Main dataset:

Script: **DEQ-foundational\_datset\_All\_years.R**

Irrigation and total DEQ withdrawals summaries at county level.

Data needed: DEQ reported data for all intakes (All\_DEQ\_dat.Rdata)

Data output: All\_Years\_DEQ\_data\_total\_nd\_irr.Rdata

Census data function:

Fn\_coefficient: This script holds two functions:

1. QS\_data function converts raw census data from quick stats to
   1. County summaries
   2. Binned operations
   3. Binned irrigated area

This function also rescales the missing values of binned irrigated area to match the county level summaries

1. fn\_Area\_TH function calculated the area under threshold for given year

# SMALL FARMER UNREPORTED

1. Small Farm Unreported Census Years.R calculates the unreported small farm withdrawals and coefficients for census years.

This script holds two functions:

* 1. small\_counties\_coefficient for the counties with DEQ reported data.
  2. small\_counties\_coefficient3 for the counties with missing DEQ reported data.

Remember DEQ withdrawals are only used to calculate the coefficients. Unreported Volume is calculated using PRISM data.

The data is saved from both the functions in SF\_Coeff.RData

1. Small farmer time series script uses the above data to generate the timeseries

TS\_SF\_Coeff\_fn uses median coefficient for each county to generate the timeseries (only for counties with DEQ data)

TS\_SF\_Under\_TH\_fn uses median under Th for for each county to generate the timeseries (for all counties)

Results are saved in SF\_times\_series\_Median.RData

1. Monthly Times series small farms script uses the monthly distribution to convert yearly time series to monthly

# LARGE FARMER UNREPORTED

1. Similar to Small farm unreported Large\_DEQ\_IRR\_Coeff and Large\_DEQ\_Tot\_area are used to generate coefficient for census years. Results are saved in LF\_Coeff\_both.RData
2. Larger Farmer time series is used to generate timeseries for large farmers
   1. TS\_LF\_Coeff\_Unreported\_median uses median coefficient
   2. TS\_LF\_Unreported\_Median\_Area uses median
3. Converted time series to monthly

# Regression

Regression cleaned.R Linear model for DEQ reported withdrawals. Needs response and predictor variables which is stored in /Regression/LMER\_input.RData

# Dry Wet and Normal year

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Use regression to obtain the withdrawals in dry, wet and normal year