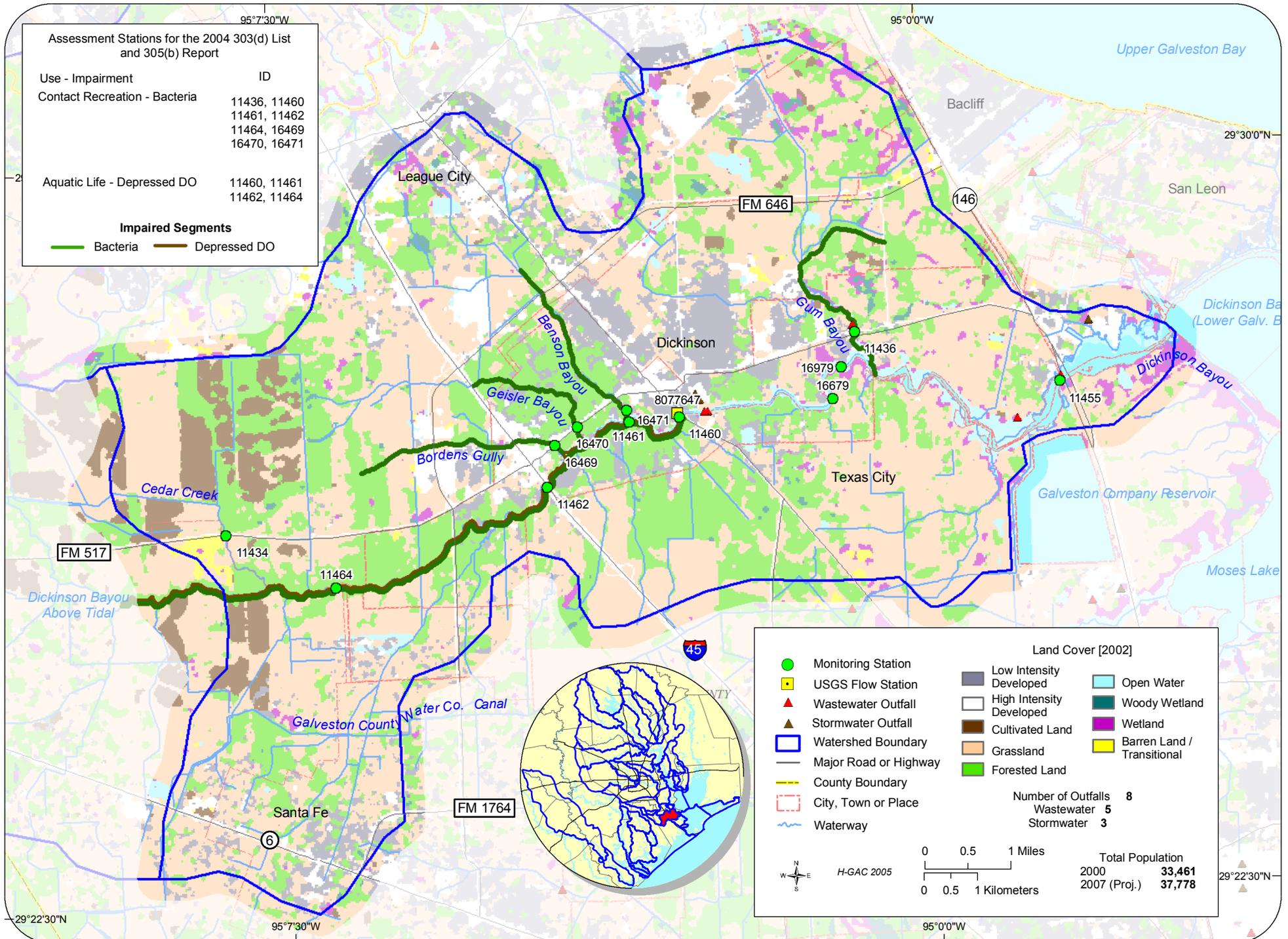


# DICKINSON BAYOU TIDAL - SEGMENT 1103



Name: **DICKINSON BAYOU TIDAL**

Segment: 1103

Description of Segment 1103: From the confluence with Dickinson Bay 2.1 km (1.3 miles) downstream of SH146 in Galveston County to a point 4.0 km (2.5 miles) downstream of FM 517 in Galveston County

Sub-Segment 1103A: Bensons Bayou (unclassified water body) – From the confluence of Dickinson Bayou Tidal to 0.37 miles upstream of FM 646 in Galveston County

Sub-Segment 1103B: Bordens Gully (unclassified water body) – From the confluence of Dickinson Bayou Tidal to upstream of Calder Road in Galveston County

Sub-Segment 1103C: Geisler Bayou (unclassified water body) – From the confluence of Dickinson Bayou Tidal to I-45 in Galveston County

Sub-Segment 1103D: Gum Bayou (unclassified water body) – From the confluence of Dickinson Bayou Tidal to FM 3436 in Galveston County

Segment Length: 15 miles

Watershed Area: 60 square miles

Designated Uses: Contact Recreation  
High Aquatic Life

Standards for Segment 1103:

Temperature (°C):	35
Dissolved Oxygen ( <i>24-Hr Average</i> ) (mg/L):	4.0
Dissolved Oxygen ( <i>Absolute Minima</i> ) (mg/L):	3.0
pH (standard units):	6.5 – 9.0
Enterococcus (mpn/100mL) (grab):	89
Fecal Coliform (#/100 mL) (grab):	400

Nutrient Screening Criteria for Segment 1103:

Ammonia (mg/L):	0.46
Nitrite + Nitrate (mg/L):	1.10
Orthophosphate Phosphorus (mg/L):	0.46
Total Phosphorus (mg/L):	0.66
Chlorophyll- <i>a</i> (µg/L):	21

Number of Active Surface Water Monitoring Stations: 10

Monitoring Agencies: TCEQ  
Environmental Institute of Houston – UHCL

Texas Watch Volunteer Monitoring Stations: 1

Number of Permitted Outfalls: Wastewater 5  
Industrial Stormwater 3

TCEQ Assessment Summary:

2004 303(d): Bacteria – 1103, 1103A, 1103B, 1103C & 1103D  
Depressed Dissolved Oxygen – 1103

2002 303(d):	Bacteria – 1103, 1103A, 1103B, 1103C & 1103D Depressed Dissolved Oxygen – 1103
2004 305(b):	Bacteria – 1103, 1103A, 1103B, 1103C & 1103D Depressed Dissolved Oxygen – 1103
2002 305(b):	Bacteria – 1103, 1103A, 1103B, 1103C & 1103D Depressed Dissolved Oxygen – 1103, 1103B, & 1103C

**Narrative:** The watershed is heavily developed with the City of Dickinson located in the center, the City of Santa Fe in the southwest and the City of League City stretching across the northern area and extending to the western end. Low intensity residential and mixed commercial developments are the predominant land uses. High intensity developments and business districts are found adjacent to and at the intersections of the major thoroughfares such as FM517 at Interstate-45 and Highway 3 or along Hwy 6 in Santa Fe. Ranchettes or hobby farms, small acreage farms that may or may not include raising large animals such as cows and horses, are commonly seen throughout the rural areas of the watershed. The southern and eastern most portions of the watershed along with the far west area, are the most undeveloped. Large tracts of land used for grazing or other agricultural activities can still be found in these areas.

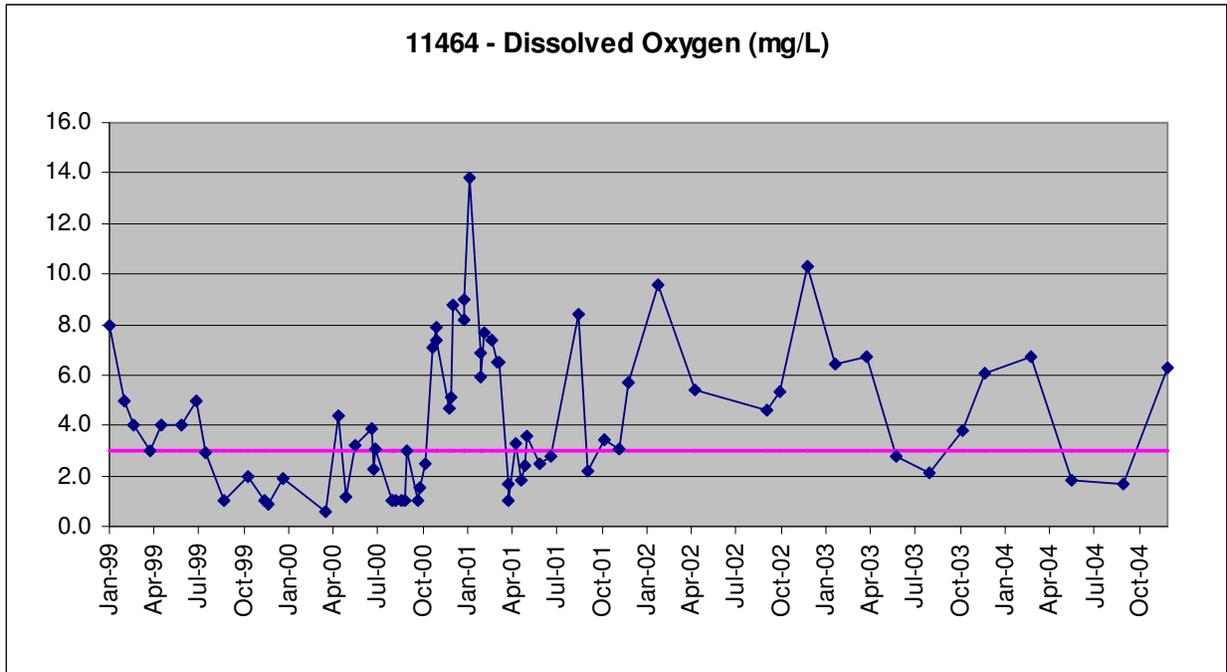
Approximately 35% of the watershed is serviced by municipal sanitary sewer collection and treatment systems. Development in the remaining area relies upon “on-site waste water disposal systems” (septic systems). There are several rural subdivisions located north of Dickinson Bayou and east of Highway 3 or south of Dickinson Bayou and west of I-45 that have known septic system problems. Galveston County Health District (GCHD), the local authorized agent for the state, addresses these issues through complaint investigation. Successful resolutions are achieved through notices, plan review, inspection, permitting, and – if necessary – court intervention.

This segment is currently monitored by the Environmental Institute of Houston – UHCL, and the TCEQ. EIH’s 8 sampling sites are distributed throughout the watershed and its many tributaries while TCEQ has two sampling sites on the main bayou.

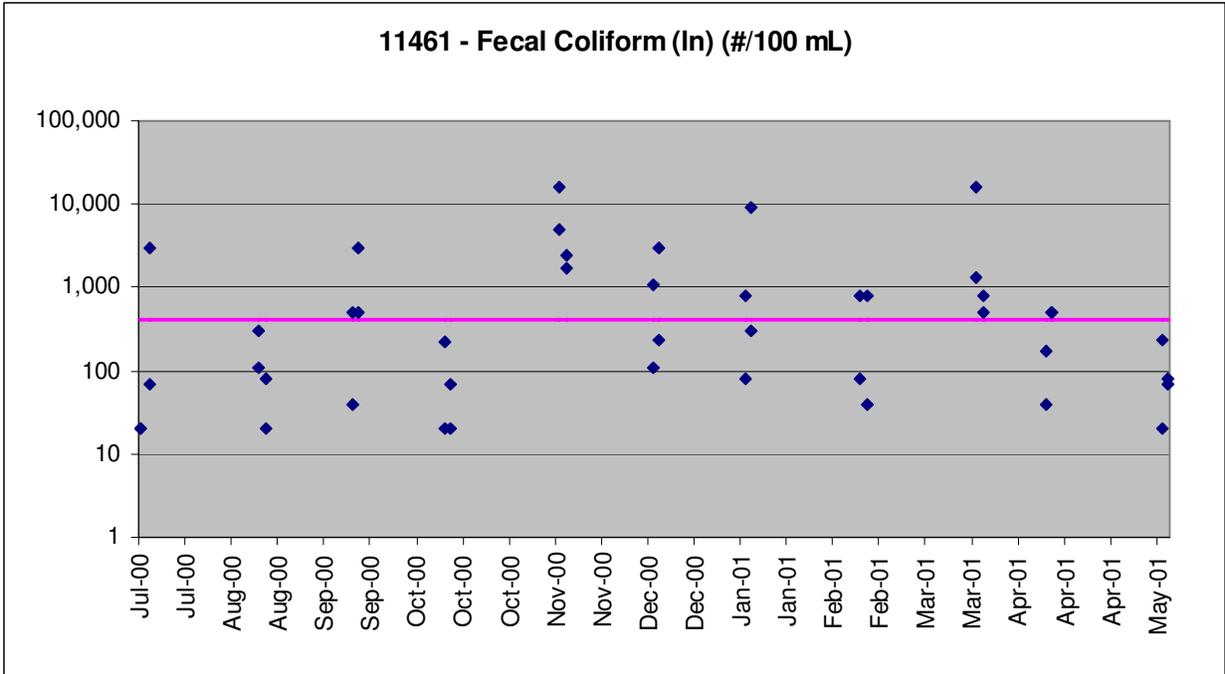
All routine data for these segments was reviewed and a trends analysis performed where sufficient data was available. **Dickinson Bayou Tidal (segment 1103)** has 11 sampling stations with sufficient data – five of which are on tributaries. Analysis revealed trends at three sites. Data collected between March 1992 and January 2005 for sampling station 11460 shows increasing trends in ammonia but a decreasing trend in orthophosphate phosphorus. Data for site 11434 shows a decreasing trend in ammonia but there is only three years of data. Station 11434 is on a tributary located on the upper portion of this segment and changes in land use upstream of this sampling site may account for the decrease in ammonia. Site 11460, however, is on the main stem of the bayou and is located in the middle of the segment as well as in the middle of the City of Dickinson. Urban runoff and possible sanitary sewer by-passes or overflows may explain the increasing ammonia concentration. The last trends were found at sample site 16471 which is located on Benson Bayou (**sub-segment 1103A**), a tributary. Conductivity and salinity are decreasing, which indicates a “freshening of the water body,” while total suspended solid concentrations are increasing. Additionally, a nutrient trend shows nitrite + nitrate concentrations are decreasing at this location.

First listed in 1976, Segment 1103 is on the 2002 and 2004 Texas 303(d) Lists and the 2002 and 2004 305(b) Reports for bacteria and depressed dissolved oxygen. A TMDL for dissolved oxygen was initiated in 2000 after the impairment was verified. H-GAC conducted a special study to determine the extent and severity of the impairment in the bayou. Currently, TCEQ is facilitating a stakeholders group which will help determine the best strategies for addressing the problems and, eventually assist in developing a watershed management plan.

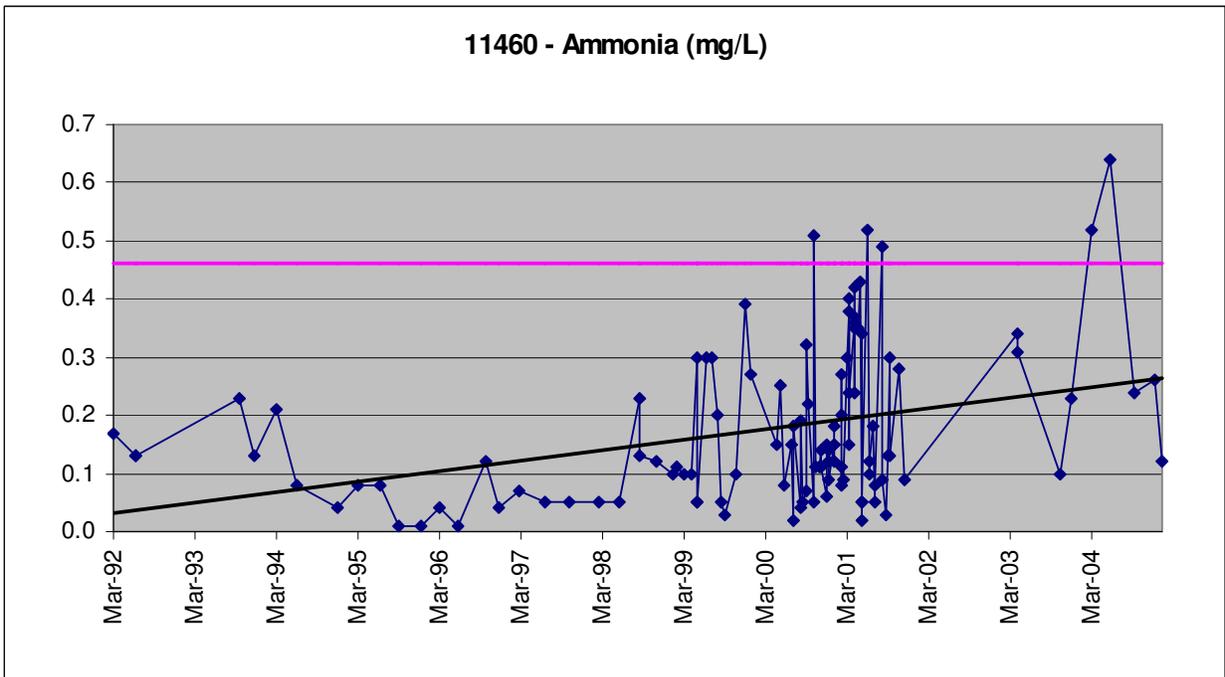
One of the 11 monitoring stations was non-compliant with the water quality standard for DO. Station 11464 (Dickinson Bayou at Cemetery Rd.) has an exceedance rate of 39% (28 out of 72 surface measurements) in data collected from January 1999 and January 2005. A second station located on Dickinson Bayou at I-45, site 11462, was almost non-compliant with the standard when 24% or 16 out of 64 measurements were below the minimum DO concentration of 3.0 mg/L. However, since July 2001 all surface layer instantaneous DO measurements collected at 11462 have been above the absolute minima.



Bacteria concentrations found in segment 1103 and several of its sub-segments are sometimes higher than the state's standards set to protect public health during contact recreation. Nine of the 11 sampling stations located throughout Dickinson Bayou tidal and its tributaries had bacteria concentrations that exceeded the standard for contact recreation. Fecal coliform exceedance rates for all sites varied from 29% (18 out of 62 samples) at site 11464 to 65% (13 out of 20 samples) at site 16469 (**sub-segment 1103B**) respectively. These samples were collected between April 2000 and November 2001 as part of a special study. H-GAC contracted with then CRP partner GCHD to conduct a special project which collected 24-hour and profiled information on DO, nutrients and bacteria. USGS completed the flow, habitat and biological portion of the study. USGS also maintained a continuous monitoring station located at State Highway 3. Station 11461, located at the confluence of Dickinson Bayou and Benson Bayou is another example of high bacteria concentrations. Twenty out of 44 samples (45%) collected between July 2000 and May 2001 exceeded the state contact recreation standard for fecal coliform. In response to the elevated bacteria levels found in the bayou and its tributaries, the TCEQ will eventually initiate a Bacteria TMDL to determine the measures necessary to support recreational uses in these water bodies. There are several Bacteria TMDLs currently underway on various water bodies throughout the region. Hopefully, the lessons learned from those projects will be applicable to Dickinson Bayou for facilitating restoration of water quality. In the meantime, the start date for this TMDL has not yet been determined.



Analysis of nutrient data revealed a concern with only one sampling location and only one parameter - ammonia. At station 11461 located at the confluence of Dickinson and Benson Bayous, 13 out of 44 samples (30%) collected between July 2000 and May 2001 show ammonia concentrations exceeding the 2006 nutrient screening criteria. Downstream, at site 11460 which has a much longer period of record, high ammonia results were also measured during the same time period. Station 11460 has chlorophyll a data collected from March 1992 through December 2004. While not a concern at this time, data shows a 16% exceedance rate with 10 out of 61 chlorophyll a samples exceeding the January 2006 nutrient screening criteria.



Overall, bacteria and nutrient concerns and/or impairments are found throughout the Dickinson Bayou Tidal watershed and occur with high frequency in some areas. Sources for both nutrients and bacteria are usually associated with municipal rather than industrial activities. Elevated bacteria levels likely stem from the usual sources such as intermittent municipal collection system overflows, failing septic systems, pet waste, naturally occurring wildlife and avian populations found throughout the watershed and ranchettes or hobby farms that include raising large animals such as cows and horses. Nutrients can come from the above sources as well as fertilizers applied to lawns. In-stream levels of bacteria and nutrients are usually higher after rainfall events that result in stormwater run-off.

Next Steps: Continue routine monitoring and monitor progress of TMDL projects being conducted in watershed.