

**Total Maximum Daily Loads for Indicator Bacteria
in the Houston Metropolitan Area**

**Contract No. 582-6-70860
Work Order 582-6-70860-17**

Quarterly Report No. 3

Prepared by
University of Houston

Principal Investigators
Hanadi Rifai
Randy Palachek

PREPARED IN COOPERATION WITH THE
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

TCEQ Contact:
Ron Stein
TCEQ MC – 203
12100 Park 35 Circle
Austin, TX 78735
RStein@tceq.state.tx.us

June 2008

INTRODUCTION

Twenty-seven segments in the general Houston Metropolitan Area (see Table 1) are considered impaired water bodies for contact recreation because they do not meet indicator bacteria (*Escherichia coli* (*E. coli*)) water quality standards. These segments are in a number of watersheds in the San Jacinto River basin including, Greens Bayou Watershed, Halls Bayou Watershed, Hunting Bayou Watershed, Brays Bayou Watershed, Sims Bayou Watershed, and the general Houston Ship Channel Watershed.

For the purpose of TMDL development, the project has been subdivided into five sub-projects; Greens Bayou Watershed – Bacteria, Halls Bayou Watershed – Bacteria, Brays Bayou Watershed – Bacteria, Sims Bayou Watershed, and Eastern Houston – Bacteria. The Eastern Houston watershed contains all of the bacteria impaired segments in the Houston Ship Channel and Houston Ship Channel/Buffalo Bayou watersheds. All of these segments are fresh water bodies with contact recreation use and they drain into the tidally influenced Houston Ship Channel and Houston Ship Channel/Buffalo Bayou segments with non-contact recreation use.

Greens Bayou (segment 1016) was placed on the Texas Clean Water Act 303(d) List in 1996 and the remaining 26 segments were listed in 2002. All of these segments were placed on the 303(d) list for not meeting contact recreation water quality standards. The purpose of this study is to provide the Texas Commission on Environmental Quality (TCEQ) with the information and assistance necessary for the preparation of a Total Maximum Daily Load (TMDL) for the indicator bacteria (*E. coli*) impairments.

The information gathered under this project will be used to develop the TMDL allocations. First, the TMDL allocations identify how much indicator bacteria (*E. coli*) the water bodies can assimilate and maintain the contact recreation standard (load capacity). Second, the TMDL allocations identify how much reduction is needed to the sources of indicator bacteria (*E. coli*) to reach the contact recreation standard. Reductions are identified for two broad categories of indicator bacteria sources, those sources that are covered by permits referred to as the waste load allocation (WLA) and those sources that are not covered by a permit referred to as the load allocation (LA). This relationship is referred to as the TMDL equation and it is expressed as: $LC = LA + WLA$.

In 2000, the State of Texas adopted new bacteria standards for contact recreation. The *E. coli* indicator bacteria standard was adopted for contact recreation in place of the existing fecal coliform indicator bacteria. For fecal coliform, no sample should exceed 400 colony-forming units (cfu) per 100 mL for contact recreation. In addition, the geometric mean should be less than 200 cfu/100 mL. For *E. coli*, no sample should exceed 394 cfu/100 mL and the geometric mean should be less than 126 cfu/100 mL (30 Texas Administrative Code 307.7(b)(A)).

The overall objective of this project is to establish the TMDL allocation equation for the segments listed above.

There are eleven tasks for WO 582-6-70860-17:

1. Administer Project;
2. Participate in Public/Advisory Group Process;
3. Compile Data;
4. Define Water Quality Targets;
5. Pollutant Source Assessment;
6. Development of Load Duration Curves for Contact Recreation Segments;
7. Development of TMDLs for Contact Recreation Segments;
8. Historical Data Gathering and Analysis for 5c Segments;
9. Preparation of Draft TMDL Report
10. Revise Draft Technical Guidance Reports, and
11. Mass Balance Tools.

This report describes the progress for the period from March 2008 through May 2008 for the metro project.

TASK PROGRESS – 1st Quarter FY08

TASK 1 Administer Project

UH administered all aspects of the project during the quarter. An amendment was prepared that adds tasks 10 and 11 listed above to the project scope. The notice to proceed for the amendment was received from TCEQ.

TASK 2 Participate in Stakeholder/Advisory Group Process

No meetings were held for the stakeholder group or the Bacteria Implementation Group (BIG) this past quarter.

TASKS 3-11

A Draft Technical Guidance document has been drafted for Brays Bayou and is in the final stages of completion. The document includes all the data for Brays Bayou as well as the source assessment analysis and load duration curve analysis. Data gathering for the 5c segments has been initiated as well as mass balance analyses for all the metro segments.

FUTURE WORK

Development of the TMDL technical support documents for the remaining segments in the Metro project will begin.

Table 1. Metro Segments

TMDL Project Name	Segment Number	Segment Name
Eastern Houston - Bacteria	1006F	Big Gulch Above Tidal
	1006H	Spring Gully Above Tidal
	1007F	Berry Bayou Above Tidal
	1007G	Kuhlman Gully Above Tidal
	1007H	Pine Gully Above Tidal
	1007I	Plum Creek Above Tidal
	1007K	Country Club Bayou
	1007M	Unnamed Non-Tidal Tributary of Hunting Bayou
	1007O	Unnamed Non-Tidal Tributary of Buffalo Bayou
	1007R	Hunting Bayou Above Tidal
Greens Bayou Watershed – Bacteria	1016	Greens Bayou Above Tidal
	1016A	Garners Bayou
	1016B	Unnamed Tributary of Greens Bayou
	1016C	Unnamed Tributary of Greens Bayou
	1016D	Unnamed Tributary of Greens Bayou
Halls Bayou Watershed – Bacteria	1006D	Halls Bayou below US 59
	1006E	Halls Bayou above US 59
	1006I	Unnamed Tributary of Halls Bayou
	1006J	Unnamed Tributary of Halls Bayou
Brays Bayou Watershed – Bacteria	1007B	Brays Bayou Above Tidal
	1007C	Keegans Bayou above tidal
	1007E	Willow Waterhole Bayou Above Tidal
	1007L	Unnamed Non-Tidal Tributary of Brays Bayou
	1007P	Brays Bayou Above Tidal
Sims Bayou Watershed – Bacteria	1007D	Sims Bayou Above Tidal
	1007N	Unnamed Non-Tidal Tributary of Sims Bayou
	1007Q	Sims Bayou Above Tidal