

Construction of Hydrology at Historical Development Levels (HDL) in Sacramento Valley

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CA Department of Water Resources

CWEMF Annual Meeting

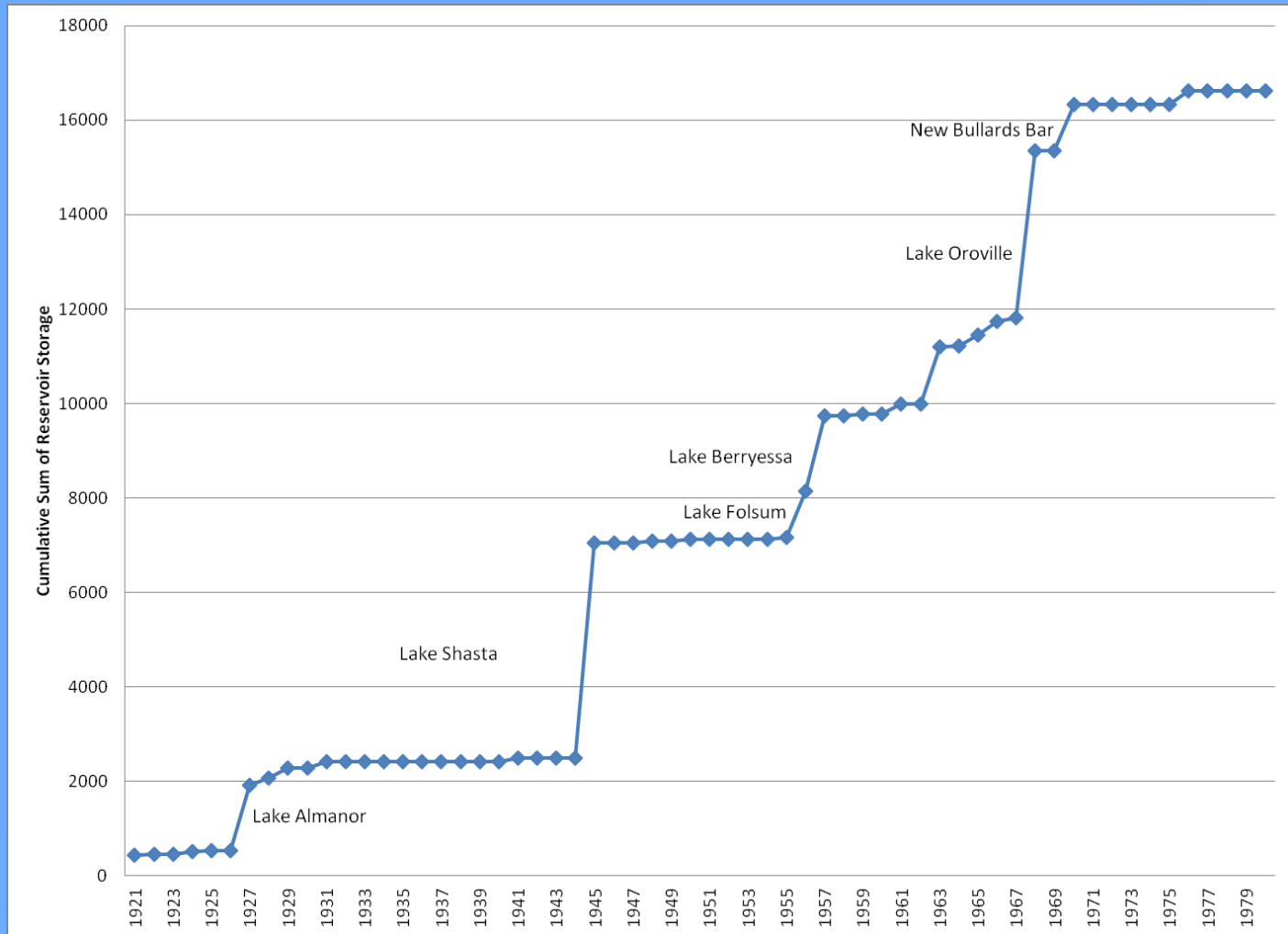
April 13, 2016



Objective

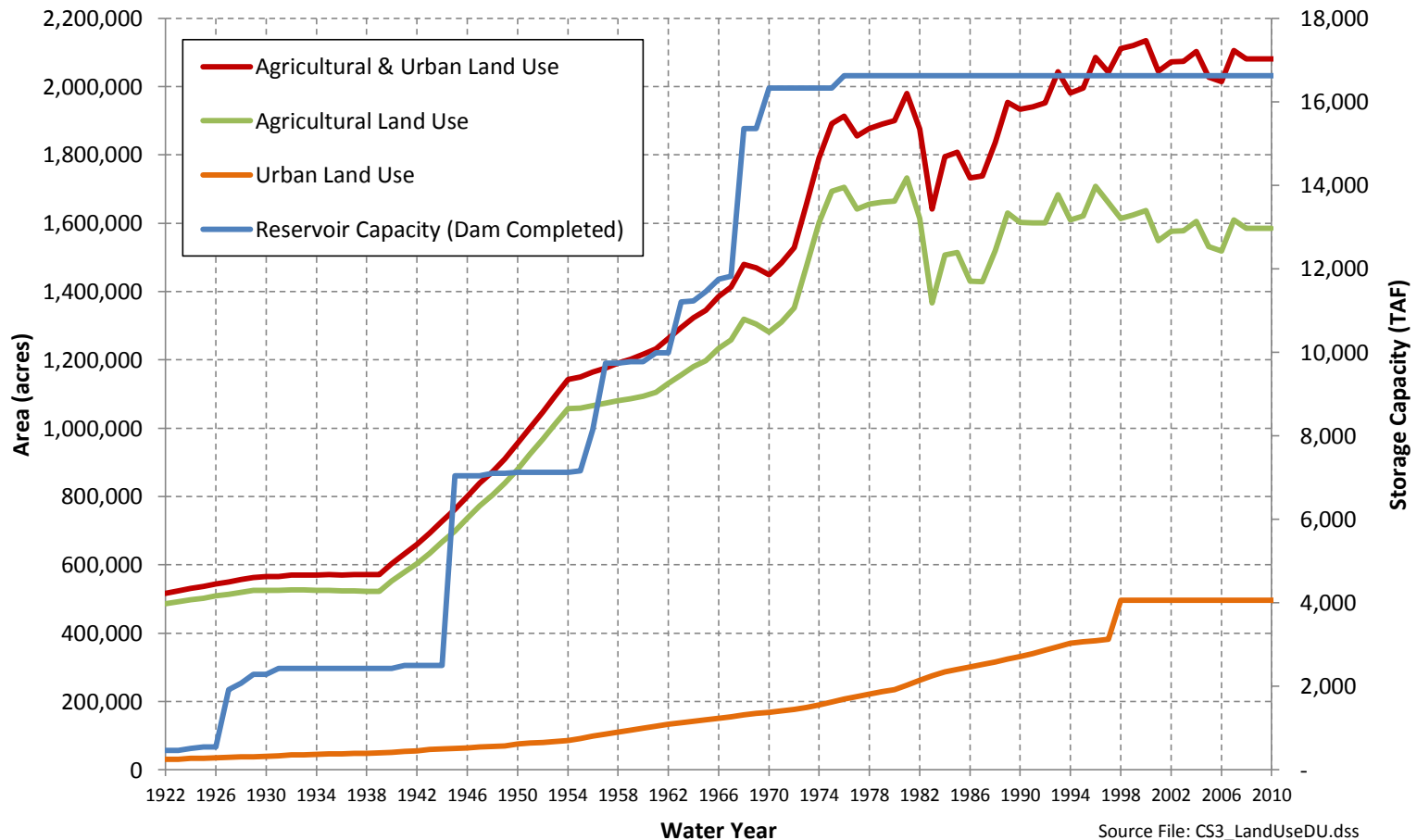
To quantify Sacramento Valley hydrology at historical development levels.

Historical Cumulative Reservoir Storage in Sacramento Valley



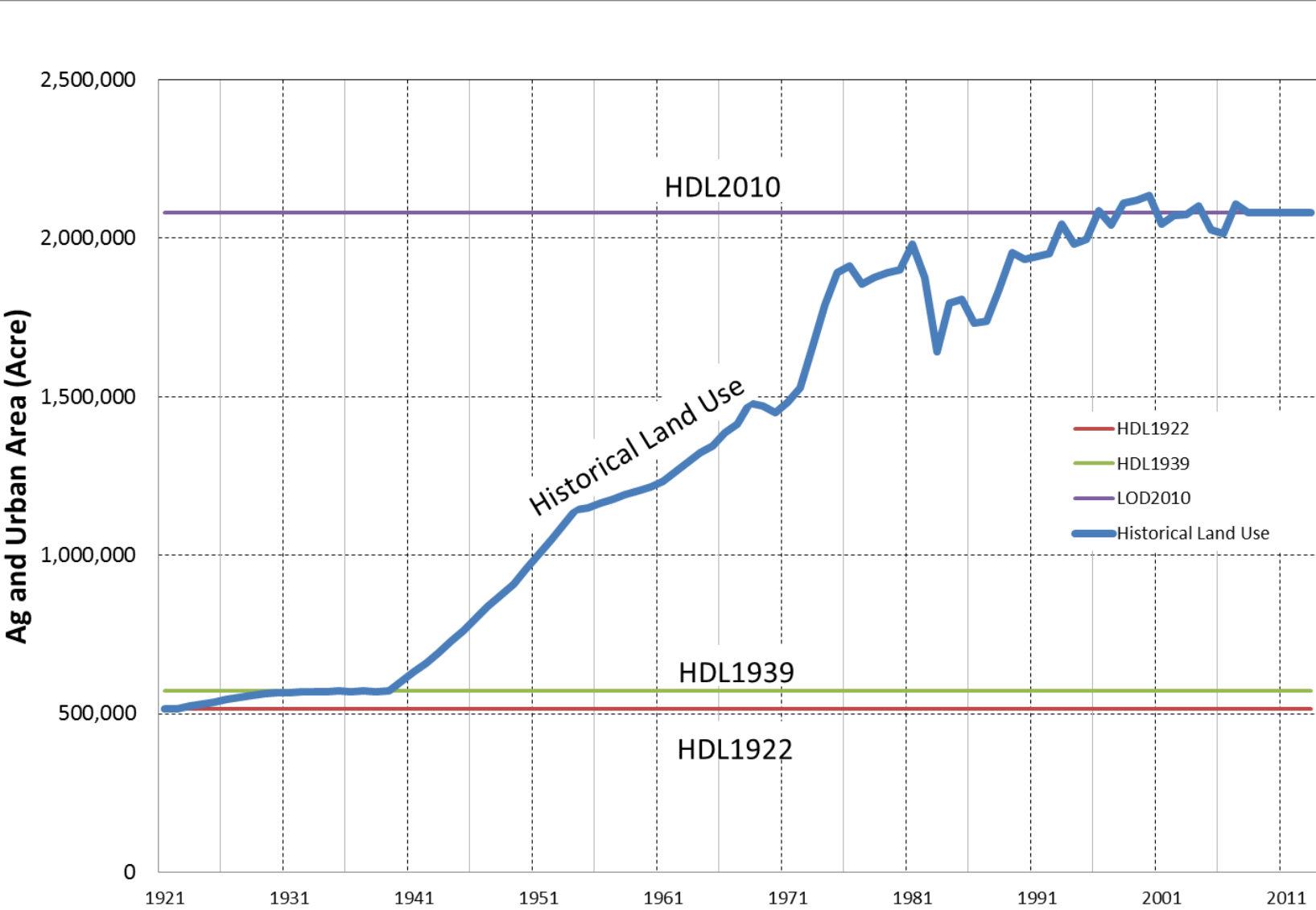
Historical Development Levels in Sacramento Valley

Historical Land Use v.s. Historical Cumulative Reservoir Storage



Source File: CS3_LandUseDU.dss

Historical Development Levels (HDL) vs Historical Land Use



Methodology

1. Retrieve landuse datasets at several historical development levels (HDL) from a CalSimHydro's historical land use dataset.
2. Develop demand unit hydrology at several HDLs using CalSimHydro
3. Modify CalSim 3.0
 - To remove reservoir operations
 - To remove import/export operations
 - To remove regulations
 - To allow pumping when shortages of surface diversion occur.
4. Run and Analyze

Simulation Configuration

1. CalSimHDL1922
2. CalSimHDL1939
3. CalSimHDL2010
4. CalSimLOD2010

CalSimHDL1939 and CalSimHDL2010

1. No reservoir operation
2. No SOD Export
3. No instream/water quality flow requirements
4. Groundwater by C2VSIM DLL
5. Landuse fixed at HDLs
 - HDL1922
 - HDL1939
 - HDL2010

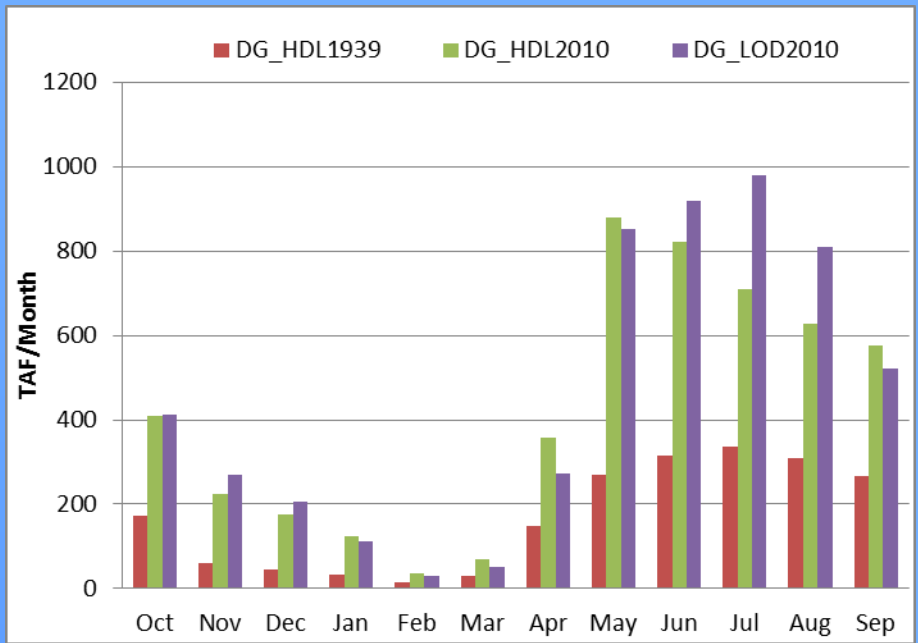
CalSimLOD2010

1. Reservoir operation
2. SOD export with LOD2010
3. BO based instream and water quality flow requirements
4. Groundwater by C2VSIM DLL
5. Landuse fixed at HDL2010

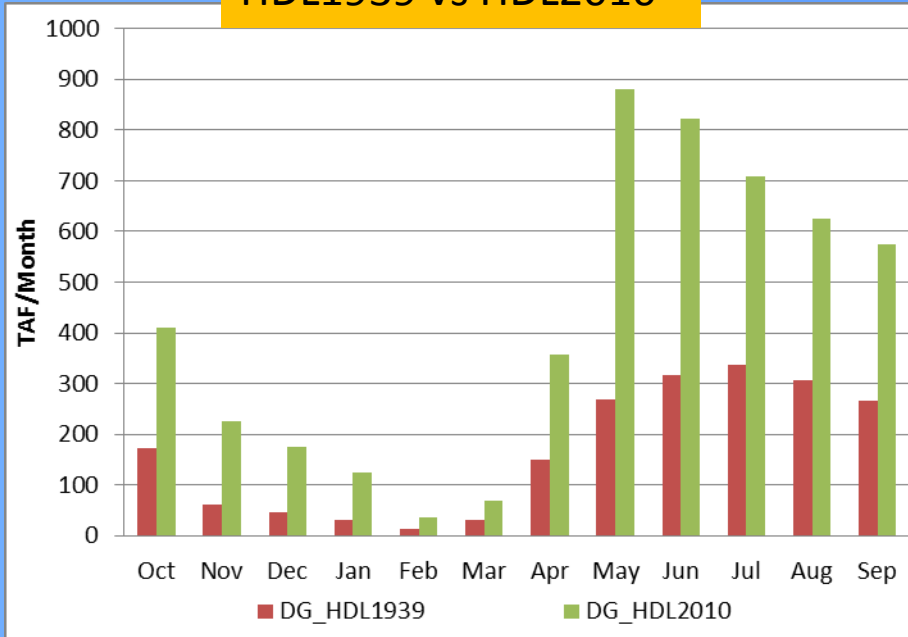
Model Results

- Surface Diversion
- Groundwater Pumping
- Stream Gain/Loss
- Sacramento River Delta Inflow

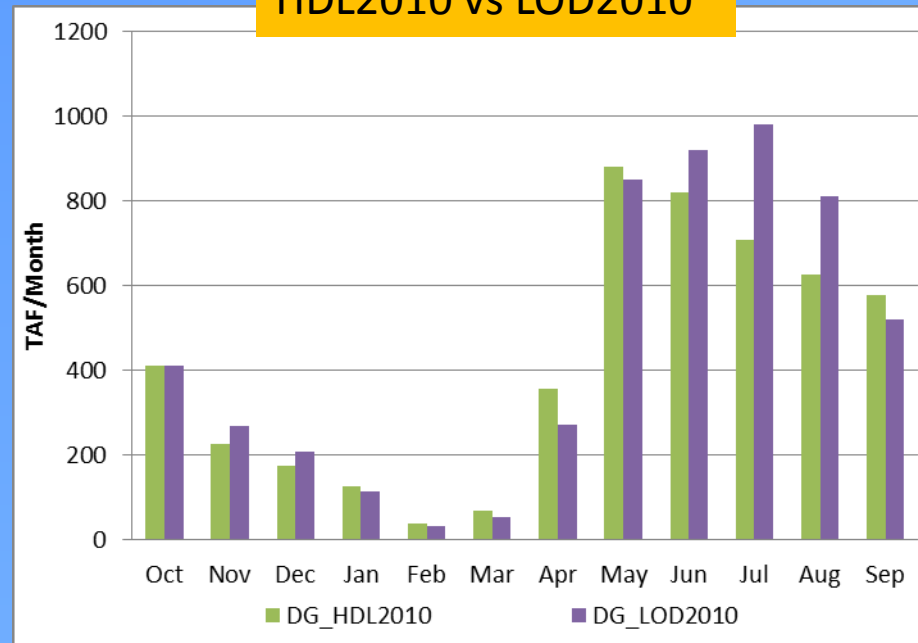
Mean Monthly Sacramento Valley Surface Diversion



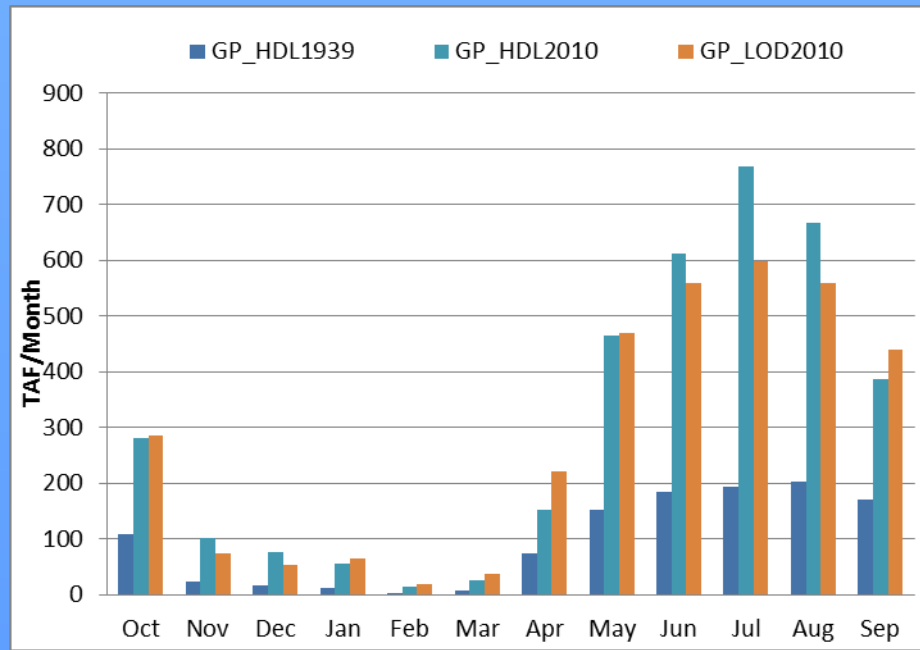
HDL1939 vs HDL2010



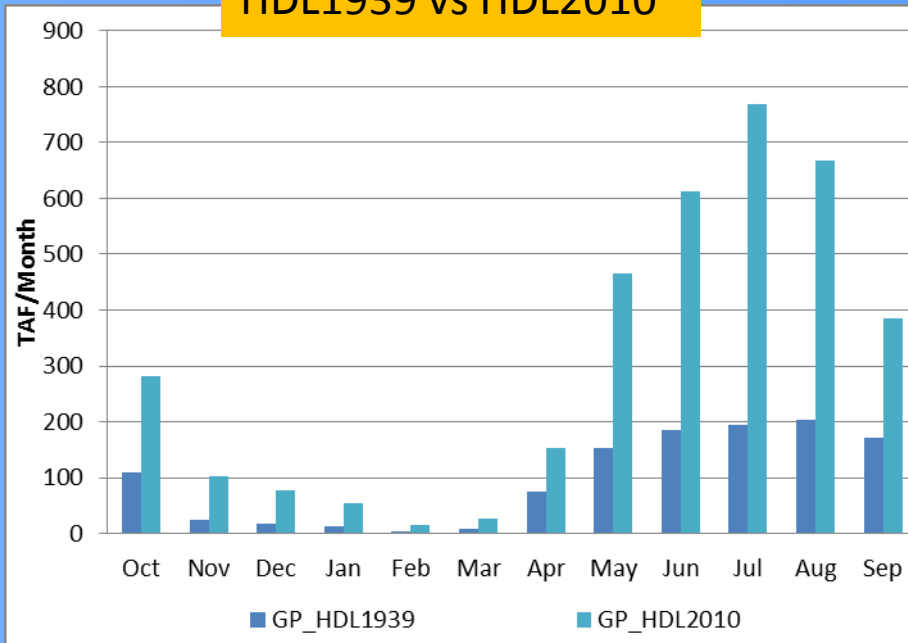
HDL2010 vs LOD2010



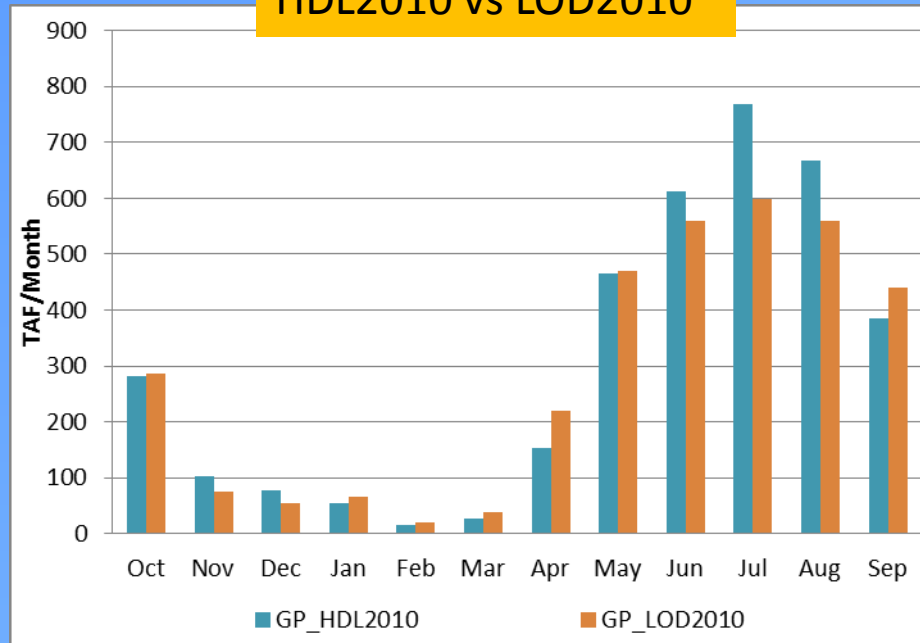
Mean Monthly Sacramento Valley Groundwater Pumping



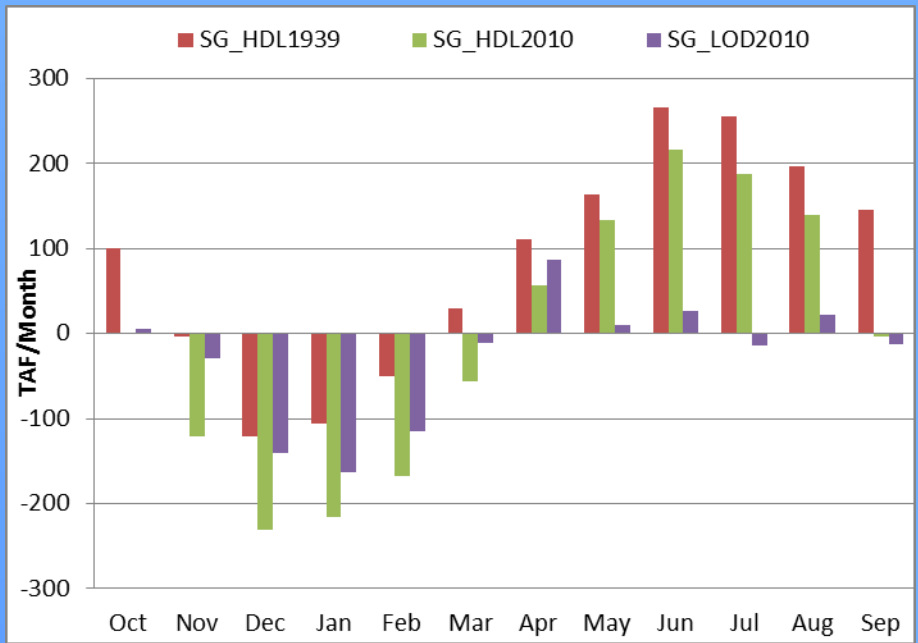
HDL1939 vs HDL2010



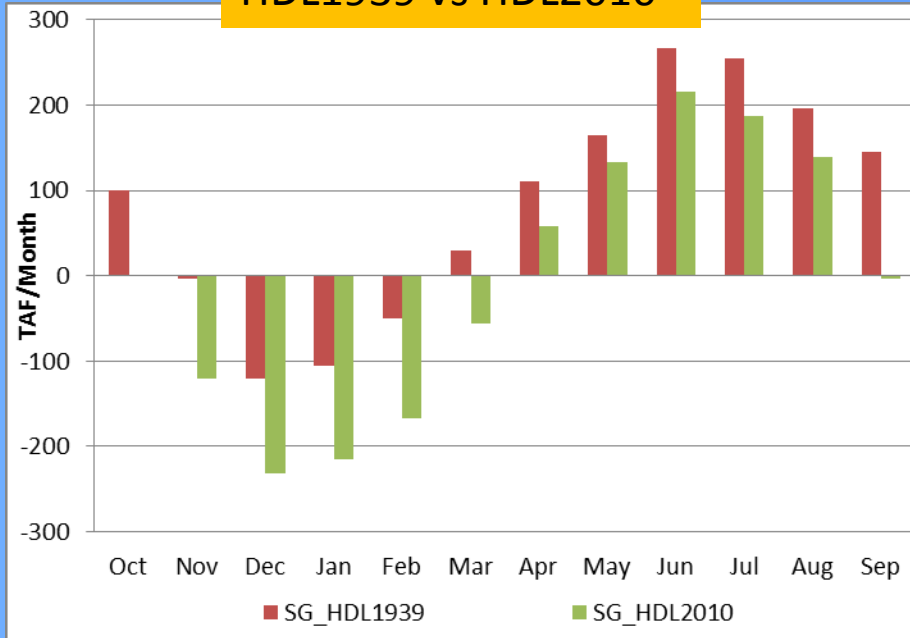
HDL2010 vs LOD2010



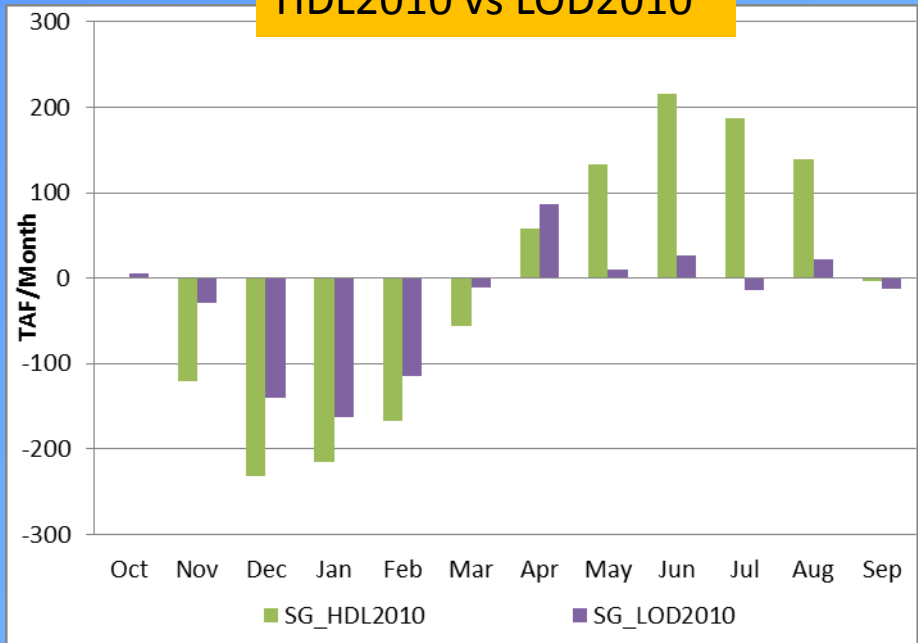
Mean Monthly Sacramento River Stream Gain(+)/Loss(-)



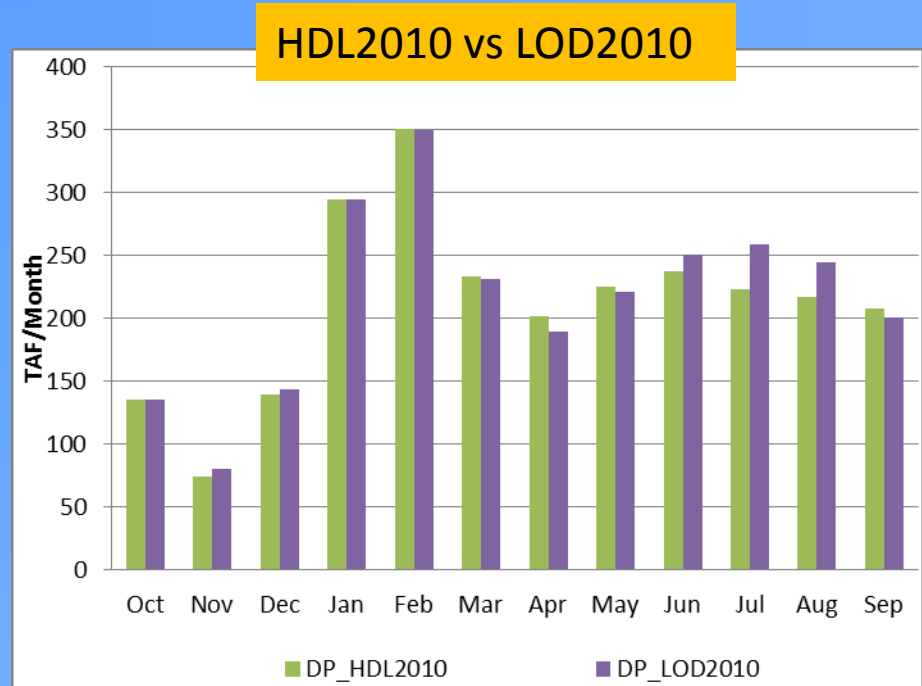
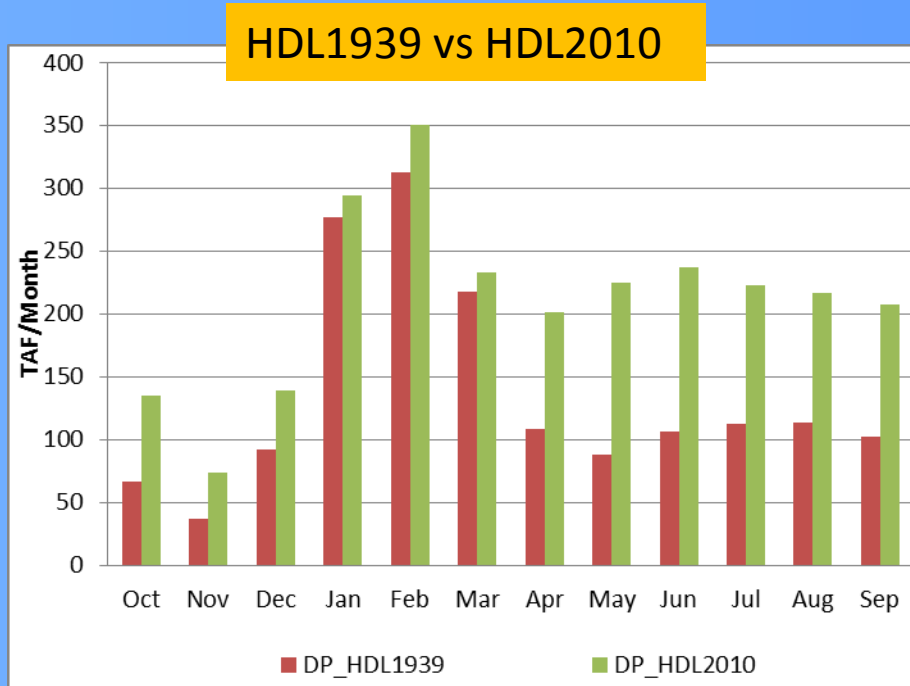
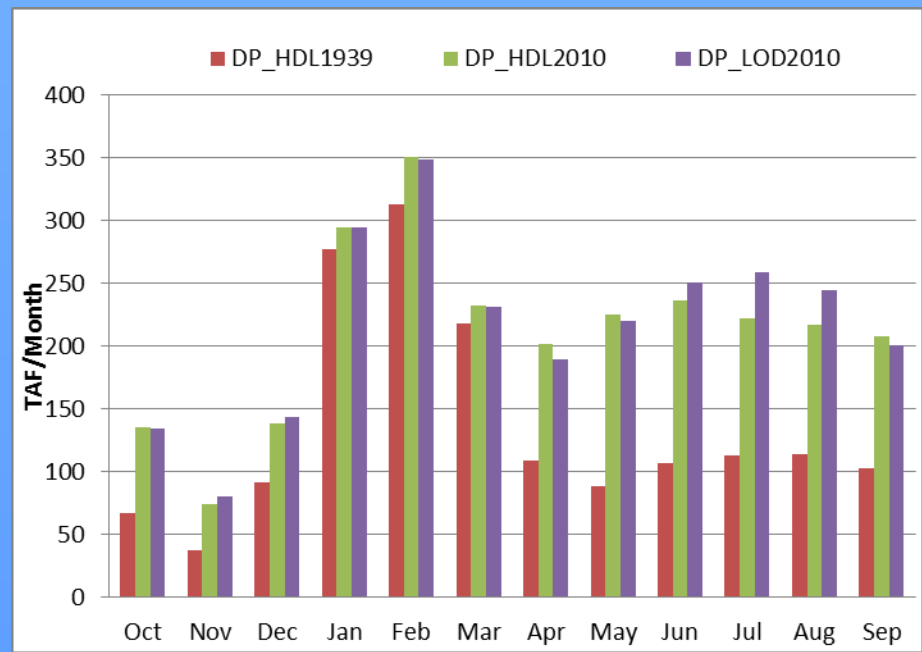
HDL1939 vs HDL2010



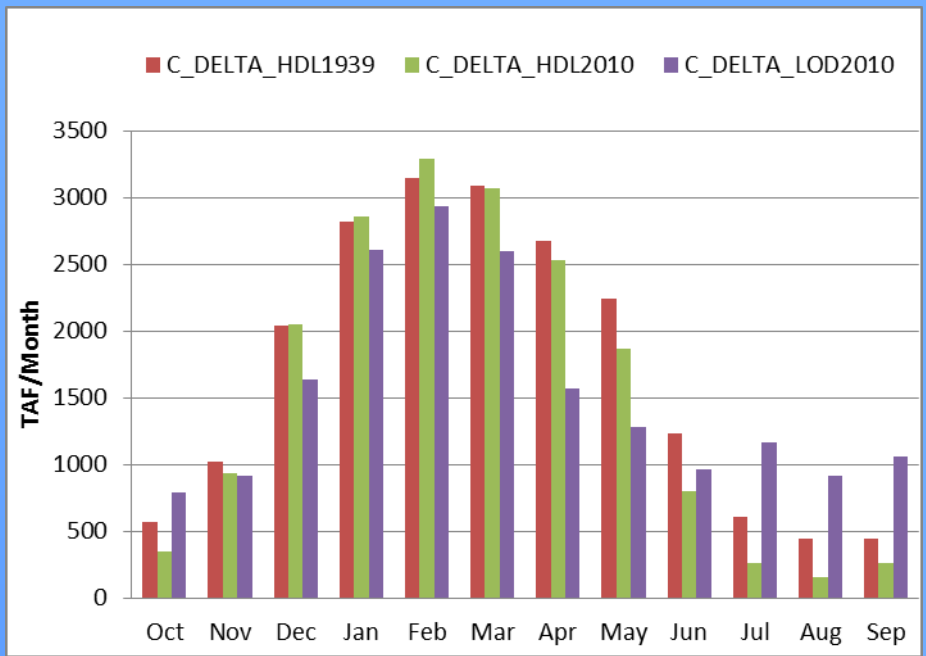
HDL2010 vs LOD2010



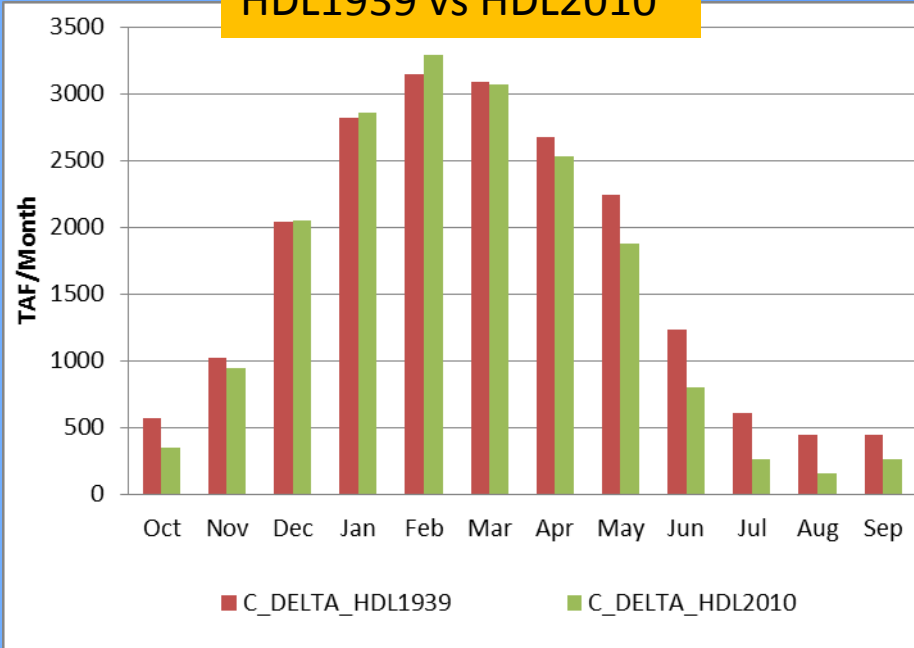
Mean Monthly Sacramento Valley Deep Percolation



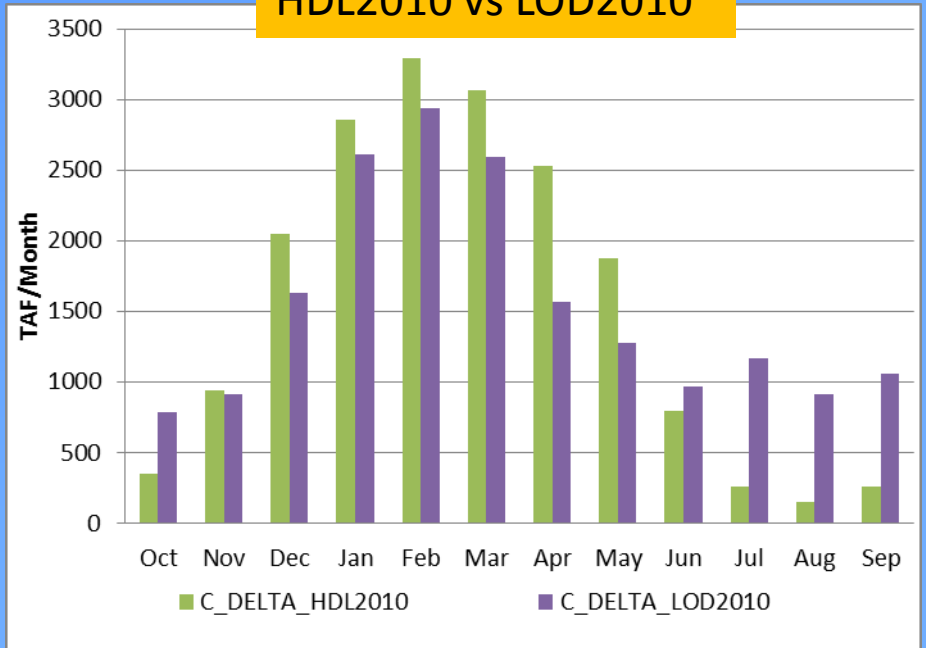
Mean Monthly Sacramento River Delta Inflow



HDL1939 vs HDL2010



HDL2010 vs LOD2010

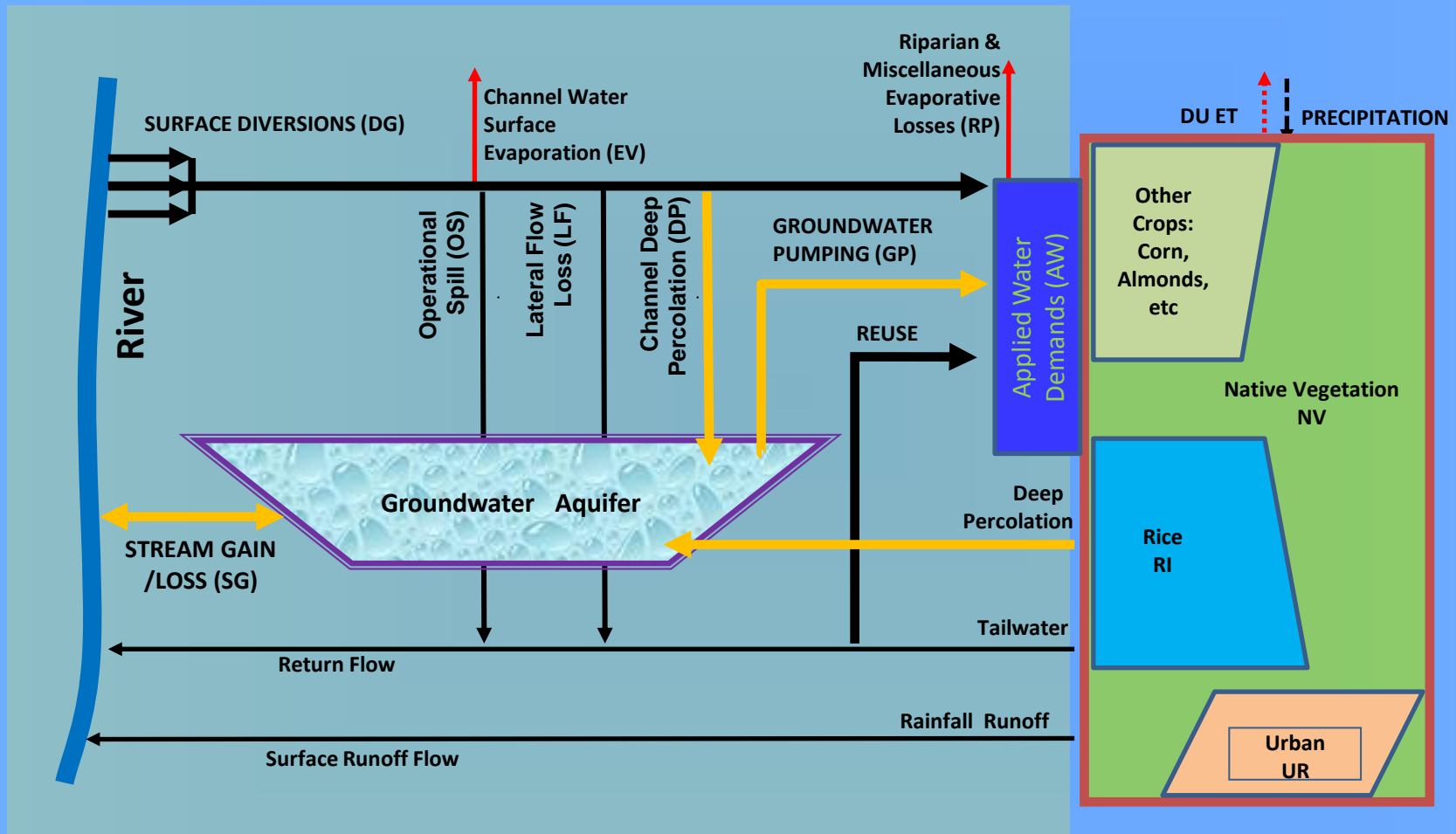


Summary

1. CalSim3HDL was developed and run successfully
2. HDL selection is flexibly
3. Results of CalSim3HDL are useful
 - To access the impact of land use changes
 - To quantify project impact on hydrology

Question?

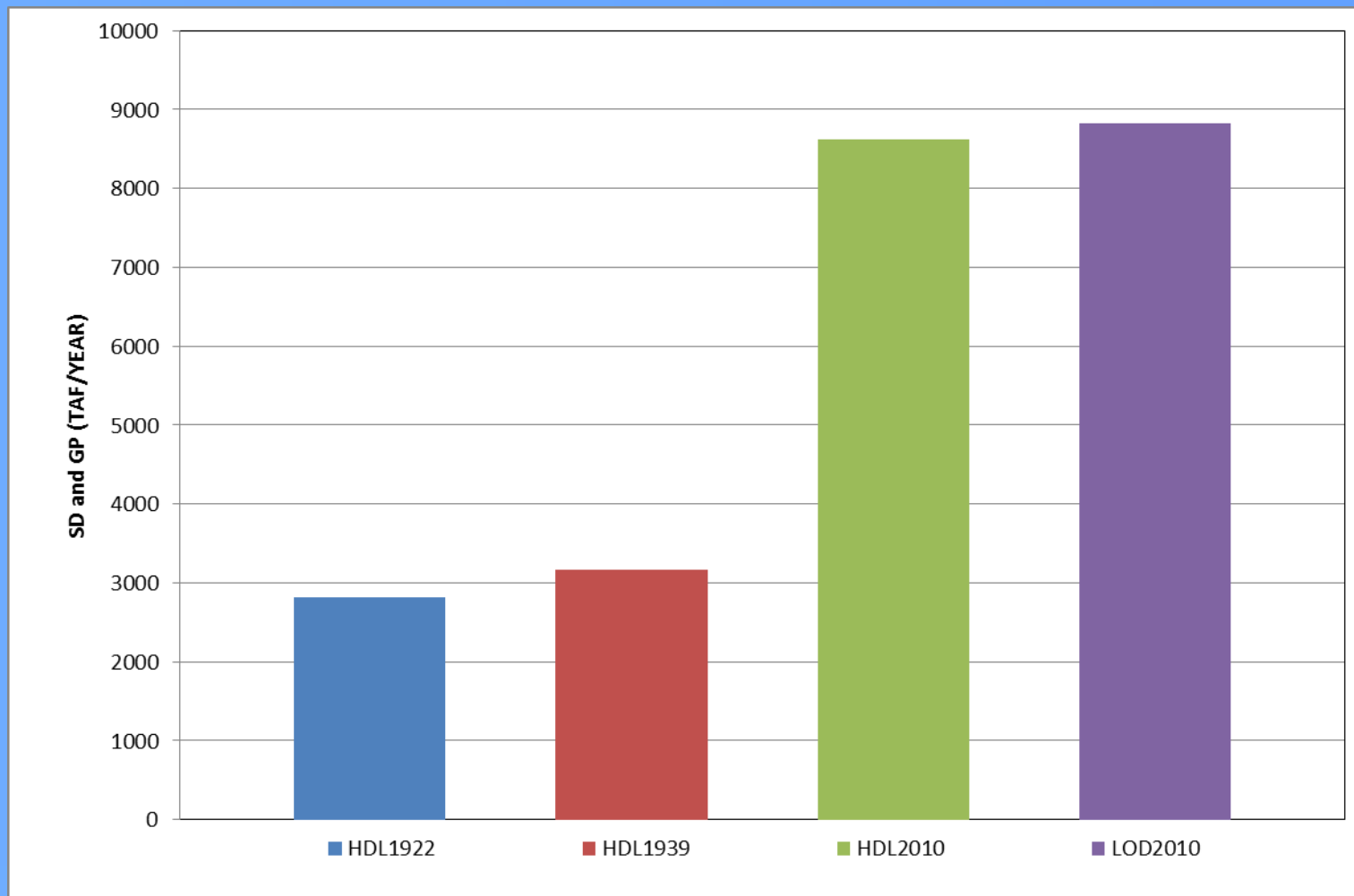
CalSim Hydrology



CalSim 3.0

CalSimHydro

Total Surface Water Diversion and Groundwater Pumping in Sac Valley



Recharge and Pumping in Sacramento Valley Floor

