

Alabama Department of Environmental Management

TMDL Puppy Creek – Escatawpa River Basin Organic Enrichment/Dissolved Oxygen

June 7, 1996
Water Quality Branch

MEMORANDUM

To: File

From: Charles Reynolds
Water Quality Branch

Subject: Puppy Creek TMDL

As mandated by section 303(d) of the Clean Water Act, a TMDL has been completed for Puppy Creek for CBOD₅ and NH₃-N. Puppy Creek is in Mobile County and is a part of the Escatawpa River basin. The Escatawpa River is a part of the Pascagoula River basin.

Attached is a spreadsheet labeled "ADEM TMDL DEVELOPMENT STRATEGY." This attachment summarizes all relevant information for the 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.

One of the sources of water quality impairment to this creek is considered to be the Citronelle WWTP.

In order to bring D.O. model predictions up to the required F&W D.O. standard of 5 mg/l, pollutant loading reductions were made to the Citronelle WWTP for the summer season. The summer season entails the months of May through November. Citronelle's current and revised summer effluent limitations are as follows:

	CURRENT	REVISED
CBOD₅ (mg/l)	18	13
NH₃-N (mg/l)	3	1
D.O. (mg/l)	6	6

The aforementioned effluent limitations are for a design wasteflow of 0.36 mgd. An ultimate-to-five-day CBOD ratio (CBOD_U/CBOD₅) of 1.5 was assumed for the Citronelle effluent.

Chronic ammonia toxicity to aquatic life was evaluated at the Citronelle outfall location. Using EPA's 30°C criterion, this resulted in an allowable effluent NH₃-N concentration of 1.35 mg/l.

MEMORANDUM

To: Water Quality File

From: Charles Reynolds
Water Quality Branch

Subject: Winter Puppy Creek TMDL

A winter TMDL has been completed for Puppy Creek for CBOD₅ and NH₃-N. Attached is a spreadsheet labeled "ADEM WINTER TMDL SUMMARY." This attachment summarizes all relevant information for the winter 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.

One of the sources of water quality impairment to this creek is considered to be the Citronelle WWTP. In order to bring D.O. model predictions up to the required F&W D.O. standard of 5 mg/l, pollutant loading reductions were made to the Citronelle WWTP for the winter season. The winter season entails the months of December through April. Citronelle's current and revised winter effluent limitations are as follows:

	CURRENT	REVISED
CBOD₅ (mg/l)	30	25
NH₃-N (mg/l)	8	3.5
D.O. (mg/l)	6	6.

The aforementioned effluent limitations are for a design wasteflow of 0.36 mgd. An ultimate-to-five-day CBOD ratio (CBOD_U/CBOD₅) of 1.5 was assumed for the Citronelle effluent.

Chronic ammonia toxicity to aquatic life was evaluated at the Citronelle outfall. Using an 18°C interpolated EPA criterion, this resulted in an allowable effluent NH₃-N concentration of 3.47 mg/l.

This memorandum can be considered as an addendum to the June 7, 1996, memorandum to the Water Quality file. The subject of that memo was listed as "Puppy Creek TMDL" and was, in reality, the summer TMDL for Puppy Creek.

ADEM SUMMER TMDL SUMMARY

Impacted Waterbody: Puppy Creek
303(d) Priority Ranking: Low
County(s): Mobile
Size: 10 miles
From: Ala Hwy 217
To: Citronelle WWTP
Use Classification: F&W
Support Status: Non-support
Causes: Nutrients, Org Enrichment, Pathogens
Sources: Municipal WWTP
Critical Conditions: 7Q₁₀ Flows and 30°C Temp
Water Quality Model: DOMODEL
MOS: 7Q₁₀ Flows, 30°C Temp & Model Reaction Rate Coefficients
Pollutants Evaluated: CBOD₅, NH₃-N & Ammonia Toxicity
Background Numbers for
Ammonia Toxicity: 30 Deg C Temp & pH of 7
EPA Chronic Total
Ammonia Criterion: 1.23 mg/l

TMDL LOADINGS (ppd)

Source	CBOD ₅	NH ₃ -N
Headwaters	1.51	0.12
Incremental Inflow (IF)	14.30	1.17
Total LA	15.8	1.30
Citronelle WWTP	39.03	3.00
Total WLA	39.0	3.00
Total Loading	54.8	4.30

Summer TMDL: PUPPY CREEK

SOURCE	FLOW		CONCENTRATION (mg/l)				LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD	NH3-N	CBOD5	NH3-N
Headwaters	0.21	0.14	2	1.33	0.5	0.11	1.51	0.12
IF	1.99	1.29	2	1.33	0.5	0.11	14.30	1.17
Citronelle WWTP		0.36	19.5	13.00	4.57	1.00	39.03	3.00

ADEM WINTER TMDL SUMMARY

Impacted Waterbody: Puppy Creek
303(d) Priority Ranking: Low
County(s): Mobile
Size: 10 miles
From: Ala Hwy 217
To: Citronelle WWTP
Use Classification: F&W
Support Status: Non-support
Causes: Nutrients, Organic Enrichment, Pathogens
Sources: Municipal WWTP
Critical Conditions: 7Q₂ Flows and 18°C Temp
Water Quality Model: DOMODEL
MOS: 7Q₂ Flows, 18°C Temp & Model Reaction Rate Coefficients
Pollutants Evaluated: CBOD₅, NH₃-N & Ammonia Toxicity
Background Numbers for Ammonia Toxicity: 18°C Temp & pH of 7
EPA Chronic Total Ammonia Criterion: 2.54 mg/l

WINTER TMDL LOADINGS (ppd)

Source	CBOD ₅	NH ₃ -N
Headwaters	2.80	0.23
Incremental Inflow (IF)	27.39	2.25
Total LA	30.2	2.48
Citronelle WWTP	75.06	10.51
Total WLA	75.1	10.51
Total Loading	105.3	12.99

WINTER TMDL: PUPPY CREEK

SOURCE	FLOW		CONCENTRATION (mg/l)				LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD	NH3-N	CBOD5	NH3-N
Headwaters	0.39	0.25	2	1.33	0.5	0.11	2.80	0.23
IF	3.81	2.46	2	1.33	0.5	0.11	27.39	2.25
Citronelle STP		0.36	37.5	25.00	16	3.50	75.06	10.51

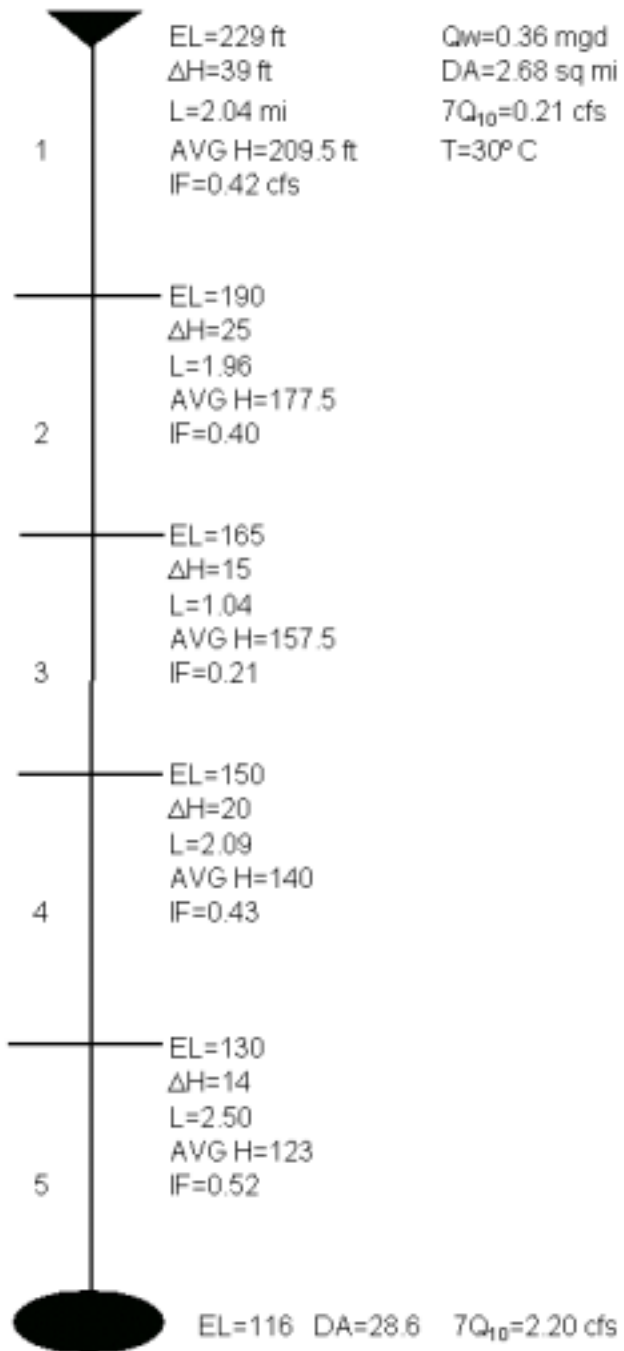
PUPPY CREEK - MOBILE COUNTY

SE1/4,SEC 2, T1N,R3W

Lat. Long.
31°04'32" 88°14'48"

NH₃ Toxicity=1.35 mg/l

Total Length=9.63 miles



ALA HWY 217

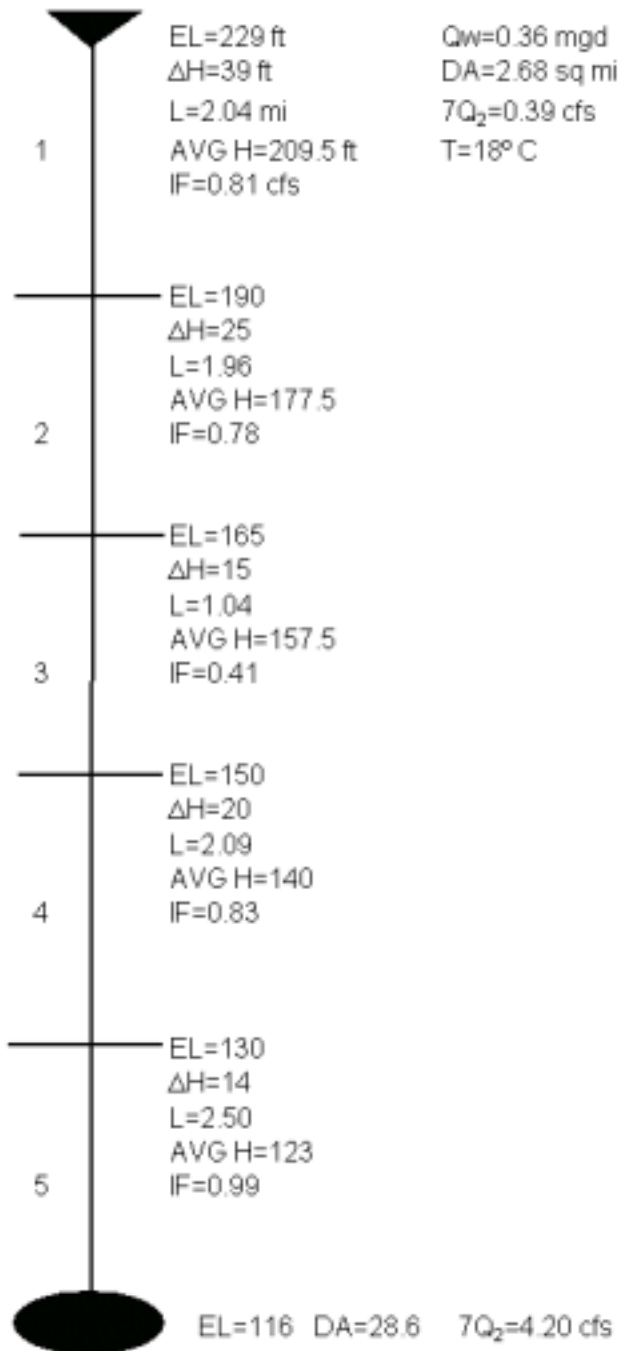
PUPPY CREEK - MOBILE COUNTY - WINTER

SE1/4,SEC 2, T1N,R3W

Lat. Long.
31°04'32" 88°14'48"

NH₃ Toxicity=3.47 mg/l

Total Length=9.63 miles



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