



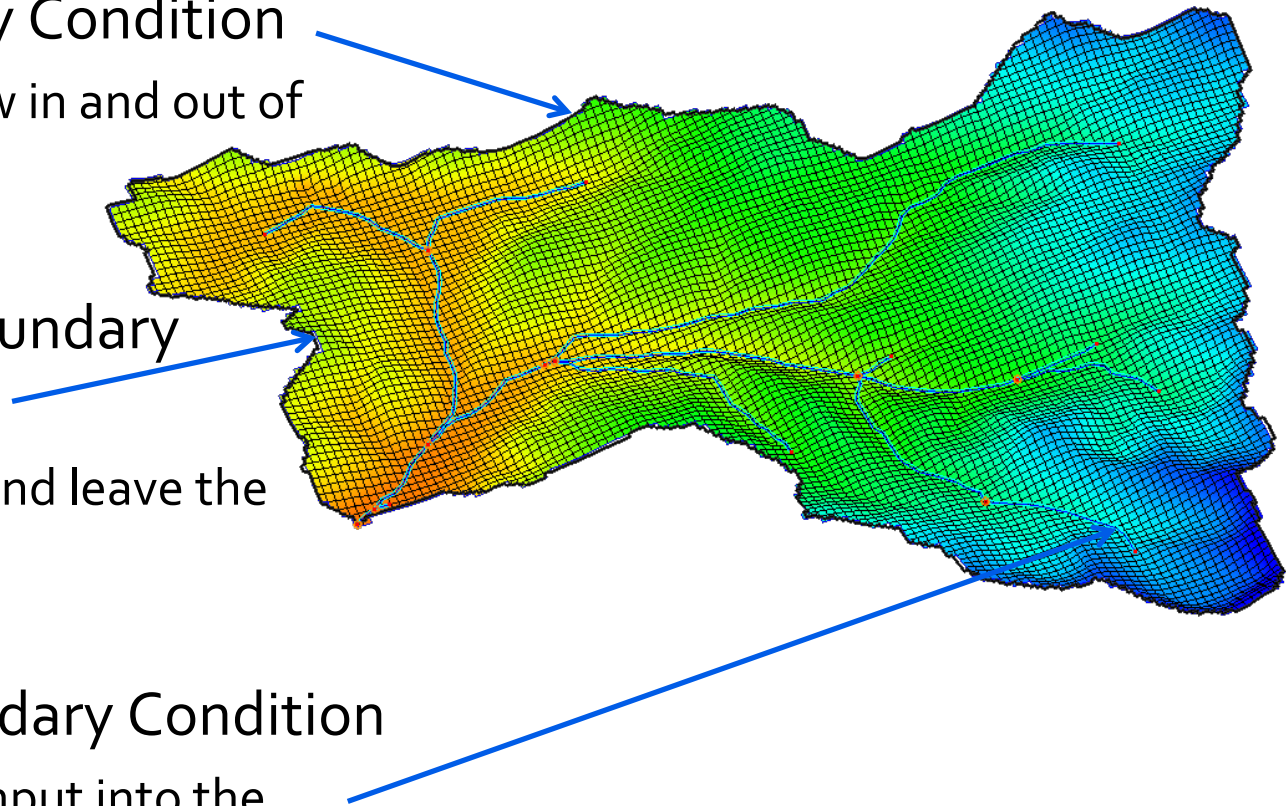
GSSHA Boundary Conditions





Types of BC's

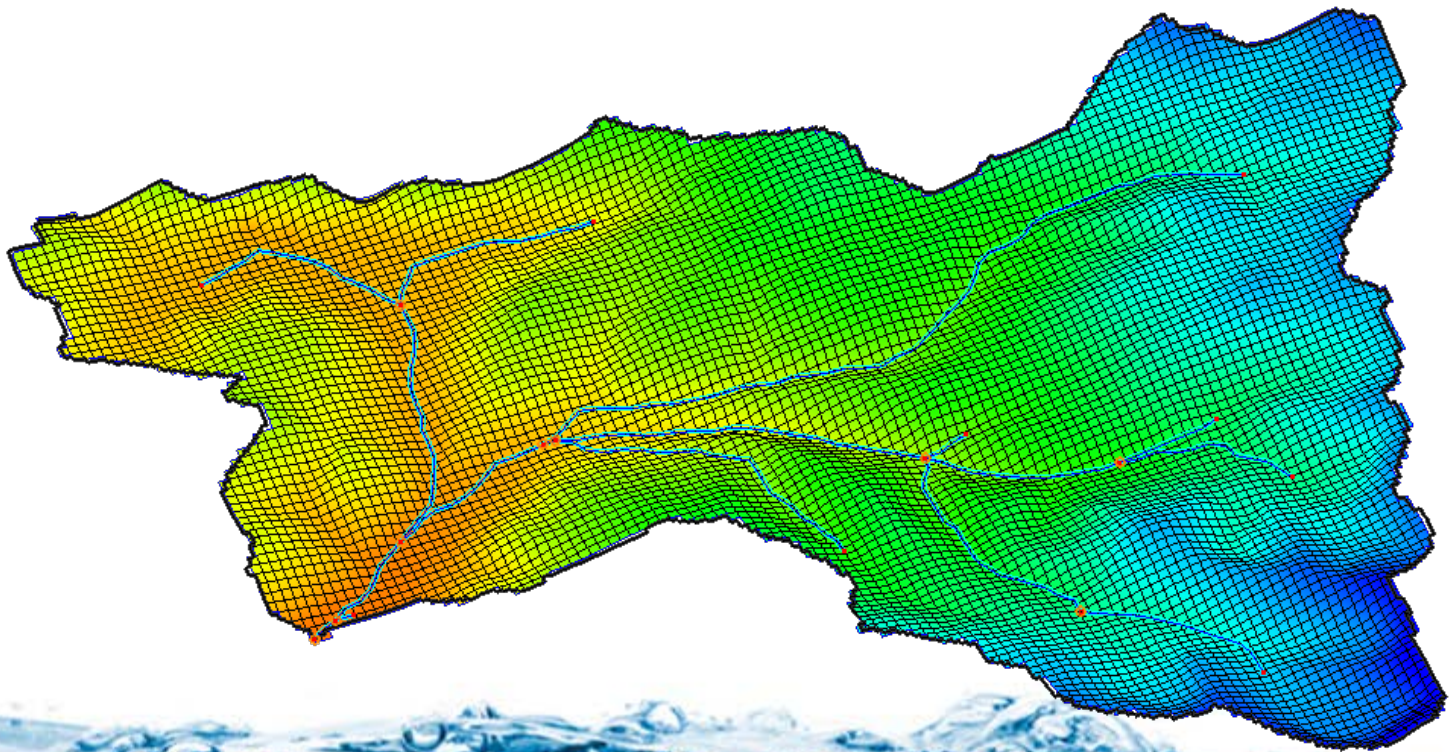
- No Flow Boundary Condition
 - Water cannot flow in and out of this boundary
- Overland Flow Boundary Condition
 - Water can enter and leave the boundary cells
- Hydrograph Boundary Condition
 - A hydrograph is input into the channel





No Flow Boundary

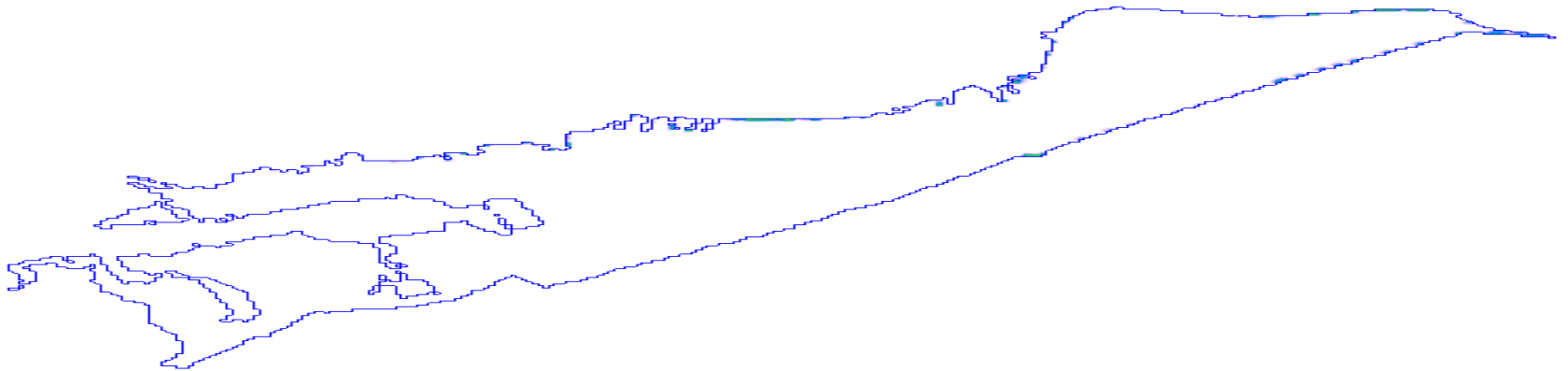
- Default BC
- Water cannot flow in and out of this boundary
eg Watershed divide





Overland Flow Boundary

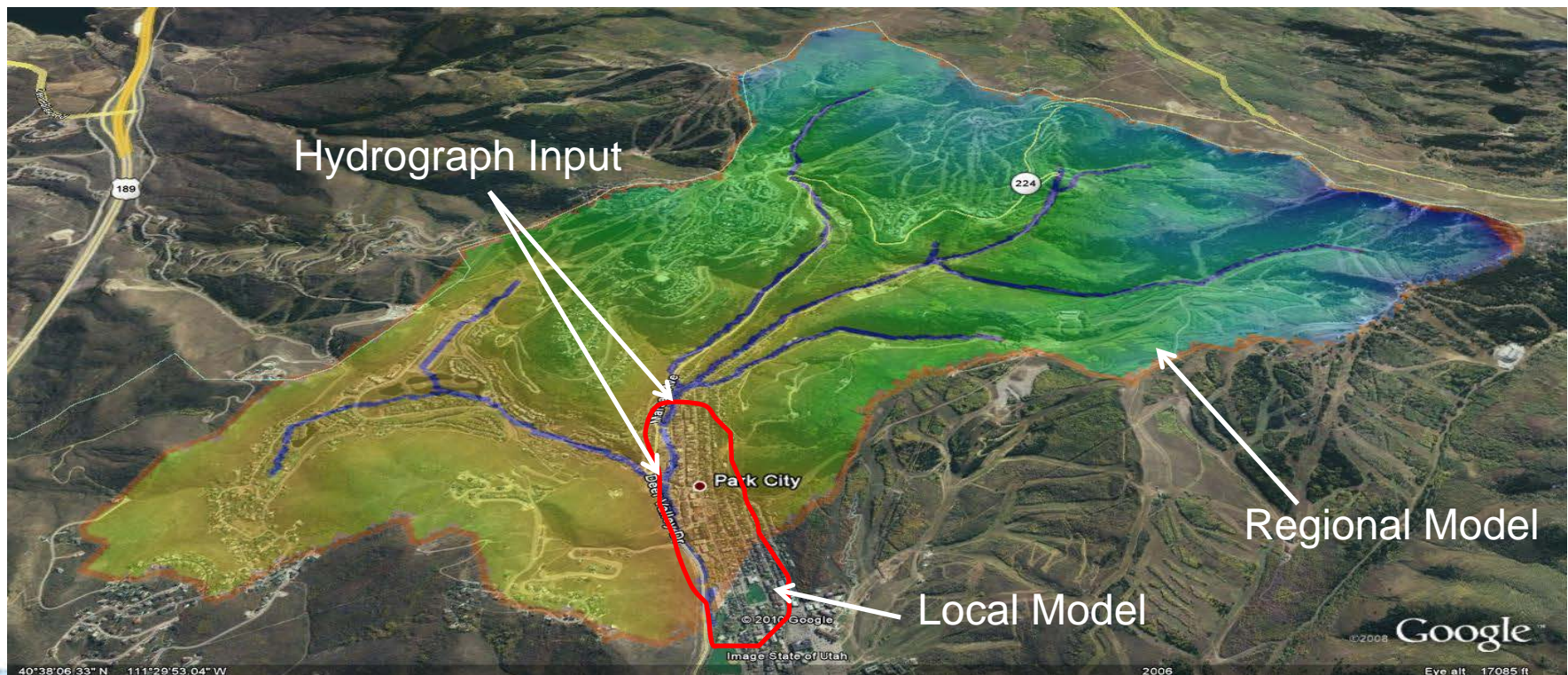
- Overland Flow Boundary Condition
 - Water can enter and leave the overland grid cells
 - Used to simulate flood surge





Hydrograph Boundary

- A hydrograph is input into the channel node
- The hydrograph can come from
 - Regional model upstream
 - Flood surge generated from reservoir operation or dam break





Overbank Flow

- How does GSSHA decide to put water into the channel?
- Three options
 - Default
 - Overland_Backwater card
 - Overbank_Flow card

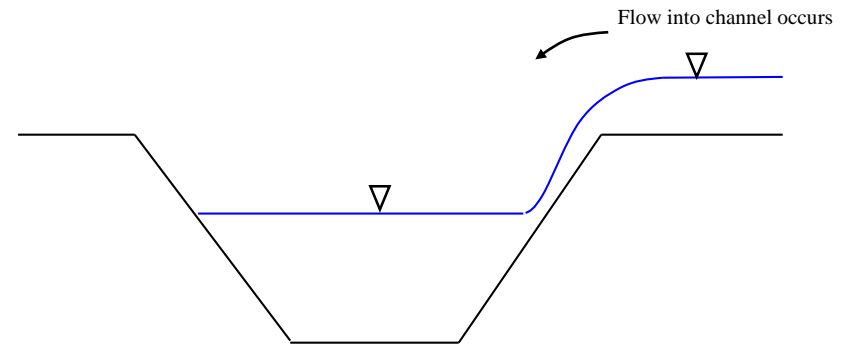
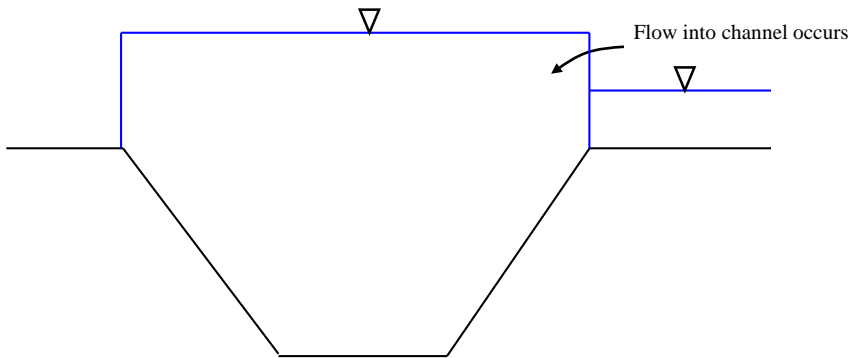




Overbank Flow

- Default – “Everything goes in, nothing goes out”

No Flow occurs

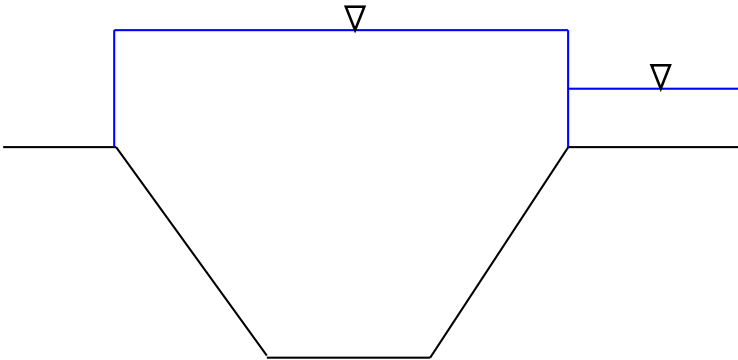




■ Overland_Backwater

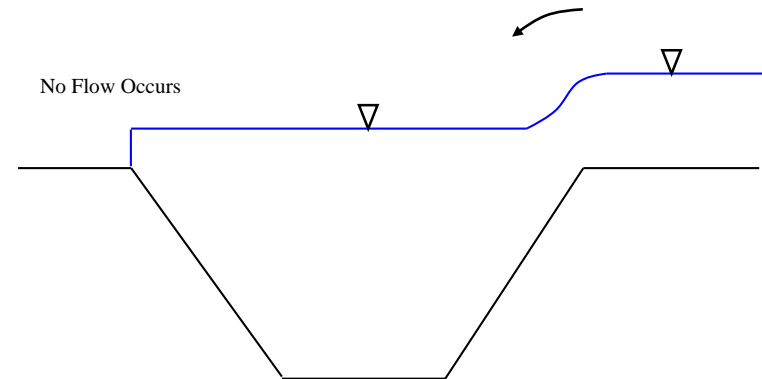
No Flow Occurs

No Flow Occurs



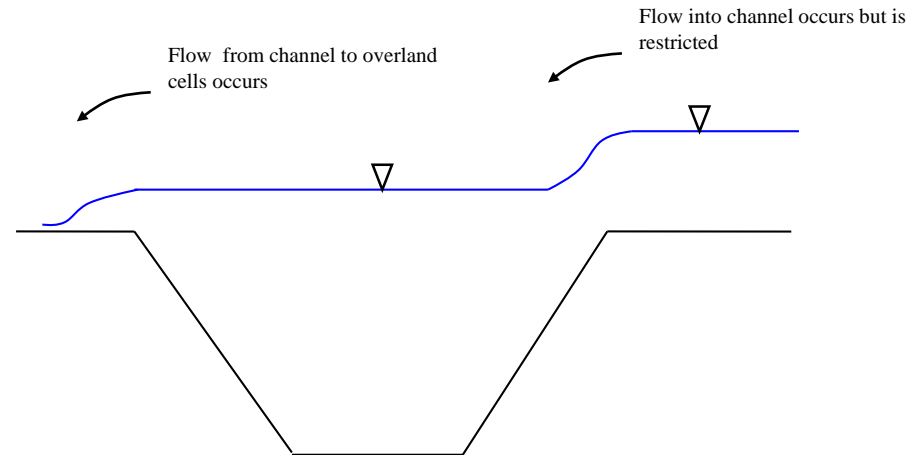
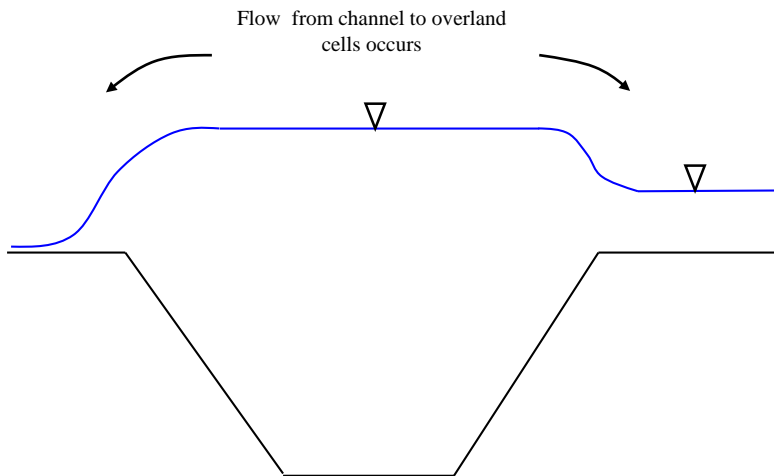
No Flow Occurs

Flow into channel occurs but is
restricted





■ Overbank_Flow





Precipitation??

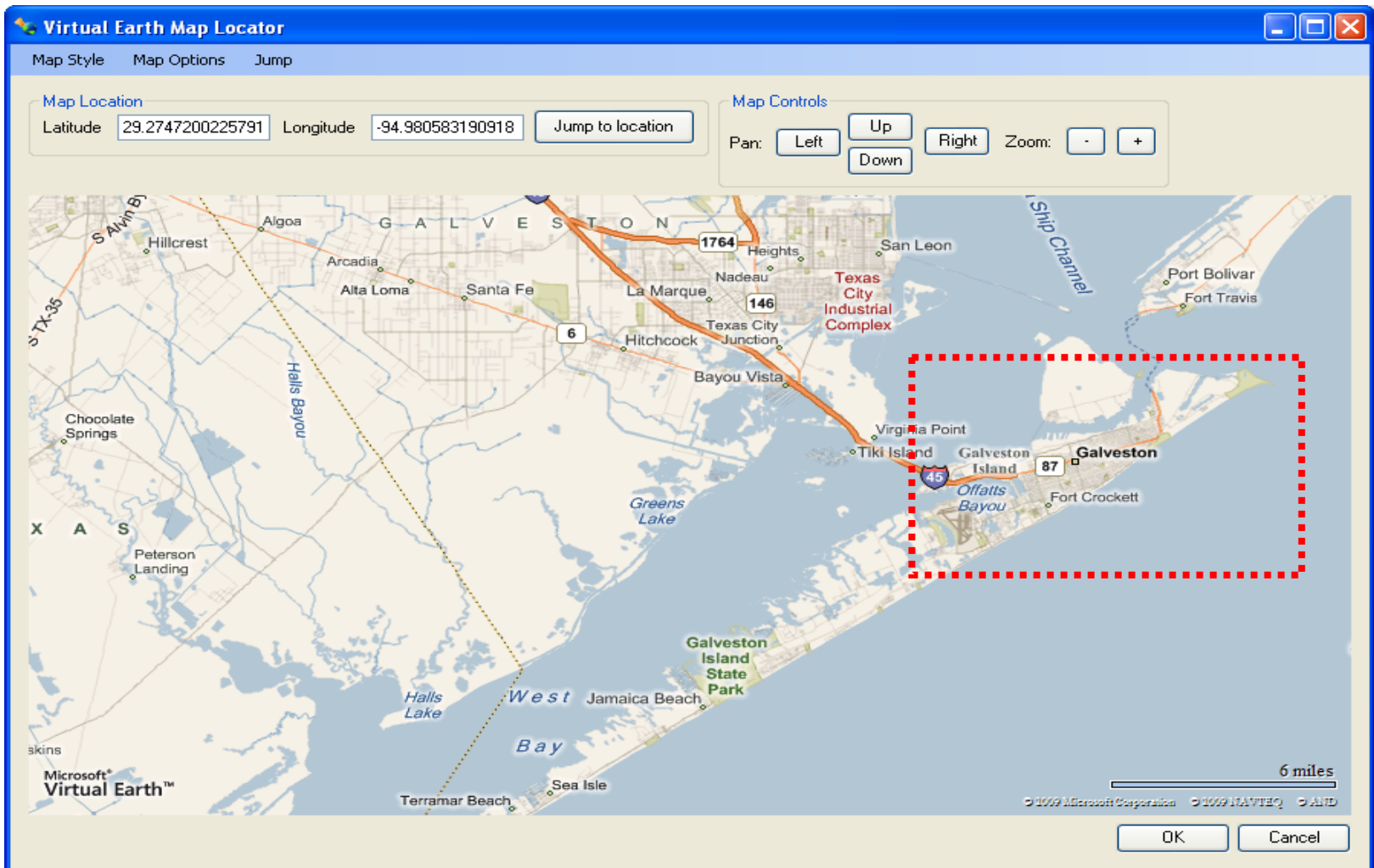
- We are simulating a model in which rainfall is not the driving force
- But GSSHA needs some value of precipitation to run
- In the models that you will use for this workshop, a small amount of precipitation is already defined.
- Since the effect of overland surge or the hydrograph input is so large that the effect of rainfall can be negligible





Modeling Workshop

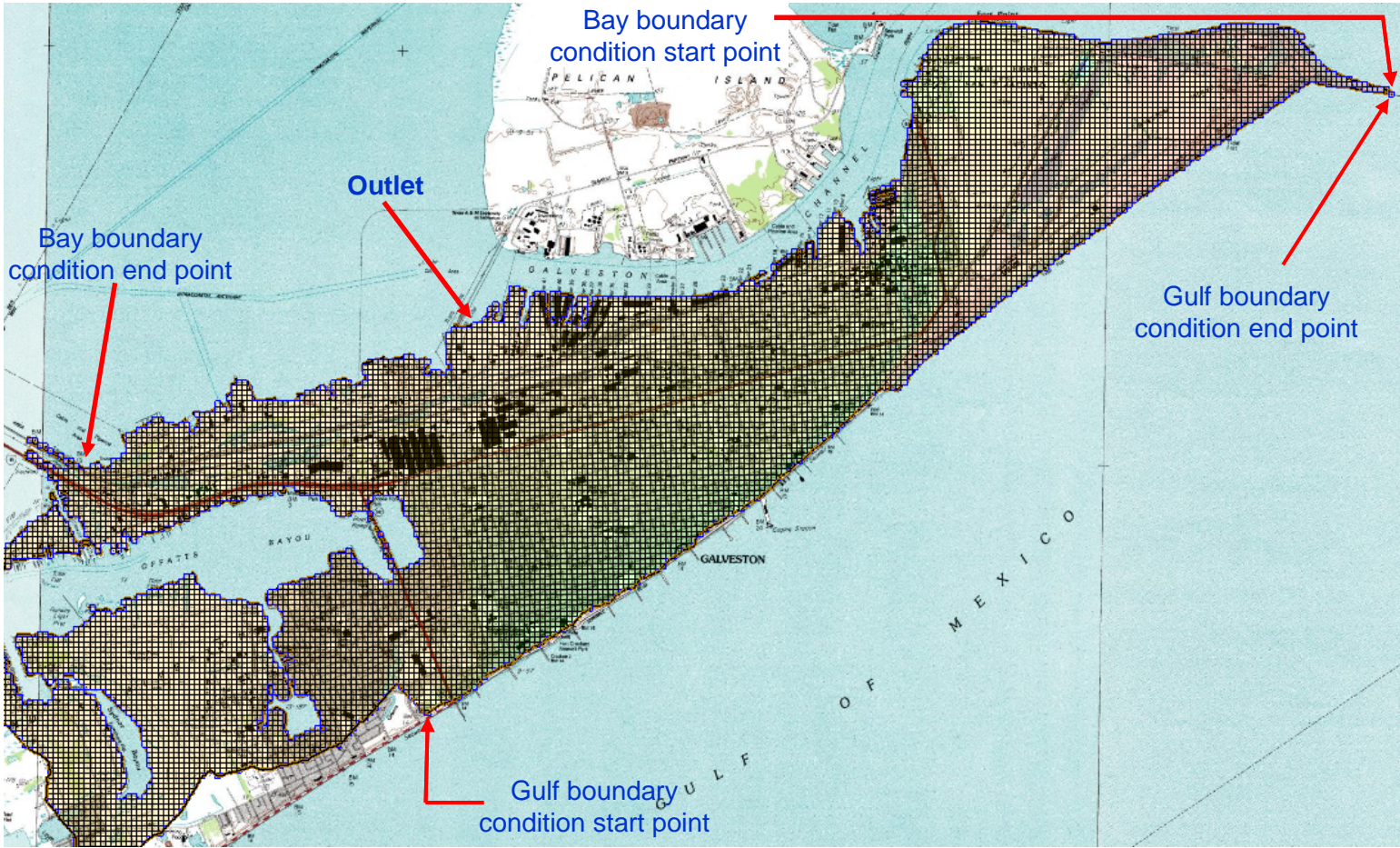
Galveston Island, Texas





Modeling Workshop


Boundary Arcs





Modeling Workshop

Defining BC

 Properties

Feature type:

Arcs

Show:

Selected

Filter using: Column:

None

Value:

ID	Type	Groundwater BC	Flow BC Type	Variable Depth BC	Constant BC	Solution Results
All			
11786	Generic	Generic	Variable depth	...	0.0	...

Help...

OK

Cancel

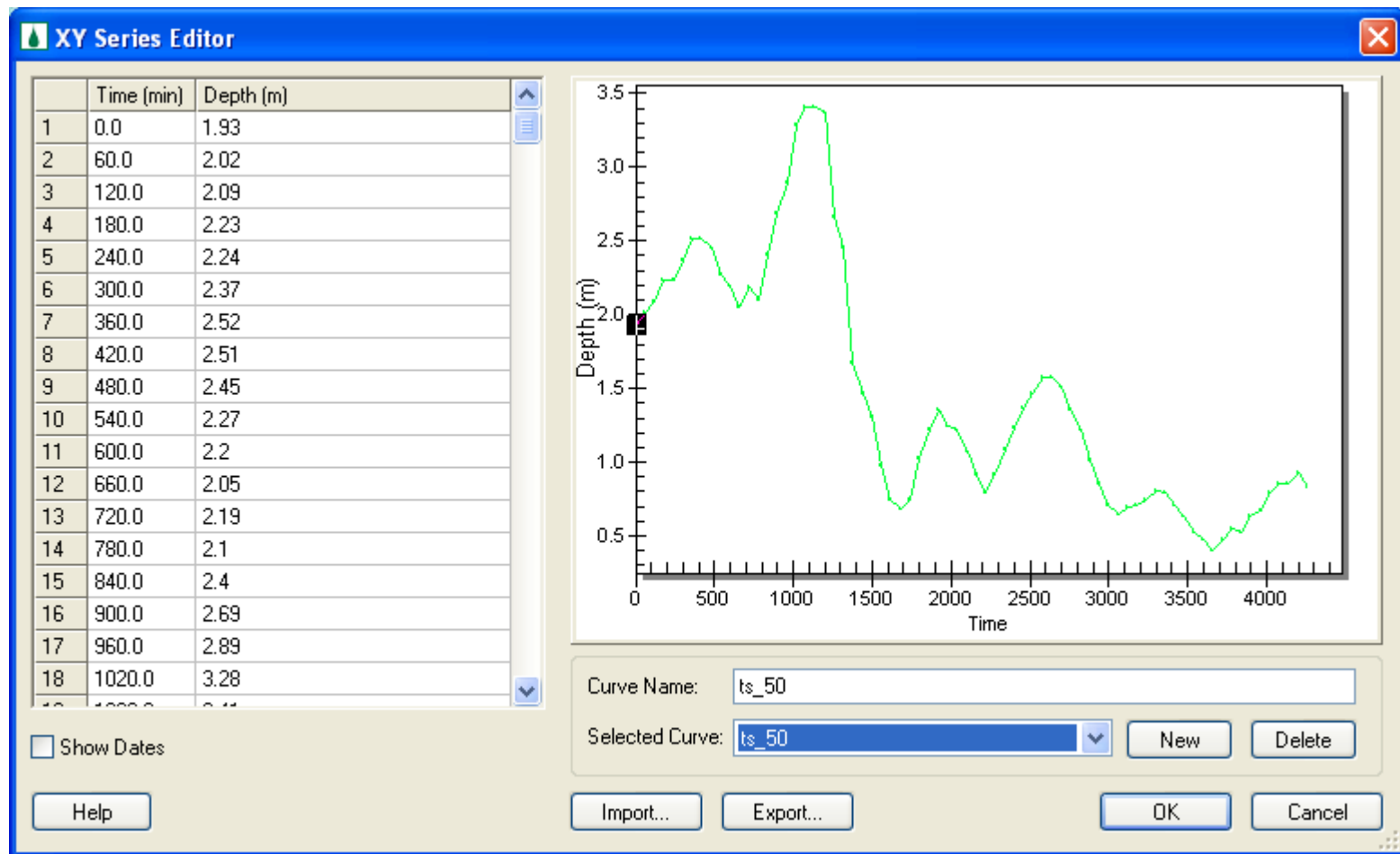




Modeling Workshop

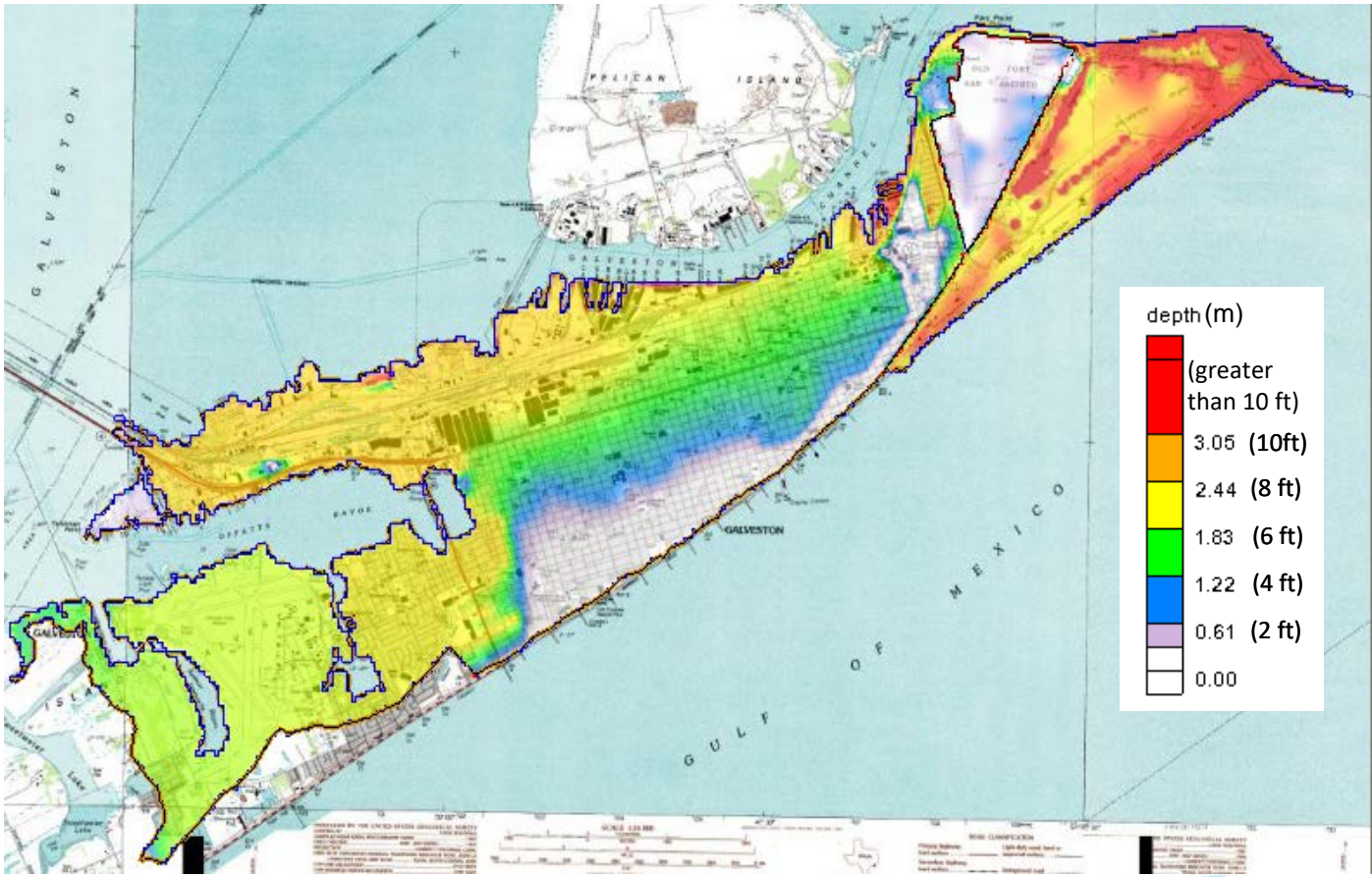
Watershed Management and Modeling

Defining storm surge time series





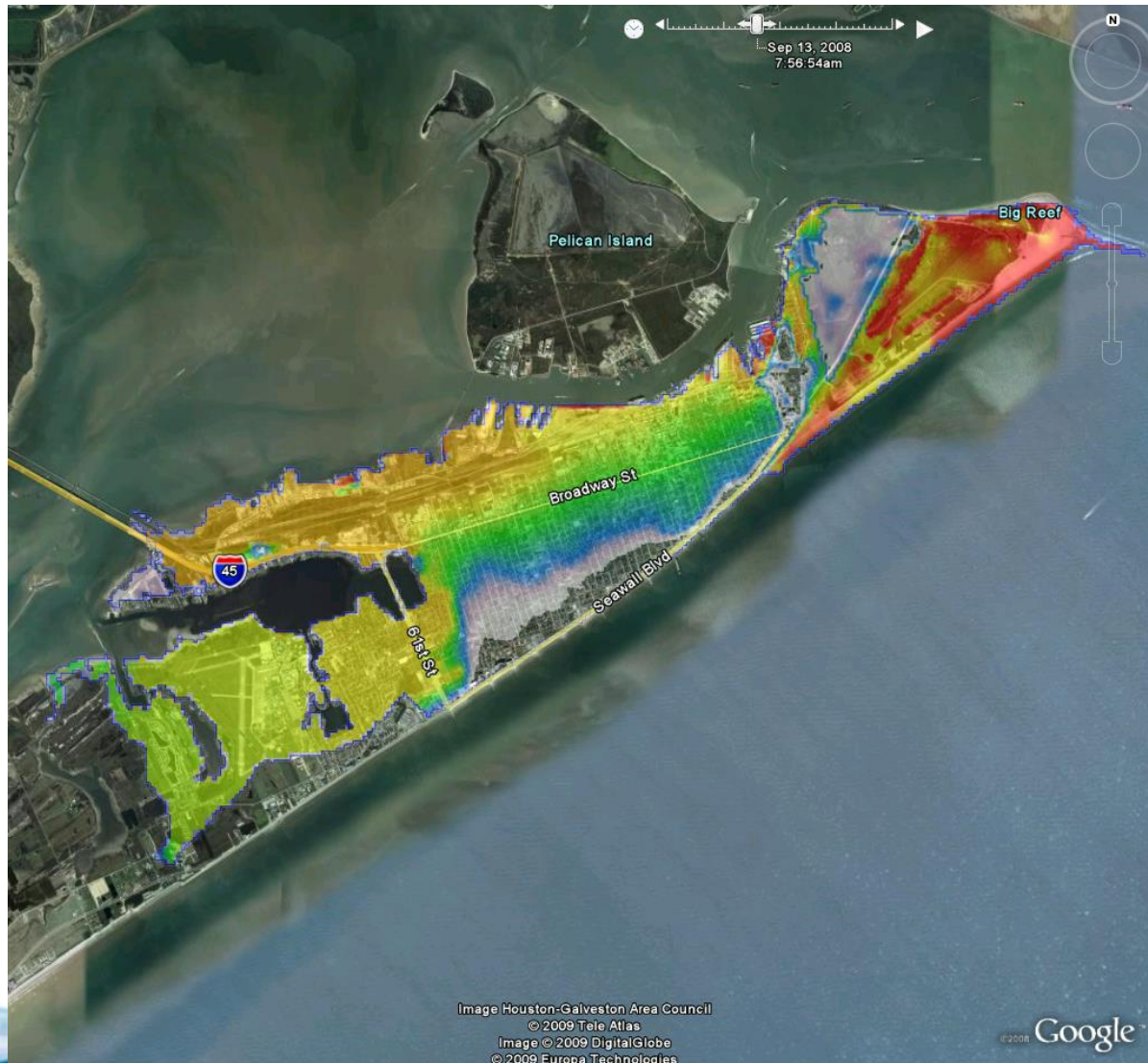
View Results





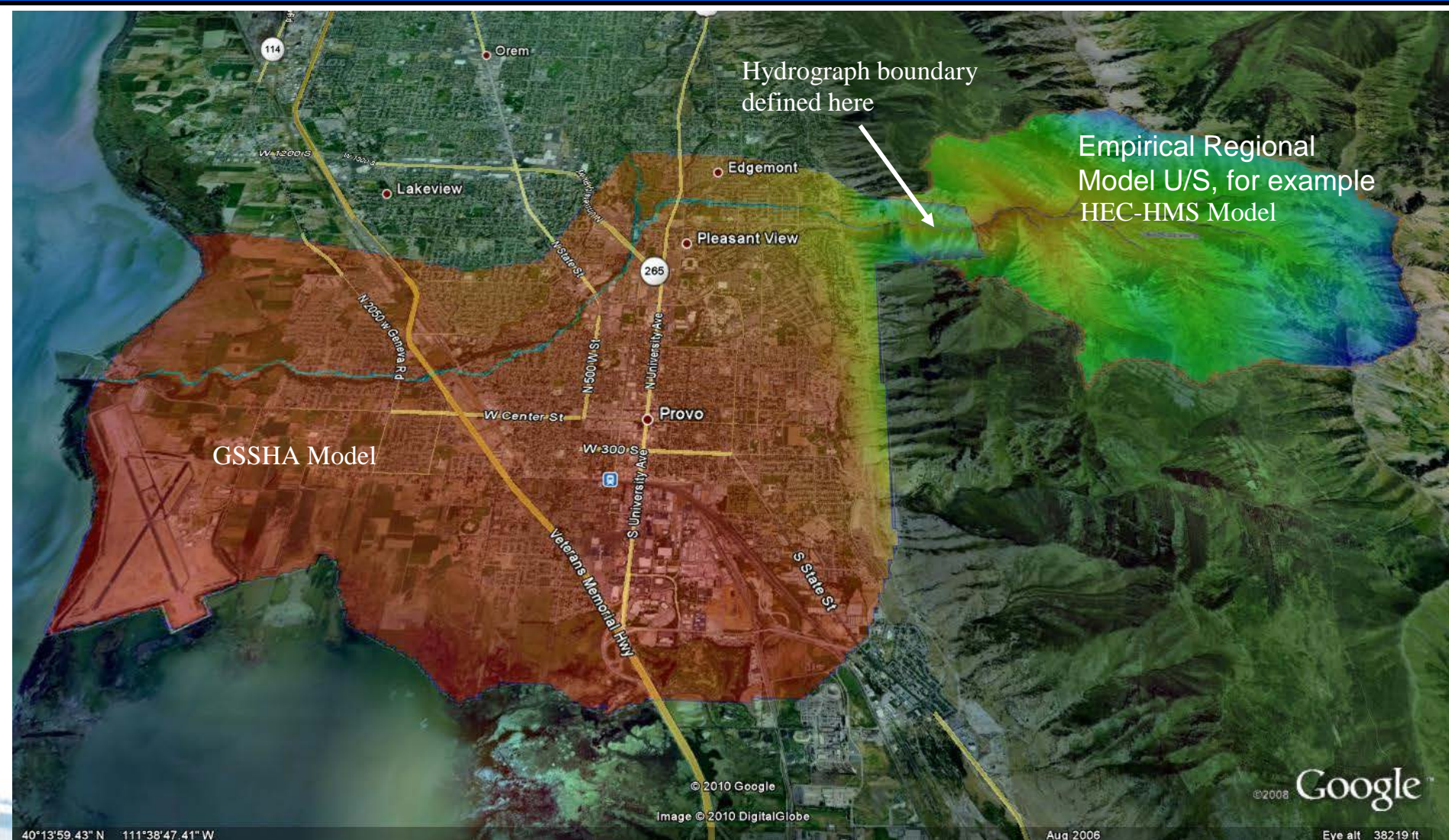
View Results (Google Earth)

Watershed Management and
Modeling





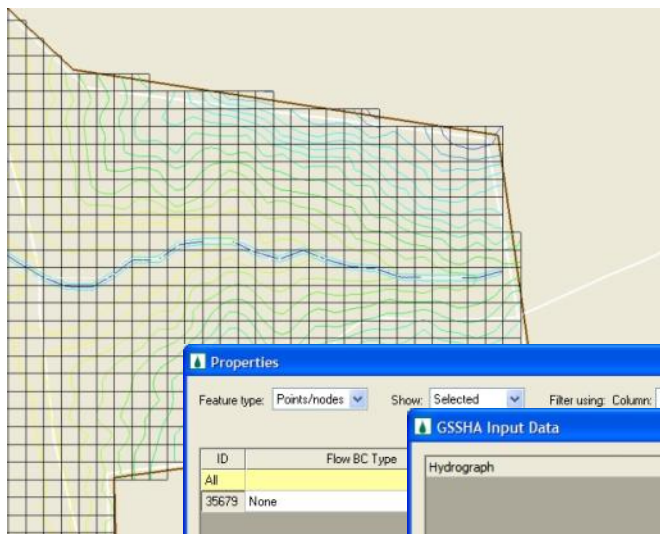
Modeling Workshop





Modeling Workshop

- Define Inflow Hydrograph
 - Define attributes for upstream node in the mouth of the canyon
 - Toggle on “Use Input Data”
 - Click on “Define Input Data” then
 - Click on “Define”
 - Copy and paste the hydrograph data



Properties

Feature type: Points/nodes Show: Selected Filter using: Column: None

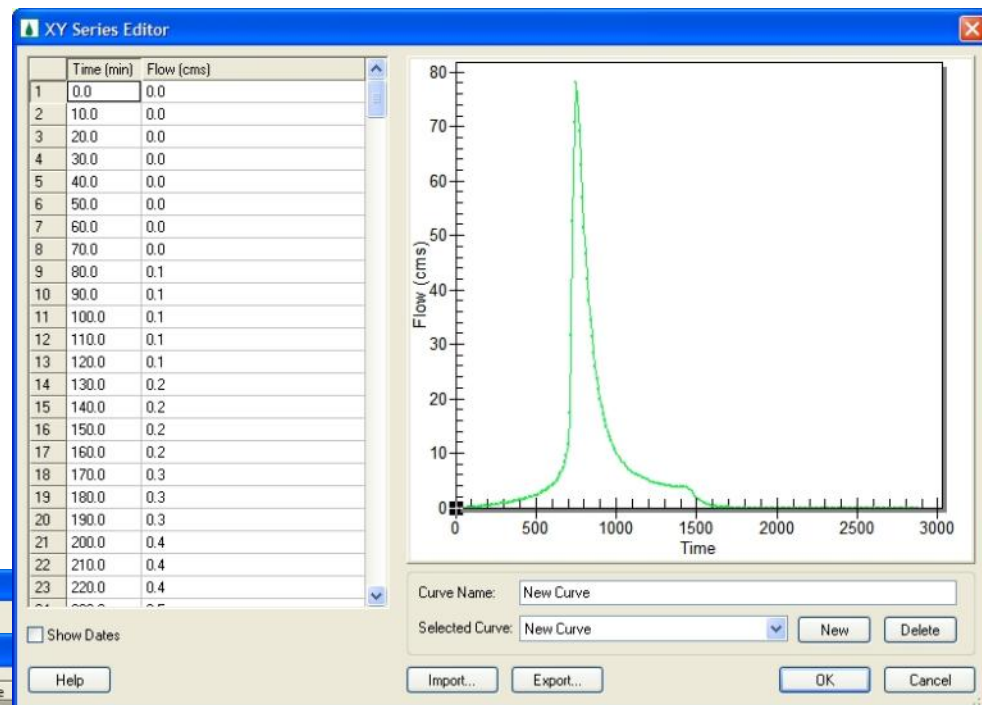
ID	Flow BC Type
All	
35679	None

Help...

GSSHA Input Data

Hydrograph Define

Done





Modeling Workshop

- Enable Overbank Flow
 - Open Job Control
 - Set channel routing option to “Diffusive Wave”
 - Toggle on “Allow Overbank flow” option

GSSHA Job Control Parameters

Computation parameters
Total time (min): 2880
Time step (sec): 10

Outlet information
Column: 1
Row: 76
Slope: 0.00100

Infiltration
☒ No infiltration
☐ Green + Ampt with soil moisture redistribution
Sacramento Model...
☐ Richard's infiltration
Edit Parameters...
☐ Soil depth (m)
☐ Top layer depth (m)

Channel routing computation scheme
☐ No routing
☒ Diffusive wave
Edit Parameters...
☐ MESH

Overland flow
Computation method: ADE
☐ Interception
☐ Initial depth
☐ Retention depth
☐ Area reduction

Evapotranspiration
☒ No evaporation
☐ Deardorff method
☐ Penman method
☐ Seasonal resist.

Help Output Control... OK Cancel

GSSHA Channel Routing Parameters

Minimum flow: 0.0 (cms)
☒ Allow overbank flow
☐ Outlet head BC 0.0 (m)
☐ Create hot start file
Hot start filename: untitled.sta
☐ Start from hot start file
Hot start filename: untitled.sta

Channel erosion
Sediment porosity: 0.4
Water temperature: 20.0 (C)
Sand size: 0.25 (mm)

Contaminant transport
☐ Compute contaminant transport
Decay coefficient: 0.0 (per day)
Dispersion coefficient: 0.0 (m²/s)
Initial concentration: 0.0 (mg/l)

Help OK Cancel



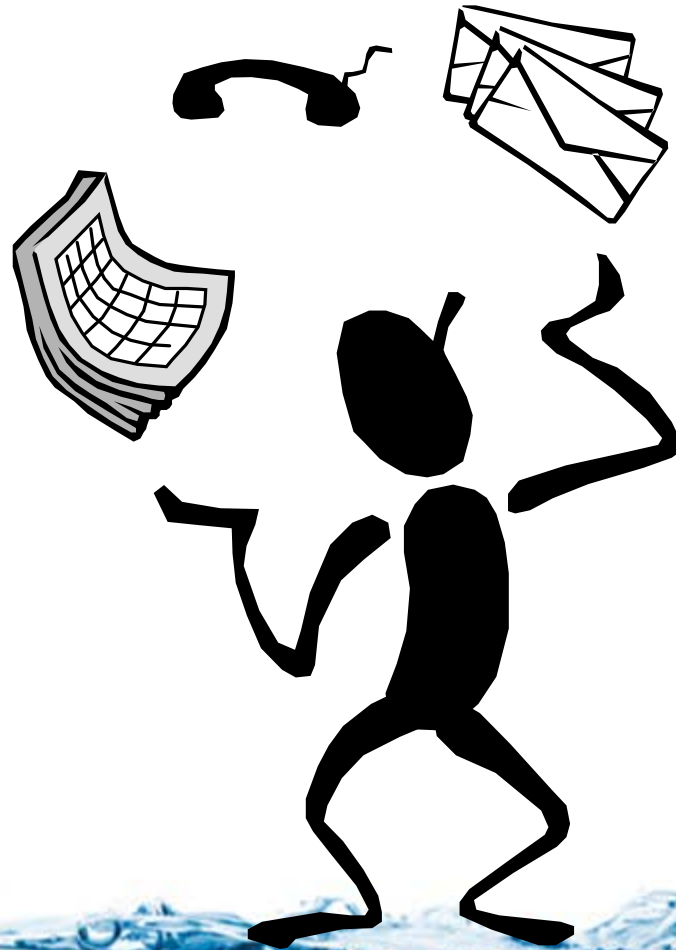
Run and Visualize

- Run the model and view the results
- View how the overland flow depth contours change with time
- Export the depth contour to Google Earth
- Export Film loop to Google Earth





Demonstration





Workshop

