CARPINTERIA GROUNDWATER BASIN
AB3030 GROUNDWATER MANAGEMENT PLAN

ANNUAL REPORT WATER YEAR 2017

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Pueblo Water Resources, Inc.

AB 3030 Groundwater Management Plan

- AB 3030 Allowed Local Agencies to Develop GWMPs for DWR Bulletin 118 GW Basins.
- CVWD Adopted Plan for CGB in 1999.
- Provides Mechanism for Systematic Data Collection and Analysis.
- Monitor Hydrogeologic Conditions with the Carpinteria Groundwater Basin (CGB).
- Identify Important Trends in Water Levels and Water Quality Throughout the Basin.

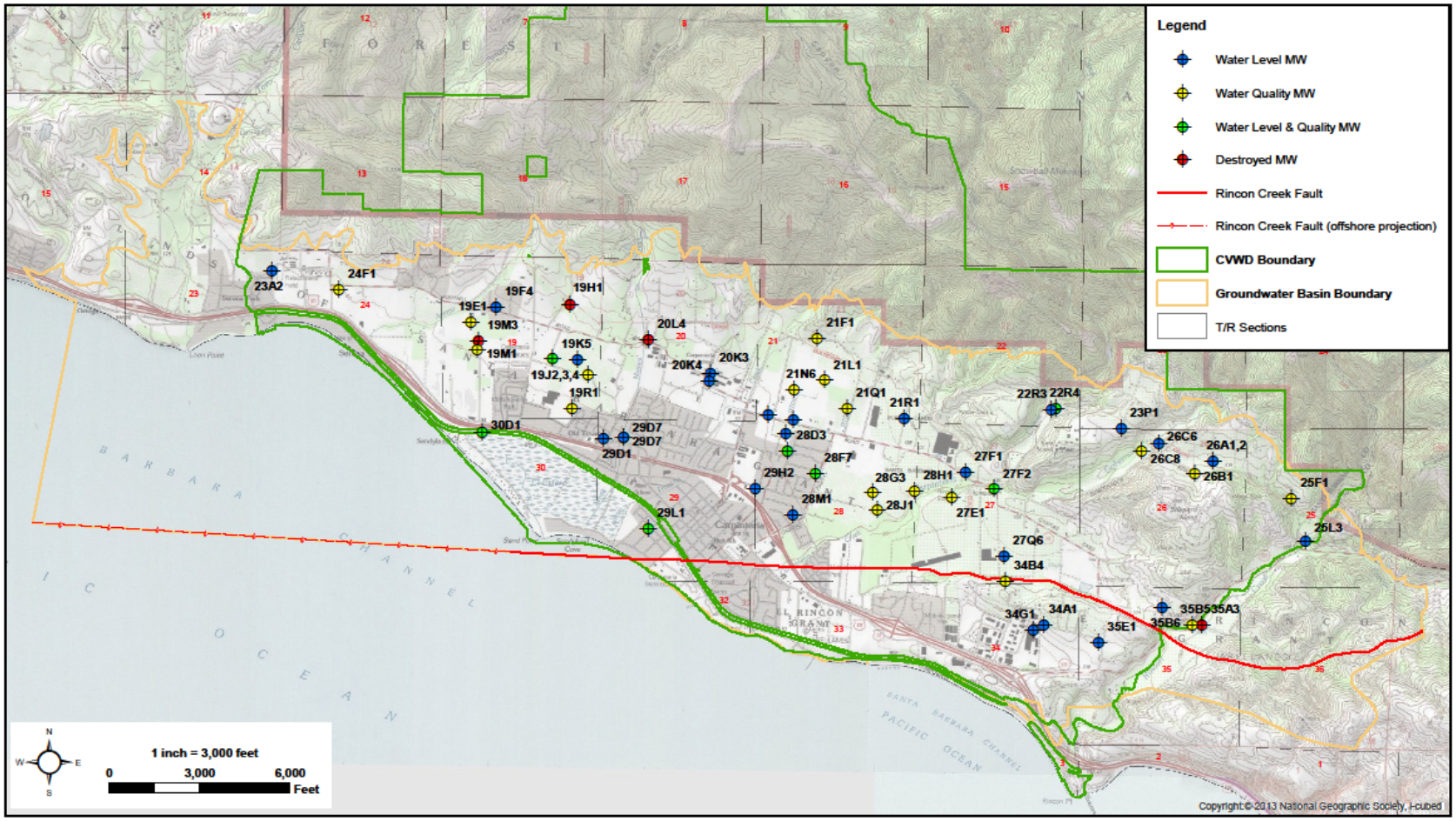
Components of CGB GWMP

- Precipitation Data
- Groundwater Pumpage
- Water Levels
- Groundwater Quality
- Surface Water Quality
- Hydrologic Budget

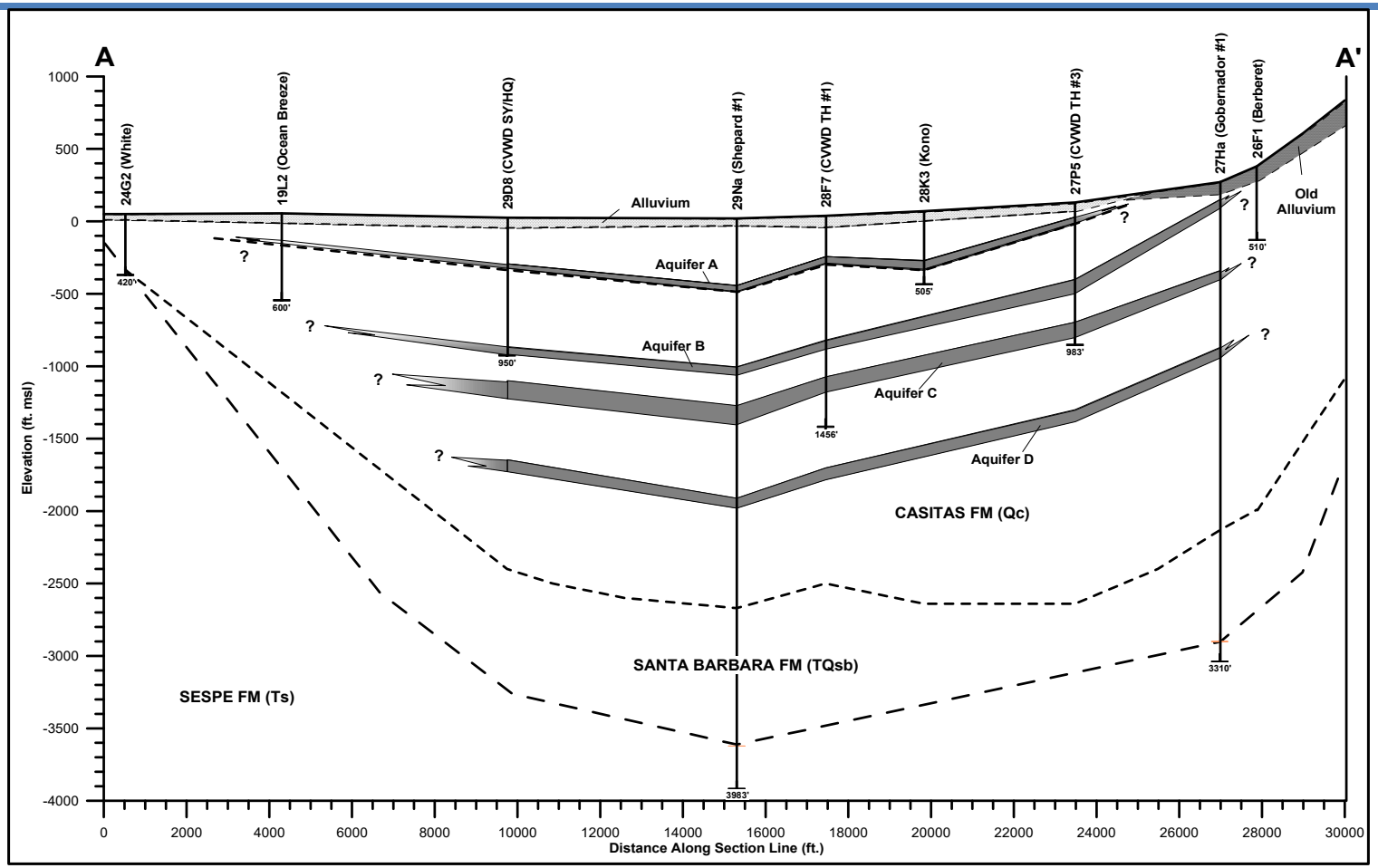
Monitoring Program

- Monitoring Well Network: 42 Wells throughout the CGB (District and Private wells).
- Water Level data from Approx. 25 wells on a Bi-monthly basis.
- Water Quality samples collected from Approx. 25 wells on a Bi-annual basis – Spring and Fall of each Water Year.
- Water Quality samples collected from 6 surface water locations throughout the CGB during the Spring and Fall.

Monitoring Well Network



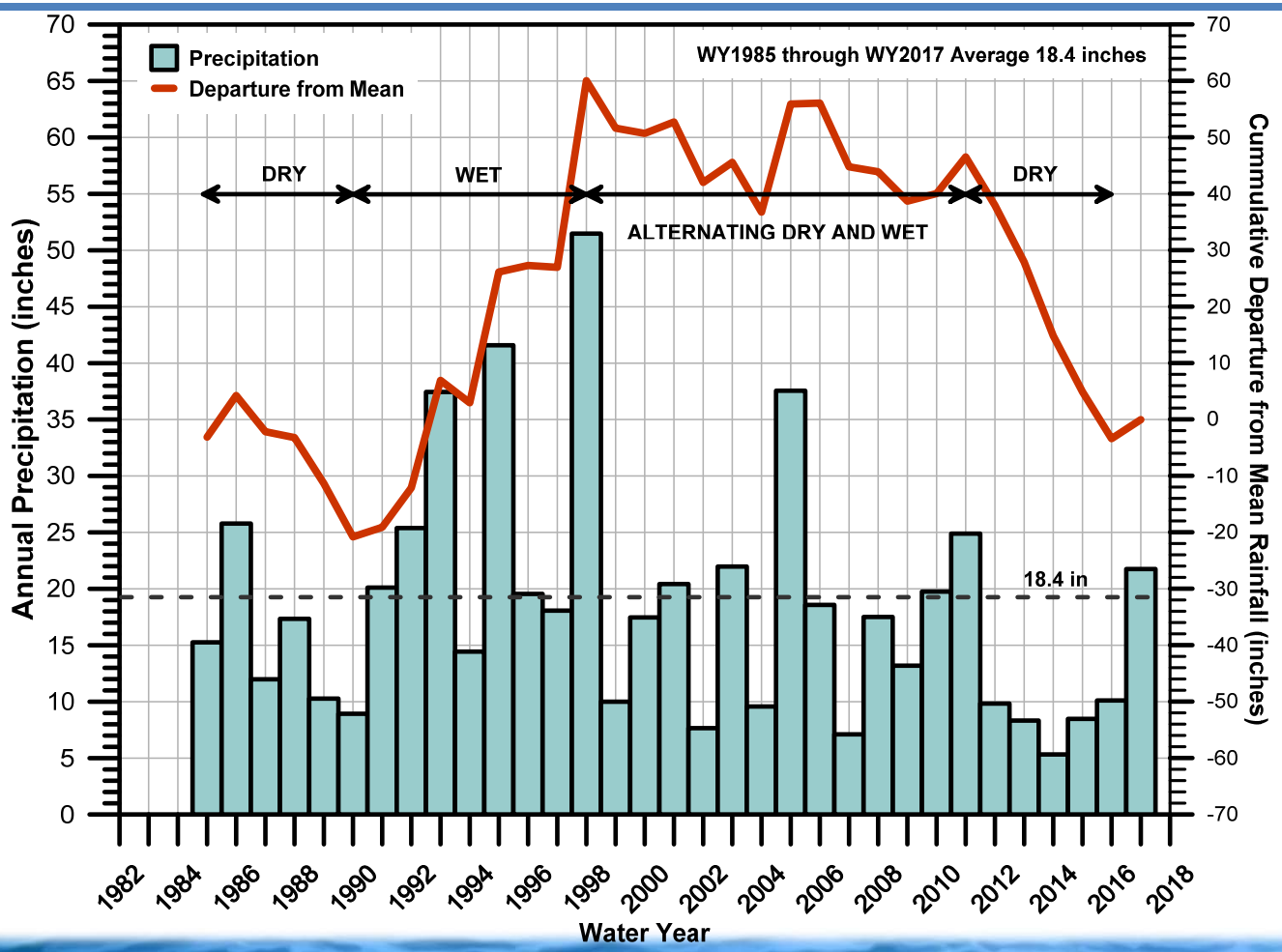
CGB Cross-Section



Precipitation Data

- Data from SB County Carpinteria Fire Station Gauge.
- Average over WY 1985 – 2017 Period = 18.4 inches.
- Cumulative Departure Curve Shows Wet and Dry Periods.
- WY 2017 Total = 21.8 in., 121 % of Average.
- WY 2018 Total = 8.96 in.

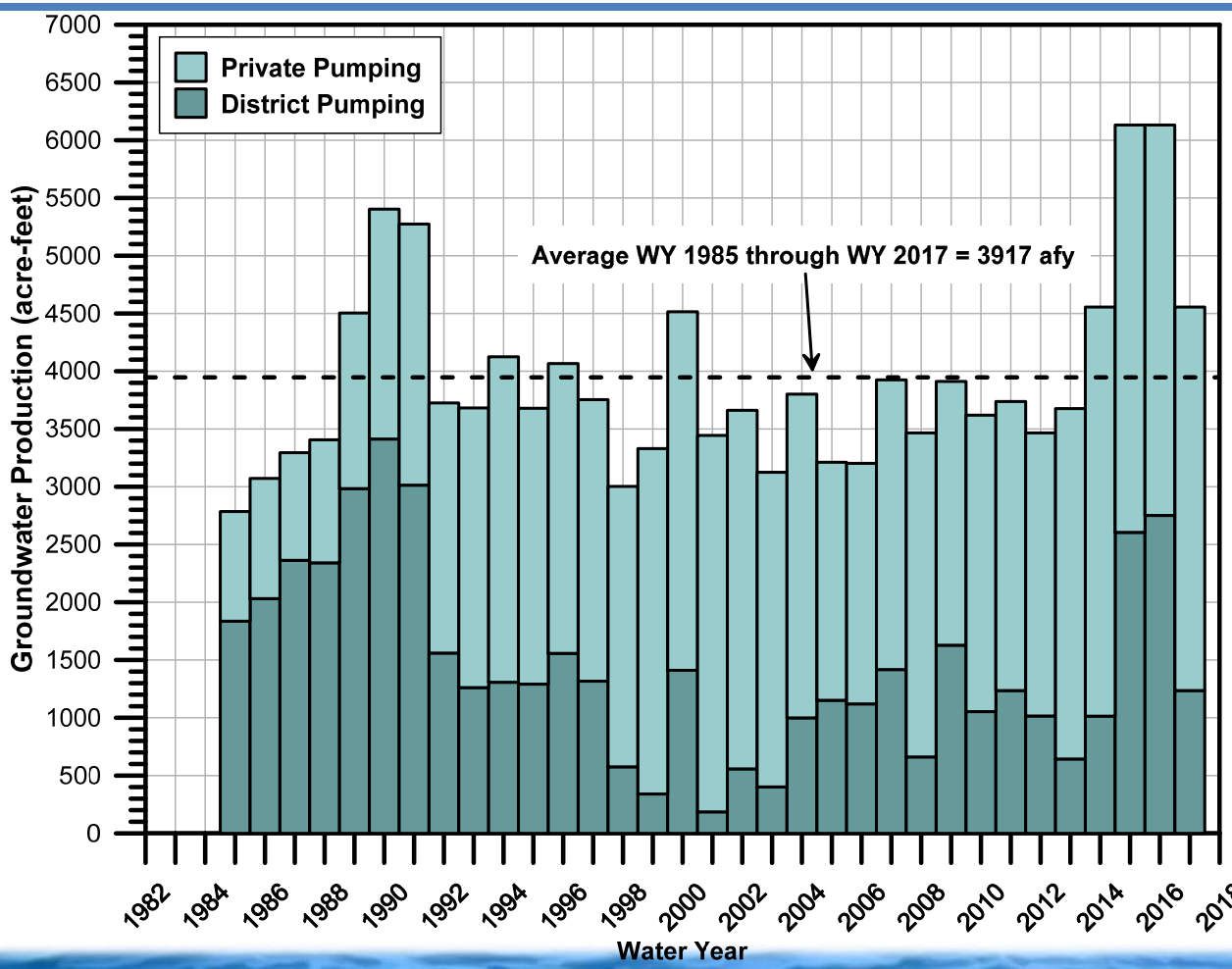
Precipitation Data



Groundwater Production Data

- Pumpage from District Wells is Metered.
- Pumpage from Private Wells Estimated by District Using Land Use Surveys and Water Delivery Information.
- 33 Year Average of 3,917 acre feet per year (afy).
- WY 2017 Total of 4,556 af, 16% Higher than Ave.
- WY 2017 District Pumpage = 1,235 af.
- WY 2017 Private Pumpage = 3,321 af.

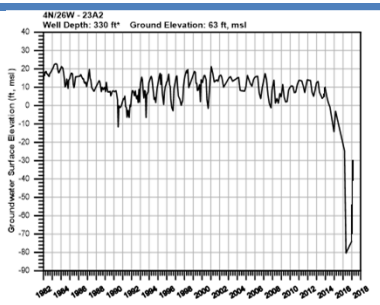
Groundwater Production Data

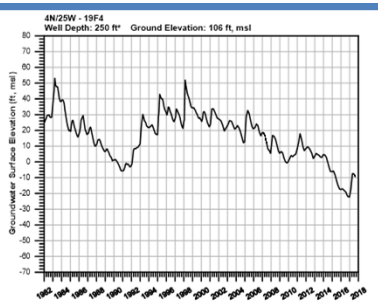


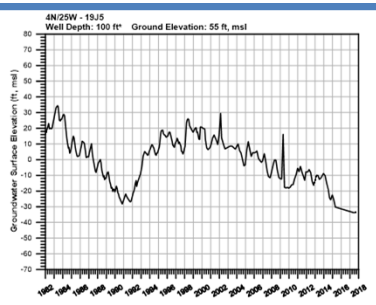
Water Level Data

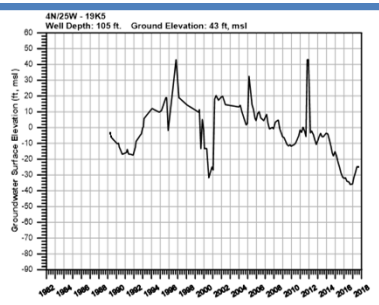
- Water Levels Measured Every Other Month
- Hydrographs for Individual Wells in Storage Units 1 and 2 (mostly SU1)
- Basin Wide Water Level Contours for the Spring and Fall of Each Water Year (Storage Unit 1 Only)

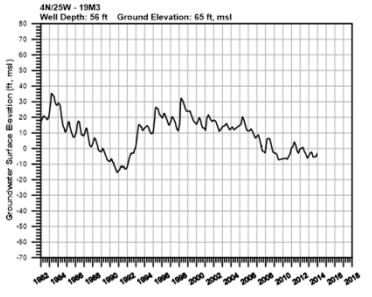
Hydrographs

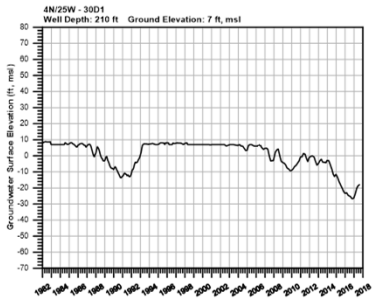


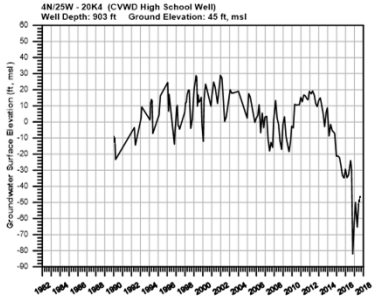


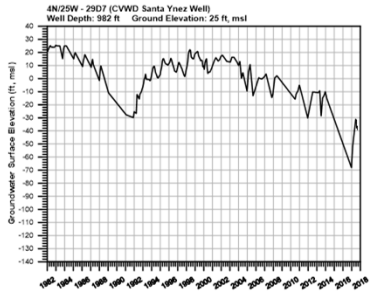


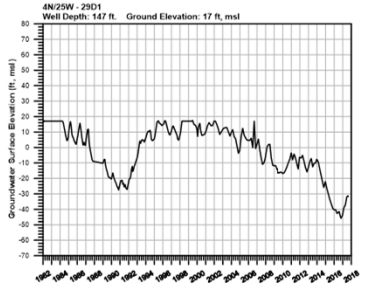


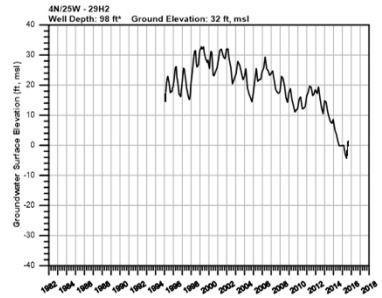


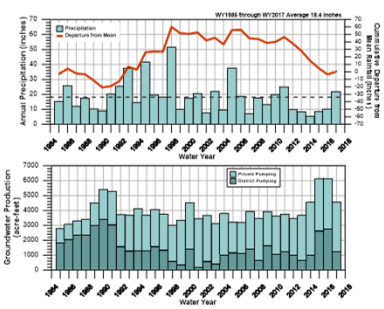


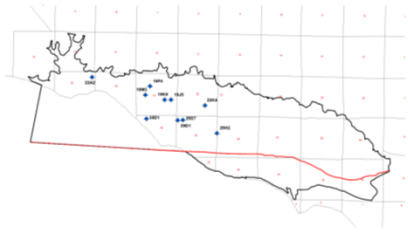








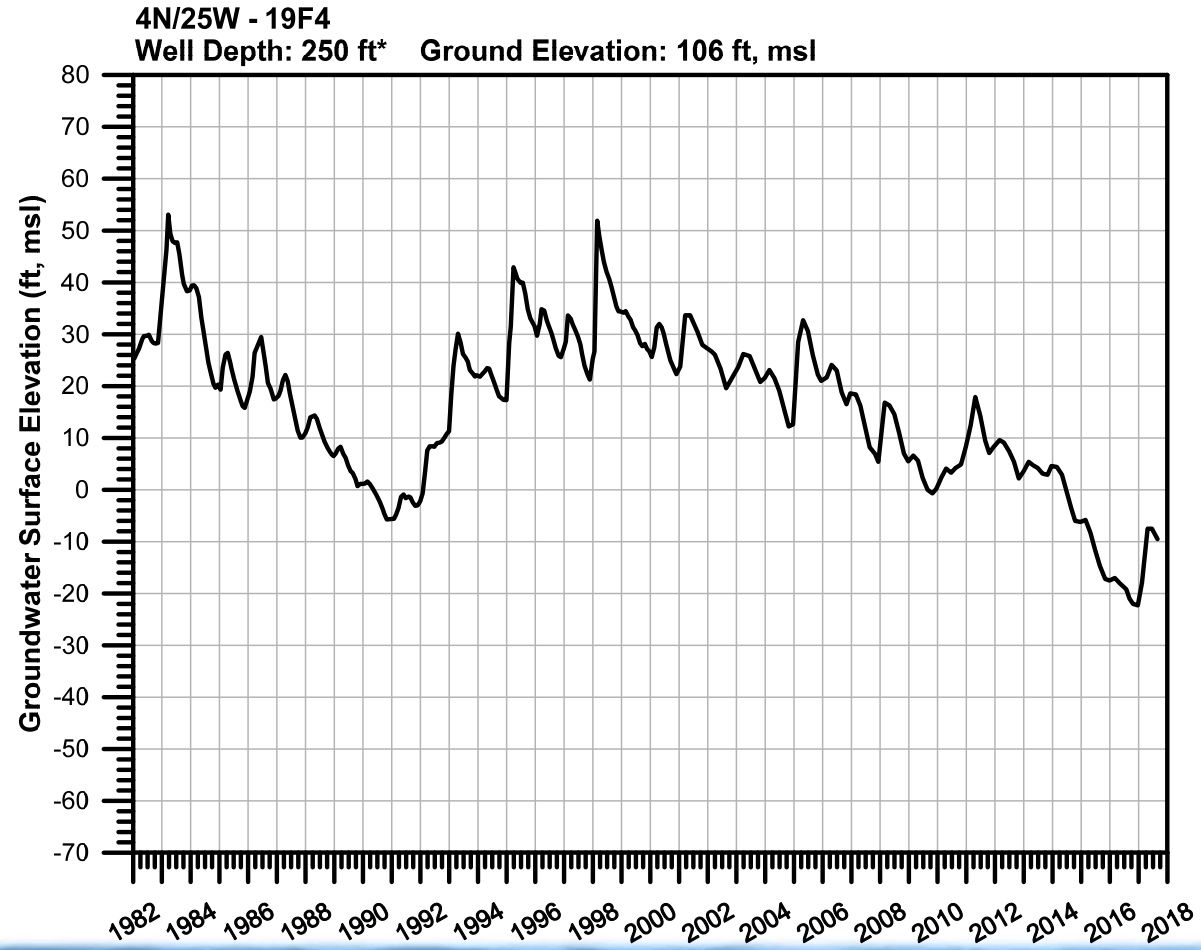




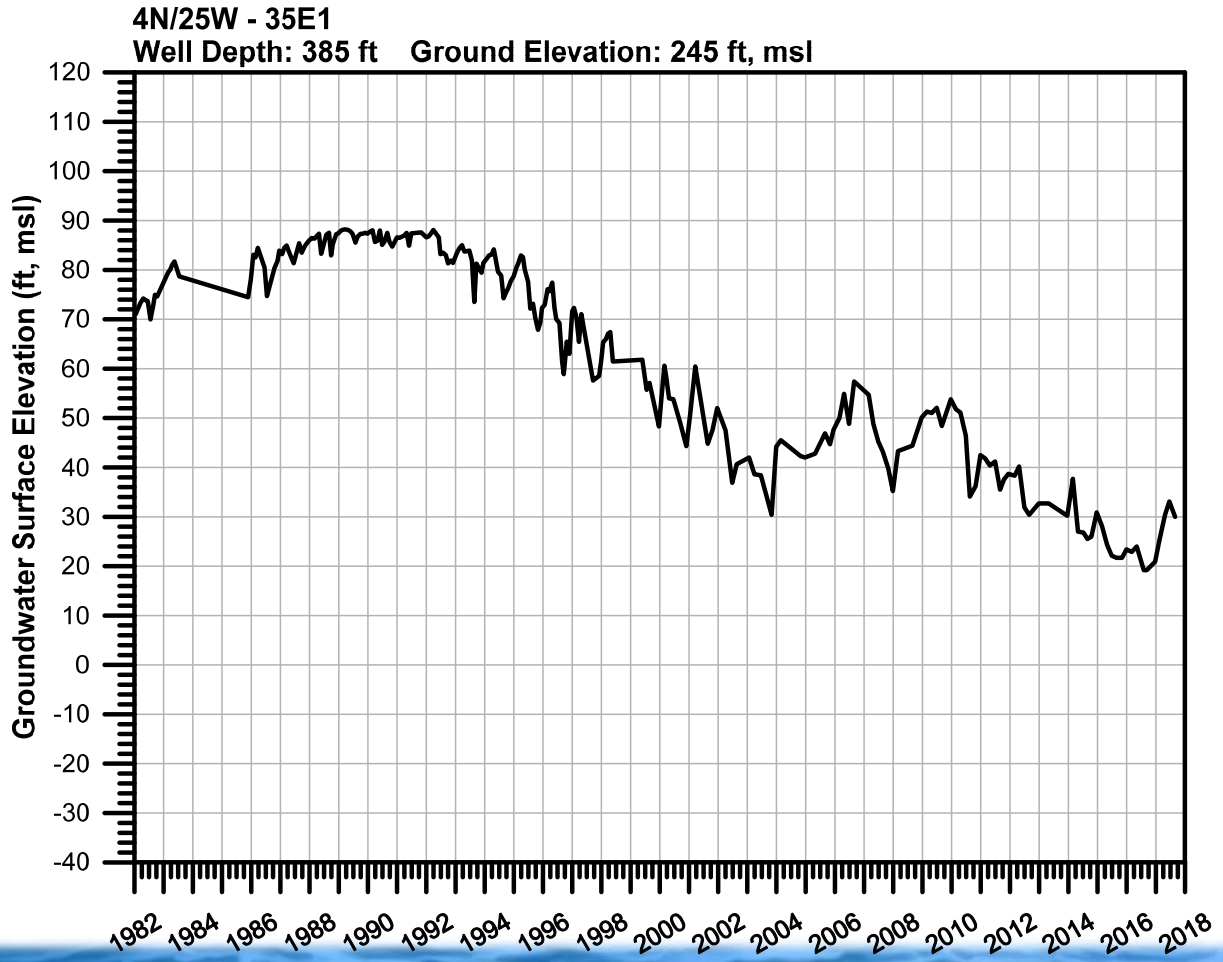
Reference Elevation = Mean Sea Level (MSL)

Key Hydrographs – Well 4N/25W-19F4

(Storage Unit 1)



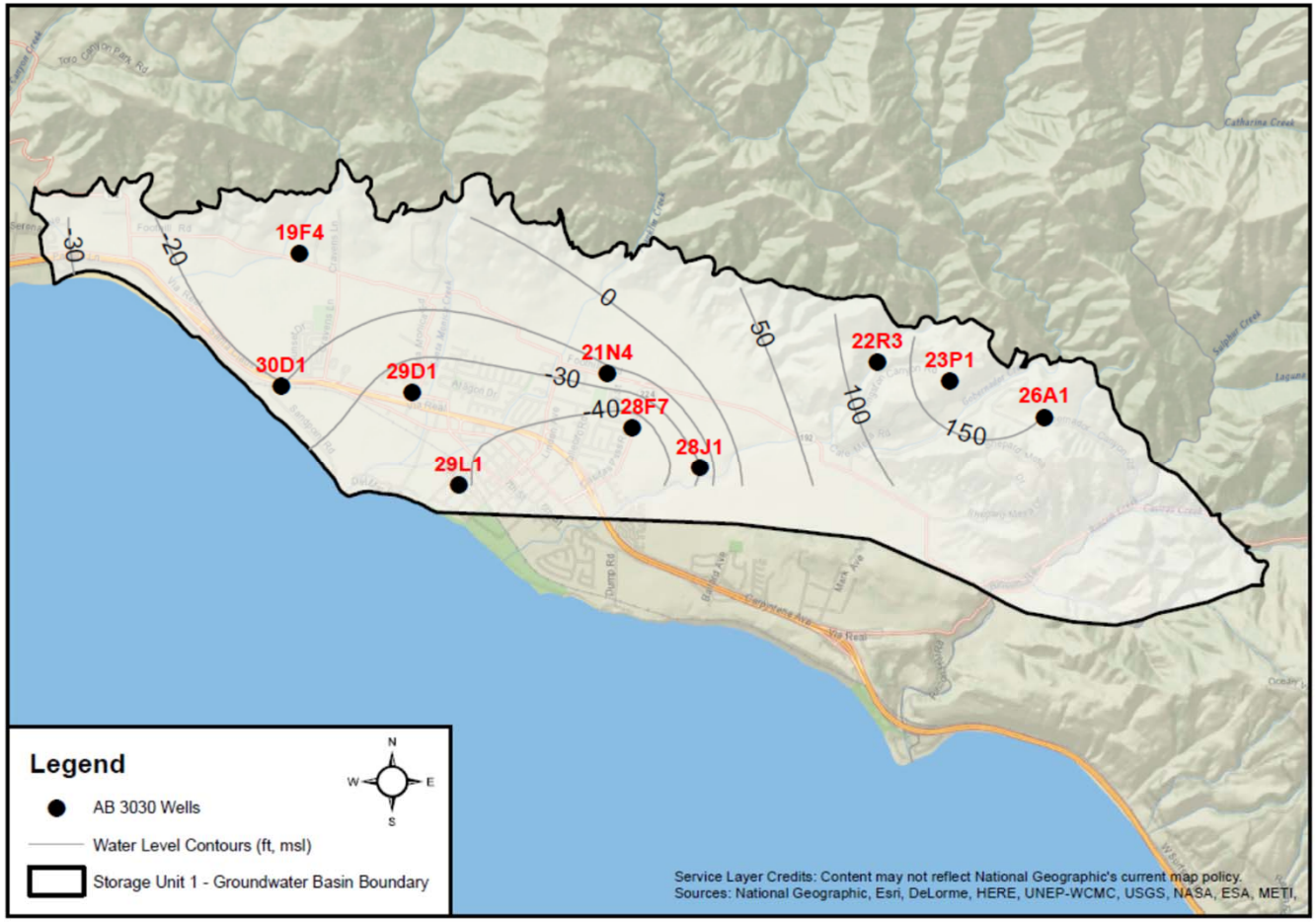
Key Hydrographs – Well 4N/25W-35E1
(storage unit 2)



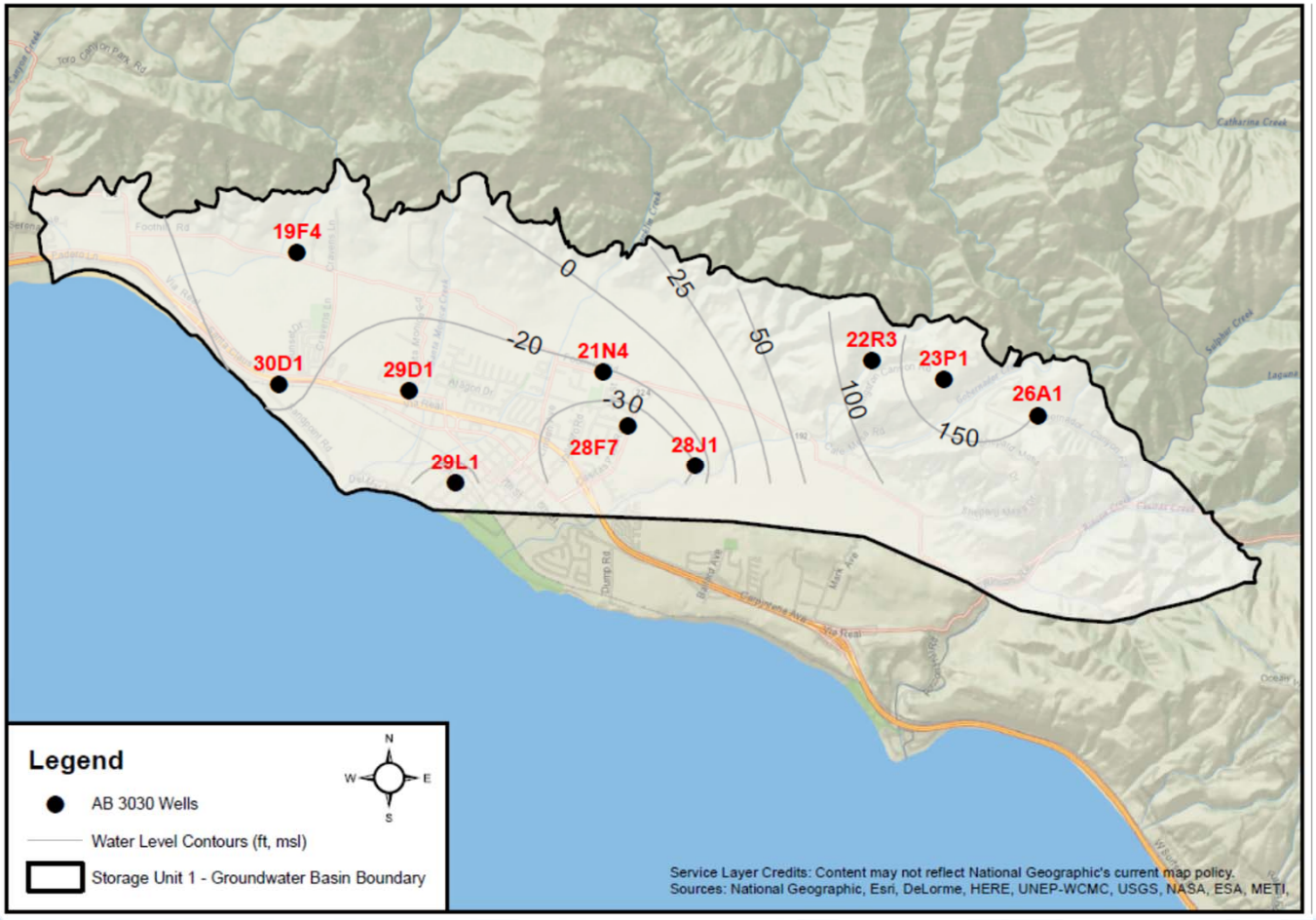
Water Level Contours

- Basin Wide Evaluation of Water Level Conditions.
- Identify General Patterns of Groundwater Flow.
- Reveal Recharge Areas and Pumping Troughs.
- Project of Water Level Conditions at Margins of the Basin (i.e. along the coast in western portion of SU1).

Water Level Contours
(Spring WY 2017)



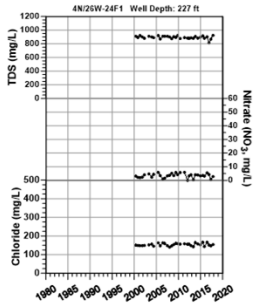
Water Level Contours
(Fall WY 2017)

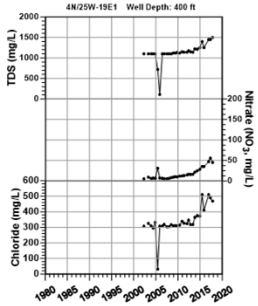


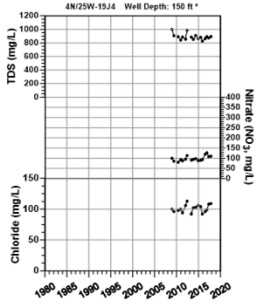
Water Quality Data

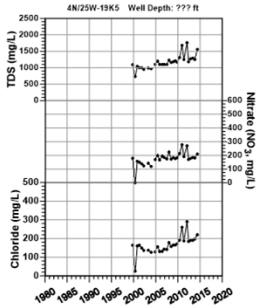
- Samples Collected in Spring and Fall.
- Irrigation Suitability Analysis includes Analysis for Minerals, TDS, and Nitrates.
- Chemical Hydrographs Allow for Tracking CGB Water Quality.
- CGB Contains Relatively High Quality Groundwater.
- TDS ranging between 600 and 900 mg/L.
- Chlorides ranging between 40 and 80 mg/L.
- Some Localized Areas with Elevated Nitrates.
- No Evidence of Seawater Intrusion.

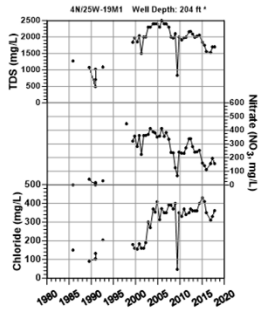
Chemical Hydrographs

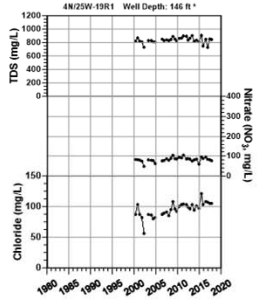


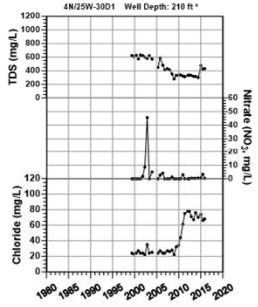


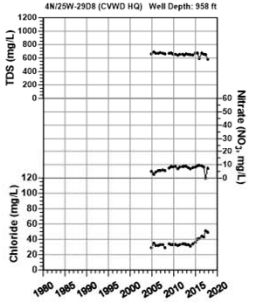


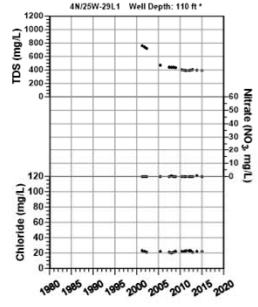


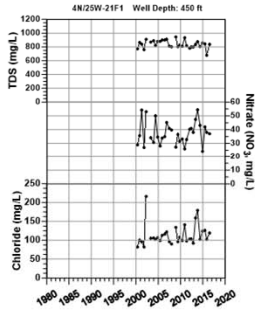


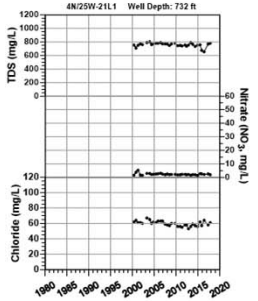


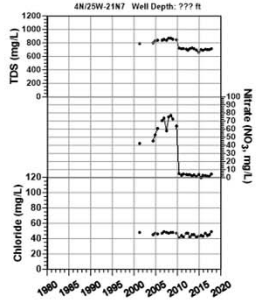


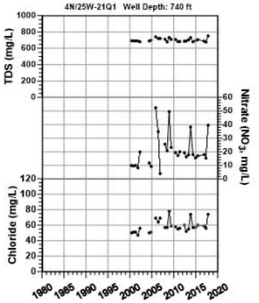


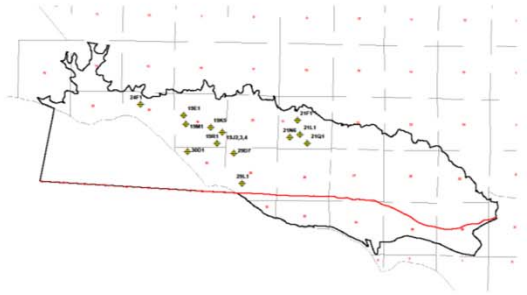




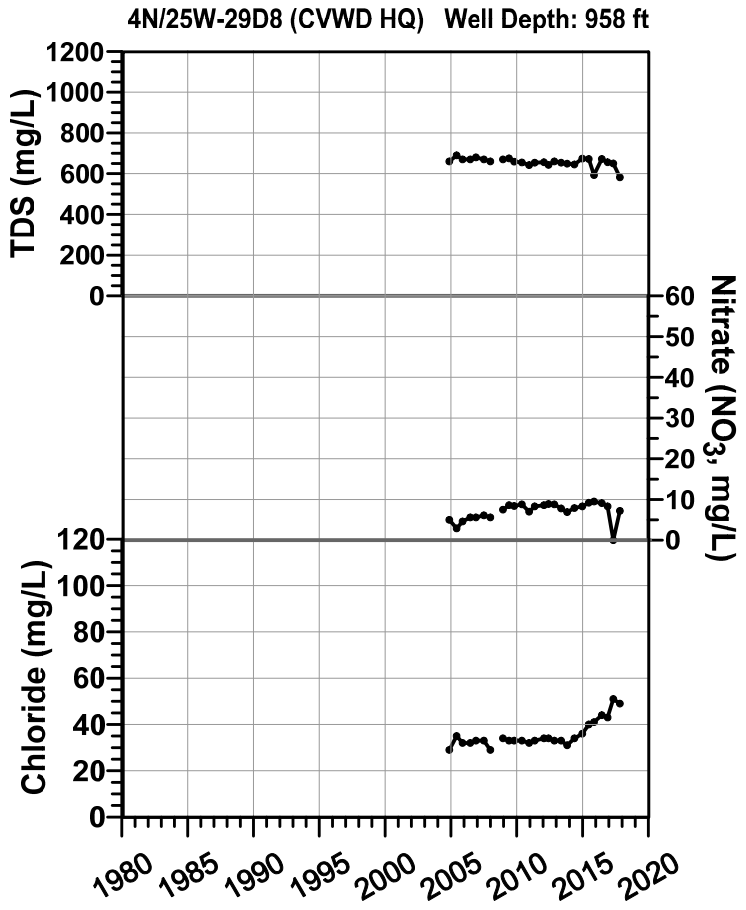


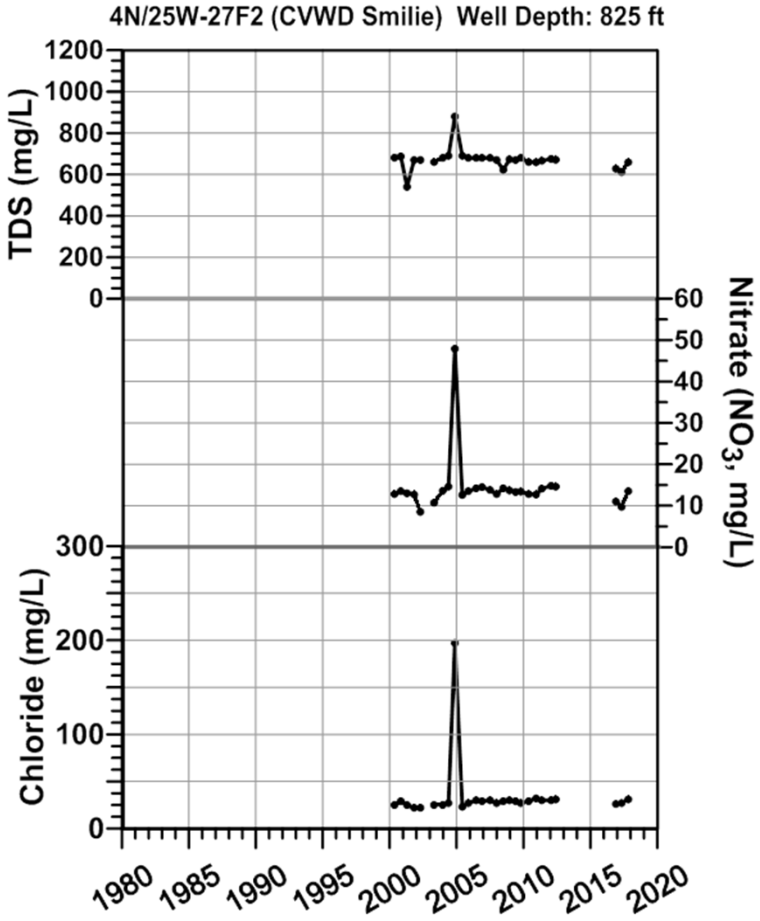






Chemical Hydrographs





Hydrologic Budget

- HB is an Accounting of All the Components of CGB GW Inflow and Outflow.
- Allows for Quantification of CGB Recharge and Storage Changes.
- Updated for WY 1985 through WY 2008 for CGB Hydrogeologic Update and Model Project (PWR 2012).
- Annual Updates Included in Annual AB3030 Reports.

Hydrologic Budget Components

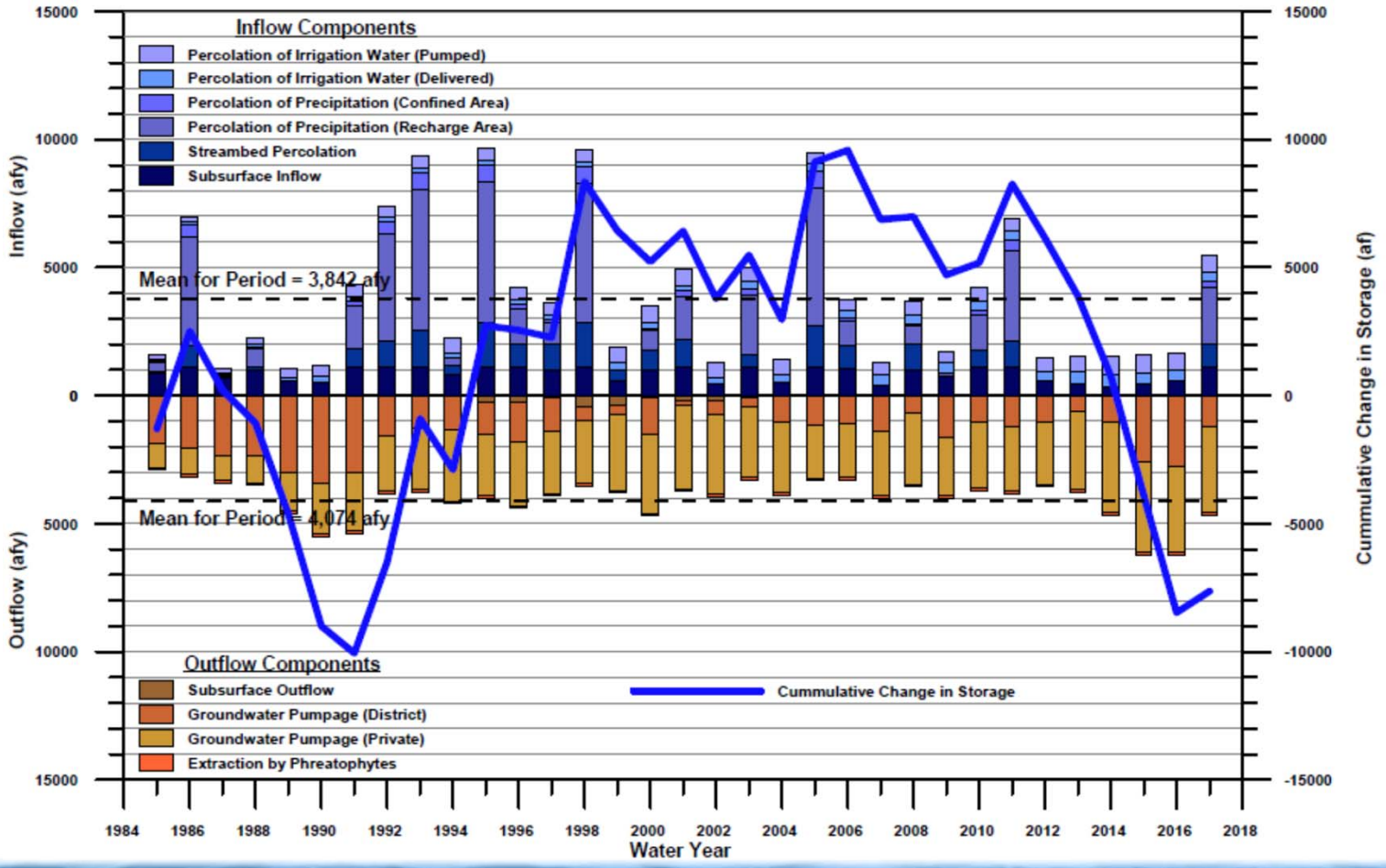
Inflows

- Subsurface Inflow (from mountain bedrock)
- Stream Percolation
- Percolation of Rainfall
- Irrigation Return Flows

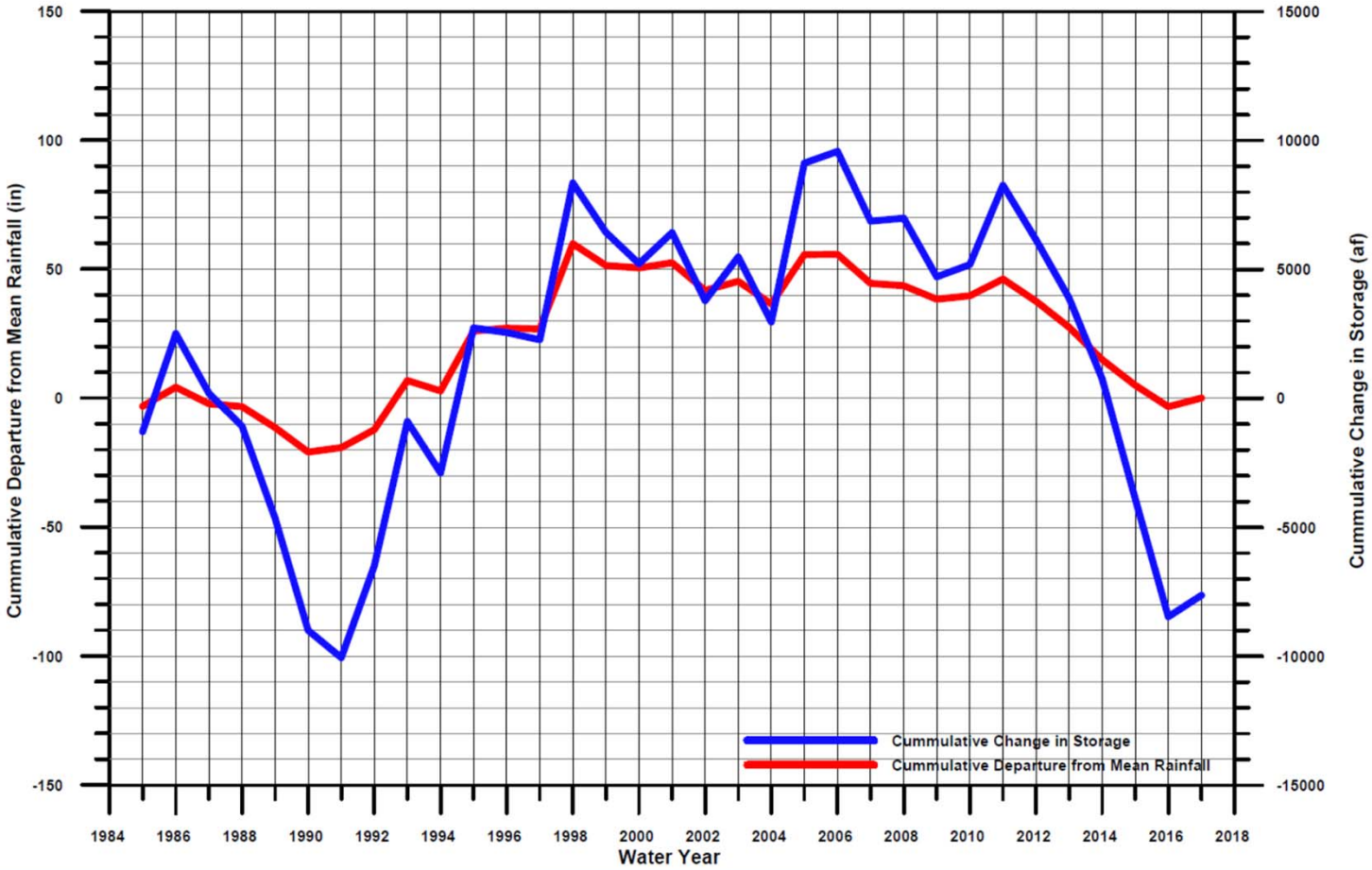
Outflows

- Subsurface Outflow (to ocean)
- Groundwater Pumpage
- Evapotranspiration

Hydrologic Budget



Hydrologic Budget



Hydrologic Budget WY 2017

- + 834 af Storage Accretion in WY 2017
- First Accumulation of Aquifer Storage Since WY 2011

Groundwater Sustainability Plan (GSP) Scoping Analysis

- Sustainable Groundwater Management Act Requires Development of GSPs for Priority Basins.
- Comparative Analysis of GSP vs. AB 3030 GWMP for Carpinteria Groundwater Basin.
- Monitoring Well Network Key to Both Programs to Monitor, Track, and Measure Sustainability Components.
- Technical Memorandum Prepared by Bondy Groundwater Consulting Inc.

Groundwater Sustainability Plan (GSP) Requirements for GSP Monitoring Network

- Known Well Construction Details
- Non-Pumping Wells
- Aquifer (Zone) Specific Monitoring
- Key Locations to Monitor Conditions in Basin Management Areas

WY 2017 Conclusions

- Above Average Rainfall in WY 2017.
- Water Levels Recovery at Most Wells.
- Water Levels Below Sea Level in Central Portion of SU1 and Along Coast.
- Water Quality Stable, No Significant Trends.
- CGB GW Storage Accretion in WY 2017.

Recommendations

- Continue GWMP in Existing Form.
- Install Sentry Wells at Coast in Western Portion of Storage Unit 1 and include Sentry Wells in CGB GWMP.
- Gradually Transition AB 3030 Program to be SGMA/GSP Compliant.

Discussion