**Utah Lake CNP Modeling Work – collaboration with Jake Vander Laan**

Data and code: <https://github.com/KateriSalk/UtahLake_CNPMassBalance>

For each task, creating a separate code file and output file(s) will likely be easiest. Commit and push to the repo for sharing.

**Task List (in order of priority)**

1. *Paired watershed approach to estimate missing watershed data*

* For all unmonitored watersheds, determine which monitored watershed most closely resembles that watershed. Variables of interest may include land use/land cover and slope (and others if you have thoughts).
* Determine area of each unmonitored watershed and area of the associated monitored watershed
* Kateri can then scale the loads for unmonitored watersheds by area and add them to the total budget
* Files of interest:
  + Code/ulMap.Rmd
  + Code/ULTributaryData
  + Data/GIS/UL\_subwshedsWGS84\_v2 (all file extensions)
  + Data/GIS/comp4489\_wgs84 (all file extensions)
  + *Note*: Data/GIS/ulSubWshdsWGS84 are out of date.

1. *Evaluate potential for nutrient attenuation between WWTP outflow and lake*

* For the following watersheds, determine if concentrations of N and P decrease in a downstream direction on any given day.
  + Powell Slough Major
    - 4995251
    - 4995252
    - All others in between these sites, inside Powell Slough
    - 4995210
    - 4995230
  + Mill Race
    - 4996570
    - All others in between these sites moving south from Provo City Corporation
    - 4996540
    - 4996566
    - 4996536
* Water quality variables:
  + Total nitrogen (CharacteristicName = “Nitrogen”, ResultSampleFractionText = “Total”)
  + Total dissolved nitrogen (CharacteristicName = “Nitrogen”, ResultSampleFractionText = “Dissolved”)
  + Total phosphorus (CharacteristicName = “Phosphate-phosphorus”, ResultSampleFractionText = “Total”)
  + Total dissolved phosphorus (CharacteristicName = “Phosphate-phosphorus”, ResultSampleFractionText = “Dissolved”)
* Files of interest:
  + Data/Processed/ul\_Tribdata\_wqp\_processed\_2021-03-02.csv
  + Some processing code for nutrients is in Code/UL\_TributaryData.Rmd

1. *Generate stage-discharge curves from pressure transducer data*
   * Goal is to generate daily discharge data and inform load-duration curves
   * Files of interest:
     + Data/Processed/PT2018.csv
     + Data/Processed/PT2019.csv
     + Data/Processed/PT2020.csv
     + Flow from Data/Processed/ul\_Tribdata\_wqp\_processed\_2021-03-02.csv
     + Some processing code for flow is in Code/UL\_TributaryData.Rmd
2. *Generate load-duration curves for watersheds*
   * See O’Bryant and Daly document for details (ReferenceDocs/Utah Lake Water Quality Study\_Phase 2 Mass Balance\_Draft\_v3 -(DO).docx)
3. *Monthly groundwater/spring loading*
   * Kateri may get to this
4. *Monthly water budget (inflows and outflows, w/o analysis of change in storage)*
   * Kateri may get to this
5. *Evaluate water and nutrient budgets in the context of changing lake volume*
   * Need to generate separate estimates for each year, not lumped into averages