SANTA CRUZ MID-COUNTY GROUNDWATER SUSTAINABILITY PLANNING

Advisory Committee Meeting #8

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

Wednesday, June 27, 2018, 5:00 – 8:30 p.m.
Simpkins Family Swim Center, Santa Cruz

Welcome and Introductions

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

Meeting Objectives

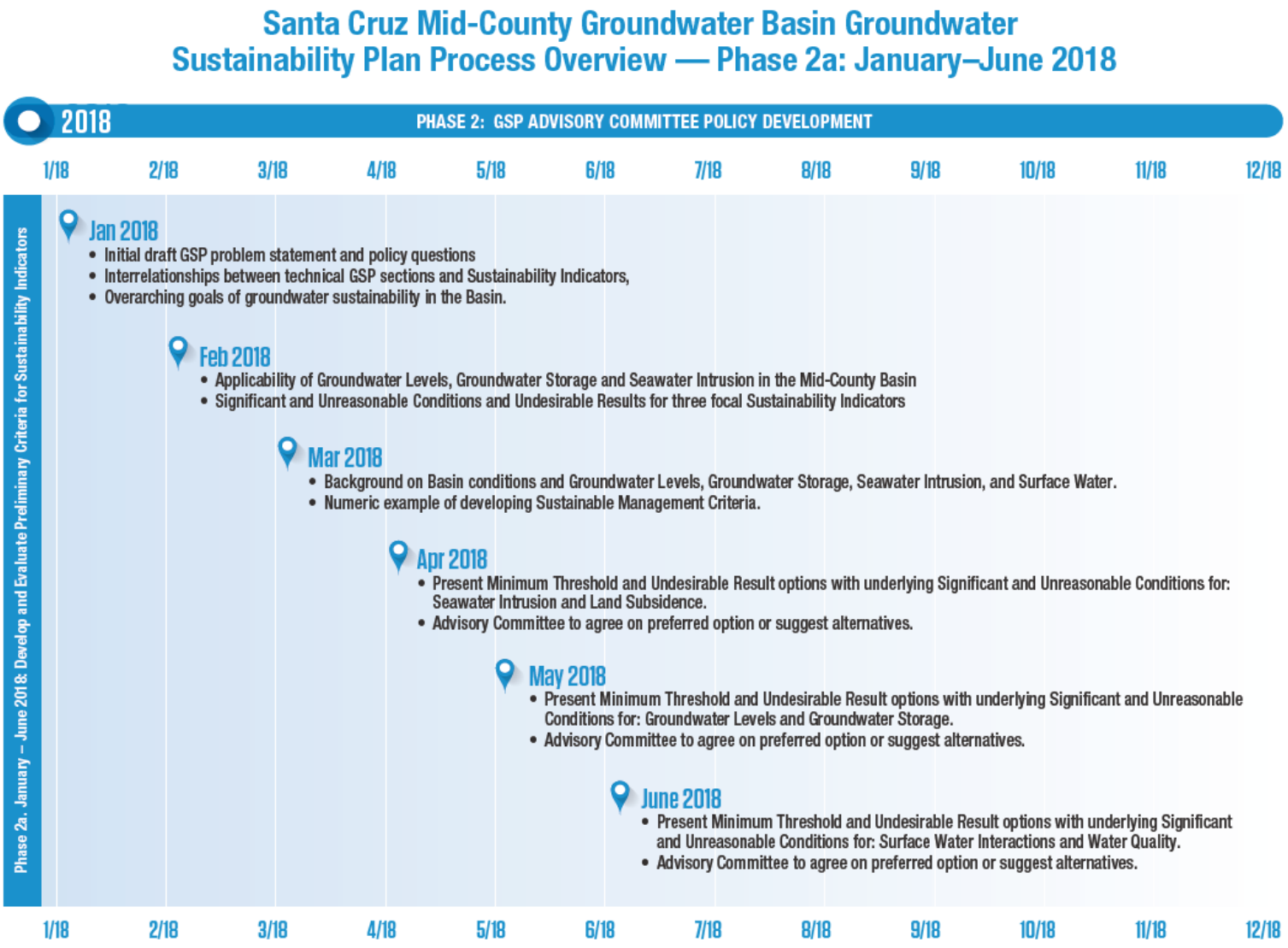
- Discuss and share Advisory Committee input on Undesirable Result Options with Underlying Significant and Unreasonable Conditions for the following Sustainability Indicators:
  - Surface Water Interactions
  - Water Quality

Agenda

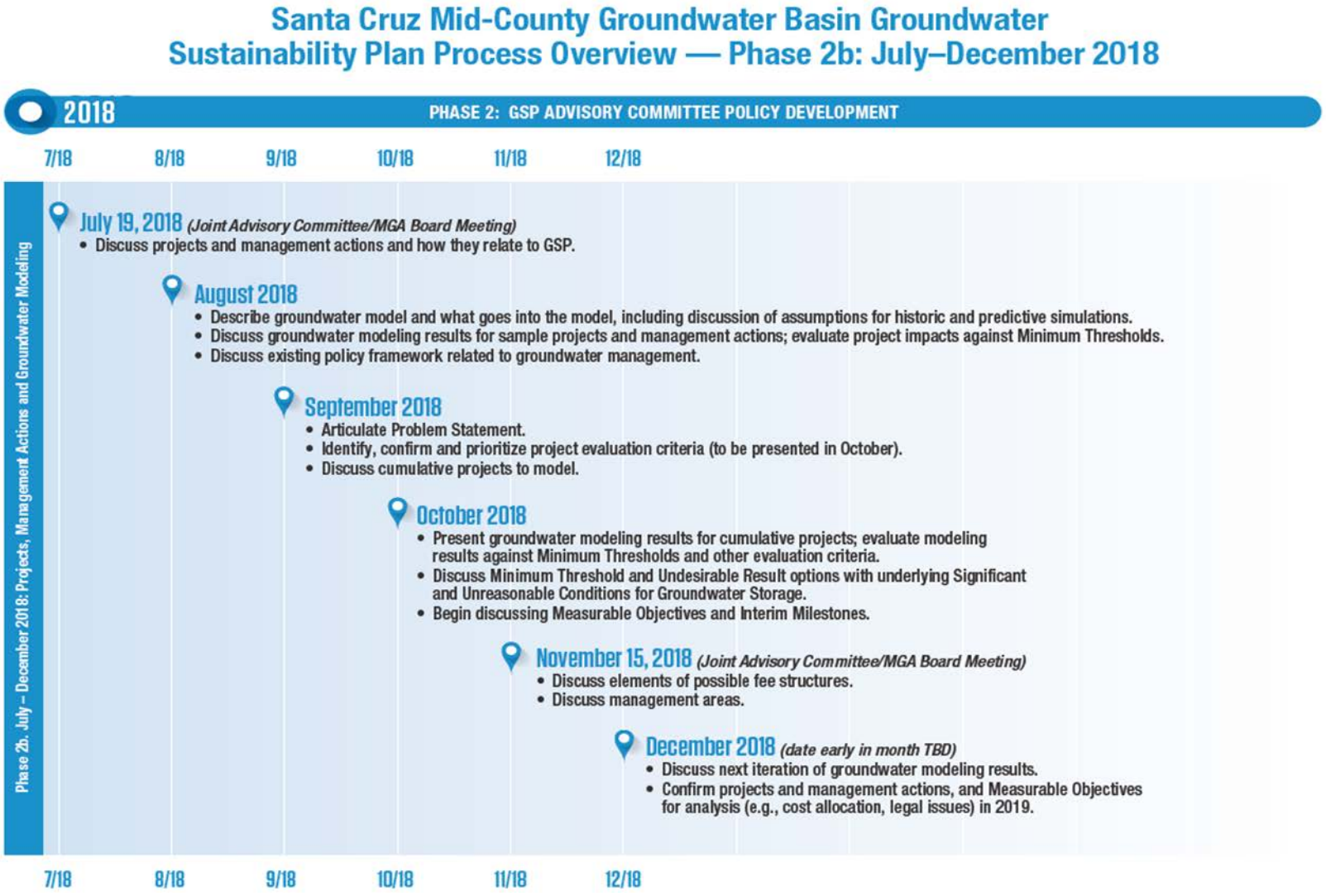
5:00	Welcome, Introductions, Objectives, Agenda, GSP Project Timeline Review, Project Updates and Outreach/Communications
5:20	Oral Communications
5:30	*Surface Water Interactions* – Significant and Unreasonable Conditions
6:40	Public Comment
6:50	*Break*
7:05	*Water Quality* – Undesirable Results with Underlying Significant and Unreasonable Conditions
8:10	Public Comment
8:20	Confirm May 23, 2018 Advisory Committee Meeting Summary and Distribute Staff Incorporation of Advisory Committee input from May 23 meeting
8:25	Recap and Next Steps
8:30	*Adjourn*

GSP Project Timeline

GSP Process Timeline – Phase 2a



GSP Process Timeline – Phase 2b



Share

Project Updates

Outreach and Communications

Jason Hoppin,

Communications Officer

County of Santa Cruz

Oral Communications

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

GROUNDWATER INFLUENCE ON USES OF SURFACE WATER

Significant and Unreasonable Conditions

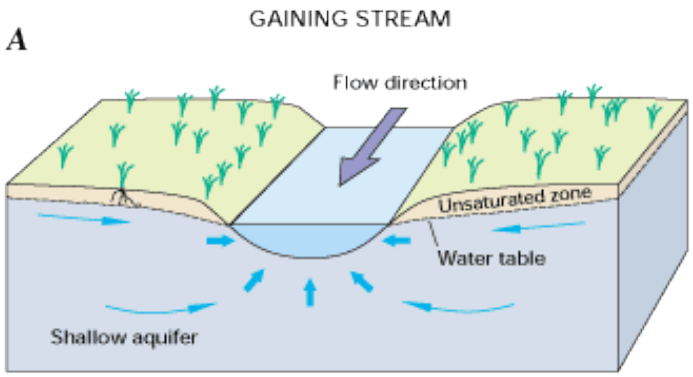
Surface Water Working Group

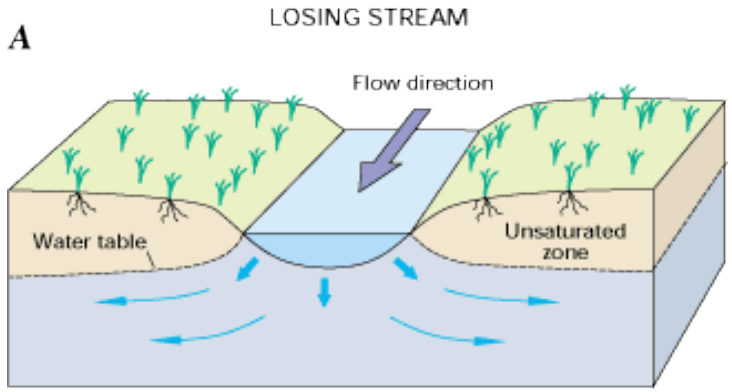
- NOAA Fisheries
- GSP Advisory Committee
- The Nature Conservancy
- California Department of Fish and Wildlife
- US Fish and Wildlife Service
- National Marine Fisheries Service
- City of Santa Cruz
- Resources Conservation District SCC
- PV Water
- National Marine Fisheries Service
- Friends of Soquel Creek
- Santa Cruz County
- Regional Water Management Foundation/MGA

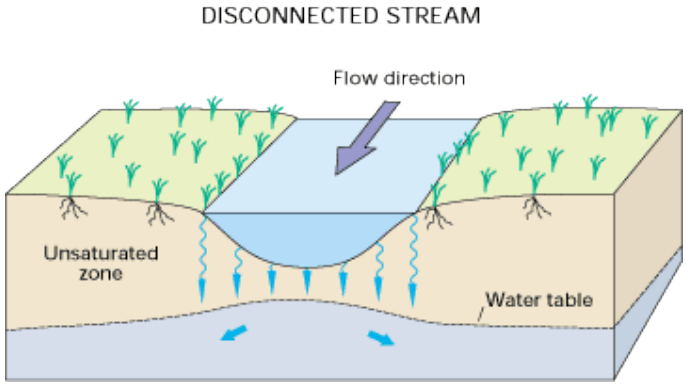
- Two meetings held, one in April and one in May 2018.
- 1-2 more meetings after model results become available.

Groundwater/Surface Water Interactions

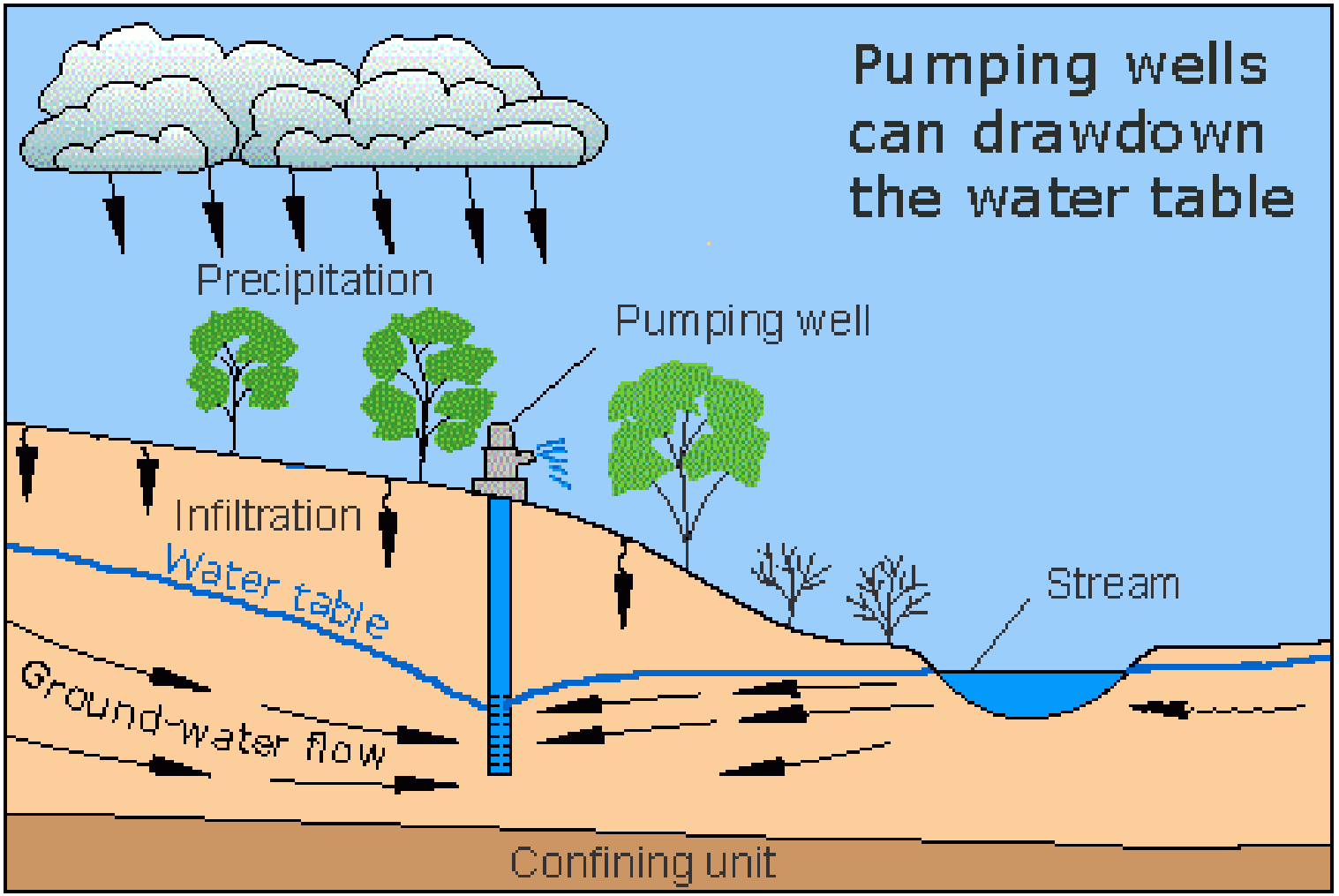
Groundwater / Surface Water Interactions





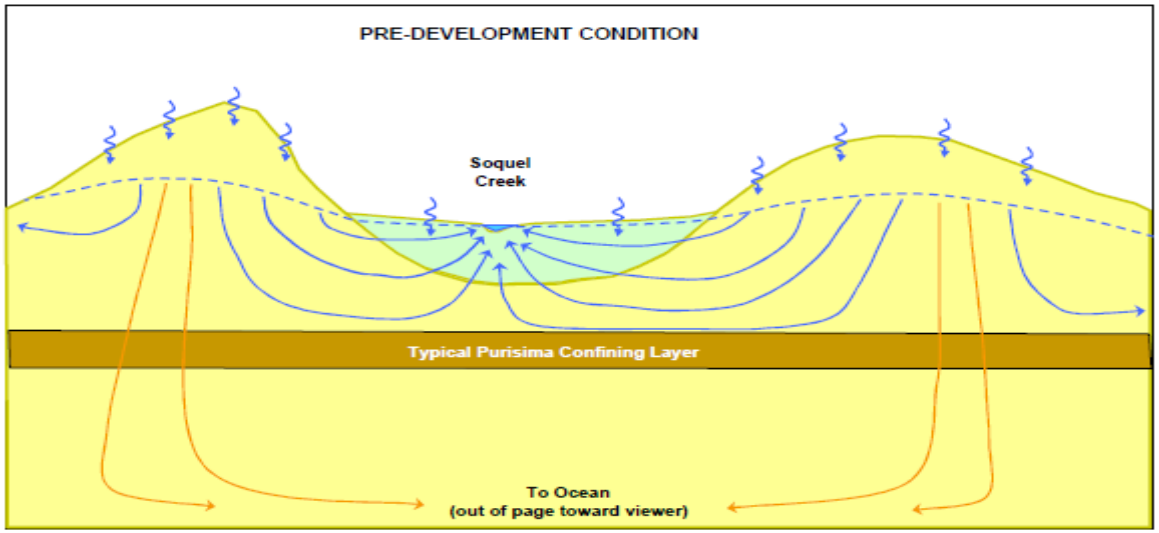


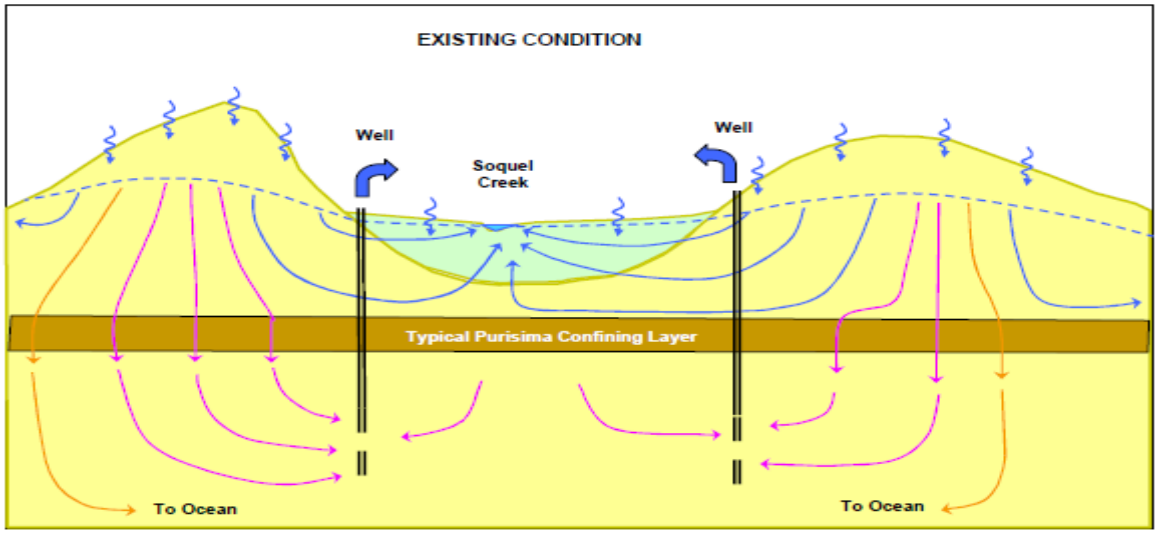
Surface Water Interactions



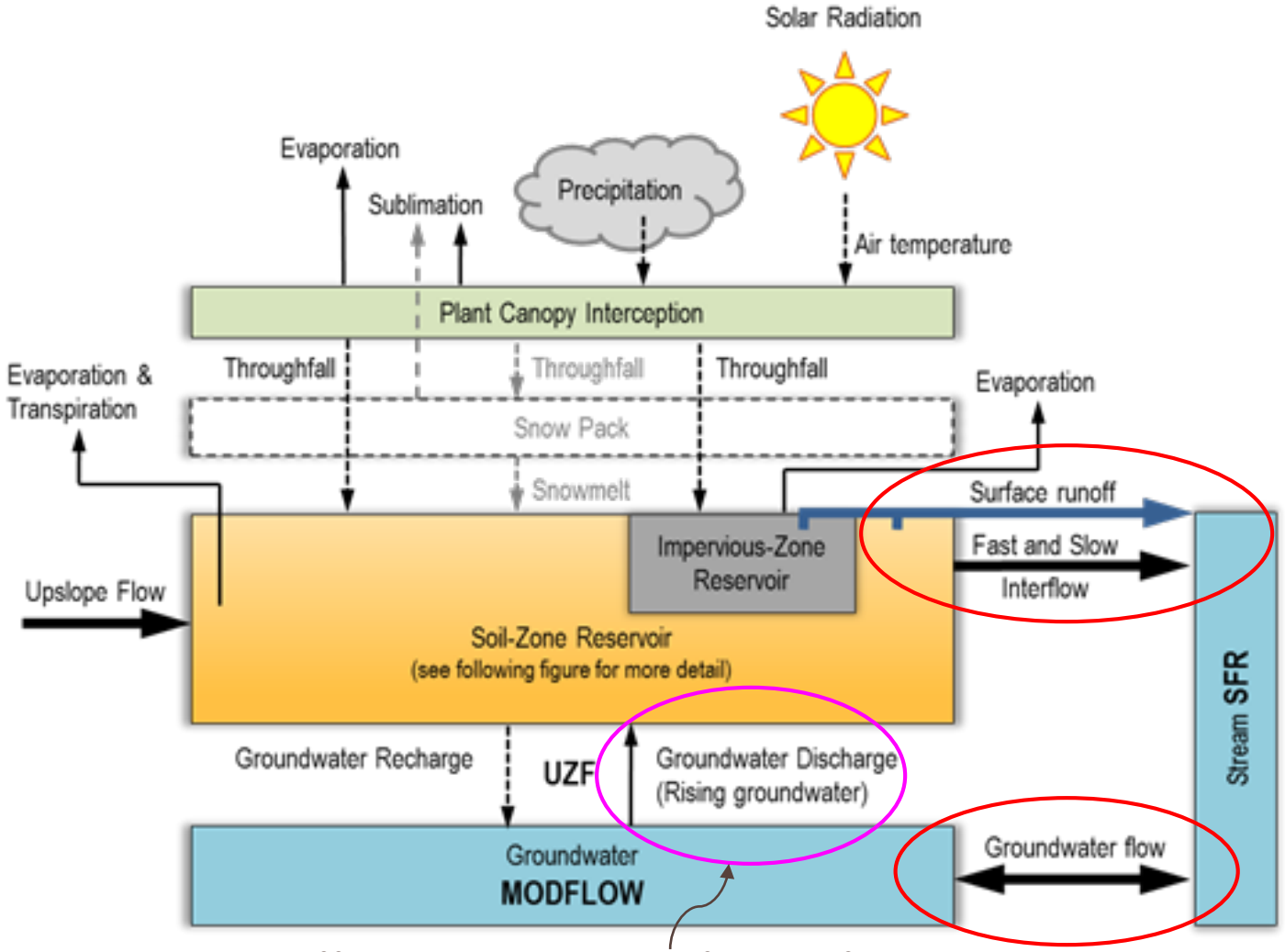
Attenuated influence of deep pumping

(Johnson, et.al, 2004)





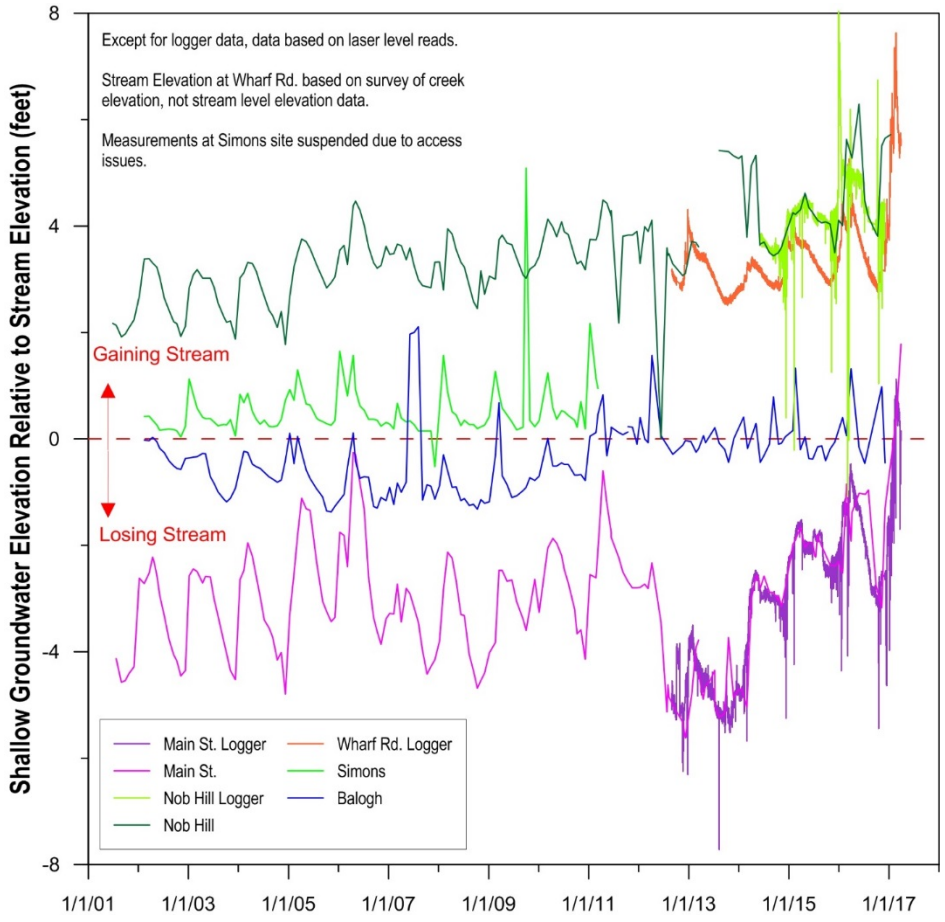
Conceptual Model: Surface Water Interactions



Summary of Past and Ongoing Work looking at Streamflow Groundwater Interactions

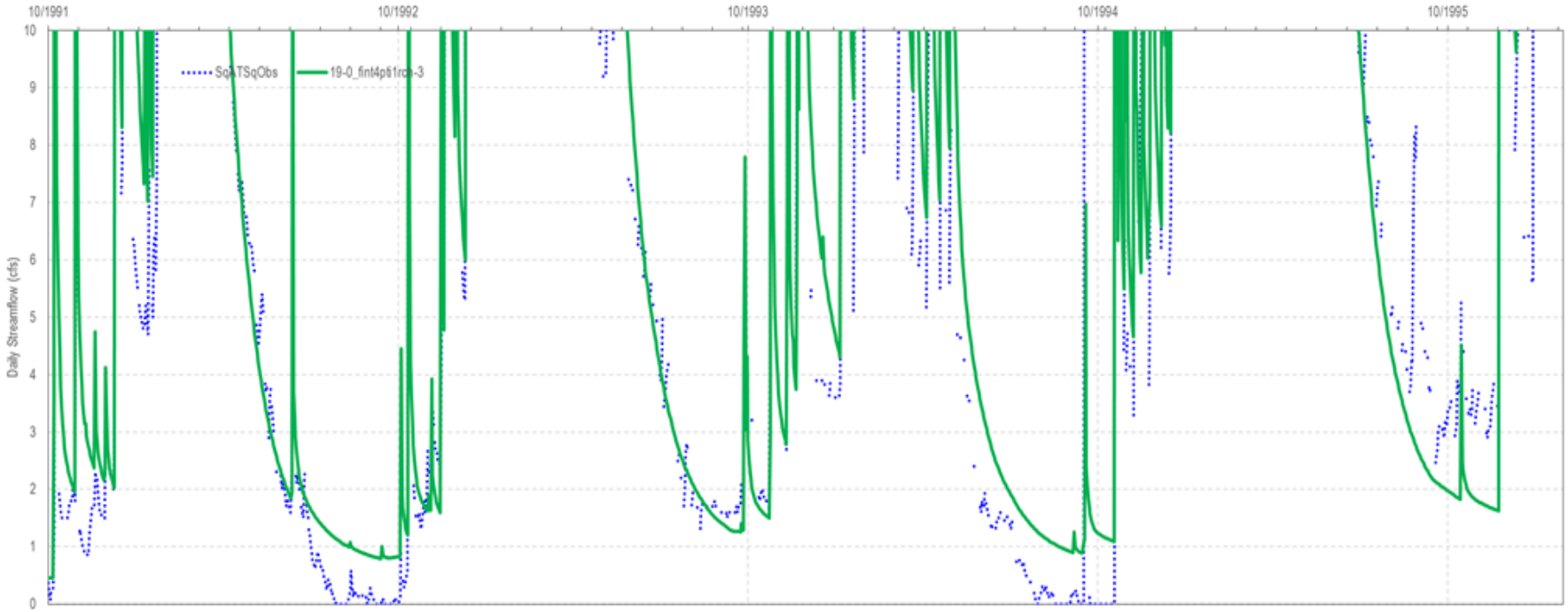
- Water-level differences between creek and wells
- Pump tests to observe drawdown of groundwater level
- Streamflow gains, losses and fluctuations
- Baseflow comparisons to reference streams
- Rainfall-runoff regression models
- Low-flow frequency distribution
- Baseflow recession rates
- Groundwater modelling
- In Soquel Creek, over 15 reports by 10 investigators over 30 years

Direct Measurements of Groundwater and Stream Levels



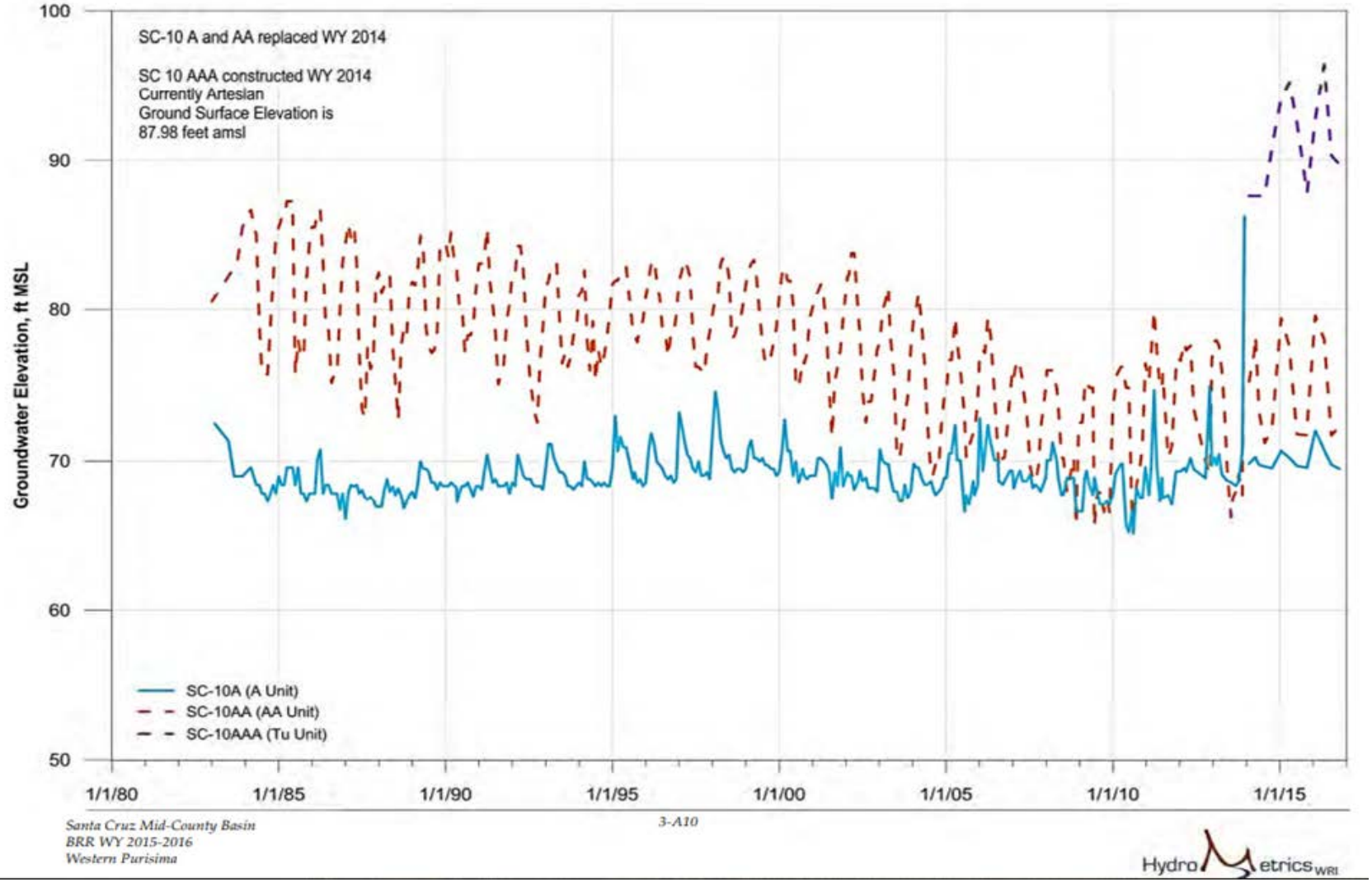
How much streamflow is from groundwater? How much depletion is related to groundwater?

- Soquel Creek at Soquel USGS Streamflow Gauge Measurements between October 1991 and December 1995 (Blue is actual flow, green is modelled flow) Stream went dry in 1992, 1994.

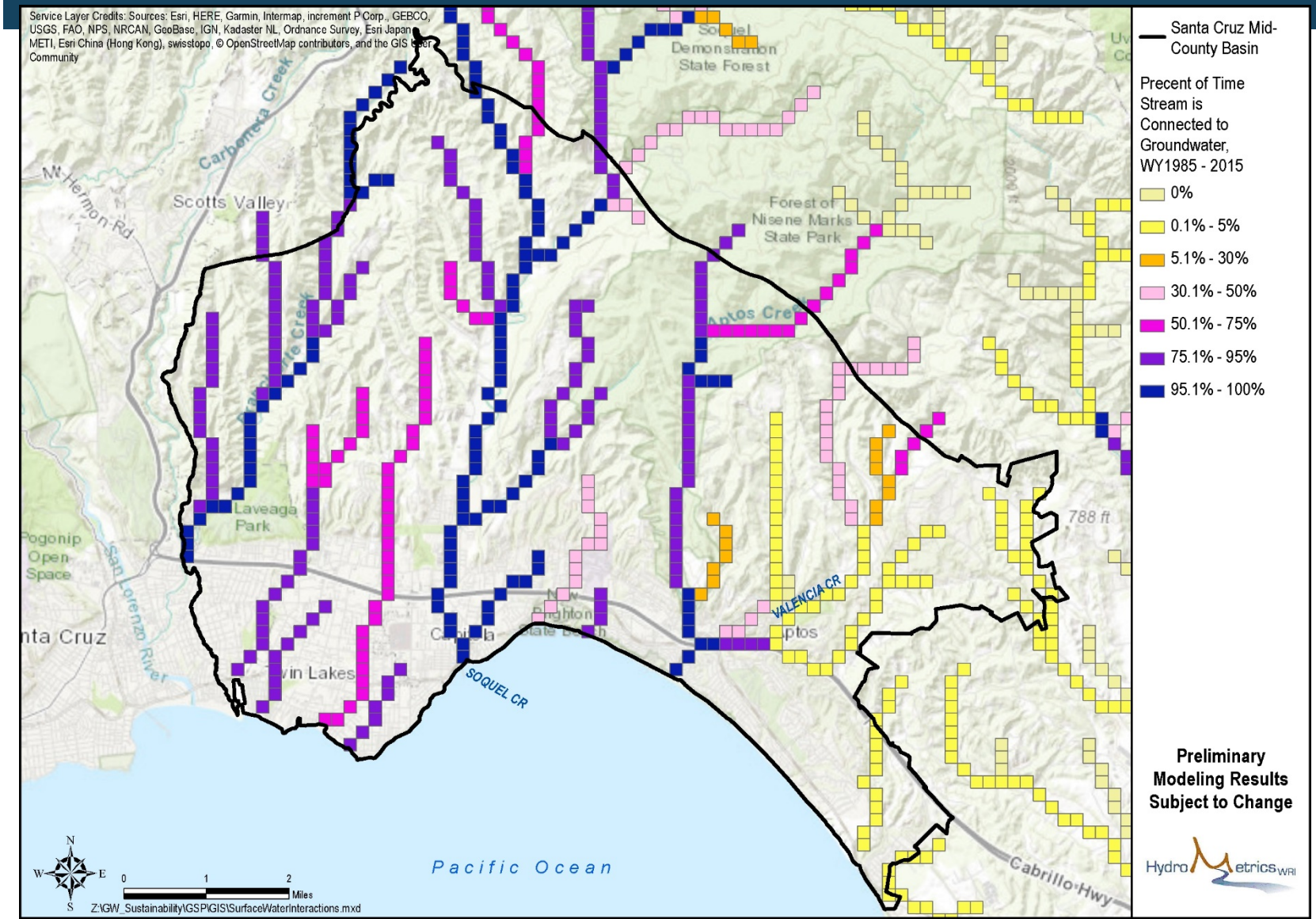


No Flow for One Hour 9/9/2015

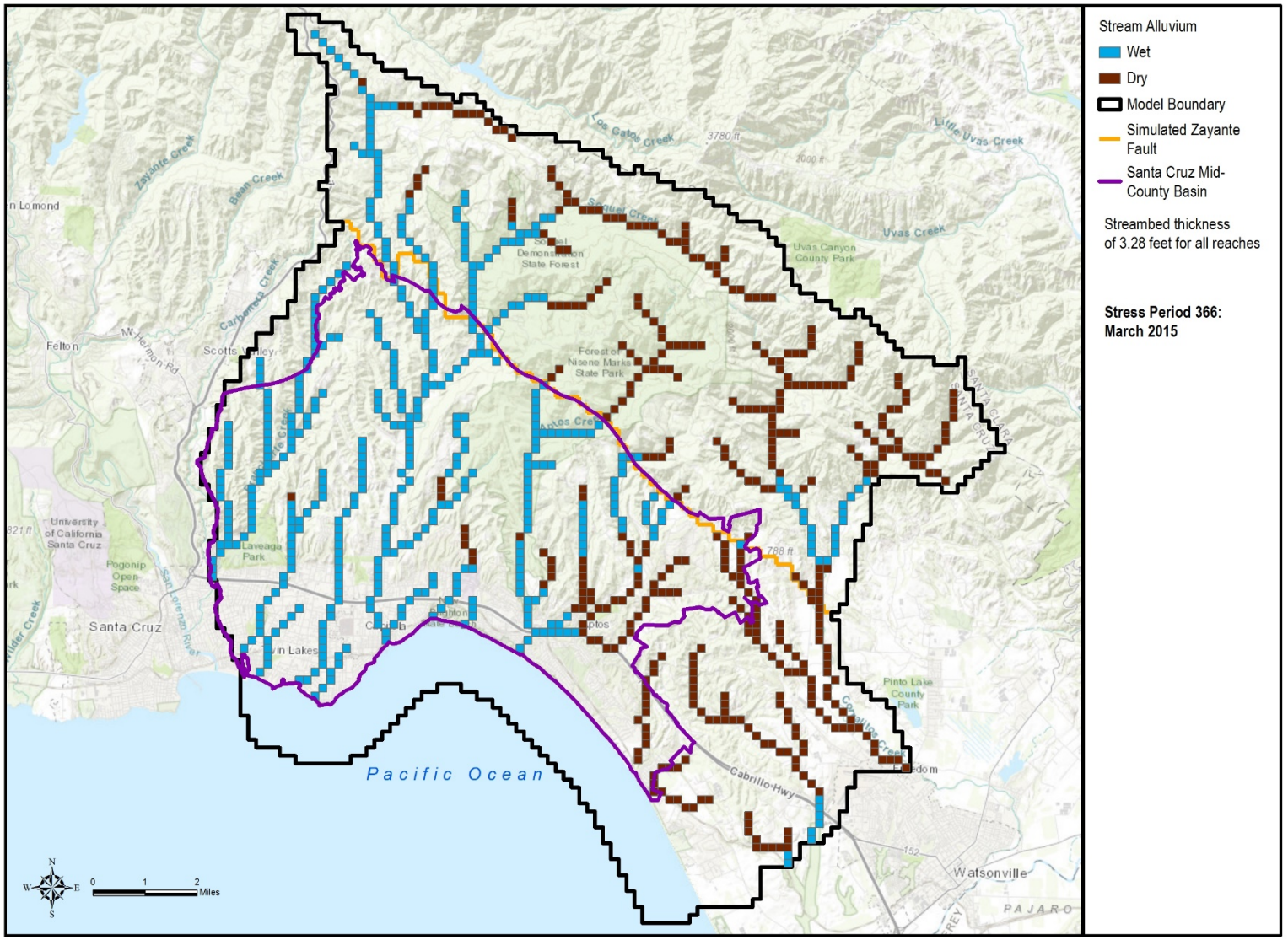
Hydrograph for Soquel Creekside Well SC-10 – Cherryvale



Where is Surface Water Connected to Groundwater?

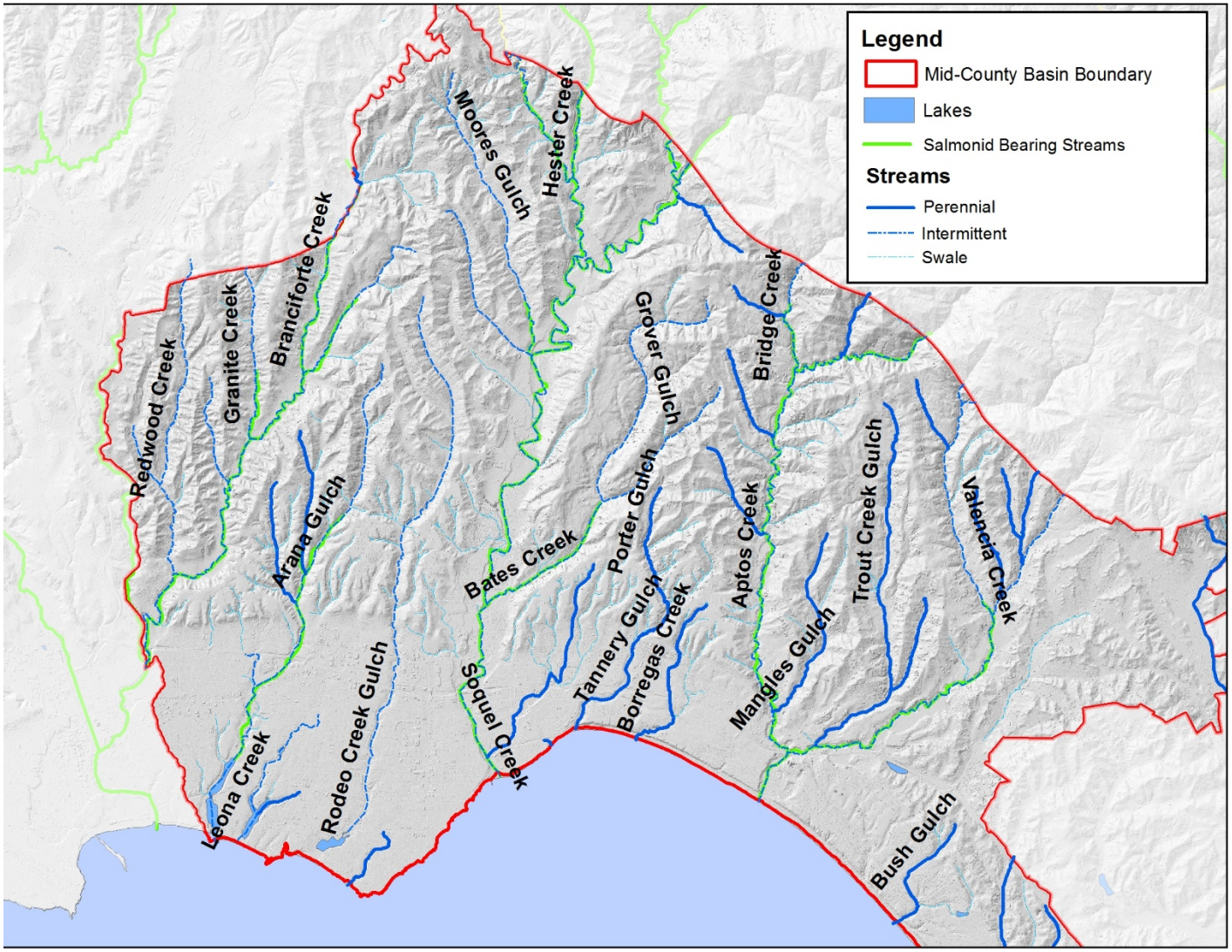


Model: Dry Streambeds, March 2015

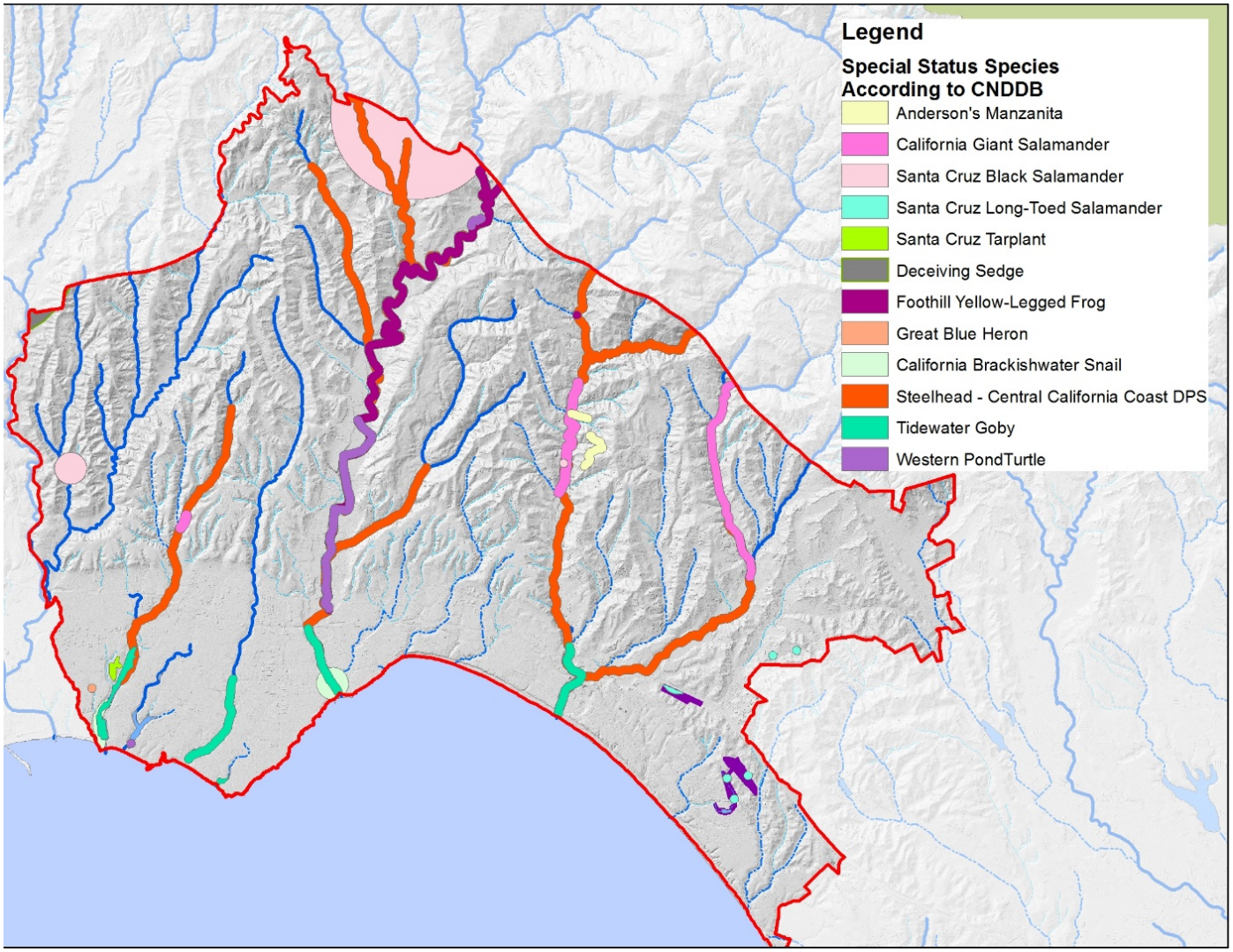


Groundwater Dependent Ecosystems

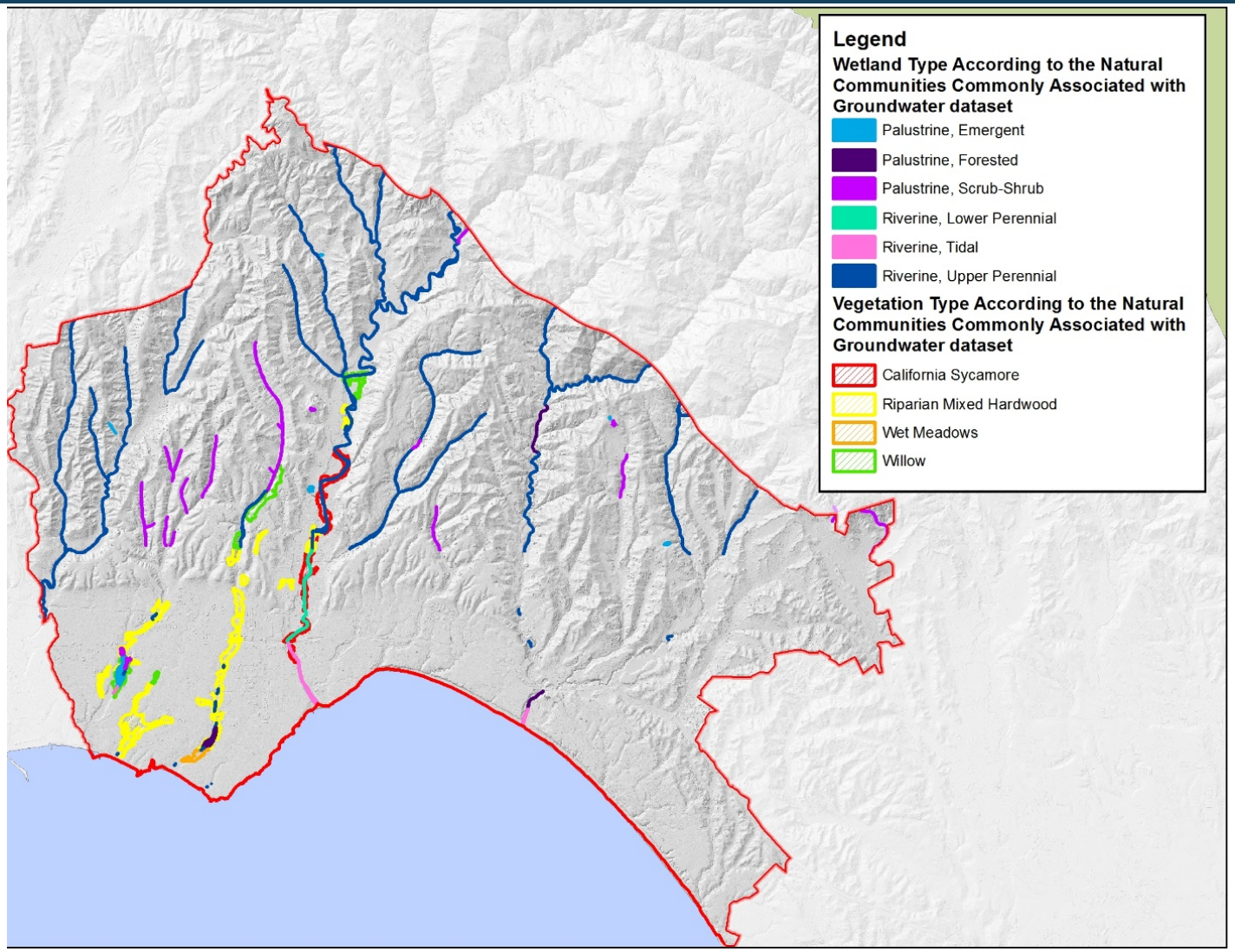
Streams and Riparian Habitat



Species according to CNDDB



Habitat Types



Priorities for Management

Species common name	Priority for GDE management	Needs covered by prioritized species
Steelhead	X	
Coho Salmon	X	X
California Giant Salamander		X
Foothill Yellow-Legged Frog		X
Western Pond Turtle		X
Riparian forest including willow and sycamore	X	

- These species are a top priority, and groundwater management will likely benefit them.
- Rather than focus on every one separately, focus on those with the most critical needs.

Further Information Needed

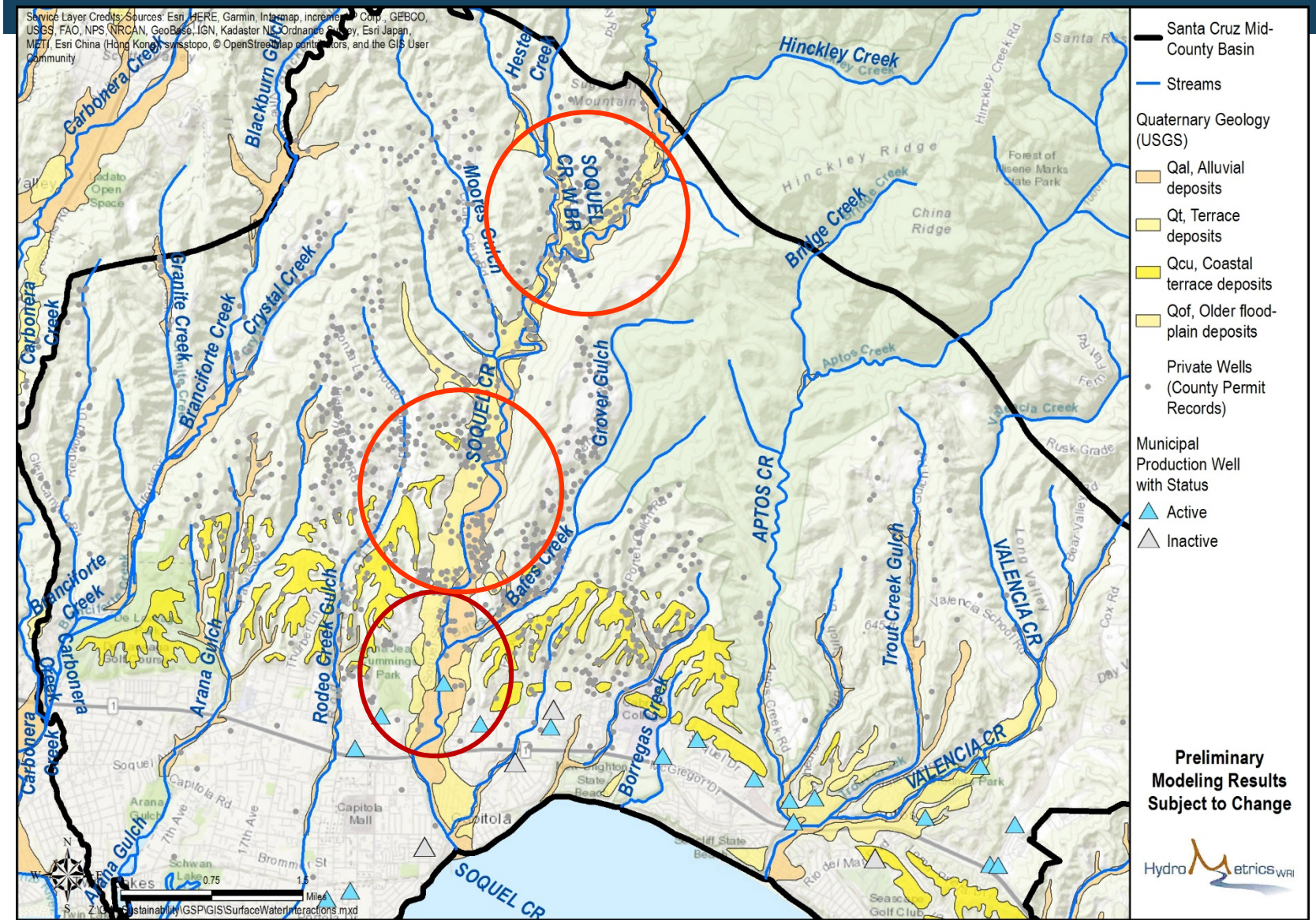
Species common name	Further input required
Santa Cruz Long-Toed Salamander	X
California Red-Legged Frog	X
California Brackishwater Snail	X
Tidewater Goby	X
Western Pond Turtle	X
Lamprey	X
Wet Meadows	X

- Where and how could management of groundwater elevations benefit these species?
- If management of groundwater levels will not benefit these species/habitats, remove them from consideration

Species Found through County Monitoring Program

Site	Sample Count	LAMPREY	GIANT SALAMANDER	YELLOWLEGGED FROG	TIDEWATER GOBY	REDLEGGED FROG	WESTERN TURTLE
SLR-bran-21a1	2	0	0	0	0	0	0
SLR-bran-21a2	15	10	0	0	0	0	0
SLR-bran-21b	10	2	0	0	0	0	0
SLR-bran-21c	5	0	0	0	0	0	0
SOQ-east-13b	4	0	0	1	0	0	0
SOQ-main-1	20	8	0	1	0	0	0
SOQ-main-2	9	1	0	0	0	0	0
SOQ-main-3	7	1	0	1	0	0	0
SOQ-main-4	21	8	1	14	0	0	0
SOQ-main-5	6	0	0	3	0	0	0
SOQ-main-6	9	1	0	3	0	0	0
SOQ-main-7	6	1	0	2	0	0	0
SOQ-main-8	7	1	0	5	0	0	0
SOQ-main-9	10	2	0	3	0	0	0
SOQ-main-10	22	6	2	10	0	0	0
SOQ-main-11	5	1	0	1	0	0	0
SOQ-main-12	21	10	2	11	0	0	0
SOQ-east-13a	22	5	3	9	0	0	0
SOQ-west-19	17	4	3	1	0	0	0
SOQ-west-20	9	0	3	0	0	0	0
SOQ-east-14	10	3	0	5	0	0	0
SOQ-west-21	13	2	9	0	0	0	0
APT-apto-3	13	1	1	0	1	0	0
APT-apto-4	13	1	3	0	0	0	0
APT-vale-2	9	0	0	0	0	0	0
APT-vale-3	9	0	1	0	0	0	0

Groundwater Pumping Near Soquel Creek



Summary of Biotic Need Priorities

- By maintaining adequate flow for salmonids during the Fall, we will address critical species needs.
- Where possible, maintain groundwater levels to minimize depletion of flow during the dry season.
- Link the basic aquatic needs of species of concern in the basin to groundwater elevations that benefit these species (proxy)
  - Focus on areas of highest extraction
  - Where streams are interconnected with groundwater

Significant and Unreasonable Conditions

Significant and Unreasonable

- What would you consider significant and unreasonable interconnected surface water depletion?
  - Is there any historic time period that resulted in significant and unreasonable surface water depletion

Responses to this question should be descriptive and not numeric

Groundwater Level Proxy

- Groundwater model simulates rates or volumes
  - Runoff
  - Interflow
  - **Groundwater level and contribution to flow**
- Model will not be updated every year
- Preferable to use groundwater levels to manage surface water depletion if there is a direct relationship with depletion rate

Groundwater Level Proxy

Depletion of Interconnected Surface Water

Generic Framing: Lowering of groundwater levels adjacent to <historically> interconnected <Surface Water Type> *as a result of groundwater extraction* that results in a decrease in stream baseflow during <Time Period>

<historically> options

- Pre-development: Least flexible, would rely on modeling to establish thresholds. Difficult in the East side of the basin to account for Pajaro Valley pumping.
- Currently/Blank: Use the term Currently or delete this descriptor. Most Flexible, addresses the needs of SGMA, but could provide less protection.

Depletion of Interconnected Surface Water

<Stream Type> options

- Based on flow: perennial creeks (most flexible), perennial and intermittent creeks, any surface water (least flexible).
- Based on ecosystems: surface waters that support GDEs, salmonid bearing streams

<Time Period> options

- Year-round
- During the dry season of April-October
- During the driest period from August-October
- During key lifecycle stages for species they are supporting

Staff Proposal

- Technical Staff Recommendation for Significant and Unreasonable Effect: Lowering of groundwater levels adjacent to interconnected salmonid bearing streams *as a result of groundwater extraction* that results in a significant decrease in stream baseflow during the driest period from August-October.

- Rationale

Discussion

and

Selection of Significant & Unreasonable Interconnected Surface Water Depletion

Public Comment

Break

15 Minutes

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

DEGRADED GROUNDWATER QUALITY

Significant and Unreasonable Conditions and Undesirable Results

Background

Groundwater Quality Background

- Municipal water agencies routinely test untreated groundwater to determine the groundwater quality of the basin and to comply with state water quality reporting
- County of Santa Cruz requires once-off testing of nitrate, TDS, and chloride for any new private well, and since 2013, testing for iron and manganese
- Small water systems with 15 – 199 service connections report water quality to the County that includes: inorganics, nitrates, arsenic, perchlorate, chromium, radiation, synthetic organic compounds, and volatile organic compounds (including MTBE)

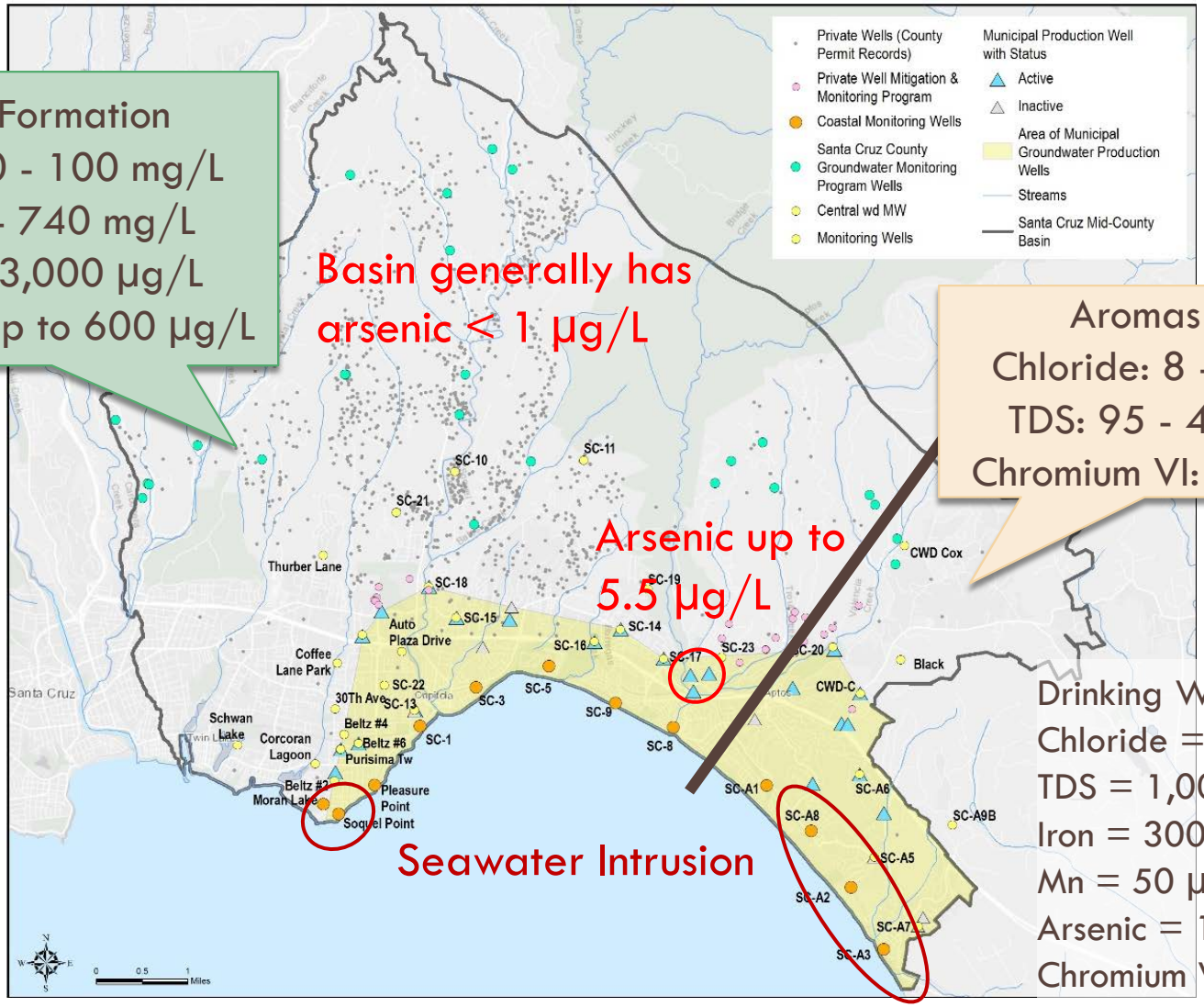
Groundwater Quality Background

- Primary drinking water standards are concentrations that may have an adverse effect on human health
- Secondary standards are set for constituents that are not health threatening
- Mid-County Basin groundwater is generally of good quality and does not regularly exceed primary drinking water standards
  - Naturally occurring constituents:

    iron, manganese, arsenic and chromium VI are elevated in areas of the basin
  - Some monitoring wells along the coast have elevated chloride and TDS concentrations associated with seawater intrusion

Natural Groundwater Quality

Purisima Formation
Chloride: 10 - 100 mg/L
TDS: 270 - 740 mg/L
Iron: up to 3,000 µg/L
Manganese: up to 600 µg/L

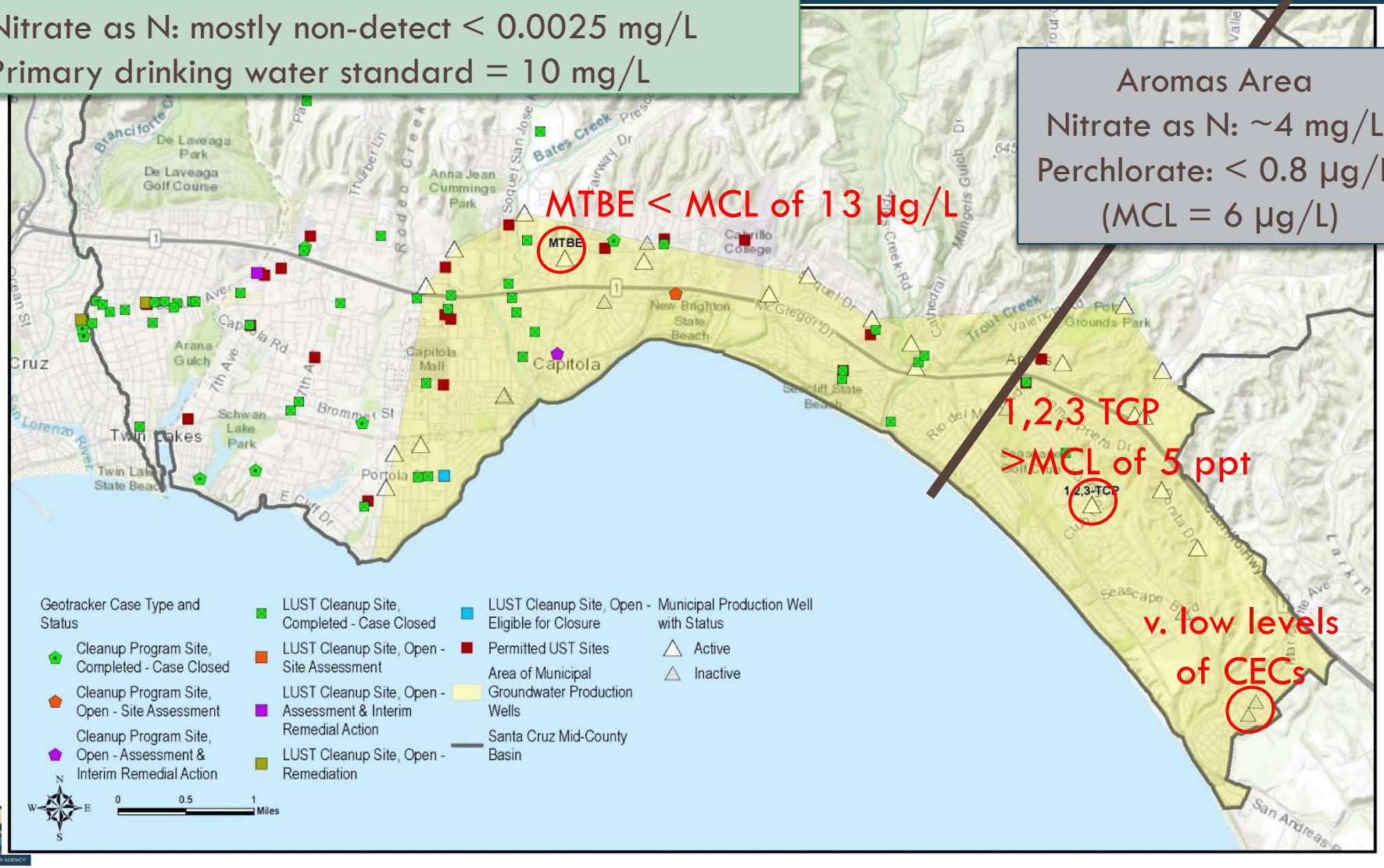


Aromas Area
Chloride: 8 - 58 mg/L
TDS: 95 - 470 mg/L
Chromium VI: 5-40 µg/L

Drinking Water Stds
Chloride = 250 mg/L (S)
TDS = 1,000 mg/L (S)
Iron = 300 µg/L (S)
Mn = 50 µg/L (S)
Arsenic = 10 µg/L (P)
Chromium VI = 50 µg/L (P)

Contaminated Groundwater Quality

Purisima Area
Nitrate as N: mostly non-detect < 0.0025 mg/L
Primary drinking water standard = 10 mg/L



Significant and Unreasonable Conditions

Significant & Unreasonable Conditions

Degraded groundwater quality has potential to impact uses and users by:

- Impairing water quality to the point it exceeds drinking water standards, and needs to be treated
- Impacts overlying land uses, such as agriculture

Groundwater projects can cause the migration of contaminant plumes that increase the footprint of impaired water supplies

Significant & Unreasonable
Water Quality Degradation we want to avoid

Technical staff proposal:

Significant and unreasonable conditions occur when groundwater quality, attributable to groundwater pumping or managed aquifer recharge, exceeds state drinking water standards

Significant & Unreasonable
Rationale

- Sustainability Indicator of degraded water quality is a "do no harm" indicator of sustainability
- Groundwater quality in the basin should not be allowed to degrade due to projects and management actions implemented under the GSP
- Contaminant spills and improper handling of chemicals cannot be controlled by sustainable groundwater management. What can be controlled by groundwater management is the inadvertent spread of contaminant plumes by production wells

Significant & Unreasonable

Rationale, cont.

- "attributable to groundwater pumping or managed aquifer recharge" purposely excludes local contamination and naturally occurring constituents and only focuses on those aspects of groundwater management that can be controlled by the GSA

Discussion

and

Selection of Significant & Unreasonable Water Quality Degradation

Undesirable Results

Undesirable Results for Water Quality Degradation

What set of conditions are significant & unreasonable

Key Variables: Undesirable results in the basin occur when as a result of groundwater pumping or managed aquifer recharge, <percentage> or more Representative Monitoring Wells exceed <constituent> <Minimum Threshold> over <time period>

What happens when you change <variables>?

- <percentage> options
  - **25% or more** Representative Monitoring Wells. If there are 40 Representative Monitoring Wells, ten or more wells exceeding minimum thresholds will cause undesirable results. This percentage provides less flexibility in avoiding undesirable results than a higher percentage.
  - **33% or more** Representative Monitoring Wells. If there are 40 Representative Monitoring Wells, 13 or more wells exceeding minimum thresholds will cause undesirable results. This percentage provides more flexibility in avoiding undesirable results than a lower percentage.

What happens when you change <variables>?

- <constituent> options
  - **Any** constituents. This mean that if any constituent exceeds its drinking water standard, i.e., this can mean that Representative Monitoring Wells could have different constituents exceeding their minimum thresholds. This is the recommended option because an exceedance of any constituent means the water cannot be used for drinking water unless treated
  - **Respective** constituents. This means the exceedance of a minimum threshold must be for the same constituent. The occurrence of minimum threshold exceedances will likely be less than the any constituents option because exceedances are limited to just one constituent. Depending on the percentage exceeding allowed, this option can provide more flexibility in avoiding undesirable results

What happens when you change <variables>?

- <Minimum Threshold> options
  - **State drinking water standards** for each constituent
  - GSP guidelines say minimum threshold can be set at specific sites, along an isocontour or for a volume of groundwater

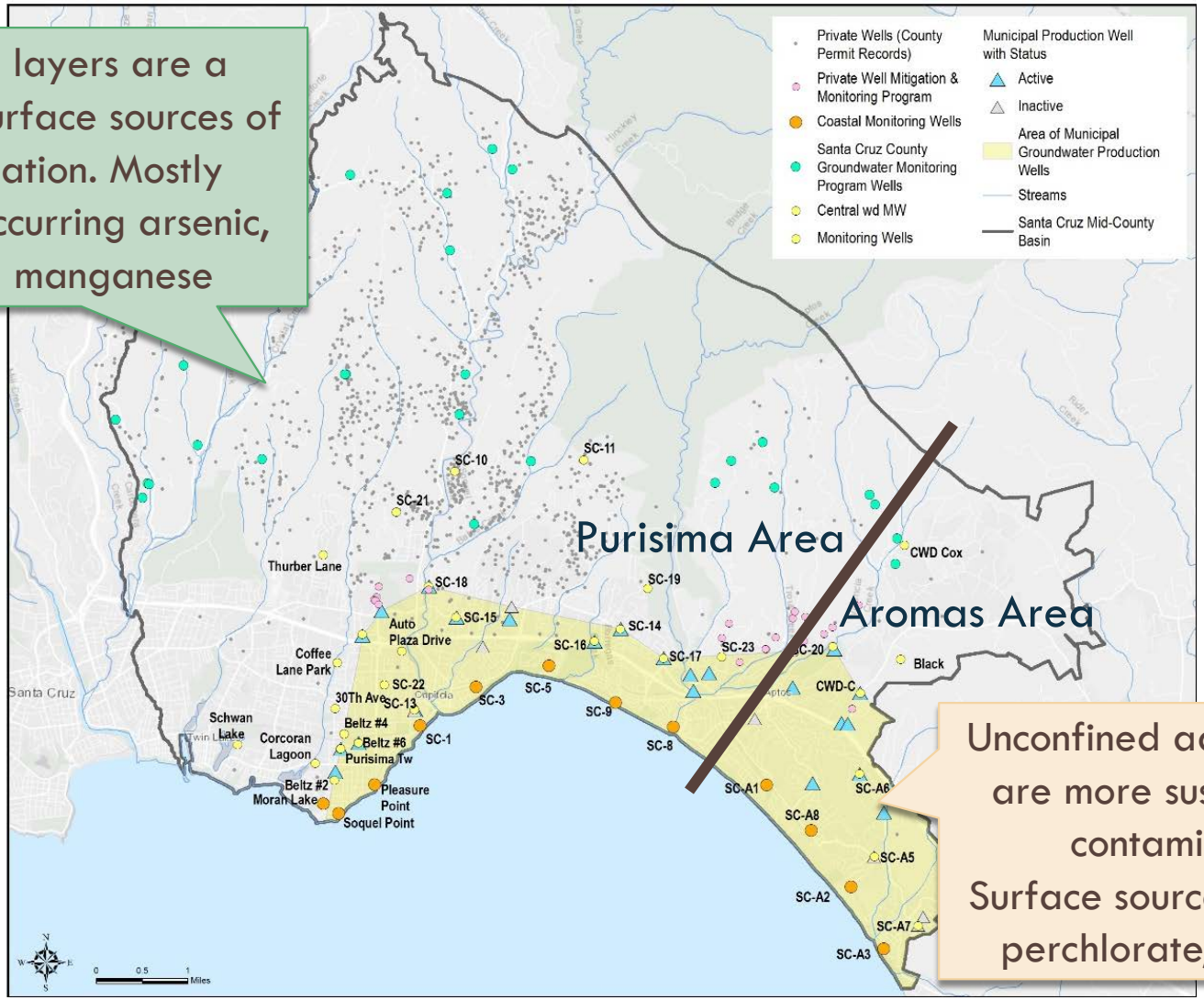
Note: concentrations that are stricter than state drinking water standards will be used for Measurable Objectives to ensure the good water quality in the basin is conserved.

What happens when you change <variables>?

- <time period> options
  - **Annually** – each year, the number of Representative Monitoring Wells exceeding the minimum threshold will be evaluated. This option provides less flexibility in avoiding undesirable results than using results over a longer time period.
  - **Over a two year period** – concentrations are averaged from samples taken over two consecutive years. This option provides more flexibility in avoiding undesirable results than an annual period.

Potential for Management Areas

Confined layers are a barrier to surface sources of contamination. Mostly naturally occurring arsenic, iron and manganese



Unconfined aquifers which are more susceptible to contamination.
Surface sources of nitrate, perchlorate, and CECs

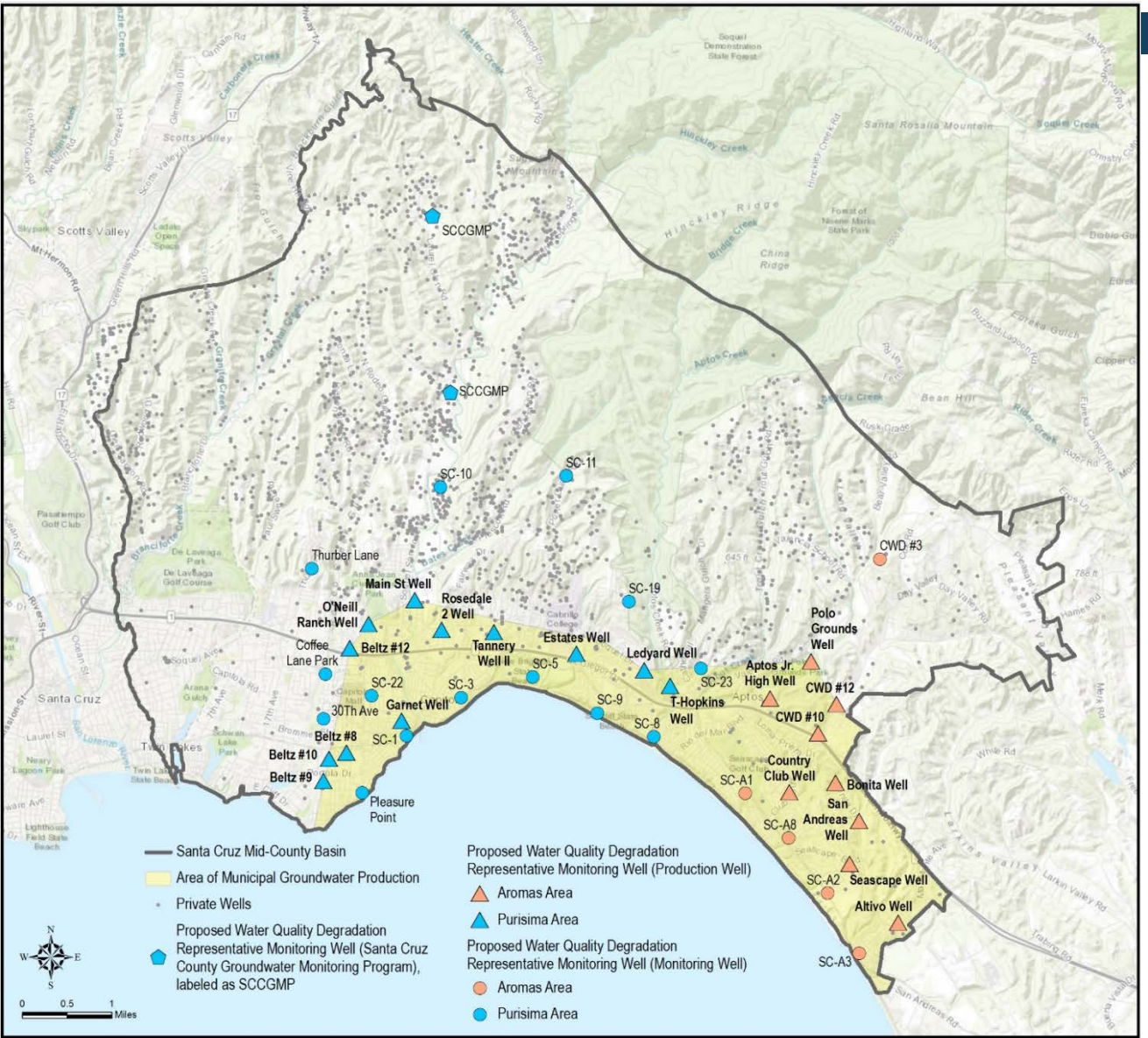
Undesirable Results
Technical Staff Proposal – Aromas Area

- Undesirable results in the basin occur when, as a result of groundwater pumping or managed aquifer recharge, 33% or more Representative Monitoring Wells exceed any <minimum threshold> annually.
  - Aromas area is more susceptible to surface contamination than Purisima area – allow a greater percentage of wells to exceed minimum thresholds (at 33%, if the are 14 representative monitoring wells, then 4 or more exceeding)
  - The any constituent exceeding minimum thresholds is preferred because an exceedance of any constituent means the groundwater at that location cannot be used for drinking water unless treated, no matter what the contaminant is.
  - Minimum threshold = state water quality standards

Undesirable Results
Technical Staff Proposal – Purisima Area

- Undesirable results in the basin occur when, as a result of groundwater pumping or managed aquifer recharge, 25% or more Representative Monitoring Wells exceed any <minimum threshold> annually.
  - Purisima area is less susceptible to surface contamination than the Aromas area – allow a lower percentage of wells to exceed minimum thresholds (at 25%, if the are 28 representative monitoring wells, then 7 or more exceeding the threshold is undesirable)

Potential Representative Monitoring Wells



- 14 Aromas Area wells (9 production wells & 5 monitoring wells)
- 28 Purisima Area Wells (12 municipal production wells, 2 private wells, & 14 monitoring wells)

Discussion
and
Selection of Undesirable Results
For Water Quality Degradation
Aromas & Purisima Areas

Public Comment

Confirm

May 23, 2018

GSP Advisory Committee Meeting Summary

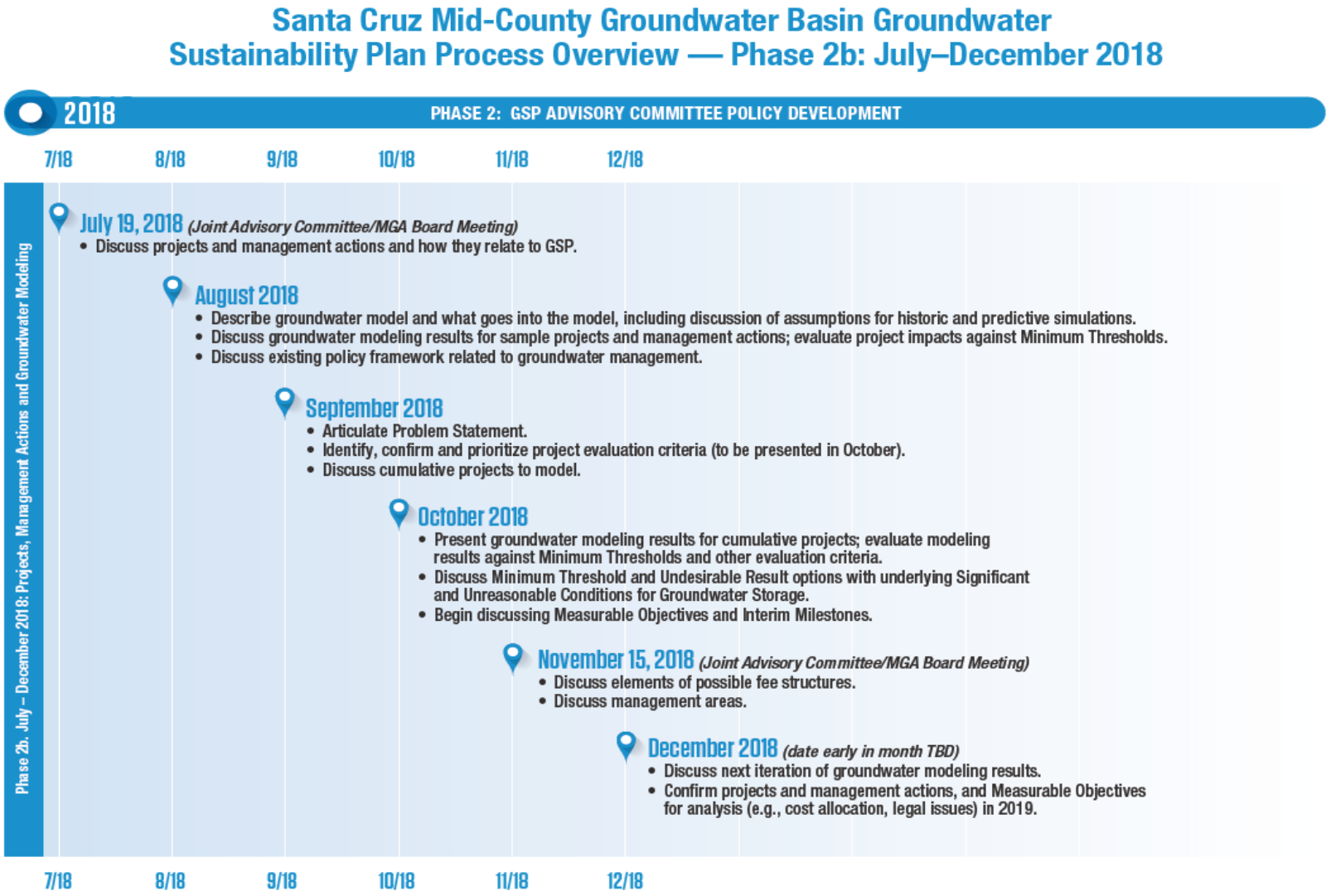
Review Request

Proposed Draft Chronic Lowering of Groundwater Levels Minimum Thresholds

By: Mid-August, 2018

Recap and Next Steps

GSP Project Timeline – Phase 2b



Next Steps: Meetings 9 & 10 and Late Fall

- **Meeting 9 (July 19, Joint MGA/Advisory Committee)**
  - Discuss projects and management actions and how they relate to the GSP
- **Meeting 10 (August 22)**
  - Groundwater modeling description
  - Groundwater modeling results for sample projects/management actions; evaluate project impacts against Minimum Thresholds
  - Existing policy framework related to groundwater management
- Possible reschedule of **November** and **December** Meetings

THANK YOU!

FOR ANY QUESTIONS, PLEASE CONTACT:

DARCY PRUITT, Senior Planner
831.662.2052
dpruitt@cfscc.org

SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

www.midcountygroundwater.org