Water Availability

HARP 2023-2024

**Water Availability Equation**

* Original equation from literature:
  + = water availability
  + = baseline streamflow available
  + = streamflow diverted to fill storage
  + = cumulative use
  + = instream flow required
* Adapted equation and combining terms:
  + = withdrawals removed from streamflow
  + = point source discharges added to streamflow
  + = percent of flow required to remain in the stream (ex. 0.9 for VA)
  + The withdrawal variable encompasses water removed from the stream to refill storage ()
  + The withdrawal and point source variables together represent cumulative use ()
  + Multiplying the baseline flow available () by the instream flow percentage () represents water required to remain in the stream ()
* Generalized equation:
  + = demand scenario streamflow
  + = baseline scenario streamflow
  + = the minimum available storage during a specific period
  + = critical period length, the number of days of the drought of interest
* Specific example:
  + = available water during a prolonged (90-day) drought
  + = demand scenario streamflow during a prolonged drought
  + = baseline scenario streamflow during a prolonged drought
  + = the minimum available storage during a prolonged drought

**Baseline Flow**

* Explanation of how baseline and demand scenarios are different
* Back-calculation of baseline scenario using demand scenario and why that process is flawed

**Storage and Impoundments**

* Different methods of getting Smin: approximate, near-exact
  + Mention ‘exact’ method?

**Minimum Instream Flow Coefficient / Percent of Flow (POF)**

**Interpreting Results**

* Scale: basin-wide
* What do the resulting WA values mean?
  + Positive and negative
    - A positive WA value:
      * The most useful units from a planning perspective for positive WA is discharge in million gallons per day (mgd)
      * Says: This is the average discharge available for withdrawal during a 30/90 day drought in addition to the already-expected withdrawals
    - A negative WA value:
      * The most useful units from a planning perspective for positive WA is storage in million gallons (mg)
      * Says: This is the total storage that would be needed to sustain water demands during a 30/90 day drought

**Error and Uncertainty**

* Sources of error contributing to WA error