

Alabama Department of Environmental Management

TMDL

Bayou Sara/Norton Creek – Mobile River Basin Organic Enrichment/Dissolved Oxygen

October 10, 1996
Water Quality Branch

MEMORANDUM

To: Water Quality File

From: Charles Reynolds
Water Quality Branch

Subject: Bayou Sara/Norton Creek Seasonal TMDL

As mandated by section 303(d) of the Clean Water Act, a seasonal TMDL has been completed for Bayou Sara/Norton Creek in Mobile County. Norton Creek is a tributary to Bayou Sara which is, in turn, a tributary to Big Bayou Canot. Big Bayou Canot is a tributary to the Mobile River. Norton Creek is classified as Fish & Wildlife (F&W). Bayou Sara is classified as Swimming/Fish & Wildlife (S/F&W) from its mouth to U.S. Highway 43 and F&W from 43 to its source. The impacted reach for this TMDL extends from Norton Creek at the Saraland outfall to Bayou Sara approximately 1/3 mile upstream of Gunnison Creek.

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).

One of the sources of water quality impairment to the impacted reach is the point source wastewater discharge from the Saraland WWTP. In order to bring D.O. model predictions up to the required D.O. standard of 5 mg/l, pollutant loading reductions had to be made to the Saraland WWTP. The predicted seasonal limitations for Saraland at its current outfall location are as follows:

PARAMETER	SUMMER	WINTER
CBOD ₅ (mg/l)	3	4
NH ₃ -N (mg/l)	0.4	1
Min. D.O. (mg/l)	6.5	6.5.

The above limitations for Saraland are for an effluent design wasteflow of 2.6 mgd.

An ultimate-to-five-day CBOD ratio ($CBOD_U/CBOD_5$) of 3 was used for the Saraland effluent. This value is based on longterm CBOD data collected on the Saraland effluent in a July 1992 water quality study conducted by ADEM.

Chronic ammonia toxicity to aquatic life was evaluated at both outfall locations for both seasons. In all cases, the ammonia numbers predicted from the waste load allocations were more restrictive than those calculated from toxicity considerations.

ADEM SUMMER TMDL SUMMARY

Impacted Waterbody: Bayou Sara/Norton Creek
303(d) Priority Ranking: Low
County(s): Mobile
Size: 0.2 Sq Mi
From: 1/3 mi Above Gunnison Ck
To: Saraland WWTP
Use Classification: Bayou Sara - S/F&W
 Norton Ck - F&W
Support Status: Non-support
Causes: Nutrients, Org Enrichment
Sources: Municipal, Urban Surface Runoff, Natural
Critical Conditions: 7Q₁₀ Flows and 30°C Temp
Water Quality Model: Estuary Model by Nemerow
MOS: 7Q₁₀ Flows, 30°C Temp and Model Reaction Rate Coefficients
Pollutants Evaluated: CBOD₅ and NH₃-N

SUMMER TMDL LOADINGS (ppd)

Source	CBOD ₅	NH ₃ -N
Headwaters	0.14	0.00
Bayou Sara	52.76	1.19
Total LA	52.9	1.19
Satsuma WWTP	93.83	6.26
Saraland WWTP	65.05	8.67
Total WLA	158.9	14.93
Total Loading	212	16.12

SUMMER TMDL: BAYOU SARA/NORTON CREEK

SOURCE	FLOW		CONCENTRATION (mg/l)			LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD NH3-N	CBOD5	NH3-N
Headwaters	0.02	0.013	2	1.33	0.03	0.14	0.00
Satsuma WWTP		0.75	45	15	1.00	93.83	6.26
Saraland WWTP		2.6	9	3	0.40	65.05	8.67
Bayou Sara	7.34	4.74	2	1.33	0.03	52.76	1.19

ADEM WINTER TMDL SUMMARY

Impacted Waterbody: Bayou Sara/Norton Creek
303(d) Priority Ranking: Low
County(s): Mobile
Size: 0.2 Sq Mi
From: 1/3 mi Above Gunnison Ck
To: Saraland WWTP
Use Classification: Bayou Sara - S/F&W
 Norton Ck - F&W
Support Status: Non-support
Causes: Nutrients, Org Enrichment
Sources: Municipal, Urban Surface Runoff, Natural
Critical Conditions: 7Q₂ Flows and 20°C Temp
Water Quality Model: Estuary Model by Nemerow
MOS: 7Q₂ Flows, 20°C Temp and Model Reaction Rate Coefficients
Pollutants Evaluated: CBOD₅ and NH₃-N

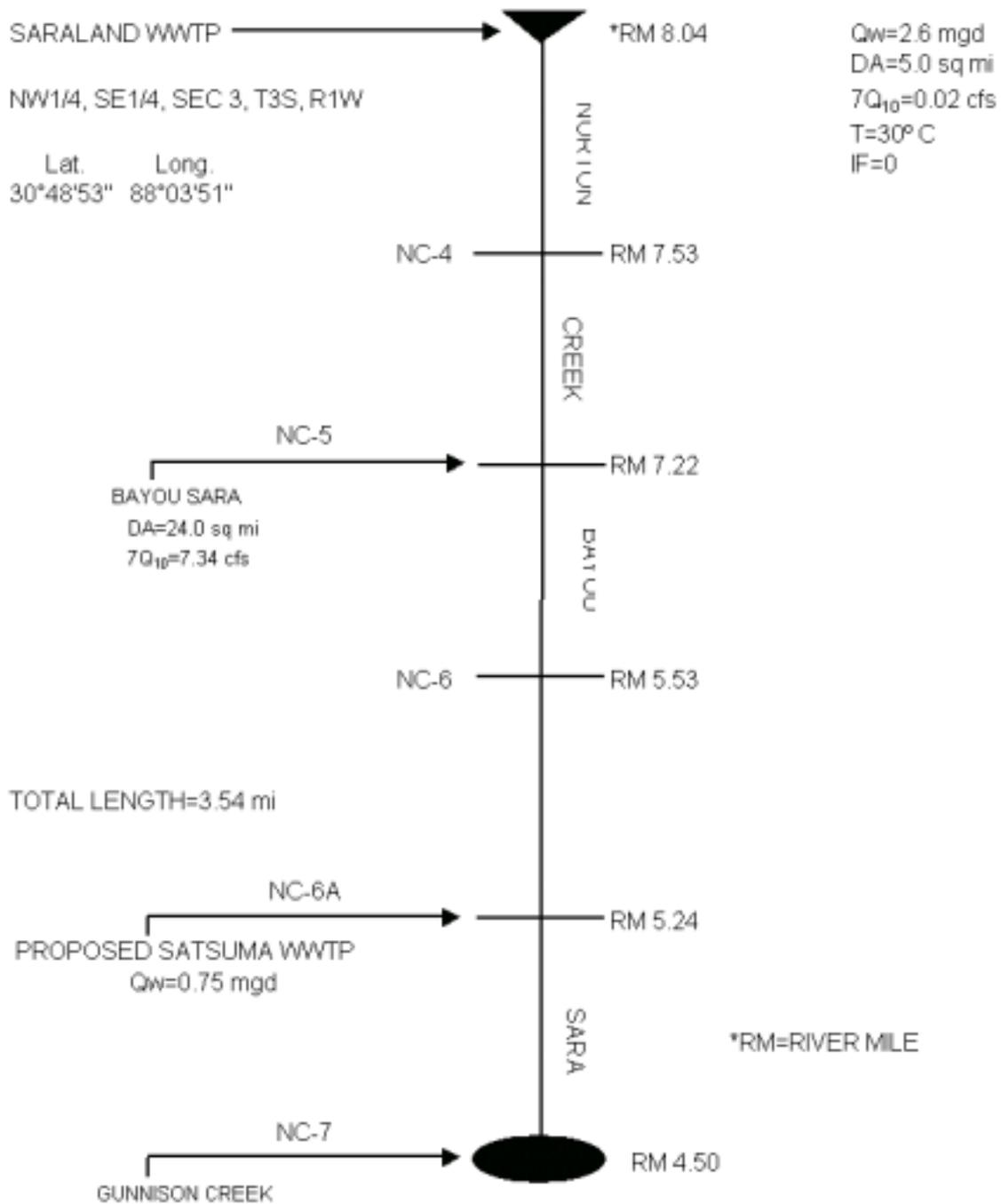
WINTER TMDL LOADINGS (ppd)

Source	CBOD ₅	NH ₃ -N
Headwaters	0.93	0.02
Bayou Sara	102.21	2.30
Total LA	103.1	2.32
Satsuma WWTP	156.38	62.55
Saraland WWTP	86.74	21.68
Total WLA	243	84.2
Total Loading	346	86.6

WINTER TMDL: BAYOU SARA/NORTON CREEK

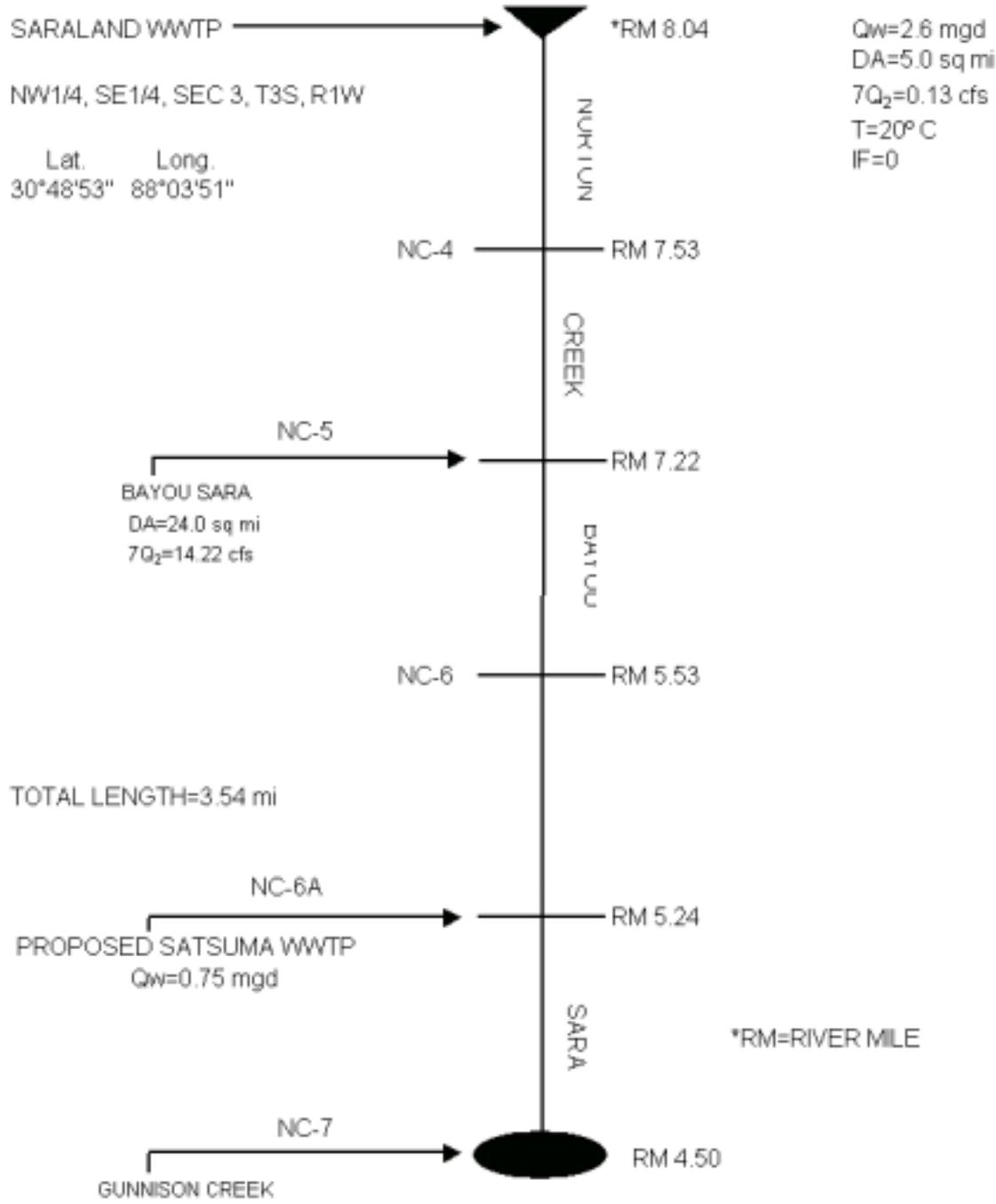
SOURCE	FLOW		CONCENTRATION (mg/l)				LOADING (ppd)	
	(cfs)	(mgd)	CBODU	CBOD5	ANOD	NH3-N	CBOD5	NH3-N
Headwaters	0.13	0.08	2	1.33		0.03	0.93	0.02
Satsuma WWTP		0.75	75	25.00		10	156.38	62.55
Saraland WWTP		2.6	12	4.00		1.00	86.74	21.68
Bayou Sara	14.22	9.19	2	1.33		0.03	102.21	2.30

BAYOU SARA/NORTON CREEK/SUMMER TMDL



NOTE: The designations "NC-4" through "NC-7" above refer to stations sampled in ADEM studies conducted in July and September 1992.

BAYOU SARA/NORTON CREEK/WINTER TMDL



NOTE: The designations "NC-4" through "NC-7" above refer to stations sampled in ADEM studies conducted in July and September 1992.