The programming structure and data requirements for Wetbud

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Zach Agioutantis, PhD
Concept (1/4)

• Developed for collaborative (office) environment

• Database driven application
  – Database stores primary data
  – Database stores results

• Features multiple projects and multiple scenarios per project
• 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
Concept (3/4)

• Climate data is reusable
• Data generated based on climate (e.g., ET) are also reusable
• Climate data are tied to weather stations, i.e. by location
• Multiple units (e.g., in, cm, m) are supported (and more in the future)
Concept (4/4)

• Supports multiple projects and multiple scenarios per project
• Supports Basic and Advanced models
• All input data for both scenarios/models are stored in the database
• All output data for Basic models are stored in the database
• Supports a custom report generator
Multi-User (Client/Server) Environment by Design
Working with in a Client / Server Environment

- Information is shared (Work is not “lost” in Excel or Doc files hiding in individual computers)
- Centralized data keeping – simplifies managements and backup
- User Tracking available
- Any PC unit can act as a server; even a desktop computer
- Sets the background for web reporting of data
Large Office Environment

Diagram showing a server connected to a database and multiple clients.
Small Office Environment
Support of Multiple Databases (not recommended for beginners)
Working with a Fully Parametric Application

• Definition of data sets is independent of the current use (e.g. download and clean up precipitation data – this can be used by multiple projects)
• Comments are allowed in most areas to document actions
• Reporting is (will be) fully parametric
• Individual users (with login and password) with different roles and permissions are supported (not implemented yet)
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 done 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 WEM
- Stream overbank time series may be generated via built in algorithm
Basic Scenarios (2/2)

Weather Station Data
- Precipitation Data
- Weather Data (Temperature, Wind Speed, Dew Point)
- Solar Data

Water Input / Output Time Series Data
- Groundwater I/O
- User Water I/O
- Weir Elevations
- Well Data

Scenario Data
- Dates
- Site Characteristics
- Options

Results
- ET Data
- WEM
- Stream Overflow
- Water Budget
Advanced Scenarios (1/2)

- Solution is generated via the publicly 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
Questions?