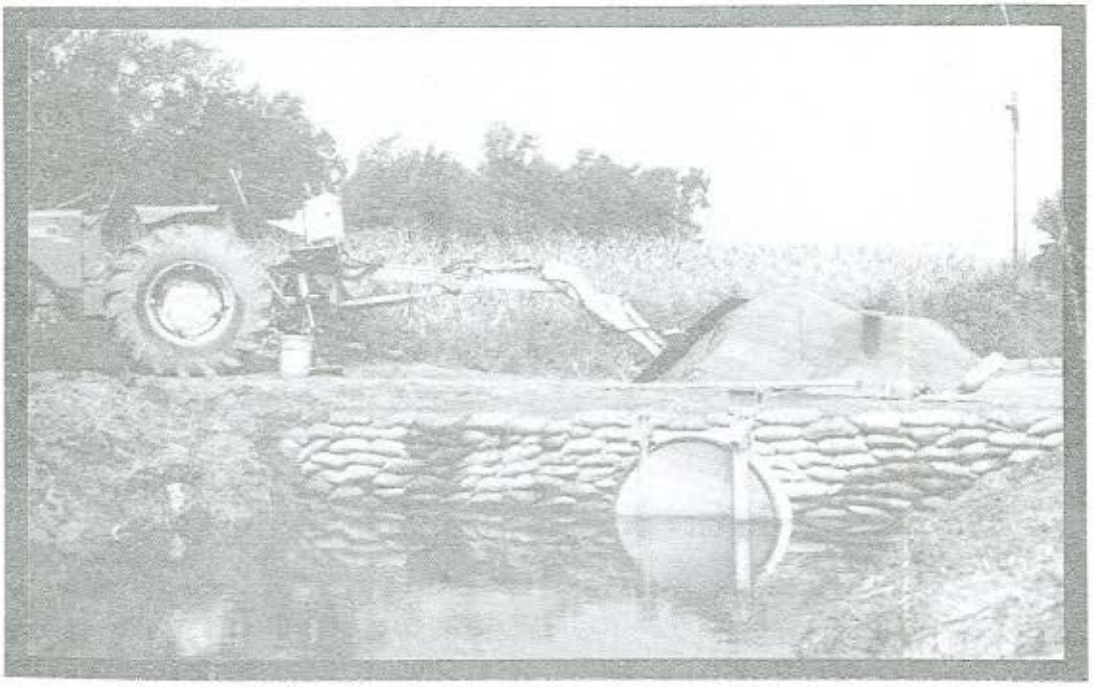
APES Report 92-14

HYDROLOGIC AND WATER-QUALITY DATA IN SELECTED AGRICULTURAL DRAINAGES IN BEAUFORT AND HYDE COUNTIES, NORTH CAROLINA, 1988-90

U.S. GEOLOGICAL SURVEY
Open-File Report 92-498



Prepared in cooperation with the

DIVISION OF ENVIRONMENTAL MANAGEMENT and
ALBEMARLE-PAMLICO ESTUARINE STUDY of the
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES

COVER PHOTOGRAPHS: Two views of the tide gate at site H1, near Swanquarter, Hyde County, North Carolina.

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By M.W. Treece, Jr., and Jerad D. Bales

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Raleigh, North Carolina

1992

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Multiply	by	To obtain
	Length	
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Area	
square mile (mi^2)	2.590	square kilometer
acre	4,047	square meter
	Volume	
gallon (gal)	3.785	liter
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
cubic foot per second per square mile [$(ft^3/s)/mi^2$]	0.01093	cubic meter per second per square kilometer
	Mass	
ounce, avoirdupois (oz)	28.35	gram
	Specific Conductance	
micromho per centimeter at 25 degrees Celsius (µmho/cm at 25 °C)	1.000	microsiemens per centimeter at 25 degrees Celsius

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

Temperature: In this report, temperature is given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the following equation:

$$°F = 1.8\ (°C) + 32$$

Definitions used in this report:

Water year - The period October 1 through September 30, determined by the calendar year in which it ends.

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ABSTRACT

An investigation began in 1988 to (1) quantify nutrient, sediment, and freshwater loadings in canals that collect drainage from cropland field ditches, (2) determine the effects of tide gates and flashboard risers on these loadings and on receiving-water quality, and (3) characterize the effects of drainage on the salinity regime of a tidal creek. Data were collected in three canals in Hyde County, three canals in Beaufort County, and in Campbell Creek, which receives drainage directly from two of the Beaufort County canals. Water-control structures were placed on two of the six canals near the beginning of the investigation. Following about two years of data collection, control structures were placed on the remaining canals.

Hydrologic and water-quality data are presented for each of the study sites for the period of May 1988 through September 1990. Data presented in this report cover the first phase of the investigation prior to the installation of water-control structures in four of the six canals. Following a description of the study sites and data-collection methods, data are presented. These data include: (1) daily values of accumulated precipitation, (2) water-level statistics, (3) daily mean values of discharge in the canals, (4) biweekly water-quality measurements and sample analyses, (5) storm-event water-quality measurements and sample analyses, (6) continuous records of specific conductance in the canals, (7) vertical profiles of salinity in Campbell Creek, and (8) daily mean values of salinity at five sites in Campbell Creek.

INTRODUCTION

Water-control structures are used to manage runoff from artificially drained cropland in the Coastal Plain of North Carolina. Cropland in eastern North Carolina is typically drained by an array of small ditches that feed larger collector canals that empty into creeks or other receiving waters. Flashboard risers and tide gates are the two primary types of water-control structures used in North Carolina field ditches. The crest elevation of flashboard risers may be changed at any time by removing or adding boards to the structure. Consequently, landowners may exert some control over drainage from ditches upstream from these structures. Tide

gates, on the other hand, operate solely in response to the difference between the water levels upstream and downstream from the structure. According to the design used in the Coastal Plain, the tide gates open and allow drainage from the upstream fields when the upstream water level exceeds the downstream water level by more than 0.2 ft (R. Woolard, U.S. Soil Conservation Service, oral commun., 1989).

In response to the need for management of runoff from agricultural lands, the North Carolina Agricultural Cost Share Program was implemented in 1984 in selected counties in the Coastal Plain. The Program, which is administered by the North Carolina Division of Soil and Water Conservation, is now in place in all counties of the State. The purpose of the Program is to reduce the input of agricultural nonpoint-source pollutants into the streams, lakes, and estuaries of the State through the application of best-management practices. The Cost Share Program provides funding for the installation of flashboard risers in ditches and canals that drain agricultural lands. Tide gates, however, are not an approved best-management practice by the Program.

In 1988, the U.S. Geological Survey (USGS), in cooperation with the North Carolina Department of Environment, Health, and Natural Resources, began an investigation to address issues concerning artificial drainage of cropland, water-control structures, and estuarine receiving-water quality. The objectives of the investigation were to (1) quantify nutrient and sediment loadings, and freshwater inflow to canals that collect drainage from cropland field ditches, (2) determine the effects of tide gates and flashboard risers on these loadings and on receiving-water quality, and (3) characterize the effects of drainage on the salinity regime of a tidal creek.

Data were collected in three canals in Hyde County, in three canals in Beaufort County, and in Campbell Creek, which receives drainage directly from two of the Beaufort County canals (fig. 1). The flow in five of the six canals is affected by water-level fluctuations in the downstream estuary. A tide gate was installed on one of the Hyde County canals (site H1, fig. 2) near the beginning of the study; tide gates were installed in the remaining two Hyde County canals in August 1990, after about 2 years of preinstallation data had been collected. Likewise, a flashboard riser was installed on one of the Beaufort County canals (site B1, fig. 3) very early in the study, and risers were installed on the remaining two canals in April 1991. Installation of the flashboard risers was funded cooperatively by the landowner and the North Carolina Agricultural Cost Share Program. State funds were appropriated for the installation of tide gates at the study sites and at other sites in Hyde County.

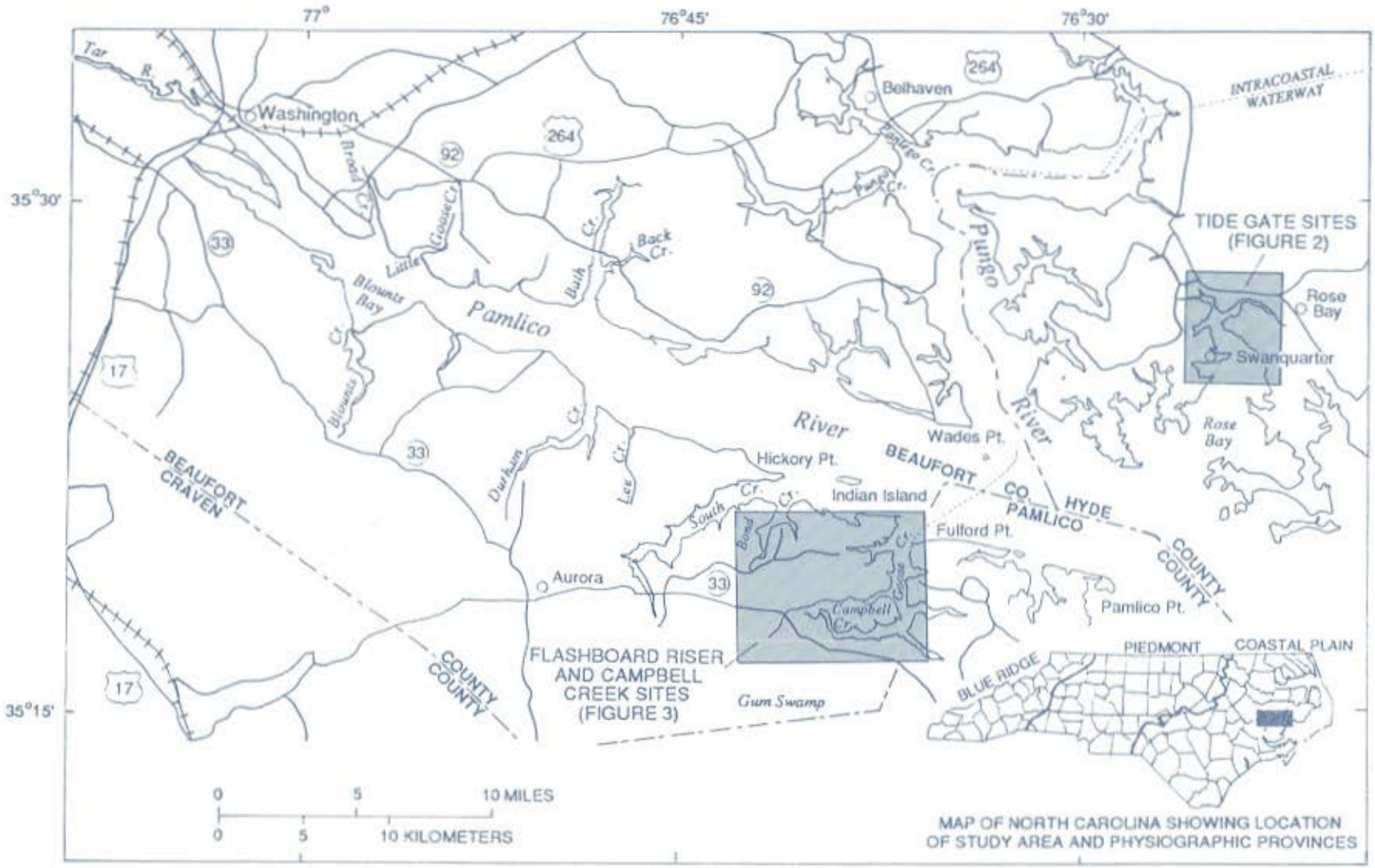

Figure 1.--General location of data-collection sites.

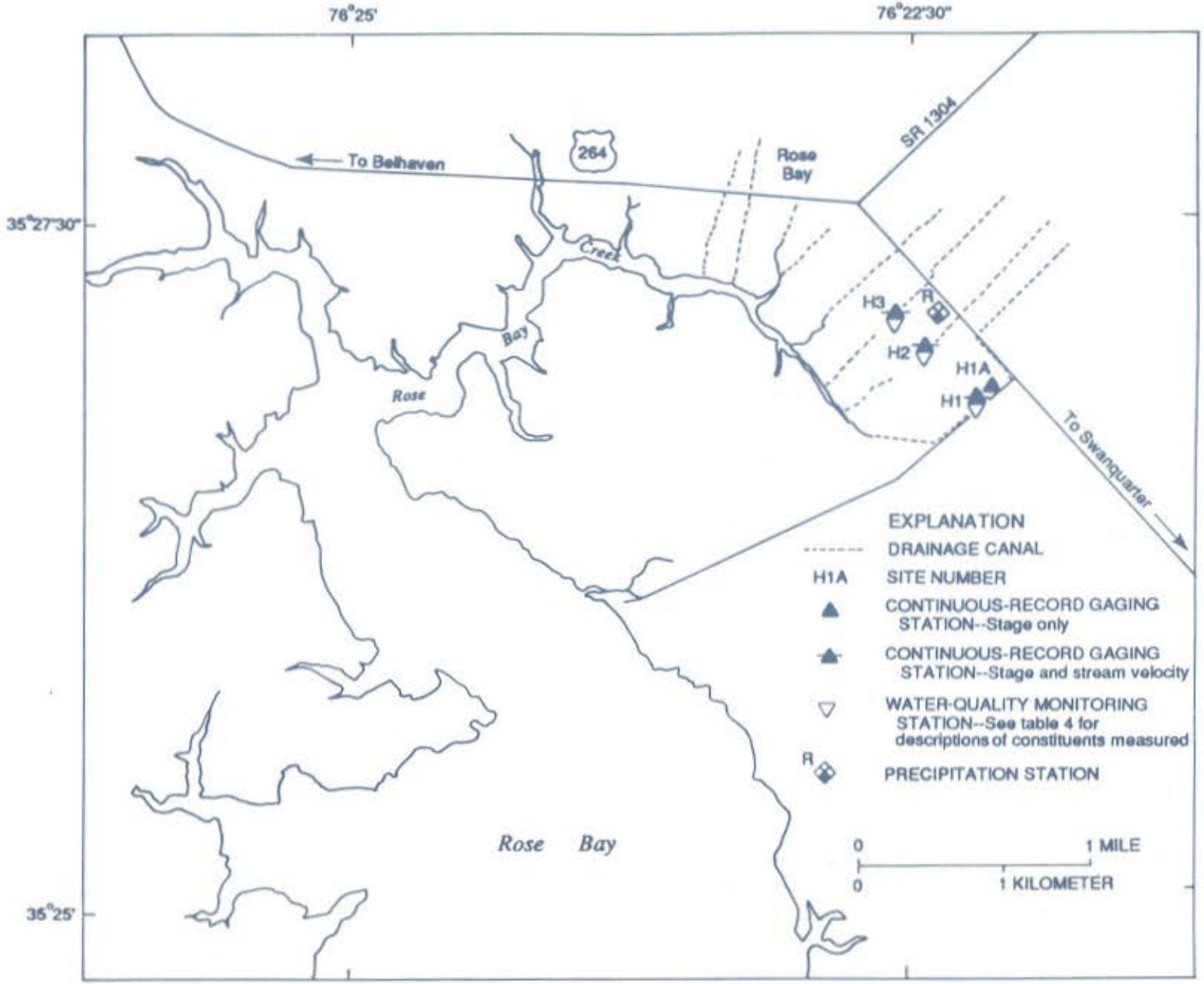

Figure 2.--Location of data-collection sites for Hyde County drainage canals.

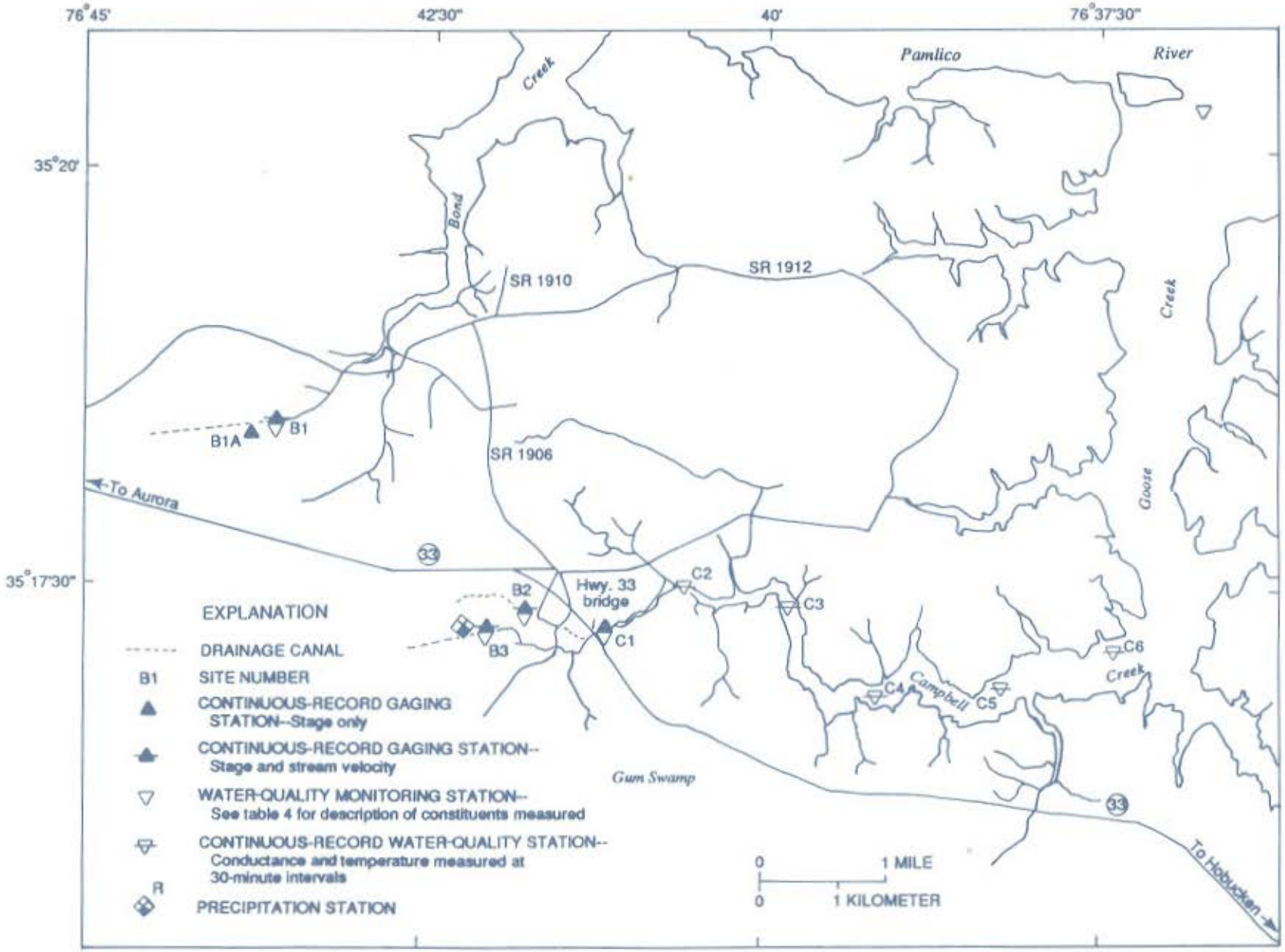

Figure 3.--Location of data-collection sites for Beaufort County drainage canals and Campbell Creek sites.

Purpose and Scope

The purpose of this report is to provide hydrologic and water-quality data collected from (1) three small agricultural basins in Hyde County, (2) three small agricultural basins in Beaufort County, and (3) Campbell Creek, North Carolina (fig. 1). A description of the study sites and data-collection procedures is followed by hydrologic and water-quality data presented in the form of tables and graphs.

Hydrologic and water-quality data are presented for the period of May 1988 through September 1990, which roughly constitutes the first phase (pre-water-control structure installation) of the investigation. Hydrologic data include precipitation, water-level, and stream-velocity data recorded at 15-minute intervals. Water-quality data include physical properties measured in the field as well as nutrient and sediment concentrations measured biweekly and for selected storm events. Salinity and water temperature were measured daily at regular intervals for the agricultural basins and Campbell Creek sites.

Acknowledgments

The authors gratefully acknowledge the cooperation of the owners of property on which the study sites are located. The landowners provided free and open access to the property, farming-practice data, and valuable assistance throughout the investigation. Cooperating landowners are: Mr. Sydney Credle, Mr. Charlie Godley, Mr. David O'Neal, Mr. Hiram Paul, and Mr. Kelly Williams. Mr. David O'Neal was particularly instrumental in identifying Hyde County sites and in maintaining local support for the investigation. Mr. Rufus Croom, Mr. James T. Etheridge, Mr. Michael W. Harriett, and Mr. Rodney Woolard, all of the U.S. Soil Conservation Service, assisted in identifying sites, developing and maintaining local contacts, and providing technical guidance. The Hyde County Soil and Water Conservation District was also responsible for blocking a ditch to hydraulically separate two of the basins. Mr. James R. Cummings and Ms. Patricia Hooper (North Carolina Division of Soil and Water Conservation), Ms. Elizabeth McGee and Mr. Jimmie R. Overton (North Carolina Division of Environmental Management), and Mr. Thomas W. Ellis (North Carolina Department of Agriculture) were instrumental in initiating and developing continuing support for the investigation. This study was begun in cooperation with the Albemarle-Pamlico Estuarine Study, North Carolina Department of Environment, Health, and Natural Resources, and has continued in cooperation with the Division of Environmental Management.

AGRICULTURAL BASINS AND DATA-COLLECTION SITES

The agricultural basins lie within the Coastal Plain physiographic province of North Carolina near the mouth of the Pamlico River (fig. 1). The Pamlico River is a drowned river-valley estuary characterized by daily mean water-level fluctuations of less than a foot and salinities from near zero to about 20 ppt (parts per thousand) (Bales, 1990). Because of the proximity of the basins to the Pamlico River and Pamlico Sound, and because the bottom of the canal that drains each basin is near or below mean sea level, water level and water quality in the canals are often affected by downstream estuarine conditions.

The climate of the region is mild and moderately moist. The annual mean temperature is more than 15.5 °C, and mean annual precipitation is about 52 in. (Hardy and Hardy, 1971). Interannual variability in precipitation is large, with annual totals ranging from 35 to 80 in., but average monthly precipitation is uniform throughout the year, although slightly higher amounts typically occur during the late summer months of July, August, and September. Evapotranspiration rates average about 34 in/yr (inches per year) and exhibit much less variability from year to year than precipitation (Wilder and others, 1978). Average wind speeds are about 10 mi/hr (miles per hour). Winds typically blow from the south to southwest from April through August, and from the north to northwest between September and February; there is no prevailing wind direction during March (Garrett and Bales, 1991).

Hyde County Basins

The three Hyde County agricultural basins located near the community of Rose Bay are drained by adjacent, parallel drainage canals (fig. 2). The data-collection sites are all less than 2,000 ft from the confluence of the drainage canals with Rose Bay Creek, a tidal creek draining to Rose Bay. Each of the basins contains about 100 acres (table 1) of cropland characterized by highly productive mineral soils, which are used to produce winter wheat and soybeans in rotation (R. Woolard, U.S. Soil Conservation Service, oral commun., 1988). All runoff within each basin is by way of surface drainage to ditches and subsequently to the canals on which the data-collection installations are located. At sites H2 and H3, the canals are about 13 ft wide at the top and about 4 ft deep. At site H1, where the canal is not as well maintained as at sites H2 and H3, the drainage canal is about 9 ft wide and 2 ft deep.

Table 1.--*Description of data-collection sites*

Site number (figs. 2 & 3)	USGS station[1] number	County	Latitude	Longitude	Drainage area (acres)	Description
H1	0208458600	Hyde	35°26'44"	76°22'25"	70	Drainage canal, downstream from tide gate (tide gate installed July 1988)
H1A	0208458600	Hyde	35°26'48"	76°22'18"	70	Drainage canal, upstream of tide gate
H2	0208458700	Hyde	35°26'57"	76°22'37"	140	Drainage canal, tide gate installed August 1990
H3	0208458800	Hyde	35°27'01"	76°22'49"	104	Drainage canal, tide gate installed August 1990
B1	0208455130	Beaufort	35°18'41"	76°43'28"	93	Drainage canal, downstream from flashboard riser (riser installed July 1988)
B1A	0208455130	Beaufort	35°18'44"	76°43'35"	93	Drainage canal, upstream of flashboard riser
B2	0208455143	Beaufort	35°17'20"	76°41'45"	47	Drainage canal, with no flashboard riser (riser installed April 1991)
B3	0208455141	Beaufort	35°17'10"	76°41'50"	68	Drainage canal, with no flashboard riser (riser installed April 1991)
C1	0208455145	Beaufort	35°17'13"	76°41'13"	5,120	Campbell Creek, receiving stream for B2 and B3
C2	0208455165	Beaufort	35°17'30"	76°40'33"	6,342	Campbell Creek, 0.75 mile downstream from C1
C3	0208455175	Beaufort	35°17'25"	76°39'48"	7,501	Campbell Creek, 0.75 mile downstream from C2
C4	0208455195	Beaufort	35°16'55"	76°39'12"	9,306	Campbell Creek, 1 mile downstream from C3
C5	0208455205	Beaufort	35°17'00"	76°38'12"	10,835	Campbell Creek, 0.90 mile downstream from C4
C6	0208455220	Beaufort	35°17'12"	76°37'23"	12,755	Campbell Creek at confluence with Goose Creek

[1]U.S. Geological Survey downstream order identification number.

Data were collected in the Hyde County basins to determine nutrient and sediment loadings, and freshwater inflow to canals that drain cropland before and after the installation of tide gates and, thus, to quantify the effects of tide gates on downstream receiving-water quality. In July 1988, a tide gate was placed in the canal about 100 ft upstream from site H1. The tide gate was installed by the landowner, with assistance from the Hyde County Soil and Water Conservation District. Following two years of post-installation data collection at site H1 and 2 years of pre-installation data collection at sites H2 and H3, tide gates were placed in the canals upstream from sites H2 and H3 in August 1990; September 1990 data at these sites reflect post-water-control structure conditions.

Beaufort County Basins

The three Beaufort County agricultural basins are located near the community of Campbell Creek, 5 mi east of Aurora (fig. 3) and about 20 mi southwest of the Hyde County basins. The basins are similar in size to the Hyde County basins (table 1). Soils within the basins are loams and fine sandy loams. The basins are used exclusively for row crops (corn, milo, soybeans, potatoes, and winter wheat), as are the Hyde County basins. All runoff within each basin is by way of surface drainage, but there is a more extensive network of surface-drainage ditches in the Beaufort County basins than in the Hyde County basins.

The network of agricultural drainage ditches and canals upstream from site B1 (fig. 3) forms the headwaters of Bond Creek. Site B1 is about 4,000 ft from the mainstem of Bond Creek, but the land between site B1 and Bond Creek is entirely forested. At this site, the flow channel is about 7 ft wide and 2 ft deep. The maintained canal, which ends just upstream from site B1, is about 7 ft wide and 8 ft deep.

Sites B2 and B3 are on adjacent canals that drain directly to Campbell Creek. Sites B2 and B3 are about 2,000 ft upstream from Campbell Creek. The area between the data-collection sites and Campbell Creek is forested, and no additional ditches or canals drain to the two canals between the data-collection sites and Campbell Creek. The canals at sites B2 and B3 are each about 12 ft wide. At site B2, the canal is 3 ft deep, whereas the canal at site B3 is 4 ft deep.

Data were collected at the Beaufort County sites to determine nutrient and sediment loadings. Data also were collected to determine freshwater inflow to canals that drain cropland before and after the installation of flashboard risers and, thus, to quantify the effects of flashboard risers on downstream receiving-water quality. The support structure for flashboard

risers was installed in the canal upstream from site B1 in 1989 (table 1) by the landowner in cooperation with the Beaufort County Soil and Water Conservation District. The structure was not used between the time of installation and September 1990 to control drainage from the basin. Following more than 2 years of post-installation data collection at site B1 and more than 2 years of pre-installation data collection at site B2 and B3, flashboard risers were installed in the canals upstream from sites B2 and B3 in April 1991.

Campbell Creek Data-Collection Sites

Upstream from the State Highway 33 bridge, Campbell Creek drains a 5,120-acre (8-mi^2) wetland area known as Gum Swamp (fig. 1). There is very little agricultural land in the Campbell Creek watershed upstream from the State Highway 33 bridge. With the exception of the canals that drain sites B2 and B3, only one other agricultural drainage canal is known to drain to Campbell Creek upstream from the State Highway 33 bridge.

Between the State Highway 33 bridge and the confluence of Campbell Creek with Goose Creek, an additional 7,610 acres (11.9 mi^2) drain to Campbell Creek, creating a total drainage area of 12,700 acres (19.9 mi^2) for the entire Campbell Creek watershed. The distance along the axis of the creek from the State Highway 33 bridge to the mouth of the creek is about 5 mi. Land use in the lower part of the Campbell Creek basin is a mixture of agriculture (primarily row crops) and forested wetlands.

Data were collected in Campbell Creek to (1) characterize the salinity regime of the tidal creek, including the effects of freshwater drainage and drainage control on salinity, and (2) evaluate the effects of drainage control on receiving-water nutrient concentrations. Data were collected at six sites (C1-C6) on Campbell Creek (fig. 3). A continuous-recording gaging station (C1) was located on the right bank at the State Highway 33 bridge to record water levels at 15-minute intervals. Temperature and specific conductance were measured at 30-minute intervals at sites C2-C6, which were placed equidistantly along a longitudinal axis from C1 to the mouth of Campbell Creek.

As part of another investigation, additional data were collected in Goose Creek, 3.5 mi downstream of the confluence with Campbell Creek (Garrett, 1992; Garrett and Bales, 1991). Water level, water temperature, specific conductance, and dissolved-oxygen concentrations were recorded at 15-minute intervals. Although not presented in this report, these data may be useful in characterizing the salinity regime of Campbell Creek.

HYDROLOGIC DATA

Hydrologic records collected at the Hyde County sites, the Beaufort County sites, and in Campbell Creek are summarized in table 2. The data-collection network for the Hyde County sites is shown in figure 2; the Beaufort County and Campbell Creek data-collection network is shown in figure 3.

Table 2.--*Hydrologic data-collection network*

[--, no data]

Site (figs. 2 and 3)	Measurement type and time interval (in minutes)			
	Precipitation	Water level	Stream velocity	Discharge
H1	--	15	15	Periodically
H1A	--	15	--	--
H2	15	15	15	Periodically
H3	--	15	15	Periodically
B1	--	15	15	Periodically
B1A	--	15	--	--
B2	--	15	15	Periodically
B3	15	15	15	Periodically
C1	--	15	--	--

Precipitation

Precipitation amounts were recorded at 15-minute intervals at sites H2 and B3 (table 2). Precipitation data from the nearest National Weather Service station located at New Holland, 12 mi to the east of site H2, were used to compare observations at site H2 with long-term averages and to estimate missing daily values at this site. Likewise, data from the nearest National Weather Service station located at New Bern, 25 mi to the southwest of site B3, were used to compare observations at site B3 with long-term averages and to estimate missing daily values at this site. Based on cumulative differences between observed rainfall and National Weather Service records, the period from July 1988 through September 1990 was generally drier than normal at both study sites (table 3).

Table 3.--*Observed precipitation at sites H2 and B3 and long-term average precipitation at nearby National Weather Service stations, July 1988-September 1990*

[--, no data]

Year	Month	Precipitation, in inches, at site H2				Precipitation, in inches, at site B3			
		Observed	Long-term average at New Holland	Difference	Cumulative difference	Observed	Long-term average at New Bern	Difference	Cumulative difference
1988	July	--	6.04	--	--	1.67	6.75	-5.08	-5.08
	August	--	6.36	--	--	2.58	6.33	-3.75	-8.83
	September	--	5.62	--	--	2.66	5.75	-3.09	-11.92
	October	2.42	3.90	-1.48	-1.48	3.07	3.39	-.32	-12.24
	November	5.16	3.70	+1.46	-.02	4.24	3.08	+1.16	-11.08
	December	.28	3.35	-3.07	-3.09	.48	3.69	-3.21	-14.29
1989	January	2.84	4.20	-1.36	-4.45	3.39	4.01	-.62	-14.91
	February	3.55	3.87	-.32	-4.77	4.14	3.97	+.17	-14.74
	March	4.11[a]	3.61	+.5	-4.27	6.19	3.62	+2.57	-12.17
	April	4.87	3.31	+1.56	-2.71	5.83[b]	2.98	+2.85	-9.32
	May	4.01[a]	4.21	-.20	-2.91	4.01[b]	4.41	-.40	-9.72
	June	4.26[a]	4.37	-.11	-3.02	6.70	5.13	+1.57	-8.15
	July	3.15	6.04	-2.89	-5.91	4.54	6.75	-2.21	-10.36
	August	6.19	6.36	-.17	-6.08	6.17	6.33	-.16	-10.52
	September	6.91	5.62	+1.29	-4.79	7.09	5.75	+1.34	-9.18
	October	5.79	3.90	+1.89	-2.90	4.34[b]	3.39	+.95	-8.23
	November	2.11	3.70	-1.59	-4.49	1.21	3.08	-1.87	-10.1
	December	4.19	3.35	+.84	-3.65	3.78	3.69	+.09	-10.01
1990	January	3.15[a]	4.20	-1.05	-4.70	3.12[b]	4.01	-.89	-10.90
	February	1.48	3.87	-2.39	-7.09	1.03[b]	3.97	-2.94	-13.84
	March	2.60	3.61	-1.01	-8.10	6.99[b]	3.62	+3.37	-10.47
	April	1.75	3.31	-1.56	-9.66	3.36	2.98	+.38	-10.09
	May	6.03	4.21	+1.82	-7.84	6.07	4.41	+1.66	-8.43
	June	1.58	4.37	-2.79	-10.63	2.69	5.13	-2.44	-10.87
	July	3.44	6.04	-2.60	-13.23	4.65	6.75	-2.10	-12.97
	August	13.86	6.36	+7.50	-5.73	7.00	6.33	+.67	-12.3
	September	1.78	5.62	-3.84	-9.57	2.97	5.75	-2.78	-15.08

[a]Monthly total includes some daily values estimated from New Holland observations.
[b]Monthly total includes some daily values estimated from New Bern observations.

Water Levels

Water levels were recorded at 15-minute intervals in each of the six drainage canals and at Campbell Creek site C1. All water levels were referenced to sea level, and datums were checked annually.

Water levels were also recorded upstream from the control structures at sites H1A and B1A. The relation between water levels upstream (site H1A) and downstream (site H1) from the tide gate is shown in figure 4. The relation between water levels at site B2 and in Campbell Creek (site C1), which receives drainage from the canal on which site B2 is located, is presented in figure 5.

A weir was installed at site B1 in November 1989 and at site B2 in early 1988 to stabilize and constrict the channels and thereby simplify the procedure of obtaining accurate records of discharge. The weir was removed at site B1 in January 1990 upon evidence of significant streambed scouring, and a new, more stable weir was installed in February 1990. The elevation of the bottom of the canal was lowered 0.3 ft by the scour. The control at site B2 was repaired in November 1989 to prevent scouring of the left bank. Elevation of zero flow was unchanged.

Flow Velocity

Standard stream-gaging techniques using a weir and a stage-discharge relation were not suitable at most of the study sites for three reasons. First, movement of water in these canals occurs in two directions--downstream, as a result of runoff, and upstream, as a result of tidal action. Second, the weir will typically become submerged and nonfunctional during periods of extremely high water levels resulting from runoff or increases in tidal elevation. Finally, the weir itself may act as a water-control structure by storing water in the canal upstream from the weir. This storage could potentially change the runoff volume and water quality from what would occur without the presence of the weir.

A continuous record of flow velocity (magnitude and direction) was obtained in each of the six drainage canals using Marsh-McBirney[1] bi-directional electromagnetic velocity meters. The meter sensor, which is

[1]Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

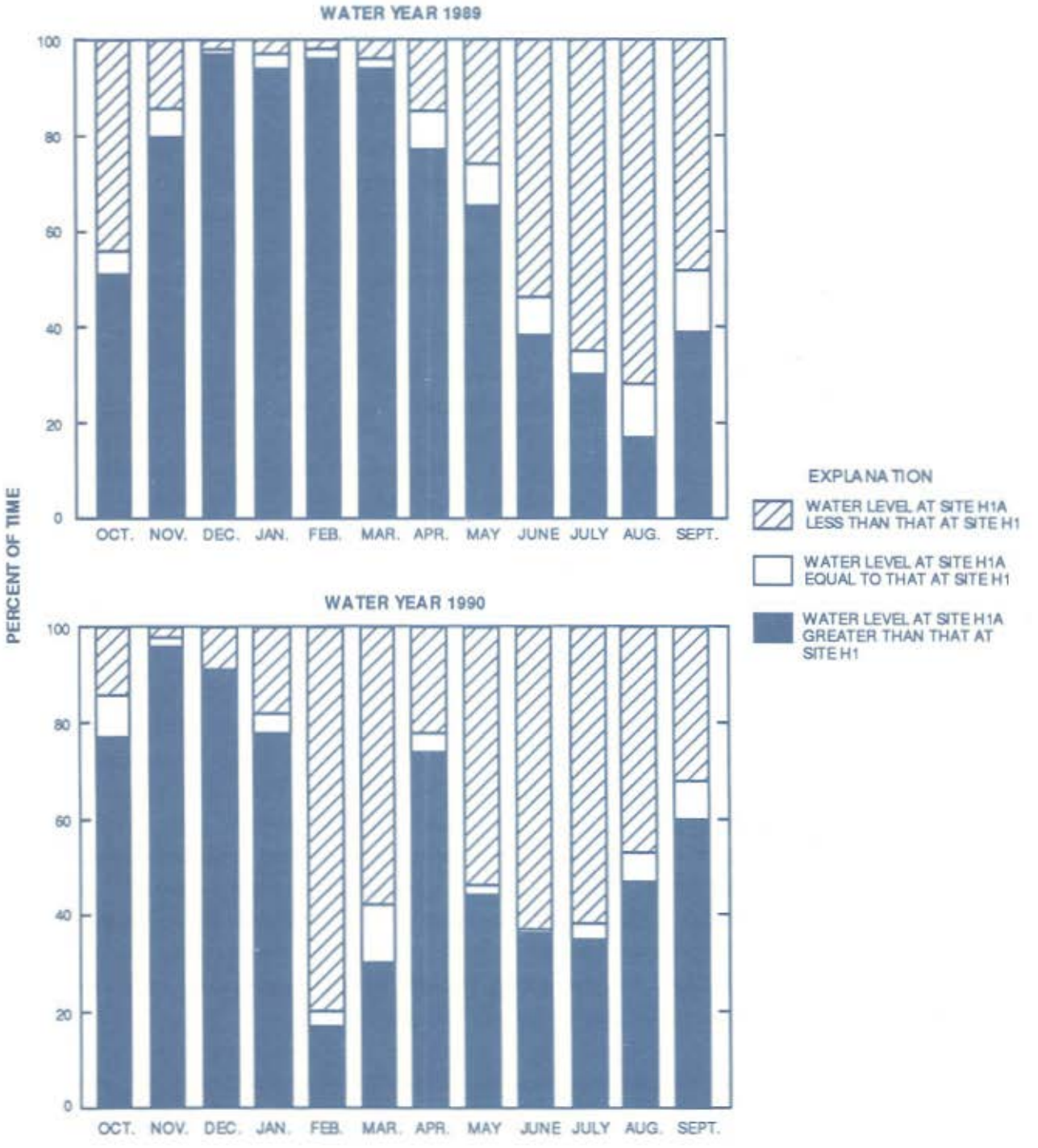

Figure 4.--Relation of water levels in drainage canal upstream (site H1A) and downstream (site H1) of tide gate.

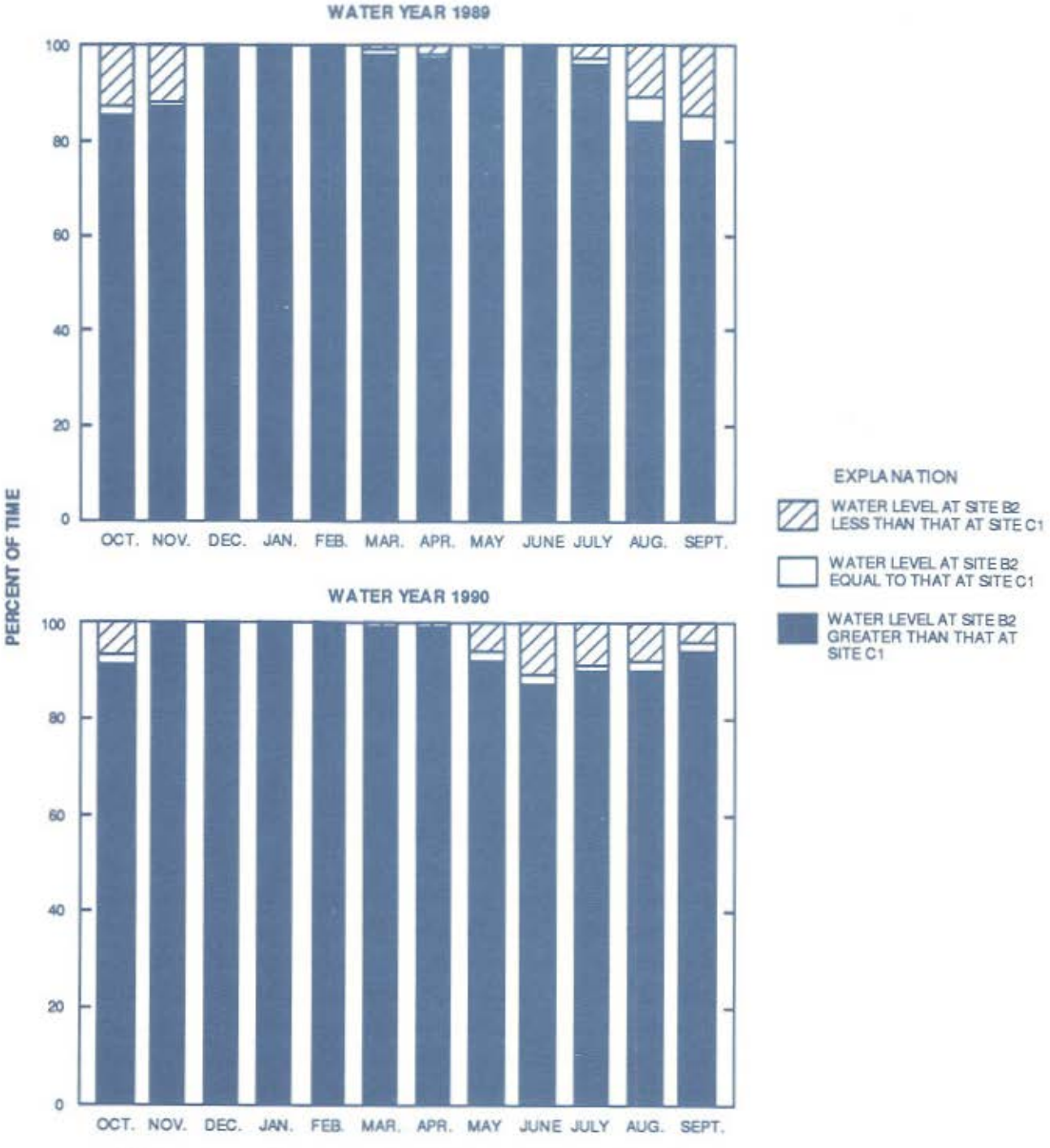

Figure 5.--Relation of water levels in Campbell Creek (site 1) and in upstream drainage canal (site B2).

about 10 in. long and 1 in. in diameter, was mounted to extend horizontally and perpendicular to the flow. The meter was programmed to make 30 measurements during a 15-minute interval. These measurements were averaged to provide a mean velocity for the interval. The meter was controlled by an electronic datalogger, which also performed the averaging and stored the data. During biweekly visits to the sites, field measurements of velocity were made with a Price AA optic current meter or a Marsh-McBirney MDL 201 current meter and compared to the electromagnetic velocity meter readings to ensure meter calibration and determine appropriate data corrections. The maximum velocity magnitudes recorded at each of the six velocity-monitoring sites (table 2) are shown in table 4.

Table 4.--*Maximum recorded upstream and downstream velocity magnitudes in six drainage canals*

[ft/s, foot per second]

	Maximum stream velocities			
	Water year 1989		Water year 1990	
Site	Upstream flow (ft/s)	Downstream flow (ft/s)	Upstream flow (ft/s)	Downstream flow (ft/s)
H1	-0.048	0.10	-0.056	0.29
H2	-.42	.13	-.057	.16
H3	-.12	.095	-.28	.23
B1*	.00	1.30	.00	1.10
B2	-.07	.55	-.532	.30
B3	-.061	.088	-.18	.06

*B1 is not influenced by tide; therefore, no upstream flow occurred.

Discharge

Continuous records of discharge were computed for each canal in the following manner: first, the relation between water level (or stage) and cross-sectional area was determined from measurements in each canal. The stage-area relation is for the cross section at which the velocity-meter probe is located. Next, discharge measurements (about 15 measurements in each canal) were made for different flow and water-level conditions. Using the average flow velocity for the cross section (measured flow divided by total area) determined from the discharge measurement and the point velocity measured by the bi-directional electromagnetic velocity meter at the time of the discharge measurement, a relation between measured point velocity and average velocity was developed for each canal. The relation between point velocity and average velocity was checked throughout the study period by making additional discharge measurements in the canal.

Continuous records of discharge were then determined by (1) using measured stage to obtain a cross-sectional area, (2) using measured point velocity to obtain a cross-sectionally averaged velocity, and (3) multiplying cross-sectional area by cross-sectionally averaged velocity to obtain an instantaneous flow rate. Flows were calculated at 15-minute intervals and averaged for a 24-hour period to obtain daily means.

Discharge record is dependent on accurate and continuous water-level and flow-velocity data; therefore, periods of discharge record may be missing due to missing water-level or velocity data. Flow-velocity data are missing whenever the water level in canals declined below the elevation of the velocity probe. Other periods of missing water-level or velocity data occurred due to instrumentation malfunction.

WATER-QUALITY DATA

Water-quality records were collected at the Hyde County sites (fig. 2), the Beaufort County sites (fig. 3), and in Campbell Creek (fig. 3). Data collection included routine, biweekly measurements and storm-event sampling. In addition, water samples at each canal site were continuously collected and composited for determination of specific conductance. A summary of the water-quality sample collection is listed in table 5.

Standard USGS procedures for the collection and analysis of water-quality samples were followed. Procedures for the collection of field data and maintenance of instrumentation and processing of data were also developed for the specific instrumentation and conditions of this study. These procedures are documented in a quality-assurance manual that was prepared as part of this investigation.

Biweekly Sampling

Field measurements of water temperature, pH, barometric pressure, dissolved-oxygen concentration, and specific conductance were made in the drainage canals and at site C1 at approximately biweekly intervals. Measurements of water temperature and specific conductance were also made upstream from the water-control structures at sites H1A and B1A.

Field meters were calibrated at the beginning of each day of use. Field instruments used were the Yellow Springs Instrument Company Model 33 S-C-T meter for specific conductance, the Yellow Springs Instrument Company Model 54 dissolved-oxygen meter, the Beckman 11 pH meter, and a Thommen

Table 5.--Summary of water-quality sample collection, November 1988-September 1990

Site (figs. 2 and 3)	Measurement interval: 14 hours[1] — Specific conductance	Measurement interval: Biweekly — Specific conductance	pH	Water temperature	Barometric pressure	Dissolved oxygen	Total nitrogen, NO_2 + NO_3a	Total nitrogen, ammonia	Total nitrogen, organic	Total nitrogen, ammonia + organic	Total phosphorus	Total phosphorus, ortho	Suspended sediment	Measurement interval: Storm-event samples[2] — Apr. 11-12, 1989	July 19-21, 1989	Mar. 31-Apr. 1, 1990
H1	627	46	47	47	47	45	47	9	9	46	46	46	47	8	6	5
H1A	0	42	10	42	47	10	0	0	0	0	0	0	0	0	0	0
H2	602	44	45	45	45	44	45	8	8	44	44	44	45	9	5	5
H3	645	44	45	45	45	44	44	9	9	44	44	44	45	8	6	5
B1	292	27	26	27	26	26	27	2	2	27	27	27	25	9	6	5
B1A	0	26	0	26	28	0	0	0	0	0	0	0	0	0	0	0
B2	437	38	37	38	38	38	38	6	6	38	38	38	38	5	6	5
B3	494	45	44	45	45	44	45	9	9	45	45	45	44	7	6	5
C1	0	37	36	36	37	36	37	9	9	37	37	37	36	0	0	0

[1] Composite sample consisting of five discrete samples collected at 2.8-hour intervals.

[2] Storm-event samples analyzed for total nutrient and suspended-sediment concentrations.

barometer. The specific conductance, dissolved-oxygen, and pH meters are all capable of measuring temperature. The temperatures of collected samples were measured with the specific-conductance meter so that conductance values could be adjusted to 25 °C. The dissolved-oxygen meter was used to measure water temperature in the canals at a 1-ft depth.

Temperature thermistors were calibrated against an American Society for Testing Materials thermometer at two temperatures. All values were within 0.5 °C after calibration. Specific-conductance standards were used to develop a calibration curve for the conductance meter. Field meter readings were within 5 percent of the standards after calibration. The dissolved-oxygen meter was calibrated in water-saturated air after adjustment for barometric pressure. After calibration, the meter readings were within 0.1 mg/L (milligram per liter) of the saturation value at the measured temperature and pressure. The dissolved-oxygen calibration was for freshwater. The pH meter was calibrated using standard solutions; after calibration, meter readings were within 0.2 pH units of the standards. Blind pH and specific-conductance samples were also analyzed annually, and the barometer was calibrated annually against a National Weather Service barometer.

Manually collected samples were also obtained at biweekly intervals in the six drainage canals and at site C1. Samples were collected using the equal-width increment (EWI) method (Edwards and Glysson, 1988), which requires equal spacing of subsamples across the cross section of canal or creek and an equal transient rate, both up and down, for all subsamples. Samples were immediately composited, stored in opaque brown bottles, preserved with mercuric chloride, and placed on ice.

Samples were analyzed for concentrations of total and dissolved Kjeldahl nitrogen, total nitrite plus nitrate as nitrogen, total phosphorus, total orthophosphate, and suspended sediment. Nutrient analyses were performed in the USGS's National Water-Quality Laboratory in Denver using methods described by Fishman and Friedman (1985). Analysis of ammonia was added in May 1990 to allow calculation of the organic nitrogen part of total Kjeldahl nitrogen. Initially, samples were analyzed for total and dissolved nutrient concentrations. Because, in most cases, dissolved concentrations were very nearly equal to total concentrations and because of funding limitations, only total concentrations were analyzed after May 15, 1990. Suspended-sediment concentrations were determined in the USGS's Raleigh, N.C., sediment laboratory using procedures documented by Guy (1969).

Event Sampling

To document water quality during high-flow events in drainage canals, samples were collected at time intervals of between 30 and 60 minutes during three events (table 5). Event samples were not collected in Campbell Creek.

Event samples were collected using the Instrumentation Specialty Company (ISCO) model 2700 pumping sampler with fixed intake. The sampler intake was located near the center of the canal and about 0.5 ft above the bottom of the canal. Samples were also collected manually to ensure that automatically collected point samples were representative of conditions throughout the sampled transect. Results indicate that flow in these six canals is well mixed; there were only slight differences between automatically collected samples and samples collected by depth integration at three equally spaced locations across the canal. This is probably because of the small cross-sectional area of flow and because there were long, straight approaches with uniform geometry upstream from the sampling sites.

Samples were retrieved from the sampler within 24 hours of sample collection, stored in opaque bottles, preserved with mercuric chloride, and placed on ice. Samples were analyzed for the same constituents as the biweekly, manually collected samples.

Conductance Samples in Drainage Canals

Because of the potential for crop damage and the loss of soil productivity, the movement of saltwater up drainage canals is a major concern for farmers having low-lying lands near estuarine waters. Salinity may change quickly in the drainage canals in response to upland drainage or to downstream estuarine conditions.

To characterize salinity conditions in the six drainage canals, samples were collected automatically in each of the monitored canals using the ISCO Model 2700 automatic water sampler. Each 500 mL (milliliter) sample represents conditions during a 14-hour period and is the composite of five 100 mL samples collected at approximately 3-hour intervals. During biweekly visits to the sites, the sample bottles were replaced with clean empty bottles. The samples were then returned to the laboratory for measurement of specific conductance, and the bottles were cleaned and stored.

Specific Conductance/Salinity in Campbell Creek

Measurements of specific conductance and temperature were made at six locations along the longitudinal axis of Campbell Creek (fig. 3). Instrument sensors were located at approximately mid-depth in the creek. Because specific conductance in Campbell Creek was significantly higher than in the drainage canals, specific conductance at sites C1-C6 was converted to salinity using a conversion rating (Miller and others, 1988) and is presented as such in this report (table 6).

Table 6.--*Conversion table for specific conductance to salinity*

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; ppt, parts per thousand]

Specific conductance (µS/cm)	Salinity (ppt)	Specific conductance (µS/cm)	Salinity (ppt)
0	0.00	15,000	8.71
500	.23	15,500	9.03
1,000	.47	16,000	9.34
1,500	.74	16,500	9.65
2,000	1.00	17,000	9.97
2,500	1.27	17,500	10.29
3,000	1.55	18,000	10.62
3,500	1.82	18,500	10.94
4,000	2.10	19,000	11.26
4,500	2.38	19,500	11.59
5,000	2.67	20,000	11.91
5,500	2.95	20,500	12.23
6,000	3.24	21,000	12.56
6,500	3.54	21,500	12.89
7,000	3.83	22,000	13.21
7,500	4.13	22,500	13.54
8,000	4.42	23,000	13.87
8,500	4.71	23,500	14.20
9,000	5.01	24,000	14.53
9,500	5.31	24,500	14.86
10,000	5.62	25,000	15.19
10,500	5.92	25,500	15.53
11,000	6.23	26,000	15.86
11,500	6.54	26,500	16.20
12,000	6.84	27,000	16.54
12,500	7.15	27,500	16.87
13,000	7.45	28,000	17.21
13,500	7.77	28,500	17.54
14,000	8.08	29,000	17.88
14,500	8.40	29,500	18.22

At five of the Campbell Creek data-collection sites (C2-C6), a Hydrolab DataSonde I (DSI) was used to measure and record temperature and specific conductance at 30-minute intervals. The DSI is a submersible, fully self-contained unit capable of measuring and recording temperature and specific conductance, as well as several other properties not measured in this study. The DSI has a temperature range of -2 to 50 ^{o}C with a calibrated accuracy of ±0.1 ^{o}C. The selectable specific-conductance ranges are from 0-1,500, 0-15,000, and 0-150,000 µS/cm (microsiemens per centimeter at 25 degrees Celsius); calibrated accuracy is ±1 percent of full scale.

The DSI's were mounted in aluminum pipes which were driven into the streambed. Because the sensors and data-storage device were housed in one unit, the DSI had to be returned to the laboratory for data downloading and recalibration. This resulted in a few days of lost record each time the instrument was serviced. Field measurements were made whenever the DSI was deployed and whenever the unit was recovered. Calibration was performed in the laboratory using specific-conductance standards and an internal calibration curve. Data were recovered and the units were recalibrated at 4- to 5-week intervals.

Vertical profiles of specific conductance and temperature were measured at sites C2-C6 each time the conductance meters were serviced. Measurements were made at 1-ft intervals over the full depth of flow. Field readings at the appropriate depth were also compared to values recorded by the DSI at the corresponding time, and corrections were applied if necessary. Vertical profiles of specific conductance and temperature were measured biweekly at site C1 as part of the routine sampling schedule.

PRESENTATION OF DATA

Hydrologic and water-quality data in three Hyde County drainage canals, three Beaufort County drainage canals, and Campbell Creek are presented in this section. In order to effectively present the large amount of information obtained at the study sites, some of the data collected at short time intervals have been summarized. For example, monthly summaries of water level are provided, and daily mean flows are presented, although these data were recorded at 15-minute intervals and are stored in the National Water Data Storage and Retrieval System of the U.S. Geological Survey.

Data are presented in the following order:

- Daily values of accumulated precipitation (tables 7 and 8).
- Summaries of monthly water-level statistics (tables 9-17)--Maximum and minimum are instantaneous values; daily maximum and daily minimum mean are the monthly means of the daily maximum and minimum values; daily mean range is the monthly average of daily ranges between the daily maximums and daily minimums.
- Daily mean values of discharge (table 18-23).
- Results of biweekly field measurements and sample analyses (tables 24-32)--Barometric pressure was measured and used with water temperature, dissolved oxygen, and specific conductance to compute saturation percentage of dissolved oxygen; barometric pressure is not reported in the tables.
- Storm-event sample water-quality analyses (tables 33-38).
- Specific conductance measured in composite samples, with each sample representing a 14-hour period (figs. 6-11).
- Summary of vertical profiles of salinity in Campbell Creek (tables 39-44).
- Daily mean values of salinity in Campbell Creek (tables 45-49).

Within each data type, data are presented (if available) first for the Hyde County drainage canals, then for the Beaufort County drainage canals, and finally for the Campbell Creek sites.

Table 7.--*Daily values of accumulated precipitation at site H2, October 1988-September 1990*

LOCATION.--Lat 35°27'04", long 76°22'30"; Hyde County; in agricultural field adjacent to drainage canal, 0.1 mi southeast of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

GAGE.--Water-stage recorder on a standpipe rain collector. Recording interval was 15 minutes.

PERIOD OF RECORD.--October 1988 through September 1990.

REMARKS.--mi, mile; e, estimated from National Weather Service gage at New Holland; ---, missing data.

RAINFALL ACCUMULATED (INCHES), OCTOBER 1988-SEPTEMBER 1989
SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.00	0.85	0.00	0.68	0.00	0.00	0.00	1.35	0.00e	0.00	0.00	0.00
2	.00	.00	.00	.00	.00	.00	.00	.41	.00e	.00	1.10	1.36
3	.00	.00	.00	.29	.00	.00	.00	.00	.00e	.00	.00	.00
4	.29	.00	.00	.00	.00	.00	.00	.00	.00e	.15	.00	.00
5	.00	.13	.00	.00	.57	.00	.00	.00	.42e	.97	.00	.48
6	.00	.00	.00	.15	.12	.00	.08	.32	.80e	.28	.00	.00
7	1.37	.00	.00	.00	.15	.00	.52	.00	.00e	.00	1.13	.00
8	.00	.00	.00	.00	.00	.00	.07	.00	.17e	.40	.00	.00
9	.00	.00	.13	.00	.00	.00	.07	.00	.98e	.00	.30	.00
10	.00	.00	.00	.24	.00	.00	.32	.93	.00e	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.98	.00	.00e	.00	.00	.00
12	.00	.00	.00	.32	.00	.00	.00	.00	.00e	.00	.78	.00
13	.00	.00	.00	.20	.00	.00	.00	.18	.67e	.46	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00e	.00	.00	.28
15	.00	.00	.00	.40	.00	.00e	1.52	.68	.00e	.00	.69	.22
16	.00	.00	.00	.00	.00	.17e	.00	.00	.00e	.55	.00	.54
17	.00	.54	.00	.00	.70	.00e	.00	.00	.00e	.34	.00	.00
18	.00	.00	.00	.00	1.44	.78e	.00	.00	.14e	.00	.47	.14
19	.45	.00	.00	.00	.00	.00e	.00	.00	.00e	.00	.00	.81
20	.00	.23	.00	.00	.00	.00e	.00	.00	.65e	.00	.13	.61
21	.20	.00	.00	.00	.57	.90e	.00	.00	.27e	.00	.00	.00
22	.00	.00	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.08
23	.00	.87	.00	.56	.00	.96	.00	.14	.16	.00	.00	.41
24	.00	.00	.00	.00	.00	1.30	.00	.00e	.00	.00	1.59	.00
25	.00	.00	.00	.00	.00	.00	.00	.00e	.00	.00	.00	1.90
26	.00	.00	.00	.00	.00	.00	.16	.00e	.00	.00	.00	.08
27	.00	.00	.00	.00	.00	.00	.83	.00e	.00	.00	.00	.00
28	.11	2.54	.00	.00	.00	.00	.00	.00e	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.39	.00e	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.00e	.00	.00	.00	.00
31	.00	---	.15	.00	---	.00	---	.00e	---	.00	.00	---
TOTAL	2.42	5.16	0.28	2.84	3.55	4.11	4.87	4.01	4.26	3.15	6.19	6.91

WATER YEAR TOTAL: 47.75

Table 7.--*Daily values of accumulated precipitation at site H2, October 1988-September 1990*--Continued

LOCATION.--Lat 35°27'04", long 76°22'30"; Hyde County; in agricultural field adjacent to drainage canal, 0.1 mi southeast of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

GAGE.--Water-stage recorder on a standpipe rain collector. Recording interval was 15 minutes.

PERIOD OF RECORD.--October 1988 through September 1990.

REMARKS.--mi, mile; e, estimated from National Weather Service gage at New Holland; ---, missing data.

RAINFALL ACCUMULATED (INCHES), OCTOBER 1989-SEPTEMBER 1990
SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	1.57	0.00	0.00	0.47	0.00e	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	.50	.57	.00	.00	.00e	.33	.00	.00	.00	1.51	.09	.00
3	.00	.00	.00	.00e	.00	.69	.00	.12	.00	.00	.00	.73
4	.00	.00	.00	.40e	.35	.00	.00	.51	.00	.00	.00	.00
5	.00	.00	.00	.00e	.00	.00	.00	.10	.08	.00	.00	.00
6	.00	.00	.00	.45e	.00	.00	.00	.00	.00	.00	.31	.00
7	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.00	1.73	.00
8	.48	.00	2.03	.00e	.00	.00	.00	.00	.00	.00	1.16	.00
9	.00	.09	1.16	.65e	.00	.00	.00	.00	.00	.00	.20	.00
10	.00	.00	.46	.00e	.21	.00	.00	.31	.00	.00	.12	.00
11	.00	.00	.00	.00e	.00	.00	.59	.00	.00	.00	.00	.07
12	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00e	.00	.00	.00	.53	.00	.00	.00	.98
14	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.11	1.29	.00
15	.00	.00	.00	.00e	.00	.00	.16	.00	.00	.10	.00	.00
16	.00	.19	.00	.00e	.00	.00	.00	.00	.00	.00	3.11	.00
17	.00	.00	.00	.00e	.00	.15	.00	.00	.00	.00	.00	.00
18	1.12	.00	.00	.00e	.00	.71	.00	.00	.00	.00	.22	.00
19	.12	.00	.46	.00e	.55	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.08	.00e	.00	.00	.00	.00	.00	.00	.54	.00
21	.00	.00	.00	.15e	.00	.00	.11	.00	.00	.12	.00	.00
22	.00	.51	.00	.00e	.20	.00	.00	1.35	.46	.00	.00	.00
23	.00	.63	.00	.00e	.17	.00	.00	.42	.00	.00	4.23	.00
24	.00	.00	.00	.00e	.00	.00	.00	.00	1.04	.00	.57	.00
25	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.00	.29	.00
26	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00e	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00e	.00	.00	.00	1.29	.00	.71	.00	.00
29	.00	.12	.00	.00e	---	.72	.29	1.40	.00	.35	.00	.00
30	1.86	.00	.00	.00e	---	.00	.60	.00	.00	.33	.00	.00
31	.14	---	.00	1.03e	---	.00	---	.00	---	.21	.00	---
TOTAL	5.79	2.11	4.19	3.15	1.48	2.60	1.75	6.03	1.58	3.44	13.86	1.78

WATER YEAR TOTAL: 47.76

Table 8.--*Daily values of accumulated precipitation at site B3, July 1988-September 1990*

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County; in agricultural field adjacent to drainage canal, 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

GAGE.--Water-stage recorder on a standpipe rain collector. Recording interval was 15 minutes.

PERIOD OF RECORD.--July 1988 through September 1990.

REMARKS.--mi, mile; ---, missing data; e, estimated from National Weather Service gage at New Bern.

RAINFALL ACCUMULATED (INCHES), JULY-SEPTEMBER 1988
SUM VALUES

DAY	JULY	AUG	SEPT
1	0.00	0.00	0.00
2	.00	.25	.00
3	.00	.14	.00
4	.00	.00	.60
5	.00	.10	.28
6	.00	.00	.00
7	.00	.00	.00
8	.00	.00	.90
9	.00	.00	.39
10	.00	.49	.00
11	.00	.00	.00
12	.77	.00	.00
13	.00	.00	.00
14	.00	.12	.00
15	.00	.00	.39
16	.13	.00	.10
17	.00	.00	.00
18	.00	.00	.00
19	.00	.00	.00
20	.00	.20	.00
21	.00	.00	.00
22	.38	.00	.00
23	.20	.00	.00
24	.00	1.13	.00
25	.00	.00	.00
26	.00	.00	.00
27	.00	.07	.00
28	.19	.00	.00
29	.00	.00	.00
30	.00	.08	.00
31	.00	.00	---
TOTAL	1.67	2.58	2.66

JULY-SEPTEMBER 1988 TOTAL: 6.91

Table 8.--*Daily values of accumulated precipitation at site B3, July 1988-September 1990*--Continued

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County; in agricultural field adjacent to drainage canal, 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

GAGE.--Water-stage recorder on a standpipe rain collector. Recording interval was 15 minutes.

PERIOD OF RECORD.--July 1988 through September 1990.

REMARKS.--mi, mile; ---, missing data; e, estimated from National Weather Service gage at New Bern.

RAINFALL ACCUMULATED (INCHES), OCTOBER 1988-SEPTEMBER 1989
SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.00	0.50	0.00	0.78	0.08	0.00	0.00	1.01e	0.00	0.00	0.25	0.09
2	.00	.00	.00	.00	.00	.00	.00	.10e	.07	.00	.15	.97
3	.00	.00	.00	.43	.00	.29	.00	.00	.17	.00	.00	.16
4	.84	.16	.00	.00	.00	.00	.00	.00	.17	.12	.00	.00
5	.00	.28	.00	.00	.31	.00	.07	.00	.44	.96	.00	.08
6	.00	.00	.00	.24	.00	.13	.29	.48	.10	.00	.00	.00
7	.96	.00	.00	.00	.00	.08	.58	.00	.39	.25	.00	.00
8	.00	.00	.00	.00	.00	.82	.11	.00	.81	.37	.07	.08
9	.00	.00	.07	.00	.00	.00	.09	.09	.43	.00	1.01	.11
10	.00	.00	.00	.16	.00	.00	.23	1.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	1.16	.00	.07	.00	.00	.07
12	.00	.00	.00	.17	.00	.00	.00	.00	.22	.27	1.76	.10
13	.08	.00	.00	.11	.00	.61	.07	.26	.11	1.02	.85	.00
14	.08	.00	.00	.00	.00	.00	.09	.08	.00	.00	.00	.25
15	.07	.00	.00	.49	.00	.00	1.55	.62	.00	.00	.00	.46
16	.08	.00	.00	.00	.00	.36	.00	.00	.00	.89	.00	.35
17	.00	.00	.00	.00	.65	.00	.00	.00	.26	.18	.46	.00
18	.00	.00	.00	.00	1.34	.44	.00	.00	.08	.27	.16	.00
19	.43	.00	.11	.00	.00	.00	.00	.00	.32	.00	.34	.26
20	.00	.35	.00	.00	.00	.00	.00	.00	.07	.00	.09	.68
21	.28	.00	.00	.00	.82	.72	.00	.00	.57	.11	.00	.08
22	.00	.00	.00	.00	.17	.25	.08	.12	.51	.00	.00	.22
23	.00	.69	.00	.49	.15	1.20	.00	.17	.12	.00	.00	.00
24	.00	.00	.00	.00	.08	1.18	.00	.00	1.68	.00	.25	.00
25	.00	.00	.00	.11	.00	.00	.16	.00	.00	.00	.08	2.34
26	.00	.00	.00	.00	.00	.00	.14e	.00	.00	.00	.00	.08
27	.10	.16	.00	.15	.23	.00	.74e	.00	.00	.00	.08	.00
28	.15	2.10	.00	.07	.31	.00	.00e	.08	.00	.00	.07	.07
29	.00	.00	.00	.07	---	.08	.00e	.00	.00	.10	.00	.00e
30	.00	.00	.09	.00	---	.09	.19e	.00	.11	.00	.48	.64e
31	.00	---	.21	.12	---	.12	---	.00	---	.00	.07	---
TOTAL	3.07	4.24	0.48	3.39	4.14	6.19	5.83	4.01	6.70	4.54	6.17	7.09

WATER YEAR TOTAL: 55.85

Table 8.--*Daily values of accumulated precipitation at site B3, July 1988-September 1990--Continued*

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County; in agricultural field adjacent to drainage canal, 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

GAGE.--Water-stage recorder on a standpipe rain collector. Recording interval was 15 minutes.

PERIOD OF RECORD.--July 1988 through September 1990.

REMARKS.--mi, mile; ---, missing data; e, estimated from National Weather Service gage at New Bern.

RAINFALL ACCUMULATED (INCHES), OCTOBER 1989-SEPTEMBER 1990
SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	1.33e	0.00	0.00	0.59	0.00	0.00	0.13e	0.07	0.11	0.38	0.00	0.08
2	.73e	.00	.00	.00	.00	.00	.11	.17	.08	.07	.08	.08
3	.00e	.00	.00	.00	.00	.00	.00	.27	.00	.08	.08	1.65
4	.00e	.00	.00	.00	.39	.00	.00	.58	.20	.07	.00	.08
5	.00e	.00	.00	.00	.00	.00	.00	.12	.07	.07	.00	.00
6	.00e	.00	.00	.41	.43e	.00	.00	.00	.00	.10	.00	.00
7	.00e	.00	.00	.55	.06e	2.07	.16	.08	.00	.00	.95	.00
8	.38e	.00	1.68	.35e	.00e	.07	.00	.08	.00	.00	.15	.00
9	.00e	.26	.79	.00e	.00e	.00	.07	.00	.00	.28	1.40	.00
10	.00e	.00	.60	.00e	.15e	.08	.00	.67	.00	.07	.33	.99
11	.00e	.00	.00	.00e	.00e	.00	.84	.00	.00	.00	.00	.00
12	.00e	.07	.00	.00e	.00e	.00	.00	.00	.08	.00	.00	.00
13	.07e	.00	.00	.00e	.00e	.00	.00	.25	.09	.07	.00	.00
14	.00	.00	.00	.00e	.00e	.08	.00	.00	.00	.44	.33	.00
15	.08	.00	.00	.00e	.00	.10	.14	.00	.00	.11	.00	.00
16	.00	.17	.00	.00e	.00	.08	.09	.00	.07	1.18	.17	.09
17	.00	.00	.00	.00e	.00	.27	.00	.11	.08	.41	.13e	.00
18	1.53	.00	.00	.00e	.00	.49	.10	.00	.07	.00	.00	.00
19	.15	.00	.59	.00e	.00	.10	.00	.00	.46	.10	.00	.00
20	.07	.00	.00	.00	.00	.00	.08	.20	.08	.09	.88	.00
21	.00	.00	.00	.10	.00	.09	.19	.12	.00	.10	.00	.00
22	.00	.20	.00	.00	.00	.09	.00	1.20	.70	.00	.31	.00
23	.00	.51	.00	.00	.00	.00	.00	.00	.50	.11	.61	.00
24	.00	.00	.00	.07	.00	.00	.07	.10	.00	.14	.90	.00
25	.00	.00	.00	.00	.00	.00	.08	.00	.00	.08	.20	.00
26	.00	.00	.00	.42	.00	.00	.07	.00	.00	.00	.09	.00
27	.00	.00	.00	.00	.00	.00	.08	.18	.00	.24	.00	.00
28	.00	.00	.00	.09	.00	2.93	.08	.87	.10	.15	.07	.00
29	.00	.00	.00	.16	---	.00	.50	.83	.00	.31	.13	.00
30	.00	.00	.00	.10	---	.00e	.57	.08	.00	.00	.12	.00
31	.00	---	.12	.28	---	.54e	---	.09	---	.00	.07	---
TOTAL	4.34	1.21	3.78	3.12	1.03	6.99	3.36	6.07	2.69	4.65	7.00	2.97

WATER YEAR TOTAL: 47.21

Table 9.--Monthly water-level statistics at site H1, May 1988-September 1990

LOCATION.--Lat 35°26'44", long 76°22'25"; Hyde County, on left bank of agricultural drainage canal about 100 ft downstream from tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--May 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; NA, not applicable; ---, missing daily values precluded obtaining monthly and water year means. Values are in feet above or below (-) sea level; bottom of canal and point of zero flow is at elevation -0.46 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			May-September 1988			
May	0.70	1.19	0.30	0.84	0.56	0.27
June	.60	1.33	.07	.79	.46	.32
July	.29	.89	-.20	.42	.20	.22
August	.53	1.01	.01	.72	.38	.35
September	.75	1.28	.26	.92	.60	.32
			Water year 1989			
October	0.72	1.20	0.20	0.88	0.56	0.32
November	.53	1.47	.24	.72	.37	.35
December	.21	.58	.11[a]	.30	.17	.12
January	.40	1.02	.16	.51	.31	.20
February	.41	.94	.11[a]	.54	.32	.22
March	.95	1.61	.45	1.10	.82	.28
April	.76	1.14	.31	.92	.62	.29
May	.79	1.30	.32	.93	.68	.25
June	.46	.94	.14	.65	.30	.35
July	.66	1.08	.16	.83	.50	.33
August	.84	1.29	.39	.96	.73	.23
September	1.17	1.96[b]	.53	1.29	1.07	.22
Water year mean	0.66	NA	NA	0.80	0.54	0.26
			Water year 1990			
October	0.91	1.36	0.54	1.02	0.83	0.19
November	.69	1.31	.28	.77	.63	.14
December	.63	1.43	.31	.70	.58	.12
January	.51	.92	.37	.54	.48	.06
February	.52	.75	.40	.58	.46	.12
March	.60	1.39	.27	.74	.48	.26
April	.62	1.34	.16	.75	.49	.26
May	---	.90	.19	---	---	---
June	---	1.10	.15	---	---	---
July	.50	1.15	.08[a]	.69	.37	.33
August	.88	1.56[b]	.36	1.03	.76	.28
September	.95	1.26	.41	1.07	.84	.23
Water year mean	---	NA	NA	---	---	---

[a]Minimum value recorded for the water year.
[b]Maximum value recorded for the water year.

Table 10.--*Monthly water-level statistics at site H1A, October 1989-September 1990*

LOCATION.--Lat 35°26'48", long 76°22'18"; Hyde County, on left bank of agricultural drainage canal about 15 ft upstream of tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--October 1989 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above sea level; bottom of canal and point of zero flow is at elevation -0.50 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			Water year 1989			
October	---	1.17	0.23	---	---	---
November	0.54	1.65	.27	0.69	0.39	0.30
December	.26	.56	.16	.33	.22	.11
January	.44	.91	.21	.54	.36	.17
February	.46	.95	.17	.57	.38	.20
March	.99	1.59	.50	1.12	.87	.25
April	.78	1.18	.35	.91	.65	.26
May	.80	1.34	.32	.90	.70	.20
June	.43	.68	.15[a]	.54	.32	.23
July	.59	.96	.18	.67	.51	.16
August	.78	1.05	.39	.85	.71	.14
September	1.15	1.87[b]	.53	1.26	1.07	.19
Water year mean	---	NA	NA	---	---	---
			Water year 1990			
October	0.93	1.40	0.54	1.02	0.84	0.18
November	.73	1.33	.33	.81	.66	.14
December	.67	1.48	.36	.75	.61	.14
January	.56	1.07	.41	.60	.53	.08
February	.49	.74	.35	.58	.42	.16
March	.57	1.44	.29	.69	.47	.22
April	.64	1.38	.20	.76	.54	.21
May	.56	1.38	.14[a]	.70	.43	.26
June	.61	1.22	.17	.71	.53	.18
July	.40	.90	.14[a]	.48	.34	.13
August	.81	1.64[b]	.38	.93	.73	.20
September	.94	1.29	.45	1.03	.86	.17
Water year mean	0.66	NA	NA	0.75	0.58	0.17

[a]Minimum value recorded for the water year.
[b]Maximum value recorded for the water year.

Table 11.--*Monthly water-level statistics at site H2, May 1988-September 1990*

LOCATION.--Lat 35°26'57", long 76°22'37"; Hyde County, on right bank of agricultural drainage canal without tide gage; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

DRAINAGE AREA.--Approximately 140 acres (0.219 mi^2).

PERIOD OF RECORD.--May 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above or below (-) sea level; bottom of canal and point of zero flow is at elevation -1.42 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			May-September 1988			
May	---	1.43	-0.62	---	---	---
June	0.63	1.62	-.40	0.95	0.29	0.67
July	.29	1.02	-.63	.62	-.01	.62
August	.51	1.39	-.66	.92	.13	.78
September	.73	1.35	-.35	1.02	.43	.58
			Water year 1989			
October	0.68	1.40	-0.39	0.98	0.35	0.63
November	.44	1.28	-.70[a]	.78	.07	.72
December	.06	.72	-.70[a]	.35	-.28	.63
January	.23	1.21	-.70[a]	.55	-.13	.68
February	.27	1.17	-.69	.62	-.09	.71
March	.80	1.73	-.69	1.12	.40	.72
April	.57	1.22	-.70[a]	.95	.12	.83
May	.65	1.63	-.49	1.04	.22	.82
June	.41	1.07	-.50	.81	-.02	.83
July	.61	1.43	-.52	.97	.23	.74
August	.81	1.56	-.08	1.11	.47	.64
September	1.11	2.29[b]	-.09	1.41	.76	.65
Water year mean	0.55	NA	NA	0.89	0.18	0.72
			Water year 1990			
October	0.82	1.37	-0.10	1.09	0.54	0.55
November	.54	1.49	-.69	.84	.15	.69
December	.34	1.58	-.70[a]	.67	-.04	.71
January	.09	1.01	-.70[a]	.39	-.26	.65
February	.22	.82	-.70[a]	.56	-.24	.79
March	.43	1.14	-.69	.74	.03	.71
April	.48	1.23	-.70[a]	.82	.08	.74
May	.55	1.65[b]	-.70[a]	.97	.09	.88
June	.65	1.38	-.68	.99	.28	.71
July	.46	1.38	-.68	.86	.10	.76
August	.76	1.58	-.21	1.08	.39	.69
September	.90	1.42	.07	1.17	.58	.59
Water year mean	0.52	NA	NA	0.85	0.14	0.71

[a] Minimum value recorded for the water year.
[b] Maximum value recorded for the water year.

Table 12.--*Monthly water-level statistics at site H3, May 1988-September 1990*

LOCATION.--Lat 35°27'01", long 76°22'49"; Hyde County, on left bank of agricultural drainage canal without tide gage; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458800.

DRAINAGE AREA.--Approximately 104 acres (0.162 mi^2).

PERIOD OF RECORD.--May 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above or below (-) sea level; bottom of canal and point of zero flow is at elevation -0.92 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			May-September 1988			
May	0.63	1.32	0.06	0.93	0.31	0.62
June	.58	1.51	.02	.88	.33	.54
July	---	.89	-.13	---	---	---
August	---	1.15	-.18	---	---	---
September	---	1.25	-.02	---	---	---
			Water year 1989			
October	---	1.34	-0.33	---	---	---
November	0.41	1.24	-.54	0.75	0.06	0.69
December	.01	.67	-.55[a]	.30	-.30	.60
January	.19	1.17	-.53	.51	-.13	.64
February	.24	1.15	-.52	.58	-.10	.68
March	.80	1.71	-.32	1.10	.42	.68
April	.59	1.20	-.50	.93	.17	.76
May	.64	1.60	-.45	1.04	.23	.80
June	.41	1.05	-.47	.80	.01	.79
July	.61	1.39	-.42	.95	.27	.69
August	.80	1.56	.03	1.10	.50	.61
September	1.12	2.31[b]	-.02	1.42	.78	.64
Water year mean	---	NA	NA	---	---	---
			Water year 1990			
October	0.82	1.37	-0.08	1.09	0.55	0.54
November	.55	1.50	-.49	.84	.19	.64
December	.30	1.57	-.51[a]	.63	-.04	.67
January	.09	1.01	-.50	.38	-.22	.61
February	.22	.83	-.49	.55	-.18	.73
March	.43	1.13	-.49	.73	.06	.68
April	.48	1.23	-.49	.81	.12	.70
May	.56	1.62[b]	-.50	.95	.14	.81
June	.64	1.37	-.39	.97	.33	.65
July	.46	1.35	-.49	.85	.13	.71
August	.76	1.61	-.17	1.07	.41	.66
September	.89	1.43	.04	1.17	.58	.58
Water year mean	0.52	NA	NA	0.84	0.17	0.67

[a] Minimum value recorded for the water year.
[b] Maximum value recorded for the water year.

Table 13.--*Monthly water-level statistics at site B1, August 1988-September 1990*

LOCATION.--Lat 35°18'41", long 76°43'28"; Beaufort County, on right bank of agricultural drainage canal about 100 ft downstream from flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--August 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above sea level; bottom of canal was at elevation 1.93 ft and point of zero flow or the vertex of the V-notch weir was at elevation 2.33 ft prior to installation of control; point of zero flow changed to elevation 2.85 ft with control installed on November 13, 1989. Control was removed on January 19, 1990, due to scouring. New control installed February 21, 1990, and point of zero flow became 2.73.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
August-September 1988						
August	---	1.93	1.93	---	---	---
September	2.03	2.38	1.93	2.06	2.02	0.03
Water year 1989						
October	2.01	2.05	1.98	2.02	2.01	0.01
November	1.99	3.54	1.93[a]	2.03	1.97	.06
December	---	2.41	2.36	---	---	---
January	---	2.67	2.37	2.48	2.45	.03
February	2.57	3.22	2.40	2.62	2.53	.09
March	---	4.14[b]	2.48	2.85	2.64	.21
April	---	---	---	---	---	---
May	---	3.22	2.21	---	---	---
June	2.25	4.08	1.99	2.33	2.20	.13
July	2.31	3.06	2.06	2.37	2.26	.11
August	2.20	2.62	2.06	2.22	2.17	.05
September	2.34	3.53	1.97	2.44	2.27	.18
Water year mean	---	NA	NA	---	---	---
Water year 1990						
October	2.47	3.17	2.26	2.51	2.41	0.10
November	2.77	2.97	2.44	2.80	2.74	.06
December	2.73	3.52	2.41	2.79	2.68	.11
January	2.54	3.21	2.37	2.60	2.49	.10
February	2.58	3.11	2.36	2.62	2.56	.06
March	2.90	3.97[b]	2.76	2.97	2.86	.12
April	2.84	3.40	2.66	2.87	2.82	.05
May	2.81	3.18	2.67	2.85	2.77	.08
June	---	2.97	2.18	2.63	2.57	.07
July	---	2.90	2.06	---	---	---
August	2.27	3.45	2.05[a]	2.32	2.26	.07
September	2.64	3.10	2.06	2.67	2.60	.07
Water year mean	---	NA	NA	---	---	---

[a]Minimum value recorded for the water year.
[b]Maximum value recorded for the water year.

Table 14.--*Monthly water-level statistics at site B1A, December 1988-September 1990*

LOCATION.--Lat 35°18'44", long 76°43'35"; Beaufort County, on left bank of agricultural drainage canal about 75 ft upstream of flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--December 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ---, missing daily values during the month precluded obtaining monthly mean; NA, not applicable. Values are in feet above sea level; bottom of canal and point of zero flow is at elevation 1.24 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			December 1988-September 1989			
December	2.27	2.42	2.14	2.28	2.27	0.01
January	2.46	2.68	2.23	2.48	2.44	.04
February	2.56	3.30	2.39	2.61	2.52	.09
March	2.74	4.55	2.38	2.86	2.65	.21
April	2.48	3.58	2.30	2.57	2.41	.16
May	2.44	3.38	2.23	2.52	2.38	.14
June	---	4.55	1.95	---	---	---
July	---	3.21	2.19	---	---	---
August	2.32	2.69	2.00	2.35	2.29	.06
September	2.50	3.80	2.24	2.61	2.43	.18
			Water year 1990			
October	2.49	3.31	2.34	2.54	2.43	0.10
November	2.77	3.07	2.41	2.81	2.74	.08
December	2.80	3.74	2.47	2.88	2.75	.12
January	2.59	3.37	2.39	2.66	2.54	.12
February	2.60	3.11	2.38	2.64	2.58	.07
March	2.89	4.42[a]	2.75	2.99	2.85	.14
April	2.82	3.47	2.65	2.84	2.80	.05
May	2.79	3.19	2.65	2.83	2.76	.08
June	2.60	2.96	2.05	2.63	2.56	.07
July	1.89	2.87	1.24[b]	1.99	1.83	.16
August	1.79	3.48	1.24[b]	1.93	1.72	.21
September	2.57	3.04	1.70	2.61	2.53	.08
Water year mean	2.55	NA	NA	2.61	2.51	0.11

[a]Maximum value recorded for the water year.
[b]Minimum value recorded for the water year.

Table 15.--*Monthly water-level statistics at site B2, May 1988-September 1990*

LOCATION.--Lat 35°17'20", long 76°41'45"; Beaufort County, on right bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455143.

DRAINAGE AREA.--Approximately 47 acres (0.074 mi^2).

PERIOD OF RECORD.--May 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above sea level; bottom of canal is at elevation 0.79 ft; point of zero flow is at elevation 1.08 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			May-September 1988			
May	1.27	2.04	1.22	1.34	1.26	0.08
June	1.28	2.09	1.17	1.38	1.24	.14
July	---	1.38	1.17	---	---	---
August	1.06	1.47	.80	1.11	1.04	.07
September	1.14	1.85	.81	1.29	1.04	.25
			Water year 1989			
October	1.06	1.88	0.80	1.17	0.99	0.18
November	.98	2.72	.79[a]	1.04	.91	.13
December	1.24	1.51	1.17	1.25	1.23	.02
January	1.42	1.58	1.21	1.45	1.39	.06
February	1.39	2.05	1.18	1.44	1.34	.10
March	1.68	3.67[b]	1.43	1.83	1.58	.25
April	1.55	3.06	1.24	1.71	1.44	.27
May	1.37	2.02	1.07	1.43	1.32	.11
June	---	3.11	.98	---	---	---
July	---	1.74	.96	---	---	---
August	1.21	1.98	.92	1.37	1.11	.27
September	1.47	2.73	.94	1.79	1.25	.54
Water year mean	---	NA	NA	---	---	---
			Water year 1990			
October	1.33	1.97	1.07	1.47	1.24	0.23
November	1.36	1.78	1.21	1.41	1.32	.09
December	1.51	3.10	1.18	1.61	1.45	.17
January	1.47	2.27	1.29	1.51	1.43	.07
February	1.38	1.53	1.25	1.41	1.36	.05
March	1.40	3.29[b]	1.19	1.52	1.34	.19
April	1.33	2.04	1.12	1.37	1.29	.07
May	1.30	1.95	1.08	1.41	1.23	.17
June	1.15	1.63	.98	1.27	1.11	.17
July	1.08	1.63	.89[a]	1.20	1.02	.17
August	1.17	1.72	.97	1.32	1.11	.21
September	1.27	1.94	.95	1.44	1.19	.26
Water year mean	---	NA	NA	---	---	---

[a]Minimum value recorded for the water year.
[b]Maximum value recorded for the water year.

Table 16.--*Monthly water-level statistics at site B3, May 1988-September 1990*

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

DRAINAGE AREA.--Approximately 68 acres (0.107 mi^2).

PERIOD OF RECORD.--May 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above or below (-) sea level; bottom of canal and point of zero flow is at elevation -0.11 ft.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			May-September 1988			
May	---	1.98	0.29	---	---	---
June	0.75	2.01	.12	1.08	0.50	0.58
July	.37	1.36	-.11	.55	.23	.32
August	.66	1.46	.01	.95	.40	.55
September	.97	1.83	.17	1.28	.70	.58
			Water year 1989			
October	0.93	1.85	0.24[a]	1.18	0.68	0.50
November	.72	2.90	.25	1.00	.48	.52
December	.43	1.20	.27	.58	.35	.23
January	.62	1.52	.37	.79	.49	.31
February	.69	1.59	.31	.88	.56	.32
March	1.30	2.90	.65	1.53	1.12	.41
April	1.06	2.23	.52	1.31	.88	.44
May	.82	1.62	.37	.95	.70	.25
June	.61	3.02[b]	.26	.82	.49	.33
July	---	1.29	.42	---	---	---
August	---	1.62	.40	---	---	---
September	1.40	2.70	.63	1.71	1.14	.57
Water year mean	---	NA	NA	---	---	---
			Water year 1990			
October	1.09	1.96	0.52	1.36	0.88	0.48
November	---	1.73	.54	.96	.72	.24
December	---	1.18	.80	---	---	---
January	.75	1.33	.58	.80	.71	.08
February	.88	1.33	.73	.96	.82	.14
March	1.01	2.83[b]	.48	1.20	.87	.33
April	.80	1.67	.37	1.04	.63	.42
May	.78	1.91	.31	1.09	.59	.50
June	.86	1.54	.25	1.14	.65	.49
July	.67	1.59	.17[a]	.97	.47	.50
August	.98	1.69	.36	1.30	.72	.58
September	1.13	2.20	.45	1.44	.86	.57
Water year mean	---	NA	NA	---	---	---

[a]Minimum value recorded for the water year.
[b]Maximum value recorded for the water year.

Table 17.--*Monthly water-level statistics at site C1, May 1988-September 1990*

LOCATION.--Lat 35°17'13", long 76°41'13"; Beaufort County, on right bank of Campbell Creek, which receives inflow from sites B2 and B3; on State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455145.

DRAINAGE AREA.--Approximately 5,120 acres (8 mi^2).

PERIOD OF RECORD.--May 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, missing daily values precluded obtaining monthly and water year means; NA, not applicable. Values are in feet above or below (-) sea level.

Period	Mean	Maximum recorded	Minimum recorded	Daily maximum mean	Daily minimum mean	Daily mean range
			May-September 1988			
May	---	2.04	0.33	---	---	---
June	---	2.06	-.14	---	---	---
July	---	1.35	-.76	---	---	---
August	---	1.45	.13	---	---	---
September	0.94	1.83	-.27	1.25	0.62	0.63
			Water year 1989			
October	0.88	1.84	-0.26	1.15	0.57	0.58
November	.58	1.21	-1.00[a]	.90	.21	.70
December	.24	1.20	-.70	.55	-.13	.67
January	.46	1.53	-.56	.76	.08	.68
February	.52	1.64	-.35	.87	.19	.68
March	1.10	2.41	-.53	1.43	.73	.69
April	.82	1.66	-.75	1.20	.42	.79
May	.77	1.52	-.25	1.13	.34	.79
June	.47	1.45	-.62	.84	.08	.76
July	.76	1.51	-.43	1.13	.36	.77
August	1.00	1.97	.19	1.30	.70	.59
September	1.37	2.70[b]	.49	1.72	1.01	.71
Water year mean	0.75	NA	NA	1.08	0.38	0.70
			Water year 1990			
October	1.04	1.79	-0.18	1.33	0.75	0.58
November	.68	1.76	-.83	1.01	.33	.69
December	.56	2.35[b]	-.94	.90	.20	.70
January	.20	.94	-.86	.54	-.19	.73
February	.35	1.31	-1.00[a]	.74	-.07	.80
March	.65	1.79	-.50	.98	.31	.67
April	.66	1.46	-.41	1.03	.30	.73
May	.66	1.91	-.77	1.07	.22	.86
June	.78	1.59	-.22	1.11	.43	.68
July	.61	1.63	-.60	.96	.29	.67
August	---	1.70	.06	---	---	---
September	1.08	1.78	.16	1.39	.77	.62
Water year mean	---	NA	NA	---	---	---

[a] Minimum value recorded for the water year.
[b] Maximum value recorded for the water year.

Table 18.--*Daily mean values of discharge at site H1, April 1989-September 1990*

LOCATION.--Lat 35°26'44", long 76°22'25"; Hyde County, on left bank of agricultural drainage canal about 100 ft downstream from tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ---, no data or water level below velocity probe thus discharge could not be computed; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, APRIL-SEPTEMBER 1989

DAY	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	0.36	---	0.079	0.053	---
2	---	.21	0.041	.065	---	---
3	---	.17	.062	.052	---	---
4	---	.17	---	.058	---	---
5	---	.17	---	.063	---	---
6	---	.15	---	.051	---	---
7	---	.10	.013	.032	---	---
8	---	.091	.023	.037	---	---
9	---	.082	.012	.062	---	---
10	---	.091	---	.036	---	---
11	---	.084	.017	---	---	---
12	---	.074	.024	.016	---	---
13	---	.065	.032	---	---	---
14	---	.042	---	---	---	---
15	---	.039	---	.059	---	---
16	---	.035	---	.075	---	---
17	---	.032	---	.043	---	---
18	---	.036	---	.071	---	---
19	---	.040	---	---	---	---
20	---	.038	-.10	---	---	---
21	---	.10	.093	.073	---	---
22	0.062	.067	.033	.082	---	---
23	.048	.14	.035	.076	---	---
24	.044	.039	.047	.067	---	---
25	.032	.095	.059	.080	---	---
26	.024	.098	.045	.064	---	---
27	.050	.093	.038	.041	---	---
28	.091	.13	.032	---	---	---
29	.12	.036	---	.048	---	---
30	.11	.074	.073	.064	---	---
31	---	.045	---	.039	---	---
TOTAL	---	2.996	---	---	---	---
MEAN	---	.097	---	---	---	---
MAX	---	.36	---	---	---	---
MIN	---	.032	---	---	---	---
CFSM	---	.89	---	---	---	---
IN.	---	1.03	---	---	---	---

Table 18.--*Daily mean values of discharge at site H1, April 1989-September 1990*--Continued

LOCATION.--Lat 35°26'44", long 76°22'25"; Hyde County, on left bank of agricultural drainage canal about 100 ft downstream from tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ---, no data or water level below velocity probe thus discharge could not be computed; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1989-SEPTEMBER 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.062	---	0.009	0.031	0.024	0.026	0.052	0.003	---	-0.013	0.012	0.025
2	.61	---	.007	.013	.013	.32	.69	.002	0.059	-.024	-.015	.012
3	.76	0.058	.007	.018	.003	.67	.52	.004	.038	-.023	-.023	.004
4	.069	.055	.003	.020	.001	-.003	.41	.004	.011	-.016	-.013	.008
5	.067	.053	.004	.021	-.003	.067	.29	.002	.020	---	-.003	.000
6	.045	.045	.004	.022	-.007	.019	.31	---	---	-.004	.003	.001
7	.032	.037	.005	.025	---	.008	.17	.006	---	-.004	.008	-.005
8	.057	.033	.015	.022	---	-.015	-.036	.003	---	.000	.024	-.011
9	.052	---	.011	.029	---	-.011	-.042	---	.042	-.001	.025	-.015
10	.053	---	.014	.029	---	.011	.078	.007	-.021	---	.028	-.013
11	.042	.038	.026	.028	---	.015	.12	---	---	---	.026	-.027
12	---	.029	.053	.022	---	.020	.088	.008	---	---	.024	-.037
13	---	.032	.048	.015	---	.060	.018	---	---	---	.024	-.034
14	---	.029	.043	.014	.018	.15	.034	---	---	---	.018	-.064
15	---	.027	.046	.015	.051	.15	.10	---	.047	.004	.025	-.072
16	---	.026	.030	.015	.076	.023	.091	---	.047	---	---	-.10
17	---	.018	.024	.014	.077	.035	---	---	.037	.004	.054	-.098
18	---	.015	.022	.015	.040	.062	.077	---	.023	.004	.033	-.085
19	---	.011	.022	.013	.14	.030	.10	---	.008	---	.024	-.069
20	---	.009	.025	.012	.28	.013	.032	---	.005	---	.017	-.022
21	---	.004	.023	.015	.20	.017	---	-.23	-.001	---	.021	.022
22	---	.007	.015	.013	.43	.026	---	.008	-.006	---	.018	.024
23	---	.020	.014	.011	.59	.016	---	.009	-.010	---	.019	.012
24	---	.022	.020	.012	.48	.074	---	.005	-.016	.007	.012	.007
25	---	.019	.024	.015	-.007	.13	---	.015	-.035	.010	.002	.014
26	---	.018	.019	.018	-.007	.071	---	.019	-.041	.011	-.005	.014
27	---	.017	.011	.015	.000	.12	---	.010	-.039	.013	-.010	.018
28	---	.016	.009	.013	-.026	.24	.000	.011	-.034	.012	-.013	.032
29	---	.018	.011	.016	---	.10	.000	---	-.021	.014	-.016	.026
30	---	.014	.013	.019	---	-.039	---	---	---	.015	-.020	.021
31	---	---	.022	.021	---	.17	---	---	---	.016	-.009	---
TOTAL	---	---	0.599	0.561	---	2.575	---	---	---	---	---	-0.412
MEAN	---	---	.019	.018	---	.083	---	---	---	---	---	-.014
MAX	---	---	.053	.031	---	.67	---	---	---	---	---	.032
MIN	---	---	.003	.011	---	-.039	---	---	---	---	---	-.10
CFSM	---	---	.18	.17	---	.76	---	---	---	---	---	-.13
IN.	---	---	.21	.19	---	.88	---	---	---	---	---	-.14

Table 19.--*Daily mean values of discharge at site H2, April-August 1989 and March-September 1990*

LOCATION.--Lat 35°26'57", long 76°22'37"; Hyde County, on right bank of agricultural drainage canal without tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

DRAINAGE AREA.--140 acres (0.219 mi^2).

PERIOD OF RECORD.--April through August 1989; March through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction. Tide gate installed August 16, 1990.

DISCHARGE, CUBIC FEET PER SECOND, APRIL-AUGUST 1989

DAY	APR	MAY	JUNE	JULY	AUG
1	---	---	---	-0.006	0.016
2	---	0.65	---	-.005	.11
3	---	.46	---	.001	.21
4	---	.45	---	.057	.099
5	---	.62	---	.077	.023
6	---	.38	---	.17	.068
7	---	.26	0.025	.30	.033
8	---	.19	.055	.30	-.026
9	---	.59	.064	.081	-.010
10	---	1.1	.062	.096	-.075
11	---	.54	-.012	.099	-.051
12	---	.56	-.012	.018	-.013
13	---	.52	.013	-.033	1.1
14	---	.56	.002	.037	.63
15	---	.75	-.008	-.019	.37
16	---	.35	-.009	-.035	1.6
17	---	.072	-.009	-.013	.61
18	---	.072	.023	.061	.21
19	---	.21	.010	.31	.38
20	---	.13	.013	.031	1.3
21	---	.14	.031	-.029	1.2
22	0.17	.10	.076	.20	.60
23	.020	.17	.14	.19	.53
24	.35	-.11	.19	.19	.32
25	.95	-.10	.19	.012	.15
26	.83	.06	.13	-.035	.083
27	---	-.014	.16	-.010	.062
28	---	---	.057	.012	.12
29	---	---	.061	-.024	.099
30	---	---	.034	-.005	---
31	---	---	---	.008	---
TOTAL	---	---	---	2.036	---
MEAN	---	---	---	.066	---
MAX	---	---	---	.31	---
MIN	---	---	---	-.035	---
CFSM	---	---	---	.30	---
IN.	---	---	---	.35	---

Table 19.--*Daily mean values of discharge at site H2, April-August 1989 and March-September 1990*--Continued

LOCATION.--Lat 35°26'57", long 76°22'37"; Hyde County, on right bank of agricultural drainage canal without tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

DRAINAGE AREA.--140 acres (0.219 mi^2).

PERIOD OF RECORD.--April through August 1989; March through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction. Tide gate installed August 16, 1990.

DISCHARGE, CUBIC FEET PER SECOND, MARCH-SEPTEMBER 1990

DAY	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.69	---	0.54	2.5	---	1.7	---
2	.58	---	.42	.90	---	---	---
3	.54	---	.47	.61	---	---	---
4	.45	---	.37	.22	---	---	---
5	.56	---	.20	.039	---	---	---
6	.44	---	.21	-.15	-2.4	---	---
7	.52	---	.34	-.21	-2.7	---	---
8	.54	---	.22	-.30	-2.6	---	---
9	.36	---	.21	-.26	-2.2	---	---
10	.26	---	.11	.66	-1.9	---	---
11	.26	---	.11	1.2	-1.1	---	---
12	.20	---	.20	1.5	.78	---	---
13	.14	---	.11	1.3	1.1	---	-0.039
14	.13	---	.18	1.2	2.3	---	.059
15	---	---	.32	1.5	2.2	---	.41
16	---	---	.40	2.6	2.3	---	.46
17	---	---	.38	2.6	1.8	---	.62
18	---	---	.51	2.1	1.5	---	.23
19	1.3	---	.74	1.6	1.8	---	.27
20	.82	---	1.0	2.2	2.1	---	.62
21	.93	---	1.9	2.8	.97	---	.81
22	.97	---	2.7	2.6	.30	---	.75
23	1.3	---	3.0	1.8	.35	---	.46
24	1.7	---	3.1	1.6	.46	---	-.11
25	1.9	---	3.2	2.5	.52	---	.015
26	2.0	---	3.2	1.8	.42	---	.30
27	2.1	---	1.9	---	.37	---	.35
28	2.2	0.57	2.0	---	.37	---	-.032
29	2.2	.56	2.1	---	.40	---	-.045
30	1.5	.55	3.1	---	2.1	---	.16
31	---	---	4.2	---	2.6	---	---
TOTAL	---	---	37.44	---	---	---	---
MEAN	---	---	1.21	---	---	---	---
MAX	---	---	4.2	---	---	---	---
MIN	---	---	.11	---	---	---	---
CFSM	---	---	5.51	---	---	---	---
IN.	---	---	6.36	---	---	---	---

Table 20.--*Daily mean values of discharge at site H3, April 1989-September 1990*

LOCATION.--Lat 35°27'01", long 76°22'49"; Hyde County, on left bank of agricultural drainage canal without tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458800.

DRAINAGE AREA.--Approximately 104 acres (0.162 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, APRIL-SEPTEMBER 1989

DAY	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	---	-0.014	0.052	0.14	---
2	---	---	.013	-.050	-.094	---
3	---	---	-.24	.008	-.11	---
4	---	---	.18	.007	.030	---
5	---	---	.59	-.21	.048	---
6	---	---	.58	-.30	.22	---
7	---	---	.33	-.32	.17	---
8	---	---	.35	-.25	.56	---
9	---	---	.055	-.033	.28	---
10	---	---	-.22	.023	.24	---
11	---	---	.35	.017	.24	---
12	---	---	-.56	-.070	.010	---
13	---	---	-1.1	-.27	.13	---
14	---	---	---	-.17	.32	---
15	---	---	---	-.044	.21	---
16	---	---	---	-.40	.23	---
17	---	---	---	-.28	.32	---
18	---	---	---	-.29	.073	---
19	---	---	---	---	-.094	---
20	---	---	---	---	.17	---
21	---	---	---	---	.22	---
22	0.35	---	.037	-.073	.23	---
23	.36	---	.034	.089	.18	---
24	.42	---	-.008	.13	-.005	---
25	.39	1.5	.071	.083	.032	---
26	.29	1.8	.049	.15	.088	---
27	.37	.96	.045	.098	.15	---
28	.37	-.28	.099	.12	-.017	---
29	.39	.50	.070	.16	-.011	0.14
30	-.33	.15	.093	.14	---	-.11
31	---	-.13	---	.15	---	---
TOTAL	---	---	---	---	---	---
MEAN	---	---	---	---	---	---
MAX	---	---	---	---	---	---
MIN	---	---	---	---	---	---
CFSM	---	---	---	---	---	---
IN.	---	---	---	---	---	---

Table 20.--*Daily mean values of discharge at site H3, April 1989-September 1990*--Continued

LOCATION.--Lat 35°27'01", long 76°22'49"; Hyde County, on left bank of agricultural drainage canal without tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458800.

DRAINAGE AREA.--Approximately 104 acres (0.162 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1989-SEPTEMBER 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.10	---	-0.58	0.50	-0.32	0.48	-0.028	-1.8	---	0.16	1.3	---
2	.75	---	-.54	.10	---	1.2	.14	-2.1	0.29	.15	1.3	---
3	.31	---	---	.050	.91	.72	.14	-3.3	.25	.17	1.2	---
4	-.17	---	---	.081	---	.87	.20	-2.9	.21	.081	1.0	---
5	-.008	---	---	.004	---	.75	.19	-2.1	.19	-.049	.72	---
6	.055	---	-.59	.020	---	.40	.42	---	.18	.000	.77	---
7	.090	---	-.78	.045	1.0	-2.5	.29	---	.22	.077	.68	---
8	.11	---	1.6	.28	1.1	-1.5	.31	---	.28	.058	.78	---
9	.11	---	.47	.11	1.1	.54	.46	---	.27	.034	.75	---
10	-.19	---	.27	.10	1.1	.16	-.061	---	.30	.030	.59	---
11	-.21	---	.11	.15	1.4	1.1	.36	---	.47	-.098	.47	---
12	---	---	-.034	.060	1.1	1.1	.29	---	.65	.49	.48	---
13	---	---	-.049	.024	1.3	1.3	.31	---	.75	.48	.41	0.55
14	---	---	-.13	.010	1.6	1.3	.47	---	.75	.63	.22	.20
15	---	---	1.1	-.060	1.6	.41	.44	---	.61	.67	.23	.36
16	---	---	-.051	-.074	1.4	-2.3	-.087	---	.83	.58	---	.62
17	---	0.10	-.25	-.091	1.3	-3.9	.42	---	.76	.68	---	.51
18	---	.12	-.20	-.17	1.8	-1.3	-1.8	---	.68	.67	---	.53
19	---	-.005	-.10	-.29	1.5	.61	-3.0	---	.56	.70	---	.53
20	---	.048	-.069	-.33	1.4	.49	-.39	---	.56	.67	---	.51
21	---	---	-.046	-.33	1.6	.83	.10	---	.52	.66	---	.58
22	---	-.42	-.009	-.36	1.3	.58	.33	---	.49	.72	---	.53
23	---	-.078	-.064	-.35	1.2	.60	.50	---	.40	.86	---	.48
24	---	-.34	-.14	-.38	.69	-.098	.52	---	.37	.95	---	.41
25	---	-.29	-.14	.97	---	.32	.40	---	.39	1.1	---	.40
26	---	-.33	-.20	---	1.0	1.2	.19	---	.35	1.1	---	.37
27	---	-.51	-.18	---	1.0	-1.4	-.63	---	.28	1.2	---	.38
28	---	-.52	-.15	-.31	1.0	-4.4	-.71	---	.24	1.3	---	---
29	---	-1.1	-.052	-.21	---	-4.1	-1.5	---	.20	1.4	---	---
30	---	-.62	.10	---	---	.31	-1.6	---	.16	1.4	---	---
31	---	---	.37	---	---	.27	---	---	---	1.2	---	---
TOTAL	---	---	---	---	---	-5.958	-3.326	---	---	18.073	---	---
MEAN	---	---	---	---	---	-.19	-.11	---	---	.58	---	---
MAX	---	---	---	---	---	1.3	.52	---	---	1.4	---	---
MIN	---	---	---	---	---	-4.4	-3.0	---	---	-.098	---	---
CFSM	---	---	---	---	---	-1.19	-.68	---	---	3.60	---	---
IN.	---	---	---	---	---	-1.37	-.76	---	---	4.15	---	---

Table 21.--*Daily mean values of discharge at site B1, October 1988-September 1990*

LOCATION.--Lat 35°18'41", long 76°43'28"; Beaufort County, on right bank of agricultural drainage canal about 100 ft downstream from flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--October 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ---, no data; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1988-SEPTEMBER 1989

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.000	0.000	0.006	---	0.009	0.98	---	0.77	0.000	0.002	0.000	0.000
2	.000	.000	.004	0.003	.009	.48	---	2.0	.000	.000	.000	.000
3	.000	.000	.002	.013	.007	.65	---	.60	.000	.000	.000	.000
4	.000	.000	---	.015	.007	.68	---	.041	.000	.000	.000	.000
5	.000	.000	---	.012	.008	.35	---	.012	.000	.000	.000	.000
6	.000	.000	---	.017	.009	.23	---	.055	.000	.000	.000	.000
7	.000	.000	---	.020	.015	.11	---	---	.000	.000	.000	.000
8	.000	.000	---	.021	.016	1.0	---	---	.000	.000	.000	.000
9	.000	.000	---	.016	.015	1.4	---	---	.000	.000	.000	.000
10	.000	.000	---	.015	.013	.61	---	---	.000	.000	.000	.000
11	.000	.000	---	.015	.013	.21	---	.63	.000	.000	.000	.000
12	.000	.000	---	.080	.009	.073	---	.065	.000	.000	.008	.000
13	.000	.000	---	.12	.007	.41	---	.028	.000	.83	.25	.000
14	.000	.000	---	.11	.007	1.4	---	.011	.000	1.3	.34	.000
15	.000	.000	---	.63	.005	.55	---	.58	.000	.15	.041	.44
16	.000	.000	---	.60	.005	.48	---	.42	.000	.50	.005	.66
17	.000	.000	---	.26	.007	.49	---	---	.000	.92	.000	.12
18	.000	.000	---	.10	1.1	.23	---	---	.000	.76	.011	.005
19	.000	.000	---	.051	2.1	.66	---	---	.000	.51	.009	.061
20	.000	.000	---	.034	1.0	.17	---	---	.000	.024	.002	1.4
21	.000	.000	---	.021	2.0	.95	---	---	.000	.016	.000	.93
22	.000	.000	---	.015	2.6	1.7	---	---	.11	.042	.000	.91
23	.000	.000	---	.065	1.2	3.5	---	---	.095	.006	.000	.10
24	.000	.000	---	.15	1.6	9.7	---	.003	3.0	.000	.000	.003
25	.000	.000	---	.076	1.2	2.6	---	.002	3.0	.000	.000	1.7
26	.000	.000	---	.045	1.1	.77	---	.001	1.2	.000	.000	4.7
27	.000	.000	---	.037	.75	.28	---	.000	.23	.000	.000	2.5
28	.000	.95	---	.021	1.7	.065	---	.000	.17	.000	.000	.97
29	.000	.029	---	.015	---	---	---	.000	.062	.000	.000	.33
30	.000	.011	---	.015	---	---	---	.000	.006	.000	.000	.073
31	.000	---	---	.014	---	---	---	.000	---	.000	.000	---
TOTAL	.0000	.990	---	---	16.511	---	---	---	7.873	5.0600	.666	14.902
MEAN	.000	.033	---	---	.59	---	---	---	.26	.16	.021	.50
MAX	.000	.95	---	---	2.6	---	---	---	3.0	1.3	.34	4.7
MIN	.000	.000	---	---	.005	---	---	---	.000	.000	.000	.000
CFSM	.00	.23	---	---	4.05	---	---	---	1.80	1.12	.15	3.41
IN.	.00	.25	---	---	4.22	---	---	---	2.01	1.29	.17	3.81

Table 21.--*Daily mean values of discharge at site B1, October 1988-September 1990*--Continued

LOCATION.--Lat 35°18'41", long 76°43'28"; Beaufort County, on right bank of agricultural drainage canal about 100 ft downstream from flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--October 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1989-SEPTEMBER 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	1.8	0.40	0.005	2.6	0.39	0.048	1.7	0.004	0.032	---	0.000	0.000
2	3.2	.24	.005	1.0	.099	.048	1.1	.003	.012	---	.000	.000
3	2.0	1.9	.004	.46	.055	.58	.98	.002	.006	---	.000	.29
4	.84	.72	.003	.23	.11	.58	.78	.007	.025	---	.000	.74
5	.30	.21	.003	.12	.23	.30	.47	.005	.11	---	.000	.32
6	.11	.098	.003	.54	.040	.16	.28	.007	.007	---	.000	.10
7	.034	.060	.003	.59	.031	.083	.15	.001	.002	---	.000	.037
8	.21	.041	.50	2.3	.022	.039	.064	.000	.001	---	.000	.014
9	.36	.39	1.6	1.1	.017	.038	.027	.000	.000	---	.000	.005
10	.097	.42	1.8	.56	.017	.034	.018	.000	.000	---	.000	.005
11	.029	.077	.78	.16	.016	.025	.080	.012	.000	---	.000	.37
12	.006	.033	.71	.057	.012	.018	.033	.001	.000	---	.000	.28
13	.002	---	.49	.036	.011	.014	.015	.17	.000	0.000	.000	.10
14	.001	.012	.22	.020	.008	.011	.011	.17	.000	.000	.000	.039
15	.000	.011	.090	.013	.010	.009	.011	.030	.000	.000	.000	.021
16	.000	.014	.036	.009	.016	.008	.010	.012	.000	.005	.000	.010
17	.000	.010	.015	.006	.026	.023	.006	.012	.000	.001	.000	.004
18	.000	.007	.015	.004	.041	.13	.002	.014	.000	.000	.000	.001
19	.54	.006	.41	.003	.068	.035	.001	.001	.000	.000	.000	.000
20	.31	.006	1.2	.003	.10	.051	.002	.000	.000	.000	.000	.000
21	.086	.007	.29	.003	.087	.025	.001	.000	.000	.000	.000	.000
22	.020	.004	.051	.004	.14	.012	.004	.019	.000	.000	.000	.000
23	.004	.015	.010	.005	.64	.009	.001	.15	.000	.000	.000	.000
24	.002	.021	.035	.006	.88	.007	.001	.031	.000	.000	.59	.000
25	.000	.014	.023	.057	.42	.006	.000	.012	.000	.000	1.2	.000
26	.000	.013	.016	.48	.19	.007	.000	.007	.000	.000	.42	.000
27	.000	.010	.019	.15	.15	.008	.000	.006	.000	.000	.11	.000
28	.000	.009	.065	.040	.092	.003	.000	.12	---	.000	.019	.000
29	.000	.008	.72	.44	---	1.7	.000	1.0	---	.000	.004	.000
30	.000	.007	1.7	.69	---	2.1	.004	.49	---	.000	.003	.000
31	.88	---	2.2	.74	---	2.6	---	.12	---	.000	.001	---
TOTAL	10.831	---	13.021	12.426	3.918	8.711	5.751	2.406	---	---	2.347	2.336
MEAN	.35	---	.42	.40	.14	.28	.19	.078	---	---	.076	.078
MAX	3.2	---	2.2	2.6	.88	2.6	1.7	1.0	---	---	1.2	.74
MIN	.000	---	.003	.003	.008	.003	.000	.000	---	---	.000	.000
CFSM	2.40	---	2.88	2.75	.96	1.93	1.32	.53	---	---	.52	.53
IN.	2.77	---	3.33	3.17	1.00	2.23	1.47	.61	---	---	.60	.60

Table 22.--*Daily mean values of discharge at site B2, April 1989-September 1990*

LOCATION.--Lat 35°17'20", long 76°41'45"; Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455143.

DRAINAGE AREA.--Approximately 47 acres (0.074 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data or water level below velocity probe thus discharge could not be computed; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, APRIL-SEPTEMBER 1989

DAY	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	0.88	---	---	---	---
2	---	.46	---	---	---	---
3	---	.37	---	---	---	-0.002
4	---	.26	---	---	---	-.013
5	---	.25	---	---	---	-.006
6	---	---	---	0.010	---	.006
7	---	.043	---	.008	---	.004
8	---	.089	---	.009	---	.001
9	---	.090	0.26	.011	---	.003
10	---	1.1	.29	---	---	---
11	---	.75	.17	---	---	---
12	---	---	.096	---	---	---
13	---	---	.086	---	---	---
14	---	.004	.058	.11	---	---
15	---	.006	.034	.060	---	---
16	---	.008	---	.13	0.10	-.001
17	---	.006	---	.21	.024	-.001
18	----	-.007	.023	.23	.003	---
19	----	-.006	.049	.28	-.027	.015
20	----	-.001	.092	.15	-.031	.022
21	0.051	-.001	.069	.054	.003	-.020
22	.052	.007	.20	.078	.006	-.010
23	.058	.019	.17	.051	---	---
24	.046	.035	.022	.083	---	.89
25	.047	.038	.68	---	.047	.61
26	.052	.030	.36	---	.025	.45
27	.063	.021	.27	---	---	.64
28	.12	.095	---	---	---	.43
29	.082	---	---	---	---	---
30	---	---	---	---	---	---
31	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---
MEAN	---	---	---	---	---	---
MAX	---	---	---	---	---	---
MIN	---	---	---	---	---	---
CFSM	---	---	---	---	---	---
IN.	---	---	---	---	---	---

Table 22.--*Daily mean values of discharge at site B2, April 1989-September 1990*--Continued

LOCATION.--Lat 35°17'20", long 76°41'45"; Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455143.

DRAINAGE AREA.--Approximately 47 acres (0.074 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data or water level below velocity probe thus discharge could not be computed; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1989-SEPTEMBER 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	---	-0.004	0.80	---	0.075	---	0.029	0.002	---	---	0.49
2	---	---	-.013	.58	0.20	.081	0.45	.022	.003	---	---	---
3	0.17	---	-.058	.43	.16	.15	.34	.013	.003	---	---	---
4	.026	-0.025	-.058	---	.18	.15	.28	.092	.003	---	---	.88
5	.000	-.035	-.052	.36	.19	.13	.28	.088	-.001	---	---	.71
6	.005	-.026	-.053	.39	.14	.10	.15	.069	-.001	---	---	.38
7	.000	-.005	-.067	.39	.11	.16	.14	.047	---	---	---	.090
8	-.007	.029	.005	.56	.089	.11	.10	.012	---	---	---	.43
9	-.004	.061	.95	.55	.065	.096	.089	---	---	---	---	.48
10	.011	.052	.37	---	.063	.075	.085	.053	---	---	0.041	.081
11	.005	.009	.74	---	.040	.065	.22	.10	---	---	---	.44
12	---	.000	.67	---	.016	.044	.33	.025	---	---	---	---
13	---	.048	.50	---	.041	.024	.27	.061	---	---	---	---
14	---	.070	.45	---	.051	.017	.14	.071	---	---	---	---
15	---	.076	.41	---	.000	.015	.18	.028	---	---	---	---
16	---	.036	.38	---	.087	.016	.12	.037	-.007	---	---	---
17	---	---	.34	---	.059	.019	.13	.010	---	0.11	---	---
18	---	---	.31	---	.046	.034	.13	.024	---	.14	---	---
19	---	---	.36	---	.088	.029	.085	---	---	---	---	---
20	---	---	.18	---	.097	.028	.046	---	---	---	---	---
21	---	---	.21	---	.083	.026	.045	---	---	---	---	---
22	---	---	.35	---	.083	.023	.051	---	---	---	.14	---
23	---	---	.31	---	.12	.023	.035	-.016	---	---	.33	---
24	---	---	.31	---	.14	.024	.010	-.019	---	---	.35	---
25	---	---	.34	---	.11	.021	---	-.011	---	---	.47	---
26	---	---	.31	---	.097	.020	---	-.003	.000	---	-.24	---
27	---	---	.32	---	.088	.036	.003	-.002	---	---	---	---
28	---	---	.34	---	.082	.034	---	.028	---	.19	---	---
29	---	---	.37	---	---	.28	---	.15	---	---	.093	---
30	---	---	.42	---	---	.55	---	.030	---	---	.28	---
31	---	---	.54	---	---	.76	---	.015	---	---	.70	---
TOTAL	---	---	9.180	---	---	3.215	---	---	---	---	---	---
MEAN	---	---	.30	---	---	.10	---	---	---	---	---	---
MAX	---	---	.95	---	---	.76	---	---	---	---	---	---
MIN	---	---	-.067	---	---	.015	---	---	---	---	---	---
CFSM	---	---	4.01	---	---	1.41	---	---	---	---	---	---
IN.	---	---	4.63	---	---	1.62	---	---	---	---	---	---

Table 23.--*Daily mean values of discharge at site B3, April 1989-September 1990*

LOCATION.--Lat 35°17'10", long 76°41'50", Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

DRAINAGE AREA.--Approximately 68 acres (0.107 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data or water level below velocity probe thus discharge could not be computed; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, APRIL-SEPTEMBER 1989

DAY	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	0.66	0.059	0.12	---	0.055
2	---	.59	.075	.078	---	.029
3	---	.56	.11	.046	---	.054
4	---	.62	.050	.024	---	.076
5	---	.59	.049	.004	---	.081
6	---	.39	.037	.007	---	.055
7	---	.34	.084	.006	---	.059
8	---	.31	.067	.005	---	.048
9	---	.31	.066	.012	---	.038
10	---	.33	.046	.014	---	.023
11	---	.35	.12	.050	---	.014
12	---	.32	.13	.090	---	.010
13	---	.31	.054	.11	---	.009
14	---	.24	.058	.084	---	.006
15	---	.27	.050	.16	---	---
16	---	.23	.040	.17	0.046	---
17	---	.19	.052	.050	.020	---
18	---	.24	.057	.056	.070	---
19	---	.33	.099	.080	.069	---
20	---	.27	.11	---	.12	---
21	0.30	.22	.072	---	.11	---
22	.30	.19	.015	---	.074	---
23	.37	.17	.036	---	.058	---
24	.28	.088	---	---	.033	---
25	.28	.16	-.15	---	-.023	---
26	.24	.11	-.017	---	-.036	---
27	.40	.084	-.019	---	-.016	---
28	.56	.31	.003	---	.007	---
29	.56	.31	.032	---	.027	---
30	.49	.15	.10	---	.017	.074
31	---	.074	---	---	.043	---
TOTAL	---	9.316	---	---	---	---
MEAN	---	.30	---	---	---	---
MAX	---	.66	---	---	---	---
MIN	---	.074	---	---	---	---
CFSM	---	2.82	---	---	---	---
IN.	---	3.25	---	---	---	---

Table 23.--*Daily mean values of discharge at site B3, April 1989-September 1990*--Continued

LOCATION.--Lat 35°17'10", long 76°41'50", Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

DRAINAGE AREA.--Approximately 68 acres (0.107 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ---, no data or water level below velocity probe thus discharge could not be computed; MAX, maximum; MIN, minimum; CFSM, cubic foot per second per square mile; IN., inch. Negative values indicate tidally driven flow in an upstream direction.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1989-SEPTEMBER 1990

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	0.079	---	---	0.028	0.077	0.071	---	0.17	0.19	0.023	0.012	0.045
2	.051	---	---	.020	.069	.088	---	.19	.17	.054	---	-.008
3	.045	---	---	.039	.075	.13	---	.21	.093	.079	-.094	.026
4	.051	0.13	---	.037	.075	.19	-0.44	.19	.060	.046	.028	.029
5	.034	.080	---	.033	.094	.24	---	.097	.17	.021	.014	.024
6	.020	-.098	---	.025	.075	.26	---	.097	.12	.052	.008	.012
7	.024	-.037	---	.039	.064	.38	---	.13	.039	.12	.006	.010
8	.015	.031	---	.062	.066	---	---	.061	.059	.12	.026	.041
9	.011	.023	---	.049	.053	.30	---	.050	.022	.051	.002	.044
10	.010	.042	---	.019	.052	.28	---	.067	.024	.026	-.096	.024
11	.016	.003	---	.004	.068	.28	---	.058	.056	.029	-.15	.044
12	.010	-.21	---	.015	.046	.25	---	.11	.11	.019	-.047	.045
13	---	---	-0.001	.015	.042	.23	.36	.075	.11	.019	.017	.025
14	---	-.11	.003	.023	.028	.21	.33	.11	.089	.066	.009	.009
15	---	-.064	.005	.032	.027	---	.22	.12	.13	.035	.004	-.011
16	---	---	.007	.039	.035	---	.28	.068	.17	.046	-.011	-.021
17	---	---	.015	.043	.049	---	.17	.039	.12	.064	.004	-.037
18	---	.020	.018	.048	.094	---	.26	.033	.091	.057	.008	-.025
19	---	-.050	.014	.055	.058	---	.37	.040	.049	.045	.010	-.010
20	---	-.071	.014	.063	.059	---	.13	.026	.073	.024	.006	-.014
21	---	-.041	.019	.063	.067	---	.087	.030	.065	.019	.008	-.028
22	---	.034	.023	.065	.049	---	.11	.18	.076	.025	.009	-.014
23	---	.019	.031	.064	.041	---	.096	.18	.041	.033	.011	-.011
24	---	.021	.020	.062	.048	---	.082	.12	.034	.055	---	.007
25	---	-.019	.013	.063	.056	---	.084	.099	.029	.071	.021	.011
26	---	-.065	.014	.073	.051	---	.10	.059	.025	.076	.014	.007
27	---	-.054	.017	.072	.056	---	.12	.067	.011	.061	.011	.015
28	---	-.066	---	.061	.057	---	.10	.15	---	.058	.008	.027
29	---	---	---	.061	---	---	.12	.15	.011	.048	.003	.049
30	---	---	.025	.052	---	---	.17	.20	.010	.037	-.003	.013
31	---	---	.029	.078	---	---	---	.22	---	.018	.010	---
TOTAL	---	---	---	1.402	1.631	---	---	3.396	---	1.497	---	0.328
MEAN	---	---	---	.045	.058	---	---	.11	---	.048	---	.011
MAX	---	---	---	.078	.094	---	---	.22	---	.12	---	.049
MIN	---	---	---	.004	.027	---	---	.026	---	.018	---	-.037
CFSM	---	---	---	.42	.55	---	---	1.03	---	.45	---	.10
IN.	---	---	---	.49	.57	---	---	1.19	---	.52	---	.11

Table 24.--*Results of biweekly field measurements and sample analyses at site H1, November 1988-September 1990*

LOCATION.--Lat 35°26'44", long 76°22'25"; Hyde County, on left bank of agricultural drainage canal about 100 ft downstream from tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
November 1988-September 1989									
Nov.	09	1025	0.37	--	17,000	6.9	14.0	2.7	28
	22	0850	.37	--	14,000	7.1	10.0	.9	8
Dec.	06	1515	.22	--	4,000	6.7	6.0	5.6	46
	20	1030	.21	--	15,500	6.5	5.5	.8	7
Jan.	04	0845	.31	--	5,950	6.5	2.0	6.9	51
	19	0945	.33	--	2,120	6.1	5.0	9.1	71
	30	1515	.23	--	2,820	6.9	12.0	10.2	96
Feb.	13	1230	.36	--	3,240	6.8	6.0	11.0	88
	22	1100	.71	--	--	6.7	13.5	--	--
	28	1415	.74	0.87	1,160	6.5	10.0	10.8	96
Apr.	11	1145	1.07	--	574	6.0	4.0	10.0	76
	25	1430	.73	.018	138	6.8	23.0	12.2	143
May	09	1200	.74	--	864	6.2	16.0	4.4	45
	24	1100	.46	--	2,940	6.2	22.5	2.1	25
June	06	1900	.32	--	9,400	6.0	28.0	1.8	24
	21	1100	.52	--	13,000	7.4	27.5	2.3	30
July	03	1630	.73	--	13,500	6.5	28.0	6.8	91
	19	1430	.98	--	14,700	6.4	27.5	4.8	64
Aug.	02	1345	.82	.073	16,000	6.3	27.5	3.3	44
	15	0900	.86	--	11,600	5.7	24.0	.8	10
	30	1600	.44	--	7,270	6.3	28.5	2.2	29
Sept.	15	1000	.78	--	9,120	6.3	25.0	1.3	16
	28	1645	1.58	--	2,050	6.1	18.5	2.9	30
Water year 1990									
Oct.	12	1530	0.86	0.044	1,930	7.6	15.5	3.9	39
Nov.	02	1500	1.30	.058	5,130	6.6	17.5	1.4	15
	16	1430	.66	.030	1,510	6.6	19.0	3.3	36
	30	1030	.46	.016	930	6.6	6.0	6.1	49
Dec.	11	1400	1.24	.013	561	6.4	6.5	6.7	55
Jan.	09	1530	.70	.035	712	6.2	9.5	7.0	61
	18	1630	.43	.013	611	6.7	13.0	8.2	77
Feb.	02	1200	.40	.022	819	6.3	14.5	8.3	81
	13	1645	.68	.015	958	7.2	11.5	11.8	108
	28	1530	.50	.003	990	7.6	12.0	10.4	96
Mar.	15	1400	.37	.031	663	7.2	22.0	8.3	95
	31	1500	1.30	.022	513	6.3	18.0	--	--
Apr.	10	1330	.70	.015	663	6.5	17.0	9.6	99
	26	1800	.47	--	1,960	6.4	27.0	5.1	65
May	15	1130	.59	--	7,140	6.5	20.5	1.7	19
June	01	1145	1.12	--	2,860	6.3	21.0	3.7	41
	14	1300	.69	.042	8,720	6.6	24.0	3.5	43
	27	1800	.83	-.046	12,500	6.2	27.0	3.3	42
July	11	1730	.46	--	12,300	7.4	28.0	6.2	83
Aug.	02	0930	.91	--	19,000	6.3	25.5	1.2	16
	16	1700	.62	--	6,580	8.2	27.5	8.3	108
	31	1200	1.03	.001	4,660	6.4	26.5	.8	10
Sept.	12	1045	1.08	-.036	10,600	6.5	25.0	.5	6
	28	1615	.81	.059	11,500	6.4	23.0	6.3	76

Table 24.--*Results of biweekly field measurements and sample analyses at site H1, November 1988-September 1990*--Continued

LOCATION.--Lat 35°26'44", long 76°22'25"; Hyde County, on left bank of agricultural drainage canal about 100 ft downstream from tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; uS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
November 1988-September 1989								
Nov.	09	<0.10	--	--	1.2	0.02	<0.01	5
	22	<.10	--	--	2.1	.04	.03	8
Dec.	06	1.00	--	--	1.4	.04	.02	9
	20	.23	--	--	4.0	.06	.04	0
Jan.	04	.21	--	--	2.7	.20	.15	7
	19	1.60	--	--	.80	.04	.01	15
	30	.55	--	--	1.0	.03	<.01	3
Feb.	13	<.10	--	--	.70	.04	.01	7
	22	1.60	--	--	1.8	.18	.06	52
	28	1.40	--	--	2.0	.27	.07	95
Apr.	11	.39	--	--	1.2	.14	.05	55
	25	<.10	--	--	--	--	--	23
May	09	.19	--	--	1.1	.06	.01	17
	24	<.10	--	--	1.9	.15	.05	10
June	06	.18	--	--	2.4	.05	.05	19
	21	<.10	--	--	2.3	.18	.17	26
July	03	<.10	--	--	1.2	.02	.01	40
	19	<.10	--	--	.40	.03	<.01	8
Aug.	02	<.10	--	--	1.1	.04	.07	18
	15	<.10	--	--	2.2	.06	.02	136
	30	<.10	--	--	5.5	.40	.16	10
Sept.	15	<.10	--	--	2.7	.11	.05	58
	28	.75	--	--	1.4	.04	.04	12
Water year 1990								
Oct.	12	0.14	--	--	1.1	0.05	0.04	15
Nov.	02	<.10	--	--	1.4	.10	.06	15
	16	<.10	--	--	1.1	.09	.05	8
	30	<.10	--	--	.80	.03	.02	4
Dec.	11	.66	--	--	1.8	.21	.15	68
Jan.	09	.81	--	--	.90	.06	.05	24
	18	.68	--	--	.70	.01	.01	4
Feb.	02	<.10	--	--	.80	.03	.02	5
	13	<.10	--	--	.80	.02	.01	3
	28	<.10	--	--	.70	.04	.02	11
Mar.	15	<.10	--	--	1.6	.11	.05	24
	31	.40	--	--	1.3	.14	.05	43
Apr.	10	<.10	--	--	.80	.03	.02	34
	26	<.10	--	--	3.6	.10	.07	19
May	15	<.10	--	--	2.0	.05	.02	5
June	01	1.90	1.80	2.0	3.8	.10	.04	19
	14	.10	.18	1.3	1.5	.07	.01	33
	27	<.10	.11	1.2	1.3	.05	<.01	27
July	11	<.10	.04	5.0	5.0	.09	.03	14
Aug.	02	<.10	.07	1.3	1.4	.05	.03	5
	16	<.10	.06	2.2	2.3	.09	.01	14
	31	<.10	.36	1.3	1.7	.06	.02	19
Sept.	12	<.10	.08	1.2	1.3	.04	.01	11
	28	<.10	.09	1.0	1.1	.02	<.01	14

Table 25.--*Results of biweekly field measurements and sample analyses at site H1A, November 1988-September 1990*

LOCATION.--Lat 35°26'48", long 76°22'18"; Hyde County, on left bank of agricultural drainage canal about 15 ft upstream of tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); --, no data.

Date		Time	Water level (feet above sea level)	Specific conductance (µS/cm)	Temperature of water (°C)
November 1988-September 1989					
Nov.	09	1025	0.38	17,000	15.0
	22	0850	.38	--	--
Dec.	06	1515	.24	--	--
	20	1030	.20	15,000	5.0
Jan.	04	0845	.35	--	--
	19	0945	.37	1,760	5.0
	30	1515	.26	2,330	12.0
Feb.	13	1230	.37	2,650	6.0
	22	1100	.75	--	--
	28	1415	.78	964	10.0
Apr.	11	1145	1.09	567	6.0
	25	1430	.73	--	--
May	09	1200	.73	770	16.0
	24	1100	.48	2,860	22.0
June	06	1900	.31	8,860	28.5
	21	1100	.50	12,100	28.0
July	03	1630	.64	12,400	28.0
	19	1430	.74	14,570	27.0
Aug.	02	1345	.76	17,000	27.5
	15	0900	.80	11,200	20.0
	30	1600	.44	6,770	28.5
Sept.	15	1000	.80	8,730	23.0
	28	1645	1.58	2,062	20.5
Water year 1990					
Oct.	12	1530	0.86	1,580	17.5
Nov.	02	1500	1.30	2,220	17.0
	16	1430	.66	2,760	18.0
	30	1030	.48	894	8.0
Dec.	11	1400	1.26	538	6.5
Jan.	09	1530	.73	715	9.5
	18	1630	.43	493	13.5
Feb.	02	1200	.46	615	14.5
	13	1645	.67	743	11.5
	28	1530	.50	891	12.5
Mar.	15	1400	.38	588	20.0
	31	1500	1.38	325	18.5
Apr.	10	1330	.70	500	17.0
	26	1800	.46	1,350	27.0
May	15	1130	.54	6,570	22.0
June	01	1145	1.10	2,190	23.0
	14	1300	.70	8,540	24.5
	27	1800	.66	11,400	25.0
July	11	1730	.26	11,400	28.0
Aug.	02	0930	.48	18,400	25.5
	16	1700	.58	5,680	27.5
	31	1200	1.03	3,330	27.0
Sept.	12	1045	1.06	10,800	25.0
	28	1615	.83	10,300	23.0

Table 26.--*Results of biweekly field measurements and sample analyses at site H2, November 1988-September 1990*

LOCATION.--Lat 35°26'57", long 76°22'37"; Hyde County, on right bank of agricultural drainage canal without tide gage; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

DRAINAGE AREA.--Approximately 140 acres (0.219 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen. Tide gate installed August 15, 1990.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
November 1988-September 1989									
Nov.	09	0950	0.32	--	27,500	6.9	15.0	7.4	86
	22	0945	.61	--	26,000	7.5	14.0	6.7	71
Dec.	06	1330	0	--	15,100	6.6	10.5	7.8	75
	20	1130	.16	--	25,000	7.4	7.5	12.6	114
Jan.	19	1015	.11	--	11,400	6.8	6.0	10.8	90
	30	1545	-.20	--	22,600	6.9	15.0	11.4	124
Feb.	13	1315	.19	--	28,800	7.6	11.0	11.8	118
	22	1120	.37	--	--	6.7	14.5	--	--
	28	1545	.75	--	13,800	6.8	11.0	10.9	104
Apr.	11	1430	.90	--	3,510	6.6	6.5	11.4	93
	25	1700	.79	2.2	14,000	6.8	25.0	10.8	137
May	09	1500	.86	.000	6,880	6.5	19.5	4.8	54
	24	0930	.61	.000	9,450	6.5	24.0	4.4	54
June	06	1700	.14	--	11,000	7.3	30.0	8.1	111
	21	0900	.50	.27	13,800	6.5	28.5	3.0	40
July	03	1530	.75	.000	15,300	7.2	30.0	6.8	94
	19	1230	1.02	1.1	15,200	6.7	28.5	5.9	80
Aug.	02	1230	.79	-.31	16,000	6.4	28.0	3.8	51
	15	0730	.80	-.59	16,300	6.3	25.5	2.3	29
	30	1500	.48	--	13,500	7.1	31.0	7.5	106
Sept.	15	0900	.76	--	16,200	6.5	26.5	2.0	26
	28	1530	1.67	--	13,000	6.3	20.5	3.2	37
Water year 1990									
Oct.	12	1430	.84	--	9,900	7.6	22.0	7.8	92
Nov.	02	1400	1.25	--	13,300	7.1	19.0	4.4	50
	16	1300	.55	--	10,400	7.2	19.0	4.8	55
	30	0930	.38	--	6,980	7.2	10.0	5.2	47
Dec.	11	1300	.90	--	1,300	6.4	7.0	6.6	54
Jan.	09	1400	.40	--	1,780	6.4	9.5	8.1	72
	18	1400	-.03	--	3,450	9.0	15.0	12.8	127
Feb.	02	1030	.14	--	4,360	6.8	16.0	5.5	57
	13	1730	.68	--	4,670	7.1	15.0	8.1	81
	28	1400	.44	--	5,900	7.3	11.5	10.3	95
Mar.	15	1200	.33	0.12	5,250	7.2	24.0	6.8	82
	31	1400	.93	.000	1,440	6.7	17.0	7.5	78
Apr.	10	1130	.59	--	4,200	6.4	18.5	11.0	118
	26	1630	.52	--	5,640	7.5	27.0	11.9	152
May	15	1030	.59	-.27	8,500	6.7	22.5	8.5	100
June	01	1045	1.14	1.1	7,140	6.9	23.0	6.1	73
	14	1000	.78	.91	8,360	7.4	24.5	4.8	59
	27	1600	.75	.15	12,700	7.3	30.0	6.8	94
July	11	1530	.50	3.1	13,700	7.5	28.0	6.8	91
Aug.	02	0800	.87	--	22,800	6.8	28.0	2.3	32
	31	1330	.99	--	12,100	6.8	29.5	5.1	69
Sept.	12	1000	1.06	.000	14,100	7.0	26.0	2.1	27
	28	1530	.85	.19	16,200	7.5	24.0	7.7	96

Table 26.--*Results of biweekly field measurements and sample analyses at site H2, November 1988-September 1990*--Continued

LOCATION.--Lat 35°26'57", long 76°22'37"; Hyde County, on right bank of agricultural drainage canal without tide gage; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

DRAINAGE AREA.--Approximately 140 acres (0.219 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen. Tide gate installed August 15, 1990.

Date		Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
November 1988-September 1989								
Nov.	09	<0.10	--	--	0.70	0.02	<0.01	4
	22	<.10	--	--	.80	.02	.01	9
Dec.	06	.23	--	--	1.0	.02	<.01	9
	20	<.10	--	--	.60	.05	.03	13
Jan.	19	.81	--	--	1.2	.03	.02	2
	30	<.10	--	--	.70	.03	<.01	7
Feb.	13	<.10	--	--	.60	.03	<.01	4
	22	1.0	--	--	1.1	.06	.02	16
	28	.54	--	--	1.0	.05	<.01	7
Apr.	11	<.10	--	--	1.0	.02	<.01	7
	25	<.10	--	--	--	--	--	5
May	09	.23	--	--	.70	.04	<.01	10
	24	<.10	--	--	.40	.04	.02	10
June	06	<.10	--	--	1.0	.02	.01	25
	21	<.10	--	--	1.1	.03	.03	12
July	03	<.10	--	--	1.0	.03	.02	27
	19	<.10	--	--	.7	.02	<.01	9
Aug.	02	<.10	--	--	.80	.03	.03	5
	15	<.10	--	--	.80	.04	.01	171
	30	<.10	--	--	1.0	.03	.02	34
Sept.	15	<.10	--	--	1.0	.04	.02	211
	28	.23	--	--	.90	.02	.03	139
Water year 1990								
Oct.	12	0.69	--	--	1.2	0.04	0.05	21
Nov.	02	.20	--	--	.70	.03	.02	9
	16	<.10	--	--	1.0	.02	.02	6
	30	.25	--	--	1.0	.04	.02	6
Dec.	11	3.7	--	--	.50	.10	.06	17
Jan.	09	2.0	--	--	1.4	.05	.05	10
	18	.10	--	--	.70	.03	.02	7
Feb.	02	.29	--	--	1.1	.03	.01	8
	13	.10	--	--	1.0	.02	.02	6
	28	<.10	--	--	.60	.02	.01	6
Mar.	15	<.10	--	--	1.0	.02	.01	28
	31	1.60	--	--	1.0	.05	.01	15
Apr.	10	<.10	--	--	.80	.04	<.01	25
	26	<.10	--	--	.60	.05	.02	20
May	15	<.10	--	--	.90	.02	.02	15
June	01	.60	0.09	1.0	1.1	.04	.01	51
	14	<.10	.05	1.2	1.2	.03	.01	25
	27	<.10	.03	1.4	1.4	.03	<.01	49
July	11	<.10	.05	2.5	2.5	.11	.03	135
Aug.	02	<.10	.05	.65	.70	.03	.01	27
	31	<.10	.39	.61	1.0	.05	.02	43
Sept.	12	<.10	.02	.88	.90	.04	.02	13
	28	<.10	.03	.67	.70	.03	.02	18

Table 27.--*Results of biweekly field measurements and sample analyses at site H3, November 1988-September 1990*

LOCATION.--Lat 35°27'01", long 76°22'49"; Hyde County, on left bank of agricultural drainage canal without tide gage; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458800.

DRAINAGE AREA.--Approximately 104 acres (0.162 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen. Tide gate installed August 16, 1990.

Date	Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (uS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
November 1988-September 1989								
Nov. 09	1045	0.42	--	24,700	7.3	13.5	6.8	73
22	1005	.65	--	26,000	7.2	13.0	7.2	77
Dec. 06	1400	.07	--	11,000	6.9	11.0	10.8	97
20	1200	.20	--	24,000	7.3	5.0	13.0	110
Jan. 19	1030	.06	--	13,400	6.7	8.0	11.6	102
30	1600	-.35	--	19,800	6.8	15.0	13.6	147
Feb. 13	1345	.15	--	26,700	7.5	11.0	12.6	125
22	1230	.40	--	--	6.9	14.0	--	--
28	1612	.37	--	8,220	6.7	11.0	10.9	102
Apr. 11	1530	.79	--	2,450	6.9	6.0	10.2	82
25	1800	.66	0.50	13,700	6.8	23.0	5.8	71
May 09	1630	.76	--	9,810	6.2	19.5	6.0	67
24	0800	.40	1.1	10,300	6.8	22.0	2.8	33
June 06	1400	.10	.90	10,200	9.0	31.0	9.5	132
21	0700	.44	--	13,800	6.6	28.0	1.7	23
July 03	1400	.72	.27	14,900	7.4	28.5	8.1	109
19	1100	.90	-.60	15,800	6.7	26.0	4.4	57
Aug. 02	1030	.70	.26	16,200	6.5	27.5	3.3	44
15	0630	.80	.28	15,100	7.1	25.0	2.3	29
30	1400	.34	-.33	12,300	7.8	28.0	8.3	111
Sept. 15	0800	.81	--	16,800	6.8	25.0	1.4	18
28	1330	1.57	--	11,100	6.6	21.0	3.3	38
Water year 1990								
Oct. 12	1300	0.92	-0.30	7,840	7.5	19.5	5.9	66
Nov. 02	1300	1.36	--	12,300	7.3	19.0	5.4	61
16	1030	.90	--	11,800	7.0	19.5	5.5	64
30	0830	.33	-.48	5,070	8.0	8.5	8.9	77
Dec. 11	1130	1.01	-.03	1,540	6.5	7.5	6.4	54
Jan. 09	1130	.35	-.092	1,710	7.1	8.0	8.0	67
18	1530	-.03	-.30	3,490	7.5	12.5	12.5	118
Feb. 02	0900	.20	--	3,480	6.9	13.5	4.7	45
13	1500	.65	--	5,590	7.7	13.0	7.3	70
28	1230	.27	.91	5,070	8.1	10.5	11.7	105
Mar. 15	1000	.29	1.3	4,280	8.4	18.5	4.8	52
31	1200	.60	.00	1,640	7.0	17.0	7.1	74
Apr. 10	1000	.50	.72	3,760	6.9	14.0	8.9	87
26	1430	.42	.90	6,300	7.0	24.5	13.0	159
May 15	0930	.56	--	8,720	5.1	21.0	6.1	70
June 01	0930	1.07	--	6,760	7.5	21.5	6.5	75
14	1500	.65	.70	8,830	7.1	28.0	10.6	140
27	1430	.67	.26	13,300	9.1	29.0	12.5	170
July 11	1300	.12	.00	14,100	8.8	27.0	11.0	145
Aug. 01	1400	.90	1.2	21,200	7.3	30.0	7.7	110
31	1445	1.05	--	9,680	6.8	28.5	7.0	93
Sept. 12	0830	1.06	--	14,300	7.2	25.0	3.2	40
28	1400	.87	.48	17,200	6.9	22.0	7.1	86

Table 27.--*Results of biweekly field measurements and sample analyses at site H3, November 1988-September 1990*--Continued

LOCATION.--Lat 35°27'01", long 76°22'49"; Hyde County, on left bank of agricultural drainage canal without tide gage; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458800.

DRAINAGE AREA.--Approximately 104 acres (0.162 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen. Tide gate installed August 16, 1990.

Date		Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
November 1988-September 1989								
Nov.	09	<0.10	--	--	0.70	0.03	<0.01	4
	22	<.10	--	--	.70	.04	.02	8
Dec.	06	.30	--	--	1.1	.03	<.01	8
	20	<.10	--	--	.80	.04	.01	5
Jan.	19	.79	--	--	3.9	.04	.01	3
	30	<.10	--	--	.80	.03	<.01	6
Feb.	13	<.10	--	--	.50	.04	<.01	6
	22	1.4	--	--	1.1	.04	.01	22
	28	.80	--	--	.60	.04	<.01	9
Apr.	11	--	0.24	0.86	1.1	.04	.02	20
	25	<.10	--	--	--	--	--	10
May	09	.19	--	--	.50	.03	<.01	11
	24	<.10	--	--	.70	.03	<.01	5
June	06	<.10	--	--	1.0	.04	.02	9
	21	<.10	--	--	1.1	.03	.02	4
July	03	<.10	--	--	.90	.01	.01	15
	19	<.10	--	--	1.0	.03	<.01	89
Aug.	02	<.10	--	--	.80	.03	<.01	70
	15	<.10	--	--	1.1	.03	<.01	39
	30	<.10	--	--	.90	.03	.02	6
Sept.	15	<.10	--	--	.80	.03	.01	18
	28	.30	--	--	.80	.02	.02	56
Water year 1990								
Oct.	12	0.39	--	--	0.90	0.03	0.03	7
Nov.	02	.26	--	--	.80	.03	.01	5
	16	<.10	--	--	.70	.01	<.01	6
	30	.20	--	--	.80	.02	.02	2
Dec.	11	3.8	--	--	1.1	.05	.02	13
Jan.	09	2.6	--	--	1.2	.03	.02	2
	18	.74	--	--	.70	.01	.01	2
Feb.	02	.39	--	--	1.2	.02	<.01	6
	13	.11	--	--	.70	.03	.02	13
	28	.20	--	--	.70	.03	.02	9
Mar.	15	<.10	--	--	1.0	.01	.01	29
	31	1.6	--	--	1.5	.04	.01	14
Apr.	10	.20	--	--	1.0	.03	<.01	44
	26	<.10	--	--	1.4	.06	.04	9
May	15	<.10	--	--	.80	.02	.02	6
June	01	.40	0.10	0.80	.90	.03	<.01	3
	14	.20	.04	1.1	1.1	.05	<.01	6
	27	5.0	.03	.77	.80	.01	<.01	9
July	11	<.10	.02	1.4	1.4	.04	.02	32
Aug.	01	<.10	.03	.67	.70	.02	<.01	17
	31	<.10	.17	.73	.90	.03	<.01	13
Sept.	12	<.10	.02	.88	.90	.04	.02	8
	28	<.10	.03	.67	.70	.06	.03	9

Table 28.--*Results of biweekly field measurements and sample analyses at site B1, December 1988-September 1990*

LOCATION.--Lat 35°18'41", long 76°43'28"; Beaufort County, on right bank of agricultural drainage canal about 100 ft downstream from flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--December 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date	Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
December 1988-September 1989								
Dec. 06	1000	1.13	0.0	--	--	--	--	--
Jan. 18	1045	2.35	.096	263	6.5	6.0	9.8	78
30	1230	2.28	.015	312	6.7	13.0	8.9	85
Feb. 14	1115	--	.007	--	--	--	--	--
Mar. 01	1145	2.77	.92	268	7.0	10.0	10.6	93
Apr. 12	1100	2.87	1.70	158	6.0	9.5	10.0	87
26	0900	2.41	--	335	7.4	18.0	5.0	53
May 10	1500	2.82	1.50	126	6.4	15.5	6.8	69
23	1600	2.38	--	268	7.0	21.5	5.0	57
June 07	1500	2.05	.000	--	--	--	--	--
20	1700	1.99	.000	--	--	--	--	--
July 04	1300	2.14	.000	--	--	--	--	--
20	1845	2.38	.003	204	6.8	26.0	5.4	67
Aug. 03	1400	2.08	.000	--	--	--	--	--
15	1700	2.44	.02	210	6.3	23.5	6.3	75
29	1630	2.08	.000	--	--	--	--	--
Sept. 15	1500	1.97	.000	--	--	--	--	--
29	1400	2.52	.34	184	6.3	20.0	5.8	64
Water year 1990								
Oct. 13	0915	2.35	0.002	222	--	15.0	--	--
Nov. 03	1500	2.80	1.7	192	6.2	17.5	6.1	64
17	1130	2.90	.009	225	7.1	10.0	4.6	--
29	1500	2.90	.007	251	6.8	12.5	4.7	44
Dec. 12	1400	2.74	.80	174	6.1	9.5	8.0	70
Jan. 10	1000	2.62	.55	179	6.6	8.0	9.0	76
19	1030	2.36	.003	226	7.2	11.0	7.0	62
Feb. 01	1200	2.58	.38	161	7.1	14.5	11.8	115
14	1100	2.36	.007	229	7.1	12.5	7.6	71
Mar. 01	1245	2.86	.058	218	7.5	12.0	12.9	117
14	1200	2.80	.013	204	8.7	21.5	10.0	113
Apr. 01	1400	3.22	1.60	405	6.0	15.5	6.5	65
11	1345	2.89	.15	183	7.0	20.0	7.3	81
27	1230	2.68	.00	278	7.5	21.5	4.9	56
May 16	0830	2.83	.015	207	7.4	19.0	5.8	62
June 01	1545	2.84	.026	224	6.8	23.5	6.3	74
15	1030	2.51	.000	--	--	--	--	--
28	1230	2.68	--	--	--	--	--	--
July 12	0730	2.21	--	--	--	--	--	--
Aug. 02	1530	2.21	.000	--	--	--	--	--
17	1200	2.21	.000	--	--	--	--	--
Sept. 12	1900	2.94	.23	213	7.0	26.0	1.4	17
28	1100	2.21	.000	--	--	--	--	--

Table 28.--*Results of biweekly field measurements and sample analyses at site B1, December 1988-September 1990*--Continued

LOCATION.--Lat 35°18'41", long 76°43'28"; Beaufort County, on right bank of agricultural drainage canal about 100 ft downstream from flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--December 1988 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; uS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
December 1988-September 1989							
Dec. 06	--	--	--	--	--	--	--
Jan. 18	2.4	--	--	0.70	0.06	0.04	11
30	.20	--	--	.60	.06	.03	7
Feb. 14	--	--	--	--	--	--	--
Mar. 01	4.5	--	--	1.1	.05	.02	9
Apr. 12	4.0	--	--	1.1	.03	.01	13
26	.17	--	--	.70	.25	.16	17
May 10	2.7	--	--	1.5	.16	.07	387
23	.16	--	--	2.1	.18	.13	77
June 07	--	--	--	--	--	--	--
20	--	--	--	--	--	--	--
July 04	--	--	--	--	--	--	--
20	1.5	--	--	.90	.06	.03	10
Aug. 03	--	--	--	--	--	--	--
15	1.4	--	--	.70	.06	.04	--
29	--	--	--	--	--	--	--
Sept. 15	--	--	--	--	--	--	--
29	1.2	--	--	.80	.07	.06	--
Water year 1990							
Oct. 13	0.84	--	--	0.80	0.06	0.09	15
Nov. 03	3.2	--	--	1.1	.05	.04	22
17	<.10	--	--	.90	.05	.04	8
29	<.10	--	--	.80	.07	.05	15
Dec. 12	4.1	--	--	.70	.04	.05	9
Jan. 10	4.0	--	--	1.0	.03	.02	6
19	.17	--	--	1.7	.03	.03	6
Feb. 01	2.3	--	--	1.0	.04	.03	25
14	<.10	--	--	.80	.04	.03	4
Mar. 01	1.0	--	--	.30	.02	.02	4
14	.20	--	--	<.20	.05	.03	198
Apr. 01	2.8	--	--	.70	.08	.04	25
11	.90	--	--	.60	.03	.05	98
27	<.10	--	--	1.2	.07	.03	11
May 16	1.6	--	--	.70	.05	.04	15
June 01	2.2	0.10	0.60	.70	.05	.04	26
15	--	--	--	--	--	--	--
28	--	--	--	--	--	--	--
July 12	--	--	--	--	--	--	--
Aug. 02	--	--	--	--	--	--	--
17	--	--	--	--	--	--	--
Sept. 12	<.10	.21	1.9	2.1	.18	.08	19
28	--	--	--	--	--	--	--

Table 29.--*Results of biweekly field measurements and sample analyses at site B1A, January 1989-September 1990*

LOCATION.--Lat 35°18'44", long 76°43'35"; Beaufort County, on left bank of agricultural drainage canal about 75 ft upstream of flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

PERIOD OF RECORD.--January 1989 through September 1990.

REMARKS.--ft, foot; mi, mile; mi^2, square mile; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); --, no data.

Date		Time	Water level (feet above sea level)	Specific conductance (µS/cm)	Temperature of water (°C)
January-September 1989					
Jan.	18	1045	2.28	--	--
	30	1230	2.16	--	--
Mar.	01	1145	2.80	268	10.0
Apr.	12	1100	2.95	165	9.5
	26	0900	2.31	325	18
May	10	1500	2.90	115	16
	23	1600	2.38	216	22
July	20	1845	2.39	205	26.0
Aug.	03	1400	2.26	--	--
	15	1700	2.45	200	23.5
Sept.	15	1500	2.29	455	24.5
	29	1400	2.56	195	20.0
Water year 1990					
Oct.	13	0915	2.38	212	16.0
Nov.	03	1500	2.95	--	--
	17	1130	2.90	233	10.0
	29	1500	2.90	250	12.0
Dec.	12	1400	2.82	174	9.0
Jan.	10	1000	2.66	152	8.0
	19	1030	2.36	211	10.5
Feb.	01	1200	2.62	160	19.0
	14	1100	2.38	188	12.5
Mar.	01	1245	2.85	180	12.0
	14	1200	2.78	158	25.0
Apr.	01	1400	3.26	403	15.5
	11	1345	2.89	180	20.0
	27	1230	2.66	259	20.5
May	16	0830	2.80	189	20.0
June	01	1545	1.99	199	23.0
	28	1230	2.68	335	23.5
Aug.	02	1530	1.50	--	--
Sept.	12	1900	2.90	210	25.5

Table 30.--*Results of biweekly field measurements and sample analyses at site B2, November 1988-September 1990*

LOCATION.--Lat 35°17'20", long 76°41'45"; Beaufort County, on right bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455143.

DRAINAGE AREA.--Approximately 47 acres (0.074 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
November 1988-September 1989									
Nov.	09	1420	0.81	0.00	--	--	--	--	--
	21	1322	.79	.00	--	--	--	--	--
Dec.	06	0830	1.29	--	400	6.8	4.0	9.2	70
	20	1545	1.20	--	675	7.0	6.5	11.0	88
Jan.	03	1015	1.47	--	298	7.0	7.0	8.3	69
	18	1000	1.46	--	332	6.2	6.0	10.8	86
	30	1145	1.32	--	505	6.5	12.0	12.6	118
Feb.	14	1030	1.22	--	452	6.7	12.0	6.9	63
Mar.	01	1023	1.59	.92	283	7.7	8.0	10.2	86
Apr.	12	0930	2.07	--	159	6.1	7.0	9.8	80
	26	1200	1.29	.063	398	6.8	21.0	3.8	43
May	10	0900	1.61	1.2	160	6.8	17.0	5.7	60
	23	1230	1.23	-.021	543	6.8	22.5	4.8	56
June	07	1200	1.0	--	--	--	--	--	--
	20	1430	1.32	.14	199	6.9	25.0	4.9	59
July	04	1030	1.15	.001	215	6.7	22.0	3.9	45
	20	1500	1.33	.19	259	6.4	26.5	5.0	63
Aug.	03	1130	1.01	.00	--	--	--	--	--
	15	1330	1.38	--	223	6.2	24.5	6.3	76
	29	1400	.97	.00	--	--	--	--	--
Sept.	15	1630	1.22	.01	3,110	6.9	23.5	6.2	74
	29	1200	1.37	.11	254	6.5	20.5	6.5	72
Water year 1990									
Oct.	13	1100	1.11	--	319	--	17.0	7.3	75
Nov.	03	1000	1.60	-0.11	234	6.8	16.0	5.8	59
	17	1000	1.28	.012	310	7.6	9.5	4.6	40
	30	1400	1.25	.006	301	7.4	10.0	8.5	75
Dec.	12	1100	1.60	.79	206	6.8	8.5	7.9	68
Jan.	10	1430	1.56	.63	211	6.8	11.0	9.8	90
	19	0900	1.36	--	271	7.1	11.5	4.5	41
Feb.	01	1500	1.44	.39	296	7.8	18.0	12.3	129
	14	1315	1.30	.018	329	7.9	18.5	14.8	157
Mar.	01	1130	1.30	.078	297	7.5	12.0	13.4	122
	14	1500	1.30	.020	310	8.6	26.0	15.8	194
Apr.	01	1130	1.90	.40	413	6.3	14.5	6.5	64
	11	1100	1.45	.16	228	7.1	17.0	5.2	54
	27	1030	1.15	.008	828	7.3	22.5	2.6	30
May	15	1630	1.26	.033	2,930	7.0	22.5	4.7	54
	31	1500	1.46	.060	306	7.1	20.5	6.5	72
June	15	1300	1.18	-.007	4,900	7.6	23.5	8.5	102
	28	0945	1.10	.00	--	--	--	--	--
July	12	0845	.95	.00	--	--	--	--	--
Aug.	02	1200	1.14	.00	11,700	7.3	26.5	5.4	70
	17	1030	1.14	.00	4,480	7.3	24.5	2.4	29
	30	1530	1.30	.45	318	7.7	27.0	3.7	47
Sept.	12	1630	1.42	.50	236	7.2	26.5	6.9	86
	28	0845	1.04	.00	--	--	--	--	--

Table 30.--*Results of biweekly field measurements and sample analyses at site B2, November 1988-September 1990*--Continued

LOCATION.--Lat 35°17'20", long 76°41'45"; Beaufort County, on right bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455143.

DRAINAGE AREA.--Approximately 47 acres (0.074 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
November 1988-September 1989								
Nov.	09	--	--	--	--	--	--	--
	21	--	--	--	--	--	--	--
Dec.	06	3.5	--	--	0.70	0.05	0.04	9
	20	<.10	--	--	.80	.04	.02	5
Jan.	03	3.4	--	--	.90	.06	.03	19
	18	4.5	--	--	.70	.06	.02	12
	30	1.8	--	--	.70	.02	<.01	1
Feb.	14	.12	--	--	.60	.05	<.01	2
Mar.	01	8.1	--	--	1.1	.06	.03	8
Apr.	12	4.2	--	--	1.8	.07	.03	10
	26	<.10	--	--	1.2	.11	.06	13
May	10	1.1	--	--	4.1	.63	.46	146
	23	.17	--	--	.40	.17	.13	46
June	07	--	--	--	--	--	--	--
	20	.35	--	--	1.3	.16	.14	161
July	04	<.10	--	--	1.1	.14	.11	7
	20	3.1	--	--	.90	.08	.07	20
Aug.	03	--	--	--	--	--	--	--
	15	3.7	--	--	.70	.11	.07	0
	29	--	--	--	--	--	--	--
Sept.	15	.18	--	--	2.4	.31	.18	41
	29	3.3	--	--	1.1	.05	.07	126
Water year 1990								
Oct.	13	<0.10	--	--	0.60	0.09	0.08	5
Nov.	03	2.8	--	--	1.0	.12	.10	18
	17	<.10	--	--	.60	.06	.05	11
	30	<.10	--	--	.60	.09	.04	3
Dec.	12	4.1	--	--	.60	.09	.06	16
Jan.	10	3.1	--	--	1.1	.05	.04	2
	19	.14	--	--	.40	.04	.04	4
Feb.	01	.10	--	--	.80	.07	.05	12
	14	<.10	--	--	1.0	.06	.04	4
Mar.	01	.30	--	--	.60	.03	.03	9
	14	<.10	--	--	<.20	.19	.16	36
Apr.	01	5.3	--	--	1.5	.09	.04	15
	11	.40	--	--	1.1	.18	.16	44
	27	<.10	--	--	2.9	.38	.23	55
May	15	<.10	--	--	1.0	.18	.13	36
	31	5.7	0.06	0.74	.80	.06	.04	16
June	15	<.10	.37	4.5	4.9	.40	.17	17
	28	--	--	--	--	--	--	--
July	12	--	--	--	--	--	--	--
Aug.	02	.10	.92	2.0	2.9	.32	.12	39
	17	<.10	.11	1.6	1.7	.57	.35	11
	30	<.10	.10	1.0	1.1	.32	.27	43
Sept.	12	1.1	.03	.04	.07	.09	.06	11
	28	--	--	--	--	--	--	--

Table 31.--*Results of biweekly field measurements and sample analyses at site B3, November 1988-September 1990*

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

DRAINAGE AREA.--Approximately 68 acres (0.107 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date	Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
November 1988-September 1989								
Nov. 09	1400	0.99	--	14,900	6.7	13.0	1.3	13
21	1335	.25	--	16,900	7.0	13.5	1.9	20
Dec. 06	0915	.39	--	1,100	6.6	4.0	10.0	76
Jan. 03	1030	.50	--	1,510	7.0	7.5	10.6	89
18	1015	.49	--	815	6.4	5.0	13.4	104
30	1200	.41	--	1,240	7.1	14.0	15.1	148
Feb. 14	1100	.34	--	1,530	7.0	12.0	7.9	73
Mar. 01	0940	1.02	--	462	7.9	7.0	10.6	87
Apr. 12	1020	1.36	--	180	5.8	8.0	10.4	87
26	1100	.79	0.22	430	7.6	20.0	4.5	50
May 10	1100	.85	.32	230	7.1	17.0	7.3	76
23	1330	.79	.17	540	7.0	26.0	3.7	46
June 07	1000	.46	.077	1,960	6.8	23.5	3.2	38
20	1600	.76	.052	630	7.5	27.0	2.6	33
July 04	0900	.75	.058	550	7.1	24.0	4.3	51
20	1630	.98	.057	387	7.0	29.0	5.2	68
Aug. 03	1000	.89	--	5,040	7.2	25.0	2.9	36
15	1315	1.30	.044	407	6.6	24.0	5.6	67
29	1500	1.00	.046	5,760	7.1	26.5	6.2	79
Sept. 15	1730	.96	-.002	7,000	6.7	25.0	4.8	60
29	1000	1.35	--	428	6.4	17.0	6.1	63
Water year 1990								
Oct. 13	1200	0.90	0.008	502	--	15.0	4.7	46
Nov. 03	1100	1.00	.08	274	7.1	16.0	7.8	79
17	0830	.64	--	439	8.0	7.5	6.3	52
29	1600	.80	-.05	396	7.8	12.0	13.4	124
Dec. 12	0930	1.19	--	254	7.3	8.5	8.6	74
Jan. 10	1330	.88	.044	250	7.2	11.0	9.7	89
19	0800	.59	.076	308	6.1	11.5	4.0	36
Feb. 01	1630	.68	.09	316	8.0	18.5	12.2	130
14	1400	.56	.028	317	8.3	16.0	12.5	126
Mar. 01	1030	.92	.053	403	7.2	10.0	7.5	66
14	1630	.57	.21	310	7.5	25.0	--	--
Apr. 01	1230	1.62	-.83	445	6.6	15.0	7.2	72
11	1230	.72	--	303	7.3	19.0	6.9	75
27	1130	.45	.088	451	7.6	26.5	4.0	50
May 16	1000	.66	.074	292	7.2	20.0	2.9	31
31	1630	1.32	.14	348	7.2	21.5	6.8	77
June 15	1200	1.14	.13	7,920	6.8	22.5	1.8	21
28	1030	.94	--	6,890	6.9	24.0	2.3	28
July 12	1100	.22	.019	9,300	7.3	22.0	4.3	51
Aug. 02	1300	1.22	--	11,900	7.0	25.5	2.5	32
17	0930	.80	.017	7,280	7.2	25.0	1.5	19
31	1900	1.53	.008	17,200	6.8	27.0	1.2	16
Sept. 12	1745	1.36	.042	376	7.2	25.5	8.3	101
28	0930	.84	.019	8,390	7.8	17.0	10.3	109

Table 31.--*Results of biweekly field measurements and sample analyses at site B3, November 1988-September 1990*--Continued

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

DRAINAGE AREA.--Approximately 68 acres (0.107 mi^2).

PERIOD OF RECORD.--November 1988 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
November 1988-September 1989								
Nov.	09	<0.10	--	--	1.0	0.15	0.05	7
	21	<.10	--	--	1.6	.17	.09	6
Dec.	06	6.2	--	--	1.5	.04	.02	6
Jan.	03	4.2	--	--	.70	.08	.02	8
	18	5.4	--	--	1.3	.06	.03	6
	30	2.8	--	--	.60	.03	.01	3
Feb.	14	.51	--	--	.60	.04	.01	4
Mar.	01	7.0	--	--	1.0	.06	.02	24
Apr.	12	3.5	--	--	.60	.13	.02	9
	26	.35	--	--	1.0	.11	.03	24
May	10	1.3	--	--	1.1	.17	.10	48
	23	<.10	--	--	.40	.07	.05	25
June	07	<.10	--	--	2.4	.33	.26	55
	20	<.10	--	--	1.5	.21	.14	45
July	04	<.10	--	--	1.6	.13	.04	25
	20	1.4	--	--	1.5	.25	.10	20
Aug.	03	<.10	--	--	1.5	.18	.09	25
	15	1.3	--	--	1.1	.09	.03	47
	29	<.10	--	--	2.0	.14	.06	--
Sept.	15	<.10	--	--	2.2	.17	.08	27
	29	1.3	--	--	2.0	.05	.06	16
Water year 1990								
Oct.	13	<0.10	--	--	0.70	0.08	0.06	25
Nov.	03	2.8	--	--	1.0	.10	.10	17
	17	.26	--	--	.60	.05	.05	10
	29	<.10	--	--	.60	.10	.05	5
Dec.	12	2.8	--	--	.50	.05	.06	6
Jan.	10	2.4	--	--	.60	.05	.02	1
	19	.45	--	--	.50	.06	.06	4
Feb.	01	.27	--	--	.70	.05	.03	123
	14	.36	--	--	1.3	.04	.03	5
Mar.	01	.70	--	--	.40	.03	.02	11
	14	<.10	--	--	<.20	.09	.07	22
Apr.	01	5.9	--	--	1.6	.08	.03	7
	11	.30	--	--	2.1	.42	<.10	188
	27	<.10	--	--	1.7	.28	.16	47
May	16	<.10	--	--	.90	.18	.14	13
	31	4.2	0.05	0.75	.80	.08	.04	31
June	15	<.10	.63	1.1	1.7	.19	.10	16
	28	<.10	.67	1.3	2.0	.24	.15	28
July	12	<.10	.75	3.0	3.7	.42	.26	19
Aug.	02	<.10	.41	1.5	1.9	.12	.04	23
	17	<.10	.55	1.5	2.1	.24	.12	14
	31	<.10	.23	.87	1.1	.10	.06	12
Sept.	12	1.7	.05	.75	.80	.07	.06	36
	28	<.10	.23	1.4	1.6	.07	.05	13

Table 32.--*Results of biweekly field measurements and sample analyses at site C1, April 1989-September 1990*

LOCATION.--Lat 35°17'13", long 76°41'13"; Beaufort County, on right bank of Campbell Creek, which receives inflow from sites B2 and B3; on State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455145.

DRAINAGE AREA.--Approximately 5,120 acres (8 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ppt, parts per thousand; °C, degrees Celsius; mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Salinity (ppt)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
April-September 1989								
Apr.	12	0730	0.15	3.2	5.4	7.0	7.2	60
	26	1300	.96	3.2	6.3	20.0	3.9	44
May	10	1300	.44	1.5	6.4	15.5	4.7	48
	23	1030	.75	2.0	6.5	23.0	2.7	32
June	07	1300	.16	5.4	6.1	26.0	2.0	26
	20	1300	.68	5.7	6.9	30.0	3.9	53
July	04	1130	.80	4.1	6.2	26.0	3.0	37
	20	1330	.74	3.4	6.6	27.0	4.8	62
Aug.	03	1230	.81	6.2	6.3	28.5	2.2	29
	15	1500	1.47	4.9	6.3	26.0	3.2	41
	29	1300	.97	6.9	6.5	27.5	2.3	30
Sept.	15	1530	1.13	9.3	6.4	24.5	1.3	17
	29	1300	1.35	2.5	6.3	20.0	2.3	26
Water year 1990								
Oct.	13	1300	0.96	5.3	--	18.5	1.8	20
Nov.	03	0830	.94	1.4	6.7	16.0	5.1	53
	17	1500	.96	6.8	6.9	19.0	5.1	58
	30	1500	.50	6.3	7.8	13.0	6.1	60
Dec.	12	1230	1.13	4.0	6.7	8.0	6.9	60
Jan.	10	1530	.30	5.2	6.9	9.5	7.2	66
	19	1000	.50	4.0	7.0	10.5	6.6	60
Feb.	01	1400	.30	4.0	6.7	--	--	--
	14	1230	0	5.1	7.5	15.0	5.7	58
Mar.	01	1200	.98	2.9	7.3	11.0	8.5	77
	15	1730	.51	4.4	7.0	17.0	7.3	77
Apr.	01	1030	1.42	4.4	6.7	14.5	4.4	45
	11	0930	.11	1.3	6.6	15.5	5.4	55
	27	0900	.48	3.8	6.6	22.5	2.8	33
May	15	1430	.85	3.1	6.8	23.0	4.2	50
	31	1330	1.38	3.8	8.1	22.5	2.7	32
June	15	1400	1.10	6.3	6.9	25.5	4.8	61
	28	0830	.94	5.4	6.5	26.0	2.6	33
July	12	0900	-.29	7.0	6.8	24.0	1.8	23
Aug.	02	1430	1.26	8.5	6.7	29.0	4.4	60
	17	1100	.88	7.8	7.0	27.0	2.2	29
	30	1330	1.16	8.3	7.2	29.5	4.3	59
Sept.	12	1600	1.22	6.2	7.1	27.0	3.9	51
	27	1400	.67	9.3	7.4	22.0	6.3	76

Table 32.--*Results of biweekly field measurements and sample analyses at site C1, April 1989-September 1990*--Continued

LOCATION.--Lat 35°17'13", long 76°41'13"; Beaufort County, on right bank of Campbell Creek, which receives inflow from sites B2 and B3; on State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455145.

DRAINAGE AREA.--Approximately 5,120 acres (8 mi^2).

PERIOD OF RECORD.--April 1989 through September 1990.

REMARKS.--mi, mile; mi^2, square mile; ppt, parts per thousand; °C, degrees Celsius; mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus; <, less than. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
April-September 1989								
Apr.	12	1.0	--	--	1.2	0.04	0.02	14
	26	.24	--	--	.80	.04	<.01	16
May	10	.16	--	--	1.1	.09	.02	12
	23	<.10	--	--	.70	.05	.03	15
June	07	<.10	--	--	1.8	.08	.05	6
	20	<.10	--	--	1.6	.08	.06	5
July	04	<.10	--	--	1.5	.06	.03	8
	20	.18	--	--	1.2	.07	.03	4
Aug.	03	<.10	--	--	1.1	.06	.03	34
	15	.26	--	--	1.1	.08	.04	6
	29	<.10	--	--	1.2	.09	.05	12
Sept.	15	<.10	--	--	.90	.12	.09	165
	29	.28	--	--	1.1	.05	.05	31
Water year 1990								
Oct.	13	0.12	--	--	1.0	0.08	0.06	38
Nov.	03	.22	--	--	1.1	.04	.03	--
	17	<.10	--	--	1.0	.06	.03	8
	30	<.10	--	--	.80	.04	.02	35
Dec.	12	1.20	--	--	1.0	.04	.05	41
Jan.	10	.93	--	--	1.0	.05	.03	10
	19	.64	--	--	.90	.02	.02	12
Feb.	01	.20	--	--	.80	.04	.03	23
	14	.10	--	--	<.20	.05	.03	41
Mar.	01	.50	--	--	1.1	.02	.03	4
	15	<.10	--	--	<.20	.03	.01	17
Apr.	01	.60	--	--	.90	.03	<.01	5
	11	.40	--	--	1.0	.03	.02	22
	27	<.10	--	--	.90	.04	<.01	9
May	15	<.10	--	--	1.0	.04	.02	25
	31	.20	0.08	0.72	.80	.03	.02	5
June	15	<.10	.03	.97	1.0	.04	<.01	0
	28	<.10	.05	.75	.80	.04	<.01	1
July	12	<.10	.11	.99	1.1	.06	.04	27
Aug.	02	<.10	.04	.76	.80	.03	.03	26
	17	<.10	.07	.93	1.0	.04	<.01	4
	30	<.10	.01	.49	.50	.07	.03	7
Sept.	12	<.10	.03	.77	.80	.04	.02	3
	27	<.10	.02	.58	.60	.04	.02	7

Table 33.--*Storm-event sample water-quality analyses at site H1, April 11, 1989; July 19-20, 1989; and March 31-April 1, 1990*

LOCATION.--Lat 35°26'44", long 76°22'25"; Hyde County, on left bank of agricultural drainage canal about 100 ft downstream from tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458600.

DRAINAGE AREA.--Approximately 70 acres (0.109 mi^2).

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; <, less than; N, nitrogen; P, phosphorus. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
					1989				
Apr.	11	0830	0.90	--	592	6.0	4.0	10.0	76
	11	0930	.93	--	561	--	--	--	--
	11	1030	1.00	--	561	--	--	--	--
	11	1100	1.03	--	530	--	--	--	--
	11	1300	1.07	--	520	--	--	--	--
	11	1500	1.08	--	541	--	--	--	--
	11	1730	1.06	--	535	--	--	--	--
	11	2000	1.04	--	540	--	--	--	--
July	19	1400	.99	0.092	16,500	6.4	27.5	4.8	64
	19	1800	1.08	--	15,800	--	--	--	--
	20	0400	.94	.086	15,800	--	--	--	--
	20	1200	.75	.064	15,100	--	--	--	--
	20	1800	.95	.088	14,100	--	--	--	--
	20	2400	.76	.066	13,000	--	--	--	--
					1990				
Mar.	31	1530	1.31	0.26	502	6.3	18.0	--	--
	31	1730	1.39	.13	328	--	--	--	--
	31	1830	1.39	.13	295	6.3	17.5	--	--
	31	2030	1.37	.12	317	--	--	--	--
Apr.	01	0630	1.34	-.19	317	--	--	--	--

Date		Time	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
					1989				
Apr.	11	0830	0.50	0.08	--	<0.20	0.16	0.10	50
	11	0930	.50	.07	1.1	1.2	.15	.11	48
	11	1030	.50	.05	1.4	1.4	.13	.07	59
	11	1100	.50	.05	1.0	1.1	.13	.07	40
	11	1300	.60	.05	1.0	1.1	.13	.07	42
	11	1500	.60	.07	.93	1.0	.11	.06	33
	11	1730	.60	.07	.73	.80	.07	.04	21
	11	2000	.60	.07	1.0	1.1	.07	.04	16
July	19	1400	<.10	.17	.93	1.1	<.01	.02	--
	19	1800	<.10	.15	.85	1.0	.02	.02	--
	20	0400	<.10	.21	.89	1.1	.02	.01	--
	20	1200	<.10	.16	2.6	2.8	.10	.05	--
	20	1800	<.10	.16	1.2	1.4	.03	.01	--
	20	2400	<.10	.14	.86	1.0	<.01	<.01	--
					1990				
Mar.	31	1530	0.40	0.06	1.6	1.7	0.15	0.09	37
	31	1730	.30	.04	1.5	1.5	.15	.09	38
	31	1830	.30	.06	.94	1.0	.13	.09	33
	31	2030	.40	.06	1.3	1.4	.13	.06	34
Apr.	01	0630	.60	.10	1.2	1.3	.13	.06	35

Table 34.--*Storm-event sample water-quality analyses at site H2, April 11-12, 1989; July 19-21, 1989; and March 31-April 1, 1990*

LOCATION.--Lat 35°26'57", long 76°22'37"; Hyde County, on right bank of agricultural drainage canal without tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458700.

DRAINAGE AREA.--Approximately 140 acres (0.219 mi^2).

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; <, less than; N, nitrogen; P, phosphorus. Negative values indicate tidally driven flow in an upstream direction. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
					1989				
Apr.	11	1500	0.90	--	1,620	6.6	6.5	114	92
	11	1530	.85	--	4,100	--	--	--	--
	11	1600	.72	--	3,550	--	--	--	--
	11	1700	.68	--	2,700	--	--	--	--
	11	1830	.57	--	2,040	--	--	--	--
	11	2100	.74	--	1,850	--	--	--	--
	11	2400	.65	--	1,860	--	--	--	--
	12	0130	.75	--	1,730	--	--	--	--
	12	0230	.76	--	1,710	--	--	--	--
July	19	1630	1.23	0.60	16,300	6.7	285	5.9	80
	19	2030	1.00	-.14	15,600	--	--	--	--
	20	0830	.55	0	14,600	--	--	--	--
	20	1830	1.11	.038	14,800	--	--	--	--
	21	0030	.34	-.07	15,200	--	--	--	--
					1990				
Mar.	31	2200	0.77	--	546	6.7	17.0	7.5	78
Apr.	01	0300	.93	--	634	--	--	--	--
	01	0500	1.00	--	710	--	--	--	--
	01	0800	1.21	--	535	--	--	--	--
	01	1200	.96	--	612	--	--	--	--

Date		Time	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
					1989				
Apr.	11	1500	1.5	0.14	1.3	1.4	0.06	0.02	12
	11	1530	<.10	.04	.86	.90	.03	.01	11
	11	1600	.10	.11	.89	1.0	.05	.14	3
	11	1700	.20	.06	.84	.90	.04	.02	5
	11	1830	.60	.14	.96	1.1	.06	.02	13
	11	2100	1.1	.10	1.0	1.1	.05	.02	13
	11	2400	1.2	.10	1.0	1.1	.10	.03	8
	12	0130	1.3	.12	1.1	1.2	.06	.03	5
	12	0230	1.4	.13	.77	.90	.05	.02	7
July	19	1630	<.10	.09	.91	1.0	.02	.02	--
	19	2030	<.10	.28	1.1	1.4	.02	.02	--
	20	0830	<.10	.07	1.9	2.0	.02	.02	--
	20	1830	<.10	.08	.72	.80	.01	<.01	--
	21	0030	<.10	.07	.73	.80	<.01	<.01	--
					1990				
Mar.	31	2200	1.8	0.09	1.1	1.2	0.11	0.11	32
Apr.	01	0300	2.2	.08	1.0	1.1	.08	.05	17
	01	0500	2.2	.09	1.0	1.1	.09	.06	19
	01	0800	2.4	.07	.93	1.0	.06	.02	12
	01	1200	2.2	.09	.91	1.0	.08	.02	15

Table 35.--*Storm-event sample water-quality analyses at site H3, April 11-12, 1989; July 19-21, 1989; and March 31-April 1, 1990*

LOCATION.--Lat 35°27'01", long 76°22'49"; Hyde County, on left bank of agricultural drainage canal without tide gate; 0.1 mi southwest of U.S. Highway 264, 5 mi northwest of Swanquarter; Hydrologic Unit 03020105; USGS downstream order identification number 0208458800.

DRAINAGE AREA.--Approximately 104 acres (0.162 mi^2).

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; <, less than; N, nitrogen; P, phosphorus. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
					1989				
Apr.	11	1430	0.95	--	2,230	6.8	6.0	10.2	82
	11	1531	.79	--	1,980	--	--	--	--
	11	1630	.64	--	1,800	--	--	--	--
	11	1830	.51	--	1,770	--	--	--	--
	11	2000	.69	--	1,670	--	--	--	--
	11	2200	.67	--	1,540	--	--	--	--
	11	2400	.61	--	1,540	--	--	--	--
	12	0200	.73	--	1,520	--	--	--	--
July	19	1500	1.07	--	16,500	6.7	26.0	4.4	57
	19	1700	1.23	--	15,800	--	--	--	--
	19	2100	1.05	--	15,700	--	--	--	--
	20	0700	1.10	--	16,400	--	--	--	--
	20	1900	.99	--	15,600	--	--	--	--
	21	0100	.26	0.74	15,800	--	--	--	--
					1990				
Mar.	31	2315	0.77	0.77	688	7.0	17.0	7.1	74
Apr.	01	0515	1.01	1.01	874	--	--	--	--
	01	0715	1.09	1.09	939	--	--	--	--
	01	0915	1.01	1.01	874	--	--	--	--
	01	1215	.95	.95	1,530	--	--	--	--

Date		Time	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
					1989				
Apr.	11	1430	0.30	0.08	1.0	1.1	0.06	0.02	42
	11	1531	--	--	--	--	--	--	17
	11	1630	.50	.23	.77	1.0	.03	.01	16
	11	1830	.70	.20	.90	1.1	.03	.01	13
	11	2000	.70	.17	4.3	4.5	.03	.02	11
	11	2200	.90	.17	.83	1.0	.03	.01	11
	11	2400	1.1	.17	1.0	1.2	.04	.02	9
	12	0200	1.2	.18	.72	.90	.03	.01	8
July	19	1500	<.10	.08	1.1	1.2	.03	.02	--
	19	1700	<.10	.19	.71	.90	.08	.06	--
	19	2100	<.10	.07	.63	.70	.01	<.01	--
	20	0700	<.10	.08	.62	.70	.01	.01	--
	20	1900	<.10	.06	.54	.60	.01	<.01	--
	21	0100	<.10	.05	.65	.70	.03	<.01	--
					1990				
Mar.	31	2315	1.8	0.06	1.2	1.3	0.09	0.05	28
Apr.	01	0515	2.0	.08	1.0	1.1	.08	.06	24
	01	0715	2.5	.05	.85	.90	.06	.03	18
	01	0915	2.1	.05	.95	1.0	.07	.03	22
	01	1215	1.7	.04	.86	.90	.04	.02	15

Table 36.--*Storm-event sample water-quality analyses at site B1, April 11-12, 1989; July 18-20, 1989; and March 31, 1990*

LOCATION.--Lat 35°18'41", long 76°43'28"; Beaufort County, on right bank of agricultural drainage canal about 100 ft downstream from flashboard riser; 0.2 mi north of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455130.

DRAINAGE AREA.--Approximately 93 acres (0.145 mi^2).

REMARKS.--ft, foot; mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; <, less than; N, nitrogen; P, phosphorus. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
					1989				
Apr.	11	0315	2.50	0.035	121	6.6	17.0	10.0	103
	11	0515	2.67	.50	126	6.5	17.0	10	103
	11	0715	2.87	1.5	129	--	--	--	--
	11	0915	3.00	2.5	129	--	18.0	--	--
	11	1145	3.10	3.2	135	--	18.5	--	--
	11	1415	3.20	4.1	138	6.4	17.5	--	--
	12	1230	--	--	192	6.0	18.5	10	106
	12	1630	--	--	162	6.0	18.5	--	--
	12	2000	--	--	166	6.1	18.0	--	--
July	18	1930	2.57	.43	200	6.8	26.0	5.4	67
	18	2330	2.65	.80	190	--	--	--	--
	19	0330	2.66	.84	200	--	--	--	--
	19	0730	2.64	.75	200	--	--	--	--
	19	1530	2.56	.38	180	--	--	--	--
	20	0530	2.47	.044	205	--	--	--	--
					1990				
Mar.	31	1200	3.13	--	240	6.0	15.5	6.5	65
	31	1600	3.90	--	109	--	--	--	--
	31	1700	3.95	--	109	--	--	--	--
	31	1800	3.84	--	109	--	--	--	--
	31	2400	3.40	--	174	--	--	--	--

Date		Time	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
					1989				
Apr.	11	0315	1.0		--	1.7	0.10	0.05	58
	11	0515	1.6	--	--	1.8	.07	.04	52
	11	0715	2.4	--	--	.70	.06	.03	39
	11	0915	2.6	--	--	1.6	.06	.03	34
	11	1145	3.0	--	--	1.5	.07	.04	40
	11	1415	3.6	--	--	1.7	.05	.02	24
	12	1230	4.4	--	--	1.7	.03	.01	13
	12	1630	4.4	--	--	<.20	.03	.01	16
	12	2000	4.3	--	--	.60	.03	.02	13
July	18	1930	2.1	0.14	0.86	1.0	.05	.02	43
	18	2330	2.2	.09	1.2	1.3	.07	.03	16
	19	0330	2.3	.10	.50	.60	.06	.03	25
	19	0730	2.4	.13	.27	.40	.06	.03	--
	19	1530	2.4	.14	.46	.60	.05	.02	433
	20	0530	2.1	.16	.44	.60	.05	.08	23
					1990				
Mar.	31	1200	6.1	0.20	0.80	1.0	0.05	0.02	24
	31	1600	2.9	.80	3.9	4.7	.68	.21	1,110
	31	1700	2.9	.82	2.2	3.0	.49	.21	429
	31	1800	2.9	.64	2.0	2.6	.40	.17	398
	31	2400	5.4	.43	2.0	2.4	.11	.08	34

Table 37.--*Storm-event sample water-quality analyses at site B2, April 12, 1989; July 19-20, 1989; and March 31, 1990*

LOCATION.--Lat 35°17'20", long 76°41'45"; Beaufort County, on right bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455143.

DRAINAGE AREA.--Approximately 47 acres (0.074 mi^2).

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
					1989				
Apr.	12	1130	2.04	--	168	6.1	7.0	9.8	80
	12	1430	1.99	--	171	--	--	--	--
	12	1730	1.94	--	172	--	--	--	--
	12	2030	1.89	--	187	6.0	6.5	--	--
	12	2230	1.87	--	188	--	--	--	--
July	19	0030	1.51	0.25	270	6.9	22.5	4.8	56
	19	0430	1.52	.25	255	6.9	23	--	--
	19	0830	1.46	.19	250	--	23.5	--	--
	19	1630	1.49	.47	275	--	23	--	--
	19	2030	1.40	.28	260	6.8	22.5	--	--
	20	0830	1.35	.13	270	6.7	22.5	--	--
					1990				
Mar.	31	1500	1.88	0.84	251	6.3	14.5	6.5	64
	31	1700	2.02	.97	251	--	--	--	--
	31	2000	2.12	.96	251	--	--	--	--
	31	2100	2.11	.84	251	--	--	--	--
	31	2400	2.04	.75	251	--	--	--	--

Date		Time	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
					1989				
Apr.	12	1130	4.6	--	--	0.50	0.06	0.03	11
	12	1430	4.6	--	--	1.1	.06	.03	--
	12	1730	4.5	--	--	1.0	.06	.04	--
	12	2030	4.4	--	--	1.5	.05	.03	--
	12	2230	4.4	--	--	.90	.05	.03	--
July	19	0030	5.2	0.09	3.3	3.4	.06	.05	41
	19	0430	5.2	.09	1.1	1.2	.07	.04	259
	19	0830	5.2	.08	1.2	1.3	.06	.04	19
	19	1630	4.9	.06	.74	.80	.06	.03	145
	19	2030	4.5	.06	1.0	1.1	.07	.05	127
	20	0830	3.8	.07	1.4	1.5	.06	.04	99
					1990				
Mar.	31	1500	7.0	0.32	0.98	1.3	0.08	0.06	26
	31	1700	8.1	.63	.87	1.5	.13	.07	19
	31	2000	8.1	.74	.76	1.5	.13	.08	34
	31	2100	7.6	.65	1.2	1.8	.16	.10	38
	31	2400	7.5	.46	.94	1.4	.13	.12	33

Table 38.--*Storm-event sample water-quality analyses at site B3, April 12, 1989; July 18-20, 1989; and March 31, 1990*

LOCATION.--Lat 35°17'10", long 76°41'50"; Beaufort County, on left bank of agricultural drainage canal without flashboard riser; 0.2 mi south of State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455141.

DRAINAGE AREA.--Approximately 68 acres (0.106 mi^2).

REMARKS.--mi, mile; mi^2, square mile; ft^3/s, cubic foot per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius (°C); mg/L, milligram per liter; --, no data; N, nitrogen; P, phosphorus. Rounding may result in total nitrogen concentrations that are not equal to the sum concentrations of the forms of nitrogen.

Date		Time	Water level (feet above sea level)	Streamflow, instantaneous (ft^3/s)	Specific conductance (µS/cm)	pH (standard units)	Temperature of water (°C)	Dissolved oxygen (mg/L)	Dissolved oxygen (percent saturation)
					1989				
Apr.	12	1130	1.45	--	187	5.8	8.0	10.4	87
	12	1230	1.46	--	197	--	--	--	--
	12	1530	1.50	--	194	--	--	--	--
	12	1700	1.57	--	196	--	--	--	--
	12	1900	1.52	--	204	--	--	--	--
	12	2100	1.43	--	231	--	--	--	--
	12	2230	1.32	--	206	--	--	--	--
July	18	2400	1.21	0.15	320	7.0	29.0	5.2	68
	19	0800	1.26	.058	350	--	--	--	--
	19	2000	1.29	.067	350	--	--	--	--
	20	0200	1.00	.082	390	--	--	--	--
	20	1000	1.05	.056	375	--	--	--	--
	20	1400	.98	.045	380	--	--	--	--
					1990				
Mar.	31	1500	1.57	--	273	6.6	15.0	7.2	72
	31	1700	1.65	--	273	--	--	--	--
	31	2000	1.71	--	273	--	--	--	--
	31	2100	1.72	--	273	--	--	--	--
	31	2400	1.66	--	273	--	--	--	--

Date		Time	Total nitrogen, NO_2+NO_3 (mg/L as N)	Total nitrogen, ammonia (mg/L as N)	Total nitrogen, organic (mg/L as N)	Total nitrogen, ammonia + organic (mg/L as N)	Total phosphorus (mg/L as P)	Total phosphorus, ortho (mg/L as P)	Suspended sediment (mg/L)
					1989				
Apr.	12	1130	4.1	--	--	0.60	0.03	0.02	8
	12	1230	4.0	--	--	1.1	.04	.02	10
	12	1530	4.1	--	--	.30	.03	.02	10
	12	1700	4.1	--	--	1.0	.03	.02	8
	12	1900	3.8	--	--	.60	.05	.02	8
	12	2100	3.7	--	--	.30	.04	.02	9
	12	2230	4.1	--	--	.60	.04	.02	9
July	18	2400	1.7	0.14	0.66	.80	.11	.06	100
	19	0800	1.8	.13	4.8	4.9	.08	.04	249
	19	2000	1.7	.13	2.9	3.0	.08	.02	296
	20	0200	1.4	.16	.24	.40	.07	.03	13
	20	1000	1.4	.14	.46	.60	.08	.03	16
	20	1400	1.3	.02	1.9	1.9	.17	.08	23
					1990				
Mar.	31	1500	3.1	0.05	1.2	1.2	0.30	0.14	59
	31	1700	3.0	.08	1.3	1.4	.32	.18	39
	31	2000	3.1	.08	.92	1.0	.22	.15	18
	31	2100	3.2	.06	.84	.90	.19	.13	23
	31	2400	3.2	.05	.75	.80	.17	.09	22

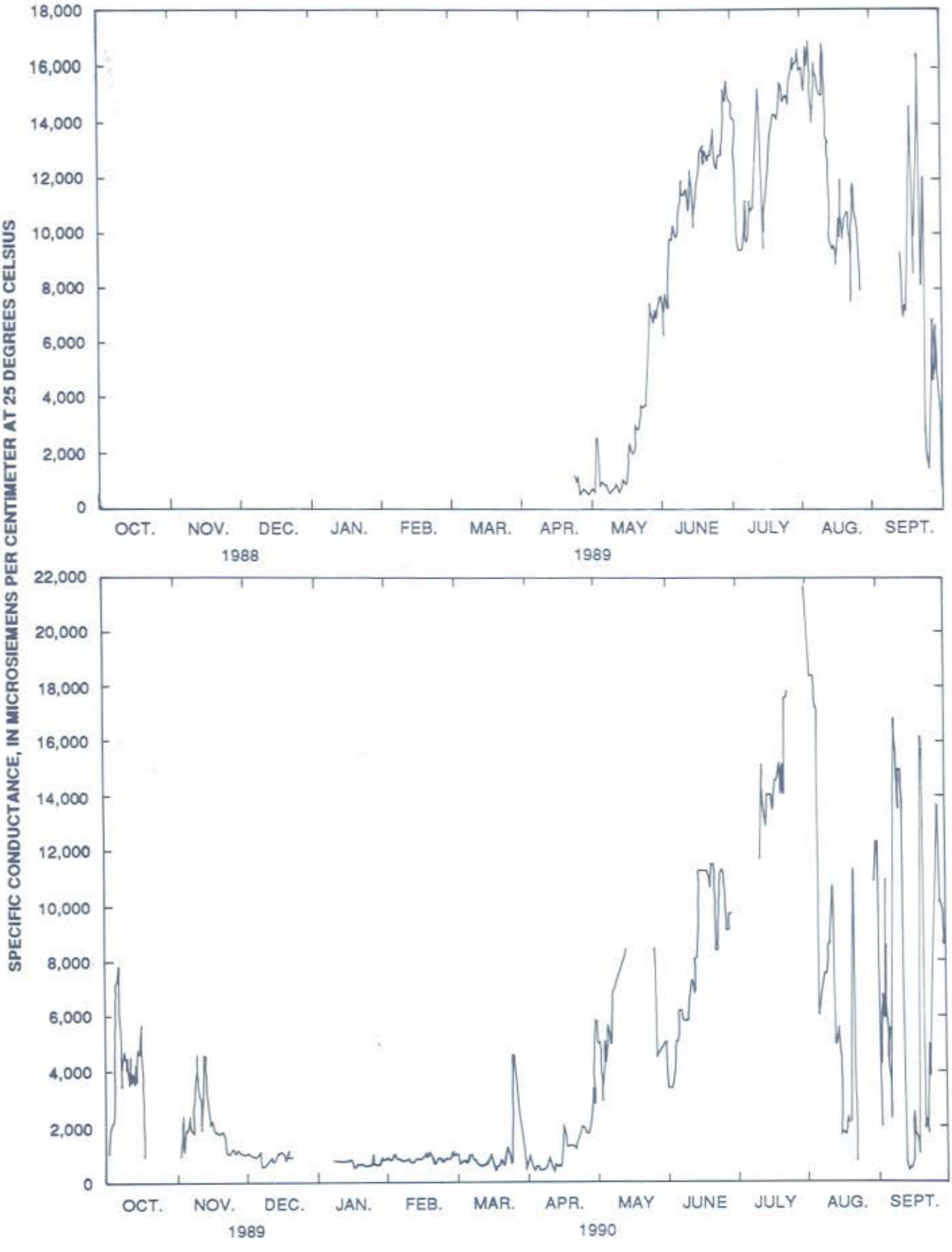

Figure 6.--Specific conductance for composite samples at site H1.

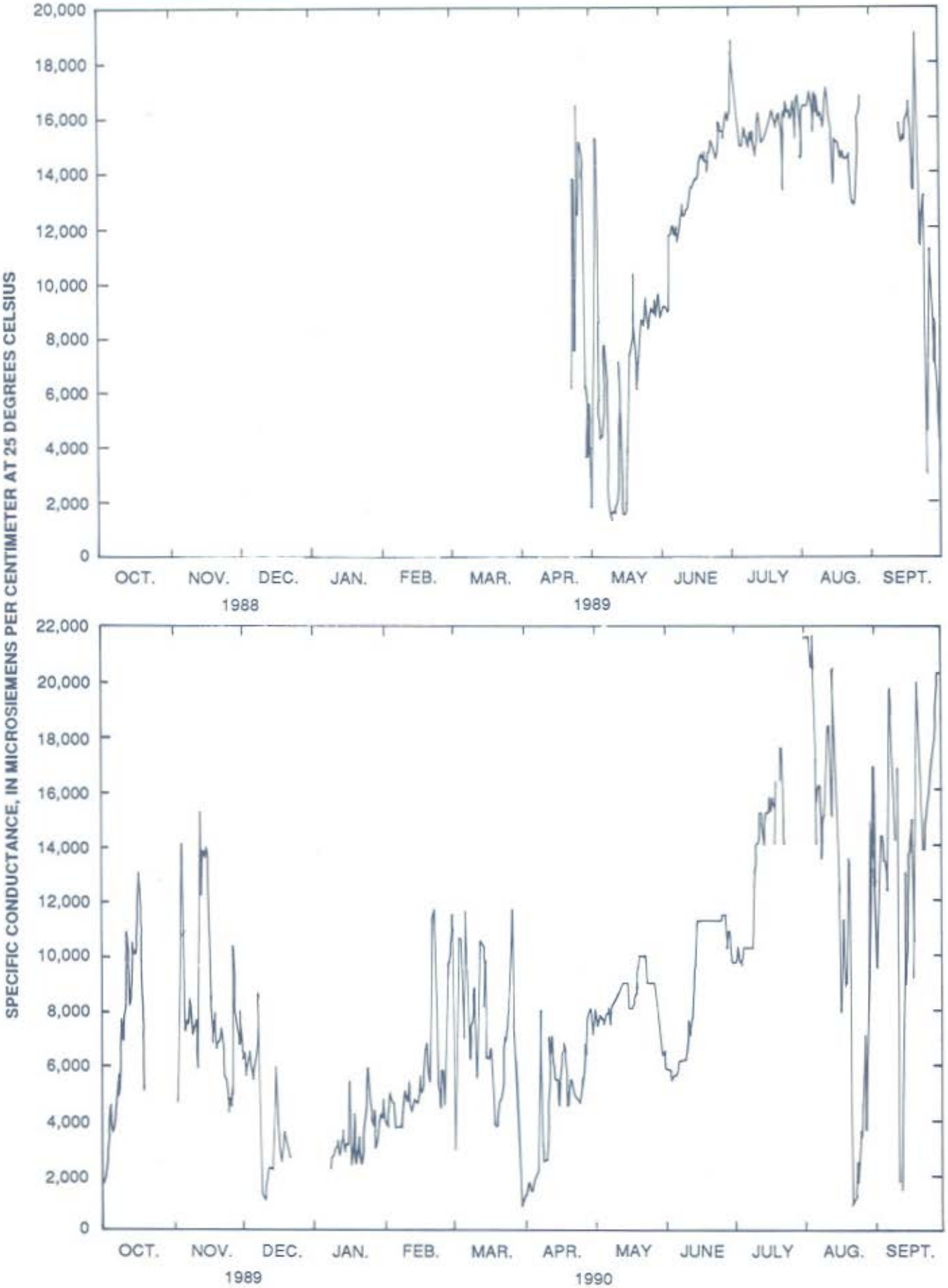

Figure 7.--Specific conductance for composite samples at site H2.

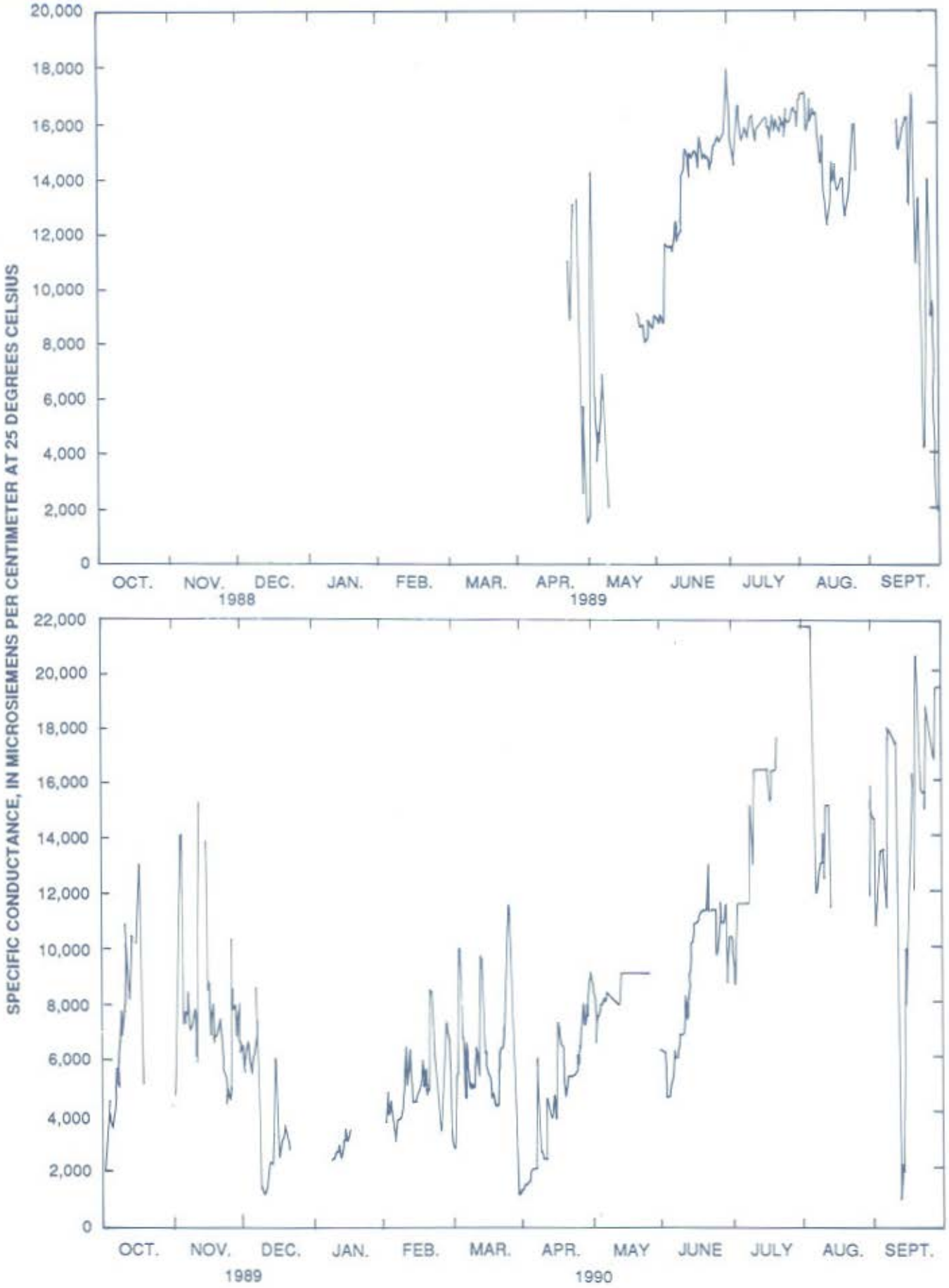

Figure 8.--Specific conductance for composite samples at site H3.

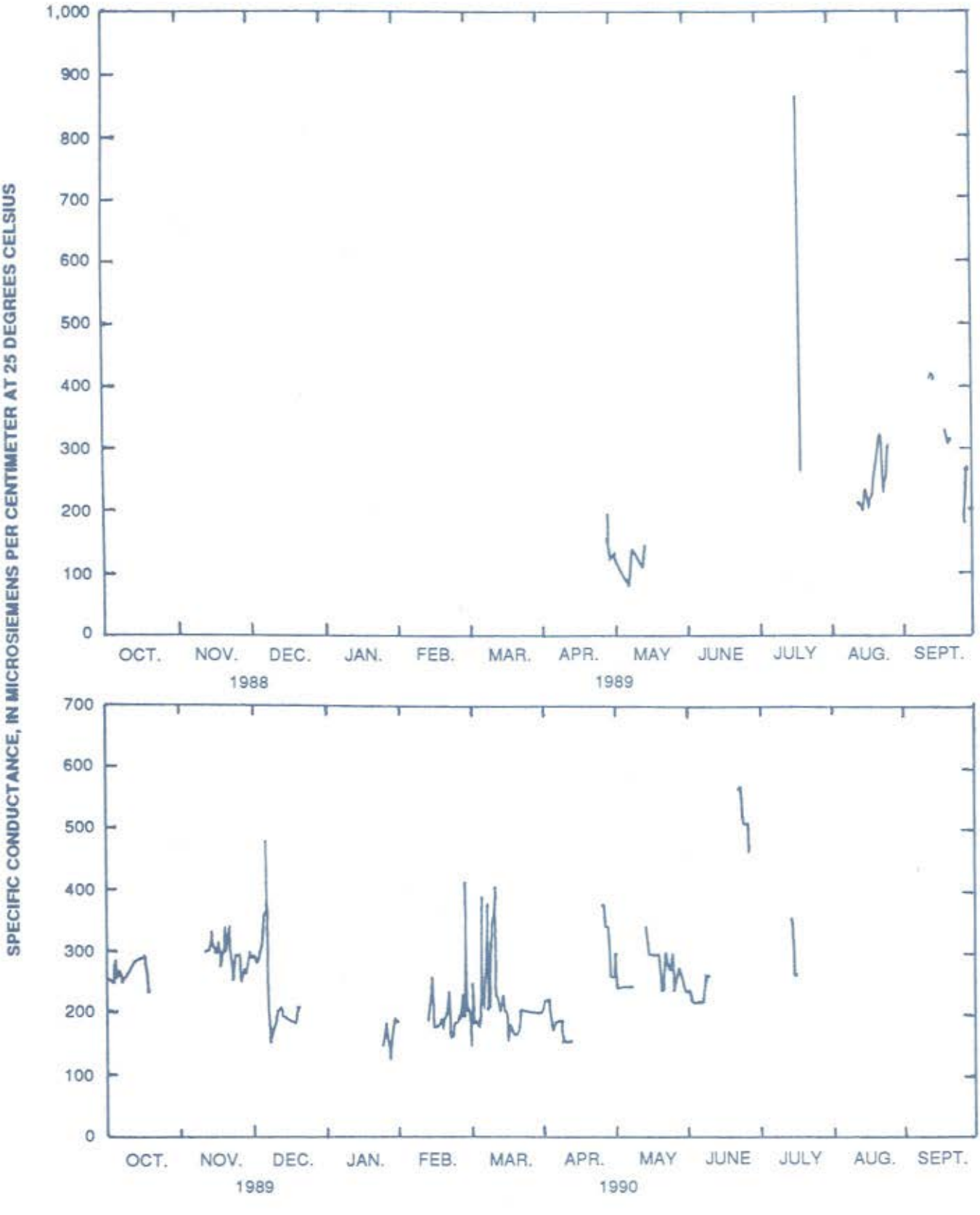

Figure 9.--Specific conductance for composite samples at site B1.

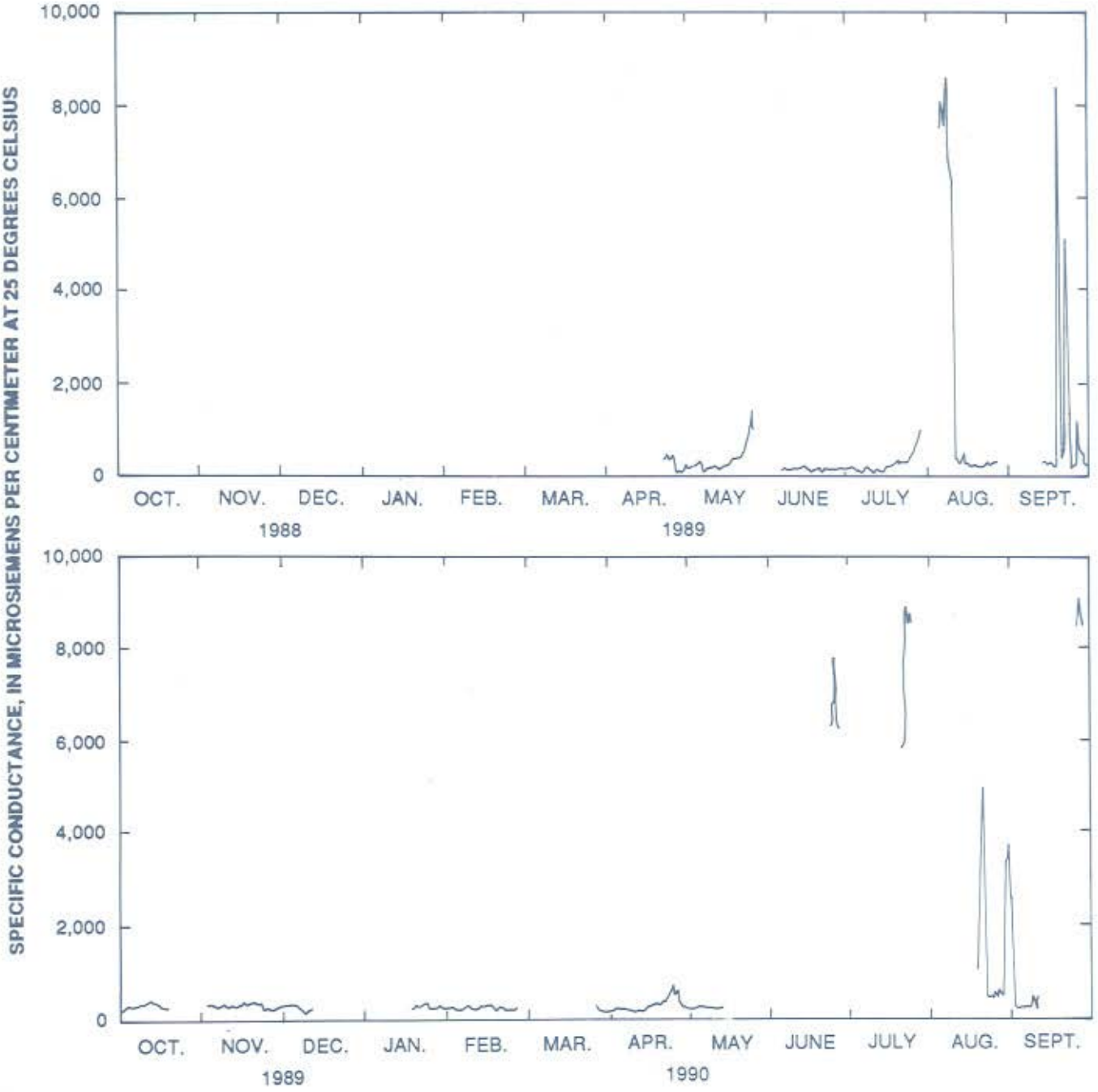

Figure 10.--Specific conductance for composite samples at site B2.

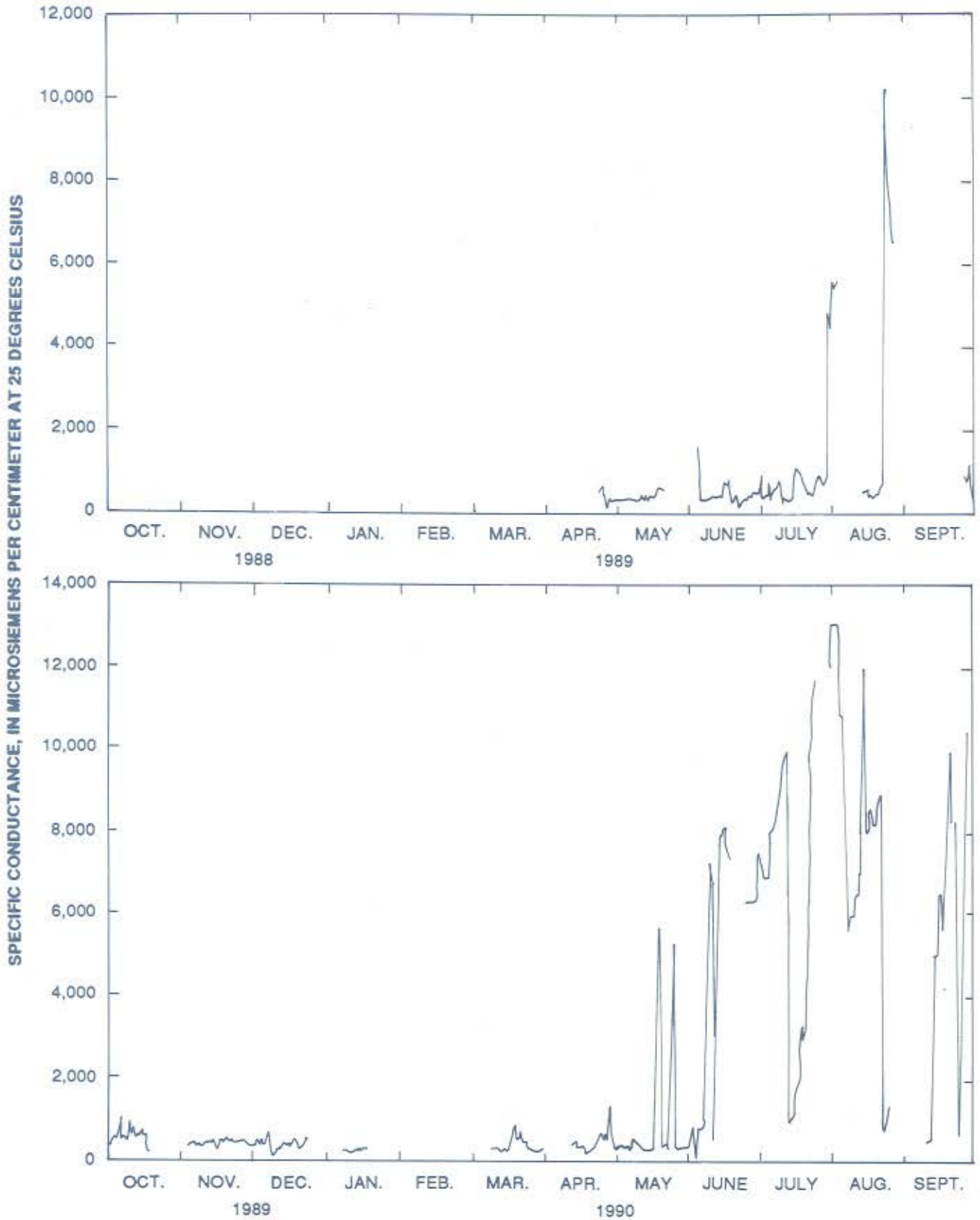

Figure 11.--Specific conductance for composite samples at site B3.

Table 39.--*Vertical profiles of salinity at site C1, October 1988-September 1990*

LOCATION.--Lat 35°17'13", long 76°41'13"; Beaufort County, on right bank of Campbell Creek, which receives inflow from sites B2 and B3; on State Road 33, 5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455145. Measurements were made from bridge at mid-point of creek.

DRAINAGE AREA.--Approximately 5,120 acres (8 mi^2).

REMARKS.--mi, mile; mi^2, square mile; --, no data.

SALINITY, PARTS PER THOUSAND, OCTOBER 1988-SEPTEMBER 1990

Date	Time	Depth (feet below water surface) 0.1	1.0	2.0	3.0	4.0	5.0	6.0
10-26-88	1230	--	17.6	17.6	18.9	19.5	19.5	19.5
01-19-89	1230	--	20.2	20.7	20.7	20.7	20.7	--
02-09-89	1430	15.7	17.0	18.8	19.0	19.0	--	--
03-22-89	1330	2.1	2.2	2.2	7.1	8.9	9.4	--
03-29-89	1230	1.4	4.1	11.0	11.4	11.5	--	--
04-20-89	1500	--	.6	1.2	2.0	3.4	3.4	--
04-26-89	1300	--	1.1	5.3	5.9	6.3	6.3	6.3
05-10-89	1300	.5	.7	1.3	2.8	4.4	4.4	--
05-22-89	1200	.8	--	2.7	--	4.6	--	4.6
05-23-89	1030	.6	1.4	2.4	4.0	4.5	4.6	4.6
06-07-89	1300	5.9	5.9	5.9	5.9	5.9	5.9	--
06-20-89	1300	5.8	5.8	5.8	5.8	5.8	5.8	--
06-28-89	0830	1.5	--	5.2	--	6.3	6.3	--
07-04-89	1130	4.3	4.3	4.3	5.5	5.5	5.8	--
07-20-89	1330	1.5	4.2	5.4	5.5	5.6	5.6	5.6
08-03-89	1230	6.0	6.0	6.0	6.1	6.1	6.1	6.1
08-15-89	1500	4.5	4.7	4.9	5.0	5.5	5.9	6.1
08-29-89	1300	1.4	4.1	9.5	9.5	9.5	9.5	9.5
10-13-89	1300	1.6	5.6	6.4	6.6	6.6	6.6	6.6
11-03-89	0830	.9	1.1	1.2	1.4	2.0	2.4	2.5
11-14-89	1500	6.5	7.0	7.1	7.2	7.7	7.8	--
11-30-89	1500	4.8	7.0	7.3	7.4	7.4	7.4	--
12-12-89	1230	1.1	1.3	1.5	2.1	5.4	6.9	6.9
01-10-90	1530	2.5	2.7	3.2	4.3	4.6	4.7	--
01-19-90	1000	.9	1.4	2.4	5.7	6.3	6.6	--
02-01-90	1400	1.6	3.4	6.2	6.6	6.6	--	--
02-14-90	1230	2.7	6.2	6.6	6.6	6.6	6.6	--
03-15-90	1730	1.5	4.6	5.3	5.5	5.6	5.6	--
04-01-90	1030	.7	.9	1.2	3.8	6.4	6.6	6.6
04-11-90	0930	.9	1.2	1.2	3.6	4.0	4.0	--
04-27-90	0900	1.1	3.6	4.6	4.8	4.8	4.6	--
05-15-90	1430	2.6	2.6	3.7	4.2	4.3	4.3	4.3
05-15-90	1430	1.4	2.7	3.3	3.7	3.9	3.7	--
06-15-90	1400	6.2	6.3	6.3	6.3	6.3	6.3	6.3
06-28-90	0830	5.3	5.3	5.6	5.6	5.6	5.6	--
07-12-90	0900	6.5	6.5	6.5	6.5	6.5	--	--
08-02-90	1430	8.4	8.4	8.4	8.4	8.4	8.4	--
08-17-90	1100	8.0	8.0	8.0	8.0	8.0	8.0	--
09-12-90	1600	1.3	1.4	1.4	1.4	1.5	1.6	--
09-27-90	1400	9.8	9.8	9.8	9.8	10.2	10.2	10.2

Table 40.--*Vertical profiles of salinity at site C2, November 1989-September 1990*

LOCATION.--Lat 35°17'30", long 76°40'33"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.75 mi downstream from site C1 at N.C. Highway 33 bridge, 6 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455165. Measurements were made within 3 ft of sensor housing.

DRAINAGE AREA.--6,342 acres (9.9 mi^2).

REMARKS.--mi, mile; ft, foot; mi^2, square mile; --, no data.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

Date	Time	Depth (feet below water surface) 0.1	1.0	2.0	3.0	4.0	5.0	6.0	7.0
11-03-89	1355	2.4	4.7	5.4	6.1	6.5	6.8	6.8	--
12-12-89	0930	--	1.8	4.3	7.9	8.2	8.5	--	--
01-08-90	1445	--	--	.8	4.1	4.9	6.1	6.4	--
02-14-90	0930	5.2	5.3	5.3	5.6	5.8	5.9	--	--
02-15-90	1000	4.2	--	--	5.6	6.3	--	--	--
03-15-90	1500	--	6.8	7.0	7.2	7.3	7.3	7.6	7.6
03-20-90	1330	7.2	7.2	7.2	7.2	7.2	7.2	--	--
05-14-90	1130	4.1	--	--	4.2	4.4	--	--	--
05-15-90	1600	--	--	--	4.2	4.4	4.4	--	--
06-13-90	1100	--	6.1	6.1	6.2	6.3	6.3	6.3	--
07-12-90	1130	--	5.2	5.2	5.2	--	--	--	--
08-14-90	1310	9.2	9.2	9.5	9.7	9.9	10.1	10.0	--
08-17-90	1415	9.0	9.0	9.0	9.0	9.0	9.1	--	--
09-26-90	1240	9.0	9.1	9.1	9.2	9.2	--	--	--
09-27-90	0930	10.2	10.4	10.6	11.3	11.5	11.7	--	--

Table 41.--*Vertical profiles of salinity at site C3, November 1989-September 1990*

LOCATION.--Lat 35°17'25", long 76°39'48"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.75 mi downstream from site C2, 6.5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455175. Measurements were made within 3 ft of sensor housing.

DRAINAGE AREA.--7,501 acres (11.7 mi^2).

REMARKS.--mi, mile; ft, foot; mi^2, square mile; --, no data.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

Date	Time	Depth (feet below water surface)							
		0.1	1.0	2.0	3.0	4.0	5.0	6.0	7.0
11-03-89	1340	5.9	6.3	6.3	6.3	6.4	7.2	7.7	7.7
12-12-89	0930	--	4.4	5.4	8.2	9.2	10.1	10.2	10.2
01-08-90	1430	--	--	2.8	2.9	--	--	--	--
02-14-90	0930	5.7	5.7	5.7	5.9	7.4	7.4	7.4	--
02-15-90	0950	--	--	--	6.6	6.9	--	--	--
03-15-90	1530	--	6.0	6.3	6.7	7.5	7.5	7.8	--
03-20-90	1300	--	8.0	8.0	8.0	8.0	--	8.0	--
05-14-90	1120	--	--	--	4.8	4.8	4.8	4.8	4.8
05-15-90	1600	--	--	--	--	5.1	5.1	5.1	--
06-13-90	1100	--	6.4	6.4	6.4	6.4	6.4	6.4	--
07-12-90	1100	--	--	5.8	--	5.8	--	5.8	--
08-14-90	1408	9.7	9.9	10.0	10.1	10.5	10.5	--	--
08-17-90	1430	9.3	9.3	9.3	9.3	9.3	9.2	9.3	--
09-26-90	1250	9.8	9.8	9.8	10.0	11.7	11.7	--	--
09-27-90	1230	10.6	10.6	10.7	10.7	12.1	12.4	12.4	--

Table 42.--*Vertical profiles of salinity at site C4, November 1989-September 1990*

LOCATION.--Lat 35°16'55", long 76°39'12"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 1 mi downstream from site C3, 7 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455195. Measurements were made within 3 ft of sensor housing.

DRAINAGE AREA.--9,306 acres (14.5 mi^2).

REMARKS.--mi, mile; ft, foot; mi^2, square mile; --, no data.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

Date	Time	Depth (feet below water surface)							
		0.1	1.0	2.0	3.0	4.0	5.0	6.0	7.0
11-03-89	1330	5.8	5.8	5.8	6.1	6.1	6.4	7.1	7.5
12-12-89	0900	--	4.3	8.2	9.2	9.9	10.1	10.4	--
01-08-90	1400	--	--	2.9	3.0	2.9	--	--	--
02-14-90	1000	6.5	6.5	6.5	6.5	7.2	8.1	8.1	--
02-15-90	0945	--	--	--	6.8	7.1	--	--	--
03-15-90	1500	--	5.6	5.6	5.7	6.5	7.2	7.5	--
03-20-90	1330	--	8.3	8.3	8.3	8.5	8.8	9.0	--
05-14-90	1115	--	--	--	5.2	5.2	5.2	5.2	4.7
05-15-90	1530	--	--	--	--	5.1	5.1	5.1	--
06-13-90	1030	--	6.6	6.6	6.6	6.6	6.7	6.7	--
07-12-90	1100	--	--	6.3	6.3	6.3	6.3	6.3	--
08-14-90	1430	10.1	10.0	10.0	10.0	10.2	10.3	--	--
08-17-90	1400	9.5	9.6	9.6	9.5	9.5	9.5	9.6	--
09-26-90	1300	10.1	10.3	10.3	10.3	11.6	12.0	--	--
09-27-90	1203	11.6	11.6	11.7	11.7	11.8	12.1	12.5	--

Table 43.--*Vertical profiles of salinity at site C5, November 1989-September 1990*

LOCATION.--Lat 35°17'00", long 76°38'12"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.90 mi downstream from site C4, 8 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455205. Measurements were made within 3 ft of sensor housing.

DRAINAGE AREA.--10,835 acres (16.9 mi^2).

REMARKS.--mi, mile; ft, foot; mi^2, square mile; --, no data.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

		Depth (feet below water surface)							
Date	Time	0.1	1.0	2.0	3.0	4.0	5.0	6.0	7.0
11-03-89	1300	7.1	7.1	7.1	7.1	7.6	7.6	7.9	7.9
12-12-89	0900	--	4.4	4.5	8.2	8.7	9.2	10.4	10.4
01-08-90	1500	--	5.7	5.7	5.9	--	--	--	--
01-23-90	1100	--	7.6	7.6	7.6	7.6	7.7	7.7	7.7
02-14-90	0930	7.4	7.4	7.4	7.4	7.7	8.2	8.2	--
02-15-90	0940	--	--	--	7.2	7.3	--	--	--
03-15-90	1500	--	5.7	5.7	5.8	5.8	6.8	7.3	--
03-20-90	1330	--	9.9	9.9	9.9	9.9	10.1	10.2	--
05-14-90	1110	--	--	--	5.2	5.2	5.2	5.2	--
05-15-90	1530	--	--	--	--	5.8	5.8	5.8	--
06-13-90	1030	--	7.3	7.3	7.3	7.3	7.3	7.3	--
07-12-90	1100	--	--	6.6	6.6	6.6	6.6	6.6	--
08-14-90	1500	10.3	10.4	10.4	10.5	10.6	10.7	10.7	--
08-17-90	1315	10.0	10.0	10.0	10.0	10.2	10.1	10.0	--
09-26-90	1300	10.5	11.6	11.8	11.8	11.8	12.4	12.4	--
09-27-90	1230	11.8	11.8	12.2	12.2	12.2	12.2	12.2	12.3

Table 44.--*Vertical profiles of salinity at site C6, November 1989-September 1990*

LOCATION.--Lat 35°17'12", long 76°37'23"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.80 mi downstream from site C5, 9 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455220. Measurements were made within 3 ft of sensor housing.

DRAINAGE AREA.--12,755 acres (19.9 mi^2).

REMARKS.--mi, mile; ft, foot; mi^2, square mile; --, no data.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

Date	Time	Depth (feet below water surface) 0.1	1.0	2.0	3.0	4.0	5.0	6.0	7.0
11-03-89	1245	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
12-12-89	0900	--	8.0	8.0	9.2	9.7	10.4	10.4	10.4
01-08-90	1330	--	--	5.5	5.8	5.9	--	--	--
02-14-90	1000	7.7	7.7	7.7	7.7	7.7	8.1	--	--
02-15-90	0930	--	--	--	7.3	7.6	--	--	--
03-15-90	1430	--	6.2	6.2	6.2	6.2	6.2	7.3	7.4
03-20-90	1300	--	10.1	10.1	10.1	10.1	10.1	10.1	10.1
05-14-90	1100	--	--	--	--	5.3	5.3	5.3	5.3
05-15-90	1530	--	--	--	--	5.9	5.9	5.9	--
06-13-90	1030	--	7.3	7.4	7.5	7.5	7.5	7.5	7.5
07-12-90	1030	--	--	7.4	7.4	7.4	7.4	7.4	--
08-14-90	1515	10.4	10.5	10.5	10.8	10.9	10.9	11.0	--
08-17-90	1315	10.3	10.2	10.2	10.3	10.3	10.3	10.2	10.2
09-26-90	1315	11.3	11.3	11.4	11.4	11.6	12.1	12.3	--
09-27-90	1320	12.1	12.1	12.1	12.2	12.2	12.3	13.0	--

Table 45.--*Daily mean values of salinity at site C2, November 1989-September 1990*

LOCATION.--Lat 35°17'30", long 76°40'33"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.75 mi downstream from site C1 at N.C. Highway 33 bridge, 6 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455165. Salinity sensor positioned about 2 1/2 ft above bottom of channel.

DRAINAGE AREA.--6,342 acres (9.9 mi^2).

PERIOD OF RECORD.--November 1989 through September 1990.

REMARKS.--mi, mile; ft, foot; mi^2, square mile; ppt, parts per thousand; ---, no data. Maximum recorded salinity (12.4 ppt) occurred on September 28 and September 30, 1990; minimum recorded salinity (1.7 ppt) occurred on December 10, 1989.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	7.9	6.1	7.9	6.5	7.8	4.9	4.4	6.3	8.9	8.9
2	---	8.0	6.5	7.5	6.8	7.6	4.9	4.8	6.4	9.1	8.7
3	---	7.8	7.6	7.4	6.2	7.6	4.8	5.2	6.4	9.1	8.4
4	---	7.9	7.8	6.7	6.0	7.6	4.5	5.7	6.4	9.2	7.5
5	---	8.4	8.1	6.8	5.6	6.7	4.1	5.7	6.4	9.0	7.2
6	7.7	10.5	8.3	7.6	5.7	5.6	4.1	5.6	6.5	9.3	7.8
7	8.4	9.8	8.3	7.8	4.9	6.2	4.5	5.4	6.7	9.3	8.0
8	9.5	9.5	---	8.0	4.2	5.1	4.5	6.0	6.7	9.2	9.1
9	9.2	8.5	---	7.6	4.6	---	4.4	5.7	6.6	8.8	9.5
10	9.3	5.4	---	6.6	4.6	---	4.4	5.6	6.5	8.9	9.0
11	9.1	---	---	6.5	5.2	---	4.3	6.2	6.6	9.6	8.6
12	9.3	---	6.0	7.3	6.2	4.6	4.4	6.3	---	9.9	8.5
13	8.7	9.3	5.8	7.1	---	4.2	4.3	---	---	9.6	8.6
14	---	9.2	5.6	---	---	3.5	---	---	---	---	8.6
15	---	9.0	7.1	---	---	4.2	---	---	---	---	8.7
16	7.3	8.8	8.3	5.4	---	4.2	4.9	6.5	---	---	9.4
17	7.6	8.4	8.3	6.0	---	4.3	4.7	6.4	7.3	---	9.5
18	7.6	8.5	7.9	6.2	---	3.5	4.8	6.4	7.1	8.9	9.6
19	7.6	8.4	7.1	6.3	---	3.5	4.9	6.2	7.3	8.9	9.5
20	8.0	8.4	8.2	6.5	---	3.6	5.0	6.2	7.5	8.9	9.5
21	8.0	8.2	6.9	6.0	6.9	3.5	5.0	6.2	7.8	8.9	9.8
22	7.4	7.6	7.4	6.3	7.5	4.0	5.4	6.2	8.2	8.9	---
23	7.3	7.6	7.2	5.5	8.6	5.0	5.1	6.0	8.5	9.0	---
24	7.3	7.4	7.2	4.4	8.3	5.5	4.9	6.0	8.9	8.2	---
25	8.0	6.8	6.3	3.8	8.0	5.6	5.3	6.2	9.2	8.0	---
26	7.2	6.8	5.8	5.4	7.8	5.6	4.9	6.2	9.2	7.7	---
27	7.6	6.8	6.4	6.6	7.9	5.4	4.9	6.2	9.3	8.0	---
28	8.0	6.9	7.1	6.9	7.6	5.3	5.4	6.1	9.2	8.4	11.8
29	7.9	7.0	7.0	---	7.1	5.1	4.3	6.0	9.2	8.6	12.0
30	7.8	6.8	6.7	---	6.0	4.9	5.0	6.0	9.1	8.6	12.2
31	---	6.3	7.9	---	7.0	---	4.8	---	8.9	8.7	---

Table 46.--*Daily mean values of salinity at site C3, November 1989-September 1990*

LOCATION.--Lat 35°17'25", long 76°39'48"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.75 mi downstream from site C2, 6.5 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455175. Salinity sensor positioned about 2 1/2 ft above bottom of channel.

DRAINAGE AREA.--7,501 acres (11.7 mi^2).

PERIOD OF RECORD.--November 1989 through September 1990.

REMARKS.--mi, mile; ft, foot; mi^2, square mile; ppt, parts per thousand; ---, no data. Maximum recorded salinity (11.5 ppt) occurred on September 30, 1990; minimum recorded salinity (3.6 ppt) occurred on March 9, 1990.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	8.1	7.4	7.8	7.3	9.4	5.2	5.7	6.8	9.8	9.4
2	---	7.8	7.8	8.2	6.3	9.2	5.1	6.0	6.6	9.8	9.5
3	---	7.9	8.4	8.3	5.4	8.2	5.2	6.1	6.6	9.6	9.3
4	---	8.1	8.8	6.1	5.0	7.6	5.1	6.5	6.6	9.7	9.1
5	---	9.0	8.8	6.7	4.9	7.1	4.9	5.8	6.6	9.8	9.2
6	---	8.7	8.5	7.4	5.4	6.4	4.8	5.8	6.8	9.8	9.0
7	---	9.7	8.1	7.7	4.7	5.8	4.7	6.1	6.6	9.9	10.2
8	---	9.3	---	7.2	4.2	5.8	4.7	6.4	6.5	10.0	11.1
9	---	9.0	---	6.6	4.1	---	4.8	6.3	6.5	9.9	10.7
10	---	7.2	---	5.2	4.9	---	4.7	6.3	6.6	10.2	10.3
11	---	---	---	6.1	5.6	---	4.7	6.2	6.6	10.4	10.2
12	---	---	6.4	6.4	6.9	4.9	4.8	6.3	---	10.6	10.2
13	---	9.3	5.2	6.5	---	5.1	4.8	---	---	10.1	9.9
14	---	9.6	6.4	---	---	4.6	---	---	---	---	9.7
15	---	8.9	8.1	---	---	4.6	---	---	---	---	9.4
16	7.9	7.7	8.0	6.4	---	5.6	5.5	6.7	---	---	9.8
17	8.6	8.2	8.0	7.2	---	4.8	5.4	6.7	7.9	---	9.7
18	8.7	8.1	8.2	8.1	---	5.0	5.4	6.7	8.1	9.3	9.9
19	7.9	7.8	8.1	8.6	---	5.0	5.5	6.5	8.2	9.4	9.9
20	7.9	7.6	7.6	8.7	---	4.8	5.5	6.6	8.6	9.5	10.1
21	8.1	7.8	6.9	7.3	9.1	4.6	5.6	6.7	8.8	9.5	10.6
22	8.5	7.1	6.8	7.7	8.4	5.0	5.9	6.7	8.9	9.4	---
23	8.2	6.8	6.9	7.2	10.7	5.0	5.8	6.4	9.2	9.6	---
24	8.2	6.3	7.1	7.4	9.7	5.3	5.6	6.5	9.7	9.4	---
25	8.0	6.4	7.0	5.8	9.2	5.4	5.8	6.3	9.4	9.2	---
26	8.0	6.7	6.8	6.7	9.9	5.4	5.5	6.4	9.4	9.2	---
27	8.4	6.7	6.4	8.0	9.5	5.3	5.9	6.5	9.2	9.2	---
28	8.7	6.8	7.1	7.9	8.3	5.2	6.0	6.4	9.2	9.3	11.1
29	8.6	6.7	7.6	---	9.7	5.2	5.5	6.4	9.5	8.9	11.2
30	8.0	6.5	7.5	---	9.6	5.2	5.5	6.7	9.3	8.9	11.4
31	---	6.4	7.4	---	9.5	---	5.9	---	9.2	9.1	---

Table 47.--*Daily mean values of salinity at site C4, November 1989-September 1990*

LOCATION.--Lat 35°16'55", long 76°39'12"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 1 mi downstream from site C3, 7 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455195. Salinity sensor positioned about 2 1/2 ft above bottom of channel.

DRAINAGE AREA.--9,306 acres (14.5 mi^2).

PERIOD OF RECORD.--November 1989 through September 1990.

REMARKS.--mi, mile; ft, foot; mi^2, square mile; ppt, parts per thousand; ---, no data. Maximum recorded salinity (13.0 ppt) occurred on December 7, 1989; minimum recorded salinity (4.2 ppt) occurred on March 11, 1990.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	10.5	9.3	8.4	8.3	8.9	5.6	7.0	6.8	10.8	9.0
2	---	11.2	11.7	9.0	7.5	8.9	6.0	7.5	6.7	9.8	9.0
3	---	10.5	11.4	9.5	6.5	8.1	6.0	7.2	7.0	9.2	9.3
4	---	10.9	11.4	8.5	5.6	6.4	5.6	6.8	6.9	9.3	9.0
5	---	10.9	11.3	8.6	5.6	7.7	5.7	6.3	7.1	9.3	9.0
6	---	12.0	10.9	8.6	5.3	7.7	5.8	6.4	7.2	9.2	8.9
7	---	11.9	9.9	8.7	5.4	7.0	5.9	6.5	7.0	9.7	9.9
8	---	11.1	---	8.4	5.4	6.1	5.7	6.8	7.1	10.5	10.3
9	---	10.8	---	8.0	5.4	---	5.6	6.5	6.9	10.0	9.5
10	---	9.6	---	7.6	5.3	---	5.7	6.8	7.0	10.3	9.6
11	---	10.2	---	7.9	6.1	---	6.0	7.1	7.0	10.8	10.1
12	---	11.5	7.4	8.1	6.8	5.6	5.8	6.6	---	10.8	9.7
13	---	10.8	6.5	7.9	---	5.6	5.4	---	---	10.3	9.9
14	---	10.9	8.4	---	---	5.4	---	---	---	---	10.0
15	---	10.7	9.6	---	---	5.7	---	---	---	---	9.7
16	9.6	9.1	9.9	8.9	---	6.4	5.6	7.0	---	---	10.0
17	9.8	9.7	10.3	8.9	---	6.4	5.4	6.9	9.1	---	10.0
18	9.7	9.8	10.0	9.0	---	6.3	5.3	7.0	9.0	9.2	10.3
19	9.8	8.5	9.4	9.1	---	5.5	5.9	6.9	9.3	9.1	10.2
20	10.0	9.4	9.0	8.5	---	5.9	6.0	6.9	9.7	9.3	10.3
21	10.4	9.6	8.4	8.6	9.1	6.0	6.0	6.8	9.4	9.2	10.4
22	10.3	8.8	8.1	8.2	10.1	6.3	6.6	6.8	9.5	9.4	---
23	11.2	7.7	8.7	8.0	10.5	6.5	6.8	6.8	10.0	9.4	---
24	10.7	7.5	9.2	8.1	10.0	6.5	6.8	6.8	10.2	9.4	---
25	10.3	7.7	9.1	8.0	9.6	6.2	6.8	6.8	9.6	9.4	---
26	10.9	7.5	8.5	9.9	9.6	6.2	6.5	6.6	9.6	9.0	---
27	10.5	8.0	8.6	9.4	9.9	5.8	6.6	6.7	9.7	8.8	---
28	9.9	8.4	9.9	9.4	9.8	5.5	6.9	6.7	9.6	8.9	11.9
29	9.5	8.1	9.6	---	9.4	6.1	6.7	6.8	9.8	8.8	11.8
30	10.2	8.0	8.1	---	8.6	5.9	6.5	7.0	9.5	8.6	12.0
31	---	7.7	8.3	---	8.9	---	6.8	---	9.8	8.8	---

Table 48.--*Daily mean values of salinity at site C5, November 1989-September 1990*

LOCATION.--Lat 35°17'00", long 76°38'12"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.90 mi downstream from site C4, 8 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455205. Salinity sensor positioned about 2 1/2 ft above bottom of channel.

DRAINAGE AREA.--10,835 acres (16.9 mi^2).

PERIOD OF RECORD.--November 1989 through September 1990.

REMARKS.--mi, mile; ft, foot; mi^2, square mile; ppt, parts per thousand; ---, no data. Maximum recorded salinity (12.5 ppt) occurred on September 30, 1990; minimum recorded salinity (4.1 ppt) occurred on March 1 and March 8, 1990.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	8.9	9.9	8.8	5.1	---	5.5	7.0	6.8	10.2	8.8
2	---	8.9	9.1	9.3	4.9	---	5.4	7.0	6.8	10.0	8.8
3	---	8.7	9.3	9.2	5.1	---	5.4	6.7	7.1	10.0	9.1
4	---	9.0	8.7	9.0	5.1	---	5.3	6.7	7.3	10.0	8.7
5	---	9.2	8.7	9.2	5.2	---	5.2	6.8	7.3	10.2	8.6
6	---	9.7	9.0	9.1	5.2	---	5.2	7.0	7.3	10.5	8.9
7	---	9.8	8.9	9.1	5.0	---	5.3	6.9	7.4	11.4	9.3
8	---	9.9	---	9.0	4.8	---	5.2	6.8	7.3	11.4	9.1
9	---	9.7	---	9.0	5.3	---	5.2	6.6	7.2	10.9	9.2
10	---	8.9	---	8.8	5.6	---	5.3	6.8	7.3	10.6	9.5
11	---	---	---	9.4	5.9	---	5.1	7.1	7.4	10.5	9.3
12	---	---	---	9.3	6.0	6.9	5.2	7.1	---	10.3	9.6
13	---	8.7	---	9.4	---	6.9	5.1	---	---	10.3	9.8
14	---	9.3	---	---	---	6.6	---	---	---	---	10.0
15	---	9.2	---	---	---	7.4	---	---	---	---	9.9
16	8.9	8.5	---	8.0	---	6.4	6.0	7.2	---	---	10.0
17	8.2	8.9	---	8.6	---	5.5	5.8	7.2	9.5	---	10.2
18	8.3	8.7	---	8.5	---	5.9	5.7	7.0	9.5	10.1	10.2
19	8.6	8.1	---	8.2	---	6.8	5.9	6.9	9.7	10.0	10.3
20	8.2	8.0	---	8.0	---	6.1	6.0	7.0	9.6	10.0	10.7
21	8.5	8.2	---	7.8	---	6.2	6.1	7.0	9.1	9.9	10.8
22	8.6	7.1	---	7.8	---	5.9	6.4	6.7	9.7	9.9	---
23	8.7	6.9	---	8.4	---	5.9	6.3	6.8	10.2	9.9	---
24	8.8	6.7	8.3	8.3	---	5.7	6.3	6.7	9.9	9.8	---
25	8.7	7.1	8.4	8.4	---	5.7	6.8	6.8	9.5	9.5	---
26	8.6	7.0	8.2	9.0	---	5.7	6.6	7.0	9.7	9.3	---
27	8.6	6.9	9.0	7.0	---	5.6	6.6	6.9	9.7	9.0	---
28	8.7	6.9	9.7	6.8	---	5.6	6.9	7.0	9.4	8.9	12.1
29	8.9	7.1	9.4	---	---	5.5	6.6	6.8	9.5	8.6	11.8
30	8.9	6.6	9.1	---	---	5.5	6.6	6.9	9.3	8.7	12.3
31	---	7.2	9.1	---	---	---	6.9	---	10.2	8.8	---

Table 49.--*Daily mean values of salinity at site C6, November 1989-September 1990*

LOCATION.--Lat 35°17'12", long 76°37'23"; Beaufort County, on left side of channel in Campbell Creek, which receives drainage from agricultural drainage canals B2 and B3; 0.80 mi downstream from site C5, 9 mi east of Aurora; Hydrologic Unit 03020104; USGS downstream order identification number 0208455220. Salinity sensor positioned about 2 1/2 ft above bottom of channel.

DRAINAGE AREA.--12,755 acres (19.9 mi^2).

PERIOD OF RECORD.--November 1989 through September 1990.

REMARKS.--mi, mile; ft, foot; mi^2, square mile; ppt, parts per thousand; ---, no data. Maximum recorded salinity (12.7 ppt) occurred on August 8 and September 30, 1990; minimum recorded salinity (2.6 ppt) occurred on May 14, 1990.

SALINITY, PARTS PER THOUSAND, NOVEMBER 1989-SEPTEMBER 1990

DAY	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
1	---	9.6	8.0	9.3	4.6	6.8	5.6	7.5	7.5	10.5	8.1
2	---	9.5	8.3	9.2	3.6	6.8	5.7	7.3	7.6	10.3	9.2
3	---	9.6	9.0	9.1	4.0	6.9	5.8	7.0	7.6	10.3	9.6
4	---	10.9	9.0	8.3	4.2	6.5	5.6	7.4	7.6	10.4	9.2
5	---	10.6	8.9	8.9	4.0	6.7	5.5	7.5	7.8	10.5	9.2
6	---	10.4	8.6	9.0	4.5	6.9	5.4	7.6	7.8	10.5	9.6
7	---	10.3	8.5	8.7	4.4	7.1	5.4	7.2	7.9	11.5	9.6
8	---	10.0	---	8.8	3.8	6.8	5.4	7.1	7.9	11.7	9.3
9	---	9.9	---	8.7	4.5	---	5.3	7.0	7.7	11.2	9.3
10	---	9.9	---	8.3	4.7	---	5.3	7.4	7.8	10.4	9.8
11	---	9.6	---	9.0	5.3	---	5.4	7.3	8.1	10.5	9.6
12	---	8.2	7.3	9.4	5.6	6.3	5.4	7.4	---	10.8	9.4
13	---	7.8	7.8	9.2	---	6.2	5.3	---	---	11.0	9.5
14	---	8.5	8.6	---	---	6.1	4.7	---	---	---	9.6
15	---	8.4	8.5	---	---	6.2	---	---	---	---	9.5
16	9.0	8.0	8.3	8.8	---	6.0	6.1	7.3	---	---	9.6
17	9.9	8.1	8.2	9.2	---	5.6	5.9	7.1	9.0	---	9.5
18	9.7	8.2	8.0	9.1	---	5.4	6.0	7.1	9.2	9.6	9.6
19	9.9	8.0	8.0	9.1	---	5.2	6.4	7.2	9.3	9.3	9.9
20	9.8	7.7	8.0	9.3	---	5.5	6.2	7.2	9.4	9.3	9.8
21	10.0	7.7	7.8	9.0	10.6	6.1	6.3	7.3	9.4	8.7	9.8
22	10.0	7.3	8.3	8.9	10.5	5.9	6.5	7.2	9.4	8.3	---
23	9.9	8.7	8.3	9.6	10.4	5.9	6.3	7.1	9.6	8.2	---
24	10.0	8.7	8.4	9.3	10.1	6.0	7.0	7.4	9.8	8.2	---
25	9.6	9.4	8.1	9.8	9.7	5.8	7.2	7.4	9.8	8.2	---
26	9.6	9.3	8.6	9.3	9.4	5.9	6.9	7.4	9.7	8.4	---
27	9.6	8.9	9.6	7.7	9.1	5.8	7.3	7.4	9.7	8.3	---
28	9.5	8.7	9.8	6.4	9.1	5.8	7.4	7.5	9.8	8.3	12.4
29	9.6	8.3	9.4	---	9.0	5.8	7.3	7.5	9.8	8.5	12.4
30	9.6	8.2	9.3	---	7.9	5.7	7.3	7.4	10.0	8.5	12.4
31	---	8.2	9.4	---	6.6	---	7.4	---	11.1	8.5	---

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