

Notes for WW2100 3.0 set of WW2100 simulations

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This set of WW2100 simulations is being run on the Econ and Freshwater computers starting in early July, 2016. These simulations use the source code and data in versions 330 and 331 of the CEOAS WW2100svn repository.

This set is designated as WW2100 canonical output 3.0. It is compared in these notes to the previous canonical output, WW2100 2.3 which was produced in mid-February 2016 using the code and data in v229 of the CEOAS WW2100svn repository.

23 scenarios have been run:

- Ref
- LowClim
- HighClim
- FireSuppress
- FullCostUrb
- HighPop
- UrbExpand
- LateRefill
- Managed
- Extreme
- NoReservoirs
- NoGrow
- AllFallow
- LowIrrig
- HighIrrig
- NewIrrig
- NewInstream
- StationaryClim
- EconExtreme
- NoPopGrowth
- NoIncGrowth
- HistoricRef
- HistoricHadGEM

V229 was used for WW2100 2.3, while v330 and v331 have been used for WW2100 3.0. Log messages for the repository versions v230-v331 have been compiled at the end below. Here are the items I see in that list which may have caused the output data to change noticeably:

- The HBV calibration was changed for upland portions of the basin.
- The High Cascades groundwater contribution was adjusted.
- Bulk stomatal resistance was decreased from 400 s/m to 150 s/m.
- The separate canopy evaporation estimate was eliminated, in recognition

that canopy evaporation is included in the Penman-Monteith evapotranspiration estimate used in the forested uplands.

- The data for Spring Hill municipal water intake was corrected to reflect Spring Hill as an in-basin source rather than an out-of-basin source.
- Some seasonal inconsistencies and duplicate entries were corrected in the water right point-of-diversion input file.
- A bug in the calculation of farm rent was corrected in v321.
- The calculation of water price in urban water model was revised: prices increase faster in 2011-15 than they did before.
- The rules for allocating water to Metro were revised.

Overall water metrics for this set of simulations have been entered into the ScenariosComparison.xlsx spreadsheet, and there compared to the corresponding metrics for the mid-February "WW2100 2.3" output. RAIN_EVAP is now zero. AET has increased by about 35%. The High Cascades groundwater contribution has decreased by 15%. Water imported from outside the basin has decreased by amounts ranging from 13% to 30%. The amount of water in the soil, streams, and reservoirs has increased by about 15%. Municipal and rural domestic use of water has decreased by 11%, except it is unchanged for the FullCostUrb scenario. The overall mass balance discrepancy has gone from about -0.6% to +0.9%.

Here is a version-by-version list of the change log from v229, used in WW2100 2.3, through v330 and v331, used in WW2100 3.0.

230: Populate ECO in the stream layer from ECOREGION in the IDU layer. Add logic to populate HBVCALIB in both layers.

231: The ECO attribute in the streams layer was rebuilt using the ECOREGION attribute in the IDU layer.

232: Get the logic associated with HBVCALIB working.

233: blank

234: Save IDU.dbf with populated values of HBVCALIB, good at least for the McKenzie and Long Tom basins.

235: Get HBVCALIB working for the 9 target reservoir headwater subbasins.

236: Commit versions of IDU.dbf and streams.dbf which have HBVCALIB initialized for the 9 target reservoir headwater subbasins and the 6 tributary subbasins in which they are located.

237: Add HBVCALIB for the Clackamas, Tualatin, and Yamhill basins.

238: Add HRU output variable HRU_TO_AQ, the amount of water going to the High Cascades aquifer instead of to the stream, with units of mm. Add HRU_TO_AQ to the HBV mass balance report. Remove HC groundwater contribution from ecoregion 8 and put it all in ecoregion 9. Comment out the call to HBVCALIB() (which populates the HBVCALIB attributes in the stream and IDU layers). Comment out the Init-time log message for individual instream water rights.

239: Switch over to using HBVCALIB for looking up soil hydraulic properties, and switch over to using Q2 in the High Cascades ecoregion to recharge the aquifer rather than to flow directly back to the stream network. There is still a bug present: Q2 is still getting counted in the water in the streams.

240: Disable the logic to redirect Q2 to the aquifer instead of the stream in the High Cascades ecoregion. The logic wasn't working, and I haven't been able to figure out how to get it to work. Comment out an unused member of the HRU class and an unused method of the HBV class.

241: Add files for simulating the area that drains into Detroit reservoir. Add Detroit and NSantiamBoulder to the HBV Flows report. Add MACA training data as an alternative climate dataset in the HBV xml file. Adjust a few things in the Calibrate_NSantiamBoulder.envx file to reflect the current calibration method.

242: Update High Cascades groundwater specs per Gordon Grant and Sarah Lewis. Add StudyAreas/HBVCALIB directory and subdirectories for the 19 drainages to be recalibrated.

243: Get the HBVCALIB/LongTom_FernRidge7/FernRidge7.envx stuff working, in prep for recalibration work.

244: Remove obsolete file.

245: Add empty directories for some of the HBVCALIB drainages.

246: Add MiddleFork_HillsCreek1 files.

247: Comment out the logic for identifying non-unique COMIDs.

248: Add MiddleFork_FallCreek4 and MiddleFork_Jasper38 files. Fix the path to Reservoirs/ControlPoints in LongTom_FernRidge7/HBV.xml and MiddleFork_HillsCreek1/HBV.xml.

249: Add files for HBVCALIB subdirectories Detroit, CottageGrove, and Dorena. In the FernRidge, HillsCreek, FallCreek, and Jasper subdirectories, delete HBV.xml and wv_Scenarios.xml, rename HBV.csv to HBV_PEST.csv, and change the .envx files to reference wv_Scenarios_PEST.xml and HBV_PEST.xml files in StudyAreas/WW2100. Add wv_Scenarios_PEST.xml and HBV_PEST.xml to StudyAreas/WW2100.

250: Add files for BlueRiver, Cougar, and GreenPeter to HBVCALIB.

251: Add Goshen, Monroe, Walterville, Mehama, and Waterloo files to subdirectories in HBVCALIB.

252: Add the files for WestLinn and McMinnville to the subdirectories in HBVCALIB.

253: Add Kathleen Moore's historic reservoir inflow data for the 9 reservoirs in the HBVCALIB set.

254: Add outputs to the HBV Flow report for the 9 reservoirs in the HBVCALIB set. Remove reports which aren't needed for the PEST runs.

255: Correct the reach associated with the Salem gauge used for HBVCALIB. Repopulate HBVCALIB in IDU.dbf and streams.dbf. Begin data preprocessing in blu.xls, which brought to light a problem with missing data.

256: Commit the version of idu_2011.dbf which was used in running the HistoricRef and HistoricHadGEM scenarios for WW2100 2.3.

257: Commit changes and additions related to HBV calibration.

258: Correct COMID for Hills Creek reservoir pour point and consequent corrections in HBVCALIB attribute values. Add reservoir drainage pour points to HBV Flows report.

259: Correct COMID for Blue River reservoir pour point and consequent corrections in HBVCALIB attribute values.

260: Commit corrected versions of IDU and streams shapefiles for Blue River, Walterville, Hills Creek, and Jasper.

261: Corrections to HBVCALIB for Cottage Grove, Fall Creek, Cougar, Goshen, Jasper, and Walterville.

262: Commit corrected versions of IDU and stream shapefiles for Cottage Grove, Fall Creek, Cougar, Goshen, Walterville, and Jasper.

263: Update HBV_PEST.csv to match HBV.csv. This version of HBV_PEST.csv is the starting point for the PEST runs.

264: Fix line ending problems in HBV.csv and HBV_PEST.csv.

265: Add John Dalrymple's BlueRiver9.pst file.

266: Correct the name of BlueRiver9.pst.txt to BlueRiver9.pst.

267: Correct initial values.

268: FluxExpr.cpp fix a readOnly problem.
GDALWrapper.cpp read gdal111.dll instead of gdal18.dll
Boulder.envx use relative paths instead of absolute paths

269: Insert calibrated HBV parameter values for Blue River, Cottage Grove, and Fern Ridge, in HBV.csv.
Add climate report to HBV_PEST.xml.
Turn on reporter.dll in the .envx files for the 9 reservoirs, using
wv_reporter_PEST.xml.
Add Ref and PESTwithReservoirs scenarios to wv_scenarios_PEST.xml.

270: Specify additional groundwater inputs to Blue River, Fall Creek, Dorena, Green Peter, Detroit, Cougar, and Hills Creek. Add the CalibrationResults spreadsheet to the repository. Update HBV_PEST.csv for Dorena and Hills Creek.

271: Save the results of the PEST run on the Fall Creek reservoir drainage.

272: Correct the COMID entry for the Spring Hill intake. It was coded as -98 for out-of-basin, but it is actually in the basin, so I changed the code to -99, which tells AltWaterMaster::LoadWRDatabase() to look up the COMID based on the coordinates of the POD.

273: Update HBV parameter values for Fall Creek, Dorena, and Green Peter. Correct a typo in the entry for Blue River. Revise the groundwater contributions in HBV_PEST.xml for Blue River, Cottage Grove, Fall Creek, Green Peter, and Detroit. Comment out all the scenarios in wv_scenarios_PEST.xml except the PESTwithReservoirs scenario. Update various files in the folders for all the reservoirs in the HBVCALIB folder.

274: Propagate the v273 changes in HBV_PEST.xml to AlthBV_Minimum.xml. Propagate the v273 changes to HBV.csv to the HBV_PEST.csv files in the 9 reservoir subfolders of HBVCALIB.

275: Go back to using gdal18.dll, in \Envision\GDAL\release-1600-x64\bin.

276: Add HBV_Reservoir.xml. Add the analysis spreadsheets for 7 reservoirs. Add newly calibrated parameter values for Hills Creek to HBV.csv. Change Hills Creek groundwater contribution in HBV_PEST.xml and AlthBV_Minimum.xml.

277: Fix seasonal inconsistencies and duplicate entries in Alt_wr_pods.csv. Add calibrated values for Cougar8 in HBV.csv and ...Cougar8/HBV_PEST.csv.

278: Add HBVparameterInfo.xlsx to the repository.

279: Add preliminary new calibration values for Detroit12 to HBV.csv. Change GW contribution for Detroit12. Add some files to the repository.

280: Remove WR 169839 from the POD file. Change Detroit GW from 540 to 2126. Comment out some of the HBV reports to speed up the Ref scenario. Various spreadsheet updates.

281: Commit latest HBV parameter values for HBVCALIB = 12 Detroit reservoir drainage.

282: Copy latest preliminary HBV.csv to ...Detroit12/HBV_PEST.csv. Add DetroitAnalysis.xlsx to repository.

283: Correct a typo in the Dorena reservoir (HBVCALIB = 5) entry in HBV.csv.

284: HBV.csv - Fill in latest interim values for Detroit12. Use old valley floor ecoregion values for HBVCALIB 0 and 29. Correct a typo in the entry for HBVCALIB 5. AlthBV_Minimum.xml - Turn on the HBV daily mass balance report. Update various spreadsheet files.

285: Add gdal-1.11.4. Remove gdal/swig-1.3.39 and gdal/regex-0.12. Change GDALWrapper.cpp to refer to gdal111.dll. Change logbook to cause the log to be written to the desktop.

286: Add the final calibrated values for Detroit12 to HBV.csv. Fix wv_Scenarios_PEST.xml so that it only has the PEST scenario.

287: blank

288: Update some spreadsheets and add NRNI data files.

289: Update the Blue River and Detroit analysis spreadsheets for the comparison to NRNI data for 1980-2007.

290: Commit Cottage Grove analysis with comparison to NRNI.

291: Add GW for MiddleFork_Jasper38 (620 m3/day/reach) and McKenzie_Waltermville_34 (3928 m3/day/reach), in HBV_PEST.xml and AlthBV_Minimum.xml. Update various analysis spreadsheets. Correct a typo in wv_Scenarios_PEST.xml. Update HBV_PEST.csv for RiverMill28.

292: Add 3348 GW for Salem29 to AlthBV_minimum.xml and HBV_PEST.xml. Update various spreadsheets. Add ...HistoricalReservoir.envx files for Cougar8 and FallCreek4. Add NSantiam.envx to NSantiam_Mehama37. Update HBV_PEST.csv for Cougar8, FallCreek4, WRB. Update idu.spndx - I don't know why.

293: Add files for calibrating Willamette_Salem29.

294: Commit files for calibrating Waltermville34.

295: Change GW for HBVCALIB=29 Willamette at Salem from 3348 to 2500. Update various spreadsheets. Add WillametteAtSalemAnalysis.xlsx, YamhillBasinHistorical.envx, wv_Scenarios_BasinHistorical.xml, and wv_Scenarios_HistoricalReservoir.

296: Enter daily GW contribution for HBVCALIB=29 Willamette at Salem of 981 m3/reach.

297: Add shapefiles for tributary basins.

298: Commit the latest results of the ongoing PEST run for McKenzie_Waltermville34.

299: Add Yamhill Analysis spreadsheet.

300: Commit latest HBV parameter values for Clackamas_RiverMill28.

301: Bring HBV.csv up to date.

302: Commit latest values for McKenzie_Waltermville34 from PEST HBV calibration run.

303: Calibration-related additions and changes.

304: Commit final HBV parameter values for McKenzie_Waltermville34 from PEST run.
Update the CalibrationResults.xlsx and HBVparameterInfo.xlsx spreadsheets

305: Save the current versions of analysis spreadsheets.

306: Roll back a change which was causing problems.

307: Incorporate the results of the PEST run for the Clackamas above River Mill.
Update some spreadsheets and the HBV_PEST.csv file for Willamette_Salem29.

308: Commit data and analysis for Willamette flows at Portland.

309: blank

310: Add draft of stage 2 calibration report.
In previous revision (v309), some DEBUG mode issues were fixed in AltWaterMaster.cpp and WaterAllocation.cpp; unneeded comments were removed from the groundwater section of AlthBV_minimum.xml and HBV_PEST.xml, many analysis spreadsheets were updated, and WillametteAtSalem.spndx was added.

311: Move the Envision_log.txt file back to the Release or Debug directory.

312: Commit changes associated with switching from VisualStudios 2012 to VS 2015.
Also add SNOTEL reports to wv_reporter_Minimum.xml.

313: Get the log file working again for the Dell Computer.

314: Temporarily make the log file come out on C:\Users\Dave\Desktop, rather than in C:\Envision\src\x64\Release, because is it opened for shared write access, and the latest Windows server update on the freshwater.ceoas server doesn't allow shared access writes at C:\Envision\src\x64\Release.
Turn off rain evap and all groundwater additions.

315: Move the Envision_log.txt file to the users Documents folder. Look up the path to the users Documents folder from the environment.

316: Reinstate HC groundwater per Sarah Lewis.

317: Commit temporary changes to apply HBVCALIB=28 ClackamasAboveRiverMill HBV parameter values everywhere in ecoregions 8, 9, and 10.

318: Comment out "#pragma omp parallel" lines in EvapTrans.cpp.

319: Copy the current version of StudyAreas/WW2100/HBV.csv into StudyAreas/WW2100/HBVCALIB/WRB/HBV_PEST.csv.
Commit the LongTom_Monroe35/HBV_PEST.csv at the conclusion of the PEST run for LongTomAboveMonroe.

320: Commit updated spreadsheets.
Turn off parallel flow generation.

321: Change SOILH2O_EST to SOILH2OEST.
Correct a bug in the calculation of farm rent.
Add test mode attributes X0...X14 to IDU.dbf.

322: Add INSTRM_REQ to streams.dbf, and as a model variable in Flow.
Change calculation of water price in the urban water model: prices increase by 6% per year for 2011-2015, and then by 1.5% per year for 2016-2025.
Add INSTRM_REQ outputs to HBV Instream Water Rights.csv file.

323: Add outputs for Metro water from Barney Reservoir, Spring Hill intake, and the Clackamas River.

324: Add REP outputs for irrigation rent premium metrics.

325: Move the warning messages about overlapping instream water rights from run-time to initialization.

326: Changes related to sources of Metro muni water.

327: Change bulk stomatal resistance from 400 to 150 s/m.
Rename some instream water right columns in an output file.
Correct some errors in POD input file.
Fix a misleading error message.

328: Add the reach for the Spring Hill intake to the HBV Flows report.

329: Reduce the stomatal resistance from 400 s/m to 150 s/m.

330: Raise Barney Reservoir max pod rate from 60 cfs to 65 cfs.
Refine the logic for allocating water to Metro.

331: Update idu_2011.dbf for use by the historical scenarios.