# IPET
# Interior Modeling

## Report 2

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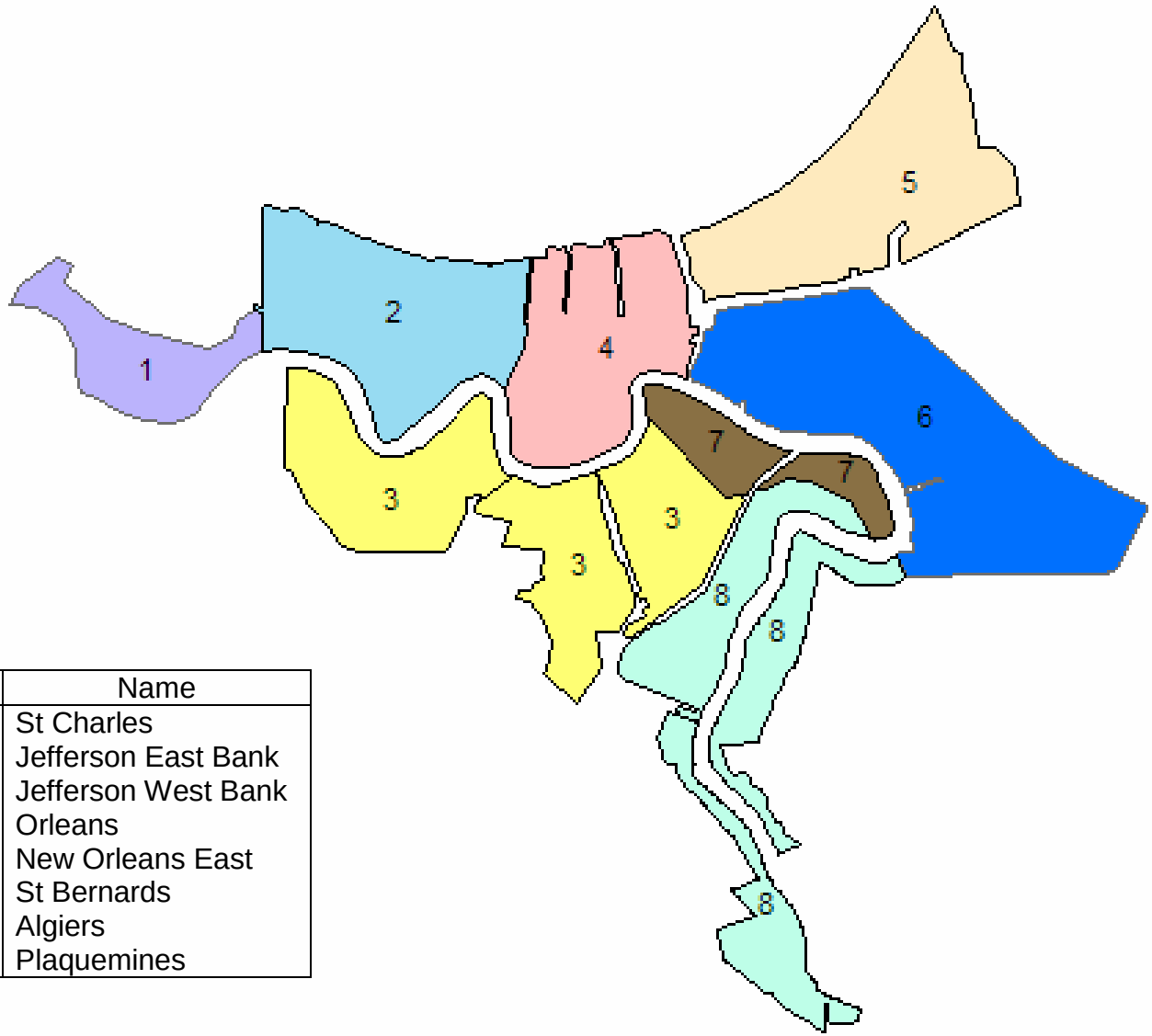
Harris County Flood Control District

# Model Areas




| Area | Name |
|---|---|
| 1 | St Charles |
| 2 | Jefferson East Bank |
| 3 | Jefferson West Bank |
| 4 | Orleans |
| 5 | New Orleans East |
| 6 | St Bernards |
| 7 | Algiers |
| 8 | Plaquemines |

# Modeling Assignment

| Leveed Area | Priority | Team | |
|---|---|---|---|
| | | RAS | HMS |
| Jefferson East Bank | 1 | CTE | CTE |
| Jefferson West Bank | 2 | CTE | CTE |
| Orleans East Bank | 1 | MVK | MVK |
| New Orleans East | 1 | MVN | MVN |
| Orleans West Bank | 2 | MVN | MVN |
| St. Bernard | 1 | MVN | HEC |
| St Charles East Bank | 3 | MVN | HEC |
| Plaquemines | 1 | HEC | HEC |

CTE – CTE Consultants, Chicago, IL
MVK – Corps of Engineers, Vicksburg District
MVN – Corps of Engineers, New Orleans District
HEC – Corps of Engineers, Hydrologic Engineering Center, Davis, CA

# Modeling Status

| Leveed Area | Priority | Est. % Complete | |
|---|---|---|---|
| | | RAS | HMS |
| Jefferson East Bank | 1 | 60 | 75 |
| Jefferson West Bank | 2 | 50 | 75 |
| Orleans East Bank | 1 | 70 | 50 |
| New Orleans East | 1 | 50 | 35 |
| Orleans West Bank | 2 | 15 | 15 |
| St. Bernard | 1 | 75 | 33 |
| St Charles East Bank | 3 | 15 | 15 |
| Plaquemines | 1 | 70 | 70 |

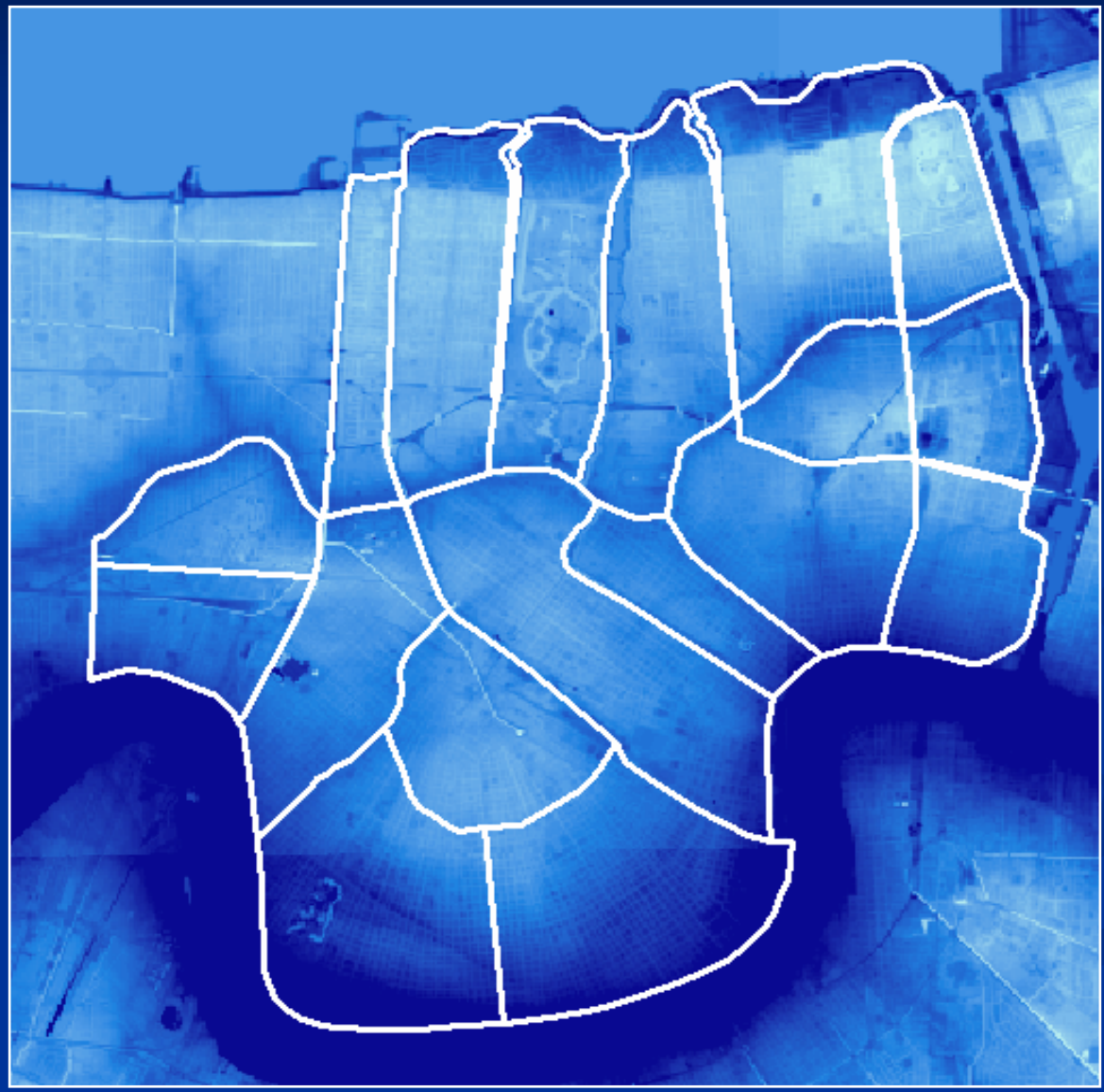
# RAS Models

- Terrain
  - Vertical - 5M Lidar NAVD88
    - All Models
    - Jefferson Parish updated (Cairo)
  - Horizontal – State Plane LA South 1983 feet
    - Georeferenced

# RAS Models

- Storage Areas
  - HEC-GeoRAS
  - Elevation-Volume data from terrain
  - Connections profile from terrain
    - Geographic Features
      - Roads
      - Railroad Embankments
      - Terrain

# Orleans RAS Model Storage Areas



# RAS Models

- Geometric Data
  - Cross-Sections
    - Canals
    - Storm Drains
  - Surveys
    - Received New
    - Some Outstanding (Maybe)
  - Existing Data

# RAS Models

- Storm Drains
  - Lidded Cross-Sections
  - Priessmann Slot option
    - Open Channel mimic pressure flow
  - Based on Drainage System Map
  - Connected to surface through lateral connections
  - Backflow

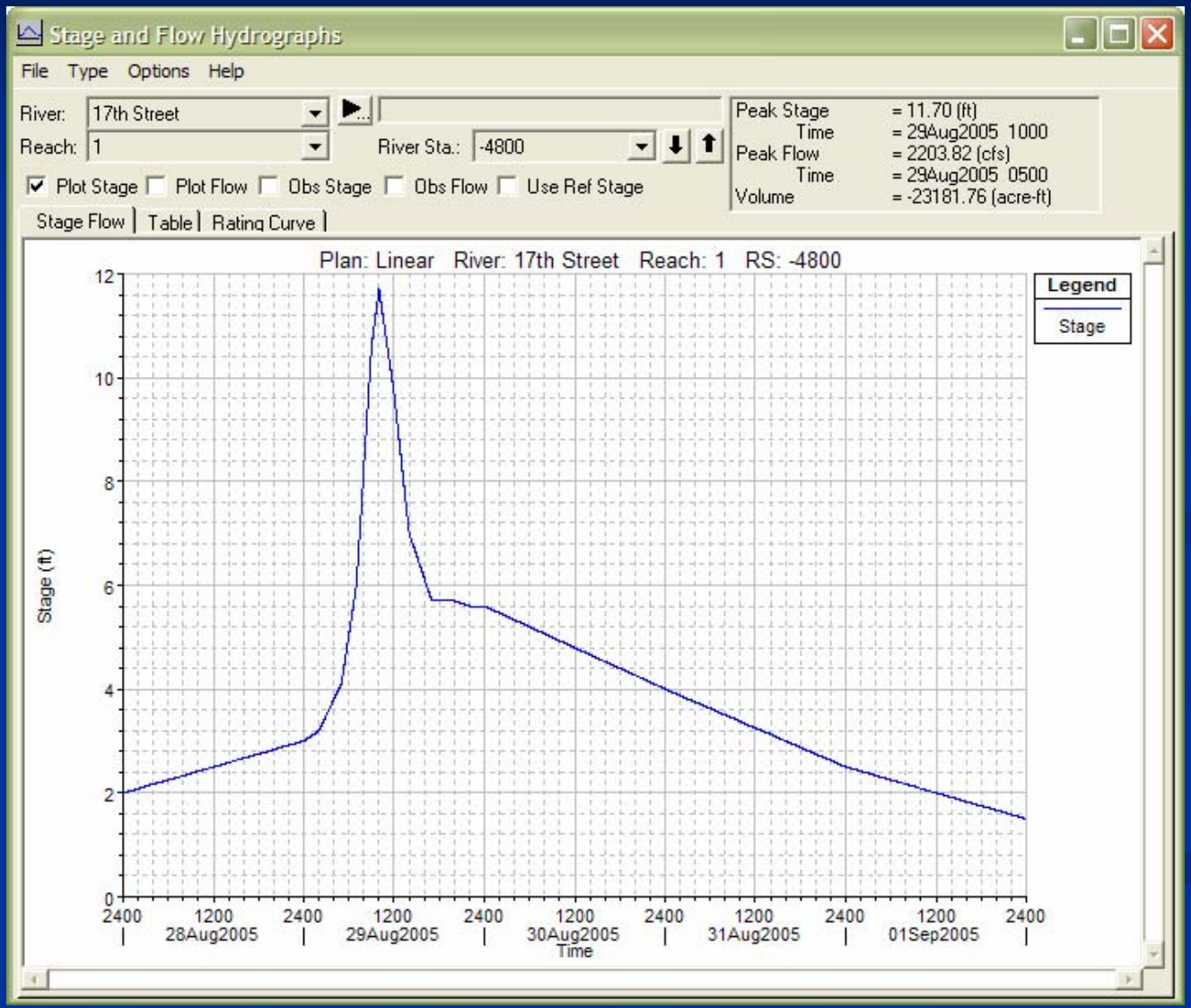
# RAS Models

- Pump Stations
  - All stations
  - Data from Pump task
  - On-Off elevations
  - Multiple pumps per station
  - Override rules
  - Backflow

# RAS Models

- Boundary Conditions
  - Storm drain and channel baseflow
  - Storage Areas dry
  - ADCIRC Results

# RAS Models


Stage and Flow Hydrographs
File Type Options Help
River: 17th Street
Reach: 1
River Sta.: -4800
Plot Stage Plot Flow Obs Stage Obs Flow Use Ref Stage
Peak Stage = 11.70 (ft)
Time = 29Aug2005 1000
Peak Flow = 2203.82 (cfs)
Time = 29Aug2005 0500
Volume = -23181.76 (acre-ft)
Stage Flow | Table | Rating Curve |
Plan: Linear River: 17th Street Reach: 1 RS: -4800
Legend
Stage
Stage (ft)
0
2
4
6
8
10
12
2400
1200
28Aug2005
29Aug2005
30Aug2005
31Aug2005
01Sep2005
Time

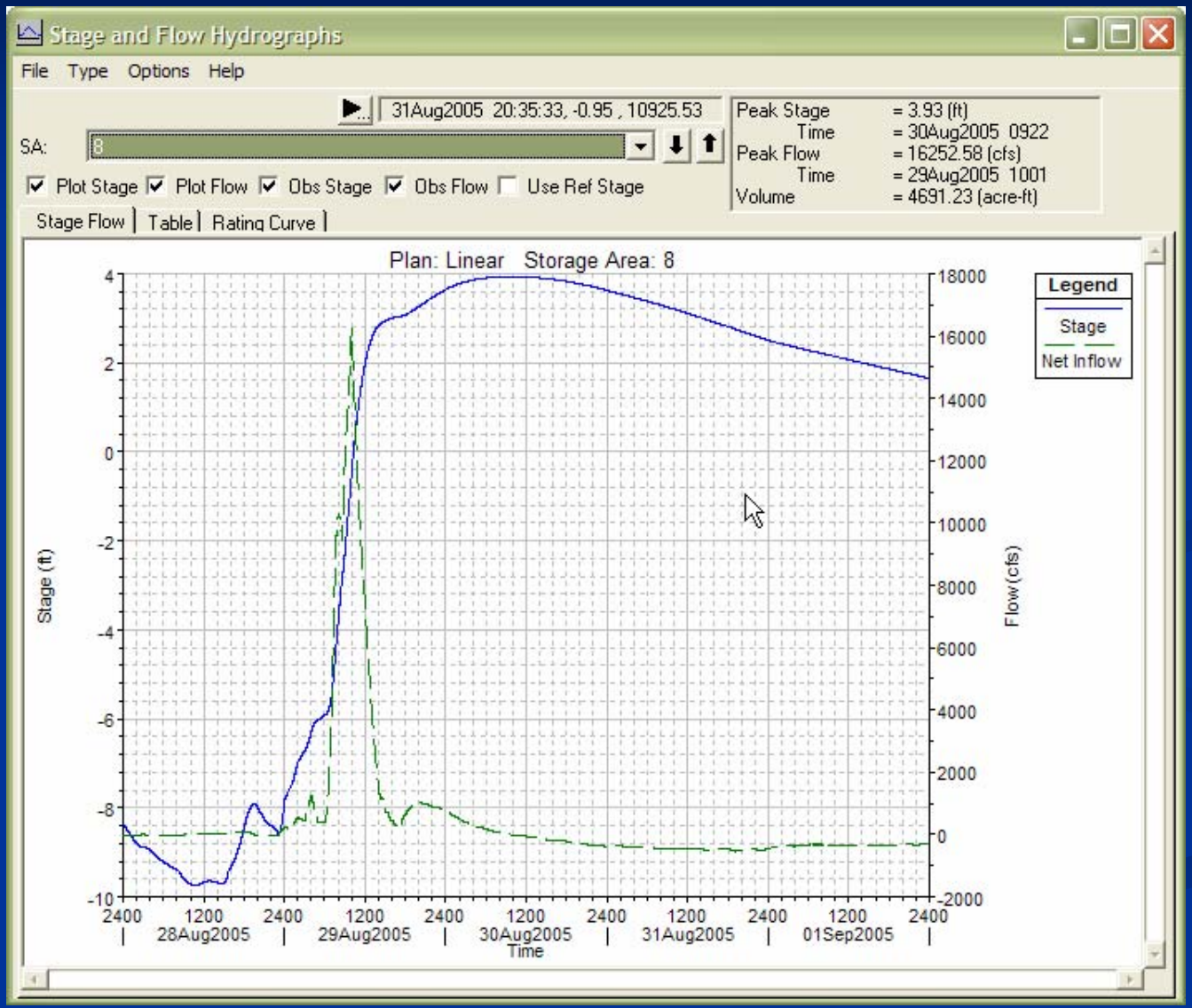
# RAS Models

- Levee Overtopping
  - Lateral Structures
    - Connected to Storage Area
    - Tailwater
    - Weir equation
    - Top of wall/levee from terrain data and surveys

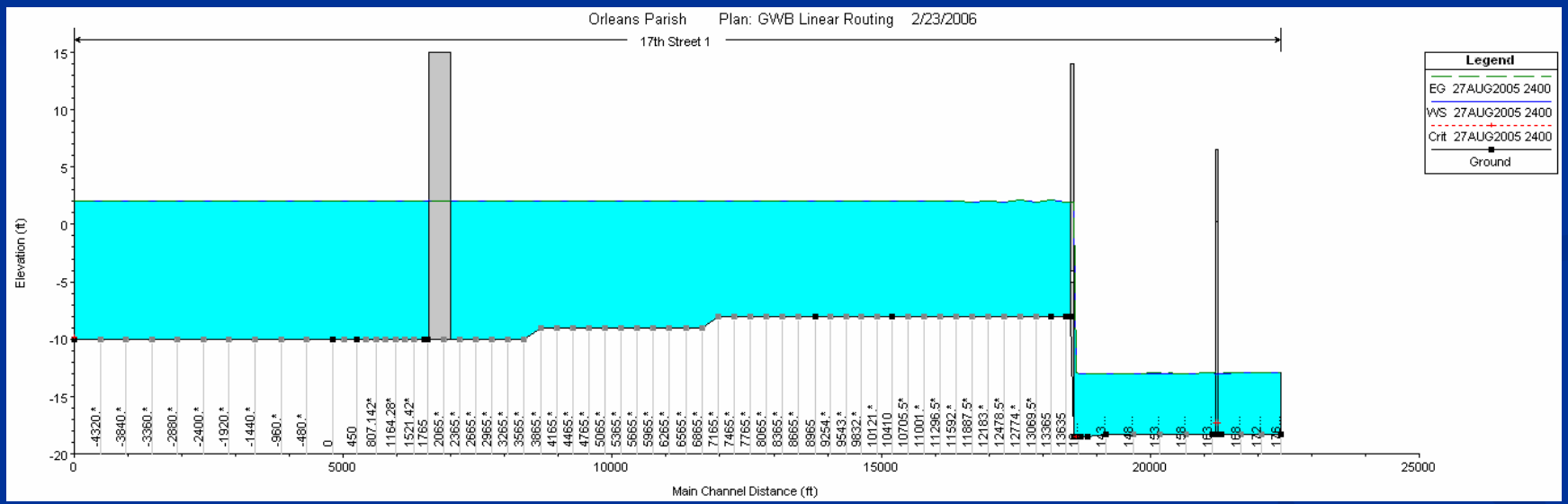
# RAS Models

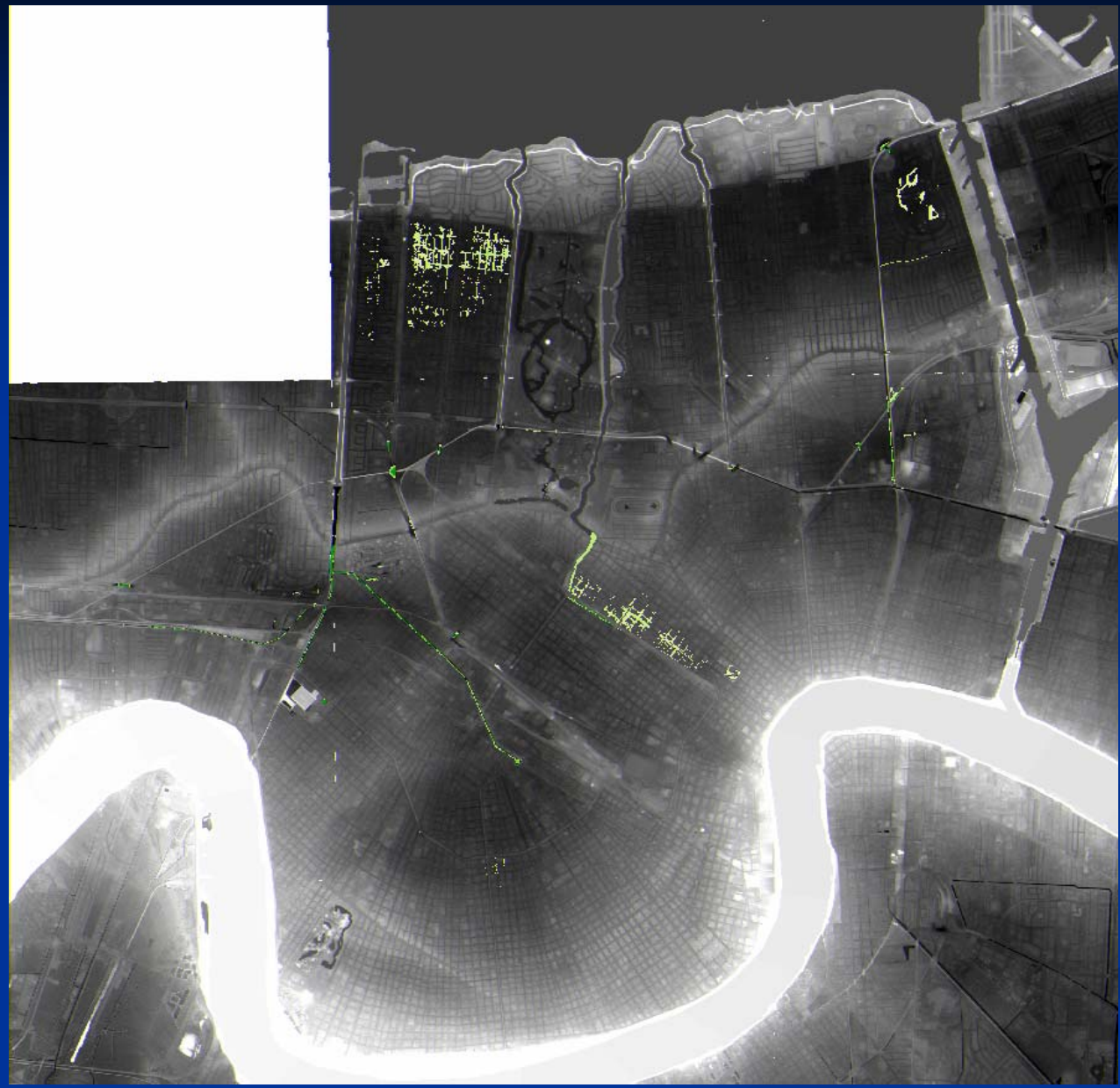
- Levee Failures
  - Lateral Structures
    - Connected to Storage Area
    - Tailwater
    - Define Breach Parameters
    - Based on Time, Elevation, Duration

# RAS Models


Stage and Flow Hydrographs
File Type Options Help
31Aug2005 20:35:33, -0.95 , 10925.53
SA: 8
Plot Stage Plot Flow Obs Stage Obs Flow Use Ref Stage
Peak Stage = 3.93 (ft)
Time = 30Aug2005 0922
Peak Flow = 16252.58 (cfs)
Time = 29Aug2005 1001
Volume = 4691.23 (acre-ft)
Stage Flow | Table | Rating Curve |
Plan: Linear Storage Area: 8
Legend
Stage
Net Inflow
Stage (ft)
Flow (cfs)
Time
28Aug2005
29Aug2005
30Aug2005
31Aug2005
01Sep2005

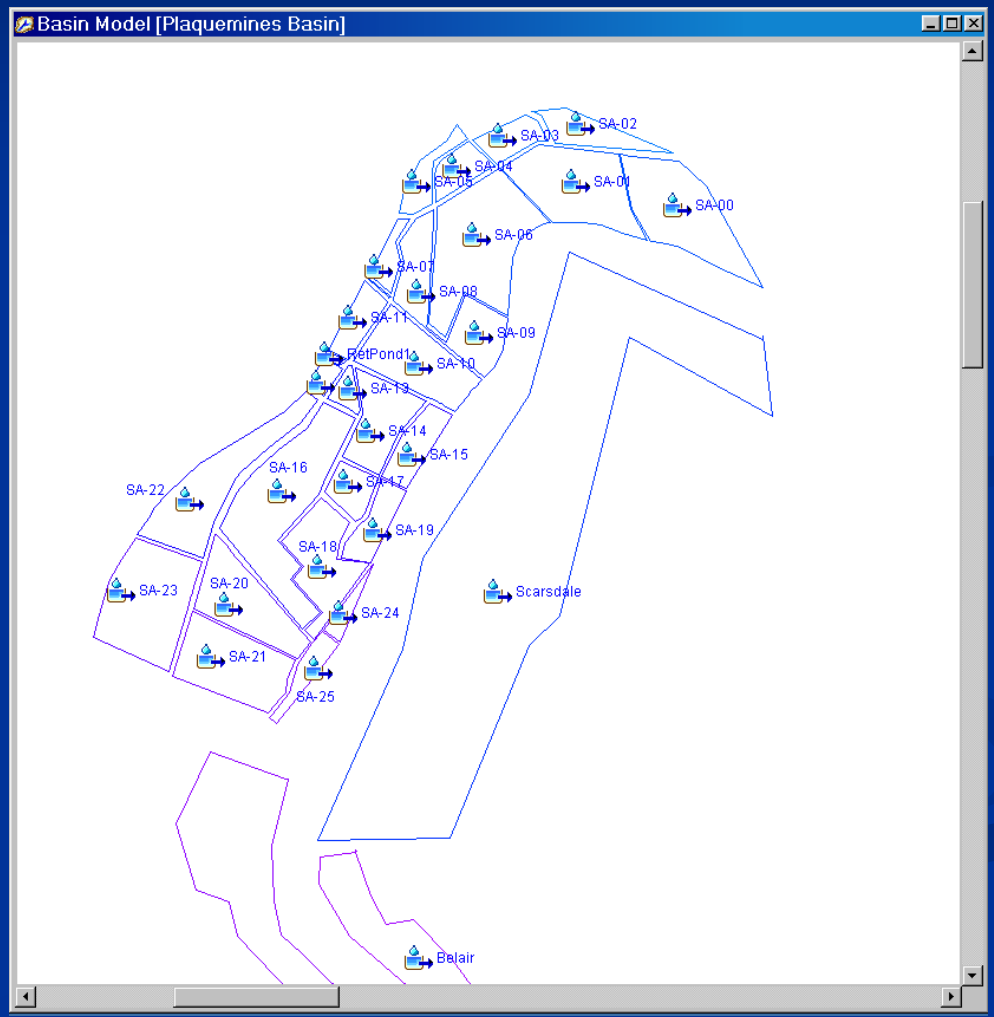
# 17th Street


Orleans Parish
Plan: GWB Linear Routing
2/23/2006
17th Street 1
Legend
EG 27AUG2005 2400
WS 27AUG2005 2400
Crit 27AUG2005 2400
Ground
Elevation (ft)
Main Channel Distance (ft)
15
10
5
0
-5
-10
-15
-20
0
5000
10000
15000
20000
25000



# HMS Models

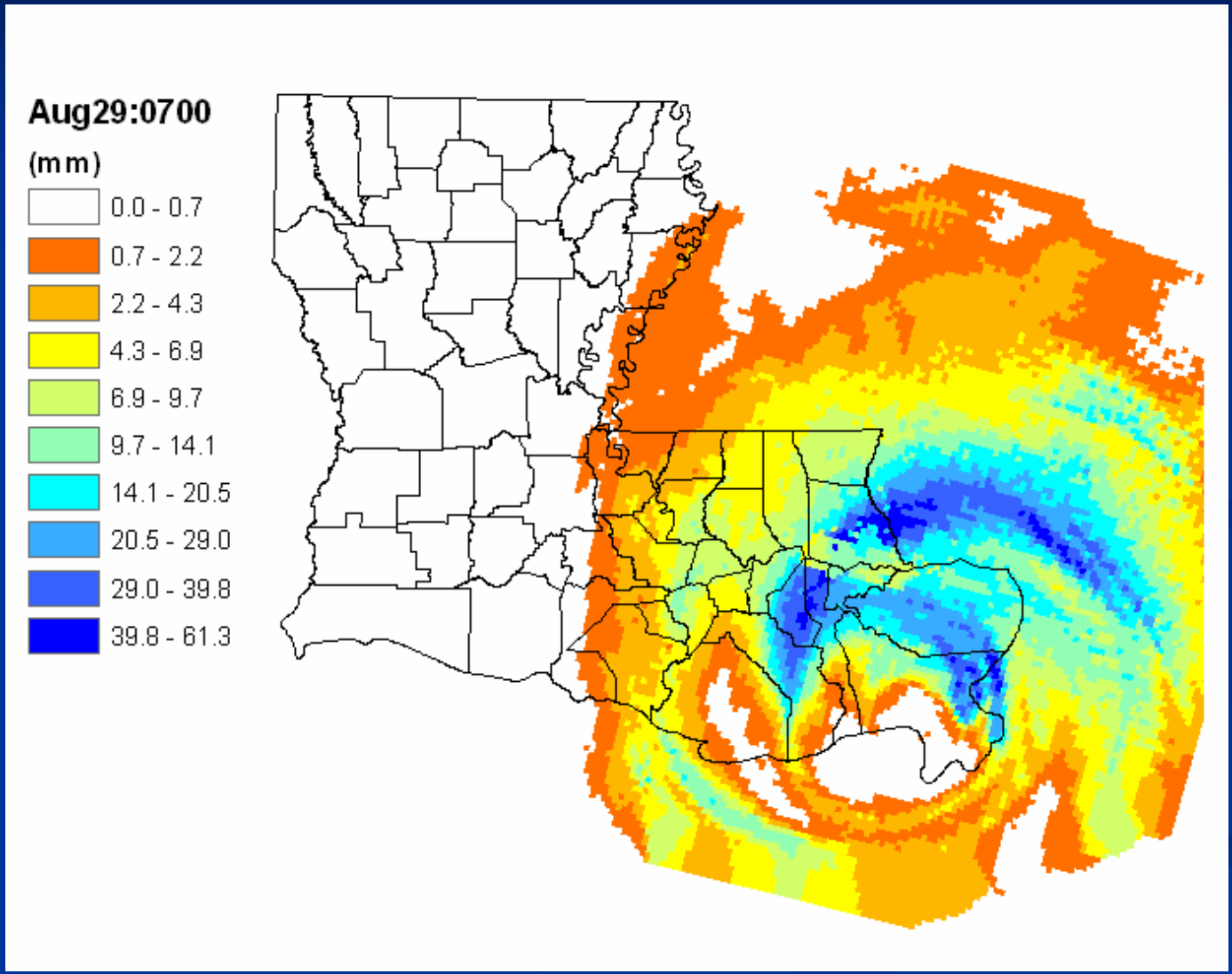
- Basin Models
  - Correspond to RAS Storage Areas



# HMS Models

- Precipitation
  - Multisensor Precipitation Estimator (MPE)
    - Lower Mississippi River Forecast Center
    - Radar data adjusted by rain gage measurements
  - GIS tools
    - Hyetographs for each HMS subbasin
    - Saved in DSS
    - In HMS as a Rain Gage

# HMS Models


Aug29:0700
(mm)
0.0 - 0.7
0.7 - 2.2
2.2 - 4.3
4.3 - 6.9
6.9 - 9.7
9.7 - 14.1
14.1 - 20.5
20.5 - 29.0
29.0 - 39.8
39.8 - 61.3

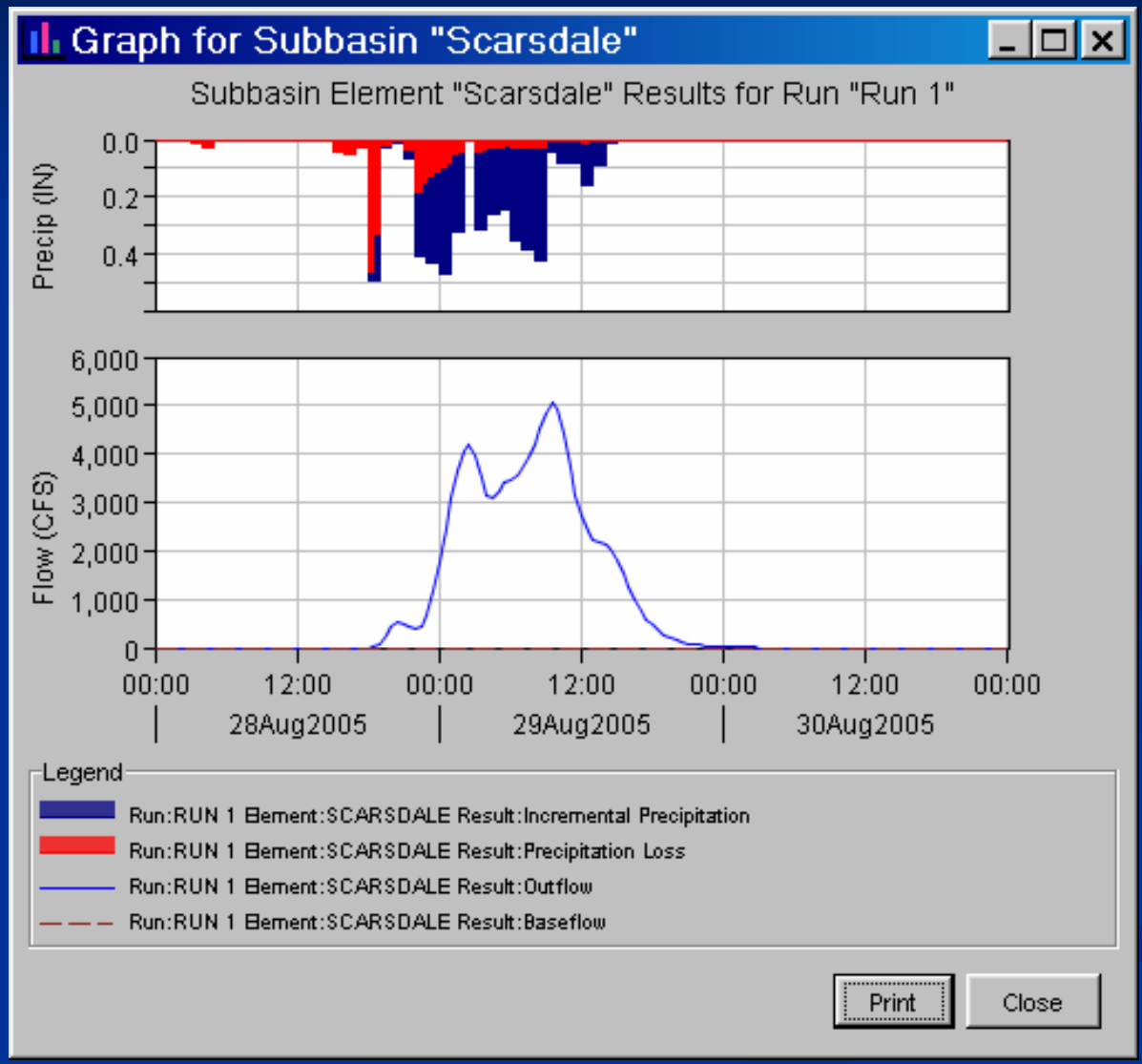
# HMS Models

- Loss rates
  - Land Use (MVN)
  - NRCS SSURGO data
  - Curve Number

# HMS Models

- Transform
  - SCS Lag Method
    - GIS develop physical data
    - Estimate travel time

# HMS Models


Graph for Subbasin "Scarsdale"
Subbasin Element "Scarsdale" Results for Run "Run 1"
Precip (IN)
0.0
0.2
0.4
Flow (CFS)
6,000
5,000
4,000
3,000
2,000
1,000
0
00:00
12:00
00:00
12:00
00:00
12:00
00:00
28Aug2005
29Aug2005
30Aug2005
Legend
Run:RUN 1 Element:SCARSDALE Result:Incremental Precipitation
Run:RUN 1 Element:SCARSDALE Result:Precipitation Loss
Run:RUN 1 Element:SCARSDALE Result:Outflow
Run:RUN 1 Element:SCARSDALE Result:Baseflow
Print
Close

# Remaining Tasks

- Sensitivity Analysis
  - Lag, Weir Coefficients, Levee Breach Parameters, Roughness Coefficient
- Run two scenarios
- Debris Impacts?
- Complete Technical Appendix