T-6282

NEW RIVER BASIN

ONSLOW COUNTY

APPLICATION OF COASTAL REGULATION 2H.0404(C)

The North Carolina Department of Natural Resources

and Community Development

Division of Environmental Management

Water Quality Section

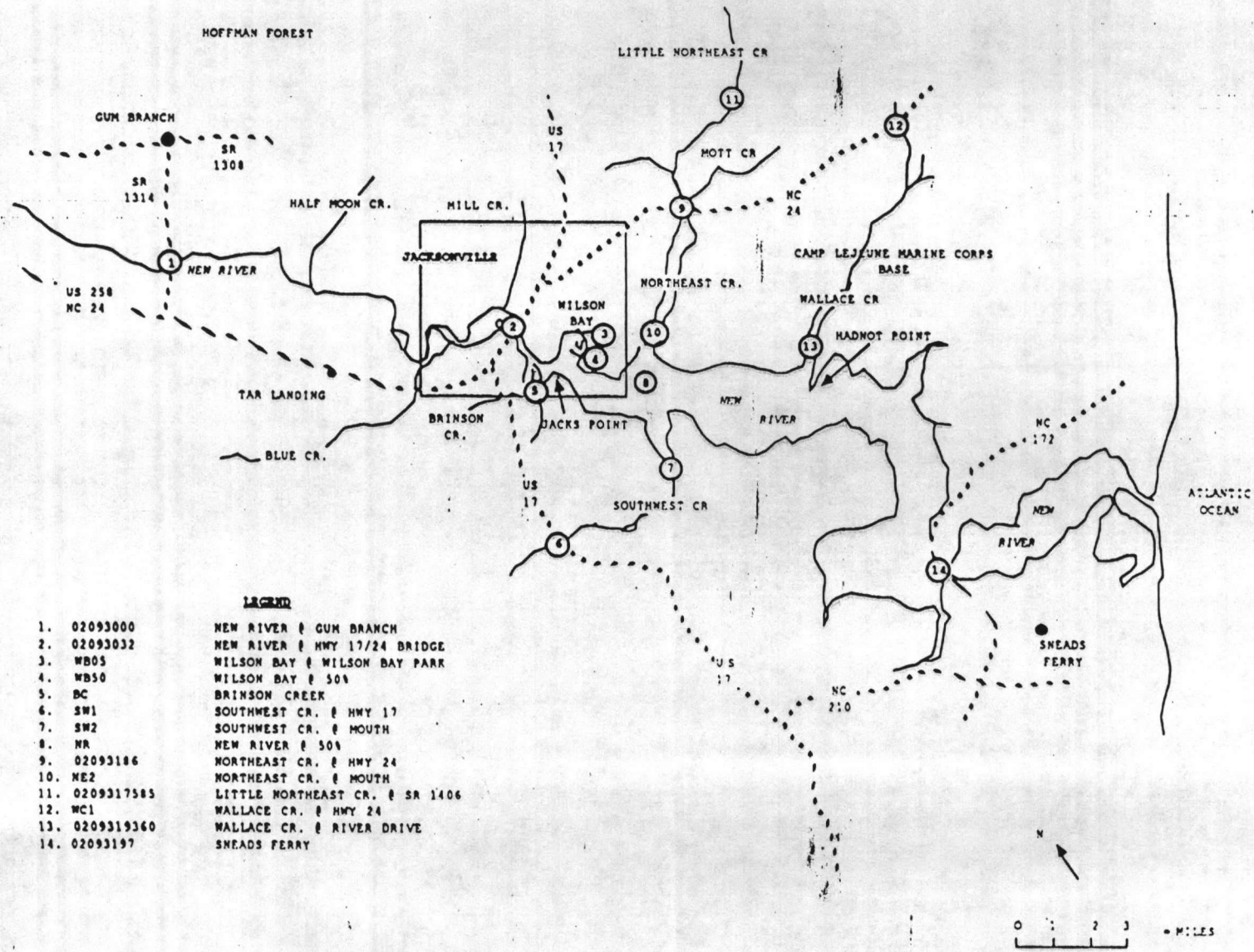
January 1987

INTRODUCTION

The New River is a blackwater river surrounded by gum-cypress swamp above Jacksonville where the River broadens and becomes significantly affected by tidal influences. Reports of decreases in anadromous fish populations, increasing frequency of fish kills, discoloration of waters, and low dissolved oxygen in the New River prompted the Wilmington Regional Office to request an investigation to assess water quality in the Jacksonville area.

This investigation included review of existing data in the ambient network, estimates of nutrient loading from point and non-point sources, and monthly sampling in the New River and its tributaries during the summer of 1986.

The results of this investigation documented an alarming biological response to current nutrient loading into the New River. The following information summarizes those results and recommends possible actions to improve water quality in the New River watershed.



LEGEND

1.	02093000	NEW RIVER @ GUM BRANCH
2.	02093032	NEW RIVER @ HWY 17/24 BRIDGE
3.	WB05	WILSON BAY @ WILSON BAY PARR
4.	WB50	WILSON BAY @ 50%
5.	BC	BRINSON CREEK
6.	SW1	SOUTHWEST CR. @ HWY 17
7.	SW2	SOUTHWEST CR. @ MOUTH
8.	NR	NEW RIVER @ 50%
9.	02093186	NORTHEAST CR. @ HWY 24
10.	NE2	NORTHEAST CR. @ MOUTH
11.	0209317585	LITTLE NORTHEAST CR. @ SR 1406
12.	WC1	WALLACE CR. @ HWY 24
13.	0209319360	WALLACE CR. @ RIVER DRIVE
14.	02093197	SNEADS FERRY

FIGURE 1. STATION LOCATIONS FOR THE NEW RIVER.

BACKGROUND

Problems associated with the over-enrichment of surface waters have been identified in many areas of North Carolina in recent years. These problems are most obvious in fresh waters experiencing advanced stages of eutrophication. Surface scums of blue-green algae and subsequent fish kills have occurred, on the Chowan River in 1972 and Neuse River in 1983.

While having the potential of being just as harmful, overenrichment in estuarine waters is more subtle in appearance. Staff of the Wilmington Regional Office observed impacts often associated with over-enrichment occurring frequently over past years in the New River estuary and its tributaries near Jacksonville, North Carolina. Sixteen fish kills have been documented in the area since 1978. Some of these kills were attributed to sewer overflows and others to low dissolved oxygen concentrations as a result of algal blooms.

Problems in the late summer of 1985 were frequent and rather extensive (Table 1). Fish kills occurred in Northeast Creek, Wilson Bay, and as far upstream as Tar Landing on the New River in August and September. Low dissolved oxygen concentrations (<4 mg/l) and high chlorophyll-a concentrations (300 ug/l) were associated with these kills. With these increased problems, the Regional Office requested the assistance of the Technical Services Branch to assess the extent and potential impacts of over-enrichment in this area.

A survey was conducted October 3, 1985 on the New River from Jack's Point upstream to a point above Tar Landing where further progress was impeded by a dense mat of alligator-weed (Alternanthera philoxeroidos). Low dissolved oxygen concentrations were measured in the surface waters at 7 locations near and above the Hwy 17/24 bridge at Jacksonville. High nutrient and chlorophyll-a concentrations were measured near Wilson Bay. As a result of data review, it was determined that more intensive monitoring in the Jacksonville area would improve assessment of water quality conditions in the area.

Table 1. NEW RIVER PROBLEM SUMMARY FOR LATE SUMMER 1985.

- Numerous Fish Kills and Dissolved Oxygen Problems In Late Summer 1985. (Region Requested Assistance)

AUGUST 5	- Fish kill near Wilson Bay
	- Total N 2.2 mg/l in Wilson
SEPTEMBER 5	- Complaint green soupy water
	- Wilson Bay had many indicators of severe nutrient loading problems
	- Chlorophyll = 300 ug/l TN = 3.21 mg/l pH = 9.1 DO = 16.2 mg/l
SEPTEMBER 17	- Fish kill upstream near Tar Landing
	- Chlorophyll = 72 ug/l
	- Phytoplankton upstream dominated by Euglena sp. indicating organic enrichment
OCTOBER 3	- Raleigh & regional staff survey
	- Wilson Bay TN @ 3 sites above 4 mg/l
	- NH_3 above 2 mg/l
	- Chlorophyll = 88 ug/l
	- DO @ 7 sites above 17/24 bridge <4.1 mg/l

CONCLUSION - STRONG EVIDENCE OF SEVERE ENRICHMENT PROBLEMS IN TRIBUTARIES AND IN NEW RIVER NEAR JACKSONVILLE.

Monthly sampling was initiated in 1986 in the New River and major tributaries near Jacksonville (Figure 1). Measured parameters included nutrients, chlorophyll-a, and phytoplankton concentrations, as well as physical data (conductivity, dissolved oxygen, temperature and salinity), and BOD_5 and fecal coliform.

Point Sources

There are a total of forty-three point source discharges permitted by the Division within the New River Basin. Of these forty-three discharges, thirty-five are built and discharging to waters of the basin. Thirty existing discharges are located upstream of Hadnot Point (near mouth of Wallace Creek) in the upper basin where the majority of water quality violations have been observed. The combined wasteflow of these latter thirty discharges totals 10.2 MGD.

Approximately 60 percent of the permitted wasteflow in the upper New River Basin is discharged to Wilson Bay. Another 31 percent is discharged into the mouth of Northeast Creek. Numerous small discharges (0.001 to 0.100 MGD) are located along tributaries throughout the upper basin.

Nutrient Budget

Preliminary nutrient budgets have been developed for the upper New River Basin (above Hadnot Point) for total phosphorus (TP) and total nitrogen (TN). Nutrient loads were grouped into point source and non-point source categories. Non-point sources consisted of export from various land uses (i.e. forest, agriculture, wetlands, and urban) and from precipitation to the open water surface area.

Non-point source loads were estimated using nutrient export coefficients and land use data provided by the Wilmington Regional Office (Table 2). The export coefficients (i.e. p-loading rate, n-loading rate) were obtained from the Chowan/Albemarle Action Plan (NRCD, 1982). The total estimated non-point source TP and TN loads are 49930 kg/yr and 254745 kg/yr, respectively.

TABLE 2. Non-point Nutrient Loading to the Upper New River Basin

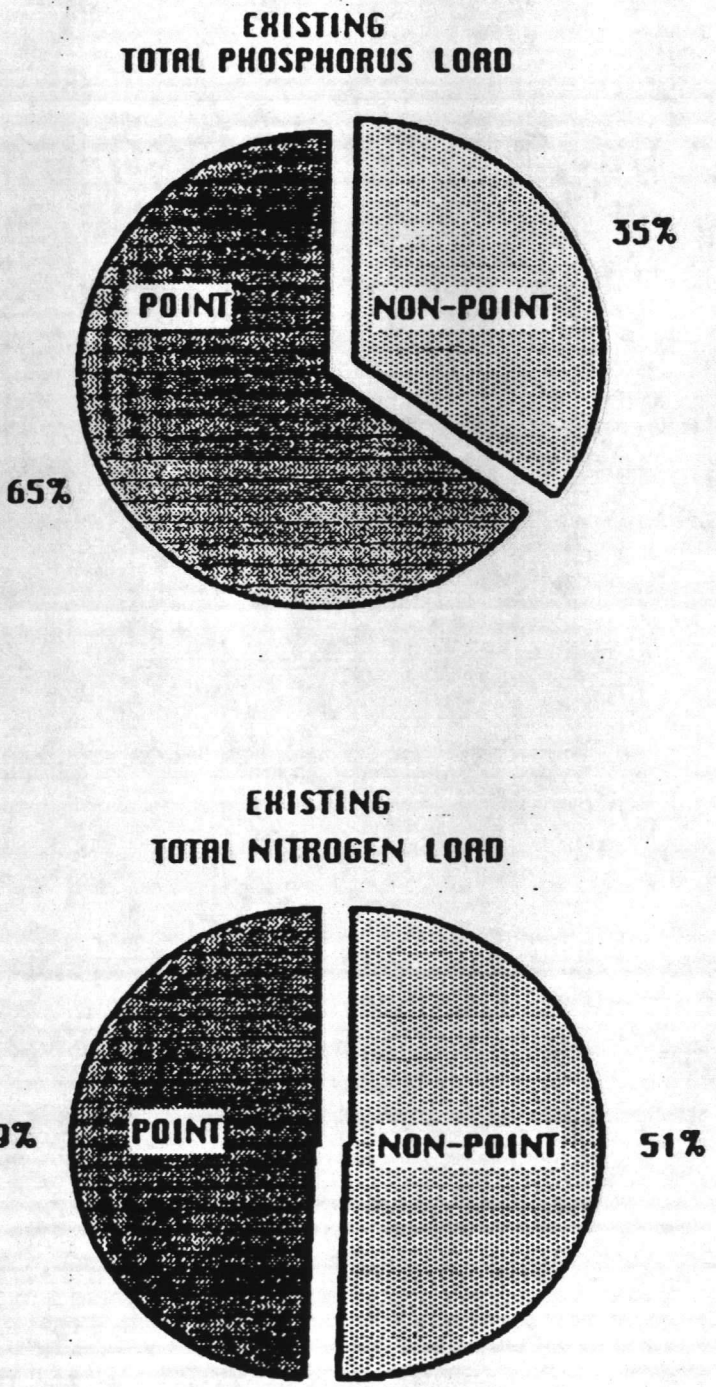
SOURCE - LAND USE	AREA km² (%)	P-LOADING RATE (kg/km²-yr)	P-LOAD (kg/yr)	N-LOADING RATE (kg/km²-yr)	N-LOAD (kg/yr)
Forested	364.7 (50.7)	10	3647	165	60175
Agricultural/Cleared	151.8 (21.1)	110	16698	625	94875
Marsh/Wetlands	34.7 (4.8)	10	347	165	5478
Urban - High Density	133.6 (18.6)	200	26720	525	70140
Urban - Low Density	11.7 (1.6)	90	1053	375	4387
Precipitation to Open Water	22.5 (3.1)	65	1463	875	19688
TOTALS	719.0		49928		254743

TABLE 3. Point Source Nutrient Loading to the Upper New River

BASIN SEGMENT	TOTAL POINT SOURCE FLOW (MGD)	ESTIMATED POINT SOURCE TP (kg/yr)	ESTIMATED POINT SOURCE TN (kg/yr)
Headwaters of New River	0.429	3850 (2960-4740)	10305 (8765-11845)
Blue Creek	0.131	1175 (905-1445)	3145 (2675-3615)
Brinson Creek	0.238	2135 (1640-2630)	5715 (4860-6570)
Wilson Bay	6.06	54380 (41830-66930)	145570 (123820-167320)
Southwest Creek	0.068	610 (470-750)	1635 (1390-1880)
Northeast Creek	3.138	28155 (21660-34655)	75375 (64115-86640)
Wallace Creek	0.1595	1430 (1100-1760)	3835 (3260-4405)
TOTALS	10.2235	91735	245580

Figure 2.

Upper New River Basin Nutrient Budgets



Point source loads were estimated using probable nutrient concentration ranges obtained from basin-pooled self-monitoring data (performed for Neuse River and Tar/Pamlico River studies) and permitted wasteflows (Table 3). Wasteflows were totaled for various basin segments, and then multiplied by 6.5 mg/l TP and 17.4 mg/l TN to determine point source loads. These concentrations reflect the midpoints of the likely ranges of TP, 5.0 to 8.0 mg/l, and TN, 14.8 mg/l to 20 mg/l. Loading estimates which reflect the ranges are shown in parentheses below the average estimates in Table 3. The total estimated point source (at permitted conditions) TP and TN loads are 91,735 kg/yr and 245,580 kg/yr.

The estimated point source phosphorus load is nearly twice that of the non-point source estimate, accounting for 65 percent of the total basin load (Figure 2). The expected nitrogen contribution from point sources is expected to be about equal to the non-point source TN load (Figure 2). These substantial contributions from point sources to the overall nutrient load have led to elevated nutrient concentrations within the New River Basin.

RESULTS OF 1986 SUMMER SURVEY

River Sites

Sampling included 6 sites on the New River from Gum Branch to Sneads Ferry. Mean values of nutrient, chlorophyll-a and phytoplankton data are presented in Table 4 and the corresponding distributions are shown by station location in Figures 3, 4 and 5.

It should be noted that nutrient values at Gum Branch were elevated (mean TP=0.3 mg/l) and tended to increase during periods of low flow, which generally indicates point source impacts. Problems were identified with effluent discharges from Carter Packing Company. A total of 48 effluent violations (see attached) were found during a 23 month period. Therefore, Gum Branch would not serve as a representative upstream "background level" location.

Downstream, total nitrogen was relatively high (>1 mg/l) at Highway 17/24 near Jacksonville, increased dramatically at Wilson Bay, and gradually declined to more desirable concentrations at Sneads Ferry which is about 30 miles downstream of Gum Branch and is very near the Atlantic Ocean.

Mean concentrations of total phosphorus displayed a similar pattern in a downstream progression Relative concentrations were not as elevated as nitrogen at Gum Branch, but were extremely high near Wilson Bay.

Chlorophyll-a and phytoplankton analyses revealed a tremendous response to over-enrichment in the Jacksonville area. Mean chlorophyll-a concentrations from the Hwy 17/24 bridge to Station NR 50% (New River at mid channel near the mouths of Northeast and Southwest Creeks ranged from 48-165 ug/l (Figure 5).

It should also be noted that dominance by a single group of organisms was responsible for most of the measured chlorophyll-a concentrations in the Wilson Bay area. Those phytoplankton present were not surface, scum forming, species as seen in our freshwater rivers, but were found in concentrations large enough to severely affect dissolved oxygen in shallow areas. This type of uni-algal dominance is not generally healthy to most food webs (Figure 6).

TABLE 4. NEW RIVER SITES MEAN VALUES JUNE-SEPT 1986.

STATION	CHL-a ug/l	TN mg/l	TP mg/l	DENSITY units/ml	BIOVOLUME mm3/m3
GUM BRANCH	-	2.76	0.30	-	-
NEW RIVER @ 17/24 BRIDGE	51	1.15	0.19	11,400	5,500
WILSON BAY 5%	165	1.94	0.62	320,600	44,800
WILSON BAY 50%	161	1.25	0.40	119,800	19,500
NEW RIVER @ 50%	48	0.76	0.16	62,100	9,400
NEW RIVER @ SNEADS FERRY	18	0.73	0.11	-	-

Figure 3.

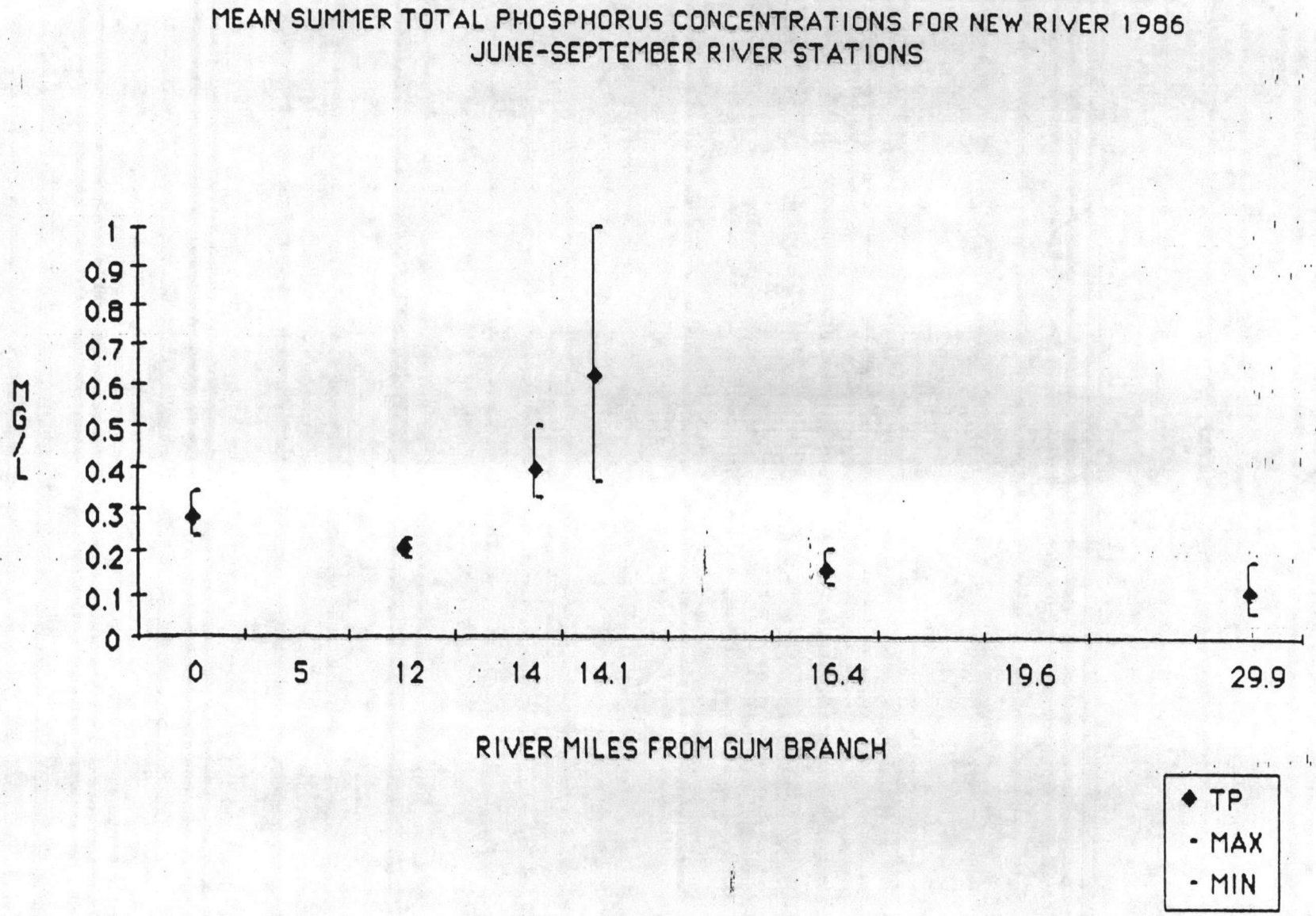

MEAN SUMMER TOTAL PHOSPHORUS CONCENTRATIONS FOR NEW RIVER 1986
JUNE-SEPTEMBER RIVER STATIONS
MG/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
12
14
14.1
16.4
19.6
29.9
RIVER MILES FROM GUM BRANCH
TP
MAX
MIN

Figure 4.

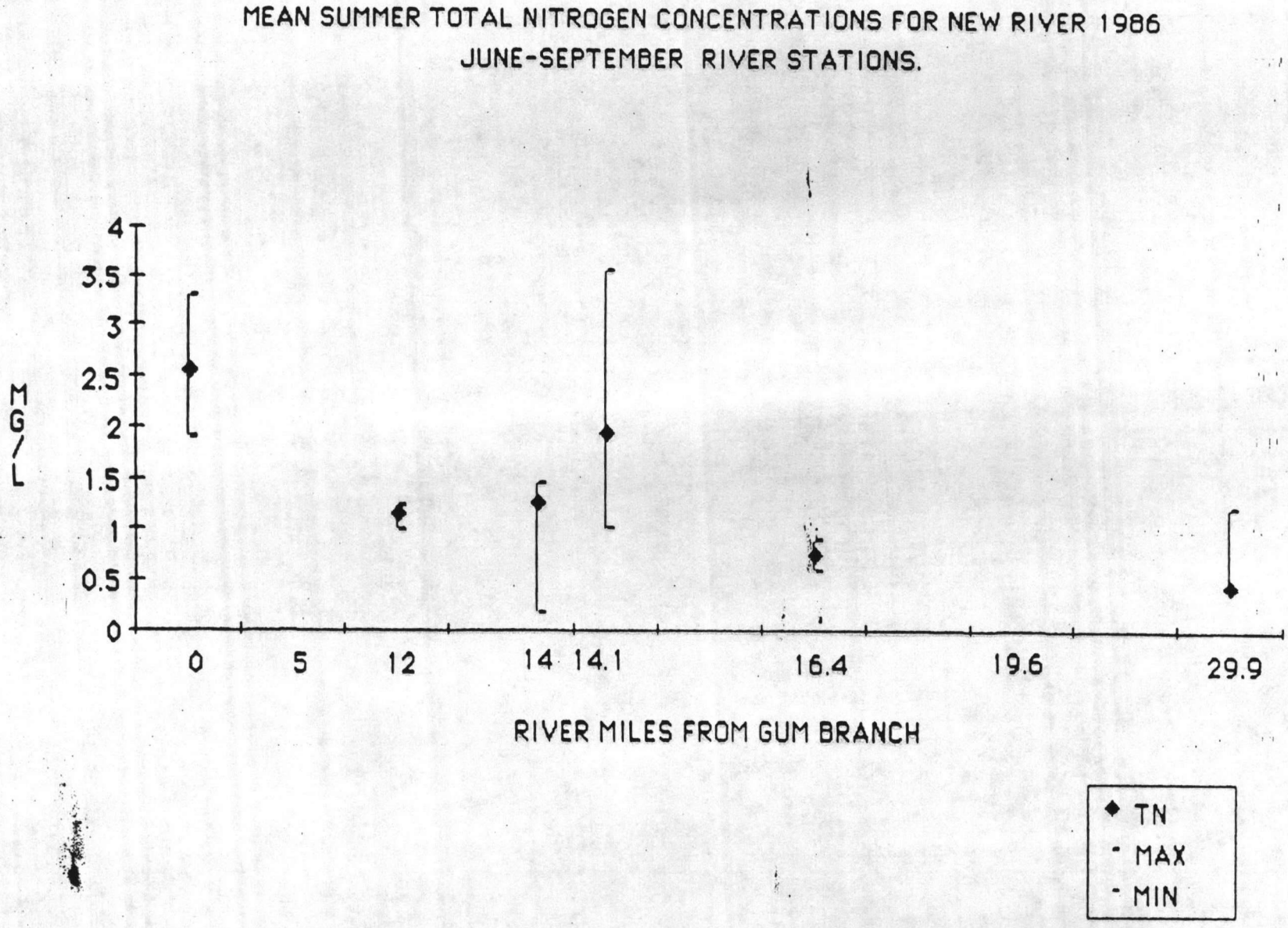

MEAN SUMMER TOTAL NITROGEN CONCENTRATIONS FOR NEW RIVER 1986
JUNE-SEPTEMBER RIVER STATIONS.
MG/L
4
3.5
3
2.5
2
1.5
1
0.5
0
0
5
12
14
14.1
16.4
19.6
29.9
RIVER MILES FROM GUM BRANCH
TN
MAX
MIN

Figure 5.

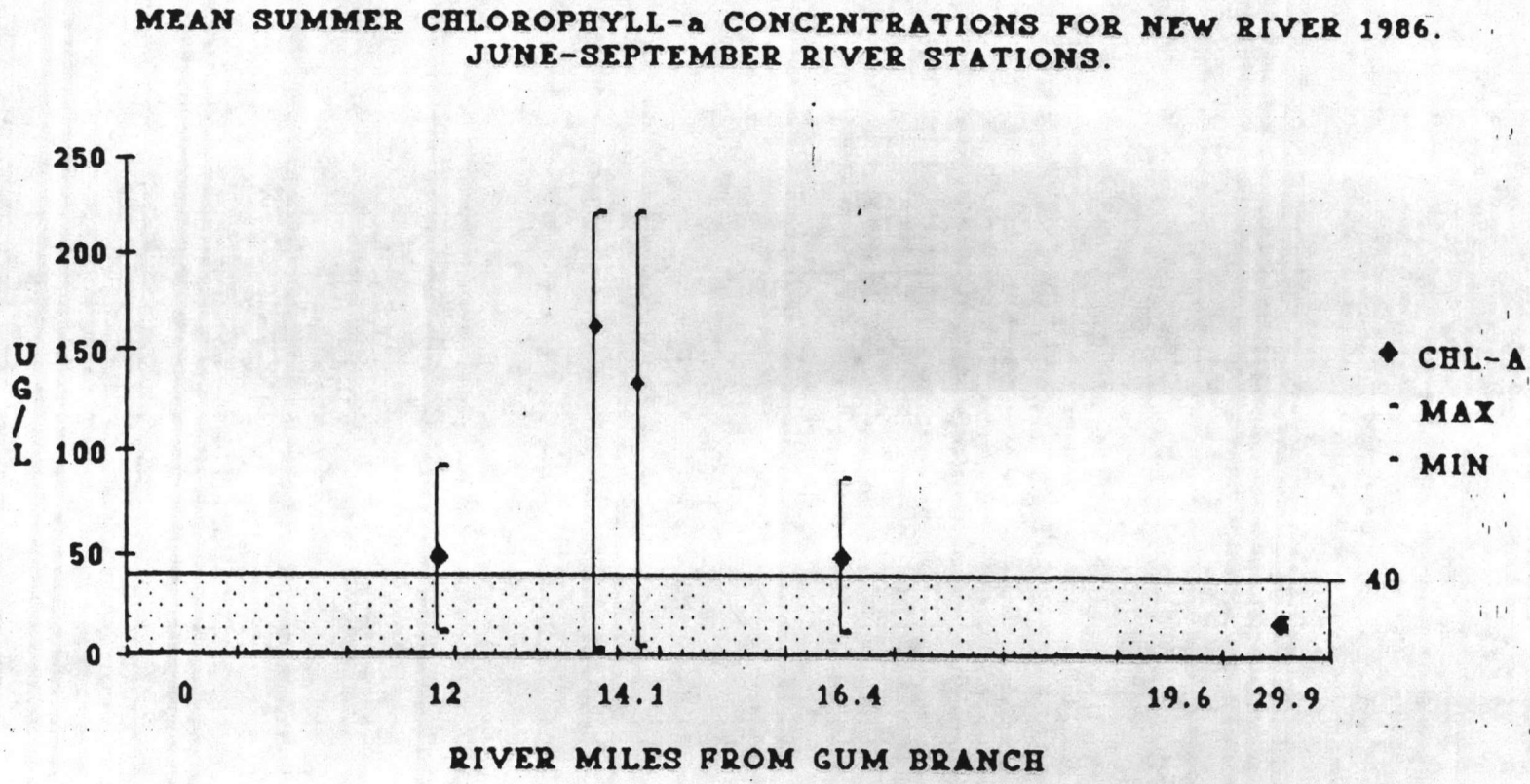
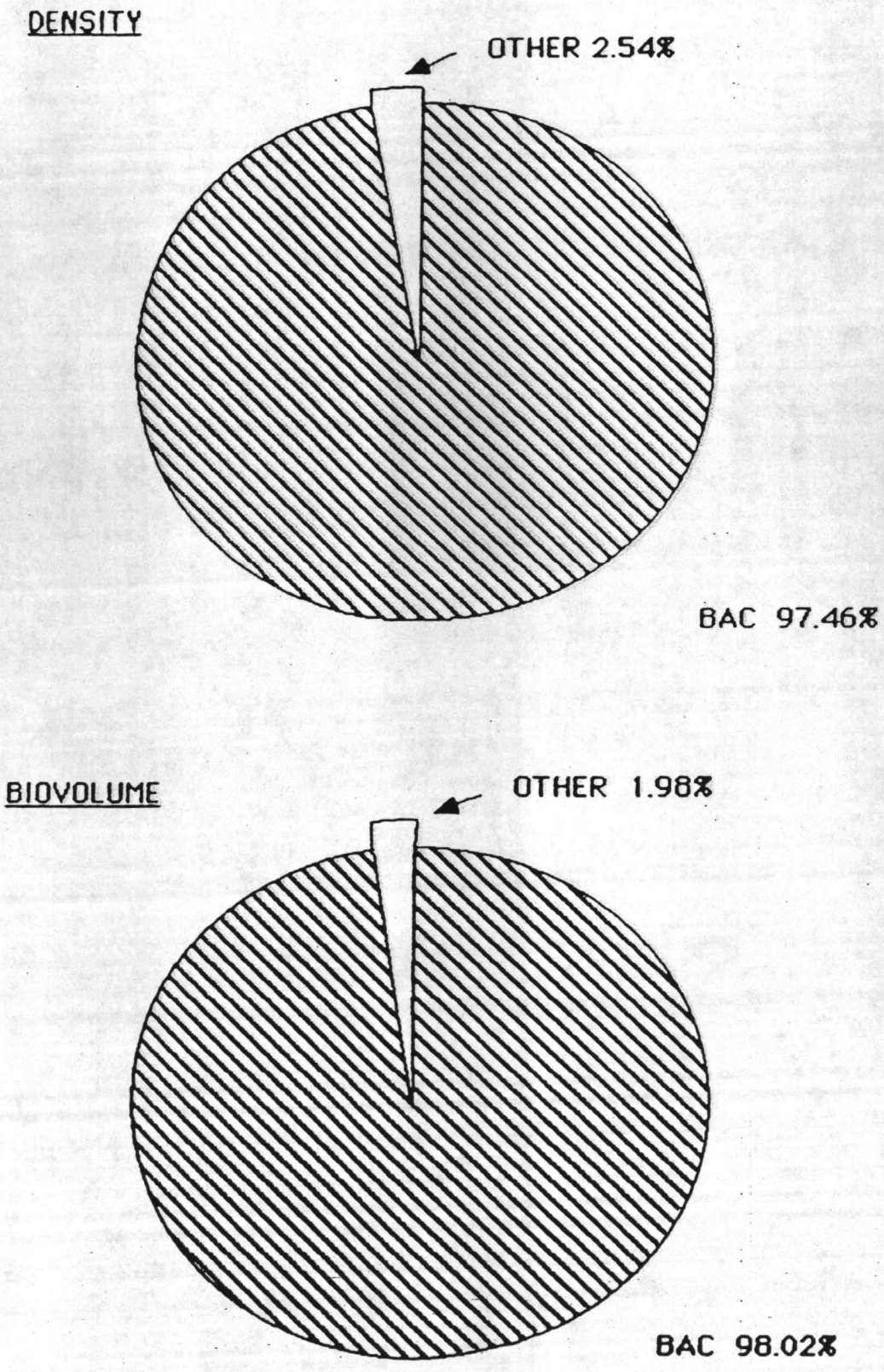

MEAN SUMMER CHLOROPHYLL-a CONCENTRATIONS FOR NEW RIVER 1986.
JUNE-SEPTEMBER RIVER STATIONS.
250
200
150
100
50
0
U
G
/
L
40
CHL-A
MAX
MIN
0
12
14.1
16.4
19.6
29.9
RIVER MILES FROM GUM BRANCH

Figure 6.

DENSITY & BIOVOLUME BY CLASS FOR WILSON BAY
JULY 1986



Tributary Sites

Mean concentrations of chlorophyll-a, nutrients, and phytoplankton for major tributaries to the New River near Jacksonville are presented in Table 5. Brinson Creek was sampled near the mouth only. Chlorophyll-a concentrations at this site exceeded the water quality standard each date sampled and the mean value was 103 ug/l. Little Northeast, which flows into Northeast Creek, also contained chlorophyll-a values well above the standard.

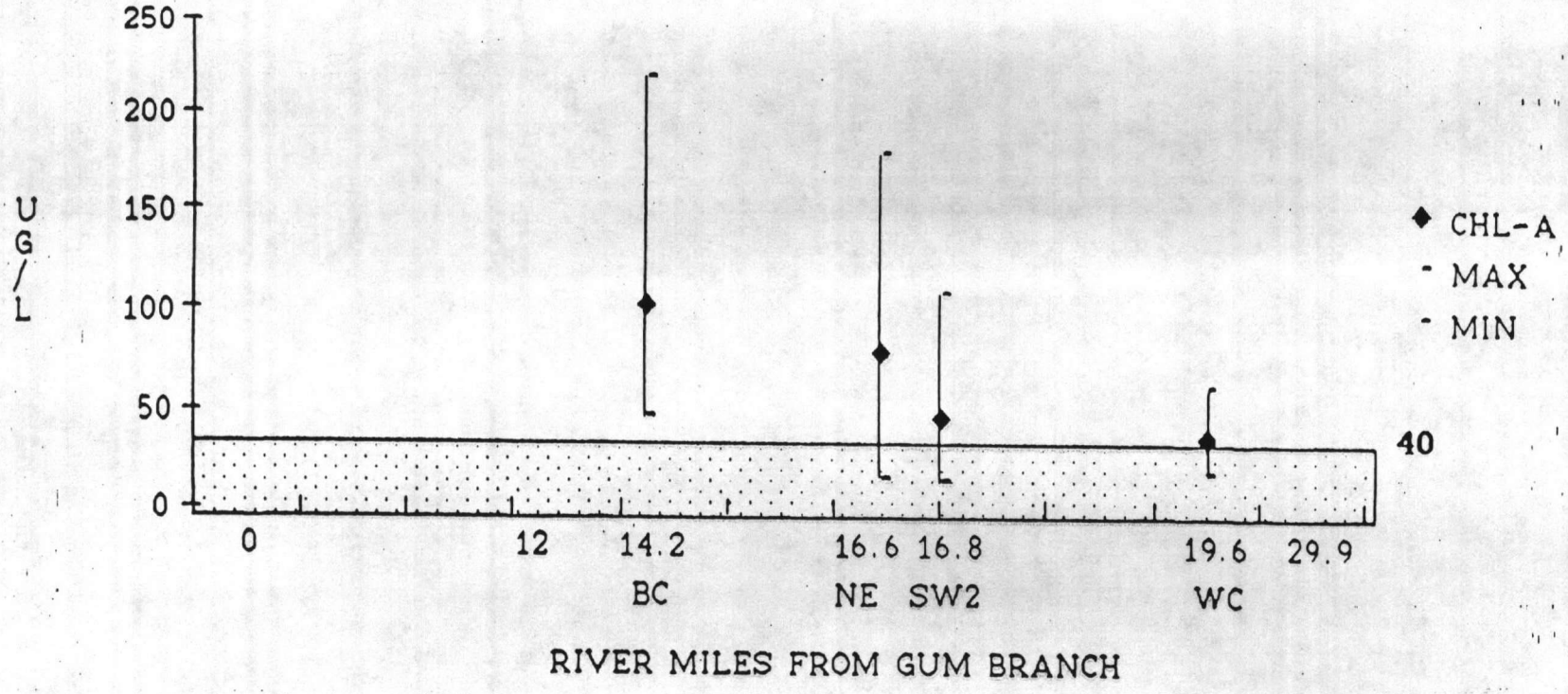
Chlorophyll-a standard exceedances were also identified at the mouths of Northeast, Brinson, Southwest and Wallace Creeks (Figure 7). The only sites sampled during the survey that did not seem to be experiencing significant effects from overenrichment were the most upstream sites on Wallace and Southwest Creeks.

TABLE 5. NEW RIVER TRIBUTARIES MEAN VALUES JUNE-SEPT 1986.

STATION	CHL-a ug/l	TN mg/l	TP mg/l	DENSITY units/ml	BIOVOLUME mm3/m3
BRINSON CREEK (MOUTH)	103	1.16	0.38	97,100	15,600
LITTLE NORTHEAST CREEK	60	0.58	0.13	-	-
NORTHEAST CREEK (UP)	54	0.77	0.18	120,600	15,800
(MOUTH)	79	0.84	0.17	95,200	11,200
SOUTHWEST CREEK (UP)	2	0.77	0.09	200	100
(MOUTH)	46	0.86	0.17	31,800	7,300
WALLACE CREEK (UP)	6	1.04	0.13	2,400	3,400
(MOUTH)	38	0.64	0.13	15,000	6,100

Figure 7.

MEAN SUMMER CHLOROPHYLL-a CONCENTRATIONS FOR NEW RIVER 1986
JUNE-SEPTEMBER TRIBUTARY STATIONS.



Conclusions

Current nutrient loading into the New River and its tributaries near Jacksonville, N.C. are significantly impacting water quality as indicated by the following:

- Almost 60% of chlorophyll-a samples taken during a survey in the New River and the mouths of Brinson, Little Northeast, Northeast, Southwest and Wallace Creeks from June-September 1986 exceeded 40 ug/l.
- Phytoplankton biovolumes measured during this time period often exceeded 5,000 mm^3/m^3 with uni-algal dominance by certain phytoplankton.
- Phytoplankton density as high as 813,000 units/ml were measured in Wilson Bay. A density of 100,000 units/ml is considered a "bloom" by any phytoplankton ecologist.
- The numerous fish kills and low dissolved oxygen levels, in association with highly colored water and elevated chlorophyll-a levels during the past few years provide strong circumstantial evidence that growths of microscopic vegetation substantially impair the intended best usage of the waters.

NEW RIVER SUMMARY & RECOMMENDATIONS

Based upon the data and evidence available, it is a staff recommendation that the Director exercise his authority as provided in NCAC, Title 15: 2H.0404 which addresses facility location and design involving coastal waste treatment disposal.

NCAC, Title 15: 2H.0404(c) states: "The director may prohibit or limit any discharge of waste into surface waters if, in the opinion of the director, the surface waters experience or the discharge would result in:

(1) growths of microscopic vegetation such that chlorophyll a values are greater than 40 ug/l; or

(2) growths of microscopic or macroscopic vegetation which substantially impair the intended best usage of the waters.

NCAC, T15: 2H.0403 clearly incorporates the New River and its tributaries, as far as applicability of these regulations to the waters in question.

It is the staff's recommendation that the Director determine appropriate nutrient limitations for all new or expanding discharges in this system, as opposed to prohibition of discharge. Currently there are 43 permitted discharges in the area. At this time there are four (4) proposed applications and one (1) proposed expansion. Implementation of .0404(c) therefore would immediately only impact (not prohibit) five proposed actions.

There exist two viable options for facilities which currently hold issued NPDES permits. The first option would be to petition the EMC to exercise its authority relating to the classification of waters. As detailed in NCAC, T15: .0214, the EMC may designate and classify these waters as nutrient sensitive (NSW).

A second option would be for the Director to apply .0404(c) to each existing facility upon expiration of the existing NPDES permits.

Both of these options would necessitate nutrient limitations to be incorporated into final permit limitations either basin-wide or case-by-case.

Based upon available data and knowledge, the staff would recommend the same nutrient limitations that will be applied to the Falls and Jordan NSW basin strategy.

Effectiveness of Controls

Since point sources account for a major portion of nutrient loading to the New River Basin, Point source controls will provide an effective means of reducing elevated nutrient levels. If a 1.0 mg/l monthly average phosphorus limit were placed on existing discharges, an estimated 85 percent reduction in point source loading could be achieved. The contribution of point source phosphorus loading to the upper basin would be reduced from the existing level of 65 percent to 22 percent (Figure 8). The corresponding reduction in overall phosphorus mass would be approximately 76,600 kg/yr (55 percent), from 141,665 kg/yr to 64,045 kg/yr (Figure 9).

If a 2.0 mg/l monthly average phosphorus limit were applied, an estimated 69 percent reduction in point source loading could be achieved. The point source contribution to the basin would be reduced to 36 percent (Figure 10). The corresponding reduction in overall phosphorus mass would be approximately 62,500 kg/yr (45 percent), from 141,665 kg/yr to 78,160 kg/yr (Figure 11).

Figure 8.

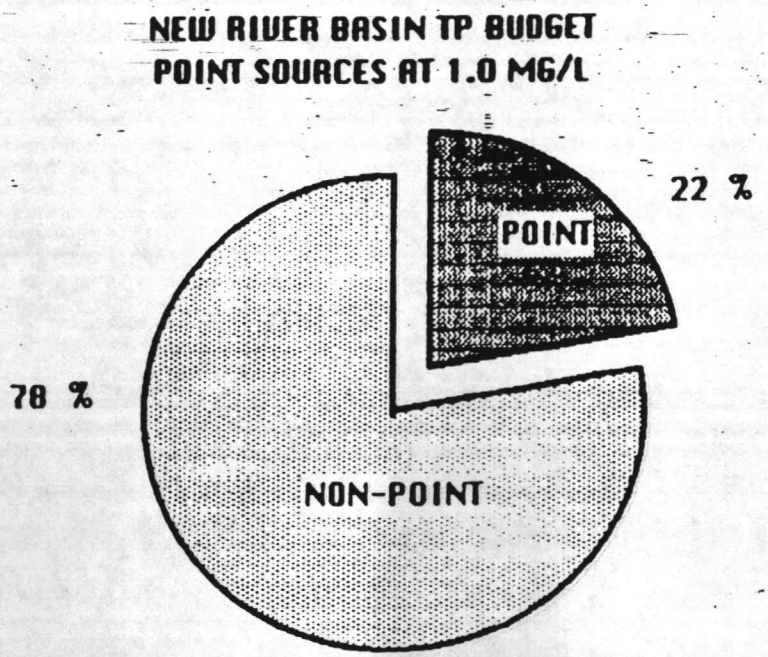


Figure 9.

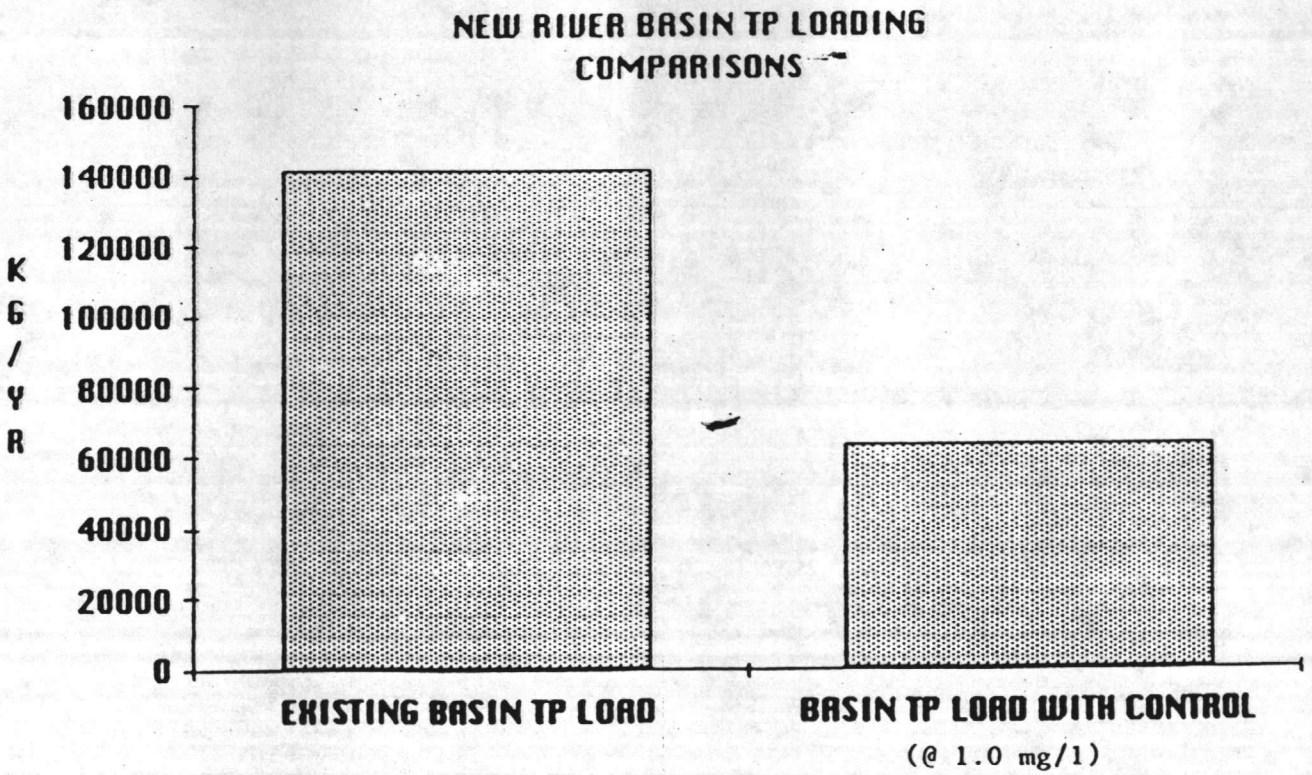


Figure 10.

NEW RIVER BASIN TP BUDGET
POINT SOURCES AT 2.0 MG/L

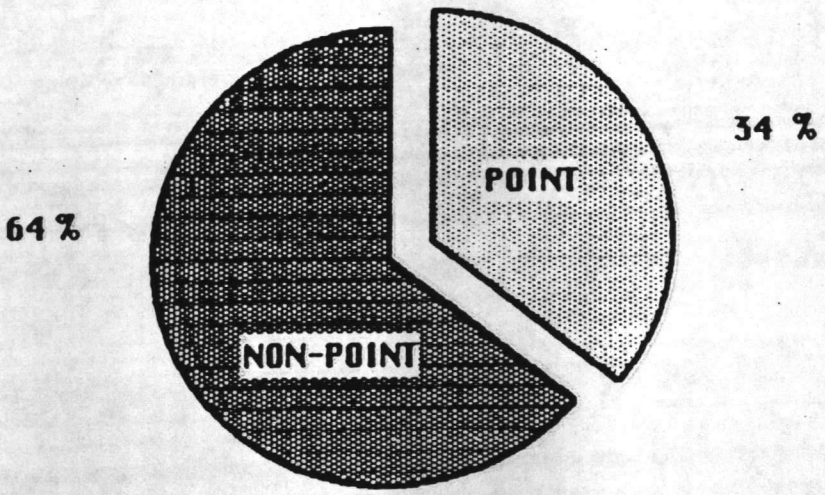
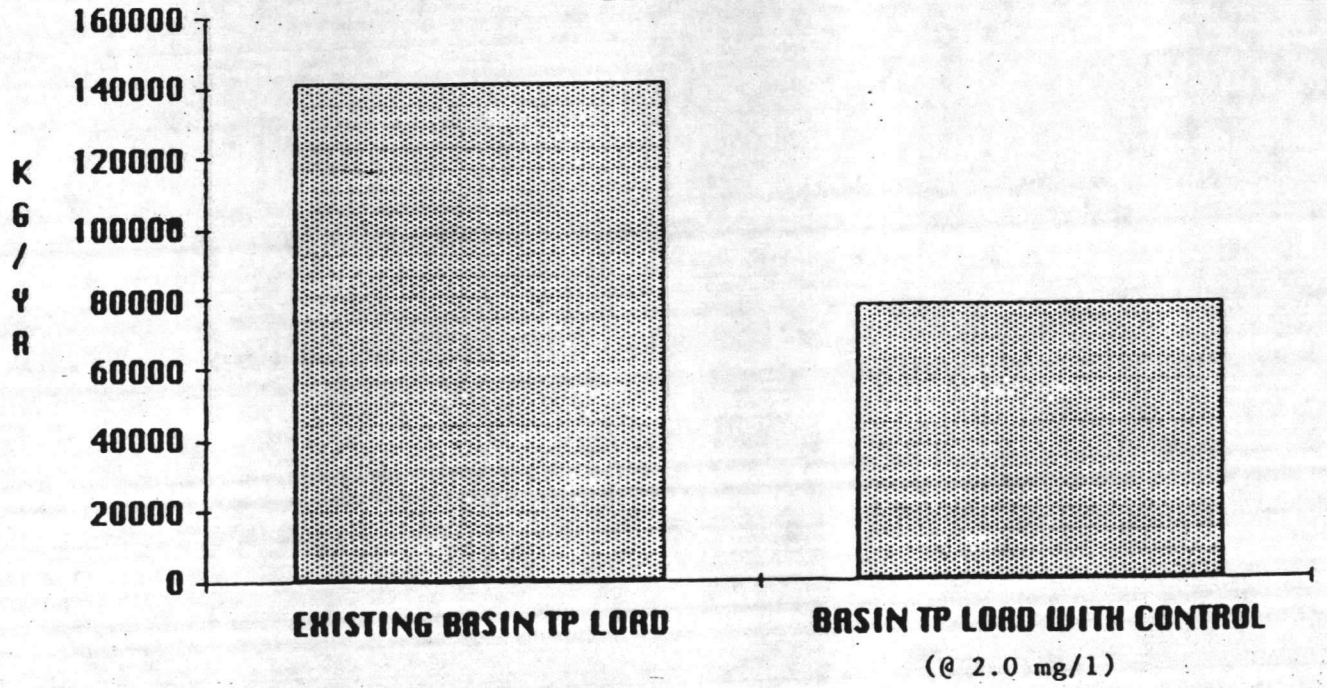
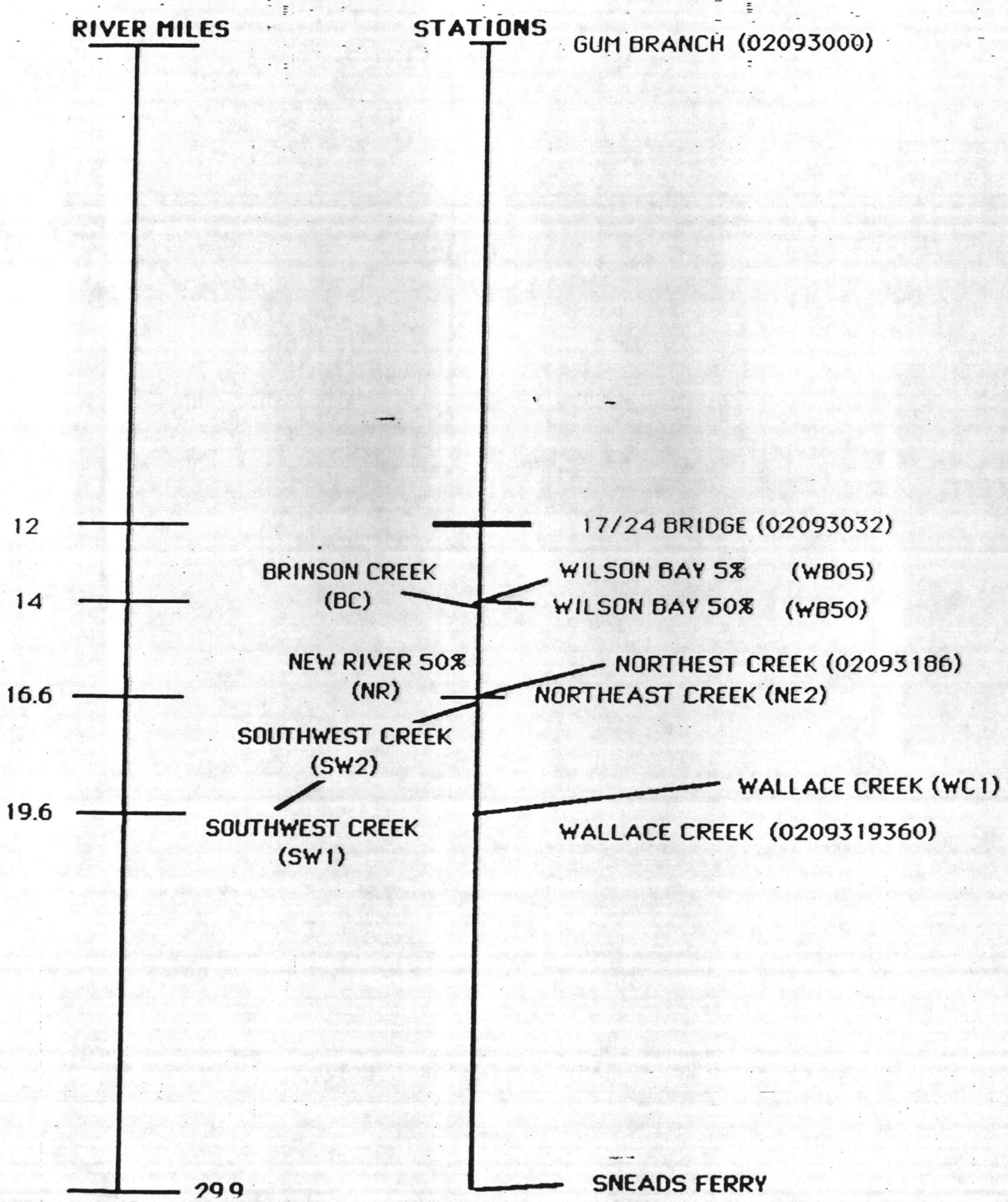


Figure 11.

NEW RIVER BASIN TP LOADING
COMPARISONS



SCHEMATIC DIAGRAM OF NEW RIVER SAMPLING STATIONS 1986



DATA SUMMARY BY STATION

STATION	DATE	CHL-A	TN	TP	DO	TEMP	pH	S°/oo	DENSITY	BIOVOLUME
02093000	860611		3.3	0.34	5.6	24				
	860730		1.9	0.24	6.4	24	7	0		
	860910		3.1	0.31	6.9	19	7.7			
02093032	860515	33	0.71	0.19	7.5	23	7.9	18		
	860611	82	1.19	0.2	7.2	26	8		22273	2354
	860730	13	1.19	0.22	4	27	7.3	1	15110	1622
	860828	14	1.23	0.19	4	26	6.6		4905	1514
	860930	94	1.005	0.23	11.3	28.4	8.4	7.6	3406	16524
WB05	860515	120	1.105	0.48	11.6	24	8.5	15	26640	6860
	860611	120	3.57	1	8.1	28	8.3	10	226744	39482
	860724	210	1.01	0.37	14.2	31	8.8	2.5	812993	95042
	860814	220	1.09	0.5	11.3	30	9.1	3	238098	31614
	860910	6	2.09	0.62	8.3	28	8.2	7	2446	1566
	860930	110	NS	NS	5.8	28.5	7.47	11.7	4542	13074
WB50	860611	120	1.21	0.33	10.3	29	8.5	10	75814	11849
	860730	260	1.43	0.5	12	30	8.4	7	372083	45462
	860828	170	1.46	0.4	6.3	28.5	6.8	1	28125	9553
	860930	94	0.905	0.35	7	27.4	7.78	12	3144	10959
BC	860611	62	1.01	0.36	7.6	28	8.6	8	31356	4435
	860730	220	1.41	0.47	10.8	30	7.9	3.5	323520	42943
	860828	47	1.11	0.31	7.1	28.2	7		30308	8791
	860930	84	1.12	0.38	7.3	27.4	7.76	9.2	3232	6103
SW1	860611	0.5	1.03	0.11	4.7	24		0	285	128
	860730	0.5	0.91	0.13	5	26	6.9	0	50	20
	860828	3	0.87	0.07	5.3	23	7		437	305
	860930	3	0.28	0.07	3.4	23	7.3	0	293	199
SW2	860611	14	0.71	0.08	6.9	29	7.8	9	5350	1894
	860730	110	1.02	0.29	3.4	29	6.7	9	112149	21525
	860828	25	0.9	0.13	4.5	28	6.5	1	8472	3066
	860930	36	0.81	0.16	5.5	26.5	7.5	14.2	1118	2801
NR	860611	11	0.605	0.15	8	27	8.5	13	10656	2083
	860730	62	0.81	0.21	4.6	29	7.6	17	180277	23299
	860828	88	0.905	0.13	7.4	28	7		45943	10434
	860930	32	0.705	0.15	5.8	26.8	7.6	14.6	11646	1877
02093186	860515	26	0.61	0.13	6.8	24	7.6	13		
	860611	28	0.605	0.18	7	30		14	9713	7106
	860730	74	0.83	0.2	4.6	27	6.7	2	469558	51718
	860828	81	0.91	0.13	6.8	28	6.9	3	1616	1062
	860930	31	0.72	0.2	4.8	26	7.22	13	1328	2459
NE2	860611	16	0.605	0.15	9.1	30	8.6	15	12053	2320
	860730	180	0.91	0.22	6.8	30	7.6	10	341338	37336
	860828	81	0.81	0.13	6.8	28	6.9	3	26465	1772
	860930	38	1.005	0.19	6.1	25.98	7.3	13.5	873	3557
0209317585	860611	19	0.49	0.17	3.8	27				
	860724	100	0.66	0.12	5.7	24	6.9			
	860910		0.61	0.13	5.2	22	7.5			
WC1	860611	20	0.66	0.28	5.5	26		0		
	860730	0.5	0.76	0.02	6.3	23	4.3	0	344	306

DATA SUMMARY BY STATION

STATION	DATE	CHL-A	TN	TP	DO	TEMP	pH	S°/∞	DENSITY	BIOVOLUME
	860819	4	2.42	0.13	8	23	4.8	-	815	2814
	860930	2	0.82	0.07	4.3	25	6.4	0	6114	6992
0209319360	860611	18	0.705	0.12	7.2	25		19	11646	3037
	860730	41	0.705	0.13	7.4	33	8.6	8	43584	10837
	860819	29	0.805	0.16	4.2	26	7.8		11180	2143
	860828	62	0.71	0.11	5.5	28	7		2970	6692
	860930	30	0.705	0.14	6.7	28		12	1834	3708
02093197	860611		0.45	0.06	9.8	17	8.4	12		
	860730	14	1.23	0.19	8.3	33	8.6	8		
	860814	21			5.7	27	8.6			
	860910		0.505	0.08	7.4	26	8.6	16		

Dischargers to the New River above Hadnot Point
Onslow County

Permit #			Actual Flow	Permitted Flow
	Upper New River			
NC0002968	Carter Packing Co.		.0100	.0100
NC0023230	Town of Richlands		.0566	.2100
NC0062294	Rock Creek Golf & Country Club		ND	.1152
NC0060739	R.P.D., Inc.		*	.1000
NC0043699	Sumersill Elementary School		.0050	.0090
NC0036226	Lauradale Subdivision		.1555	.2000
NC0056049	Hurst Development		*	.2000
		Totals	.2271	.8442
	Blue Creek			
NC0043702	Southwest High School		.0044	.0200
NC0056952	Pollard Enterprises		.0047	.1000
NC0043656	Blue Creek School		.0053	.0110
NC0049671	Biscuit Town Restaurant		ND	.0010
NC0044377	Onslow Oil Co.		ND	NL
		Totals	.0144	.1320
	Brinson Creek			
NC0057053	Sentry Enterprises		.0075	.0870
NC0028223	Beachams Apts #1		.0260	.0400
NC0061565	Canady Road Tract		*	.0400
NC0051853	Southgate MHP		.0040	.0030
NC0002585	A-1 Cleaners		.0069	.0080
NC0028215	Beachams Apts #2		.0270	.1000
		Totals	.0714	.2780
	Wilson Bay			
NC0003239	USMC Camp Geiger		1.1653	1.6000
NC0024121	City of Jacksonville		2.8260	4.4600
		Totals	3.9913	6.0600
	Northeast Creek			
NC0000698	Weyerhaeuser		.0003	.0033
NC0032239	Mercer Environmental - Regalwood Subdivision		.0790	.3000
NC0031577	Mercer Environmental - White Oak Estates		.0635	.2200
NC0043711	Morton Elementary School		.0076	.0075
NC0036676	Collins Estates MHP		ND	.0250
NC0023825	Webb Apartments		.0197	.0250
NC0034991	Hickory Grove MHP		Unknown	.0225
NC0022462	Sherwood MHP		.1500	.0600
NC0049387	Hunters Creek - Viking Utility		.0392	.2500
NC0003239	Tarawa Terrace		.9758	1.2500
NC0003239	Camp Johnson		.4259	1.0000
		Totals	1.7610	3.1633

Permit #		Actual Flow	Permitted Flow
	Southwest Creek		
NC0030813	Kenwood Estates	.0372	.0500
NC0034339	Old Hickory MHP	.0120	.0180
	Totals	.0492	.0680
	Wallace Creek		
NC0023108	Gatlin-Ramsey MHP	.2820	.0900
NC0030431	Hewitts MHP	.0144	.0030
NC0062642	Queens Creek Development	*	.5000
NC0051471	Big Pines MHP	.0027	.0065
NC0058874	Piney Green Shopping Center - Bailey & Assoc.	.0062	.0600
	Totals	.3053	.6595

Note: These are all permitted discharges. They differ from total MGD in handout which is the total existing dischargers.

ND - No Discharge
NL - No Permit Limit
* - Not Built

FACILITIES LISTED BY PERMITTED FLOWS

1,000 - 10,000 GPD

Carter Packing	.0100
Summersill Elem. Sch.	.0090
Biscuit Town Rest.	.0010
Southgate MHP	.0030
A-1 Cleaners	.0080
Weyerhaeuser	.0033
Morton Elem. Sch.	.0075
Hewitts MHP	.0075
Big Pines MHP	.0065
Total	.0513 MGD

11,000 - 20,000 GPD

Southwest High Sch.	.0200
Blue Creek School	.0110
Old Hickory MHP	.0180
Total	.0490 MGD

21,000 - 50,000 GPD

Beacham Apt. #1	.0400
Canady Road Tract	.0400
Collins Estates MHP	.0250
Webb Apts.	.0250
Hickory Grove MHP	.0225
Kenwood Estates	.0500
Total	.2025 MGD

51,000 - >100,000 GPD

Town of Richlands	.2100
Rock Cr. Country Club	.1152
R.P.D., Inc.	.1000
Lauradale Subdiv.	.2000
Pollard Enterprises	.1000
Sentry Enterprises	.0870
Beacham Apts. #2	.1000
Mercer Environ.-Regalwood	.3000
Mercer Environ.-White Oak	.2200
Sherwood MHP	.0600
Hunters Creek Viking Util.	.2500
Gatlin Ramsey MHP	.0900
Queens Development	.5000
Piney Green Shopping Center	.0600
Total	2.5922 MGD

>1.0 MGD

USMC Camp Geiger	1.6000
City of Jacksonville	4.4600
Tarawa Terrace	1.2500
Camp Jackson	1.0000
Total	8.3100 MGD

Total permitted for basin above Hadnot Point: 11.2050 MGD

OVERALL SUMMARY

Category (GPD)	Category Wasteflow	Percent of Total Basin Wasteflow
1,000-10,000	.0513	.5%
11,000-20,000	.0490	.5%
21,000-50,000	.2025	1.8%
51,000->100,000	2.5922	23.1%
>1,000,000	8.3100	74.1%

Effluent Limit Violations
Carter Packing Company

Permit Limits	BOD5 8 mg/l Daily Maximum (mg/l)	Nitrogen Ammonia 3 mg/l Daily Maximum (mg/l)	TSS 1.4 lbs/day Daily Maximum (lbs/day)	Oil & Grease 0.5 lbs/day Daily Max (lbs/day)
Month				
July 1984	38.7		3.67	
August	11.7		1.67	
September	16.7		2.75	
October	48.5		8.84	
November	60.4		6.00	
December	68.2		8.84	
January 1985	25.7	13.4	1.67	
February	89.0	3.4	2.34	0.79
March	31.2	7.8	8.34	
April	56.3	24.6	5.0	8.0
May		MISSING REPORT		
June	19.9		4.8	
July		NO VIOLATIONS		
August		MISSING REPORT		
September		MISSING REPORT		
October	10.7			
November	33.4		3.50	
December	54.8	10.4	7.75	
January 1986	63.1	33.9	7.25	
February	16.1			
March	9.0			
April	10.4		23.58	
May	15.9		3.00	
June	15.8		29.6	
July			1.5	
August	10.4		1.84	
Violation Totals	21	6	19	2

Total number of effluent violations = 48 during the 23 months reported.