

# White River Converting from Period of Record to Realtime Operations Model

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US Army Corps of Engineers  
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# ***Introduction***

- Period of Record
- Forecasting
- White River Background
- Modify Rules
- Configuration Period of Record to Real time
  - ▶ HEC-HMS
- Routing
- Results
- Future Work



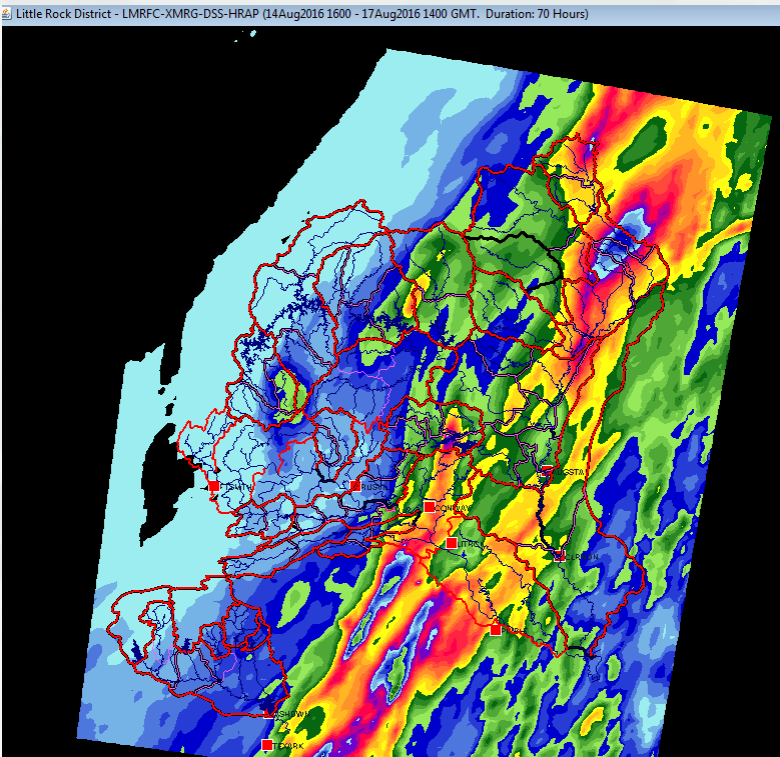
# Period of Record

- Studies\Analysis
  - ▶ Simulation Reservoir and system operations for longer period of time
  - ▶ Daily timestep model
  - ▶ Proposed Reservoir Operations Changes
    - Benefits and impacts



# Forecasting

Rain



MFP/MetVue

Runoff



HEC-HMS

Release Plan

Date	Release (cfs)
Aug 1, 2011	32,000
Aug 16, 2011	16,000
Aug 18, 2011	5,000
Aug 20, 2011	3,200

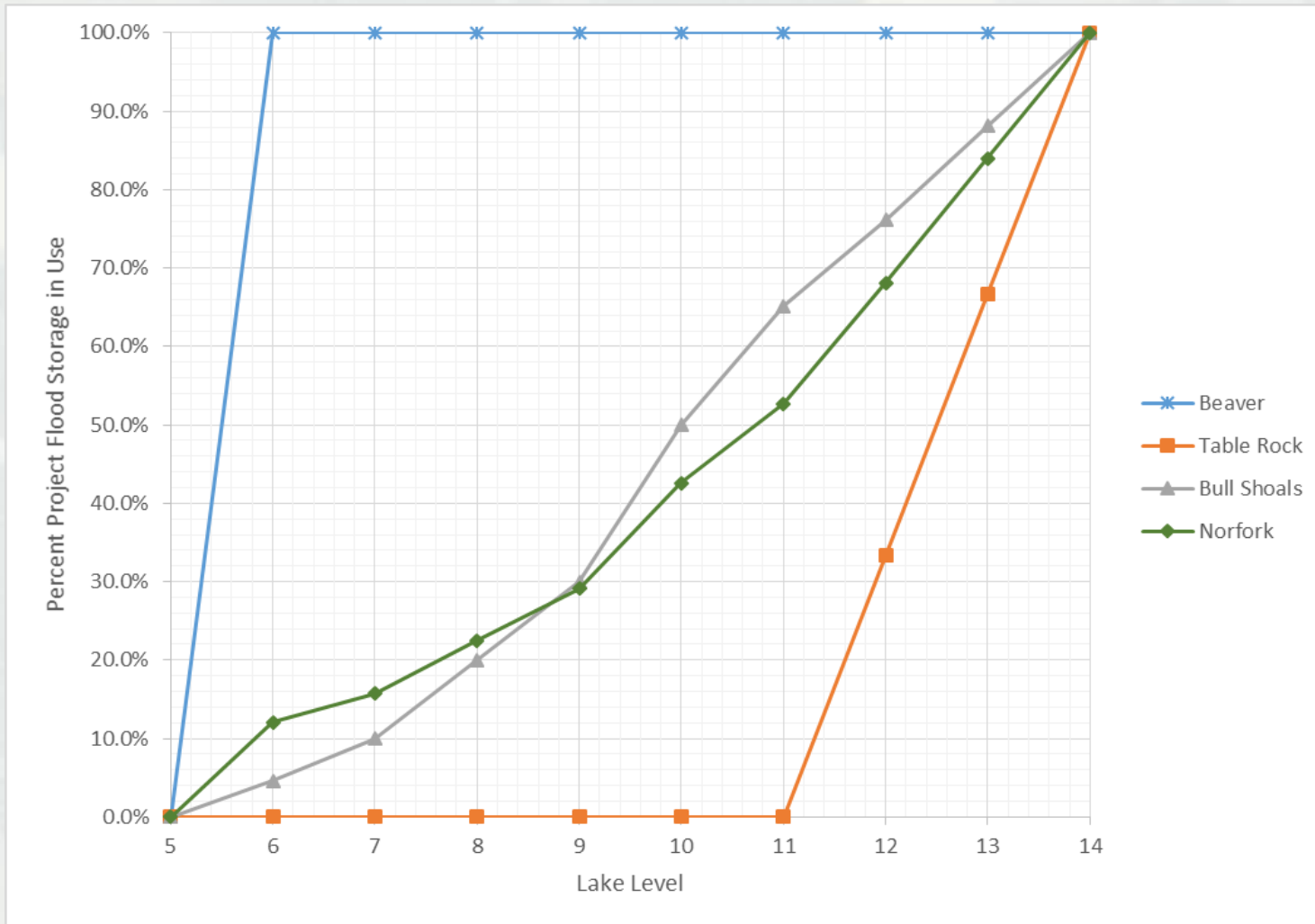
RiverWare



# White River



# Operating Level



# Operating Level Table

Lake Level	5	6	7	8	9	10	11	12	13	14
<b>Lake Elevation:</b>										
Beaver	1120.43	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00	1130.00
Table Rock	915.00	915.00	915.00	915.00	915.00	915.00	915.00	920.69	926.01	931.00
Bull Shoals	659.00	661.00	663.31	667.46	671.38	678.76	684.00	687.60	691.38	695.00
Norfolk	553.75	557.40	558.46	560.42	562.28	565.95	568.60	572.49	576.31	580.00
<b>Percent Full:</b>										
Beaver	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Table Rock	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	66.6%	100.0%
Bull Shoals	0.0%	4.6%	10.0%	20.0%	30.0%	50.0%	65.2%	76.2%	88.1%	100.0%
System	0.0%	12.1%	15.7%	22.5%	29.1%	42.6%	52.7%	68.1%	84.0%	100.0%
Norfolk	0.0%	12.1%	15.7%	22.5%	29.1%	42.6%	52.7%	68.1%	84.0%	100.0%

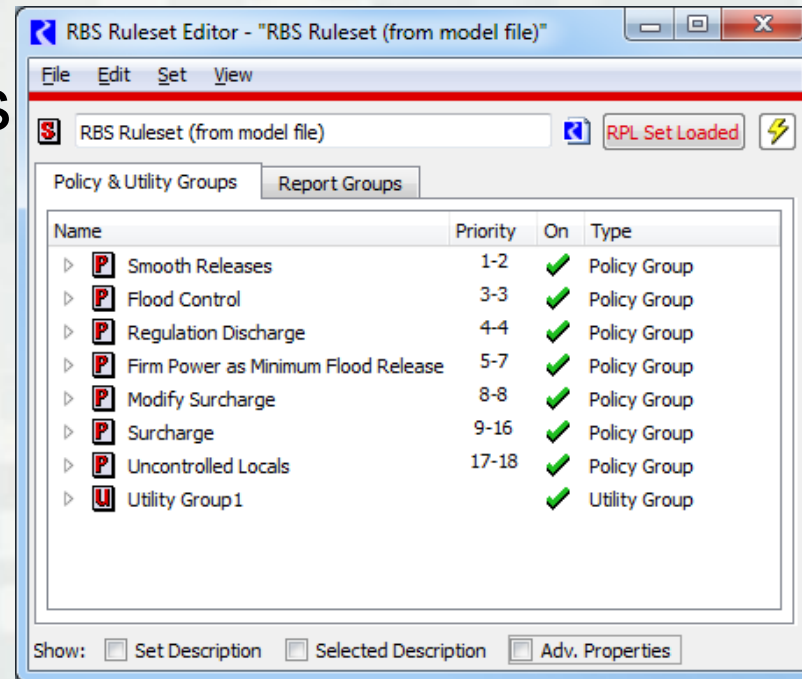
The lakes are considered to be balanced when they are all at the same level.





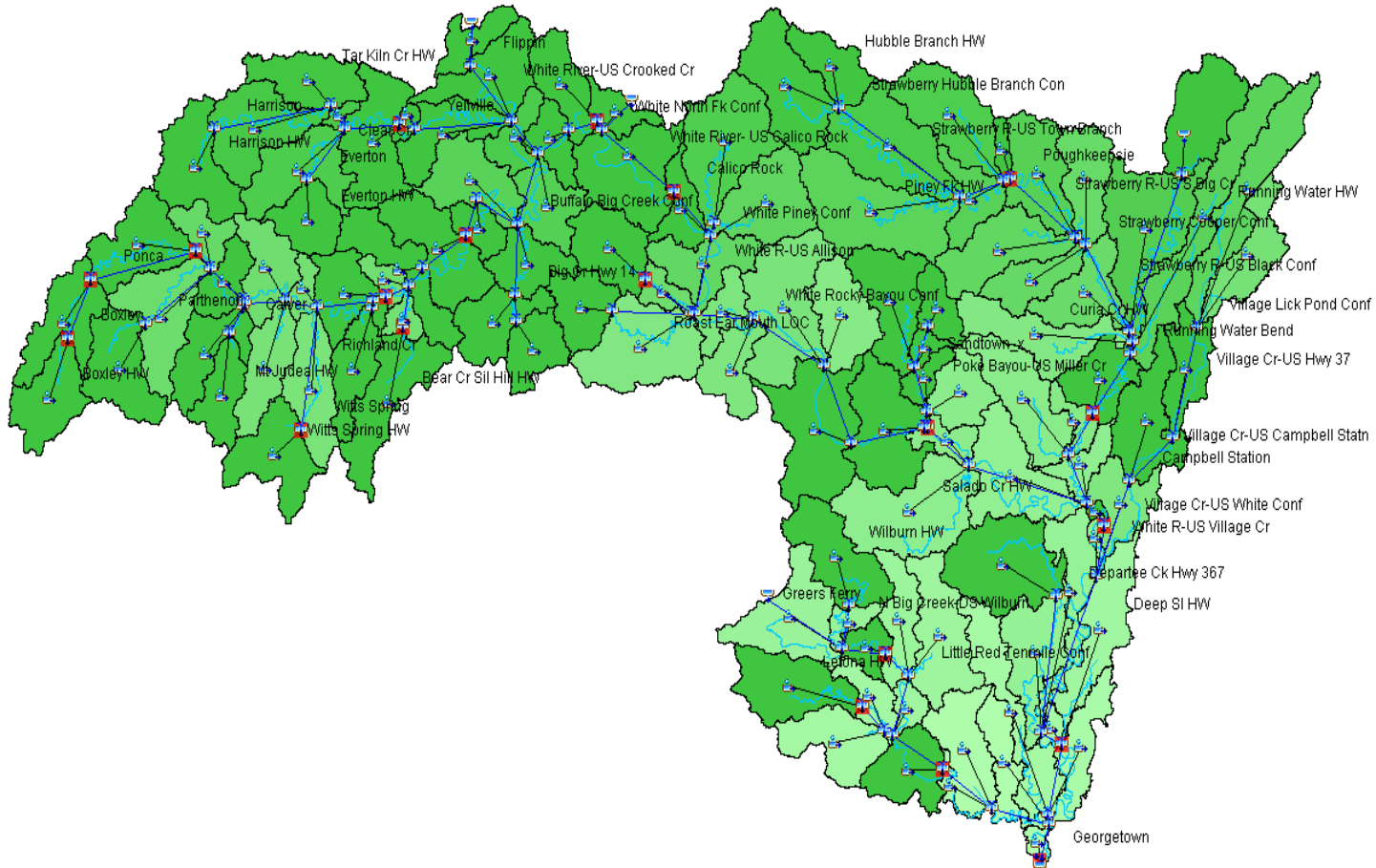
# Operation Policy

- Modify Rules
  - ▶ Delete conservation rules
  - ▶ Additional rules
    - Surcharge
    - Smooth Flood Control Releases

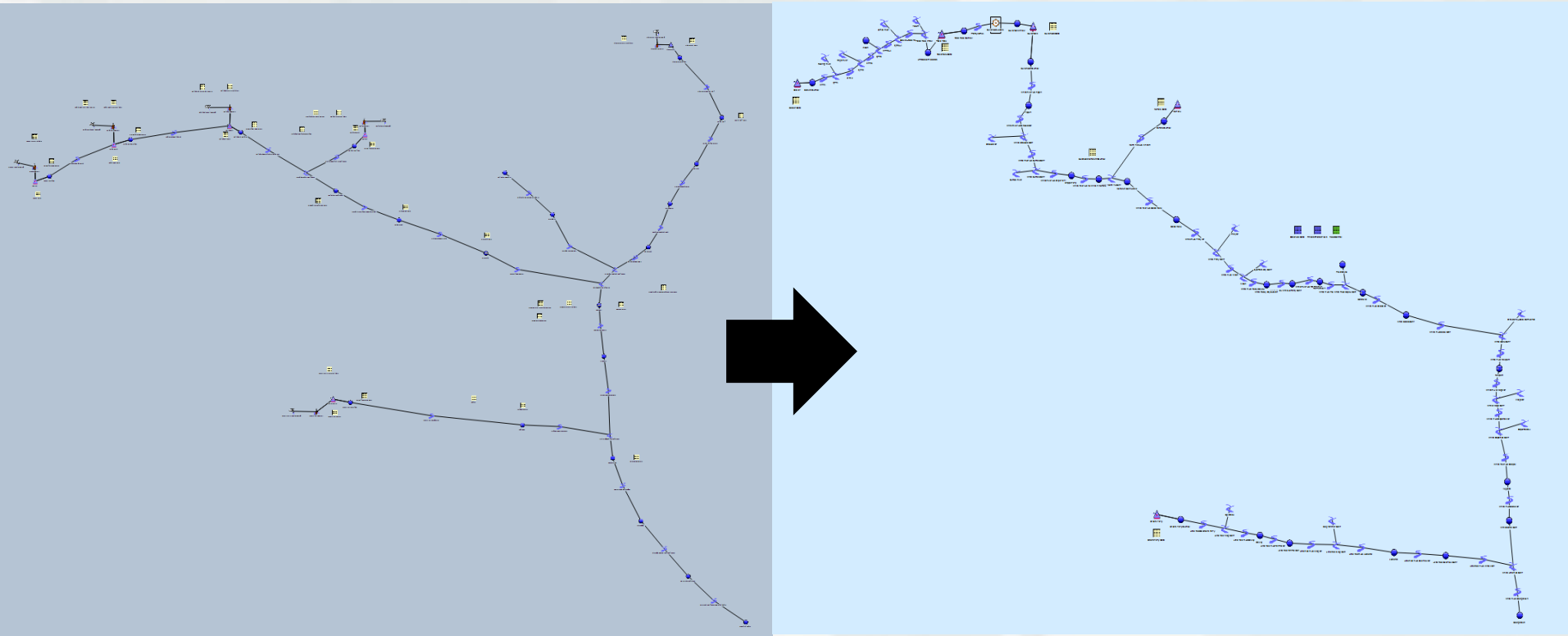




# HMS Configuration

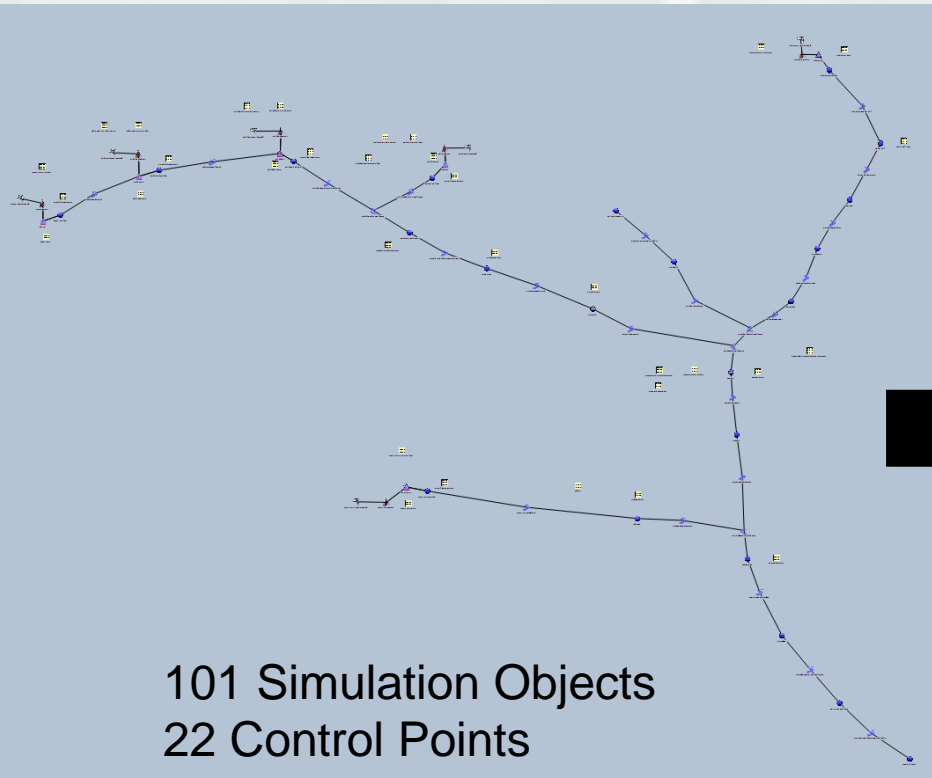


# Configuration

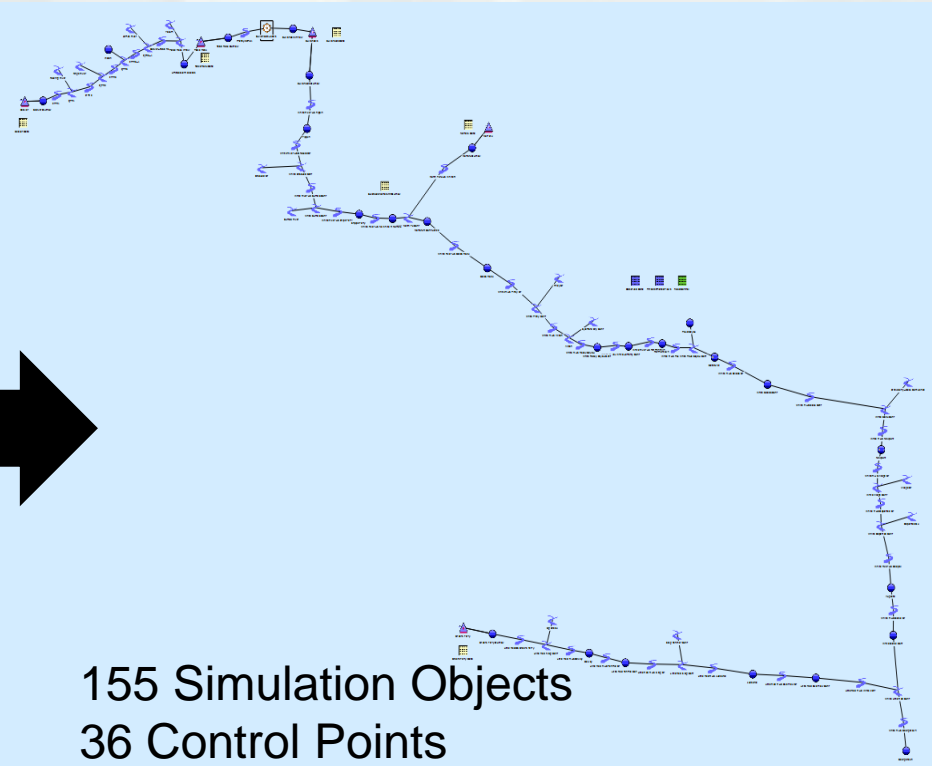
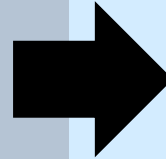


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# Configuration



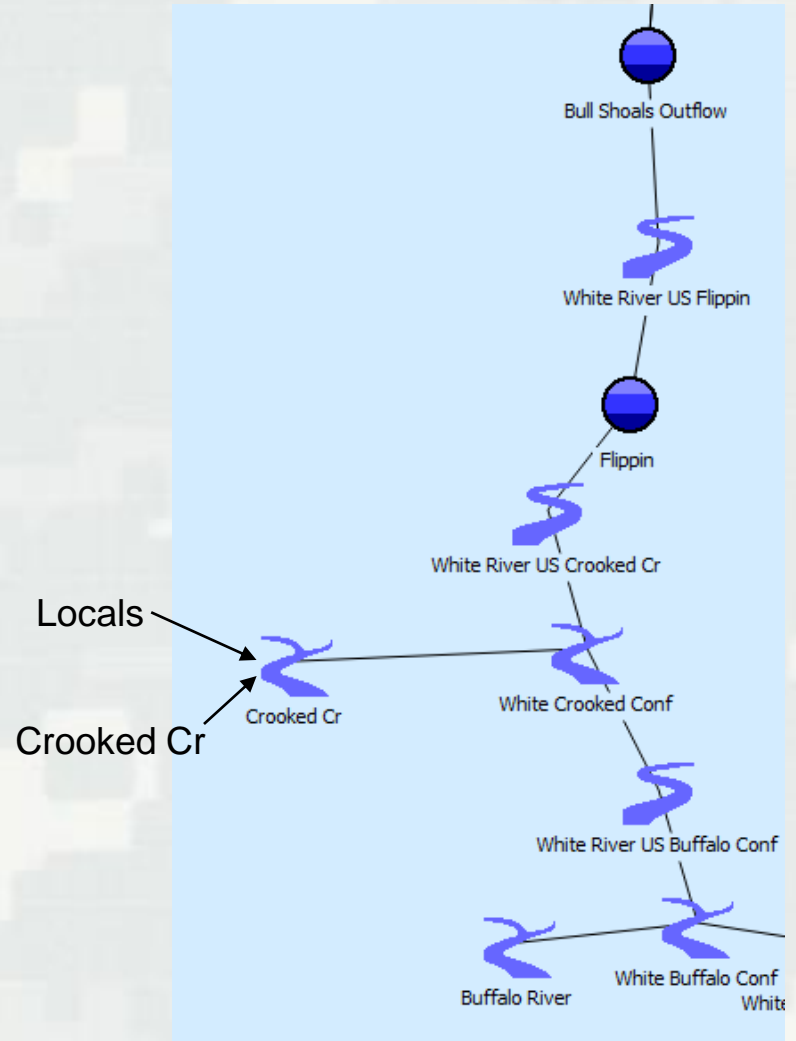
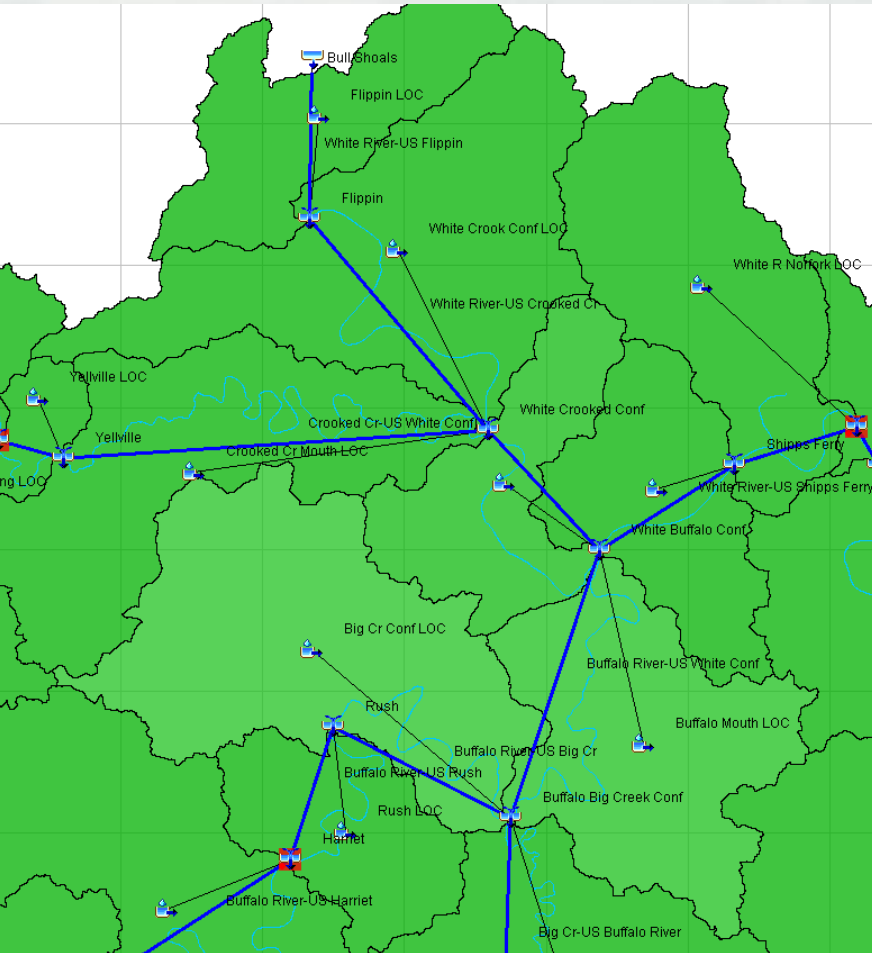
101 Simulation Objects  
22 Control Points  
6 Diversion Objects  
33 Data Objects  
5 Level Power Reservoirs  
1 Storage Reservoir  
4 Confluences  
21 Reaches



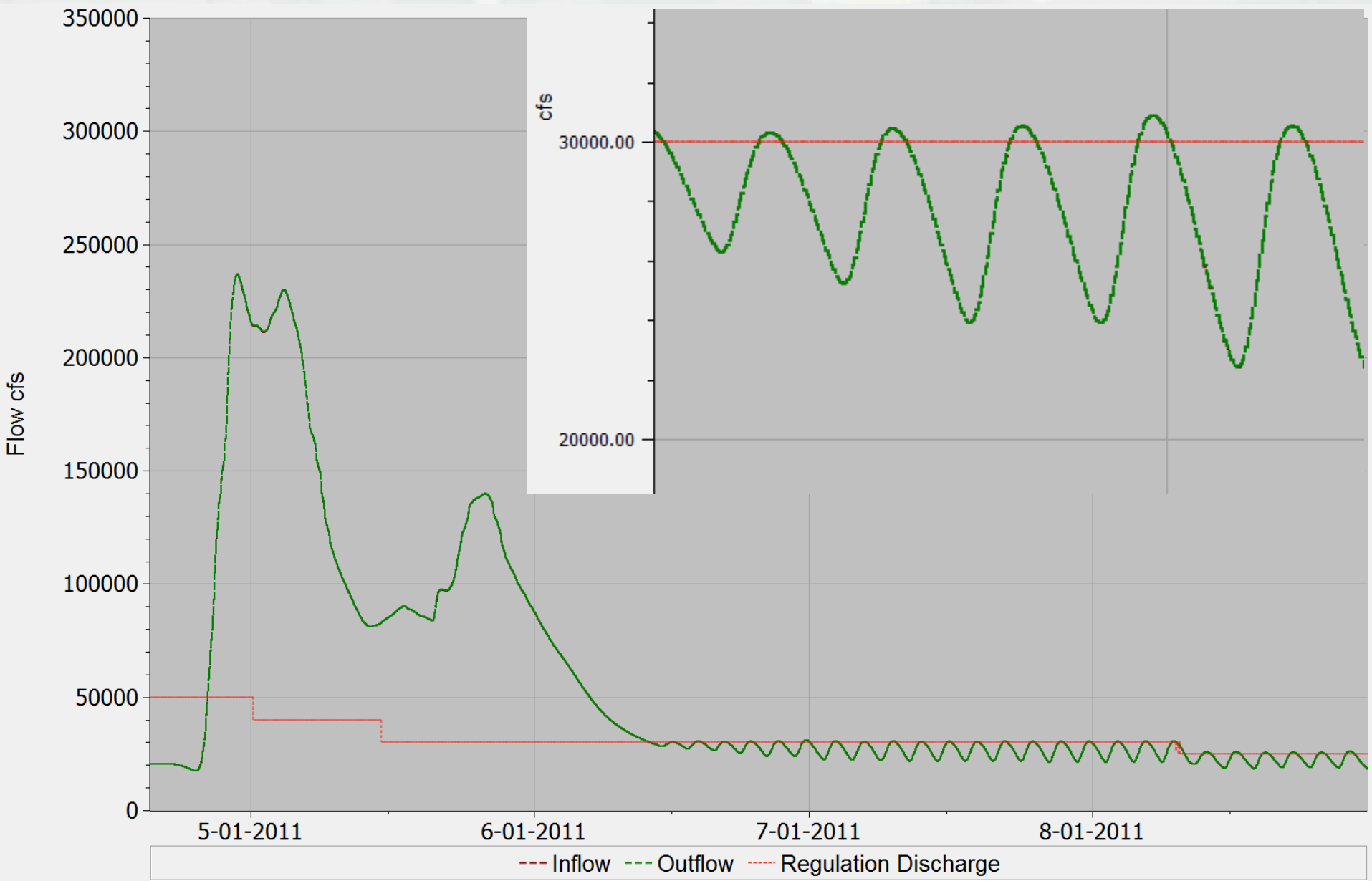
155 Simulation Objects  
36 Control Points  
0 Diversion Objects  
9 Data Objects  
5 Level Power Reservoirs  
0 Storage Reservoir  
49 Confluences  
47 Reaches



# HMS Configuration

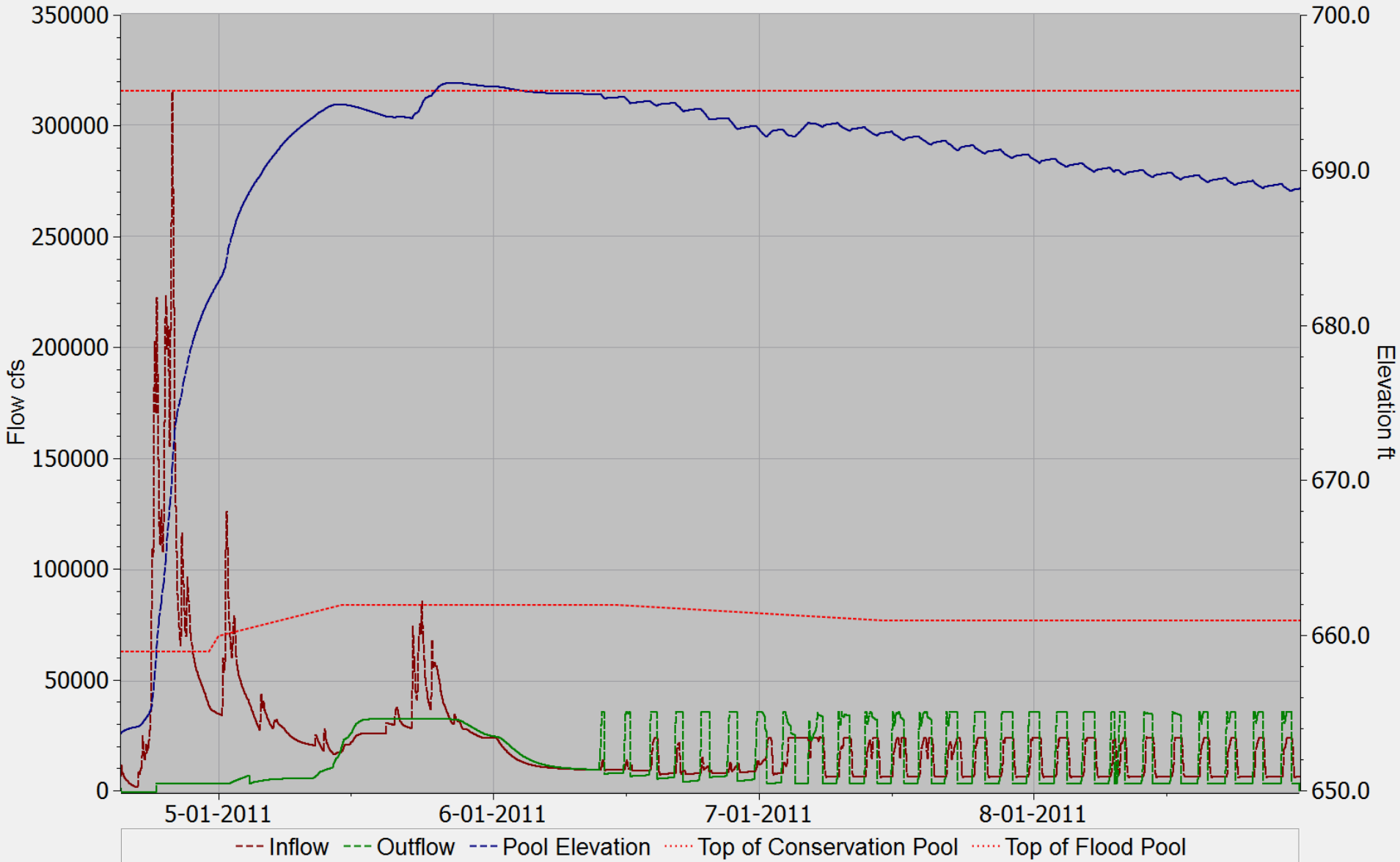


# Newport



# Variable Routing

Bull Shoals



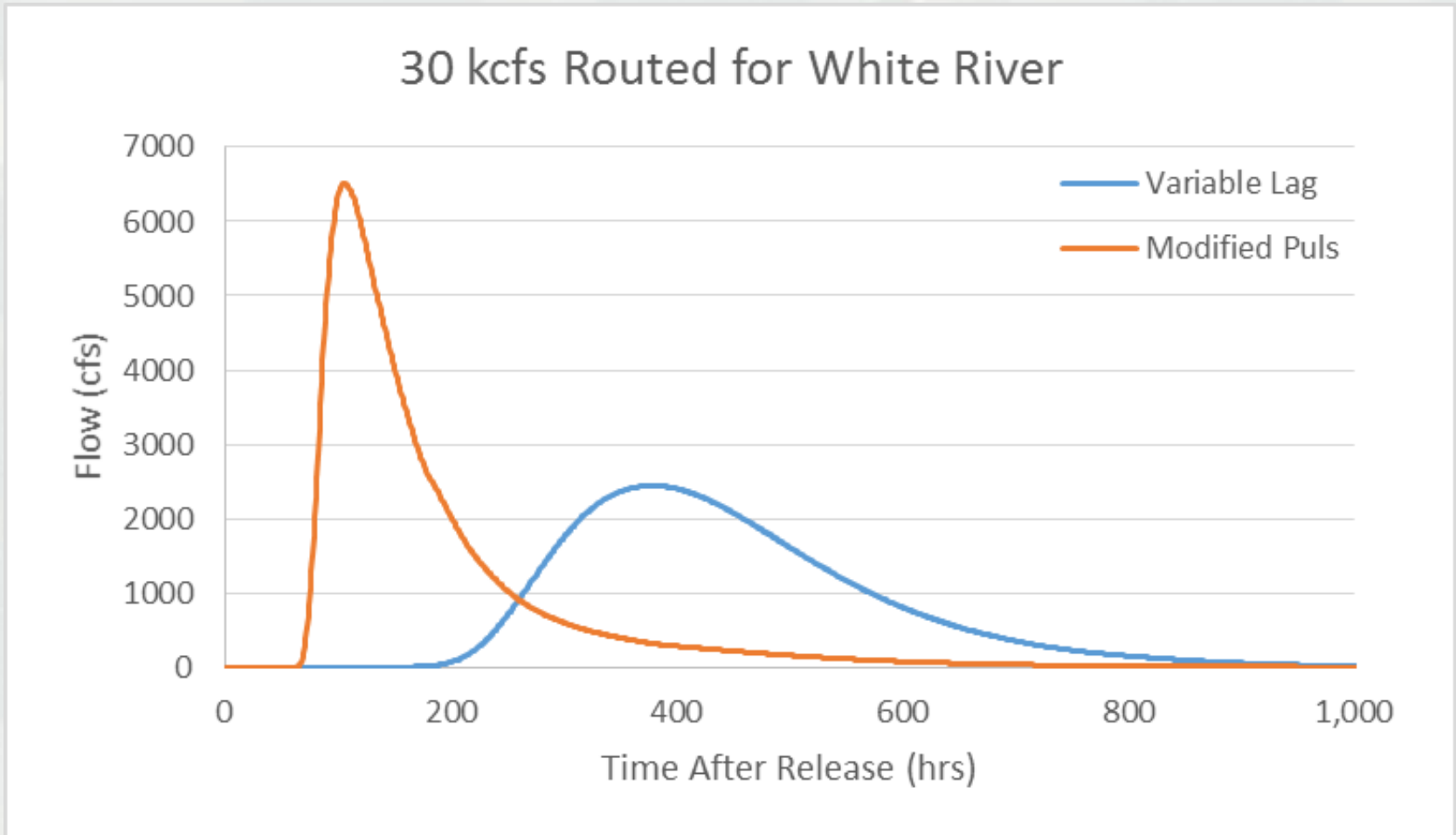
# Routing

- Reach routing
  - ▶ Match routing method of HMS
    - Modified Puls
- Flood Control simplified routing
  - ▶ Routing Coefficients on Control Points
  - ▶ Variable Lag Coefficients on Reach



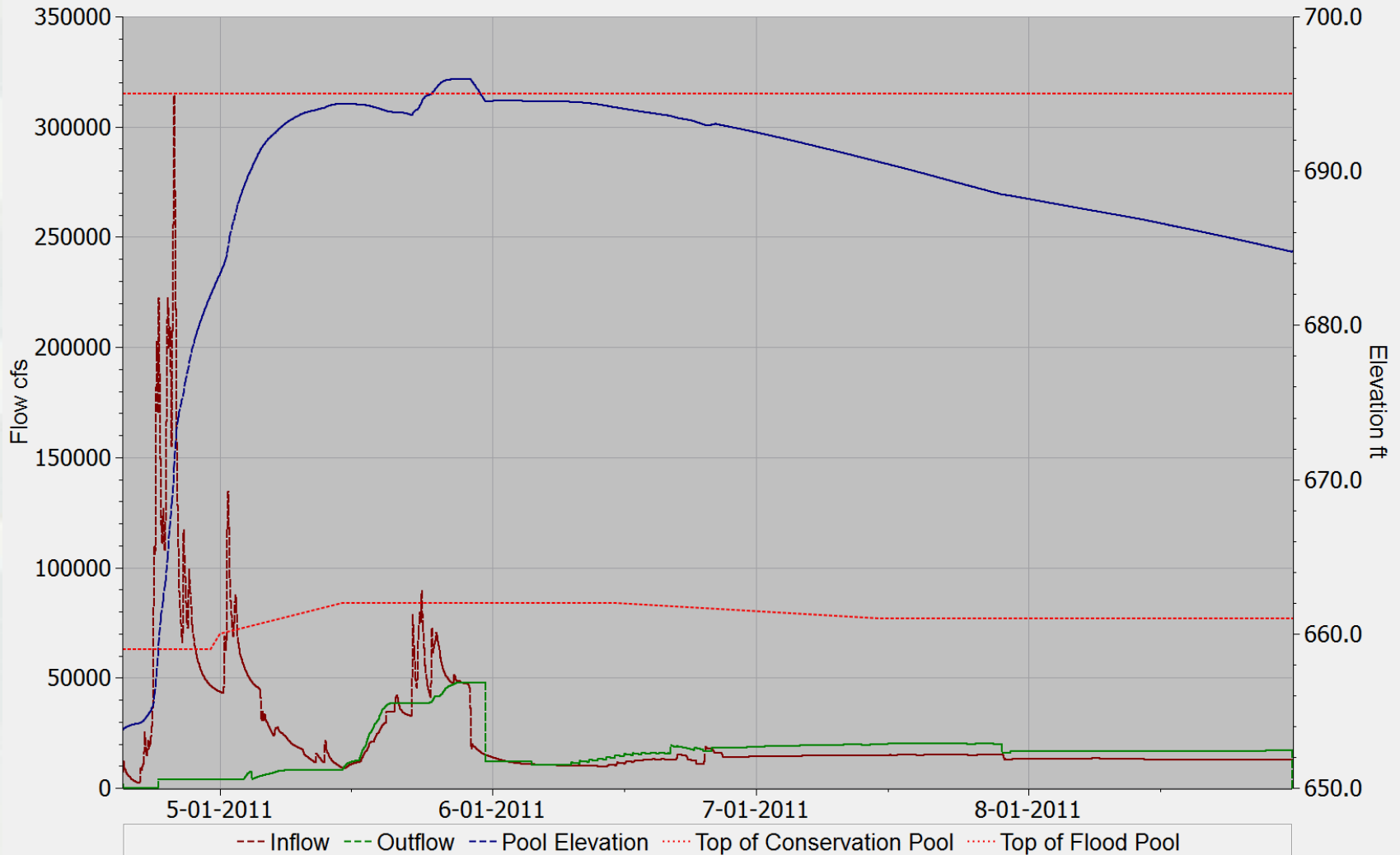


# Routing Issue

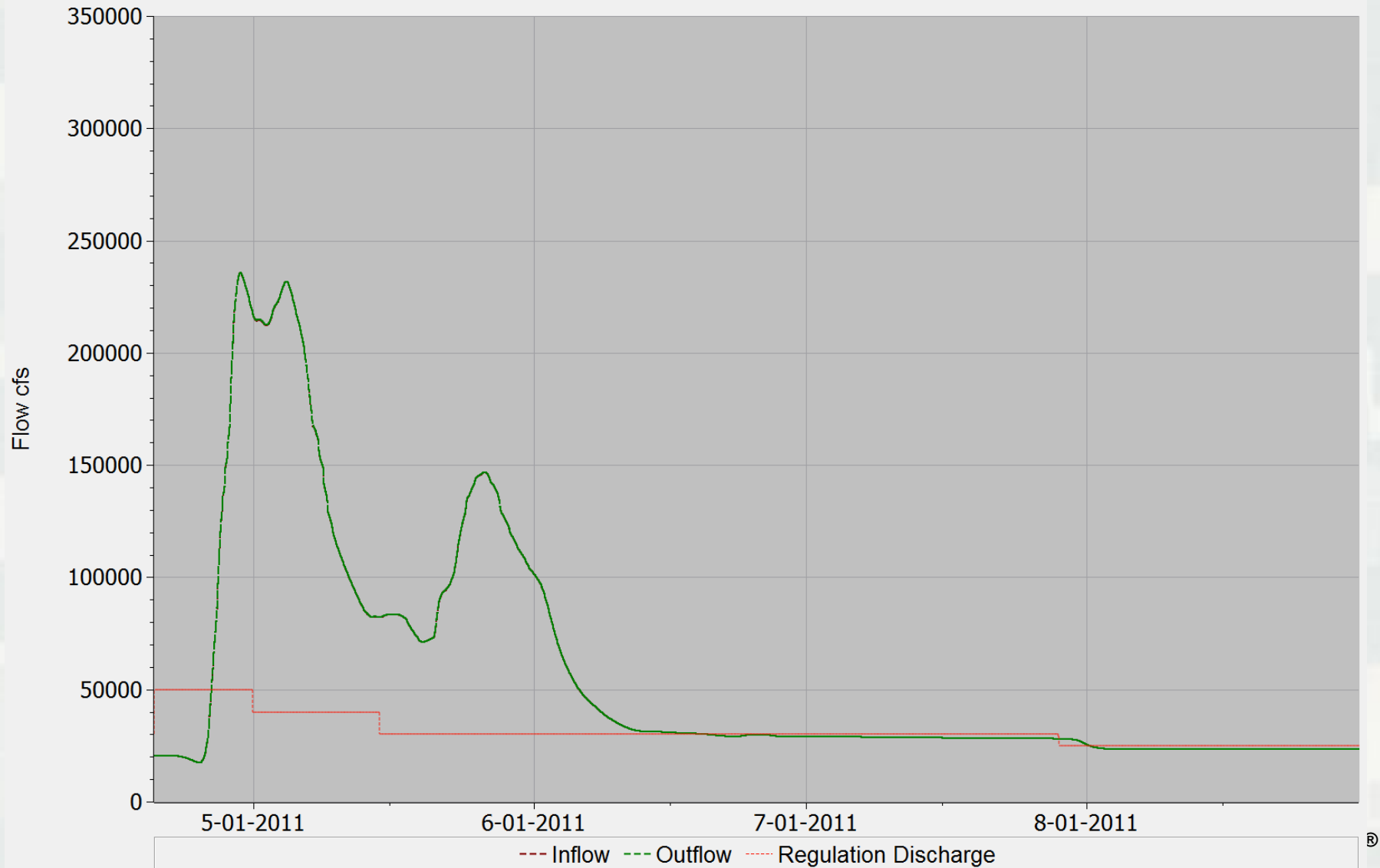


# Control Point Routing Coefficient

Bull Shoals



# Newport

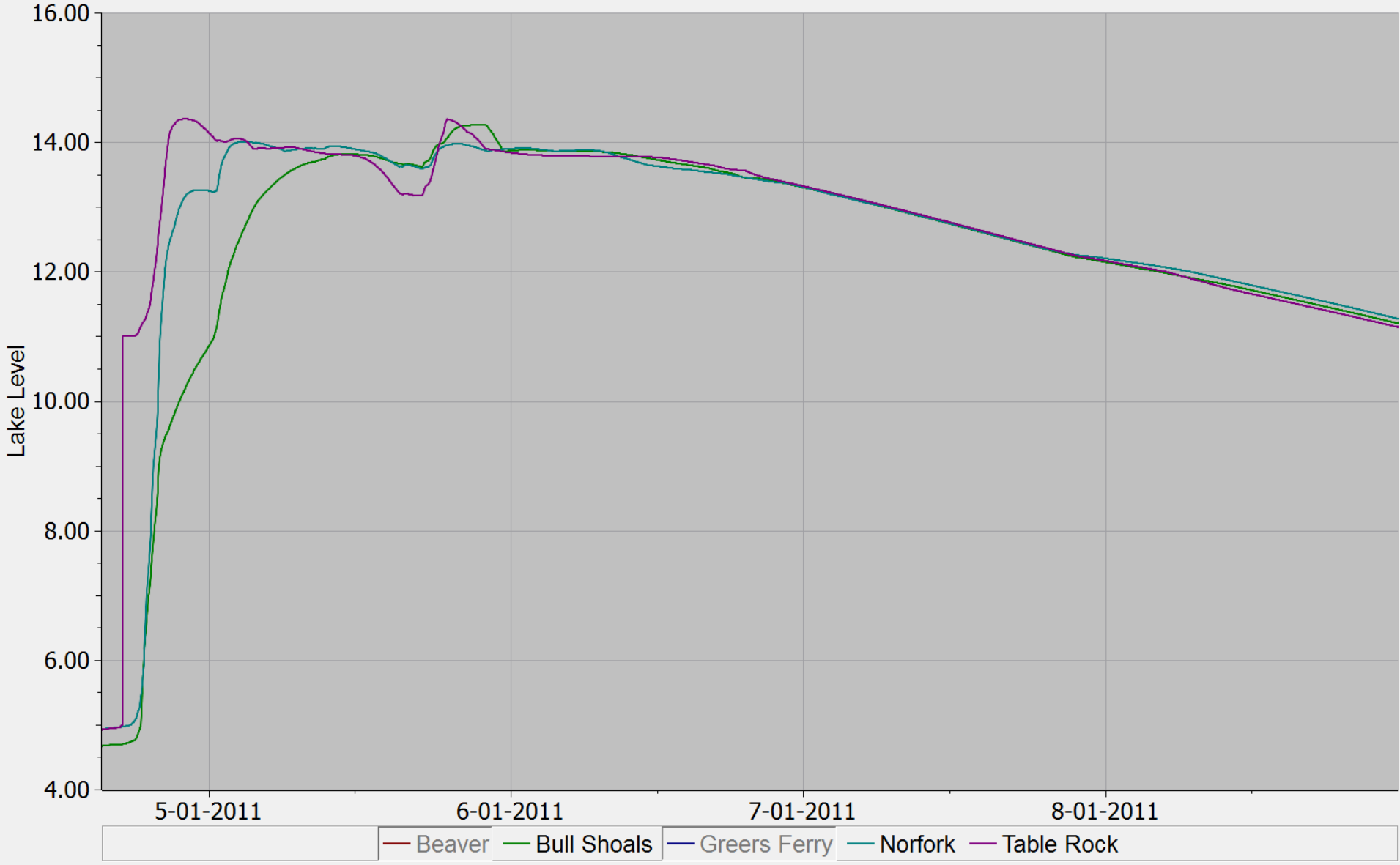


# Results

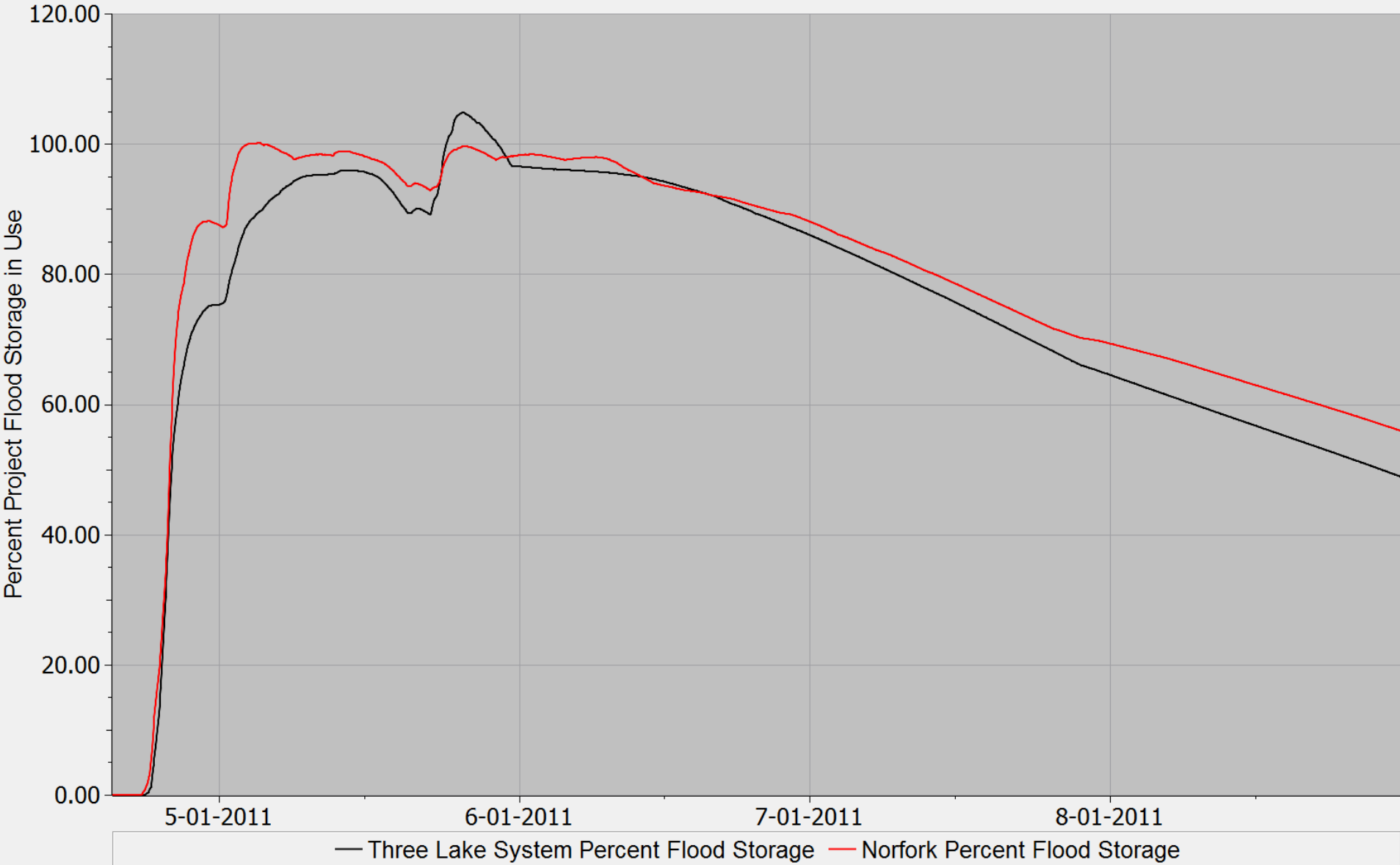


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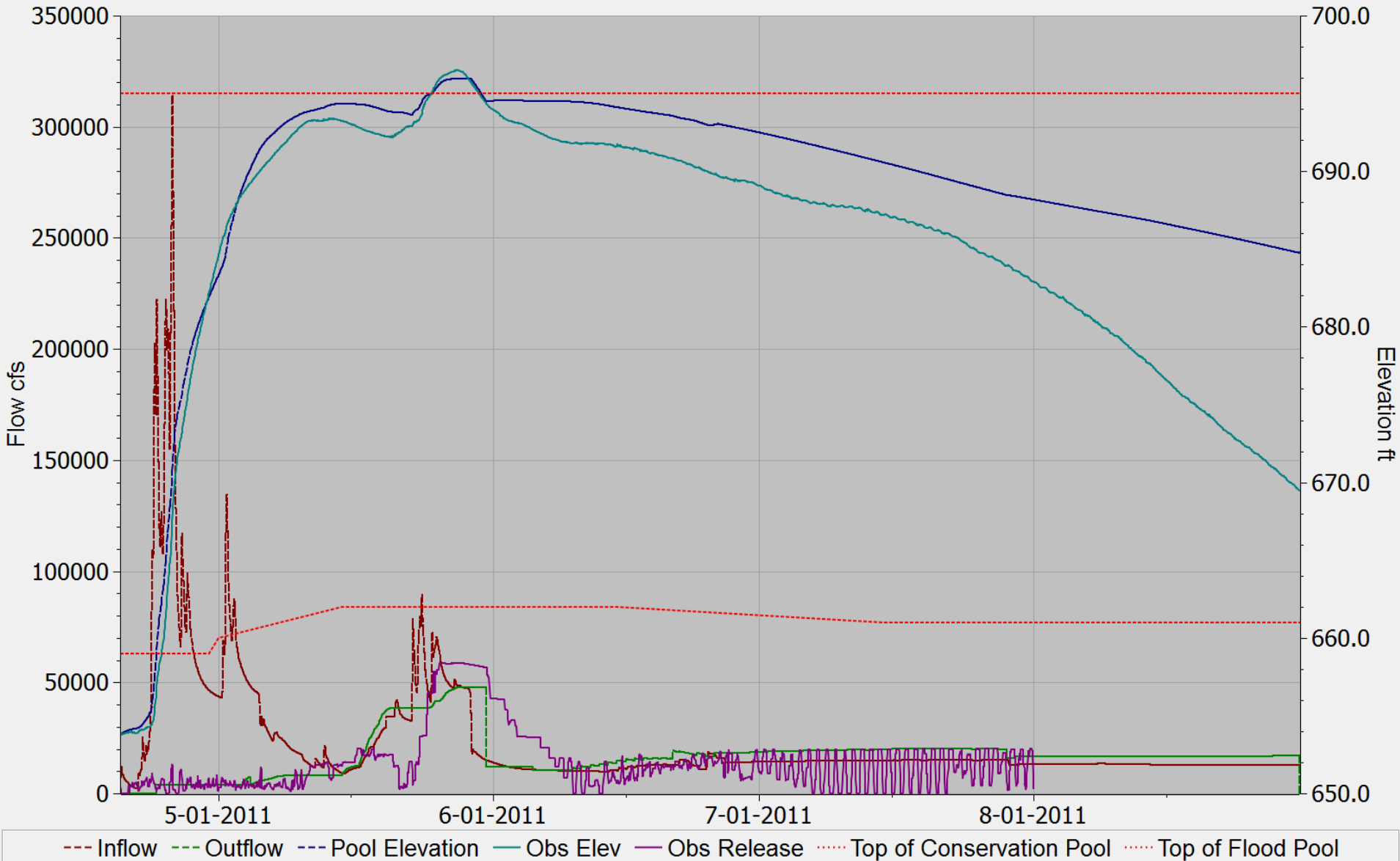
# Project Lake Level



### Percent Flood Storage for Three Lake System and Norfolk

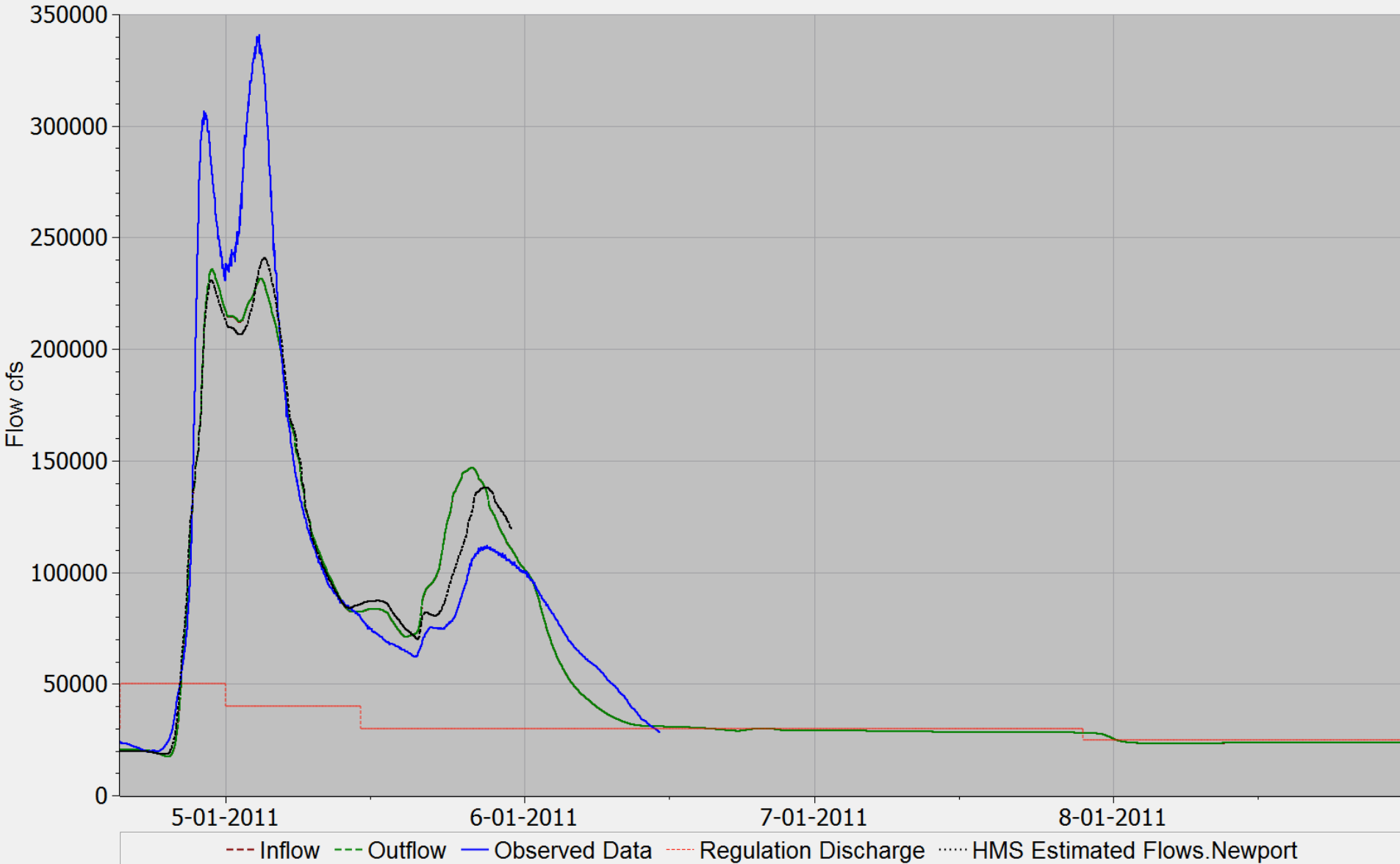


# Bull Shoals

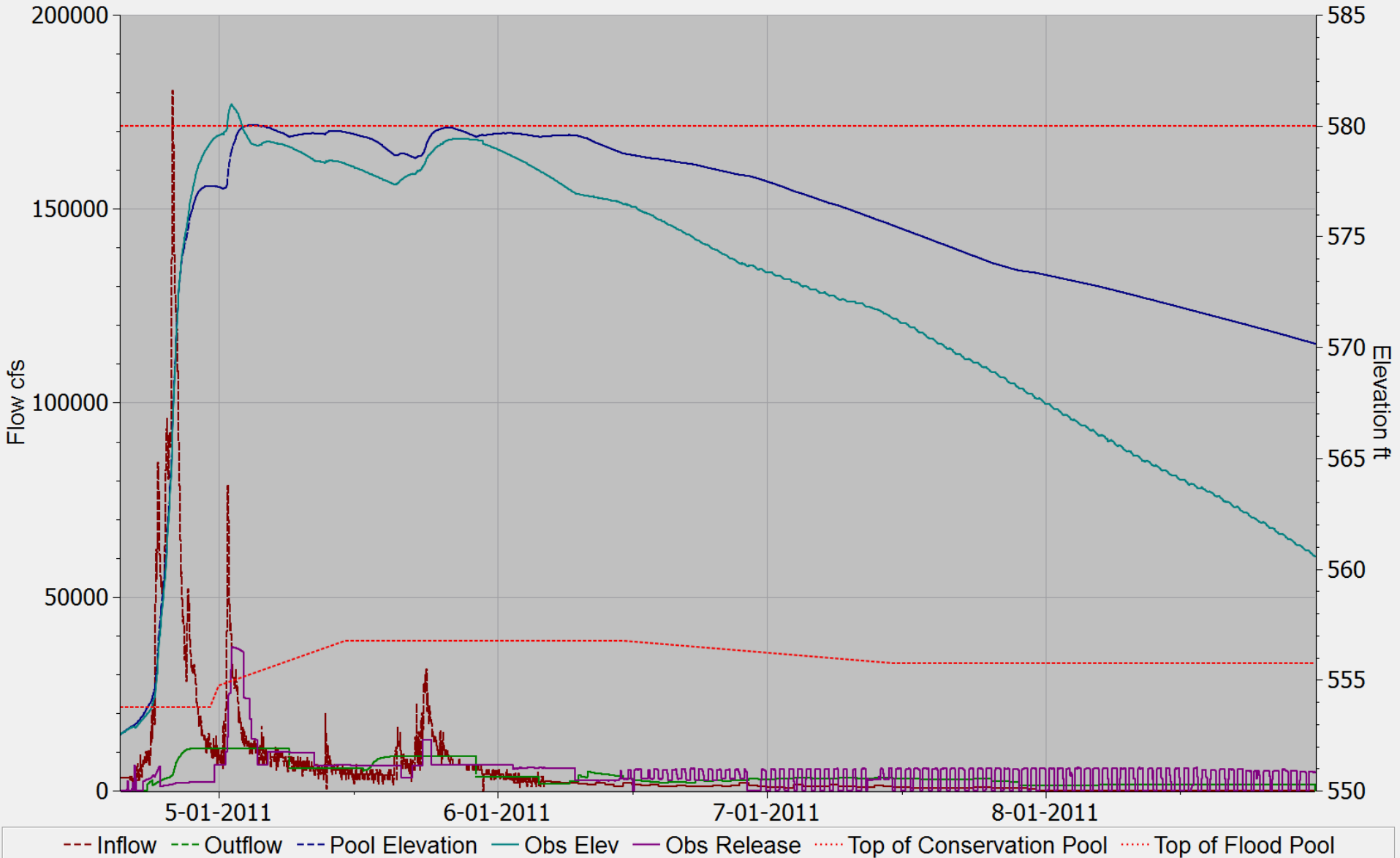




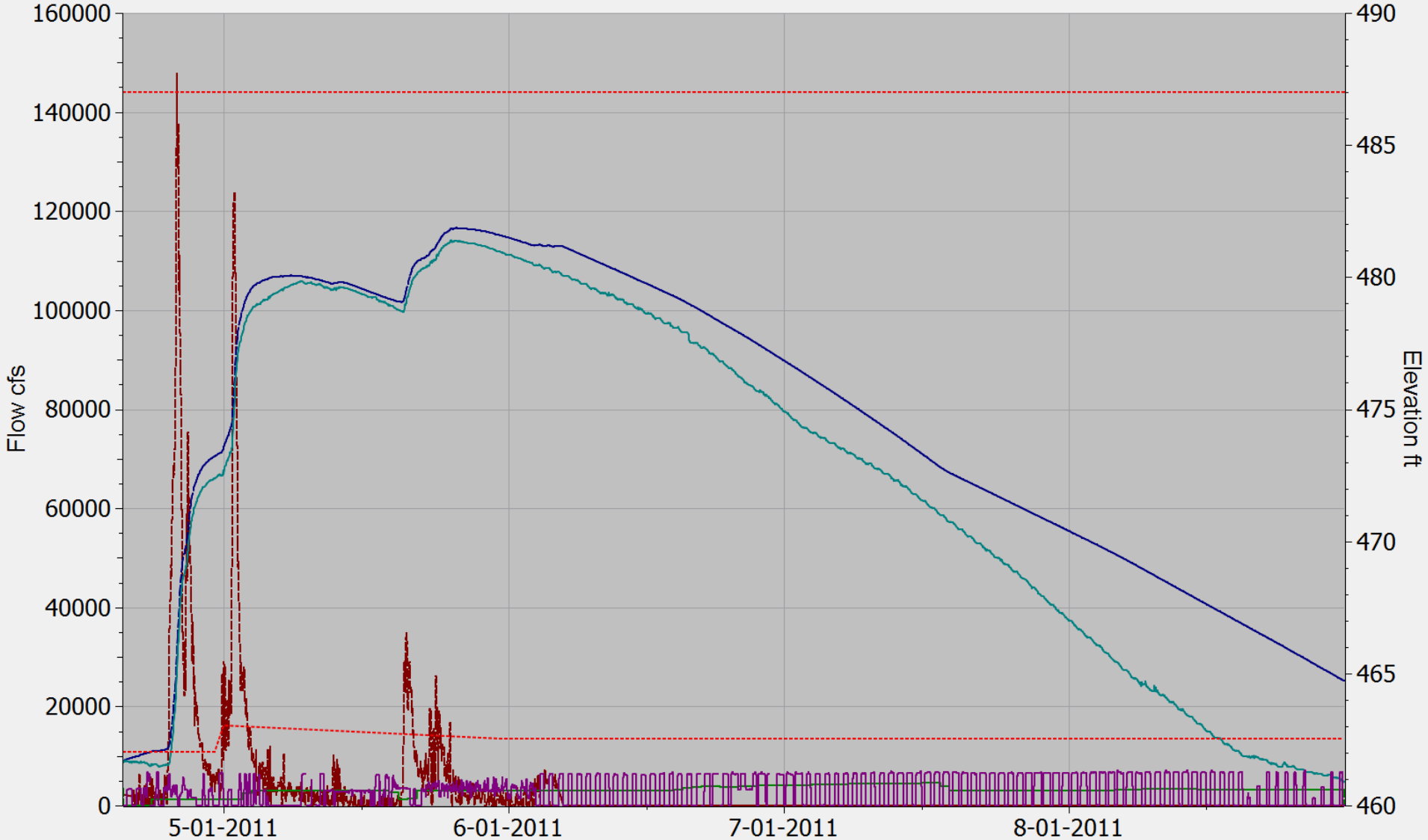
# Newport



# Norfolk

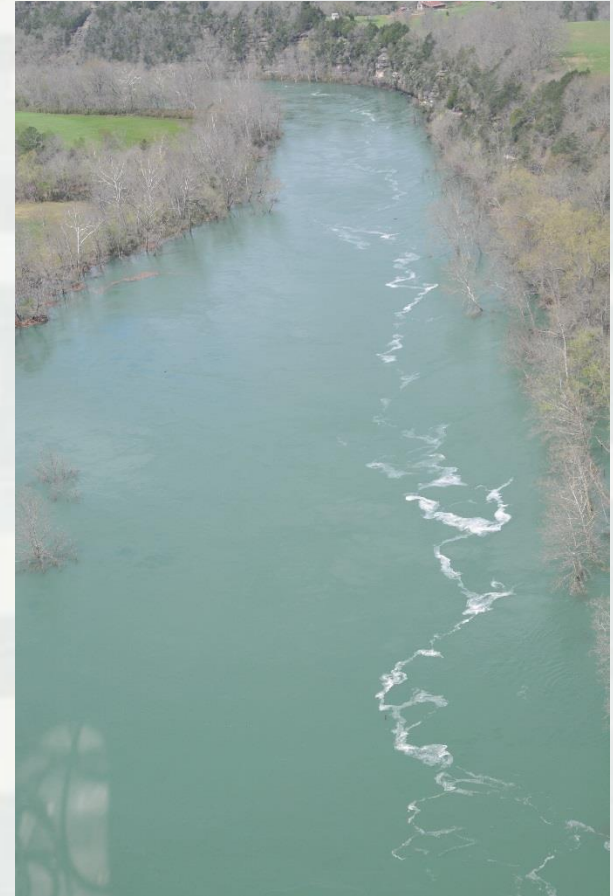


# Greers Ferry



# Remaining Work

- Fix routing
- Integrate into CWMS framework
- Testing, Testing, Testing



# Model Building

- Model Reconfiguration
  - ▶ Match HEC-HMS configuration and routing
  - ▶ Test run in simulation mode
- Modify rules and test routing
- Testing
- Review
- Testing





# Acknowledgments

- CADSWES
- Little Rock
  - ▶ Jan Jones
  - ▶ Steve Bays
  - ▶ Aaron Short



# Questions



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