

# Alabama Department of Environmental Management

## TMDL UT to Dry Creek – Coosa River Basin Organic Enrichment/Dissolved Oxygen

October 16, 1996  
Water Quality Branch

**MEMORANDUM**

To: Water Quality File  
From: Charles Reynolds  
Water Quality Branch  
Subject: Unnamed Tributary to Dry Branch TMDL

As mandated by section 303(d) of the Clean Water Act, a seasonal TMDL has been completed for an unnamed tributary (UT) to Dry Branch in Shelby County. UT to Dry Branch is classified as Fish & Wildlife (F&W). Dry Branch is a tributary to the Coosa River (Lay Lake) near Wilsonville in Shelby County.

Attached are two spreadsheets summarizing all relevant information for the TMDLs, 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 spreadsheets is labeled "ADEM SUMMER TMDL SUMMARY." This sheet lists allowable loadings for the summer model. The second spreadsheet is labeled "ADEM WINTER TMDL SUMMARY." This sheet lists allowable loadings for the winter model.

One of the sources of impairment to this waterbody is the wastewater discharge from the town of Wilsonville. The seasonal model was executed in order to maintain a minimum D.O. concentration of 5 mg/l throughout the modeled reach. The following effluent limitations were predicted for Wilsonville for each season:

<b>PARAMETER</b>	<b>SUMMER</b>	<b>WINTER</b>
CBOD <sub>5</sub> (mg/l)	8	13
NH <sub>3</sub> -N (mg/l)	1	2
Min. D.O. (mg/l)	6	6.

These limitations are for a design wasteflow of 0.04 mgd. Summer includes the months of May through November; winter, the other five months.

Chronic ammonia toxicity to aquatic life was considered at the Wilsonville outfall for both seasons. Using the EPA 30 and 18°C criteria for summer and winter, respectively, this resulted in allowable effluent NH<sub>3</sub>-N concentrations for Wilsonville of 1.0 and 2.1 mg/l.

An ultimate-to-five-day CBOD ratio (CBOD<sub>U</sub>/CBOD<sub>5</sub>) of 1.5 was assumed for the Wilsonville effluent.

## ADEM SUMMER TMDL SUMMARY

**Impacted Waterbody:** UT to Dry Branch  
**303(d) Priority Ranking:** High  
**County(s):** Shelby  
**Size:** 2 miles  
**From:** Dry Branch  
**To:** Wilsonville WWTP  
**Use Classification:** F&W  
**Support Status:** Non-support  
**Causes:** Nutrients, Organic Enrichment  
**Sources:** Municipal  
**Critical Conditions:** 7Q<sub>10</sub> Flows and 30°C Temp  
**Water Quality Model:** DOMOD2  
**MOS:** 7Q<sub>10</sub> Flows, 30°C Temp and Model Reaction Rate Coefficients  
**Pollutants Evaluated:** CBOD<sub>5</sub>, NH<sub>3</sub>-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 <sub>5</sub>	NH <sub>3</sub> -N
<b>Total LA</b>	0	0
Wilsonville WWTP	2.67	0.33
<b>Total WLA</b>	2.67	0.33
<b>Total Loading</b>	2.67	0.33

### SUMMER TMDL: UT TO DRY BRANCH

SOURCE	FLOW (cfs) (mgd)	CONCENTRATION (mg/l)				LOADING (ppd)	
		CBODU	CBOD5	ANOD	NH3-N	CBOD5	NH3-N
Wilsonville WWTP	0.04	12	8.00	4.57	1.00	2.67	0.33

## ADEM WINTER TMDL SUMMARY

**Impacted Waterbody:** UT to Dry Branch  
**303(d) Priority Ranking:** High  
**County(s):** Shelby  
**Size:** 2 miles  
**From:** Dry Branch  
**To:** Wilsonville WWTP  
**Use Classification:** F&W  
**Support Status:** Non-support  
**Causes:** Nutrients, Organic Enrichment  
**Sources:** Municipal  
**Critical Conditions:** 7Q<sub>2</sub> Flows and 18°C Temp  
**Water Quality Model:** DOMODEL  
**MOS:** 7Q<sub>2</sub> Flows, 18°C Temp and Model Reaction Rate Coefficients  
**Pollutants Evaluated:** CBOD<sub>5</sub>, NH<sub>3</sub>-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 <sub>5</sub>	NH <sub>3</sub> -N
<b>Total LA</b>	0	0
Wilsonville WWTP	4.34	0.67
<b>Total WLA</b>	4.34	0.67
<b>Total Loading</b>	4.34	0.67

### WINTER TMDL: UT TO DRY BRANCH

SOURCE	FLOW		CONCENTRATION (mg/l)			LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD NH3-N	CBOD5	NH3-N
Wilsonville WWTP	0.04	19.5	13.00	9.14	2.00	4.34	0.67

UT TO DRY BRANCH -SUMMER

NW1/4,SW1/4,SEC 6, T21S,R2E

Lat. Long.  
33°13'58" 86°28'51"

NH<sub>3</sub> Toxicity=1 mg/l

Total Length=1.55 miles



EL=418

Qw=0.04 mgd  
DA<1 sq mi  
7Q<sub>10</sub>=0 cfs  
T=30° C

$\Delta H=22$   
L=1.55  
AVG H=407  
IF=0



EL=396

DRY BRANCH (LAY LAKE)

UT TO DRY BRANCH - WINTER

NW1/4,SW1/4,SEC 6, T21S,R2E

Lat. Long.  
33°13'58" 86°28'51"

NH<sub>3</sub> Toxicity=2.1 mg/l

Total Length=1.55 miles



EL=418

Qw=0.04 mgd  
DA<1 sq mi  
7Q<sub>2</sub>=0 cfs  
T=18° C

$\Delta H=22$   
L=1.55  
AVG H=407  
IF=0



EL=396

DRY BRANCH (LAY LAKE)