Surface Water Modeling Project

• Develop surface-water quantity models for each of the State’s 8 major river basins

• Models will be an important tool for regional water planning and for updating the State Water Plan:
  o identify potential future water shortages
  o analyze impact of new withdrawals
  o analyze impact of increased water demands
  o evaluate different management strategies

• DNR and DHEC working together

• 2-year project
These are the same basins used by DHEC for water-quality assessments and for managing interbasin transfers of water.
In 2013, DNR and DHEC began preparing a Request for Proposals (RFP) as part of the state procurement process.

In July 2014, CDM Smith, Inc. was awarded a contract to develop these models using its Simplified Water Allocation Model (SWAM) modeling tool.
Surface Water Modeling Project

- Clemson University is facilitating a stakeholder process, with support from DNR, DHEC, and CDM Smith.

- US Geological Survey is providing streamflow data and is developing a groundwater model.

- US Army Corps of Engineers will be developing water-demand forecasts.
Surface Water Modeling Project

Technical Advisory Committee

Industry • Public Supply • Agriculture • Energy • Environment • Legal

Ruth Albright  Synterra Corporation
Ed Bruce       Duke Energy
Andy Fairey   Charleston Water System
Eric Krueger  The Nature Conservancy
Julie Metts   Santee Cooper
Heather Nix   Upstate Forever
K.C. Price    Greenville Water
Mullen Taylor Mullen Taylor, LLC
Eddie Twilley Twilley, Fondren & Associates
Harrison Watson Florence Mill
Charles Wingard Walter P. Rawls and Sons, Inc.
Schedule for Developing the Models

- **Pilot Model** is the Saluda River basin model
- Other models to follow, with order based on data availability
- 2-year schedule requires that groups of models be constructed in parallel

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Data Collection
Streamflow, M&I and ag withdrawals, discharges, precipitation, reservoir operations, interconnections, facility operation dates, etc.

Data Analysis
Gap filling and record extension

Unimpaired Flow Development
Daily mean UIFs

Data collection and processing

Data extension/gap filling to produce complete daily data sets for 80-year period for all stream gages and water withdrawals and discharges

Unimpaired Flow is the flow in a river as it would be in a completely unaltered state
SWAM Model – Saluda basin framework
SWAM Model – Edisto basin framework

Figure 1: Overview Map
SWAM Model – Broad basin framework

Figure 1: Overview Map
SWAM Model – Pee Dee basin framework
SWAM Model – Catawba basin framework

Figure 1: Overview Map
Major Steps in Model Development

Task 1: Data Collection
- Streamflow, M&I and ag withdrawals, discharges, precipitation, reservoir operations, interconnections, facility operation dates, etc.

Task 2: Data Analysis
- Gap filling and record extension

Task 2: Model Development
- Daily mean UIFs

Task 2: Baseline Model Runs
- Simulate current conditions

Task 2: Model Calibration
- Reproduce actual conditions

Task 2: Basin Schematic
- Model framework development
SWAM Model – Saluda basin
SWAM Model – Saluda basin
SWAM Model – Saluda basin
## Status Update

Progress of each basin model (as of 12/8/2015)

<table>
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<tr>
<th>BASIN</th>
<th>% COMPLETE</th>
<th>STATUS OF MODEL DEVELOPMENT</th>
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<tbody>
<tr>
<td>Saluda</td>
<td>99</td>
<td>Draft Baseline model complete</td>
</tr>
<tr>
<td>Edisto</td>
<td>99</td>
<td>Draft Calibration model complete</td>
</tr>
<tr>
<td>Broad</td>
<td>79</td>
<td>Draft UIF data mostly complete</td>
</tr>
<tr>
<td>Pee Dee</td>
<td>69</td>
<td>Draft UIF data mostly complete</td>
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<tr>
<td>Catawba</td>
<td>35</td>
<td>Data collection mostly complete</td>
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<td>Santee</td>
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<td>Data collection mostly complete</td>
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<tr>
<td>Savannah</td>
<td>9</td>
<td>Data collection ongoing</td>
</tr>
<tr>
<td>Salkehatchie</td>
<td>19</td>
<td>Data collection mostly complete</td>
</tr>
</tbody>
</table>
After baseline models are complete

**DHEC**
- Can start using models to analyze withdrawal permit applications

**DNR**
- Development of groundwater model
- Develop water-demand forecasts
- Use models to identify potential water-supply shortages
- Form basin planning groups
- Develop basin water plans
- Update State water plan
- Update model UIF data every 5-10 years
Potentiometric mapping

Water level elevation of the Black Creek aquifer, November 2012
Real-time groundwater monitoring
FOR MORE INFORMATION

On the Web

- DNR: http://www.dnr.sc.gov/water/waterplan/surfacewater.html
- Clemson: www.scwatermodels.com

Contacts

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