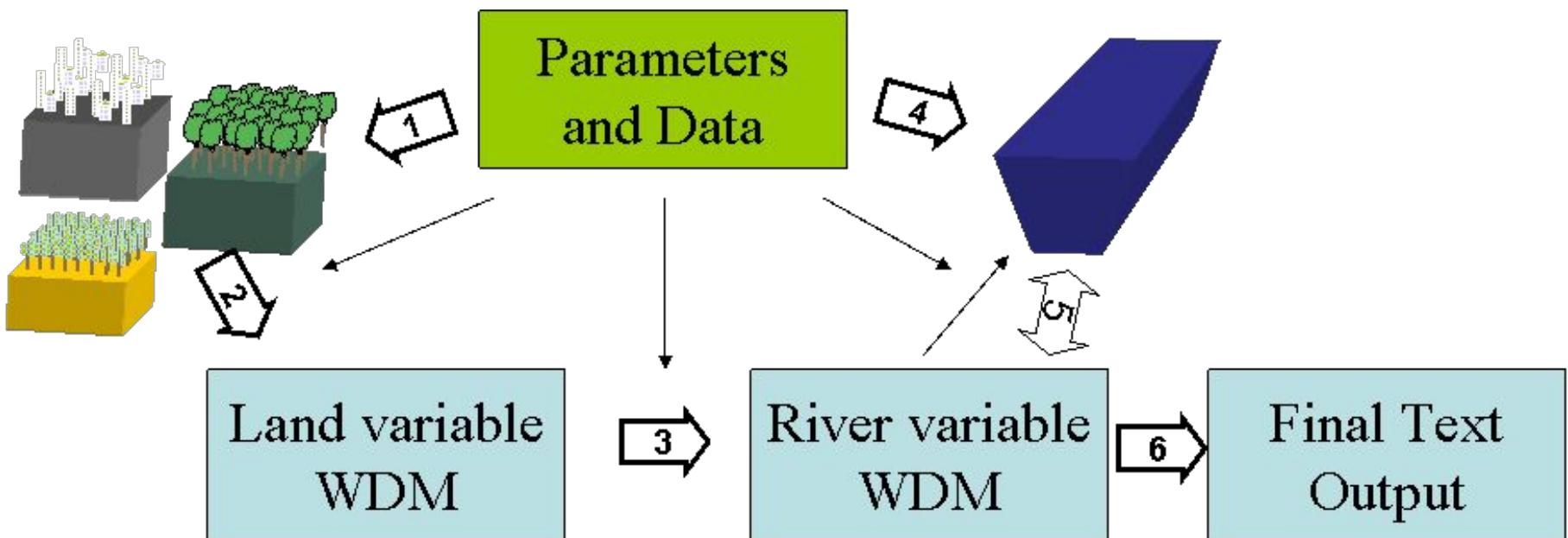


Running The Phase 5 Watershed Model

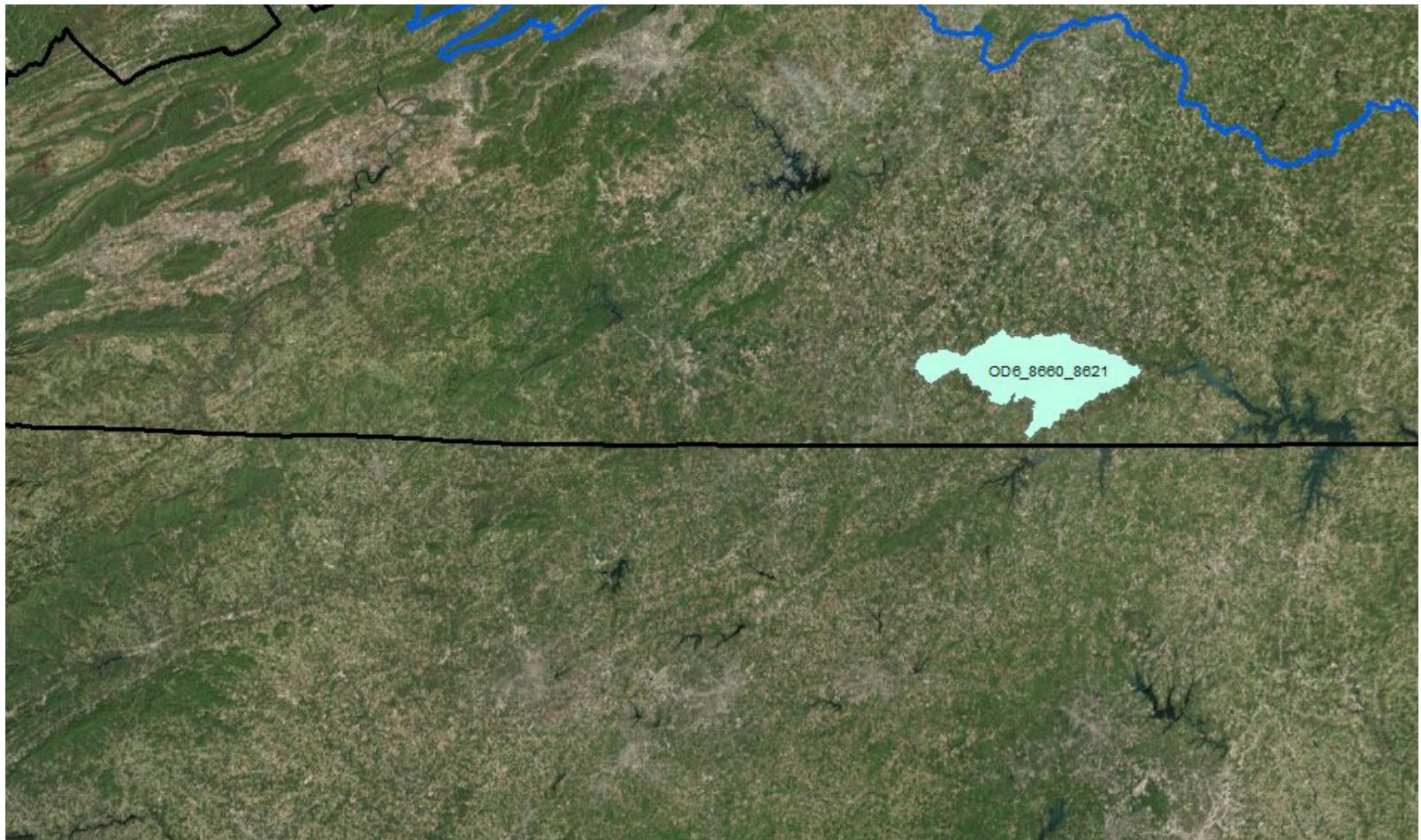
Running model for a specified scenario and river segment



Specify Outlet River Segment

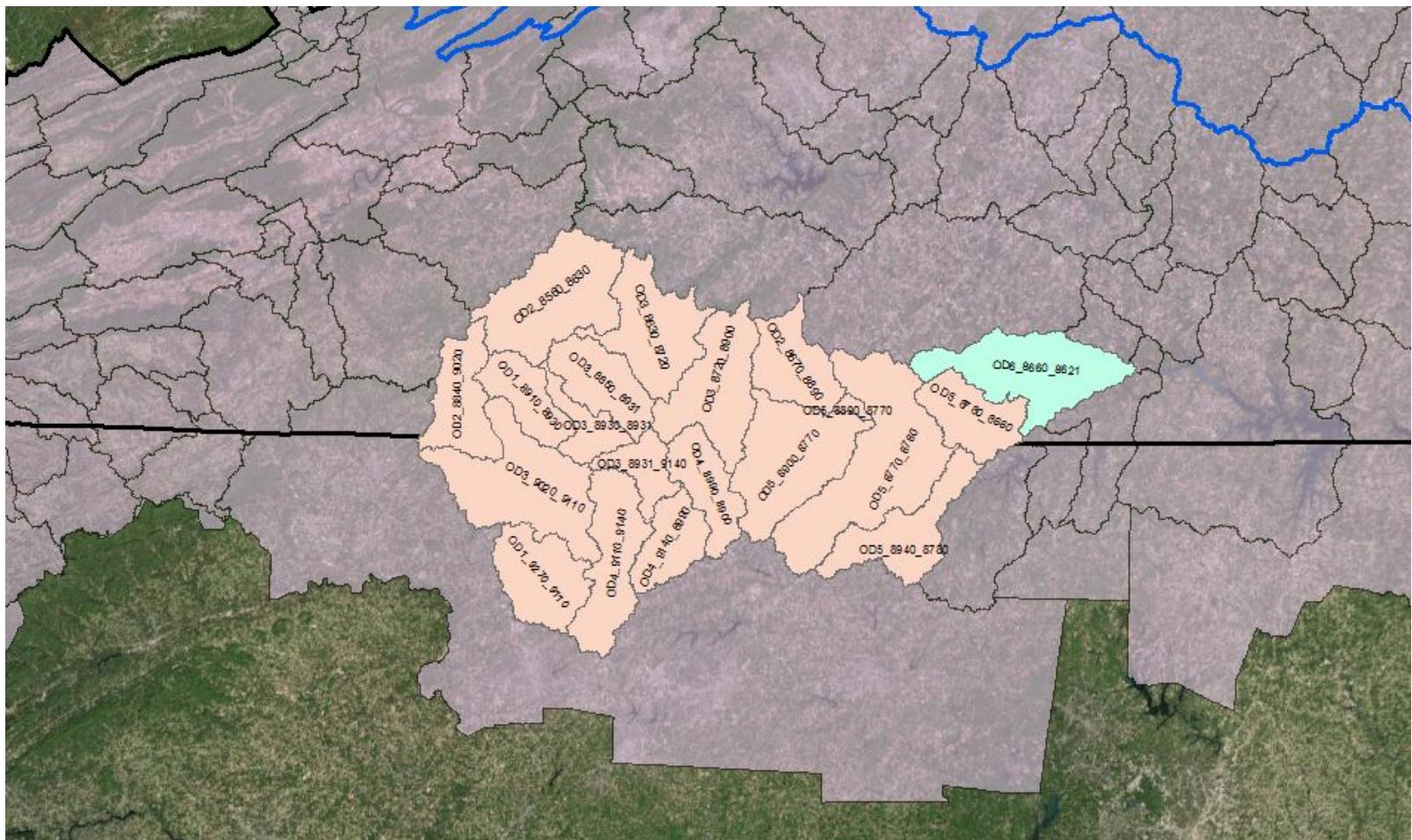
```
# Create the river and land segment lists
cd /opt/model/p53/p53c-sova/run/make_seglists

# basingen.csh takes the arguments of a river scenario and the unique id of a river segment and generates
three files in the ./run/seglists/ directory listing the land segments, river segments, and calibration
stations
./basingen.csh p532cal_062211 8660
ls -l /opt/model/p53/p53c-sova/config/seglists/ | grep 8660
```



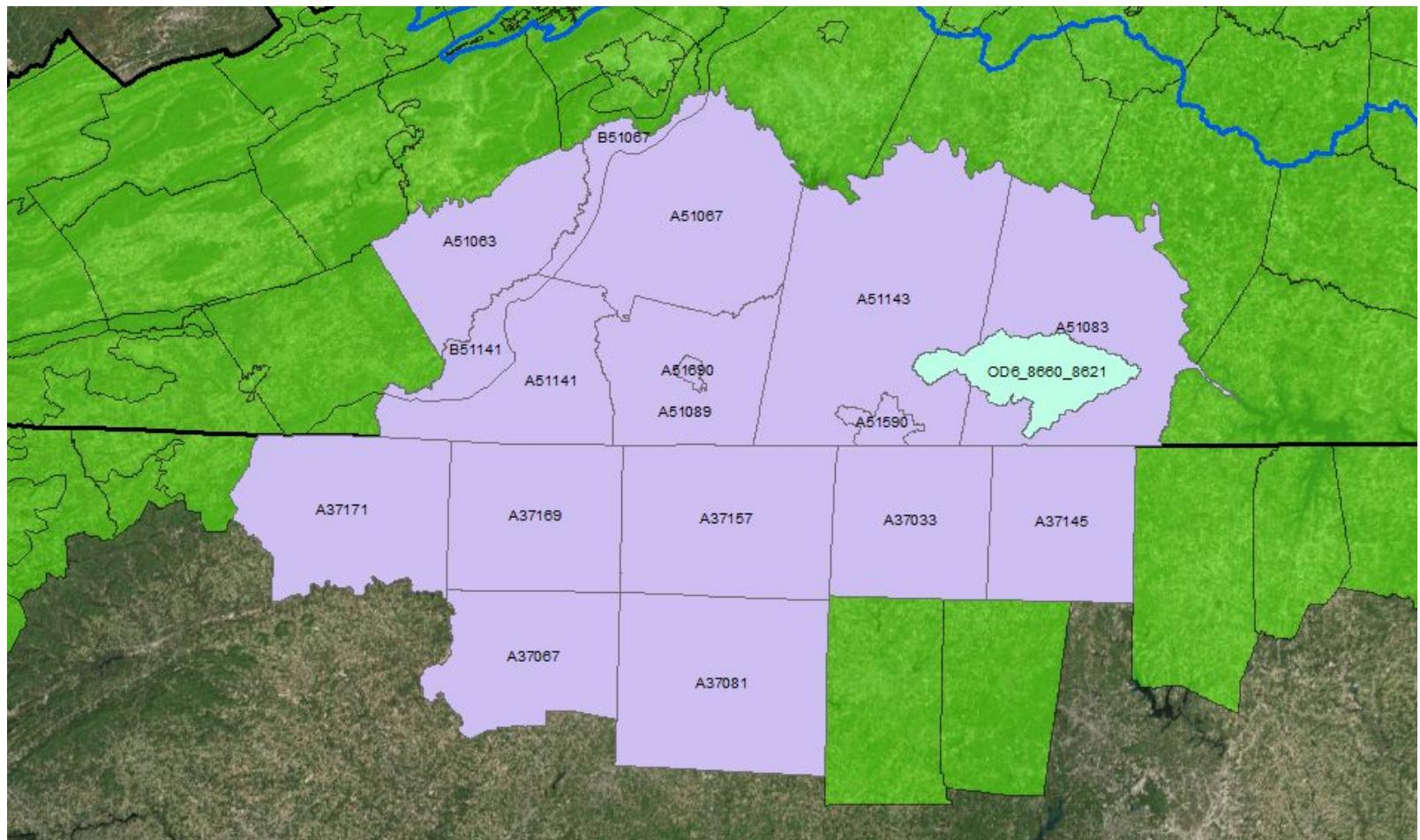
basingen.csh finds Upstream Segments

```
cat /opt/model/p53/p532c-sova/config/seglists/OD6_8660_8621.riv
```



Also Contributing Land Segments

```
cat /opt/model/p53/p532c-sova/config/seglists/OD6_8660_8621.land
```



Run Model

```
# go to model run directory  
cd /opt/model/p53/p532c-sova/run/standard  
  
# tell model to generate all land model (UCI) files  
.run_lug.csh p532cal_062211 OD6_8660_8621
```

1) **run_lug.csh**

- Takes the arguments of land scenario and basin.
- Runs the Land UCI Generator program, creating a UCI for each land use and land segment in the basin.

**UCI = (User Controlled Input) file*

Run Model (cont.)

```
# run the land simulation  
./run_land.csh p532cal_062211 OD6_8660_8621
```

2) **run_land.csh**

- Takes the arguments of land scenario and basin.
- Runs HSPF on the UCI for each land use and land segment in the basin.
 - copies a blank wdm to the name \$landuse\$landseg.wdm
 - runs the UCI with HSPF
 - moves the wdm, out, and echo file to the appropriate directories.

HSPF is run on the land UCIs to generate a separate WDM for each land use and land segment. These WDMs contain hourly time series for flow, sediment, and species of nutrient from the different soil layers simulated in HSPF. The outputs are on a per-acre basis.

**WDM = Water Data Management binary file*

Run Model (cont.)

```
# process the External Transfer Module (land to stream)
./run_etm.csh p532cal_062211 OD6_8660_8621
```

3) run_etm.csh

- Takes the arguments of land scenario and basin.
- Runs the External Transfer Module that stands in for the MASSLINKS and SCHEMATIC.
 - Runs the program 'make_binary_transfer_coeffs.exe' that combines the time-varying BMP, time-varying land use, and static EOF-EOS transfer coefficients into hourly time series and stores them in binary files. Runs the program 'transfer_wdms.exe' that reads the binary files and multiplies the land wdm outputs by these factors and creates wdm files of EOS loads in RCHRES variables using the transfer file ./pp/catalog/iovarts/land_to_river

The External Transfer Module (etm) runs separately for each river segment being simulated in a particular run. It gathers information on acreage of each land use and land segment within each river segment and the management practices which alter the time series. It **translates and aggregates land time series into river input time series** and stores the individual time series for each constituent in a WDM. Each river segment has a separate WDM. The user can specify the geographic area, and the land use and management practice data set to use.

Run Model (cont.)

```
# tell the model to generate the river UCI files  
./run_rug.csh p532cal_062211 OD6_8660_8621
```

4) run_rug.csh

- Takes the arguments of land scenario and basin.
- Runs the river UCI Generator program. This script is for calibration or other special cases only. For scenarios, use run_scenario_river.csh

The River UCI Generator (rug) produces a UCI for each river segment using stored parameters. The user can specify the geographic area and parameters to use.

Run Model (cont.)

```
# run the river simulation UCI  
./run_river.csh p532cal_062211 OD6_8660_8621
```

5) run_river.csh

- Takes the arguments of land scenario and basin.
- Runs the river UCIs with HSPF. runs each river segment in the basin. This script is for calibration or other special cases only. For scenarios, use run_scenario_river.csh
 - Copies a blank wdm to the name riv\$riverseg.wdm
 - Copies the EOS wdm made with the ETM to a working directory.
 - Adds the output of any upstream river reaches to the EOS loads.
 - Combines point source, septic, diversions, and atmospheric deposition in to a single wdm
 - Runs the UCI with HSPF
 - Moves the wdm, out, and echo file to the appropriate place

Post-processing

#

- Upstream river loads are added to the WDM for each river, which has been loaded with the local land-based loads by the etm. HSPF is run on the river UCIs and the results are written back to the same WDM, preserving the input data as well
- A system of postprocessors generates text output from the land and river WDMs. The user can configure the postprocessor to get output on various time and spatial scales or to get comparisons of simulated and observed data.

Post-processing

```
# post process data summaries  
./run_scenario_postproc.csh p532cal_062211 OD6_8660_8621
```

run_scenario_postproc.csh

- Takes the arguments of river scenario and basin.
- Generates ASCII output from the WDM files. Flags near the top of the script are preset to the standard average annual scenario output. The user should not modify this file.
 - Available output from land simulation:
 - monthly, annual, or average annual: EOF, EOS, or delivered to bay
 - daily: EOF and EOS
 - Available output from river simulation:
 - monthly, annual, or average annual loads and flows
 - daily concentrations and flows
 - summary statistics of flow, load, and concentration calibrations.

*EOF = Edge of field loads, the post-processed output of the HSPF land simulation

*EOS = Edge of stream loads, which are the edge of field loads multiplied by land use acreage and modified by any bmp effects, regional factors, or sub-scale transport factors

Post-processing

```
# example standard bay program summary  
./summarize_output_aveann.csh p532cal_062211 OD6_8660_8621 1991 2000
```

summarize_output_aveann.csh

- Takes the arguments of river scenario, basin, and first and last year for averaging.
- Creates a summary file of the outputs.
- Requires that the postproc was run at some point in the past with the same averaging dates.

Model Outputs

```
# Change directory to location of model outputs  
cd /opt/model/p53/p532c-sova/tmp/wdm
```

Model Outputs

- **del:** Transport factors, delivery factors, and delivered loads. Transport factors are the fractional change in load within a given segment. Delivery factors are the fraction change in load from the edge of stream to tidal water, and delivered loads are the loads that are delivered to tidal waters.
- **eof:** Edge of field loads, the post-processed output of the HSPF land simulation
- **eos:** Edge of stream loads, which are the edge of field loads multiplied by land use acreage and modified by any bmp effects, regional factors, or sub-scale transport factors.
- **etm:** binary land-river transfer files generated from the external transfer module. The files under this directory contain time series to translate edge-of-field to edge-of-stream loads and summarize by river segment.
- **hspf:** standard output and message files from HSPF. The output are sometimes used during calibration to gather information on fluxes. The message files are checked for successful completion.
- **input:** echo out of nutrient application data used in a model run.
- **pltgen:** pltgen output files. These are a standard method of getting information out of an HSPF run. The user can specify which outputs are to be put into pltgens in the control file for a run. They are use in calibration, but are not necessary for scenarios.
- **ret.freq:** return frequency?
- **river:** post-processed river simulation results and various calculated statistics

*all files in this output directory are ASCII files so that they can be viewed easily by the user. The **eof, eos, and del** directories have loads that are organized into a very large number of small files. A **secondary program is normally used to summarize these outputs** into a more usable format. This strategy uses the server file system as a database. The directories above these directories are organized by time aggregation (daily, monthly, annual, average annual) and river scenario.

Run Model (All)

```
# run the river simulation UCI  
./run_river.csh p532cal_062211 OD6_8660_8621
```

run_all.csh

- Takes the arguments of scenario and basin.
- Runs lug, rug, land, etm, river, and postproc for the calibration.
 - Copies a blank wdm to the name riv\$riverseg.wdm

***This is an alternative method to running each process separately (to be used in the future)**