SWAT OWL: A New Tool for Quicker Visualisation of SWAT Outputs and Calibration

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Introduction

- Working with Anglian Water.
- 23 Surface Water Catchments over 2 years.
- Diffuse pollution from agricultural land (metaldehyde).
- Tools and methodologies developed to quickly produce calibrated models and run scenarios.
Objectives

- Quick and easy way to visualise model outputs
- Quick and easy ways to automate changing of parameters and run SWAT.

- Visualisation enables greater understanding of the effect changes to SWAT parameters.
Overview of Swat Owl Window
Swat Model Run Selection Panel
Annual Water Balance Output
Annual Water Balance Selection
Monthly Water Balance Output
Monthly Water Balance Selection
Monthly Water Balance Selection
Swat Model Automation

Start

Change model database tables using SQL ‘Update’ queries.

Write SWAT input files using database tables

Run SWAT Model

Copy SWAT outputs into a new directory (named using date and time of run). Write log file.

Inspect Model Outputs

End

SQL Script
HRU Outputs
Automation of Parameter Changes and Model Runs

![Swat Owl interface](image)

- **1. Log File**
  - Click on `Save Log`, `Load Log`, or `Open in Text Editor`.

- **2. Log File Content**
  - Example: Date and time, model parameters, and run details.

- **3. Scenario Script**
  - Example: `Update gw SET RCHRG_DP = 0.07 WHERE RCHRG_DP > 0`

- **4. SWAT Scenarios**
  - Run Scenarios button

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### Example 1:

- **Scenario 1a:** ESCO and EPCO
  
<table>
<thead>
<tr>
<th>SQL Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPDATE bsn SET ESCO = 0.25</td>
<td>Update ESCO to 0.25</td>
</tr>
<tr>
<td>UPDATE bsn SET EPCO = 0.5</td>
<td>Update EPCO to 0.5</td>
</tr>
<tr>
<td><strong>RUN</strong></td>
<td>Run SQL command</td>
</tr>
</tbody>
</table>

- **Scenario 1b:** ESCO and EPCO
  
<table>
<thead>
<tr>
<th>SQL Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPDATE bsn SET ESCO = 0.5</td>
<td>Update ESCO to 0.5</td>
</tr>
<tr>
<td>UPDATE bsn SET EPCO = 0.1</td>
<td>Update EPCO to 0.1</td>
</tr>
<tr>
<td><strong>RUN</strong></td>
<td>Run SQL command</td>
</tr>
</tbody>
</table>

- **Scenario 1c:** ESCO and EPCO
  
<table>
<thead>
<tr>
<th>SQL Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPDATE bsn SET ESCO = 0.75</td>
<td>Update ESCO to 0.75</td>
</tr>
<tr>
<td>UPDATE bsn SET EPCO = 0.3</td>
<td>Update EPCO to 0.3</td>
</tr>
<tr>
<td><strong>RUN</strong></td>
<td>Run SQL command</td>
</tr>
</tbody>
</table>

### Example 2:

- **Scenario 1b:** Update ESCO
  
<table>
<thead>
<tr>
<th>SQL Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPDATE hru SET DEP_IMP = 4500 WHERE SOIL LIKE '%WICK%'</td>
<td>Update DEP_IMP to 4500 for soil 'WICK'</td>
</tr>
<tr>
<td>UPDATE hru SET DEP_IMP = 1510 WHERE SOIL LIKE '%BANBURY%'</td>
<td>Update DEP_IMP to 1510 for soil 'BANBURY'</td>
</tr>
<tr>
<td><strong>RUN</strong></td>
<td>Run SQL command</td>
</tr>
</tbody>
</table>
Graph Functionality
Objectives

• Quick and easy way to visualise model outputs
• Quick and easy ways to automate changing of parameters and run SWAT.
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Thank you for listening.

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