Alabama Department of Environmental Management

TMDL
Pepperell Branch – Tallapoosa River Basin
Organic Enrichment/Dissolved Oxygen

June 26, 1996
Water Quality Branch

Water Division June 26, 1996

MEMORANDUM

To: Water Quality File

From: Charles Reynolds
Water Quality Branch

Subject: Pepperell Branch TMDL

As mandated by section 303(d) of the Clean Water Act, a TMDL has been completed for Pepperell Branch in Lee County. Pepperell Branch is a tributary of Sougahatchee Creek which, in turn, is a part of the Tallapoosa River basin. Pepperell Branch, along with a segment of Sougahatchee Creek, is currently classified as A&I. The segment of Sougahatchee Creek currently classified as A&I extends from Lee County road 11 to its confluence with Pepperell Branch.

Two summer TMDLs have been completed for Pepperell Branch - one for its current use classification of A&I and the other for an upgraded use classification of F&W. The upgraded use TMDL is in accordance with the Clean Water Act goal of upgrading any waterbody with a less stringent use classification than F&W to F&W.

Attached are two spreadsheets, each labeled "ADEM TMDL SUMMARY/SUMMER." One TMDL summary sheet is for Pepperell Branch's current use classification; the other, for an upgraded use classification. Each attachment summarizes all relevant information for its respective TMDL, including maximum allowable loadings. "Total LA" refers to "total load allocation" and is the maximum allowable loadings from all nonpoint sources, including tributaries, headwaters and incremental inflow (IF). "Total WLA" refers to "total waste load allocation" and is the maximum allowable loadings from all point sources. "Total Loading" is the sum of all point and nonpoint source loadings and is the maximum allowable loadings from all sources.

TMDL limits are listed for $CBOD_5$ and NH_3-N. The basis for these limits comes from a June 1991 EPA report entitled "A Calibrated QUAL2E Model of Pepperell Branch and Sougahatchee Creek, Opelika, Alabama." The results of this report are based on a use attainability analysis (UAA) study conducted by EPA in October and November 1988.

There are two sources of water quality impairment considered to be affecting this stream system - the West Point Pepperell (WPP) wastewater discharge and urban surface runoff. EPA's QUAL2E model was run such that minimum D.O. standards were maintained under critical conditions of flow (i.e., $7Q_{10}$ flow) and temperature (i.e., 28°C) for both use classifications. The effluent limitations for WPP for each use classification are as follows:

	CURRENT USE	UPGRADED USE
WASTEFLOW (mgd)	2.75	2.75
$CBOD_5$ (mg/l)	15	7
NH_3-N (mg/l)	1	1
MIN D.O. (mg/l)	6	6.

A carbonaceous ultimate-to-five-day BOD ratio ($CBOD_U/BOD_5$) of 5 was used for the WPP effluent.

MEMORANDUM

To: Water Quality File

From: Charles Reynolds
Water Quality Branch

Subject: Pepperell Branch Winter TMDL

A winter TMDL has been completed for Pepperell Branch in Lee County. Pepperell Branch is a tributary of Sougahatchee Creek which, in turn, is a part of the Tallapoosa River basin. Pepperell Branch, along with a segment of Sougahatchee Creek, is currently classified as A&I. The segment of Sougahatchee Creek currently classified as A&I extends from Lee County road 11 to its confluence with Pepperell Branch.

Two winter TMDLs have been completed for Pepperell Branch - one for its current use classification of A&I and the other for an upgraded use classification of F&W. The upgraded use TMDL is in accordance with the Clean Water Act goal of upgrading any waterbody with a less stringent use classification than F&W to F&W.

Attached are two spreadsheets, each labeled "ADEM TMDL SUMMARY/WINTER." One TMDL summary sheet is for Pepperell Branch's current use classification; the other, for an upgraded use classification. Each attachment summarizes all relevant information for its respective TMDL, including maximum allowable loadings. "Total LA" refers to "total load allocation" and is the maximum allowable loadings from all nonpoint sources, including tributaries, headwaters and incremental inflow (IF). "Total WLA" refers to "total waste load allocation" and is the maximum allowable loadings from all point sources. "Total Loading" is the sum of all point and nonpoint source loadings and is the maximum allowable loadings from all sources.

TMDL limits are listed for $CBOD_5$ and NH_3-N. The basis for these limits comes from a June 1991 EPA report entitled "A Calibrated QUAL2E Model of Pepperell Branch and Sougahatchee Creek, Opelika, Alabama." The results of this report are based on a use attainability analysis (UAA) study conducted by EPA in October and November 1988.

There are two sources of water quality impairment considered to be affecting this stream system - the West Point Pepperell (WPP) wastewater discharge and urban surface runoff. EPA's QUAL2E model was run such that minimum D.O. standards were maintained under critical conditions of flow (i.e., $7Q_{10}$ flow) and temperature (i.e., 20°C) for both use classifications. The effluent limitations for WPP for each use classification are as follows:

	CURRENT USE	**UPGRADED USE**
WASTEFLOW (mgd)	2.75	2.75
$CBOD_5$ (mg/l)	23	12

NH_3-N (mg/l)	2	2
MIN D.O. (mg/l)	6	6.

A carbonaceous ultimate-to-five-day BOD ratio ($CBOD_U/BOD_5$) of 5 was used for the WPP effluent.

MEMORANDUM

To: Water Quality File

From: Charles Reynolds
Water Quality Section

Subject: Revised Pepperell Branch TMDL

A revised seasonal TMDL has been completed for Pepperell Branch in Lee County. Pepperell Branch is a tributary of Sougahatchee Creek which, in turn, is a part of the Tallapoosa River basin. Pepperell Branch is currently classified as Agricultural and Industrial Water Supply (A&I).

The purpose of the revised TMDL is to reflect a change in the ultimate-to-five-day BOD ratio (BOD_U/BOD_5) assumed for the Westpoint Stevens effluent. In late 1998, Westpoint Stevens submitted three time series sets of BOD data on its effluent. ADEM's regression analyses of the data indicated a ratio of 4. The value employed in the previous TMDL was 5.

Two summer, as well as two winter, TMDLs were completed for Pepperell Branch – two for the current use classification of A&I and the other two for an upgraded use classification of Fish and Wildlife (F&W). The upgraded use TMDLs are in accordance with the Clean Water Act goal of upgrading any waterbody with a less stringent use classification than F&W to F&W. Summer includes the months of May through November; winter, the other five months.

Attached are two summer spreadsheets, each labeled "ADEM TMDL SUMMARY/SUMMER," as well as two winter spreadsheets, each labeled "ADEM TMDL SUMMARY/WINTER." One TMDL summary sheet for each season is for Pepperell Branch's current use classification; the other two, for an upgraded use classification. Each attachment summarizes all relevant information for its respective TMDL, including maximum allowable loadings. "Total LA" refers to "total load allocation" and is the maximum allowable loadings from all nonpoint sources, including tributaries, headwaters and incremental inflow (IF). "Total WLA" refers to "total waste load allocation" and is the maximum allowable loadings from all point sources. "Total Loading" is the sum of all point and nonpoint source loadings and is the maximum allowable loadings from all sources.

TMDL limits are listed for $CBOD_5$ and NH_3-N. The basis for these limits comes from a June 1991 EPA report entitled "A Calibrated QUAL2E Model of Pepperell Branch and Sougahatchee Creek, Opelika, Alabama." The results of this report are based on a use attainability analysis (UAA) study conducted by EPA in October and November 1988.

There are two sources of water quality impairment considered to be affecting this stream system - the West Point Stevens (WPS) wastewater discharge and urban surface runoff. EPA's QUAL2E model was run such that minimum D.O. standards were maintained under critical conditions of

flow and temperature for each season and both use classifications. The summer effluent limitations for WPS for each use classification are as follows:

	CURRENT USE	UPGRADED USE
WASTEFLOW (mgd)	2.75	2.75
$CBOD_5$ (mg/l)	18.75	8.75
NH_3-N (mg/l)	1	1
MIN D.O. (mg/l)	6	6.

The winter effluent limitations for WPS for each use classification are as follows:

	CURRENT USE	UPGRADED USE
WASTEFLOW (mgd)	2.75	2.75
$CBOD_5$ (mg/l)	28.75	15
NH_3-N (mg/l)	2	2
MIN D.O. (mg/l)	6	6.

ADEM TMDL SUMMARY/SUMMER/UPGRADED USE

Impacted Waterbody: Pepperell Branch
303(d) Priority Ranking: Low
County(s): Lee
Size: 4.5 miles
From: Sougahatchee Creek
To: West Point Pepperell
Use Classification: F&W
Support Status: Partial
Causes: Toxicity, Nutrients, Org Enrichment
Sources: Industrial, Urban Surface Runoff
Critical Conditions: $7Q_{10}$ Flows & 28°C Temp
Water Quality Model: EPA QUAL2E Model (Predictive Simulation D)
MOS: $7Q_{10}$ Flows, 28°C Temp & Model Reaction Rate Coefficients
Pollutants Evaluated: $CBOD_5$ & NH_3-N

TMDL LOADINGS (ppd)

Source	**$CBOD_5$**	**NH_3-N**
Headwaters	2.75	0.55
Trib T-1	3.99	0.00
Incremental Inflow (IF)	7.09	0.28
Total LA	13.8	0.83
WPP WWTP	200.68	22.94
Total WLA	201	22.9
Total Loading	215	23.8

Revised 3/10/99

TMDL: PEPPERELL BRANCH/SUMMER/UPGRADED USE

	FLOW		**CONCENTRATION (mg/l)**				**LOADING (ppd)**	
SOURCE	**(cfs)**	**(mgd)**	**CBODU**	**CBOD5**	**ANOD**	**NH3-N**	**CBOD5**	**NH3-N**
Headwaters	0.51	0.33	1.5	1.00		0.20	2.75	0.55
Trib T-1	0.74	0.48	1.5	1.00		0	3.99	0.00
IF	1.316	0.85	1.5	1.00		0.04	7.09	0.28
WPP WWTP		2.75	35	8.75		1	200.68	22.94

Revised 3/10/99

ADEM TMDL SUMMARY/WINTER/UPGRADED USE

Impacted Waterbody: Pepperell Branch
303(d) Priority Ranking: Low
County(s): Lee
Size: 4.5 miles
From: Sougahatchee Creek
To: West Point Pepperell
Use Classification: F&W
Support Status: Partial
Causes: Toxicity, Nutrients, Org Enrichment
Sources: Industrial, Urban Surface Runoff
Critical Conditions: $7Q_{10}$ Flows & 20°C Temp
Water Quality Model: EPA QUAL2E Model (Predictive Simulation F)
MOS: $7Q_{10}$ Flows, 20°C Temp & Model Reaction Rate Coefficients
Pollutants Evaluated: $CBOD_5$ & NH_3-N

TMDL LOADINGS (ppd)

Source	**$CBOD_5$**	**NH_3-N**
Headwaters	2.75	0.55
Trib T-1	3.99	0.00
Incremental Inflow (IF)	7.09	0.28
Total LA	13.8	0.83
WPP WWTP	344.03	45.87
Total WLA	344	45.9
Total Loading	358	46.7

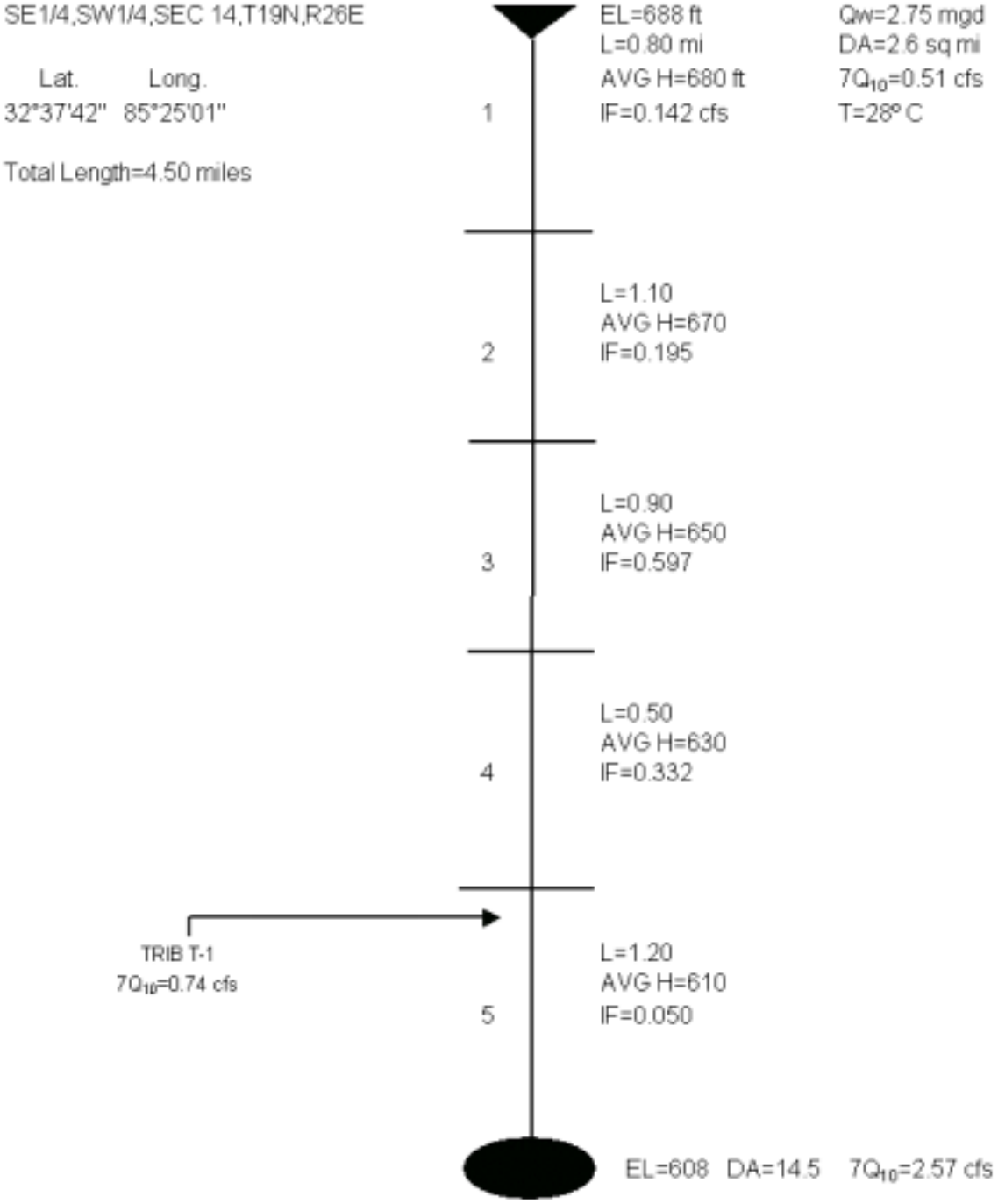
Revised 3/10/99

TMDL: PEPPERELL BRANCH/WINTER/UPGRADED USE

	FLOW		**CONCENTRATION (mg/l)**				**LOADING (ppd)**	
SOURCE	**(cfs)**	**(mgd)**	**CBODU**	**CBOD5**	**ANOD**	**NH3-N**	**CBOD5**	**NH3-N**
Headwaters	0.51	0.33	1.5	1.00		0.20	2.75	0.55
Trib T-1	0.74	0.48	1.5	1.00		0	3.99	0.00
IF	1.316	0.85	1.5	1.00		0.04	7.09	0.28
WPP WWTP		2.75	60	15		2	344.03	45.87

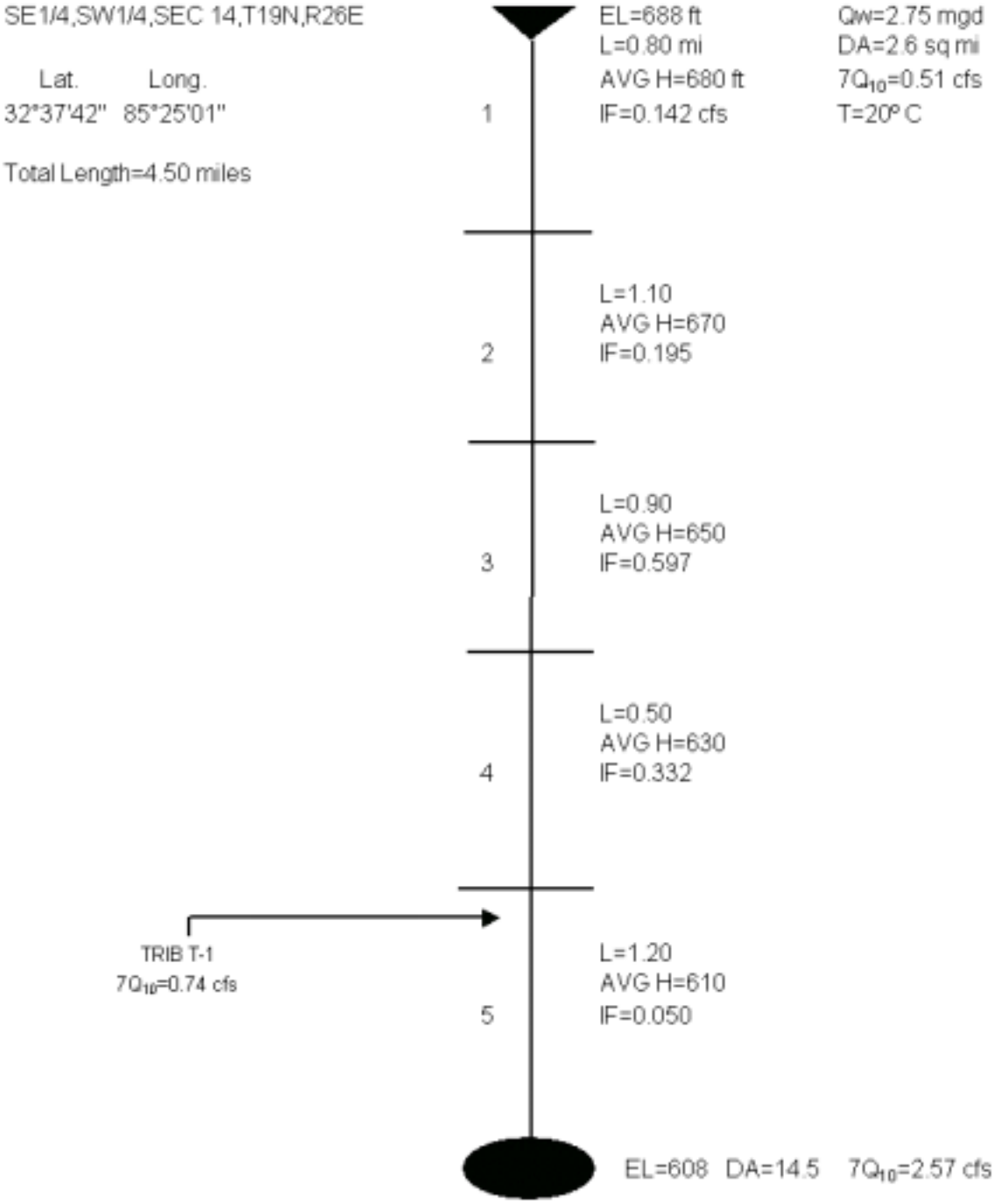
Revised 3/10/99

PEPPERELL BRANCH - LEE COUNTY
SUMMER - CURRENT/UPGRADED USE CLASSIFICATIONS



SOUGAHATCHEE CREEK

PEPPERELL BRANCH - LEE COUNTY
WINTER - CURRENT/UPGRADED USE CLASSIFICATIONS



SOUGAHATCHEE CREEK