SANTA ROSA PLAIN
GROUNDWATER
SUSTAINABILITY AGENCY

Santa Rosa Plain Basin Overview

BOARD OF PUBLIC UTILITIES STUDY SESSION, AUGUST 5, 2021

Presentation Agenda

Introduction
- *Peter Martin, Deputy Director, Water Resources*

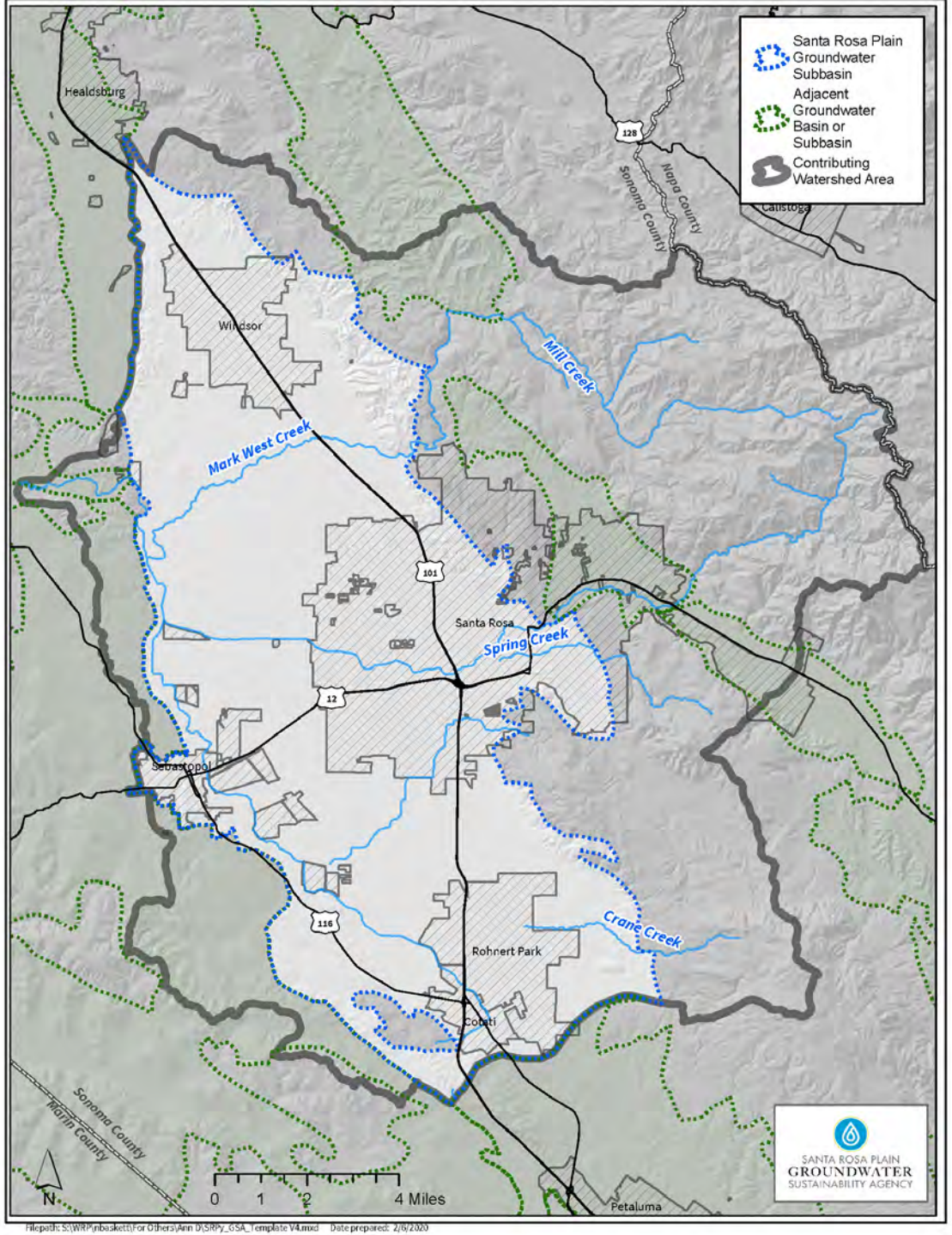
General Overview of the Santa Rosa Plain Groundwater Sustainability Agency (GSA)
- *Andy Rodgers, Administrator, Santa Rosa Plain GSA*

Groundwater Sustainability Plan (GSP)
- **Santa Rosa Plain Groundwater Conditions**
  Jay Jasperse, Chief Engineer, Sonoma Water
- **Sustainable Management Criteria**
  Andy Rodgers, Administrator, Santa Rosa Plain GSA
- **Project & Management Actions**
  Jay Jasperse, Chief Engineer, Sonoma Water

GSP Schedule

Questions

Santa Rosa Plain Groundwater Subbasin



How can we ensure that groundwater is available to future generations?

- Conserve
- Protect
- Measure and Monitor
- Be part of the Solution

The Sustainable Groundwater Management Act (SGMA) of 2014 requires that three steps be completed by local agencies

Santa Rosa Plain GSA formed in 2017

Structure of the Santa Rosa Plain Groundwater Sustainability Agency

The Sustainable Groundwater Management Act (SGMA) of 2014 requires that three steps be completed by local agencies

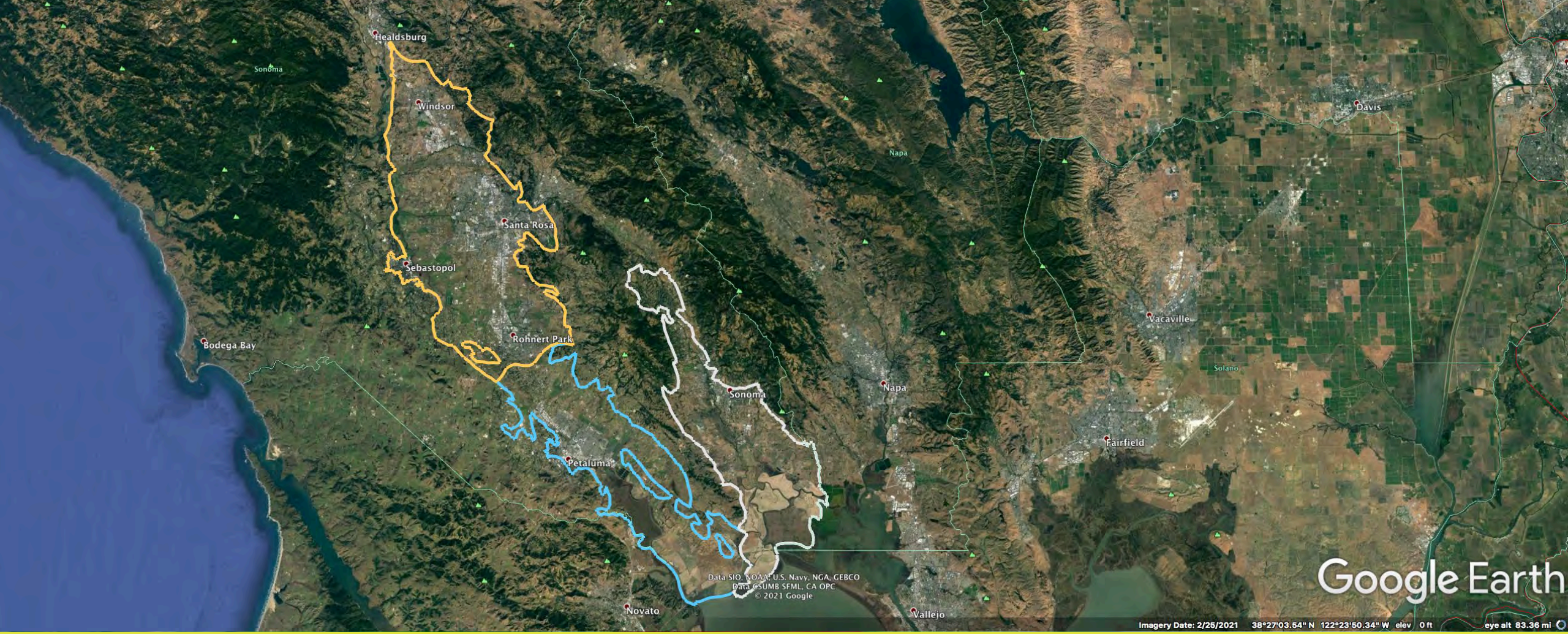
The GSA is currently developing a Groundwater Sustainability Plan

The public review draft GSP will be available in the fall 2021

Four main sections of the Groundwater Sustainability Plan (GSP)

Want more details?
santarosaplaingroundwater.org/gsp

08/05/2021



Santa Rosa Plain Groundwater Conditions

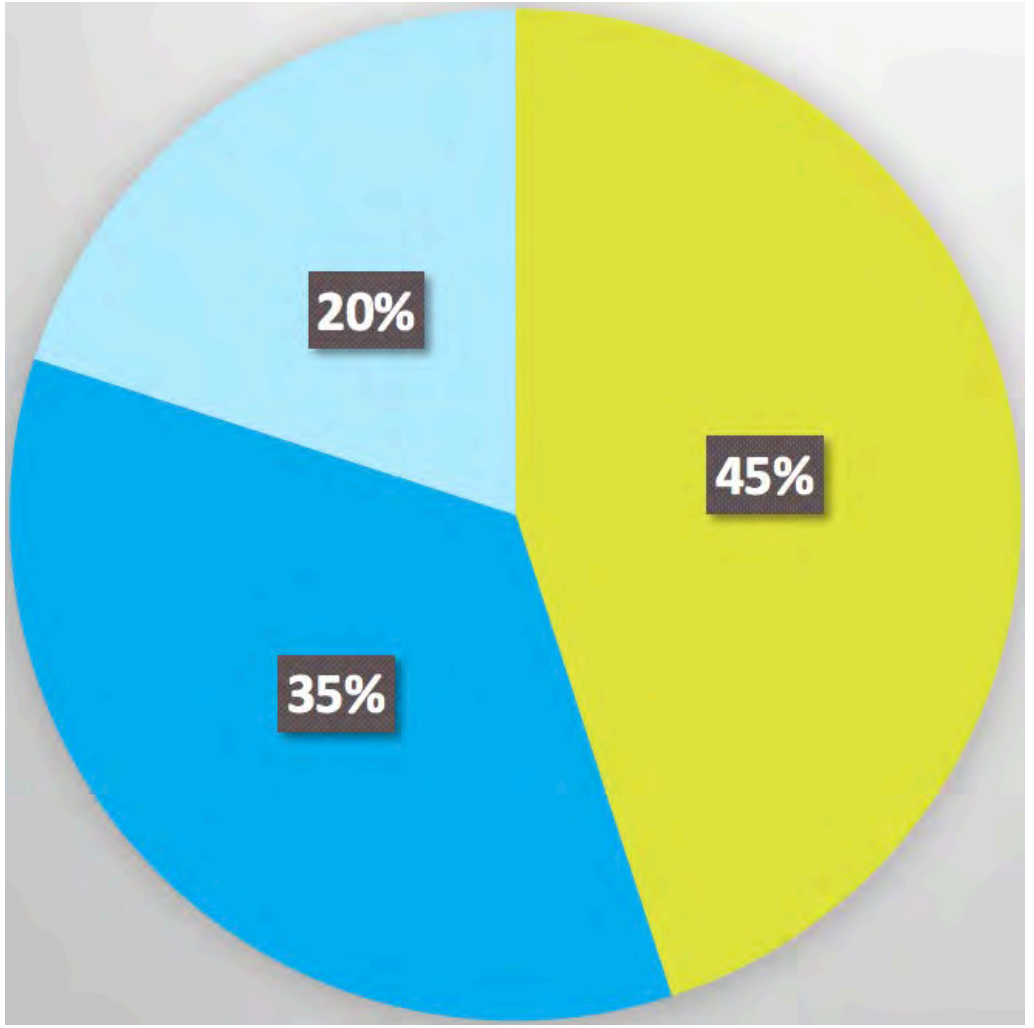
Jay Jasperse, Chief Engineer, Sonoma Water

What we are talking about today

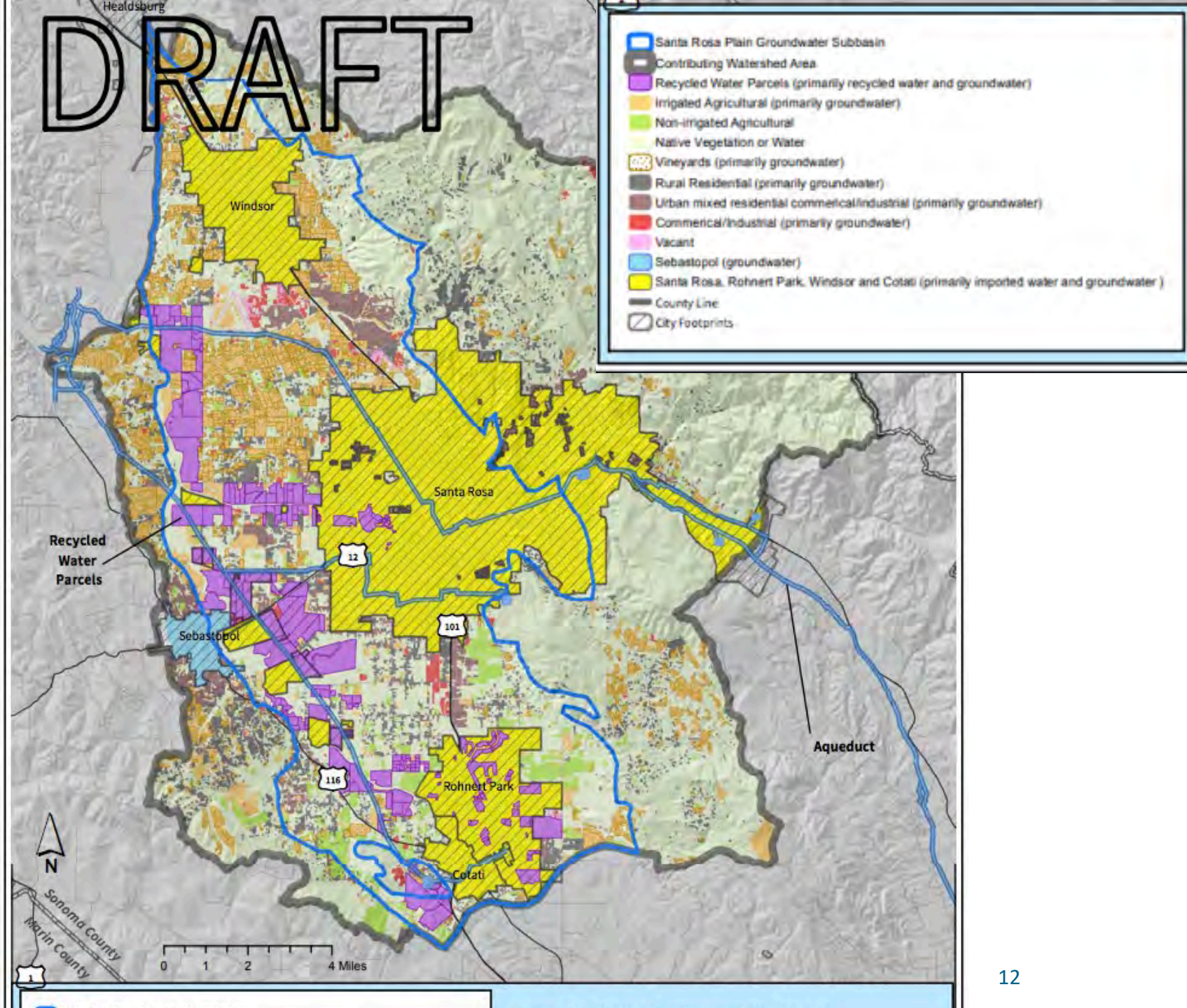
- Sustainable Groundwater Management Act (SGMA)
- Groundwater Sustainability Plan
- Santa Rosa Plain Basin groundwater conditions
- Santa Rosa Plain Sustainable Management Criteria

- A *Groundwater Sustainability Plan* required by law is being prepared by the *Santa Rosa Plain Groundwater Sustainability Agency* to map the course for sustainable groundwater resources
- The basin relies on a variety of water sources including groundwater, recycled water and Russian River water
- Groundwater resources in the basin are complex due to regional geology, including two aquifers separated by an aquitard
- Obtaining data and information from the subsurface is expensive -- but several tools are being used to increase our knowledge and to fill data gaps
- The basin groundwater budget indicates a small decrease in storage over time that will need to be addressed to be sustainable under SGMA

The basin relies on a variety of water sources for diverse land uses



The basin is characterized by a wide array of stakeholders



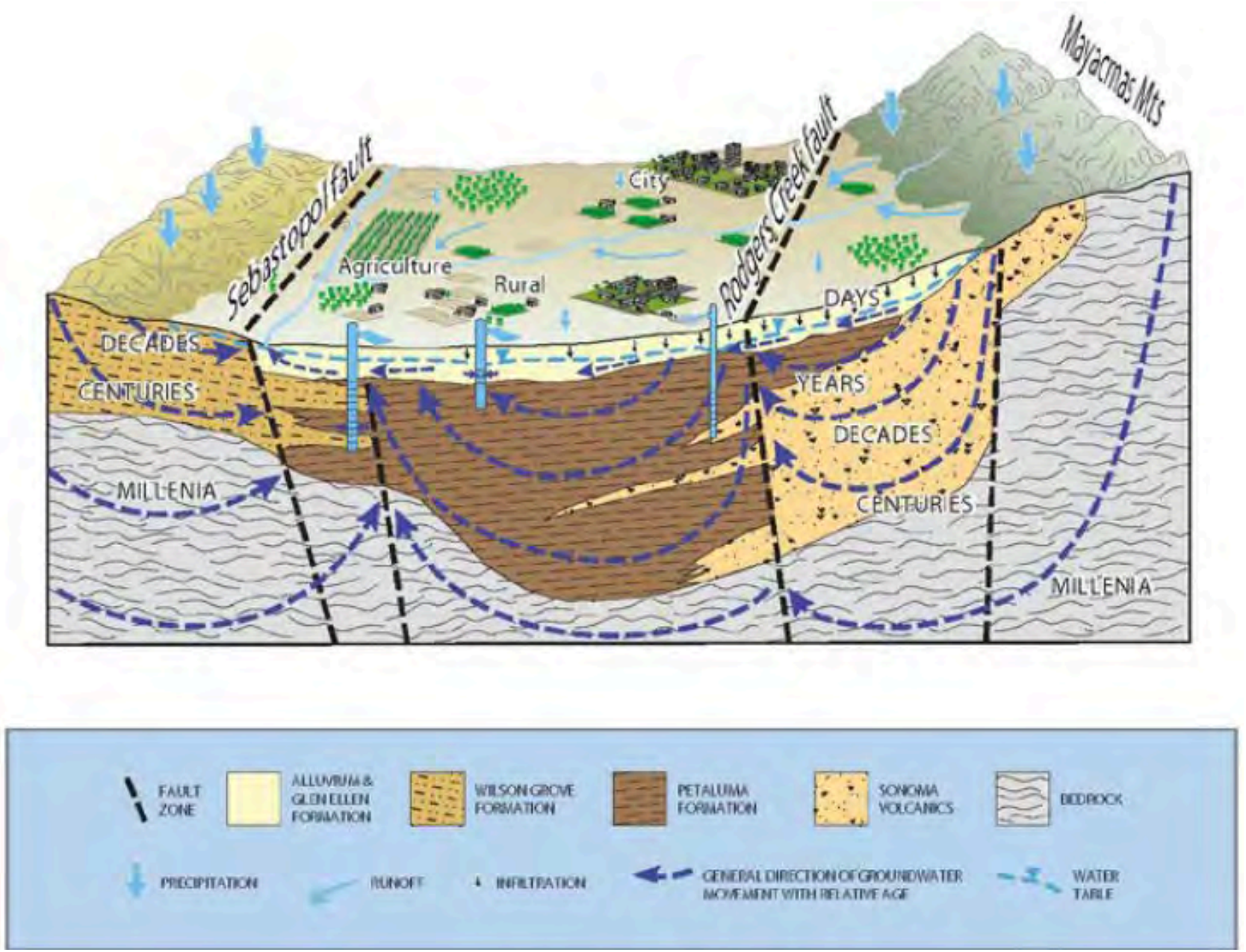
Geology and groundwater in the basin is complex

Faults and geology affect groundwater occurrence and flow directions

Land uses can affect water quantity and quality

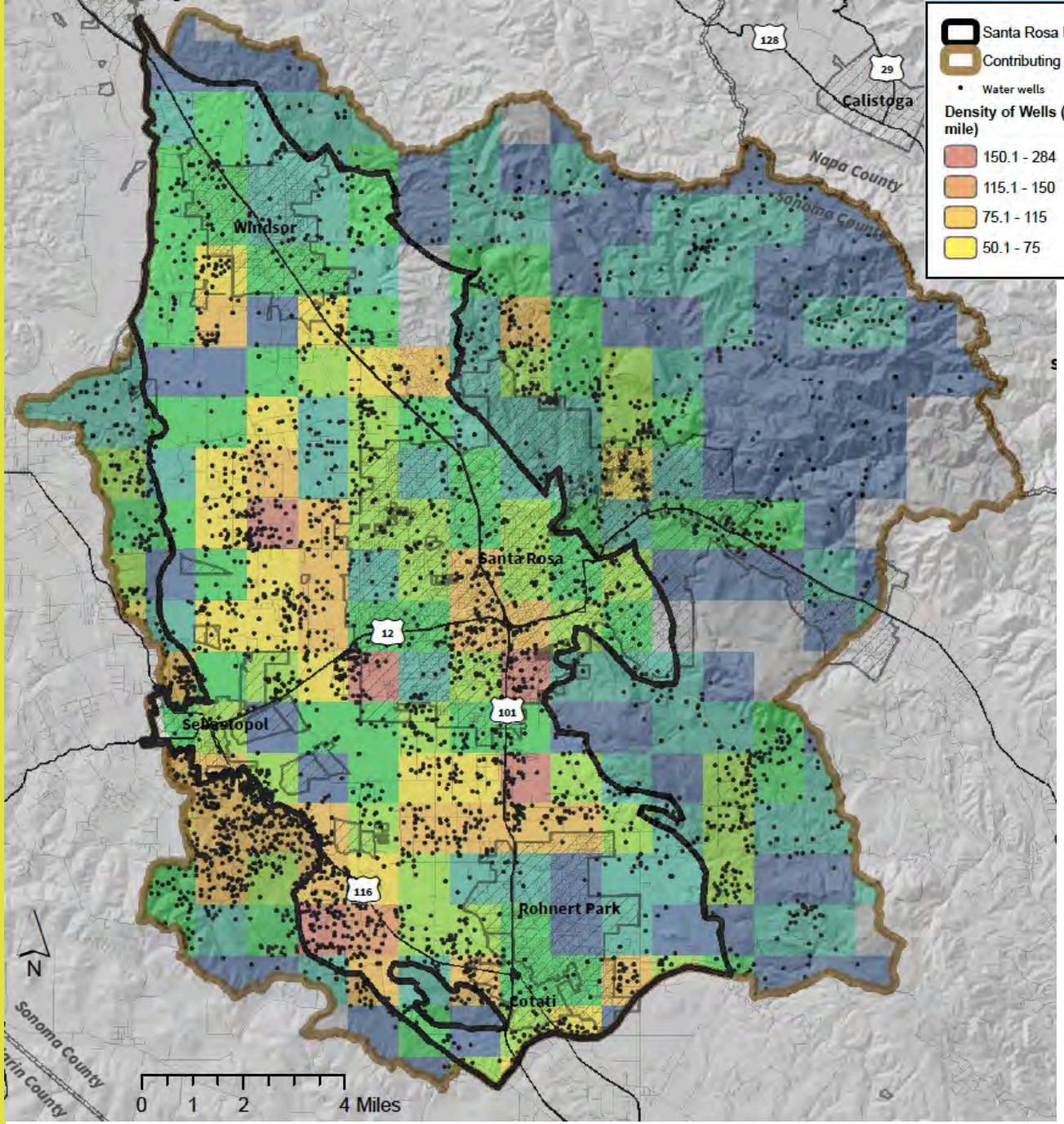
Shallow Aquifer: Approximately 200 feet deep or less

Deep Aquifer: More than 200 feet deep



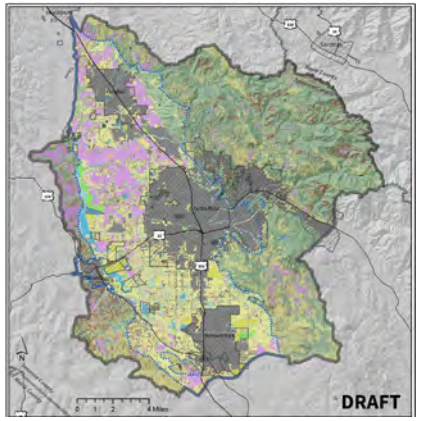
There are an estimated 7,000 wells in the basin, including rural domestic, mutual water company, agricultural and public supply

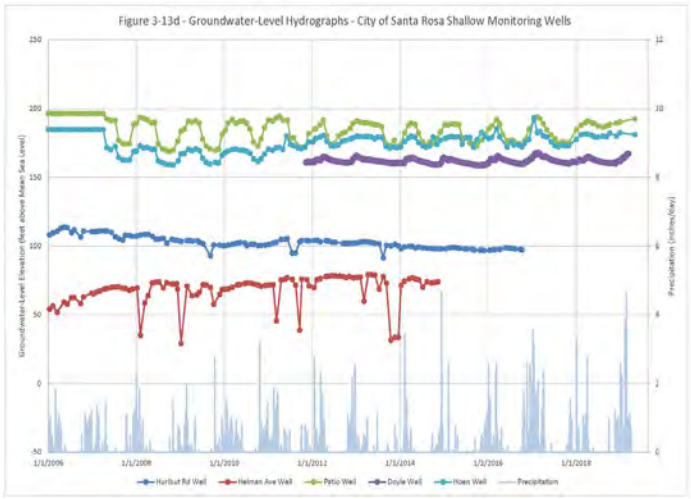
The figure shows approximate location and distribution of active wells in the watershed, and density of wells per square mile



Groundwater Tools Applied in the Watershed

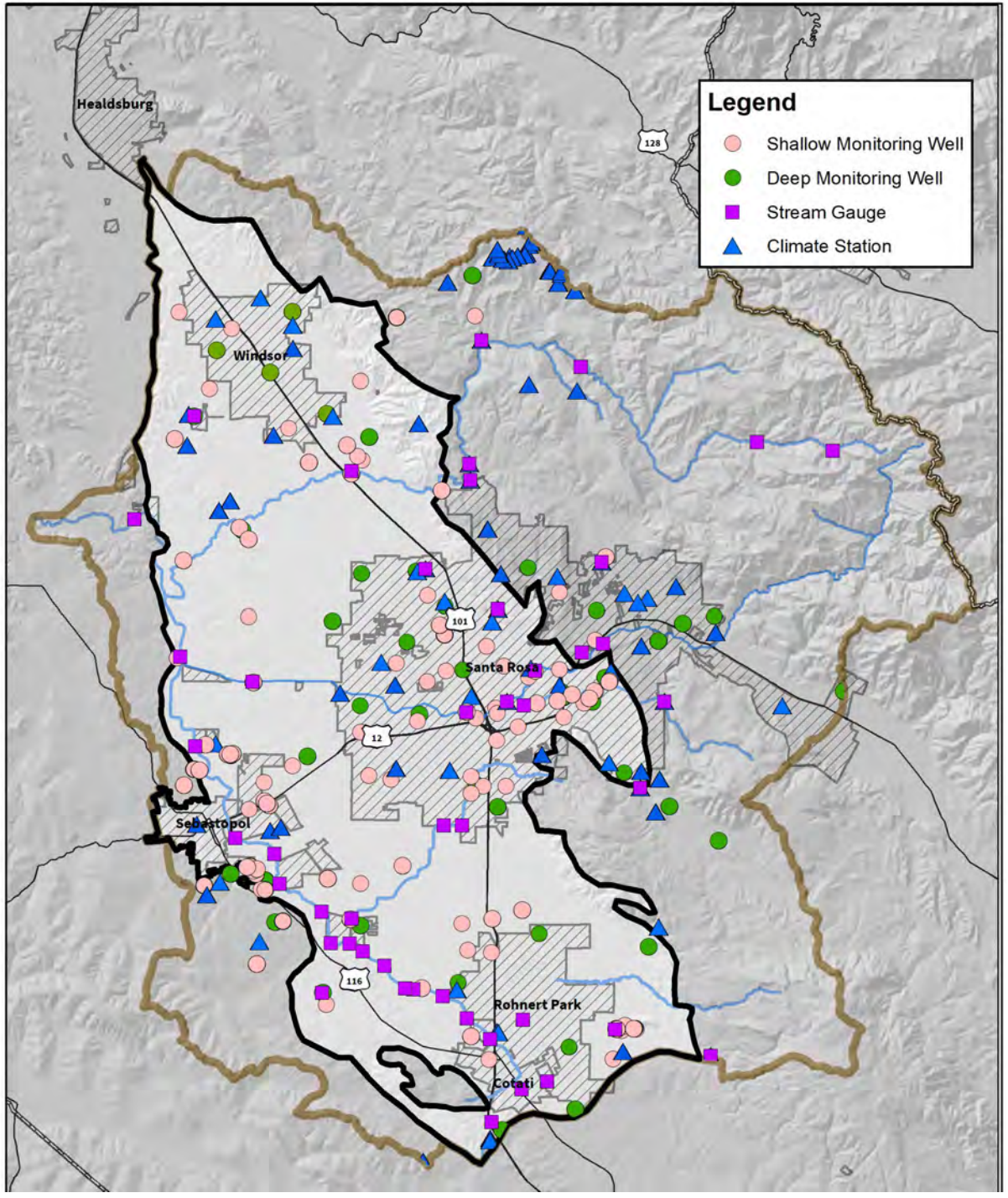
- Remote sensing data for satellites
- Data collected during the drilling and sampling of wells
- Gages to measure stream flow
- Weather monitoring instrumentation
- Hydrographs to visualize and interpret groundwater level, streamflow and precipitation data





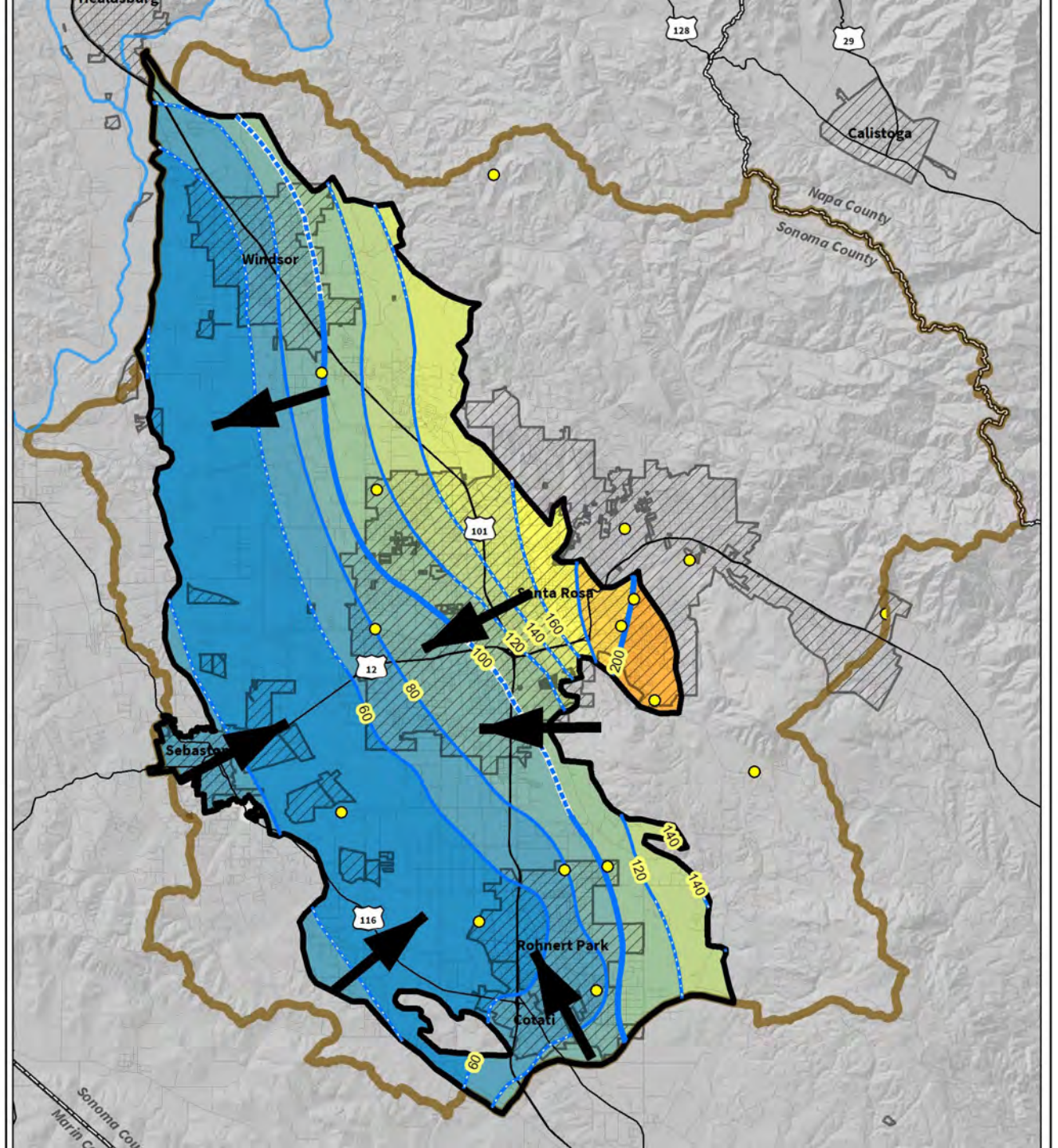
The basin monitoring network includes:

- Dedicated and volunteer wells for groundwater levels and quality
- Stream gages
- Weather stations
- Remote sensing



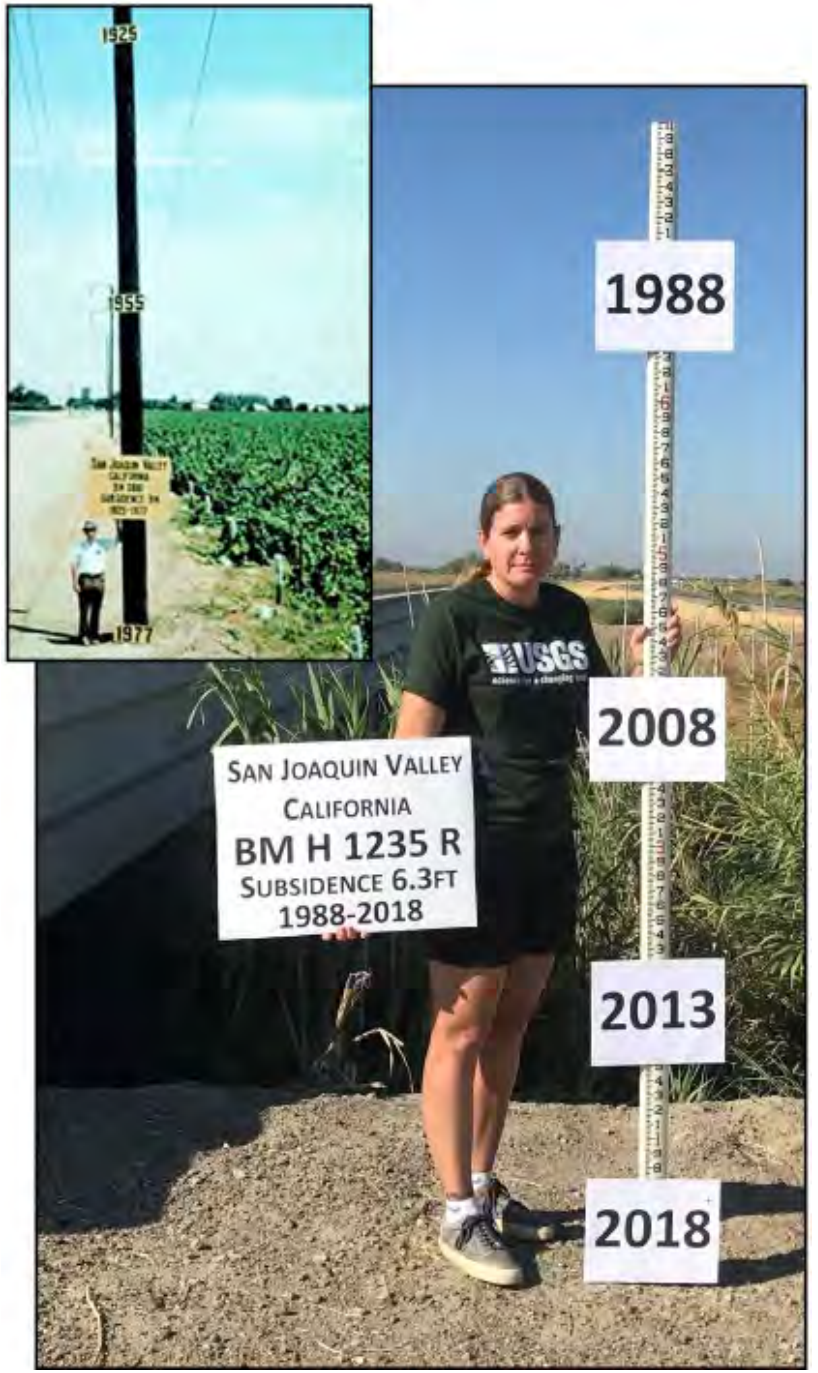
Groundwater Flow in the Basin

Groundwater flow follows the land surface topography in general, from the highlands on the west and east sides of the basin towards the Laguna de Santa Rosa.



Groundwater pumping isn't causing land subsidence in the basin

(Land can subside due to groundwater pumping or to other factors such as tectonic activity)



Groundwater quality is generally acceptable

- Arsenic is naturally occurring in the basin and is found above maximum contaminant levels for drinking water
- Chloride and total dissolved solids testing suggests these levels may be rising slightly in the basin, although still well below any thresholds
- Nitrate is found in a couple of wells above maximum contaminant levels for drinking water

Water budgets calculate water coming in … and water going out

Inventory of all inflows (supply) and outflows (demand)

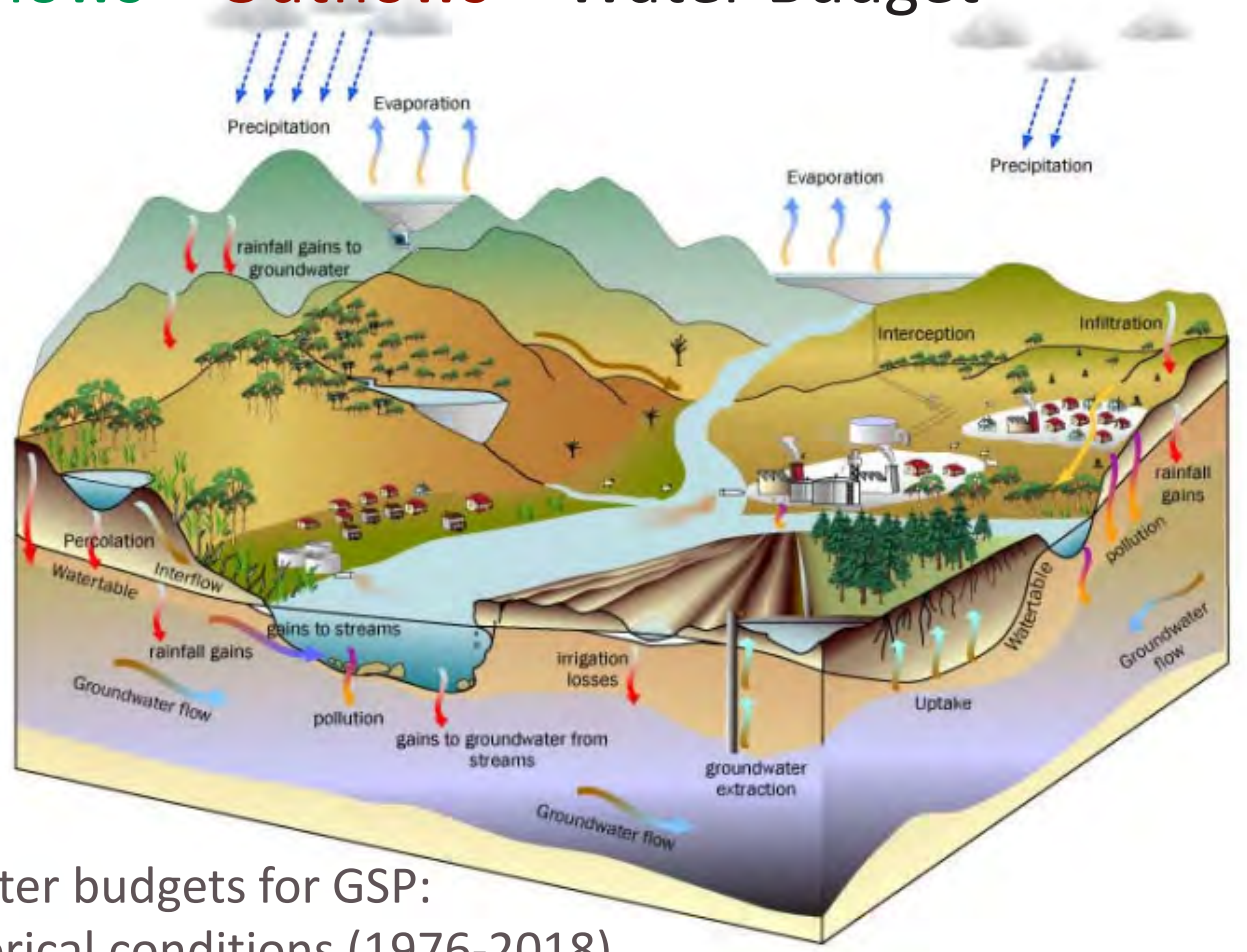
Summary of both surface water and groundwater budgets

Evaluation of changes of groundwater in storage

Estimation of groundwater overdraft (if applicable)

Estimation of sustainable yield

Inflows – Outflows = Water Budget



Three water budgets for GSP:

1. Historical conditions (1976-2018)
2. Current conditions (2012-2018)
3. Projected conditions over the **50-year planning and implementation horizon** (2021-2070)

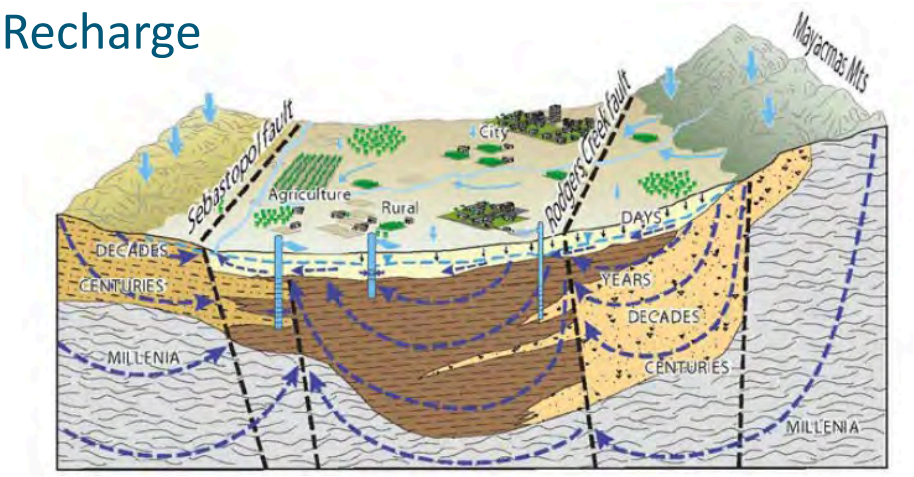
There are multiple sources of inflows and outflows in the Santa Rosa Plain Groundwater Budget

Major Inflows

Percolation of Precipitation & Applied Agricultural Water
Basin Subsurface Flows
Streambed Recharge

Minor Inflows

Watershed Subsurface Inflows
Septic Return flows



Major Outflows

Groundwater Pumping
Discharge to Streams
Groundwater Evapotranspiration

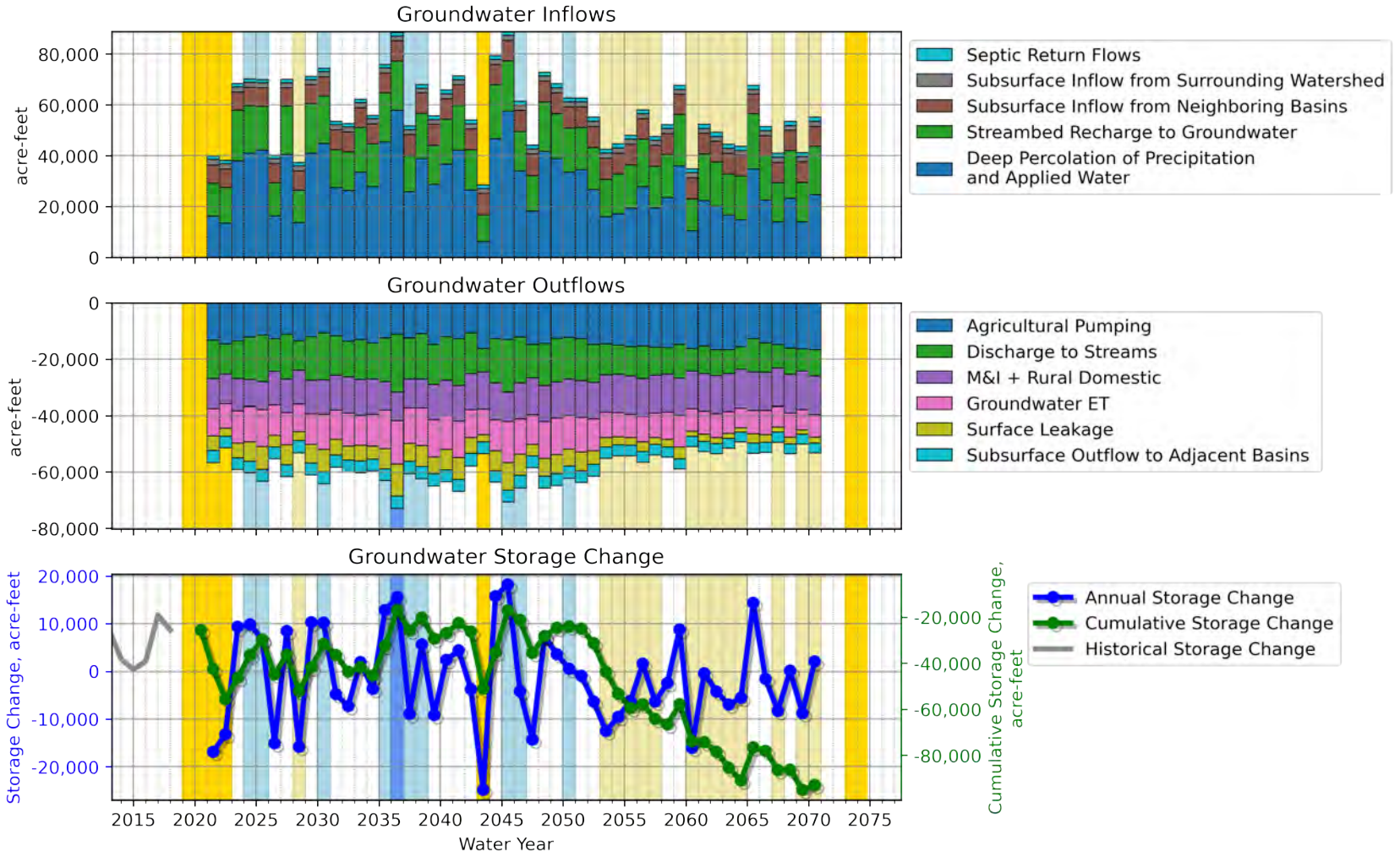
Minor Outflows

Surface Leakage
Basin Subsurface Flows

Projected Groundwater Budget: Total groundwater storage projected to stabilize during extended wet periods and decline during long-term droughts

Projected Mean Annual Change in Storage:

Period	Mean (in Acre Feet)
Water Year 2021-2040	-200
Water Year 2021-2070	-1400



In summary, here are the things to remember about the Santa Rosa Plain groundwater basin ...

- A *Groundwater Sustainability Plan* required by law is being prepared by the *Santa Rosa Plain Groundwater Sustainability Agency* to map the course for sustainable groundwater resources
- The basin relies on a variety of water sources including groundwater, recycled water and Russian River water
- Groundwater resources in the basin are complex due to regional geology, including two aquifers separated by an aquitard
- Obtaining data and information from the subsurface is expensive -- but several tools are being used to increase our knowledge and to fill data gaps
- The basin groundwater budget indicates a small decrease in storage over time that will need to be addressed to be sustainable under SGMA

Managing Groundwater Sustainably in the Santa Rosa Plain

Andy Rodgers, GSA Administrator

SGMA has its own vocabulary for defining sustainability

Sustainable Management Criteria:

- Sustainability Indicator
- Undesirable Results
- Minimum Thresholds
- Measurable Objectives
- Interim Milestone

Each of the six Sustainability Indicators have three primary Sustainable Management Criteria terms

1. Undesirable Results
2. Minimum Thresholds

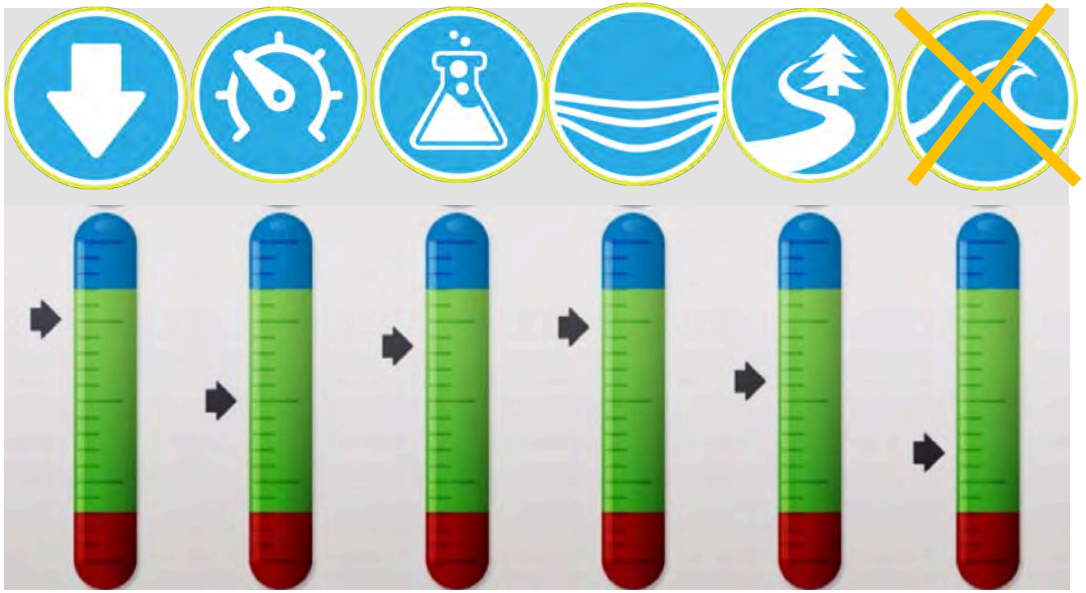
} Together, these two terms define what is unacceptable within the basin and determine whether the basin is being managed sustainably.

3. Measurable Objectives

} This term defines what is desirable within the basin and the conditions which the GSA must strive to achieve

Measurable Objective →

Minimum Threshold →



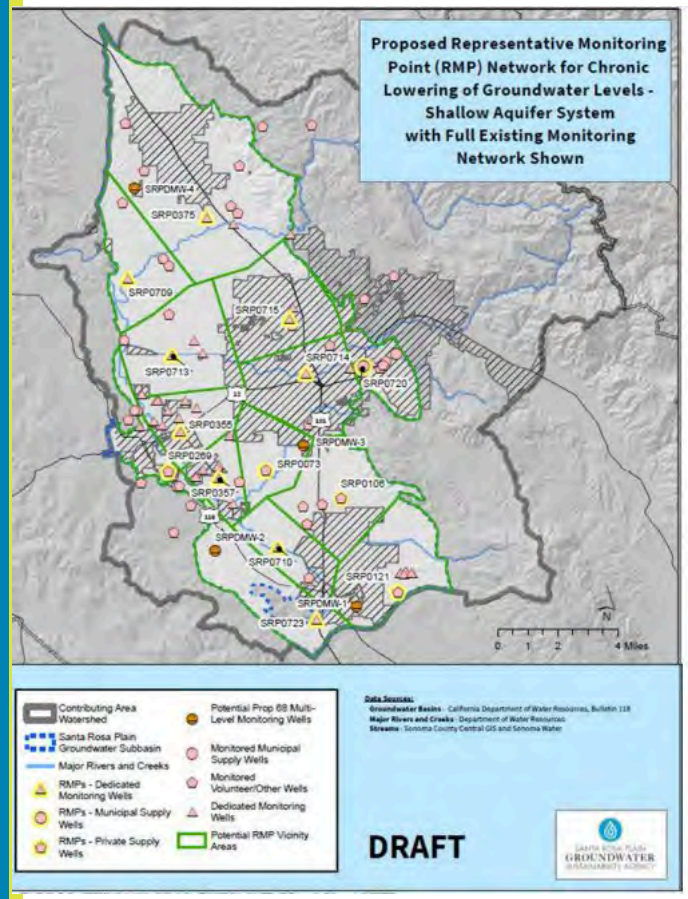
Measuring Sustainability Indicators – Key Concepts

Most Sustainability Indicators have a direct relationship to groundwater level changes

- **Chronic declines in groundwater levels** are monitored by measuring groundwater levels in the Basin monitoring network wells
- **Groundwater storage volume changes** are monitored by measuring groundwater levels in the Basin monitoring network wells
- **Land surface subsidence due to groundwater pumping** will only occur if groundwater levels decline significantly enough for subsurface sediments to compact
- **Depletion of surface water flows due to groundwater pumping** is monitored by measuring groundwater level changes in the Basin monitoring network wells along streams and with stream gages and seepage measurements
- ***Exception:*** **Water quality degradation** due to project and management actions of the GSA will be monitored with project-specific to-be-determined new monitoring requirements

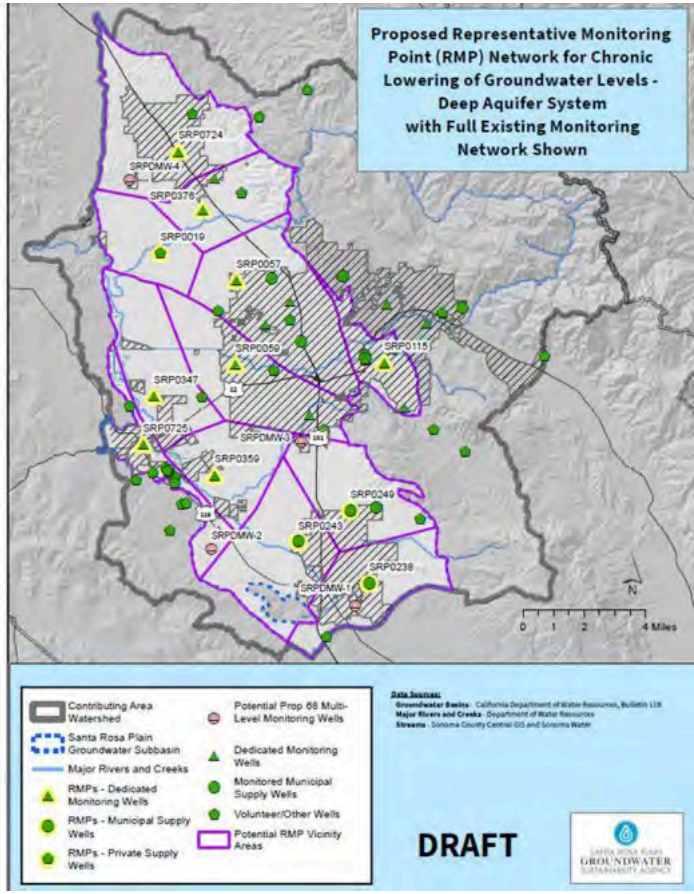
Sustainable Management Criteria are measured at monitoring points that are representative of the basin

These maps show the Representative Monitoring Points for groundwater levels in the Santa Rosa Plain



Preliminary Recommended RMP Network

- 14 existing shallow zone wells and 12 existing deep zone
- 4 planned multi-level monitoring wells would be additional RMPs for both shallow and deep aquifers
- Total of 34 potential RMPs (18 shallow zone and 16 deep zone)
- Preliminary data gap areas also identified



Summary ‘take-aways’ regarding the Groundwater Sustainability Plan

- Sustainable management criteria and **five sustainability indicators** are applicable to the Basin
- The **Representative Monitoring Point** network provides direct measurement on progress
- **Significant and unreasonable statements** have been developed for the five sustainability indicators
- **Maintaining groundwater levels above historic lows** will provide protection and allow the basin to meet sustainability goals into the distant future
- **In coordination with jurisdictional agencies,** measurement of groundwater level and water quality parameters will track any water quality changes during implementation of projects in the basin

Introduction to Project Concepts and Management Actions

Jay Jasperse, Chief Engineer, Sonoma Water

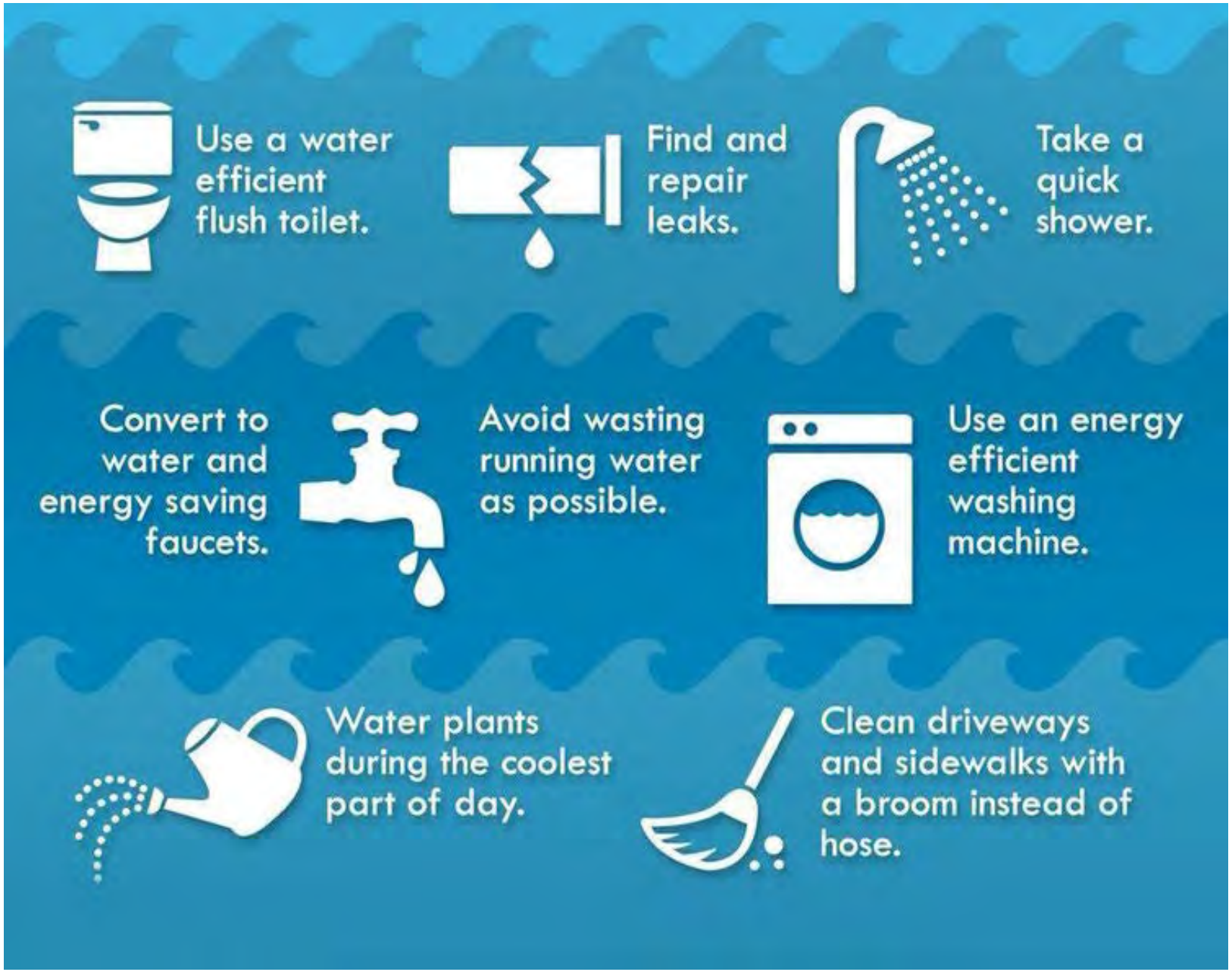
Project Concepts & Management Actions

What we are talking about today

- Collection of additional data and information to reduce uncertainty and fill data gaps will be key during early stages of GSP implementation to improve efficiency and cost-effectiveness of future projects and actions
- Some projects and management actions are needed to address sustainable management criteria and achieve groundwater sustainability
- Voluntary conservation and water use efficiency measures are the first actions
- Percolating stormwater into the ground to recharge groundwater can be done on a small scale, a farm-scale or a large-scale project
- Aquifer storage and recovery involves recharging drinking water directly into the aquifer through wells
- If needed, the GSA could implement mandatory actions including mandatory conservation and water use efficiency measures

Project Concepts & Management Actions

Voluntary rural conservation and water efficiency would be the first programs to be deployed



Project Concepts & Management Actions

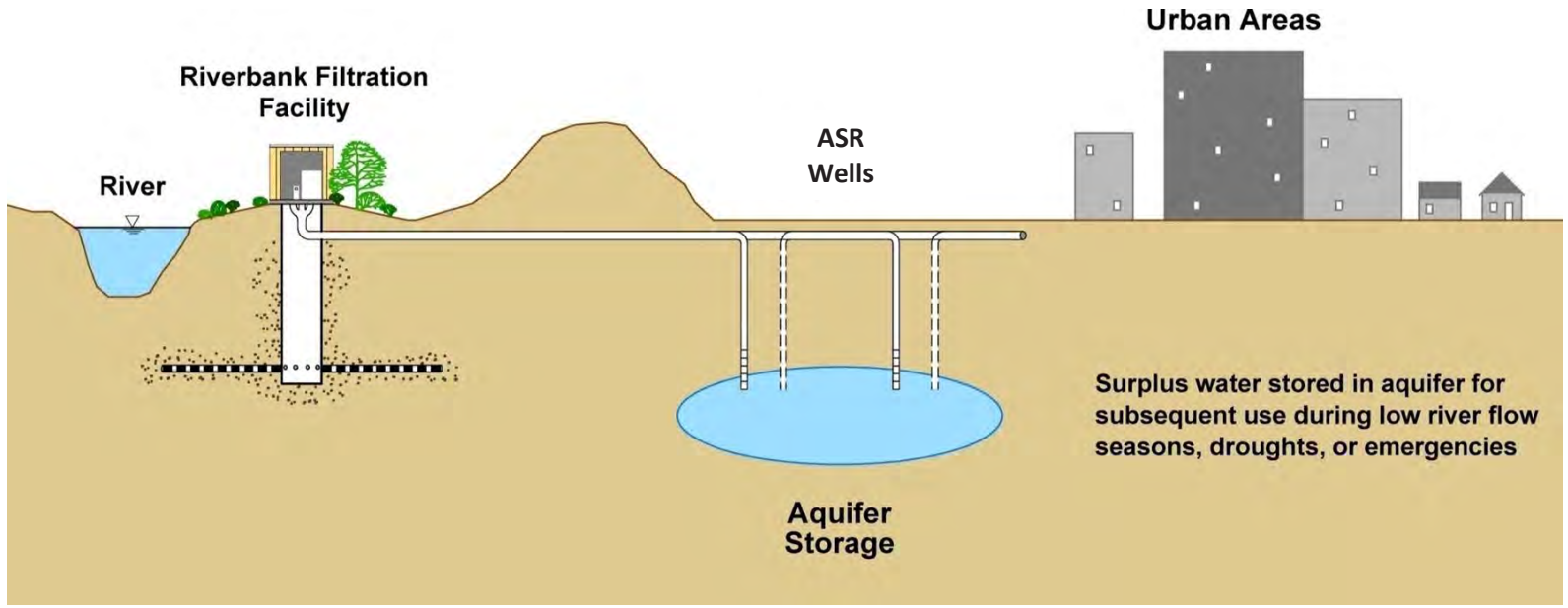
Stormwater can be used to recharge groundwater through small basins, large on- and off-stream basins and on permanent crops

Project Concepts & Management Actions

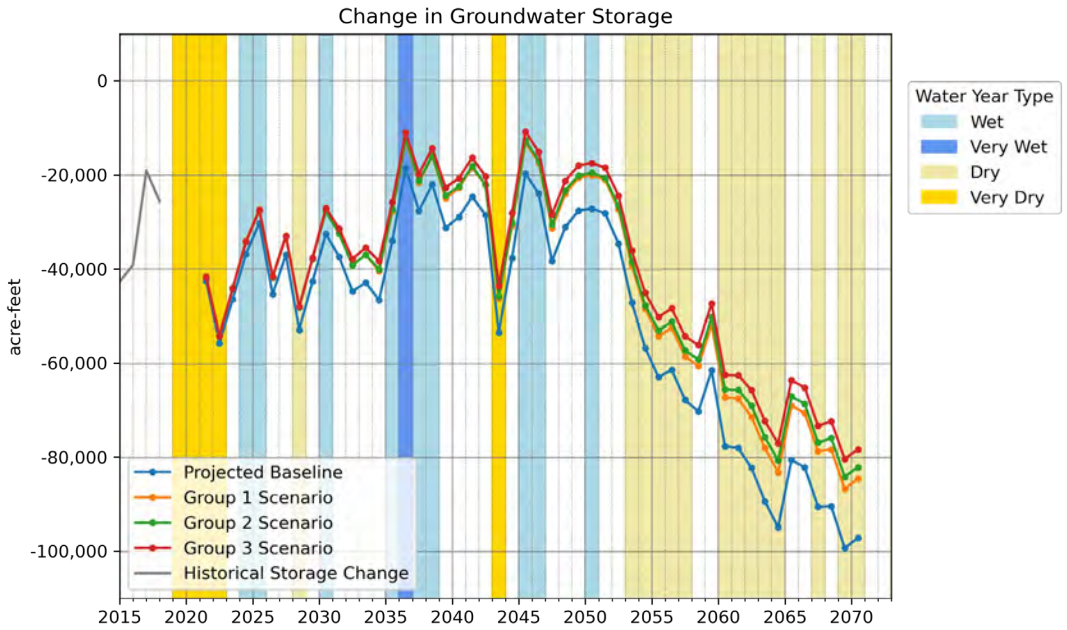
An Aquifer Storage and Recovery pilot project in Sonoma Valley was successful

What is Aquifer Storage and Recovery (ASR)?

- Temporary storage of surface water underground
- Used in place of water tanks and reservoirs
- Water is recharged through wells directly into a target aquifer zone during wet or surplus periods and pumped out for beneficial use during dry or peak need periods



Baseline and the Project and Management Action Scenarios Results



Time Period	Projected Baseline (acre-feet)	Group 1 Scenario (acre-feet)	Group 2 Scenario (acre-feet)	Group 3 Scenario (acre-feet)
2021-2040 Mean	-200	100	200	200
2021-2070 Mean	-1,400	-1,200	-1,100	-1,100

- Simulated projects eliminate storage losses during normal and wet years and mitigate against potential storage losses that could occur during extreme forecasted drought

NUMBER OF REPRESENTATIVE MONITORING POINTS (RMPS) WITH 3 OR MORE CONSECUTIVE MINIMUM THRESHOLD EXCEEDANCES (IE POTENTIAL UNDESIRABLE RESULT)

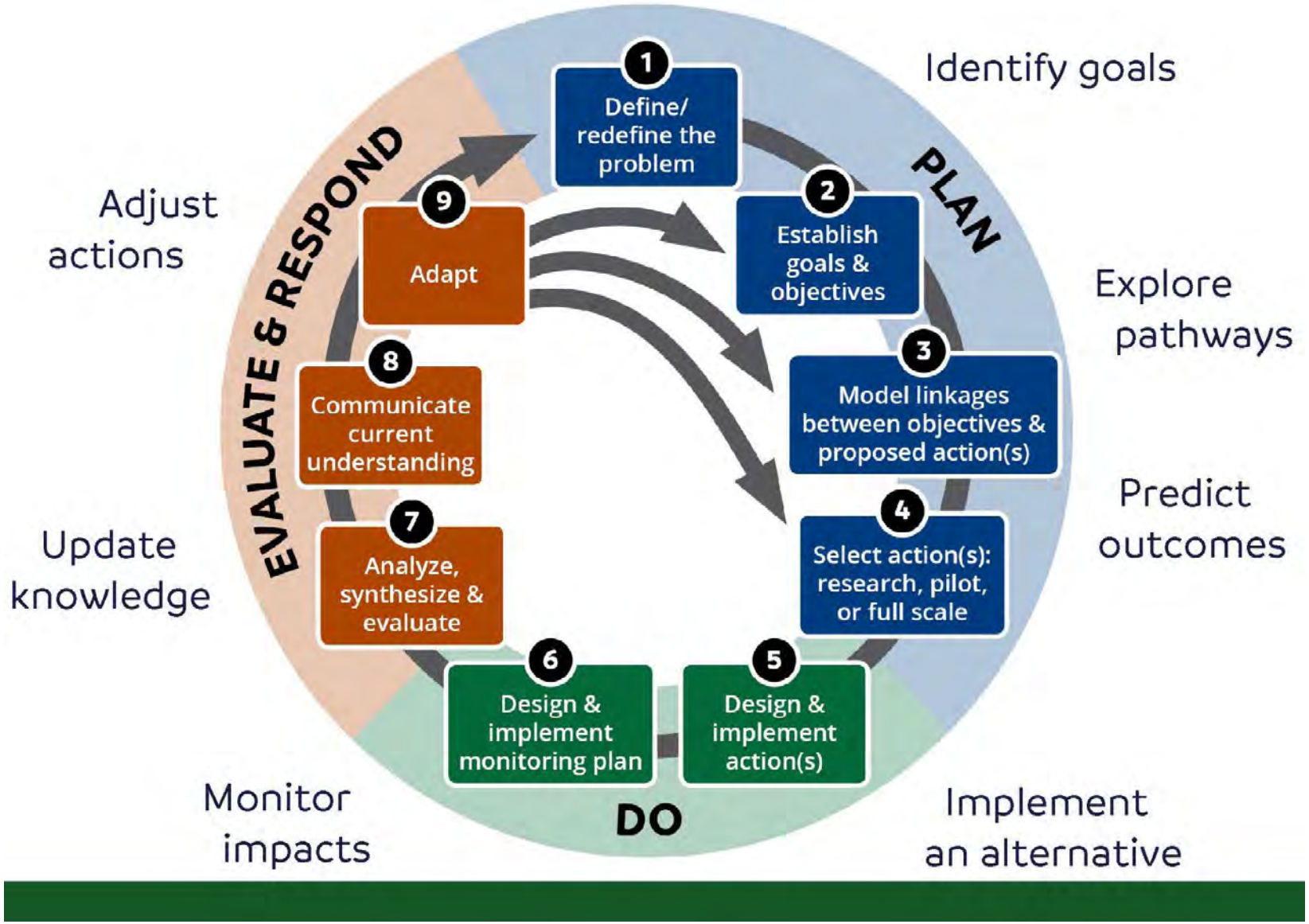
Scenario	Number of RMPs	Potential Undesirable Results during 50-Year Projection?
Scenario - Baseline	3	Yes
Scenario - Group 1	1	No
Scenario - Group 2	1	No
Scenario - Group 3	1	No

- Simulated projects also reduce potential occurrence of undesirable results for chronic lowering of groundwater levels

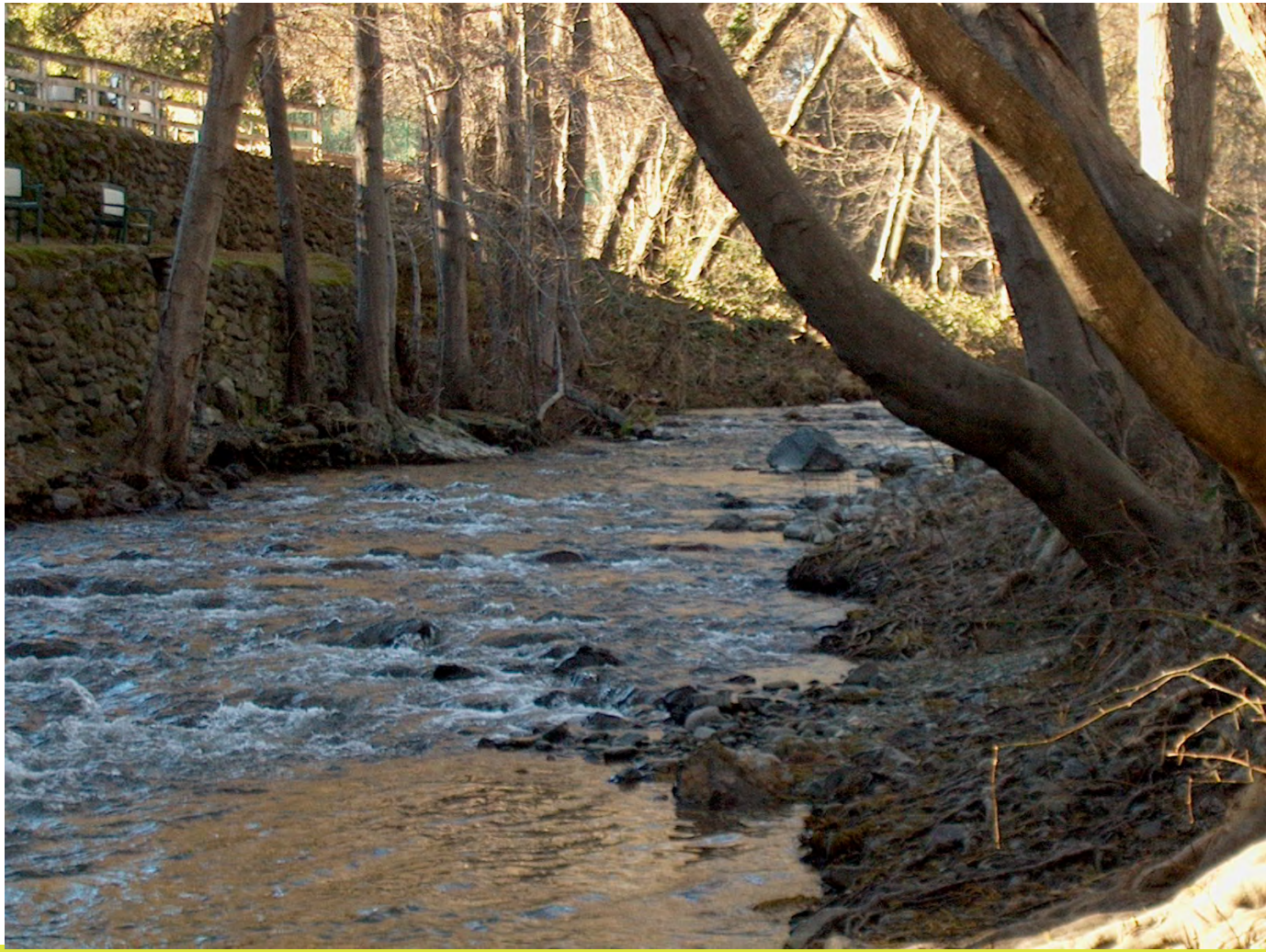
Project Concepts & Management Actions

Data Gaps, Uncertainty and Adaptive Management

- Continue to refine information
- Improve mapping and correlation of data
- Assess and develop plans to fill data gaps
- Adjust technical approach as more data and information are available



- GSA Board and staff will compile the information provided for consideration in the final draft GSP
- Go to https://santarosaplaingroundwater.org to share follow-up thoughts and concerns
- Opportunities for additional input:
  - Board Meetings
  - Advisory Committee Meetings
  - Community Meetings
  - Public Review Draft GSP



GSP Schedule

GSP Schedule – Santa Rosa Plain

GSP Element	2021												2022
	January	February	March	April	May	June	July	August	September	October	November	December	January
1.0 Introduction	AC Review												
2.0 Plan Area Description	Prepare Revised AC Draft	AC Review											
3.0 Basin Setting	Prepare Revised AC Draft ***Baseline 50-Year Water Budget***		AC Review										
4.0 Sustainable Management Criteria	Prepare AC Draft ***Finalize SMCs***						AC Review						
5.0 Monitoring Program	Prepare AC Draft						AC Review						
6.0 Projects & Management Actions			***Model Projects and Management Actions***					AC Review					
7.0 Implementation Plan				***Develop Funding and Implementation Plans***				AC Review					
Final GSP Preparation and Reviews				Prepare Final AC/Board Review Draft and ***Executive Summary***				AC Review					
							Prepare Final Public Review Draft and Board Resolution for Public Review			30-Day Public Review			
								☆ 90 Day Notice to Cities and Counties of Intent to Adopt					
										Prepare Final GSP and Board Resolution to Adopt		Adopt and File GSP ★	
Meetings								Board: 8/12	AC: 9/13	Comm Mtg: 10/13 Board: 10/14	AC: 11/8 (TBD)	Board: Dec 12/9	

Santa Rosa Plain Groundwater Sustainability Agency

Estimated Groundwater Pumping by Sector

In general, total groundwater pumpage has remained relatively constant since 2000, with perhaps some shifting between components of the pumping over the years.

Historical (WY 1976 to 2018) Groundwater Pumpage

	M&I	Rural Domestic	Agricultural Pumping
Mean	7,900	2,600	9,100

Current (WY 2012 to 2018) Groundwater Pumpage

	M&I	Rural Domestic	Agricultural Pumping
Mean	7,000	2,900	10,400