

Alabama Department of Environmental Management

TMDL Boggy Creek – Chipola River Basin Organic Enrichment/Dissolved Oxygen

October 18, 1996
Water Quality Branch
Water Division

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MEMORANDUM

To: Water Quality File

From: Charles Reynolds
Water Quality Branch

Subject: Boggy Creek TMDL

As mandated by section 303(d) of the Clean Water Act, a seasonal TMDL has been completed for Boggy Creek. Boggy Creek is a tributary to Buck Creek which is, in turn, a tributary to Marshall Creek. Marshall Creek and Cowarts Creek come together to form the Chipola River. Both Boggy and Buck Creeks are classified as F&W.

Attached are two spreadsheets summarizing all relevant information for the TMDLs, including maximum allowable loadings for CBOD₅ and NH₃-N. "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 spreadsheets is labeled "ADEM SUMMER TMDL SUMMARY." This sheet lists allowable loadings to the impacted reach for the summer season (May through November). The second spreadsheet is labeled "ADEM WINTER TMDL SUMMARY." This sheet lists allowable loadings to the impacted reach for the winter season (December through April).

The seasonal TMDL indicated that the current effluent limitations for Cottonwood would not have to be restricted any further in order for the impacted reach to meet its F&W use classification. The current NPDES permit for Cottonwood became effective April 1, 1996, and will expire March 31, 2001. Cottonwood is permitted for two seasons - summer and winter. Its effluent limitations are as follows:

PARAMETER	SUMMER	WINTER
BOD ₅ (mg/l)	10	30
NH ₃ -N (mg/l)	3	15
Min. D.O. (mg/l)	6	2.

The wastewater design flow for Cottonwood is 0.155 mgd.

Chronic ammonia toxicity to aquatic life was considered at the Cottonwood outfall location. Using EPA's 30 and 18°C criteria, this resulted in allowable effluent NH₃-N concentrations of 3.15 and 14.5 mg/l, respectively, for summer and winter.

ADEM SUMMER TMDL SUMMARY

Impacted Waterbody:	Boggy Creek
303(d) Priority Ranking:	Low
County(s):	Houston
Size:	5 miles
From:	Buck Creek
To:	Cottonwood WWTP
Use Classification:	F&W
Support Status:	Non-support
Causes:	Organic Enrichment
Sources:	Municipal, Natural
Critical Conditions:	7Q ₁₀ Flows and 30°C Temp
Water Quality Model:	DOMODEL
MOS:	7Q ₁₀ Flows, 30°C Temp and Model Reaction Rate Coefficients
Pollutants Evaluated:	CBOD ₅ , NH ₃ -N & Ammonia Toxicity
Background Numbers for Ammonia Toxicity:	30°C Temp & pH of 7
EPA Chronic Total Ammonia Criterion:	1.23 mg/l

SUMMER TMDL LOADINGS (ppd)

Source	CBOD ₅	NH ₃ -N
Headwaters	4.10	0.34
Buck Creek	10.42	0.86
Incremental Inflow (IF)	3.23	0.27
Total LA	17.75	1.46
Cottonwood WWTP	12.93	3.88
Total WLA	12.93	3.88
Total Loading	30.7	5.33

SUMMER TMDL: BOGGY CREEK

SOURCE	FLOW		CONCENTRATION (mg/l)				LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD	NH3-N	CBOD5	NH3-N
Headwaters	0.57	0.37	2	1.33	0.5	0.11	4.10	0.34
IF	0.45	0.29	2	1.33	0.5	0.11	3.23	0.27
Buck Creek	1.45	0.94	2	1.33	0.5	0.11	10.42	0.86
Cottonwood WWTP		0.155	15	10.00	13.71	3.00	12.93	3.88

ADEM WINTER TMDL SUMMARY

Impacted Waterbody:	Boggy Creek
303(d) Priority Ranking:	Low
County(s):	Houston
Size:	5 miles
From:	Buck Creek
To:	Cottonwood WWTP
Use Classification:	F&W
Support Status:	Non-support
Causes:	Organic Enrichment
Sources:	Municipal, Natural
Critical Conditions:	7Q ₂ Flows and 18°C Temp
Water Quality Model:	DOMODEL
MOS:	7Q ₂ Flows, 18°C Temp and Model Reaction Rate Coefficients
Pollutants Evaluated:	CBOD ₅ , NH ₃ -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	10.78	0.88
Buck Creek	24.80	2.03
Incremental Inflow (IF)	3.23	0.27
Total LA	38.8	3.19
Cottonwood WWTP	38.78	19.39
Total WLA	38.8	19.4
Total Loading	77.6	22.6

WINTER TMDL: BOGGY CREEK

SOURCE	FLOW		CONCENTRATION (mg/l)				LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD	NH3-N	CBOD5	NH3-N
Headwaters	1.5	0.97	2	1.33	0.5	0.11	10.78	0.88
IF	0.45	0.29	2	1.33	0.5	0.11	3.23	0.27
Buck Creek	3.45	2.23	2	1.33	0.5	0.11	24.80	2.03
Cottonwood WWTP		0.155	45	30.00	68.55	15.00	38.78	19.39

BOGGY CREEK - SUMMER TMDL

NW1/4,SW1/4,SEC 24,T1N,R27E

Lat. Long.
31°02'26" 85°17'59"

NH₃ Toxicity=3.15 mg/l

Total Length=4.7 miles

EL=128

Qw=0.155 mgd
DA=7 sq mi
7Q₁₀=0.57 cfs
T=30° C

1
BOGGY CREEK
ΔH=19
L=3.5
AVG H=118.5
IF=0.3

BUCK CREEK → EL=109
7Q₁₀=1.45

2
BUCK CREEK
ΔH=4
L=1.2
AVG H=107
IF=0.15

EL=105 7Q₁₀=2.47

MARSHALL CREEK

BOGGY CREEK - WINTER TMDL

NW1/4,SW1/4,SEC 24,T1N,R27E

Lat. Long.
31°02'26" 85°17'59"

NH₃ Toxicity=14.5 mg/l

Total Length=4.7 miles

EL=128

Q_w=0.155 mgd
DA=7 sq mi
7Q₂=1.5 cfs
T=18° C

1

BOGGY CREEK

ΔH=19
L=3.5
AVG H=118.5
IF=0.3

BUCK CREEK

7Q₂=3.45

EL=109

2

BUCK CREEK

ΔH=4
L=1.2
AVG H=107
IF=0.15

EL=105 7Q₂=5.40

MARSHALL CREEK

