

# Application of WaterHUB for Sharing Hydrologic Models



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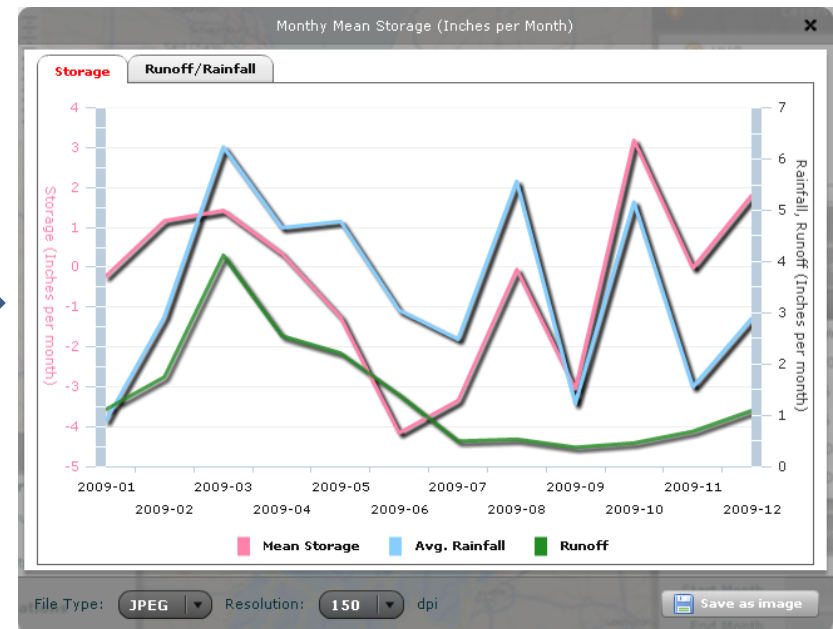
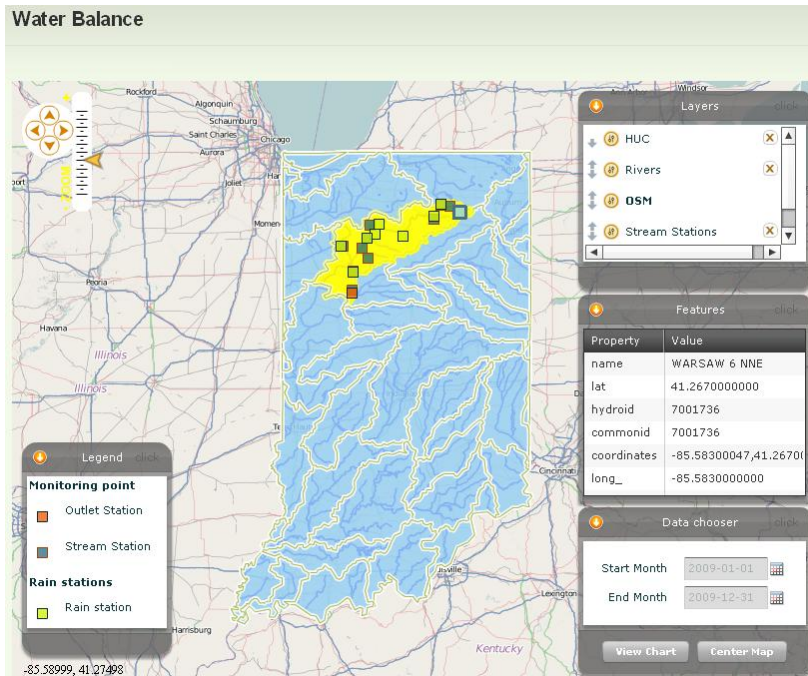
# What is WaterHUB?

- Based on Purdue's HUBzero Web Portal technology, utilizing CUAHSI HIS web services and open standards for data access
- WaterHUB creates an environment for hydrologists to share and discover information- especially models and data
- Think of WaterHUB as Social Networking for hydrology researchers, students, educators, and the public



# Example: Data Discovery & Access

Users can access water data and run simple calculations (e.g., computing water balance over a watershed)



User selects a watershed in Indiana to see available USGS and NCDC data points

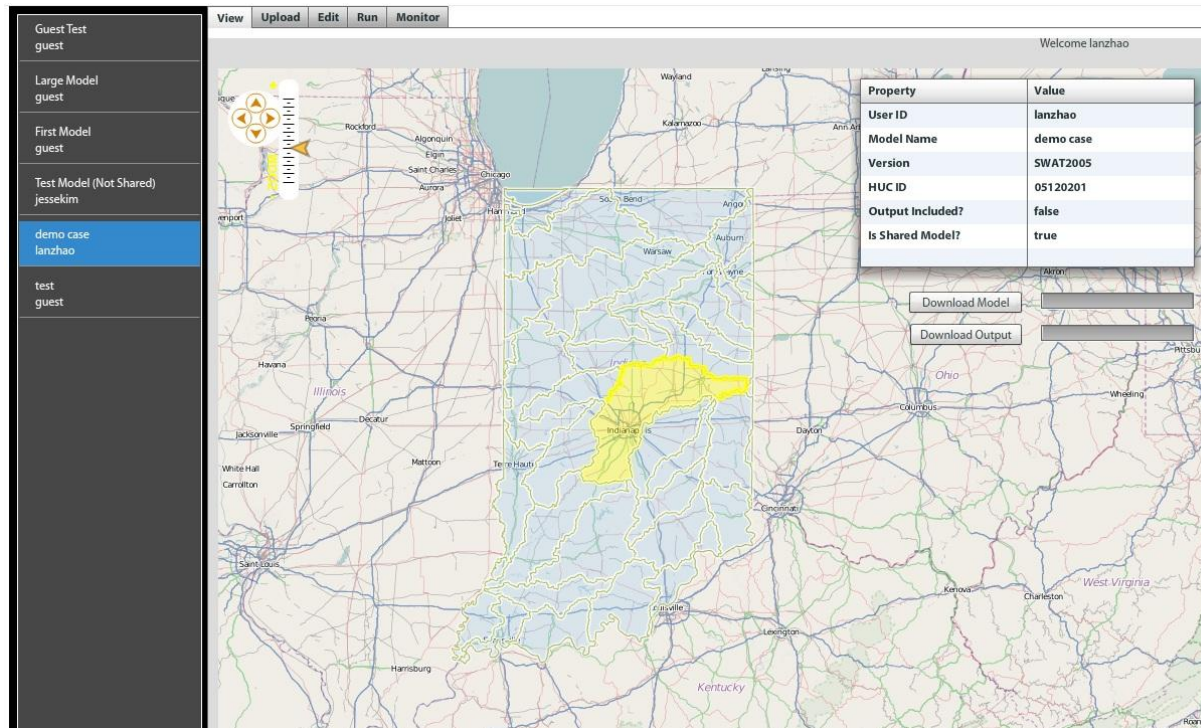
Information from all the data points is fetched through CUAHSI HIS services to get the above plot of rainfall and streamflow

# Example: Sharing of SWAT Models

- Our initial efforts are focused on sharing of SWAT (Soil Water Assessment Tool) on WaterHUB
- SWAT is a semi-distributed model for simulating both hydrology and water quality of watershed
- Why SWAT:
  - It is a popular, open source model with users located around the globe
  - Several SWAT models exist for many watersheds in Indiana (where Purdue is located), thus making the initial testing easy

# SWAT Tool: Model Search & Discovery

- Explore SWAT models uploaded to WaterHUB (list, search)
- View model metadata
- Download a model (input/output) if it is published to the public



The screenshot displays the WaterHUB SWAT Tool interface. On the left, a sidebar lists user models: Guest Test (guest), Large Model (guest), First Model (guest), Test Model (Not Shared) (jessekim), demo case (lanzhao), and test (guest). The 'demo case (lanzhao)' is selected. The main area shows a map of the Indiana region with a yellow highlighted area. A metadata table is overlaid on the map, showing the following properties and values:

| Property         | Value     |
|------------------|-----------|
| User ID          | lanzhao   |
| Model Name       | demo case |
| Version          | SWAT2005  |
| HUC ID           | 05120201  |
| Output Included? | false     |
| Is Shared Model? | true      |

Below the table, there are buttons for 'Download Model' and 'Download Output'. The top navigation bar includes 'View', 'Upload', 'Edit', 'Run', and 'Monitor' tabs. The top right corner says 'Welcome lanzhao'.



# Browse/View Mode

Guest Test  
guest

Large Model  
guest

First Model  
guest

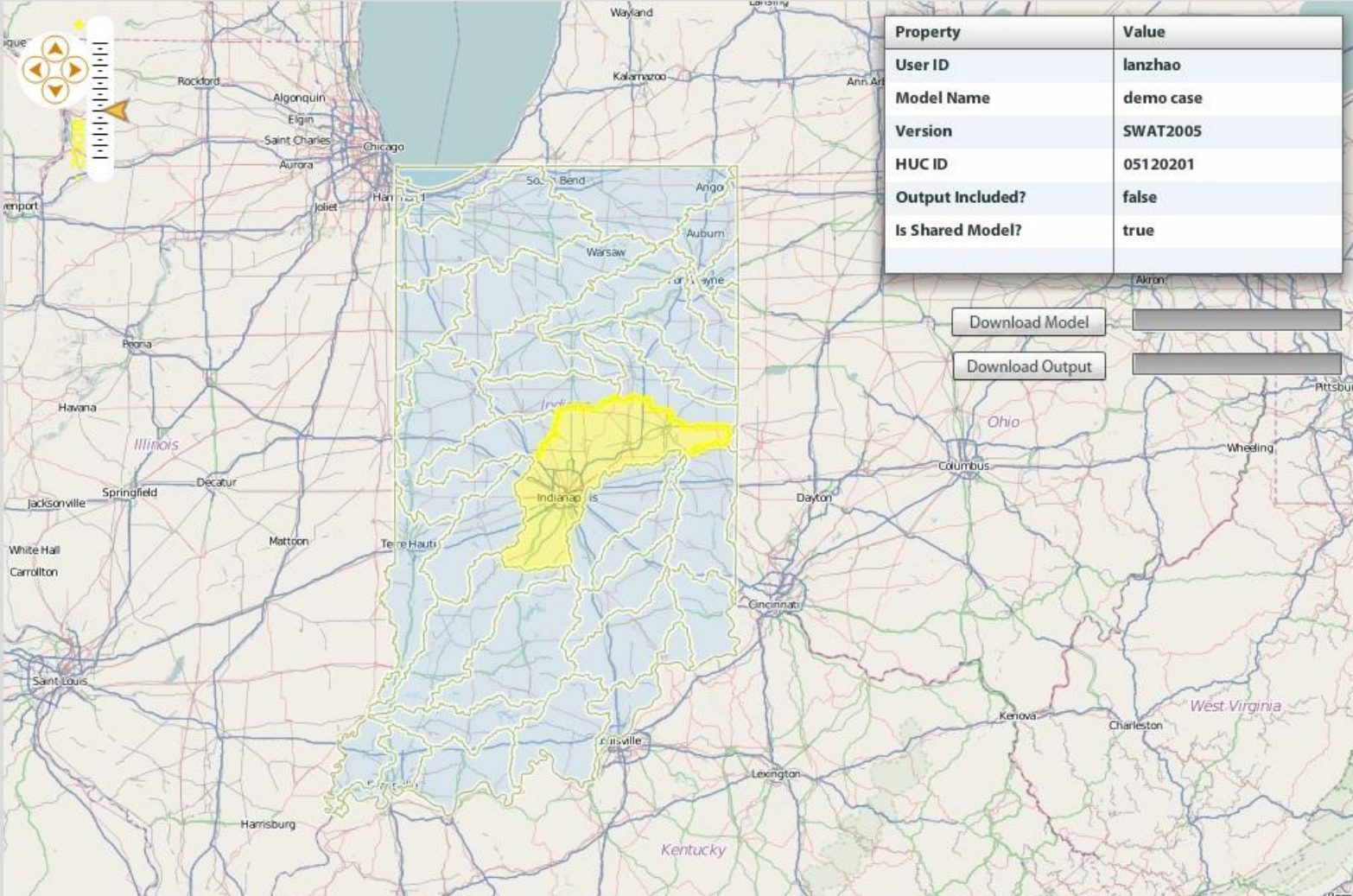
Test Model (Not Shared)  
jessekim

**demo case  
lanzhao**

test  
guest

ViewUploadEditRunMonitor

Welcome lanzhao



| Property         | Value     |
|------------------|-----------|
| User ID          | lanzhao   |
| Model Name       | demo case |
| Version          | SWAT2005  |
| HUC ID           | 05120201  |
| Output Included? | false     |
| Is Shared Model? | true      |

Download Model

Download Output

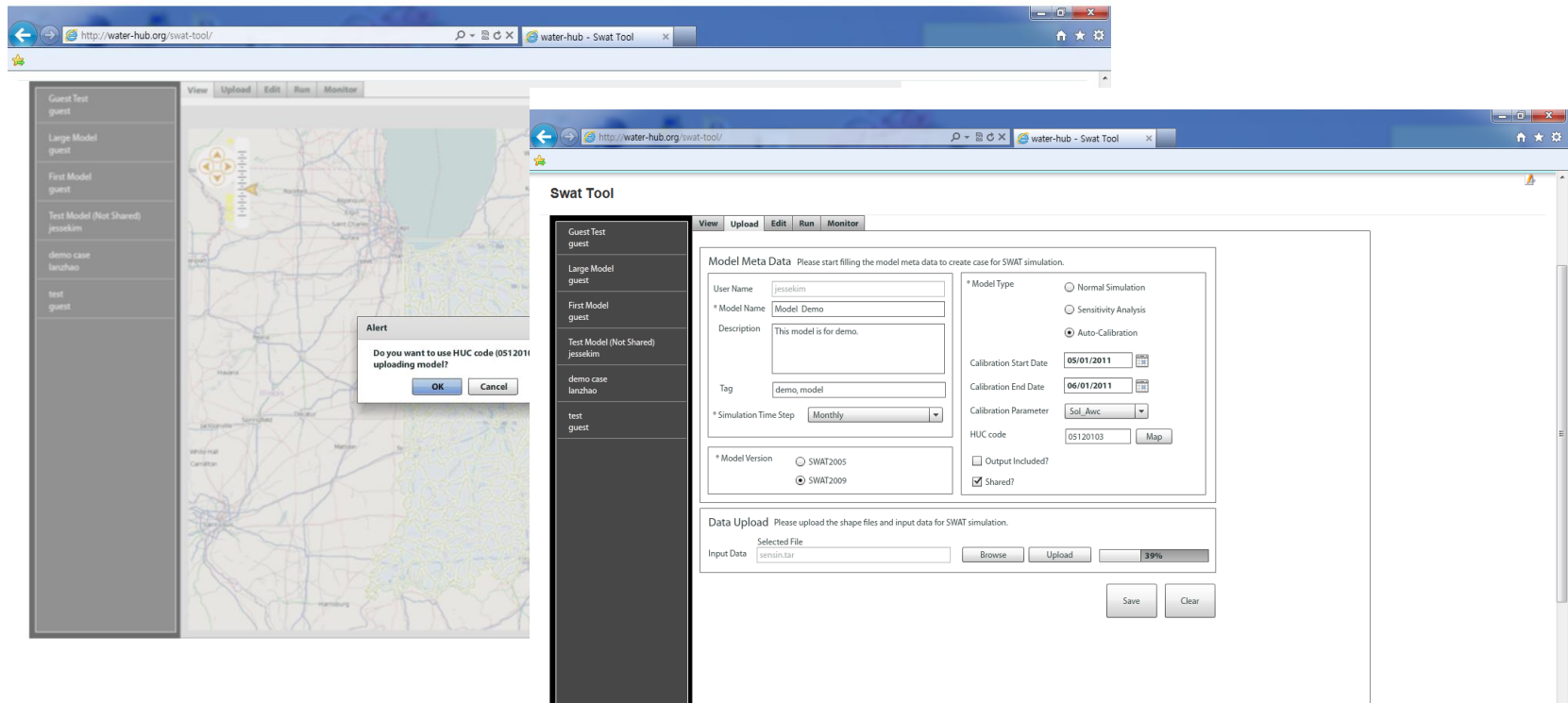
23 June 2011

WaterHUB for Sharing Hydrologic Models,  
CUAHSI HIS Conference, Logan Utah

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# SWAT Tool: Model Upload & Sharing

- Select a watershed to upload a new model
- Enter or edit the metadata describing the model (parameters, time range, model mode, HUC code, access permission)
- Upload the model input data to the server
- Only the model owner can perform edits



# Upload/Share Model: Map Space

The screenshot shows the WaterHub Swat Tool interface. On the left is a sidebar with a list of models: Guest Test guest, Large Model guest, First Model guest, Test Model (Not Shared) jessekim, demo case lanzhao, and test guest. The main area displays a map of the Ohio River region. A dialog box titled "Alert" is centered on the map, asking "Do you want to use HUC code (05120103) for uploading model?" with "OK" and "Cancel" buttons. On the right, a "Property" table displays the following information:

| Property         | Value                   |
|------------------|-------------------------|
| User ID          | jessekim                |
| Model Name       | Test Model (Not Shared) |
| Version          | SWAT2005                |
| HUC ID           | 04050001                |
| Output Included? | false                   |
| Is Shared Model? | false                   |

Below the table are buttons for "Download Model" and "Download Output". The top of the interface includes a navigation bar with "View", "Upload", "Edit", "Run", and "Monitor" tabs, and a "Welcome jessekim" message.



# Upload/Share Model: Metadata

← → http://water-hub.org/swat-tool/ water-hub - Swat Tool

**Swat Tool**

View Upload Edit Run Monitor

**Model Meta Data** Please start filling the model meta data to create case for SWAT simulation.

User Name

\* Model Name

Description

Tag

\* Simulation Time Step

\* Model Type

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

Calibration Start Date

Calibration End Date

Calibration Parameter

HUC code

☐ Output Included?

☒ Shared?

\* Model Version

- ☐ SWAT2005
- ☒ SWAT2009

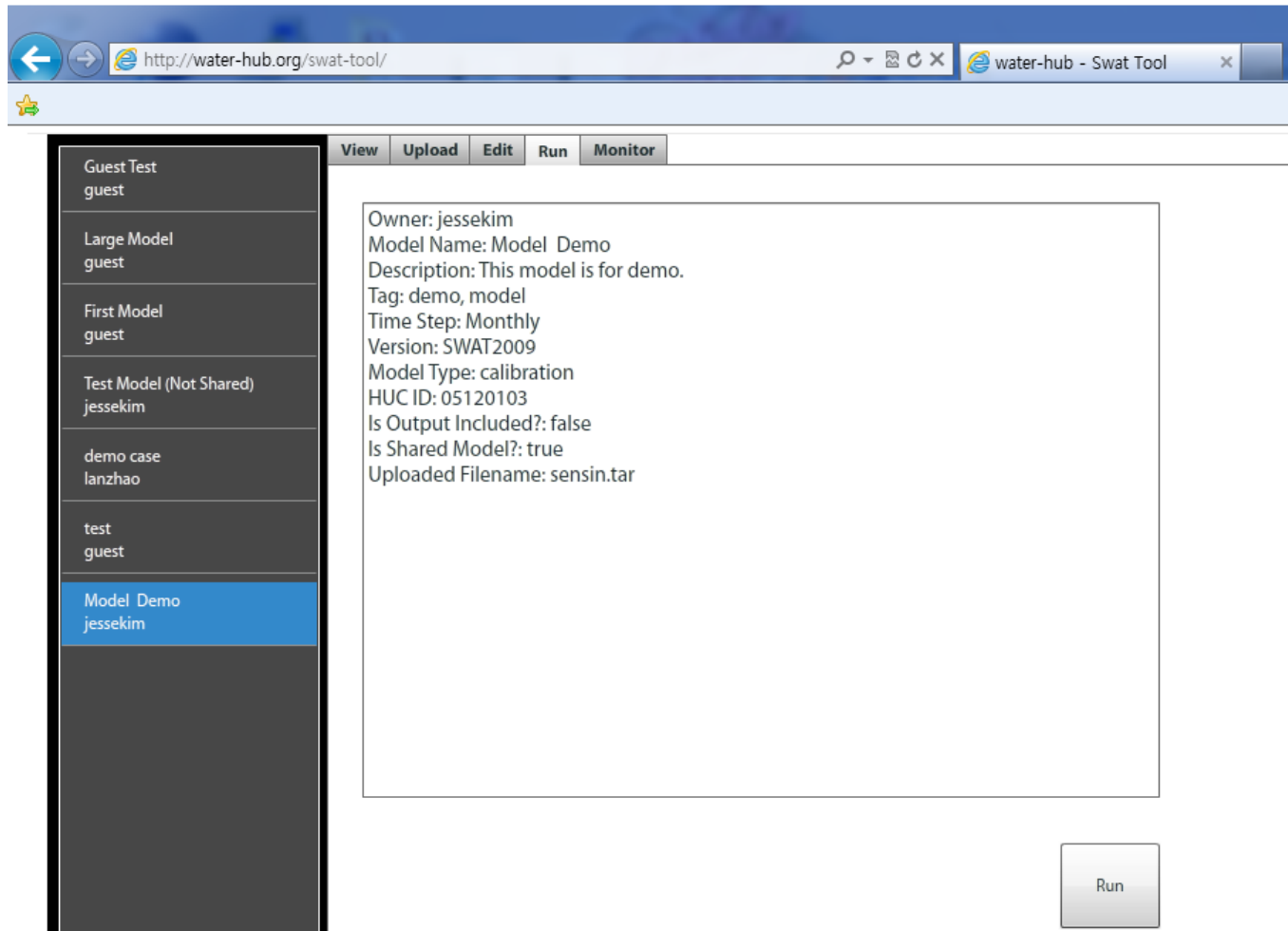
**Data Upload** Please upload the shape files and input data for SWAT simulation.

Input Data

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# SWAT Tool: Run Model on “Cloud”

- Run a Model (Run Mode)
  - Run a SWAT model on computation resources at the backend



# Conclusions

- HydroHUB allows data discovery, model publication/sharing, and results visualization
- We use CUAHSI HIS services for data
- Model Metadata is published
- First functionality is now available via the SWAT prototype on Purdue servers
- We want to connect this project with others in the HIS and hydrology community