Pacific Northwest
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Watershed Overview and Input Data Processing

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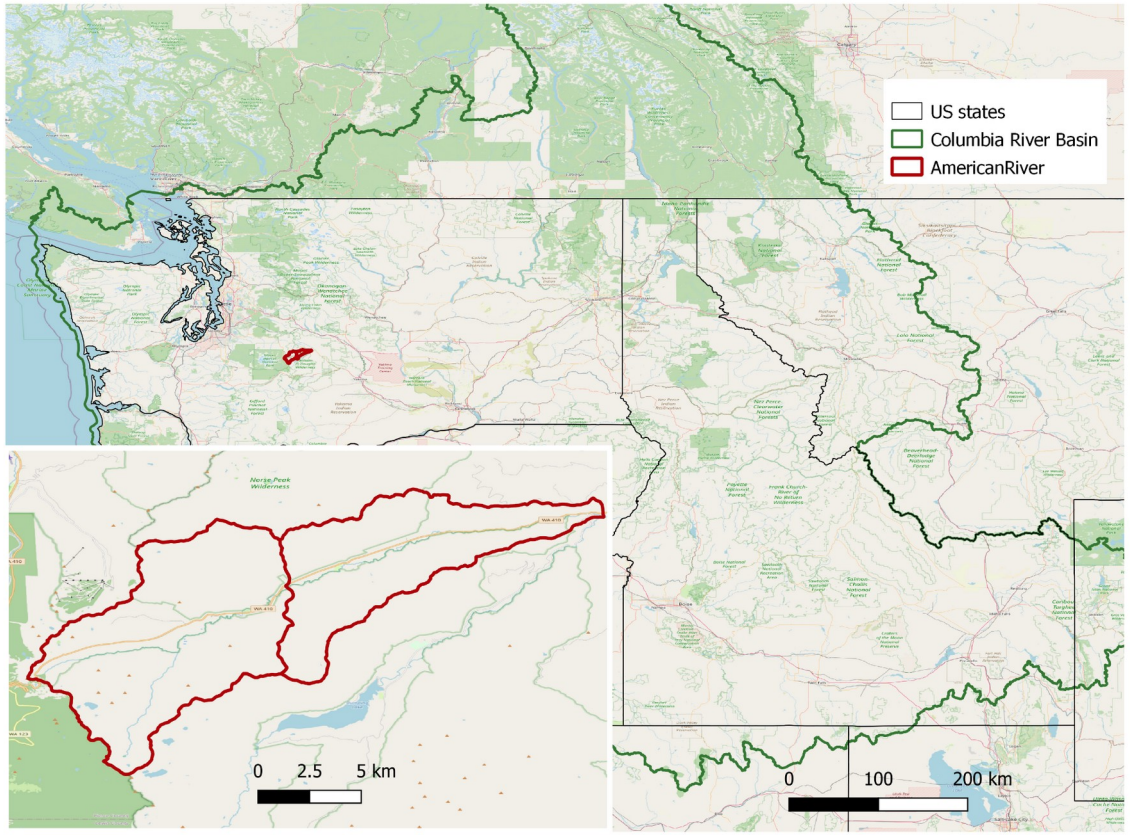
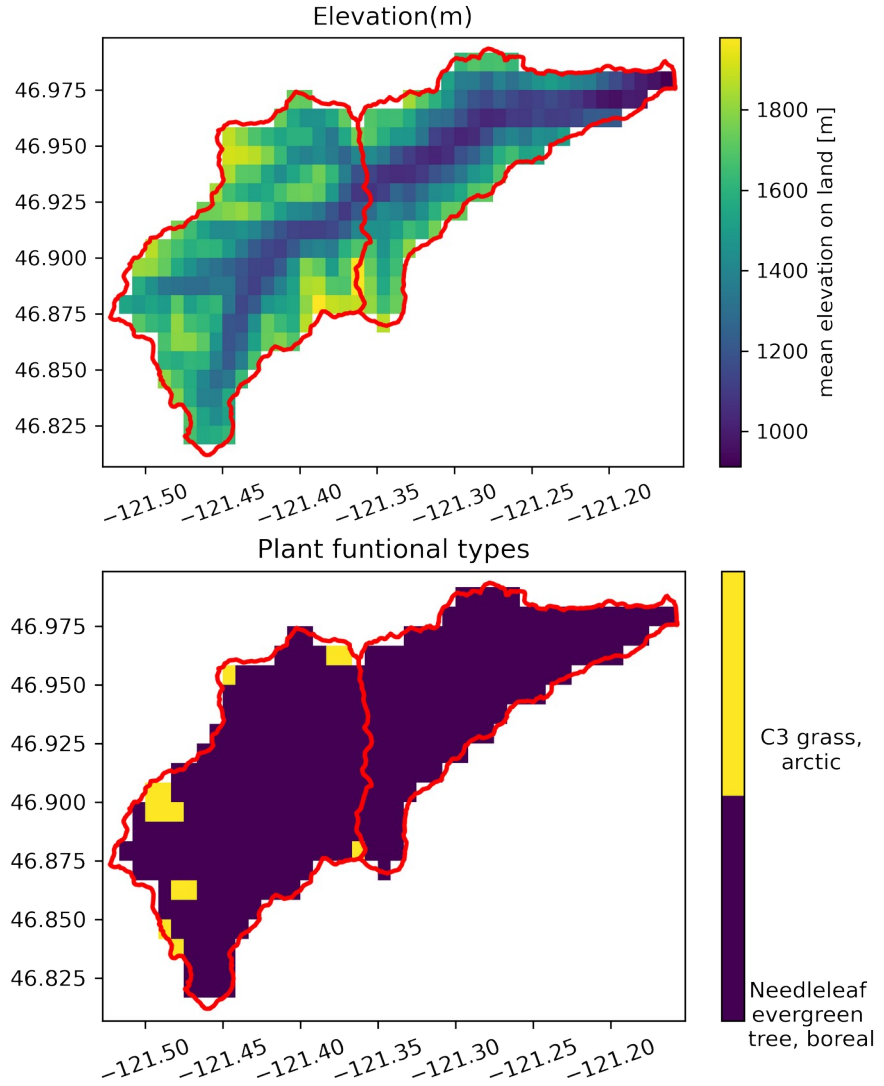
The American River Watershed





Watershed Area = 206 sq. km.

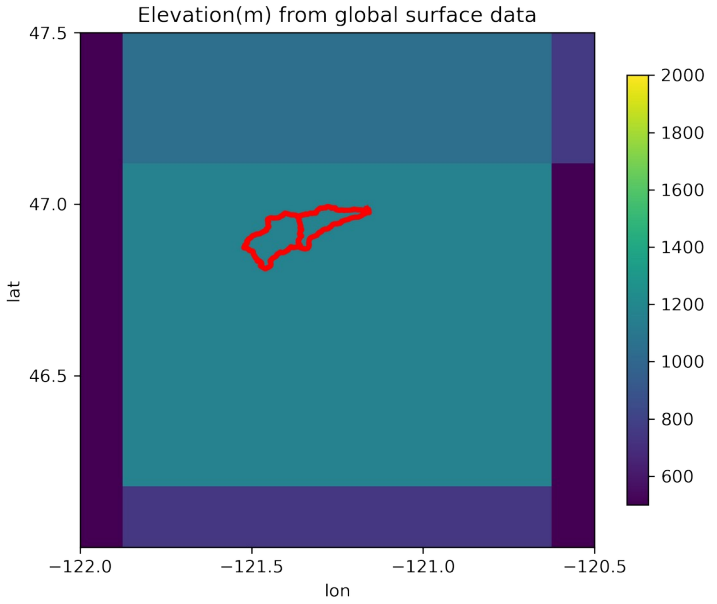
Average annual precipitation: ~860 mm

Data Processing: Download global domain and surface datasets

Global domain file: domain.lnd.fv1.9x2.5_USGS.110713.nc
(URL: https://svn-ccsm-inputdata.cgd.ucar.edu/trunk/inputdata/share/domains . Also, available on NERSC)
Contains lats and lons of grid cell center and vertices (lon resolution: 2.5 deg, lat resolution: 1.9 deg)

Global surface file: surfdata_0.9x1.25_simyr2000_c220129.nc
(URL: https://web.lcrc.anl.gov/public/e3sm/inputdata/lnd/clm2/surfdata_map/ . Also, available on NERSC)
Contains surface data such as vegetation type, monthly leaf area index (LAI), topography, soil properties etc. (lon resolution: 1.25 deg, lat resolution: 0.9 deg)

The global dataset is too coarse for watershed level analysis



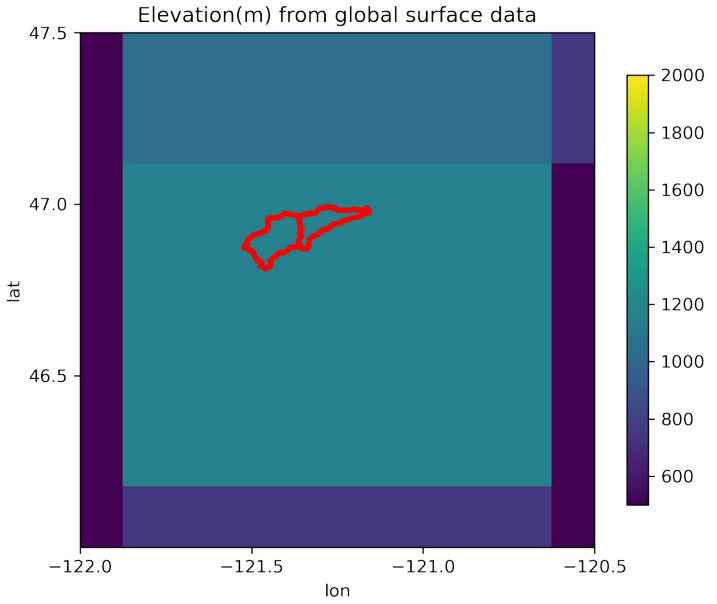
Data Processing: Downscale global domain and surface datasets to 1km

Python script: https://github.com/ftzahura/SettingUpELM/blob/main/CreateSurfdataDomainNetcdf.ipynb

Use the global domain and surface datasets as template and create 1D unstructured:

- Domain dataset with 1km resolution
- Surface dataset with 1km resolution and populates with nearest neighbor values from the variables in the global dataset

For our watershed, there is only one nearest pixel.



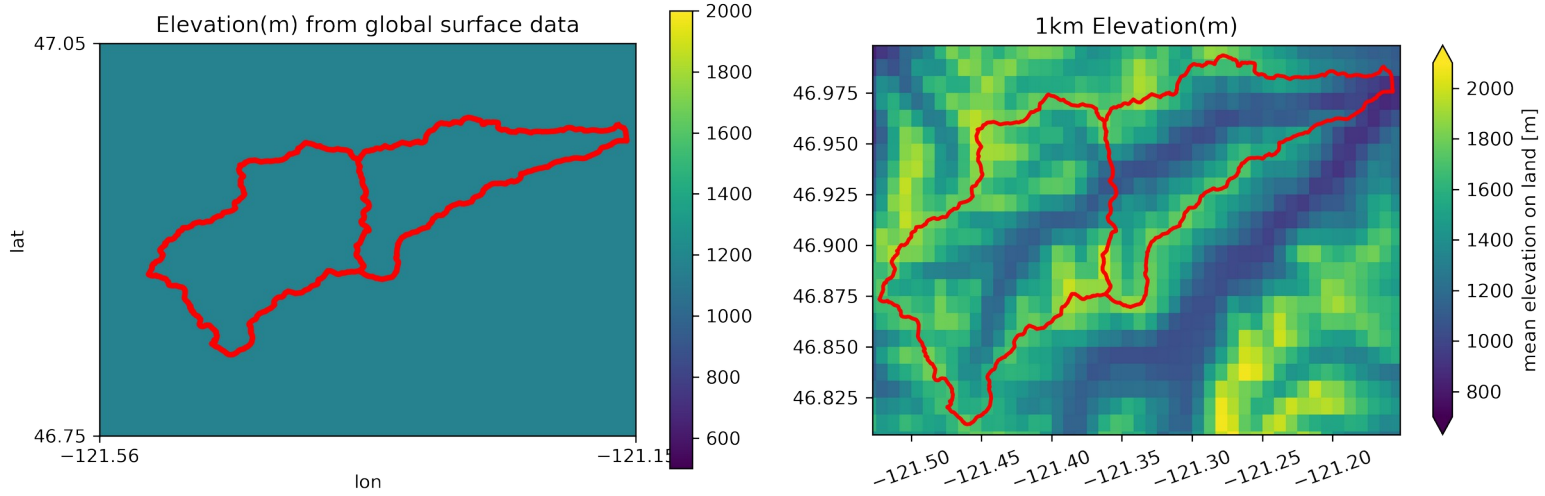
Data Processing: Update the downscaled surface dataset with high resolution data

The downscaled surface data was updated with high resolution (1km) surface data:
Soil properties: %clay, %sand, organic matter density for soil layers (datasource: SOILGRID V2)

Land cover: Vegetation type, monthly LAI/SAI, monthly canopy top and bottom, %urban, %wetland, %natural vegetation, %glacier, %lake (datasource: MODIS)

Topography: elevation, standard deviation of elevation and slope

Example:

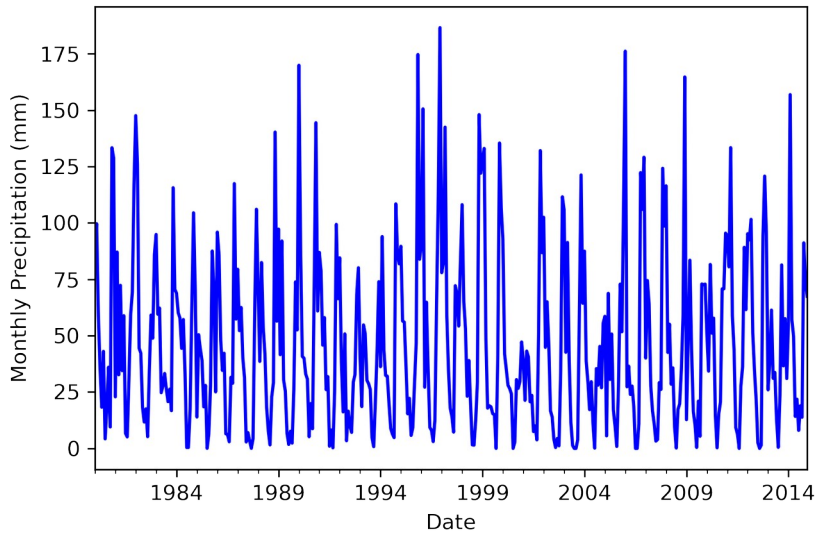


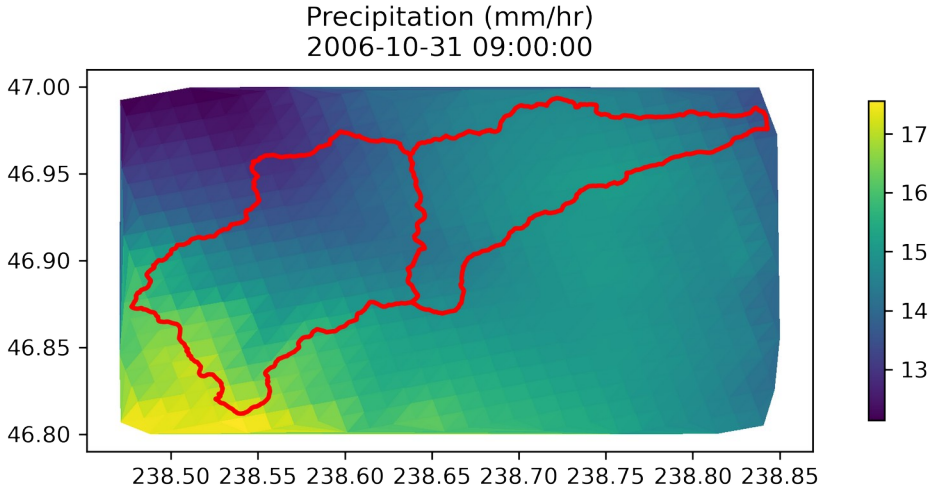
Data Processing: Meteorological Forcing from Daymet

Daymet 1 km daily met forcing was temporally downscaled to 3-hourly forcing based on GSWP3 data

Met forcing data includes:

- Precipitation
- Total incident Solar radiation
- Incident longwave radiation
- Temperature
- Pressure
- Specific humidity
- Wind





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Thank you