SANTA CRUZ MID-COUNTY GROUNDWATER SUSTAINABILITY PLANNING

Advisory Committee Meeting #5

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

Wednesday, March 28, 2018, 5:30 – 9:00 p.m.
Santa Cruz County Sheriff's Office

Welcome and Introductions

- Groundwater Sustainability Plan (GSP) Advisory Committee
  - New Committee Members
- Staff
- Public

Meeting Objectives

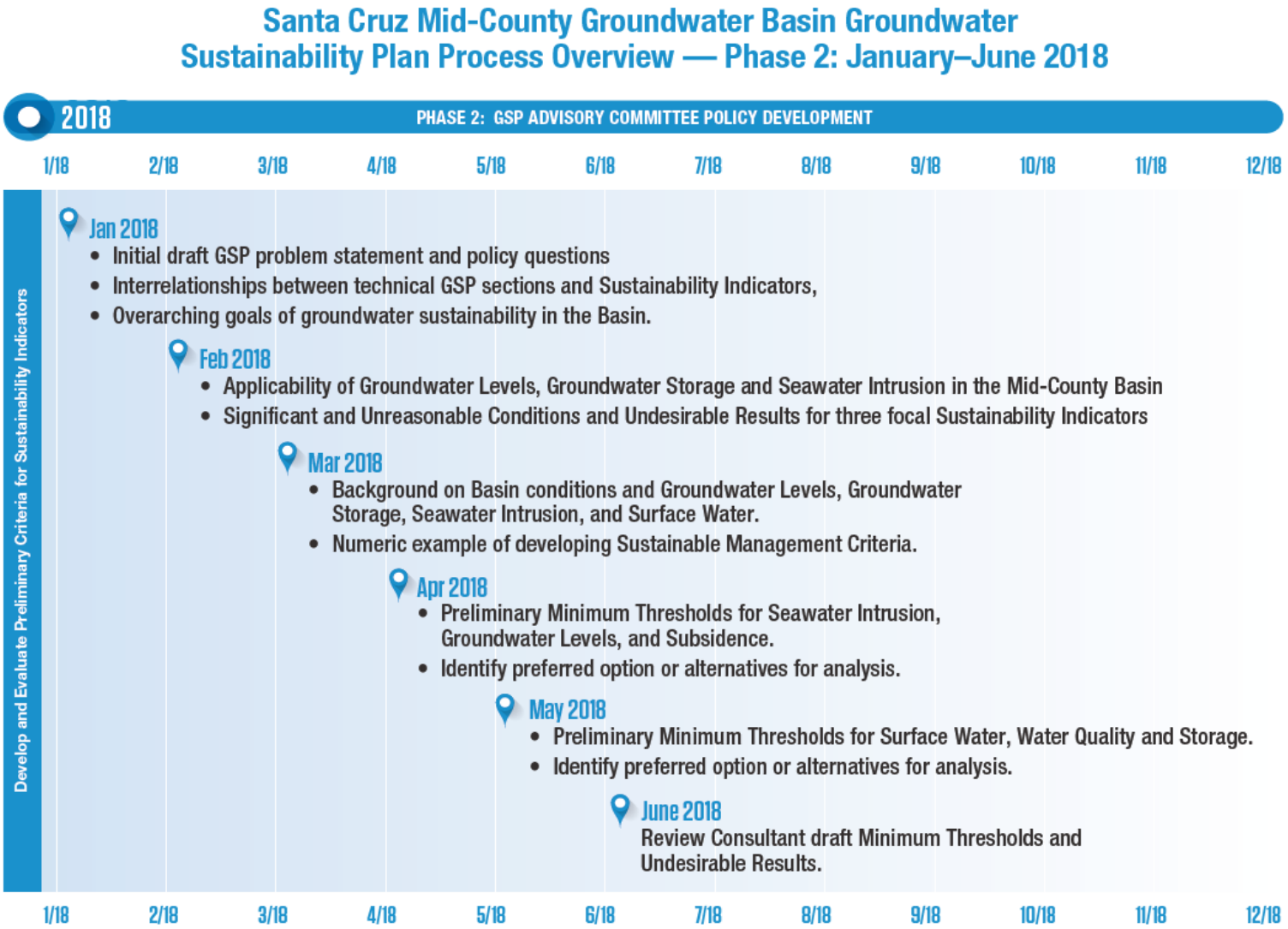
1. Share additional background information about basin conditions.
2. Build understanding around four related Sustainability Indicators—Groundwater Levels, Groundwater Storage, Seawater Intrusion, and Surface Water
3. Discuss Seawater Intrusion example initial proposal to better understand the information that will be included in future options and alternatives to be presented by support staff.

Agenda

5:30	Welcome, Introductions, Objectives and Agenda Review
5:45	Oral Communications
5:55	*Presentation*: Understand the Broader Context for four focal Sustainability Indicators
6:35	*Maps*: Background Information on Basin Conditions to Inform Future Advisory Discussion on Options re Sustainability Indicators
7:05	Review/discuss example Seawater Intrusion proposal
7:40	*Break*
7:55	Overview of Management Areas
8:05	Public Comment
8:15	Form Working Group to Review Streamflow Depletion and Groundwater Dependent Ecosystems
8:45	*Confirm* February 28 meeting summary and Amended Charter
8:50	Recap and Next Steps
9:00	*Adjourn*

GSP Project Timeline

GSP Process Timeline – Phase 2



Oral Communications

Background/Context

Broader Context for and Interrelationships among Sustainability Indicators:

- *Groundwater Levels*
- *Groundwater Storage*
- *Seawater Intrusion*
- *Surface Water Interactions*

CONCEPTUAL CONTEXT SETTING

MAIN POINTS TO KNOW

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

for GSP ADVISORY COMMITTEE (March 29, 2018)

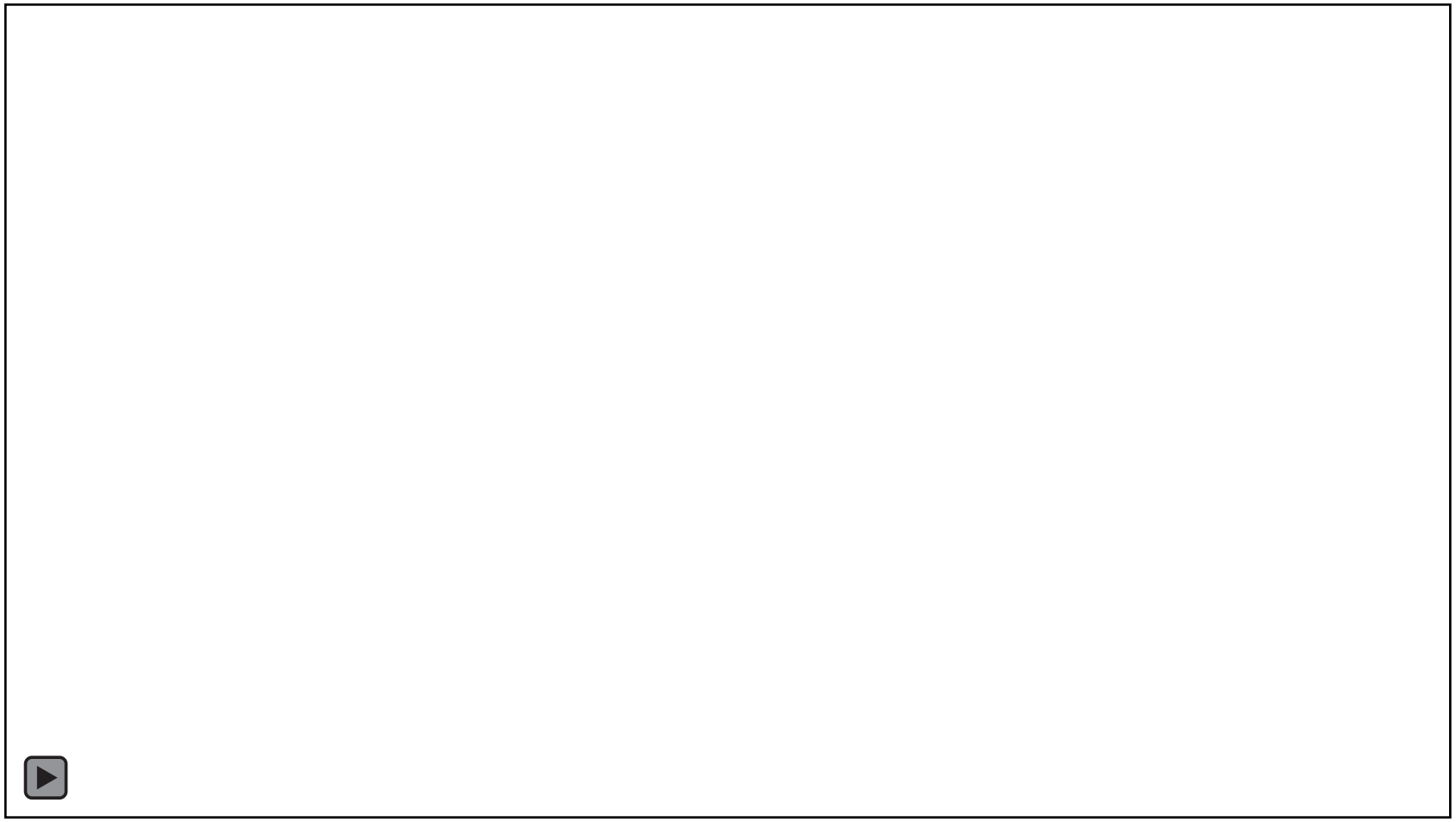
(rev. 3/17/18)

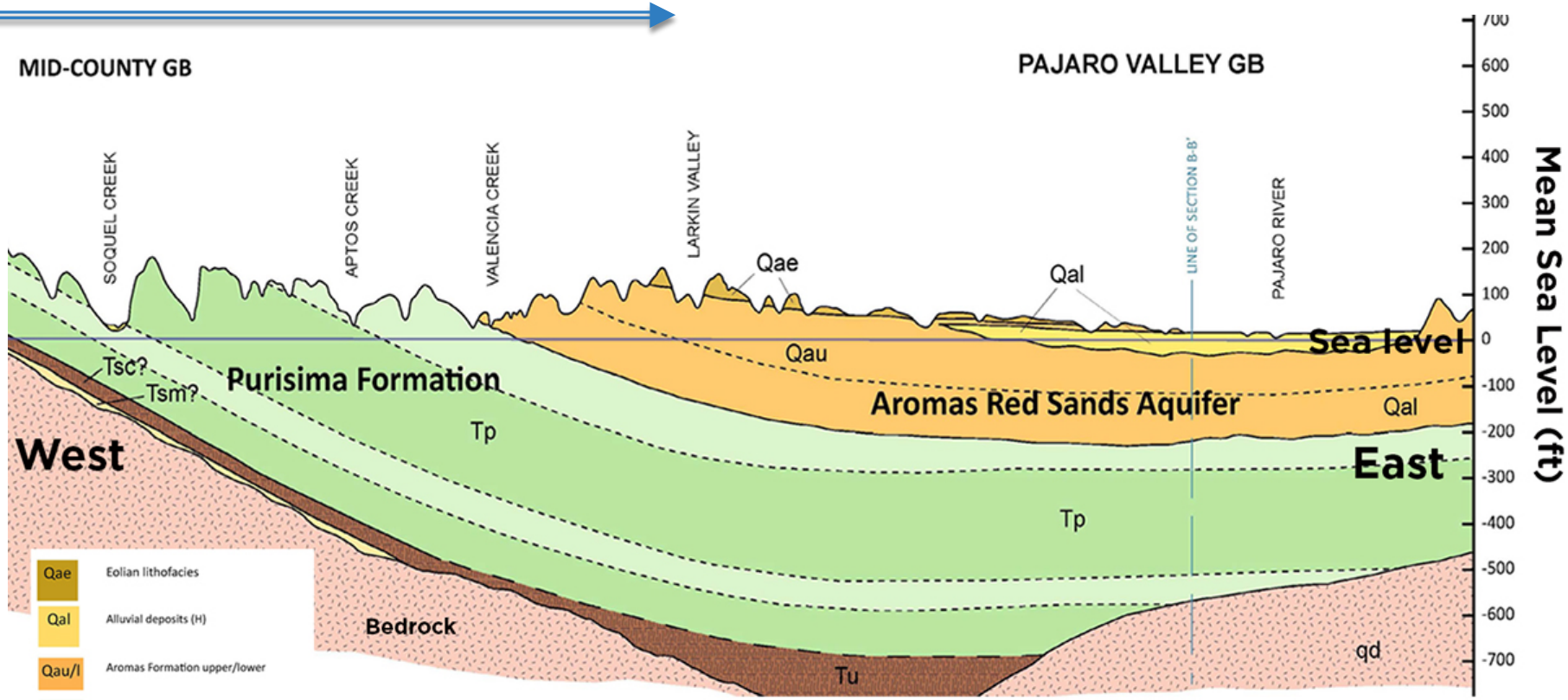
Goal – Conceptual Understanding

- Groundwater in Storage
- Groundwater Levels
- Seawater Intrusion
- Surface Water Interactions

Niagara Falls
~1 hour - MGA basinwide water use

Niagara Flowing (video)



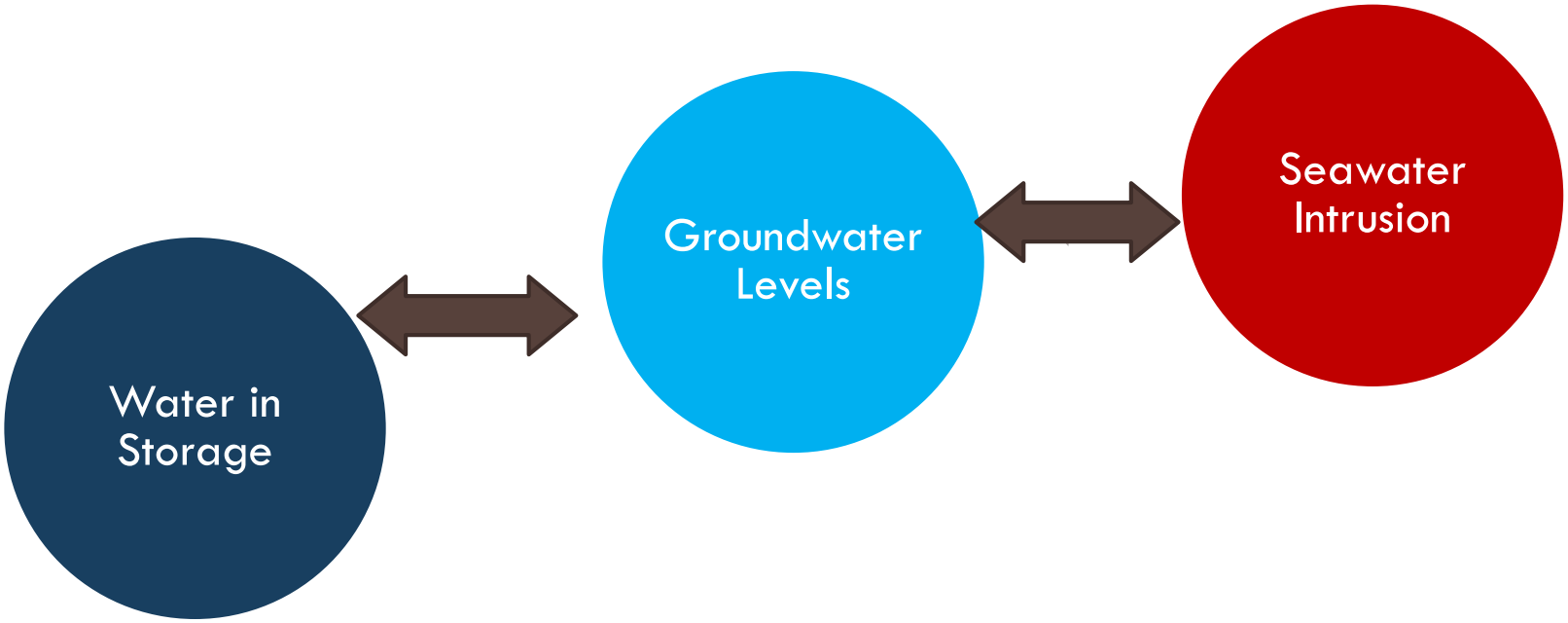


Generalized cross section of geologic structure

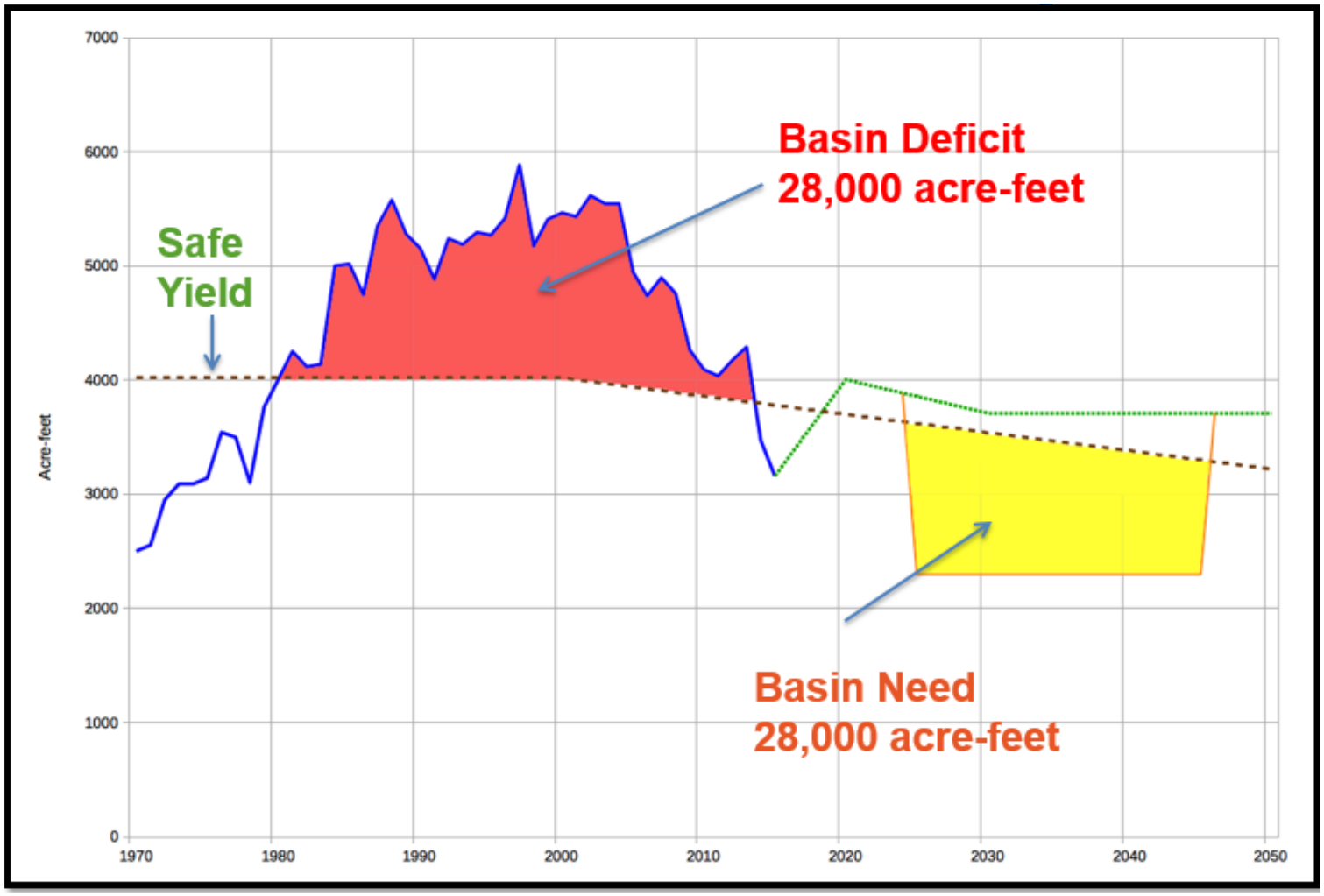
Purisima Formation is composed of layers of mudstone and sandstone and slants South East under the Aromas Aquifer.

Source: Modified from Regional Managed Aquifer Recharge and Runoff Analyses in Santa Cruz and Northern Monterey Counties, Ca. By A.T. Fisher, S. Lozano, S. Beganskas, E. Teo, K. Young, W. Weir, R. Harmon. Based on Personal Communication with Mike Cloud.

Impact Relationship – Seawater Intrusion



Older Storage Concept – Understanding Evolving (Soquel WD Only)



Groundwater Pumping MGA Basin

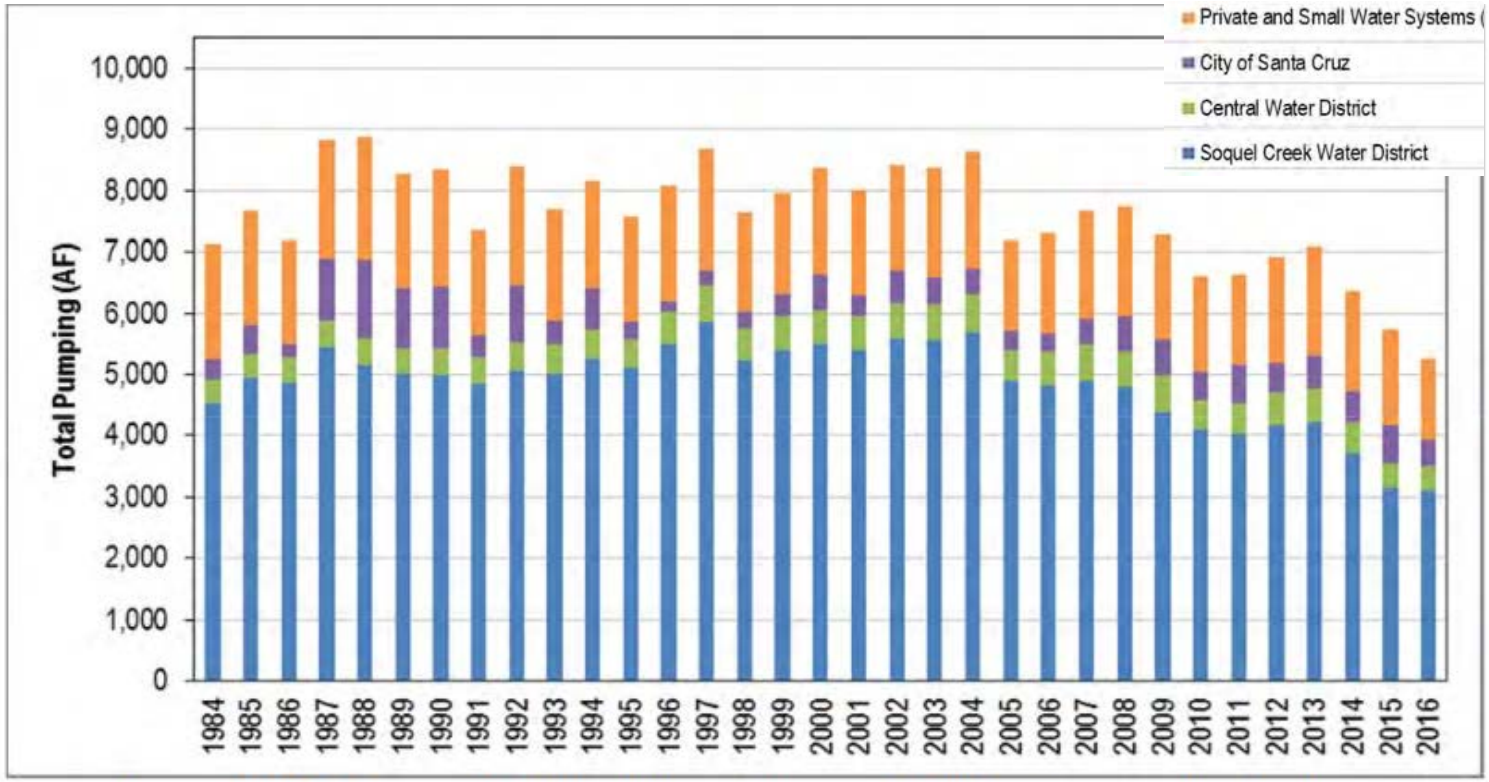
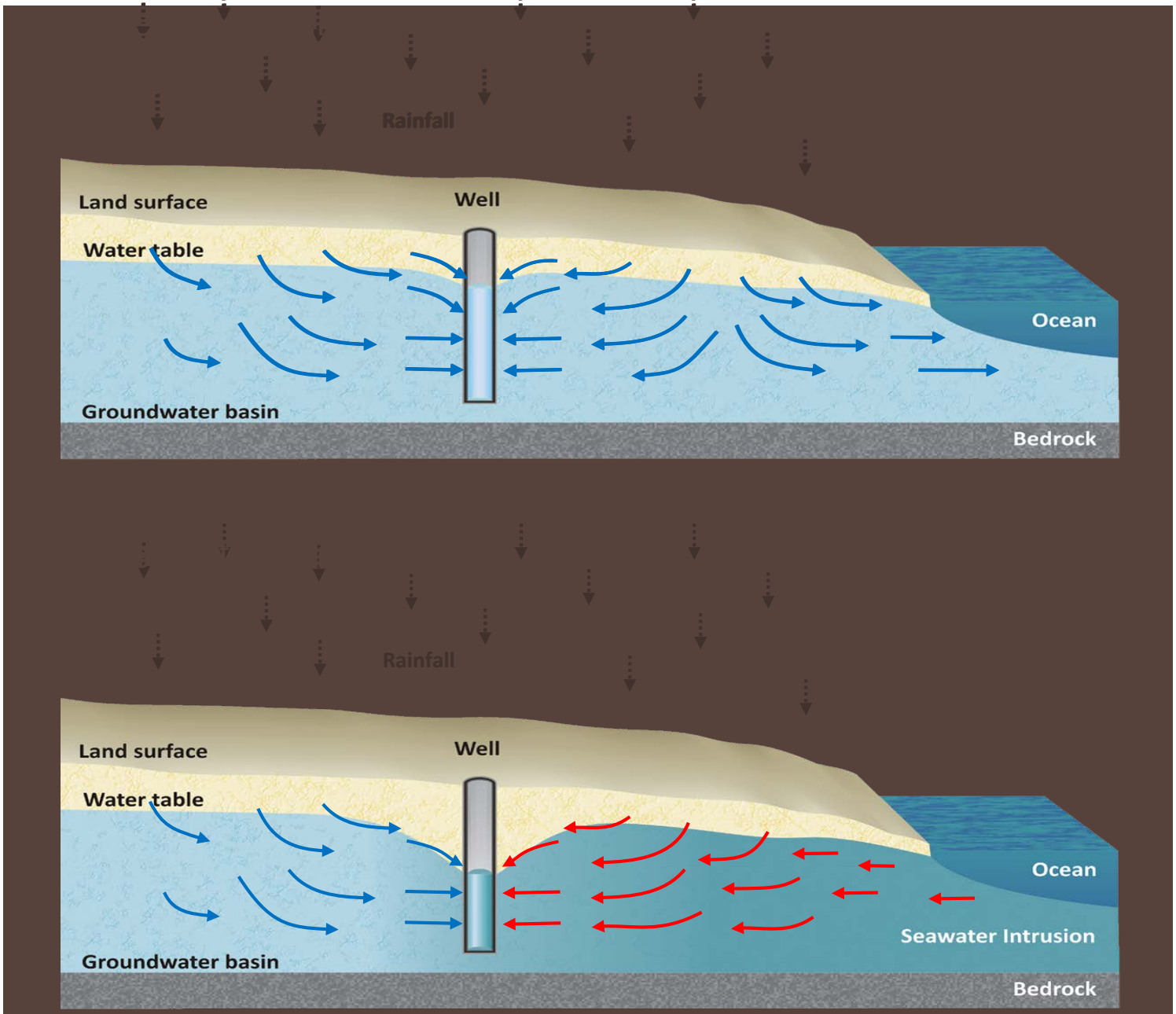
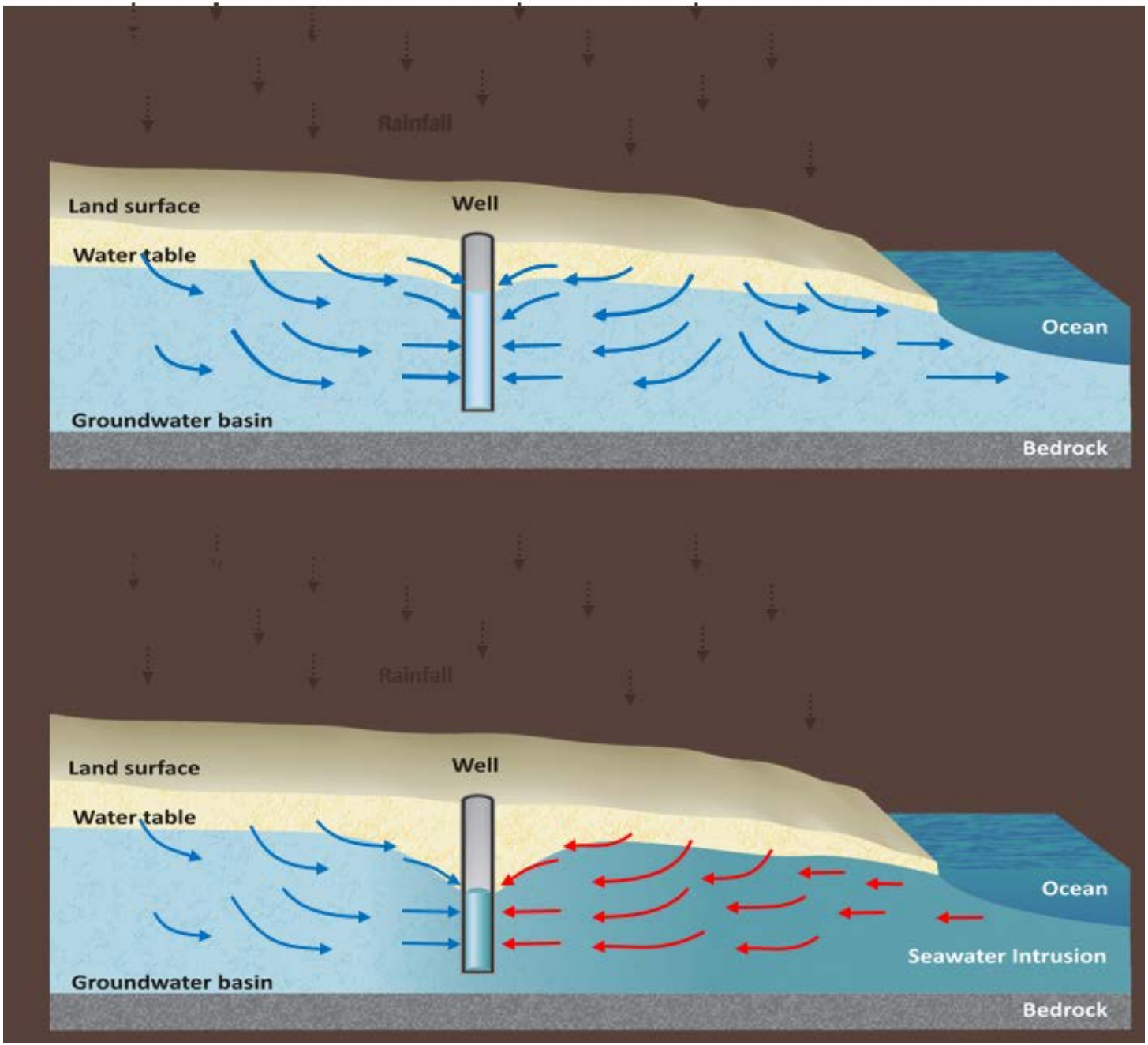


Figure 2-3: Santa Cruz Mid-County Basin Pumping by Water Year in Acre-Feet

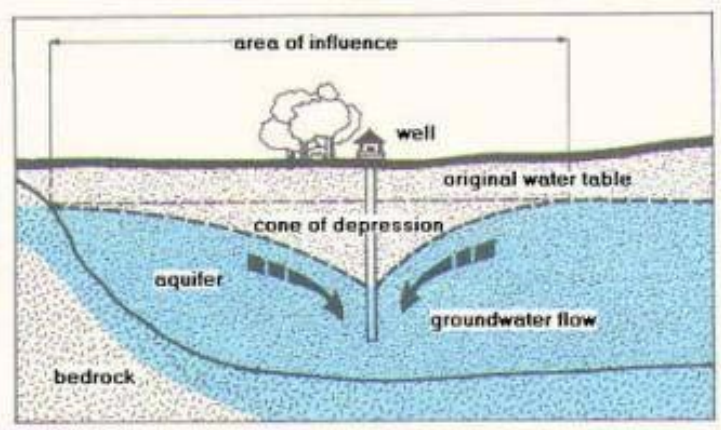
Seawater Intrusion Animation

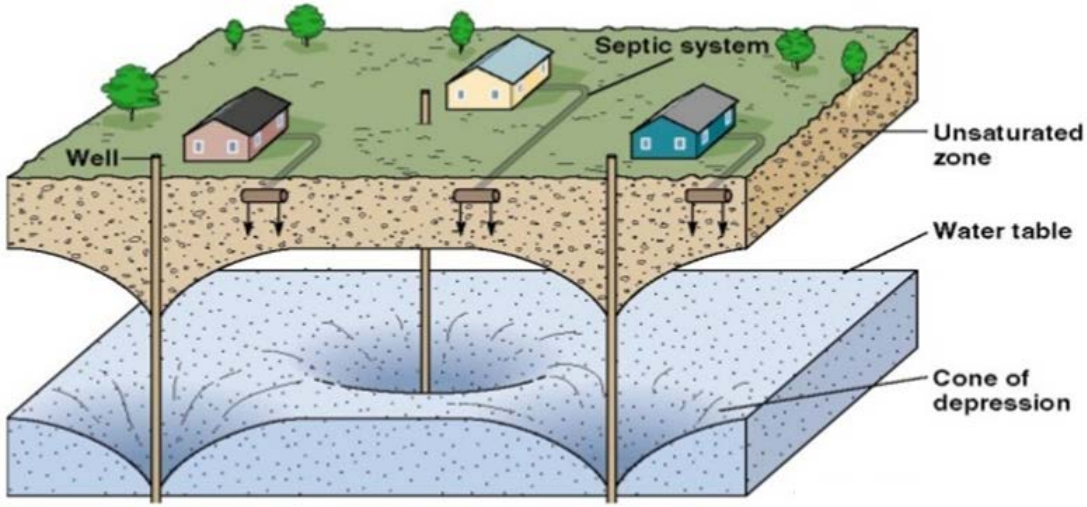


Seawater Intrusion



Pumping Cone of Depression

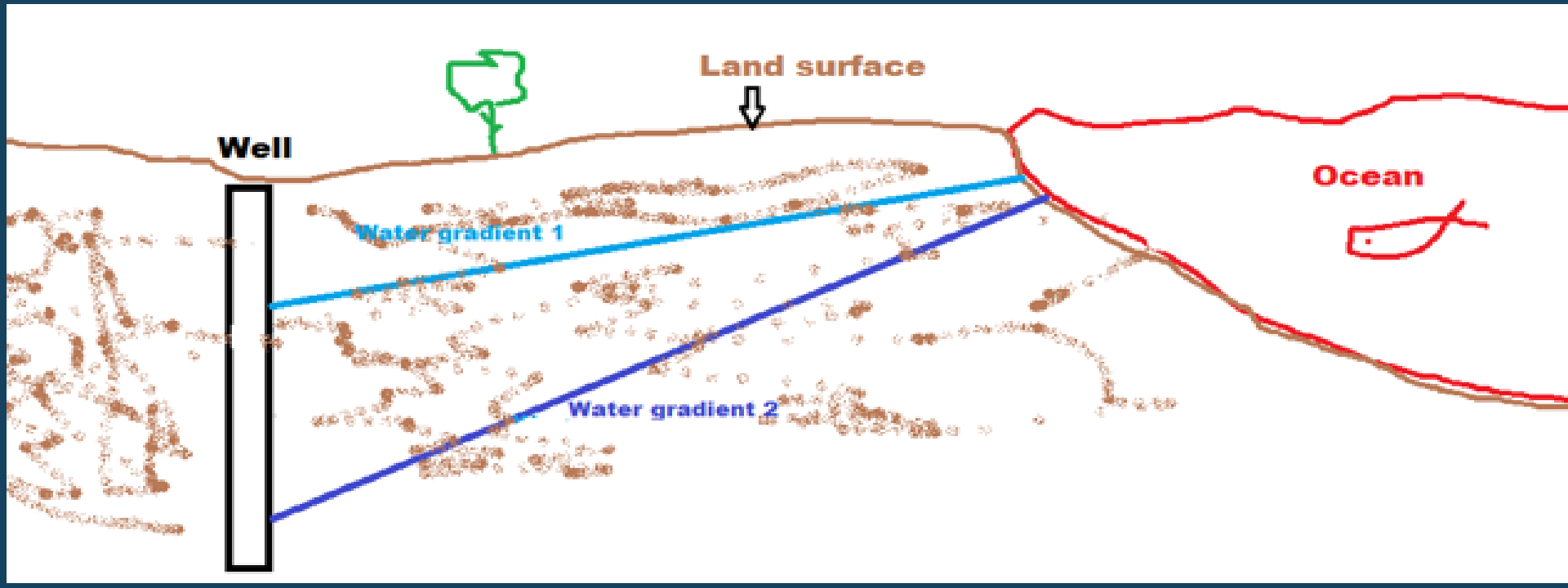


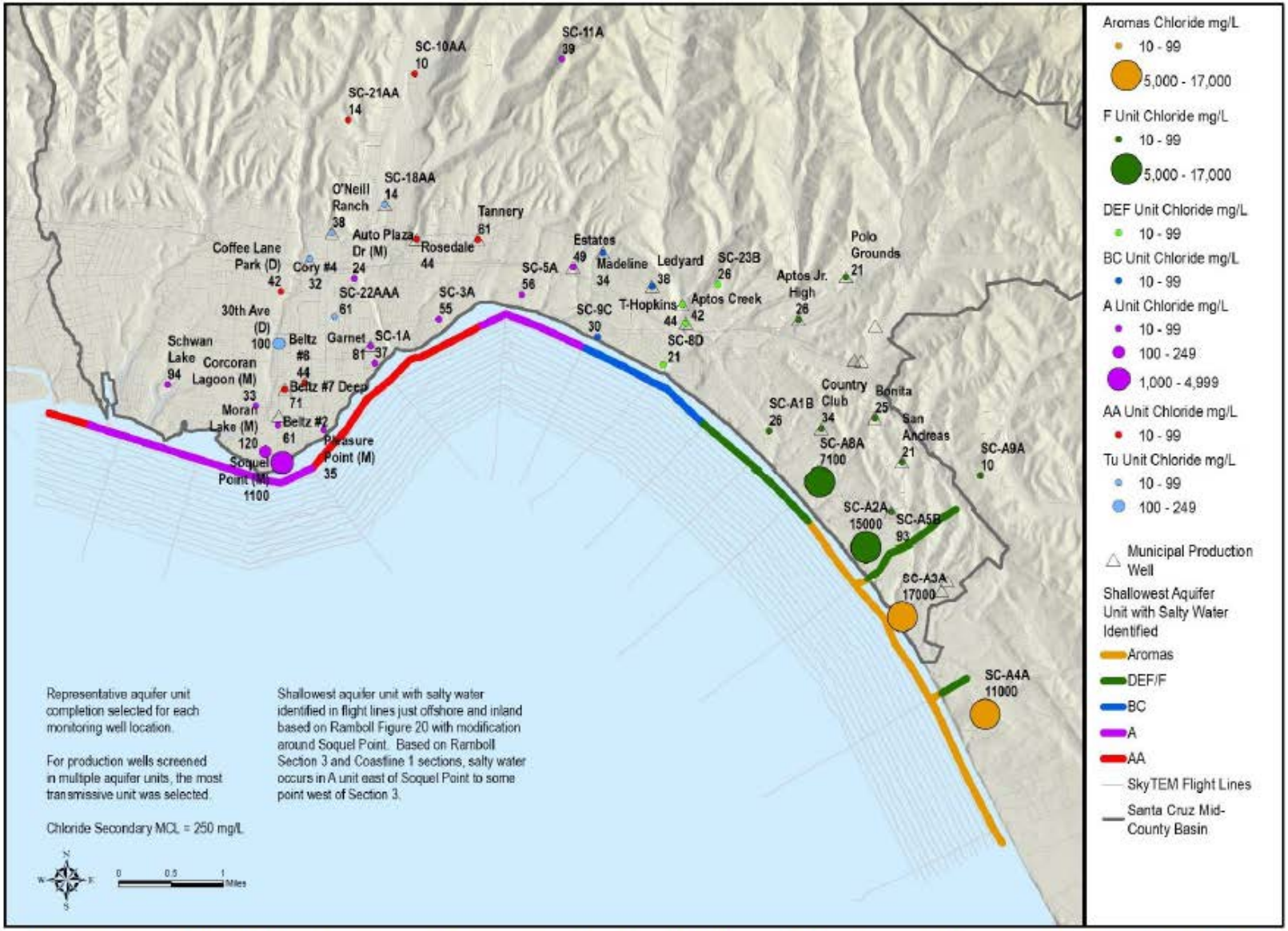


Seawater Intrusion Rates

Flow Velocity = Hydraulic Conductivity of Geo. x Flow Gradi

V = K * G





Water Year 2016 Chloride Concentrations in Onshore Wells and Shallowest Aquifer Unit with Salty Water Just Offshore

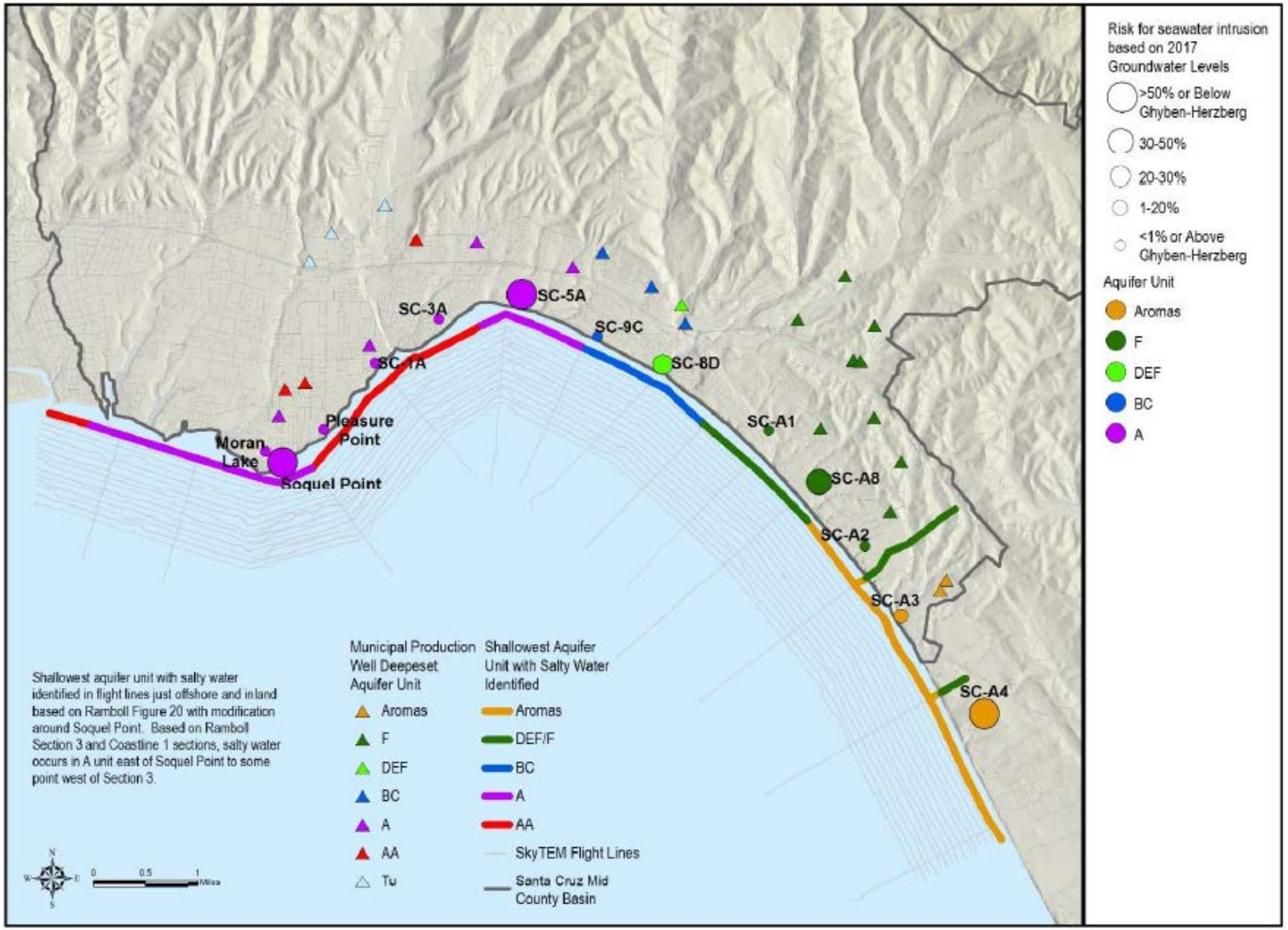
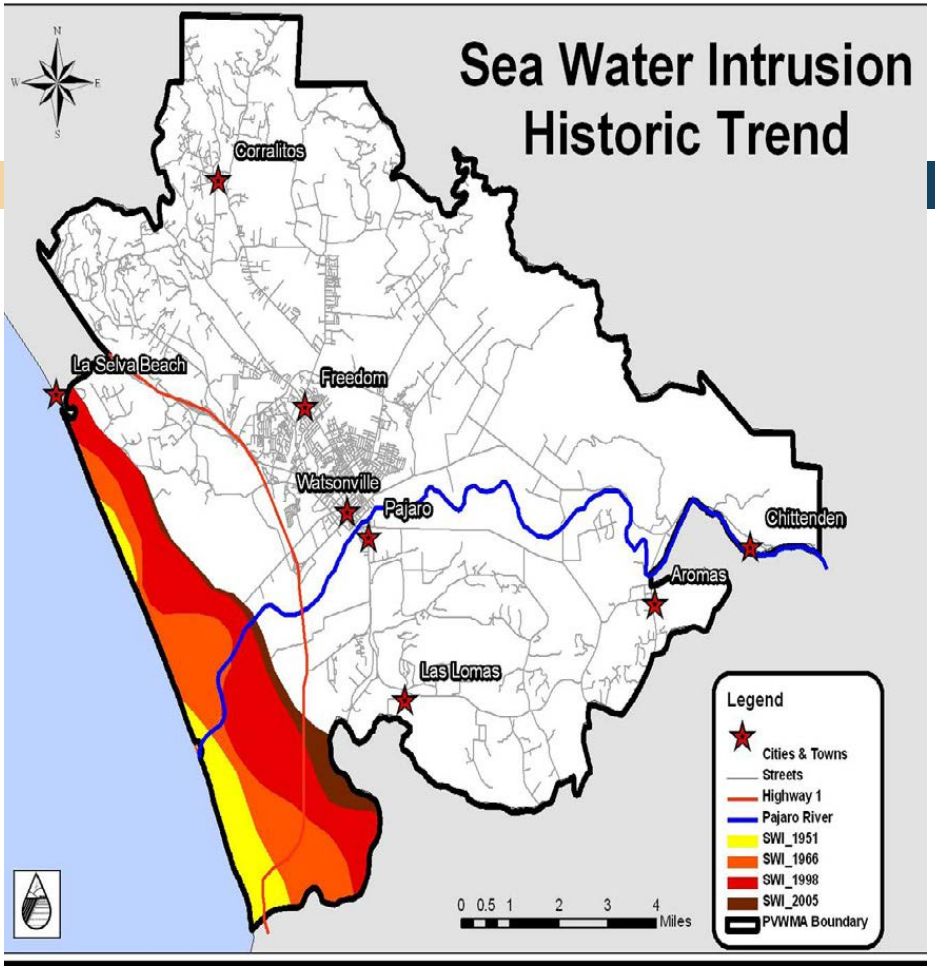
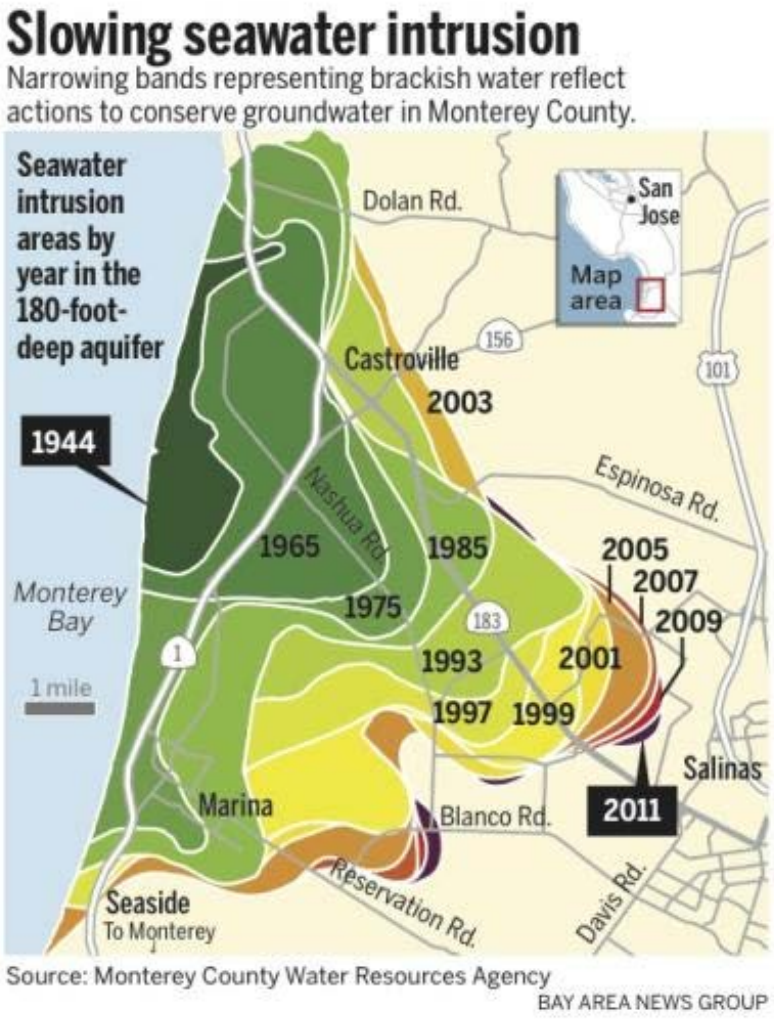
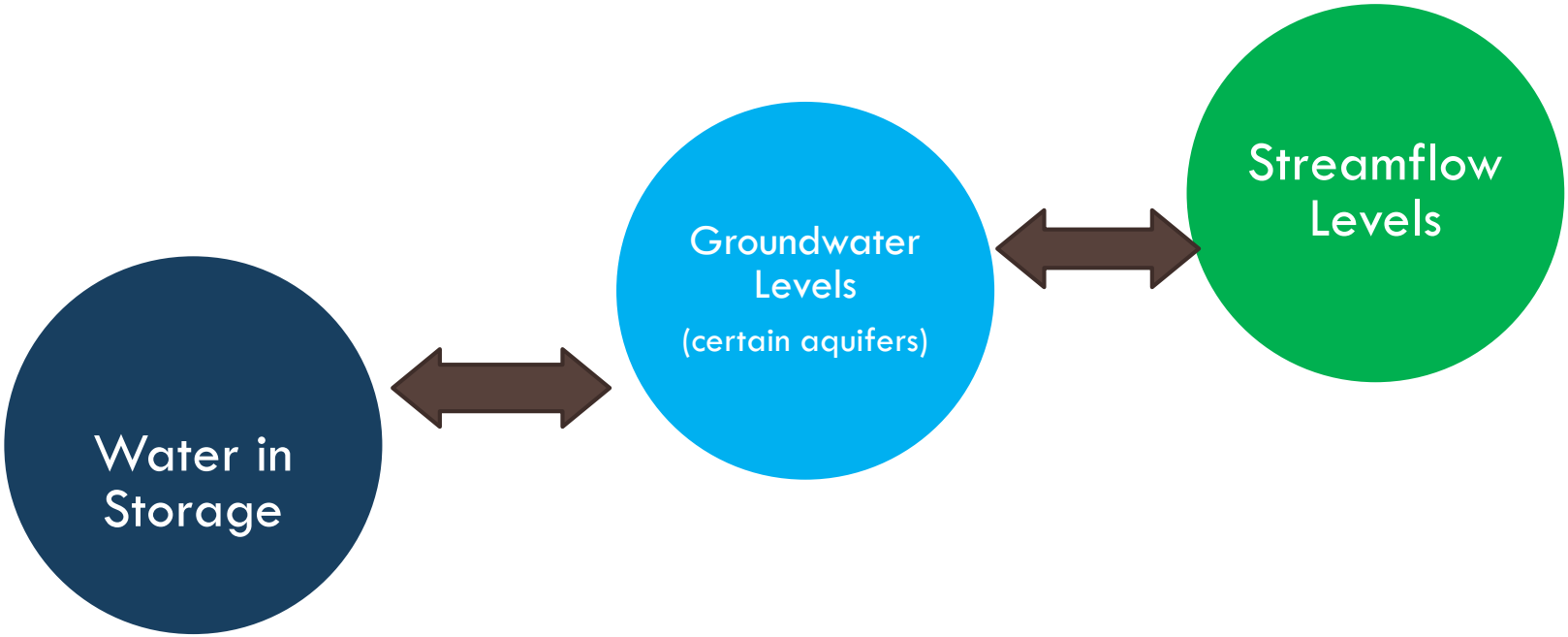


Figure 2: Pumped Aquifer Units, Risk for Seawater Intrusion Based on Water Year 2017 Groundwater Levels and Shallowest Aquifer Unit with Salty Water Just Offshore

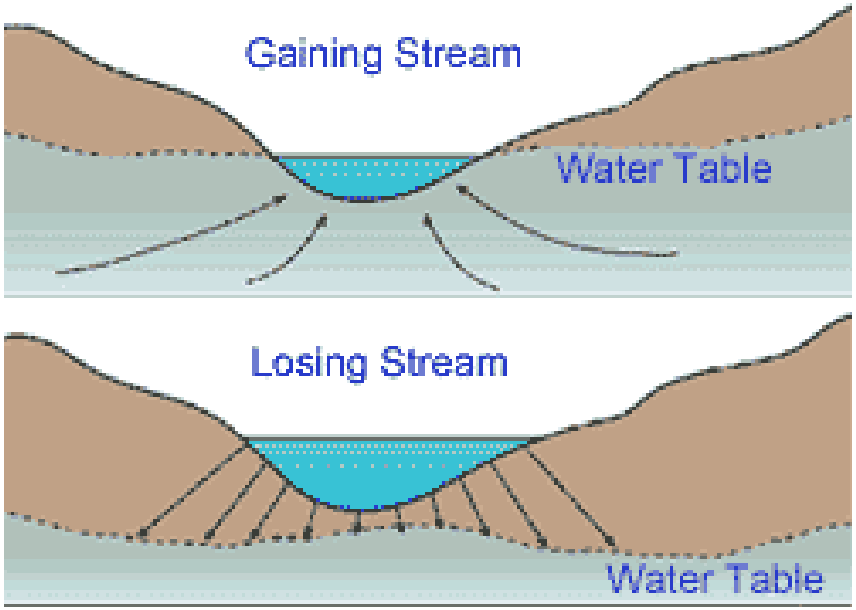

Sea Water Intrusion
Historic Trend
Corralitos
La Selva Beach
Freedom
Watsonville
Pajaro
Chittenden
Aromas
Las Lomas
Legend
Cities & Towns
Streets
Highway 1
Pajaro River
SWI_1951
SWI_1966
SWI_1998
SWI_2005
PVWMA Boundary
0 0.5 1 2 3 4
Miles

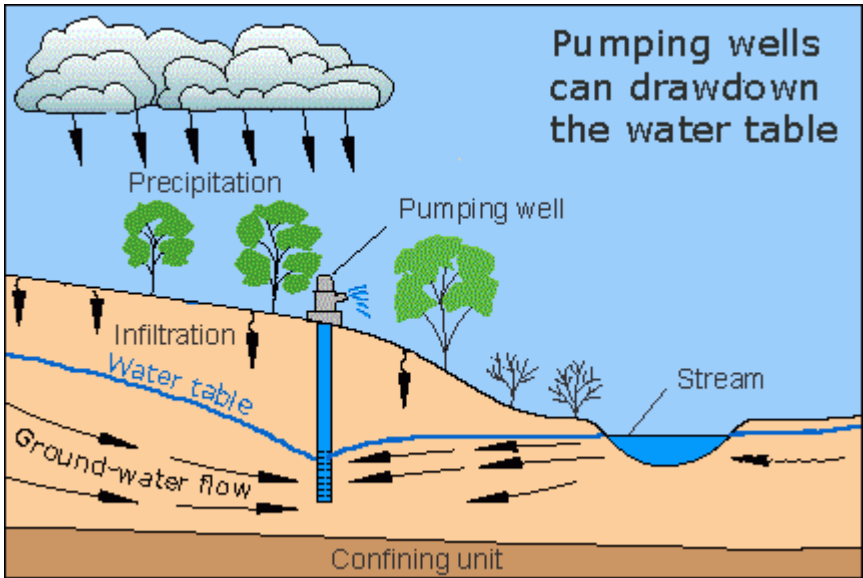

Slowing seawater intrusion
Narrowing bands representing brackish water reflect actions to conserve groundwater in Monterey County.
Seawater intrusion areas by year in the 180-foot-deep aquifer
1944
1965
1975
1985
1993
1997
1999
2001
2003
2005
2007
2009
2011
Dolan Rd.
San Jose
Map area
Castroville
156
101
Espinosa Rd.
Nashua Rd.
Monterey Bay
1 mile
183
1
Marina
Blanco Rd.
Salinas
Reservation Rd.
Davis Rd.
Seaside
To Monterey
Source: Monterey County Water Resources Agency
BAY AREA NEWS GROUP

Impact Relationship - Streams



Stream Water Interactions

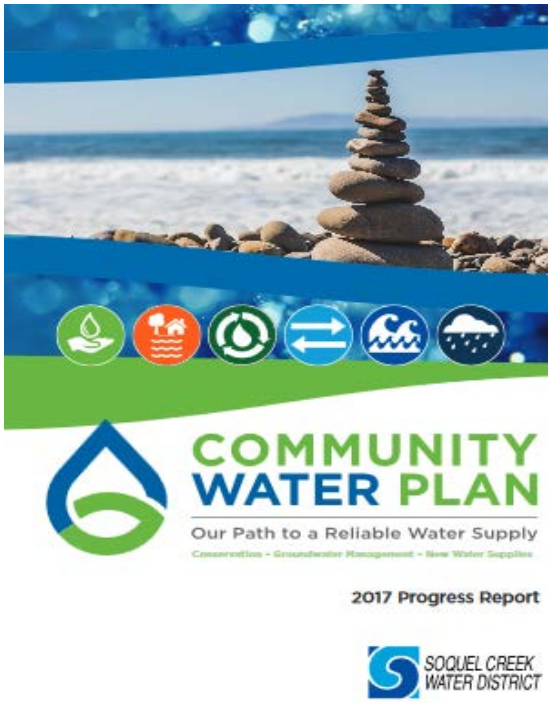




Solutions Being Evaluated

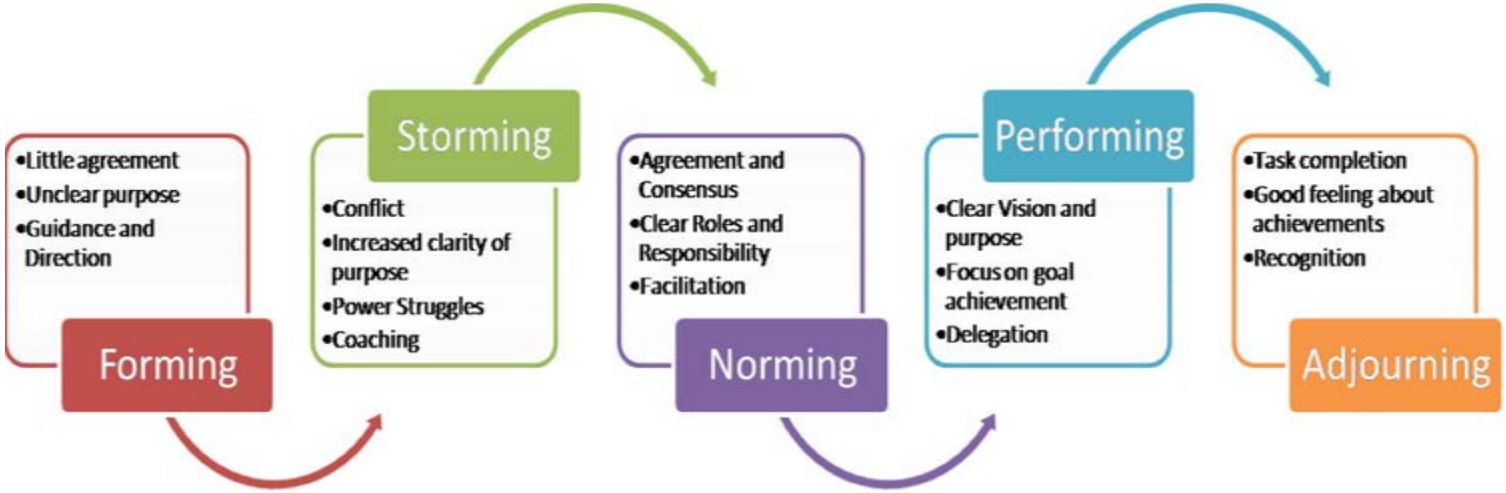
(beyond conservation and well management)

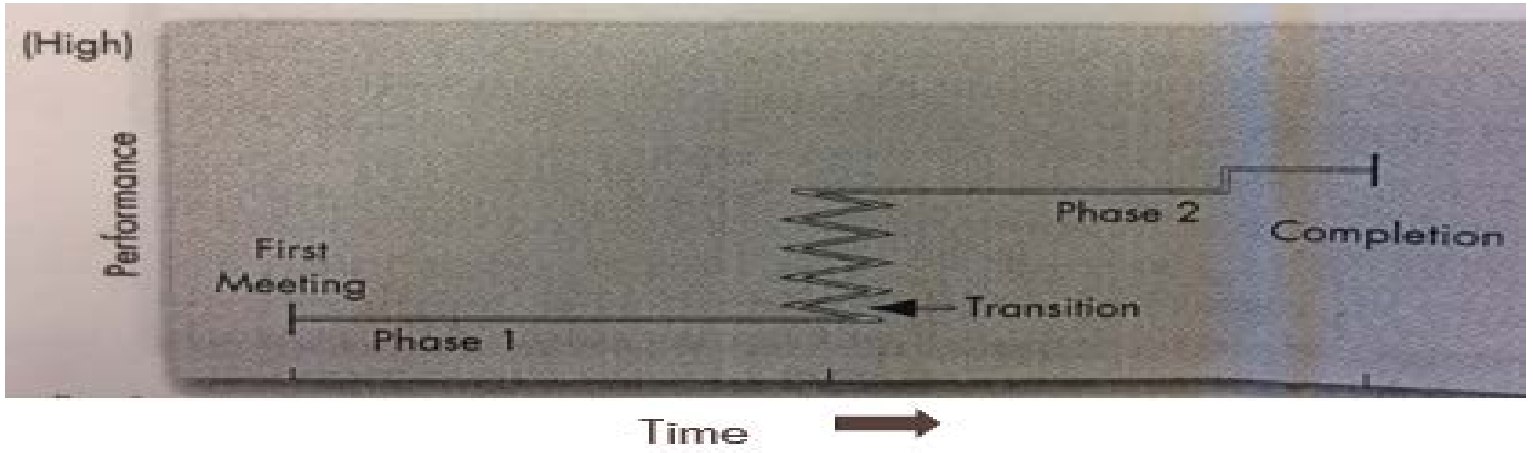
- Surface Water
  - In Lieu Recharge
  - Aquifer Storage and Recovery
- Recycled Water
  - Nonpotable for irrigation
  - Indirect potable groundwater reuse
  - Indirect potable surface water aug.
  - Indirect potable groundwater reuse
  - Direct potable reuse
- Desal & Stormwater



City of Santa Cruz
Water Supply Advisory Committee

Physics of Team Development





- Thank you

Background Information

- Information on Basin Conditions to Inform Future Advisory Discussions on initial proposals regarding Sustainability Indicators
  - Compendium of Maps

NUMERIC EXAMPLE OF SETTING MINIMUM THRESHOLDS FOR SEAWATER INTRUSION

Advisory Committee Meeting #5

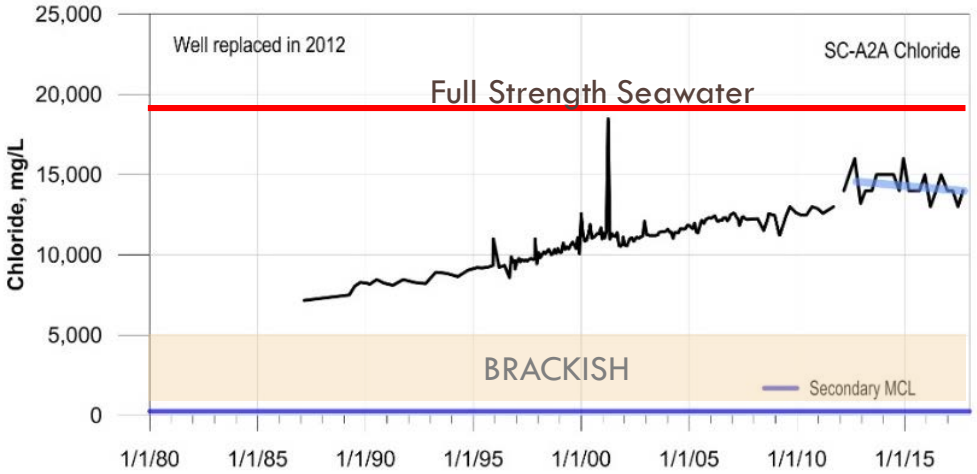
SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

Presenter: Georgina King
HydroMetrics Water Resources Inc.

Wednesday, March 28, 2018

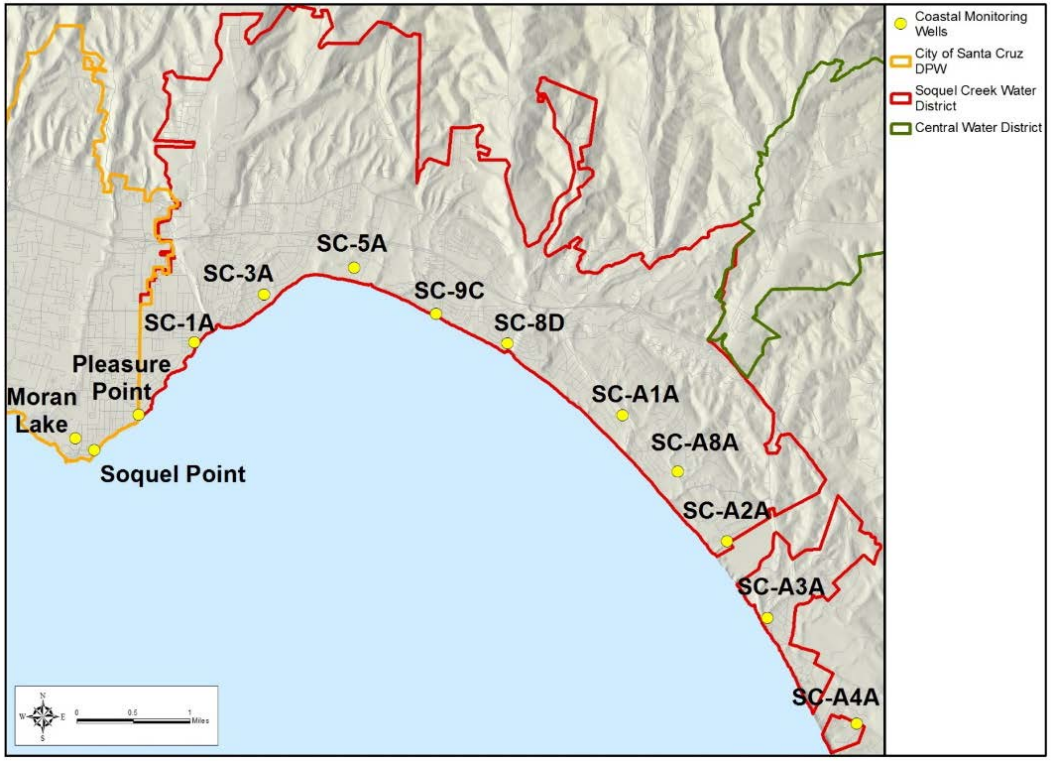
Seawater Intrusion

- Mid-County Basin has intrusion into different aquifers
- Increase in chloride has been ~ 260 mg/L per year in worst well
- Seawater intrusion in most cases causes irreversible damage to the aquifer



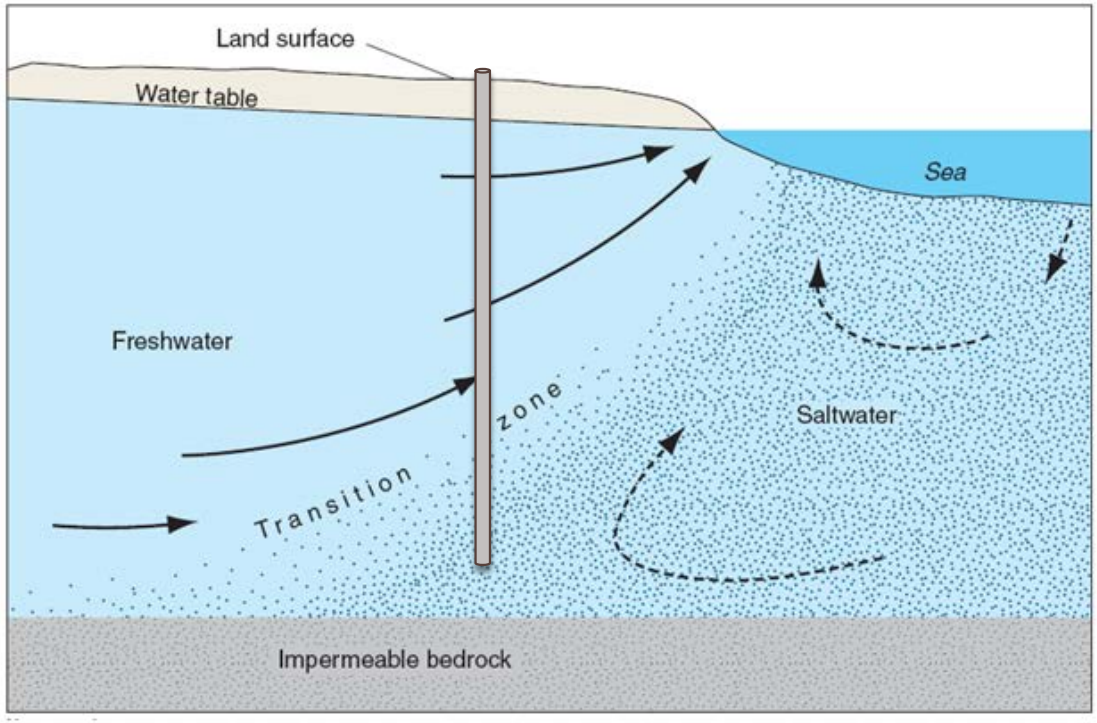
Step 1 – Select Representative Monitoring Points

- Coastal monitoring wells where groundwater level proxies can be used
- May need inland wells to evaluate chloride concentration contour



Step 2 – Describe what conditions you want to avoid having in the basin

- Seawater intrusion moving farther inland than it is now
- Municipal, Ag & Private wells impacted by seawater
- Ag land becomes unusable

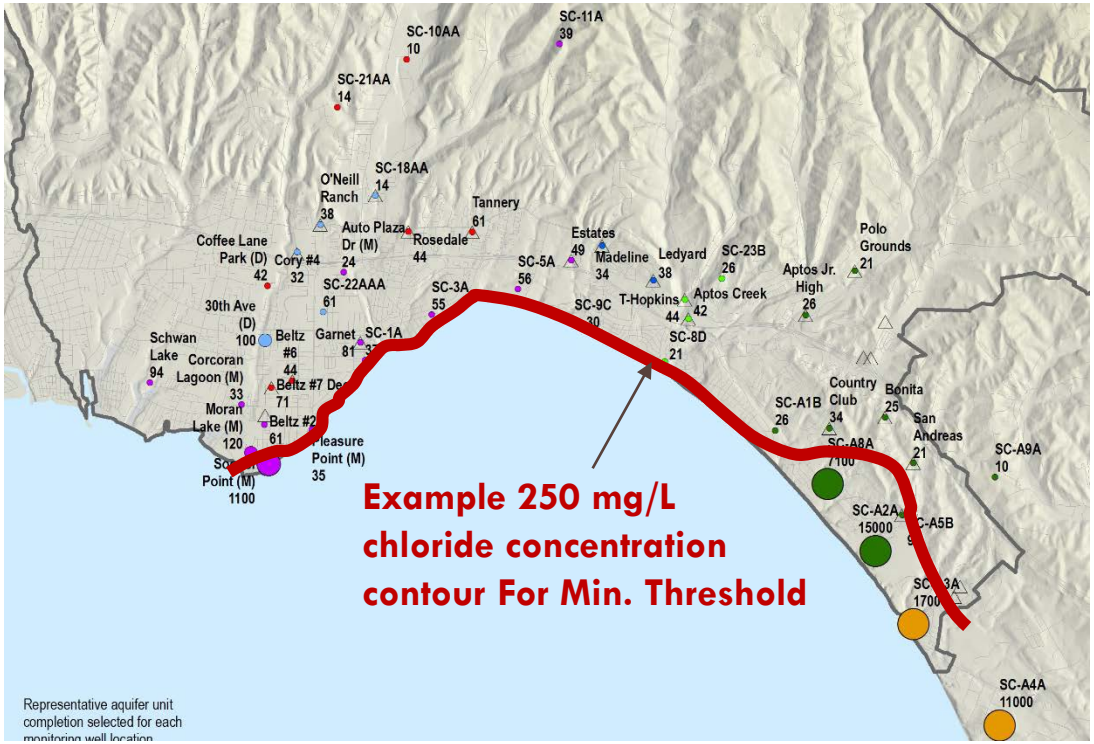


Step 3 - Describe what an Undesirable Result would look like

- If any Coastal Representative Monitoring well with current intrusion has a chloride increase above its historic maximum in all 4 quarterly samples, and/or
- If any Inland Representative Monitoring or unintruded Coastal Monitoring Well has a chloride concentration greater than 250 mg/L in all samples taken during a year

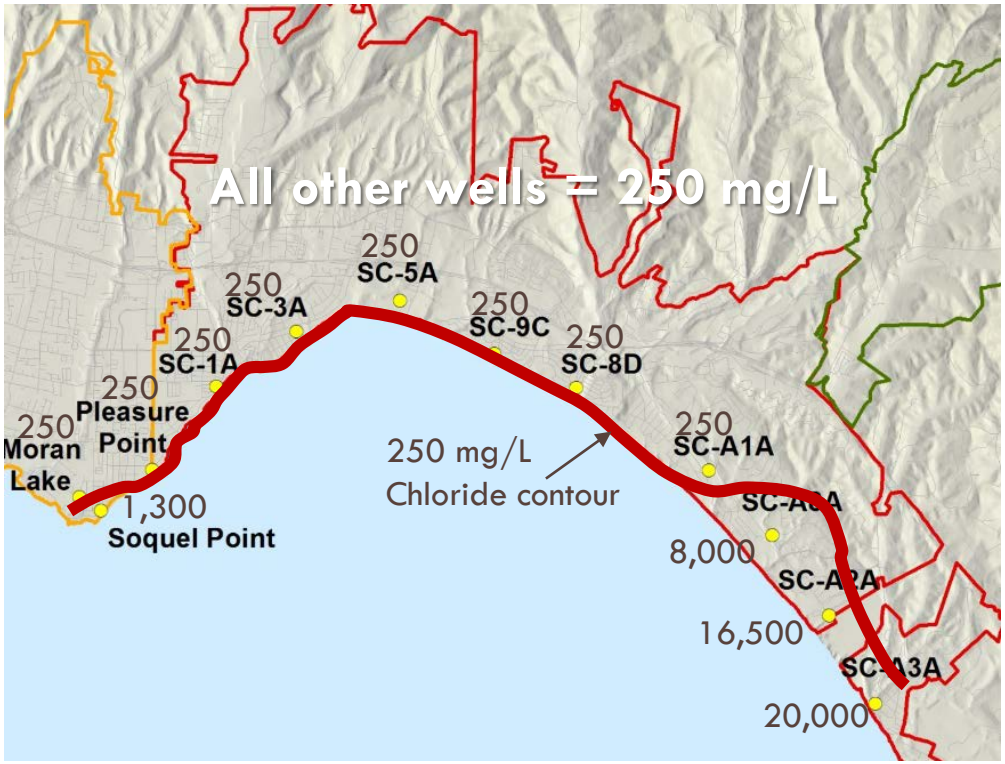
Step 4 – Establish Minimum Thresholds

- Quantitative value used to define an undesirable result
- GSP regulations require defining location of chloride contour
- Can also set concentrations at Representative Monitoring wells used for chloride contour



Example Minimum Thresholds

- Example chloride concentration Minimum Thresholds at Coastal Monitoring wells

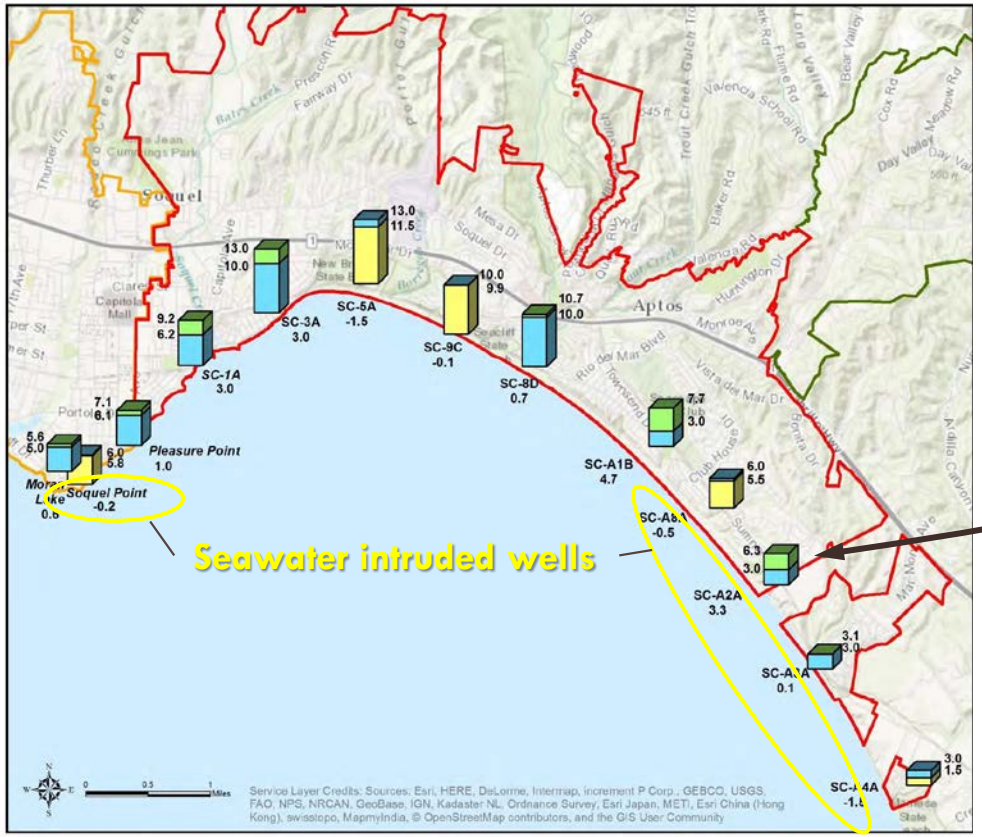


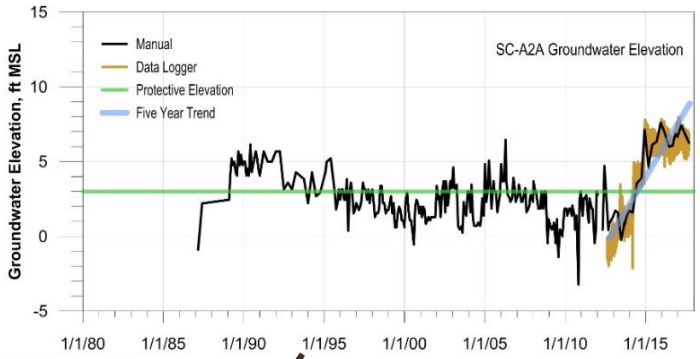
Step 4 – Establish Minimum Thresholds

- Protective elevations are currently used to manage seawater intrusion
  - Much of the basin does not have intrusion so this method was developed to ensure further intrusion does not occur

- We recommend using both chloride concentrations and protective elevation minimum thresholds

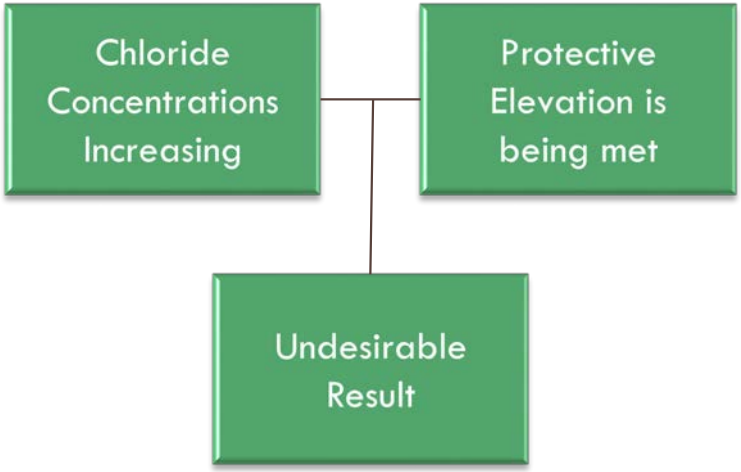
Protective Groundwater Elevations

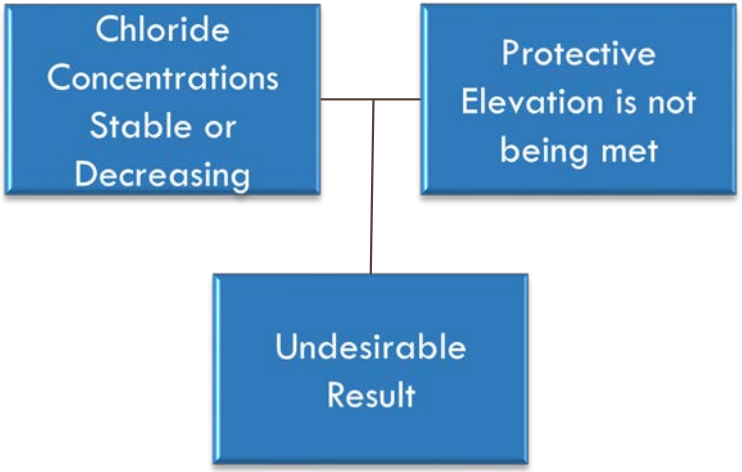




Undesirable Results

- Combination of Chloride concentration and groundwater levels being below Protective Elevations





Break

15 Minutes

Overview

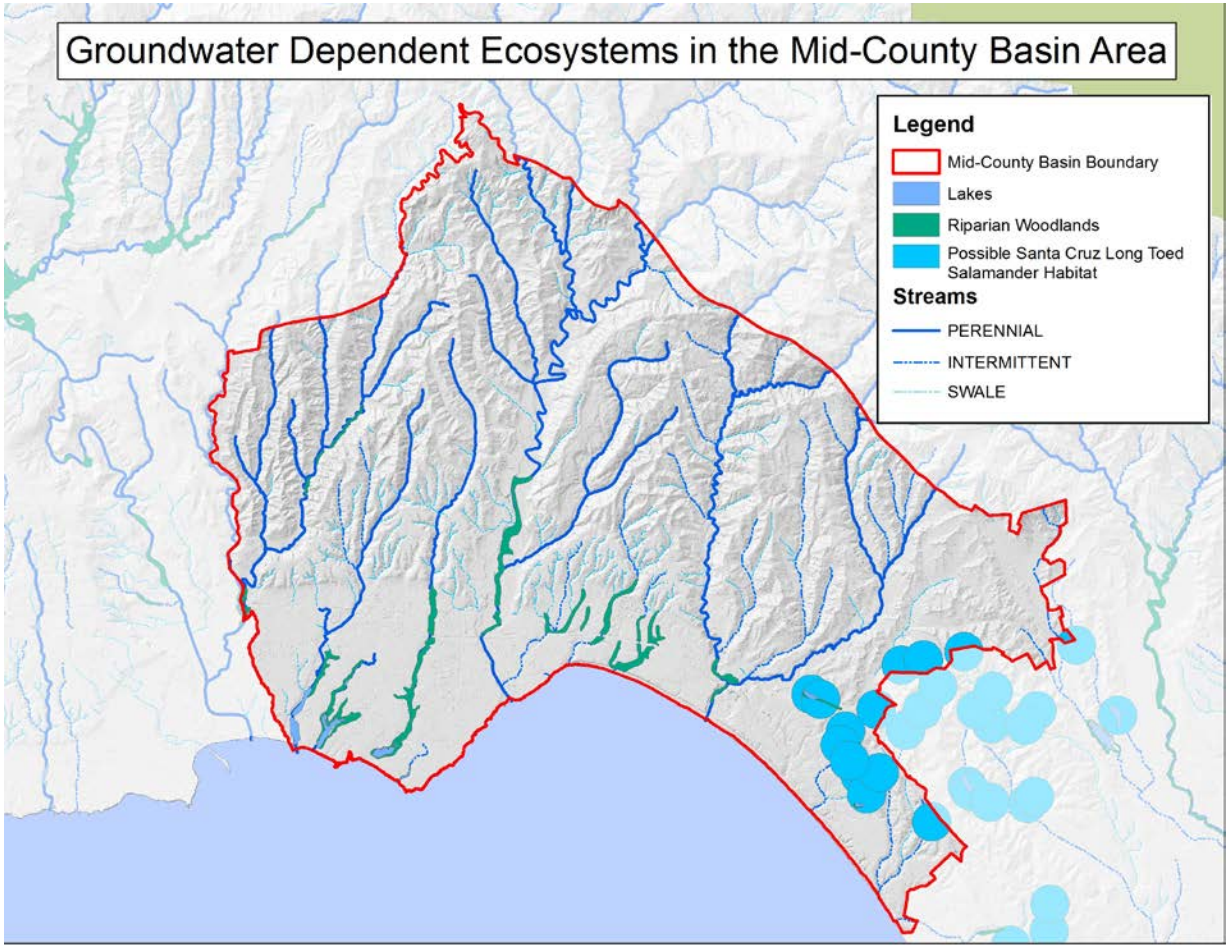
Management Areas

Public Comment

Advisory Working Group

Streamflow Depletion & Groundwater Dependent Ecosystems for Mid-County and Santa Margarita Basins

Potential Groundwater Dependent Ecosystems in Mid-County Basin



Endangered species potentially supported by GDEs in Basin:

- CA Giant Salamander
- Santa Cruz Long-toed Salamander
- Santa Cruz Black Salamander
- Foothill Yellow-legged Frog
- CA Brackishwater Snail
- Steelhead
- Coho Salmon
- Tidewater Goby
- Western Pond Turtle

Surface Water Working Group Tentative Topics to be Considered

- Overview of Groundwater Dependent Ecosystems in Mid-County
- Overview of SGMA requirements regarding GDEs
- General overview of universe of factors affecting streams and GDE's
- Focus on effect of groundwater on GDEs in Mid-County, primarily streams, including flow and temperature
- Discussion of groundwater objectives to minimize impact on GDE
- Development of recommendations and supporting information for consideration by full Advisory Committee
- Consideration of recommended quantitative objectives for protection of GDEs

Surface Water Working Group Tentative Participants

- Advisory Committee members with interest and expertise in streamflow, ecosystems and/or surface groundwater relationships (no more than 6 members)
- NOAA Fisheries
- California Department of Fish and Wildlife
- Nature Conservancy
- Trout Unlimited
- Resource Conservation District
- Technical consultants
- Staff, including City and County Fishery Planners

Working Groups Schedule

- Surface Water/GDE
  - April-May, 2-3 times plus further follow-up
  - Report to Advisory Committee, May 23

- Other potential working groups
  - Land Use, Future Water Demand, Relative Impact of Groundwater Users, after June
  - Water Quality – May-June
  - Management Areas, Later

Confirm

February 28, 2018

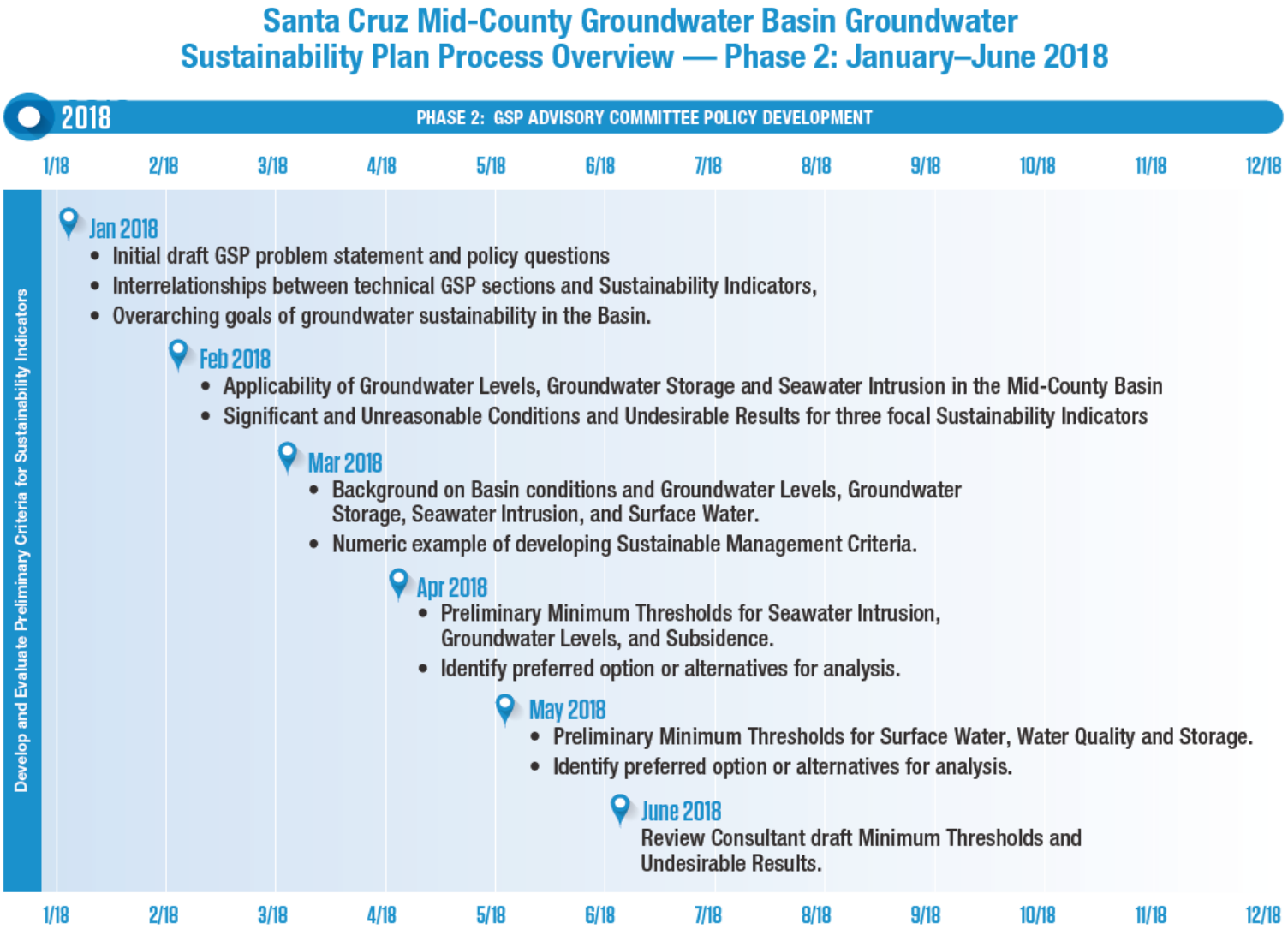
GSP Advisory Committee Meeting Summary

Confirm

Amended
GSP Advisory Committee Charter

Recap and Next Steps

GSP Process Timeline – Phase 2



Next Steps – Meetings 6, 7 & 8

- **Meetings 6 and 7 (April and May)**
  - Present Minimum Threshold and Undesirable Result Options with Underlying Significant and Unreasonable Conditions for six Sustainability Indicators.
  - Identify preferred option or suggest alternatives for analysis.
- **Meeting 8 (June)**
  - Review draft Minimum Thresholds and Undesirable Results options/alternatives developed by Consultant.

THANK YOU!

FOR ANY QUESTIONS, PLEASE CONTACT:

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dpruitt@cfscc.org

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

www.midcountygroundwater.org