Open Source Modeling Tools: Utah Perspective

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WATER QUALITY

Benefits of Open Source

- Cost - free software (typically)
- Transparent
- Reproducible
- Flexible
- Shareable
- Agency owned and maintained

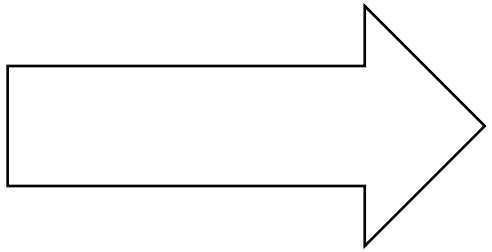
Opportunities in Open Source

- New hires from university have skills in R and/or Python
- Majority of DWQ efforts in R, some Python users
- Applications related to modeling
  1) Data acquisition
  2) Model input pre-processing tools
  3) Model output post-processing and visualization
  4) Wasteload Analysis modeling tools
  5) GitHub for collaboration and version control

Wasteload Analysis Tools Migration

Utah Rivers Model

- Originally developed by EPA R8 and UDEQ
- Compilation of tools in Excel worksheets with VBA code
  - Mixing zone, AMMTOX, DO sag
- Issues
  - Manual data acquisition and processing
  - Relies on cell references and formulas that are easily broken
  - Error corrected in one WLA workbook not auto-corrected in other WLA workbooks
  - VBA not intuitive



Wasteload R

- Recompilation of tools in R
  - Each tool is a callable function
  - Data acquisition and pre-processing tools
  - WLA documentation and reporting template
- Benefits
  - Open source
  - Less error prone
  - Easier to implement modifications and additions

Collaboration through GitHub

https://github.com/utah-dwq

- Collaboration on open source projects
  - Currently internal to UDWQ, but has potential for external collaborators
- Issue tracking
- Version control
  - Integration options
  - Coding
  - Model runs
- Archive and repository
- Distribution
- Potential concerns
  - Pricing
  - Security

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