FINAL REPORT
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Total Maximum Daily Loads For Biological Impairment by Toxicity or Unknown Pollutants

Hushpuckena Creek

In The Mississippi River Basin

Prepared by

Mississippi Department of Environmental Quality

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Pollution Control

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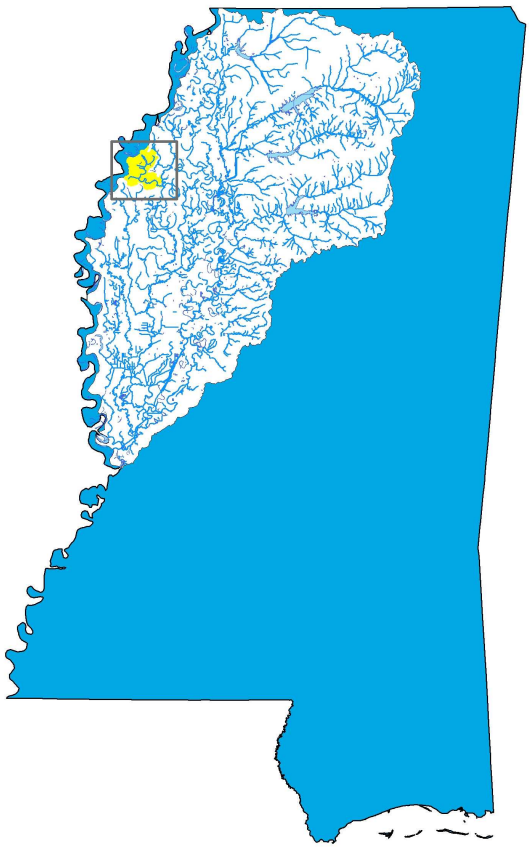


Foreword

This report has been prepared in accordance with the schedule contained within the federal consent decree dated December 22, 1998. The report contains one or more Total Maximum Daily Loads (TMDLs) for waterbody segments found on Mississippi's 1996 Section 303(d) List of Impaired Waterbodies. Because of the accelerated schedule required by the consent decree, many of these TMDLs have been prepared out of sequence with the State's rotating basin approach. The implementation of the TMDLs contained herein will be prioritized within Mississippi's rotating basin approach.

The amount and quality of the data on which this report is based are limited. As additional information becomes available, the TMDLs may be updated. Such additional information may include water quality and quantity data, changes in pollutant loadings, or changes in landuse within the watershed. In some cases, additional water quality data may indicate that no impairment exists.

Prefixes for fractions and multiples of SI units

Fraction	Prefix	Symbol	Multiple	Prefix	Symbol
10^{-1}	deci	d	10	deka	da
10^{-2}	centi	c	10^{2}	hecto	h
10^{-3}	milli	m	10^{3}	kilo	k
10^{-6}	micro	μ	10^{6}	mega	M
10^{-9}	nano	n	10^{9}	giga	G
10^{-12}	pico	p	10^{12}	tera	T
10^{-15}	femto	f	10^{15}	peta	P
10^{-18}	atto	a	10^{18}	exa	E

Conversion Factors

To convert from	To	Multiply by	To Convert from	To	Multiply by
Acres	Sq. miles	0.0015625	Days	Seconds	86400
Cubic feet	Cu. Meter	0.028316847	Feet	Meters	0.3048
Cubic feet	Gallons	7.4805195	Gallons	Cu feet	0.133680555
Cubic feet	Liters	28.316847	Hectares	Acres	2.4710538
cfs	Gal/min	448.83117	Miles	Meters	1609.344
cfs	MGD	.6463168	Mg/l	ppm	1
Cubic meters	Gallons	264.17205	μg/l * cfs	Gm/day	2.45

Table of Contents

Original Listings

Mississippi conducted a survey of district conservationists (DC) in 1988 and 1989 to find candidate watersheds for future Section 319 funding opportunities. Questionnaires were mailed to each county requesting each DC identify the impaired watersheds in the county in part based on land use. Numerous DCs responded to the survey and Mississippi's Section 319 list was created based on these surveys.

In 1992, MDEQ compiled a Section 303(d) list based, in part, on the Section 319 listed watersheds that were a concern. It is important to remember that these listings are based on speculation and not water quality monitoring. At the time, MDEQ considered the evaluated listings from the Section 319 survey as a placeholder for future monitoring to determine if there were indeed impairment in the watershed.

The State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters do not include a water quality standard applicable to aquatic life protection due to unknown toxicity. However, a narrative standard for the protection of aquatic life was interpreted to determine an applicable target for this TMDL. The narrative standard is that waters shall be free from materials attributable to municipal, industrial, agricultural, or other dischargers producing color, odor, taste, total suspended solids, or other conditions in such degree as to create a nuisance, render the waters injurious to public health, recreation, or to aquatic life and wildlife, or adversely affect the palatability of fish, aesthetic quality, or impair the waters for any designated uses. The TMDL is expressed as a toxic unit value because no specific pollutant causes were measured.

Early Biological Monitoring Efforts

In the early 1990s, MDEQ completed biological monitoring on Hushpuckena Creek. Biological Impairment indicates impairment for water bodies in which at least one biological assemblage (fish, macroinvertebrates, or algae) indicates less than full support with moderate modification of the biological community noted. MDEQ completed this sampling using a screening level biological method. However, the screening level biological method returned impaired quality, and the water body was listed. Then it was determined the first biological methods did not provide an accurate measure for the Mississippi Delta. MDEQ is working with a work group currently to develop the appropriate biological tests for this area of the state. Unfortunately these TMDLs are due before the work group can complete its work.

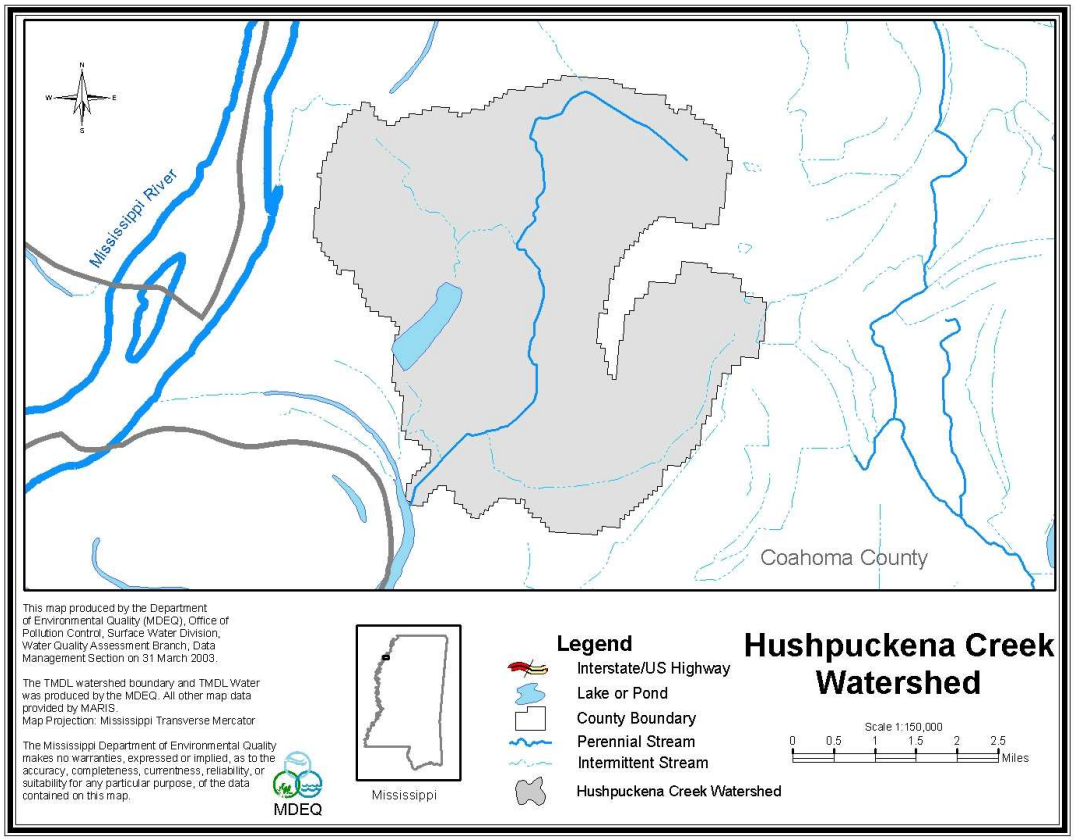
Phase 1 Toxicity TMDL Approach

Because MDEQ is unsure if the water body would be impaired using the correct methods, this toxicity TMDL is being prepared as a phase 1 TMDL in compliance with the consent decree to address the listing shown in Table 1. In a phased TMDL the best information available at the time is used to establish the TMDL at levels necessary to implement

applicable water quality standards and to make allocations to pollution sources. The phased TMDL approach recognizes that additional data and information are necessary to validate the assumptions of the TMDL and to provide greater certainty that the TMDL will achieve the applicable water quality standard. This Phase 1 TMDL is being completed for toxicity due to limited data available indicating stressors.

Table 1. Segment Identifications and Locations

Name	ID	County	HUC	Cause	Mon/Eval
Hushpuckena Creek	MS218M	Coahoma	08020100	Biological Impairment	Monitored
Near Rena Lara: From confluence with Ward Lake to Jackson Cutoff.					



Toxicity Units

The TMDL is the total amount of pollutant that can be assimilated by the receiving water body while maintaining water quality standards. For some pollutants, the TMDLs are expressed on a mass-loading basis (e.g., pounds per day). In accordance with 40 CFR Part 130.2(i), "TMDLs can be expressed in terms of …mass per time, toxicity, or other appropriate measure." In addition, NPDES permitting regulations in 40 CFR 122.45(f) state that "All pollutants limited in permits shall have limitations…expressed in terms of mass except…pollutants which cannot appropriately be expressed by mass." For the toxicity TMDL for these segments, the Total Maximum Daily Load is expressed in terms of chronic toxicity units (TU_cs).

This TMDL has been established to protect the biology of the listed segments against chronic toxicity due to pollutants that may cause toxicity to the aquatic organisms. The toxicity wasteload allocation (WLA) for a point source discharger would be determined as follows:

Toxicity from each point source = 100 / NOEC = 100 / IWC = 100 / 100 = 1.0 TU

Where NOEC is the No Effect Concentration; IWC is the Instream Water Concentration and TU is Toxicity Units. The existing toxicity contribution to these segments from point and nonpoint sources is not known. The chronic toxicity limit of 1.0 TU_c associated with nonpoint sources applies to all (i.e. both new and existing, if any) nonpoint sources.

Target Identification

MDEQ initially believed the biology data available indicated impairment and this segment was listed. It has now been concluded that the original biological methods were not appropriate for streams in the Mississippi Delta. However, this segment is listed on the 1996 Section 303(d) list and is under the terms of the consent decree to establish TMDLs. No further monitoring of this segment has occurred.

The Phase 1 TMDL for the stream establishes a toxicity limit and a monitoring plan to: (1) perform toxicity or/and biological monitoring to determine if the segment is impaired due to specific pollutants; and (2) if biologically impaired, perform additional monitoring to determine the specific cause and sources of impairment. If the toxicity and/or biological monitoring suggest impairment, then the segment should be screened for all major regulated classes of pesticides and sources of siltation and organic enrichment with particular focus on land-use activities in the immediate watershed and potential unknown point source dischargers within the watershed.

Load Allocation

The existing toxicity contribution to these segments is not known. In the event that nonpoint sources are causing or contribution to the toxicity impairment and/or biological impairment of these segments, the allocation to any unknown point sources would not be any different. The toxicity associated with either nonpoint or point sources cannot exceed 1.0 TU_c.

The toxicity load allocation (LA) for nonpoint source runoff would be determined as follows:

Toxicity from each source of nonpoint runoff = 100 / NOEC = 100 / IWC = 100 / 100 = 1.0 TU

where NOEC is the No Effect Concentration; IWC is the Instream Water Concentration and TU is Toxicity Units. It is not known if there are point sources existing that do not have a NPDES Permit. Using this approach, there is no assimilative capacity available for a discharge. The existing toxicity contribution to these segments from nonpoint sources is not known. However, if the application of this test in the field demonstrates that there is toxicity that can be attributed to a given area, appropriate BMPs will be applied. The toxicity associated with any nonpoint source cannot exceed 1.0 TU.

Wasteload Allocation

The toxicity load allocation (LA) for nonpoint source runoff would be determined as follows:

Toxicity from each point source = 100 / NOEC = 100 / IWC = 100 / 100 = 1.0 TU

Where NOEC is the No Effect Concentration; IWC is the Instream Water Concentration and TU is Toxicity Units. The IWC for any point source will be established at 100, meaning there is no instream dilution available for assimilative capacity.

The same test is applicable to both point and nonpoint sources. Specifying the IWC eliminates concern with dilution from the end of the pipe or from the overland flow. Prudence would dictate that if instream toxicity is demonstrated, further studies should be done to isolate the source, whether a pipe or runoff from a given area. These studies would have to be designed on a case-by-case basis.

Margin of Safety

The margin of safety is a required component of a TMDL and accounts for the uncertainty about the relationship between pollutant loads and the quality of the receiving water body. The two types of MOS development are to implicitly incorporate the MOS using conservative model assumptions or to explicitly specify a portion of the total TMDL as the MOS. The MOS selected for this TMDL is implicit based on setting the TU equal to 1.0.

Critical Condition

The critical condition for this TMDL is difficult to determine because the sources are not known at this time. Additional monitoring is needed to determine the specific critical time. It is anticipated that the critical nonpoint source time would be during the first flush of a rain event. The critical point source time would be during periods of low-flow when dilution in the stream is reduced.

Seasonal Variation

Since the WLA and LA apply at all times, the TMDL provides for year-round protection of water quality standards for toxicity causing pollutants. Therefore, the TMDL adequately accounts for seasonal variability.

Reasonable Assurances

This component of TMDL development does not apply. There are no point sources requesting a reduction based on LA components and reductions.

Total Maximum Daily Load for Toxicity

This Phase 1 TMDL identifies toxicity levels needed to protect the water body. The Phase 2 TMDL will identify the data and information that needs to be collected to determine the specific toxicity causes and to develop the appropriate pollutant reduction implementation plans. The Phase 2 TMDL will include targeted pollution allocation strategies for specific causes of impairment and a margin of safety that address uncertainty about the relationship between load allocations and receiving water quality.

EPA guidance states that TMDLs under the phased approach include allocations that confirm existing limits or would lead to new limits or new controls while allowing for additional data collection to more accurately determine assimilative capacities and pollution allocations. (USEPA, 1991) Therefore, no new or additional source of pollutant representative of any of the cited classes of respective impairments shall be introduced into these segments until:

- Actual impairment status is known;
- Specific pollutant causing impairment are determined; and
- The Phase 2 TMDLs are developed for individual pollutant in these segments; or
- This segment is shown not to be impaired based on the monitoring to be conducted

Public Participation

This TMDL will be published for a 30-day public notice. During this time, the public will be notified by publication in the statewide newspaper and newspapers in the area of the watersheds. The public will be given an opportunity to review the TMDL and submit comments. MDEQ also distributes all TMDLs at the beginning of the public notice to those members of the public who have requested to be included on a TMDL mailing list. TMDL mailing list members may request to receive the TMDL reports through either, email or the postal service. Anyone wishing to be included on the TMDL mailing list should contact Greg Jackson at (601) 961-5098 or Greg_Jackson@deq.state.ms.us. At the end of the 30-day period, MDEQ will determine the level of interest in the TMDL and make a decision on the necessity of holding a public meeting.

All written comments received during the public notice period and at any public meeting become a part of the record of this TMDL. All comments will be considered in the ultimate completion of this TMDL for submission of this TMDL to EPA Region 4 for final approval.

Supporting Documentation

MDEQ. 2002. *State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters.* Office of Pollution Control.

Sierra Club v. EPA & Hankinson USDC-ND-GA Atlanta Div. #1:97-CV-3683

USEPA. *Guidance for Water Quality based Decisions: The TMDL Process*, U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/440/4-91-001, April 1991.