



South Carolina Department of Health and Environmental Control

Promoting and Protecting the Health of the Public and the Environment

Surface Water Availability Assessments

Catawba/Wateree River Basin

Bi-State Commission

June 12, 2015



Surface Water Availability Assessments

- SC has limited scientific information about the availability of our water supplies, and future demands on those supplies
- Surface water assessments are necessary to complement SCDHEC's new surface water permitting program and for SCDNR to update the State Water Plan
- 1.5 million dollars allocated to the project from the SC General Assembly



South Carolina Department of Health and Environmental Control

Promoting and Protecting the Health of the Public and the Environment

SC DHEC and DNR Co-Managing Process

- CDM Smith, Inc. was contracted to develop the models using its *Simplified Water Allocation Model* (SWAM) modeling tool
- Clemson University will facilitate the stakeholder engagement process



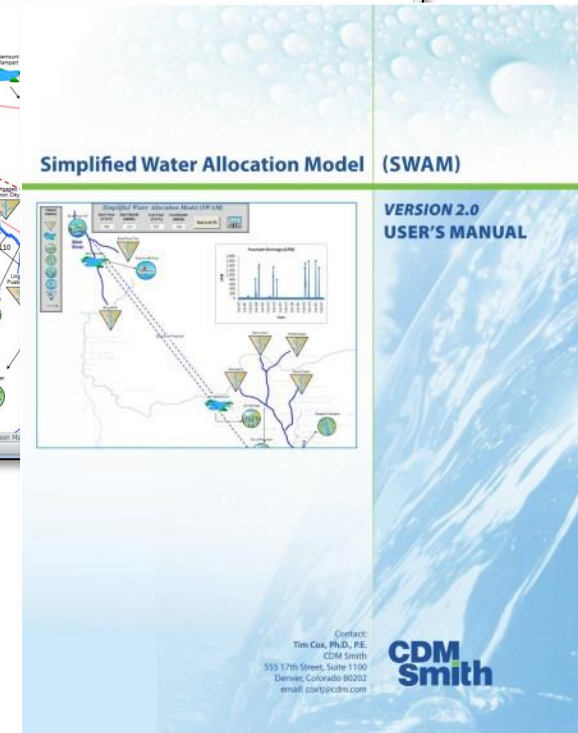
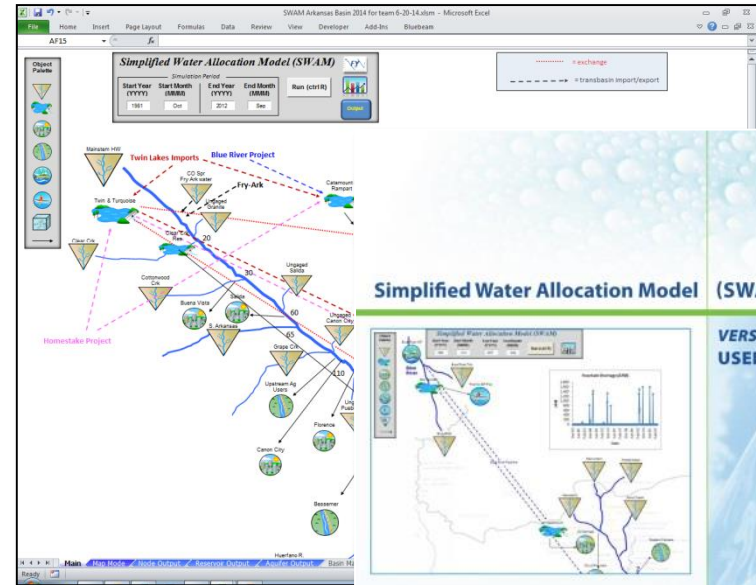


South Carolina Department of Health and Environmental Control

Promoting and Protecting the Health of the Public and the Environment

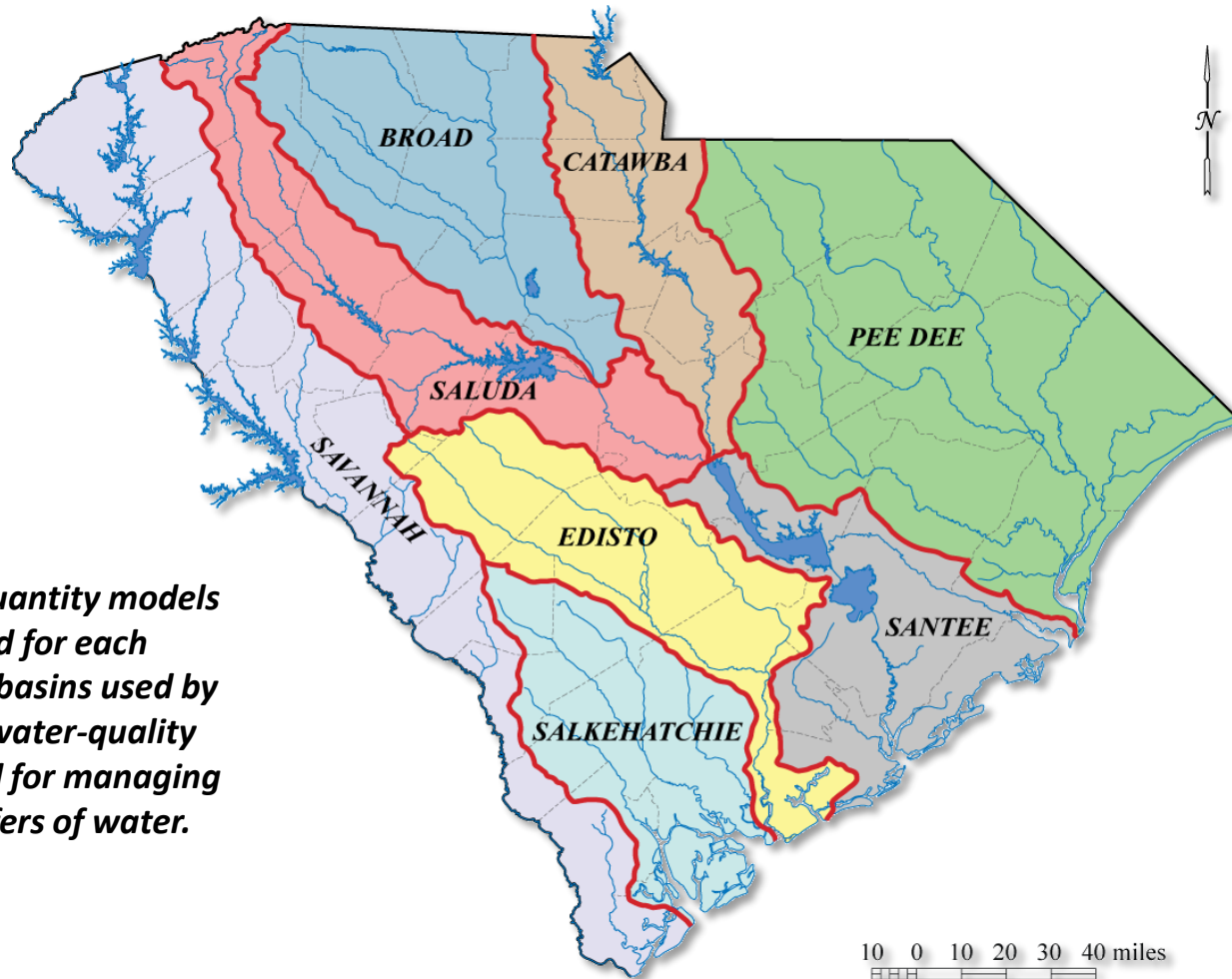
Simplified Water Allocation Model (SWAM)

- Developed in response to an increasing need for a desktop tool to facilitate regional and statewide water allocation analysis
- Calculates physically and legally available water, diversions, storage consumption and return flows at user-defined nodes
- Used to support large-scale planning studies in Colorado, Oklahoma, Arkansas and Texas





River Basin Delineation



Surface-water quantity models will be developed for each basin, the same basins used by DHEC for doing water-quality assessments and for managing interbasin transfers of water.

SWAM Model Main Screen

SWAM Arkansas Basin 2014 for team 6-20-14.xlsm - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Add-Ins Bluebeam

AF15

Simplified Water Allocation Model (SWAM)

Simulation Period

Start Year (YYYY)	Start Month (MMM)	End Year (YYYY)	End Month (MMM)	Run (ctrlR)
1981	Oct	2012	Sep	<input type="button" value="Run (ctrlR)"/>

..... = exchange

- - - - -> = transbasin import/export

Object Palette

The map displays the Arkansas River basin with various nodes and project areas. Key features include:

- Reservoirs:** Twin & Turquoise, Clear Crk Res, Cottonwood Crk, Buena Vista, S. Arkansas, Pueblo Reservoir, Pueblo Rec Pool, WWSR, Pueblo, St. Charles R., Ft. Lyon Storage Canal.
- Canals and Ditches:** Colorado Canal, Oxford Farmers Ditch, Holbrook Canal, Ft. Lyon Storage Canal.
- Projects:** Twin Lakes Imports, Blue River Project, Fry-Ark, Homestake Project.
- Other Features:** Mainstem HW, CO Spr Fry Ark water, Ungaged Granite, Catamount & Rampart, COSprings, Security & Widefield, Aurora Export, Ark Basin Aquifer, Colorado Canal, Henry & Meredith, Oxford Farmers Ditch, Holbrook Canal, Dye & Harbrook, Ft. Lyon Storage Canal, Bessemer, Comanohe Power, CF & I Steel, Apishapa R., Rocky Ford Highline, Huerfano R.

Main | Map Mode | Node Output | Reservoir Output | Aquifer Output | Basin Map

Ready

70%



The Models Can Be Used To...

- Determine surface-water availability
- Predict where and when future water shortages would occur
- Test alternative water management strategies, new operating rules, and “what-if” scenarios
- Resolve water disputes
- Consolidate hydrologic data
- Evaluate the impacts of future withdrawals on instream flow needs
- Evaluate interbasin transfers
- Support development of Drought Management Plans

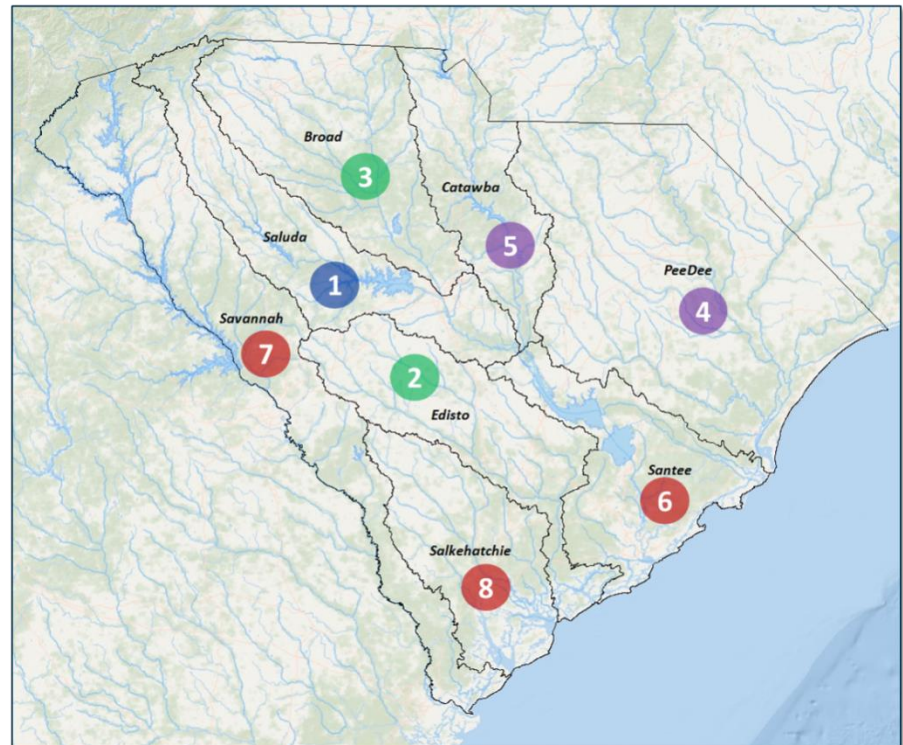
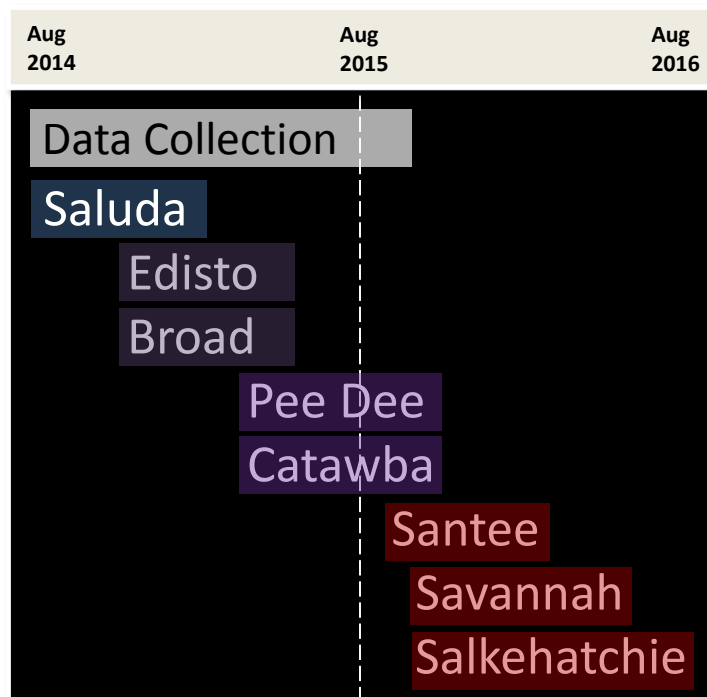


South Carolina Department of Health and Environmental Control

Promoting and Protecting the Health of the Public and the Environment

Schedule for Developing the Models

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





South Carolina Department of Health and Environmental Control

Promoting and Protecting the Health of the Public and the Environment

Data is Needed to Support...

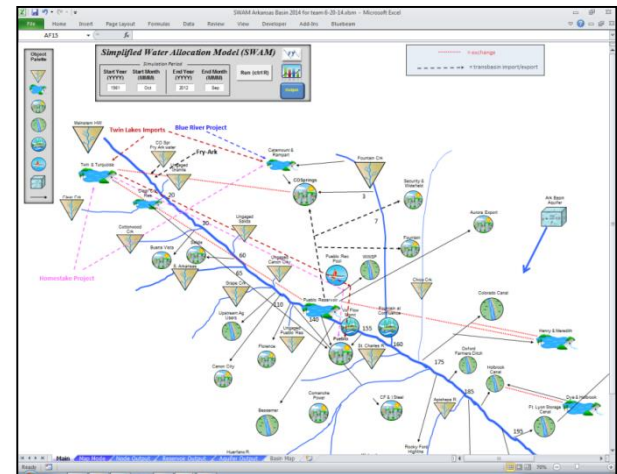
1. Development of Unimpaired Flows (UIFs)

UIF Definition: Flow in a river as it would be in a completely unaltered state
Historically removed flows with human influences removed

UIFs Provide: A baseline for evaluating impacts of human use by allowing analysts to compare altered flows to UIFs

2. Development of each baseline model

- A. Withdrawal and return amounts and locations
- B. Current reservoir operating rules
- C. Drought Management Plans and Requirements
- D. Instream flow requirements





South Carolina Department of Health and Environmental Control

Promoting and Protecting the Health of the Public and the Environment

Data Needed to Support Unimpaired Flows



Streamflow, dating back to earliest continuous gage data



Historical withdrawals (>100,000 gpd) and discharges for M&I, agriculture, hydropower



Reservoirs

- a) Operating rules and elevation-storage-area curves
- b) Historical elevation release data
- c) Precipitation and evaporation records



Interconnections

Project Overview

Task 1

Data Collection

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

Unimpaired Flow Development

- Daily mean UIFs

Data Analysis

- Gap filling and record extension

Stakeholder Input

Task 2

Basin Schematic

- Model framework development

Model Calibration

- Reproduce actual conditions

Baseline Model Runs

- Simulate current conditions

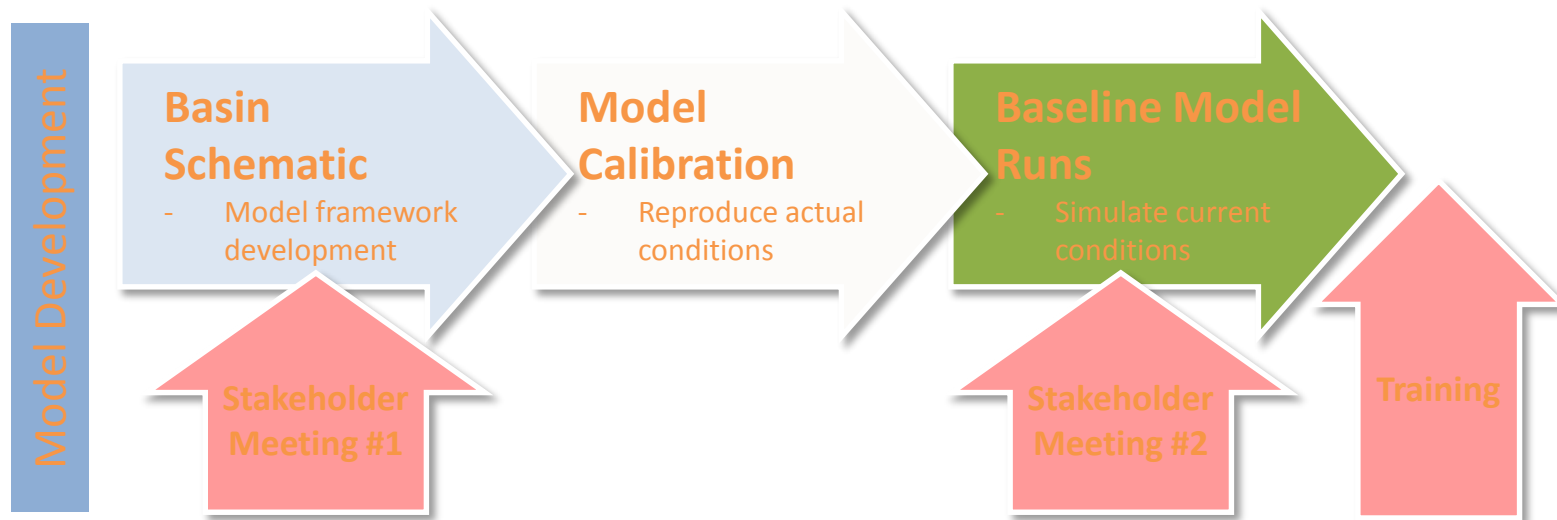
Stakeholder Meeting

Stakeholder Meeting

Stakeholder Involvement

Project Overview (Webinar)

Opportunities



- Two meetings per basin offered during model development
- Stakeholder engagement is being led by Clemson University



Stakeholder Involvement Opportunities

- **Meeting #1 - Review of Basin Framework (Workshop Format)**
 - Are all interests included in the framework?
 - Are all important tributaries represented?
 - Are additional model nodes needed for environmental flows?
 - Are there significant data gaps which still need filling?
- **Saluda Basin Meeting #1 – completed in April**
- **Edisto Basin Meeting #1 – June 18th, Blackville**



Stakeholder Involvement Opportunities

- **Meeting #2 - Review of Unimpaired Flow Dataset and Baseline Model**
 - Review of UIF development and gap filling
 - Review of baseline model
 - Review of model calibration and verification results
 - Review of model uses and limitations
- **Training**
 - Training to interested parties will be provided for each basin model after all models are completed



South Carolina Department of Health and Environmental Control
Promoting and Protecting the Health of the Public and the Environment

Questions?

www.scwatermodles.com

