

# Sediment eFlows



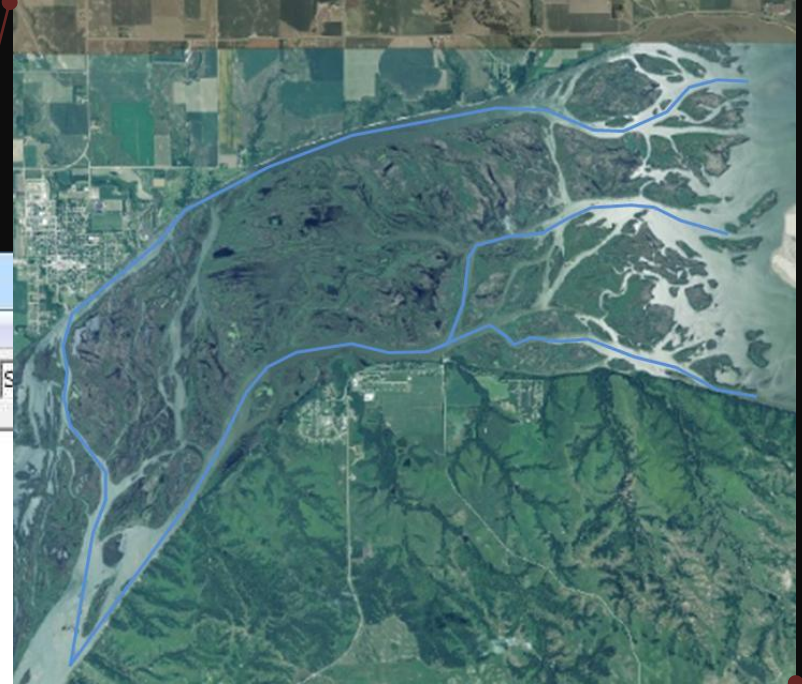
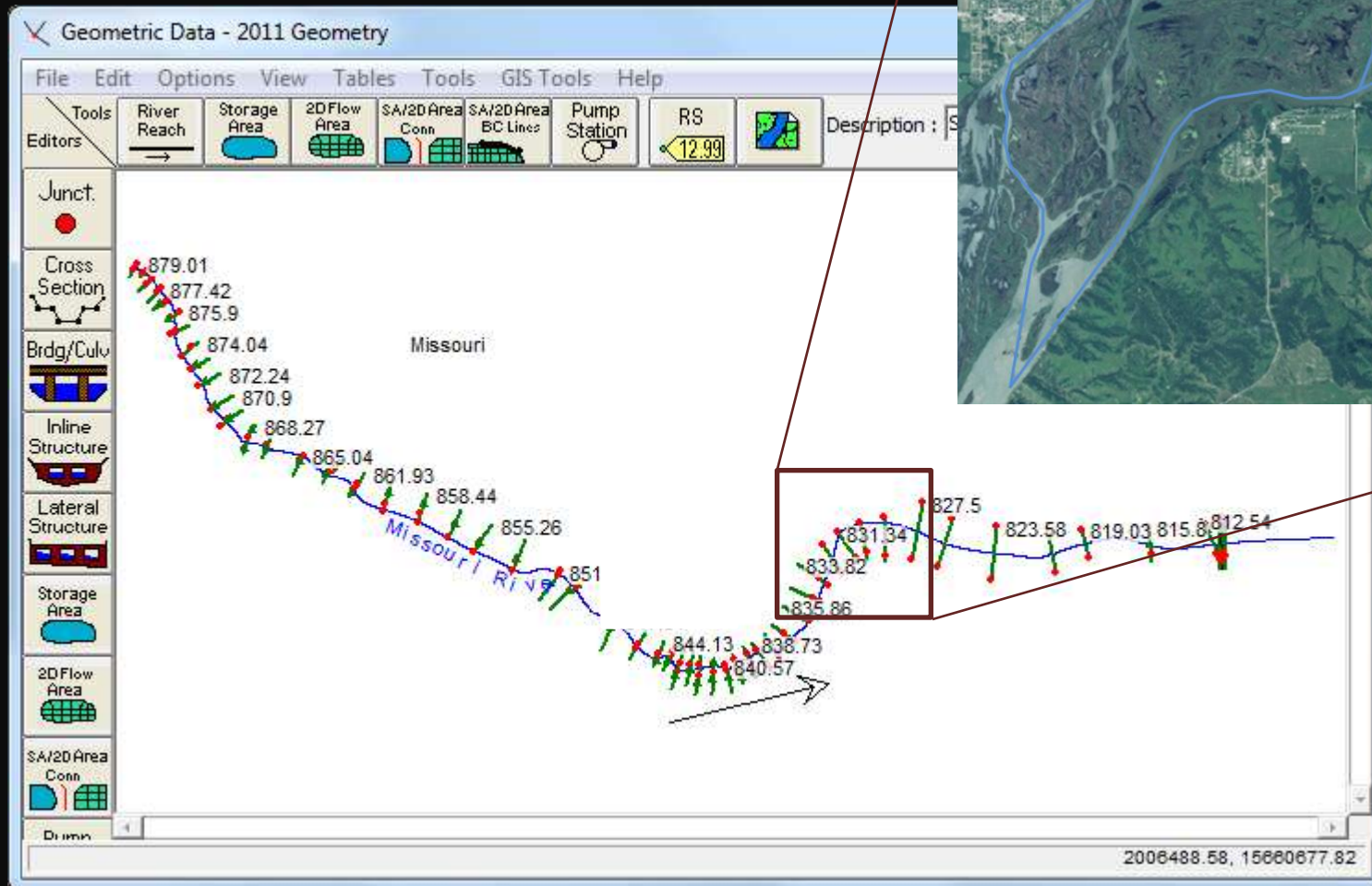
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Hydrologic Engineering Center

# Three Categories of Sediment eFlow Modeling Problems

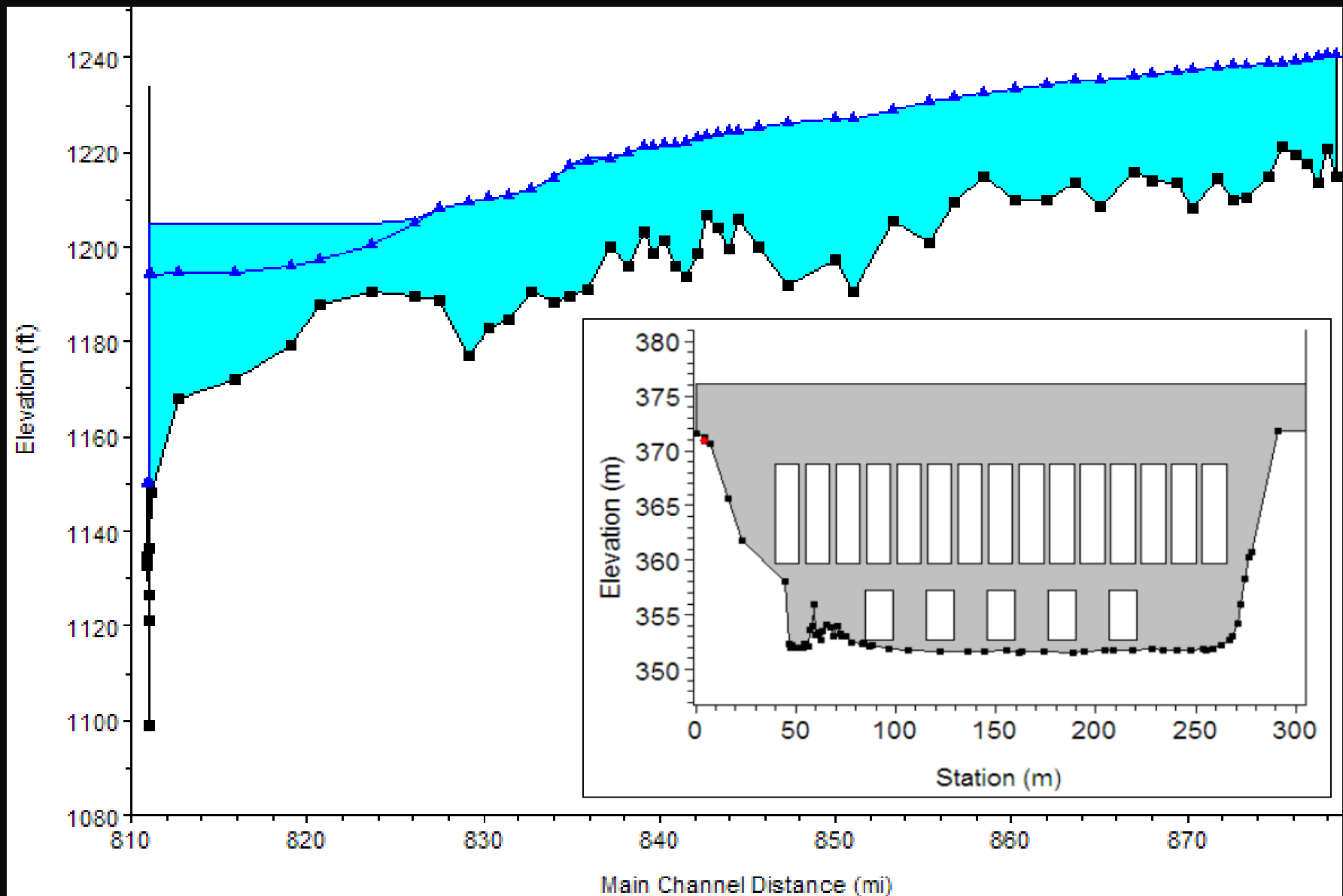
1. Operating for More Sediment
2. Operating for Less Sediment
3. Operating to Move Existing Sediment Around

More Sediment

# Lewis and Clark Flushing Model



# HEC-RAS Unsteady Model



# Sluicing – Lewis and Clark Reservoir

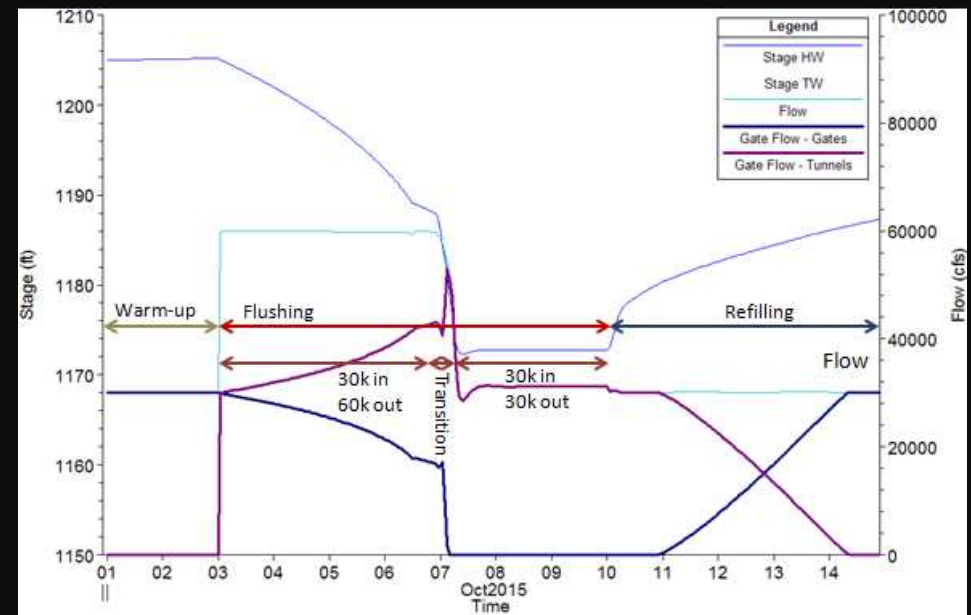
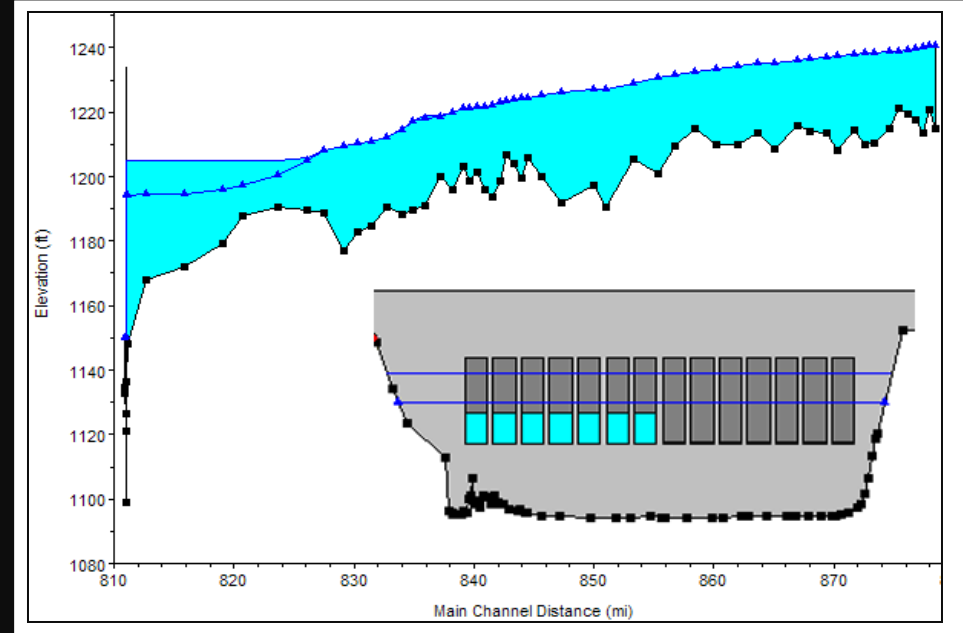
Implement unsteady sediment transport in HEC-RAS including operational rules.

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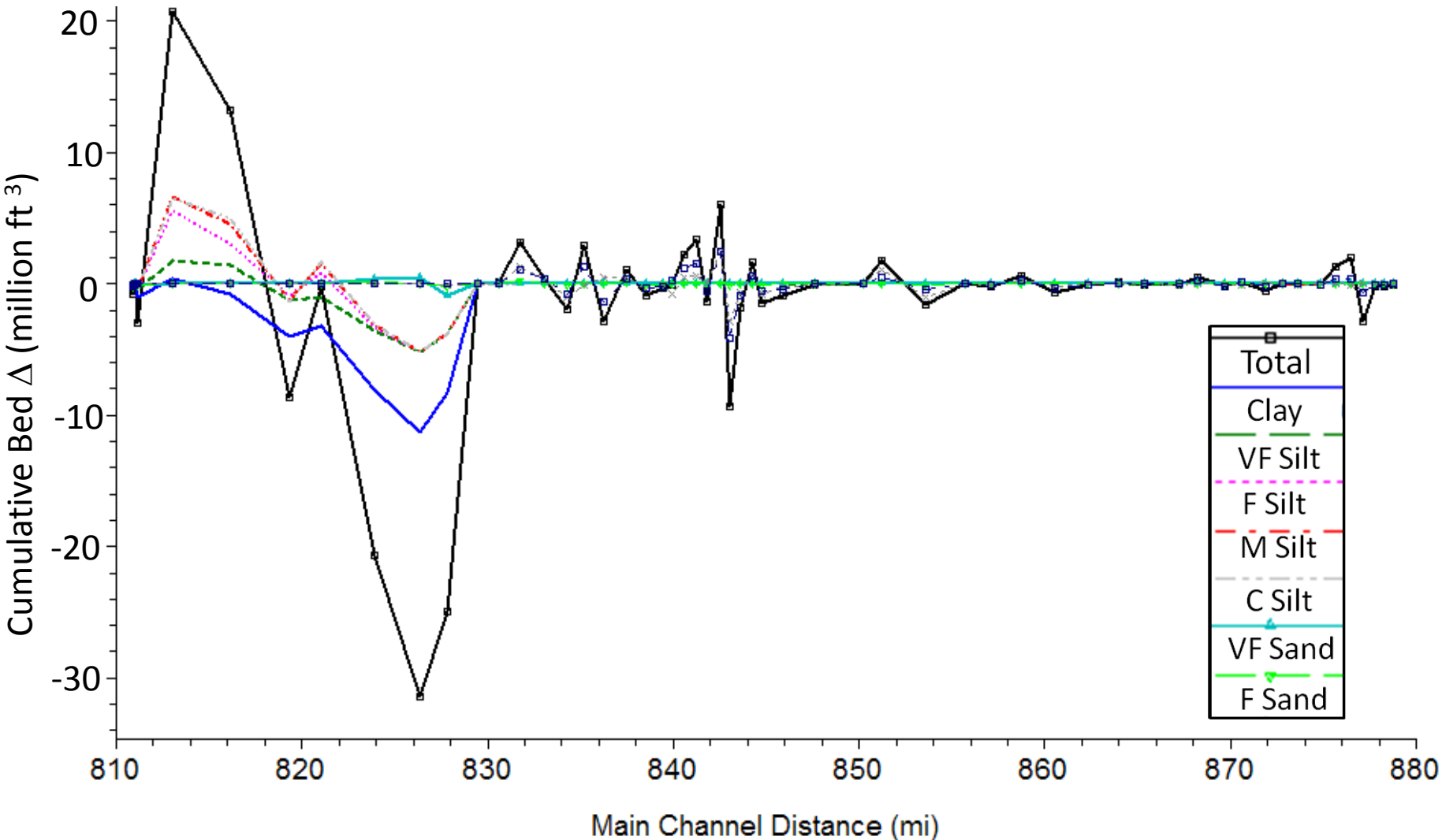
2  'Pool Stage' = Cross Sections:WS Elevation(Missouri River,Missouri,811.076
3  'RunTime' = Time:Hour of Simulation(Beginning of time step)  Get Sim Value
4  !
5  !
6  Structure.Total Flow (Desired) = 60000  Set Operational Param
7  !
8  ! Start to fill after 11 total days of run time  Comment
9  If ('RunTime' > 246) And ('Pool Stage' < 1205) Then
10     Structure.Total Flow (Desired) = 5000
11     Elself ('RunTime' > 246) And ('Pool Stage' >= 1205) Then  Branch (If/Else)
12         Structure.Total Flow (Desired) = 30000
13     End If
    
```

Allows complex, automatic, sediment reservoir modeling.

Reservoirs can now be included as part of regional sediment system models



# Sluicing – Lewis and Clark Reservoir





# Spencer Reservoir Validation

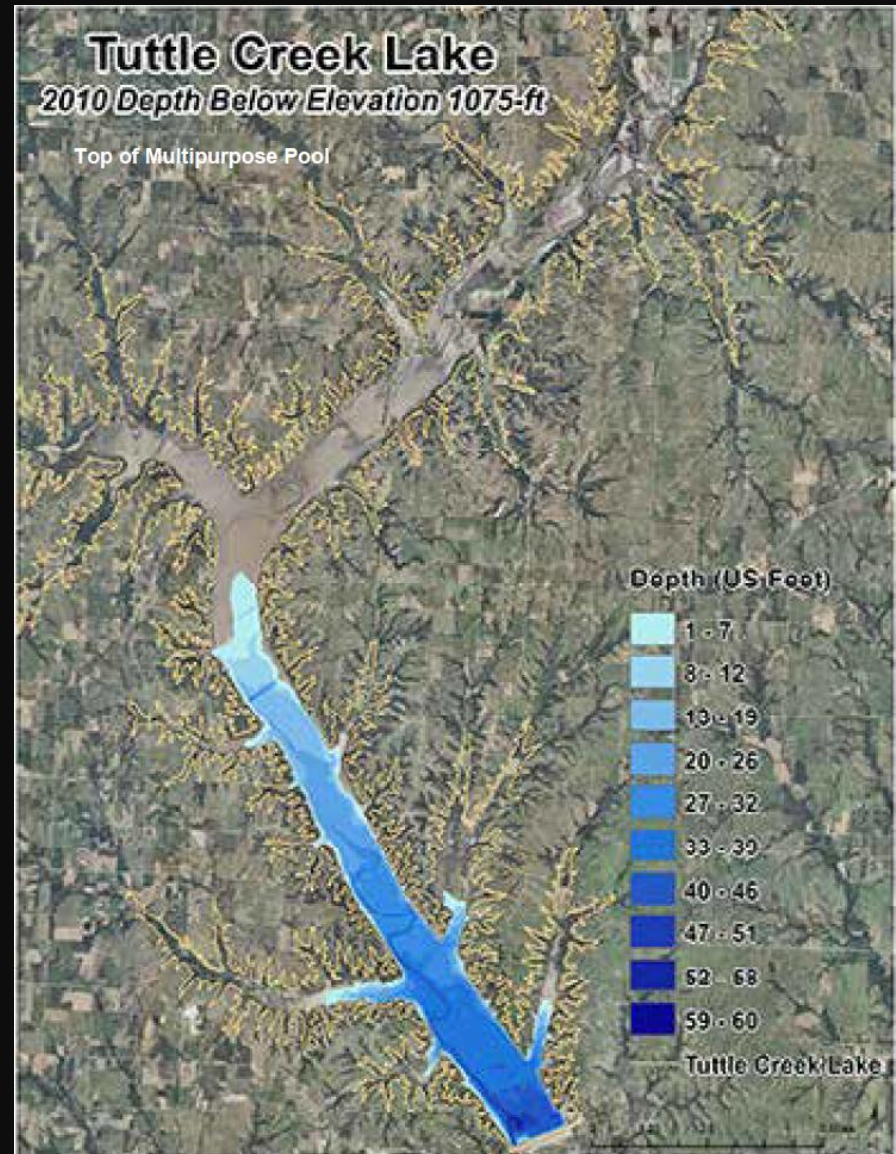
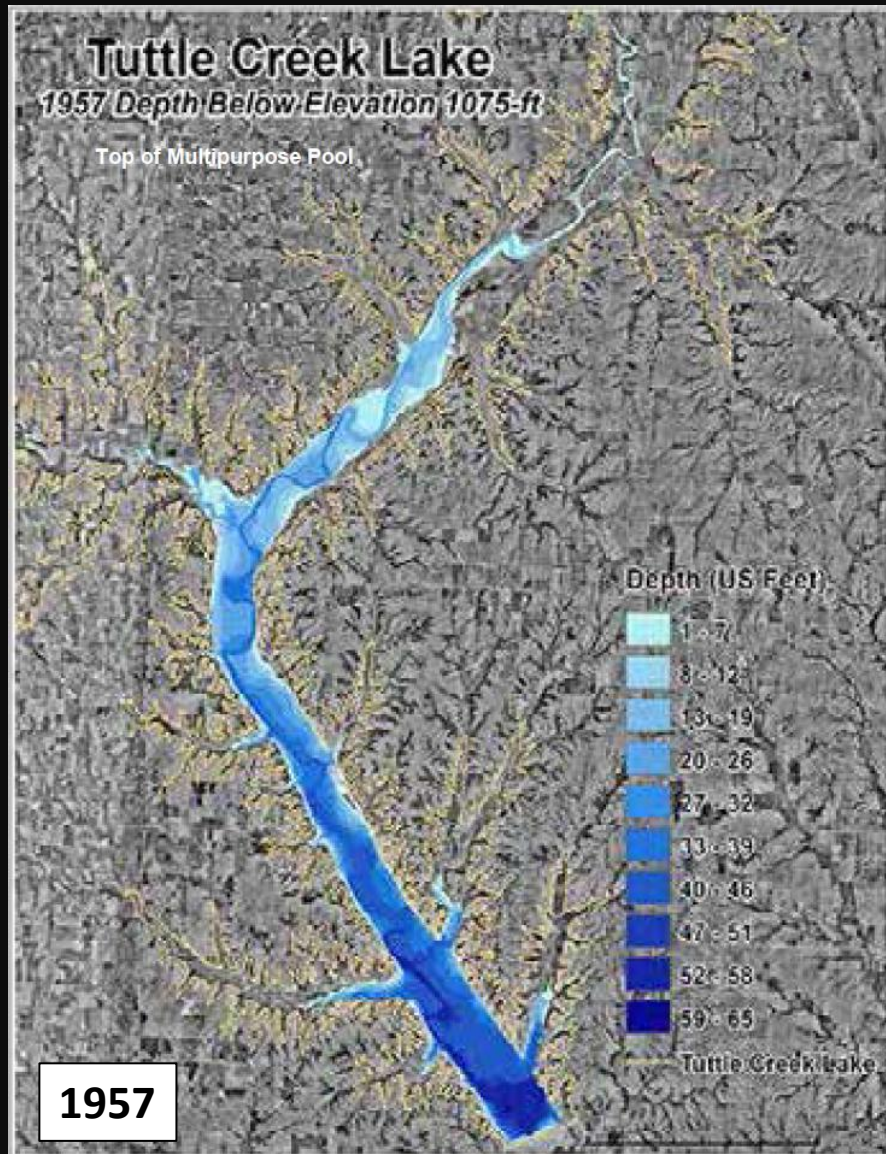




Less Sediment

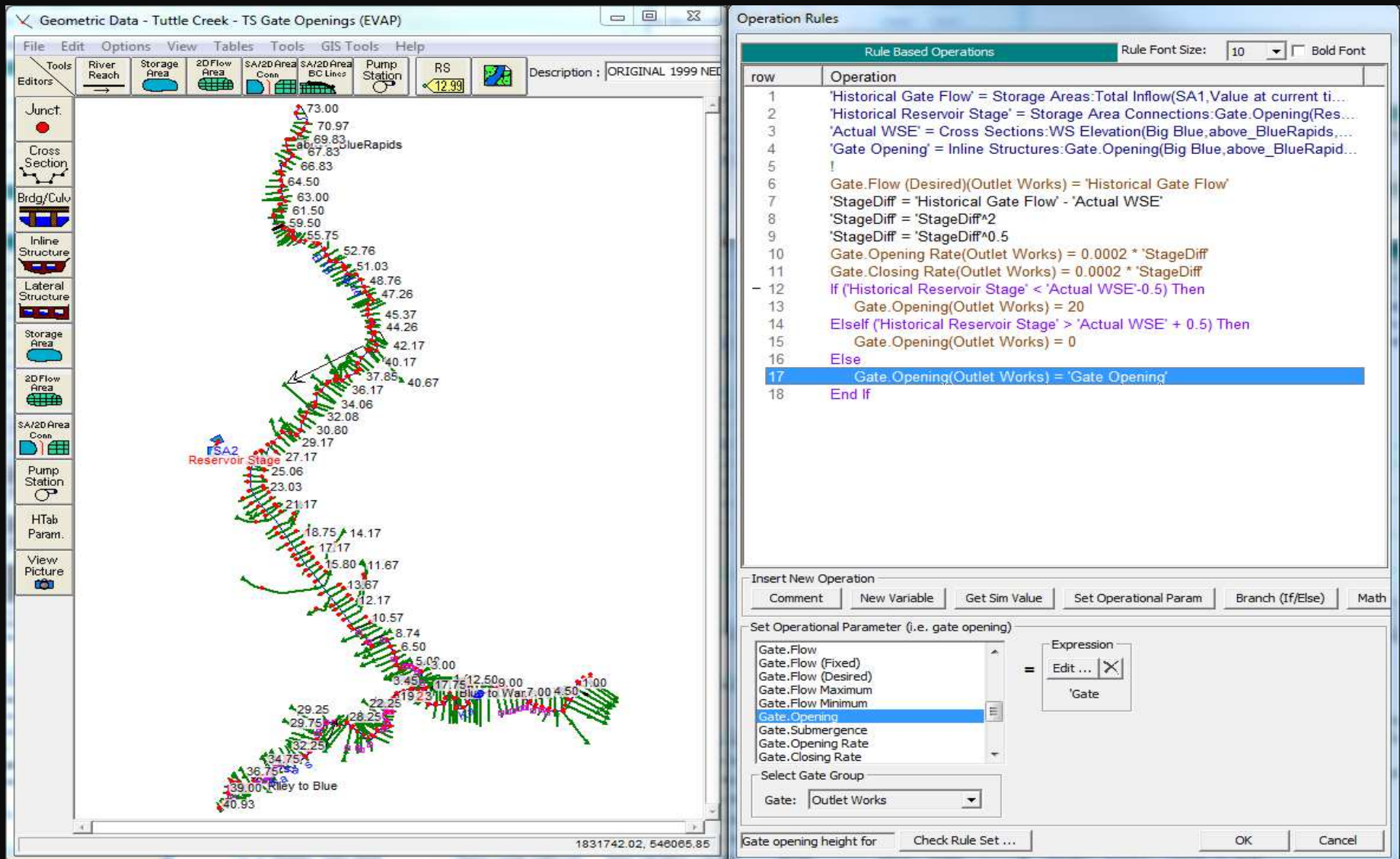
# Reservoir Management

## Flushing – Tuttle Creek Reservoir





# Tuttle Creek Sediment Routing Model



# Operating on Sediment Variables

Operation Rules

Rule Based Operations Rule Font Size: 10 Bold Font

row	Operation
1	'Concentration' = Cross Sections.Sediment Concentration(Nittany River,Weir Reach,60.1,Value at ...
2	Real "
3	If ('Concentration' < 500) Then
4	Structure.Total Flow (Desired) = 40000
5	Else
6	Structure.Total Flow (Desired) = 30000
7	End If

Insert New Operation

Comment New Variable Get Sim Value Set Operational Param Branch (If/Else) Math Table

Get Simulation Value

Assign Result

☐ Existing Variable

☒ New Variable

Concentration

Cross Sections

- WS Elevation
- Flow
- WS Change
- Flow Change
- WS Error
- Flow Error
- Bed Change**
- Sediment Concentration**

Inline Structures

Lateral Structures

Set Node Location

River: Nittany River

Reach: Weir Reach

RS: 60.1

Value :

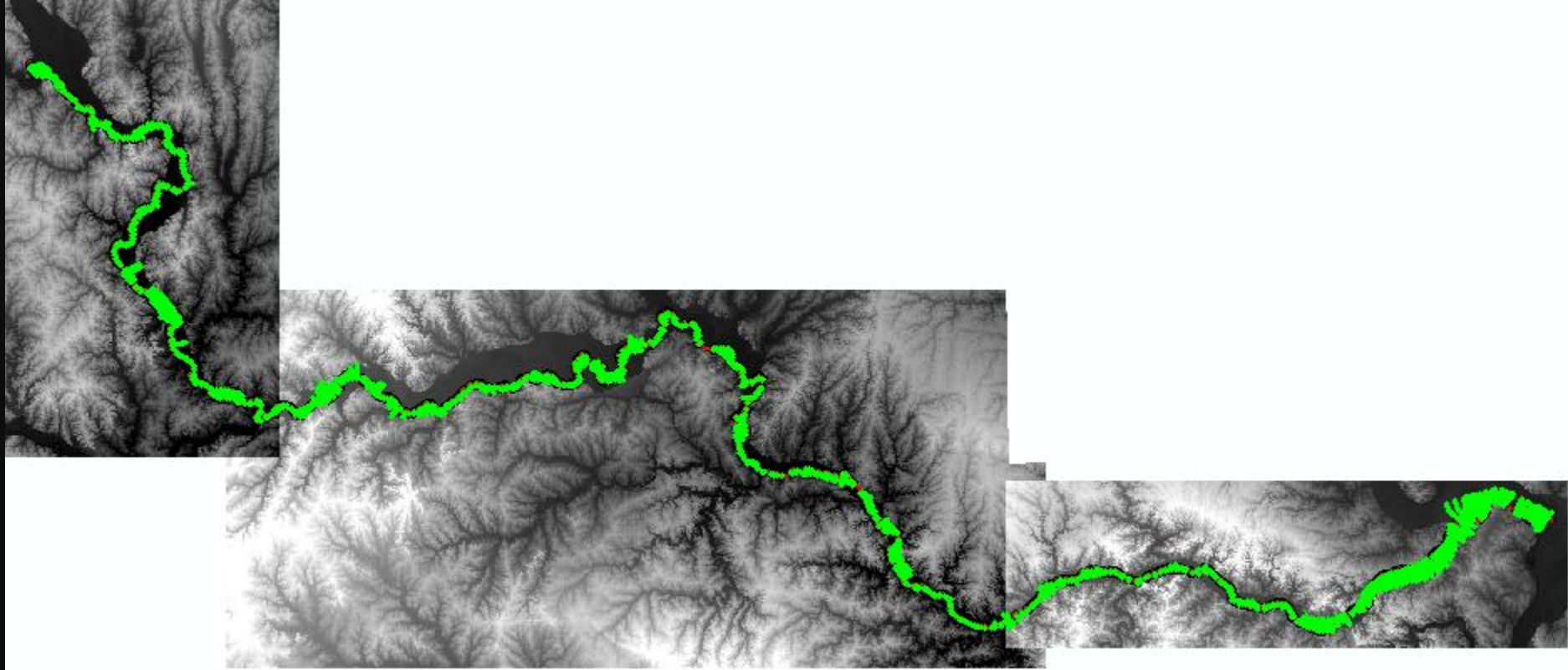
(Simulation variables in bold are only available)

Check Rule Set ... OK Cancel

Rearrange Sediment



# Missouri Sediment Model



# ESH GIS Toolbox

