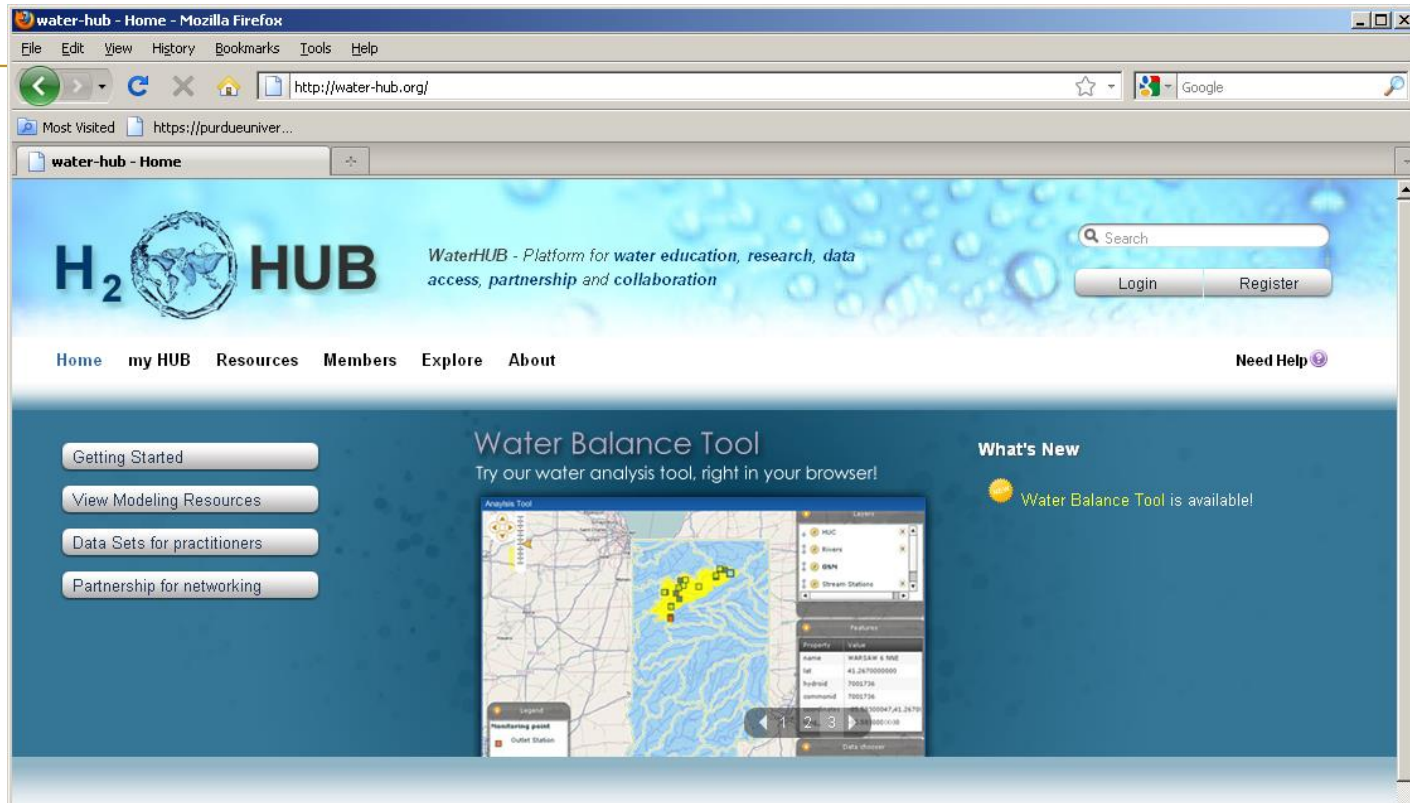




SWATShare – A Portal for Sharing, Publishing, and Running SWAT Model using XSEDE Resources

Venkatesh Merwade, Carol Song, Lan Zhao,
Shandian Zhe and Adnan Rajib
Purdue University, USA

WaterHUB



- Based on HUBzero technology at Purdue, WaterHUB uses open source packages to create an environment in which researchers, educators, and students can access tools and share information
- Think of WaterHUB as Facebook for hydrologists

SWATShare

- One of the tools on WaterHUB
- SWATShare enables
 - Searching for existing SWAT models on WaterHUB
 - Downloading of previously created SWAT models and their outputs by the community
 - Publishing and sharing of your own SWAT models with the community
 - Execution of single or multiple normal, sensitivity analysis and calibration runs
 - Visualization of outputs
- Everything is enabled by using XSEDE resources

Why SWATShare?

- Saves time and money
- Facilitates collaboration among all users
- Can bring rewards and recognition in the form of publications and community access
- Provides a platform for your model repository
- May provide avenue to keep your models updated by other users
- Provides access to HPC resources for your SWAT models

SWATShare Demo

www.water-hub.org/swatshare

View

Welcome adnanrajib

| Property | Value |
|----------------------|---------------|
| Country | United States |
| State | IN |
| Dem resolution | 30 |
| Dem source | USGS |
| Land use data source | NCLD 2006 |
| Soil data source | STATSGO |
| Stream network | 1 |

Download Model

Download Output

My Models

Shared Models

- Crabtree_futureLULC
- Crabtree_futureLULC_fu
- Flat_cal_current
- Flat_cal_current
- Flat_cal_future
- Flat_River
- Flat_River_calibrated
- Haw_River_basin
- lan0506flatriver
- lan0506flatriver
- Little_Tennessee
- myapril08
- myflat1
- myhaw
- wabash
- wabash_25March
- w_set1

Other Models

Users can download only their **own model** and a **shared model** with associated output files

The uploaded models are displayed in 3 groups

- (i) **My Models:** models that are uploaded by the current user
- (ii) **Shared Models:** models that uploaded by other users, but are shared with all users
- (iii) **Other models:** models that are uploaded by other users but not shared

Upload

View Upload Edit Run Visualization

Please follow the two steps to create case for SWAT simulation

Step 1 : Enter model meta data Please start filling the model meta data

User Name: adnanrajib

* Model Name: wabash

Description: This is watershed model on the Wabash River having outlet at Lafayette

* Simulation Time Step: Daily

HRU Threshold (Landuse): 10

HRU Threshold (Soil): 10

Land use data source: NCLD 2006

* Soil data source: STATESO

☒ Shared?

HUC code: Map

* Type: ☐ Normal Simulation ☐ Sensitivity Analysis ☒ Auto-Calibration

Date from: 01/01/2004 to: 12/31/2009

Step 2 : Upload input data

Click upload button to launch data mover tool and upload input data

Upload

Simulation time step (daily/ monthly/ yearly) needs to be the same as the *file.cio* variable **IPRINT**

IPRINT = 0 (monthly), 1 (daily), 2 (yearly)

User can select the required simulation type

Must be compatible with **ICLB** flag in *file.cio* of the TxtInOut

ICLB = 0 (normal), 1 (sensitivity), 2 (auto-calibration)

Contents of the zip folder

| Name | Type | Size |
|-----------------|---------------------------|-----------|
| info | File folder | |
| RasterStore.idb | File folder | |
| Scenarios | File folder | |
| Watershed | File folder | |
| log | File | 1 KB |
| RasterStore | Microsoft Access Database | 1,036 KB |
| SWAT2009 | Microsoft Access Database | 14,192 KB |
| WabashRiver | Microsoft Access Database | 11,060 KB |
| WabashRiver | ESRI ArcMap Document | 4,618 KB |

SWATShare User Interfaces

Please edit the following meta data for SWAT model

New Name

Step 1: Enter model meta data Please edit the meta data

User Name

* Model Name

Description

* Simulation Time Step

Country State

* Version ☐ Output Included? ☐ Shared?

HUC code

* Type ☒ Normal Simulation ☐ Sensitivity Analysis ☐ Auto-Calibration

Date from to

* DEM Source

* DEM Resolution

* Stream Network Threshold

* HRU Threshold (Slope)

* HRU Threshold (Landuse)

* HRU Threshold (Soil)

* Land use data source

* Soil data source

Calibration Parameter

☐ Ch_K2 ☐ Ch_N2 ☐ Cn2 ☐ Esco

☐ Surlag ☐ Blai ☐ Rchrg_Dp ☐ Epco

☐ Timp ☐ Alpha_BF ☐ Sol_Awc ☐ Smtmp

☐ Revapmn

Step 2: Replace input data

Click upload button to launch data mover tool and upload input data

My Models

Shared Models

08April

08April

AdnanCombo1

AdnanCombo2

Crabtree_currentLULC_1

Crabtree_current_lulc

Crabtree_futureLULC

Crabtree_futureLULC_fu

Flat_cal_current

Flat_cal_current

Flat_cal_future

Flat_River

Flat_River_calibrated

Haw_River_basin

Ian0506flatriver

Ian0506flatriver

Little_Tennessee

Other Models

- ✓ Select any model from My Model section. Related information will show up in left panel
- ✓ Manually edit or replace information including the model input file. Click on **Change**
- ✓ The **Reset** button will restore all the original information previously saved

SWATShare User Interfaces

Please select the case from model list at your left and press run.

Owner: adnanrajib Model Name: Adnan_Fat Version: SWAT2009
Time Step: Daily Model Type: normal HUC ID: Shared?: false
Description:
Input data: Adnan_Fat

Run

Refresh

| Job ID | Model Name | Job Type | Job Status | Submission Time | Actions |
|--------|------------|-------------|------------|-------------------------|---------------|
| 508 | Adnan_Fat | normal | ACTIVE | 2013-05-11-17:11:21 EST | Output Delete |
| 371 | Adnan_Haw | sensitivity | PENDING | 2013-04-03-20:04:04 EST | Output Delete |
| 370 | wabash | calibration | DONE | 2013-01-25-00:05:05 EST | Output Delete |
| 368 | Adnan_Try1 | normal | FAILED | | |
| 367 | Adnan_Try1 | normal | FAILED | | |

My Models

- Adnan_Fat
- Adnan_Haw
- Adnan_Try1
- Adnan_Try1
- Adnan_Try3
- wabash
- w_set1

Selecting a model and clicking the **Run** button will submit the model to run on one of the XSEDE clusters

The model run may start immediately or it may be dispatched in a job queue waiting to be executed on the cluster

Failed status can show up mainly due to lack of required files in the uploaded zip folder

Log Information

(stdout=/grp/tgdata/waterhub/swat/users/adnanrajib/jobs/Adnan_Fat/swat-pbs.out)(stderr=/grp/tgdata/waterhub/swat/users/adnanrajib/jobs/Adnan_Fat/swat-pbs.err)(project="TG-ATM090060")

Shared Models

Other Models

- ✓ A user can download a shared model, but can run only the models in **My Model** section
- ✓ SWATShare selects run option (normal/sensitivity/calibration) depending on model's *file.cio* and information provided in the Upload interface

Visualization

View
Upload
Edit
Run
Visualization

Pick the job that you want to visualize

wabash

Generate some fresh plots

* Plot Type: Simulation

* Output File: output.rch

Title of the Plot: Total Streamflow (optional)

Generate New Plot

completed

Start Year: 2008 Month: 1

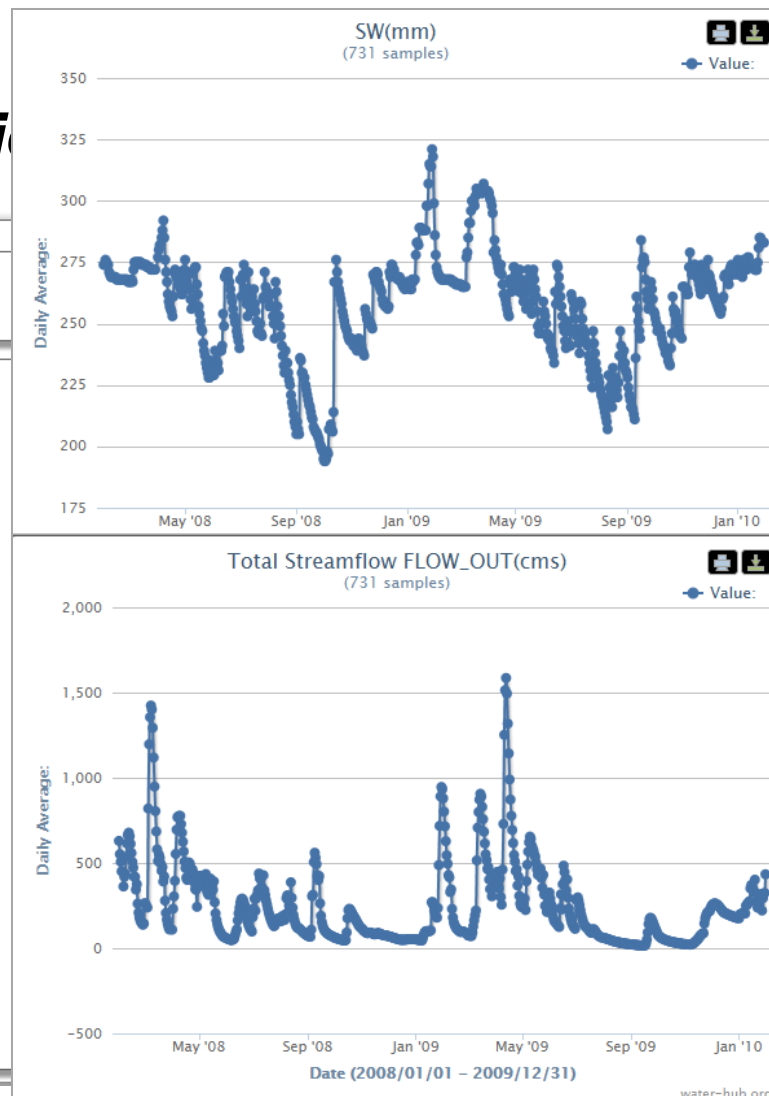
End Year: 2009 Month: 12

Time step: Daily

Primary Plot Variable

* Plot Variable: FLOW_OUT(cms): Average daily streamflow out of rea...

Y-Axis Unit: (optional) e.g. "(mm)"



- ✓ Visualization for (i) output.std, (ii) output.sub and (iii) output.rch
- ✓ One variable at a time needs to be selected to produce the visual plot
- ✓ All plots in output.rch and output.sub correspond to outputs at the watershed outlet

Thank you!

www.water-hub.org/swatshare

Contact:

Venkatesh Merwade – vmerwade@purdue.edu

<http://web.ics.purdue.edu/~vmerwade>