

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

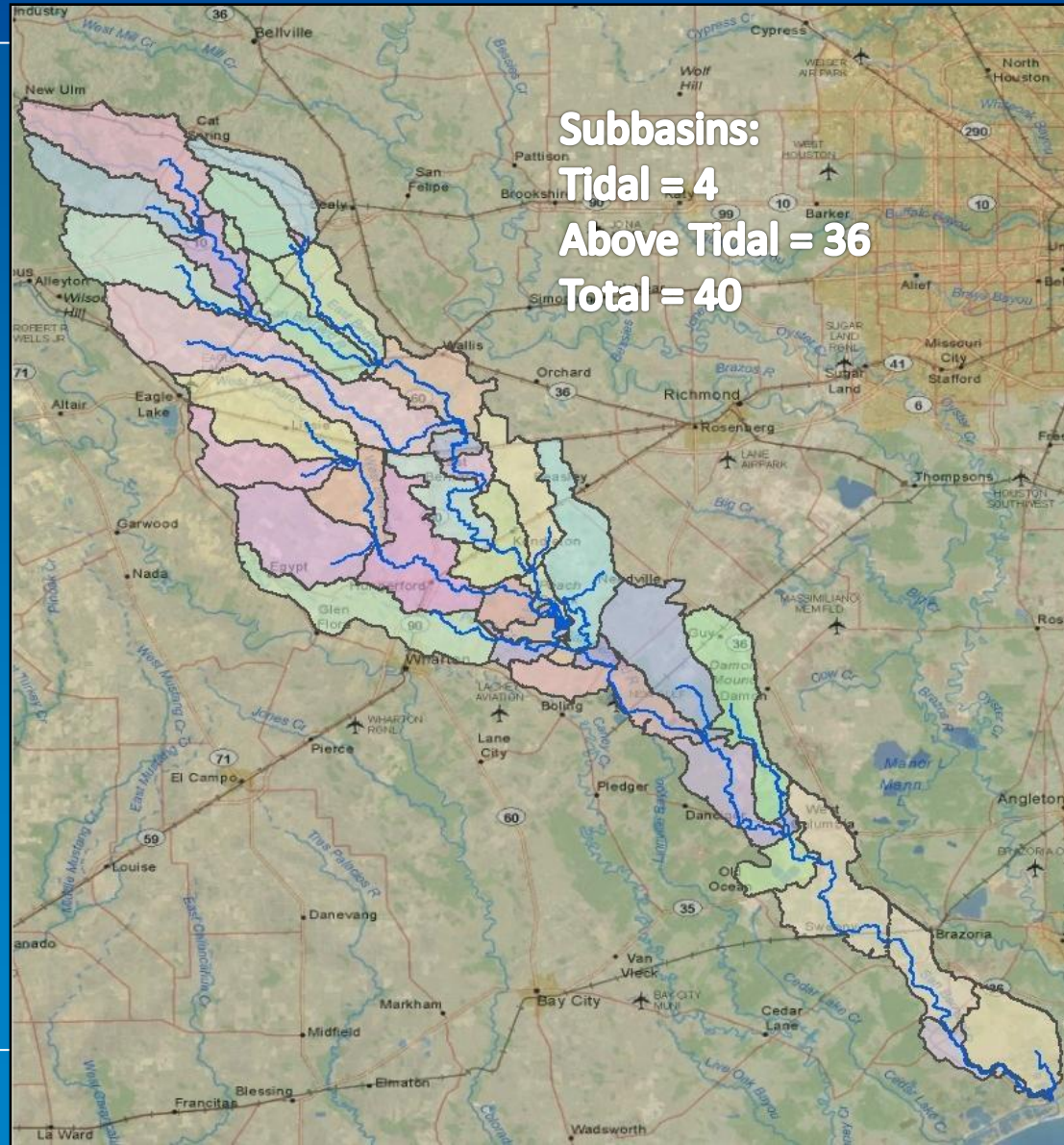
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Watershed delineation: input data

- 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



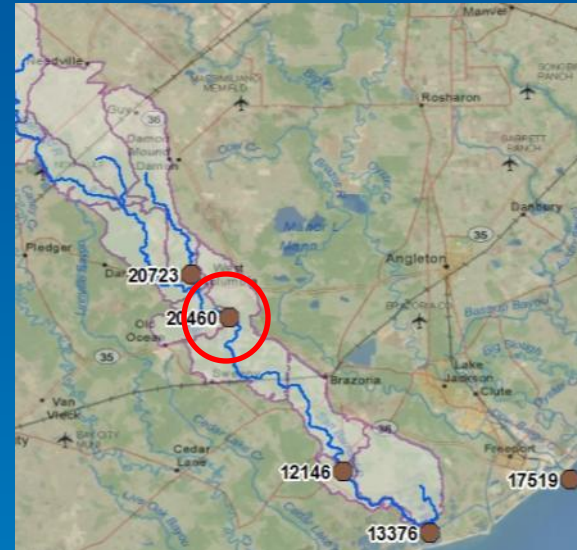
Watershed Model – Generate model input files

- 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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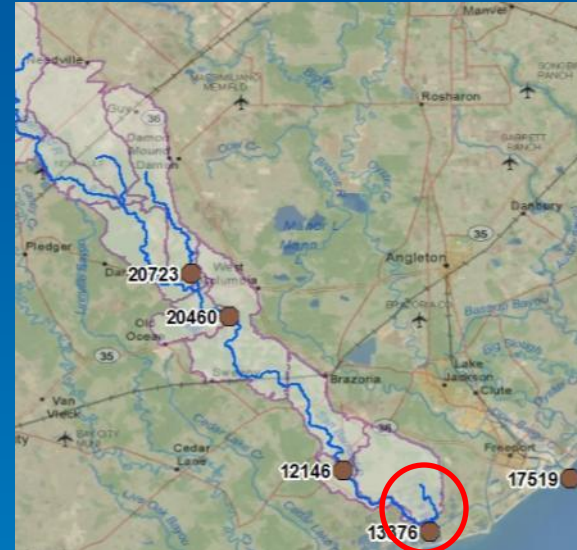
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Tidal Prism Boundary Conditions



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

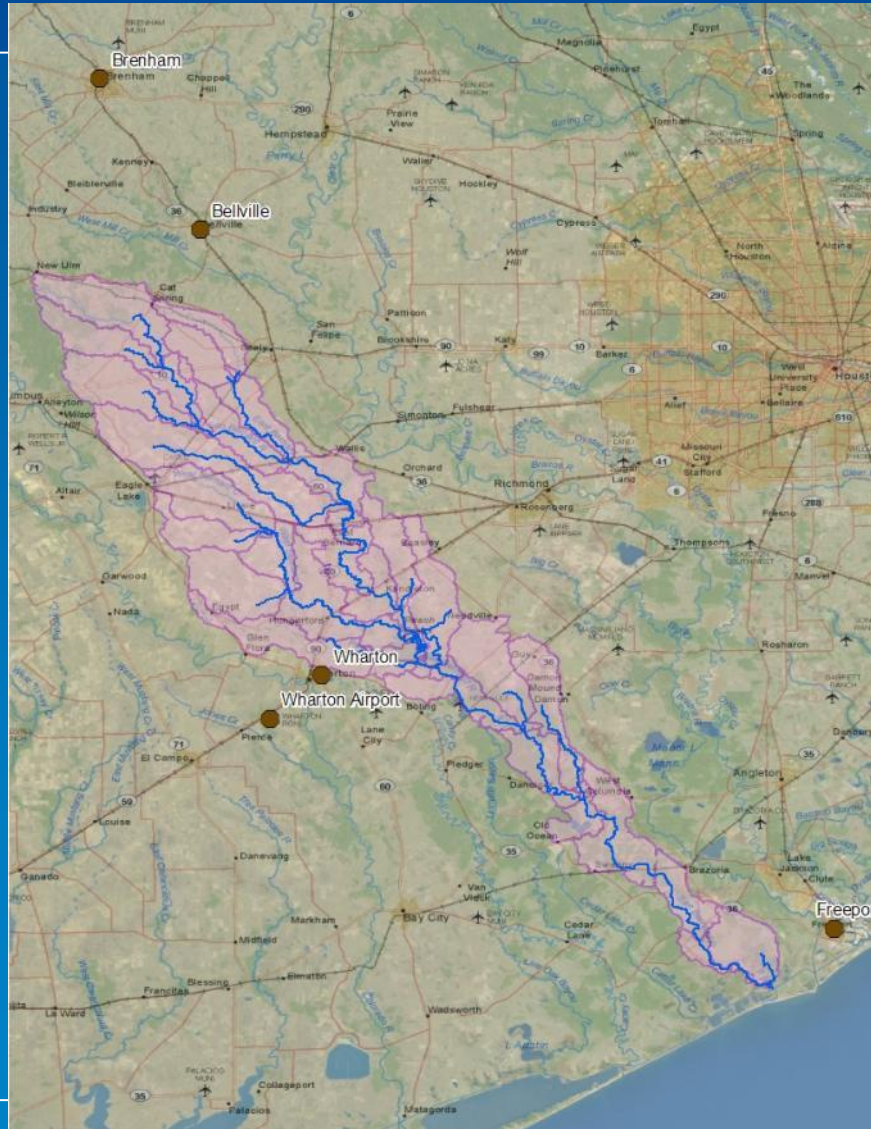
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Data Gathering

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

Precipitation Stations

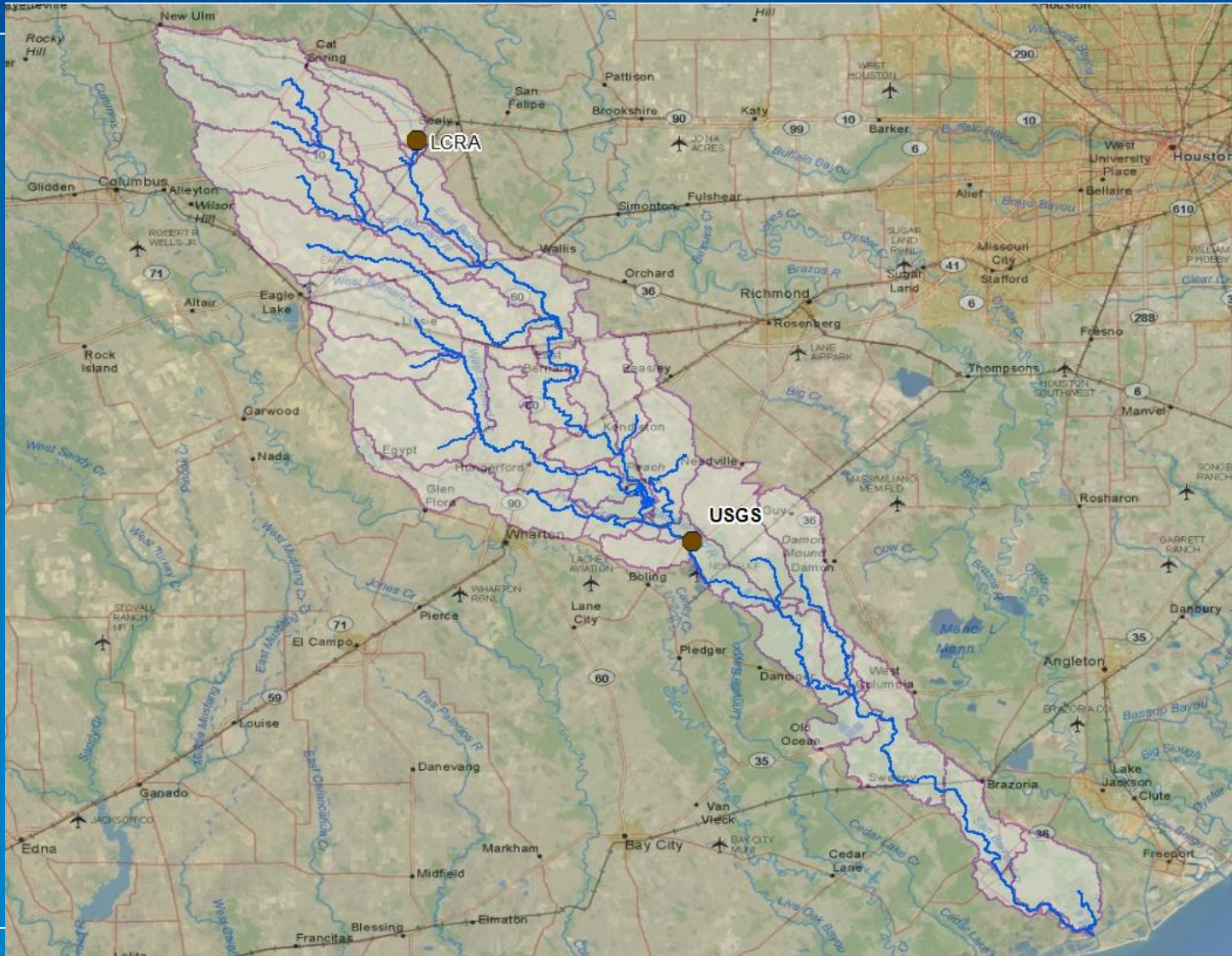


Overall Simulation and Calibration/Validation Period Selection – Rainfall Data

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

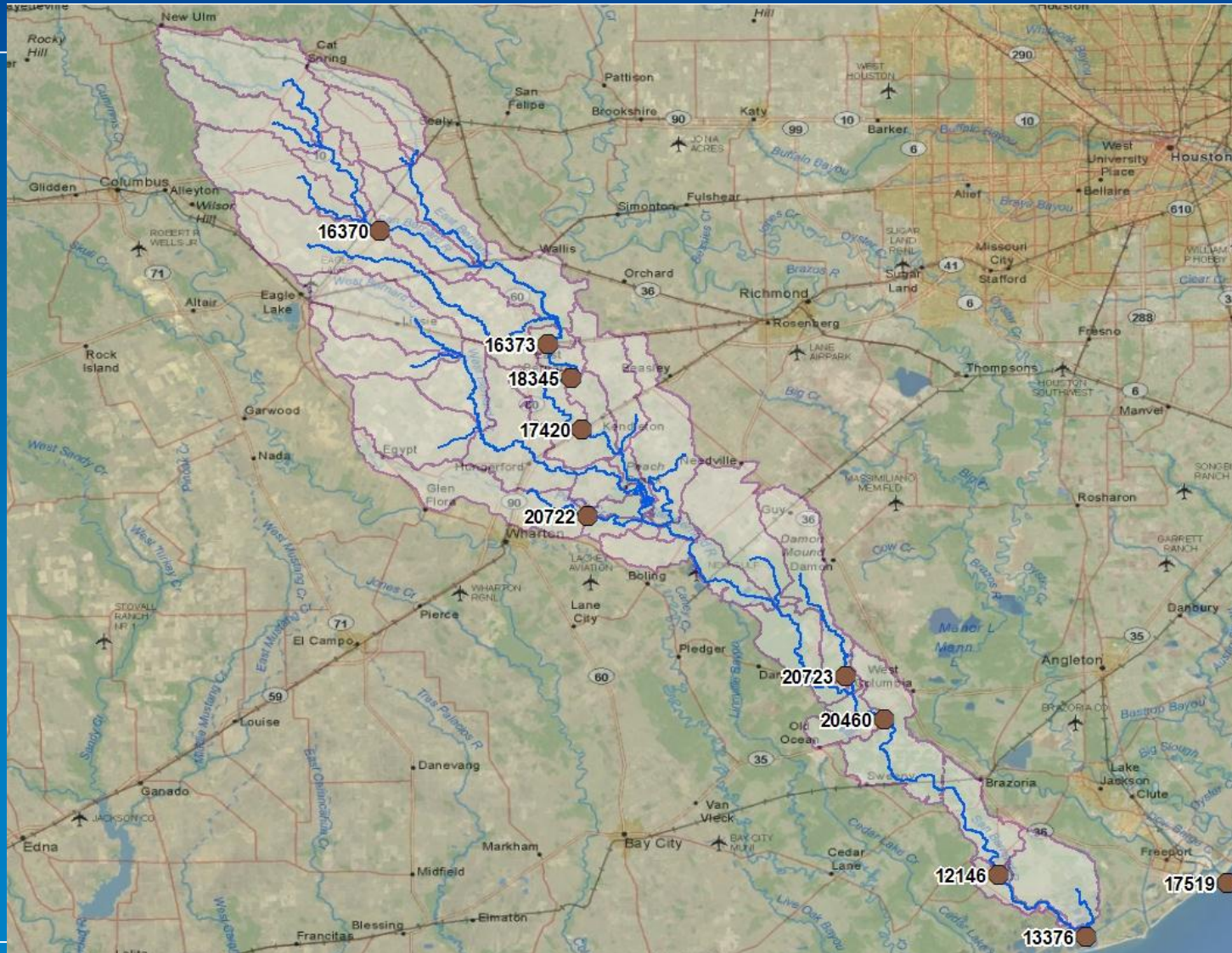


Calibration and Validation Period Selection

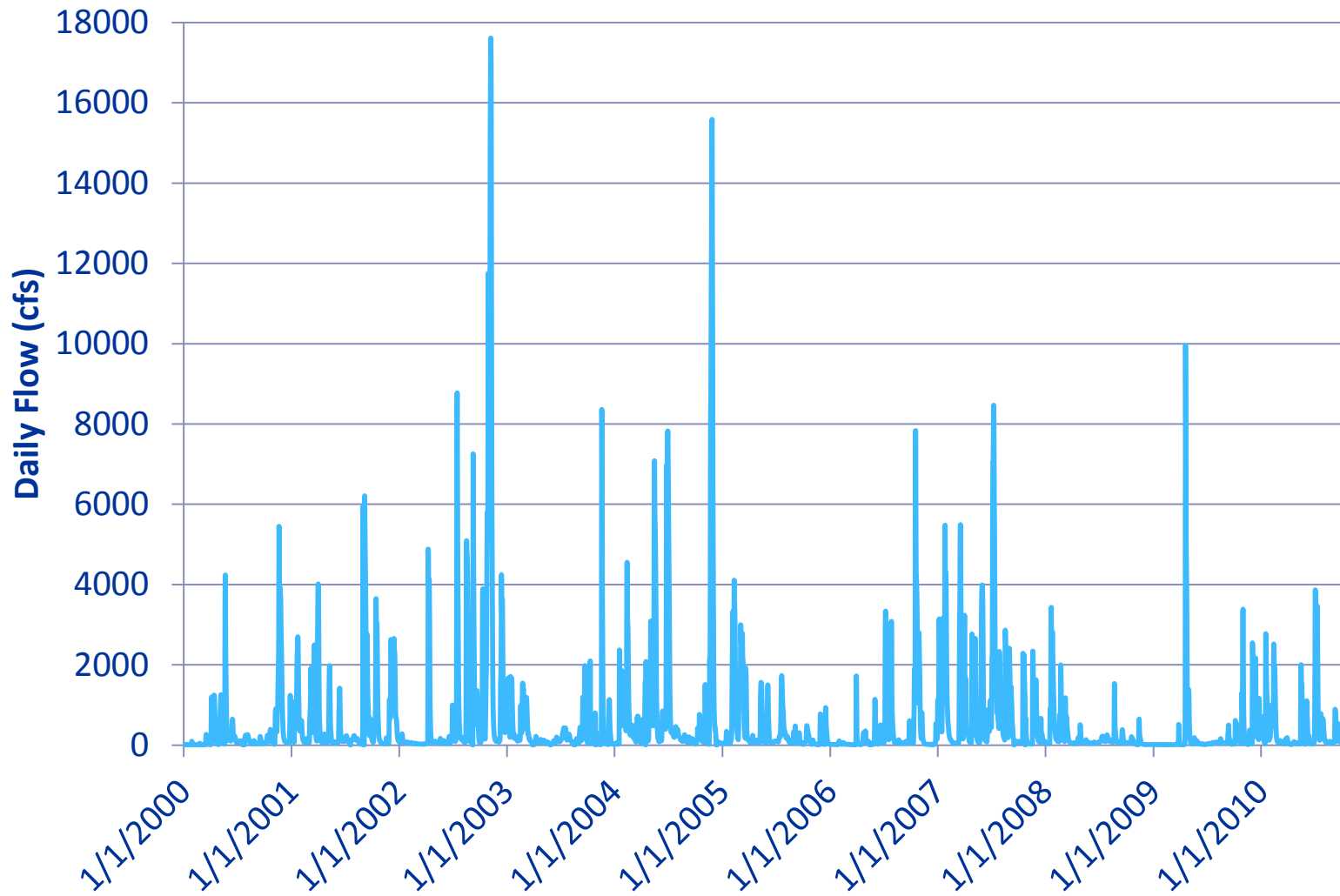
Stations ID	# Records	Period of Record
USGS	3891	Jan. 2000 - Sept. 2010
LCRA	4141	Jan. 2000 - May 2011

- Flow data available through January 2000 through September 2010

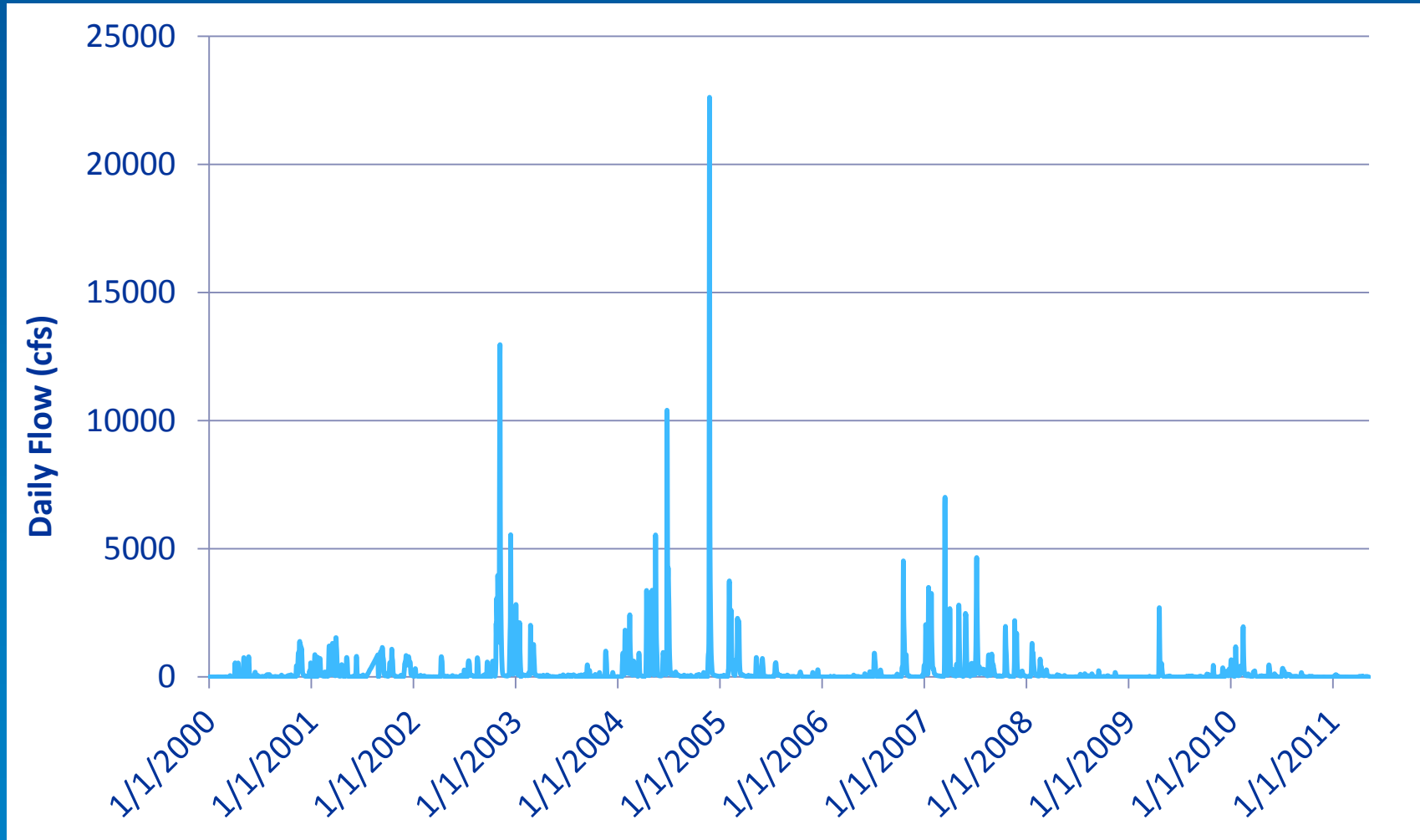
Calibration Stations – Water quality



USGS Daily Flow Data



LCRA Daily Flow Data

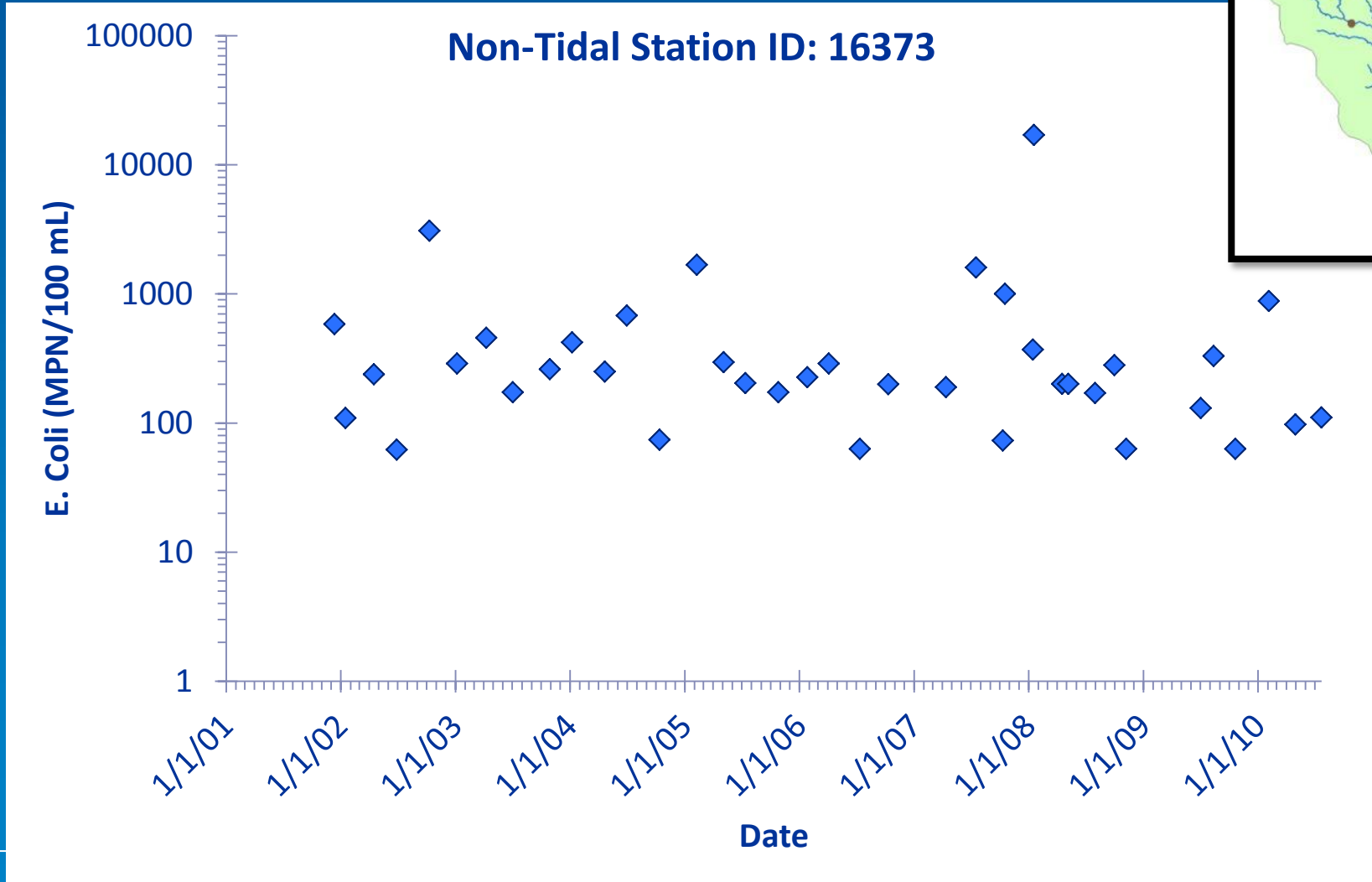


Overall Simulation and Calibration/Validation Period Selection – Water Quality Data

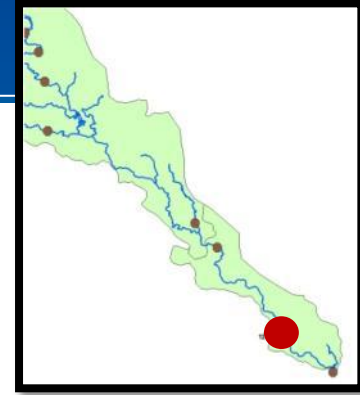
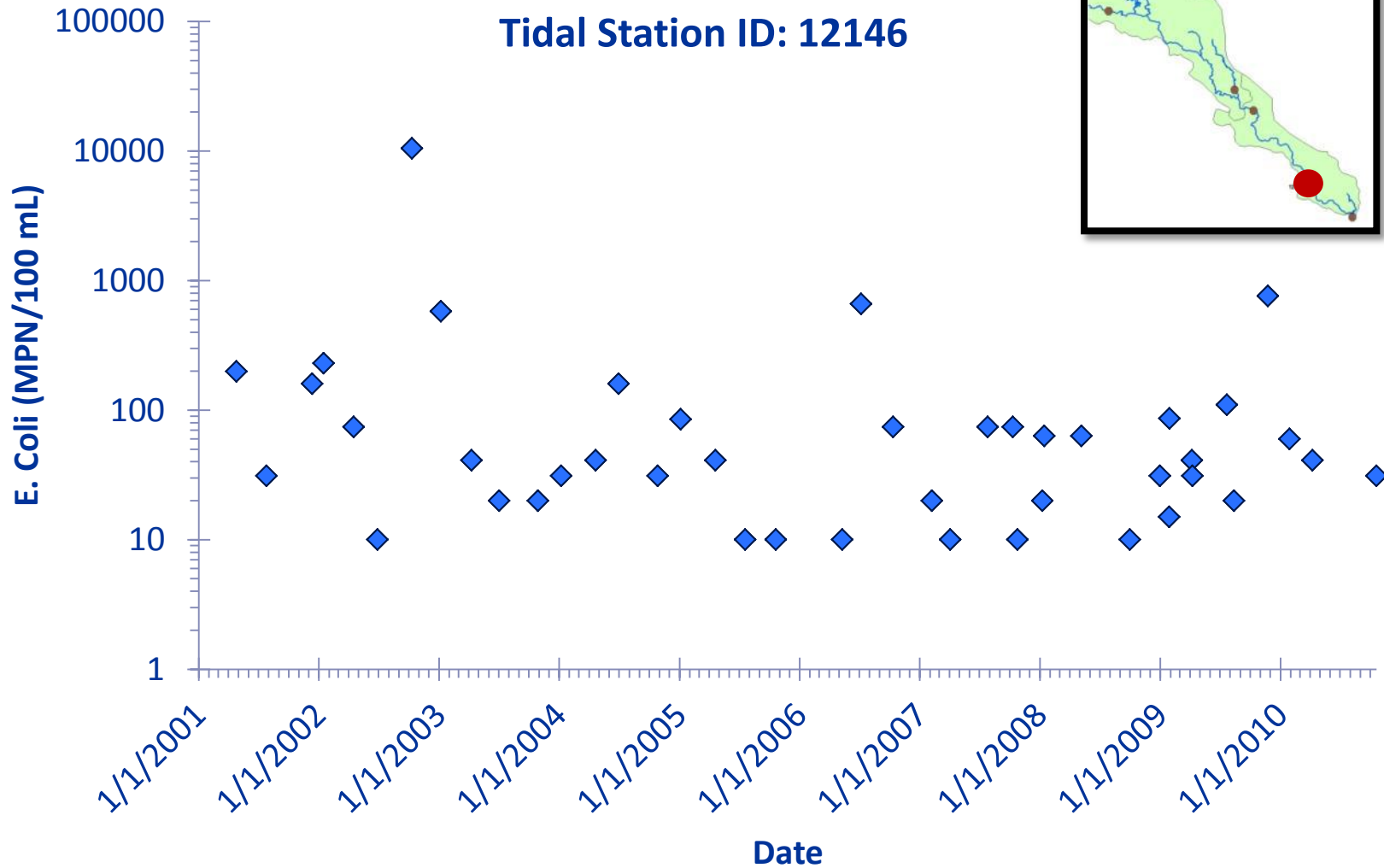
Stations ID	# Records	Period of Record
17519	10	Oct. 2001 - March 2004
12147	92	Jan. 2001 - Oct. 2010
15272	12	Jan. 2001 - Aug. 2002
16370	24	Oct. 2007 - Aug. 2010
16373	76	Dec. 2001 - July 2010
17420	13	Jan. 2001 - Aug. 2002
20722	8	Feb. 2010 - Aug. 2010
20723	4	Feb. 2010 - Aug. 2010
12146	84	April 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 1st, 2000 to September 30th, 2010
- Calibration Period:
 - January 1st, 2001 to December 31st, 2003
- Validation Period:
 - January 1st, 2006 to December 31st, 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