

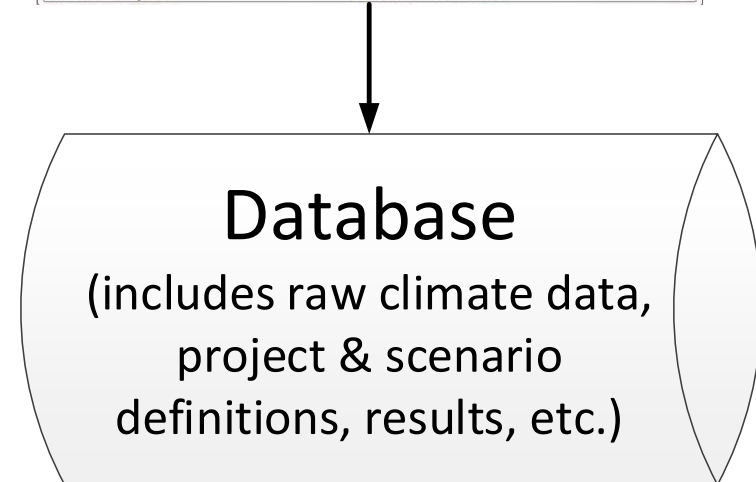
The programming structure and data requirements for Wetbud

Zach Agioutantis, PhD

VAWP Annual Fall Meeting & Wetland
Research Symposium
October 15, 2015
Fredericksburg, VA

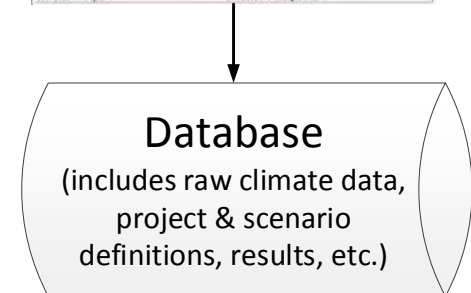
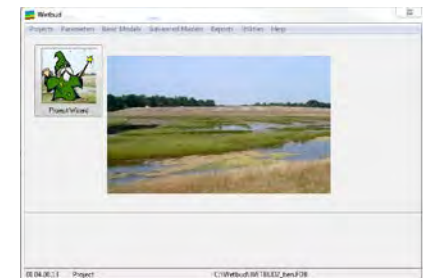
Wetbud Design Considerations (1/5)

- Available for Windows TM Systems ONLY (XP, 7, 8.1, 10)
- Developed for collaborative (office) environment
- Database driven application
 - Database stores primary data
 - Database stores results
- Features multiple projects and multiple scenarios per project



Wetbud Design Considerations (2/5)

- Climate (precipitation, weather, solar) data can be imported automatically directly from NOAA, NRCS or other sites
- Climate data can be imported manually for private weather stations
- ET data can be calculated using two methodologies:
 - Penman
 - Thornthwaite

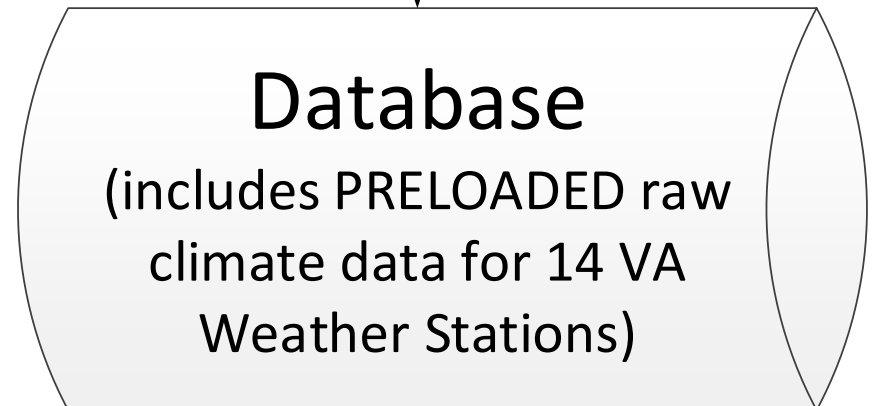


Wetbud Design Considerations (3/5)

- Climate data are **reusable**
- Data generated based on climate data (e.g., ET) are also **reusable**
- Climate data are tied to weather stations, i.e. by location
- The most time consuming part will be to get a “good” set of data.

Wetbud Design Considerations (4/5)

- The recent Wetbud release features Preloaded weather and climate data for 14 Virginia Stations

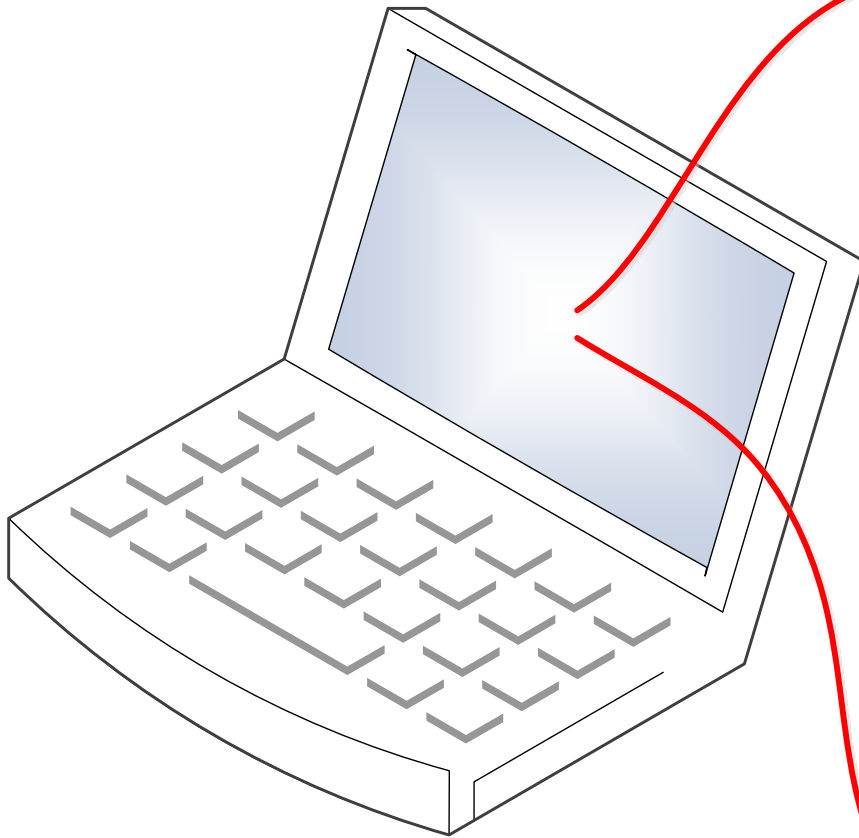


Wetbud Design Considerations (4/5)

- Wetbud Plus (also in the recent release) features a project / scenario setup wizard.
- The wizard assumes that all needed climate data are in place.

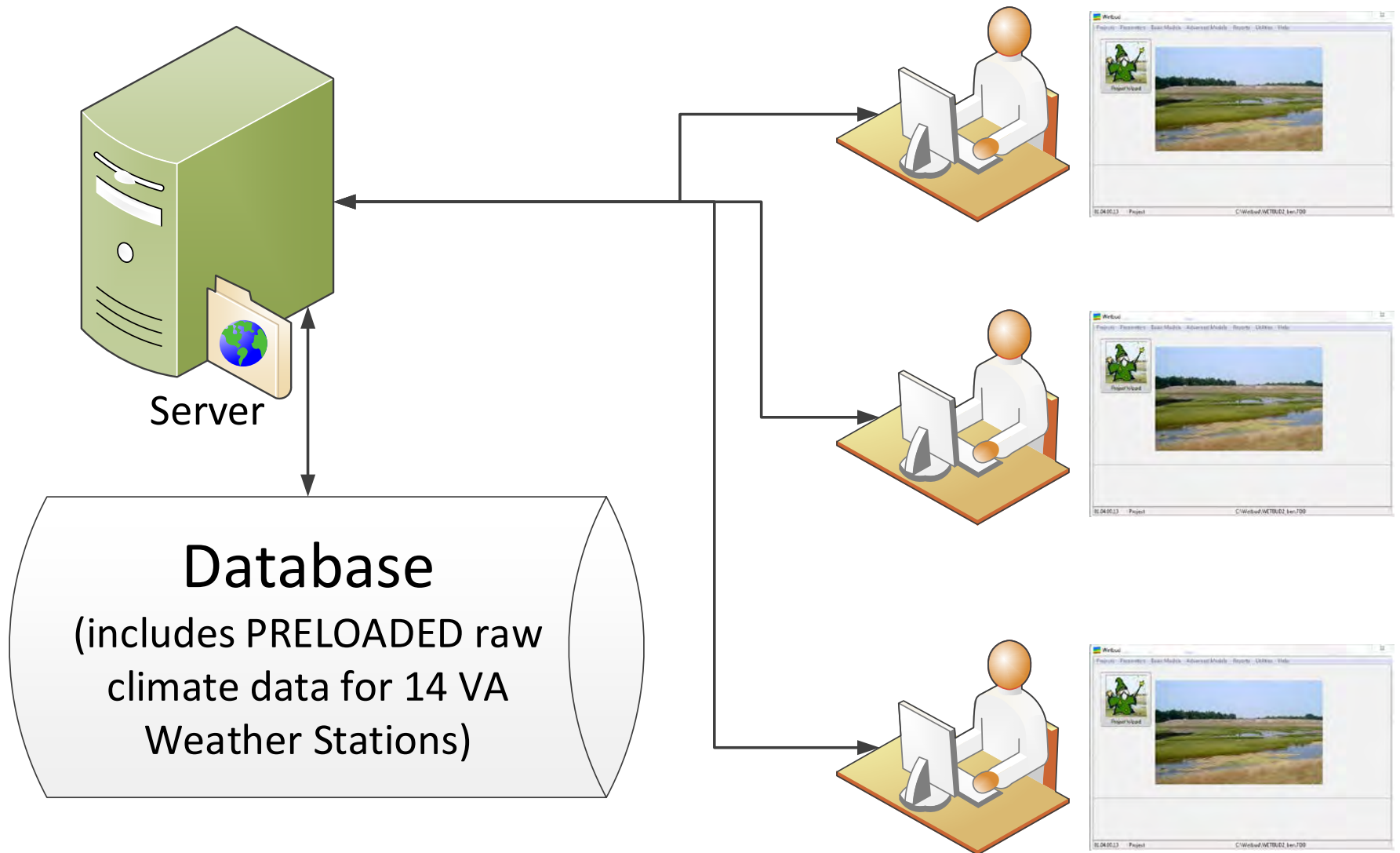


Typical Single User Setup



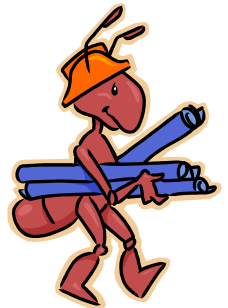
Database
(includes PRELOADED raw
climate data for 14 VA
Weather Stations)

Typical Multiuser Office Environment



Working with a Database

- Seamless interface with the application on a LAN environment
- Work is not “lost” in excel or DOC files on individual computers
- Data is shared
- Simplifies backing up of work
- Comments are allowed in most areas to document actions
- Reporting is fully parametric



The concept of a Wetbud Project

- Project information includes the location of the wetland, the weather station that will be used for the analysis, the WETS stations used for the analysis, and information on the setup of the Steam Overbank and WEM calculations options
- A project may include multiple basic and multiple advanced models

The concept of a Wetbud Scenario

- Scenarios allow multiple different runs under a project where the user can modify wetland size, the type of input and output, weir settings, etc.
- All basic scenario data results are automatically saved in the Wetbud Database.

Projects and Scenarios

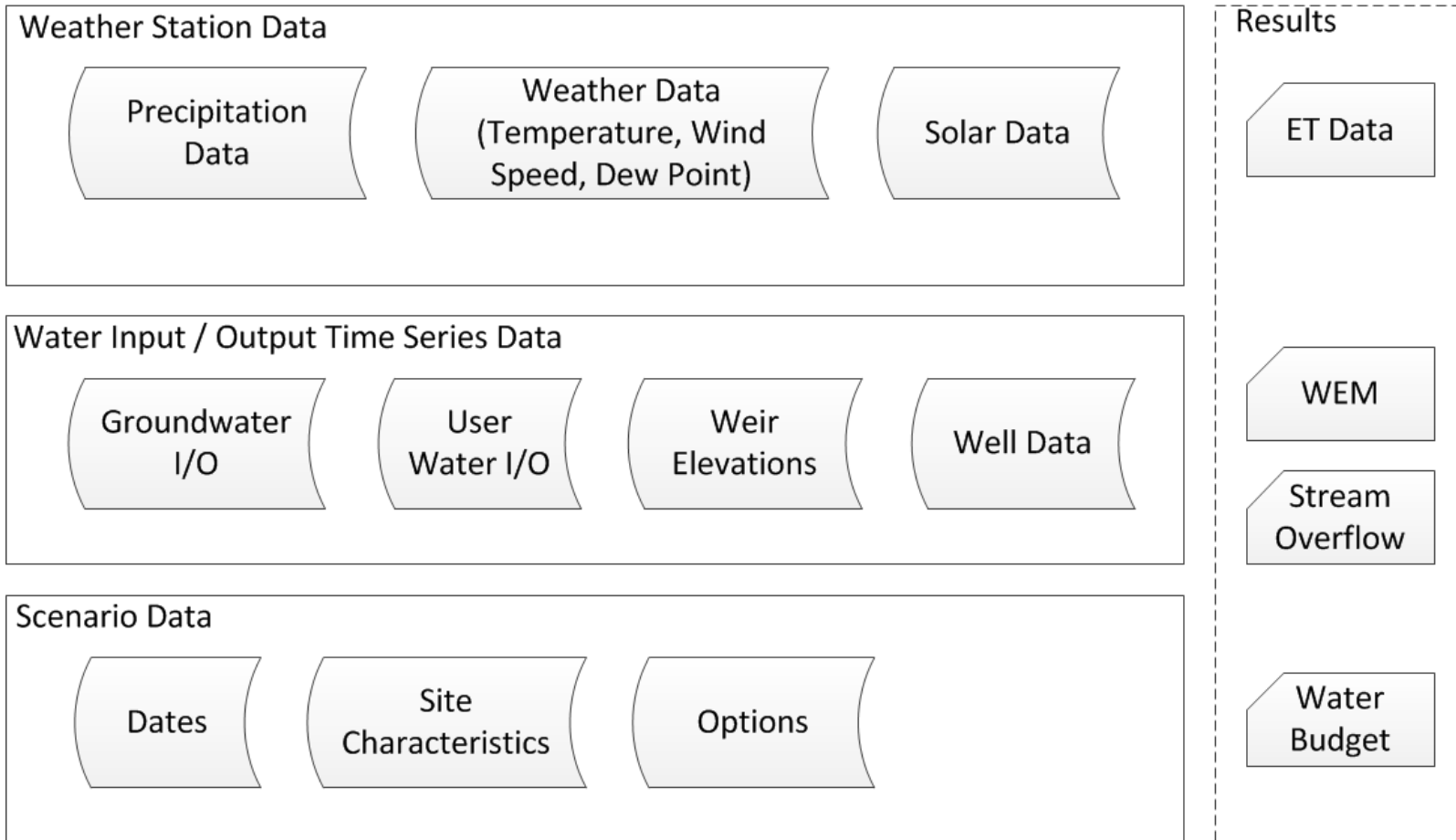
- Projects may contain basic and/or advanced scenarios
- Scenarios are linked to projects and share weather stations and other site specific data (wells, etc.)
- Basic scenarios can be simplistic or sophisticated depending on the level of analysis
- Advanced scenarios are solved using Modflow. Modelling is more complicated since data need to be “translated” to be Modflow compatible



Basic Scenarios (1/2)

- Calculate water budget for three typical years (WDN) or for given range
- Calculations are performed on a monthly basis
- Data may be constants or time series (precipitation, ET, groundwater I/O, weir elevations, etc.)
- Groundwater time series may be generated via a built-in WEM algorithm
- Stream overbank time series may be generated via a built in algorithm

Basic Scenarios (2/2)



Advanced Scenarios (1/2)

- Solution is generated via the publically available Modflow code.
- Wetbud will seamlessly generate the input required for Modflow.
- Due to the model types considered, input to Modflow (and solution times) is greatly simplified
- Calculations may be done on a daily basis
- Data for precipitation and ET can be used directly from the Wetbud databank
- Results are not stored in the database. In the future, Wetbud will support internal storage of selected advanced scenario results

Advanced Scenarios (2/2)

Input Data

Precipitation
Data

ET Data

Groundwater

Soil
Properties

Geometry

Area

Cell Size

Layers

Topo

Modelling

Grid
Zones

Cell Zones

Model Setup
and Boundary
Conditions

Results

Water
Elevations

Questions?

- Download the latest Wetbud version:
- <http://www.landrehab.org/wetbud/>

<http://www.landrehab.org/wetbud/>

