Upper Oyster Creek Dissolved Oxygen TMDL

A Brief Overview

Jason Leifester
TCEQ TMDL Program
April 22, 2008

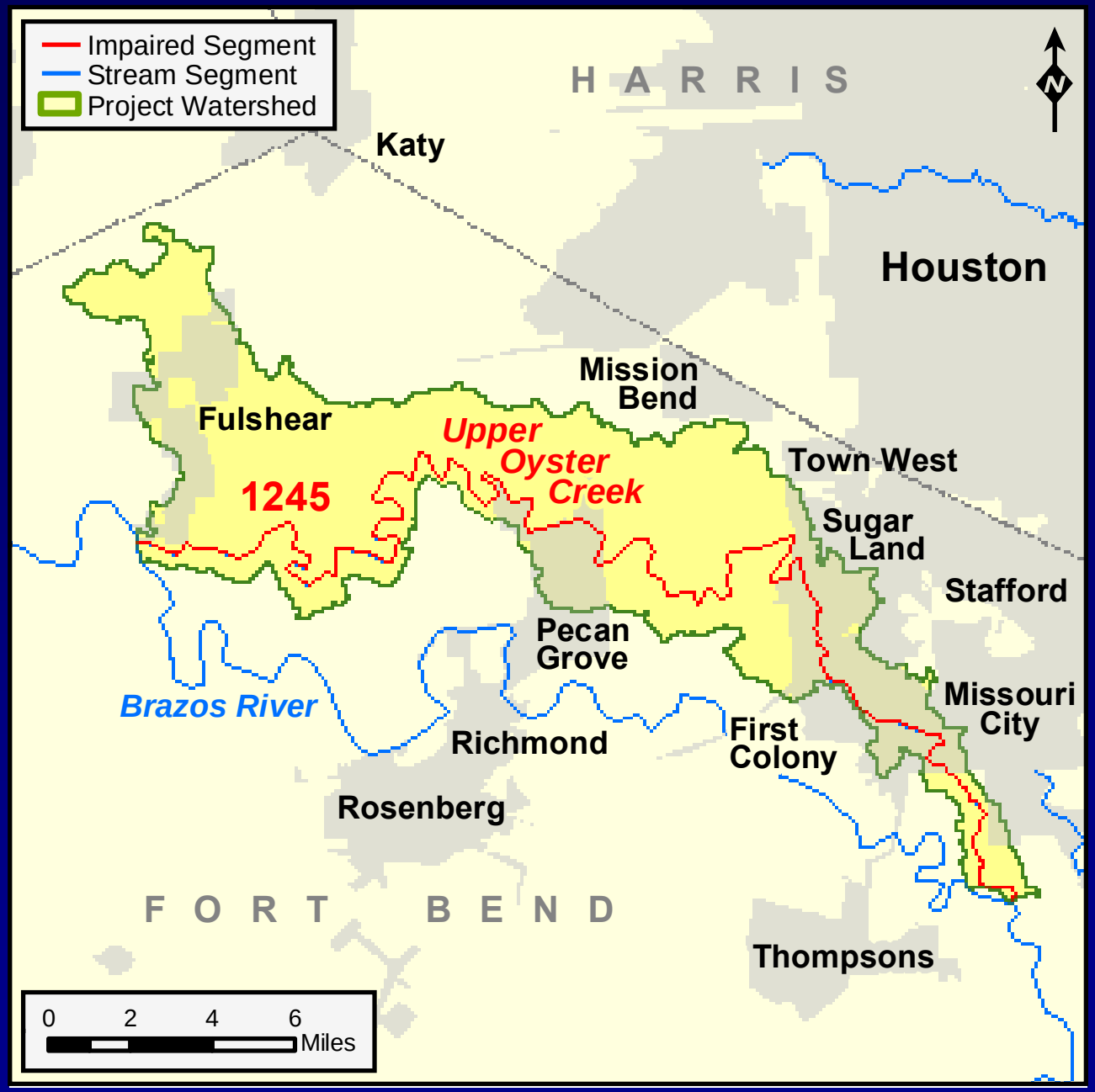
Texas TMDL Program

- Texas is required under the federal Clean Water Act to list impaired waters and to take action to restore them.
- A surface water body is considered impaired if it does not meet any of its criteria for support, as defined in the *Texas Surface Water Quality Standards*.
- Impaired waters are identified every two years in the *Texas Water Quality Inventory and 303(d) List*.
- A 3-part process is used for restoration:
  1) establish a total maximum daily load (TMDL)
  2) develop an implementation plan
  3) implement the plan

Texas TMDL Program

- TMDL – Total Maximum Daily Load
  Determines the maximum amount (load) of a pollutant that a water body can receive and still maintain its uses, and allocates this load to point and nonpoint sources in the watershed.

- A TMDL is also a document submitted to the EPA. It identifies the pollutant of concern and its sources, and allocates the allowable load.


Impaired Segment
Stream Segment
Project Watershed
H A R R I S
N
Katy
Houston
Mission Bend
Fulshear
Upper Oyster Creek
1245
Town West
Sugar Land
Stafford
Pecan Grove
Brazos River
Missouri City
First Colony
Richmond
Rosenberg
F O R T B E N D
Thompsons
0 2 4 6
Miles

Aquatic Life Use

Specific Criteria for Upper Oyster Creek

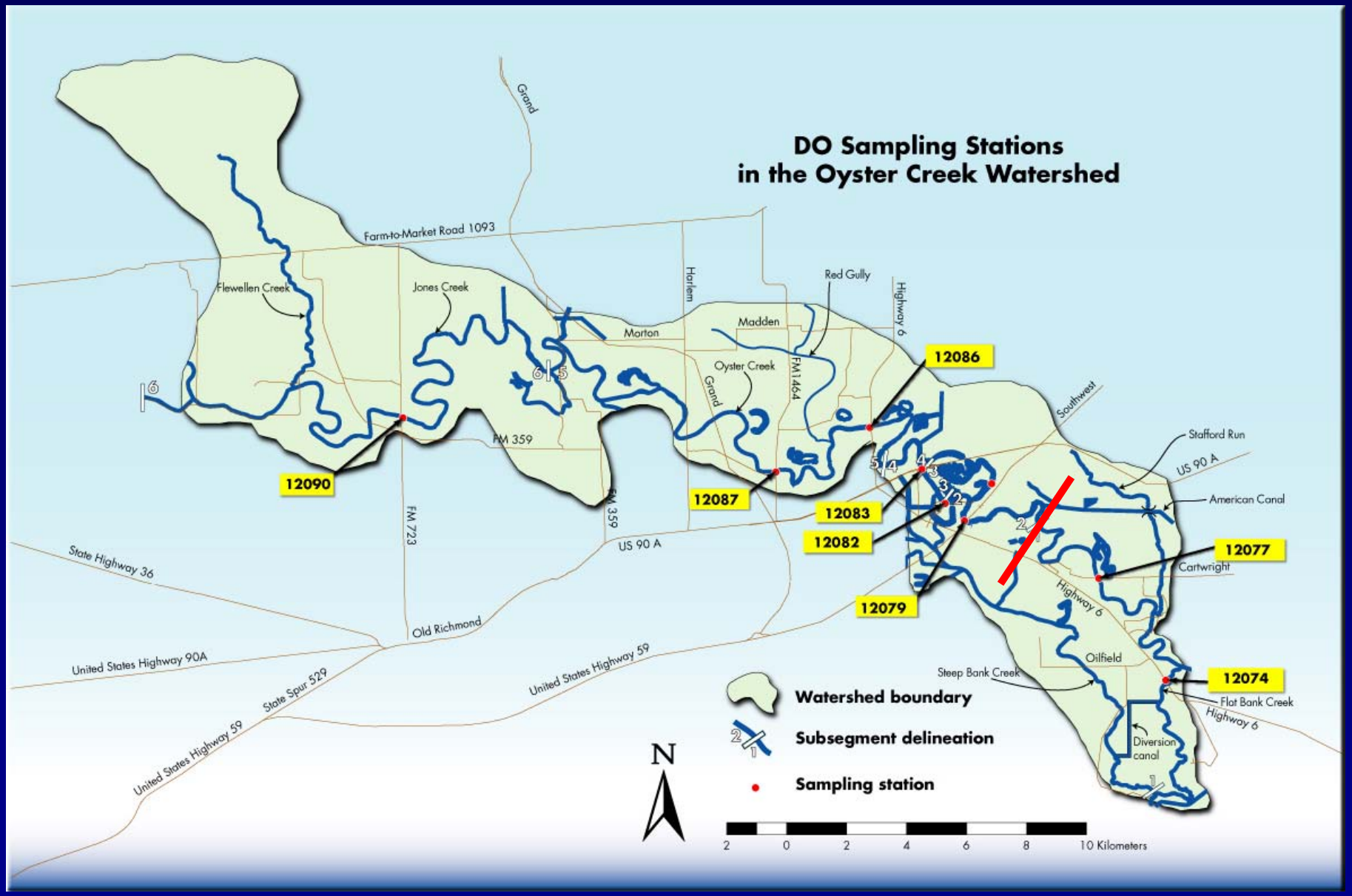
- Aquatic life use: Intermediate

- Sunfish, crappie, bass, catfish, etc.

- Dissolved oxygen criteria (mg/L)
  - Mean/minimum 4.0/3.0
  - Spring mean/minimum 5.0/4.0

Sampling and Assessment

- 24-hour DO sampling conducted 2003-2005
  - 16-17 events at 8 stations over 3 years
- In general, the Upper Oyster Creek system was *not supporting* of the intermediate aquatic life use



Station locations during 2003 - 2005 monitoring

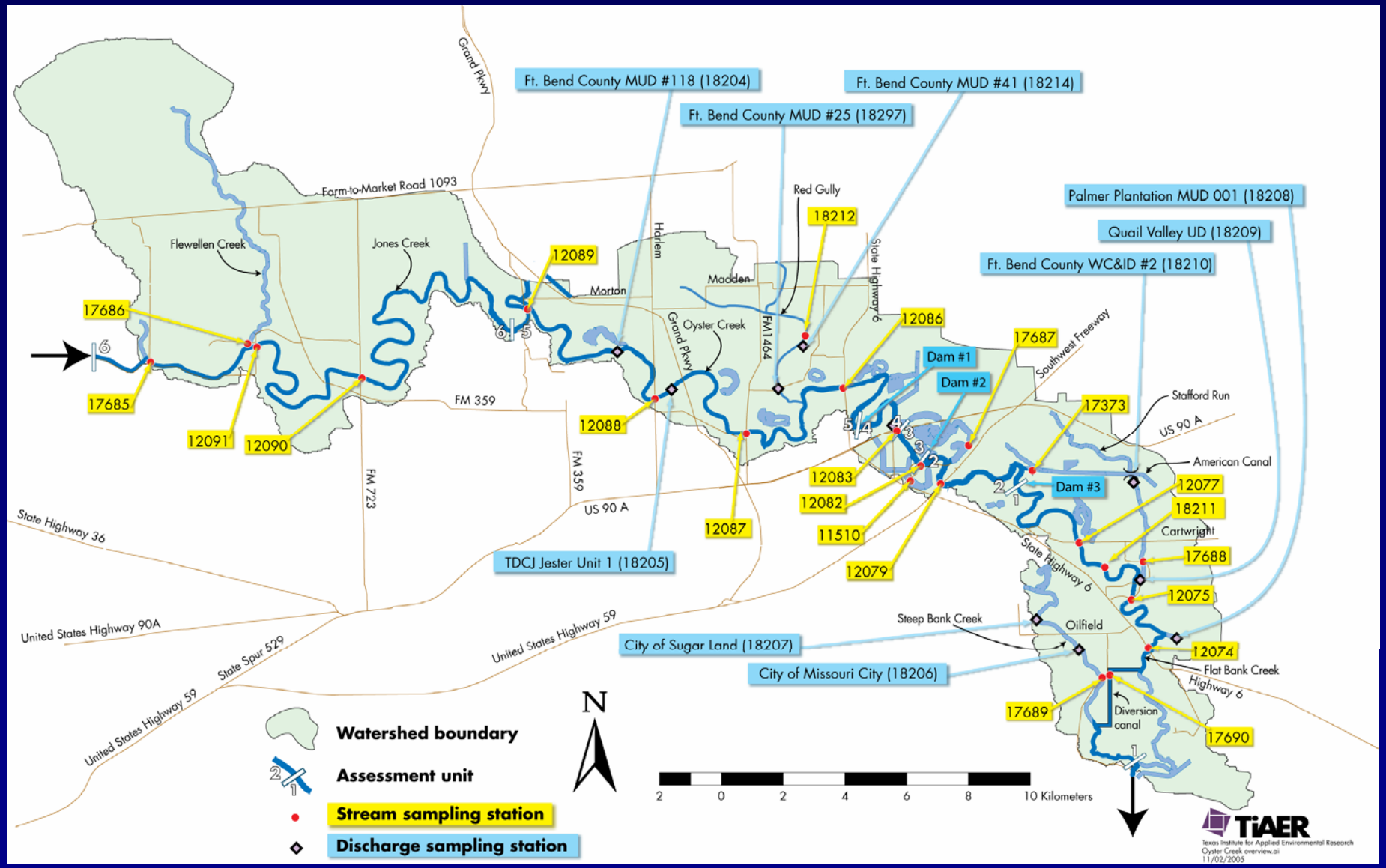
Source Analysis

- Investigated various point and nonpoint sources of oxygen-demanding substances

- Because depressed DO could not be associated with rainfall runoff and nonpoint sources, this TMDL is based on critical low-flow conditions and point source loadings

Linkage Analysis

- Used QUAL2K, a stream water quality model, to simulate water quality variables on a 24-hour time scale, including dissolved oxygen
- Data for model gathered during intensive surveys in May and August 2004
- Model results indicated the need to reduce $CBOD_5$ and NH_3-N from some permitted facilities, but not phosphorus
  - Seasonal analysis



Station locations during May and August 2004 intensive studies

Pollutant Load Allocation

- **TMDL = ΣWLA + ΣLA + MOS**
  - TMDL is the maximum amount of pollutant loading a water body can receive without violating water quality standards.
  - Wasteload allocation (WLA) is the portion of the TMDL allocated to existing point sources.
  - Load allocation (LA) is the portion of the TMDL allocated to existing nonpoint sources and to natural background sources.
  - Margin of safety (MOS) is the mechanism to account for uncertainty in determining pollutant loadings. Used an implicit MOS based on conservative model assumptions.

Control Actions

- Point source allocations may affect permits
  - New, amended, or renewed permitted loads must be consistent with the TMDL allocation.
  - New and existing facilities may be required to meet more stringent effluent limits.

Pollutant Load Allocation
Required Reductions

	Upper Reach	**Lower Reach**
$CBOD_5$ (Mar – Oct)	0%	48%
NH_3-N (Mar – Oct)	11%	26%
$CBOD_5$ (Nov - Feb)	0%	0%
NH_3-N (Nov - Feb)	0%	0%

Control Actions: Permit Limits

- For this TMDL, the model indicated the following limits were necessary for most facilities in the Lower Reach (Mar-Oct)

	Current	**Proposed**
$CBOD_5$	10 mg/L	5 mg/L
NH_3-N	3 mg/L	2 mg/L
DO	5.0 mg/L	6.0 mg/L

Control Actions: Permit Limits

- These limits are relaxed during the colder part of the year (Nov-Feb).
- Reductions for the Upper Reach are less significant.
- For individual WLAs by permitted facility (expressed in kg/day) see the TMDL document, Appendices B and D.

Control Actions: Implementation

- It is the TCEQ's intention to implement these individual WLAs through the permitting process as either monitoring requirements or effluent limitations.

- However, there may be a more economical or technically feasible means of achieving the goal of improved dissolved oxygen and circumstances may warrant changes in individual WLAs after this TMDL is adopted.

Jason Leifester

jleifest@tceq.state.tx.us

(512) 239-6457

http://www.tceq.state.tx.us/implementation/water/tmdl/25-oystercreek.html