**IEP Relevant R Packages**

1. [zooper](https://github.com/InteragencyEcologicalProgram/zooper)
   1. Author: Sam Bashevkin
   2. Download and Integrate Zooplankton Datasets from the Upper San Francisco Estuary
   3. Includes data from 5 major IEP zooplankton surveys and 3 size classes of zooplankton
   4. Can integrate data and resolve taxonomy for users interested in analyzing specific taxa or whole communities
   5. Also has a [shiny app](https://deltascience.shinyapps.io/ZoopSynth/), which includes a visualization tool
   6. Download package from GitHub
2. [deltamapr](https://github.com/InteragencyEcologicalProgram/deltamapr)
   1. Author: Sam Bashevkin
   2. Package of spatial data for the Bay-Delta
   3. Includes shapefiles for three types of data:
      1. Waterways (i.e., water coverage)
      2. Regions from [Enhanced Delta Smelt Monitoring Program](https://www.fws.gov/lodi/juvenile_fish_monitoring_program/jfmp_index.htm)
      3. Surface water and riparian areas based on [California Aquatic Resources Inventory](https://www.sfei.org/cari)
   4. Download package from GitHub
3. [spacetools](https://github.com/sbashevkin/spacetools)
   1. Author: Sam Bashevkin
   2. tools for spatial operations
      1. Ex: calculating distances along waterways
   3. Functionality is focused on aquatic systems and particularly the Sacramento San Joaquin Delta
   4. But the functions should be useful for other systems as well.
   5. Download package from GitHub
4. [smonitr](https://github.com/InteragencyEcologicalProgram/smonitr)
   1. Authors: Michael Koohafkan, David Bosworth
   2. Used to build the [IEP Seasonal Monitoring Reports](https://interagencyecologicalprogram.github.io/Status-and-Trends/)
   3. Helps download various IEP datasets including those on the following platforms:
      1. [Bay-Delta Live](https://www.baydeltalive.com/)
      2. [Environmental Data Initiative](https://environmentaldatainitiative.org/edi/) (EDI)
      3. [SacPAS](http://www.cbr.washington.edu/sacramento/) salmon data
      4. FTP sites (e.g., many CDFW data sets)
   4. Download package from GitHub
5. [cder](https://github.com/mkoohafkan/cder)
   1. Author: Michael Koohafkan
   2. Interface to the [California Data Exchange Center](http://cdec.water.ca.gov/) (CDEC) Web Service
   3. CDEC hosts a variety of hydrologic and climate data
   4. Package streamlines data exploration and downloading
   5. Note: CDEC generally contains raw data. Contact data maintainers for QAQC versions.
   6. Download package from Comprehensive R Archive Network (CRAN)
6. [CDECRetrieve](https://github.com/FlowWest/CDECRetrieve/)
   1. Author: FlowWest
   2. another package for exploring and downloading CDEC data
   3. Download package from GitHub
7. [cimir](https://github.com/mkoohafkan/cimir)
   1. Author: Michael Koohafkan
   2. Interface to the [California Irrigation Management Information System](https://cimis.water.ca.gov/) (CIMIS) Web API
   3. CIMIS is source for lots of environmental data related to agriculture
   4. Package streamlines data exploration, downloading, and reformatting
   5. Note: need a CIMIS account and to request a web services AppKey before using this package
   6. Download package from CRAN
8. [wql](https://github.com/jsta/wql)
   1. Authors: Alan Jassby, James Cloern, Joseph Stachelek
   2. Functions for exploring seasonal time series, particularly for water quality data
   3. Creates exploratory time series plots
   4. Runs nonparametric trend tests (e.g., Mann-Kendall trend test)
   5. Downloads [USGS](https://sfbay.wr.usgs.gov/access/wqdata/) water quality data for San Francisco Bay
   6. Has functions to convert among units
   7. Electrical conductivity to salinity
   8. DO in mg/L to % saturation
   9. Download package from CRAN
9. [dataRetrieval](https://github.com/USGS-R/dataRetrieval/)
   1. Authors: Laura DeCicco et al
   2. Explore and download hydrologic and water quality data
   3. [USGS National Water Information System](https://waterdata.usgs.gov/nwis) (NWIS)
   4. [Water Quality Portal](https://www.waterqualitydata.us/) (includes USGS, EPA, USDA)
   5. Download package from CRAN
10. [caladaptR](https://github.com/ucanr-igis/caladaptr/)
    1. makes it easier to work with data from [Cal-Adapt.org](https://cal-adapt.org/)
    2. package downloads data for use in R
    3. Cal-Adapt houses historical data and projections for how climate change will affect CA
    4. includes data on a variety of environmental variables, including:
       1. temperature
       2. snowpack
       3. sea level rise
       4. wildfires
    5. Download package from GitHub
11. [artemis](https://github.com/fishsciences/artemis)
    1. Author: Myfanwy Johnston, Matt Espe
    2. Aids design and analysis of environmental DNA (eDNA) survey studies
    3. Offers custom suite of models for quantitative polymerase chain reaction (qPCR) data from extracted eDNA samples
    4. Approach makes use of Bayesian truncated latent variable models
    5. Download package from GitHub
12. [waterYearType](https://rdrr.io/cran/waterYearType/)
    1. Author: Sadie Gill
    2. Sacramento and San Joaquin Valley Water Year Types
    3. Data from CA Dept. of Water Resources
    4. Based on measured unimpaired runoff
    5. Download package from CRAN