Simulating Land Use Change in GSSHA

Scenario Modeling

- Scenario modeling can be done not only for the land use change but also for other several cases
  - Different precipitations
  - Comparing the effects of adding a wetland or detention basin etc
  - Exploring different design alternatives
- Scenarios can be generated by
  - Changing the non grid parameters like precipitation or job control etc
  - Changing the index map or grid related parameters like infiltration, roughness etc

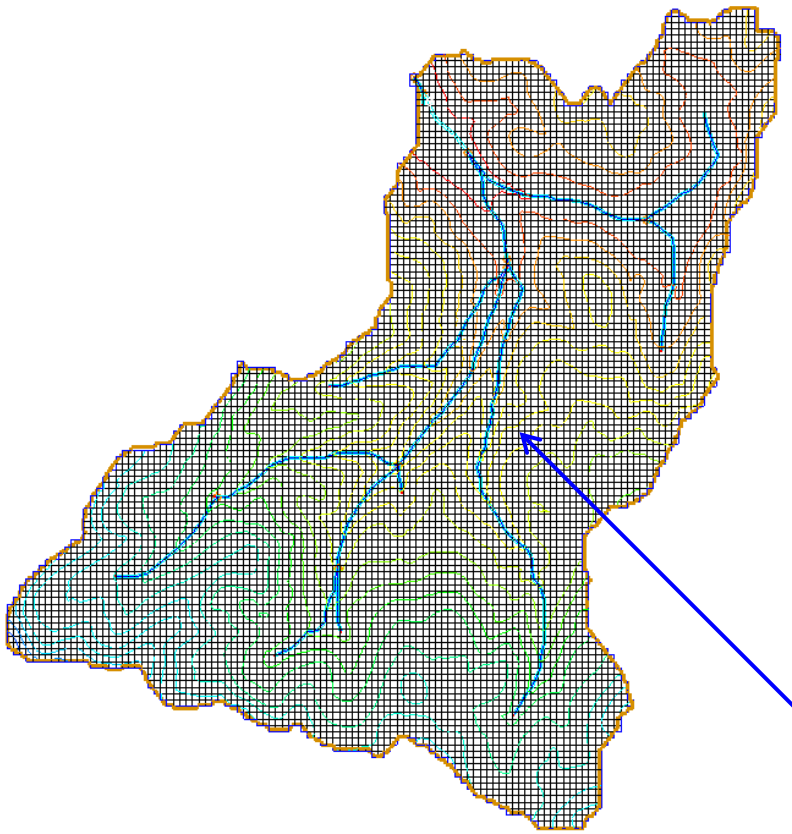
Scenario Modeling interface in WMS

- Several GSSHA projects each representing different scenario can be generated in WMS and saved as GSSHA groups
- All these different scenarios are based on the **same grid** but you can change the values assigned to the grid
- Projects and coverages can be duplicated
- Another project can be opened over the top of another but all the models that are under the scenario modeling should have same grid

Scenario Modeling interface in WMS

- Every time you create a new scenario on the grid:
  - Duplicate a coverage you wish to modify
  - Duplicate a project you want to build from
  - Assign the new coverage to the new project.
  - If you need to make change/update to an index map, you should create its copy, assign it to the model and then edit the copy.
  - Index map can be copied using Data Calculator under ***GSSHA|Maps***
- You can modify an Index map in following ways
  - Modify a land use, soil, or combo coverage and create a new index map.
  - Select cells either individually, multi select, or with a polygon and edit the ID value
- If an index map is updated, the map table associated with it needs to be updated
- You need to generate IDs in the map table for the updated index map, but you don't have to overwrite the existing IDs if you want to keep all the previous values and just define data for the new values.

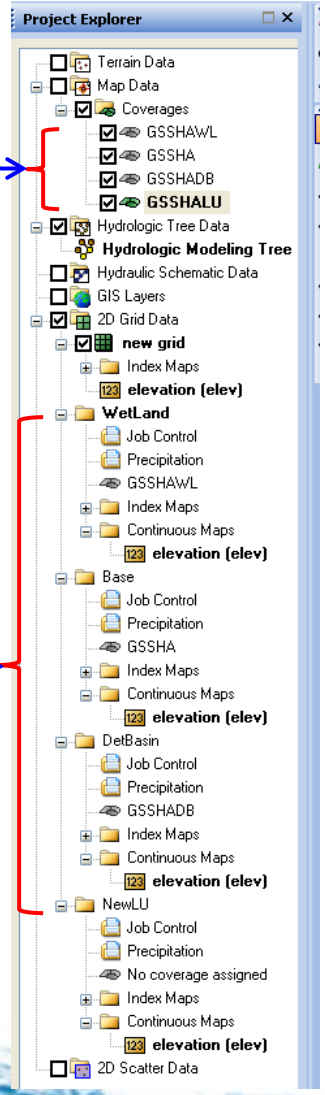
Scenario Modeling interface in WMS



Single GSSHA grid

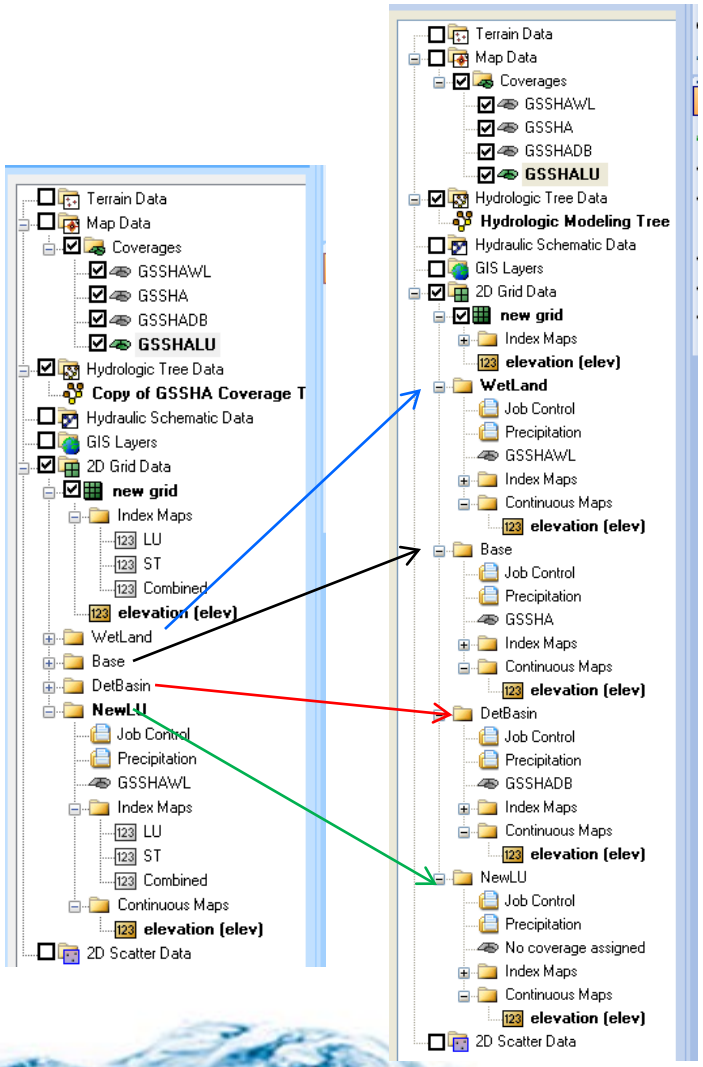
Several GSSHA coverages

Several GSSHA Projects



Scenario Modeling interface in WMS

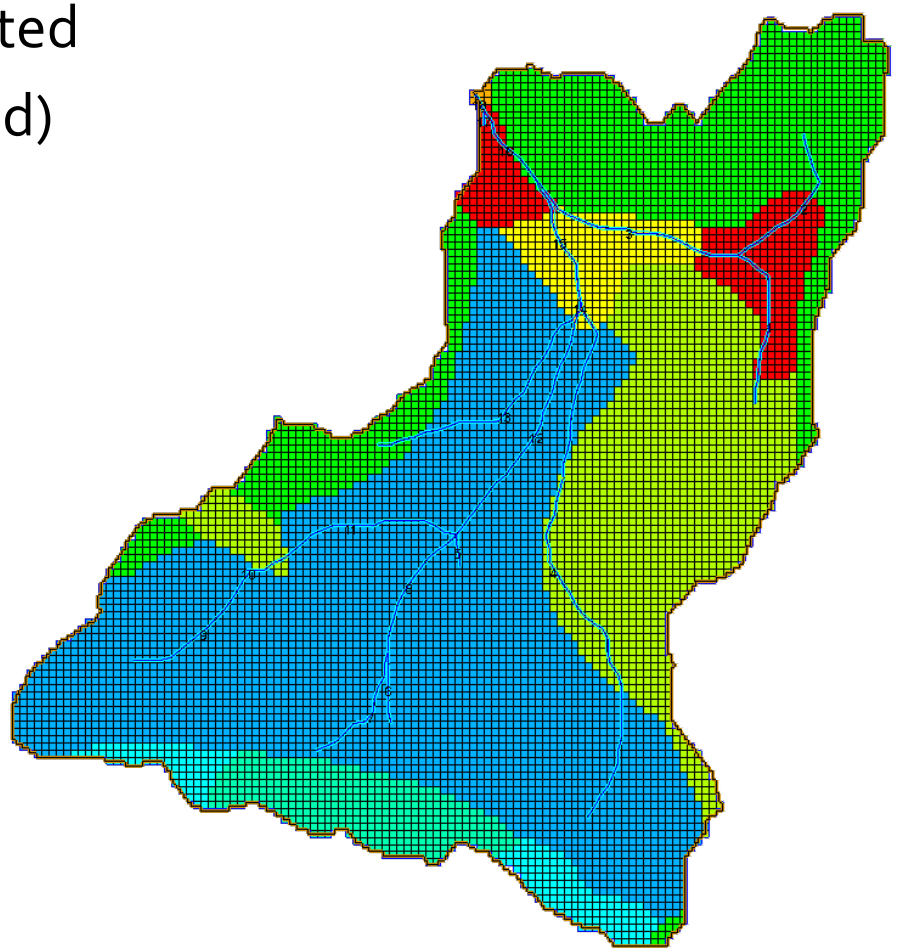
- The data tree gets big quickly if there are several GSSHA models/scenarios.
- You can collapse the display of all the GSSHA models other than the one you are working with by using expand (+) and hide (-) buttons in the project explorer



  - Compare these two views of the project explorer

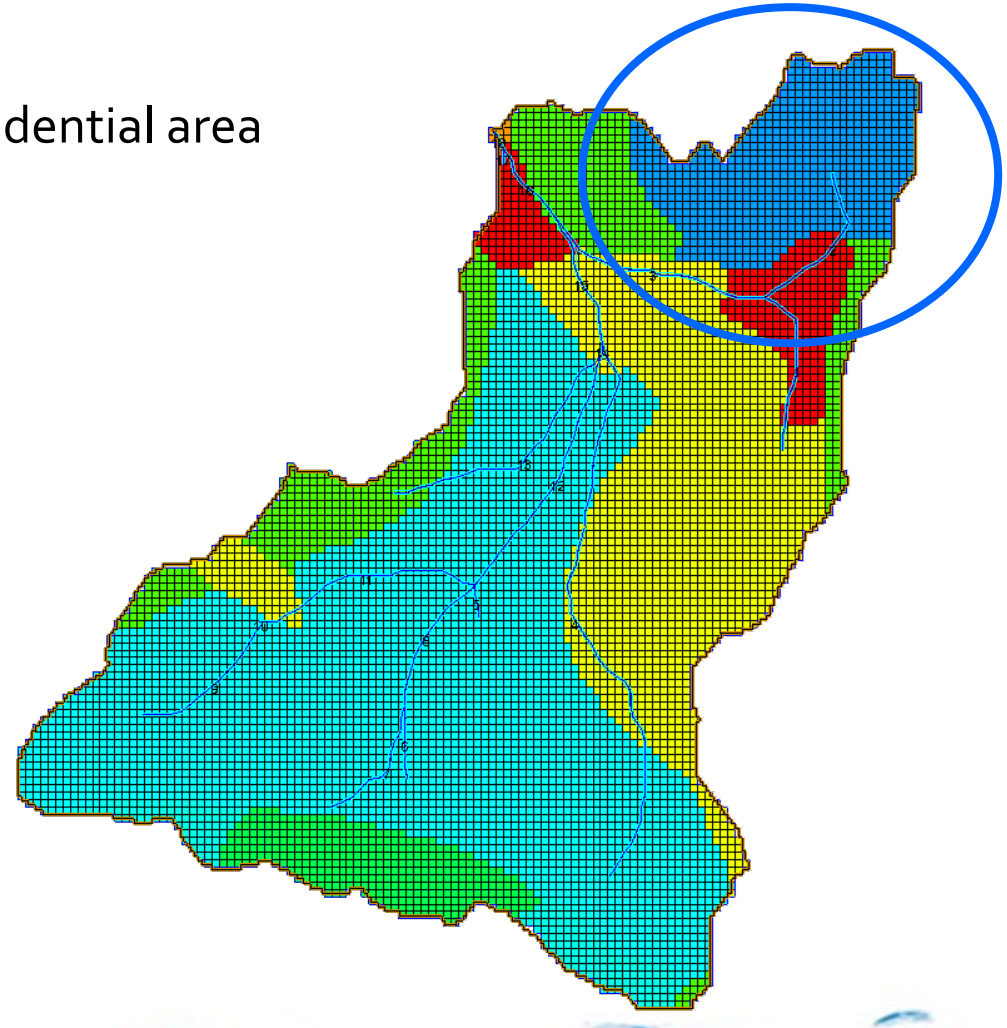
Scenarios

- The following scenarios will be simulated
- Base model (Park City, Utah Watershed)



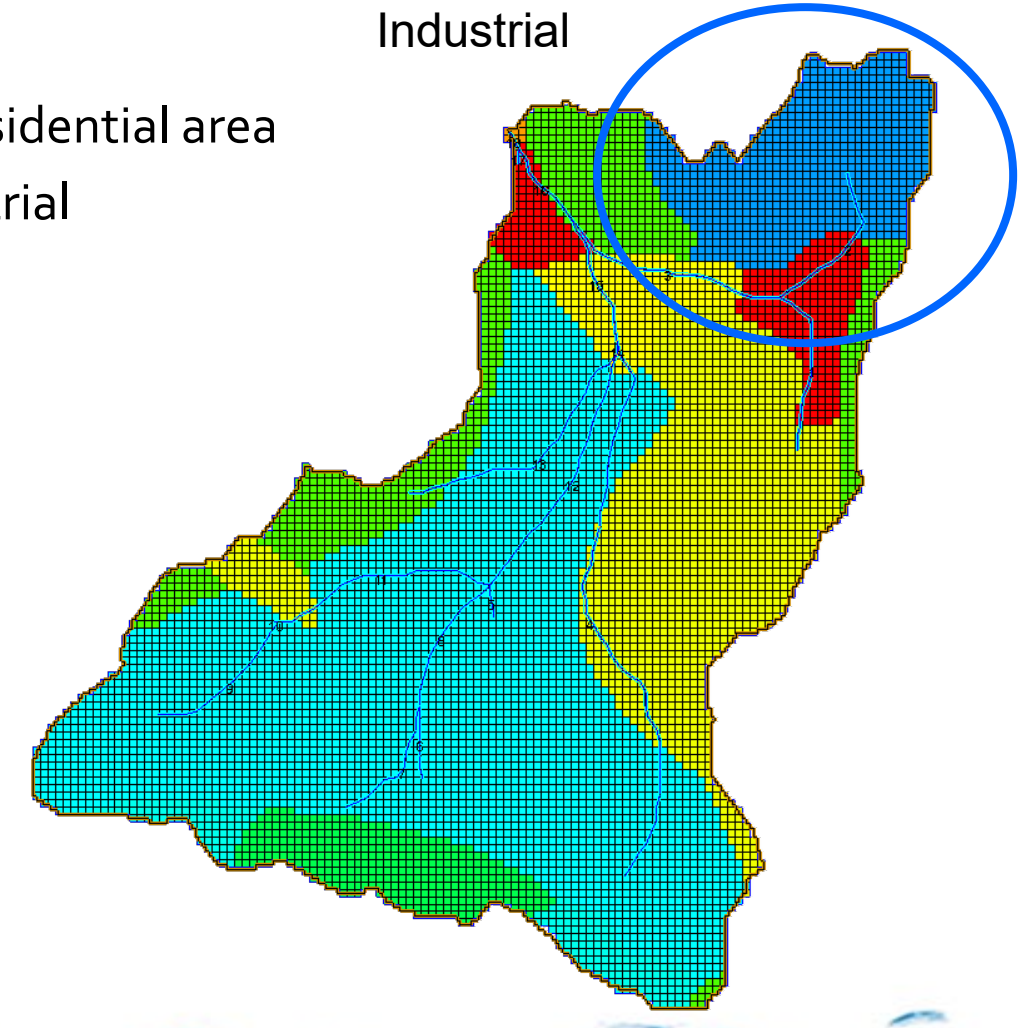
Scenarios

- Base model (Park City, Utah Watershed)
- Certain portion of land is developed to Residential area



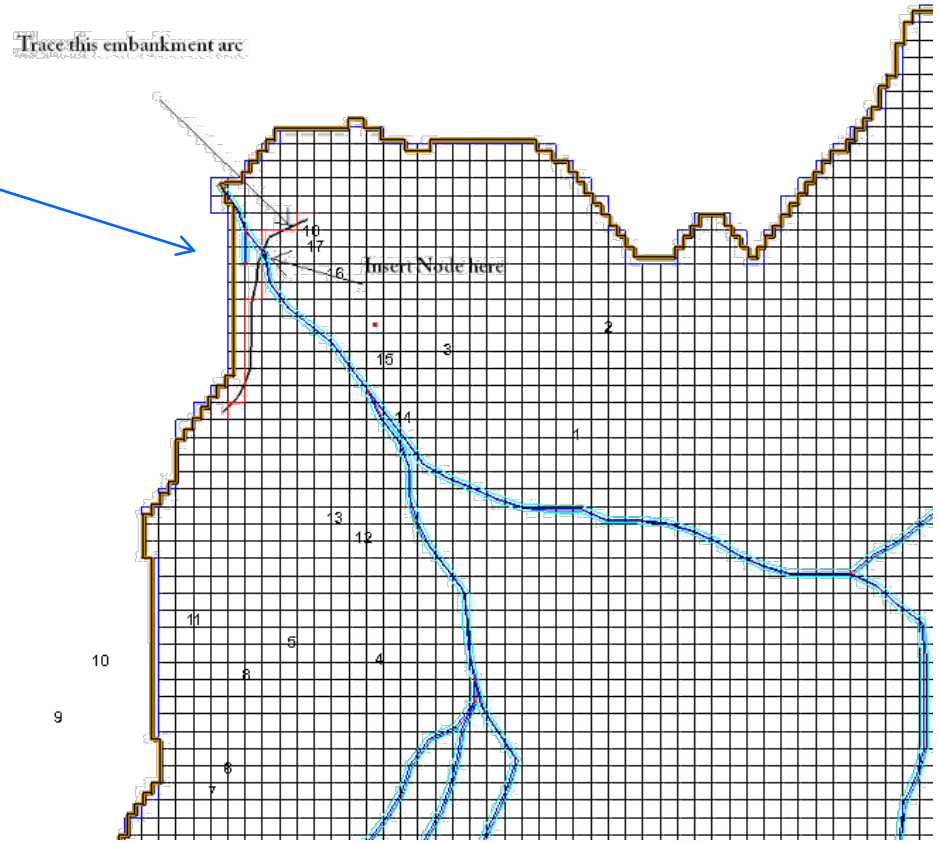
Scenarios

- Base model (Park City, Utah Watershed)
- Certain portion of land is developed to Residential area
- The same area is then developed to industrial



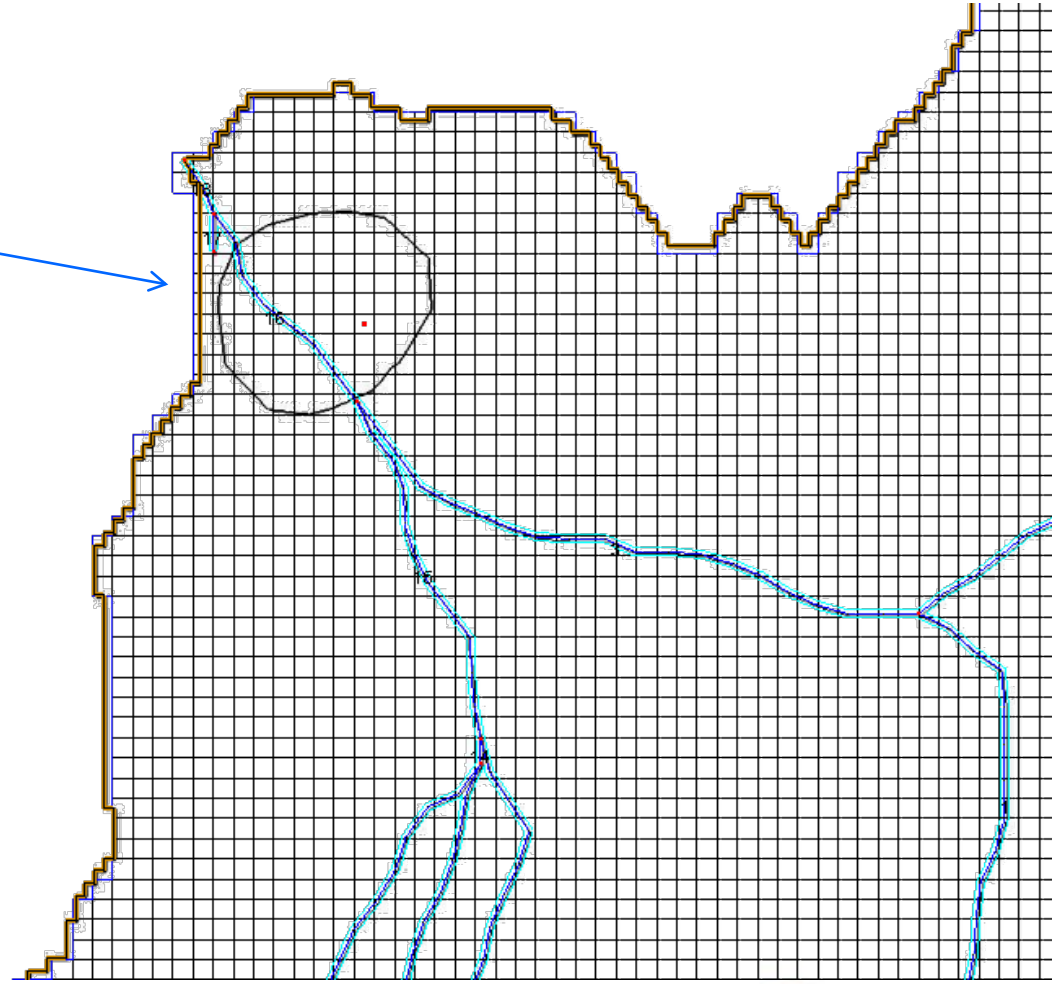
Scenarios

- The following abatement measures are compared
  - Adding a detention basin



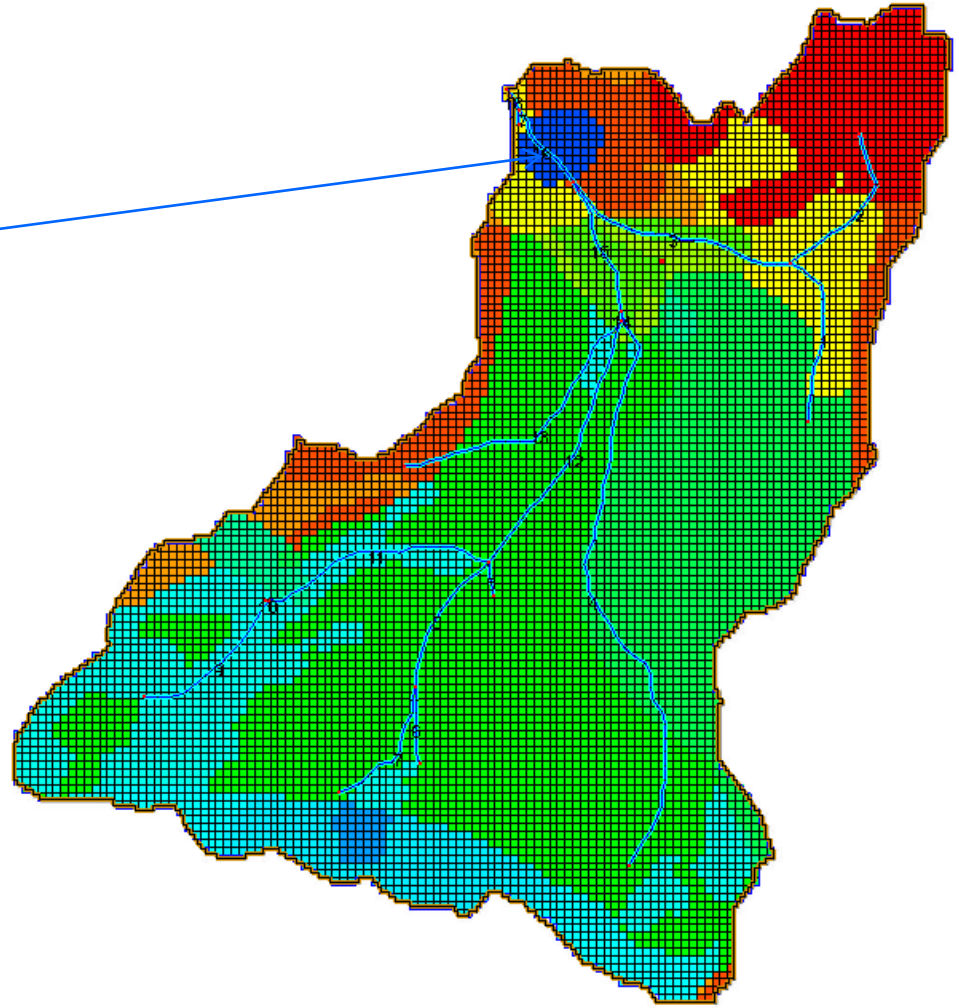
Scenarios

- Adding a detention basin
- Adding Wetland



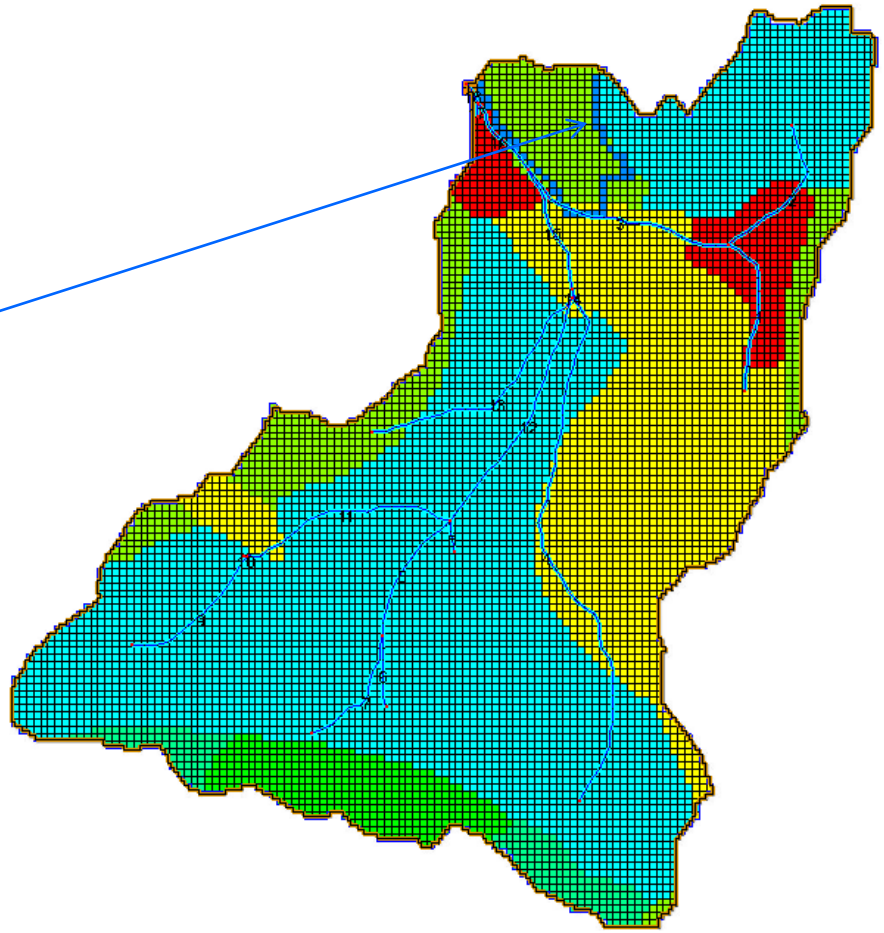
Scenarios

- Adding a detention basin
- Adding Wetland
- Adding Infiltration Basin



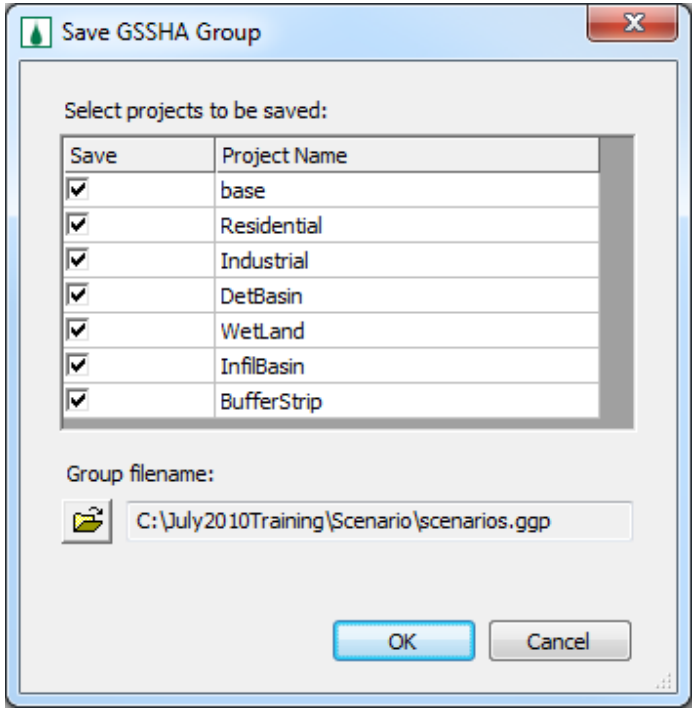
Scenarios

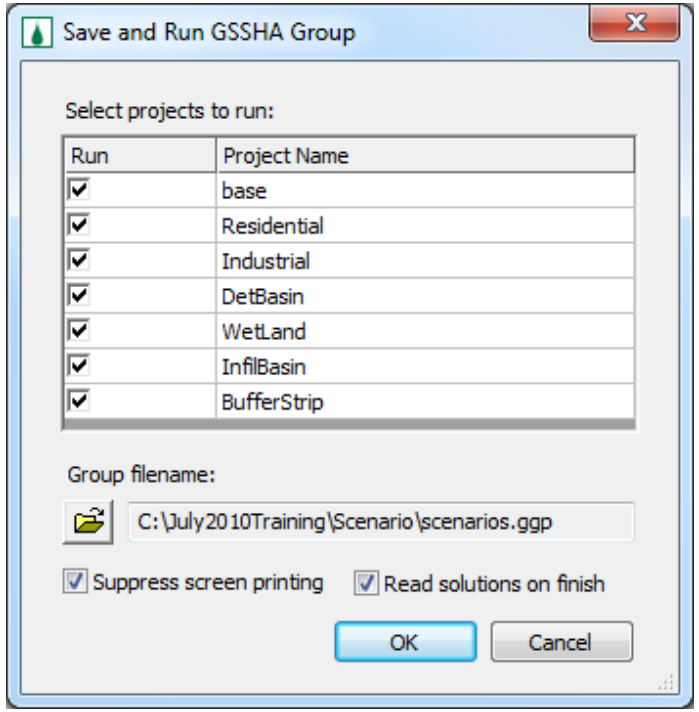
- Adding a detention basin
- Adding Wetland
- Adding Infiltration Basin
- Adding a buffer strip



Scenario Modeling interface in WMS

All these different GSSHA projects can be saved as a single GSSHA group and Run as a Group

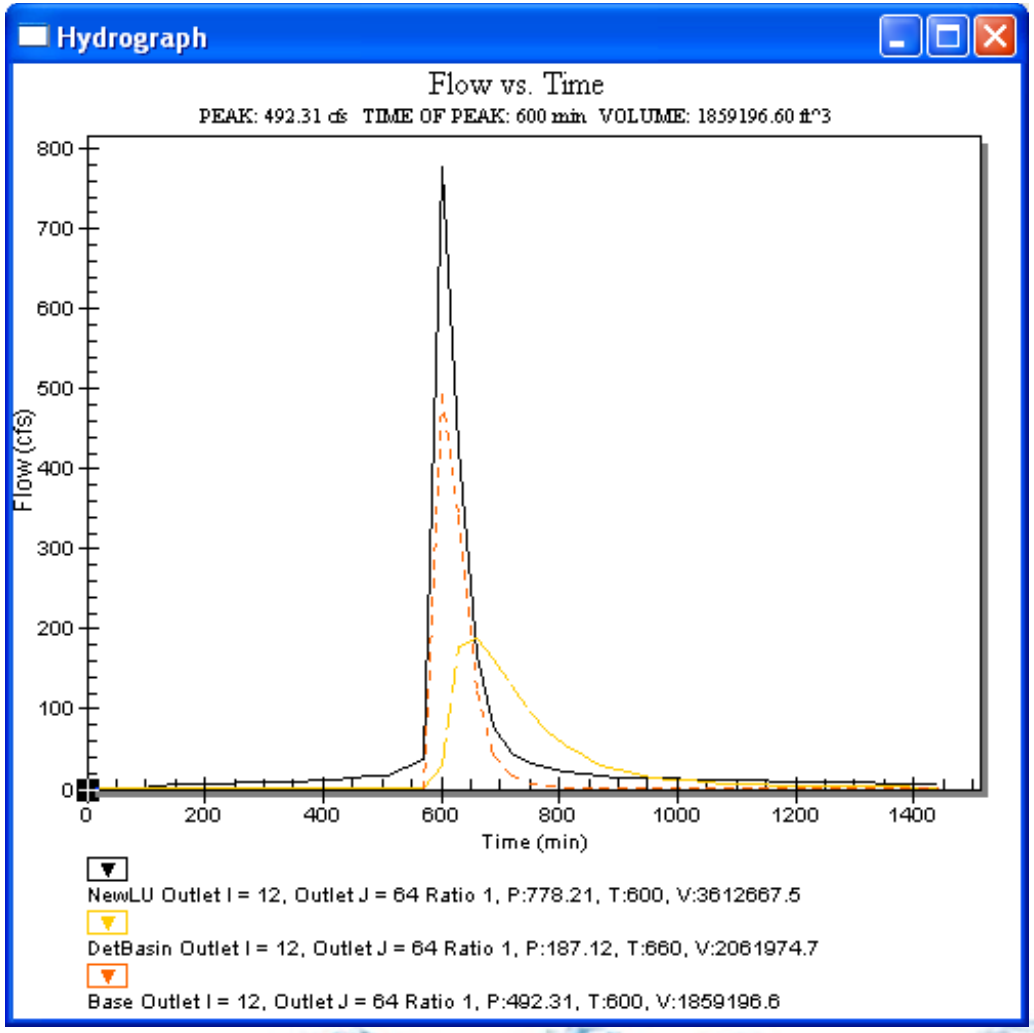




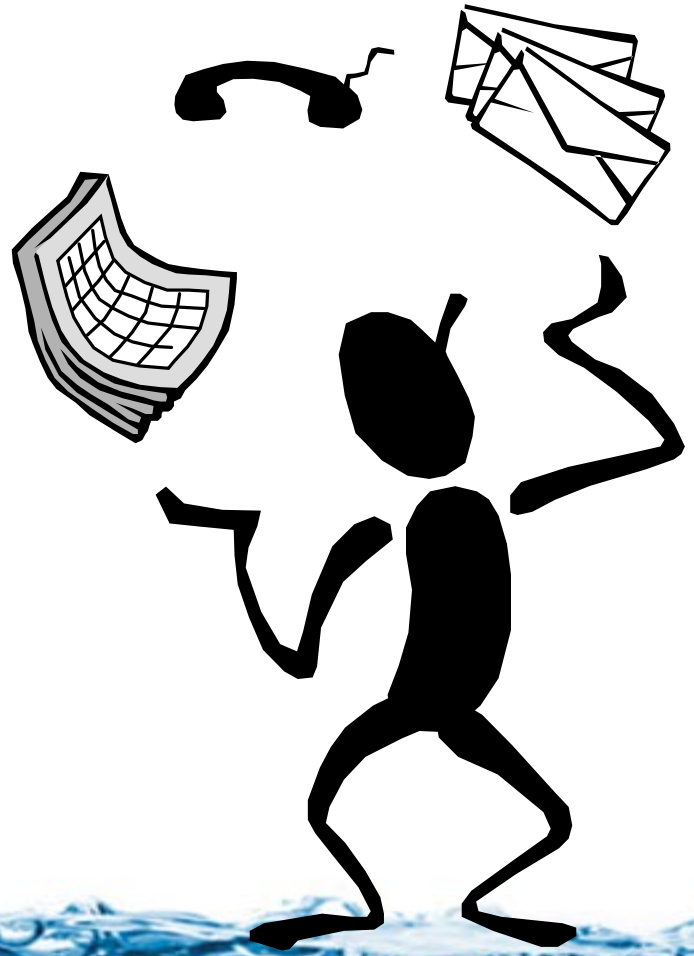
Scenario Modeling interface in WMS

- Saving with GSSHA groups is useful
  - You do not have to keep creating the same model for different scenarios, just duplicate existing and update it for another scenario
  - All the alternatives or scenarios can be analyzed together that helps in better comparison
  - All these scenarios can be run in sequence (run as group)
  - The hydrograph results are plotted on the same window

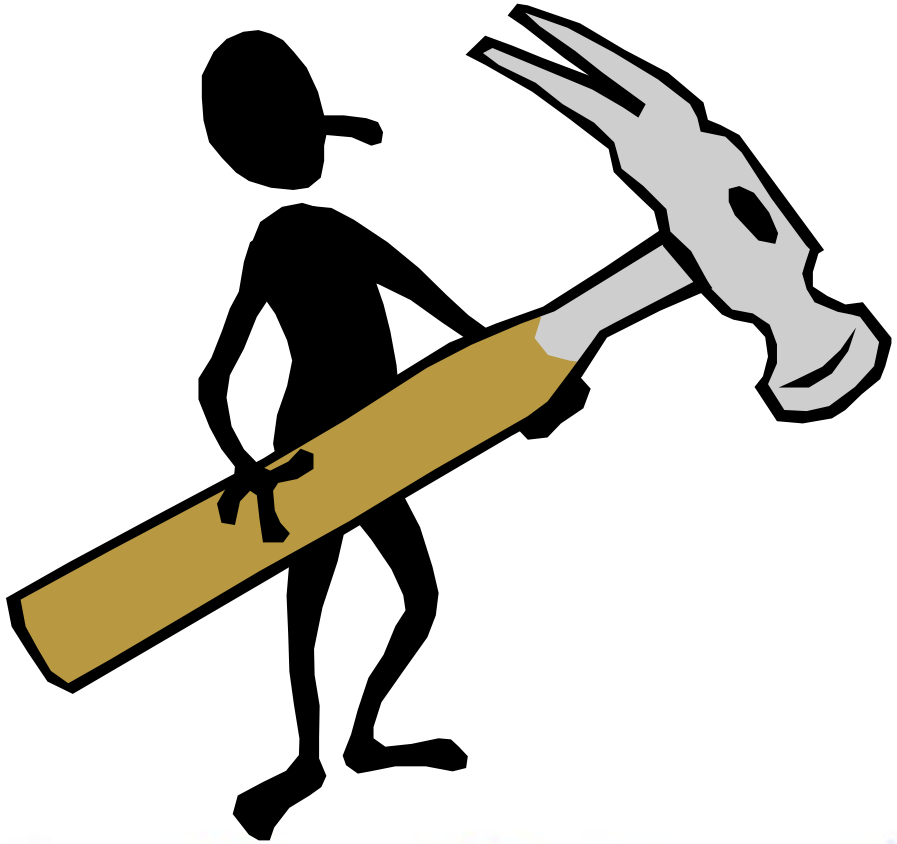
Sample Groups Result



Demonstration



Workshop



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