

East Fork San Jacinto River, Segment 1003  
Peach Creek, Segment 1011  
Caney Creek, Segment 1010

## Data Review & Analysis

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# Introduction

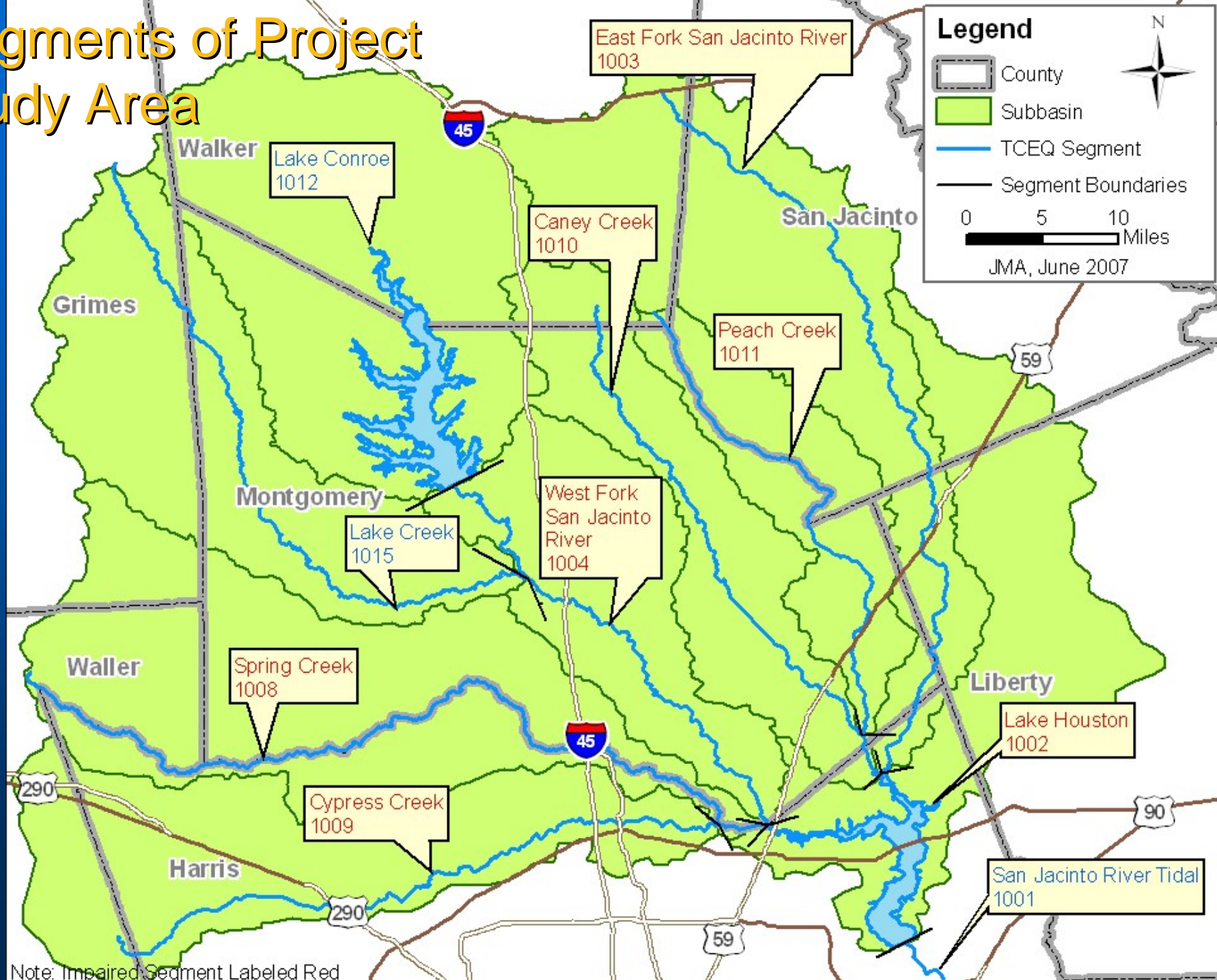
- The East Fork San Jacinto River Basin above Lake Houston is identified as impaired based on historical data
- Stream segment is considered impaired when geometric mean of *E. coli* exceeds criterion of 126 org/100mL
- Additional data has been collected
- Next step will be calculation of TMDLs and allocations



# Sources of Bacteria

- Treatment plants when not operated properly
- Septic tanks
- Storm water
- Animal waste

# Segments of Project Study Area



Note: Impaired Segment Labeled Red



# I. Historical Data Review

# Spatial and Temporal Analysis



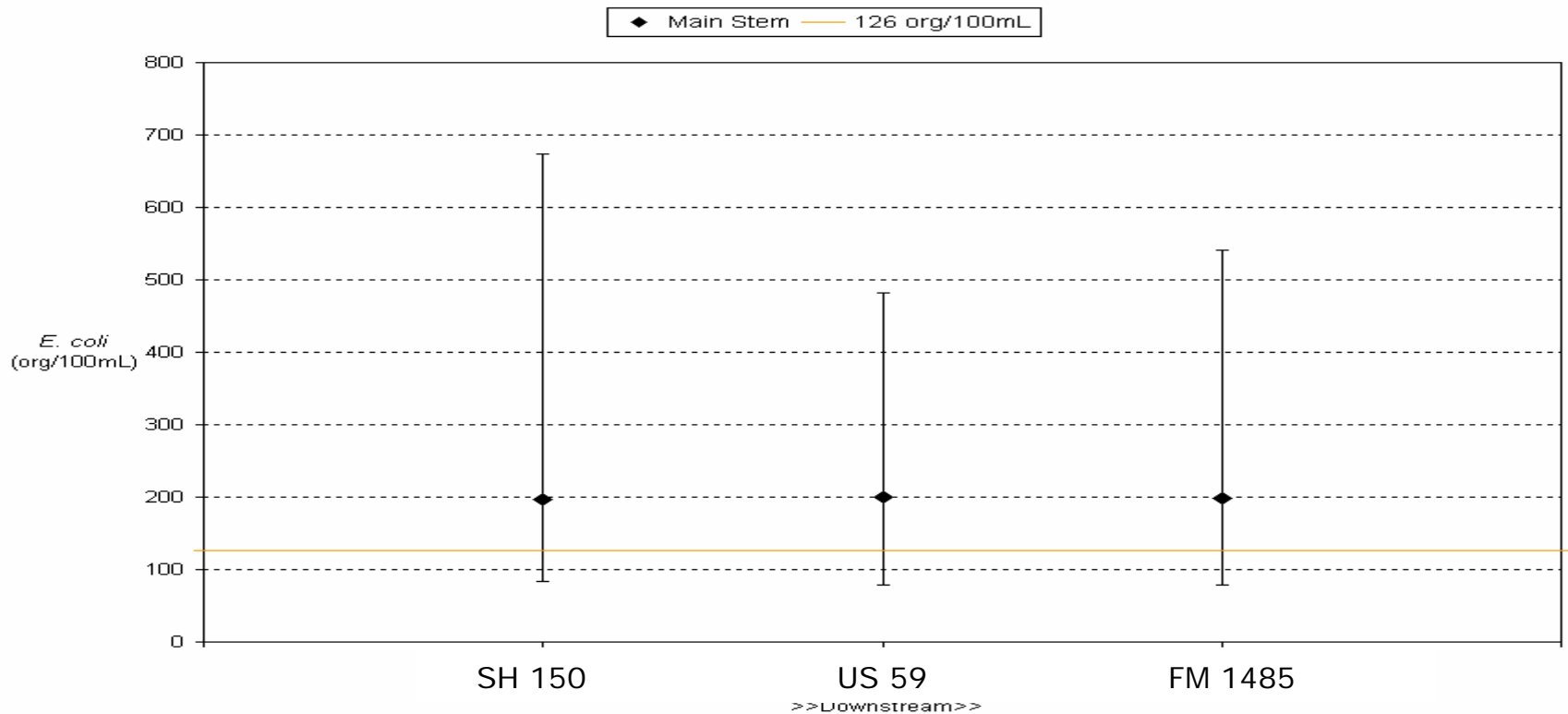
- Spatial analysis – do concentrations change over length of stream?
- Temporal analysis – do concentrations in the stream change over time?
- Both can help locate sources of bacteria

# Spatial Analysis



- Lake Houston and tributaries
  - Bacteria counts exceed geometric mean criteria in many assessment units
  - No consistent trends over length of stream

## East Fork San Jacinto River Spatial Analysis

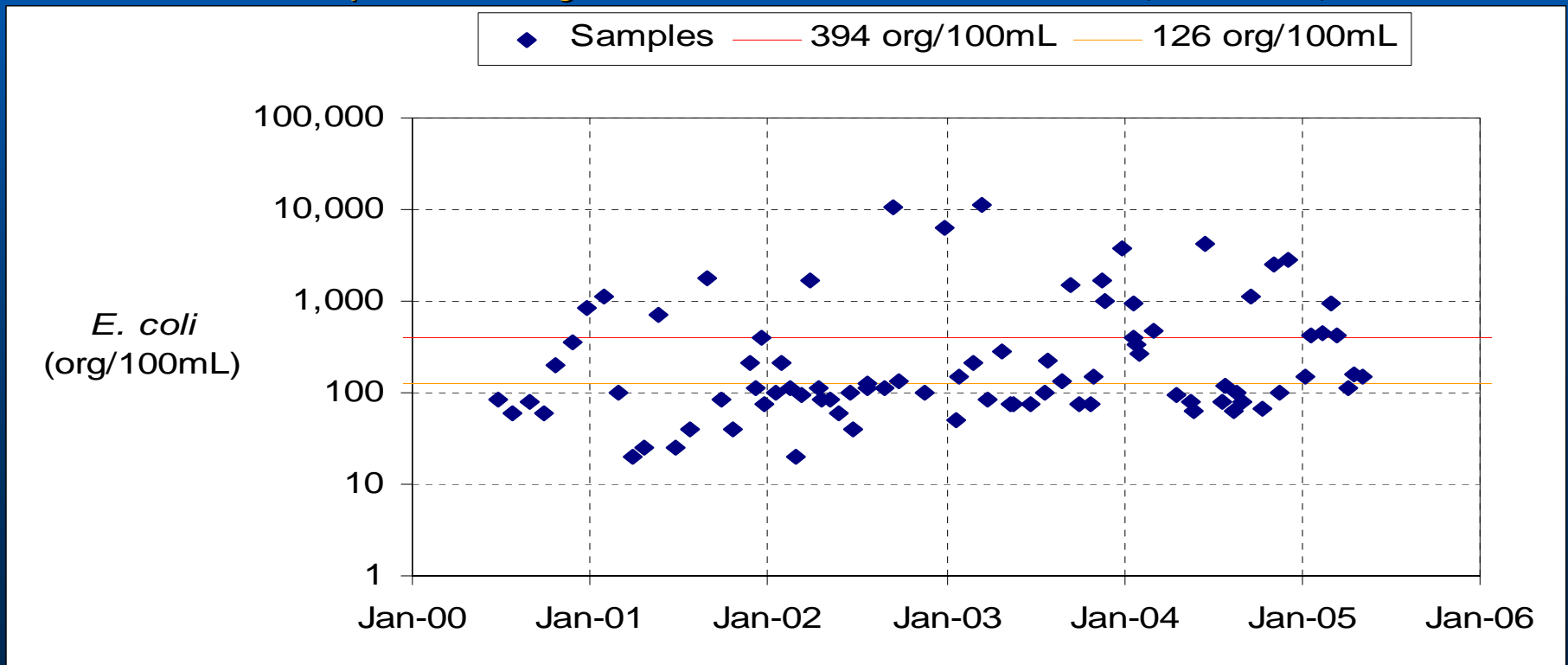


# Temporal Analysis



- Lake Houston & Tributaries
  - Bacteria counts from 10 to 10,000 org/100 mL
  - No trend over time
  - Most samples exceed 126 org/100 mL

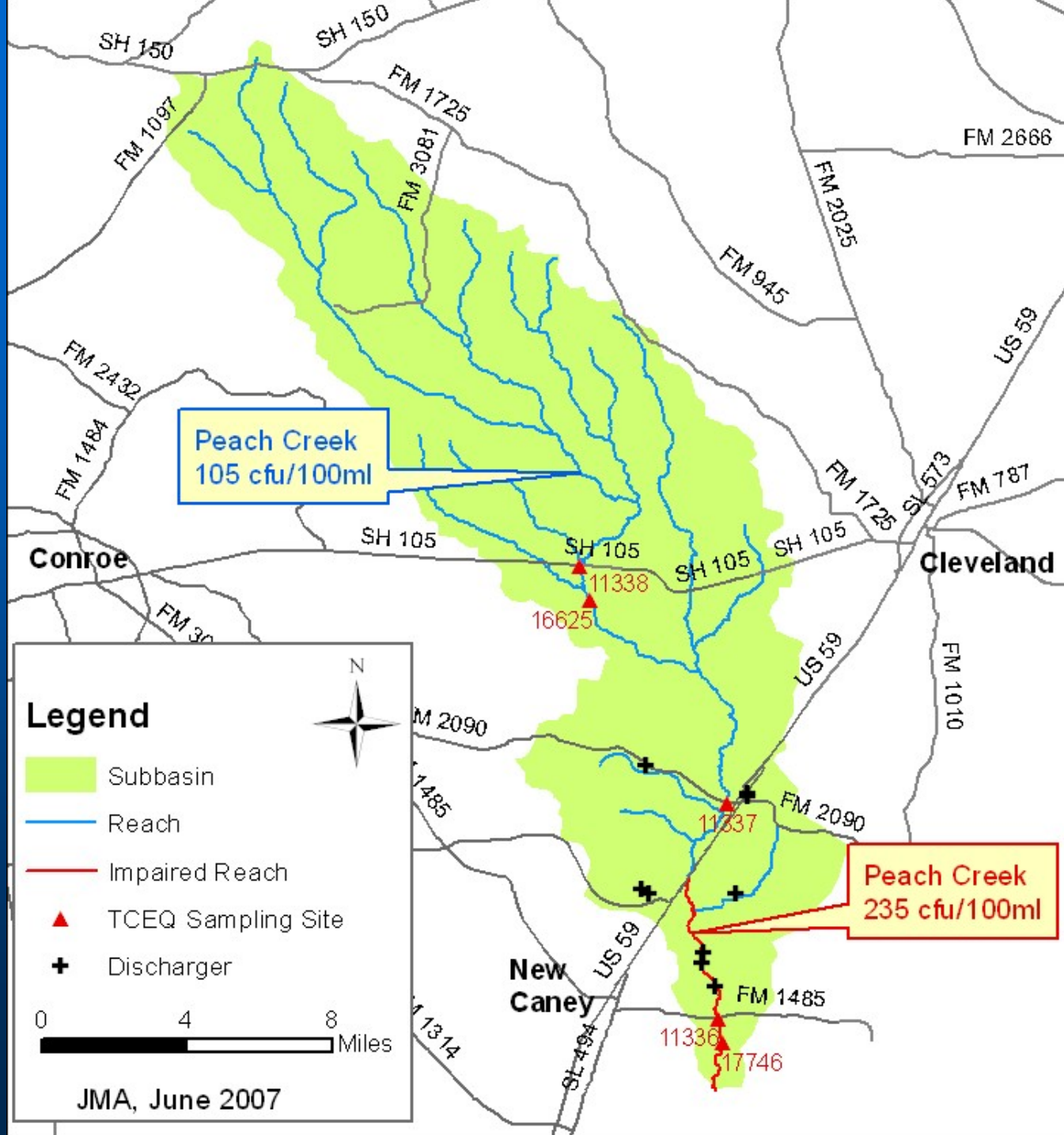
## Temporal Analysis: East Fork at FM 1485 (#11235)



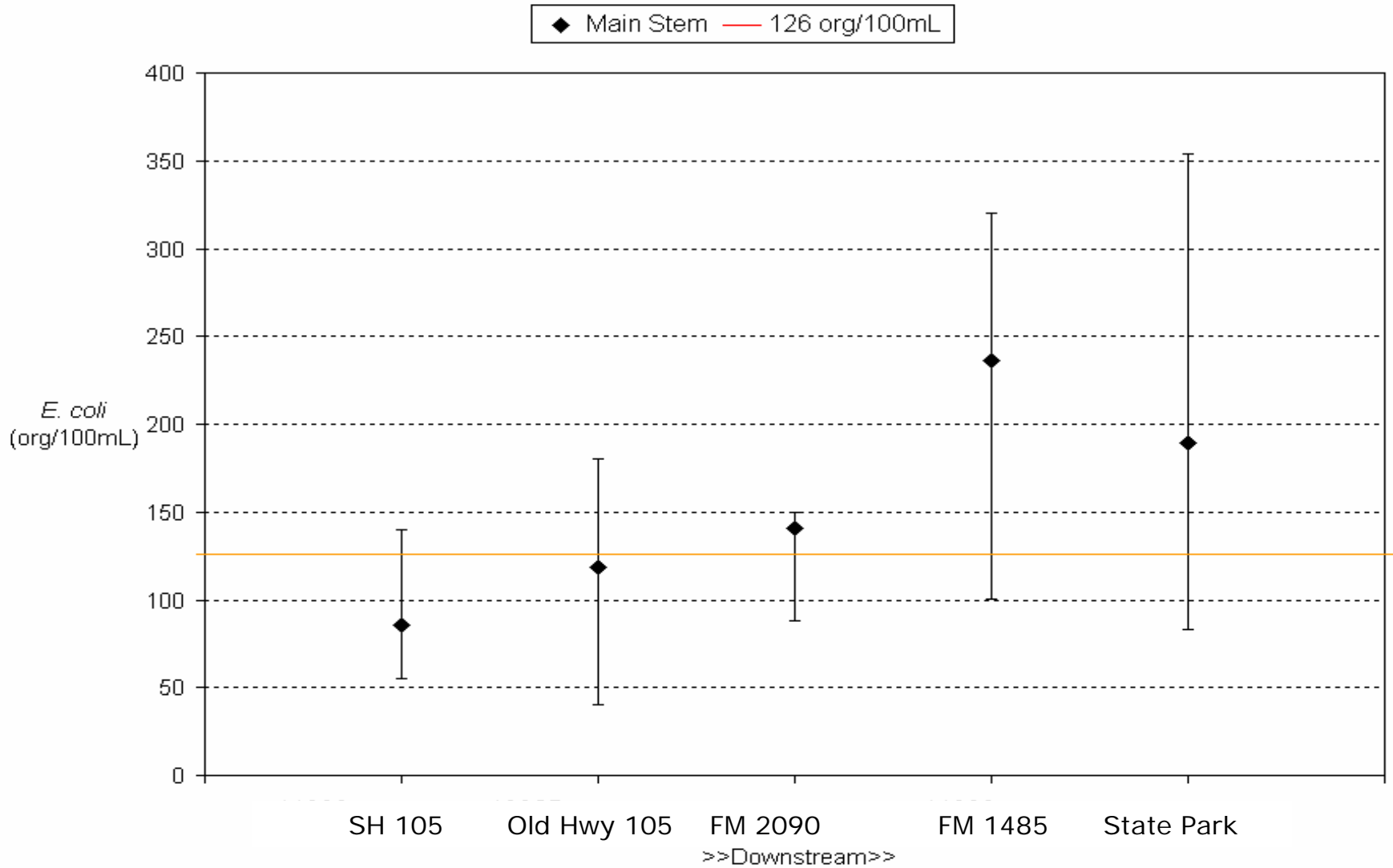




# Peach Creek Study Area



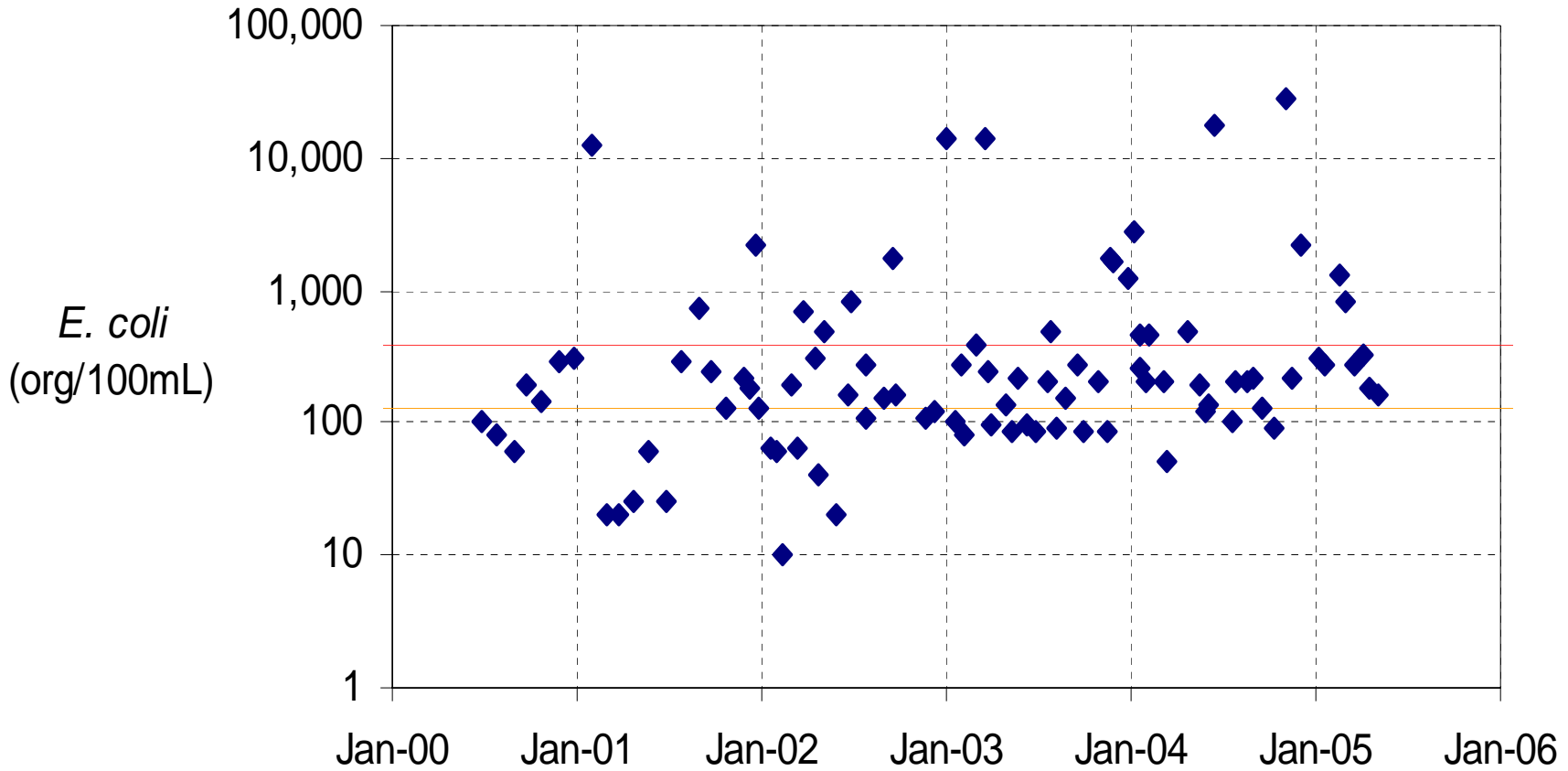
# Peach Creek Spatial Analysis



# Temporal Analysis: Peach Creek at FM 1485 (#11336)

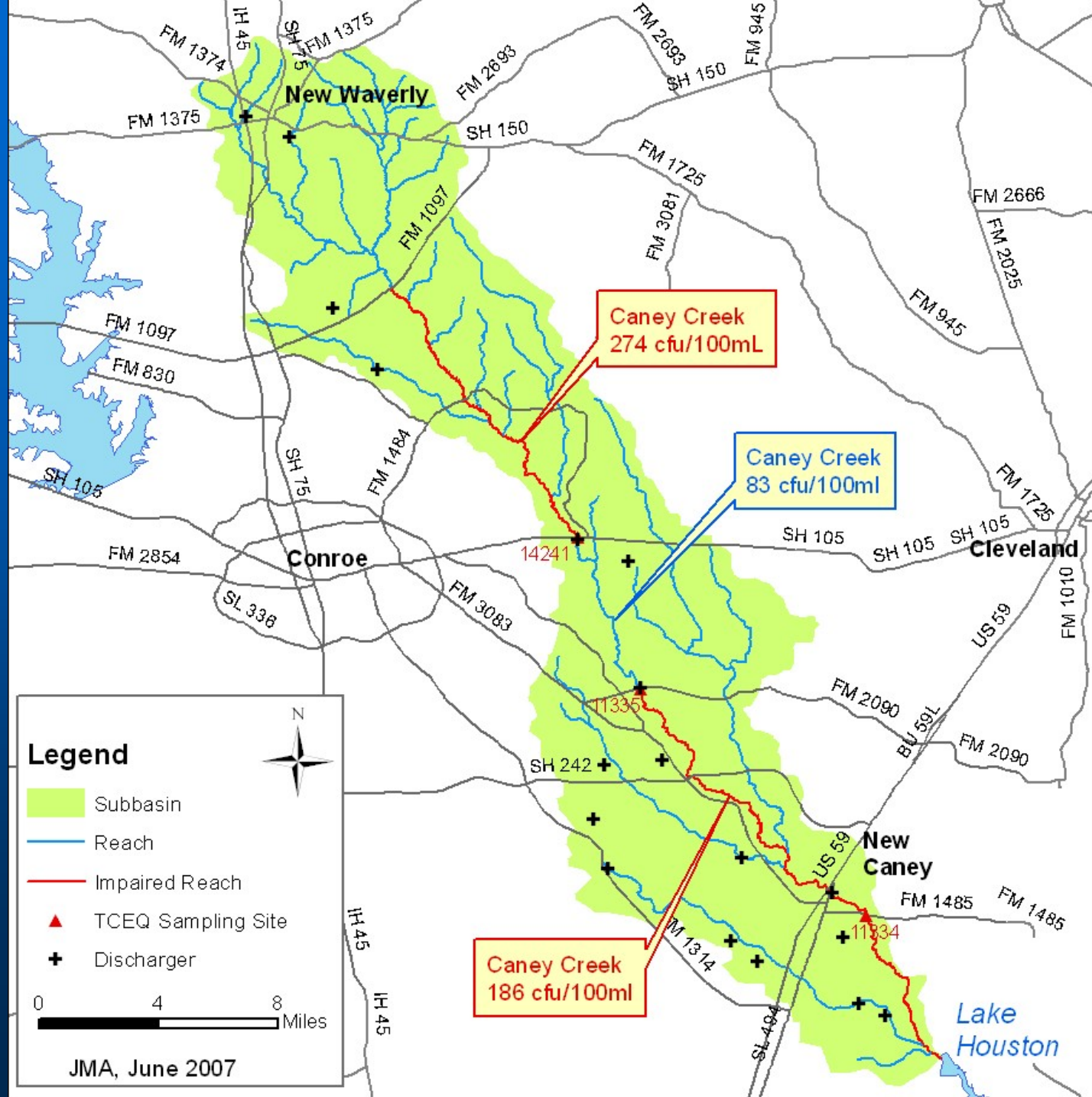


◆ Samples — 394 org/100mL — 126 org/100mL



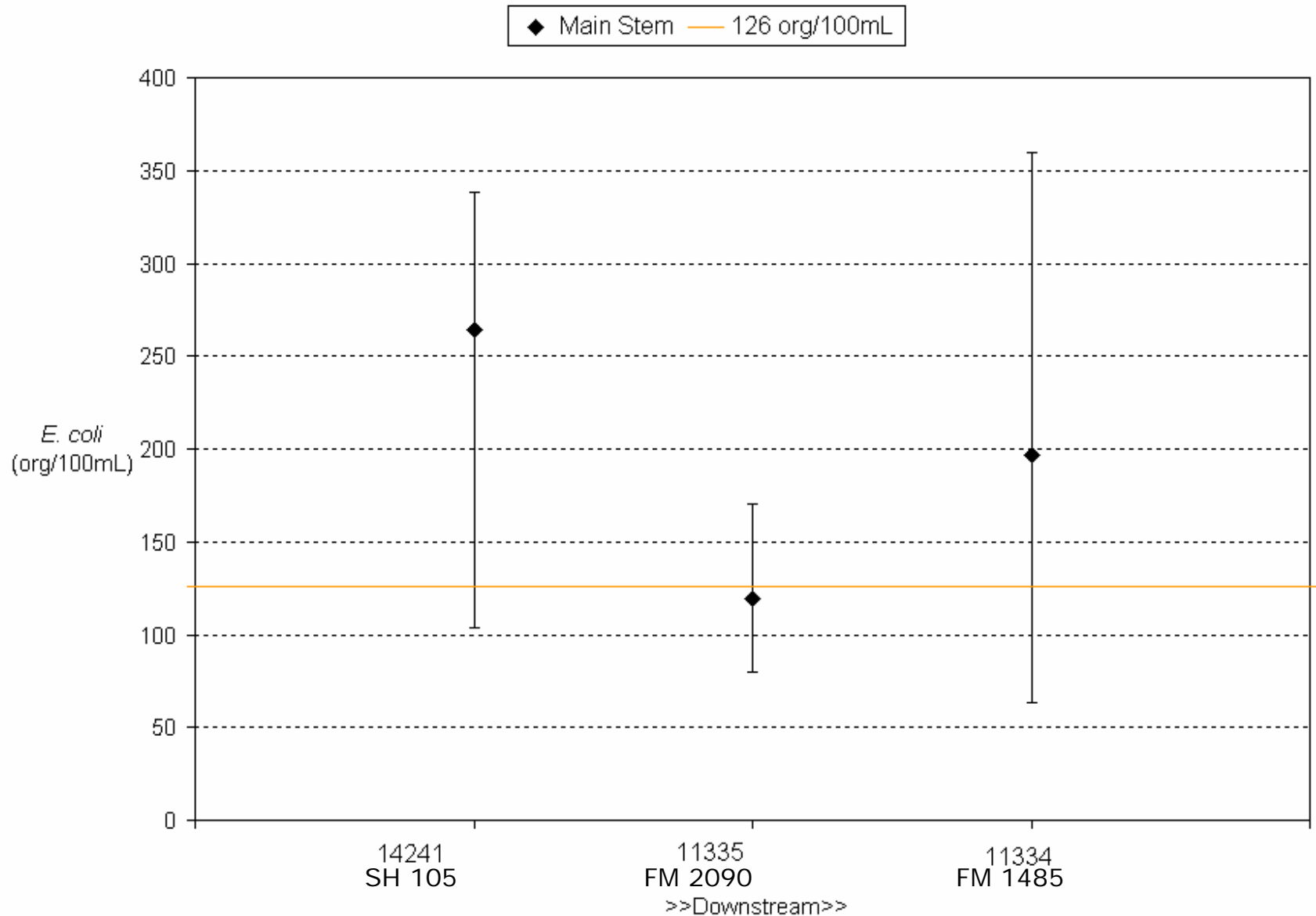


# Caney Creek Study Area

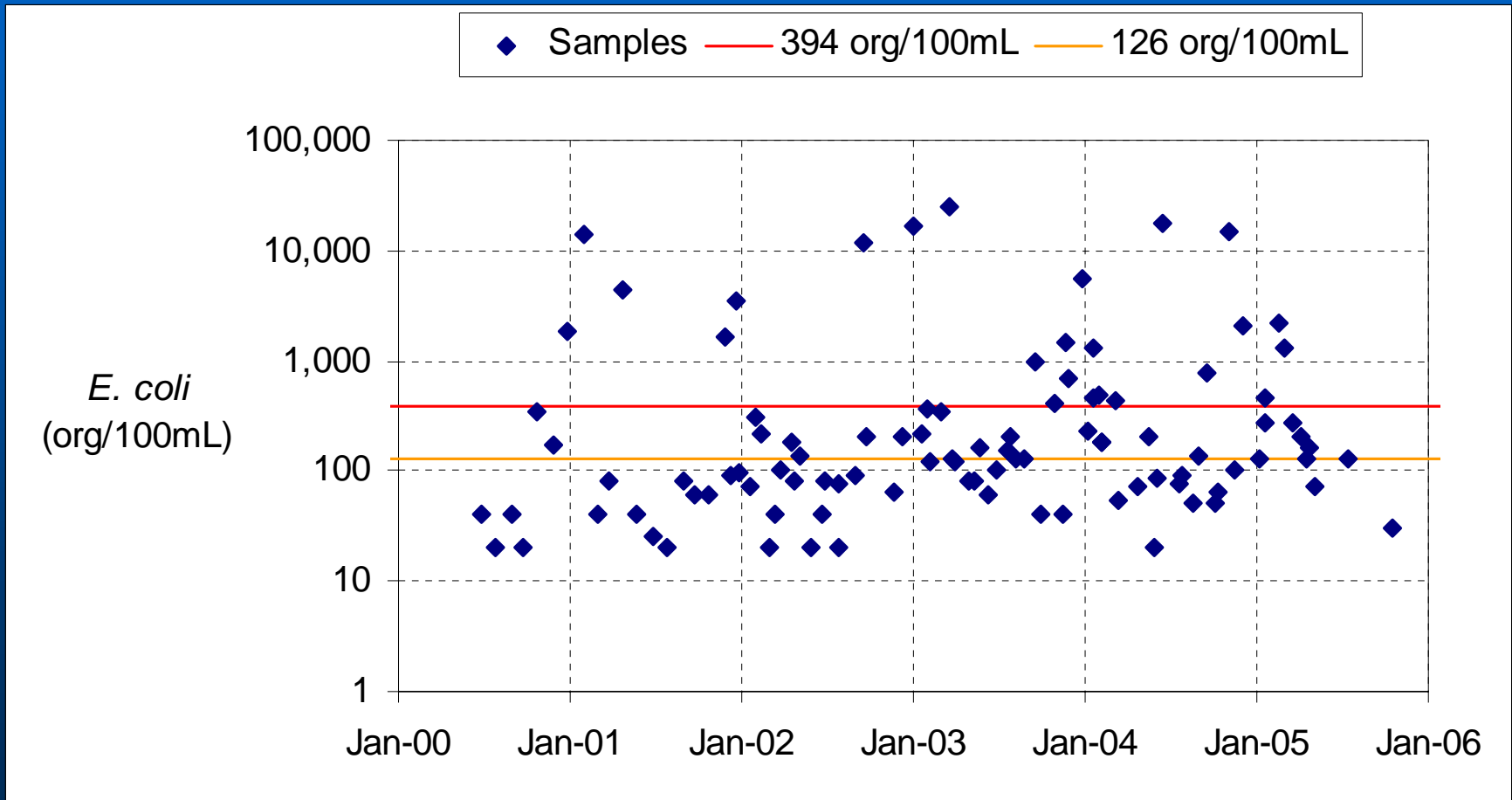


JMA, June 2007

# Caney Creek Spatial Analysis



# Temporal Analysis: Caney Creek at FM 1485 (#11334)





## II. Additional Monitoring Data





# Monitoring Objectives

- How much data do we need?
- Where do the bacteria come from?
- Definitions
  - Synoptic = simultaneous conditions over a broad area
  - Spatially Intensive = detailed sampling along stream channel



# Synoptic Sampling Surveys

- Samples to be collected under baseflow conditions
- Identify source areas, longitudinal trends, extent of impairment
- Routine monitoring stations and additional sites
- Two surveys on each study segment.
- General schedule for these events  
November 2007 to June 2008.

# Spatially-Intensive Source Studies



- Upper East Fork San Jacinto River, Segment 1003; Stewarts Creek, Segment 1004E; Willow Creek Segment, 1008H; and Spring Gully, Segment 1009 D
- Evaluate specific source locations in detail
- Baseflow Conditions
- Numerous sampling points, eg, 1000-ft intervals
- Sample pipes, outfalls, tributaries
- Extrapolate to similar areas in study area

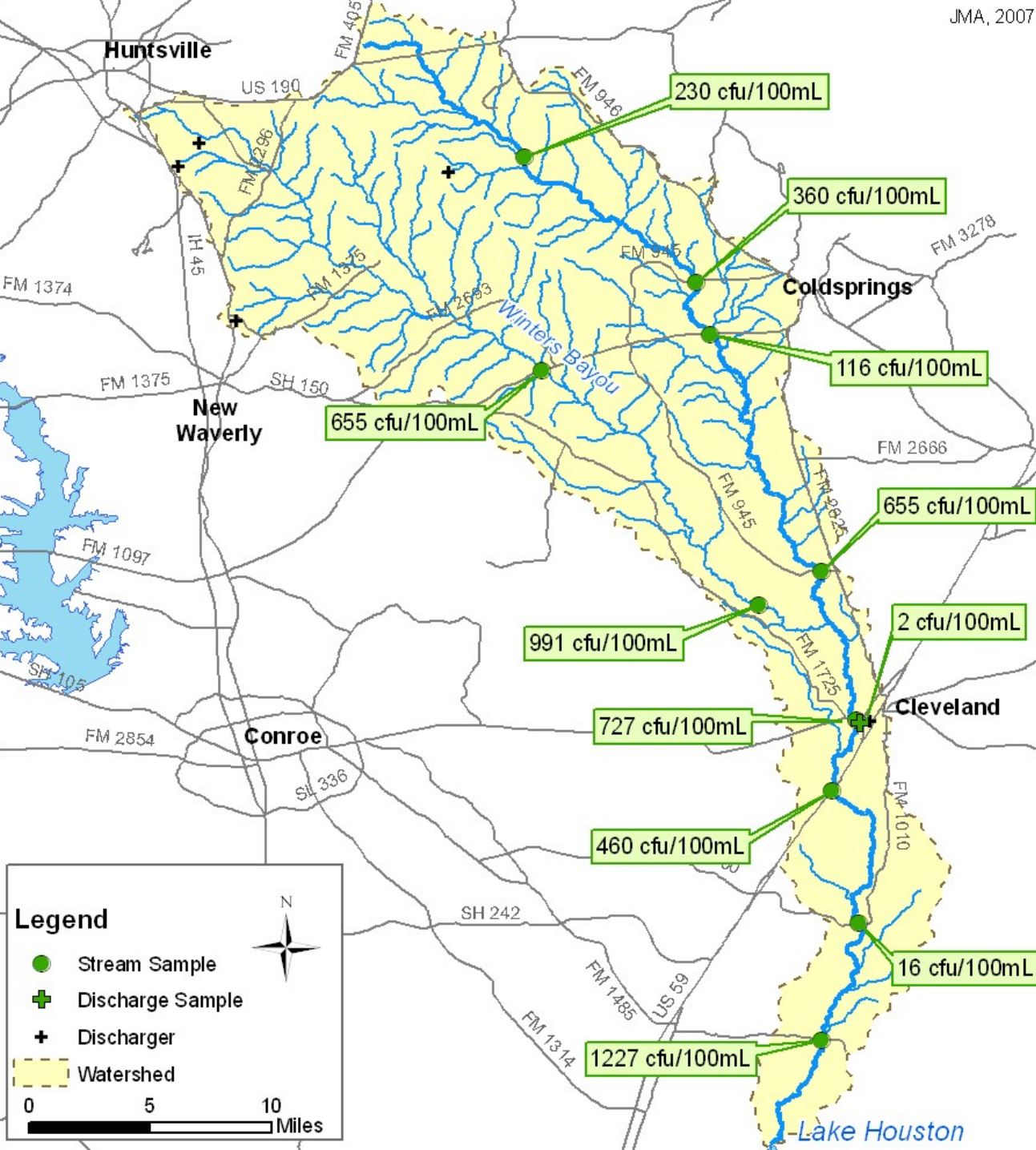
# East Fork San Jacinto River at SH 945





# East Fork San Jacinto River at US 59



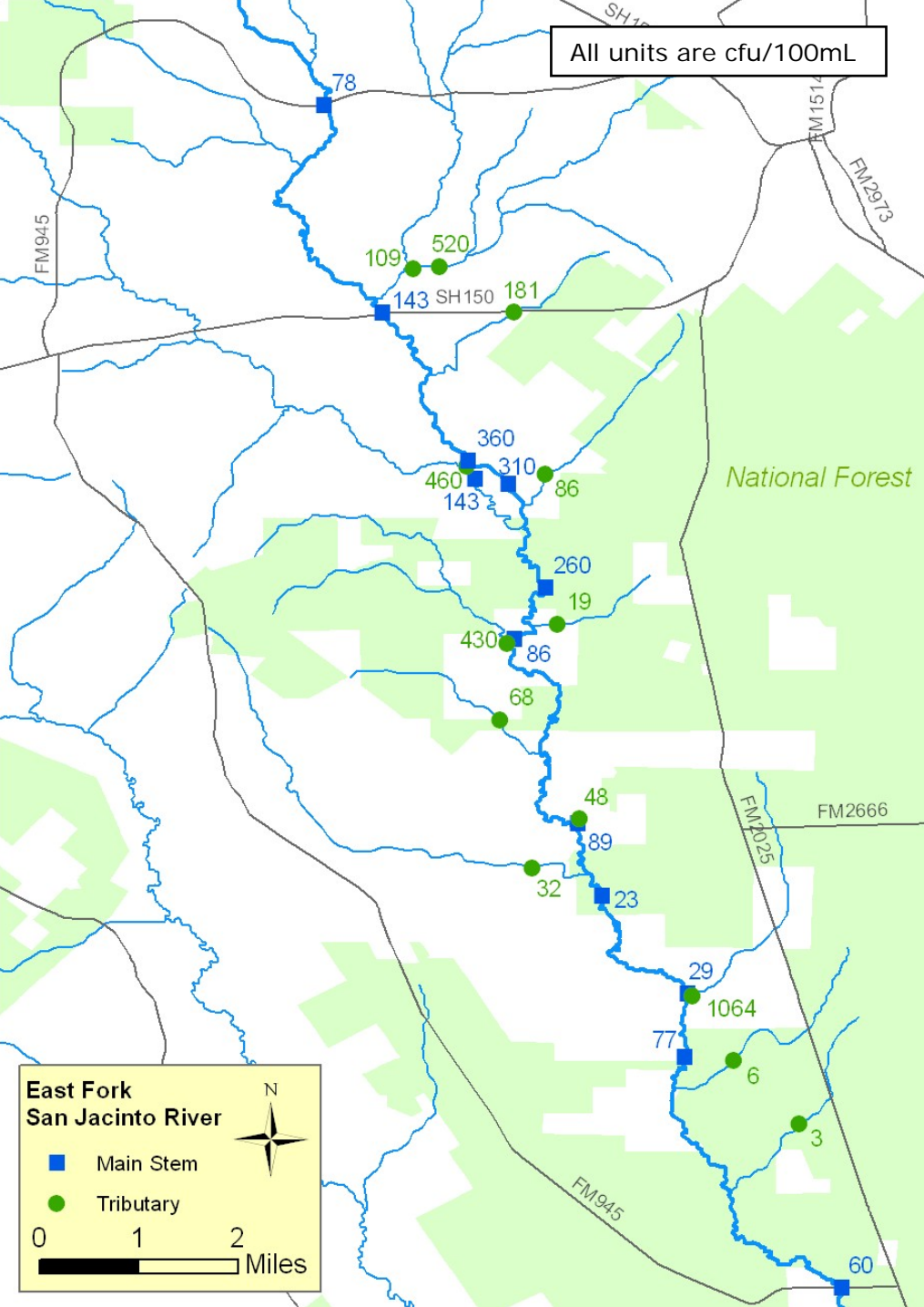


# East Fork San Jacinto River Synoptic Sampling Map





All units are cfu/100mL



# East Fork San Jacinto River Intensive Survey Map

**East Fork  
San Jacinto River**

■ Main Stem  
● Tributary

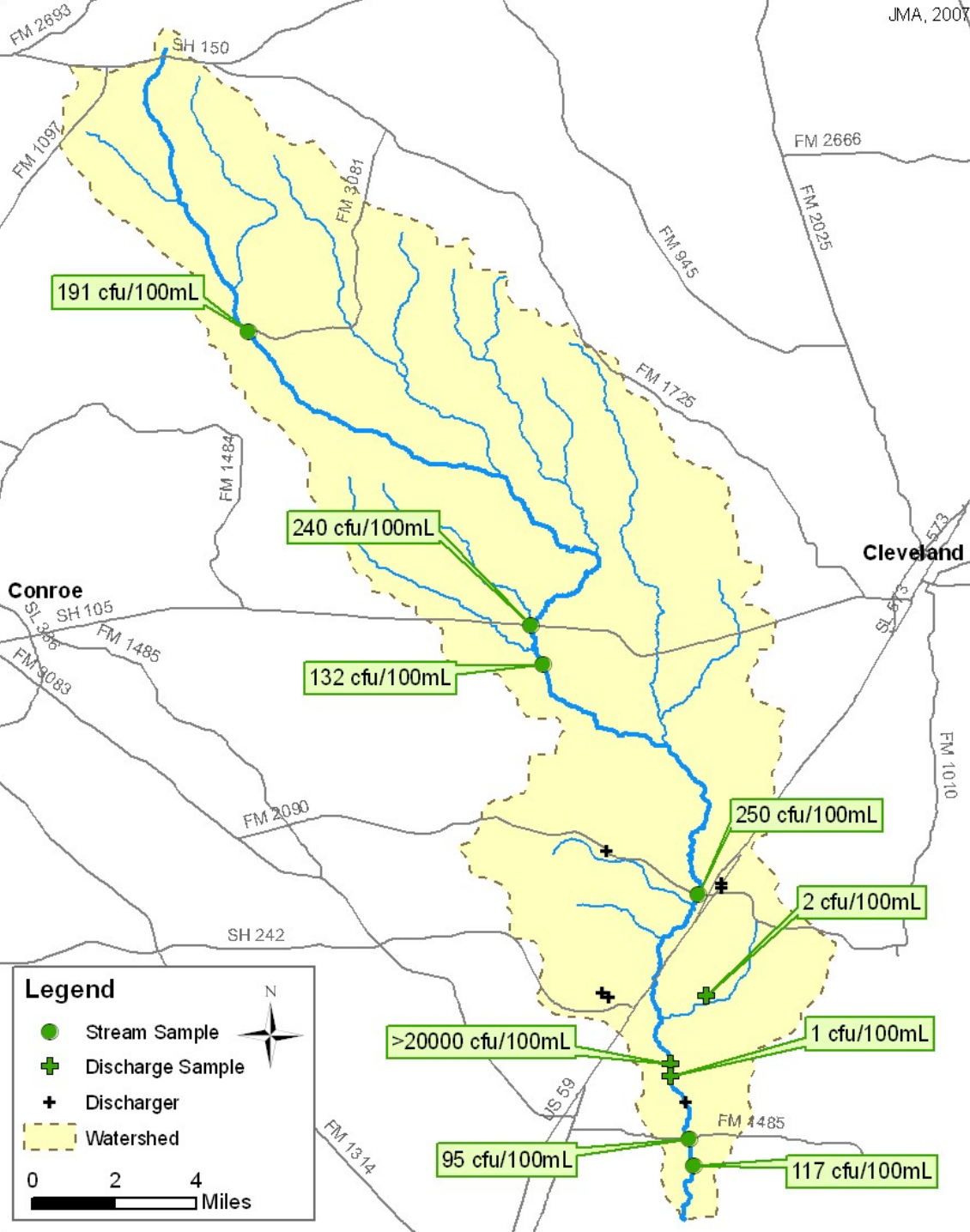
0 1 2 Miles

# Peach Creek at FM 1485





# Peach Creek Synoptic Sampling Map



# Caney Creek at FM 1485



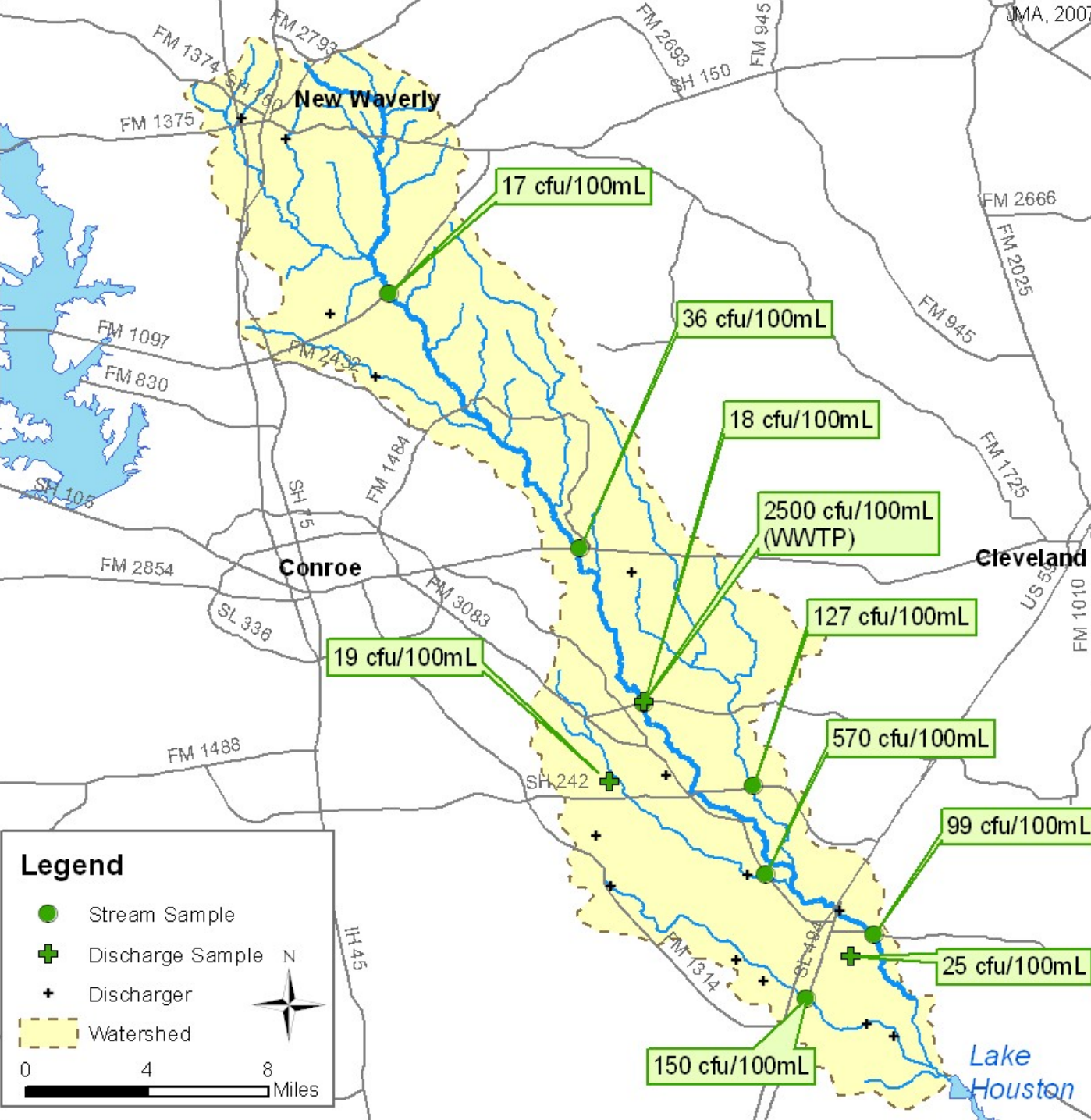


# Caney Creek at SH 105





# Caney Creek Synoptic Sampling Map





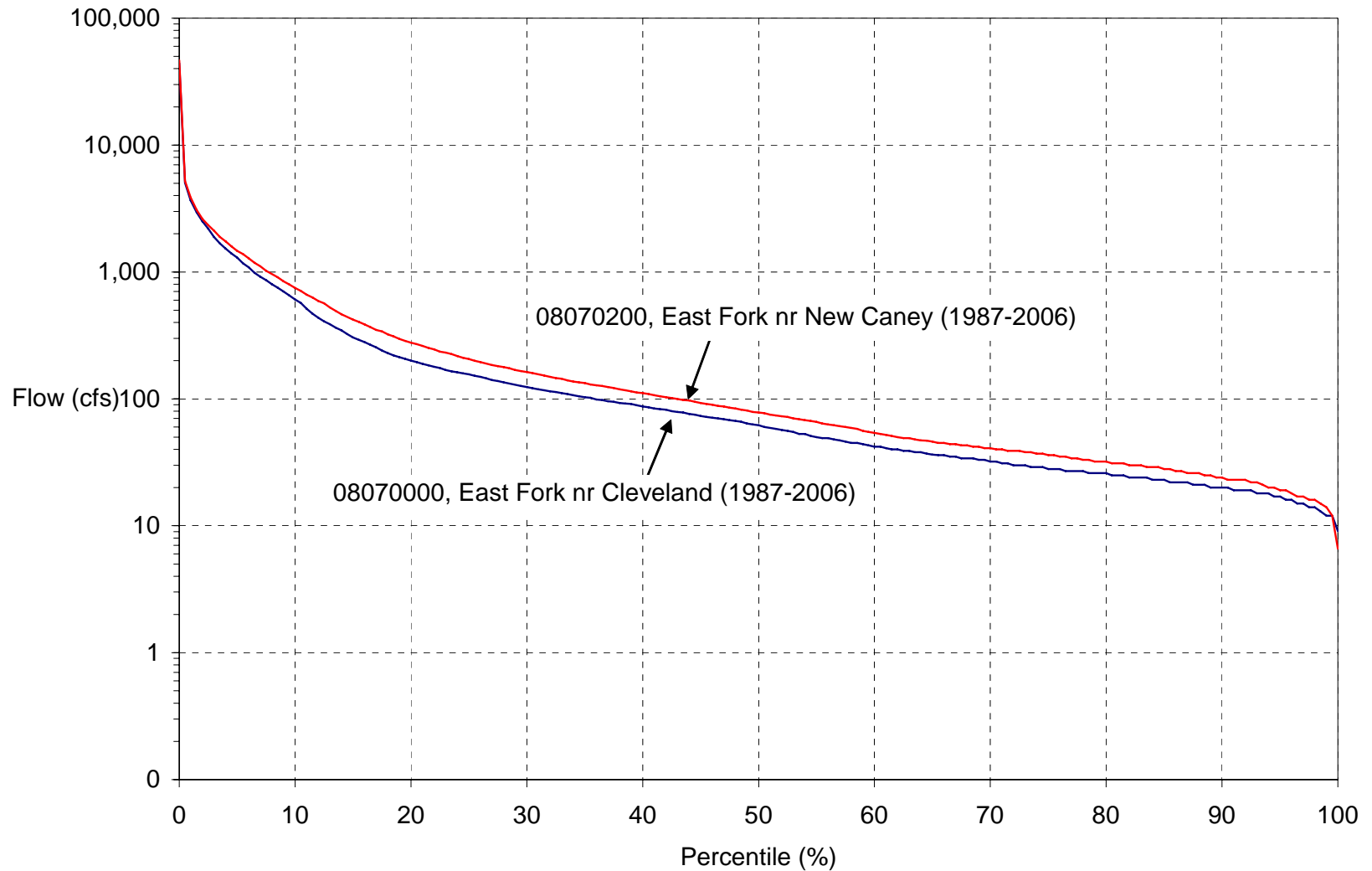
# III. Determination of TMDLS and Allocations



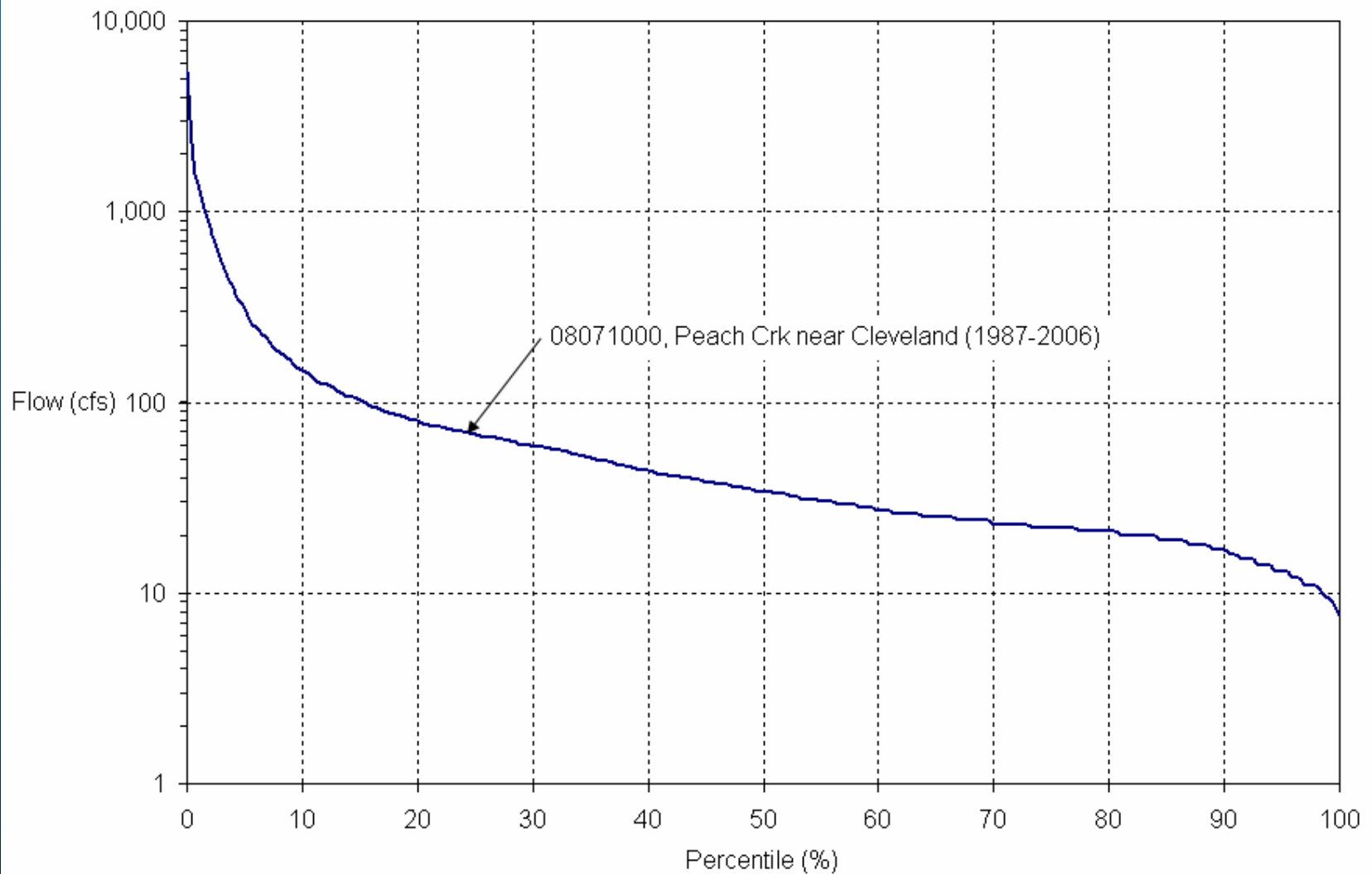
# Flow Duration Curves

- A flow duration curve (FDC) is a graph of daily average streamflow versus the percent of days that the average streamflow value is exceeded
- FDCs are typically developed using daily flow data
- Common tool in hydrology studies

# East Fork Flow Duration Curve

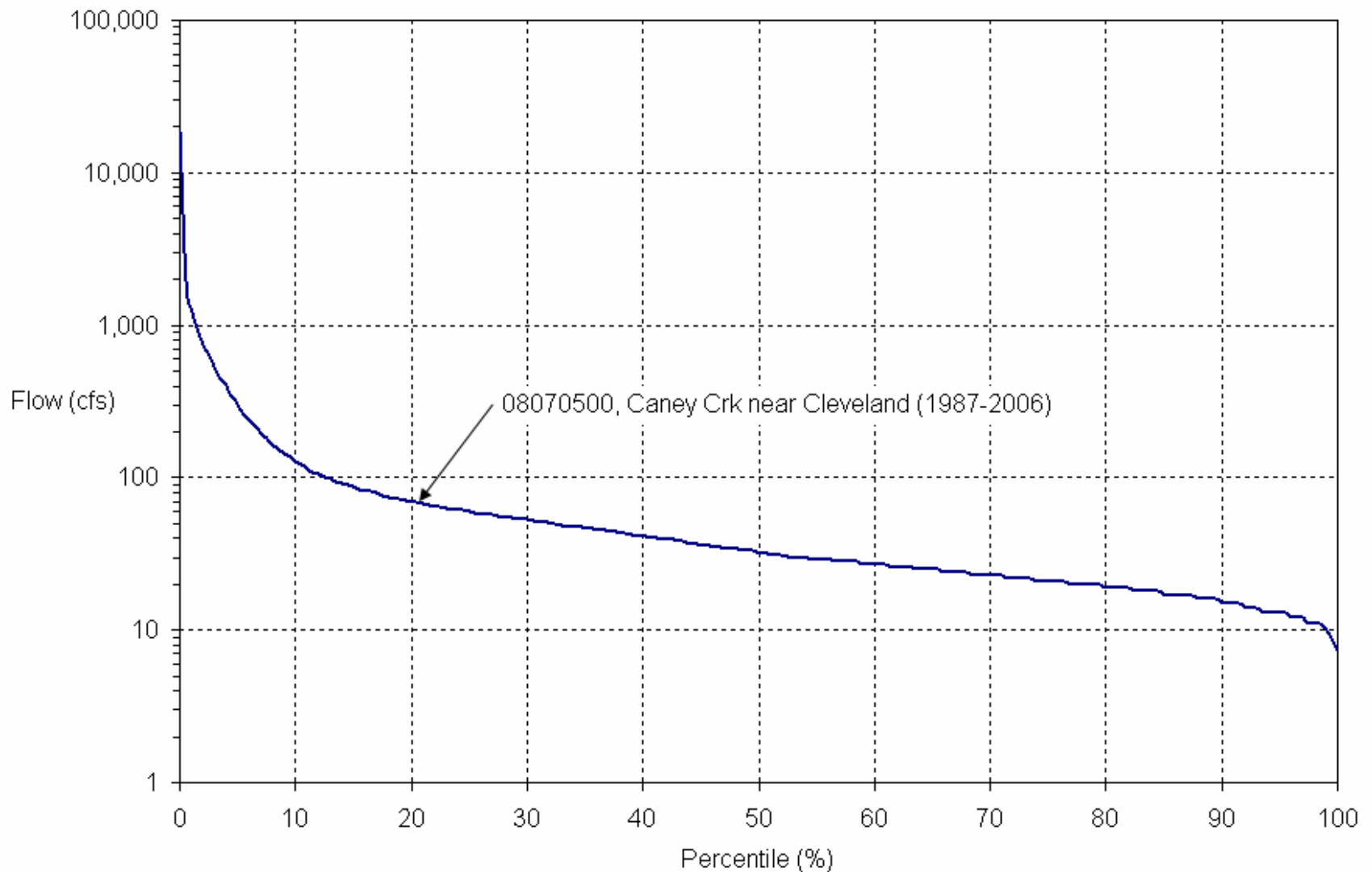


# Peach Creek Flow Duration Curve





# Caney Creek Flow Duration Curve



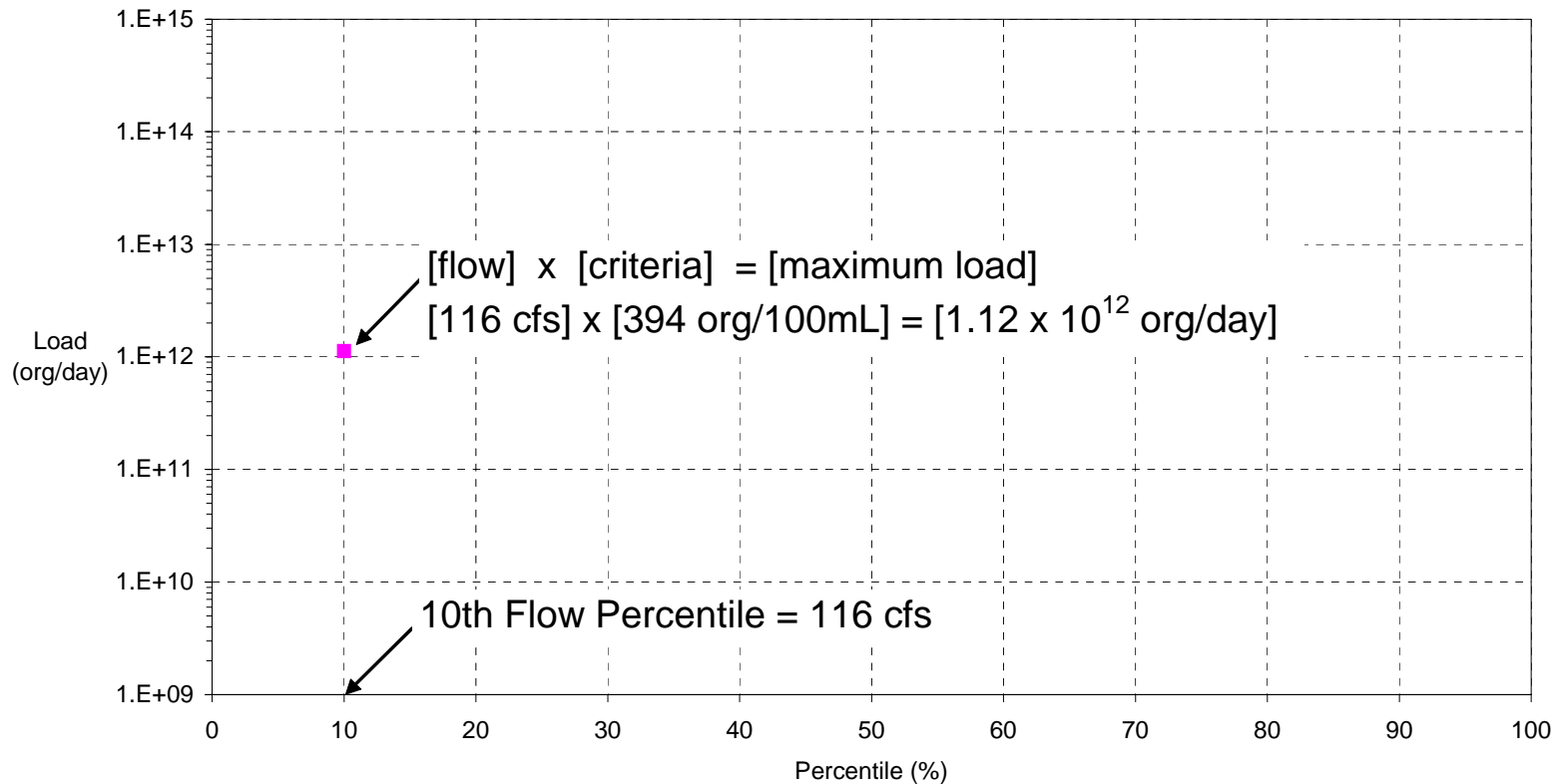


# Load Duration Curves

- Bacterial loads are the product of each grab sample bacteria concentration and the corresponding mean daily streamflow rate
- The greatest exceedances typically occur under high flow conditions
- Plot sampling data as loads, compare to criteria, to develop LDC

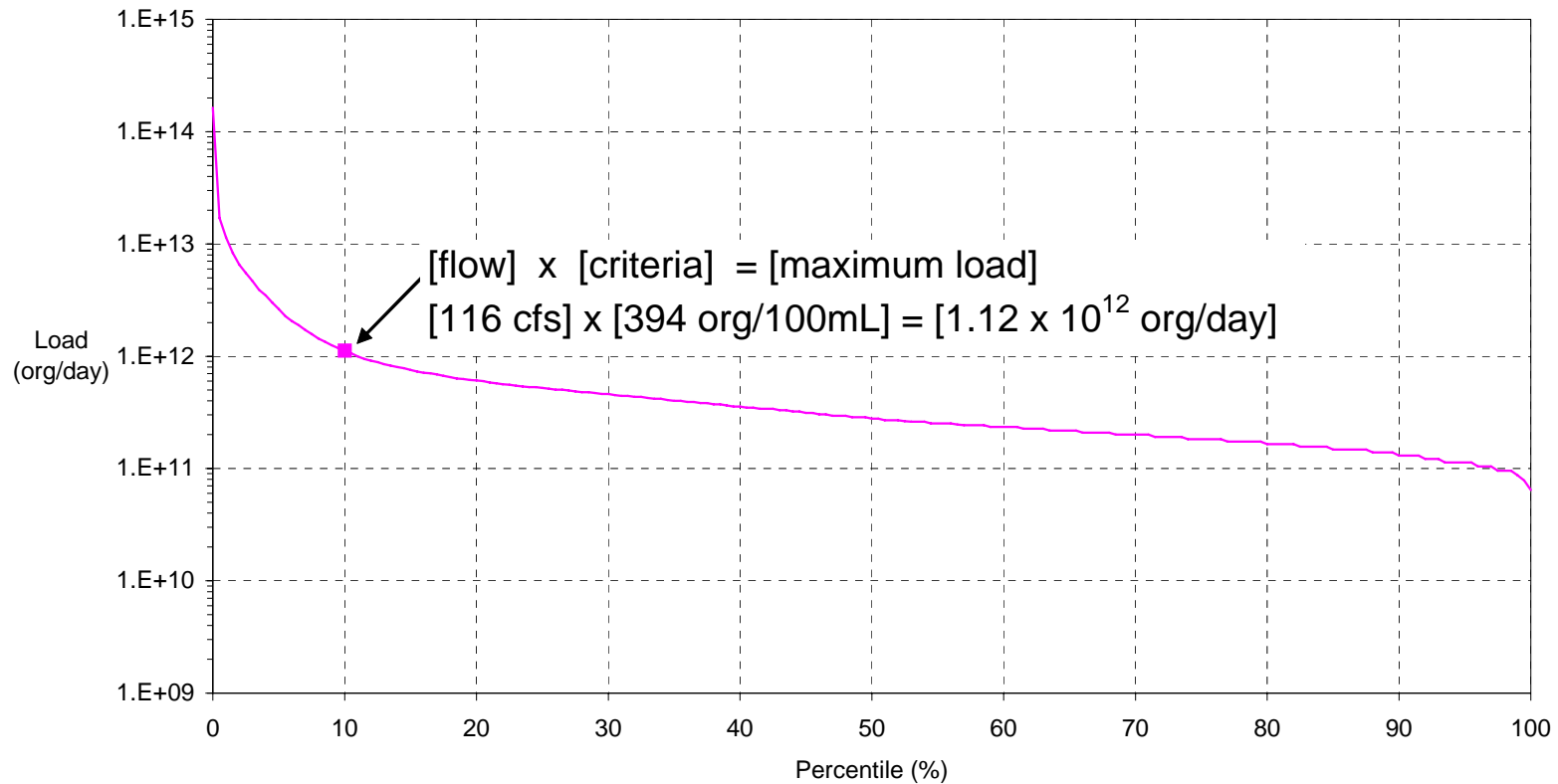
# Hypothetical LDC

## Step 1: Plot Allowable Load for a Flow Percentile



# Hypothetical LDC

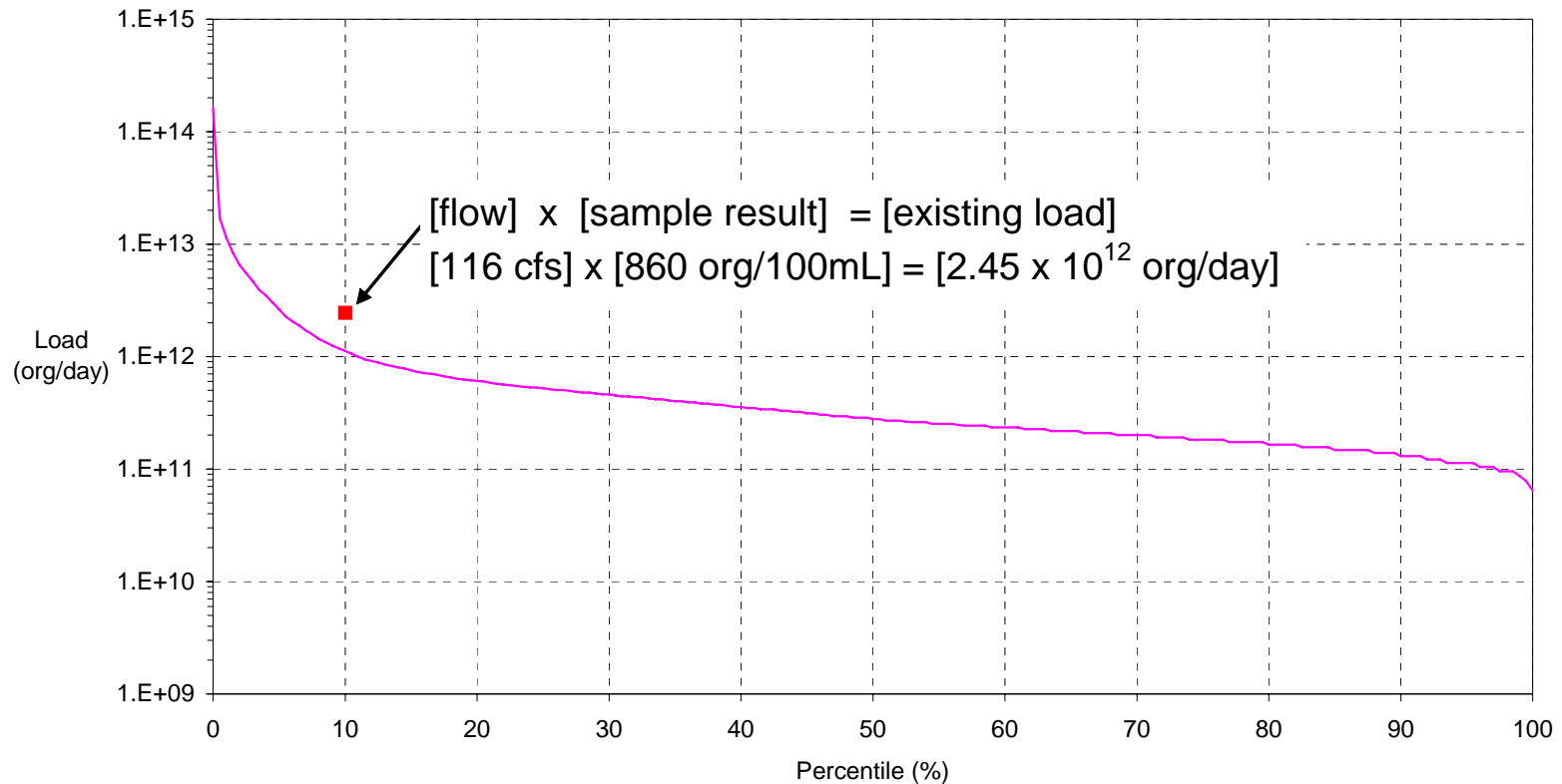
## Step 2: Plot Allowable Load for each Flow Percentile



# Hypothetical LDC

## Step 3: Plot a Sampling Result

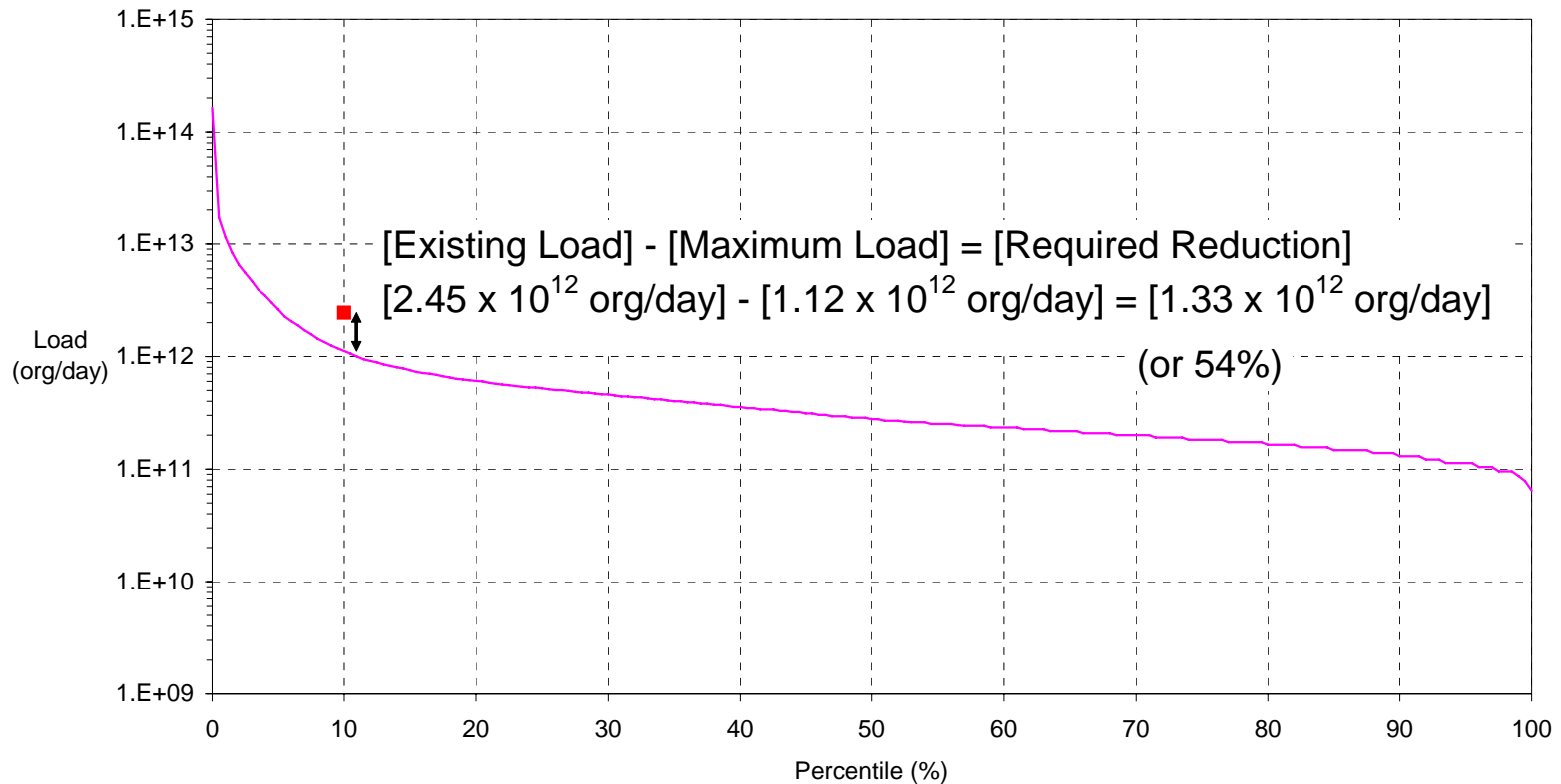
(on 21 January 2004, the flow was 116 cfs and the bacteria concentration was 860 org/100mL)



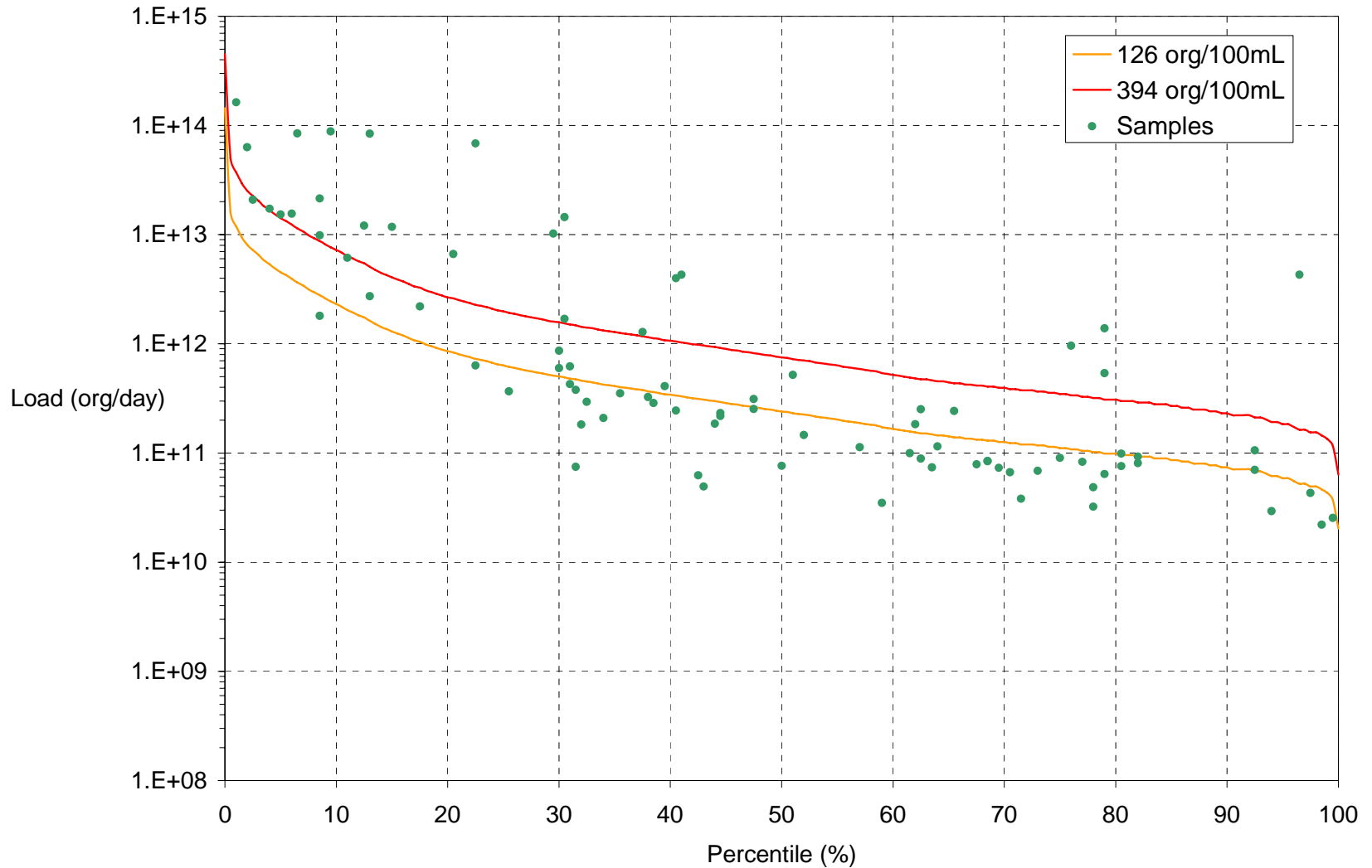
# Hypothetical LDC



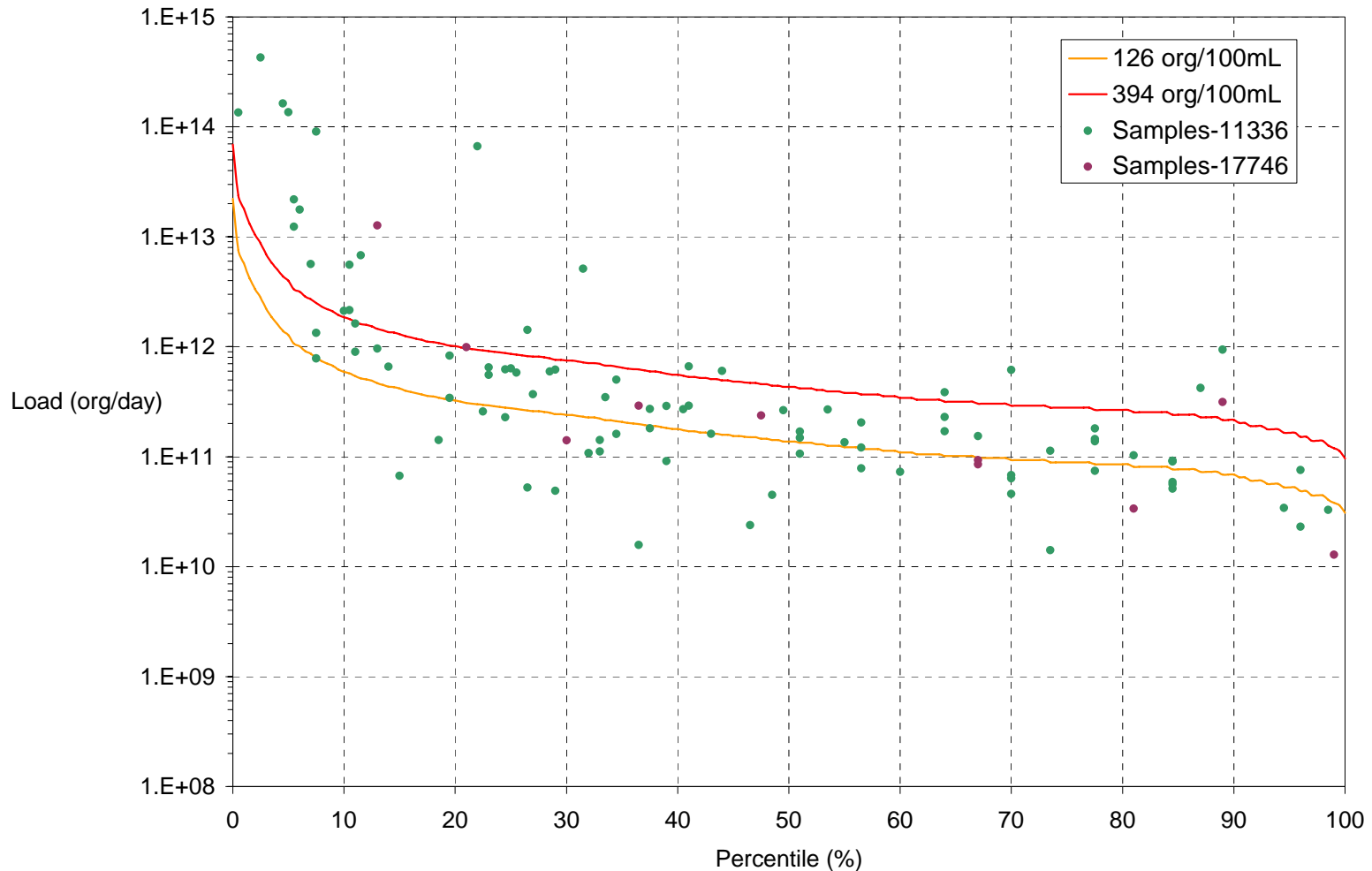
Step 4: Determine Load Exceedance  
(for 21 January 2004 only)



# LDC for East Fork at FM 1485 (#11235)

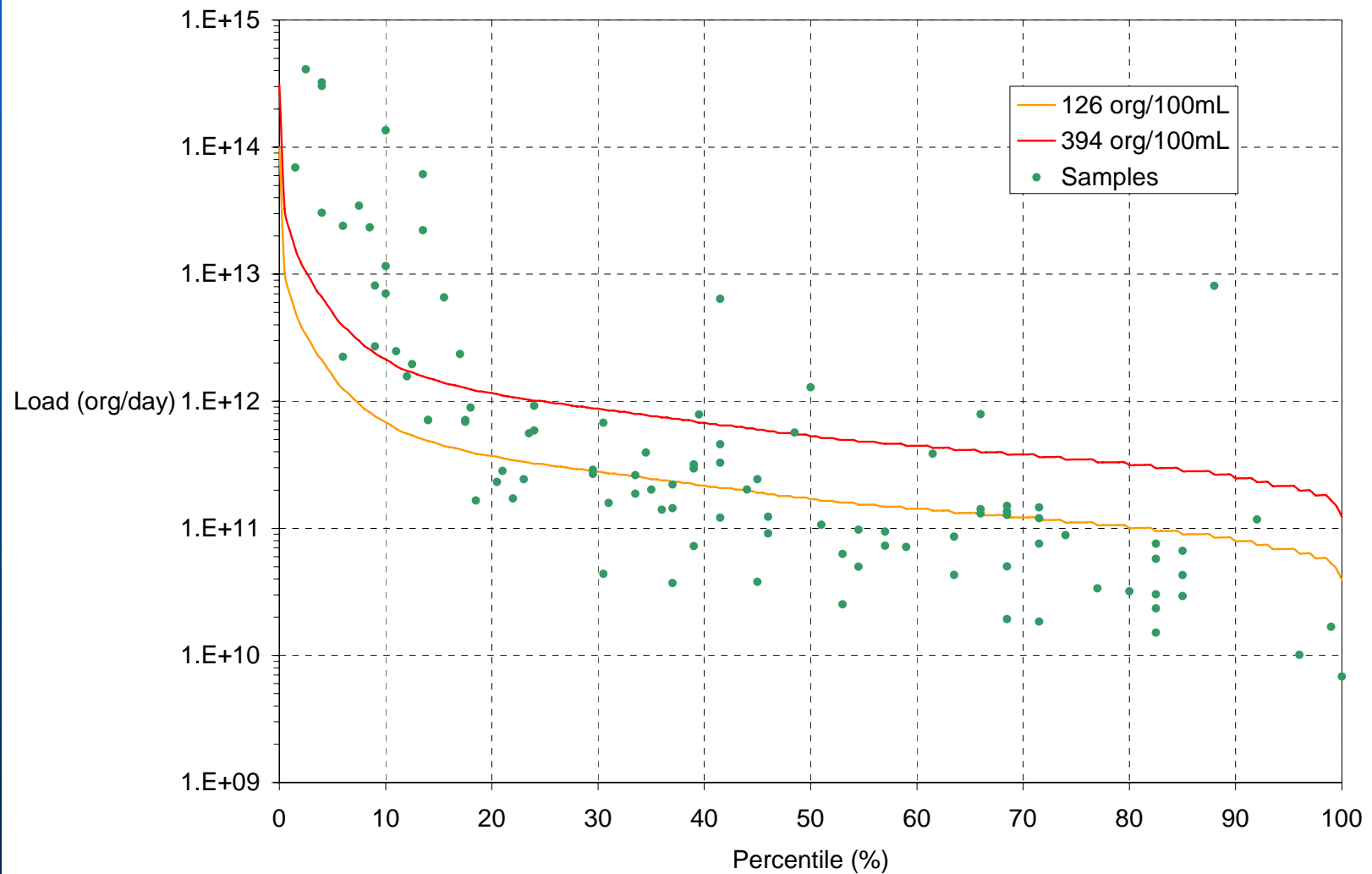


# LDC for Peach Creek at FM 1485 and Foot Bridge (#11336, 17746)





# LDC for Caney Creek at FM 1485 (#11334)





# Why does this Matter?

- LDC shows if sampling data indicates compliance or exceedance
- For exceedance of criteria, need to develop an allowable load allocation
- Potential sources are addressed in implementation plan



# Allocation Categories

- Two primary source categories
  - Wasteloads (WLA) - any source flowing into a waterway and covered by a permit
    - wastewater treatment plants
    - discharges of runoff from municipal areas covered under stormwater permits (MS4s)
  - Loads (LA) - remaining diffuse sources of pollutants that are not covered by permit
    - runoff from rural or urban areas outside of permitting jurisdictions



# Wastewater Treatment Facilities

- Potential to contribute significant bacteria loads if complete disinfection is not achieved
- Loads may be most noticeable under low flow conditions, during which some streams may be effluent dominated
- Also possible for treatment plants to contribute significant loads under wet weather conditions
- Increased loading due to stormwater inflow and infiltration may result in poorer plant performance

# East Fork



## Wastewater Treatment Facility Summary

- 5 permitted facilities
- Total current flow 0.6 MGD (0.9 cfs)
- Total Permitted flow 0.9 MGD (1.4 cfs)
- WWTP flows account for 6% of the stream flow at the 99<sup>th</sup> percentile regime (low flow), 1% of the flow at the 50<sup>th</sup> percentile (median flow)





# Peach Creek Wastewater Treatment Facility Summary

- 9 permitted facilities
- Total current flow 0.9 MGD (1.3 cfs)
- Total Permitted flow 2.7 MGD (4.3 cfs)
- WWTP flows account for 10% of the stream flow at the 99<sup>th</sup> percentile regime (low flow), 3% of the flow at the 50<sup>th</sup> percentile (median flow)



# Caney Creek Wastewater Treatment Facility Summary

- 18 permitted facilities
- Total current flow 1.8 MGD (2.8 cfs)
- Total Permitted flow 4.7 MGD (7.3 cfs)
- WWTP flows account for 16% of the stream flow at the 99<sup>th</sup> percentile regime (low flow), 5% of the flow at the 50<sup>th</sup> percentile (median flow)



# Runoff Sources

- Urban areas have human, pet, and wildlife waste sources
- Rural areas may have livestock waste sources
- Natural areas have wildlife waste sources
- Larger loads often associated with urban areas because there is more runoff from storms
- Septic Systems

# TCEQ Website for Project Information



<http://www.tceq.state.tx.us/implementation/water/tmdl/82-lakehouston.html>



