

# SAN BERNARD RIVER WATER QUALITY MODEL UPDATE

**CDM**

August 18, 2011

# Agenda

- Model Set-up
  - Watershed model
    - Watershed delineations
    - Generate model input files & establish coefficients
  - Receiving Water model
    - Establish boundary conditions
    - Segmentation – based on tidal conditions and stream volumes
    - Develop model and establish coefficients
- Data gathering
- Next Steps

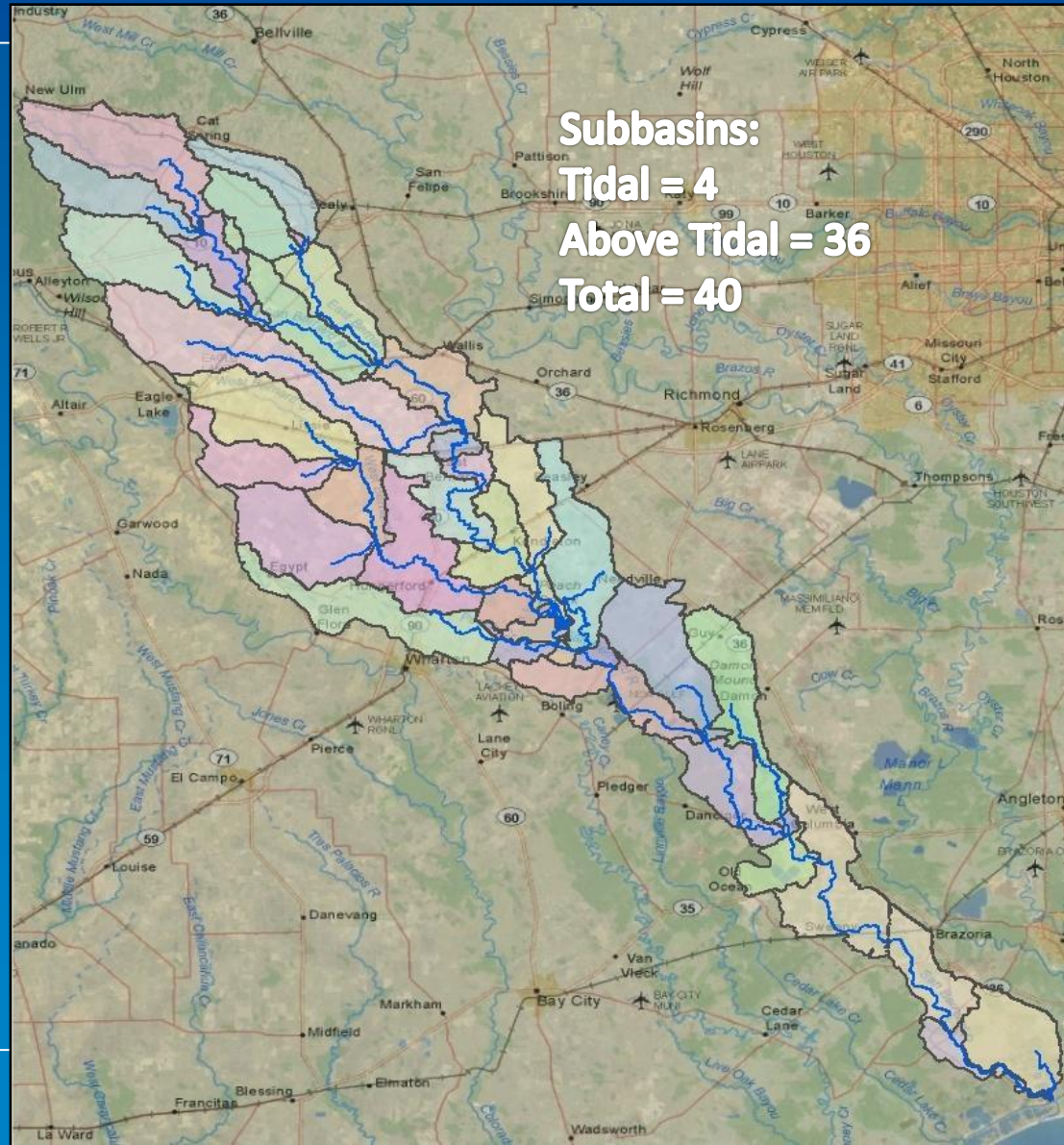
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# Watershed delineation: input data

- Necessary to delineate watersheds to take into account:
  - Calibration stations
  - Point sources
  - Tidal boundary
  - Tributary confluence with main stem of river
  - Predominant watershed characteristics
- Data sources
  - Digital Elevation Model (DEM)
  - Stream Network Shapefile
  - Land Use/Land Cover Data Layer
  - Soil Data Layer

# Delineated subbasins



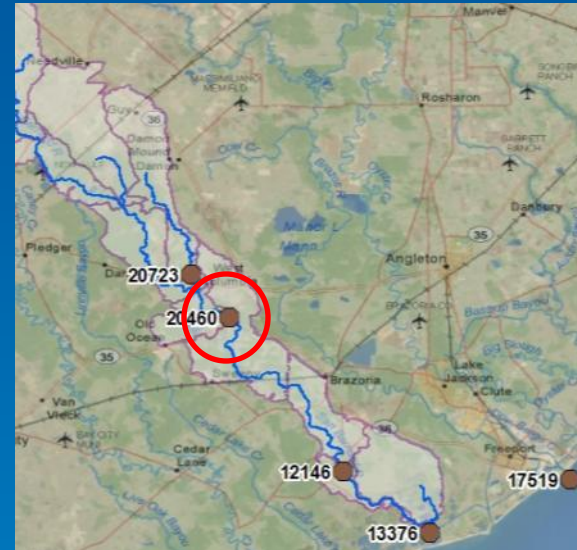
# Watershed Model – Generate model input files

- Input files are being developed
- Model input file requires:
  - Land use/land cover information
  - Watershed practices
  - Soils information
  - Information about bacteria sources in the watershed to establish land practices and model coefficients

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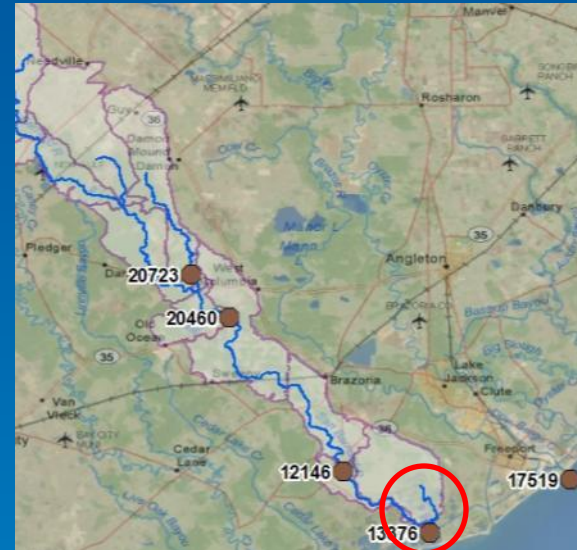
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# Tidal Prism Boundary Conditions



Upper boundary established at State Highway 35 salt water barrier dam

# Tidal Prism Boundary Conditions



Lower boundary established at upstream side of intercoastal water way

# Receiving Water Model – Develop model

- Model being developed
- Model requires:
  - Stream invert elevations
  - Input from upstream and watershed runoff from watershed model
  - Information about in-stream bacteria sources to establish loading and model coefficients

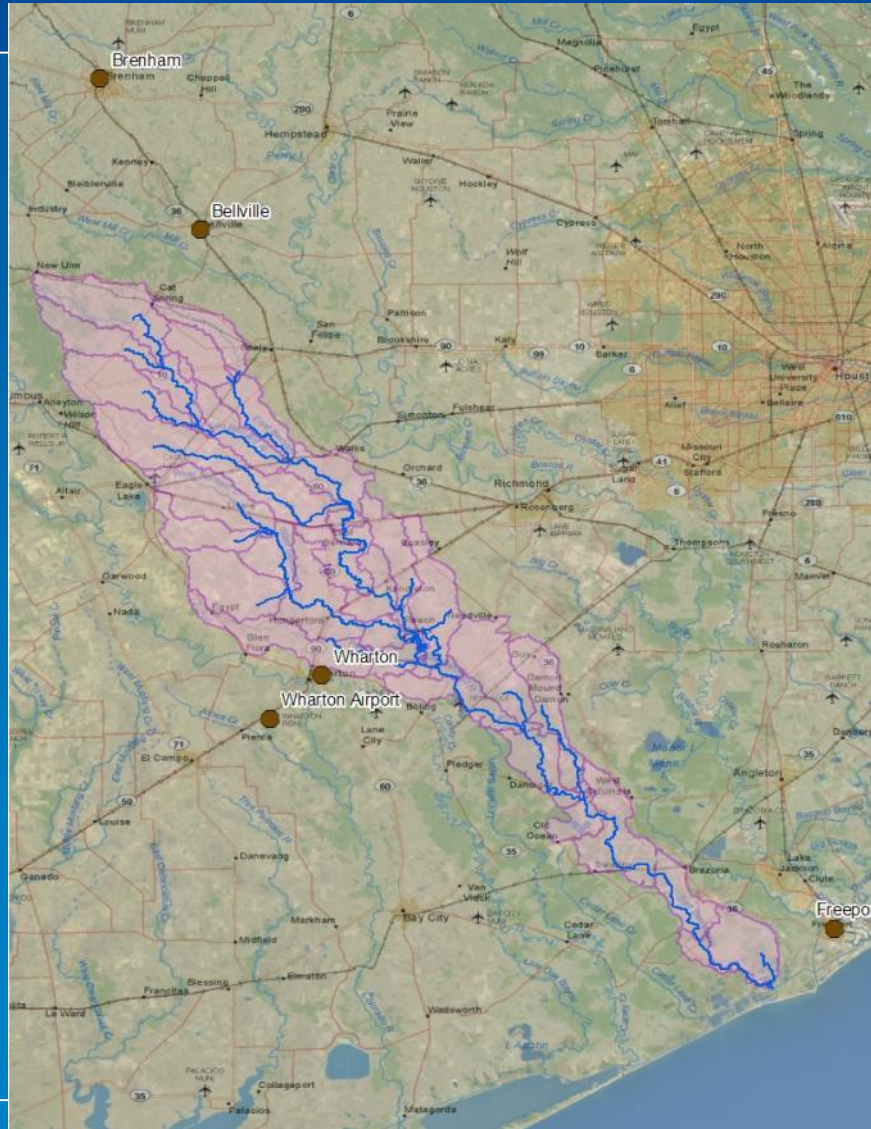
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# Data Gathering

- Weather data
  - Rainfall
  - Temperature
  - Solar radiation
  - Relative Humidity
  - Wind speed
- Water quality data
  - Bacteria
  - Salinity
- Flow data

# Precipitation Stations

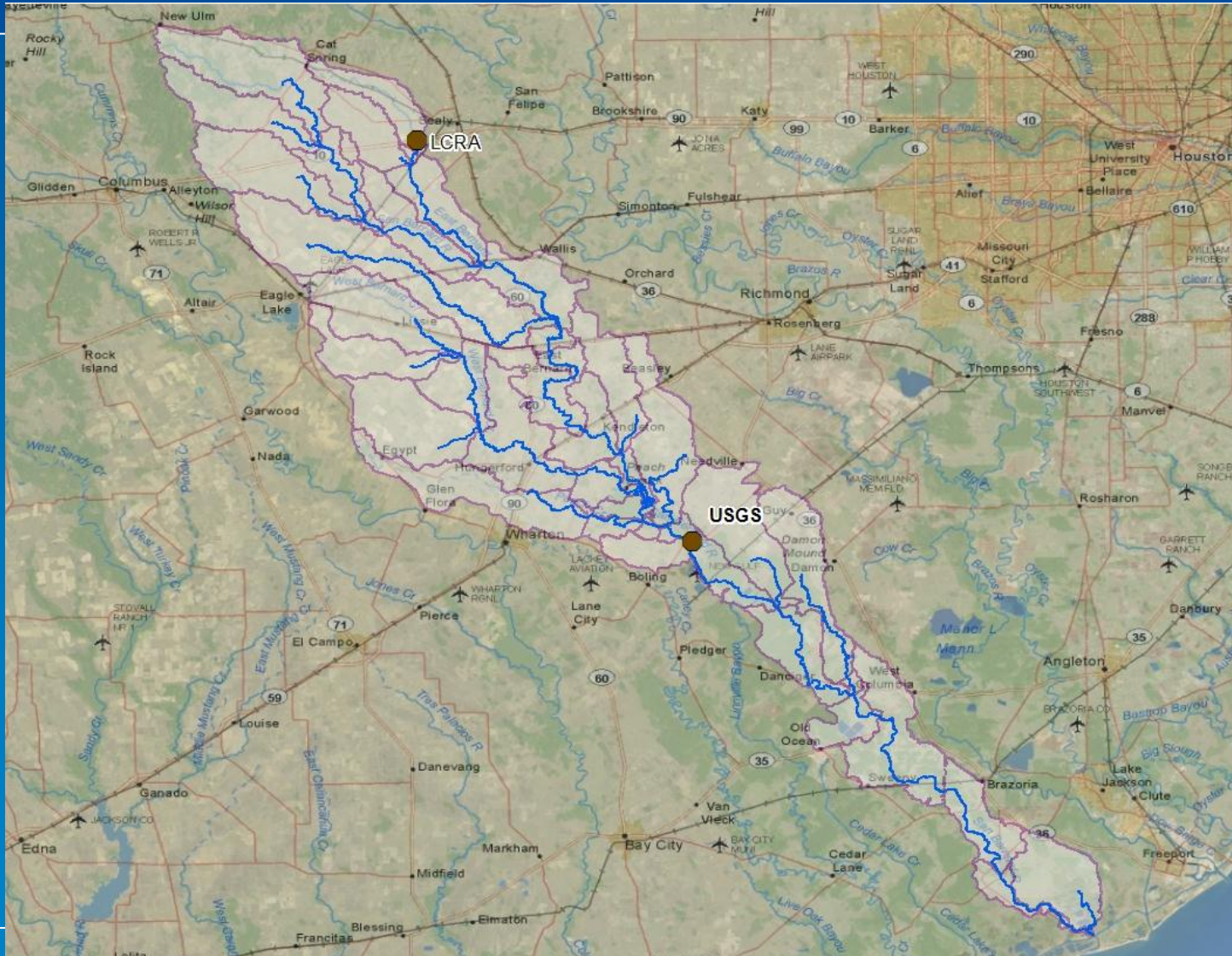


# Overall Simulation and Calibration/Validation Period Selection – Rainfall Data

Stations ID	# Records	Period of Record
Bellville	1189	Jan. 2000 - June 2011
Freeport	1086	Jan. 2000 - June 2011
Wharton	1548	Jan. 2000 - June 2011
Brenham	818	June 2000 - July 2011
LCRA	1026	Jan. 2000 - May 2011

- Rainfall and weather data available from January 2000 through May 2011

# Calibration Stations - Flow

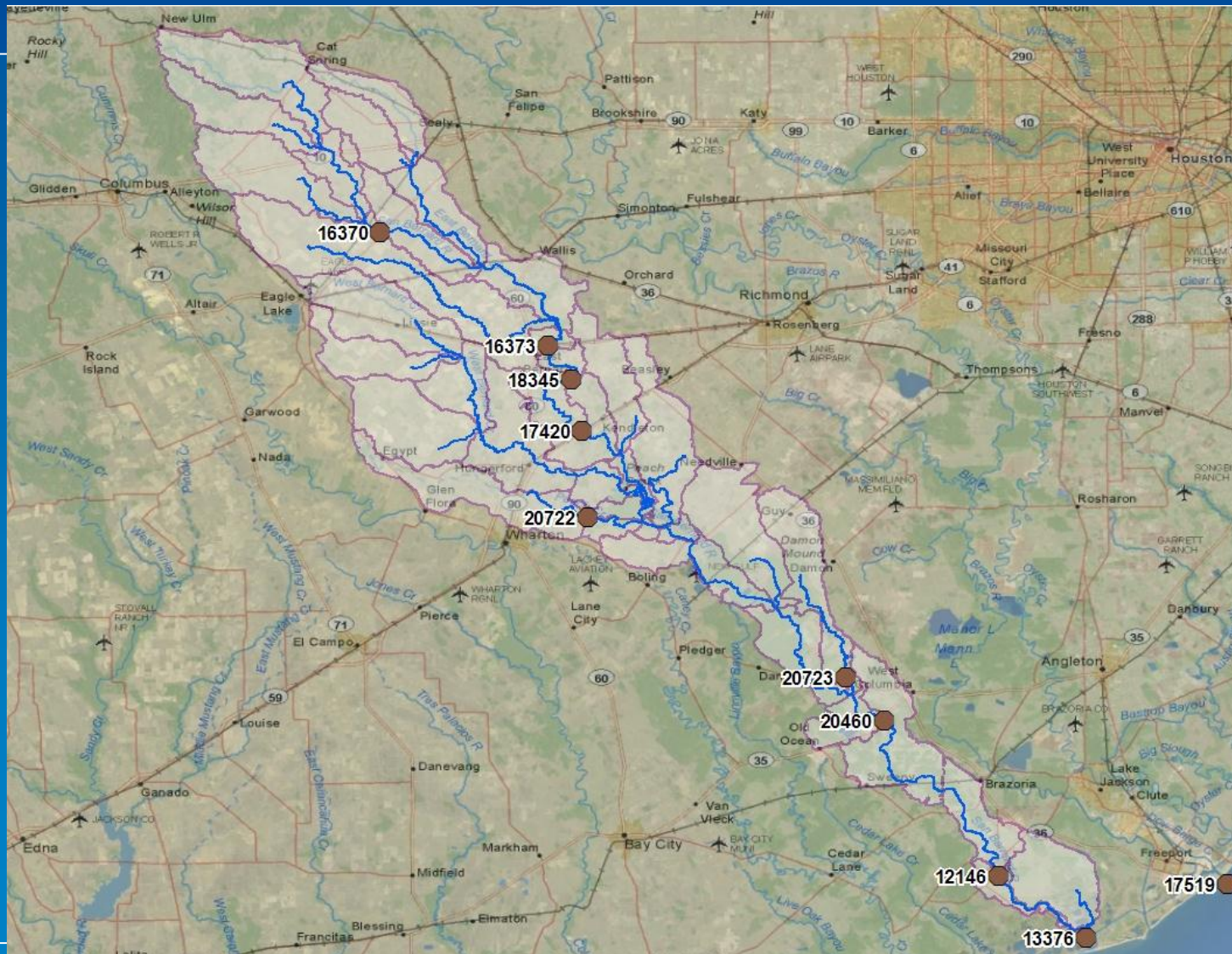


# Calibration and Validation Period Selection

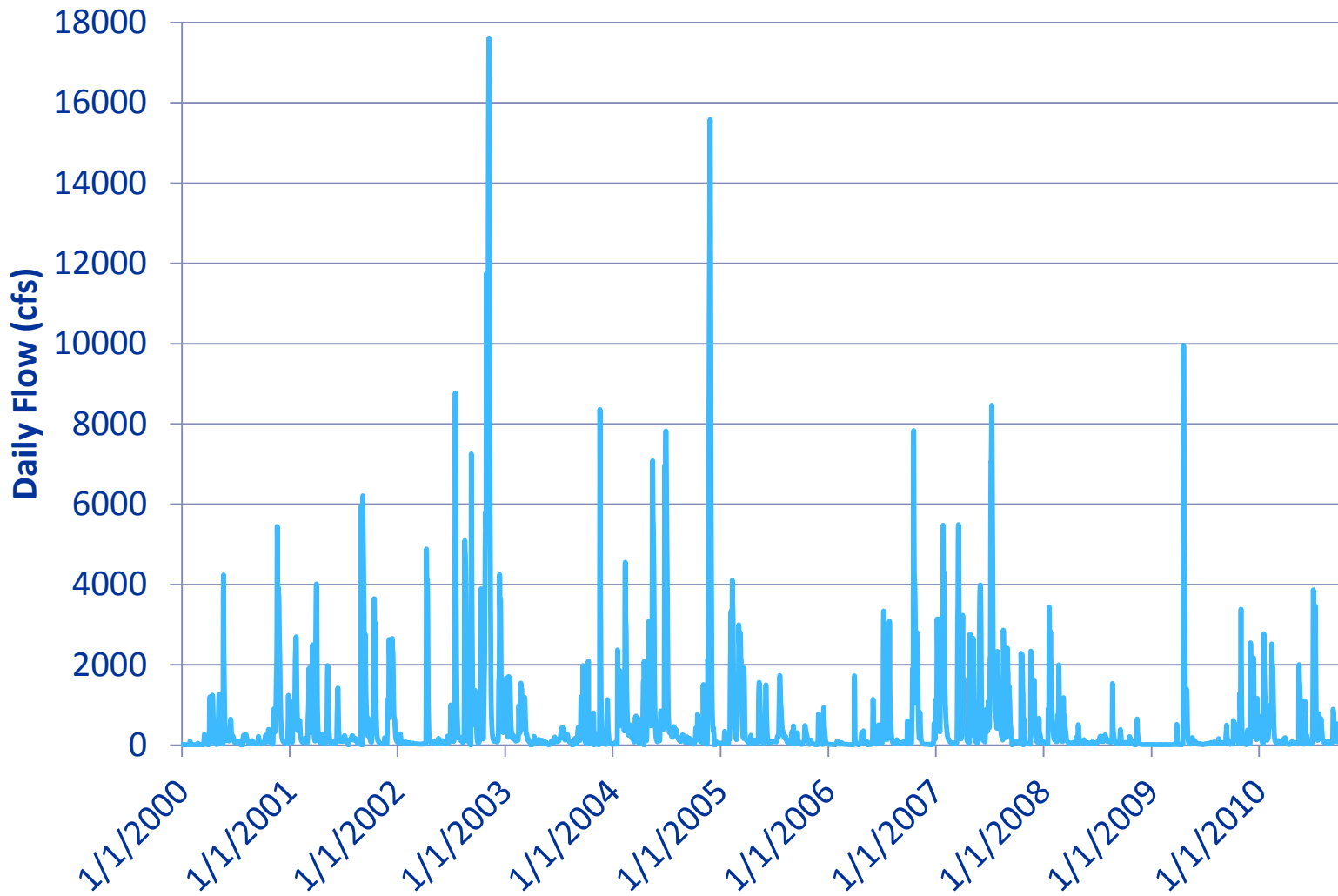
Stations ID	# Records	Period of Record
USGS	3891	Jan. 2000 - Sept. 2010
LCRA	4141	Jan. 2000 - May 2011

- Flow data available through January 2000 through September 2010

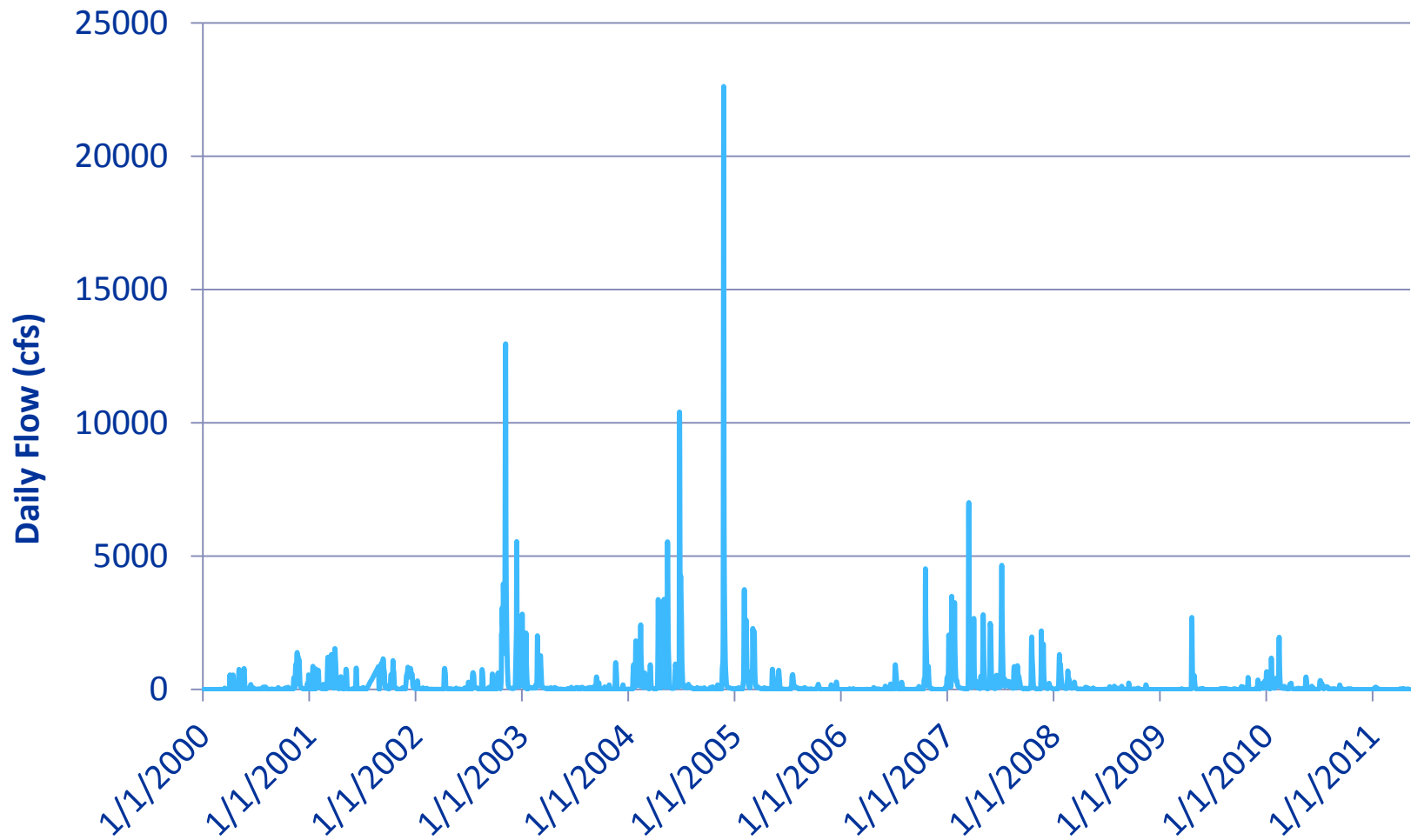
# Calibration Stations – Water quality



# USGS Daily Flow Data



# LCRA Daily Flow Data

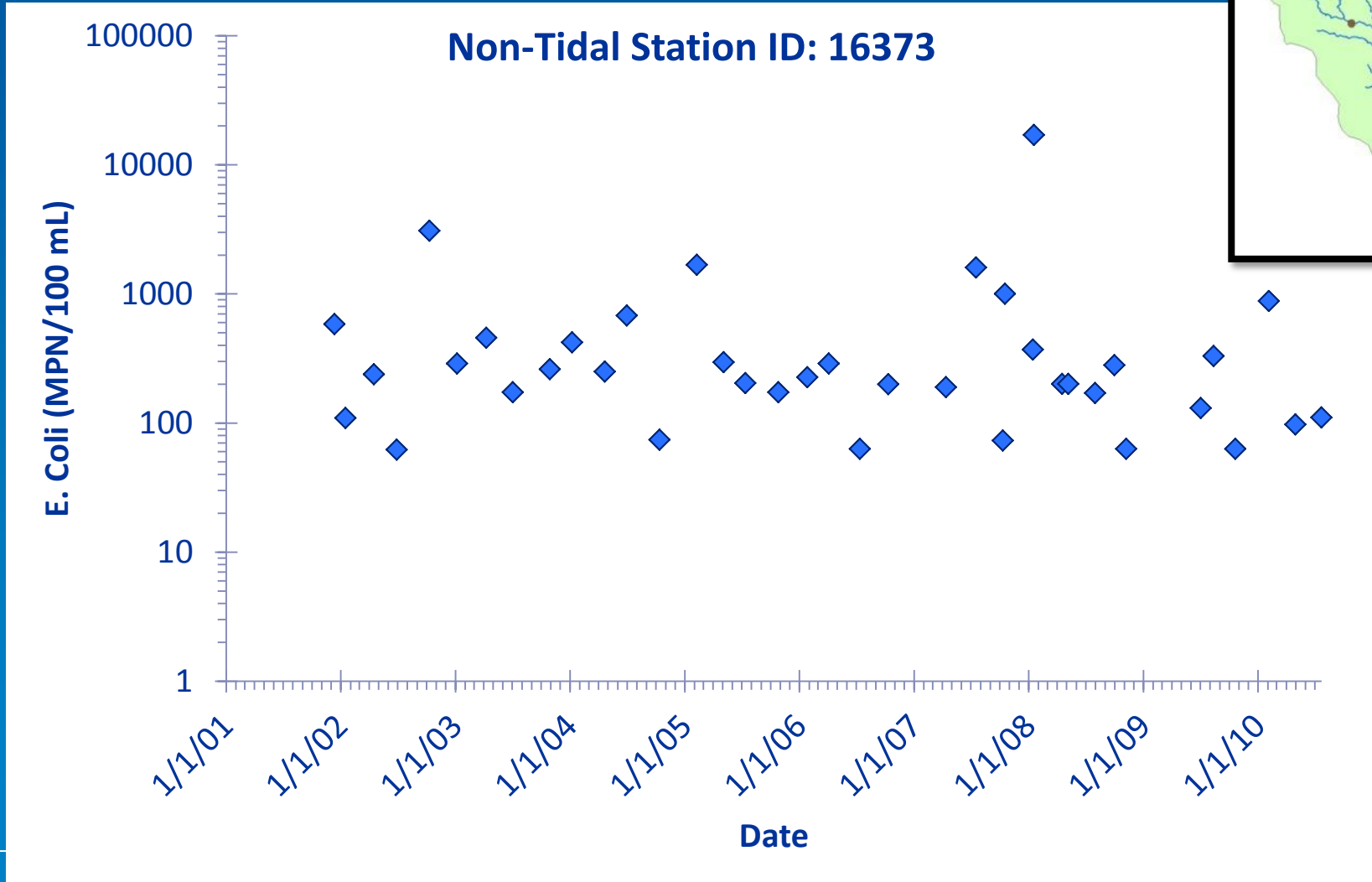
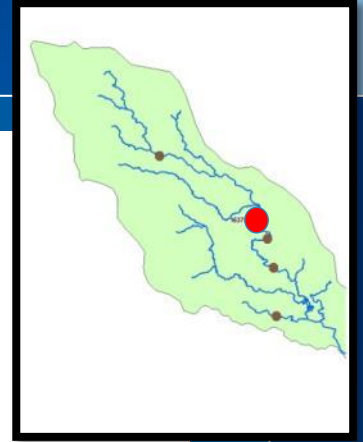


# Overall Simulation and Calibration/Validation Period Selection – Water Quality Data

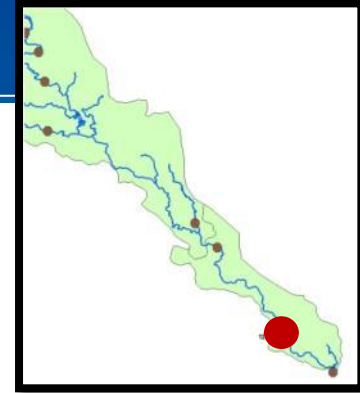
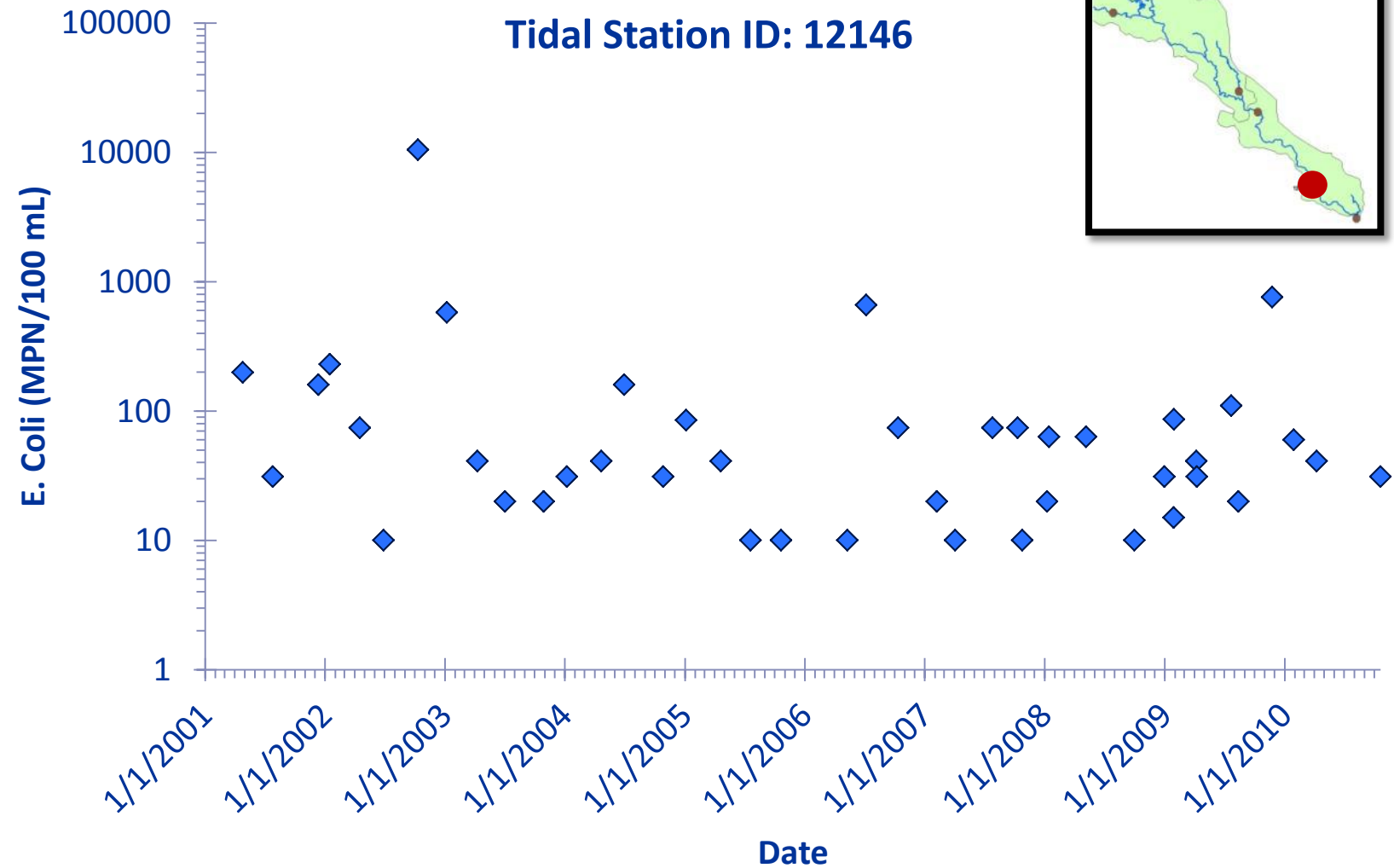
Stations ID	# Records	Period of Record
17519	10	Oct. 2001 - March 2004
12147	92	Jan. 2001 - Oct. 2010
15272	12	Jan. 2001 - Aug. 2002
16370	24	Oct. 2007 - Aug. 2010
16373	76	Dec. 2001 - July 2010
17420	13	Jan. 2001 - Aug. 2002
20722	8	Feb. 2010 - Aug. 2010
20723	4	Feb. 2010 - Aug. 2010
12146	84	April 2001 - Oct. 2010
20460	26	Oct. 2007 - Oct. 2010

- Majority of bacteria data available from January 2001 through July 2010

# *E. coli* vs. Time, Upper Region Station



# Enterococci vs. Time, Lower Region Station



# Calibration and Validation Period

- Selection criteria:
  - Majority of data are available January 2001 through July 2010
  - Flow data available beginning in January 2000
- Model simulation period:
  - January 1<sup>st</sup>, 2000 to September 30<sup>th</sup>, 2010
- Calibration Period:
  - January 1<sup>st</sup>, 2001 to December 31<sup>st</sup>, 2003
- Validation Period:
  - January 1<sup>st</sup>, 2006 to December 31<sup>st</sup>, 2009

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# Next steps

- Watershed model
  - Complete model set-up
  - Calibrate/validate
  - BMP evaluation
- Tidal prism
  - Complete model development
  - Calibrate/validate
  - Test BMP evaluation scenarios from the watershed model