Water Balance Automation
Distributed Data Production
&
Atlas of Water Balance

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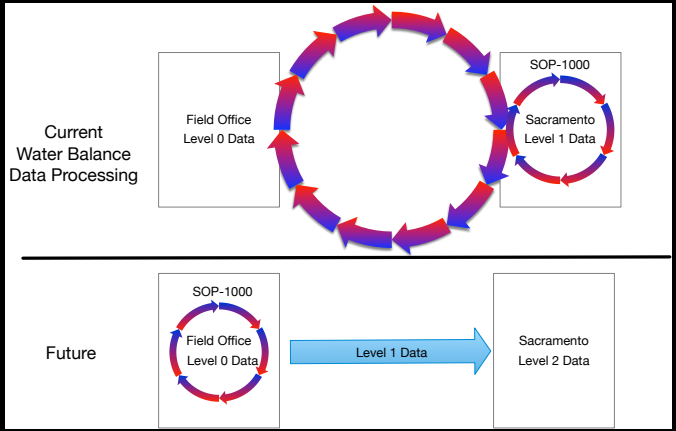
Outline

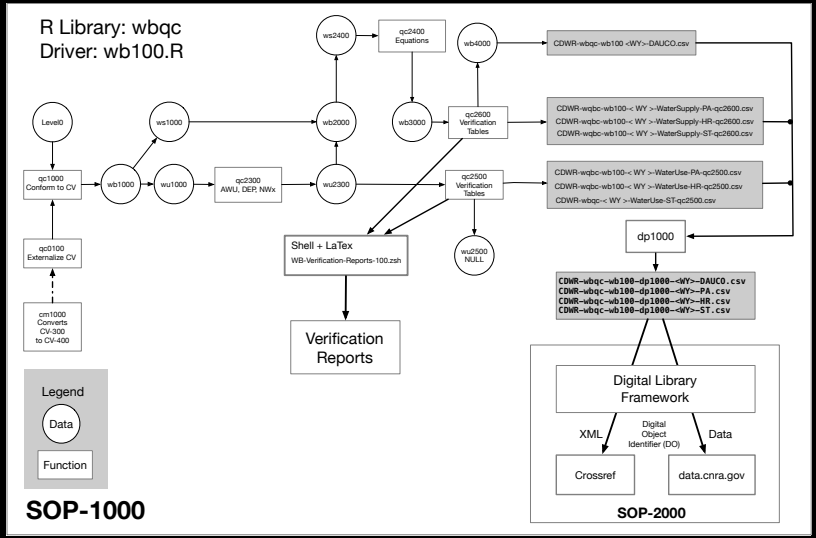
Goals of Water Balance Automation
High Quality, Less Time, Less Cost



- Automated, Centralized Level 1 Data Production
- Data Standardization
- < Time for WY Completion

- > Error Detection & Correction
- < Time Level 1 Data Production
- < Time for WY Completion

SOP-1000 Review



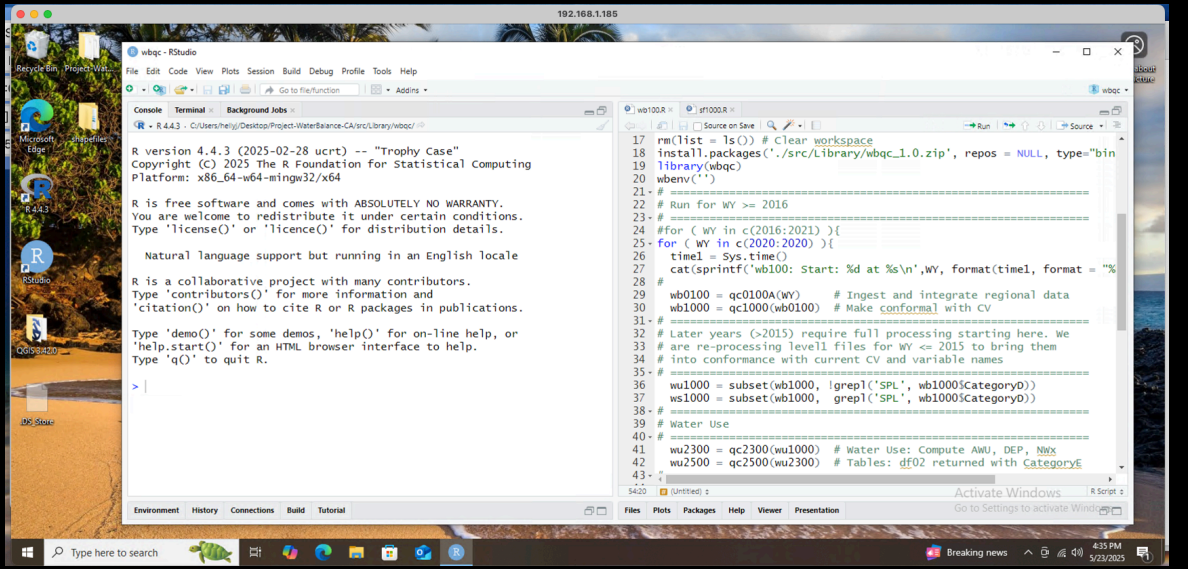
Single R-Script Encapsulates Entire Data Production Workflow

wb100.R

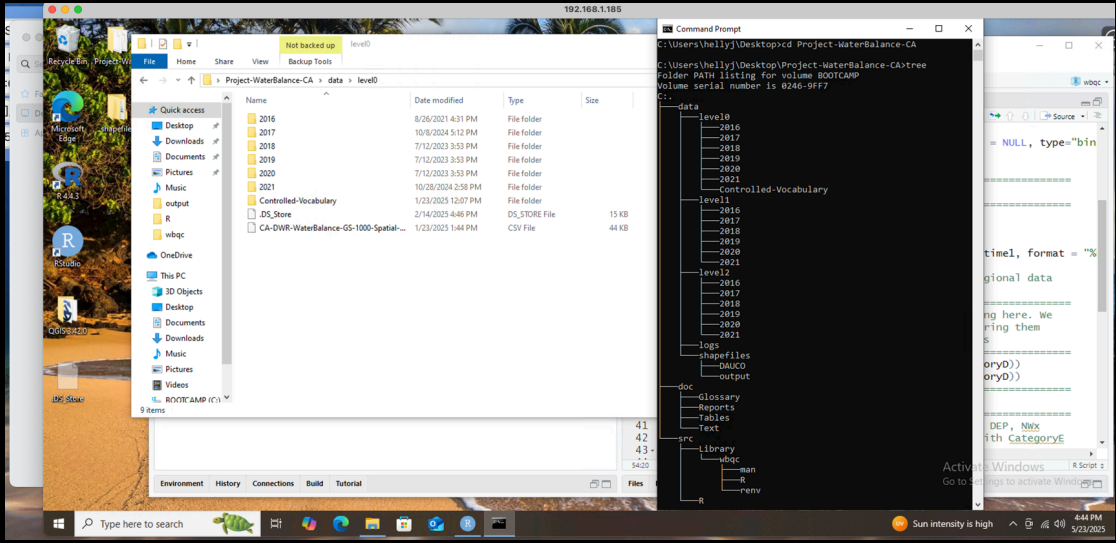
Source on Save

```
# ================================================================
for ( WY in c(2016:2021) ){
#for ( WY in c(2016:2016) ){
# WY = 2016
  time1 = Sys.time()
  cat(sprintf('wb100: Start: %d at %s\n',WY, format(time1, format = "%F %R %Z")))
#
  wb0100 = qc0100A(WY)      # Ingest and integrate regional data
  wb1000 = qc1000(wb0100)  # Make conformal with CV
# ================================================================
# Later years (>2015) require full processing starting here. We
# are re-processing level1 files for WY <= 2015 to bring them
# into conformance with current CV and variable names
# ================================================================
  wu1000 = subset(wb1000, !grepl('SPL', wb1000$CategoryD))
  ws1000 = subset(wb1000,  grepl('SPL', wb1000$CategoryD))
# ================================================================
# Water Use
# ================================================================
  wu2300 = qc2300(wu1000)  # Water Use: Compute AMU, DEP, NRx  # TBAs come from here
  wu2500 = qc2500(wu2300)  # Tables: df02 returned with CategoryC
# ================================================================
# Re-integrate since WS needs WU to complete computations
# but needs to have SPL0Z3-6 included
# ================================================================
  wb2000 = rbind(wu2300, ws1000) # After WU adjustments are made
#================================================================
# Water Supply: ws2400 Needs complete WB dataset since some values need USE
# as part of the equations (e.g., TDS)
#================================================================
  wb3000 = qc2400(wb2000)  # Add water supply equations computed terms
  ws3000 = subset(wb3000, grepl('SPL', wb3000$CategoryD)) # Avoid double counting WU
  ws4000 = qc2600(wb3000)  # Compute water supply tables and level data
# ================================================================
# Create level2 files: Re-integrate WS and WU
# Only write-out DAUCO after all the additional parameters are computed
# ================================================================
  wb3000 = wb3000[order(wb3000$CategoryD),]
# Write Level1 files
  write.table(wb3000, paste(DATA_LEVEL1,
                            '/', WY, '/CDWR-wbqc-',WY, '-DAUCO-wb100.csv',
                            sep=''), sep=',',row.names=FALSE)
# ================================================================
# Write shpefiles by WY and HR.Name values
# ================================================================
#  rc2000 = sf1000(wb3000)
# ================================================================
rc1000 = dp1000(WY)  # Generate Level2 files
cat(sprintf('Duration %d: %5.2f minutes\n', WY, difftime(Sys.time(), time1, units='mins')))
}
```

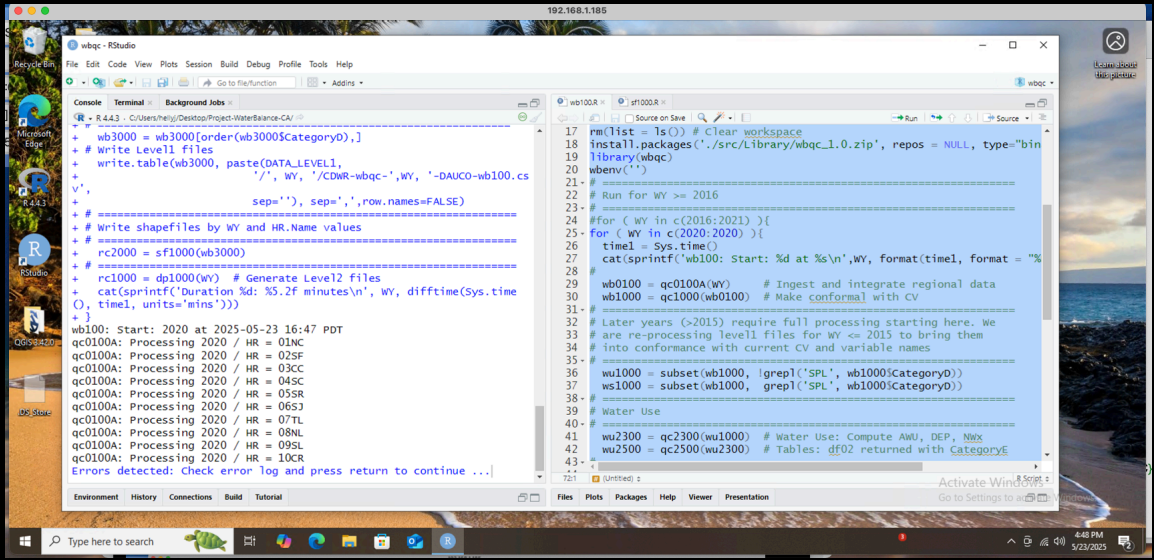
Stand-Alone Application Running on Windows: wbqc (R package)



(1) Edit Data in Inflow/Outflow Sheets then
(2) Run thru wbqc



(1) Detect and Correct Errors (Rinse and Repeat) (2) Send to HQ



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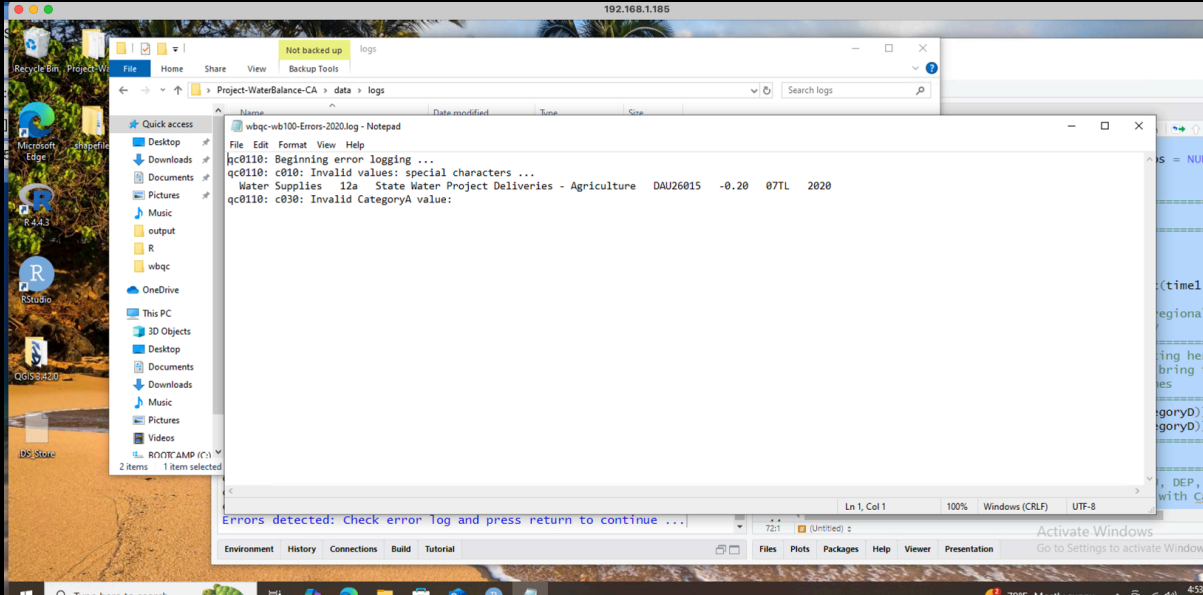
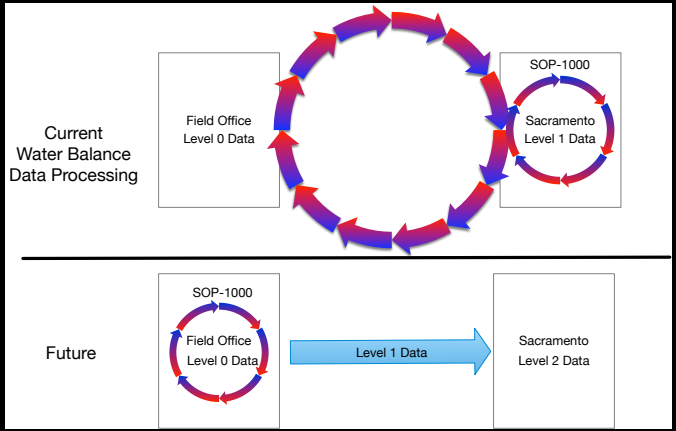


Goals of Water Balance Automation: Less Cost, Better Quality



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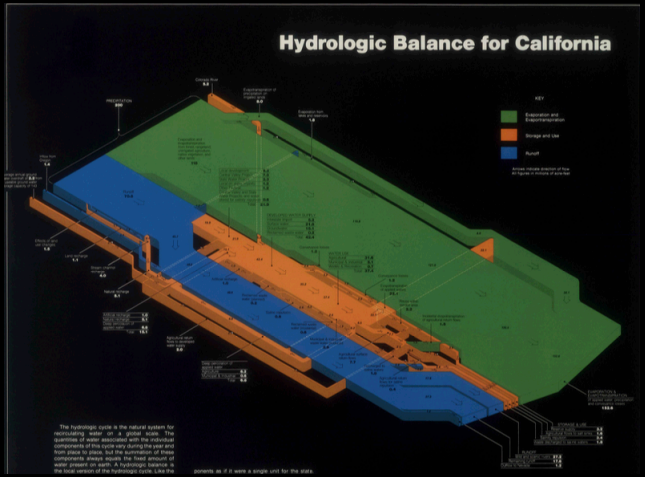
Atlas of Water Balance: wbqc-Style Methods for Figures, Tables



- Inspired by California Water Atlas, 1979
  - Based on data from 1972
  - New digital version could be updated automatically when every new WY is completed
- Catalogue of data, figures and tables for CDWR to draw from
  - Showcase for new methods of analysis and visualization
  - Useful for public outreach, research and education
  - Opportunity for Field Offices to shine
- Developing an outline

Outline