08	0.02
6	Mean	26.2	479.0	18.5	1.7
	CV	0.08	0.05	0.19	0.08
7	Mean	22.6	475.0	16.7	1.8
	CV	0.09	0.03	0.15	0.07

Table 11
Water Quality Sampling Stations Associated with BATHTUB Model
Segments for Lake Sidney Lanier for 1973 (Station names and
descriptions are those identified in the original data)

Segment	Station	Description	
4	320	Wilkie Bridge	
7	319	Boiling Bridge	
9	316	Middle Six Mile Creek Arm	
11	314	Mary Alice Park	
12	313	Lanier Islands Beach	
14	318	Near Buoy FC6	
16	322	Thompson Bridge	
17	321	Near Gainesville Marina	
19	317	Main Channel Old Federal	
20	315	Open Channel Tidwell Access	
21	312	Buford Dam	

Table 12
Mean Mixed-Layer Water Quality Conditions and Associated CV
Values for Lake Sidney Lanier, May-October 1973 (CV values
calculated as the standard error divided by the mean)

Segment		Total Phosphorus μg P/L	Total Nitrogen μg N/L	Chlorophyll <i>a</i> μg/L	Secchi, m
4	Mean	21.3	486.0	6.7	2.0
	CV	0.20	0.08	0.08	0.04
7	Mean	12.5	485.6	5.2	2.1
	CV	0.05	0.07	0.03	0.09
9	Mean	17.3	286.0	5.0	3.0
	CV	0.18	0.14	0.19	0.03
11	Mean	19.1	457.0	4.7	3.0
	CV	0.14	0.28	0.00	0.00
12	Mean	8.6	480.0	3.4	2.9
	CV	0.07	0.36	0.03	0.03
14	Mean	44.0	657.0	11.3	1.9
	CV	0.04	0.10	0.08	0.21
16	Mean	17.2	543.0	11.4	2.1
	CV	0.10	0.05	0.18	0.04
17	Mean	13.1	457.0	5.0	2.4
	CV	0.07	0.15	0.07	0.00
19	Mean	8.7	300.0	4.8	3.0
	CV	0.19	0.14	0.19	0.12
20	Mean	14.8	359.8	4.2	3.2
	CV	0.20	0.19	0.05	0.02
21	Mean	7.0	256.9	4.2	3.2
	CV	0.11	0.14	0.08	0.03

Table 13
Mean Flows and Flow-Weighted Mean Total Phosphorus and Total
Nitrogen Concentrations for 1973 for Selected Tributary Streams
Entering Lake Sidney Lanier (Based on data collected during the
National Eutrophication Survey (U.S. Environmental Protection
Agency 1978), May-October 1973)

Tributary Name	Flow, m <sup>3</sup> /sec	Total Phosphorus μg P/L	Total Nitrogen μg N/L
Chattahoochee River	28.4	50	717
Chestatee River	15.8	69	623
Wahoo Creek	1.8	72	931
West Fork Little River	0.9	55	1,072
East Fork Little River	0.8	62	1,295
Flat Creek (F1)	0.3	2,234	10,324
Flat Creek (H1)	1.0	41	739
Limestone Creek	0.2	158	1,036
Four Mile Creek	0.3	52	1,293

Table 14 Water Quality Sampling Stations Associated with BATHTUB Model Segments for Calibration (1990) and Verification (1991) Years for West Point Lake (Station descriptions are those identified in the original data)

		Station Descriptions
Segment	1990 <sup>1</sup>	1991 <sup>2</sup>
1	-	_
2	_	NR3
3	_	
4	_	_
5	-	BEC1, YC10, YC13JC, YC17, YC27BEC, YC29, YC2HC, YC7
6	_	TC2, WWC2TC, WWC6, WWC9
7	_	_
8	_	SC2, VC3, WEC10, WEC18, WEC26, WEC29CC, WEC5VC, WEC6
9	-	MC2, MC2EC, MC7
10	CH-12	123
11		113, 110, 106
12	_	104, 101
13	CH-10	96, 89
14	_	84, 74, 71
15	CH-7	65, 60
16		56YC
17	_	50, 45
18	CH-5	41, 39
19	_	36AWIC, 29
20	CH-4	15IC, 16, 18BC, 21AC, 25WEC, IC2
21	_	WES1, WES2, 8
22	CH-3	1, 2MC, EC2

<sup>&</sup>lt;sup>1</sup> Stations monitored by Georgia Department of Natural Resources (Georgia Department of

Natural Resources 1991).

Stations included in the water quality study conducted by U.S. Army Engineer Waterways Experiment Station for the U.S. Army Engineer District, Mobile (Kennedy et al. 1994).

Table 15
Mean Mixed-Layer Water Quality Conditions and Associated CV
Values for West Point Lake, May-October 1990 (CV values
calculated as the standard error divided by the mean)

Segment		Total Phosphorus µg P/L	Total Nitrogen μg N/L	Chlorophyll a	Secchl, m
10	Mean CV	132.0 0.21	1,526.0 0.17	_	_
13	Mean	74.0	1,060.0	23.2	0.7
	CV	0.11	0.11	0.25	0.00
15	Mean	62.0	716.0	24.2	0.9
	CV	0.06	0.25	0.23	0.10
18	Mean	42.0 0.09	752.0 0.08	19.8 0.14	1.10 0.08
20	Mean	26.0	630.0	14.4	1.3
	CV	0.09	0.15	0.05	0.10
22	Mean	17.5	517.0	11.2	1.6
	CV	0.06	0.14	0.17	0.08

Table 16
Mean Mixed-Layer Water Quality Conditions and Associated CV
Values for West Point Lake, May-October 1991 (CV values
calculated as the standard error divided by the mean)

Segment		Total Phosphorus µg P/L	Total Nitrogen μg N/L	Chlorophyll <i>a</i> μg/L	Secchi, m
2	Mean CV	51.5 0.06	652.0 0.17	19.4 0.09	0.6 0.00
5	Меал CV	27.5 0.12	595.0 0.14	15.5 0.11	1.3 0.10
6	Меал CV			19.2 0.09	1.1
7	Mean CV	38.6 0.07	926.0 0.02	17.5 0.08	1.4 0.03
8	Меал СV	20.6 0.04	471.0 0.24	12.3 0.12	1.4
9	Mean CV	22.3 0.10	605.0 0.05	12.4 0.16	1.6 0.10
10	Mean CV	=		3.3 0.37	0.5 0.19
11	Mean CV	_		6.0 0.29	0.4 0.18
12	Mean CV	91.8 0.08	1,085.0 0.09	8.0 0.24	0.5 0.12
13	Mean CV	_	_	16.8 0.30	0.6 0.14
14	Mean CV	77.2 0.12	1,087.0 0.05	17.5 0.20	0.8 0.13
5	Mean CV	66.0 0.17	856.0 0.22	20.1	1.0
6	Mean CV	_		21.9	1.2 0.10
7	Mean CV	47.5 0.10	965.0 0.07	22.0 0.10	1.1
8	Mean CV	41.4 0.08	932.0 0.05	20.0	1.4 0.05
9	Mean CV			19.7	1.4
0	Mean CV	33.5 0.12	797.0 0.10	16.4	1.5 0.08
	Mean CV	25.8 0.06	722.0 0.06	13.6	1.6
2.	Mean CV	23.0 0.03	675.0 0.07	14.9	I.6 0.10

Table 17
Mean Flows and Flow-Weighted Mean Total Phosphorus
Concentrations for 1991 for Selected Tributary Streams Entering
West Point Lake (Based on data collected by USGS
(Chattahoochee River only) and the U.S. Army Engineer Waterways
Experiment Station, May-October 1991)

Tributary Name	Flow, m <sup>3</sup> /sec	Total Phosphorus, μg P/L
Chattahoochee River	160.8	198.8
Yellowjacket Creek	3.2	48.0
Shoat Creek	0.4	32.0
Beech Creek	0.5	39.0
Whitewater Creek	0.2	19.0

Table 18
Contributing Area and Estimated Flow and Total Phosphorus
Concentrations for Ungauged Local Land-Use Areas for West Point
Lake, 1990 and 1991

Segment	Contributing Land Area, km <sup>2</sup>	1991 Estimated Flow <sup>1</sup> hm <sup>3</sup> /year	1990 Estimated Flow <sup>2</sup> hm³/year	Total Phosphorus <sup>3</sup> µg P/L
1	69.1	16.1	10.4	34.5
2	119.4	28.3	17.9	34.5
3	235.0	55.7	35.3	34.5
4	50.2	11.9	7.5	34.5
5	130.9	31.0	19.6	34.5
6	64.2	15.2	9.6	34.5
7	38.9	9.2	5.8	34.5
8	606.6	143.8	91.0	34.5
9	64.2	15.2	9.6	34.5
10	114.7	27.2	17.2	34.5
11	52.5	12.4	7.9	34.5
12	31.1	7.4	4.7	34.5
13	19.5	4.6	2.9	34.5
14	5.8	1.4	0.9	34.5
15	33.1	7.8	5.0	34.5
16	18.1	4.3	2.7	34.5
17	8.4	2.0	1,3	34.5
18	7.8	1.8	1.2	34.5
19	18.1	4.3	2.7	34.5
20	44.7	10.6	6.7	34.5
21	22.4	5.3	3.4	34.5
22	14.6	3.5	2.2	34.5

Estimated discharge for ungauged land-use areas for 1991 based on an estimated runoff of 0.237 m/year.

<sup>&</sup>lt;sup>2</sup> Estimated discharge for ungauged land-use areas for 1990 based on an estimated runoff of 0.150 m/year.

<sup>&</sup>lt;sup>3</sup> Estimated total phosphorus concentration computed as the average of mean concentrations for Yellowjacket, Beech, Shoal, and Whitewater creeks for 1991.

Table 19
Regional Model Calibration Factors for BATHTUB for Allatoona
Lake (Based on water quality data for 1992)

Region	Segments	Lake Region or Embayment	Total Phosphorus	Chlorophyll a
1	1-3	Allatoona Creek	1.105	1.140
2	4	Little River	6.912	1.277
3	5	Stamp Creek	0.123	0.893
4	6-10	Etowah River	1.442	0.976

Table 20
Regional Model Calibration Factors for BATHTUB for Walter F.
George Lake (Based on water quality data for 1992)

Segments	Region	Phosphorus	Nitrogen	Chlorophyll a
1	Upper George Lake	1.00	1.00	1.00
2-7	Mid and Lower George Lake	1.31	1.56	2.10

Table 21
Regional and Local Model Calibration Factors for BATHTUB for Lake Sidney Lanier (Based on water quality data for 1973)

Region	Segment	Lake Region or Embayment	Total Phosphorus	Total Nitrogen	Chlorophyll a
1	1-3 9-11 12-13 17-21	Wahoo Creek North Embayments South Embayments Lower Chattahoochee	0.42	0.39	1.14
2	14	Flat Creek	1.43	0.94	0.91
3	15-16	Upper Chattahoochee	4.01	0.84	2.50
4	4-8	Chestatee River	6.94	1.25	1.18

Table 22
Regional and Local Model Calibration Factors for BATHTUB for West Point Lake (Based on water quality data for 1991)

Region	Segments	Lake Region or Embayment	Total Phosphorus	Chlorophyll a
1	7	Wilson Creek	0.29	1.37
2	5	Yellowjacket Creek	1,11	1.49
3	6	Whitewater Creek	1.00	1.76
4	8	Wehadkee Creek	1.05	1.81
5	10	Upper Chattahoochee	2.24	0.27
5	11	Upper Chattahoochee	2.24	0.85
5	12	Upper Chattahoochee	2.24	1.46
5	13	Upper Chattahoochee	2.24	2.82
5	14	Upper Chattahoochee	2.24	3.02
5	15	Upper Chattahoochee	2.24	3.10
5	16	Upper Chattahoochee	2.24	2.61
6	17-22	Lower Chattahoochee	9.25	2.07
7	9	Maple Creek	3.28	1.69
8	1-4	Upper Embayments	1.73	1.02

# Appendix A Model Input Files for Allatoona Lake

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ALLATOONA LAKE 1992 (TP MODEL - UNCALIBRATED)
INPUT GROUP 2 - PRINT OPTIONS
 1 LIST INPUTS
                                    O NO
 2 HYDRAULICS & DISPERSION
                                    1 YES
 3 GROSS WATER & MASS BALANCES
                                     2 ESTIMATED CONCS
 4 DETAILED BALANCES BY SEGMENT
                                    2 ESTIMATED CONCS
 5 SUMMARIZE BALANCES BY SEGMENT
                                    1 OBSERVED CONCS
 6 COMPARE OBS & PREDICTED CONCS
                                  1 ALL SEGMENTS
 7 DIAGNOSTICS
                                     1 ALL SEGMENTS
 8 PROFILES
                                     2 ESTIMATED & OBSERVED CONCS
 9 PLOTS
                                     2 GEOMETRIC SCALE
10 SENSITIVITY ANALYSIS
                                     O NO
INPUT GROUP 3 - MODEL OPTIONS
                                    0 NOT COMPUTED
 1 CONSERVATIVE SUBSTANCE
 2 PHOSPHORUS BALANCE
                                     1 2ND ORDER, AVAIL P
 3 NITROGEN BALANCE
                                     O NOT COMPUTED
 4 CHLOROPHYLL-A
                                    2 P, LIGHT, T
 5 SECCHI DEPTH
                                    1 VS. CHLA & TURBIDITY
 6 DISPERSION
                                    1 FISCHER-NUMERIC
7 PHOSPHORUS CALIBRATION
                                    1 DECAY RATES
 8 HITROGEN CALIBRATION
                                    1 DECAY RATES
9 ERROR ANALYSIS
                                    1 MODEL & DATA
10 AVAILABILITY FACTORS
                                    0 MODEL 1 ONLY
INPUT GROUP 4 - VARIABLES
           ATMOSPHERIC LOADINGS AVAILABILITY
VARIABLE
            KG/KH2-YR
 1 CONSERV
                   .00
                30.00
                           .50
 2 TOTAL P
                                      1.00
                500.00
                           .50
                                      1.00
 3 TOTAL N
                   .00
                           .00
 4 ORTHO P
                                      .00
                   .00
 5 INORG N
                           .00
                                       .00
INPUT GROUP 5 - GLOBAL PARAMETERS
PARAMETER
                                   HEAN
                                            CV
                                          .000
                                   .586
 1 PERIOD LENGTH
                     YPS
                                   .746
 2 PRECIPITATION M
                                          .200
                                   .759
 3 EVAPORATION M
                                          .300
 4 INCREASE IN STORAGE M
                                  - .070
                                          .000
                                  1.000
 5 FLOW FACTOR
                                          .000
 6 DISPERSION FACTOR
                                  1.000
                                          .700
                                   .000
                   KH2
 7 TOTAL AREA
                                          .000
 8 TOTAL VOLUME
                                   -000
                                          .000
```

	1176	SEG	NAME	KM2	RAINAGE AREA HH3/YR	MEAN FLOW	FLOW	CV OF ME.	AN	
1	1		Etava	h River	1675.700		-046	.1:	27	
2	4				2900.800					
3	1	10	I k Ac	worth Disch	49.200	4004	. 132	.1		
4	1			oone Creek			.626			
5	ż	- i	Land	Seo1	46.180		.007			
6	2	,	Land	Seg2	95.180		.747			
7	2	3	Land	Seg1 Seg2 Seg3	11.650		.029			
8	1	4	Littl	e River	354.800		.298			
9				ay Creek	126.900		.735			
10	1	6	Shoal	Creek	173.500		.862			
11	2	7	Land	Seg7	62.650		. 185		00	
12	2	8	Land	Seg8	39.760		.338		00	
13	2	9	Land	Seg7 Seg8 Seg9	11.650	3	.029	.0	00	
14	1	5	Stamo	Creek	46.600	10	.916	.0		
15	2	5	Land	Seg5	29.720	7	.727	.0	00	
16	2	10	Land	Seg10	96.380		.059			
17	2	4	Land	Seg4	62.650	16	.286	.0	00	
18	2	6	Land	Segó	36.140	9	.396	.0	00	
INP	NT G	ROUP	7 - 1	RIBUTARY CON	CENTRATIONS (	PPB): ME	AH/CV			
ID		CO	ISERV	TOTAL P	TOTAL N	ORTHO	P	INORG	N	
1			.00		.0/.00	.0/.0		.0/.00		
2				49.2/.38	.0/.00	.0/.0		.0/.00		
3				22.4/.09	.0/.00	.0/.0		.0/.00		
4			.00		.0/.00	.0/.0		.0/.00		
5		.0/	.00	42.3/.00	.0/.00	.0/.0	10	.0/.00		
6		.0/	.00	44.6/.00	.0/.00	.0/.0		.0/.00		
7		.0/	•00	42.3/.00	.07.00	.0/.0		.0/.00		
8					.0/.00	.0/.0		.0/.00		
10		.0/	.00	150.0/.20	.0/.00	.0/.0		.0/.00		
11		.0/	.00	37.8/.13 52.0/.00 42.3/.00	.0/.00	.0/.0		.0/.00		
12		-0/	-00	/2 3/ 00	.0/.00	.0/.0		.0/.00		
13		.0/	-00	42.3/.00	.0/.00 .0/.00	.0/.0		.0/.00		
14		0/	00	42.3/.00 24.4/.19	-0/-00	.0/.0		.0/.00		
15		.0/	00	65.0/.00	.0/.00	.0/.0		.0/.00		
16		-0/	.00	42.3/.00	.0/.00	.0/.0		.0/.00		
17		.0/	-00	42.3/.00 42.3/.00	.07.00	.0/.0		.0/.00		
18		.0/	.00	42.3/.00	.0/.00 .0/.00	.0/.0		.0/.00		
INP	UT G	ROUP	8 - M	DOEL SEGMENTS						
SEG	OUT	FLOW	GROUP	SEGMENT NAMI		N SED		ON FACTOR SECCHI	ROD	
1		2	1	Segment 1.1	1.00	1.00	1.00	1.00	1.00	1.000
2		3	1	Segment 2.1	1.00	1.00	1.00		1.00	1.000
3 4		10	1	Segment 3.1	1.00	1.00	1.00		1.00	1.000
4		6	2	Segment 4.2	1.00	1.00	1.00		1.00	1.000
5		9	3	Segment 5.3	1.00	1.00	1.00		1.00	1.000
6		7	4	Segment 6.4	1.00	1.00	1.00		1.00	1.000
7		8	4	Segment 7.4	1.00	1.00	1.00		1.00	1.000
8		9	4	Segment 8.4	1.00	1.00	1.00		1.00	
9 10		10	4	Segment 9.4 Segment 10.4	1.00 4 1.00	1.00 1.00	1.00		1.00	1.000

			•	1	ENGTH.	AREA			ZMIX M		TAR	GET P PPB
10	LABE	L			XX	KM2		M		'	•	rrb
1	Secr	ent 1	1 1		6.10	4.4550	20	3 2	.03/ .12	.00/	.00	.0
		ent 2			5.00	3.6620			13/ .12		.00	.0
		ent 3			5.50	6.6320			28/ .1		.00	.0
		ient 4			10.50	4.5700		י כ	03/ .1	2 .00/	.00	.0
					7.60	3.4310			80/ .1	2 .00/	.00	.0
		ent 5							.97/ .12	2 .00/	.00	.0
		ent (			10.00	7.4390	9 4.1		47 / 41		.00	.0
		ent 7			9.70	7.4390 6.9780 6.4010	0.1	0 0,	13/ -13	2 .00/	.00	.0
		ent 8			8.20	6.4010	10.1	9 7.	.89/ .13 .36/ .13	.00/		.0
		ent 9			2.80	3.2010		9 8.	,36/ .14	2 .00/	.00	
10	Segn	ent :	10.4		1.20	.6920	29.3	5 8.	.39/ .1	2 .00/	.00	.0
INF	דטי	ROUP	10 -	OBSE	RVED W	ATER QUAL	YTI.					
SEC	à	TURB	10 CON				CHL-A	SECCH	ORG-I	TP-OP	HODV	MODV
		1/1	•	7	MG/H3	MG/H3	MG/M3	М	MG/H3	MG/M3 M	G/M3-0	MG/M3-0
1	MN:	.4	46	.0	18.5	1346.7	9.4	1.5	5 .	0.0	.0	.0
	CV:		13	.00	. 13	.10	. 15	.08	3 .0	00.0	_00	.00
2	MN:		53	.0	24.9	1560.0	10.7	1.4	۱. ه		.0	
_	CV:		53 12 53 10 69 16 57 58 58 13 52	.00	.12					00.0		.00
3	MN:		33	-0	23.2	2007.1	7.8	9	1 1	0.0	.0	
_	CV:		10	-00	. 14	.21	.17	-04		00.00	.00	
4	MN:		40		34.8	1871.1		1	,	0 .0	.0	
•	CV:	• 7	16	00	.19		.10	01	3 .0	00.00		.00
5	MN:	•,	17	.00	77 8	1617.5	9.2		B .		.0	
-	CV:	- 7	76	00	13	.19	.09	0		0 .00	-00	
4	MN:	- '	70 70	.00	28 0	1711.4		1		0.0		
٥	CV:		13 32 07 30 05	00	.15	20	.07	.0	B .0	00.0	.00	
7	MN:	•,	13	.00	2/ 0	2497.9			9 .		.00	
•	CV:	• 7	7	00	.08		.05				-00	
0	MN:	- '	20	.00	25 1		8.3					
٥	CV:		DE .	.0	-09		.05		3 .0			
_	MN:	• '	30	.00	-09		.05			0.00		
y			30	.00	.0							
• •	CV:		00	.00	.00		-00					.00
10	MN: CV:		29 11	.00		2425.0	7.8 .12				.00	
T NS						WATERSHE				• .00	.00	.00
		NAME				Stamp		•	-	d Kellog	Owl	Tanyaro
						'				_		
5			Seg1		46.18	.00	-00	.00	-00	.00 .00	-00 -00	.00 95.18
6			Seg2		.00	.00	.00	.00	-00	.00		91.CP
7			Seg3		11.65	.00	.00	.00	.00	.00	.00	
11			Seg7		.00	-00	.00	.00	.00	31.13		-00
12			Seg8		39.76	-00	.00	.00	.00	-00	.00	-00
13	_		Seg9		11.65	.00	.00	.00	.00		.00	.00
15			Seg5		.00	.00	.00		29.72	.00	.00	.00
16	2	Land	Seg1	) (	96.38	.00	.00	.00	.00	.00	.00	.00
17	2	Land	Seg4		62.64	.00	.00	.00	.00		.00	.00
18	2	Land	Seg6	:	36.14	.00	.00	.00	.00	.00	.00	.00

INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS

10	LAND USE		RUNOFF M/YR	CONSERV PPB	TOTAL P PPB	TOTAL N PPS	ORTHO P	INORG N
1	General	CV:	.26	.00	42.3 .00	.00	.00	.0
		CV:	.00					
2	Stamp Creek		.26	.0	24.4	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	.00					
3	H/A		.00	.0	.0	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
		cv:	.00					
4	N/A		.00	.0	.0	.0	.0	.0
		CV:	.00	.00	.00	.00	-00	
		CV:	.00				_	_
5	Rowland Spr		.26	.0	65.0	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	.00					
6	Kellog Cr.		.26	.0	59.5	.0	.0	-0
		CA:	.00	.00	-00	.00	_00	
		CV:	.00					
7	Owl Cr.		.26	.0	133.8	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
8	Tanyard Cr.		.26	.0	44.6	.0	.0	.0
,	,	CV:	.00	.00	.00	.00	.00	. •

1 C	COEFFICIENT	MEAN	CA
1	P DECAY RATE	1.000	.45
2	N DECAY RATE	1.000	.55
3	CHL-A MODEL	1.000	.26
4	SECCH! MODEL	1.000	.10
5	ORGANIC N MODEL	1.000	.12
6	TP-OP MODEL	1.000	.15
7	HODY MODEL	1.000	. 15
8	HODY MODEL	1.000	.22
9	BETA M2/MG	.020	.00
10	MINIMUM QS	.100	.00
11	FLUSHING EFFECT	1_000	.00
12	CHLOROPHYLL-A CV	.620	.00

INPUT GROUP 14 - CASE NOTES

Observed WQ data from Clean Lakes/Kennesaw State College P, Light, Flushing Model

#### ALLATOONA LAKE 1992 (TP MODEL - CALIBRATED)

#### INPUT GROUP 2 - PRINT OPTIONS

1	LIST INPUTS	0 NO
2	HYDRAULICS & DISPERSION	1 YES
3	GROSS WATER & MASS BALANCES	2 ESTIMATED CONCS
4	DETAILED BALANCES BY SEGMENT	2 ESTIMATED CONCS
5	SUMMARIZE BALANCES BY SEGMENT	1 OBSERVED CONCS
6	COMPARE OBS & PREDICTED CONCS	1 ALL SEGMENTS
7	DIAGNOSTICS	1 ALL SEGMENTS
8	PROFILES	2 ESTIMATED & OBSERVED CONCS
9	PLOTS	2 GEOMETRIC SCALE
10	SENSITIVITY ANALYSIS	O NO

## INPUT GROUP 3 - MODEL OPTIONS

1	CONSERVATIVE SUBSTANCE	O NOT COMPUTED
2	PHOSPHORUS BALANCE	1 2ND ORDER, AVAIL P
3	MITROGEN BALANCE	O NOT COMPUTED
4	CHLOROPHYLL-A	2 P, LIGHT, T
5	SECCHI DEPTH	1 VS. CHLA & TURBIDITY
6	DISPERSION	1 FISCHER-NUMERIC
7	PHOSPHORUS CALIBRATION	1 DECAY RATES
8	NITROGEN CALIBRATION	1 DECAY RATES
9	ERROR ANALYSIS	1 MODEL & DATA
10	AVAILABILITY FACTORS	0 MODEL 1 ONLY

#### INPUT GROUP 4 - VARIABLES

VAR	RIABLE	ATMOSPHERIC KG/KM2-YR	LOAD INGS	AVAILABILIT FACTOR
1	CONSERV	.00	.00	.00
2	TOTAL P	30.00	.50	1.00
3	TOTAL N	500.00	.50	1.00
4	ORTHO P	.00	.00	.00
- 5	INORG N	00	00	00

#### INPUT GROUP 5 - GLOBAL PARAMETERS

PARAMETER	MEAN	CV
1 PERIOD LENGTH YRS	.586	.000
2 PRECIPITATION N	.746	.200
3 EVAPORATION N	.759	.300
4 INCREASE IN STORAGE M	070	.000
5 FLOW FACTOR	1.000	.000
6 DISPERSION FACTOR	1.000	.700
7 TOTAL AREA KM2	.000	.000
8 TOTAL VOLUME HH3	-000	.000

11	D1	TYPE	SEG	NAME		DRAINAGE	AREA KM2		FLOW 3/YR	CV OF F	KEAN FL	,ou
3 1 1 LK Acworth Disch		1	6	Etował	ı River	167	5.700	872				
4 1 1 Allatoona Creek						1 290	0.800	1304				
5 2 1 Land Seg1		-	1	Lk Act	worth Disc	sh 41						
6 2 2 Land Seg3 95.180 24.747 .000 7 2 3 Land Seg3 11.650 3.029 .000 8 1 4 Little River 354.800 128.298 .184 9 1 4 Moonday Creek 126.900 49.735 .194 10 1 6 Shoal Creek 173.500 47.862 .130 11 2 7 Land Seg7 62.650 16.185 .000 12 2 8 Land Seg8 39.760 10.338 .000 13 2 9 Land Seg9 111.650 3.029 .000 14 1 5 Stamp Creek 46.600 10.916 .087 15 2 5 Land Seg5 29.720 7.727 .000 16 2 10 Land Seg10 96.380 25.059 .000 17 2 4 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg4 62.650 10.2916 .000  IMPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV  10 CONSERV TOTAL P TOTAL N ORTHOP INORG N ECORG 1 .0/ .00 65.6/ .33 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 2 .0/ .00 49.2/ .38 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 3 .0/ .00 22.4/ .09 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 4 .0/ .00 44.5/ .22 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 5 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 7 .0/ .00 42.3/ .00 .0/ .			1	Allato	ona Creek	ζ 7						
7 2 3 Land Seg3 11.650 3.029 .000 8 1 4 Little River 354.800 128.298 .184 9 1 4 Noonday Creek 126.900 49.735 .194 10 1 6 Shoal Creek 173.500 47.862 .130 11 2 7 Land Seg7 62.650 16.185 .000 12 2 8 Land Seg8 39.760 10.338 .000 13 2 9 Land Seg9 11.650 3.029 .000 14 1 5 Stamp Creek 46.600 10.916 .087 15 2 5 Land Seg5 29.720 7.727 .000 16 2 10 Land Seg10 96.380 25.059 .000 17 2 4 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg4 62.650 16.286 .000 19 2 4 Land Seg4 62.650 16.286 .000 10 10 10 10 10 10 10 10 10 10 10 10 10 1			1	Land 9	ieg1	4/	6.180					
8 1 4 Little River 354.800 128.298 .184 9 1 4 Noonday Creek 126.900 49.755 .194 10 1 6 Shoal Creek 173.500 47.862 .130 11 2 7 Land Seg7 62.650 16.185 .000 12 2 8 Land Seg8 39.760 10.338 .000 13 2 9 Land Seg9 11.650 3.029 .000 14 1 5 Stamp Creek 46.600 10.916 .087 15 2 5 Land Seg5 29.720 7.727 .000 16 2 10 Land Seg10 96.380 25.059 .000 17 2 4 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg4 62.650 11.286 .000 18 2 6 Land Seg4 62.650 10.986 .000  IMPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV  10 CONSERV TOTAL P TOTAL N ORTHO P IMORG N ECORG 1 .0/ .00 65.6/ .33 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 2 .0/ .00 49.2/ .38 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 3 .0/ .00 22.4/ .09 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 4 .0/ .00 44.5/ .22 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 5 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 6 .0/ .00 44.6/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 7 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 8 .0/ .00 50.0/ .20 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 10 .0/ .00 37.8/ .13 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 11 .0/ .00 52.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 12 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 11 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .00		2	2	Land \$	eg2	9						
9 1 4 Noonday Creek 126.900 49.735 .194 10 1 6 Shoal Creek 173.500 47.862 .130 11 2 7 Land Seg7 62.650 16.185 .000 12 2 8 Land Seg8 39.760 10.338 .000 13 2 9 Land Seg9 11.650 3.029 .000 14 1 5 Stamp Creek 46.600 10.916 .087 15 2 5 Land Seg5 29.720 7.727 .000 16 2 10 Land Seg10 96.380 25.059 .000 17 2 4 Land Seg4 62.650 16.286 .000 18 2 6 Land Seg6 36.140 9.396 .000  INPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV  ID CONSERV TOTAL P TOTAL N ORTHO P INORG N ECORG 1 .0/ .00 65.6/ .33 .0/ .00 .0/ .00 .0/ .00 .0/ .00 2 .0/ .00 49.2/ .38 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 3 .0/ .00 22.4/ .09 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 4 .0/ .00 44.5/ .22 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 5 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 6 .0/ .00 44.6/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 7 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 9 .0/ .00 150.0/ .20 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0 10 .0/ .00 150.0/ .20 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .00 .0		2	3	Land \$	eg3							
10 1 6 Shoal Creek 173.500 47.862 .130   11 2 7 Land Seg7 62.650 16.185 .000   12 2 8 Land Seg8 39.760 10.338 .000   13 2 9 Land Seg9 11.650 3.029 .000   14 1 5 Stamp Creek 46.600 10.916 .087   15 2 5 Land Seg5 29.720 7.727 .000   16 2 10 Land Seg10 96.380 25.059 .000   17 2 4 Land Seg4 62.650 16.286 .000   18 2 6 Land Seg6 36.140 9.396 .000    IMPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV   10 CONSERV TOTAL P TOTAL N ORTHO P INORG N ECORG   1 .0/ .00 65.6/ .33 .0/ .00 .0/ .00 .0/ .00 .0 .00 .0   2 .0/ .00 49.2/ .38 .0/ .00 .0/ .00 .0/ .00 .0 .0 .0   3 .0/ .00 22.4/ .09 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   4 .0/ .00 44.5/ .22 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   5 .0/ .00 44.5/ .22 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   5 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0   6 .0/ .00 44.6/ .00 .0/ .00 .0/ .00 .0/ .00 .0   7 .0/ .00 42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0   9 .0/ .00 \$50.0/ .20 .0/ .00 .0/ .00 .0/ .00 .0   11 .0/ .00 \$52.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   10 .0/ .00 \$73.8/ .13 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   11 .0/ .00 \$22.4/ .09 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   11 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   12 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   11 .0/ .00 \$52.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   11 .0/ .00 \$52.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   12 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   13 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   15 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   15 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   15 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   15 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0   15 .0/ .00 \$42.3/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .00												
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1	INP	UT G				CONCENTRAT	IONS (F	PPB): ME	AN/CV			
2	d1		CO	HSERV	TOTAL	LP T	OTAL N	OR'	тно Р	11	HORG N	ECORG
2	1		.0/	.00	65-6/ .7	33 .0	·/ -00	-0/	-00	.0	/ .00	.0
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12			-0/	-00	42.3/ .(	0.0	- 00	.0/	-00	.0	/ -00	.0
12			-0/	-00	50.0/ ./	20 .0	- 00	.0/	-00	.0	/ _00	.0
12			-0/	.00	150.0/ .7	20 .0	-00	.0/	-00	-0	/ .00	.0
12	10		-0/	.00	37.8/ .	13 .0	.00	.0/	.00	-0	/ .00	.0
18	11		.0/	.00	52.0/ .1	0. 00	.00	.0/	.00	-0	/ .00	.0
18	12		.0/	.00	42.3/ .0	00 .0	.00	.0/	.00	-0.	/ .00	.0
18	13		.0/	.00	42.3/ .0	00 .0	.00	.0/	.00	.0	/ .00	.0
18	14		.0/	.00	24.4/ .	19 .0	.00	.0/	.00	.0	/ .00	.0
18	15		.0/	.00	65.0/ .(	00 .0	.00	.0/	.00	.0	/ .00	.0
18	16		.0/	.00	42.3/ .1	00 .0	.00	.0/	.00	.0	/ .00	.0
INPUT GROUP 8 - MODEL SEGMENTS  SEG OUTFLOW GROUP SEGMENT NAME P SED N SED CHL-A SECCHI HOO DISM  1 2 1 Segment 1.1 1.05 1.00 1.14 1.00 1.00 1.00 2 3 1 Segment 2.1 1.05 1.00 1.14 1.00 1.00 1.00 3 10 1 Segment 3.1 1.05 1.00 1.14 1.00 1.00 1.00 4 6 2 Segment 4.2 6.91 1.00 1.28 1.00 1.00 1.00 5 9 3 Segment 5.3 .12 1.00 .89 1.00 1.00 1.00 5 7 4 Segment 6.4 1.47 1.00 .98 1.00 1.00 1.00 7 8 4 Segment 7.4 1.47 1.00 .98 1.00 1.00 1.00 8 9 4 Segment 8.4 1.47 1.00 .98 1.00 1.00 1.00	17		.0/	.00	42.3/ .0	0. 00	.00	.0/	.00	.0.		
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SEG OUTFLOW GROUP SEGMENT NAME         P SED N SED CHL-A SECCHI         HOO         DISM           1         2         1 Segment 1.1         1.05         1.00         1.14         1.00         1.00         1.00           2         3         1 Segment 2.1         1.05         1.00         1.14         1.00         1.00         1.00           3         10         1 Segment 3.1         1.05         1.00         1.14         1.00         1.00         1.00           4         6         2 Segment 4.2         6.91         1.00         1.28         1.00         1.00         1.00           5         9         3 Segment 5.3         .12         1.00         .89         1.00         1.00         1.00           6         7         4 Segment 6.4         1.47         1.00         .98         1.00         1.00         1.00           7         8         4 Segment 7.4         1.47         1.00         .98         1.00         1.00         1.00           8         9         4 Segment 8.4         1.47         1.00         .98         1.00         1.00         1.00	1 NP	UT G	ROUP	8 - M	ODEL SEGMI	ENTS						
1 2 1 Segment 1.1 1.05 1.00 1.14 1.00 1.00 1.000 2 3 1 Segment 2.1 1.05 1.00 1.14 1.00 1.00 1.000 3 10 1 Segment 3.1 1.05 1.00 1.14 1.00 1.00 1.000 4 6 2 Segment 4.2 6.91 1.00 1.28 1.00 1.00 1.00 1.000 5 9 3 Segment 5.3 .12 1.00 .89 1.00 1.00 1.00 1.000 6 7 4 Segment 6.4 1.47 1.00 .98 1.00 1.00 1.00 1.00 7 8 4 Segment 7.4 1.47 1.00 .98 1.00 1.00 1.00 1.00 8 9 4 Segment 8.4 1.47 1.00 .98 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	050	- CHIT	01	COOLIN	OCCHENT I							
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7 8 4 Segment 7.4 1.47 1.00 .98 1.00 1.00 1.00 8 9 4 Segment 8.4 1.47 1.00 .98 1.00 1.00 1.00	5				-		12					
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8 9 4 Segment 8.4 1.47 1.00 .98 1.00 1.00 1.00	7				-							
0 9 4 SEGMETIL 0.4 1.47 1.00 .70 1.00 1.00 1.00	í Q											
	9		10	4			1.47	1.00	.98	1.00		
					-							

ID	LASE	L	•	ι	ENGTH. KM	AREA KM2	ZME/	AN M	ZMI	K K	ZHYP	TAR	SET P PP8
1	Sam	nent '	1 1		6.10	4.4550	2.0	ነኝ 2	.03/	12	.00/	-00	-0
		nent i			5.00	3.6620		10 6	.13/	12	.00/		.0
		nent :			5.50	6.6320			.28/	12	.00/	-00	.0
		nent 4			10.50	4.5700			.03/			.00	.0
					7.60	3.4310		12 6	.80/	12	.00/	.00	.0
		nent (			10.00	7 / 700	10.	12 0	07/	12	00/	.00	.0
					9.70	7.4390 6.9780	, 4.	10 4	17/	12	.00/	-00	-0
		nent			9.70	7.4390 6.9780 6.4010 3.2010	44	10 0	10/	12	.00/	.00	.0
		nent			8.20 2.80 1.20	0.4010	10.	19 /	-89/	- 12	.00/	.00	
9	Segn	nent (	9.4		2.80	3.2010	24.4	29 8	.36/	-12	.00/	.00	.0
10	Segn	nent '	10.4		1.20	.6920	29.3	55 B	1.39/	. 12	.00/	.00	.0
INE	PUT (	ROUP	10 -	OBSE	RVED W	TER QUAL	LITY						
SE	G	TURB				TOTALN MG/M3	CHL-A MG/M3		I OR	G-N	TP-OP MG/M3 M0	HODV	MODV
1	MN:		46	.0	18.5	1346.7	9.4			.0	.0	.0	
_	CV:		13	.00	. 13	-10	. 15	.0		.00	.00		
2	MN:		53	.0	24.9	1560.0	10.7	1.		.0			
_	CV:	•					.11 7.8	.0	1	.00	-00	.00	
3	MN:	-	33	.00	23.2	2007.1	7.8	2.	1	.0	.0	.0	
	CV:	•	10	.00	.14	.21			14	.00.	.00	.00	
4	MN:	- 1	49	.0	34.8	1871.1	18.1		2	.0	.0	-0	
	CV:	-	16	-00	.19	.12	.10	-0	8	.00	-00	-00	
5	MN:		37	.0	33.8	1617.5	9.2	1.	8	.0	.0	.0	
	CV:	_ (	80	.00	.13	.19	. 09	.0	14	.00		.00	
6	MN:	-:	38	.0	28.9	1711.4	11.2	1.	. (	.0	-0	.0	٠0
	CV:			-00	. 15	.29	.07	.0	8	.00	.00	.00	.00
7	MN:		32	-0		2497.9				.0	.0	.0	.0
	CV:		07	.00	.08	.29 165 <b>3</b> .8	.05	-0	14	.00	.00	.00	.00
8	MN:	- :	30	.0	25.1	1653.8	8.3	2.	.1	.0	.0	.0	.0
	CV:	. (	05	-00	.09	.19	.05	.0	3	.00	.00	.00	.00
9	MN:		30	.0	.0	-0	.0		0	.0	-0	.0	
	CV:		00	.00	.00	.00	.00	.0	00	.00	.00	.00	.00
10	MN:		29	.0	26.5	2425.0		2.	3	.0	.0	-0	.0
	CV:		11	.00	.18	.25	.12	-0	6	.00	.00 .00 .00 .00	.00	
INE	PUT (	ROUP	11 -	HON-	POINT 1	/ATERSHE	AREA	S (KM2	2)				
		NAME			eneral	Stamp	N/A	N/A			Kellog		
5	_	Land		. 4	6.18	.00	.00	.00	.0		.00	.00	.00
6		Land			.00	.00	.00	.00	.0	Ü	-00	.00	95.18
7		Land		5 1	11.65	.00	.00	.00			.00	.00	.00
11		Land		,	.00	.00	-00	.00	.0		31.13		.00
12		Land			59.76	.00		.00	.0		.00	.00	-00
13		Land			11.65	-00	-00	.00			.00	-00	.00
15	2	Land	Seg5		.00	.00	.00	.00	29.7	2	.00	.00	.00
16	2	Land	Seg1	10 9	6.38	.00	.00	.00	.0	0	.00	.00	.00
17	2	Land	Seg4	• (	52.64	.00	.00	.00			.00	.00	-00
18		Land			36.14	.00	.00	.00	_0	0	.00	.00	.00

INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS

IC	LANO USE		RUNOFF	CONSERV	TOTAL P	TOTAL N	ORTHO P	INORG N
			M/YR	PPB	PP8	PPB	PP8	PPB
						_	_	_
1	General		.26	.0	42.3	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	.00					
2	Stamp Creek		.26	-0	24.4	.0	.0	.0
	•	CV:	.00	.00	.00	.00	.00	
		CV:	.00					
3	N/A		.00	.0	.0	.0	-0	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	.00					
4	N/A		.00	.0	.0	.0	.0	.0
•	.,,,,	CV:	.00	-00	.00	_00	.00	
		CV:	.00					
5	Rowland Spr	•••	.26	.0	65.0	.0	.0	.0
-	HORICANIA OP.	CV:	.00	.00	.00	.00	.00	• -
		CV:	.00		100			
4	Kellog cr.		.26	.0	59.5	.0	.0	.0
0	Kettog Ci.	cv:	.00	.00	.00	.00	.00	
				•00	.00	.00	.00	
		CV:	.00					
-	0.1.6-		24		477 0	•	•	.0
-	Owl Cr.		.26	.0	133.8	.0	.0	.0
		CV:	.00	.00	.00	· .00	.00	
		CV:	.00			_		•
8	Tanyard Cr.		.26	.0	44.6			.0
		CV:	.00	.00	.00	.00	.00	
		cv:	.00					

10	COEFFICIENT	MEAN	CV
1	P DECAY RATE	1.000	.45
2	N DECAY RATE	1.000	.55
3	CHL-A MODEL	1.000	.26
4	SECCHI MODEL	1.000	.10
5	ORGANIC N MODEL	1.000	.12
6	TP-OP MODEL	1.000	.15
7	HODY MODEL	1.000	. 15
8	MODY MODEL	1.000	-22
9	BETA M2/MG	.020	.00
10	MINIMUM QS	.100	.00
11	FLUSKING EFFECT	1.000	.00
12	CHLOROPHYLL-A CV	.620	.00

INPUT GROUP 14 - CASE NOTES

Observed WQ data from Clean Lakes/Kennesaw State College P, Light, Flush Model Regional calibration

#### ALLATOONA LAKE 1973 (TP MODEL- VERIFICATION)

#### INPUT GROUP 2 - PRINT OPTIONS

LIST INPUTS	0 NO
HYDRAULICS & DISPERSION	1 YES
GROSS WATER & MASS BALANCES	2 ESTIMATED CONCS
DETAILED BALANCES BY SEGMENT	2 ESTIMATED CONCS
SUMMARIZE BALANCES BY SEGMENT	1 OBSERVED CONCS
COMPARE OBS & PREDICTED CONCS	1 ALL SEGMENTS
DIAGNOSTICS	1 ALL SEGMENTS
PROFILES	2 ESTIMATED & OBSERVED CONCS
PLOTS	2 GEOMETRIC SCALE
SENSITIVITY ANALYSIS	0 NO
	LIST IMPUTS HYDRAULICS & DISPERSION GROSS WATER & MASS BALANCES DETAILED BALANCES BY SEGMENT SUMMARIZE BALANCES BY SEGMENT COMPARE OBS & PREDICTED CONCS DIAGNOSTICS PROFILES PLOTS SENSITIVITY ANALYSIS

#### INPUT GROUP 3 - MODEL OPTIONS

1	CONSERVATIVE SUBSTANCE	0 NOT COMPUTED
2	PHOSPHORUS BALANCE	1 2ND ORDER, AVAIL P
3	WITROGEN BALANCE	O NOT COMPUTED
4	CHLOROPHYLL-A	2 P, LIGHT, T
5	SECCHI DEPTH	1 VS. CHLA & TURBIDITY
6	DISPERSION	1 FISCHER-NUMERIC
7	PHOSPHORUS CALIBRATION	1 DECAY RATES
8	MITROGEN CALIBRATION	1 DECAY RAYES
9	ERROR ANALYSIS	1 MODEL & DATA
10	AVAILABILITY FACTORS	0 MODEL 1 ONLY

#### INPUT GROUP 4 - VARIABLES

JUNE	ATMOSPHERIC KG/KM2-YR	LOADINGS CV	AVAILABILITY FACTOR
1 CONSERV	.00	.00	.00
2 TOTAL P	30.00	.50	1.00
3 TOTAL N	500.00	.50	1.00
4 ORTHO P	.00	.00	.00
5 INORG N	-00	.00	nn

#### INPUT GROUP 5 - GLOBAL PARAMETERS

PARAMETER	MEAN	CV
1 PERIOD LENGTH YRS	.586	.000
2 PRECIPITATION H	<b>.9</b> 0D	.200
3 EVAPORATION H	.808	.300
4 INCREASE IN STORAGE M	-2.23D	.000
5 FLOW FACTOR	1.D0D	-000
6 DISPERSION FACTOR	1.000	.700
7 TOTAL AREA KH2	.000	.000
8 TOTAL VOLUME HM3	.000	.000

ID	TYPE	SEG	NAME		DR	AINAGE	AREA KH2		FLOW I3/YR	CV OF	MEAN FL	.ou
1	1	6	Etowal	h River		1675	.700	1091 2576	.280		.000	
2	4	10	Allat	oona Disc	:h	2900	0.800	2576	.080		.000	
3	1	1	LK Aci	worth Dia	sch	45	2.200	22	.070		.000	
4	1	1	Allat	cona Cree	ek .	31	.540	22	.475		.000	
5	2	1	Land	Seg1		40	180	14	.316		.000 .000	
7	5	~	Land	segz sonz		93 11	1 450	27	.612		.000	
8	1	4	Little	e River		354	800	157	7.700		.000	
9	i	4	Noond	h River pona Disc worth Disc pona Cree Seg1 Seg2 Seg3 e River ay Creek Creek		126	.900	56	.770		.000	
10	1	6	Shoat	Creek		173 62 39 11 46	3.500	82	.000		.000	
11	2	7	Land 1	Sea7		62	2.650	19	.298		.000	
12	2	8	Land :	Seg8		39	7.760	12	.326		.000	
13	2	9	Land :	Seg8 Seg9 Creek Seg5		11	1.650	3	.612		.000	
14	1	5	Stamp	Creek		46	5.600	14	-446		.000	
15	2	5	Land :	sego Secif		29	7.720	9	2.213		-000	
16 17	2	10	Land	Seg10 Seg4			3.380 2.650		.878 .418		.000 .000	
18				Seg6			5.140		.203		.000	
INP	UT G	ROUP	7 - TI	RIBUTARY	CONC	ENTRAT	ONS (	PPB): ME	AN/CV			
ID		CO	NSERV	TOTA	AL P	TO	OTAL N	OR	тно р	1	NORG N	ECORG
1		.0/	-00	51.0/	.15	587.0	, .00	-0/	.00	.0	/ .00	.0
2		.0/	.00	32.0/	. 19	.0,	.00	.0/	.00	.0	/ .00	.0
3		.0/	.00	49.0/	.00	537.0/	.00	.0/	.00	.0	/ .00	.0
4		.0/	.00	35.0/	.00	572.0/	.00	.0/	.00	.0	/ .00	.0
5		.0/	.00	36.0/	.00	544.0/	.00	.0/	.00	.0	/ .00	.0
6		.0/	.00	36.0/	.00	544.0/	.00	.0/	.00	.0	/ .00	.0
7 8		.0/	.00	30.0/	.00	1020.0	, 00	.0/	.00	.0	/ .00	.0 .0
9		.0/	00	244 07	.υυ .00	1105 0	, ,,	.0/	, 00	.0	, .00	.0
10		.0/	.00	36.0/	.00	515.0	, -00	.0/	, .00	-0	/ -00	.0
11		.0/	.00	36.0/	.00	544.0/	, 00	.0/	, .00	.0	/ .00	.0
12		.0/	.00	36.0/	.00	544.0/	.00	.0/	.00	.0	/ .00	.0
13		.0/	.00	36.0/	.00	544.0/	.00	.0/	.00	.0	/ _00	.0
14		.0/	.00	24.0/	.00	401.0/	.00	.0/	.00	.0	/ .00	.0
15		.0/	.00	36.0/	.00	544.0/	.00	.0/	.00	.0	/ .00	.0
16 17		-0/	.00	30.0/	.00	544.0/	.00	.0/	.00	.0	/ .00	.0
18		.0/	-00	36.0/	.00	544.0/	/ _00	-0/	,00	.0	/ .00	.0 .0
INP	UT G	ROUP	8 - M	32.0/ 49.0/ 35.0/ 36.0/ 36.0/ 36.0/ 36.0/ 36.0/ 36.0/ 36.0/ 36.0/ 36.0/ 36.0/	ENTS	1				-		• •
	OUT			SEGMENT				N SED				
1		2	1	Segment			1.05			1.00		1.000
2		3	1	Segment			1.05					1.000
4		10 6	1 2	Segment Segment			1.05 6.91	1.00 1.00	1.14	1.00		
5		9	3	Segment			.12	1.00	.89	1.00		
5 6 7		7	4	Segment			1.47	1.00	.98	1.00		
7		8	4	Segment			1.47	1.00	.98	1.00		
8		9	4	Segment			1.47	1.00	.98	1.00		
9		10	4	Segment	9.4		1.47	1.00	.98	1.00		
10		0	4	Segment	10.4		1.47	1.00	.98	1.00	1.0	1.000

				LENGTH	ARE	A ZMEA	N	ZMIX	ZHY	P TAR	GET P
10	LAB	EL		KH	KM	2	H	н		H	PPB
1	Seg	ment 1	.1	6.10	4.455	0 2.0	3 2.0	3/ .12	-00/	.00	-0
2	Seg	ment 2	.1	5.00	3.662	0 8.1	0 6.1	3/ .12	.00/	.00	.0
3	Seg	ment 3	.1	5.50	6.632			8/ .12	.00/		.0
4	Segr	ment 4	.2	10.50	4.570	0 2.0	3 2.0	3/ .12	.00/	-00	.0
5	Seg	ment 5	.3	7.60	3.431	0 10.1		0/ .12	.00/	.00	.0
_		ment 6		10.00	7.439		2 3.9	7/ .12	.00/	.00	.0
		ment 7		9.70	6.978			3/ .12			.0
		ment 8		8.20		0 16.1		9/ .12	.00/		.0
		ment 9		2.80		0 24.2		6/ .12		.00	.0
10	Segi	ment 1	0.4	1.20	.692	0 29.3	5 8.3	9/ .12	.00/	.00	.0
INF	PUT	GROUP	10 - 08	SERVEO W	ATER QUA	LITY					
SEC	G			R TOTALP				ORG-N	TP-OP		MOD
		1/M	?	MG/M3	MG/M3	MG/M3	H	MG/H3	MG/H3 M	G/M3-D	MG/H3
1	MN:	.6			.0	7.5	1.3	.0	.0	.0	
	CV:	.1			.00	.46	.13	.00	.00	.00	.0
2	MN:	-3			.0	.0	.0	.0	.0	.0	
7	CV:	.2			.00	.00	.00	-00	-00	.00	-0
٥	CV:	.0			.0	.0	.0	.0		.0	
4	MN:	.6			.00	.00	.00	.00		-00	.0
*	CV:	.7			.00	.0 .00	.0 .00	.0		.00	.0
5	MN:	.6			.00	.0	.0	.0	.00	.00	
•	CV:	.2			.00	.00	.00	.00	.00	.00	.0
6	MN:	.6			.0	6.3	1.3	.0	.0	.0	
	CV:	_4	6 .0	0 .30	.00	.75	.36	.00	.00	.00	.0
7	MN:	.2		0.0	.0	.0	.0	.0	4.0	.0	
_	CV:	.3				.00	.00	.00	.00	.00	.0
8	MN:	.3			.0	12.5	1.7	.0	.0	.0	_1
_	CV:	-4	-		.00	.59	.07	.00	.00	.00	
y	MN:	.5			.0	8.0	1.4	.0	.0	.0	•
40	CV:	.2			-00	-64	. 17	.00	.00	.00	.0
10	CV:	.5			.0 .00	4.3 .35	1.7	.0 .00	.00	.00	.0
INP	י דטי	ROUP	11 - NO	N-POINT N	/ATERSKE	D AREAS	(KH2)				
ID	COD	NAME		Landuse	e1 Land	use2 l	anduse3	landu	se4		
5	2	Land	Seq1	46.18	3	.00	-00		00		
6		Land		95.18		.00	.00		00		
7		Land		11.65		-00	.00		00		
11		Land		62.25		.00	.00	_	00		
12		Land :		39.76	5	.00	.00		00		
13		Land		11.65		.00	.00		00		
15		Land		29.72		-00	.00		00		
16		Land	- •	96.38		-00	.00		00		
17 18		Land :	•	62.64 36.14		.00 .00	.00		00 00		

#### INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS

IC	LAND USE		RUNOFF M/YR	CONSERV	TOTAL P	TOTAL N	ORTHO P	INORG N
			<i>м</i> /тк	PPB	PPB	PPB	FFB	775
1	landuse1		.31	.0	36.0	544.0	,D	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	.00					
2	landuse2		.00	.0	.0	.0	.0	.0
		CV:	.00	.00	.00	-00	.00	
		CV:	.00					
3	landuse3		.00	.0	.0	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	_00					
4	l anduse4		.00	.0	.0	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	
		CV:	.00					

#### INPUT GROUP 13 - MODEL COEFFICIENTS

10	COEFFICIENT	MEAN	CV
1	P DECAY RATE	1.000	.45
2	N DECAY RATE	1,000	.55
3	CHL-A MODEL	1.000	.26
4	SECCKI MODEL	1.000	.10
5	ORGANIC N MODEL	1.000	.12
6	TP-OP MODEL	1.000	.15
7	HODY MODEL	1.000	. 15
8	HODY HODEL	1.000	.22
9	BETA M2/MG	.020	.00
10	MINIMUM QS	.100	.00
11	FLUSHING EFFECT	1.000	.00
12	CHLOROPHYLL-A CV	.620	-00

## INPUT GROUP 14 - CASE NOTES

Observed WQ data from NES P, Light, Flush Model Stream loads from NES Regional calibration from 1992 Landuse from NES

# Appendix B Model Input Files For Walter F. George Lake

```
W. F. GEORGE 1992 (P&N MODEL - UNCALIBRATED)
 INPUT GROUP 2 - PRINT OPTIONS
  1 LIST INPUTS
                                      0 NO
  2 HYDRAULICS & DISPERSION
                                      1 YES
 3 GROSS WATER & MASS BALANCES
                                      2 ESTIMATED CONCS
 4 DETAILED BALANCES BY SEGMENT
                                      2 ESTIMATED CONCS
 5 SUMMARIZE BALANCES BY SEGMENT
                                      2 ESTIMATED CONCS
  6 COMPARE OBS & PREDICTED CONCS
                                      1 ALL SEGMENTS
 7 DIAGNOSTICS
                                      1 ALL SEGMENTS
 8 PROFILES
                                      1 ESTIMATED CONCENTRATIONS
 9 PLOTS
                                      0 NO
 10 SENSITIVITY ANALYSIS
                                      0 NO
INPUT GROUP 3 - MODEL OPTIONS
 1 CONSERVATIVE SUBSTANCE
                                      0 NOT COMPUTED
2 PHOSPHORUS BALANCE
                                     1 2ND ORDER, AVAIL P
3 NITROGEN BALANCE
                                     1 2ND ORDER, AVAIL N
4 CHLOROPHYLL-A
                                     1 P, N, LIGHT, Y
5 SECCHI DEPTN
                                     1 VS. CHLA & TURBIDITY
6 DISPERSION
                                     1 FISCHER-NUMERIC
7 PHOSPHORUS CALIBRATION
                                     1 DECAY RATES
8 HITROGEN CALIBRATION
                                     1 DECAY RATES
9 ERROR ANALYSIS
                                     1 MODEL & DATA
10 AVAILABILITY FACTORS
                                     0 MODEL 1 ONLY
INPUT GROUP 4 - VARIABLES
             ATMOSPHERIC LOADINGS AVAILABILITY
VARIABLE
              KG/KHZ-YR
 1 CONSERV
                                        .00
                  30.00
 2 TOTAL P
                            .50
                                       1.00
                1000.00
 3 TOTAL N
                            -50
                                       1.00
 4 ORTHO P
                  15.00
                            .50
                500.00
 5 INORG N
                                        .00
INPUT GROUP 5 - GLOBAL PARAMETERS
PARAMETER
                                    MEAN
                                             CV
 1 PERIOD LENGTH
                                    .583
                                           .000
 2 PRECIPITATION M
                                    .000
                                            .000
 3 EVAPORATION
                                    .000
                                            .000
 4 INCREASE IN STORAGE M
                                   - .384
                                           .000
 5 FLOW FACTOR
                                   1.000
                                           .000
 6 DISPERSION FACTOR
                                   1.000
                                           .000
                     KM2
                                 182,000
 7 TOTAL AREA
                                            -000
 8 TOTAL VOLUME
                      HM3
                                1152.600
                                           .000
```

INPUT GROUP 6 - TRIBUTA	RY DRAINA	GE AREAS A	AND FLOWS	
ID TYPE SEG NAME	DRAI	NAGE AREA KH2	MEAN FLOW HM3/YR	CV OF MEAN FLOW
1 1 1 Lake Inflow 2 4 7 Lake Outflo		15731.590 19321.400	5245.800 5264.766	
INPUT GROUP 7 - TRIBUTA	RY CONCEN	TRATIONS (	(PPB): MEAN	/CV
10 CONSERV TOTAL P	TOTAL	N ORTH	O P INOR	G N ECORG P
1 .0/.00 59.7/.00 2 .0/.00 .0/.00			0/.00 .0/ 0/.00 .0/	.00 .0
INPUT GROUP 8 - MODEL S				
SEG OUTFLOW GROUP SEGMEN NAME			CHL-A SECC	HI HOD OISP
	ake 1.00			1.00 1.000
2 3 1 Florence 3 4 1 Cowikee				1.00 1.000 1.00 1.000
4 5 1 US82	1.00			1.00 1.000
5 6 1 Cheneyh	tch 1.00			1.00 1.000
6 7 1 Pataula 7 0 1 Forebay				1.00 1.000 1.00 1.000
INPUT GROUP 9 - SEGMENT				
LENGTH	AREA	ZMEAN ZM	IIX ZHYP	TARGET P
IO LABEL KM	KM2	н	H M	PPB
1 Upper Lake 8.53	3.4000	5.00 2.	39/.12 .00	/.00 .0
2 Florence 12.55	5.0000		34/.12 .00	
	11.5000 27.5000		34/.12 .00	
	28.4000		15/.12 .00, 39/.12 .00,	
	46.3000		59/.12 .00	
7 Forebay 5.95	28.6000	8.70 7.	75/.12 .00	/.00 .0
INPUT GROUP 10 - OBSERVE	ED WATER	QUALITY		
SEG TURBIO CONSER 1 1/M ?	TOTAL P MG/M3	TOTAL N MG/M3	CHL-A SI MG/M3	ECCH1
1 MN: .65 .0	56.7	889.0	16.5	.9
CV: .21 .00 2 MN: .61 .0 !	.05	.06	.27	.08
2 MN: .61 .0 ! CV: .15 .00	53.7 .04	858.0 .09	18.3 .08	.9 .08
	42.8	742.0		1.1
CV .11 .00	.06	.04	-04	.05
4 MN: .31 .0 : CV: .20 .00	38.7 .06	624.0		1.3
	31.3	.07 521.0	.10 16.3	.04 1.6
CV: .16 .00	.05	.07	.08	.02
	26.2	479.0	18.5	1.7
CV: .78 .00 7 MN: .13 .0	.08	.05	.19	.08
CV: .58 .00	22.8 .09	475.0 .03	16.7 .15	1.8 .07
INPUT GROUP 11 - NON-PO	INT WATER	SHED AREAS	(KH2)	
NONE				
INPUT GROUP 12 - NON-PO	INT EXPOR	T CONCENTA	LAT IONS	
NONE				

IC COEFFICIENT	MEAN	CV
1 P DECAY RATE	1.000	.00
2 N DECAY RATE	1.000	.OD
3 CHL-A MODEL	1.000	.00
4 SECCHI MODEL	1.000	.00
5 ORGANIC N MODEL	1.000	.12
6 TP-OP MODEL	1.000	.15
7 HODY MODEL	1.000	. 15
8 MODV MODEL	1.000	.22
9 BETA M2/MG	.025	.00
10 MINIMUM QS	.100	.00
11 FLUSHING EFFECT	1.000	.00
12 CHLOROPHYLL-A CV	.620	.00

INPUT GROUP 14 - CASE NOTES

1992 Auburn Water Quality Data P and N Model TN and TP availability set to 1.0 Inflow = Station 8

#### W. F. GEORGE 1992 (P&N MODEL - CALIBRATED)

#### INPUT GROUP 2 - PRINT OPTIONS

- 1	LIST INPUTS	0	NO
2	HYDRAULICS & DISPERSION	1	YES
3	GROSS WATER & MASS BALANCES	2	ESTIMATED CONCS
4	DETAILED BALANCES BY SEGMENT	2	ESTIMATED CONCS
5	SUMMARIZE BALANCES BY SEGMENT	2	ESTIMATED CONCS
6	COMPARE OBS & PREDICTED CONCS	- 1	ALL SEGMENTS
7	DIAGNOSTICS	1	ALL SEGMENTS
8	PROFILES	1	ESTIMATED CONCENTRATIONS
9	PLOTS	0	NO
10	SENSITIVITY ANALYSIS	0	NO

#### INPUT GROUP 3 - MODEL OPTIONS

1	CONSERVATIVE SUBSTANCE	0 NOT COMPUTED
2	PHOSPHORUS BALANCE	1 2ND ORDER, AVAIL P
3	NITROGEN BALANCE	1 2ND ORDER, AVAIL N
4	CHLOROPHYLL-A	1 P, N, LIGHT, T
5	SECCHI DEPTH	1 VS. CHLA & TURBIDITY
6	DISPERSION	1 FISCHER-NUMERIC
7	PHOSPHORUS CALIBRATION	1 DECAY RATES
8	NITROGEN CALIBRATION	1 DECAY RATES
9	ERROR ANALYSIS	1 MODEL & DATA
10	AVAILABILITY FACTORS	D MODEL 1 ONLY

#### INPUT GROUP 4 - VARIABLES

VAI	RIABLE		ATMOSPHERIC KG/KM2-YR	LOADINGS CV	AVAILABILITY FACTOR
1	CONSER	٧	.00	.00	.00
2	TOTAL	Ρ	30.00	.50	1.00
3	TOTAL	N	1000.00	.50	1.00
4	ORTHO	P	15.00	.50	.00
5	INORG	N	500.00	.50	.00

#### INPUT GROUP 5 - GLOBAL PARAMETERS

PARAMETER		MEAN	CV
1 PERIOD LENGTH	YRS	.583	.000
2 PRECIPITATION P	4	.000	.000
3 EVAPORATION >	1	.000	.000
4 INCREASE IN STO	DRAGE M	384	.000
5 FLOW FACTOR		1.000	_000
6 DISPERSION FACT	ror .	1.000	.000
7 TOTAL AREA	KM2	182.000	.000
8 TOTAL VOLUME	низ	1152.600	.000

### INPUT GROUP 6 - TRIBUTARY DRAINAGE AREAS AND FLOWS

ID	TYPE	SEG	NAME	DRJ	NINAGE AREA KM2	MEAN FLOW HM3/YR	OF MEAN FLOW
1	-		Lake In		15731.590 19321.400	5245.800 5264.766	.034 .038

```
INPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV
                                                           ECORG P
                                                  INORG N
10
      CONSERV
                 TOTAL P
                            TOTAL N
                                        ORTHO P
      .0/ .0
                59.7/.06 847.0/.07
                                       .0/.00
                                                   .0/.00
                                                              .0
      .0/ .00
                   .0/.00
                              .0/.00
                                        .0/.00
                                                    .0/.00
                                                              .0
2
INPUT GROUP 8 - MODEL SEGMENTS
                              ----- CALIBRATION FACTORS -----
SEG OUTFLOW GROUP SEGMENT
                             P SED N SEO CHL-A SECCHI HOD DISP
                     NAME
                  Upper Lake 1.00 1.00
                                            1.00
                                                 1.00 1.00 1.000
                                                  1.00
                                                        1.00 1.000
2
                  Florence
                              1.31
                                    1.56
                                            2.10
                                                        1.00 1.000
3
                  Cowikee
                              1.31
                                    1.56
                                            2.10
                                                  1.00
                  US82
                              1.31
                                    1.56
                                            2.10
                                                  1.00
                                                         1.00 1.000
                                                  1.00
                                                        1.00 1.000
5
                  Cheneyhtch 1.31
                                    1.56
                                            2.10
                                            2.10
 6
                  Pataula
                              1.31
                                    1.56
                                                  1.00
                                                         1.00 1.000
         O
                                                 1.00
                                                        1.00 1.000
                  Forebay
                              1.31
                                    1.56
                                            2.10
INPUT GROUP 9 - SEGMENT MORPHOMETRY: MEAN/CV
              LENGTH
                                          ZMIX
                                                 ZHYP
                                                       TARGET P
                           AREA
                                 ZMEAN
IO LABEL
                                                             PPR
                  KH
                            KH2
 1 Upper Lake
                8.53
                         3.4000
                                  5.00
                                          2.39/.12 .00/.00
 2 Florence
                12.55
                         5.0000
                                          6.34/.12 .00/.00
                                  5.00
                        11.5000
                                          6.34/.12 .00/.00
7.15/.12 .00/.00
 3 Cowikee
                14.32
                                   5.00
                                                              .0
                        27.5000
 4 US82
                                                              .0
                9.81
                                   6.70
                        28.4000
 5 Cheneyhtch
               10.14
                                  7.30
                                          7.39/.12 .00/.00
                                                              .0
 6 Pataula
                11.58
                        46.3000
                                   8.00
                                          7.59/.12 .00/.00
                                                              .0
 7 Forebay
                 5.95
                        28.6000
                                  8.70
                                          7.75/.12 .00/.00
                                                              .0
INPUT GROUP 10 - OBSERVED WATER QUALITY
       TURBID CONSER TOTALP TOTALN CHL-A SECCHI ORG-N
SEG
                                                           TP-DP
                       MG/M3 MG/M3 MG/M3
          1/H
                                                     MG/N3
                                                            MG/H3
1 MN:
          -65
                  .0
                       56.7
                              889.0
                                      16.5
  CV:
                 .00
                                                      .00
                                                             .00
          .21
                        .05
                                               -08
                                -06
                                       -27
2 MN:
                       53.7
                             858.0
                                                              .0
          .61
                  .0
                                      18.3
                                                       -0
  CV:
          . 15
                 .00
                        .04
                                .09
                                       .08
                                               .08
                                                      .00
                                                             .00
3 MN:
          .43
                  .0
                       42.8
                              742.0
                                                       .0
                                                              .0
          .11
  CV:
                        .06
                               .04
4 MN:
          .31
                  .0
                       38.7
                             624.0
                                      19.6
                                              1.3
                                                       .0
                                                              .0
                                                      .00
  CV:
          .20
                 .00
                        -06
                               -07
                                       -10
                                               -04
                                                             -00
5 MN:
                       31.3
          .22
                  .0
                             521.0
                                      16.3
                                               1.6
                                                       -0
                                                              -0
  CV:
          -16
                 .00
                        .05
                                .07
                                       .08
                                               .02
                                                      _00
                                                              .00
6 MN:
          .13
                  .0
                       26.2
                              479.0
                                      18.5
                                                       .0
                                                              .0
  CV:
          .78
                 .00
                        .08
                               .05
                                       .19
                                               .08
                                                      .00
                                                             .00
7 MN:
          .13
                  .0
                       22.8
                              475.0
                                      16.7
                                               1.8
                                                      .0
                                                              .0
                                               .07
  CV:
          .58
                 _00
                        .09
                                .03
                                       .15
                                                      .00
                                                              .00
INPUT GROUP 11 - NON-POINT WATERSHED AREAS (KM2)
 NONE
INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS
```

NONE

IC	COEFFICIENT	MEAN	CA
1	P DECAY RATE	1.000	.00
2	N DECAY RATE	1.000	.00
3	CHL-A MODEL	1.000	.00
4	SECCHI MODEL	1.000	.00
5	ORGANIC N MODEL	1.000	.12
6	TP-OP MODEL	1.000	.15
7	HOOV MODEL	1.000	.15
8	MODY MODEL	1.000	.22
9	BETA M2/MG	-025	.DO
10	MINIMUM QS	.100	.00
11	FLUSHING EFFECT	1.000	.00
12	CHLOROPHYLL-A CV	.620	.00

#### INPUT GROUP 14 - CASE NOTES

1992 Auburn Water Quality data
P and N Model
TN and TP availbility set to 1.0
Inflow = Station 8
Calibrated with 1992 data
Segment 1 set to defaults (not calibrated)

# Appendix C Model Input Files for Lake Sidney Lanier

```
Lanier UNCALIBRATED 1973
 INPUT GROUP 2 - PRINT OPTIONS
  1 LIST INPUTS
                                       O NO
  2 HYDRAULICS & DISPERSION
                                       1 YES
                                       2 ESTIMATED CONCS
  3 GROSS WATER & MASS BALANCES
  4 DETAILED BALANCES BY SEGMENT
                                       O NO
  5 SUMMARIZE BALANCES BY SEGMENT
                                       0 NO
  6 COMPARE OBS & PREDICTED CONCS
                                       0 NO
                                       1 ALL SEGMENTS
  7 DIAGNOSTICS
 8 PROFILES
                                       1 ESTIMATED CONCENTRATIONS
  9 PLOTS
                                       2 GEOMETRIC SCALE
 10 SENSITIVITY ANALYSIS
 INPUT GROUP 3 - MODEL OPTIONS
  1 CONSERVATIVE SUBSTANCE
                                       O NOT COMPUTED
  2 PHOSPHORUS BALANCE
                                       1 2ND OROER, AVAIL P
  3 NITROGEN BALANCE
                                       1 2ND ORDER, AVAIL N
                                       1 P, N, LIGHT, T
1 VS. CHLA & TURBIDITY
  4 CHLOROPHYLL-A
  5 SECCHI DEPTH
  6 DISPERSION
                                       1 FISCHER-NUMERIC
  7 PHOSPHORUS CALIBRATION
                                       1 DECAY RATES
  8 NITROGEN CALIBRATION
                                       1 DECAY RATES
  9 ERROR ANALYSIS
                                       1 MODEL & DATA
 10 AVAILABILITY FACTORS
                                       0 MODEL 1 ONLY
 INPUT GROUP 4 - VARIABLES
             ATMOSPHERIC LOADINGS AVAILABILITY
 VAR1ABLE
              KG/KH2-YR
                             CV
  1 CONSERV
                   .00
                             .00
                                         .00
                  25.40
                             .50
  2 TOTAL P
                                        1.00
                 927.00
 3 TOTAL N
                             .50
                                        1.00
  4 ORTHO P
                  13.00
                             .50
                                         .00
  5 INORG N
                 450.00
                                         .00
 INPUT GROUP 5 - GLOBAL PARAMETERS
 PARAMETER
                                     MEAN
  1 PERIOD LENGTH
                                     .583
                                             .000
  2 PRECIPITATION M
                                     .932
                                             .200
  3 EVAPORATION M
                                    1.148
                                             .300
  4 INCREASE IN STORAGE M
                                   -1.058
                                             .000
  5 FLOW FACTOR
                                    1.000
                                             .000
  6 DISPERSION FACTOR
                                    1.000
                                            .700
 7 TOTAL AREA
                                  155.979
                                             .000
  8 TOTAL VOLUME
                                 2411.739
                                            .000
```

	TYPE	CCC	NAME		LINAGE AREAS AND	MEAN FLOUR	CV OF MEAN F	LOU
ID	ITPE	SEG	NAME		RAINAGE AREA	MEAN FLOW	CA OL MENH L	LOW
_	_			. <b>-</b>	KH2	HH3/YR	000	
1	1	15	CHATTAHOOCH	EE RV	11137.000	895.740	.000	
2	2	1	Runoff 1		249.000	79.060		
3	2	2	Runoff 2		496.000	157.391		
4	2	3	Runoff 3		65.300	20.700		
5	2	4	Runoff 4		261.100	82.769	.000	
6	2	5	Runoff 5		23.300	7.386	.000	
7	2	6	Runoff 6		30.300	9.605	.000	
8	2	7	Runoff 7		28.000	8.876		
9	2	8	Runoff 8		37.300	11.824	.000	
10	2	9	Runoff 9		74.600	23.648	.000	
11	2	10	Runoff 10		35,000	23.648 11.095	.000	
12	2	11	Runoff 11		207.400	65.746		
13	2	12	Runoff 12:		28.000	8.876	.000	
14	2	13	Runoff 13		42,000	13.314	.000	
15	2	14	Runoff 14		93,200	29.544	_000	
16	2	15	Runoff 15		815.800	258,609	000	
17	2	16	Runoff 16		23.300	29.544 258.609 7.354	_000	
18	2	17	Runoff 17		32-600	10.334	.000	
19	2	18	Runoff 18		32,600	10.334 10.334	.000	
20	2	19	Runoff 10		67,600	21 420	.000	
21	2	20	Runoff 20		11137.000 249.000 496.000 65.300 261.100 23.300 30.300 28.000 37.300 74.600 35.000 207.400 28.000 42.000 93.200 815.800 23.300 32.600 67.600 102.600 7.000 613.800	21.429 32.524 2.219	.000	
22	2	21	Runoff 21		7 000	2 210	.000	
23	1	- 21	CHECTATEE D	TUED	613.800	498.330	.000	
24	i	7	CHESTATEE K	TOID	64.700	57.772	.000	
25	1	2	WANDO CKEEK	TE DV	64.700	20.704	.000 .000	
26	1	2	W FORK LITT E FORK LITT FLAT CREEK	LE KY	46.600 41.400 15.500	28.386 25.232	-000	
27		4/	E POKK LILI	LE KY	41.400	25.232	.000	
	1	14	TEAT CREEK	(11)	15.500	9.462		
28	1	12	LIMESTONE C	KEEK	10.400 46.600	6.308		
29	1	14	FLAT CREEK	(81)	20.700 689.900	31.540		
30 31	1	24	FOUR MILE C	REEK	20.700	9.462 2691.370		
10	UI GI	CO			CENTRATIONS (P)			ECORG
1			.00 50.0	.00	717.07 .00	.0/ .00	.0/ .00	.0
3			.00 52.0		850.0/ .00	.0/ .00	.07 .00	.0
4			.00 52.0		950.07.00	.0/ .00	.0/ .00	.0
5		-	.00 52.0	7 .00	950.07.00	.0/ .00	.0/ .00	.0
6			.00 52.0	1/ 00	950.07.00	.07 .00	.0/ .00	.0
7			00 52.0	·/ .00	950.0/ .00	.0/ .00	.0/ .00	.0
8		.0/	.00 52.0		950.0/ .00	.07 .00	.0/ .00	
9		-	.00 32.0	// .00		0.4 00	0/ 00	-0
			00 52 0	1/ 00	950.0/ .00	.0/ .00	.0/ .00	.0
		-	.00 52.0	.00	850.0/ .00	.0/ .00	.0/ .00	.0
10		.0/	.00 52.0 .00 52.0	00. \(0)	850.0/ .00 850.0/ .00	.0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0
10 11		.0/	.00 52.0 .00 52.0 .00 52.0	00. \000 \000 \000 \000 \000 \000 \000	850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12		.0/	.00 52.0 .00 52.0 .00 52.0	00. \0 00. \0 00. \0 00. \0	850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13		.0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0	00. \0 00. \0 00. \0 00. \0 00. \0	850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14		.0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	00 \ 00 00 \ 00 00 \ 00 00 \ 00 00 \ 00 00 \ 00	850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15		.0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	717.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15		.0/ .0/ .0/ .0/ .0/	.00 52.0	00.	850.0/ .00	.0/ .00	.0/ .00	.0
10 11 12 13 14 15 16 17		.0/ .0/ .0/ .0/ .0/ .0/	.00 52.0	00. \(	850.0/ .00 850.0/ .00	.0/ .00 .0/ .00	.0/ .00	.0
10 11 12 13 14 15 16 17 18		.0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0	00. \(0)	850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0 .0 .0
10 11 12 13 14 15 16 17 18		.0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0	00. \(0 00. \(0 00. \(0 00. \(0	850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0 .0 .0
10 11 12 13 14 15 16 17 18 19 20		.0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0
10 11 12 13 14 15 16 17 18 19 20 21		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0
10 11 12 13 14 15 16 17 18 19 20 21		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00 850.0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0
10 11 12 13 14 15 16 17 18 19 20 21 22 23		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 69.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 931.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0 .0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00 1072.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0 .0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 69.0 .00 72.0 .00 62.0 .00 62.0	0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00 1072.0/.00 1095.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 69.0 .00 72.0 .00 62.0 .00 62.0 .00 2234.0	)/	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00 1072.0/.00 10324.0/.00 1036.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 69.0 .00 72.0 .00 62.0 .00 2234.0 .00 158.0	)/ .00 )/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00 1072.0/.00 10324.0/.00 1036.0/.00 739.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 111 12 13 14 15 16 17 18 19 20 21 22 22 23 24 25 26 27 28 29 30		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 69.0 .00 72.0 .00 69.0 .00 69.0 .00 158.0 .00 2234.0 .00 41.0 .00 52.0	0/ .00 0/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00 1072.0/.00 1295.0/.00 10324.0/.00 1334.0/.00 739.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29		.0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/ .0/	.00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 52.0 .00 69.0 .00 72.0 .00 69.0 .00 69.0 .00 158.0 .00 2234.0 .00 41.0 .00 52.0	)/ .00 )/ .00	850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 850.0/.00 623.0/.00 931.0/.00 1072.0/.00 10324.0/.00 1036.0/.00 739.0/.00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0 .0 .0 .0

							TION FAC		
		SEGMENT N					SECCHI	HOD	DIS
1	2 1			1.00		1.00	1.00	1.00	1.00
2	3 1	WEST FORK		1.00	1.00	1.00	1.00	1.00	1.00
	6 4			1.00	1.00	1.00		1.00	1.00
5	-	on on		1.00	1.00	1.00		1.00	1.00
	7 4	THOMPSON	LKEEK	1.00	1.00	1.00			1.00
	8 4	CHEST1 TAYLOR CR	CCV	1.00	1.00	1.00		1.00	1.00 1.00
	18 4			1.00	1.00	1.00	1.00	1.00	1.00
	20 1			1.00	1.00	1.00		1.00	1.00
		YOUNG DEE		1.00	1.00	1.00	1.00	1.00	1.00
	1			1.00	1.00	1.00	1.00	1.00	1.00
	1 1			1.00	1.00	1.00	1.00	1.00	1.00
		BALUS CRE		1.00	1.00	1.00	1.00	1.00	1.00
		FLAT CREE		1.00	1.00	1.00	1.00	1.00	1.00
	6 1		^	1.00	1.00	1.00	1.00	1.00	1.00
		CHAT2-SAR	DIS-ADA	1.00	1.00	1.00	1.00	1.00	1.00
	18 1		מאל פוני	1.00	1.00	1.00	1.00	1.00	1.00
		CHAT4-CHE	ST RAY		1.00	1.00		1.00	1.00
	0 1	CHATS-2-H	TLF.MUD	1.00	1.00	1.00		1.00	1.00
	1 1	CHAT6-FLO	URY RIG	1.00	1.00	1.00		1.00	1.00
	0 1	CHAT7-BUF	ORD DAM	1.00	1.00	1.00		1.00	1.00
ID LABEL 1 WAHOO 2 WEST F	CREEK ORK	EGMENT MOR LENGTH KM 3.80 5.00	AREA KM2 2.3890 2.6550	ZMEAN 5.69 16.07	6.0 6.0	2H1X H 0/ .12 0/ .12	.00/	.00	.0 .0
ID LABEL  1 WAHOO  2 WEST F  3 WAHOO-  4 YELLOW  5 THOMPS  6 CHEST1  7 TAYLOR  8 LATHAM  9 SIX-FO  10 YOUNG  11 BALD B  12 SHOAL  13 BALUS  14 FLAT C  15 CHAT2-	CREEK ORK LITTLE R CREEK CON CREEK CREEK GCREEK GUR MILE DEER CRK RIOGE CR CREEK CREEK	LENGTH KM 3.80 5.00 11.30 5.00 3.00 5.00 6.30 5.00 6.30 5.00 6.30 5.00 15.00 15.00	AREA kM2 2.3890 2.6550 3.8570 5.8370 3.3130 3.3740 2.1580 10.7530 4.1130 7.1530 5.7880 1.3850 3.7410 6.8800 8.9030	ZMEAN P 5.69 16.07 15.15 12.9.62 11.77 16.53 15.50 20.38 17.84 16.31 18.92 22.21 21.43 19.25 12.57 14.74	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	M 0/ .12 0/ .12 0/ .12 0/ .12 0/ .00 0/ .12 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .00 0/ .12 0/ .00	.00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
ID LABEL  1 WAHOO  2 WEST F  3 WAHOO-  4 YELLOW  5 THOMPS  6 CHESTI  7 TAYLOR  8 LATHAM  9 SIX-FO  10 YOUNG  11 BALD B  12 SHOAL  13 BALUS  14 FLAT C  16 CHAT2-  17 CHAT3	CREEK ORK LITTLE R CREEK CON CREEK CREEK UR MILE DEER CRK RIOGE CR CREEK CREEK CREEK CREEK	LENGTH	AREA kM2 2.3890 2.6550 3.8570 5.8370 3.3130 2.1580 10.7300 7.6730 4.1130 7.1530 5.7880 1.3850 3.7410 6.8800 8.9030 9.6640	ZMEAN P 5.69 16.07 15.15 12.9.62 11.77 16.53 15.50 20.36 17.84 16.31 18.92 22.21 21.43 19.22 12.57 14.74 18.58	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	M 0/ .12 0/ .12 0/ .12 0/ .12 0/ .00 0/ .12 0/ .00 0/ .00 0/ .00 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00	.00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
ID LABEL  1 WAHOO  2 WEST F  3 WAHOO-  4 YELLOW  5 THOMPS  6 CHESTI  7 TAYLOR  8 LATHAM  9 SIX-FC  10 YOUNG  11 BALD B  12 SHOAL  13 BALUS  14 FLAT C  16 CHAT1-  16 CHAT2-  17 CHAT3  18 CHAT4-	CREEK ORK LITTLE R CREEK CON CREEK CREEK UR MILE DEER CRK RIOGE CR CREEK	LENGTH	AREA kM2 2.3890 2.6550 3.8570 5.8370 3.3130 3.3740 2.1580 10.7300 7.6730 4.1130 5.7880 1.3850 3.7410 6.8800 8.9030 9.6640 8.8780	ZMEAN P 5.69 16.07 15.15 12.9.62 11.77 16.53 15.50 20.36 17.84 16.31 18.92 22.21 21.43 19.22 12.57 14.74 18.58 24.34	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	M 0/ .12 0/ .12 0/ .12 0/ .12 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12	.00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
ID LABEL  1 WAHOO  2 WEST F  3 WAHOO-  4 YELLOW  5 THOMPS  6 CHEST1  7 TAYLOR  8 LATHAM  9 SIX-FO  10 YOUNG  11 BALD B  12 SHOAL  13 BALUS  14 FLAT C  15 CHAT1  16 CHAT2-  17 CHAT3-  18 CHAT4-  19 CHAT5-	CREEK ORK LITTLE R CREEK CREEK CREEK CREEK DEER CRK RIOGE CR CREEK	LENGTH KM 3.80 5.00 5.00 11.30 5.00 5.00 5.00 6.30 6.30 6.30 2.50 5.80 15.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	AREA KM2 2.3890 2.6550 3.8570 5.8370 3.3130 3.3740 2.1580 10.7300 7.6730 4.1130 7.1530 5.7880 3.7410 6.8800 8.9030 9.6640 8.8780 22.8600	ZMEAN P 5.69 16.07 15.12 9.62 11.77 16.53 15.50 20.36 17.84 16.31 18.92 22.21 2.57 14.74 18.58 24.34 21.97	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	M 0/ .12 0/ .12 0/ .12 0/ .12 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00	.00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/	-00 -00 -00 -00 -00 -00 -00 -00 -00 -00	PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
ID LABEL  1 WAHOO  2 WEST F  3 WAHOO-  4 YELLOW  5 THOMPS  6 CHEST1  7 TAYLOR  8 LATHAM  9 SIX-FO  10 YOUNG  11 BALD B  12 SHOAL  13 BALUS  14 FLAT C  15 CHAT1  16 CHAT2-  17 CHAT3-  18 CHAT3-  19 CHAT5-	CREEK ORK LITTLE R CREEK CREEK CREEK CREEK CREEK RIOGE CR CREEK REEK SARDIS-A CHEST BA FLOWRY, B	LENGTH KM 3.80 5.00 11.30 5.00 5.00 5.00 5.00 6.30 7.50 3.80 2.50 5.80 15.00 00 00 00 00 00 00 00 00 00 00 00 00	AREA KM2 2.3890 2.6550 3.8570 5.8370 3.3130 3.3740 2.1580 10.7300 7.6730 4.1130 7.1530 5.7880 3.7410 6.8800 8.9030 9.6640 8.8780 22.8600	ZMEAN P 5.69 16.07 15.12 9.62 11.77 16.53 15.50 20.36 17.84 16.31 18.92 22.21 21.57 14.74 18.58 24.39 24.13	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	M 0/ .12 0/ .12 0/ .12 0/ .12 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12 0/ .00 0/ .12	.00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/	-00 -00 -00 -00 -00 -00 -00 -00 -00 -00	PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0

2 M	MN:	1/H				_	SECCH!				MODV
2 M			?		MG/M3			MG/M3		MG/M3-D	
2 P 3 P 4 P	CV:		.00	.00	.00	.00		0. 00.	.00		.0 .00
3 P 0 4 P			.00	.00	.00	.00		.00	.00		.0
3 F	CV:		.00	.00	.00	.00		.00	.00		-00
4 1		.20	.0	.0	.0	.0		.0	.0		.0
	CV:	.00	.00	.00	.00	.00		.00	.00		.00
(	MN:	.37	.0		486.0	6.7	2.0	.0	6.8	.0	.0
	CV:	.06	.00	.20	.08	.08		.00	.22	.00	.00
	MN:	.30	.0	-0	.0	.0		.0	.0		.0
	CV:	.00	.00	.00	.00	.00		.00	.00		-00
	MN:	.30	.0	.0	.0	.0		.0	.0		.0
	CV: MN:	.00 .38	.00	.00	.00 485.6	.00 5.2		.00	.00 9.0		.00
	CV:	.11	.00	.05	.07	.03		.00	.00		.00
8		.35	.0	.0	.0	-0		.0	.0		.0
	CV:	.22	.00	.00	,00	.00		.00	.00		.00
9 1	-	.24	.0	17.3	286.0	5.0	3.0	.0	3.6		.0
_	CV:	.09	.00	.18	.14	.19		.00	.18		.00
10 H		.20	.0	.0	.0	.0		.0	.0		.0
	CV:	.00	-00	.00	.00	.00		.00	-00		.00
11 F	MN: CV:	.23	.0 .00					.0	5.4		.0
12 H		.28	.00	.14 8.6	.28 480.0	.00 3.4		.00	.20 3.8		.00.
	CV:	.04	.00	.07	.36	.03	.03	.00	.24	.00	.00
13 F		.30	.0	.0		.0		.0	.0		.0
(	CV:	.00	.00	.00		.00	.00	.00	.00		.00
14 F	MN:	.29	.0	44.0	657.0	11.3	1.9	.0	30.0		.0
	CV:	.38	.00	.04	.10	.08		.00	.00	.00	.00
15 F	_	.30	.0	.00	.0	.0		.0	.0		.0
	CV:	.00	.00	.00	.00				.00		.00
16 H	MN: CV:	.26 .18	.0 .00		543.0	11.4		.0	2.4		.0
17 F	_	.31	.0	.10	.05 457.0	.18 5.0		.00	.16 3.6		.00
	CV:	.02	.00	.07	.15	.07	.00	.00	.10		.00
18 H		.20	-0	.0		.0		.0	.0		.0
(	CV:	.00	.00	.00		.00		.00	.00		.00
19 H		.24	.0	8.7		4.8	3.0	.0	6.0	.0	.0
	CV:	.19	.00	.19	.14	-19		.00	.26		.00
20 H	_	.23	.0	14.8	359.8	4.2		.0	12.5		.0.
21 X	CV:	.03	.00	.20	256.9	.05	.02 3.2	.00	.10		.00
	CV:	.05	.00		.14	4.2	.03	.00	5.0 .07		.00
INPU	JT (	GROUP 11	- NON-	POINT N	IATERSHE	D AREAS					.00
2		Runoff			9.40	.00			.00		
3	2	Runoff	2	49	6.50	.00			.00		
4		Runoff			5.30	.00			.00		
5		Runoff			1.10	.00	.0		.00		
6		Runoff			23.30	-00	.0		.00		
7		Runoff			10.30	.00	-0		.00		
8 9		Runoff Runoff			28.00	-00	.0		-00		
10		Runoff			7.30 74.60	.00	.0		.00		
11		Runoff			5.00	-00	.0 .0		.00		
12		Runoff			7.40	.00	.0		.00		
13		Runoff			8.00	.00	.0		.00		
14		Runoff			2.00	.00	.0		.00		
15		Runoff			3.20	-00	.0		-00		
16	_	Runoff			5.80	.00	0		.00		
17		Runoff		_	23.20	.00	.0		-00		
18		Runoff Runoff			2.60	-00	.0		-00		
19 20	_	Runoff			52.60 57.60	.00	.0		.00		
21		Runoff			2.60	.00	.0		.00	•	
22		Runoff		,,	7.00	.00	.0		.00		

	JT GROUP 12	- NON-						THORE II
10 1	TAND NZE		RUNOFF CO	PPB	PPB	PPB	PPB	PPB
1 (	landuse1	CV:	.32 .00	.00	52.0 .00	850.0 .00	.00	.00
2 (	l anduse2	CV:	.00	.00	.00	.00	.00	.00
3 (	landuse3	cv:	.00	.00	.00	.00	.00	.00
4 ا	l anduse4	CV:	.00	.00	.00	.0 .00	.00	.00
INPL	JT GROUP 13	- MODE	EL COEFFIC	IENTS				
IC C	COEFFICIENT		MEAN	C	V			
	DECAY RATE	_	1.000	.4				
	DECAY RATE		1.000	.5				
	RL-A MODEL		1.000	.20				
	SECCHI MODEL ORGANIC N MO	-	1.000	.10				
	P-OP MODEL	DEL	1.000	. 1	_			
	HODY MODEL		1.000	.1				
8 1	HODY MODEL		1.000	.2	2			
-	BETA H2/HG		.020	.00				
	INIMUM QS	<b></b>	.100	.00				
	LUSHING EFF		1.000 .620	.00	_			

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Lanier CALIBRATION SET 1973
INPUT GROUP 2 - PRINT OPTIONS
                                      O NO
 1 LIST INPUTS
 2 HYDRAULICS & DISPERSION
                                      1 YES
 3 GROSS WATER & MASS BALANCES
                                      2 ESTIMATED CONCS
 4 DETAILED BALANCES BY SEGMENT
                                      D NO
 5 SUMMARIZE BALANCES BY SEGMENT
                                      0 NO
 6 COMPARE OBS & PREDICTED CONCS
                                      O NO
 7 DIAGNOSTICS
                                      1 ALL SEGMENTS
 8 PROFILES
                                      1 ESTIMATED CONCENTRATIONS
 9 PLOTS
                                      2 GEOMETRIC SCALE
10 SENSITIVITY ANALYSIS
                                      O NO
INPUT GROUP 3 - MODEL OPTIONS
 1 CONSERVATIVE SUBSTANCE
                                      0 NOT COMPUTED
                                      1 2ND ORDER, AVAIL P
 2 PHOSPHORUS BALANCE
 3 NITROGEN BALANCE
                                      1 2ND ORDER, AVAIL N
 4 CHLOROPHYLL-A
                                      1 P, N, LIGHT, T
 5 SECCHI DEPTH
                                      1 VS. CHLA & TURBIDITY
                                      1 FISCHER-NUMERIC
 6 DISPERSION
 7 PHOSPHORUS CALIBRATION
                                      1 DECAY RATES
 8 NITROGEN CALIBRATION
                                      1 DECAY RATES
 9 ERROR ANALYSIS
                                      1 MODEL & DATA
10 AVAILABILITY FACTORS
                                      0 MODEL 1 ONLY
INPUT GROUP 4 - VARIABLES
            ATMOSPHERIC LOADINGS AVAILABILITY
VARIABLE
             KG/KM2-YR
                            CV
 1 CONSERV
                   .00
                           .00
 2 TOTAL P
                 25,40
                            .50
                                       1.00
                927.00
 3 TOTAL N
                           -50
                                       1.0D
 4 ORTHO P
                 13.00
                            .50
                                       .00
 5 INORG N
                45D.00
                            .50
                                        .00
INPUT GROUP 5 - GLOBAL PARAMETERS
PARAMETER
                                    MEAN
                                             CV
 1 PERIOD LENGTH
                     YRS
                                    .583
                                           .000
 2 PRECIPITATION M
                                    .932
                                           .200
 3 EVAPORATION
                                   1.148
                                           .300
 4 INCREASE IN STORAGE M
                                  -1.058
                                           .000
 5 FLOW FACTOR
                                   1.000
                                           .000
 6 DISPERSION FACTOR
                                   1.000
                                           .700
 7 TOTAL AREA
                     KH2
                                 155.979
                                           .000
 8 TOTAL VOLUME
                                2411.739
                     HM3
                                           .000
INPUT GROUP 6 - TRIBUTARY DRAINAGE AREAS AND FLOWS
ID TYPE SEG NAME
                            DRAINAGE AREA
                                              MEAN FLOW CV OF MEAN FLOW
                                                 HM3/YR
                                      KM2
                                 11137,000
         15 CHATTAHOOCHEE RV
                                                                .000
                                                895.740
          1 Runoff 1
                                  249.000
                                                 79.060
                                                                .000
 3
          2 Runoff 2
                                   496,000
                                                157.391
                                                                .000
          3 Runoff 3
                                   65.300
                                                 20.700
                                                                .D00
 5
          4 Runoff 4
                                   261.10D
                                                 82.769
                                                                .000
 6
          5 Runoff 5
                                    23.300
                                                  7.386
                                                                .000
 7
          6 Runoff 6
                                    30.300
                                                  9.605
                                                                .000
 8
          7 Runoff 7
                                                                .000
                                    28,000
                                                  8.876
 9
          8 Runoff 8
                                    37.300
                                                                -000
                                                 11.824
10
          9 Runoff 9
                                    74.600
                                                 23.648
                                                                .000
11
     2
         10 Runoff 10
                                    35.000
                                                 11.095
                                                                .000
         11 Runoff 11
12
                                  207,400
                                                 65.746
                                                                .000
     2
13
         12 Runoff 12
                                    28.00D
                                                  8.876
                                                                _000
14
     2
         13 Runoff 13
                                    42.0D0
                                                 13.314
                                                                .000
15
         14 Runoff 14
                                    93.200
                                                 29.544
                                                                _000
         15 Runoff 15
16
                                  815,800
                                                258.609
                                                                .000
         16 Runoff 16
17
                                    23.3DD
                                                  7.354
                                                               . .000
         17 Runoff 17
                                    32.600
18
                                                 1D.334
                                                                .D00
19
         18 Runoff 18
                                    32.600
                                                 10.334
                                                                .000
         19 Runoff 19
                                    67.600
                                                 21.429
                                                                .000
```

```
21
22
          20 Runoff 20
                                     102.600
                                                    32.524
                                                                    -000
          21 Runoff 21
                                                                    .000
                                       7,000
                                                     2.219
23
           4 CHESTATEE RIVER
                                     613.800
                                                   498.330
                                                                   .000
24
25
           3 WAHOO CREEK TRIB
                                      64.700
                                                                    _000
                                                    57.772
                                                                    _000
           2 W FORK LITTLE RV
                                      46.600
                                                    28.386
26
           2 E FORK LITTLE RV
                                      41.400
                                                    25.232
                                                                    .000
27
          14 FLAT CREEK (F1)
                                      15.500
                                                     9.462
                                                                   .000
28
          15 LIMESTONE CREEK
                                      10.400
                                                     6.308
                                                                   .000
29
          14 FLAT CREEK (H1)
                                                                    .000
                                      46,600
                                                    31,540
           9 FOUR MILE CREEK
30
                                      20.700
                                                     9.462
                                                                   .000
31
         21 OUTFLOW
                                     689.900
                                                  2691.370
                                                                   .000
INPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV
         CONSERV
                                                                  INORG N
ID
                       TOTAL P
                                      TOTAL N
                                                    ORTHO P
                                                                            ECORG P
         .0/ .00
                                 717.0/ .00
 1
                     50.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               -0
 2
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                                .0
 3
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
                                                   .0/ .00
                    52.0/ .00
 5
         .0/ .00
                                 850.0/ .00
                                                                 .0/ .00
                                                                                ٠0
                    52.0/ .00
 6
         .0/ .00
                                 850.0/ .00
                                                                 .0/ .00
                                                                               .0
 7
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                                _0
 8
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
 9
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
10
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                               .0
                                                                 .0/ .00
11
                    52.0/ .00
                                                   .0/ .00
         .0/ .00
                                 850.0/ .00
                                                                 .0/ .00
                                                                               .0
         .0/ .00
12
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
13
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
14
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
15
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
16
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
17
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
18
         .0/ .00
                    52.0/ .00
                                 850.0/ +00
                                                   .0/ .00
                                                                 .0/
                                                                    .00
                                                                               .0
19
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               _0
20
         .0/ .00
                                                                 .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                               .0
21
         .0/ .00
                    52.0/ .00
                                                   .0/ .00
                                 850.0/ .00
                                                                 .0/ .00
                                                                               .0
22
         .0/ .00
                    52.0/ .00
                                 850.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
23
         .0/ .00
                    69.0/ .00
                                 623.0/ .00
                                                   .0/ .00
                                                                 .0/
                                                                     .00
                                                                               .0
24
         .0/ .00
                    72.0/ .00
                                 931.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
25
         .0/ .00
                    55.0/ .00
                                1072.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
26
        .0/ .00
                    62.0/ .00
                                1295.0/ .00
                                                   .0/ .00
                                                                               ٠0
                                                                 .0/ .00
27
         .0/ .00
                  2234.0/ .00 10324.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                                .0
28
         .0/ .00
                   158.0/ .00
                                1036.0/ .00
                                                   .0/
                                                       .00
                                                                 .0/
                                                                     .00
                                                                               .0
                                                                 .0/ .00
29
         .0/ .00
                    41.0/ .00
                                 739.0/ .00
                                                   .0/ .00
                                                                               .0
30
         .0/ .00
                    52.0/ .00
                                1293.0/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
         .0/ .00
                    14.8/ .00
                                 359.9/ .00
                                                   .0/ .00
                                                                 .0/ .00
                                                                               .0
INPUT GROUP 8 - MODEL SEGMENTS
                                       ---- CALIBRATION FACTORS ----
             GROUP SEGMENT NAME
SEG
   OUTFLOW
                                       P SED
                                             N SED
                                                      CHL-A SECCHI
                                                                       HOD
                                                                                 DISP
                                         .42
1
                   WAHOO CREEK
                                                .39
         2
                                                       1.14
                                                              1.00
                                                                                1,000
                1
                                                                      1.00
                                                                                1.000
2
         3
                   MEST FORK
                                         .42
                                                 .39
                                                       1.14
                                                              1.00
                                                                      1.00
3
         16
                1
                   WAHOO-LITTLE RIV
                                         .42
                                                 .39
                                                       1.14
                                                              1.00
                                                                      1.00
                                                                                1.000
4
                   YELLOW CREEK
                                        6.94
                                                              1.00
                                                                      1.00
                                                                                1.000
                                               1.25
                                                       1.18
5
                   THOMPSON CREEK
                                        6.94
                                               1.25
                                                       1.18
                                                              1.00
                                                                      1.00
                                                                                1.000
6
         7
                   CHEST1
                                        6.94
                                               1.25
                                                                                1.000
                                                       1.18
                                                              1.00
                                                                      1.00
7
                                                                                1.000
         8
                   TAYLOR CREEK
                                        6.94
                                               1.25
                                                       1.18
                                                              1.00
                                                                      1.00
8
        18
                   LATHAM CREEK
                                        6.94
                                               1.25
                                                       1.18
                                                              1.00
                                                                      1.00
                                                                                1.000
Q
        20
                   SIX-FOUR MILE
                                         .42
                                                 .39
                                                       1.14
                                                              1.00
                                                                      1.00
                                                                                1.000
10
        21
                   YOUNG DEER CRK
                                         .42
                                                 .39
                                                              1.00
                                                                      1.00
                                                                                1.000
                                                       1.14
11
        21
                1
                   BALD BRIDGE CRK
                                         .42
                                                 .39
                                                       1.14
                                                              1.00
                                                                      1.00
                                                                                1,000
        21
                                         .42
12
                   SHOAL CREEK
                                                 .39
                                                              1.00
                                                                      1.00
                                                                                1.000
                1
                                                       1.14
                   BALUS CREEK
13
                                                 .39
        14
                1
                                         .42
                                                       1.14
                                                              1.00
                                                                      1.00
                                                                                1.000
14
        19
                   FLAT CREEK
                                        1.43
                                                        .91
                                                              1.00
                                                                      1.00
                                                                                1.000
15
        16
                   CHAT1
                                        4.01
                                                 .84
                                                       2.50
                                                              1.00
                                                                      1.00
                                                                                1.000
        17
                   CHAT2-SARDIS-ADA
                                        4.01
                                                 .84
                                                                                1.000
16
                                                       2.50
                                                              1.00
                                                                      1.00
17
        18
                                         .42
                                                 .39
                                                              1.00
                                                                      1.00
                1
                   CHAT3
                                                       1.14
                                                                                1.000
18
        19
                   CHAT4-CHEST BAY
                                         .42
                                                 .39
                                                       1.14
                                                               1.00
                                                                      1.00
                                                                                1.000
19
        20
                   CHATS-2-MILE, MUD
                                                 .39
                                                                                1.000
                                         .42
                                                       1.14
                                                               1.00
                                                                      1.00
20
                   CHAT6-FLOWRY, BIG
                                         -42
                                                 .39
                                                       1.14
                                                               1.00
                                                                      1.00
                                                                                1.000
```

21		0	1 CH	AT7-BUF	ORD DAM	.42	.39	1.14	1.00	1.00	1.00
INI	PUT	GROUP 9 -		ENT MORI	PHOMETRY:			MIX	ZHY	P TARG	ET P
ID	LAB	EL		KM	KM2			М		H	PPB
		OO CREEK		3.80	2.3890			/ .12	.00/		.0
		T FORK		5.00	2.6550			/ .12	.00/		.0
		00-LITTLE		5.00	3.8570			/ .12	.00/		.0
		LOW CREEK		11.30	5.8370			/ .12	-00/		.0
	CHE	MPSON CRE	EA	5.00	3.3130 3.3740			/ .00	.00/		.0
		LOR CREEK	,	3.00 5.00	2.1580			/ .12	.00/		.0
		HAM CREEK		5.00	10.7300			/ .00	.00/		.0 .0
		FOUR MIL		6.30	7.6730			, .00	.00/		.0
		NG DEER C		5.00	4.1130			/ .12	.00/		.0
		BRIDGE	CRK	7.50	7.1530			/ .00	.00/		.0
		AL CREEK		3.80	5.7880		6.00	/ .00	.00/	.00	.0
		JS CREEK		2.50	1.3850			/ .12	.00/		.0
		CREEK		5.80	3.7410			/ .00	.00/		.0
	CHA		- 40-4	15.00	6.8800		6.00	/ .12	.00/		.0
	CHA	12-SARDIS 13	~ADA	5.00 6.30	8.9030			/ .00	-00/		-0
		14-CHEST	RAY	5.00	9.6640 8.8780			/ .00 / .12	.00/		-0
19	CHAT	5-2-MILE	, MUID	6.20	22.8600			/ .00	.00/		.0 .0
		6-FLOWRY		5.00	25.2400			/ .12	.00/		.0
		7-BUFORD		5.00	11.2700			.00	.00/		.0
		GROUP 10									
SEC	3	TURBIO C				CHL-A SE		ORG-N	TP-OP	YOOK	MODV
1	MN:	1/M .20	? .0	MG/M3 .0		MG/M3		4G/H3		-	MG/M3-D
'	CV:	.00	.00	.00	.00	.0 .00	.0	.0	.0	.0	.0
2	MN:	.20	.0	.0	.0	-00	.0	.00	.00	.00	-00
_	CV:	.00	.00	.00	.00	.00	.00	.00	.00	.0 .0D	.00
3	MN:	.20	.0	.0	.0	.0	.0	.0	.0	.0	.0
	CV:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	MN:	.37	.0	21.3	486.0	6.7	2.0	.0	6.8	.0	.0
_	CV:	.06	-00	.20	.08	.08	-04	.00	.22	.00	.00
5	MN:	.30	.0	.0	.0	.0	.0	.0	.0	.0	.0
,	CV:	.00	.00	.00	.00	.00	.00	.00	.00	.00	-00
0	MN:	.30	-0	.0	.0	.0	.0	.0	.0	.0	-0
7	CV:	.00 .38	.00 .0	.00	.00 485.6	-00	.00	.00	.00	.00	.00
•	CV:	.11	.00	12.5 .05	.07	5.2 .03	2.1	.0	9.0	.0	.0
8	MN:	.35	.0	.0	.0	.03	.0	.00	.00	.00	-00
	CV:	.22	.00	.00	.00	.00	.00	.00	.0 .00	.00	.00
	MN:	.24	_0	17.3	286.0	5.0	3.0	.0	3.6	.0	.0
	CV:	-09	.00	.18	.14	.19	.03	.00	.18	.00	.00
10	MN:	.20	.0	.0	-0	.0	.0	.0	.0	.0	.0
	CV:	-00	.00	.00	.00	.00	_00	.00	.00	.00	.00
11		.23	.0	19.1	457.0	4.7	3.0	.0	5.4	.0	.0
	CV:	-00	.00	-14	.28	.00	.00	.00	-20	.00	.00
12		-28	.0	8.6	480.0	3.4	2.9	.0	3.8	.0	.0
	CV:	-04 30	-00	-07	.36	.03	.03	.00	.24	.00	.00
13	MN: CV:	.30 .00	.0	.0	.0	.0	.0	.0	.0	.0	.0
14		.29	.00	.00 44.0	.00 657.0	.00 11.3	.00	.00	.00	.00	.00
	CV:	.38	-00	-04	.10	.08	1.9 .21	.0 .00	30.0	.0	.0
15		.30	.0	.0	.0	.0	.0	.0	.00	-00	.00
	CV:	-00	.00	-00	.00	.00	.00	.00	.00	.00	.00
16		.26	.0	17.2	543.0	11.4	2.1	.00	2.4	.0	.00
	CV:	. 18	.00	.10	.05	.18	.04	.00	.16	.00	.00
17		.31	.0	13.1	457.0	5.0	2.4	.0	3.6	.0	.0
	CV:	.02	.00	_07	.15	.07	.00	.00	.10	.00	.00
18		.20	.0	.0	.0	.0	.0	.0	.0	.0	.0
	CV:	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	MN:	.24	.0	8.7	300.0	4.8	3.0	.0	6.0	.0	.0
		-19	.00	.19	.14	.19	.12	.00	.26		
	CV:	.23	-0	14.8	359.8	4.2	3.2	.00	12.5	-00	.00

```
.03
                          .20
                                  .19
                                                 .02
                                                         .00
                                                                .10
                                                                        -00
                                                                                .00
   CV:
           .23
                   .0
                                         4.2
                                                                5.0
                                                                                 .0
                          7.0
                               256.9
                                                 3.2
                                                          .0
                                                                         .0
21 MM:
                                                                        .00
                                                                                .00
           .05
                   .00
                                                 .03
                                                         .00
                                                                .07
   CV:
                          .11
                                          .08
INPUT GROUP 11
                  NON-POINT WATERSHED AREAS (KH2)
ID COD NAME
                          landuse1 landuse2 landuse3 landuse4
     2 Runoff 1
                            249.40
                                                   .00
                                                             .00
                                          .00
                                         .00
     2 Runoff 2
                            496.50
                                                   .00
                                                             .00
     2 Runoff
                             65.30
                                          .00
                                                   .00
                                                             .00
     2 Runoff 4
                            261.10
                                          .00
                                                             .00
                             23.30
                                          .00
                                                             .00
     2 Runoff
                                                   .00
     2 Runoff 6
                             30.30
                                         .00
                                                   .00
                                                             .00
                                          .00
                                                   .00
     2 Runoff 7
                             28.00
                                                             .00
       Runoff 8
                             37.30
                                          .00
                                                   .00
                                                             .00
     2 Runoff 9
                             74.60
                                          .00
                                                   .00
                                                             .00
11
     2 Runoff 10
                             35.00
                                          .00
                                                   .00
                                                             .00
12
     2 Runoff 11
                            207.40
                                         .00
                                                   .00
                                                             .00
                                          .00
                                                   .00
13
     2 Runoff 12
                             28.00
                                                             .00
14
       Runoff
                             42.00
                                          .00
                                                   .00
                                                             .00
15
       Runoff 14
                             93.20
                                          .00
                                                   .00
     2 Runoff 15
                            815.80
                                          .00
                                                   .00
                                                             .00
17
     2 Runoff 16
                             23,20
                                          .00
                                                   .00
                                                             -00
                             32.60
18
     2 Runoff 17
                                          .00
                                                   .00
                                                             .00
19
     2 Runoff 18
                             32.60
                                          .00
                                                   .00
                                                             .00
     2 Runoff 19
20
                             67.60
                                          .00
                                                   .00
                                                             .00
21
     2 Runoff 20
                             102.60
                                          .00
                                                   .00
                                                             .00
     2 Runoff 21
                                                   .00
                                                             .00
IMPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS
IC LAND USE
                       RUNOFF CONSERV TOTAL P TOTAL N ORTHO P INORG N
                         M/YR
                                  PPB
                                           PPB
                                                    PP8
 1 landuse1
                          .32
                                    .0
                                          52.0
                                                  850.0
                                                              .0
                                                                       .0
                CV:
                          .00
                                   .00
                                           .00
                                                    .00
                                                              .00
                                                                      .00
 2 landuse2
                          .00
                                             .0
                                                              .0
                                                                       .0
                CV:
                          .00
                                   .00
                                            .00
                                                    .00
                                                             .00
                                                                      .00
3 landuse3
                          .00
                                    .0
                                             .0
                                                     -0
                                                              ٠.0
                                                                       .0
                          .00
                CV:
                                   .00
                                            .00
                                                     _00
                                                             .00
                                                                      .00
 4 Landuse4
                          .00
                                    .0
                                             .0
                                                     .0
                                                              .0
                                                                       .0
                CV:
                          .00
                                   .00
                                            .00
                                                    .00
                                                             .00
                                                                      .00
INPUT GROUP 13 - MODEL COEFFICIENTS
IC COEFFICIENT
                           MEAN
                                      CV
 1 P DECAY RATE
                          1.000
                                     .45
 2 N DECAY RATE
                          1.000
                                     .55
3 CHL-A MODEL
                          1.000
                                     .26
4 SECCHI MODEL
                          1.000
                                     -10
5 ORGANIC N MODEL
                          1.000
                                     .12
 6 TP-OP MODEL
                          1.000
                                     .15
 7 HODY MODEL
                          1.000
                                     .15
8 MODY MODEL
                          1.000
                                     .22
 9 BETA M2/MG
                           .020
                                     .00
10 MINIMUM QS
                           -100
                                     .00
11 FLUSHING EFFECT
                          1.000
                                     .00
12 CHLOROPHYLL-A CV
                           .620
                                     .00
INPUT GROUP 14 - CASE NOTES
```

# Appendix D Model Input Files for West Point Lake

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West Point 1991 (P Uncalibated)
 INPUT GROUP 2 - PRINT OPTIONS
  1 LIST IMPUTS
                                       0 No
  2 HYDRAULICS & DISPERSION
                                       1 YES
 3 GROSS WATER & MASS BALANCES
                                       2 ESTIMATED CONCS
 4 DETAILED BALANCES BY SEGMENT
 5 SUMMARIZE BALANCES BY SEGMENT
                                       0 No
 6 COMPARE OBS & PREDICTED CONCS
 7 DIAGNOSTICS
                                       1 ALL SEGMENTS
 8 PROFILES
                                       1 ESTIMATED CONCENTRATIONS
 9 PLOTS
                                       2 GEOMETRIC SCALE
 10 SENSITIVITY ANALYSIS
 INPUT GROUP 3 - NODEL OPTIONS
 1 CONSERVATIVE SUBSTANCE
                                       0 NOT COMPUTED
                                       1 2ND ORDER, AVAIL P
0 NOT COMPUTED
 2 PHOSPHORUS BALANCE
 3 NITROGEN BALANCE
                                       2 P, LIGHT, T
1 VS. CHLA & TURBIDITY
 4 CHLOROPHYLL-A
 5 SECCHI DEPTH
 6 DISPERSION
                                       1 FISCHER-NUMERIC
 7 PHOSPHORUS CALIBRATION
                                       1 DECAY RATES
 8 NITROGEN CALIBRATION
                                       1 DECAY RATES
 9 ERROR ANALYSIS
                                       1 HODEL & OATA
10 AVAILABILITY FACTORS
                                       0 MODEL 1 ONLY
INPUT GROUP 4 - VARIABLES
             ATMOSPHERIC LOADINGS AVAILABILITY
VARTABLE
              KG/KH2-YR
                                      FACTOR
 1 CONSERV
                    .00
                             .00
                                         .00
                  30.00
 2 TOTAL P
                             .50
                                        1.00
 3 TOTAL N
                1000.00
                             .50
                                        1.00
 4 ORTHO P
                  15.00
                             .50
                                         .00
                 500.00
 5 INORG N
                                         .00
INPUT GROUP 5 - GLOBAL PARAMETERS
PARAMETER
                                     MEAN
                                     .583
 1 PERIOD LENGTH
                       YRS
                                             -000
                                     .790
 2 PRECIPITATION H
                                             .200
 3 EVAPORATION
                                             .300
                                    1.000
 4 IHCREASE IN STORAGE M
                                    1.580
                                            .000
 5 FLOW FACTOR
                                    1.000
                                             .000
 6 DISPERSION FACTOR
                                    1.000
                                            .700
 7 TOTAL AREA
                                     .000
                                            .000
 8 TOTAL VOLUME
                                     .000
INPUT GROUP 6 - TRIBUTARY DRAINAGE AREAS AND FLOWS
ID TYPE SEG NAME
                                               MEAN FLOW CV OF HEAN FLOW
                              DRAINAGE AREA
                                                  HH3/YR
          10 CHAT AT FRANK
                                   6941.000
                                                5070.940
                                                                 .000
          1 BRUSH
                                     69.070
                                                   16.133
                                                                 .000
 3
           2 NEW RIVER
                                                   28.298
                                                                 .DOO
           3 POTATO
                                    235.000
                                                                 .000
                                     50.200
                                                   11.897
                                                                 .000
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	4		VELLOUILACVE	•	E0 200	99.739	.000	
6 7	1	5	AC	1	50.200 7.300	1.751	.000	
8		5	SHOAL		22,500	12.000		
9	1	5	BEECH		50.200 7.390 22.500 29.430 7.780 7.780 5.830 48.620 8.750 5.830 38.890	16.000		
10	2	5	B3A		7.780	1.844		
11	2	5	B3B		7.780	1.844	.000	
12	2	5	DIXIE		5.830	1.382		
13	2	5	JAUKSON J1		48.02U 8.750	11.523 2.074		
15	2	5	Y1A		5.830	1.382		
16	2	5	WILLOW/SHERN	100D	38.890 86.550	9.217	.000	
17	1	6	WHITEWATER		86.550	5.000	.000	
18	2	6	THOMPSON WILSON		64.180	15.211	.000	
19 20	2	8	MILSON		38.900	9.219 19.280		
21	2	8	WEHADKEE GUSS CANEY		64.180 38.900 81.350 180.890 97.250	42.871		
22	2	8	CANEY		97.250	23.048		
23	2	8	L.WEHADKEE		132.260	31.346	.000	
24	2	8	WE2		31.120	7.375		
25	2	8	WE3		9.720	2.304		
26 27	2	R	VEASEY		40.840 0A0 7.F	9.679 <b>7.83</b> 5		
28	2	9	MAPLE		64.180	15.211	-000	
29	2	10	TALLEY		35.010	8.297	.000	
30	2	10	ZACHARY		97.250 132.260 31.120 9.720 40.840 33.060 64.180 35.010 35.010 - 44.720 52.510 31.110 19.450 5.830 33.060 18.080 8.360 7.780 18.080 44.730 22.360 14.580 9194.000	8.297	.000	
31 32	2	10	Z1-Z2		44.720	10.599		
33	2	12	85-64		32.310	12.445 7.373		
34	2	13	P7		19,450	4.610		
35	2	14	P8		5.830	1.382		
36	2	15	P9		33.060	7.835	.000	
37	2	16	J2A		18.080	4.285	.000	
38 39	2	1/	J28		8.360	1.981	.000	
40	2	19	WZ W3		18.080	1.844 4.285	.000	
41	2	20	WI 1/W12		44.730	10.601	.000	
42	2	21	WI3/V2A		22.360	5.299		
43	2	22	V2B		14.580	3.455	.000	
1 44	4	22	CHAT AT UP		9194.000	5885.000	.000	
INP	AUT GR	OUP	7 - TRIBUTAR	SA COM	CENTRATIONS (P	DR) - MEAN/CV		
					•••••••	TD/T (ICAM) OT		•
ID				TAL P		ORTHO P		
1 1		.0/	.00 198.8	.10	.0/ .00			
2 3		.0/	-00 34.5/	.15	.0/ .00			.0
1 4		-0/	.00 34.5, .00 34.5, .00 34.5, .00 34.5,	/ .15	.0/ .00 .0/ .00	.0/ .00	.0/ .00 .0/ .00	.0 .0
5 6		.0/	.00 34.5	1.15	.0/ .00	.0/ .00	.0/ .00	.0
		.0/	.00 48.0	.15	.0/ .00 964.0/ .11	25.5/ .35	242.4/ .09	.0
7		-0/	.00 34.3/	. 10	.07 .00	.0/ .00	.0/ .00	.0
8 9		-0/			702.0/ .02	5.4/ .13	242.4/ .09	.0
10		.0/	.00 39.0/		751.0/ .05 .0/ .00	9.5/ .16 .0/ .00	.0/ .00	.0
11		.0/			.0/ .00	.0/ .00	.0/ .00	.0
12		.0/	.00 34.5		.0/ .00	.0/ .00	.0/ .00	.0
13		.0/			.0/ .00	.0/ .00	.0/ .00	•0
14		.0/			.0/ .00	.0/ .00	.0/ .00	.0
15		.0/			.0/ .00	.0/ .00	.0/ .00	.0
17		.0/			.0/ .00 725.0/ .03	.0/ .00 3.8/ .11	.0/ .00 160.2/ .10	.0
18		.0/			.0/ .00	.0/ .00	.0/ .00	.0
19		-0/	.00 34.5	.15	.0/ .00	.0/ .00	.0/ .00	.0
20		-0/			.0/ .00	.0/ .00	.0/ .00	.0
21 22		.0/			.0/ .00	.0/ .00	.0/ .00	.0
23		.0/			.0/ .00 .0/ .00	.0/ .00 .0/ .00	.0/ .00	.0
24		.0/			.0/ .00	.0/ .00	.0/ .00	.0 .0
25		.0/			.0/ .00	.0/ .00	.0/ .00	.0
26		.0/			.0/ .00	.0/ .00	.0/ .00	.0
L .								

												_
27	07	.00	34.5/	15	0.4	.00	07	.00	07	.00	.0	
28		.00	34.5/			.00		.00		.00	.0	
29		.ÒO	34.5/			-00		.00		.00	.0	
0		.00 .00	34.5/ 34.5/			.00 .00	.0/	.00		.00	.0 .0	
2		.00	34.5/		.0/	.00	.0/	-00	.0/	.00	.0	2
;		.00	34.5/		.0/	.00	.0/	.00	-0/	.00	-0	
5		.00	34.5/ 34.5/			.00 .00	.0/	.00		.00 .00	.0 .0	
6		.00	34.5/		.0/	.00	.0/	.00	.0/	.00	.0	
7		.00	34.5/			.00	-0/	-00		-00	.0	
3 9		.00 .00	34.5/ 34.5/			.00		.00		.00	.0 .0	
Ó		.00	34.5/		.0/	-00	.0/	.00	.0/	.00	.0	
1		.00	34.5/	.15	.0/	.00	.0/	.00		.00	.0	
2		.00	34.5/ 34.5/			.00	.0/	.00		.00	.0 .0	
	.0/	.00	.0/			.00	.0/	.00	.0/	.00	.0	
			ODEL SEG						,			
									ION FACT			
EG (	OUTFLOW 10	GROUP 8	SEGMENT Br	NAME		SED   1.00	N SED ( 1.00	1.00	SECCHI 1.00	HO0 1.00	DISP 1.000	
2	10	8	NR			1.00	1.00	1.00	1.00	1.00	1.000	
3	10	8	PO			1.00	1.00	1.00	1.00	1.00	1.000	
4 5	14 16	8 2	WO YE			1.00	1.00	1.00	1.00	1.00	1.000	
6	17	3	WH			1.00	1.00	1.00	1.00	1.00	1.000	
7	19	1	WI			1.00	1.00	1.00	1.00	1.00	1.000	)
B 9	20	4 7	WE			1.00	1.00	1.00	1.00	1.00	1.000	
0	22 11	5	MA CH1			1.00	1.00	1.00	1.00 1.00	1.00	1.000 1.000	
1	12	5	CH2			1.00	1.00	1.00	1.00	1.00	1.000	
2	13	5	CH3			1.00	1.00	1.00	1.00	1.00	1.000	
4	14 15	5 5	CH4 CH5			1.00	1.00 1.00	1.00	1.00 1.00	1.00	1.000 1.000	
5	16	5	CH6			1.00	1.00	1.00	1.00	1.00	1.000	
•	17	5	CH7			1.00	1.00	1.00	1.00	1.00	1.000	
	18	6	CH8			1.00	1.00	1.00	1.00	1.00	1.000	
3	19 20	6	CH9 CH10			1.00	1.00	1.00	1.00 1.00	1.00	1.000 1.000	
7	20		CH11			1.00	1.00	1.00	1.00	1.00	1.000	
	21	6				1.00	1.00	1.00	1.00	1.00	1.000	
0 <b>1</b>	21 22	6	CH12							1.00	1.000	1
0 1			CH12 CH13			1.00	1.00	1.00	1.00		1,000	
0 1 2	22 0	6	CH13 EGMENT H			1.00 MEAN/C	v					
10 11 12 NPUT	22 0 GROUP	6	CH13 EGMENT M LENGT		IETRY: AREA KM2	1.00 MEAN/C ZMEAN	v z	4IX	ZHYI	P TARG		
20 21 22 NPUT D LA 1 BR	22 0 GROUP	6	CH13 EGMENT M LENGT k 2.5	H M 50	AREA KM2 .6900	1.00 MEAN/C ZMEAN M 2.21	v Z: 2.21,	HIX M / .12	ZHY!    -00/	P TARG	GET P PPB _0	
O 1 1 2 NPUT D LA 1 BR 2 NR	22 0 GROUP	6	CH13 EGMENT M LENGT k 2.5	H 24 30 30 1	AREA KM2 .6900	1.00 MEAN/C ZMEAN M 2.21 1.89	v 2.21, 1.89,	HIX H / .12 / .12	ZHY! .00/ .00/	P TARG	GET P PPB .0	
PUT LA BR	22 0 GROUP	6	CH13 EGMENT M LENGT k 2.5 4.6	TH OM 50 50 170	AREA KM2 .6900 .3500 .6900	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21	v 2.21, 1.89, 2.21,	HIX H / .12 / .12 / .12	ZHY! .00/ .00/ .00/	P TARG	GET P PPB .0 .0	
O 1 2 NPUT D LA 1 BR 2 NR 3 PC 4 WC	22 0 GROUP	6	CH13 EGMENT M LENGT k 2.5	TH 2M 50 50 170 70	AREA KM2 .6900	1.00 MEAN/C ZMEAN M 2.21 1.89	2.21, 1.89, 2.21,	HIX H / .12 / .12	ZHY! .00/ .00/	- TARG	GET P PPB .0	
O 1 2 NPUT D LA 1 BR 2 NR 3 PC 4 WC 5 YE 6 WH	22 0 GROUP	6	CH13 EGMENT M LENGT  2.5 4.6 1.7 19.7 5.4	6H 60 60 60 170 70 70 70	AREA KM2 .6900 .3500 .6900 .2400 2.8000	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40	v Zi 2.21, 1.89, 2.21, .34, 4.06, 4.83	HIX H / .12 / .12 / .12 / .12 / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/	- TARG	GET P PPB .0 .0 .0 .0	
0 1 2 NPUT D LA 1 BR 2 NR 3 PC 4 WC 5 YE 6 WH 7 WI	22 0 GROUP	6	CH13 EGMENT M LENGT k 2.5 4.6 1.7 1.7 19.7 5.4	6H 60 60 70 70 70 12 60 6	AREA KM2 .6900 .3500 .6900 .2400 2.8000 5.0900	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40 4.80	2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45,	HIX H / .12 / .12 / .12 / .12 / .12 / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/	-00 -00 -00 -00 -00 -00	GET P PPB .0 .0 .0 .0	
D LA D LA D LA D LA D LA D LA D LA D LA	22 0 GROUP	6	CH13 EGMENT M LENGT  2.5 4.6 1.7 1.7 19.7 19.7 19.6	1H	AREA KM2 .6900 .3500 .6900 .2400 2.8000 5.0900 1.0800 5.7600	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40 4.80 6.26	V Z: 2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31,	HIX H / .12 / .12 / .12 / .12 / .12 / .12 / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/	.00 .00 .00 .00 .00	GET P PPB .0 .0 .0 .0	
DO LA	22 0 GROUP	6	CH13 EGMENT M LENGT k 2.5 4.6 1.7 1.7 19.7 5.4	H	AREA KM2 .6900 .3500 .6900 .2400 2.8000 5.0900	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40 4.80	V 2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19,	HIX H / .12 / .12 / .12 / .12 / .12 / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/	P TARC 1 .00 .00 .00 .00 .00 .00 .00 .00 .00 .0	GET P PPB .0 .0 .0 .0	
O 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	22 0 GROUP BEL	6	CH13 EGMENT M LENGT  4.6 4.6 4.7 1.7 19.7 5.4 2.5 19.6 8.3 2.5	60 170 1260 160 160 160 160 160 160 160 160 160 1	AREA KM2 .6900 .3500 .6900 .2400 2.8000 5.0900 1.0800 7.2100 7.0800 1.8200	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40 4.80 6.26 8.26 2.82 3.56	2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52	HIX M / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00	P TARC	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0	
O 11 2	22 0 GROUP	6	CH13 EGMENT M LENGT  2.5 4.6 1.7 1.7 19.6 5.0 8.3 2.5	60 170 1260 160 160 160 160 160 160 160 160 160 1	AREA KM2 .6900 .3500 .6900 .2400 2.8000 5.0900 1.0800 7.2100 7.2100 7.0800 1.8200	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40 4.80 6.26 8.26 2.82 3.56 4.48	Zi 2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.23,	HIX H / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00	P TARG	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	
0 1 2 NPUT LA RR PC 1 1 8 R PC 1 1 2 NF W 1 1 2 NF W 1 1 2 CF W 1 1 2 CF W	22 0 GROUP	6	CH13 EGMENT M LENGT  4.6 4.6 4.7 1.7 19.7 5.4 2.5 19.6 8.3 2.5	60 1200 1200 1200 1200 1200 1200 1200 12	AREA KM2 .6900 .3500 .6900 .2400 2.8000 5.0900 1.0800 7.2100 7.0800 1.8200	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 .34 4.25 5.40 4.80 6.26 8.26 2.82 3.56	2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.23, 4.74,	HIX M / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00	P TARG	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0	
20 HPUT D LA HPU	22 0 GROUP BBEL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	CH13 EGMENT M LENGT  2.5 4.6 1.7 1.7 19.7 5.4 2.5 2.5 2.5 2.5 2.5	H	AREA KM2 .6900 .3500 .6900 .2400 .0800 .7600 .2100 .0800 .8200 .8200 .8900 .9700	1.00  MEAN/C ZMEAN  M 2.21 1.89 2.21 34 4.25 5.40 4.80 6.26 8.26 2.82 3.56 4.48 5.26 7.11 7.66	2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.23, 4.74, 5.72, 5.96	HIX H / .12 / .12	ZHYII -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00	P TARC -00 -00 -00 -00 -00 -00 -00 -0	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	
0 1 2 HPUT LA BROWN TO LA STATE OF LA STAT	22 0 GROUP BEL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	CH13 EGMENT M LENGT  4.6 1.7 1.7 19.7 5.4 2.5 19.6 8.3 2.5 2.5 3.9 1.3	100 100 100 100 100 100 100 100 100 100	AREA KM2 .6900 .3500 .6900 .2400 .2400 .0900 .0800 .7600 .2100 .8200 .8200 .8900 .9700 .6500	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 3.44 4.25 5.40 4.80 6.26 8.26 2.82 3.56 4.48 5.26 7.11 7.66 7.42	2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.23, 4.74, 5.76, 5.86	HIX M / .12 / .12	ZHYI -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/ -00/	P TARC -00 -00 -00 -00 -00 -00 -00 -0	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	
20 21 22 22 24 25 25 26 26 26 26 26 26 26 26 26 26 26 26 26	22 0 GROUP BEL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	CH13 EGMENT M LENGT  2.5 4.6 1.7 1.7 19.6 5.0 8.3 2.5 2.5 3.9 2.5 3.9	H	AREA KM2 .6900 .3500 .2400 .2400 .2400 .0800 .7600 .2100 .0800 .8200 .8900 .9700 .6500 .6500	1.00  MEAN/C ZMEAN  M 2.21 1.89 2.21 .345 4.25 5.40 4.80 6.26 8.26 2.82 3.56 4.48 5.26 7.11 7.66 7.42 8.03	2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.74, 5.72, 5.86, 6.11	HIX M / .12 / .12	ZHYI .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00	P TARC -00 -00 -00 -00 -00 -00 -00 -0	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	
1D LA 1 BR 2 NR 3 PC 4 WC 5 YE 6 WH 7 WI 8 WE	22 0 GROUP BEL 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6	CH13 EGMENT M LENGT  4.6 1.7 1.7 19.7 5.4 2.5 19.6 8.3 2.5 2.5 3.9 1.3	H	AREA KM2 .6900 .3500 .6900 .2400 .2400 .0900 .0800 .7600 .2100 .8200 .8200 .8900 .9700 .6500	1.00 MEAN/C ZMEAN M 2.21 1.89 2.21 3.44 4.25 5.40 4.80 6.26 8.26 2.82 3.56 4.48 5.26 7.11 7.66 7.42	V Zi 2.21, 1.89, 2.21, .34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.23, 4.74, 5.72, 5.96, 6.11, 5.68	HIX M / .12 / .12	ZHYII -00/	P TARC -00 -00 -00 -00 -00 -00 -00 -0	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	
20 21 22 22 22 22 22 22 22 22 22 22 22 22	22 0 GROUP BEL 3 11 12 13 14 15 16 17 18 19 110	6	CH13 EGMENT M LENGT  2.5 4.6 1.7 1.7 19.7 5.4 2.5 19.6 5.0 8.3 2.5 2.5 3.9 2.5 1.3	H	AREA KM2 .6900 .3500 .6900 .2400 2.8000 .7600 .7600 .2100 .8200 .8200 .8900 .6500 .6500	1.00  MEAN/C ZMEAN  M 2.21 1.89 2.21 3.44 4.25 5.40 4.80 6.26 8.26 2.82 3.56 4.48 5.26 7.11 7.66 7.42 8.03 7.03	2.21, 1.89, 2.21, 34, 4.06, 4.83, 4.45, 5.31, 6.19, 2.82, 3.52, 4.74, 5.72, 5.96, 6.11, 5.86, 6.11, 5.86, 6.44, 6.71,	HIX H / .12 / .12	ZHYII -00/ -00/ -00/ -00/ -00/ -00/ -00/ -0	P TARC -00 -00 -00 -00 -00 -00 -00 -0	GET P PPB .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0	

ZZ	CH13	5		1.70	4.280	0 14.4	6 7.6	8/ .12	.00	/ .00	.0
		ROUP 10									
SE	G	TURBID					SECCHI	ORG-N	TP-OP		MOOV
1	MN:	1/H 1.62	?	MG/H3	MG/H3	MG/M3	H	MG/M3		MG/M3-D	
'	CV:	.00	.00	.00	.0	.00	.00	.0	.0		.0
2	MN:	1.22	63.8		.00 652.0	19.4	.00 .6 .00	.00	-00		.00
~	CV:			.06	.17	-09	.0	.0 00-	.0		.0 .00
3	MN:	1.62	.18 .0	.00	.0	-09	-00		.00		
	CV:	.00	.00	.00	.00			.0 00.	.00		.0 .00
4	MN:	1 62	.00	-00	.00	.0	.0	.00	.00		.00
-	CV:	002	.00	00	.0	.00		.00	.00		.00
5	MN:	.40	72.6	27 5	595.0	15.5	.00 1.3	.0	.0		.00
-	CV:	.18	.10	. 12	.14	.11 19.2 .09	10		0.0	00	.00
6	MN:	.50	.0	.0	.0	10.2	.10	.0	.00. 00.	.00	.0
_	CV:	.14	.00	.00	-00	.09	-07	.00	.00	-00	.00
7	MN:	.37	80.7		926-0	17.5	1.4	.0	.0	.0	.0
•	CV:	.10	.03	.07	926.0 .02	.08	-03	.00	.00		.00
8	MN:	.48	65.5	20.6	.02 471.0 .24	12.3	1.4	.0	.0		.0
-	CV:	.12	.03	.04	24	.12	.07	.00	.00		.00
9	MN:	.39	78 3	22 Z	ፈበ5 በ	12.4	1.6	.0	.0		.0
•	CV:		.02		.07	. 16	.10		.00		.00
10	MR:		86.0	.0	.0	.16 3.3	.5	.0	.0		.0
	CV:	.20	.00	.00	.00	.37	.19	.00	.00		.00
11	MN:	2.10	.0	.0	.0	6.0	.4	.0	.0		.0
	CV:	.19	.00	.00	.00	.29	.18	.00	.00		.00
12	MN:	1.97	82.4	91.8	1085.0	8.0	.5	.0	.0		.0
	CV:	.13	.01	.08	.09	.24	.12	.00	.00		.00
13	MR:	1.30	.0	-0	0	16.8	.6	.0	.0		.0
	CV:	.19	.00	.00	.00	.30	.6	.00	.00		.00
14	MN:	.90	77.2	74.5	1087.0	17.5	.8	.0	.0		
	CV:	-20	.07	.12	.05	.20 20.1	.13	.00	.00	.00	.00
15	MN:	.62	79.7	66.0	856.0	20.1	1.0	.0	.0	.0	.0
	CV:		.03	.17	.22	.10	.10	.00	.00		.00
	MN:	.38	.0	-0	.0	21.9	1.2	.0	.0	.0	.0
	CV:	.23	.00	.00	.00	.08	.10	.00	.00	.00	.00
	MN:	-44	79.3	47.5	965.0	22.0	1.1	.0	.0	.0	.0
	CV:	.15	.00	.10	.07	.10	.06	.00	.00	.00	.00
	MN:	.34	80.8		932.0	20.0	1.4	.0	.0	.0	.0
	CV:	.17				.11	.05	.00	.00	.00	.00
	MN:	.30	.0	.0	.0	19.7	1.4	.0	.0		.0
	CV:	-18	-00	.00	.00	.11	.05	.00	.00	.00	.00
	MN:	-35	79.1		797.0		1.5	.0	.0		.0
	CV:	-19		.12	.10	.12	.08	.00	.00	.00	.00
	MN:	.35	77.2		722.0		1.6	.0	.0		.0
	CV:	.20	-03	.06	.06	.12	.10		.00		.00
	MN:	.33	79.3	23.0		14.9		.0	.0		.0
	CV:	.22	.00	.03	.07	. 13	.10	.00	.00	.00	.00
JWP	UT G	ROUP 11	- NON-F	M THEO	ATERSHE	AREAS	(KM2)				
		NAME					l anduse3				
2		BRUSH			8.07	.00	.00		.00		
3		NEW RIVE	K		9.40	.00	.00		.00		
5		POTATO MOLF			5.00	-00	.00		.00		
7	2				0.20	.00	.00		.00		
á		SHOAL			7.39 2.50	.00	-00		.00		
10		B3A			7.78	-00	.00		.00		
11		83B			7.78	-00	.00		.00		
12		SIXIE				-00	.00		.00		
13		JACKSON			5.83	-00	.00		-00		
14	2				8.62 8.75	-00	-00		.00		
15		r1A				-00	-00		.00		
16		ria Villow/s	nebi ~~~		5.83	.00	.00		-00		
18		THOMPSON		_	8.89	.00	.00		.00	•	
19		/ILSON	ı		4.18	-00	.00		.00		
17		VEHADKEE			8.90 1.35	.00	.00		.00 .00		
20											

21	2 GUSS	180.89	.00	.00	.00
22	2 CANEY	97.25	.00	-00	.00
23	2 L.WEHADKEE	132.26	.00	-00	.00
24	2 WE2	31.12	-00	.00	.00
25	2 WE3	9.72	.00	.00	.00
26	2 STROUD	40.84	.00	.00	.00
27	2 VEASEY	33.06	.00	.00	.00
28	2 MAPLE	64.18	.00	-00	.00
29	2 TALLEY	35.01	.00	.00	.00
30	2 ZACHARY	35.01	.00	.00	.00
31	2 Z1-Z2	44.72	.00	-00	.00
32	2 82	52.51	.00	.00	-00
33	2 P5-P6	31.11	.00	.00	.00
34	2 P7	19.45	-00	.00	.00
35	2 P8	5.83	.00	.00	.00
36	2 P9	33.06	.00	.00	.00
37	2 J2A	18.08	.00	-00	.00
38	2 J2B	8.36	.00	.00	-00
39	2 W2	7.78	.00	.00	.00
40	2 W3	18.08	.00	.00	.00
41	2 W[1/W12	44.73	-00	.00	.00
42	2 W13/V2A	22.36	.00	.00	.00
43	2 V2B	14.58	.00	.00	.00
72		.4.50			.00

#### INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS

IC LANO USE		RUNOFF M/YR	CONSERV PPB	TOTAL P	TOTAL N	ORTHO P PPB	INORG N PPB
1 Averaged	Use	.24	.0	34.5	.0	.0	-0
	CV:	.00	.00	.15	.00	.00	.00
2 landuse2		.00	.0	.0	.0	.0	.0
	CV:	.00	.00	.00	.00	.00	.00
3 landuse3		.00	.0	.0	.0	.0	.0
	CV:	.00	.00	.00	.00	.00	.00
4 landuse4		.00	.0	.0	.0	.0	.0
	CV:	.00	.00	.00	- 00	.00	.00

#### INPUT GROUP 13 - MODEL COEFFICIENTS

IC	COEFFICIENT	MEAN	CV
1	P DECAY RATE	1.000	.45
2	N DECAY RATE	1.000	.55
3	CHL-A MODEL	1.000	.26
4	SECCHI MODEL	1.000	.10
5	ORGANIC N MODEL	1.000	.12
6	TP-OP MODEL	1,000	.15
7	HODY MODEL	1.000	.15
8	MODY MODEL	1.000	.22
9	BETA M2/MG	.020	.00
10	MINIMUM QS	.100	.00
11	FLUSHING EFFECT	1.000	.00
12	CHLOROPHYLL-A CV	-620	.00

### INPUT GROUP 14 - CASE NOTES

Water quality data for 1991 WES Landsat study WES tributary data from 1991 for YC, BC, SC and WC Landuse is tributary average P, Light, Flushing Model (Uncalibrated)

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West Point 1991 (P Calibated)
  INPUT GROUP 2 - PRINT OPTIONS
   1 LIST INPUTS
                                        0 NO
  2 HYDRAULICS & DISPERSION
                                        1 YES
  3 GROSS WATER & MASS BALANCES
                                        2 ESTIMATED CONCS
   4 DETAILED BALANCES BY SEGMENT
                                        0 NO
  5 SUMMARIZE BALANCES BY SEGMENT
                                        O NO
  6 COMPARE OBS & PREDICTED CONCS
                                        O NO
  7 DIAGNOSTICS
                                        1 ALL SEGMENTS
  8 PROFILES
                                        1 ESTIMATED CONCENTRATIONS
  9 PLOTS
                                        2 GEOMETRIC SCALE
 10 SENSITIVITY ANALYSIS
                                        O NO
 INPUT GROUP 3 - MODEL OPTIONS
  1 CONSERVATIVE SUBSTANCE
                                       O NOT COMPUTED
  2 PHOSPHORUS BALANCE
                                        1 2NO ORDER, AVAIL P
  3 NITROGEN BALANCE
                                       O NOT COMPUTED
  4 CHLOROPHYLL-A
                                       2 P, LIGHT, T
1 VS. CHLA & TURBIDITY
  5 SECCHI DEPTH
  6 DISPERSION
                                       1 FISCHER-NUMERIC
  7 PHOSPHORUS CALIBRATION
                                       1 DECAY RATES
  8 NITROGEN CALIBRATION
                                       1 DECAY RATES
  9 ERROR ANALYSIS
                                       1 MODEL & DATA
 1D AVAILABILITY FACTORS
                                       0 MODEL 1 ONLY
 INPUT GROUP 4 - VARIABLES
             ATMOSPHERIC LOADINGS AVAILABILITY
 VARIABLE
              KG/KM2-YR
                              CV
                                      FACTOR
  1 CONSERV
                    .00
                             .00
                                         .00
 2 TOTAL P
                  30.00
                             .50
                                        1.00
 3 TOTAL N
                1000.00
                             .50
                                        1.00
  4 ORTHO P
                  15.00
                             .50
                                         .00
 5 INORG N
                 500.00
                             .50
                                         .00
INPUT GROUP 5 - GLOBAL PARAMETERS
PARAMETER
                                     MEAN
 1 PERIOD LENGTH
                      YRS
                                     .583
                                            .000
 2 PRECIPITATION M
                                     .790
                                            .200
 3 EVAPORATION
                                    1.000
                                            .300
 4 INCREASE IN STORAGE M
                                   -1.580
                                            -000
 5 FLOW FACTOR
                                    1.000
                                            .000
 6 DISPERSION FACTOR
                                    1.000
                                            .700
 7 TOTAL AREA
                      KH2
                                    .000
                                            .000
 8 TOTAL VOLUME
                      HM3
                                     .000
                                            .000
INPUT GROUP 6 - TRIBUTARY ORAINAGE AREAS AND FLOWS
10 TYPE SEG NAME
                             DRAINAGE AREA
                                              MEAN FLOW CV OF MEAN FLOW
                                       KN2
                                                  HM3/YR
         10 CHAT AT FRANK
                                  6941.000
                                                5070.940
                                                                 .000
 2
     2
          1 BRUSH
                                    69.070
                                                  16.133
                                                                 .000
 3
     2
          2 NEW RIVER
                                   119.400
                                                  28,298
                                                                 .000
          3 POTATO
                                   235.000
                                                  55.695
                                                                 .000
 5
     2
          4 WOLF
                                    50,200
                                                  11.897
                                                                 .000
          5 YELLOWJACKET
                                    50.200
                                                  99.739
                                                                 .000
 7
     2
          5 YC
                                     7.390
                                                   1.751
                                                                 .000
 8
          5 SHOAL
                                    22.500
                                                  12.000
                                                                 .000
 9
          5 BEECH
                                    29.430
                                                  16.000
                                                                 .000
10
          5 B3A
                                     7.780
                                                   1.844
                                                                 .000
11
     2
          5 B38
                                     7.780
                                                   1.844
                                                                 .000
     2
12
          5 DIXIE
                                     5.830
                                                   1.382
                                                                 .000
13
     2
          5 JACKSON
                                    48.620
                                                  11.523
                                                                 .000
14
          5 J1
                                     8.750
                                                  2.074
                                                                 .000
15
          5 Y1A
                                     5.830
                                                   1.382
                                                                 -000
16
     2
          5 WILLOW/SHERWOOD
                                    38.890
                                                  9.217
                                                                 .000
17
     1
          6 WHITEWATER
                                    86.550
                                                  5.000
                                                                .000
18
     2
          6 THOMPSON
                                    64.180
                                                  15.211
                                                                .000
19
          7 WILSON
                                    38,900
                                                  9.219
                                                                 .000
20
          8 WEHADKEE
                                    81.350
                                                  19.280
                                                                 .000
```

21	2 8 GUS	s	180.890	42.871	.000	
22	2 8 CAN	EY	97.250	23.048	.000	
23		EHADKEE			.000	
24	2 8 WEZ		132.260 31.120 9.720 40.840 33.060 64.180 35.010 35.010 44.720 52.510 31.110	7.375	.000	
25	2 8 WE3		9.720	2.304	.000	
26	2 8 STR	OUD	40.840	9.679		
27		SEY	33,060	7.835		
28	2 9 MAP1	LE	64.180	15.211		
29	2 10 TAL	LEY	35.010	8.297	.000	
30	2 10 ZACI	HARY	35.010	8,297	.000	
31	2 10 Z1-7	72	44.720	10.599		
32	2 11 R2		52,510	12.445		
33	2 12 P5-F	26	31,110	7.373	.000	
34	2 12 P5-6 2 13 P7	-	19.450	4.610		
35	2 14 P8		5.830	1.382	.000	
36			33.060	7.835		
37	2 15 P9 2 16 J2A 2 17 J2B		18.080	4.285		
38	2 17 J2B		8.360			
39	2 18 W2		7.780	1 R44	.000	
40	2 19 W3		18 080	4.285		
41	2 20 WI1,	/⊔12	18.080 44.730	10.601		
42	2 21 WI3	/V2A				
43	2 22 V2B	, , , , , , , , , , , , , , , , , , ,	14.580	3.455		
44		T AT WP	9194.000	5885.000		
INP	UT GROUP 7 -	TRIBUTARY CON				
10	CONSERV		TOTAL N	ORTHO P	INORG N	ECORC (
1	.0/ .00			.0/ .00		
ż				.0/ .00	.0/ .00	.0
3	0/ 00	34.5/ .15	.0/ .00	.0/ .00	.0/ .00	
4	0/ .00	34.3/ .13	.0/ .00	.0/ .00	.0/ .00	
5	.0/ .00	34.3/ ,13 7/ E/ 4E	.0/ .00	.0/ ,00	.0/ .00	.0
6	0/ 00	/9 0/ 15	04/ 0/ 11	.0/ .00	.0/ .00 242.4/ .09 .0/ .00	.0
7	.0/ .00	7/ 5/ 45	904.0/ .11	25.5/ .35	242.4/ .09	.0
8	.0/ .00	34.5/ .15	.07 .00	.0/ .00	.0/ .00	.0
				F / 4 47	212 11 22	
	.0/ .00	70.04.06	702.0/ .02	5.4/ .13	242.4/ .09	.0
9	.0/ .00	39.0/ .06	702.0/ .02 751.0/ .05	5.4/ .13 9.5/ .16	242.4/ .09 206.8/ .08	.0
9 10	.0/ .00	39.0/ .06 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00	.0
9 10 11	.0/ .00 .0/ .00 .0/ .00	39.0/ .06 34.5/ .15 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00	.0 .0 .0
9 10 11 12	.0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/ .06 34.5/ .15 34.5/ .15 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0
9 10 11 12 13	.0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/ .06 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0
9 10 11 12 13 14	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/ .06 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/.06 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/ .06 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/ .06 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0 .0 .0
9 10 11 12 13 14 15 16 17 18	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/.06 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 19.0/.02	702.0/ .02 751.0/ .05 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 3.8/ .11 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0 .0 .0
9 10 11 12 13 14 15 16 17 18	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/.06 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 19.0/.02 34.5/.15	.0/ .00 .0/ .00	5.4/ .13 9.5/ .16 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0 .0 .0 .0 .0 .0
9 10 11 12 13 14 15 16 17 18 19 20	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	39.0/.06 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15 34.5/.15	.0/ .00	.0/ .00	242.4/ .09 206.8/ .08 .0/ .00 .0/ .00	.0 .0 .0 .0 .0 .0
9 10 11 12 13 14 15 16 17 18 19 20 21	.0/ .00	34.5/ .15 34.5/ .15	.0/ .00	.0/ .00	.0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22	.0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	.0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	.0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00	.0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 33 34	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15	.0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 31 33 34 35	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00	.0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00 .0/ .00	.0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00	.0/ .00 .0/ .00	.0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 37 38	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00	.0/ .00 .0/ .00	.0/ .00 .0/ .00	
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 33 34 35 36 37 38 39 39 39 39 39 39 39 39 39 39 39 39 39	.0/ .00 .0/ .00	34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15 34.5/ .15	.0/ .00 .0/ .00	.0/ .00 .0/ .00	.0/ .00 .0/ .00	

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.0
         .0/ .00
                    34.5/ .15
                                     .0/ .00
                                                    .0/ .00
                                                                  .0/ .00
42
                                                                                .0
         .0/ .00
                    34.5/ .15
                                     .0/ .00
                                                                  .0/ .00
43
                                                    .0/ .00
                                                                  .0/ .00
                                                                                .0
44
         .0/
             .00
                       .0/ .00
                                     .0/ .00
                                                    .0/ .00
INPUT GROUP 8 - MODEL SEGMENTS
                                       ----- CALIBRATION FACTORS ---
SEG OUTFLOW GROUP SEGMENT NAME
                                       P SED N SED CHL-A SECCHI
                                                                        HOD
                                                                                 1.000
         10
                8
                                        1.73
                                                1.00
                                                        1.02
                                                               1.00
                                                                       1.00
                  R₽
                                                                                 1.000
                                                               1.00
                                                                       1.00
         10
                8
                   NR
                                        1.73
                                                1.00
                                                        1.02
 3
         10
                8
                   PO
                                        1.73
                                                1.00
                                                        1.02
                                                               1.00
                                                                       1.00
                                                                                 1_000
                                                               1.00
         14
                   WO
                                        1.73
                                                1.00
                                                        1.02
                                                                       1.00
                                                                                 1.000
 5
                   YE
                                                1.00
                                                        1.49
                                                               1.00
                                                                       1.00
                                                                                 1.000
         16
                                        1.11
                                              1.00
                                                               1.00
                                                                                 1,000
                                                        1.76
                                                                       1.00
 6
         17
                3
                   WH
                                        1.00
                                                                                 1.000
         19
                   WI
                                         .29
                                                1.00
                                                        1.37
                                                               1.00
                                                                       1.00
 8
        20
                   WE
                                        1.05
                                                1.00
                                                               1.00
                                                                       1.00
                                                                                 1.000
                                                        1.81
                                                                                 1.000
        22
                                        3.28
                                                1.00
                                                        1.69
                                                               1.00
                                                                       1.00
10
                5
                   CH1
                                        2.24
                                                         .27
                                                               1.00
                                                                       1.00
                                                                                 1.000
         11
                                                1.00
                5
                                                                       1.00
                                                                                 1.000
                                        2.24
                                                         .85
                                                               1.00
11
         12
                   CH2
                                                1.00
12
         13
                5
                   CH3
                                        2.24
                                                1.00
                                                        1.46
                                                               1.00
                                                                       1.00
                                                                                 1,000
13
         14
                5
                   CH4
                                        2.24
                                                1.00
                                                        2.82
                                                               1.00
                                                                       1.00
                                                                                 1.000
                                                               1.00
14
        15
                   CH<sub>5</sub>
                                        2.24
                                                1.00
                                                       3.02
                                                                       1.00
                                                                                 1.000
15
         16
                   CH6
                                                1.00
                                                        3.10
                                                               1.00
                                                                       1.00
                                                                                 1.000
                                        2.24
                5
16
        17
                   CH7
                                        2-24
                                                1.00
                                                        2.61
                                                               1.00
                                                                       1.00
                                                                                 1,000
17
                6
                                                               1.00
                                                                                 1.000
         18
                                        9.25
                                                        2.07
                                                                       1.00
                   CHB
                                                1.00
18
        19
                6
                   CH9
                                                1.00
                                                        2.07
                                                               1.00
                                                                       1.00
                                                                                 1.000
19
        20
                   CH10
                                        9.25
                                                1.00
                                                        2.07
                                                               1.00
                                                                       1.00
                                                                                 1.000
20
        21
                6
                   CH11
                                        9.25
                                                1.00
                                                        2.07
                                                               1.00
                                                                       1.00
                                                                                 1.000
21
                                        9.25
        22
                6
                   CH12
                                                1.00
                                                        2.07
                                                                       1.00
                                                                                 1.000
                                                               1.00
22
         0
                6 CH13
                                                1.00
                                                                       1.00
                                                                                 1.D00
                                        9.25
                                                        2.07
                                                               1.00
INPUT GROUP 9 - SEGMENT MORPHOMETRY: MEAN/CV
                     LENGTH
                                   AREA
                                         ZMEAN
                                                     ZMIX
                                                                 ZHYP TARGET P
ID LABEL
                                    KH2
                                                                     М
                                                                              PPB
                                                         M
                                                                 .00/ .00
 1 BR
                        2,50
                                  -6900
                                           2.21
                                                  2.21/ .12
                                                                               .0
 2 NR
                        4.60
                                 1.3500
                                           1.89
                                                  1.89/ .12
                                                                 .00/ .00
                                                                               .0
 3 PO
                        1.70
                                  .6900
                                          2.21
                                                  2.21/ .12
                                                                 .00/ .00
 4 WO
                        1.70
                                  2400
                                           .34
                                                    .34/ .12
                                                                 .00/ .00
                                                                               .0
  YE
                                          4.25
                                                  4.06/ .12
                       19.70
                                12.8000
                                                                 .00/ .00
                                                                               -0
                                                  4.83/ .12
 6 ₩H
                        5.40
                                 6.0900
                                          5.40
                                                                 .00/
                                                                      .00
                                                                               .0
 7 WI
                        2,50
                                 1_0800
                                           4.80
                                                  4.45/ .12
                                                                 .00/
                                                                      -00
                                                                               ٠0
                                                  5.31/ .12
 8 WE
                       19.60
                                16.7600
                                           6.26
                                                                 .00/ .00
 9 MA
                        5.00
                                 9.2100
                                          8.26
                                                  6.19/ .12
                                                                 .00/ .00
                                                                               .0
                                                  2.82/ .12
10 CH1
                        8.30
                                 3.0800
                                          2.82
                                                                 .00/ .00
                                                                               .0
                                                  3.52/ .12
11 CH2
                        2.50
                                 1.8200
                                          3.56
                                                                 -00/
                                                                      -00
                                                                               -0
12 CH3
                        2.50
                                 1.8900
                                           4.48
                                                  4.23/ .12
                                                                 .00/
                                                                      .00
                                                                               ٠0
13 CH4
                        2.50
                                 3.9300
                                          5.26
                                                  4.74/ .12
                                                                 .00/ .00
14 CH5
                        3.90
                                 3.9700
                                           7.11
                                                  5.72/ .12
                                                                 .00/
                                                                      .00
                                                                               .0
15 CH6
                        2.50
                                 4.6700
                                           7.66
                                                  5.96/ .12
                                                                 .00/ .00
                                                                               ٥,
16 CH7
                                  .6500
                                                  5.86/ .12
                                                                 .00/
                                                                      .00
                        1.30
                                          7.42
                                                                               .0
17 CHB
                        2.50
                                 4.6500
                                           8.03
                                                  6.11/ .12
                                                                 .00/
                                                                      _00
                                                                               .0
18 CH9
                        1.70
                                 5.2000
                                          7.03
                                                  5.68/ .12
                                                                 .00/ .00
19 CH10
                        2.50
                                 3.6100
                                          8.96
                                                  6.44/ .12
                                                                 .00/
                                                                      .00
                                                                               .0
20 CH11
                                                  6.71/ .12
                        2.50
                                11.2700
                                          9.82
                                                                 .00/ .00
                                                                               -0
                                                                 .00/ .00
21 CH12
                        2.50
                                6.8900
                                          10.83
                                                  6.98/ .12
                                                                               .0
22 CH13
                        1.70
                                 4.2800
                                         14.46
                                                  7.68/ .12
                                                                 .00/
                                                                      .00
                                                                               .0
INPUT GROUP 10 - OBSERVED WATER QUALITY
       TURBID CONSER TOTALP TOTALN CHL-A SECCHI
                                                      ORG-N
                                                              TP-OP
                                                                       HODV
                                                                               MODV
                        MG/H3
                                       MG/M3
          1/M
                  7
                               MG/M3
                                                      MG/M3
                                                              MG/M3 MG/M3-D
                                                   м
                                                                              MG/M3-D
 1 MN:
                                   .0
          1.62
                    ٠.0
                           .0
                                           .0
                                                   . 0
                                                          .0
                                                                  .0
                                                                          _0
                                                                                 _0
   CV:
           .00
                   .00
                           .00
                                  .00
                                          .00
                                                  .00
                                                                                 .00
 2 MN:
          1.22
                 63.8
                         51.5
                                652.0
                                         19.4
                                                  .6
                                                          .0
                                                                  .0
                                                                         .0
                                                                                 _0
   CV:
           .03
                          .06
                                                  -00
                  .18
                                  . 17
                                          .09
                                                         .00
                                                                 .00
                                                                         .00
                                                                                .00
3 MN:
          1.62
                    .0
                           -0
                                   .0
                                           .0
                                                  .0
                                                          .0
                                                                  .0
                                                                          .0
                                                                                 .0
   CV:
           .00
                   .00
                          .00
                                  .00
                                          .00
                                                 .00
                                                                         .00
                                                         .00
                                                                 .00
                                                                                .00
          1.62
                           .0
 4 MN:
                   .0
                                   .0
                                          .0
                                                  .0
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                                                                  .0
                                                                         .0
                                                                                 .0
   cv:
           .00
                   .00
                           .00
                                  .00
                                          .00
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                                                         .00
                                                                 .00
                                                                        .00
                                                                                .00
 5 MN:
           .49
                         27.5
                                         15.5
                                                 1.3
                 72.6
                                595.0
                                                          .0
                                                                  .0
                                                                         ٠0
                                                                                 .0
           .18
   CV:
                  .10
                          .12
                                         .11
                                                  .10
                                                         .00
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                                                                         .00
                                                                                 .00
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6 MN:
              .50
                       .0
                                             19.2
                                                                                         ٠.0
              . 14
     CV:
                      .00
                              .00
                                      .00
                                              .09
                                                       .07
                                                               .00
                                                                       -00
                                                                               .00
                                                                                        .00
   7 MN:
              .37
                     80.7
                             38.6
                                    926.0
                                             17.5
                                                       1.4
                                                                .0
                                                                        .0
                                                                                .0
                                                                                        .0
     CV:
              .10
                      .03
                              .07
                                      .02
                                               .08
                                                       .03
                                                               .00
                                                                       .00
                                                                               .00
                                                                                       .00
   8 MN:
              .48
                     65.5
                                    471.0
                             20.6
                                             12.3
                                                                .0
                                                                        .0
                                                                                .0
                                                                                        .0
     CV:
              .12
                      .03
                              .04
                                      .24
                                              .12
                                                       -07
                                                               .00
                                                                       .00
                                                                               .00
                                                                                       .00
   9 MH:
              .39
                     78.3
                             22.3
                                    605.0
                                             12.4
                                                      1.6
                                                                .0
                                                                        .0
                                                                                .0
                                                                                        .0
     CV:
              . 19
                     .02
                              .10
                                      .07
                                              .16
                                                               .00
                                                      .10
                                                                       .00
                                                                               .00
                                                                                       .00
  10 MN:
            1.86
                    86.0
                               .0
                                       .0
                                              3.3
                                                        .5
                                                                .0
                                                                                .0
                                                                                        .0
                              .00
     CV:
             .20
                     .00
                                      .00
                                              .37
                                                      .19
                                                               -00
                                                                       .00
                                                                               .00
                                                                                       .00
  11 MN:
            2.10
                       -0
                               .0
                                       .0
                                              6.0
                                                               .0
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                                                                                        .0
     CV:
             .19
                      -00
                              .00
                                      .00
                                              .29
                                                      .18
                                                               .00
                                                                       .00
                                                                               .00
                                                                                       .00
  12 MR:
            1.97
                    82.4
                            91.8 1085.0
                                              8.0
                                                       .5
                                                               -0
                                                                        -0
                                                                                .0
                                                                                        .0
     CV:
             . 13
                     .01
                              .08
                                      .09
                                              -24
                                                       .12
                                                               .00
                                                                       .00
                                                                               .00
                                                                                       .00
  13 MN:
            1.30
                       .0
                               .0
                                       .0
                                             16.8
                                                       .6
                                                                .0
                                                                        .0
                                                                                .0
                                                                                        .0
     CV:
                              .00
             .19
                     .00
                                      .00
                                              .30
                                                      .14
                                                              .00
                                                                      .00
                                                                               .00
                                                                                       .00
 14 MN:
             .90
                    77.2
                            74.5
                                  1087.0
                                             17.5
                                                       .8
                                                               -0
                                                                        .0
                                                                                .0
                                                                                        .0
             .20
     CV:
                     .07
                              .12
                                      .05
                                              -20
                                                      . 13
                                                              .00
                                                                       .00
                                                                               .00
                                                                                       .00
 15 MN:
             .62
                    79.7
                            66.0
                                   856.0
                                             20,1
                                                      1.0
                                                               .0
                                                                                        .0
                     -03
     CV:
             .18
                             -17
                                      .22
                                              .10
                                                      .10
                                                              .00
                                                                      .00
                                                                               .00
                                                                                       .00
 16 MN:
             .38
                      .0
                              .0
                                       .0
                                             21.9
                                                      1.2
                                                               .0
                                                                        .0
                                                                               -0
                                                                                        .0
     CV:
             .23
                     .00
                              .00
                                                      1.1
                                      .00
                                              .08
                                                              .00
                                                                      .00
                                                                               .00
                                                                                       .00
 17 MN:
              .44
                    79.3
                            47.5
                                   965.0
                                             22.0
                                                               _0
                                                                       .0
                                                                               .0
                                                                                        .0
    CV:
             . 15
                     .00
                             .10
                                      .07
                                              .10
                                                      .06
                                                              .00
                                                                      .00
                                                                               .00
                                                                                       .00
 18 MH;
             .34
                    80.8
                            41.4
                                   932.0
                                             20.0
                                                      1.4
                                                               .0
                                                                       .0
                                                                                .0
                                                                                        .0
     CV:
             .17
                             .08
                     .02
                                     .05
                                              .11
                                                      .05
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                                                                                       .00
 19 MN:
             .30
                      -0
                              .0
                                       .0
                                             19.7
                                                      1.4
                                                               .0
                                                                       .0
                                                                               .0
                                                                                        .0
                     .00
     CV:
             .18
                              .00
                                      .00
                                             .11
                                                      .05
                                                              .00
                                                                      .00
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                                                                                       .00
 20 MN:
             .35
                    79.1
                            33.5
                                   797.0
                                            16.4
                                                     1.5
                                                               .0
                                                                       .0
                                                                                       .0
     CV:
             . 19
                     .03
                             .12
                                     .10
                                                      .08
                                             _12
                                                              .00
                                                                      .00
                                                                              .00
                                                                                       -00
 21 MN:
             .35
                    77.2
                            25.8
                                   722.0
                                            13.6
                                                     1.6
                                                               .0
                                                                       .0
                                                                               .0
                                                                                       .0
                             .06
    CV:
             .20
                     .03
                                                                      .00
                                     -06
                                             .12
                                                      .10
                                                              .00
                                                                              .00
                                                                                       .00
             .33
 22 MN:
                    79.3
                            23.0
                                   675.0
                                            14.9
                                                     1.6
                                                               .0
                                                                       .0
                                                                               .0
                                                                                       -0
    CV:
             .22
                     .00
                             .03
                                     .07
                                                              .00
                                             .13
                                                      -10
                                                                      .00
                                                                               .00
                                                                                      .00
 INPUT GROUP 11 - NON-POINT WATERSHED AREAS (KH2)
 ID COD NAME
                             Averaged landuse2 landuse3 landuse4
      2 BRUSH
                                68.07
                                             .00
                                                        .00
                                                                  .00
         NEW RIVER
                               119.40
                                             .00
                                                        .00
                                                                   .00
      2 POTATO
                               235.00
                                             .00
                                                        .00
                                                                  .00
      2 WOLF
                                50.20
                                             -00
                                                        .00
                                                                  .00
      2 YC
                                 7.39
                                             .00
                                                        .00
                                                                  .00
 8
        SHOAL
                                22.50
                                             .00
                                                        .00
                                                                  -00
 10
      2 B3A
                                 7.78
                                             .00
                                                        .00
                                                                  .00
 11
      2 B3B
                                 7.78
                                             .00
                                                        .00
                                                                  .00
12
      2 DIXIE
                                 5.83
                                             .00
                                                        .00
                                                                  -00
 13
      2 JACKSON
                                48.62
                                             .00
                                                        .00
                                                                  .00
 14
      2 J1
                                 8.75
                                             -00
                                                        .00
                                                                  .00
15
      2 Y1A
                                 5.83
                                             -00
                                                        -00
                                                                  .00
16
      2 WILLOW/SHERWOOD
                                38.89
                                             .00
                                                       .00
                                                                  .00
18
      2 THOMPSON
                                64.18
                                             .00
                                                        .00
                                                                  .00
19
      2 WILSON
                                38.90
                                             .00
                                                        -00
                                                                  .00
20
      2 WEHADKEE
                                81,35
                                             -00
                                                       .00
                                                                  .00
21
      2 GUSS
                               180.89
                                             .00
                                                       .00
                                                                  .00
22
23
     2 CANEY
2 L.WEHADKEE
                                97.25
                                             .00
                                                       .00
                                                                  .00
                               132.26
                                             -00
                                                       .00
                                                                  .00
24
25
      2 WE2
                                31.12
                                             .00
                                                       .00
                                                                  .00
      2 WE3
                                 9.72
                                             .00
                                                       .00
                                                                  .00
26
      2 STROUD
                                40.84
                                             .00
                                                       .00
                                                                  .00
27
      2 VEASEY
                                33.06
                                             .00
                                                       .00
                                                                  .00
28
     2 MAPLE
                                64.18
                                             .00
                                                       .00
                                                                  .00
29
     2 TALLEY
                               35.01
                                             _00
                                                       .00
                                                                  .00
30
     2 ZACHARY
                               35.01
                                             .00
                                                       .00
                                                                  .00
31
     2 21-22
                                44.72
                                             .00
                                                       .00
                                                                  .00
32
33
     2 B2
                               52.51
                                             .00
                                                       .00
                                                                  .00
     2 P5-P6
                               31.11
                                             .00
                                                       .00
                                                                  .00
34
     2 P7
                                19.45
                                             -00
                                                       .00
                                                                  .00
35
     2 P8
                                5.83
                                             .00
                                                       .00
                                                                  .D0
                               33.06
                                             .00
                                                       .00
                                                                  .00
```

37	2 J2A	18.08	.00	.00	.00
38	2 J2B	8.36	.00	.00	.00
39	2 W2	7 <b>.7</b> 8	.00	.00	.00
40	2 W3	18.08	.00	.00	.00
41	2 WI 1/W12	44.73	.00	.00	.00
42	2 W13/V2A	22.36	.00	.00	.00
43	2 V2B	14.58	.00	.00	.00

## INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS

IC	LAND USE		RUNOFF	CONSERV	TOTAL' P	TOTAL N	ORTHO P	INORG N
			H/YR	PPB	PPB	PPB	PPB	PPB
1	Averaged	Use	.24	.0	34.5	.0	.0	.0
		CV:	-00	.00	.15	.00	.00	.00
2	landuse2		.00	.0	.0	.0	.0	.0
		cv:	.00	-00	.00	.00	.00	.00
3	landuse3		.00	-0	.0	.0	.0	.0
		CV:	.00	.00	.00	.00	.00	.00
4	landuse4		.00	.0	.0	.0	.0	.0
		cv:	.00	.00	.00	-00	.00	.00

#### INPUT GROUP 13 - MODEL COEFFICIENTS

IC COEFFICIENT	MEAN	CV
1 P DECAY RATE	1.000	.45
2 N DECAY RATE	1.000	.55
3 CHL-A MODEL	1.000	.26
4 SECCHI MODEL	1.000	. 10
5 ORGANIC N MODEL	1.000	. 12
6 TP-OP MODEL	1.000	.15
7 HODY MODEL	1.000	.15
8 MODY MODEL	1.000	.22
9 BETA M2/MG	.020	.00
10 MINIMUM QS	.100	.00
11 FLUSHING EFFECT	1.000	.00
12 CHLOROPHYLL-A CV	.620	.00

INPUT GROUP 14 - CASE NOTES Water quality data for 1991 WES Landsat study WES tributary data from 1991 for YC, BC, SC and WC Landuse is tributary average P, Light, Flushing Model (Calibrated)

Regional and local calibration

```
WEST POINT 90 (P Verification)
INPUT GROUP 2 - PRINT OPTIONS
 1 LIST INPUTS
                                      0 NO
 2 HYDRAULICS & DISPERSION
                                       1 YES
 3 GROSS WATER & MASS BALANCES
                                       2 ESTIMATED CONCS
 4 DETAILED BALANCES BY SEGMENT
                                      O NO
 5 SUMMARIZE BALANCES BY SEGMENT
                                      O NO
 6 COMPARE OBS & PREDICTED CONCS
                                      0 NO
 7 DIAGNOSTICS
                                      0 NO
 8 PROFILES
                                       1 ESTIMATED CONCENTRATIONS
 9 PLOTS
                                      2 GEOMETRIC SCALE
10 SENSITIVITY ANALYSIS
                                      O NO
INPUT GROUP 3 - MODEL OPTIONS
 1 CONSERVATIVE SUBSTANCE
                                      0 NOT COMPUTED
 2 PHOSPHORUS BALANCE
                                       1 2NO ORDER, AVAIL P
 3 NITROGEN BALANCE
                                      0 NOT COMPUTED
                                      2 P, LIGHT, T
1 VS. CHLA & TURBIDITY
 4 CHLOROPHYLL-A
 5 SECCHI DEPTH
 6 DISPERSION
                                      1 FISCHER-NUMERIC
 7 PHOSPHORUS CALIBRATION
                                      1 DECAY RATES
 8 NITROGEN CALIBRATION
                                      1 DECAY RATES
 9 ERROR ANALYSIS
                                      1 MODEL & DATA
10 AVAILABILITY FACTORS
                                      1 ALL MODELS EXCEPT 2
INPUT GROUP 4 - VARIABLES
            ATMOSPHERIC LOADINGS AVAILABILITY
VARIABLE
             KG/KM2-YR
                             CV
 1 CONSERV
                   .00
                            .00
                                        .00
                  30.00
 2 TOTAL P
                            .50
                                        1,00
 3 TOTAL N
                1000.00
                            .50
                                       1.00
 4 ORTHO P
                 15.00
                            .50
                                        .00
 5 INORG N
                500.00
                                        .00
INPUT GROUP 5 - GLOBAL PARAMETERS
PARAMETER
                                    MEAN
                                              CV
 1 PERIOD LENGTH
                      YRS
                                     .583
                                            .000
 2 PRECIPITATION M
                                     .501
                                            .200
 3 EVAPORATION
                                   1.222
                                            .300
 4 INCREASE IN STORAGE M
                                   1.250
                                            -000
5 FLOW FACTOR
                                   1.000
                                            .DOO
 6 DISPERSION FACTOR
                                   1.000
                                            .700
 7 TOTAL AREA
                     KM2
                                    .000
                                            .000
 8 TOTAL VOLUME
                      HM3
                                    .000
                                            .000
INPUT GROUP 6 - TRIBUTARY DRAINAGE AREAS AND FLOWS
ID TYPE SEG NAME
                             DRAINAGE AREA
                                               MEAN FLOW CV OF MEAH FLOW
                                       KH2
                                                  HM3/YR
         10 CHAT AT FRANK
                                  6941.000
                                                3926.000
                                                                 .000
          1 Brush
                                    68.070
                                                  10.211
                                                                 .000
3
     2
          2 Newriver
                                   119.400
                                                  17.910
                                                                 -000
          3 Potato
                                   235.300
                                                  35.295
                                                                 .000
5
     2
          4 Wolf
                                    29.170
                                                   4.376
                                                                 .000
 6
     2
          5 Yellowjacket
                                    50.200
                                                   7.530
                                                                 .000
          5 Yc
                                     7.390
                                                   1,109
                                                                 -000
8
    2
          5 shoal
                                    22.500
                                                   3.375
                                                                 .000
     2
          5 beech
                                    29.430
                                                   4.415
                                                                 .000
10
     2
          5 b3a
                                     7.780
                                                                 .000
                                                   1.167
          5 b3b
11
     2
                                     7.780
                                                   1.167
                                                                 .000
12
          5 dixie
                                     5,830
                                                    .875
                                                                 -000
13
    2
          5 jackson
                                    48.620
                                                   7.293
                                                                 .DO0
14
          5 J1
    2
                                     8.750
                                                   1.313
                                                                 .000
15
    2
          5 y1a
                                     5.830
                                                                 .000
                                                    .875
16
     2
          5 Willow/Sherwood
                                    38.890
                                                   5.833
                                                                 .000
17
     2
          6 whitewater
                                    86.550
                                                  12,983
                                                                 .000
18
    2
          6 thompson
                                    64.180
                                                   9.627
                                                                 .000
19
          7 wilson
                                    38.900
                                                   5.835
                                                                 .000
20
          8 wehadkee
                                    81.350
                                                  12.203
                                                                 .000
```

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21
             8 guss
                                        180.890
                                                       27.134
                                                                       .000
  22
             8 caney
                                         97.250
                                                       14.588
                                                                       .000
  23
             8 L.wehadkee
                                        132.260
                                                       19.839
                                                                       .000
       2
             8 we2
                                        31.120
                                                        4.668
                                                                       .000
  25
       2
             8 we3
                                          9.720
                                                        1.458
                                                                       .000
  26
             8 stroud
                                         40.840
                                                        6.126
                                                                       .000
       2
  27
             8 veasey
                                        33.060
                                                        4.959
                                                                       .000
  28
             9 maple
                                        64.180
                                                        9.627
                                                                       .000
       2
  29
            10 talley
                                        27.230
                                                        4.085
                                                                       .000
  30
            10 zachary
                                        35.010
                                                        5.252
                                                                       -000
       2
  31
            10 z1-z2
                                        44.720
                                                        6.708
                                                                       .000
  32
       2
            11 b2
                                        52.510
                                                        7.877
                                                                       .000
       2
  33
            12 p5-p6
                                        31.110
                                                        4.667
                                                                      .000
  34
           13 p7
                                        19.450
                                                        2.918
                                                                      .000
  35
       2 2 2 2
           14 p8
                                         5.830
                                                         -875
                                                                      .000
  36
           15 p9
                                        33.060
                                                        4.959
                                                                      .000
 37
           16 j2a
                                        18.080
                                                        2.712
                                                                      .000
           17 j2b
 38
                                         8.360
                                                        1.254
                                                                      .000
 39
       2
           18 w2
                                         7.780
                                                        1.167
                                                                      .000
 40
       2
           19 w3
                                        18.080
                                                        2.712
                                                                      .000
 41
       2
           20 wi1/wi2
                                        44.730
                                                                      .000
                                                        6.710
       Ž
 42
                                        22.360
           21 wi3/v2a
                                                       3.354
                                                                      .000
 43
       2
           22 v2b
                                        14.580
                                                       2.187
                                                                      .000
 44
           22 dis.chat.wp
                                      9194.000
                                                    4209.520
                                                                      .000
 INPUT GROUP 7 - TRIBUTARY CONCENTRATIONS (PPB): MEAN/CV
 ID
           CONSERV
                         TOTAL P
                                        TOTAL N
                                                      ORTHO P
                                                                     INORG N
                                                                               ECORG P
                                  1385.8/ .08
.0/ .00
  1
        97.9/ .02
                     178.8/ .10
                                                   62.6/ .08 1105.4/ .07
                                                                                  .0
  2
          .0/ .00
                      34.5/ .15
                                                     .0/ .00
                                                                    .0/ .00
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                      34.5/ .15
34.5/ .15
  3
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31
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32
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33
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36
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37
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                     34.5/ .15
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38
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                     34.5/ .15
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39
                     34.5/ .15
         .0/ .00
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40
         .0/ .00
                     34.5/ .15
                                     .0/ .00
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41
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44	.0/	.00	.(	0/ .00	)	.0/ .00		0/ .00	.0,	.00	.0
IMPUT	GROUP	8 - M	ODEL S	SEGME	112		(	CAL TRDA	TION EAG	CTORS	
SEG OL	JTFLOW	GROUP	SEGME	ENT NA	WE	P SEO			SECCHI	HOD	DISP
1	10	8	BR			1.73	1.00			1.00	
2	10	8	NR			1.73					1.000
3	10	8	PO			1.73	1.00				1.000
4 5	14 16	8 2	WO YE			1.73	1.00			1.00	
6	17	3	WH			1.11	1.00			1.00	
7	19	1	WI			.29	1.00			1.00	1.000
8	20	4	WE			1.05	1_00				
9	22	.7	MA			3.28	1.00			1.00	
10	11	5	CH1			2.24	1.00			1.00	1.000
11	12	5	CH2			2.24	1.00			1.00	
12 13	13 14	5 5	CH3 CH4			.24 2.24	1.00	1.46	1.00	1.00	1.000
14	15	5	CH2			2.24	1.00	2.82 3.02	1.00	1.00	1.000 1.000
15	16	5	CH6			2.24	1.00	3.10	1.00	1.00	1.000
16	17	5	CH7			2.24	1.00	2.61	1.00	1.00	1.000
17	18	6	CH8			9.25	1.00	2.07		1.00	1.000
18 19	19 20	6	CH9			9.25	1.00	2.07		1.00	1.000
20	21		CH10 CH11			9.25 9.25	1.00	2.07	1.00	1.00	1.000
21	22		CH12			9.25	1.00	2.07		1.00	1.000
22	0.	6	CH13			9.25	1.00	2.07			1.000
INPUT	GROUP	9 - si		MORP		Y: MEAN	′CV	~			
IO LAB	£L					EA ZHEA 42	M M	ZHIX		P TARG	ET P PPB
1 BR			2	KM 2.50 .60	.69	00 2.2			.00/	.00	.0
2 NR			4	.60	1.35		39 1.8	39/ .12	.00/	.00	.0
3 PO 4 WO			1	.70	-690		21 2.2	21/ .12	.00/	.00	.0
5 YE			10	.70	12.80	00 .3 00 4.2	14 .3	14/ .12	.00/	•00	.0
6 WH			5	-40	6.09	00 5.4	0 4.6	13/ 12	.00/	.00	.0 .0
7 WI			5	.50	1.08	00 4.8	11 4.4	6/ .12	.00/	.00	.0
8 WE			19	-60	16.76	00 6.2	6 5.3	1/ .12	.00/	.00	.0
9 MA				-00	9.210		6.1	9/ .12	.00/ .00/	.00	.0
10 CH1 11 CH2				.30	3.080		2.8	32/ .12	.00/	.00	-0
12 CH3				.50	1.820		8 6 2	12/ -12	.00/	.00	.0 .0
13 CH4				-50	3.930		6 4.7	4/ .12	.00/	.00	.0
14 CH5			3	.90	3.97		1 5.7	2/ .12	.00/	.00	.0
15 CH6				.50	4.670		6 5.9	6/ .12	.00/	.00	.0
16 CH7				-30	-650			6/ .12			.0
18 CH9				.50 .70	4.650 5.200			1/ .12		_00 _00	.0 .0
19 CH1				.50	3.610			4/ .12		.00	-0
20 CH1	1			-50	11.27			1/ .12		.00	.0
21 CH1				-50	6.890	00 10.8	3 6.9	8/ .12	.00/	.00	.0
22 CH1	3		1	.70	4.280	00 14.4	6 7.6	8/ .12	.00/	.00	.0
INPUT (	GROUP	10 - 6	RSFPV	FD UA	TED ON	N ITY					
SEG					TOTALN	CHL-A	SECCHI	ORG-N	TP-OP	HODY	MODV
	1/	M 3	P M	G/M3	MG/H3	MG/H3	M	MG/H3			MG/M3-D
1 MN:	1.6		.0	.0	.0	.0	.0	.0	.0	.0	.0
CV:	.0		.00	.00	-00	.00	-00	.00	.00	.00	.00
2 MN: CV:	1.2		.00	.00	.0	.0	.0	.0	.0	.0	.0
3 MN:	1.6		.0	.00	.00	.00	.00	.00	.00	.00	.00 .0
CV:	.0		.00	.00	.00	.00	.00	.00	.00	.00	.00
4 MN:	1.6	2	.0	.0	.0	.0	.0	.0	.0	.0	.00
cv:	-0	ο.	.00	.00	.00	.00	-00	.00	-00	.00	.00
5 MN:	.4		.0	.0	.0	.0	.0	.0	.0	.0	.0
CV: 6 MN:	.1		.00	-00	.00	-00	-00	.00	.00	.00	.00
O MA:	.5	•	.0	.0	.0	.0	.0	.0	.0	-0	.0

CV:				.00					.00	.0
7 MN:		.0	.0 .00			.0	.0	.0	.0	
CV: 8 MN:	.10 .48	^	•	.00	.00	.00	.00 .0	.00	.00	.0
CV:	- 12	- 00				.00	.00	.00	-00	.0
9 MN:	.39		.0	.0	.0	.0	.0	.0	.0	-
CV: 10 MN:	.19 1.86		.00 132.0	.00	.00 .0	.00	.00	.00 .0	.00 .0	.0
CV:		.00	.21	.17	.00	-00	.00	.00	.00	.0
11 MM:	2.10	.00	.00	.0	.00	.0	.0	.0	.0	
CV: 12 MN:	.19						.00	.00	.00	.0
CV:	1.97 .13	.0 .00	.0 .00	.00	.0 .00	.00	.00	.0 .00	.00	.0
13 MN:	1.05	87.2	74.0	1060.0	23.2	.7	.0	.0	.0	
CV:	.11 .90	- 15	-11	-11	.25	.00	.00	.00	.00	.0
14 MN: CV:	.20	.0 .00	.0	.00	.0 .00		.00	.0 .00	.0 .00	.0
15 MN:	.65	89.6	.00 62.0	716.0		.9	-0	-0	.0	
CV:	.24	.10	.06	.25	.23	-10	.00	00	00	.0
16 MN: CV:	.38	.0	.0	.0	.00	.0	.0	.0 .00	.00	
17 MN:	.44	.0	.00	-00	Λ	.00	.00	.00	.00	
CV:	.15	.00	.00	.00	.00	.00	.00	.00	.00	.0
18 MN:	.50	88.2	42.0	752.0		1.1	.0	.0		:
CV: 19 MN:	.18 .30	.08	.09	.08 .0	.14 .0	.08 .0	.00	.00	.00	.0
CV:	.18	-00	.00	-00	-00	.00	.00	.00		.0
20 MN:	-49			630.0	14.4	1.3	.0	.0	.0	-
CV: 21 MN:	.16 .35	.09	.09	.15		.10	.00	.00		.0
CV:	.20	.00	.00	.0 .00	.00	.00	.00	.00 .00 .00	.00	.0
22 MN: CV:	.40	82.0 .06	17.5	517.0	11.2	1.6	.0	.00	.00	
IN COO	ROUP 11	- NON-F	W THIO	ATERSHE	AREAS	(KM2)				
ID COD	NAME Brush	- NON-F	land	use1 lan	nduse2 l	anduse3	l andus	<del>e</del> 4		
2 2 3 2	NAME Brush Newriver	r	l and: 68 119	use1 lan 8.07 9.40	.00 .00	(KM2) anduse3 .00	l andus			
2 2 3 2 4 2	NAME Brush Newriver Potato	r	68 119 231	use1 lan 8.07 9.40 5.30	.00 .00 .00	.00 .00	l andus	00 00 00		
1D COD 2 2 3 2 4 2 5 2	NAME Brush Newriver Potato Wolf	r	l and 68 119 239	use1 lan 8.07 9.40 5.30 9.17	.00 .00 .00 .00	.00 .00 .00	l andus	e4 00 00 00 00		
2 2 3 2 4 2 5 2 6 2 7 2	NAME Brush Newriver Potato	r	68 119 239 29	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39	.00 .00 .00	.00 .00	Landuse .( .( .(	00 00 00		
1D COO 2 2 3 2 4 2 5 2 6 2 7 2 8 2	NAME Brush Newriver Potato Wolf Yellowja Yc shoal	r	68 119 23! 29 50	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50	.00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00	l andus	00 00 00 00 00 00 00 00		
1D COO 2 2 3 2 4 2 5 2 6 2 7 2 8 2 9 2	NAME Brush Newriver Potato Wolf Yellowja Yc shoal beech	r	68 119 23! 29 50	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50 9.43	.00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00	l andus	00 00 00 00 00 00 00 00 00		
1D COO 2 2 3 2 4 2 5 2 6 2 7 2 8 2 9 2 10 2	NAME Brush Newriver Potato Wolf Yellowja Yc shoal	r	1 and 68 119 239 25 50 7 22 25 7 7	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50	.00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00	l andus	00 00 00 00 00 00 00 00		
1D COO 2 2 3 2 4 2 5 2 6 2 7 2 8 2 9 2 10 2 11 2 12 2	NAME Brush Newriver Potato Wolf Yellowjs Yc shoal beech b3a b3b dixie	r	l ande 68 119 239 29 50 77 22 29	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50 9.43 7.78 6.83	.00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00	l andus	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COD  2 2 3 2 4 2 5 2 6 2 7 2 8 2 2 9 2 10 2 11 2 12 13 2	NAME Brush Newriver Potato Wolf Yellowjs Yc shoal beech b3a b3b dixie jackson	r	64 111 233 29 50 7 22 29 48	use1 lan 3.07 9.40 5.30 9.17 0.20 7.39 9.250 9.43 7.78 5.83 3.62	.00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00	landus	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COD  2 2 3 4 2 5 2 6 2 7 2 8 2 9 2 10 2 111 2 2 13 2 114 2	NAME Brush Newriver Potato Wolf Yellowjs Yc shoal beech b3a b3b dixie jackson j1	r	68 119 239 25 50 7 22 29 7 7 8 8	use1 lan 9.40 9.40 9.5.30 9.17 9.20 7.39 9.50 9.43 7.78 6.83 6.62 8.75	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00	Landus:	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 4 2 5 6 2 7 2 8 2 2 10 2 111 2 2 113 2 114 2 2 115 2 116 2	NAME Brush Newriver Potato Wolf Yellowjs Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S	r acket Sherwood	l andd 68 111 23: 25 50 7 22 29 48 8 8	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.43 7.78 6.83 8.62 8.37 5.83 8.89	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00	l anduse 	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 4 2 5 6 7 2 8 2 9 2 2 10 2 111 2 113 2 2 115 2 2 116 2 2 117 2	NAME Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat	r acket Sherwood	Landa 64 111 233 29 50 1 22 29 50 48 8 8 8 8 8 8	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50 7.78 7.78 5.83 3.62 3.75 5.83 3.89	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	l anduse 	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COD  2 2 3 4 2 2 5 6 7 2 2 9 9 2 2 111 2 2 113 2 2 115 2 2 117 2 2 118 2 2	NAME Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor	r acket Sherwood	lando 68 119 233 29 50 7 22 29 48 8 8 8 8 64	use1 lan 8.07 9.40 9.40 9.40 9.17 9.20 7.39 9.50 9.43 7.78 6.83 8.62 8.75 8.83 8.89 8.55 8.18	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	l anduse 	64 00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat	r acket Sherwood ter	l andd 68 119 239 50 7 22 25 25 48 88 84 84	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50 7.78 7.78 5.83 3.62 3.75 5.83 3.89	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowjs Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wilson wehadkee guss	r acket Sherwood ter	l andd 68 111 233 25 56 7 22 29 7 7 7 8 48 8 8 64 38 84 84 84 84 84 84 84 84 84 84 84 84 84	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.43 7.78 6.83 8.62 8.75 8.83 8.89 6.55 8.18 8.90 8.90 8.90	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wehadkee guss carey	r acket Sherwood ter 1	l andd 68 1111 233 29 50 7 7 7 7 8 48 8 8 8 64 38 8 8 97	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.43 7.78 6.83 1.62 6.55 6.18 8.99 6.555 6.18 1.35 1.35 1.89 7.25	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 yla Willow/S whitewat thompsor wehadkee guss caney l.wehadk	r acket Sherwood ter 1	Landa 68 119 233 29 50 50 7 7 7 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	use1 lan 8.07 9.40 5.30 9.17 9.20 9.250 9.43 7.78 5.83 8.62 8.75 5.83 8.62 8.89 9.555 4.18 8.90 1.35 9.89 7.25	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	l anduse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wehadkee guss carey	r acket Sherwood ter 1	l andd 68 119 233 29 50 68 68 68 88 88 88 88 88 88 88 88 88 88	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.43 7.78 6.83 1.62 6.55 6.18 8.99 6.555 6.18 1.35 1.35 1.89 7.25	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	l anduse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wilson wehadkee guss caney L.wehadk we2 we3 stroud	r acket Sherwood ter 1	l andd  68 111 233 25 56 7 22 29 56 48 88 64 38 88 67 132 31	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.550 9.43 7.78 6.83 8.62 8.75 6.83 8.89 6.55 6.18 8.390 1.35 0.89 7.25 1.26 1.72	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowjs Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wilson wehadkee guss caney l.wehadk we2 we3 stroud veasey	r acket Sherwood ter 1	l andd 68 111 233 25 56 7 22 26 7 7 7 8 8 8 8 8 6 6 7 132 31	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.43 7.78 6.83 8.62 8.75 8.83 8.89 6.55 8.18 8.90 8.185 8.185 8.185 8.20 8.20 8.20 8.20 8.20 8.20 8.20 8.20	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wilson welson yeuss caney l.wehadk we2 we3 stroud veasey maple	r acket Sherwood ter 1	l andd 68 119 233 29 50 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 9.43 7.78 6.83 1.62 6.55 6.18 1.35 1.35 1.35 1.38 1.35 1.38 1.35 1.38 1.35 1.38 1.35 1.38 1.38 1.38 1.38 1.38 1.38 1.38 1.38	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	l anduse	64 00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wehadkee guss caney l.wehadk we2 we3 stroud veasey maple talley zachary	r acket Sherwood ter 1	l andd 68 1119 233 29 50 68 88 88 88 88 88 88 88 88 88 88 88 88	use1 lan 8.07 9.40 9.40 9.40 9.43 9.43 7.78 6.83 3.62 8.77 8.83 8.89 9.55 4.18 8.90 1.35 9.89 7.25 1.26 1.12 9.72 1.84 8.06 8.18 8.23 8.01	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO  2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wehadkee guss caney l.wehadk we2 we3 stroud veasey maple talley zachary z1-z2	r acket Sherwood ter 1	l andd  68 111 233 25 56 7 22 29 56 48 88 64 38 186 64 37 33 64 27	use1 lan 8.07 9.40 5.30 9.17 0.20 7.39 2.50 0.43 7.78 6.83 3.62 3.75 6.83 3.89 6.55 6.18 6.83 6.90 6.17 6.83 6.83 6.83 6.83 6.83 6.83 6.83 6.83	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		
ID COO 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NAME  Brush Newriver Potato Wolf Yellowje Yc shoal beech b3a b3b dixie jackson j1 y1a Willow/S whitewat thompsor wehadkee guss caney l.wehadk we2 we3 stroud veasey maple talley zachary	r acket Sherwood ter 1	l andd  68 111 233 25 56 7 22 29 7 7 7 8 8 8 8 8 8 6 7 132 31 8 6 27 35 6 6 6 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7	use1 lan 8.07 9.40 9.40 9.40 9.43 9.43 7.78 6.83 3.62 8.77 8.83 8.89 9.55 4.18 8.90 1.35 9.89 7.25 1.26 1.12 9.72 1.84 8.06 8.18 8.23 8.01	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	.00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Landuse	00 00 00 00 00 00 00 00 00 00 00 00 00		

34	2 p7	19.45	.00	.00	.00
35	2 p8	5.83	.00	.00	.00
36	2 p9	33,06	.00	.00	.00
37	2 j2a	18.08	.00	.00	.00
38	2 j2b	8.36	.00	.00	.00
39	2 w2	7.78	-00	.00	.00
40	2 H3	18.08	-00	.00	.00
41	2 wi1/wi2	44.73	.00	.00	.00
42	2 wi3/v2a	22.36	.00	.00	.00
43	2 v2b	14.58	-00	-00	.00

INPUT GROUP 12 - NON-POINT EXPORT CONCENTRATIONS
IC LAND USE RUNOFF CONSERV TOTAL P TOTAL N ORTHO P INORG N

		M/YR	PPB	PP8	PPB	PPB	PPB
1 landuse	1	.15	.0	34.5	.0	.0	.0
	cv:	.00	.00	. 15	.00	.00	.00
2 landuse	2	.00	.0	.0	.D	.0	.0
	CV:	.00	.00	.00	.00	.00	-00
3 landuse	3	.00	.0	.0	.0	.0	.0
	CV:	.00	.00	-00	.00	-00	.00
4 Landuse	4	.00	.0	.0	.0	.0	.0
	CV:	.00	_00	.00	-00	.00	- 00

INPUT GROUP 13 - MODEL COEFFICIENTS IC COEFFICIENT CV MEAN .45 1 P DECAY RATE 1.000 2 N DECAY RATE 1.000 .26 3 CHL-A MODEL 1.000 4 SECCHI MODEL 1.000 5 ORGANIC N MODEL 1.000 .12 6 TP-OP MODEL 1.000 .15 7 HODY MODEL 1.000 .15 8 MODY MODEL 1.000 .22 .020 .00 9 BETA M2/MG 10 MINIMUM QS .100 .00 11 FLUSHING EFFECT 1.000 .00 12 CHLOROPHYLL-A CV -620 .00

IMPUT GROUP 14 - CASE NOTES West Point Lake 1990 Verification of calibration Data from GaEPD P, Light, Flushing Model Regional and local calibration from 1991

# REPORT DOCUMENTATION PAGE

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BATHTUB. Reservoirs included Sidney Lanier. BATHTUB model	in the study were Allatons were calibrated using I	ona Lake, Walter F. Geo historic water quality da	rvoirs were evaluated using the model orge Lake, West Point Lake, and Lake ita for each lake. Lake responses were idels provide one means for evaluating
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Chlorophyll

Loading

Modeling

OF REPORT

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Eutrophication

Nutrients

Reservoirs

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