

Creating Value ...



... Delivering Solutions

Hydraulics of Coastal and Riverine Flooding

MD 4 over the Patuxent River

Will Thomas and Mark Osler

Baker

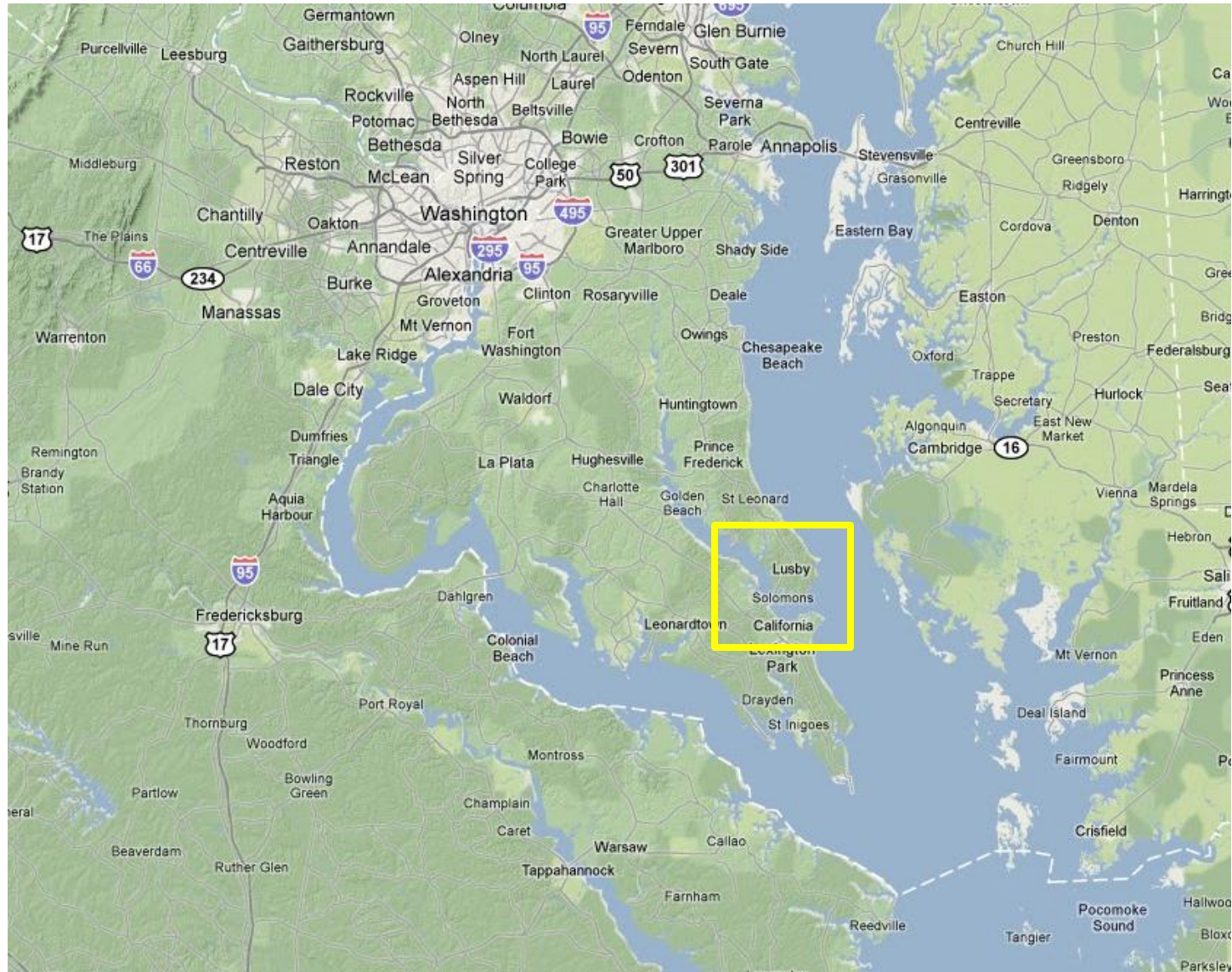
Who : Where : Why

MD State Highway Administration

Thomas Johnson Memorial Bridge - MD Route 4 over the Patuxent River

Magnitude and Duration of Flooding Events at Crossing

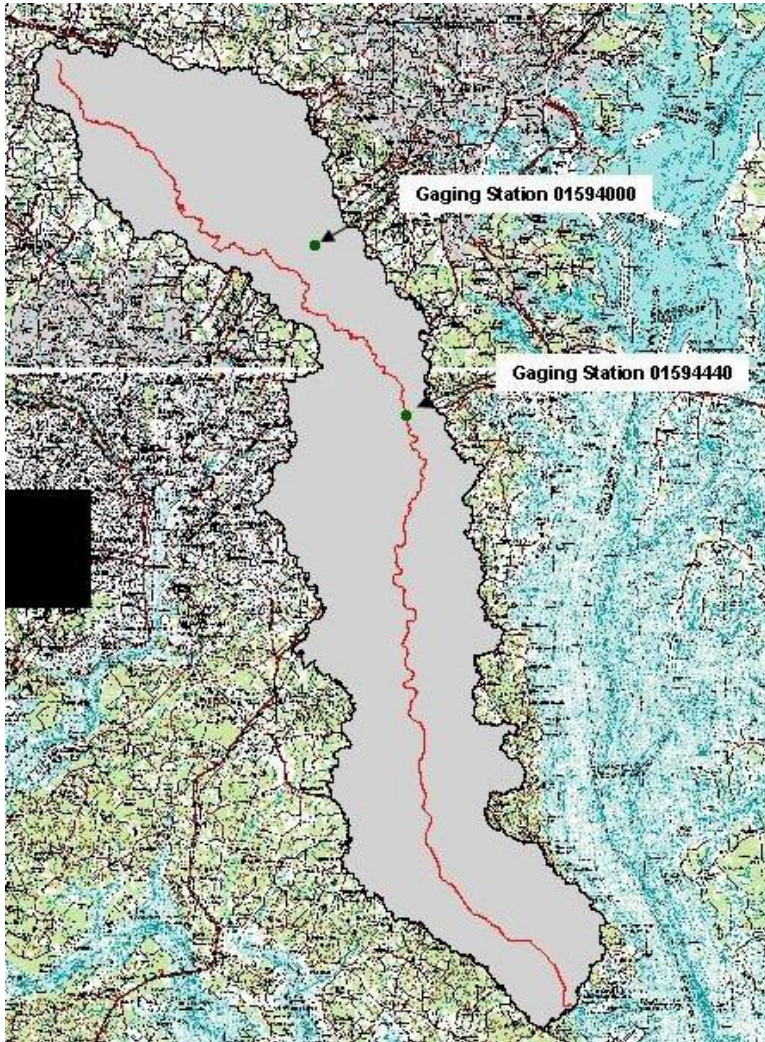
Location



Location



Hydrologic Analysis



Drainage Area: 904 square miles

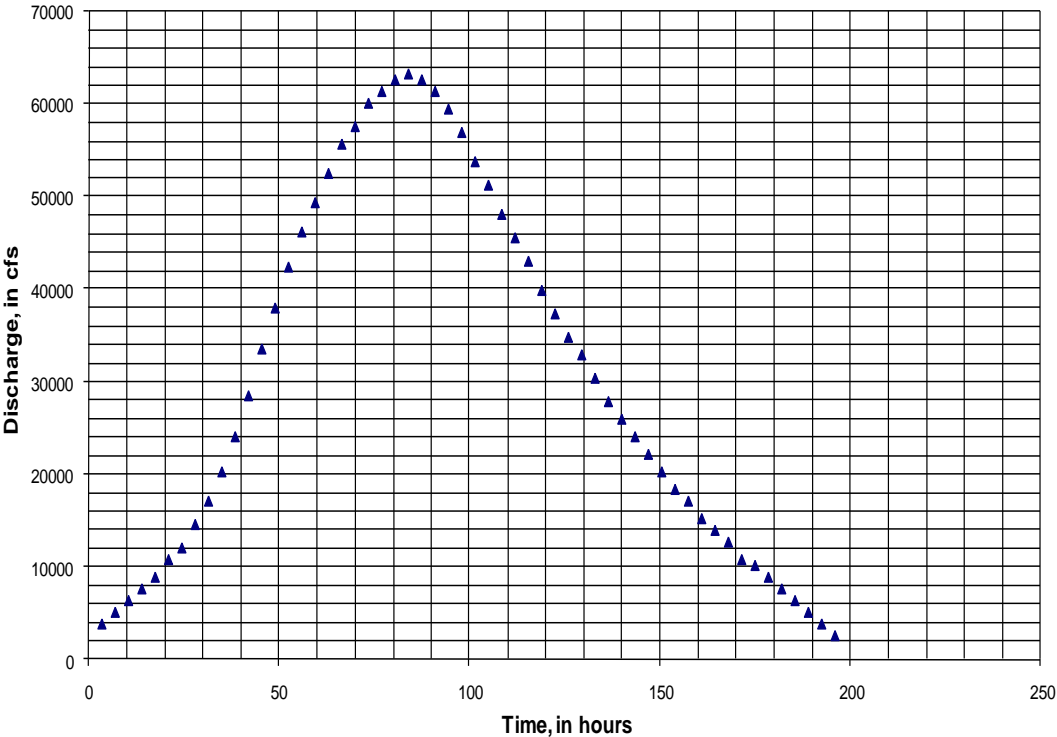
Channel Length: 115 miles

**Peak Discharge via Fixed
Region Regression Eqns**

**Hydrograph Shape via USGS
Dimensionless Hydrograph**

Hydrologic Analysis

100-year hydrograph for Patuxent River at MD Route 4



▲ 100-year hydrograph for Patuxent River at MD 4

Recurrence Interval (years)	Discharge (cfs)
2	9,350
10	24,200
25	34,600
50	49,200
100	63,200
500	114,000

Tidal and Surge Components

Tide

Semi-diurnal

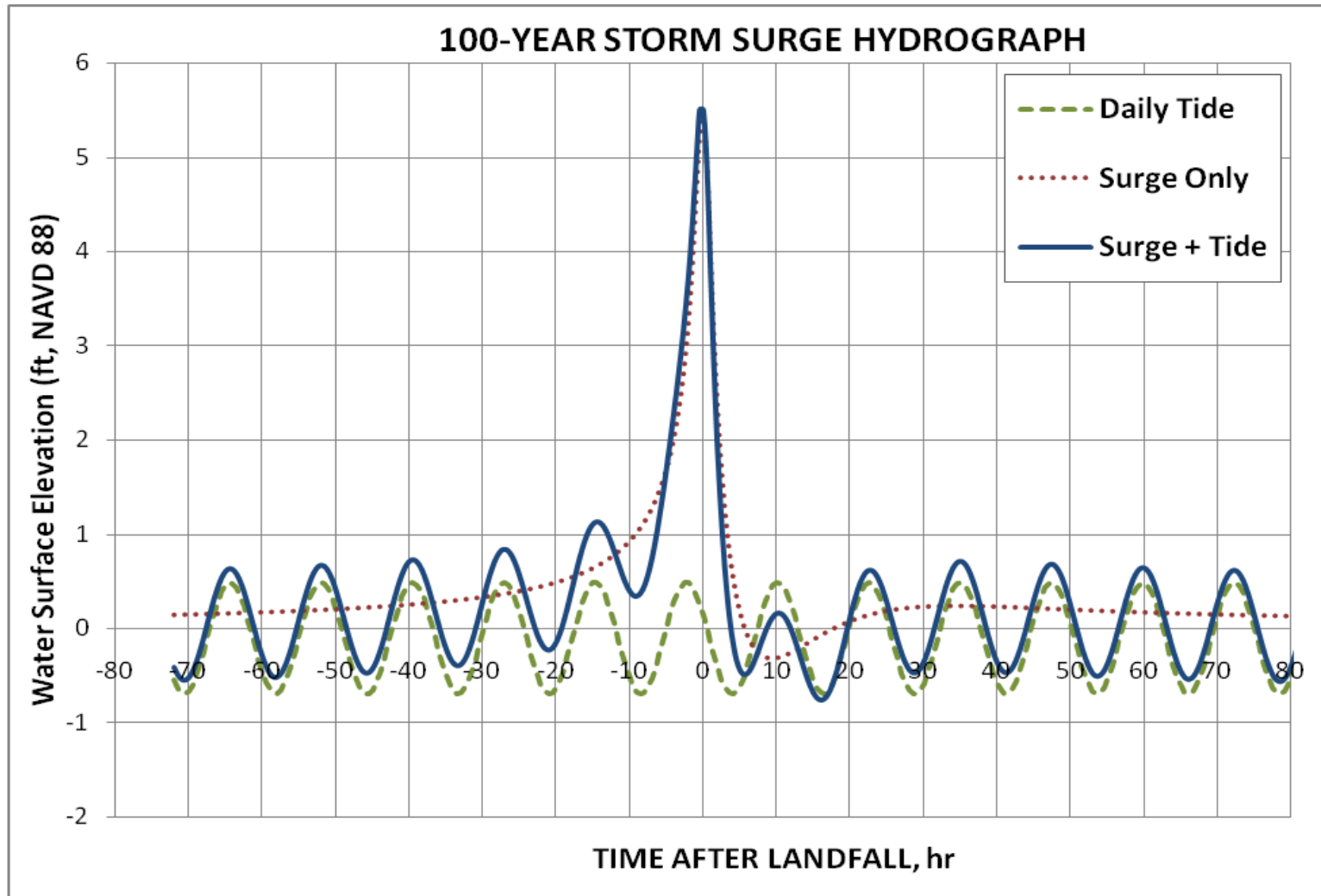
Range of 1.2 feet

Surge

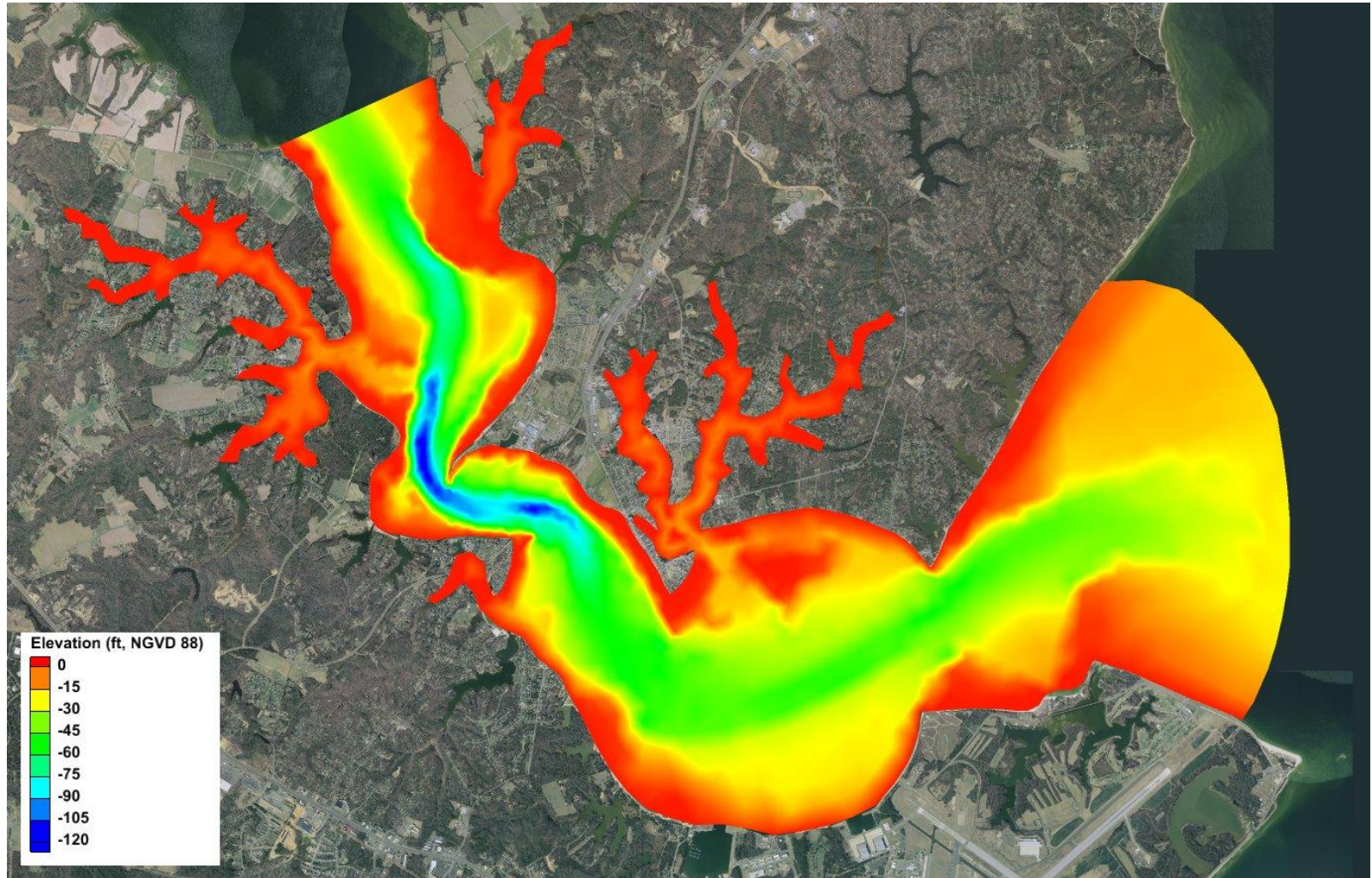
100 year levels ~ 5.5 feet (Calvert Co. FIS)

Synthetic Hydrograph bases on Ayres, 2002

Tidal and Surge Components



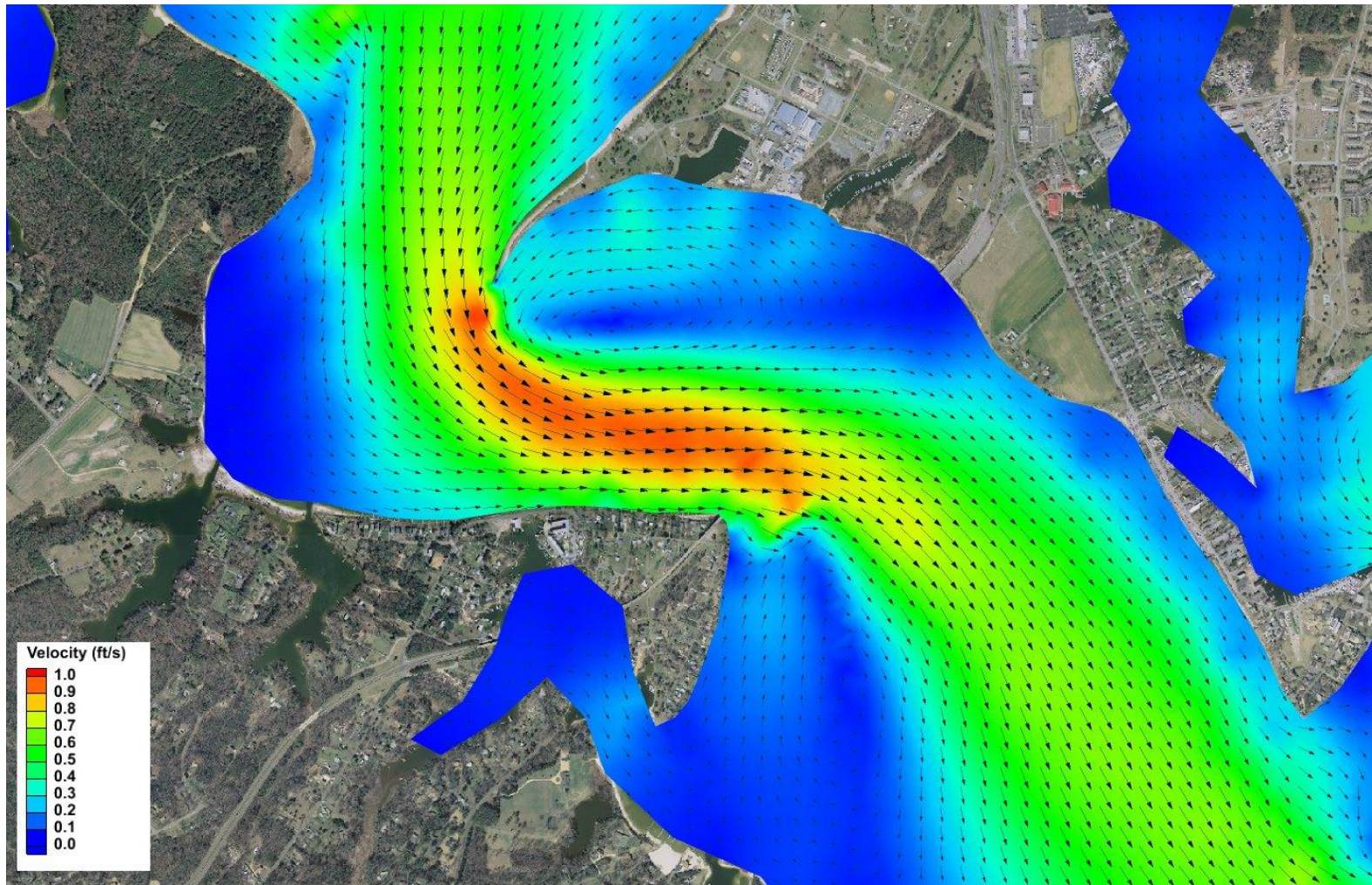
Model Construction



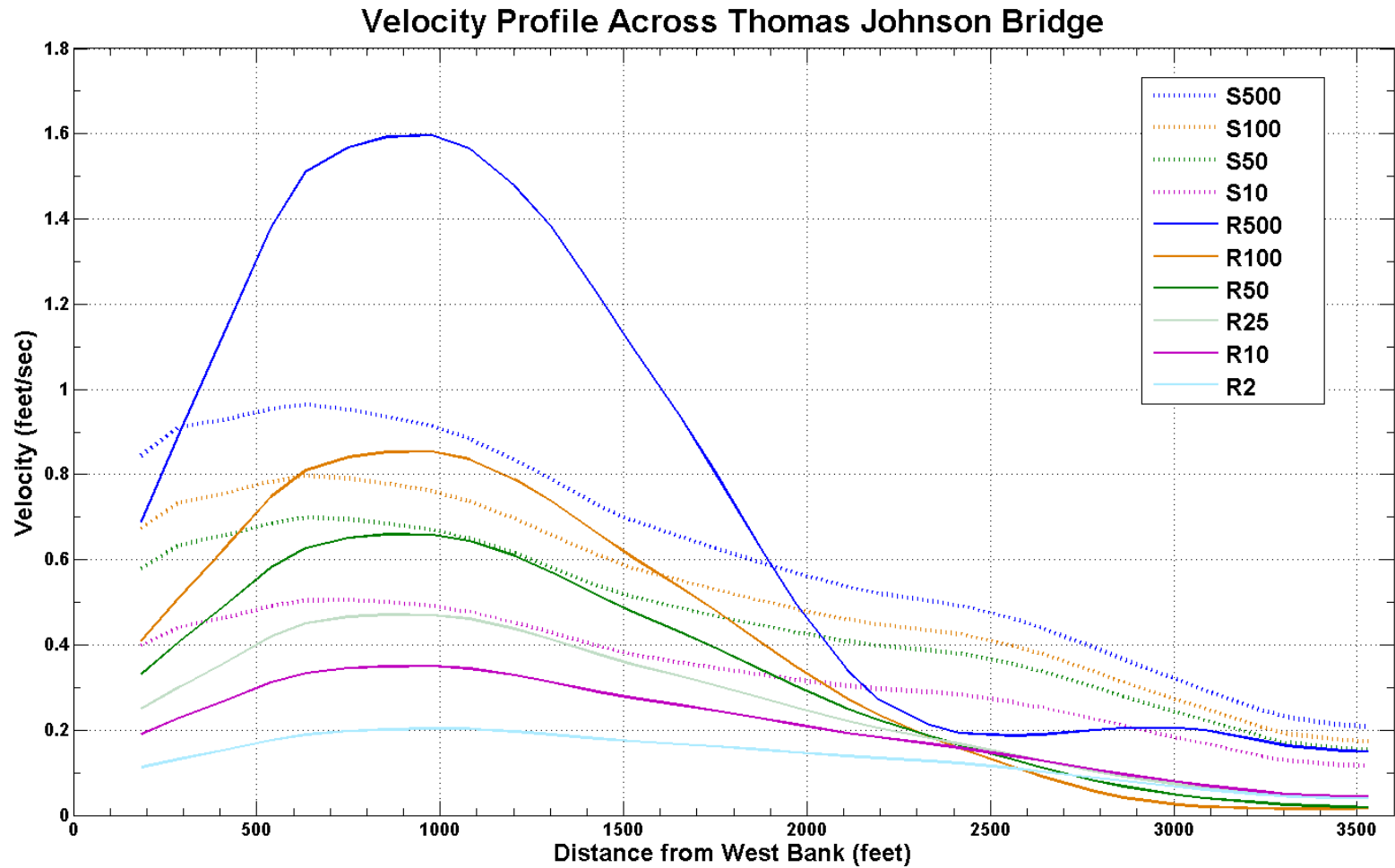
Boundary Condition Pairings

Boundary Conditions Applied for Individual Runs						
	Riverine Events			Surge Events		
Return Period	Run Name	Hydrograph Peak (cfs)	Tide Range (ft)	Run Name	Flowrate (cfs)	Peak Surge (ft, NAVD88)
2	R2	9,350	1.17	--	--	--
10	R10	24,200	1.17	S10	4,100	3.4
25	R25	34,600	1.17	--	--	--
50	R50	49,200	1.17	S50	8,400	4.8
100	R100	63,200	1.17	S100	10,700	5.5
500	R500	114,000	1.17	S500	19,400	7

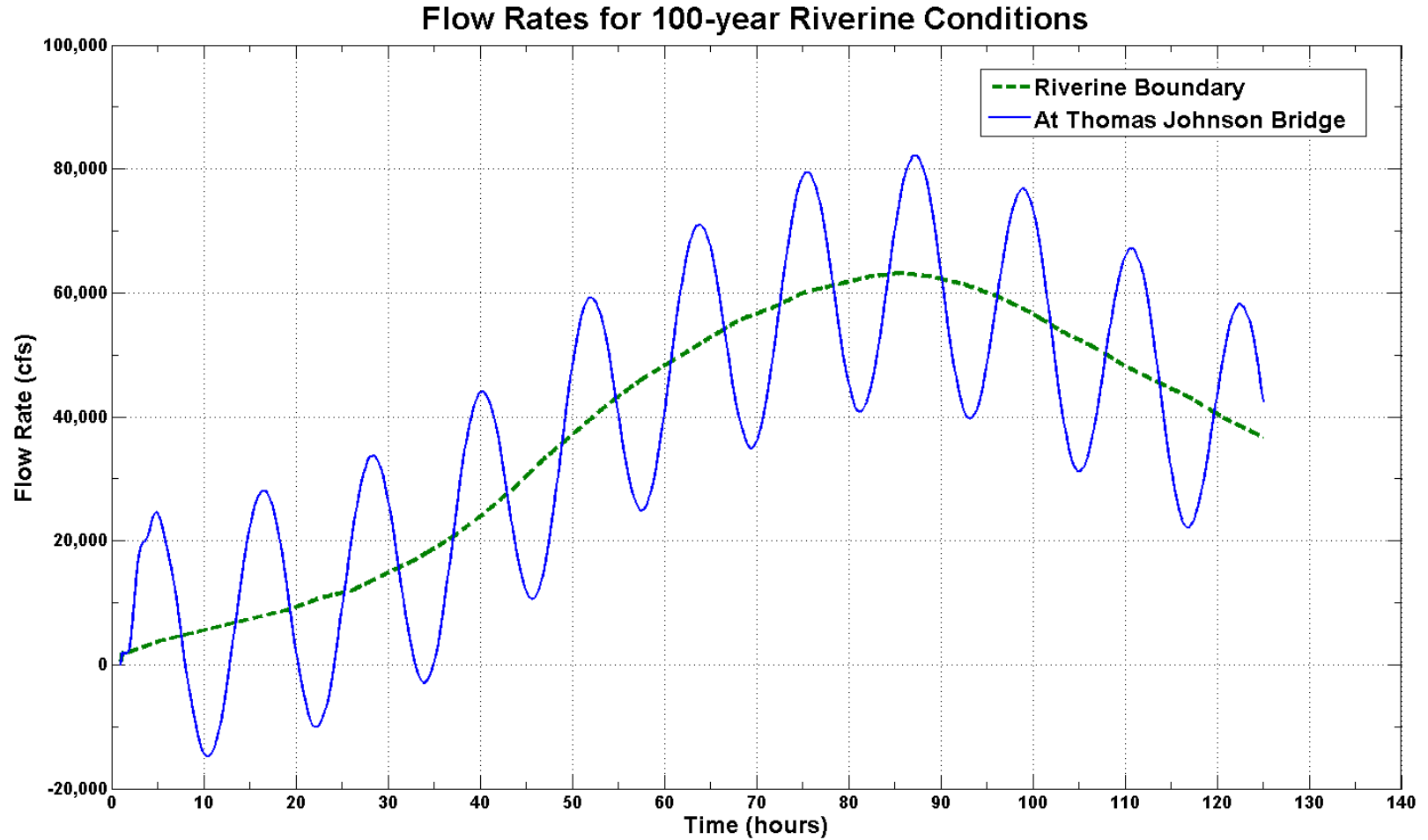
100 year Riverine Event



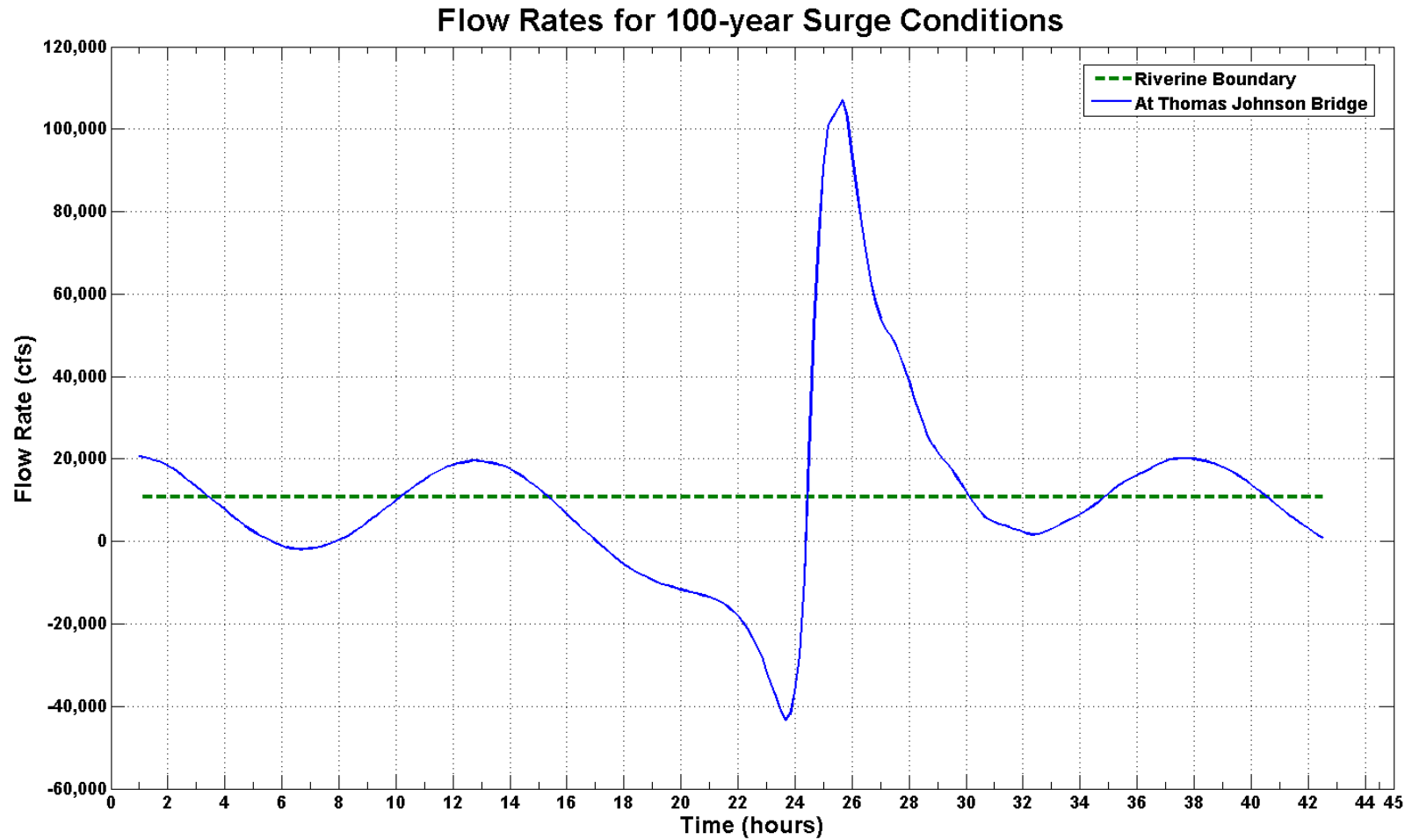
Baker Flow Distribution in Cross Section



Flow Rates – 100 year Riverine Condition



Flow Rates – 100 year Surge Condition



Questions?

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