

## **Instructions for Selecting and Reading Annual Time Series Excel® Spreadsheet Files for the Columbia River Basin**

There are 21 spreadsheet files that accompany this instructions document in the zip file for the Columbia River Basin annual time series ET Demands results. The files contain both annual values and averages of all annual values for 3 future periods and 5 climate change scenarios under static and non-static phenology conditions, plus the 1950-1999 historical baseline values.

The climate change scenarios are warm-dry (WD), warm-wet (WW), hot-dry (HD), hot-wet (HW) and central tendency (CT). The future periods are labeled 2020s (for the years covering the period 2010–2039), 2050s (2040–2069), and 2080s (2070–2099) and the historical baseline period is 1950–1999. There are two distinct sets of irrigation demand projections for each climate change scenario and future period. One assumes a fixed growing season for annual crops (static phenology) that is based on historical climate conditions and the other assumes an earlier and/or extended growing season for annual crops as a function of increasing future temperatures (non-static phenology). While earlier planting is likely in the future, socio-economic considerations come into play along with climate conditions. Hence these two sets of projections are meant to bracket the two extreme cases. Extended growing seasons due to higher temperatures is the default for all perennial crops in both sets of projections.

The analysis results include estimated changes in temperature, precipitation, reference evapotranspiration (ET<sub>o</sub>), crop evapotranspiration (ET<sub>c</sub>) and net irrigation water requirement (NIWR), relative to historical baseline estimates.

The first tab of each spreadsheet is titled “Averages” and contains the average annual values and percent change values for each watershed, as included in the report. This tab also contains values and percentages for the total basin, maximum values and percentages, and minimum values and percentages for each scenario. Columns A and G, which include the HUC8 identification numbers, are titled “Unit.” The remaining columns are titled by climate change scenario or baseline (historical).

The second tab is titled “Baseline” and includes the historical values for each year 1950-1999 in the appropriate units discussed below. All other tabs are named by either climate change scenario abbreviation (e.g., WW, Central, etc.) for values or the scenario abbreviation followed by the percent sign (e.g., WW%, Central%, etc.) for percent change from baseline. The scenario values are based on the 1950-1999 values that were adjusted by the climate change factors.

For all but the first tab, the first column heading is “Year” and the others are the HUC8 identification number followed by the results type. The units for temperature are degrees Fahrenheit and all other units are inches.

The table below provides a key to the file names and their contents.

<b>2020s Projections</b>	<b>File Name</b>
Average Annual Temperature	PNHUC8_2020AnnualCCAvgT.xlsx
Average Annual Precipitation	PNHUC8_2020AnnualCCPrecip.xlsx
Average Annual ETo	PNHUC8_2020AnnualCCPET.xlsx
Average Annual ETc with Non-Static Phenology	PNHUC8_2020AnnualCCET.xlsx
Average Annual ETc with Static Phenology	PNHUC8_2020SOGDDAnnualCCET.xlsx
Average Annual NIWR with Non-Static Phenology	PNHUC8_2020AnnualCCNIR.xlsx
Average Annual NIWR with Static Phenology	PNHUC8_2020SOGDDAnnualCCNIR.xlsx
<b>2050s Projections</b>	
Average Annual Temperature	PNHUC8_2050AnnualCCAvgT.xlsx
Average Annual Precipitation	PNHUC8_2050AnnualCCPrecip.xlsx
Average Annual ETo	PNHUC8_2050AnnualCCPET.xlsx
Average Annual ETc with Non-Static Phenology	PNHUC8_2050AnnualCCET.xlsx
Average Annual ETc Assuming Static Phenology	PNHUC8_2050SOGDDAnnualCCET.xlsx
Average Annual NIWR with Non-Static Phenology	PNHUC8_2050AnnualCCNIR.xlsx
Average Annual NIWR with Static Phenology	PNHUC8_2050SOGDDAnnualCCNIR.xlsx
<b>2050s Projections</b>	
Average Annual Temperature	PNHUC8_2080AnnualCCAvgT.xlsx
Average Annual Precipitation	PNHUC8_2080AnnualCCPrecip.xlsx
Average Annual ETo	PNHUC8_2080AnnualCCPET.xlsx
Average Annual ETc with Non-Static Phenology	PNHUC8_2080AnnualCCET.xlsx
Average Annual ETc with Static Phenology	PNHUC8_2080SOGDDAnnualCCET.xlsx
Average Annual NIWR with Non-Static Phenology	PNHUC8_2080AnnualCCNIR.xlsx
Average Annual NIWR with Static Phenology	PNHUC8_2080SOGDDAnnualCCNIR.xlsx