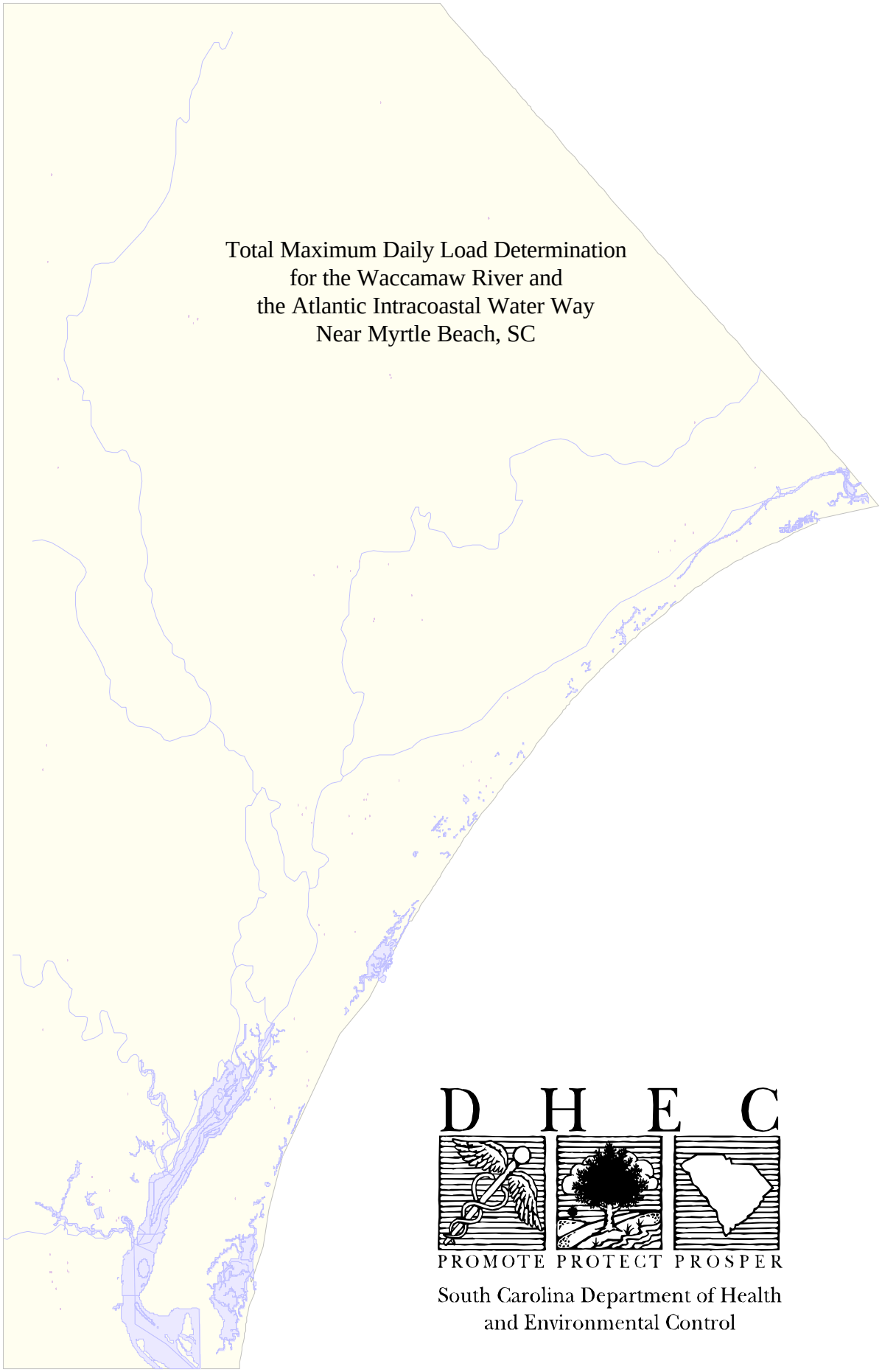

Total Maximum Daily Load Determination for the Waccamaw River and the Atlantic Intracoastal Water Way Near Myrtle Beach, SC

D H E C

PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

INDEX

State of South Carolina Administrative Record
TMDL Submittal for Waccamaw River and Atlantic Intracoastal Waterway
Biochemical Oxygen Demand

BASIS FOR 303(d) LISTING

Introduction:

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to develop total maximum daily loads (TMDLs) for their water bodies that are not meeting designated uses under technology-based controls for pollution. The TMDL process establishes the allowable loading of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and instream water quality conditions, so that the states can establish water-quality based controls to reduce pollution from both point and nonpoint sources and restore and maintain the quality of their water resources (USEPA, 1991).

Problem Definition:

Waterbodies Impaired:	Waccamaw River & Atlantic Intracoastal Waterway Watersheds 03040206-140, 03040206-150 and 03040207-030
Water Quality Standard Being Violated:	Dissolved Oxygen
Pollutant of Concern:	Biochemical Oxygen Demand (Carbonaceous and Nitrogenous)
Water Classification:	Freshwater

Atlantic Intracoastal Waterway and the Waccamaw River are classified freshwater with the Waccamaw River having a site specific criteria for dissolved oxygen (DO). Waters of this class are to be:

> "Freshwater suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses."(R.61-68)

Dissolved Oxygen Criteria:

Waccamaw River:	A minimum DO concentration of 4 mg/l.
Atlantic Intracoastal Waterway:	Daily average DO concentration of 5 mg/l with a minimum of 4 mg/l.

The Waccamaw River and the AIWW are tidally influenced fresh waters located along the

northern coastal region of the state. The referenced portion of the AIWW is the man made canal from Little River to Waccamaw River. Net flow through this section is northward and enters the Atlantic Ocean through Little River. The referenced portion of the Waccamaw River runs from Conway, SC to south of the convergence with the AIWW. The predominate direction of flow for this section is southward towards Winyah Bay, although a portion of the Waccamaw enters the AIWW and flows north. Low velocities and low re-aeration are found throughout this system. These waterbodies, located in watersheds 03040206-140, 03040206-150 and 03040207-030, are listed as Primary Priority Waterbodies on the 1996 303(d) list and the 1998 South Carolina Waters of Concern for violations of DO. South Carolina Department of Health and Environmental Control (SCDHEC) has data from seven ambient STORET monitoring stations on the Intracoastal Waterway and Waccamaw River, MD-088, MD-085, MD-127, MD-087, MD-125, MD-089, MD-091 that document periods in the late summer during which DO concentrations fail to meet numeric standards. These periods are considered naturally occurring phenomenon. Antidegradation rules of South Carolina Regulation 61-68 allow a maximum DO deficit of 0.1 mg/l from point sources ("0.1 rule") under these conditions. The "0.1 rule" will be the standard applicable in the development of these TMDLs.

TMDL TECHNICAL BASIS

Target Identification:

Antidegradation rules of South Carolina Regulation 61-68 state:

> "4. Certain natural conditions maycause a depression of dissolved oxygen in surface waters while existing and classified uses are still maintained. The Department shall allow a dissolved oxygen depression in these low dissolved oxygen waterbodies as prescribed below:
>
> > a. Under these conditions the quality of the surface waters shall not be cummulatively lowered more then 0.1 mg/l for dissolved oxygen from point sources and other activities ....."

This rule's focus is the cummulative 0.1 mg/l point source impact on DO and will be the standard applicable in the development of these TMDLs.

Point Sources by Area in Waccamaw/ AIWW Watershed:

The four areas where point source TMDLs are being established are: the Conway area of the Waccamaw River; the North Myrtle Beach area of the AIWW; the area at the confluence of the AIWW and the Waccamaw River near Bucksport; and the southern area of the Waccamaw River, north of Hagley Landing. The pollutant of concern is biochemical oxygen demand, both carbonaceous and nitrogenous, which is expressed in ultimate oxygen demand (UOD). The TMDLs will be expressed in terms of UOD, based on the water bodies' assimilative capacity for oxygen-demanding substances.

Permitted Dischargers in Areas of Concern

		Current Permit Limits		
Location	Dischargers	NPDES Permit #	Q (MGD)	UOD (#/d)
Conway	City of Conway GSW&SA Central Total	SC0021733 SC0040410	3.2 1.2 4.4	522 1,351 **1,873**
Bucksport	GSW&SA Bucksport	SC0040886	0.2	**228**
Hagley	GSW&SA Schwartz Plant Myrtle Beach WWTP GCW&SD Murrells Inlet GCW&SD Pawley's Area Total	SC0037753 SC0039039 SC0040959 SC0039951	12 17 1 2.75 32.75	7,871 13,507 567 2,275 **24,220**
North Myrtle Beach	NMB Ocean Drive NMB Crescent Beach GSW&SA Vereen Plant Total	SC0022152 SC0022161 SC0041696	3.4 2.1 2.5 8.0	685 743 481 **1,908**

TMDL Development:

The Branched Lagrangian Transport Model (BLTM), a dynamic, one dimensional water quality model, was applied by the United States Geological Survey (USGS) for the Waccamaw Regional Planning and Development Council (WRP&DC). BLTM utilizes hydrodynamic data generated by USGS's BRANCH model. These models were submitted to SC Department of Health and Environmental Control (SCDHEC) in the fall of 1995 for use in determining the assimilative capacity for oxygen demanding substances of the Waccamaw/AIWW system.

The BRANCH/BLTM model developed by USGS for the Waccamaw River and AIWW has undergone internal USGS review as well as external review by SCDHEC and Jordan, Jones & Goulding, Inc.. These entities have confirmed the model's calibration and verification. Information concerning development, calibration and verification of BRANCH/BLTM can be found in the USGS Water-Resources Investigations Report 95-4111 titled *Assimilative Capacity of the Waccamaw River and the Atlantic Intracoastal Waterway near Myrtle Beach, South Carolina 1989-92.*

As a result of public comment, a second review of the model was conducted. This included an external review of the Department's application of dynamic models by both the U.S. Environmental Protection Agency (EPA) and Tetra Tech, Inc. (an EPA contractor). This review offered specific recommendations for selection of critical conditions (App. A) which were

followed by SCDHEC.

BRANCH/BLTM, as with some other water quality models, handles point sources as loads without adding the corresponding flow to the hydrodynamic portion of the model. This approach was changed by USGS in order to utilize the model for evaluation of water withdrawal impacts on the system's assimilative capacity. The BRANCH/BLTM model specific for the Waccamaw / Atlantic Intracoastal Waterway was re-schematized (Fig.1) and re-configured to accomplish this. The drinking water withdrawal on the AIWW was entered into the model as the difference between permitted and June through July 1994 average withdrawal. Other drinking water withdrawals were entered as permitted withdrawals. AIW1.CTL (App. B) contains discharge flow and drinking water withdrawal information. An internal boundary (an artifact from original model development) was also removed.

Critical conditions for wasteload allocation application were determined using data from USGS water quality stations and SCDHEC STORET stations for the month of July from 1988 to 1998. For all water quality parameters except DO, the 75th percentile was considered as being representative of critical conditions. For DO, the 25th percentile was considered as being representative of critical conditions. Values greater than plus or minus two standard deviations of the mean of the raw data were considered anomalies and discarded. Because the data used for critical conditions were actual water quality measurements, loads attributable to non-point and natural sources are indirectly included. Meteorological effects were derived from National Oceanic and Atmospheric Administration data. Average wind speed and average monthly maximum and minimum temperatures were determined for July 1990. Flow conditions for the model runs were actual stage data (June 1 - July 15, 1994) as required by the model. Sensitivity analysis shows changes in boundary conditions have little impact when predicting the relative difference between model predicted instream DO with and without the dischargers' contributions. Boundary conditions for the critical condition model run are listed in Table 1. Model input files may be found in Appendix B.

Wasteload allocation models typically used throughout the state, for non-tidal rivers, are developed using a stream flow representing the lowest seven day average with a ten year recurrence (7Q10). A 7Q10 low flow is not applicable for the Waccamaw / AIWW system due to it's complexity and tidal influence. There are four boundaries: two fresh water boundaries, representing four large river systems each with headwaters in different geographical regions, and two tidally influenced boundaries. In an effort to identify a critical flow period analogous to a 7Q10, USGS supplied analysis of seven day mean stream flow, daily average specific conductance and daily average minimum specific conductance for various stations near the model's boundaries.

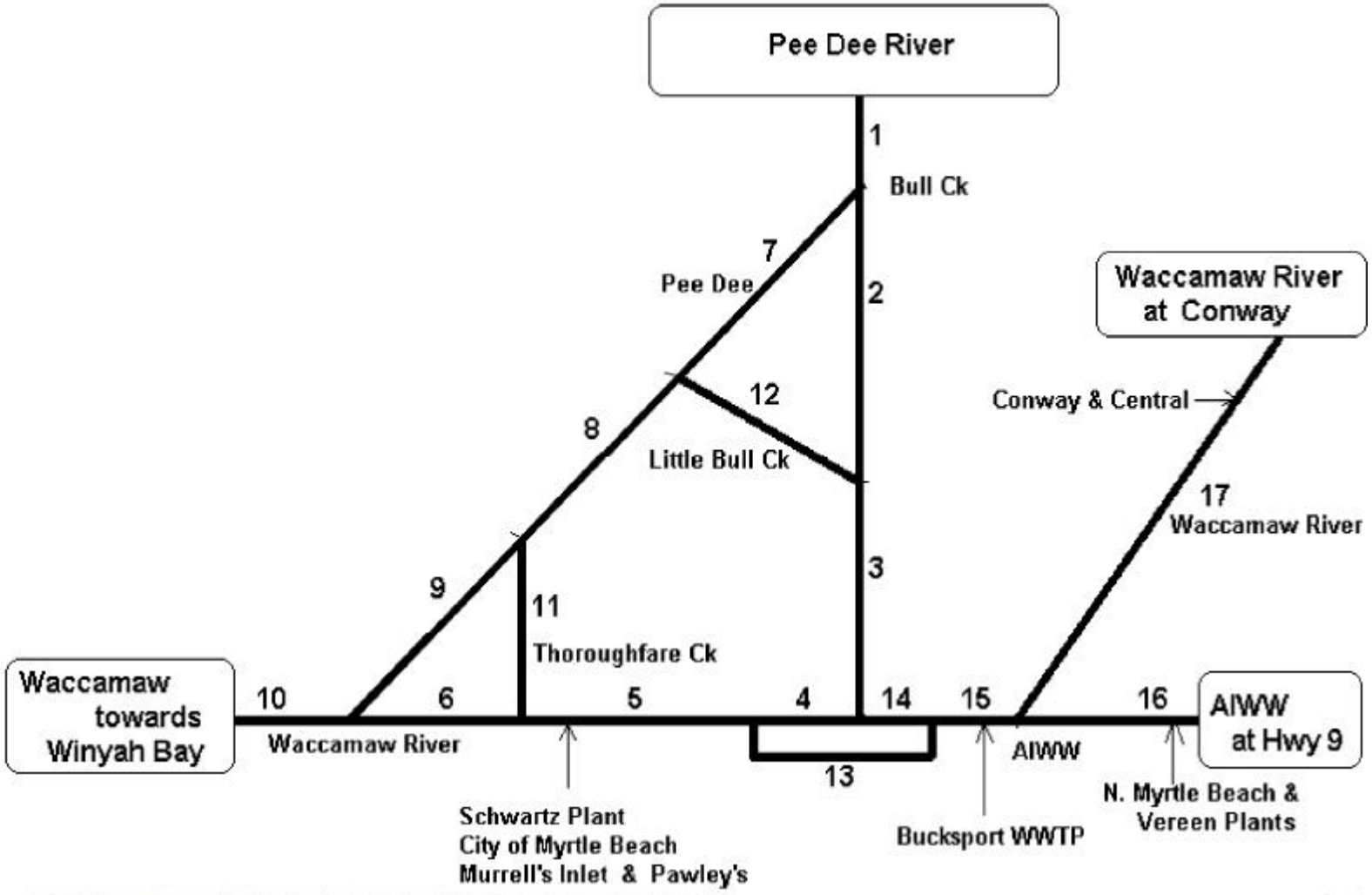
Pee Dee River
1
Bull Ck
7
Pee Dee
2
Waccamaw River
at Conway
12
Conway & Central
8
Little Bull Ck
17
Waccamaw River
3
9
11
Thoroughfare Ck
Waccamaw
towards
Winyah Bay
10
6
5
4
14
15
16
AIWW
at Hwy 9
Waccamaw River
13
AIWW
Schwartz Plant
City of Myrtle Beach
Murrell's Inlet & Pawley's
Bucksport WWTP
N. Myrtle Beach &
Vereen Plants

Figure 1- Current Model Schematization

Review of supplied data identified numerous periods with low freshwater flow in the Waccamaw River as well as periods of high specific conductance at the tidally influenced boundaries throughout the period of record. To maintain continuity, to apply a watershed approach, and to reduce human error within the permitting process, one specific flow period, rather than different flow periods for each general area of the model, was selected to be the representative low flow critical condition. The chosen flow period was June 1 - July 15, 1994. This selection was based on the period's low variability in flow, best approximation of a critical low flow with a ten year recurrence and lack of bias towards any specific region within the model.

Table 1 - Boundary Conditions for the Critical Condition Model Run with concentrations in mg/l

Location	Temperature	Ammonia	NO_3	BOD_5	DO
Pee Dee River	28 ^{0}C	0.06	0.23	2.3	5.0
Waccamaw River -at Conway	30 ^{0}C	0.07	0.22	1.3	4.5
Waccamaw River -at Hagley River	28 ^{0}C	0.09	0.36	1.2	5.0
AIWW -at Hwy 9	30 ^{0}C	0.10	0.39	2.3	4.5

Antidegradation rules of South Carolina Regulation 61-68 allow a maximum DO deficit of 0.1 mg/l attributable to point sources ("0.1 rule") where waters do not meet the numeric DO standard due to natural conditions. The "0.1 rule" was applied to determine the point source TMDL for oxygen consuming constituents. The "background" condition was identified by removing the permitted dischargers from the critical condition model and used as a baseline. The second step was to run each area's permitted loadings separately, and identify the corresponding areas of impact. The third step was to reduce the area loadings, until a change of 0.1 mg/l below the "background" DO was identified. The loadings were then run concurrently and adjusted to compensate for interaction between areas. The dischargers' impacts were determined as the difference between the "background" run's and the "load" run's twenty-four hour daily averages as required by R.61-68. Appendix C contains five graphs representing the predicted instream DO with and without the discharges at a given point in time. These graphs illustrate the dynamic nature of discharges' impact on the system. Table 2 lists the current NPDES permit limits and corresponding loads by area. Table 3 lists the identified TMDL UOD load by area.

Table 2 - Current limits for Waccamaw/ AIWW permits

		Current Permit Limits		
Location	Dischargers	Limits (BOD/NH3/DO)	Q (MGD)	UOD (#/d)
Conway	City of Conway	10/1/6	3.2	522
	GSW&SA Central	*	1.2	1,351
	Total		4.4	**1,873**
Bucksport	GSW&SA Bucksport	30/--/1	0.2	**228**
Hagley	GSW&SA Schwartz Plant	*	12	7,871
	Myrtle Beach WWTP	30/11/4	17	13,507
	GCW&SD Murrells Inlet	*	1	567
	GCW&SD Pawley's Area	*	2.75	2,275
	Total		32.75	**24,220**
North Myrtle Beach	NMB Ocean Drive	10/2/6	3.4	685
	NMB Crescent Beach	10/6/6	2.1	743
	GSW&SA Vereen Plant	*	2.5	481
	Total		8.0	**1,908**

*Currently limited by UOD load

Table 3 - Proposed TMDLs for Waccamaw/ AIWW System with effluent DO of 6 mg/l

Location	**Dischargers**	**UOD (#/d)**
Conway	City of Conway GSW&SA Central **Total**	303 #/d
Bucksport	GSW&SA Bucksport	84 #/d
Hagley	GSW&SA Schwartz Plant Myrtle Beach WWTP GCW&SD Murrells Inlet GCW&SD Pawley's Area **Total**	8,643 #/d

Location	Dischargers	UOD (#/d)
North Myrtle Beach	NMB Ocean Drive NMB Crescent Beach GSW&SA Vereen Plant **Total**	 1,638 #/d

References

Butcher, Jonathan B., 1998. "Review of South Carolina Dynamic Modeling Applications for Dissolved Oxygen." Unpublished paper

Chapra, Steven C., 1997. Surface Water Quality Modeling. McGraw-Hill, New York, New York.

South Carolina Department of Health and Environmental Control. 1998. "Water Classifications and Standards." Regulation 61-68.

South Carolina Department of Health and Environmental Control. 1997. "Watershed Water Quality Management Strategy - Pee Dee Basin." Technical Report No. 001-97.

Thomann, Robert V., 1972. Systems Analysis and Water Quality Management. McGraw-Hill, New York, New York.

Thomann, Robert V., and John A. Mueller, 1987. Principles of Surface Water Quality Modeling and Control. Harper Collins, New York, New York.

United States Environmental Protection Agency. 1991. Guidance for Water Quality-Based Decisions: The TMDL Process, Office of Water, EPA 440/4-91-001.

Untied States Geological Survey. 1991. Low-Flow Frequency and Flow Duration of Selected South Carolina Stream through 1987. Water-Resources Investigations Report 91-4170.

United States Geological Survey. 1995. Assimilative Capacity of the Waccamaw River and The Atlantic Intracoastal Waterway near Myrtle Beach, South Carolina, 1989-92. Water-Resources Investigations Report 95-4111.

Appendix A

EPA/Tetra Tech, Inc. Report

Appendix B

Input Files for BRANCH/BLTM Models

QUAL2E KINETIC TERMS

VARIABLE	RECOMMENDED RANGE	MODELED RANGE	DESCRIPTION
A1	3.01	0.10	Free convection - wind
B1	1.13	0.10	Mass transfer coefficient - wind
ALPHA0	10.0-100.0	67.0	Ratio of Chl-a to algal biomass
ALPHA1	0.07-0.09	0.09	N fraction of algal biomass
ALPHA2	0.01-0.02	0.012	P fraction of algal biomass
ALPHA3	1.40-1.80	1.60	O_2 production per unit of algal growth
ALPHA4	1.60-2.30	2.10	O_2 uptake per unit of algae expired
ALPHA5	3.00-4.00	3.90	O_2 uptake per unit of NH_3 oxidized
ALPHA6	1.00-1.14	1.09	O_2 uptake per unit of NO_2 oxidized
GROMAX	1.00-3.00	1.00	Maximum specific growth rate
IRGO	option 1,2	2	Growth rate option
RSPRT	0.05-0.50	0.20	Algal respiration rate
LFO	option 1,2	1	
CKL	0.02-0.10	0.03	Light half-saturation rate for algea
CKN	0.01-0.30	0.30	N half-saturation rate for algea
CKP	0.001-0.05	0.003	P half-saturation rate for algea
SHAD0	variable	0.100	Light extinction coefficient for algea
SHAD1	0.002-0.02	0.000	Linear self shading
SHAD2	0.0165	0.000	Non-linear self shading
PN	0.00-1.00	0.080	Algal preference factor for NH_3
K2O	options 1-8	1	Reaeration option
NO2L	0.00-1.00	0.000	Nitrate loss factor
ALGSET	0.50-6.00	1.6	Settling rate for algae
BET3	0.02-0.40	0.00	Hydrolysis rate of ON -->NH_3
SIG4	0.001-0.10	0.001	Organic N settling rate
BET1	0.1-1.00	0.07-0.23	Biological oxidation rate of NH_3 -->NO_2
SIG3	variable	-0.99 - 1.5	Benthos source rate for NH_3
BET2	0.2 - 2.0	0.6	Biological oxidation rate of NO_2 -->NO_3
BET4	0.01-0.70	0.00	Decay rate of organic P to dissolved P
SIG5	0.001-0.10	0.0	Organic P settling rate
SIG2	variable	0.0	Benthos source rate for dissolved P
CK1	0.02-3.40	0.09	Carbonaceous BOD decay rate

CK3	-0.36-0.36	-0.13- -0.01	Carbonaceous sink rate for BOD
CK4	variable	1.0-1.75	Benthos oxygen consumption rate
CK2	0.0 -100.0	0.07-0.11	Reaeration rate
CB	variable	0.00	

QUAL2E.IN

```
AIW Nutrient Model June 1 94 to July 15 94 Up-dated PRODUCTION RUN NRS 4/26/99
Wind function =  A1  +  B1 V [mm/(day kpa)], Wind speed V in m/s
                0.10   0.10
ALPH0   ALPH1   ALPH2   ALPH3   ALPH4  ALPH5  ALPH6 GROMAX IGRO RSPRT
 67.0   0.090   0.012    1.60    2.10   3.90   1.09   1.00   2   0.20
 LFO  CKL    CKN     CKP    SHAD0   SHAD1  SHAD2    PN    K2O  NO2L
  1  0.030  0.300   0.003    0.100  0.000   0.000  0.080   1   0.000
  Br  Gr  ALGSET  BET3    SIG4     BET1      SIG3       BET2      BET4
  1    1    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  1    2    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  2    1    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  2    2    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  2    3    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  2    4    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  2    5    1.6   .00    0.001     0.07     -0.99       0.6        0.0
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  2    7    1.6   .00    0.001     0.07     -0.99       0.6        0.0
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  2    9    1.6   .00    0.001     0.07     -0.99       0.6        0.0
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  5    1    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  5    2    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  5    3    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  5    4    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  5    5    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  5    6    1.6   .00    0.001     0.07     -0.99       0.6        0.0
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  7    2    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  7    3    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  7    4    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  7    5    1.6   .00    0.001     0.07     -0.99       0.6        0.0
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  8    3    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  8    4    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  9    1    1.6   .00    0.001     0.07     -0.99       0.6        0.0
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  9    4    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  9    5    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  9    6    1.6   .00    0.001     0.07     -0.99       0.6        0.0
  9    7    1.6   .00    0.001     0.07     -0.99       0.6        0.0
```

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11	3	1.6	.00	0.001	0.07	-0.99	0.6	0.0
11	4	1.6	.00	0.001	0.07	-0.99	0.6	0.0
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13	2	1.6	.00	0.001	0.07	-0.99	0.6	0.0
14	1	1.6	.00	0.001	0.07	-0.99	0.6	0.0
15	1	1.6	.00	0.001	0.07	-0.99	0.6	0.0
15	2	1.6	.00	0.001	0.07	-0.99	0.6	0.0
15	3	1.6	.00	0.001	0.23	1.50	0.6	0.0
15	4	1.6	.00	0.001	0.23	1.50	0.6	0.0
15	5	1.6	.00	0.001	0.23	1.50	0.6	0.0
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16	9	1.6	.00	0.001	0.12	0.30	0.6	0.0
16	10	1.6	.00	0.001	0.12	0.30	0.6	0.0
16	11	1.6	.00	0.001	0.12	0.30	0.6	0.0
16	12	1.6	.00	0.001	0.12	0.30	0.6	0.0
16	13	1.6	.00	0.001	0.12	0.30	0.6	0.0
16	14	1.6	.00	0.001	0.12	0.30	0.6	0.0
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16	19	1.6	.00	0.001	0.12	0.30	0.6	0.0
17	1	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	2	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	3	1.6	.00	0.001	0.23	1.50	0.6	0.0
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17	6	1.6	.00	0.001	0.23	1.50	0.6	0.0
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17	9	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	10	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	11	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	12	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	13	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	14	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	15	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	16	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	17	1.6	.00	0.001	0.23	1.50	0.6	0.0
17	18	1.6	.00	0.001	0.23	1.50	0.6	0.0

Br	Gr	SIG5	SIG2	CK1	CK3	CK4	CK2	CB
1	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
1	2	0.0	0.0	0.09	-0.01	1.50	0.07	0.00
2	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00

2	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	4	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	5	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	6	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	7	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	8	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
2	9	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
3	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
3	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
4	1	0.0	0.0	0.09	-0.10	1.00	0.07	0.00
4	2	0.0	0.0	0.09	-0.10	1.00	0.07	0.00
5	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
5	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
5	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
5	4	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
5	5	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
5	6	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
6	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
6	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
6	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
7	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
7	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
7	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
7	4	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
7	5	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
7	6	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
8	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
8	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
8	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
8	4	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	4	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	5	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	6	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
9	7	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
10	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
10	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
11	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
11	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
11	3	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
11	4	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
12	1	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
12	2	0.0	0.0	0.09	-0.01	1.00	0.07	0.00
13	1	0.0	0.0	0.09	-0.12	1.00	0.07	0.00
13	2	0.0	0.0	0.09	-0.12	1.00	0.07	0.00
14	1	0.0	0.0	0.09	-0.12	1.25	0.07	0.00
15	1	0.0	0.0	0.09	-0.12	1.75	0.07	0.00
15	2	0.0	0.0	0.09	-0.12	1.75	0.07	0.00
15	3	0.0	0.0	0.09	-0.12	1.75	0.07	0.00
15	4	0.0	0.0	0.09	-0.07	1.75	0.07	0.00
15	5	0.0	0.0	0.09	-0.07	1.75	0.07	0.00
16	1	0.0	0.0	0.09	-0.13	1.75	0.07	0.00
16	2	0.0	0.0	0.09	-0.13	1.75	0.07	0.00
16	3	0.0	0.0	0.09	-0.12	1.75	0.11	0.00
16	4	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	5	0.0	0.0	0.09	-0.11	1.75	0.11	0.00

16	6	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	7	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	8	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	9	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	10	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	11	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	12	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	13	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	14	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	15	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	16	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	17	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	18	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
16	19	0.0	0.0	0.09	-0.11	1.75	0.11	0.00
17	1	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	2	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	3	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	4	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	5	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	6	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	7	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	8	0.0	0.0	0.09	-0.01	1.75	0.08	0.00
17	9	0.0	0.0	0.09	-0.03	1.75	0.08	0.00
17	10	0.0	0.0	0.09	-0.03	1.75	0.08	0.00
17	11	0.0	0.0	0.09	-0.05	1.75	0.08	0.00
17	12	0.0	0.0	0.09	-0.05	1.75	0.08	0.00
17	13	0.0	0.0	0.09	-0.07	1.75	0.08	0.00
17	14	0.0	0.0	0.09	-0.07	1.75	0.08	0.00
17	15	0.0	0.0	0.09	-0.09	1.75	0.08	0.00
17	16	0.0	0.0	0.09	-0.11	1.75	0.08	0.00
17	17	0.0	0.0	0.09	-0.11	1.75	0.08	0.00
17	18	0.0	0.0	0.09	-0.11	1.75	0.08	0.00

time	eq tem	wind	rad
1.00	15.460	1.300	0.000
2.00	15.600	1.300	0.000
3.00	16.420	1.300	0.000
4.00	17.880	1.300	0.000
5.00	19.880	1.300	0.000
6.00	22.820	1.300	0.000
7.00	26.590	1.300	0.390
8.00	30.420	1.300	0.730
9.00	33.990	1.300	1.040
10.00	37.030	1.300	1.310
11.00	39.290	1.300	1.510
12.00	40.570	1.300	1.620
13.00	40.780	1.300	1.650
14.00	39.910	1.300	1.580
15.00	38.010	1.300	1.420
16.00	35.250	1.300	1.190
17.00	32.350	1.300	0.900
18.00	29.620	1.300	0.580
19.00	26.750	1.300	0.160
20.00	23.930	1.300	0.000
21.00	21.300	1.300	0.000
22.00	19.020	1.300	0.000
23.00	17.220	1.300	0.000
24.00	16.010	1.300	0.000
25.00	15.460	1.300	0.000

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26.00 15.600  1.300  0.000
27.00 16.420  1.300  0.000
28.00 17.880  1.300  0.000
29.00 19.880  1.300  0.000
30.00 22.820  1.300  0.000
31.00 26.590  1.300  0.400
32.00 30.420  1.300  0.730
33.00 33.990  1.300  1.040
34.00 37.030  1.300  1.310
35.00 39.290  1.300  1.510
36.00 40.570  1.300  1.620
37.00 40.780  1.300  1.650
38.00 39.910  1.300  1.580
39.00 38.010  1.300  1.420
40.00 35.250  1.300  1.190
41.00 32.350  1.300  0.900
42.00 29.620  1.300  0.580
43.00 26.750  1.300  0.160
44.00 23.930  1.300  0.000
45.00 21.300  1.300  0.000
46.00 19.020  1.300  0.000
47.00 17.220  1.300  0.000
48.00 16.010  1.300  0.000
49.00 15.460  1.300  0.000
50.00 15.600  1.300  0.000
51.00 16.420  1.300  0.000
52.00 17.880  1.300  0.000
53.00 19.880  1.300  0.000
54.00 22.820  1.300  0.000
55.00 26.590  1.300  0.400
56.00 30.420  1.300  0.730
57.00 33.990  1.300  1.040
58.00 37.030  1.300  1.310
59.00 39.290  1.300  1.510
60.00 40.570  1.300  1.620
61.00 40.780  1.300  1.650
62.00 39.910  1.300  1.580
63.00 38.010  1.300  1.420
64.00 35.250  1.300  1.190
65.00 32.350  1.300  0.900
66.00 29.620  1.300  0.580
67.00 26.750  1.300  0.170
68.00 23.930  1.300  0.000
69.00 21.300  1.300  0.000
70.00 19.020  1.300  0.000
71.00 17.220  1.300  0.000
72.00 16.010  1.300  0.000
73.00 15.460  1.300  0.000
74.00 15.600  1.300  0.000
75.00 16.420  1.300  0.000
76.00 17.880  1.300  0.000
77.00 19.880  1.300  0.000
78.00 22.820  1.300  0.000
79.00 26.590  1.300  0.400
80.00 30.420  1.300  0.730
81.00 33.990  1.300  1.040
82.00 37.030  1.300  1.310
83.00 39.290  1.300  1.510
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```
84.00 40.570  1.300  1.620
85.00 40.780  1.300  1.650
86.00 39.910  1.300  1.580
87.00 38.010  1.300  1.420
88.00 35.250  1.300  1.190
89.00 32.350  1.300  0.900
90.00 29.620  1.300  0.580
91.00 26.750  1.300  0.170
92.00 23.930  1.300  0.000
93.00 21.300  1.300  0.000
94.00 19.020  1.300  0.000
95.00 17.220  1.300  0.000
96.00 16.010  1.300  0.000
 1.00 15.460  1.300  0.000
 2.00 15.600  1.300  0.000
 3.00 16.420  1.300  0.000
 4.00 17.880  1.300  0.000
 5.00 19.880  1.300  0.000
 6.00 22.820  1.300  0.000
 7.00 26.590  1.300  0.390
 8.00 30.420  1.300  0.730
 9.00 33.990  1.300  1.040
10.00 37.030  1.300  1.310
11.00 39.290  1.300  1.510
12.00 40.570  1.300  1.620
13.00 40.780  1.300  1.650
14.00 39.910  1.300  1.580
15.00 38.010  1.300  1.420
16.00 35.250  1.300  1.190
17.00 32.350  1.300  0.900
18.00 29.620  1.300  0.580
19.00 26.750  1.300  0.160
20.00 23.930  1.300  0.000
21.00 21.300  1.300  0.000
22.00 19.020  1.300  0.000
23.00 17.220  1.300  0.000
24.00 16.010  1.300  0.000
25.00 15.460  1.300  0.000
26.00 15.600  1.300  0.000
27.00 16.420  1.300  0.000
28.00 17.880  1.300  0.000
29.00 19.880  1.300  0.000
30.00 22.820  1.300  0.000
31.00 26.590  1.300  0.400
32.00 30.420  1.300  0.730
33.00 33.990  1.300  1.040
34.00 37.030  1.300  1.310
35.00 39.290  1.300  1.510
36.00 40.570  1.300  1.620
37.00 40.780  1.300  1.650
38.00 39.910  1.300  1.580
39.00 38.010  1.300  1.420
40.00 35.250  1.300  1.190
41.00 32.350  1.300  0.900
42.00 29.620  1.300  0.580
43.00 26.750  1.300  0.160
44.00 23.930  1.300  0.000
45.00 21.300  1.300  0.000
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 46.00 19.020  1.300  0.000
 47.00 17.220  1.300  0.000
 48.00 16.010  1.300  0.000
 49.00 15.460  1.300  0.000
 50.00 15.600  1.300  0.000
 51.00 16.420  1.300  0.000
 52.00 17.880  1.300  0.000
 53.00 19.880  1.300  0.000
 54.00 22.820  1.300  0.000
 55.00 26.590  1.300  0.400
 56.00 30.420  1.300  0.730
 57.00 33.990  1.300  1.040
 58.00 37.030  1.300  1.310
 59.00 39.290  1.300  1.510
 60.00 40.570  1.300  1.620
 61.00 40.780  1.300  1.650
 62.00 39.910  1.300  1.580
 63.00 38.010  1.300  1.420
 64.00 35.250  1.300  1.190
 65.00 32.350  1.300  0.900
 66.00 29.620  1.300  0.580
 67.00 26.750  1.300  0.170
 68.00 23.930  1.300  0.000
 69.00 21.300  1.300  0.000
 70.00 19.020  1.300  0.000
 71.00 17.220  1.300  0.000
 72.00 16.010  1.300  0.000
 73.00 15.460  1.300  0.000
 74.00 15.600  1.300  0.000
 75.00 16.420  1.300  0.000
 76.00 17.880  1.300  0.000
 77.00 19.880  1.300  0.000
 78.00 22.820  1.300  0.000
 79.00 26.590  1.300  0.400
 80.00 30.420  1.300  0.730
 81.00 33.990  1.300  1.040
 82.00 37.030  1.300  1.310
 83.00 39.290  1.300  1.510
 84.00 40.570  1.300  1.620
 85.00 40.780  1.300  1.650
 86.00 39.910  1.300  1.580
 87.00 38.010  1.300  1.420
 88.00 35.250  1.300  1.190
 89.00 32.350  1.300  0.900
 90.00 29.620  1.300  0.580
 91.00 26.750  1.300  0.170
 92.00 23.930  1.300  0.000
 93.00 21.300  1.300  0.000
 94.00 19.020  1.300  0.000
 95.00 17.220  1.300  0.000
 96.00 16.010  1.300  0.000
 97.00 15.460  1.300  0.000
 98.00 15.600  1.300  0.000
 99.00 16.420  1.300  0.000
100.00 17.880  1.300  0.000
101.00 19.880  1.300  0.000
102.00 22.820  1.300  0.000
103.00 26.590  1.300  0.400
```

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104.00 30.420  1.300  0.730
105.00 33.990  1.300  1.040
106.00 37.030  1.300  1.310
107.00 39.290  1.300  1.510
108.00 40.570  1.300  1.620
109.00 40.780  1.300  1.650
110.00 39.910  1.300  1.580
111.00 38.010  1.300  1.420
112.00 35.250  1.300  1.190
113.00 32.350  1.300  0.900
114.00 29.620  1.300  0.580
115.00 26.750  1.300  0.170
116.00 23.930  1.300  0.000
117.00 21.300  1.300  0.000
118.00 19.020  1.300  0.000
119.00 17.220  1.300  0.000
120.00 16.010  1.300  0.000
121.00 15.460  1.300  0.000
122.00 15.600  1.300  0.000
123.00 16.420  1.300  0.000
124.00 17.880  1.300  0.000
125.00 19.880  1.300  0.000
126.00 22.820  1.300  0.000
127.00 26.590  1.300  0.400
128.00 30.420  1.300  0.730
129.00 33.990  1.300  1.040
130.00 37.030  1.300  1.310
131.00 39.290  1.300  1.510
132.00 40.570  1.300  1.620
133.00 40.780  1.300  1.650
134.00 39.910  1.300  1.580
135.00 38.010  1.300  1.420
136.00 35.250  1.300  1.190
137.00 32.350  1.300  0.900
138.00 29.620  1.300  0.580
139.00 26.750  1.300  0.170
140.00 23.930  1.300  0.000
141.00 21.300  1.300  0.000
142.00 19.020  1.300  0.000
143.00 17.220  1.300  0.000
144.00 16.010  1.300  0.000
145.00 15.460  1.300  0.000
146.00 15.600  1.300  0.000
147.00 16.420  1.300  0.000
148.00 17.880  1.300  0.000
149.00 19.880  1.300  0.000
150.00 22.820  1.300  0.000
151.00 26.590  1.300  0.400
152.00 30.420  1.300  0.730
153.00 33.990  1.300  1.040
154.00 37.030  1.300  1.310
155.00 39.290  1.300  1.510
156.00 40.570  1.300  1.620
157.00 40.780  1.300  1.650
158.00 39.910  1.300  1.580
159.00 38.010  1.300  1.420
160.00 35.250  1.300  1.190
161.00 32.350  1.300  0.900
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162.00 29.620  1.300  0.580
163.00 26.750  1.300  0.160
164.00 23.930  1.300  0.000
165.00 21.300  1.300  0.000
166.00 19.020  1.300  0.000
167.00 17.220  1.300  0.000
168.00 16.010  1.300  0.000
169.00 15.460  1.300  0.000
170.00 15.600  1.300  0.000
171.00 16.420  1.300  0.000
172.00 17.880  1.300  0.000
173.00 19.880  1.300  0.000
174.00 22.820  1.300  0.000
175.00 26.590  1.300  0.400
176.00 30.420  1.300  0.730
177.00 33.990  1.300  1.040
178.00 37.030  1.300  1.310
179.00 39.290  1.300  1.510
180.00 40.570  1.300  1.620
181.00 40.780  1.300  1.650
182.00 39.910  1.300  1.580
183.00 38.010  1.300  1.420
184.00 35.250  1.300  1.190
185.00 32.350  1.300  0.900
186.00 29.620  1.300  0.580
187.00 26.750  1.300  0.160
188.00 23.930  1.300  0.000
189.00 21.300  1.300  0.000
190.00 19.020  1.300  0.000
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694.00 19.020  1.300  0.000
695.00 17.220  1.300  0.000
696.00 16.010  1.300  0.000
697.00 15.460  1.300  0.000
698.00 15.600  1.300  0.000
699.00 16.420  1.300  0.000
700.00 17.880  1.300  0.000
701.00 19.880  1.300  0.000
702.00 22.820  1.300  0.000
703.00 26.590  1.300  0.340
704.00 30.420  1.300  0.710
705.00 33.990  1.300  1.020
706.00 37.030  1.300  1.290
707.00 39.290  1.300  1.490
708.00 40.570  1.300  1.610
709.00 40.780  1.300  1.640
710.00 39.910  1.300  1.570
711.00 38.010  1.300  1.410
712.00 35.250  1.300  1.170
713.00 32.350  1.300  0.880
714.00 29.620  1.300  0.550
715.00 26.750  1.300  0.130
716.00 23.930  1.300  0.000
717.00 21.300  1.300  0.000
718.00 19.020  1.300  0.000
719.00 17.220  1.300  0.000
720.00 16.010  1.300  0.000
721.00 15.460  1.300  0.000
722.00 15.600  1.300  0.000
723.00 16.420  1.300  0.000
724.00 17.880  1.300  0.000
725.00 19.880  1.300  0.000
726.00 22.820  1.300  0.000
727.00 26.590  1.300  0.340
728.00 30.420  1.300  0.710
729.00 33.990  1.300  1.020
730.00 37.030  1.300  1.290
731.00 39.290  1.300  1.490
732.00 40.570  1.300  1.610
733.00 40.780  1.300  1.630
734.00 39.910  1.300  1.560
735.00 38.010  1.300  1.400
736.00 35.250  1.300  1.170
737.00 32.350  1.300  0.880
738.00 29.620  1.300  0.550
739.00 26.750  1.300  0.120
740.00 23.930  1.300  0.000
741.00 21.300  1.300  0.000
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742.00 19.020  1.300  0.000
743.00 17.220  1.300  0.000
744.00 16.010  1.300  0.000
745.00 15.460  1.300  0.000
746.00 15.600  1.300  0.000
747.00 16.420  1.300  0.000
748.00 17.880  1.300  0.000
749.00 19.880  1.300  0.000
750.00 22.820  1.300  0.000
751.00 26.590  1.300  0.340
752.00 30.420  1.300  0.700
753.00 33.990  1.300  1.020
754.00 37.030  1.300  1.290
755.00 39.290  1.300  1.490
756.00 40.570  1.300  1.610
757.00 40.780  1.300  1.630
758.00 39.910  1.300  1.560
759.00 38.010  1.300  1.400
760.00 35.250  1.300  1.170
761.00 32.350  1.300  0.870
762.00 29.620  1.300  0.550
763.00 26.750  1.300  0.120
764.00 23.930  1.300  0.000
765.00 21.300  1.300  0.000
766.00 19.020  1.300  0.000
767.00 17.220  1.300  0.000
768.00 16.010  1.300  0.000
769.00 15.460  1.300  0.000
770.00 15.600  1.300  0.000
771.00 16.420  1.300  0.000
772.00 17.880  1.300  0.000
773.00 19.880  1.300  0.000
774.00 22.820  1.300  0.000
775.00 26.590  1.300  0.330
776.00 30.420  1.300  0.700
777.00 33.990  1.300  1.010
778.00 37.030  1.300  1.280
779.00 39.290  1.300  1.490
780.00 40.570  1.300  1.610
781.00 40.780  1.300  1.630
782.00 39.910  1.300  1.560
783.00 38.010  1.300  1.400
784.00 35.250  1.300  1.170
785.00 32.350  1.300  0.870
786.00 29.620  1.300  0.550
787.00 26.750  1.300  0.120
788.00 23.930  1.300  0.000
789.00 21.300  1.300  0.000
790.00 19.020  1.300  0.000
791.00 17.220  1.300  0.000
792.00 16.010  1.300  0.000
793.00 15.460  1.300  0.000
794.00 15.600  1.300  0.000
795.00 16.420  1.300  0.000
796.00 17.880  1.300  0.000
797.00 19.880  1.300  0.000
798.00 22.820  1.300  0.000
799.00 26.590  1.300  0.330
```

```
800.00 30.420  1.300  0.700
801.00 33.990  1.300  1.010
802.00 37.030  1.300  1.280
803.00 39.290  1.300  1.490
804.00 40.570  1.300  1.610
805.00 40.780  1.300  1.630
806.00 39.910  1.300  1.560
807.00 38.010  1.300  1.400
808.00 35.250  1.300  1.160
809.00 32.350  1.300  0.870
810.00 29.620  1.300  0.540
811.00 26.750  1.300  0.110
812.00 23.930  1.300  0.000
813.00 21.300  1.300  0.000
814.00 19.020  1.300  0.000
815.00 17.220  1.300  0.000
816.00 16.010  1.300  0.000
817.00 15.460  1.300  0.000
818.00 15.600  1.300  0.000
819.00 16.420  1.300  0.000
820.00 17.880  1.300  0.000
821.00 19.880  1.300  0.000
822.00 22.820  1.300  0.000
823.00 26.590  1.300  0.320
824.00 30.420  1.300  0.700
825.00 33.990  1.300  1.010
826.00 37.030  1.300  1.280
827.00 39.290  1.300  1.480
828.00 40.570  1.300  1.600
829.00 40.780  1.300  1.630
830.00 39.910  1.300  1.560
831.00 38.010  1.300  1.400
832.00 35.250  1.300  1.160
833.00 32.350  1.300  0.870
834.00 29.620  1.300  0.540
835.00 26.750  1.300  0.110
836.00 23.930  1.300  0.000
837.00 21.300  1.300  0.000
838.00 19.020  1.300  0.000
839.00 17.220  1.300  0.000
840.00 16.010  1.300  0.000
841.00 15.460  1.300  0.000
842.00 15.600  1.300  0.000
843.00 16.420  1.300  0.000
844.00 17.880  1.300  0.000
845.00 19.880  1.300  0.000
846.00 22.820  1.300  0.000
847.00 26.590  1.300  0.320
848.00 30.420  1.300  0.690
849.00 33.990  1.300  1.010
850.00 37.030  1.300  1.280
851.00 39.290  1.300  1.480
852.00 40.570  1.300  1.600
853.00 40.780  1.300  1.630
854.00 39.910  1.300  1.560
855.00 38.010  1.300  1.400
856.00 35.250  1.300  1.160
857.00 32.350  1.300  0.870
```

```
858.00 29.620  1.300  0.540
859.00 26.750  1.300  0.110
860.00 23.930  1.300  0.000
861.00 21.300  1.300  0.000
862.00 19.020  1.300  0.000
863.00 17.220  1.300  0.000
864.00 16.010  1.300  0.000
865.00 15.460  1.300  0.000
866.00 15.600  1.300  0.000
867.00 16.420  1.300  0.000
868.00 17.880  1.300  0.000
869.00 19.880  1.300  0.000
870.00 22.820  1.300  0.000
871.00 26.590  1.300  0.310
872.00 30.420  1.300  0.690
873.00 33.990  1.300  1.010
874.00 37.030  1.300  1.280
875.00 39.290  1.300  1.480
876.00 40.570  1.300  1.600
877.00 40.780  1.300  1.630
878.00 39.910  1.300  1.560
879.00 38.010  1.300  1.400
880.00 35.250  1.300  1.160
881.00 32.350  1.300  0.860
882.00 29.620  1.300  0.540
883.00 26.750  1.300  0.100
884.00 23.930  1.300  0.000
885.00 21.300  1.300  0.000
886.00 19.020  1.300  0.000
887.00 17.220  1.300  0.000
888.00 16.010  1.300  0.000
889.00 15.460  1.300  0.000
890.00 15.600  1.300  0.000
891.00 16.420  1.300  0.000
892.00 17.880  1.300  0.000
893.00 19.880  1.300  0.000
894.00 22.820  1.300  0.000
895.00 26.590  1.300  0.310
896.00 30.420  1.300  0.690
897.00 33.990  1.300  1.000
898.00 37.030  1.300  1.280
899.00 39.290  1.300  1.480
900.00 40.570  1.300  1.600
901.00 40.780  1.300  1.630
902.00 39.910  1.300  1.560
903.00 38.010  1.300  1.390
904.00 35.250  1.300  1.160
905.00 32.350  1.300  0.860
906.00 29.620  1.300  0.530
907.00 26.750  1.300  0.100
908.00 23.930  1.300  0.000
909.00 21.300  1.300  0.000
910.00 19.020  1.300  0.000
911.00 17.220  1.300  0.000
912.00 16.010  1.300  0.000
913.00 15.460  1.300  0.000
914.00 15.600  1.300  0.000
915.00 16.420  1.300  0.000
```

```
916.00 17.880  1.300  0.000
917.00 19.880  1.300  0.000
918.00 22.820  1.300  0.000
919.00 26.590  1.300  0.300
920.00 30.420  1.300  0.690
921.00 33.990  1.300  1.000
922.00 37.030  1.300  1.270
923.00 39.290  1.300  1.480
924.00 40.570  1.300  1.600
925.00 40.780  1.300  1.620
926.00 39.910  1.300  1.550
927.00 38.010  1.300  1.390
928.00 35.250  1.300  1.150
929.00 32.350  1.300  0.860
930.00 29.620  1.300  0.530
931.00 26.750  1.300  0.100
932.00 23.930  1.300  0.000
933.00 21.300  1.300  0.000
934.00 19.020  1.300  0.000
935.00 17.220  1.300  0.000
936.00 16.010  1.300  0.000
937.00 15.460  1.300  0.000
938.00 15.600  1.300  0.000
939.00 16.420  1.300  0.000
940.00 17.880  1.300  0.000
941.00 19.880  1.300  0.000
942.00 22.820  1.300  0.000
943.00 26.590  1.300  0.300
944.00 30.420  1.300  0.680
945.00 33.990  1.300  1.000
946.00 37.030  1.300  1.270
947.00 39.290  1.300  1.480
948.00 40.570  1.300  1.600
949.00 40.780  1.300  1.620
950.00 39.910  1.300  1.550
951.00 38.010  1.300  1.390
952.00 35.250  1.300  1.150
953.00 32.350  1.300  0.860
954.00 29.620  1.300  0.530
955.00 26.750  1.300  0.090
956.00 23.930  1.300  0.000
957.00 21.300  1.300  0.000
958.00 19.020  1.300  0.000
959.00 17.220  1.300  0.000
960.00 16.010  1.300  0.000
961.00 15.460  1.300  0.000
962.00 15.600  1.300  0.000
963.00 16.420  1.300  0.000
964.00 17.880  1.300  0.000
965.00 19.880  1.300  0.000
966.00 22.820  1.300  0.000
967.00 26.590  1.300  0.290
968.00 30.420  1.300  0.680
969.00 33.990  1.300  1.000
970.00 37.030  1.300  1.270
971.00 39.290  1.300  1.480
972.00 40.570  1.300  1.600
973.00 40.780  1.300  1.620
```

```
 974.00 39.910  1.300  1.550
 975.00 38.010  1.300  1.390
 976.00 35.250  1.300  1.150
 977.00 32.350  1.300  0.850
 978.00 29.620  1.300  0.520
 979.00 26.750  1.300  0.090
 980.00 23.930  1.300  0.000
 981.00 21.300  1.300  0.000
 982.00 19.020  1.300  0.000
 983.00 17.220  1.300  0.000
 984.00 16.010  1.300  0.000
 985.00 15.460  1.300  0.000
 986.00 15.600  1.300  0.000
 987.00 16.420  1.300  0.000
 988.00 17.880  1.300  0.000
 989.00 19.880  1.300  0.000
 990.00 22.820  1.300  0.000
 991.00 26.590  1.300  0.290
 992.00 30.420  1.300  0.680
 993.00 33.990  1.300  1.000
 994.00 37.030  1.300  1.270
 995.00 39.290  1.300  1.470
 996.00 40.570  1.300  1.590
 997.00 40.780  1.300  1.620
 998.00 39.910  1.300  1.550
 999.00 38.010  1.300  1.390
1000.00 35.250  1.300  1.150
1001.00 32.350  1.300  0.850
1002.00 29.620  1.300  0.520
1003.00 26.750  1.300  0.090
1004.00 23.930  1.300  0.000
1005.00 21.300  1.300  0.000
1006.00 19.020  1.300  0.000
1007.00 17.220  1.300  0.000
1008.00 16.010  1.300  0.000
1009.00 15.460  1.300  0.000
1010.00 15.600  1.300  0.000
1011.00 16.420  1.300  0.000
1012.00 17.880  1.300  0.000
1013.00 19.880  1.300  0.000
1014.00 22.820  1.300  0.000
1015.00 26.590  1.300  0.280
1016.00 30.420  1.300  0.680
1017.00 33.990  1.300  0.990
1018.00 37.030  1.300  1.270
1019.00 39.290  1.300  1.470
1020.00 40.570  1.300  1.590
1021.00 40.780  1.300  1.620
1022.00 39.910  1.300  1.550
1023.00 38.010  1.300  1.390
1024.00 35.250  1.300  1.150
1025.00 32.350  1.300  0.850
1026.00 29.620  1.300  0.520
1027.00 26.750  1.300  0.080
1028.00 23.930  1.300  0.000
1029.00 21.300  1.300  0.000
1030.00 19.020  1.300  0.000
1031.00 17.220  1.300  0.000
```

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1032.00 16.010  1.300  0.000
1033.00 15.460  1.300  0.000
1034.00 15.600  1.300  0.000
1035.00 16.420  1.300  0.000
1036.00 17.880  1.300  0.000
1037.00 19.880  1.300  0.000
1038.00 22.820  1.300  0.000
1039.00 26.590  1.300  0.280
1040.00 30.420  1.300  0.670
1041.00 33.990  1.300  0.990
1042.00 37.030  1.300  1.260
1043.00 39.290  1.300  1.470
1044.00 40.570  1.300  1.590
1045.00 40.780  1.300  1.620
1046.00 39.910  1.300  1.550
1047.00 38.010  1.300  1.380
1048.00 35.250  1.300  1.140
1049.00 32.350  1.300  0.850
1050.00 29.620  1.300  0.520
1051.00 26.750  1.300  0.080
1052.00 23.930  1.300  0.000
1053.00 21.300  1.300  0.000
1054.00 19.020  1.300  0.000
1055.00 17.220  1.300  0.000
1056.00 16.010  1.300  0.000
1057.00 15.460  1.300  0.000
1058.00 15.600  1.300  0.000
1059.00 16.420  1.300  0.000
1060.00 17.880  1.300  0.000
1061.00 19.880  1.300  0.000
1062.00 22.820  1.300  0.000
1063.00 26.590  1.300  0.270
1064.00 30.420  1.300  0.670
1065.00 33.990  1.300  0.990
1066.00 37.030  1.300  1.260
1067.00 39.290  1.300  1.470
1068.00 40.570  1.300  1.590
1069.00 40.780  1.300  1.620
1070.00 39.910  1.300  1.540
1071.00 38.010  1.300  1.380
1072.00 35.250  1.300  1.140
1073.00 32.350  1.300  0.840
1074.00 29.620  1.300  0.510
1075.00 26.750  1.300  0.080
1076.00 23.930  1.300  0.000
1077.00 21.300  1.300  0.000
1078.00 19.020  1.300  0.000
1079.00 17.220  1.300  0.000
1080.00 16.010  1.300  0.000
1081.00 15.460  1.300  0.000
1082.00 15.600  1.300  0.000
1083.00 16.420  1.300  0.000
1084.00 17.880  1.300  0.000
1085.00 19.880  1.300  0.000
1086.00 22.820  1.300  0.000
1087.00 26.590  1.300  0.270
1088.00 30.420  1.300  0.670
1089.00 33.990  1.300  0.980
```

```
1090.00 37.030  1.300  1.260
1091.00 39.290  1.300  1.470
1092.00 40.570  1.300  1.590
1093.00 40.780  1.300  1.610
1094.00 39.910  1.300  1.540
1095.00 38.010  1.300  1.380
1096.00 35.250  1.300  1.140
1097.00 32.320  1.300  0.840
1098.00 29.530  1.300  0.510
1099.00 26.600  1.300  0.070
1100.00 23.710  1.300  0.000
1101.00 21.020  1.300  0.000
1102.00 18.690  1.300  0.000
1103.00 16.860  1.300  0.000
1104.00 15.620  1.300  0.000
```

BLTM.IN

```
TMDL.IN   With loads 6.01.94 to 7.15.94  TMDL RUN 4/26/99 NRS 75% conditions
HEADER 1       17     10   1200      8       2      1      1      0      1
HEADER 2     1.00   0.00
LABEL           1   T         1
LABEL           2   A         2
LABEL           3   NH3       3
LABEL           4   N02       4
LABEL           5   N03       5
LABEL           6   P         6
LABEL           7   BOD       7
LABEL           8   DO        8
BRANCH   1      3     14      1       2
 GRID    1  0.000      0   0.03  27.90   0.00   0.06   0.00   0.23   0.00   3.45
            5.05
 GRID    2  1.030      0   0.03  28.00   0.00   0.06   0.00   0.23   0.00   3.45
            5.00
 GRID    3  2.390      0
BRANCH   2     10      1      3       2
 GRID    1  0.000      0   0.03  28.00   0.00   0.06   0.00   0.24   0.00   3.30
            5.00
 GRID    2  0.580      0   0.03  28.00   0.00   0.06   0.00   0.24   0.00   3.30
            5.00
 GRID    3  1.340      0   0.03  28.00   0.00   0.06   0.00   0.24   0.00   3.30
            5.00
 GRID    4  2.110      0   0.03  28.00   0.00   0.06   0.00   0.25   0.00   3.30
            5.00
 GRID    5  3.300      0   0.03  28.00   0.00   0.06   0.00   0.25   0.00   3.15
            4.95
 GRID    6  4.480      0   0.03  28.00   0.00   0.06   0.00   0.25   0.00   3.15
            4.95
 GRID    7  5.380      0   0.03  28.00   0.00   0.06   0.00   0.26   0.00   3.00
            4.95
 GRID    8  6.280      0   0.03  28.00   0.00   0.06   0.00   0.26   0.00   2.63
            4.95
 GRID    9  7.180      0   0.03  28.00   0.00   .065   0.00   0.27   0.00   2.25
            4.90
 GRID   10  8.080      0
BRANCH   3      3      3      4       2
 GRID    1  0.000      0   0.03  28.00   0.00   .065   0.00   0.28   0.00   1.88
```

```
                4.90
 GRID     2   0.950       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.80
                4.90
 GRID     3   2.250       0
BRANCH    4       3       4       5       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.70
                4.85
 GRID     2   0.800       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.69
                4.85
 GRID     3   1.600       0
BRANCH    5       7       5       7       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.69
                4.90
 GRID     2   1.850       0    0.03   28.00    0.00    0.07    0.00    0.29    0.00    1.68
                4.90
 GRID     3   2.940       0    0.03   28.00    0.00    0.08    0.00    0.29    0.00    1.68
                4.90
 GRID     4   4.140       0    0.03   28.00    0.00    0.08    0.00    0.30    0.00    1.70
                4.95
 GRID     5   5.340       0    0.03   28.00    0.00    0.08    0.00    0.30    0.00    1.71
                5.00
 GRID     6   6.650       0    0.03   28.00    0.00    0.08    0.00    0.31    0.00    1.73
                5.00
 GRID     7   7.960       0
BRANCH    6       4       7       8       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.08    0.00    0.32    0.00    1.75
                5.00
 GRID     2   1.850       0    0.03   28.00    0.00    0.09    0.00    0.34    0.00    1.76
                5.00
 GRID     3   2.780       0    0.03   28.00    0.00    0.09    0.00    0.35    0.00    1.77
                5.00
 GRID     4   3.700       0
BRANCH    7       7       1       2       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.06    0.00    0.23    0.00    3.38
                5.00
 GRID     2   1.320       0    0.03   28.00    0.00    0.06    0.00    0.23    0.00    3.38
                5.00
 GRID     3   2.350       0    0.03   28.00    0.00    0.06    0.00    0.23    0.00    3.30
                5.00
 GRID     4   3.280       0    0.03   28.00    0.00    0.06    0.00    0.24    0.00    3.30
                5.00
 GRID     5   4.250       0    0.03   28.00    0.00    0.06    0.00    0.24    0.00    3.15
                5.00
 GRID     6   5.280       0    0.03   28.00    0.00    0.06    0.00    0.25    0.00    3.15
                5.00
 GRID     7   6.320       0
BRANCH    8       5       2       6       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.06    0.00    0.26    0.00    3.00
                5.00
 GRID     2   1.110       0    0.03   28.00    0.00    0.06    0.00    0.27    0.00    2.85
                5.00
 GRID     3   2.230       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    2.85
                5.00
 GRID     4   3.550       0    0.03   28.00    0.00    0.07    0.00    0.29    0.00    2.70
                5.00
 GRID     5   4.970       0
BRANCH    9       8       6       8       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.07    0.00    0.31    0.00    2.40
```

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                5.00
 GRID     2   0.700       0    0.03   28.00    0.00    0.07    0.00    0.32    0.00    2.25
                5.00
 GRID     3   1.680       0    0.03   28.00    0.00    0.08    0.00    0.33    0.00    2.25
                5.00
 GRID     4   2.650       0    0.03   28.00    0.00    0.08    0.00    0.34    0.00    2.10
                5.00
 GRID     5   4.060       0    0.03   28.00    0.00    0.08    0.00    0.34    0.00    2.10
                5.00
 GRID     6   5.030       0    0.03   28.00    0.00    0.08    0.00    0.35    0.00    1.95
                5.00
 GRID     7   7.220       0    0.03   28.00    0.00    0.08    0.00    0.36    0.00    1.95
                5.00
 GRID     8   7.450       0
BRANCH   10       3       8      13       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.09    0.00    0.36    0.00    1.80
                5.00
 GRID     2   0.750       0    0.03   28.00    0.00    0.09    0.00    0.36    0.00    1.80
                5.00
 GRID     3   1.500       0
BRANCH   11       5       6       7       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.08    0.00    0.29    0.00    2.25
                5.00
 GRID     2   0.200       0    0.03   28.00    0.00    0.08    0.00    0.29    0.00    2.25
                5.00
 GRID     3   1.300       0    0.03   28.00    0.00    0.08    0.00    0.29    0.00    2.25
                5.00
 GRID     4   3.550       0    0.03   28.00    0.00    0.07    0.00    0.29    0.00    2.25
                5.00
 GRID     5   5.700       0
BRANCH   12       3       2       3       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.06    0.00    0.26    0.00    2.25
                4.90
 GRID     2   0.860       0    0.03   28.00    0.00    0.06    0.00    0.26    0.00    2.25
                4.90
 GRID     3   2.200       0
BRANCH   13       3       9       5       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.69
                4.85
 GRID     2   1.350       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.69
                4.85
 GRID     3   2.700       0
BRANCH   14       2       4       9       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.07    0.00    0.28    0.00    1.69
                4.65
 GRID     2   0.650       0
BRANCH   15       6       9      10       2
 GRID     1   0.000       0    0.03   28.00    0.00    0.06    0.00    0.27    0.00    1.65
                4.50
 GRID     2   1.190       0    0.03   27.90    0.00    0.06    0.00    0.25    0.00    1.65
                4.30
 GRID     3   3.480       0    0.03   27.90    0.00    0.05    0.00    0.23    0.00    1.58
                4.10
 GRID     4   4.670       0    0.03   27.90    0.00    0.05    0.00    0.23    0.00    1.58
                4.00
 GRID     5   5.860       0    0.03   28.00    0.00    0.05    0.00    0.22    0.00    1.65
                3.90
 GRID     6   6.960       0
```

```
BRANCH  16     20     10     12      2
 GRID    1  0.000      0   0.03  28.00   0.00   0.05   0.00   0.22   0.00   1.65
            3.80
 GRID    2  1.060      0   0.03  28.00   0.00   0.05   0.00   0.22   0.00   1.65
            3.70
 GRID    3  2.000      0   0.03  28.10   0.00   0.06   0.00   0.22   0.00   1.65
            3.60
 GRID    4  3.810      0   0.03  28.50   0.00   0.07   0.00   0.21   0.00   1.73
            3.90
 GRID    5  4.750      1   0.03  29.00   0.00   0.07   0.00   0.21   0.00   1.80
            4.20
 GRID    6  6.130      0   0.03  29.00   0.00   0.07   0.00   0.20   0.00   1.80
            4.40
 GRID    7  7.520      0   0.03  29.00   0.00   0.07   0.00   0.19   0.00   1.80
            4.60
 GRID    8  9.030      0   0.03  29.00   0.00   0.06   0.00   0.18   0.00   1.80
            4.80
 GRID    9 10.550      0   0.03  29.00   0.00   0.06   0.00   0.18   0.00   1.95
            4.90
 GRID   10 12.060      0   0.03  29.00   0.00   0.07   0.00   0.22   0.00   2.10
            5.00
 GRID   11 13.580      0   0.03  29.00   0.00   0.07   0.00   0.24   0.00   2.25
            5.20
 GRID   12 14.530      0   0.03  29.50   0.00   0.07   0.00   0.26   0.00   2.40
            5.40
 GRID   13 15.680      0   0.03  30.00   0.00   0.08   0.00   0.28   0.00   2.55
            5.50
 GRID   14 16.860      0   0.03  30.00   0.00   0.08   0.00   0.30   0.00   2.70
            5.60
 GRID   15 18.060      0   0.03  30.00   0.00   0.08   0.00   0.32   0.00   2.85
            5.70
 GRID   16 20.710      0   0.03  30.00   0.00   0.09   0.00   0.34   0.00   3.00
            5.80
 GRID   17 24.690      0   0.03  30.00   0.00   0.09   0.00   0.36   0.00   3.15
            6.00
 GRID   18 26.770      0   0.03  30.00   0.00   0.10   0.00   0.38   0.00   3.30
            6.00
 GRID   19 28.660      0   0.03  30.00   0.00   0.10   0.00   0.39   0.00   3.50
            6.00
 GRID   20 29.880      0
BRANCH  17     19     11     10      2
 GRID    1  0.000      0   0.03  30.00   0.00   0.07   0.00   0.22   0.00   2.00
            4.45
 GRID    2  0.570      0   0.03  30.00   0.00   0.07   0.00   0.22   0.00   2.03
            4.45
 GRID    3  1.140      0   0.03  30.00   0.00   .065   0.00   0.21   0.00   2.07
            4.50
 GRID    4  2.200      0   0.03  30.00   0.00   .065   0.00   0.21   0.00   2.09
            4.50
 GRID    5  3.690      0   0.03  29.60   0.00   0.06   0.00   0.20   0.00   2.07
            4.50
 GRID    6  4.580      0   0.03  29.40   0.00   0.06   0.00   0.20   0.00   2.03
            4.40
 GRID    7  5.460      0   0.03  29.00   0.00   0.06   0.00   0.20   0.00   1.97
            4.40
 GRID    8  6.340      0   0.03  28.80   0.00   0.06   0.00   0.20   0.00   1.94
            4.30
 GRID    9  6.750      0   0.03  28.60   0.00   0.06   0.00   0.20   0.00   1.89
```

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             4.30
 GRID   10  7.710      0   0.03  28.40   0.00   0.06   0.00   0.20   0.00   1.86
             4.20
 GRID   11  8.670      0   0.03  28.20   0.00   0.06   0.00   0.20   0.00   1.80
             4.20
 GRID   12  9.640      0   0.03  28.00   0.00   0.06   0.00   0.20   0.00   1.77
             4.10
 GRID   13 10.470      0   0.03  27.80   0.00   0.06   0.00   0.20   0.00   1.74
             4.10
 GRID   14 11.330      0   0.03  27.70   0.00   0.06   0.00   0.20   0.00   1.71
             4.00
 GRID   15 12.030      0   0.03  27.90   0.00   0.06   0.00   0.21   0.00   1.65
             4.00
 GRID   16 12.820      0   0.03  28.00   0.00   0.06   0.00   0.21   0.00   1.65
             3.90
 GRID   17 13.430      0   0.03  28.00   0.00   0.05   0.00   0.22   0.00   1.65
             3.80
 GRID   18 13.670      0   0.03  28.00   0.00   0.05   0.00   0.22   0.00   1.65
             3.70
 GRID   19 14.670      0
TIME     1       8
 B  1 G  1  27.90   0.00   0.06   0.00   0.23   0.00   3.45   5.05
 B 17 G  1  30.00   0.00   0.07   0.00   0.22   0.00   2.00   4.45
 B 16 G 20  30.00   0.00   0.10   0.00   0.39   0.00   3.50   4.50
 B 10 G  3  28.00   0.00   0.09   0.00   0.36   0.00   1.80   5.00
 B 17 G  5  30.00   0.00   0.50   0.00   0.00   0.00   6.00   6.00
 B 16 G 17  29.00   0.00   1.00   0.00   0.00   0.00  20.00   6.00
 B 15 G  4  27.90   0.00   5.00   0.00   0.00   0.00  30.00   6.00
 B  5 G  2  28.00   0.00   2.00   0.00   0.00   0.00  25.00   6.00
```

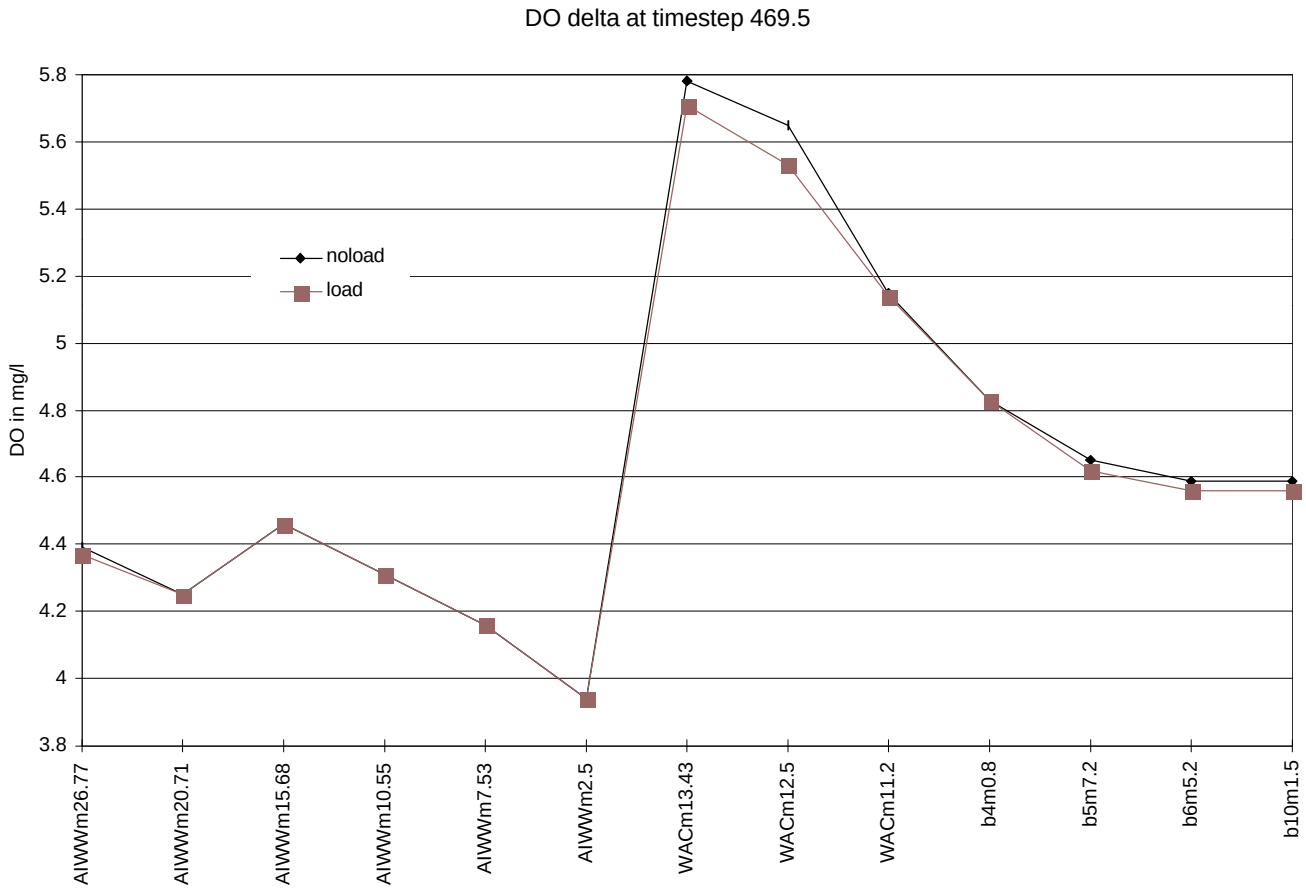
AIW1.CTL

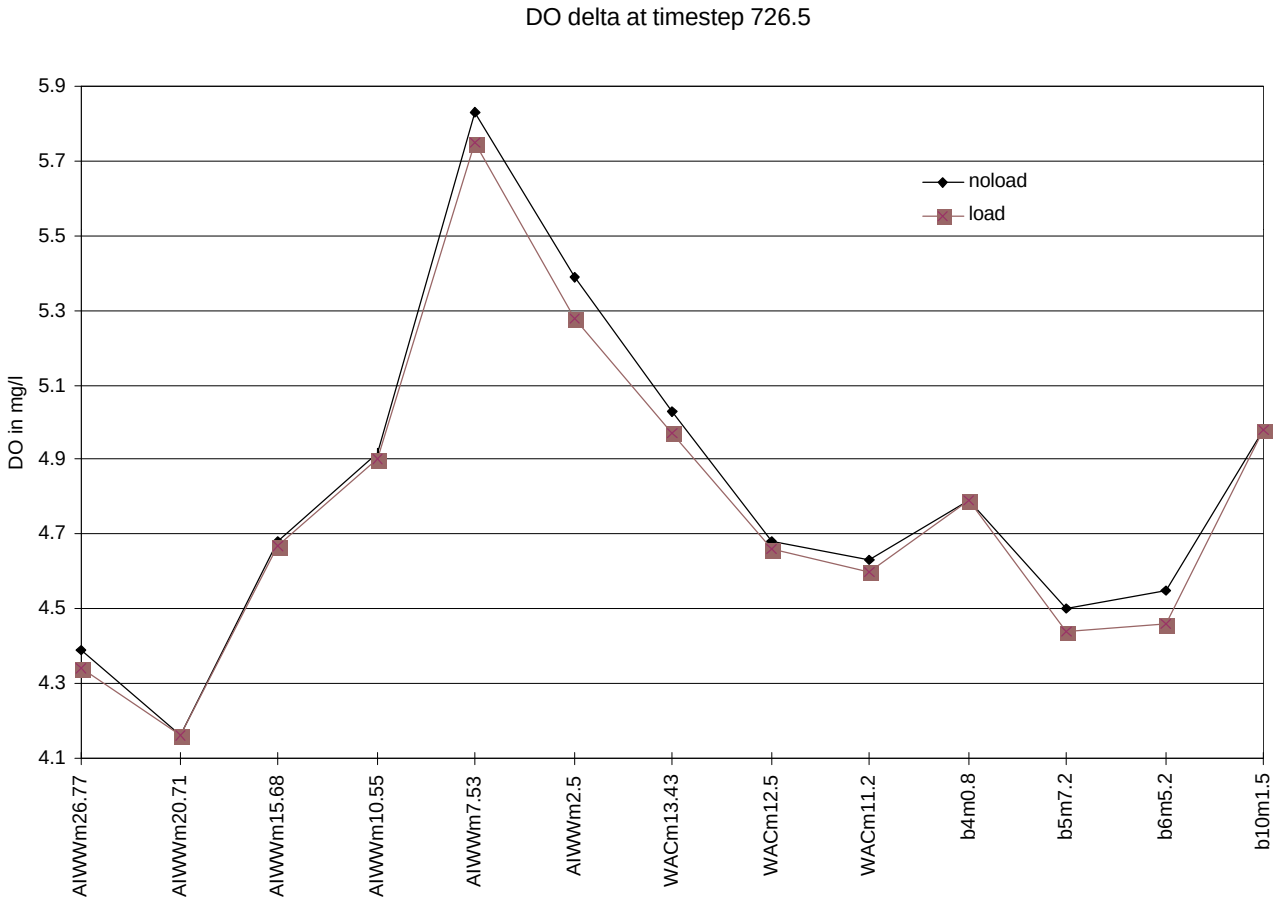
BRANCH MODEL OF AIWW NETWORK FROM HWY 9 TO 501 TO 701 TO HAGLEY. Sullins w/ withdrawals
EN2421 4 0EN10950000001 0 0 15100 10000.050 1.00.00261961710010101700.00210001
1.00.00000.0000.0000.00 15 0.0 0.00 0.000.002338 0.00068.000 0.0000
0.0 0.0 -40.3 0.0 0.0 46.9 0.0 -6.2 0.0 0.0
0.3 6.8 0.0 0.0 0.0 -17.6 12.4 0.0 0.0 0.0
0.0 0.0 0.0 0.0

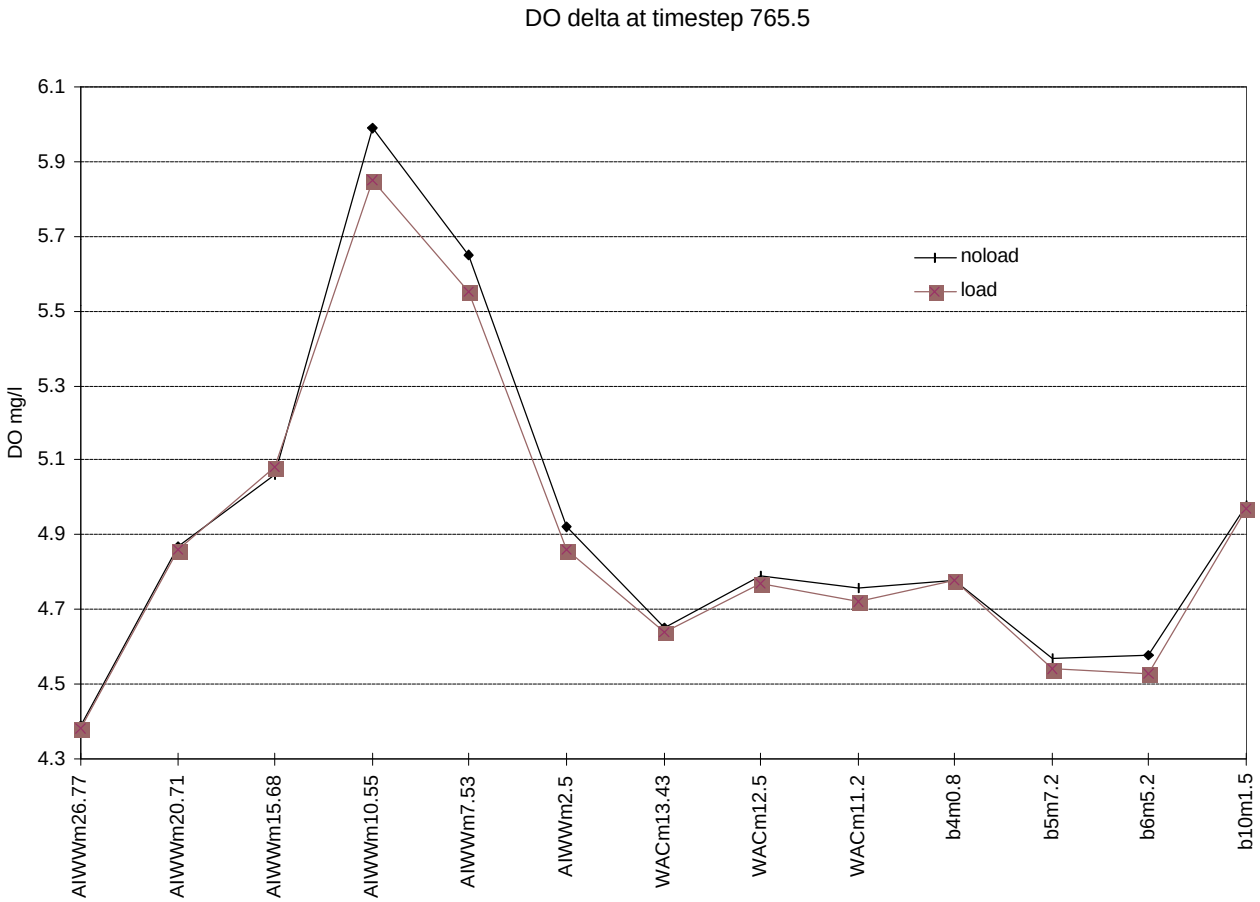
Z18 02110705 FROM= 94.06.01 24:00 TO= 94.07.15 24:00 96 -2.16 I2
Z21 02135190 96 - 1.33
Z19 02110777 96 -11.72
Z20 02110815 96 -13.95

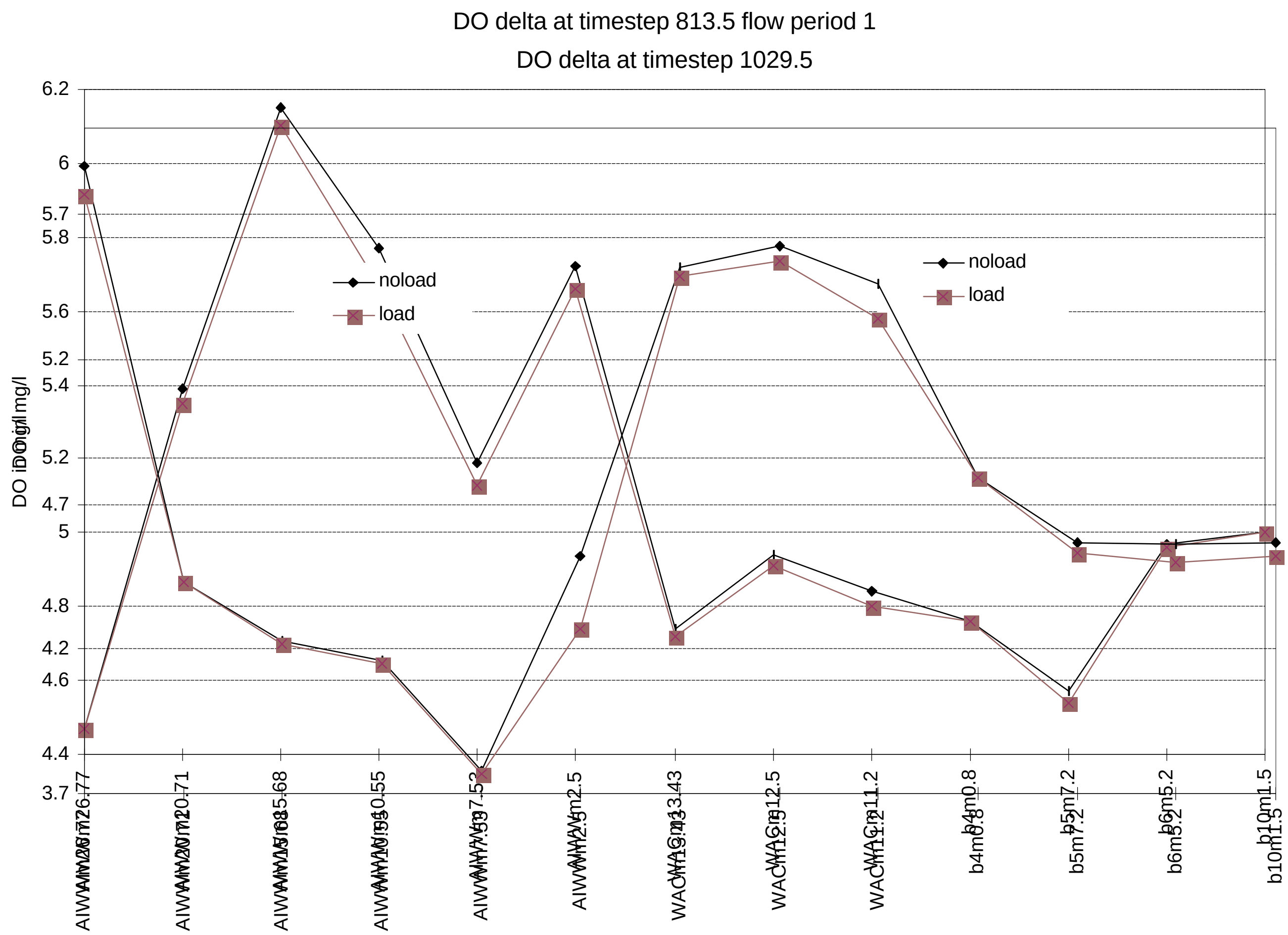
Appendix C

Model Predicted Spatially Evaluated Instream DO
at
Five Different Time Periods


DO delta at timestep 469.5
DO in mg/l
5.8
5.6
5.4
5.2
5
4.8
4.6
4.4
4.2
4
3.8
noload
load
AlWWm26.77
AlWWm20.71
AlWWm15.68
AlWWm10.55
AlWWm7.53
AlWWm2.5
WACm13.43
WACm12.5
WACm11.2
b4m0.8
b5m7.2
b6m5.2
b10m1.5


DO delta at timestep 726.5
DO in mg/l
5.9
5.7
5.5
5.3
5.1
4.9
4.7
4.5
4.3
4.1
noload
load
AlWWm26.77
AlWWm20.71
AlWWm15.68
AlWWm10.55
AlWWm7.53
AlWWm2.5
WACm13.43
WACm12.5
WACm11.2
b4m0.8
b5m7.2
b6m5.2
b10m1.5


DO delta at timestep 765.5
DO mg/l
6.1
5.9
5.7
5.5
5.3
5.1
4.9
4.7
4.5
4.3
noload
load
AIWWm26.77
AIWWm20.71
AIWWm15.68
AIWWm10.55
AIWWm7.53
AIWWm2.5
WACm13.43
WACm12.5
WACm11.2
b4m0.8
b5m7.2
b6m5.2
b10m1.5


DO delta at timestep 813.5 flow period 1
DO delta at timestep 1029.5
noload
load
noload
load
DO in mg/l
AIWWm26.77
AIWWm20.71
AIWWm15.68
AIWWm10.55
AIWWm7.53
AIWWm2.5
WACm13.43
WACm12.5
WACm11.2
b4m0.8
b5m7.2
b6m5.2
b10m1.5

Appendix D

Public Notices

NOTICE OF AVAILABILITY OF PROPOSED TMDL
FOR WATERS AND POLLUTANTS OF CONCERN IN SC

The South Carolina Department of Health and Environmental Control (DHEC) has developed a proposed total maximum daily load (TMDL) for biochemical oxygen demand for the Waccamaw River and the Atlantic Intracoastal Waterway in South Carolina and is proposing to establish this as a final TMDL. This TMDL has been developed in accordance with Section 303(d) of the Clean Water Act.

Persons wishing to offer comments or new data regarding the proposed TMDL may submit data and comments in writing no later than June 18, 1999 to Nancy Sullins, DHEC, Bureau of Water, 2600 Bull Street, Columbia, SC 29201. For more information, please contact Ms. Sullins at (803) 898-4244 or visit our website at www.state.sc.us/dhec/eqpubnot.htm.

May 17, 1999

PUBLIC NOTICE

NOTICE OF AVAILABILITY OF PROPOSED TOTAL MAXIMUM DAILY LOAD
FOR WATERS AND POLLUTANTS OF CONCERN IN THE STATE OF SOUTH CAROLINA

May 17, 1999

Section 303(d)(1)(C) of the Clean Water Act (CWA), 33 U.S.C. §1313(d)(1)(C), and EPA's implementing regulation, 40 C.F.R. §130.7(c)(1), require the establishment of total maximum daily loads (TMDLs) for waters identified as impaired pursuant to §303(d)(1)(A) of the CWA. Each of these TMDLs is to be established at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety, accounting for lack of knowledge concerning the relationship between effluent limitations and water quality. At this time, the South Carolina Department of Health and Environmental Control (SC DHEC) has developed a proposed TMDL for the Waccamaw River and the Atlantic Intracoastal Waterway, §303(d)(1)(A) waters in watershed units
03040206-140, 03040206-150 and 03040207-030 in Horry and Georgetown Counties, South Carolina. The pollutant of concern is biochemical oxygen demand, (carbonaceous and nitrogenous), the combination of which is expressed as ultimate oxygen demand (UOD). The TMDL suggests reductions in UOD as great as 64% to meet the dissolved oxygen standard. SC DHEC is proposing to establish this as a final TMDL.

Persons wishing to comment on the proposed TMDL or to offer new data regarding the proposed TMDL are invited to submit the same in writing no later than June 18, 1999 to the South Carolina Department of Health and Environmental Control, Bureau of Water, 2600 Bull Street, Columbia, South Carolina 29201, ATTN.: Ms. Nancy Sullins. Ms. Sullins' telephone number is 803- 898-4244. Her E-Mail is sullinnr @columb32.dhec.state.sc.us.

The proposed TMDL and the administrative record, including technical information, data, and analysis supporting the proposed TMDL, may be reviewed and copied at 2600 Bull Street, Columbia, South Carolina between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday. Copies can be obtained by contacting Ms. Brenda Williams at the above address, by calling her at 803-898-4173 or by e-mail at williabb @ columb32.dhec.state.sc.us. Copies will be provided at a minimal cost per page.

Following review and consideration of comments, the proposed TMDL will be sent to EPA for approval shortly after June 25, 1999.

Please bring the foregoing to the attention of persons whom you believe will be interested in this matter.

Appendix E

State of South Carolina 303(d) List for 1998