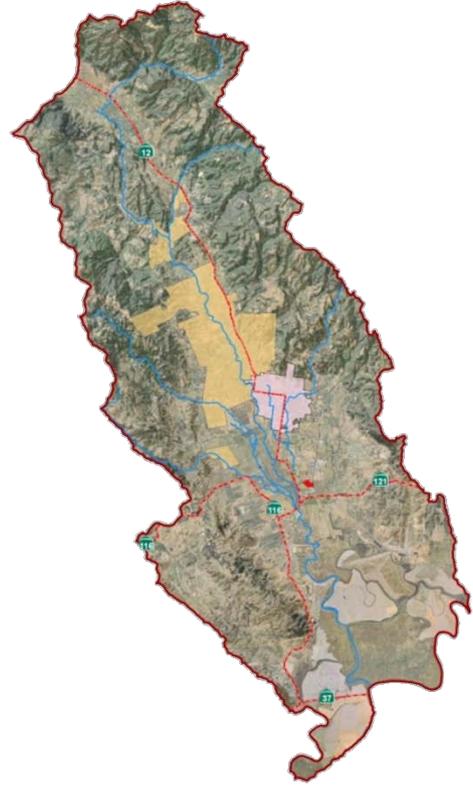


Status of Sonoma Valley Water Supply Reliability Programs



Jay Jasperse, P.E.
Chief Engineer
June 3, 2013



About the Sonoma County Water Agency

Core Business Functions Align with Integrated Management:

- Wholesale water supplier to over 600,000 people - Sonoma & Marin Counties
- Flood Control
- Sanitation
- Power Generation/Renewable Energy Development

Our Approach to Business:

- Integrated Resource Management
- Partnerships
- Innovation



The Bottom Line ...

For Sonoma Valley:

Water Supply Reliability Is An Issue

- Long Distance from Russian River Supplies
- Pipelines Vulnerable to Natural Hazards
- Aquifer Has Relatively Low Productivity
- Saline Water at Southern Boundary
- Increased Water Use Over Time

The Solution ...

Integrated Water Resource Management

- Increase Water Supply Portfolio
- Maximize Recycled Water & Conservation
- Balance Russian River & Groundwater Supplies
- Science-Based Management & Policies
- Partnerships are Key to Leverage Resources
 - Federal/State/Regional/Local Agencies
 - Community Constituencies: Agriculture, Municipal, Business, Rural Residential, Environmental

Overview

- Regional Context: Russian River System
- Water Supply Challenges
- Integrated Water Resource Management
 - Regional
 - Sonoma Valley



State Water Resources Control Board Decision 1610 – Adopted 1986

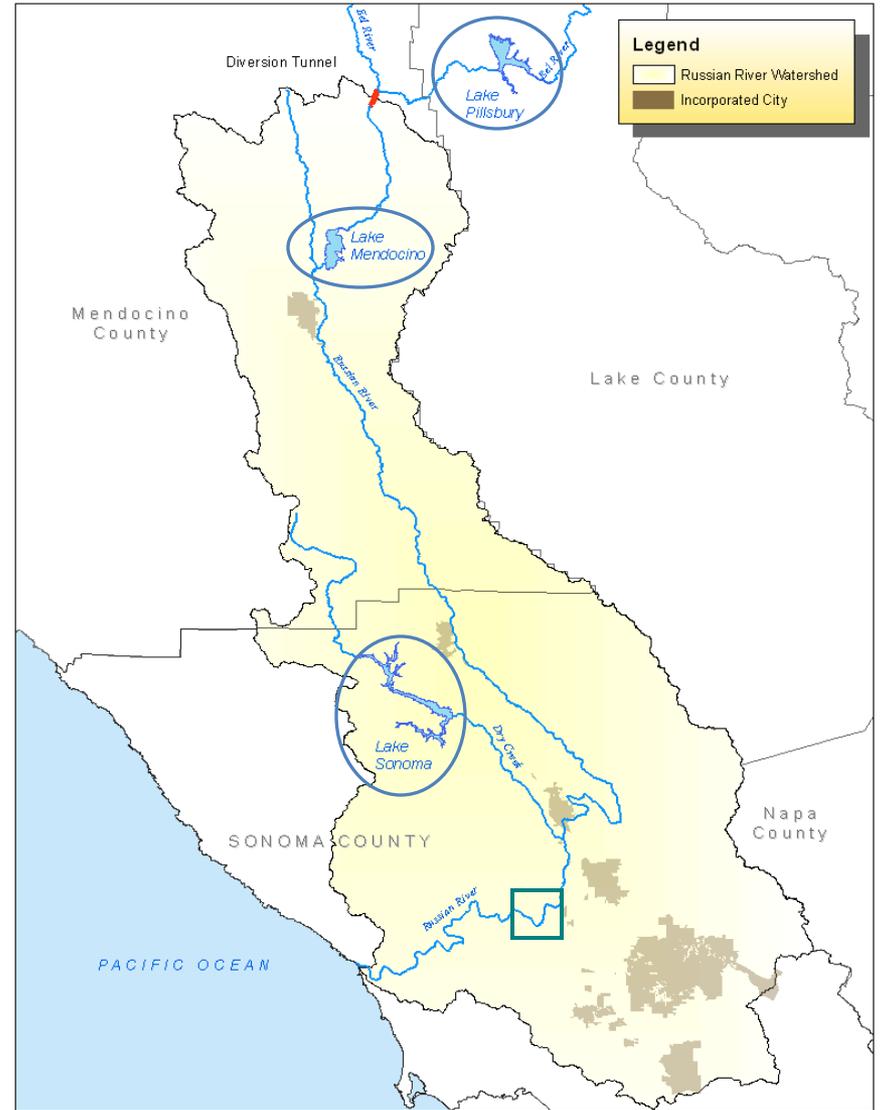
- Sets minimum Russian River instream flow requirements
- Sets water year classification based on Lake Pillsbury inflow:
 - Not representative of Russian River hydrology
- Recent regulatory requirements impact river management:
 - Developed Before Endangered Species Act – Biological Opinion
 - Decreased Potter Valley diversion to Russian River

Endangered Species Act Compliance: Biological Opinion – September 2008

- **Why:** Three species of fish listed under federal ESA
- **Parties:** US Army Corps of Engineers, SCWA, DFG, Mendocino County Flood Control, & NMFS
- **Considers:** Impacts of current operations on listed fish
- **Timeline:** 15 years to implement
- **Major findings:** D1610 flows too high, jeopardize coho salmon & steelhead
- **Requires:** Change D1610 - Decreased Dry Ck & Mainstem summer flows; closed estuary
- **Cost:** Estimated \$125M or more from 2008-2023

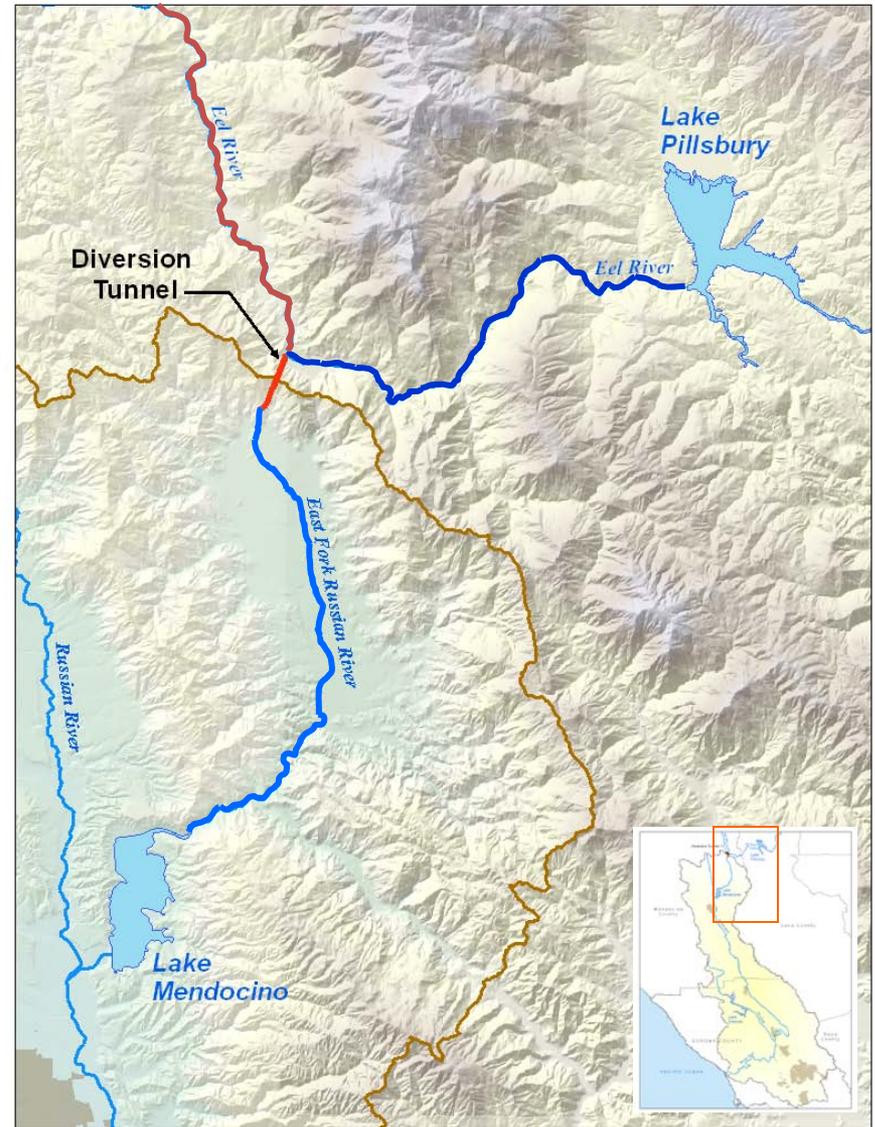
Russian River Watershed

- Lake Pillsbury / Mirabel



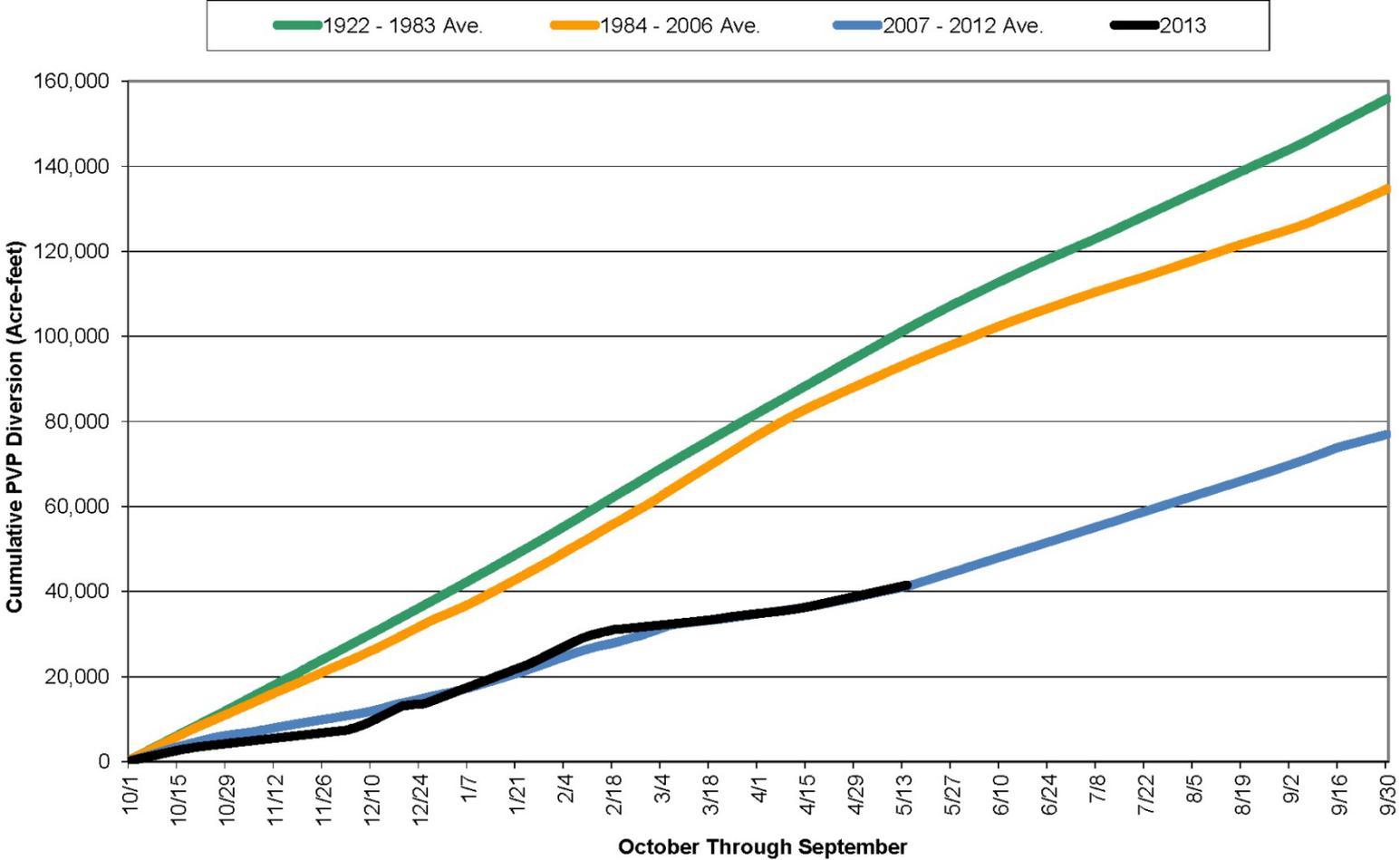
Potter Valley Project

- Lake Pillsbury & Potter Valley Project Operated by PG&E
- Project transfers have declined following 2004 amendment to FERC license

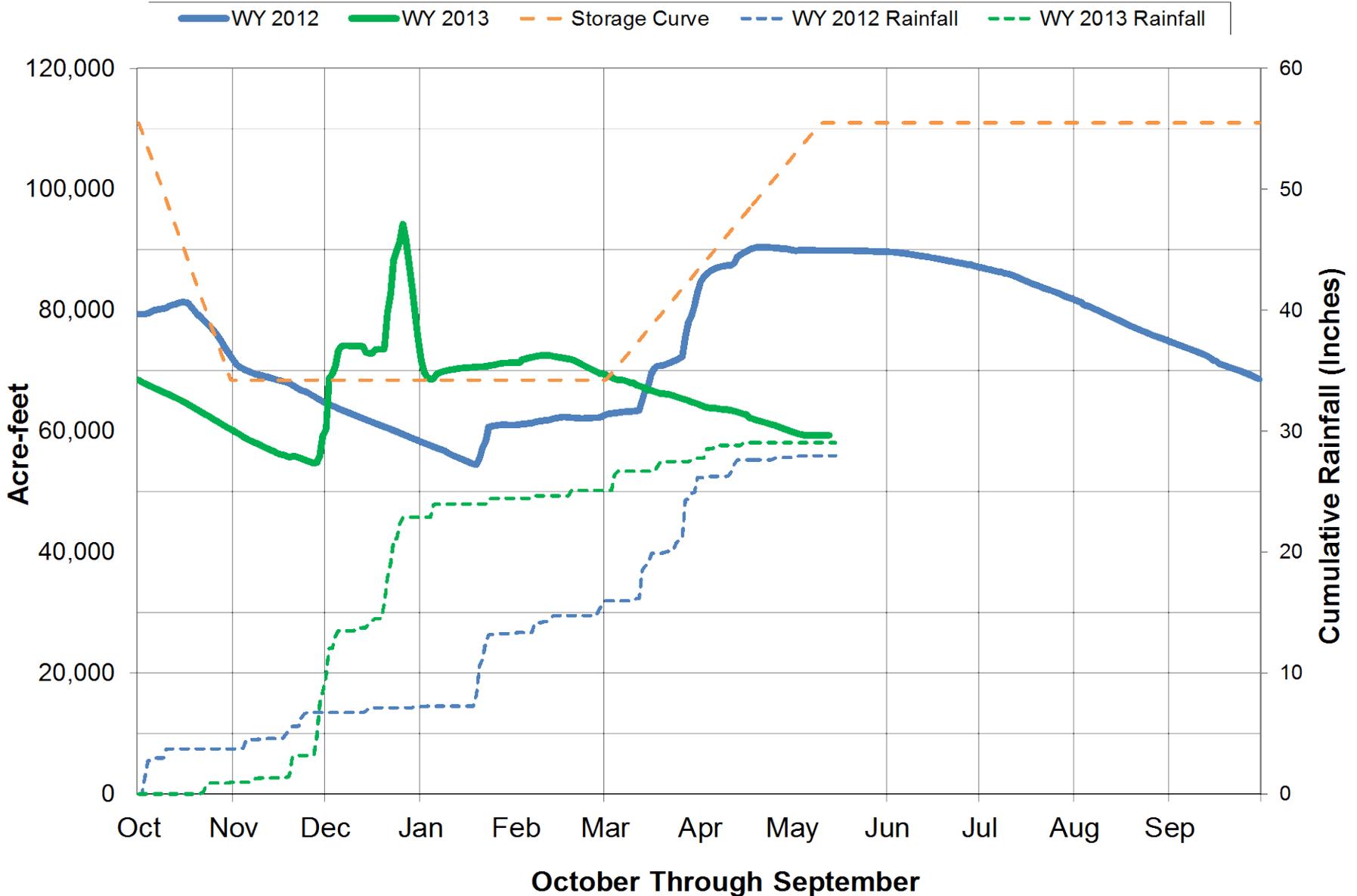


Declining Transfers from Potter Valley

Cumulative Diversion To Potter Valley Project By Water Year



Lake Mendocino 2012 & 2013 Storage Comparison

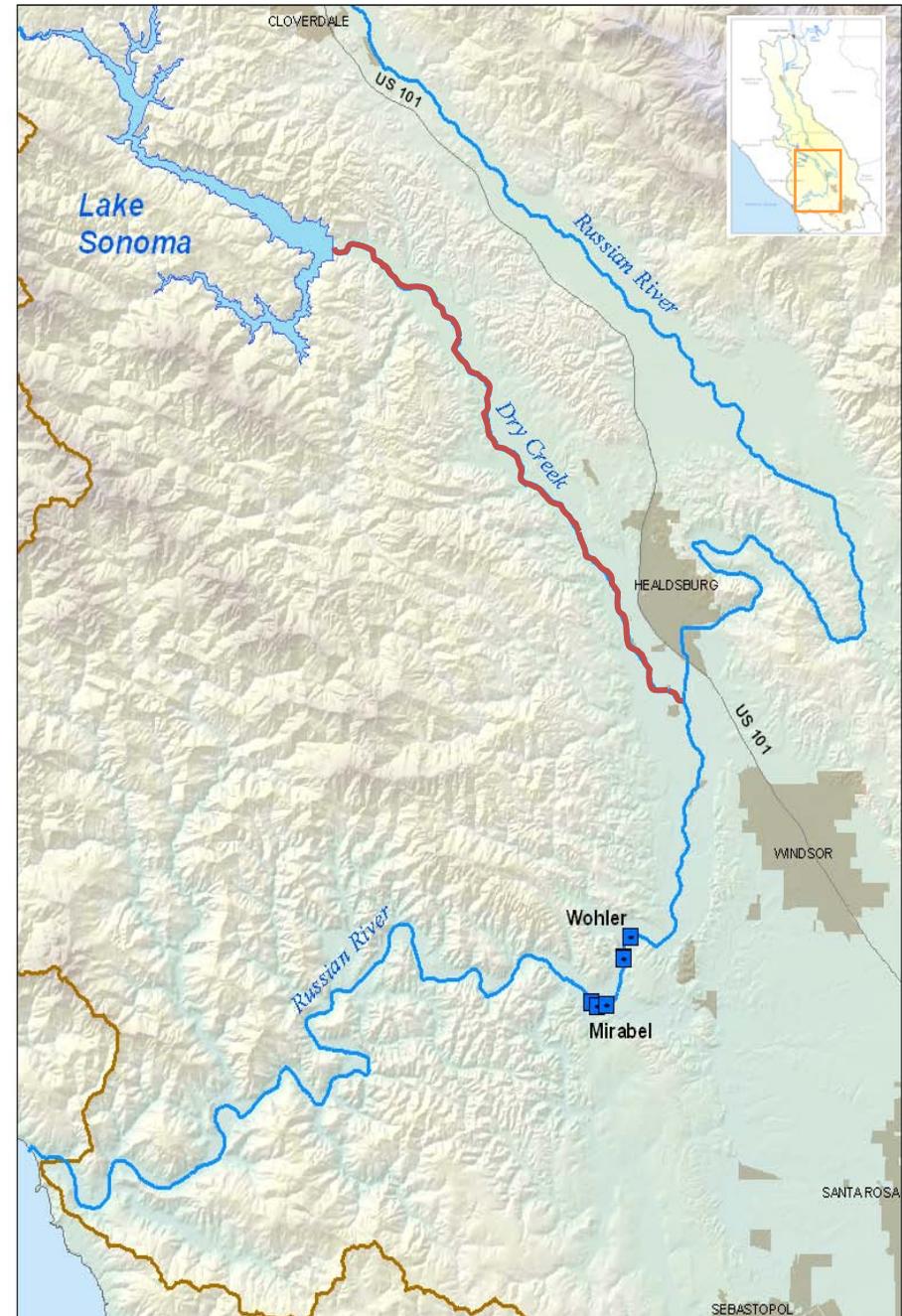


SWRCB Issues Order Approving Temporary Change in D1610

- **Temporary Urgency Change Permit filed by SCWA**
- **Reduce flows to Dry/Critical Water Supply Conditions**
- **Similar filings in 2004, 2007 and 2009**
- **Key Provisions:**
 - **Directs Water Agency to work with other Russian River water users to prepare a Water Supply Reliability Study**
 - **Perform extensive water quality and fisheries monitoring**
- **Work Closely with City staff & other water contractors**

Dry Creek Summer Flow Restrictions – Biological Opinion

- Reduced releases from Lake Sonoma to meet summer demands
- Some allowances while BO is implemented
- Habitat enhancements may result in increased releases from Lake Sonoma
- By-pass pipeline will be required if habitat enhancements are not successful



Our Key Water Supply Challenges...

Ensure Water Supply Reliability

Changing Regulations, Drought, Growth

Maintain Operational Reliability

Water Quality, Aging Infrastructure

Improve Resilience Against Natural Hazards

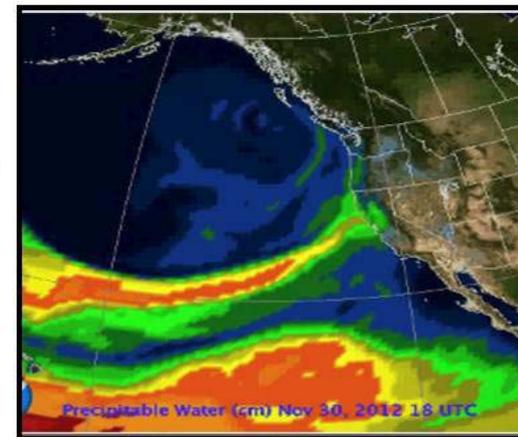
Seismic Hazards, Extreme Weather Events

Adapt to Climate Change

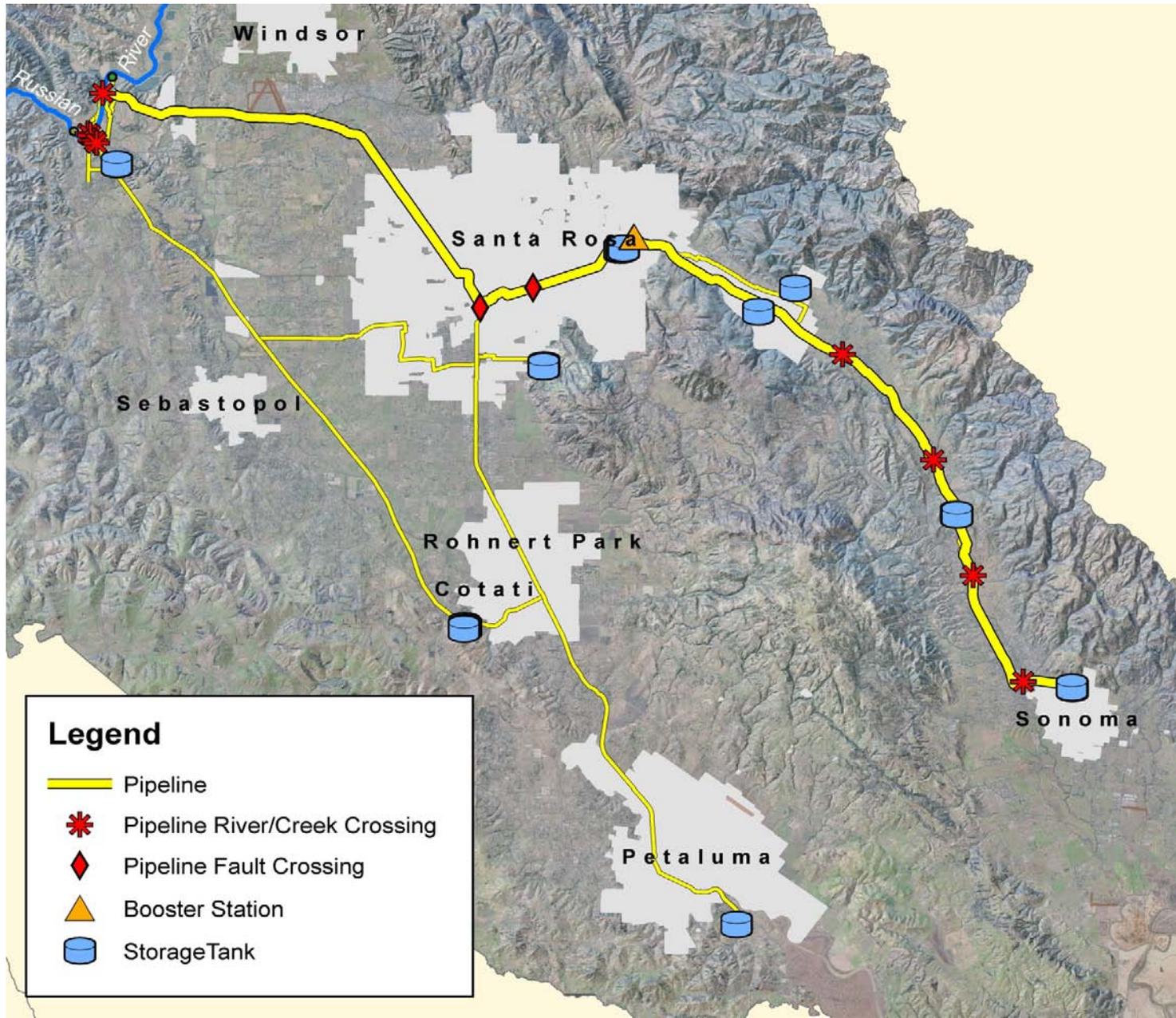
Climate Variability, Sea Level Rise, Habitat Changes, Increased Water Demand (ET, soil moisture)

Ensure Affordability & Stable Funding

Conservation vs. Rates, Increased Regulations



Seismic Hazard Projects



USGS-SCWA Climate Change Study

- Downscale future climate change scenarios
 - Spatially - 270 m
 - Temporally - 1 day timestep

- 2 Global Climate Models

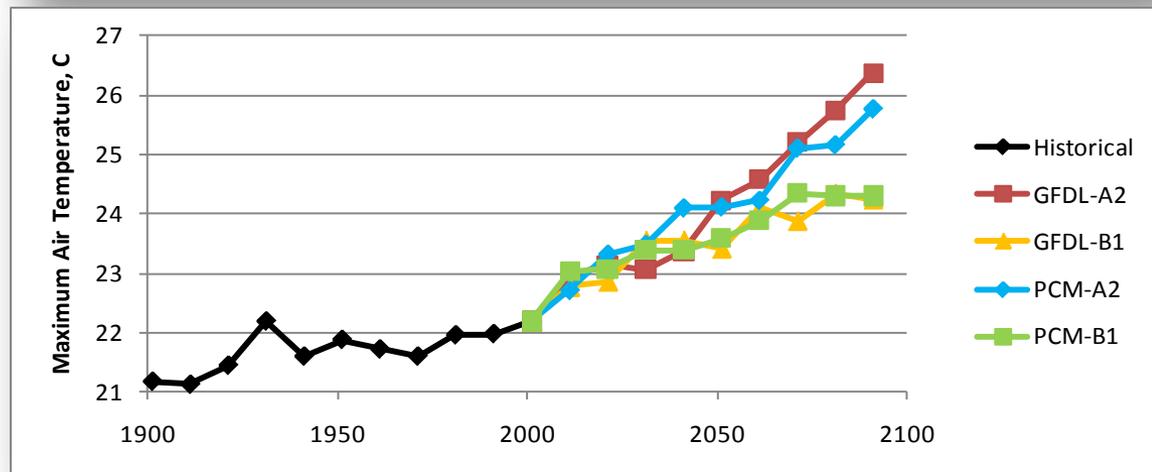
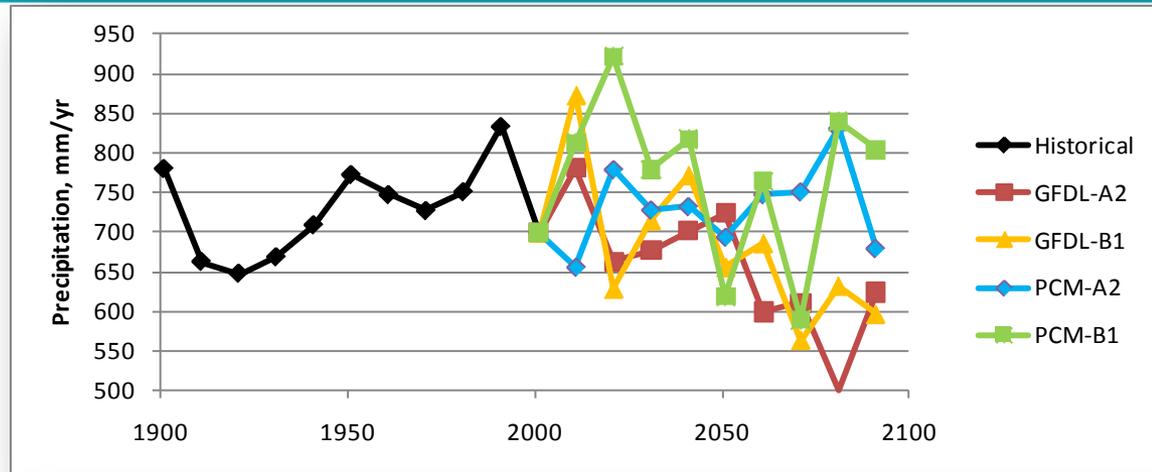
1. Parallel Climate Model
2. NOAA GFDL

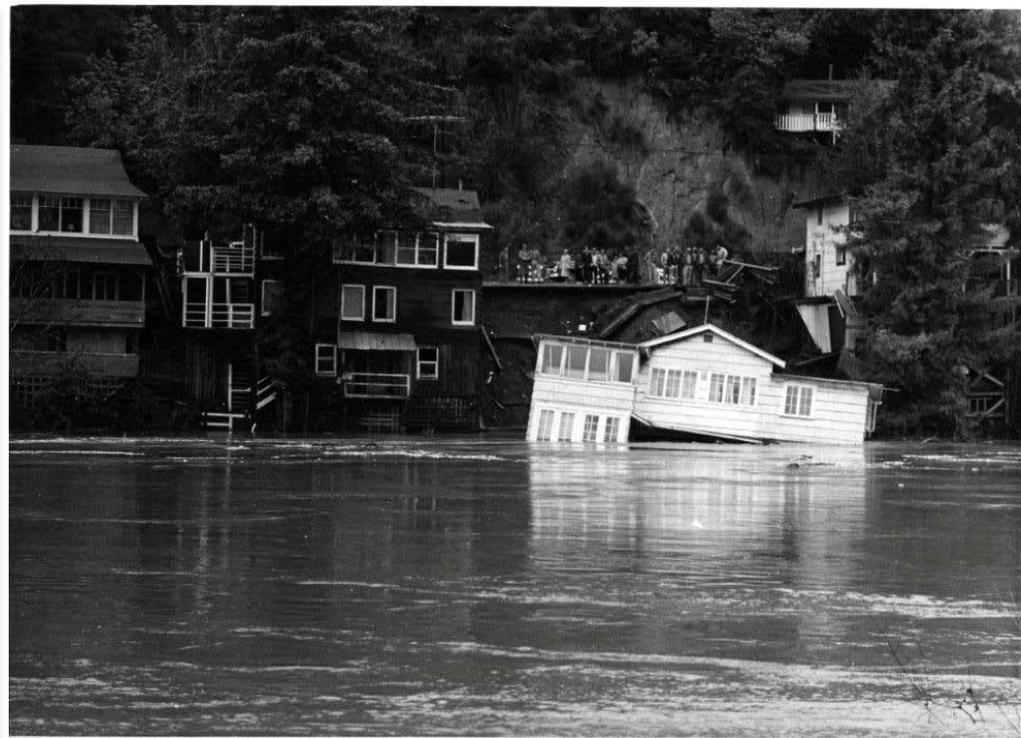
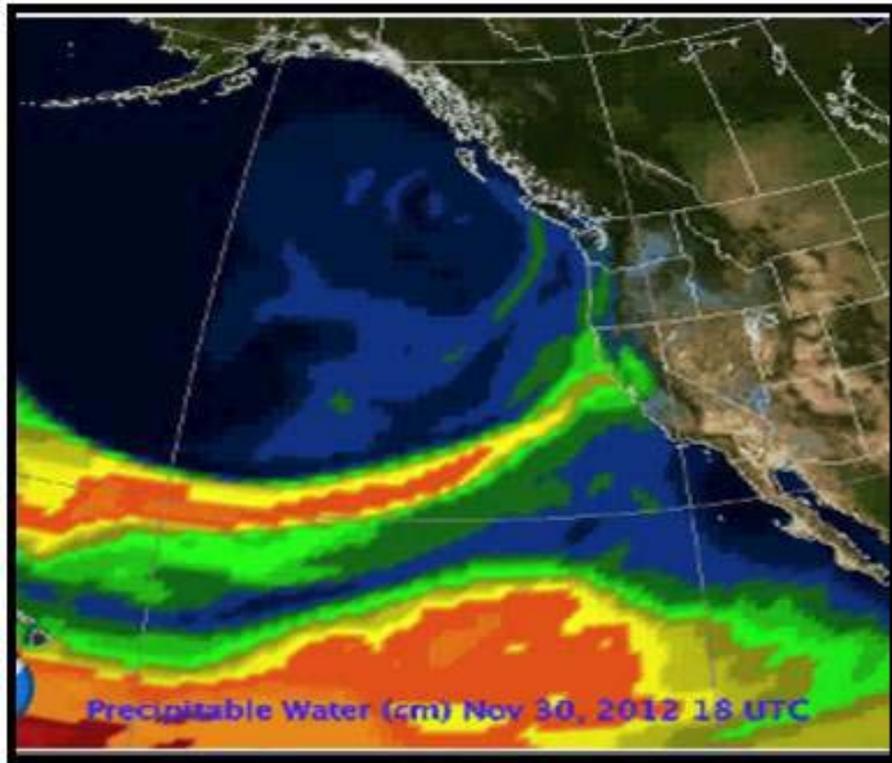
- 2 Scenarios

1. A2 - medium high emissions
2. B1 - low emissions

- Evaluate Impacts to:

- ❖ Hydrology of the Russian River using the USGS Basin Characterization Model
- ❖ Water Supply of the Russian River System
- ❖ Santa Rosa Plain Groundwater Aquifer





It's All or Nothing!



Adapting To Meet These Challenges

- Reduced Potter Valley Diversions (2005-06)
- Biological Opinion (Sept. 2008)
- Economic Downturn Beginning 2008

SCWA's Response

- 2009 Workshops Providing Comprehensive Review: Water Resources, Facilities & Management
 - ✧ Identified Key Challenges
 - ✧ Identified 12 Strategies to Meet Challenges
- Termination of "Water Project" (Sept. 2009)



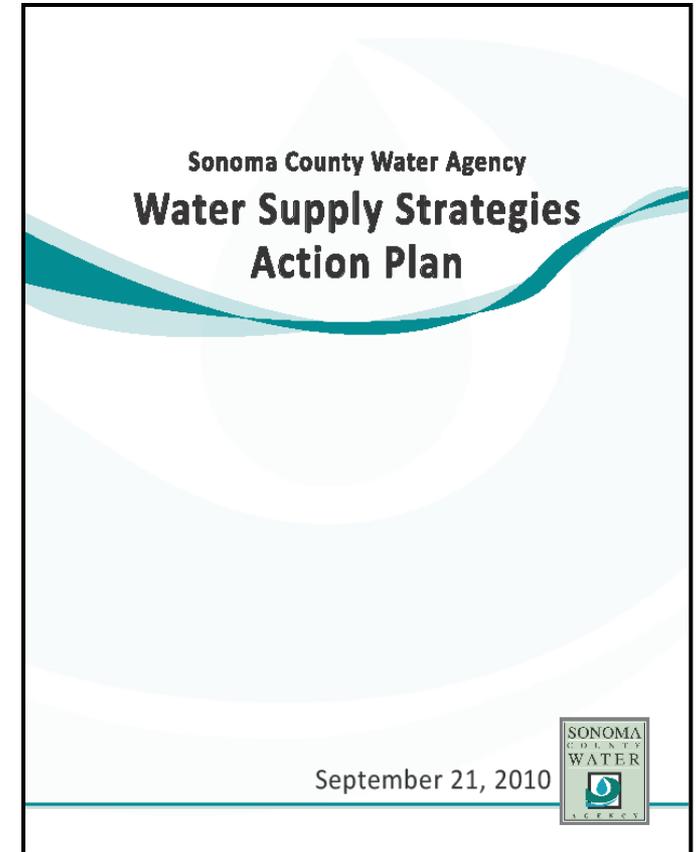
Outreach Program: 2009 - 2010

- Board Directed Staff to Conduct Outreach Regarding Strategies
- 2 Phases of Outreach
 - First Phase: Challenges & Strategies
 - Result: Reduced Strategies from 12 to 9
 - Second Phase: Water Supply Strategies Action Plan
- Dozens of Meetings & Hundreds of Comments
- First Plan Approved in 2010



Water Supply Strategy Action Plan

- Plan adopted
September 2010
- 16 months outreach
- Dozens of meetings,
hundreds of
comments
- Updated 2011 & 2013



Water Supply Strategies Action Plan: Framework for Regional Integrated Planning

- Nine strategies with prioritized actions
 - ✧ Immediate Actions
 - ✧ Near-term Actions
 - ✧ Long-term Actions
- Each Action: 1 or more projects. Status & involved parties described
- A living document

Water Supply Strategy Three

EVALUATE POTENTIAL CLIMATE CHANGE
IMPACTS ON WATER SUPPLY & FLOOD PROTECTION

Immediate Action One:

Initiate climate change modeling for Russian River and Sonoma Valley watersheds.
A. Project: Develop Model
Develop predictive model for Sonoma Valley and Russian River watersheds that downscales large climate models to local watershed scale. Model will consider effects of fog and provide hydrology input to Agency's model (ResSim) and to Sonoma Valley and Santa Rosa Plain groundwater models.
STATUS: To be completed in Fall 2010 or Winter 2011.
Involved Parties:

- U.S. Geological Survey (USGS), Regional Climate Protection Authority

Immediate Action Two:

Support development of Hydrometeorology Test bed (HMT) for the Russian River basin.
A. Project: Support Federal Partners
Support federal agencies in installing additional weather sensors to provide more accurate forecasting. Could help reservoir operations and result in water supply benefits.
STATUS: NOAA is leading effort to secure pilot project funds in 2011 federal funding cycle.
Involved Parties:

- NOAA, USACE, USGS, National Weather Service

Near Term Action One:

Develop Adaptation Measures
A. Project: Develop Reliability Actions
Once climate change predictive modeling is complete, develop actions to increase reliability of water supply, reservoir and river management, conjunctive use, and saline water management.
Involved Parties:

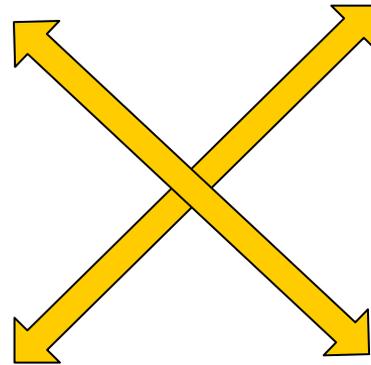
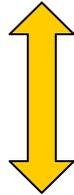
- USACE, Regional Climate Protection Authority, Water Contractors

Long-Term Action One:

Update Climate change analysis.
A. Project: To be determined
Based on advances in scientific understanding of climate processes and predictive modeling.
Involved Parties:

- USGS, Regional Climate Protection Authority

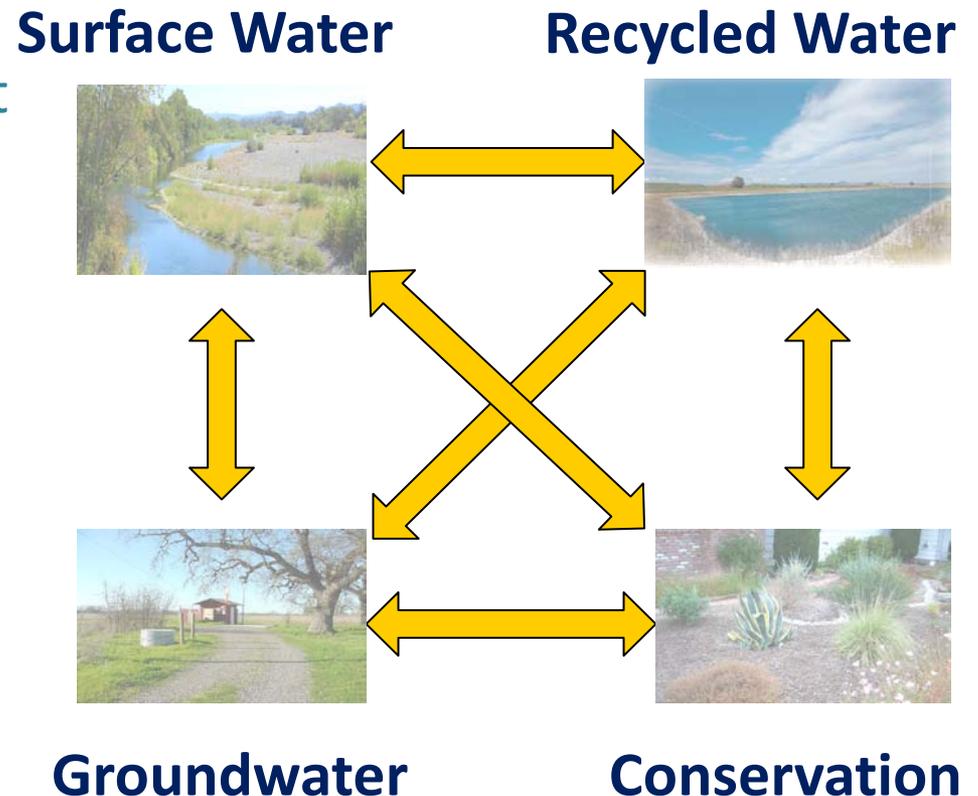
Integrated Water Management: 4 Ways to Meet Water Supply Demands

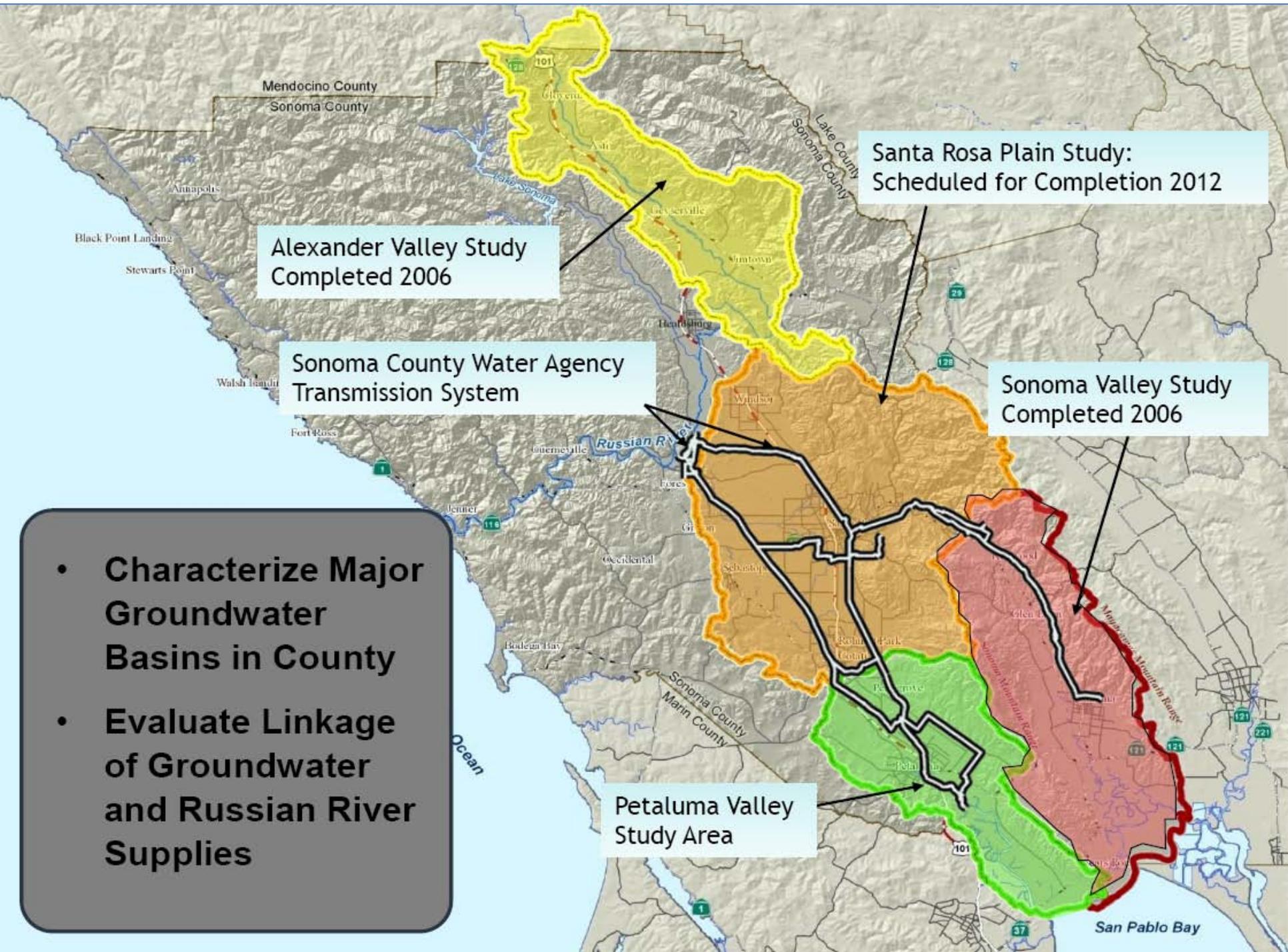


How Is Integrated Management Implemented In Sonoma Valley?

Goal: Increase Resiliency of Water Resources & Augment Russian River Supplies

- Groundwater Management
- Conservation
- Recycled Water
- Conjunctive Management of Surface & Groundwater





Santa Rosa Plain Study:
Scheduled for Completion 2012

Alexander Valley Study
Completed 2006

Sonoma County Water Agency
Transmission System

Sonoma Valley Study
Completed 2006

- Characterize Major Groundwater Basins in County
- Evaluate Linkage of Groundwater and Russian River Supplies

Petaluma Valley
Study Area

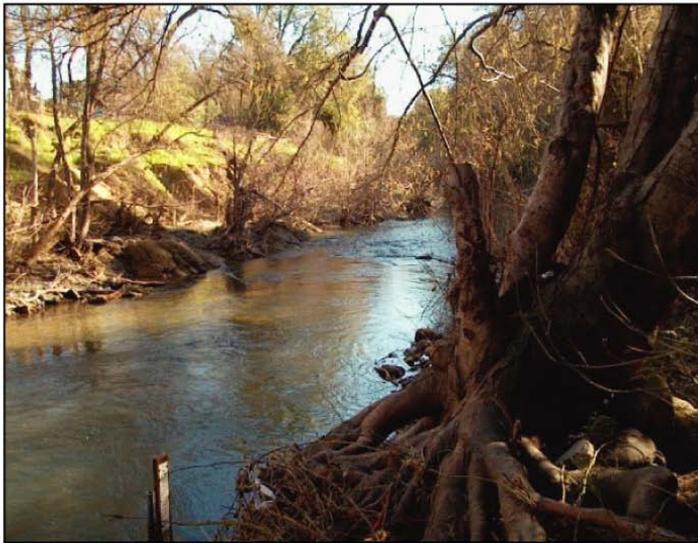
San Pablo Bay

Agency/USGS Sonoma Valley Groundwater Study



In cooperation with the
SONOMA COUNTY WATER AGENCY

**Geohydrological Characterization, Water-Chemistry,
and Ground-Water Flow Simulation Model of the
Sonoma Valley Area, Sonoma County, California**



Scientific Investigations Report 2006-5092

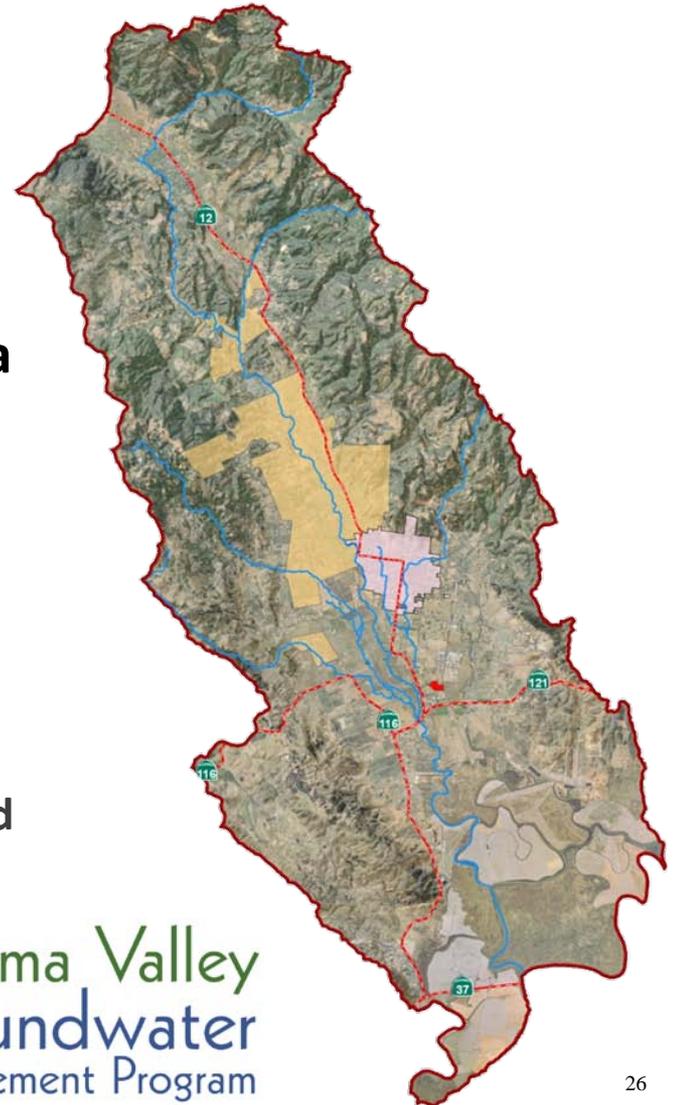
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Key Findings:

- **Increased pumping between 1975-2000 (6,000 to 8,500 acre-ft/year)**
- **Localized decline of groundwater levels**
- **17,000 acre-ft decline groundwater storage**
- **Salinity issues in southern part of Valley**
- **Numerical Model - Evaluate data gaps & simulate future conditions**

Overview of Sonoma Valley Groundwater Management Program

- **Convened Stakeholder Group in June 2006**
 - Agricultural alliances, environmental organizations, water purveyors, and residential groundwater users
- **Groundwater Management Plan Adopted by Sonoma County Water Agency, City of Sonoma & Valley of the Moon Water District in Late 2007**
 - Non-Regulatory and Collaborative Process
 - Letters of Support and Endorsement received from Mission Highlands Mutual Water Company, Sonoma County Water Coalition, Sonoma Ecology Center, and the Sonoma Valley Vintners & Growers Alliance
- **Five Years of Implementation**



Groundwater Management Program Funding

- Local Cooperative Funding Agreement

- SCWA, City of Sonoma, VOMWD, SVCSD and County

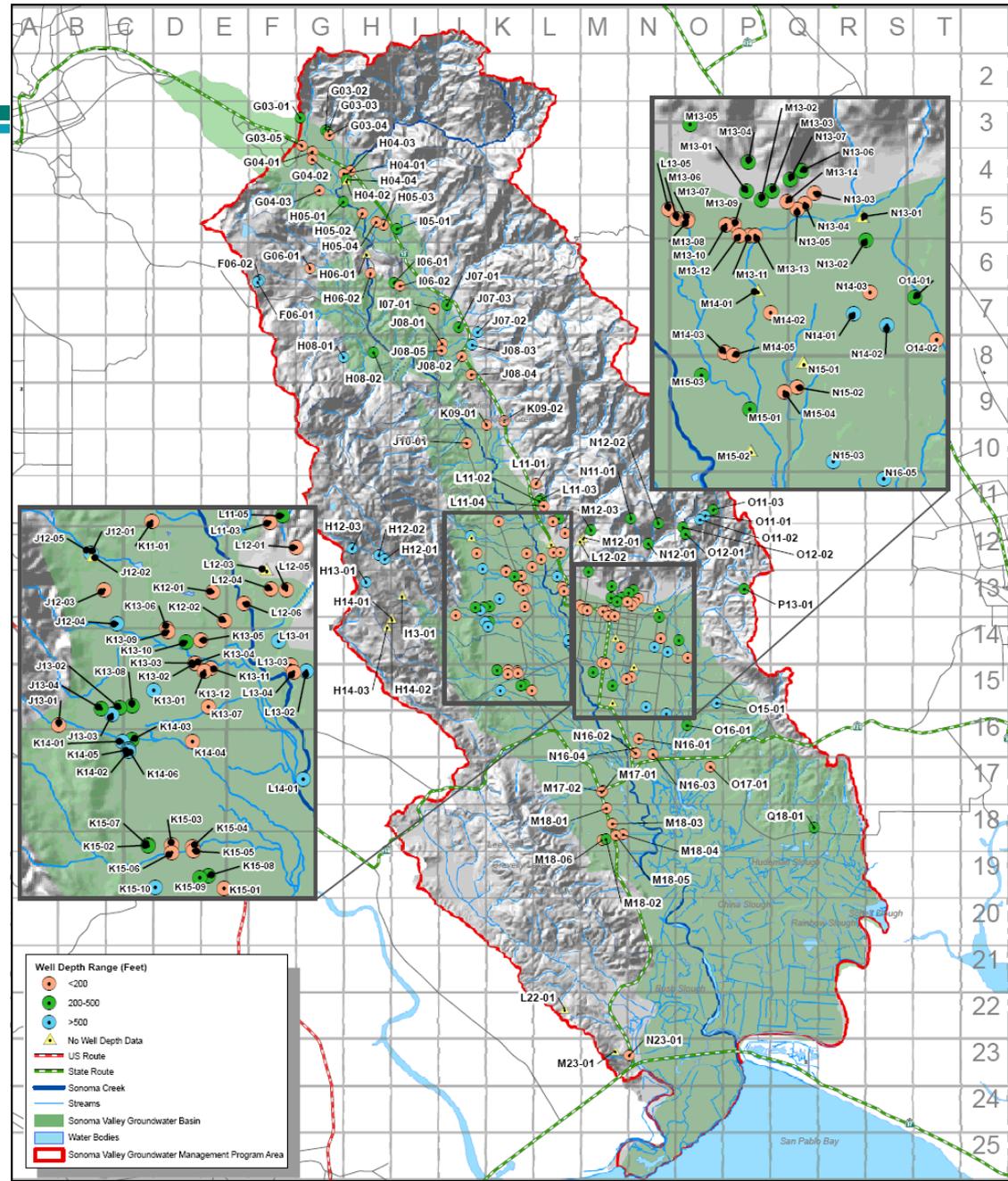
- DWR Memorandum of Understanding

- Facilitation Services For Plan Development
- Continuing Technical Assistance for Program Implementation



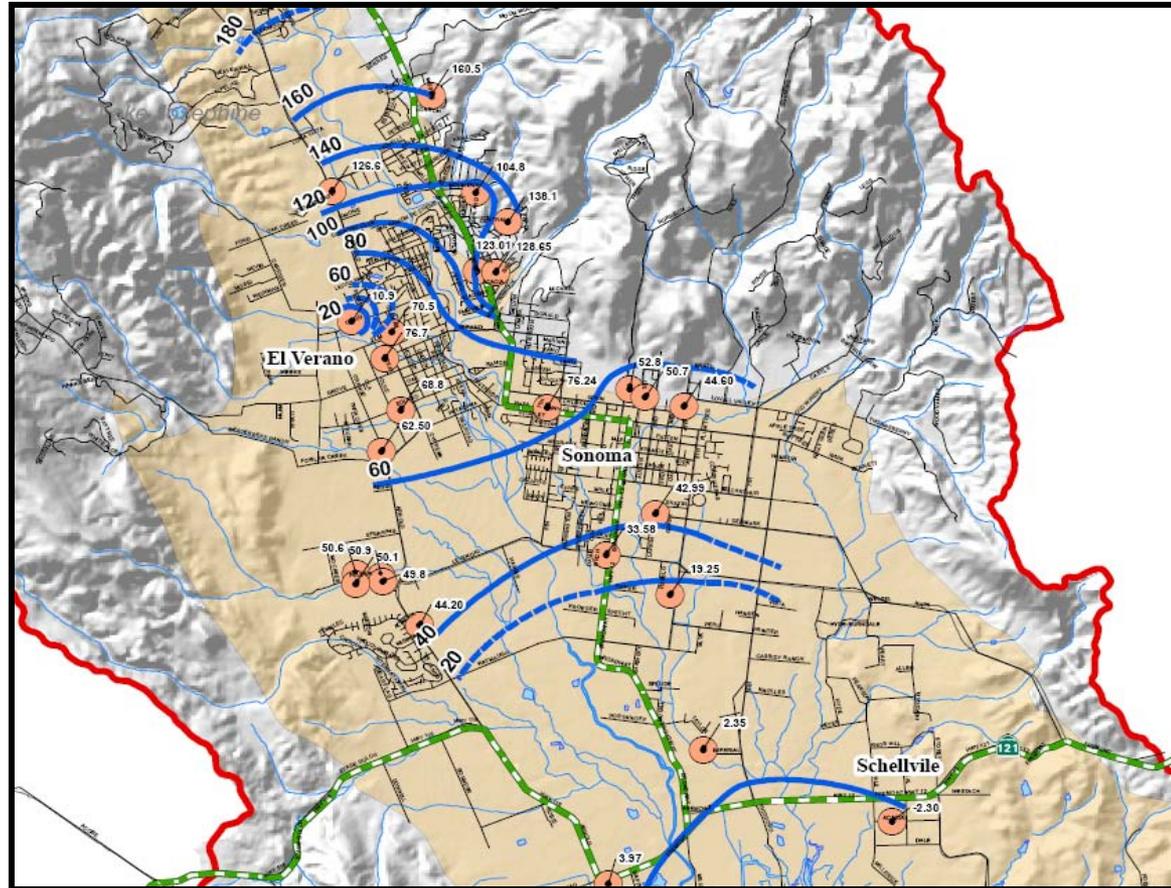
Voluntary Groundwater-Level Monitoring

- **80** - New Wells since 2007
- **140** - Wells with Synchronized Monitoring
- **Groundwater Levels Only**
- **Track and Assess Seasonal and Long-term Trends**
- **Incorporated subset of wells into CASGEM Program**



Groundwater Conditions

- Shallow-Zone wells generally stable and above sea level
- Localized areas of declining groundwater levels mainly observed in Deeper-Zone wells
 - El Verano Area
 - Southeast of City of Sonoma
- Groundwater-levels are locally below sea level

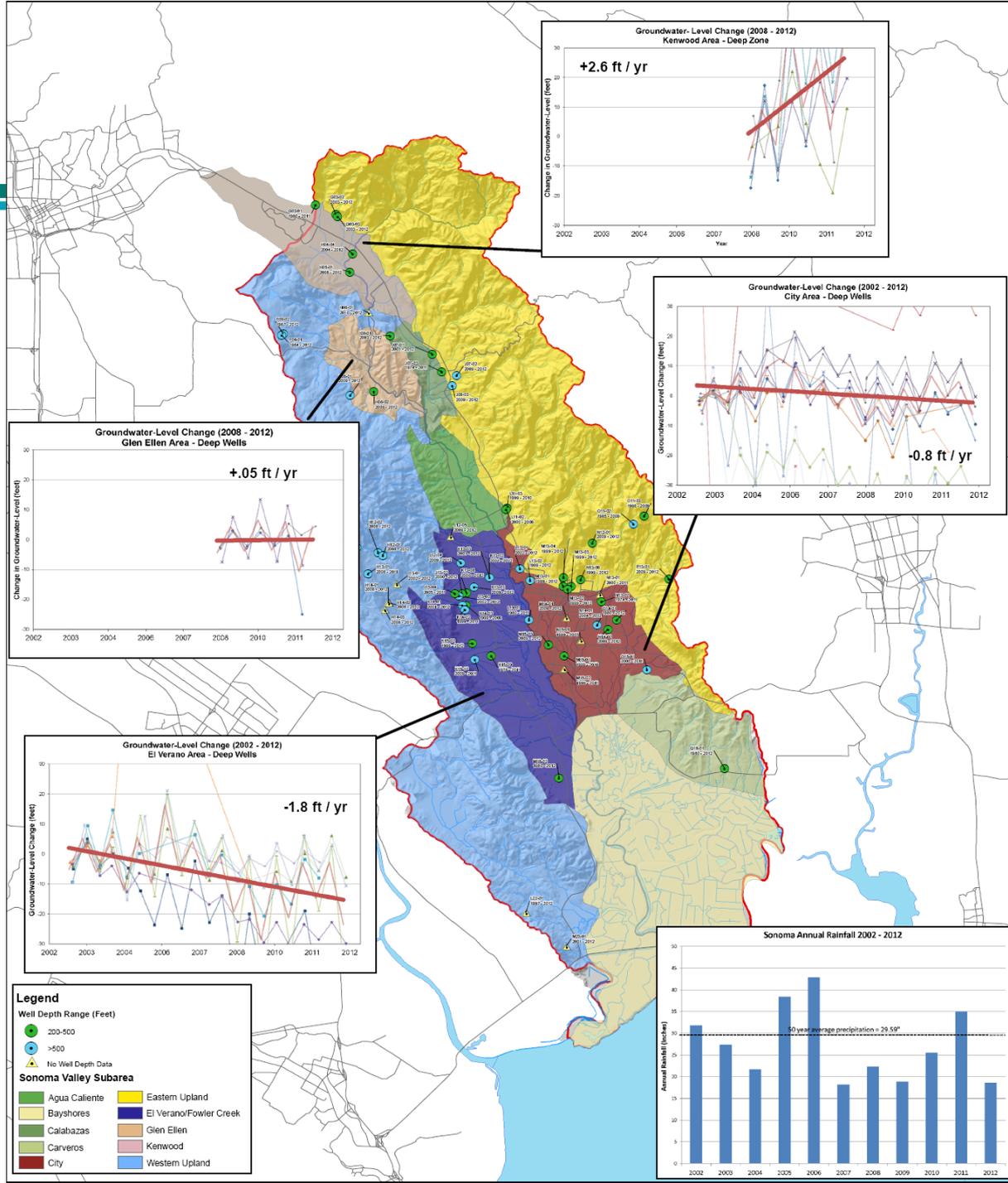


Groundwater-Level Changes by Subarea

2002 to 2012 Deep-Zone Wells

➤ Declining trends persist

- El Verano: ~1.8 ft/yr
- Southeast of the City of Sonoma: ~0.8 ft/yr

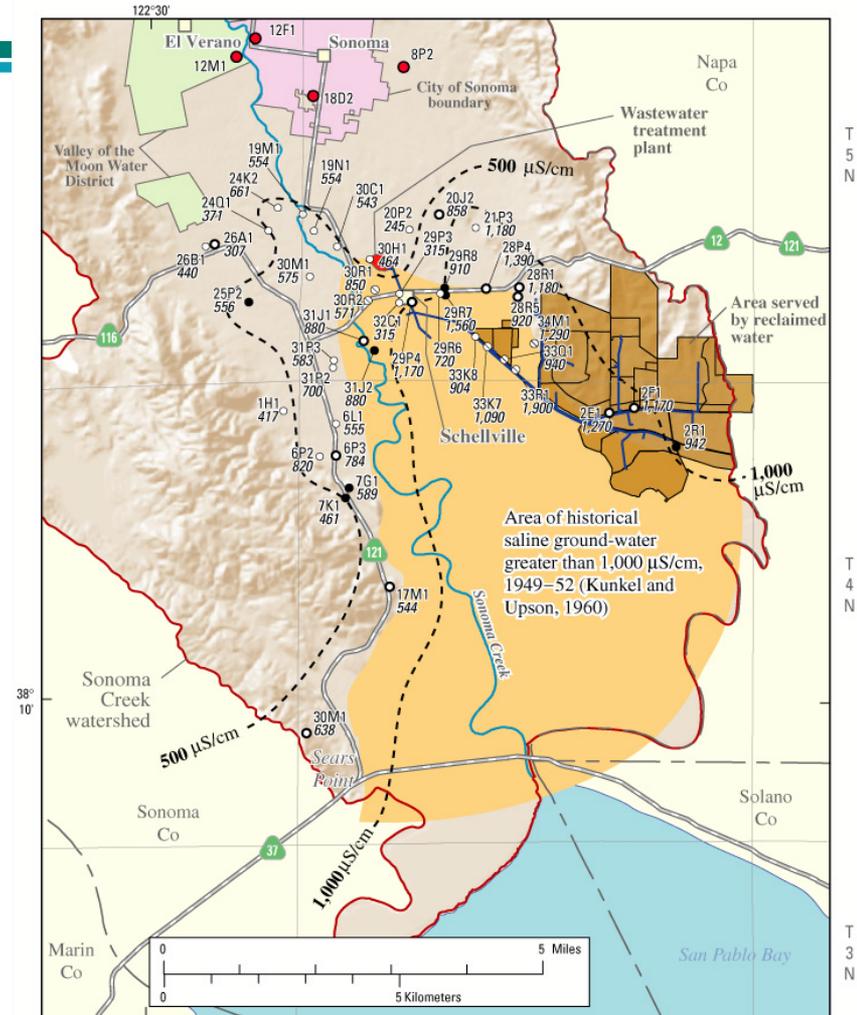


Salinity In Southern End of Sonoma Valley

Groundwater Quality Generally Acceptable

Localized Issues:

- Salinity
- Thermal Water

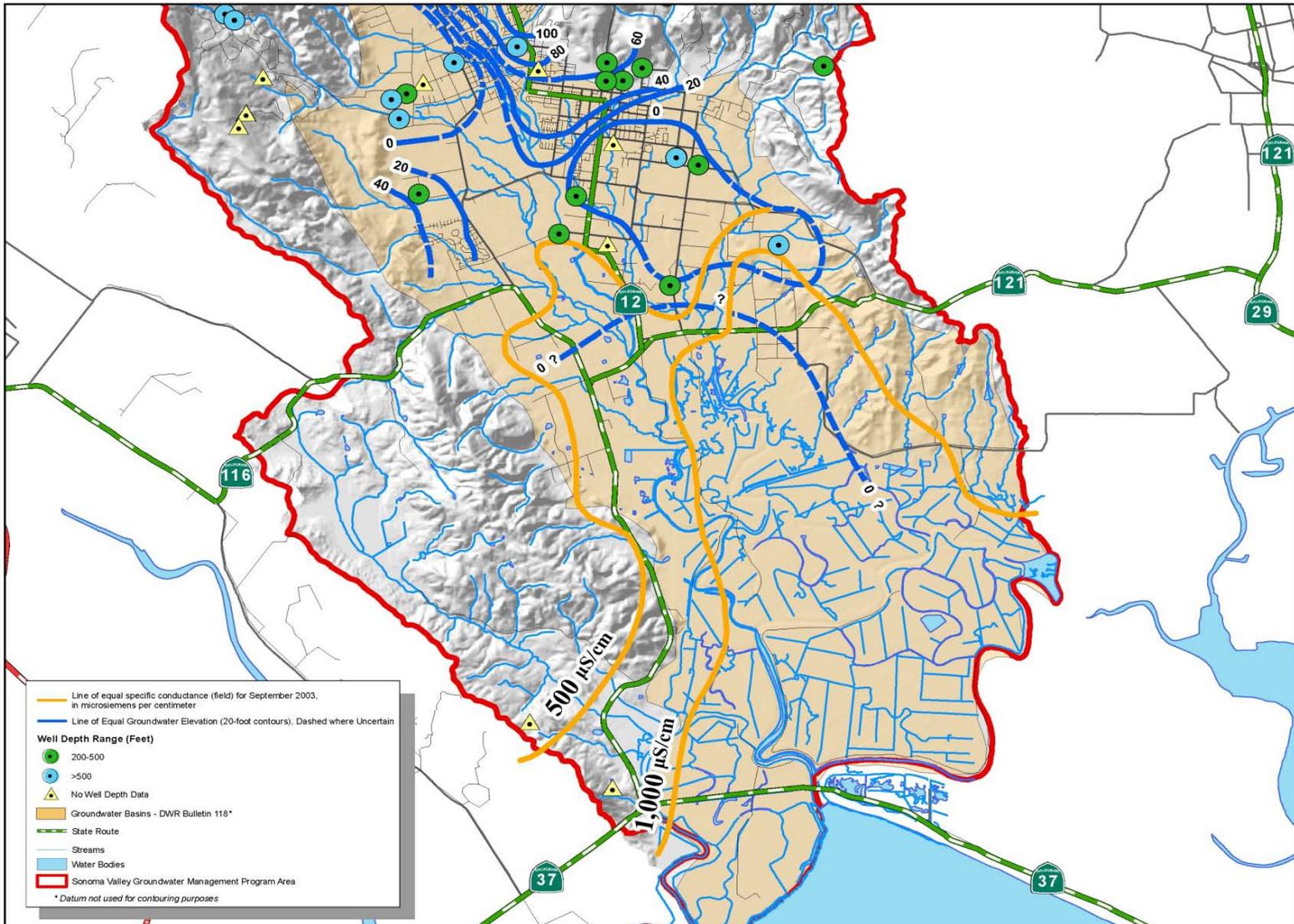


Base from U.S. Geological Survey digital data, 1:250,000, 2003. State Plane Projection, Fipzone 402. Shaded relief base from 1:250,000 scale Digital Elevation Model; sun illumination from northwest at 30 degrees above horizon

EXPLANATION

- Reclaimed water distribution system
- - - Line of equal specific conductance (field) for September 2003, in microSiemens per centimeter
- 18D2 Well and identifier—Near City of Sonoma with specific conductance greater than 500 microSiemens per centimeter, as measured by CADWR 2002–04
- Well and identifier—Number in italics is specific conductance in microSiemens per centimeter, measured by USGS 2003
 - 30H1 Well depth less than 200 feet
 - 464 Well depth less than 200 feet
 - 17M1 Well depth between 200 and 500 feet
 - 544 Well depth between 200 and 500 feet
 - 31J2 Well depth greater than 500 feet
 - 880 Well depth greater than 500 feet
 - 33K7 Well depth unknown
 - 1,090 Well depth unknown

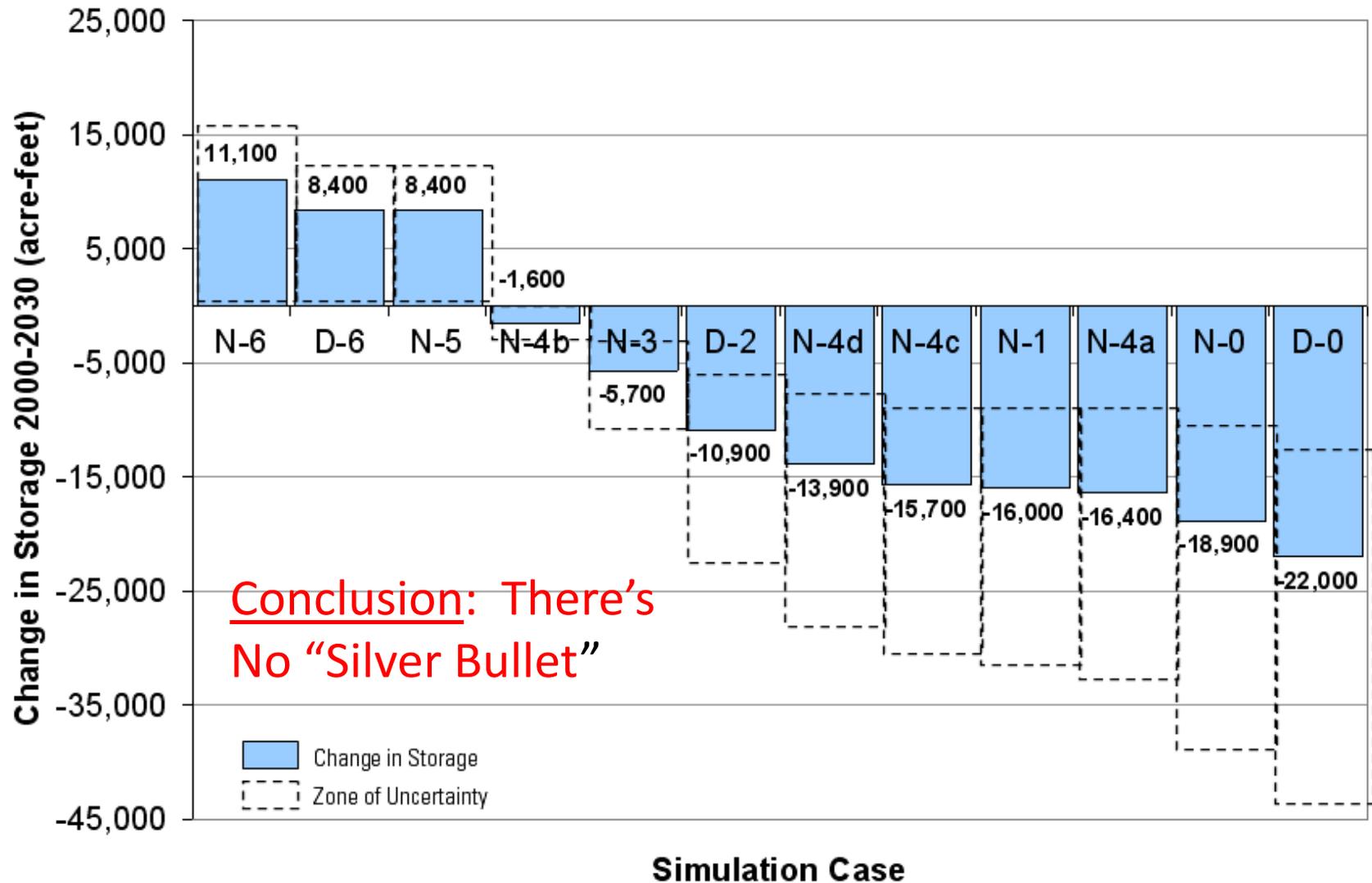
Groundwater Declines & Salinity Concerns



Basin Advisory Panel Planning Scenarios

- **Used groundwater model to identify management actions via scenario development**
- **Baseline conditions – Weather, Land Use, Population**
- **Run model forecasts in future, model estimates change in groundwater storage**
- **Apply various management actions to mitigate impacts**

What Did We Learn?



Basin Advisory Panel Recommended Management Strategies

- **CONSERVATION** of Urban, Non-Urban, & Agriculture
- **RECYCLED WATER** use to offset groundwater pumping
- **BANKING** Russian River water to recharge groundwater basin
- **STORMWATER** to recharge of groundwater

Sonoma-Marin Saving Water Partnership

- Regional Coordination for Implementation of Water Conservation Programs
- Allocates annual funding levels for Partners
- Provides mechanism for Regional Alliance to comply with State 20 x 2020 legislation
- Programs include: Public Awareness Campaigns, Green Business Program, the Qualified Water Efficient Landscaper Programs, Water Education Program, and Garden Sense



Water Use Efficiency Programs

- **Sonoma Valley County Sanitation District (SVCSD)**
 - High-Efficiency Fixture Direct Install Program
 - Water efficient commercial appliance rebates
 - Sustained Reduction Incentive
- **SVCSD: >\$500,000 (Direct Install Program – 10 Yrs)**
- **Groundwater Management Program Received NBWA Grant Water Conservation Grant – Rural Areas**
- **Grant Funding: Prop 84 Round 1: \$181,875**
 - Smart irrigation controller rebates, Cash for Grass rebates, Clothes Washer rebates)

Sonoma Valley Water Conservation Awards



- **Opportunity to highlight water conservation techniques**
- **Recognized for water conservation efforts by Basin Advisory Panel:**
 - Several residential homeowners, local businesses and schools for irrigated turf replacement, rainwater harvesting and water-smart gardening.
 - Sonoma Ecology Center and Southern Sonoma County RCD for public education efforts on water conservation workshops and demonstrations.
 - Several wineries and vineyard managers (Benziger Family Winery, Clarence Jenkins, Deerfield Ranch Winery, Mulas Family Farms and Gundlach Bundschu Winery) for water treatment and reuse, groundwater recharge, and water-use efficiency efforts.
 - Sonoma Community Center for Maloney Family Garden and rain-water harvesting.
 - City and VOMWD staff for assisting with outreach and implementing water conservation programs.



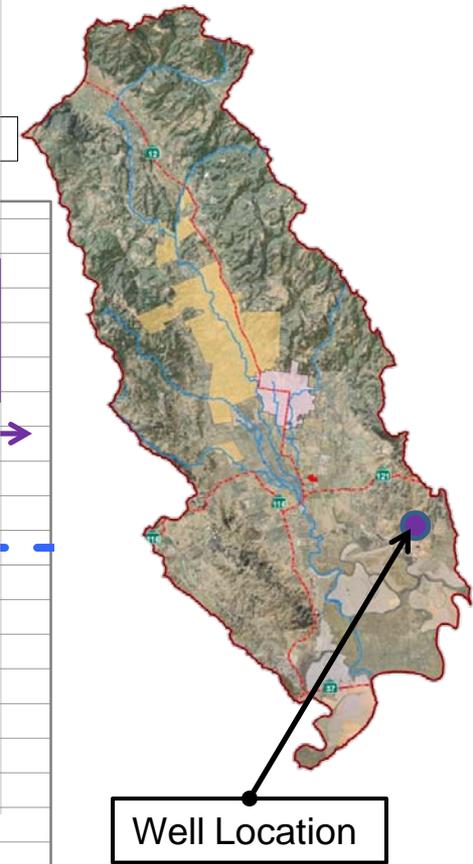
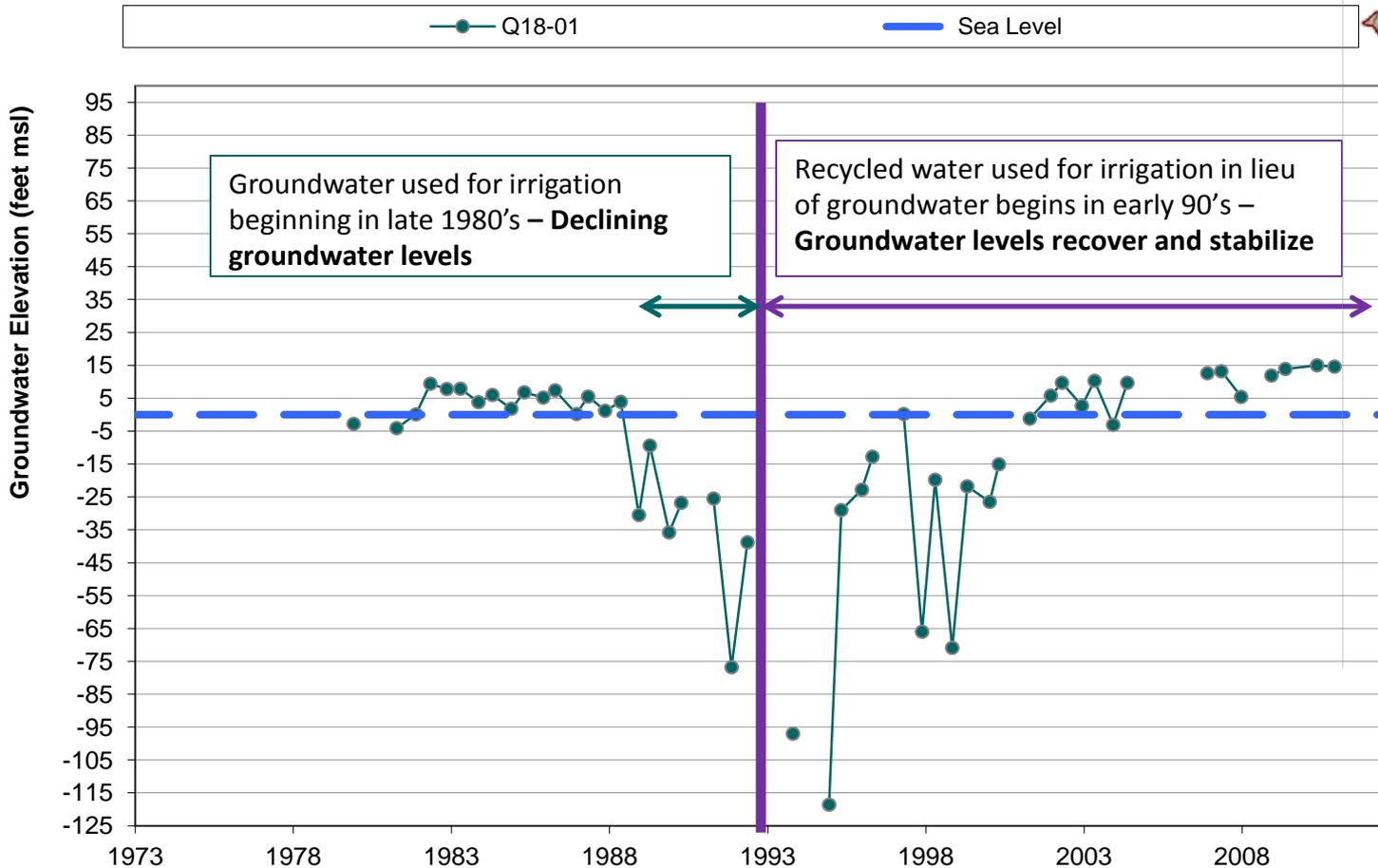
20 Gallon Challenge

- A call to action to all Russian River water users to reduce water use this summer by 20 gallons per day, per person.
- The outreach effort will include offering tangible conservation tips demonstrating what 20 gallons mean and how to save 20 gallons per day, per person.
- A pledge will be available for residents to sign to take the Challenge and enter into a prize drawing for water efficient prizes.
- Web page provides conservation tips along with a pledge.

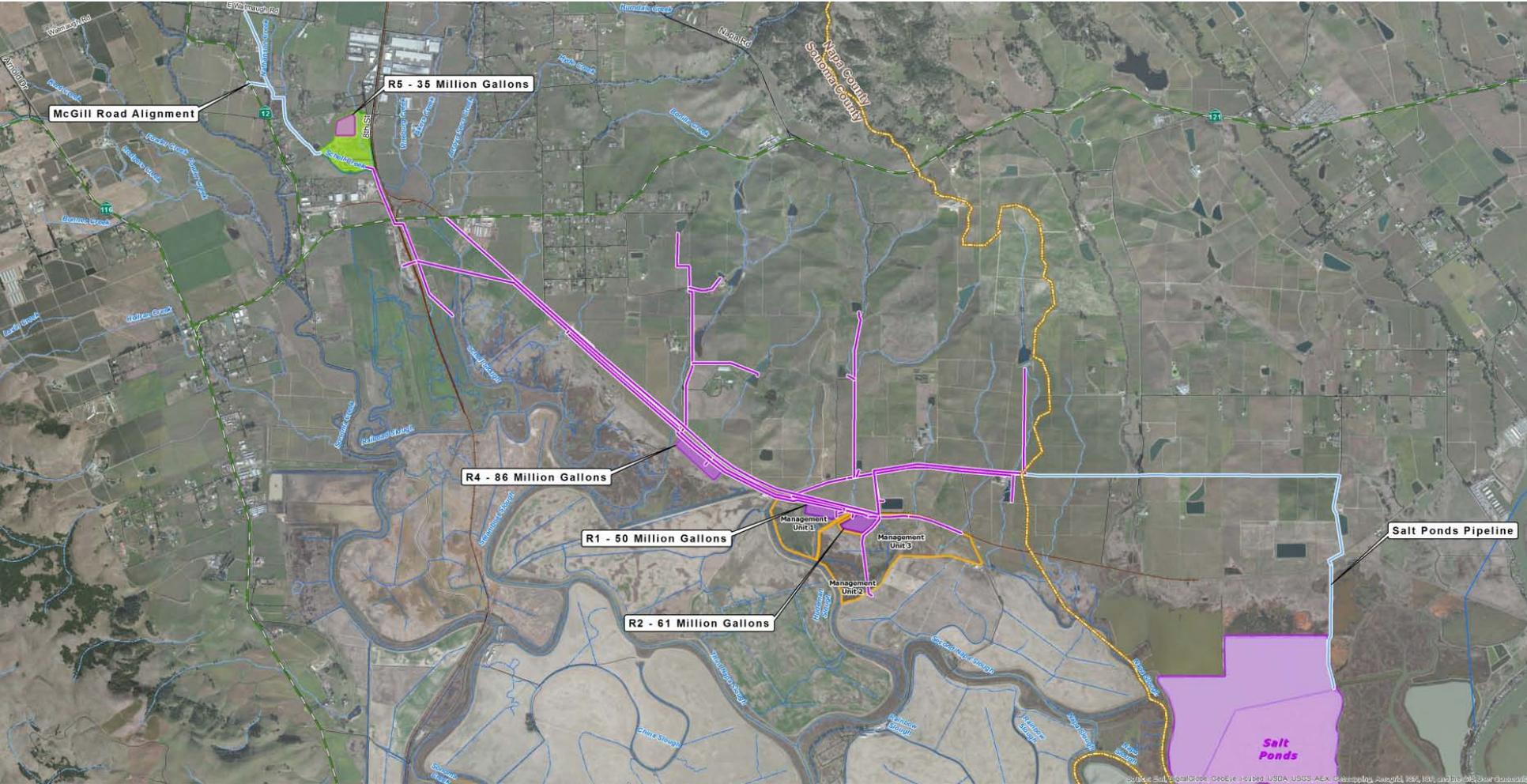
Visit www.20gallons.org to take the pledge

Irrigation with Recycled Water to Offset Groundwater Pumping

Groundwater-Level Hydrograph
Irrigation Well
Carneros Subarea

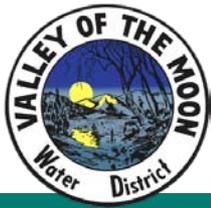


Sonoma Valley Recycled Water Projects



Conjunctive Management of Groundwater & Surface Water

- **Groundwater Banking of Winter/Spring Russian River Water**
- **Integrated Flood Control & Groundwater Recharge**



Feasibility Study - Groundwater Banking

2 Groundwater Basins: Sonoma Valley & Santa Rosa Plain

➤ Advantages/Benefits:

- Decreased summer flows in Dry Creek – protective of salmonids
- Increased drought and natural hazard reliability
- Improve adaptability to climate variations/change
- Fewer SCWA water supply & transmission facilities needed
- Decrease competition for local groundwater

➤ Challenges:

- Technical issues (aquifer & water quality suitability)
- Permitting
- Coordination of end users (groundwater management)

➤ Project Team:

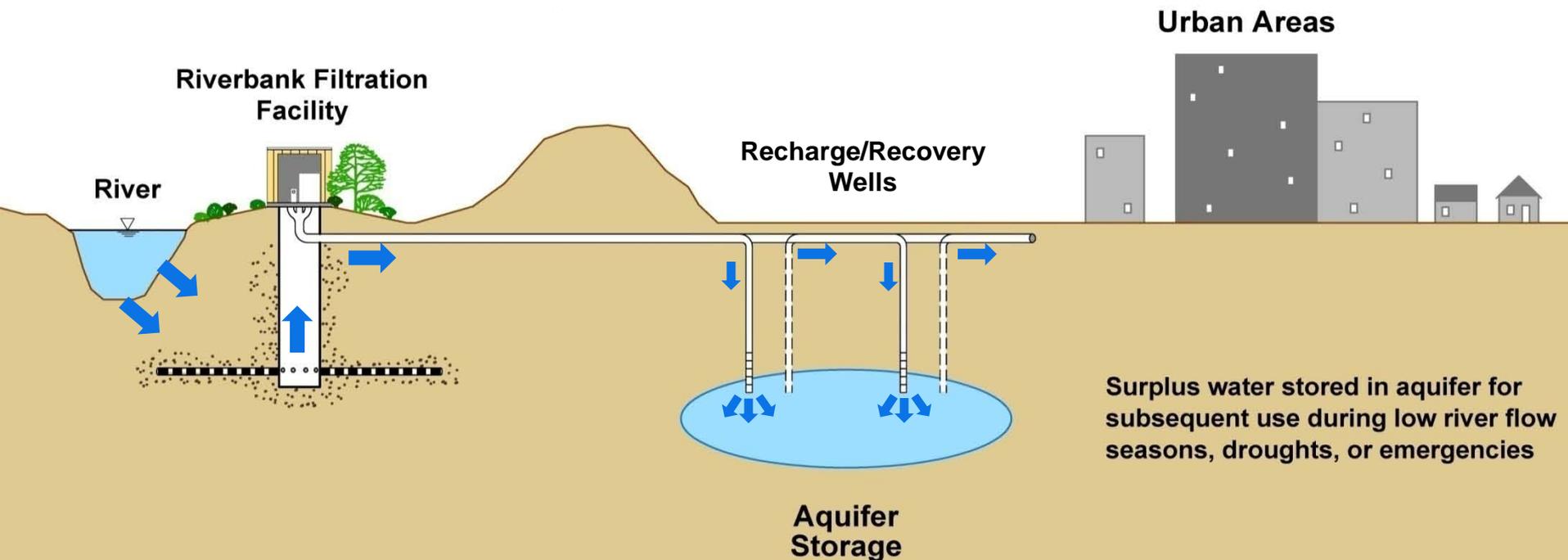


Parker
Groundwater

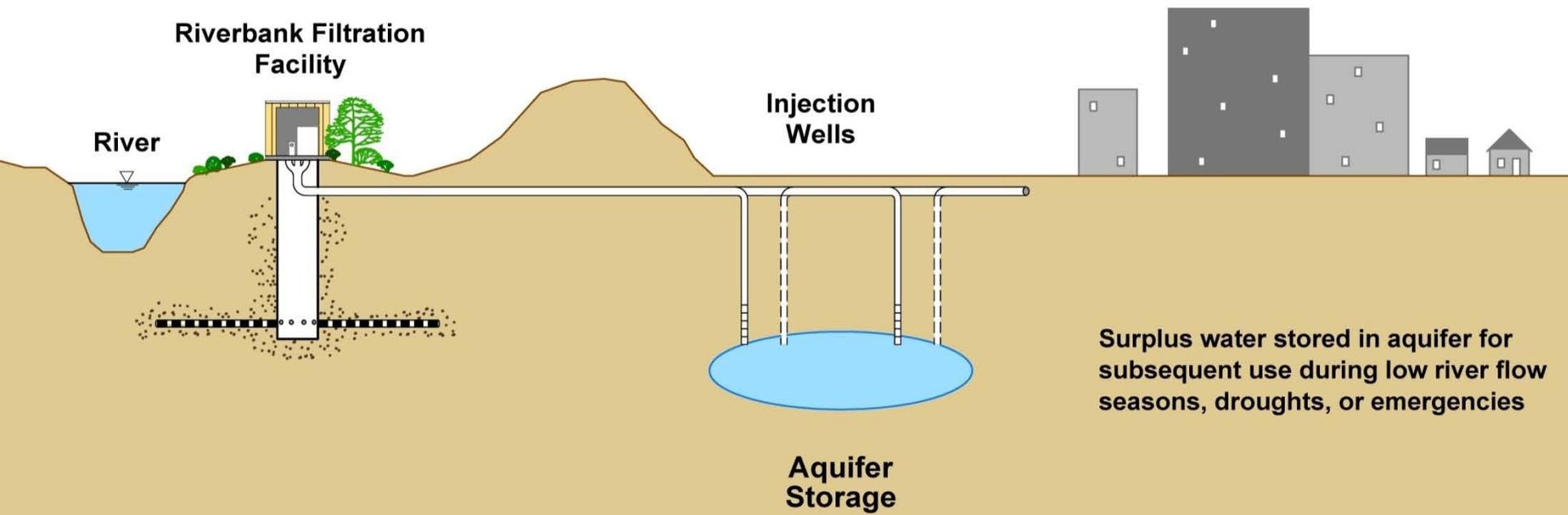
Conceptual Groundwater Banking Schematic

Aquifer Storage and Recovery

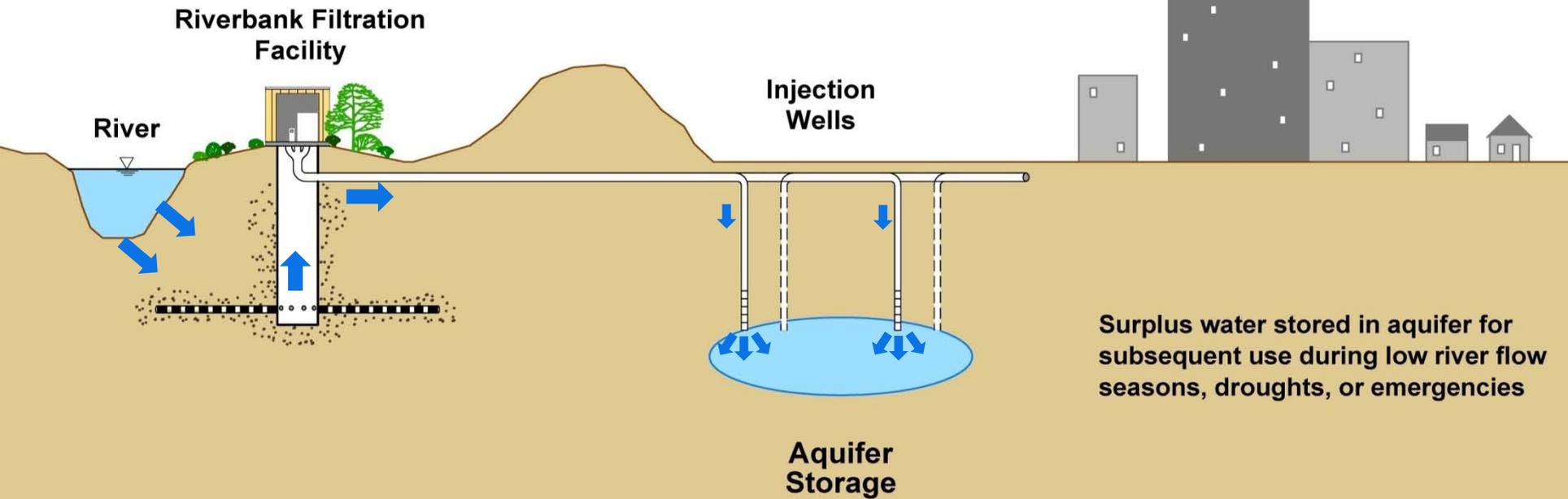
- Proceeding with Aquifer Storage and Recovery Concepts
- Geochemical compatibility assessment
 - Groundwater quality sampling and geochemical modeling
- Developing Work Plans for Pilot-Scale Demonstration Project(s)
- Explore funding options



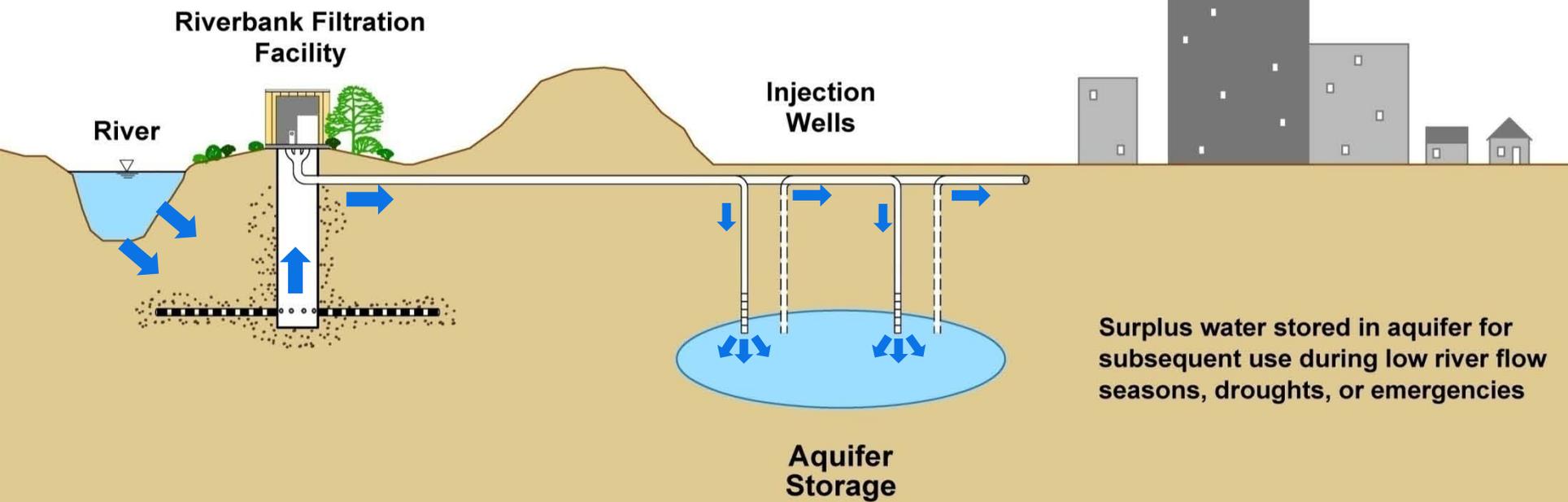
High River Flow Conditions



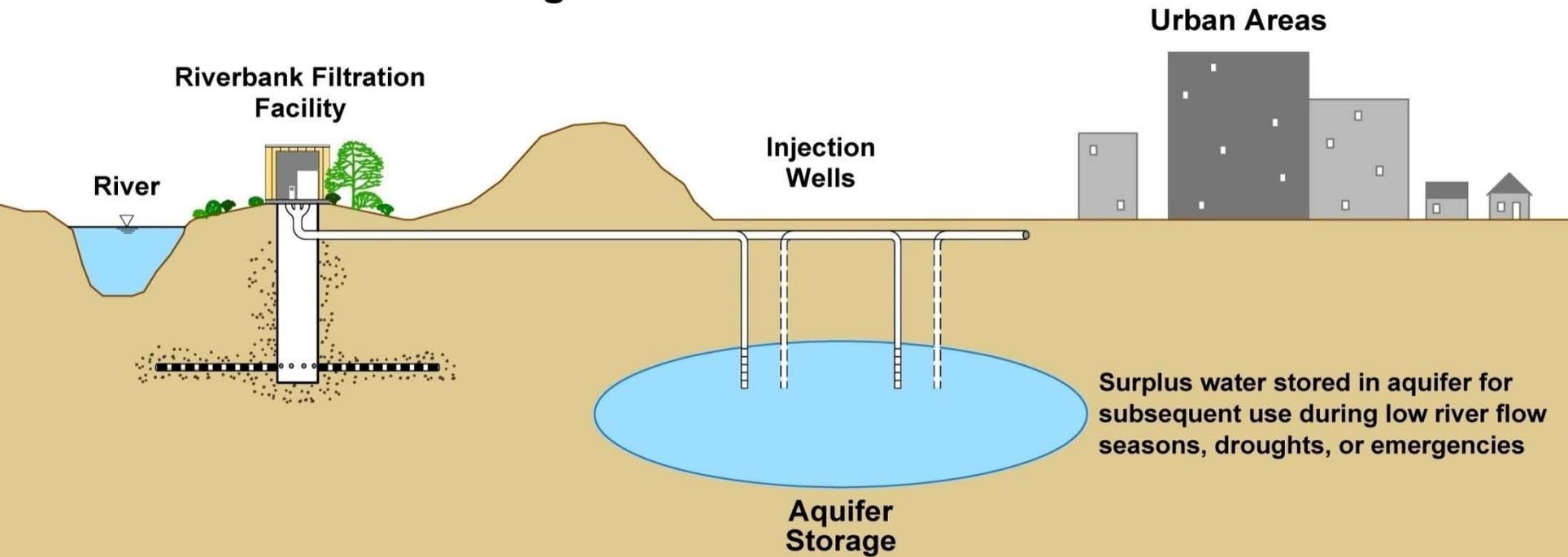
High River Flow Conditions



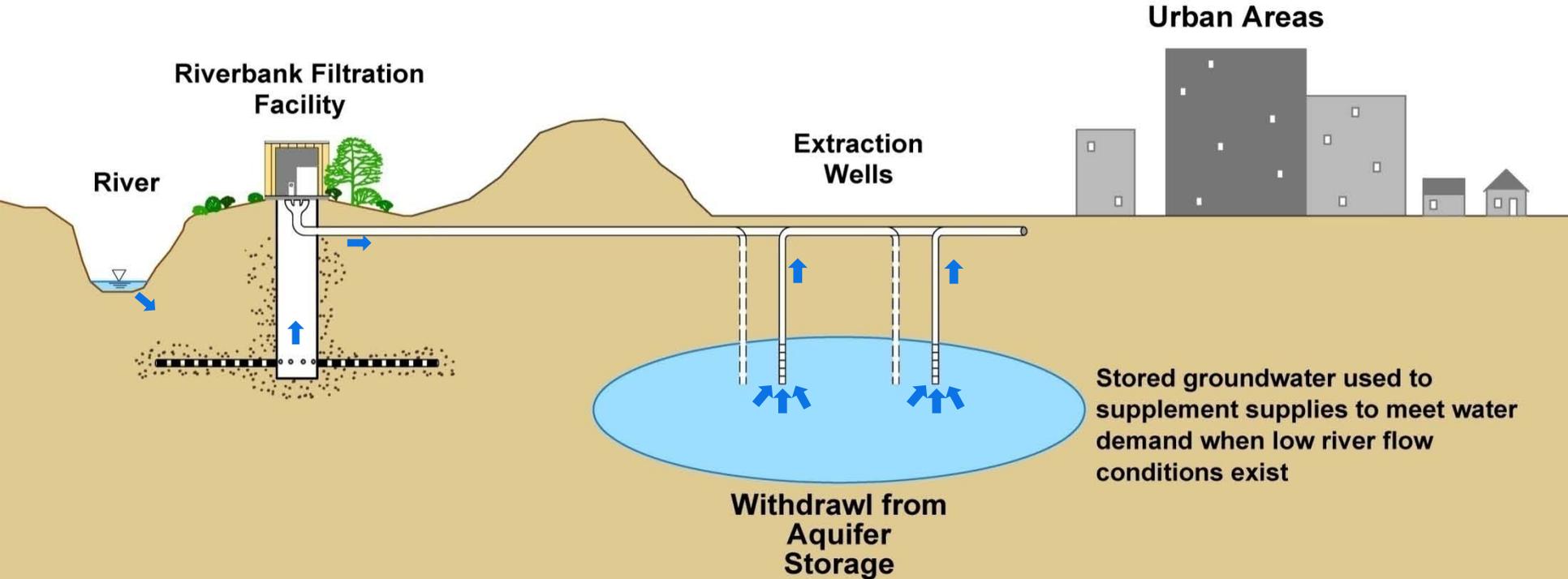
High River Flow Conditions



High River Flow Conditions



Low River Flow Conditions



River

Riverbank Filtration Facility

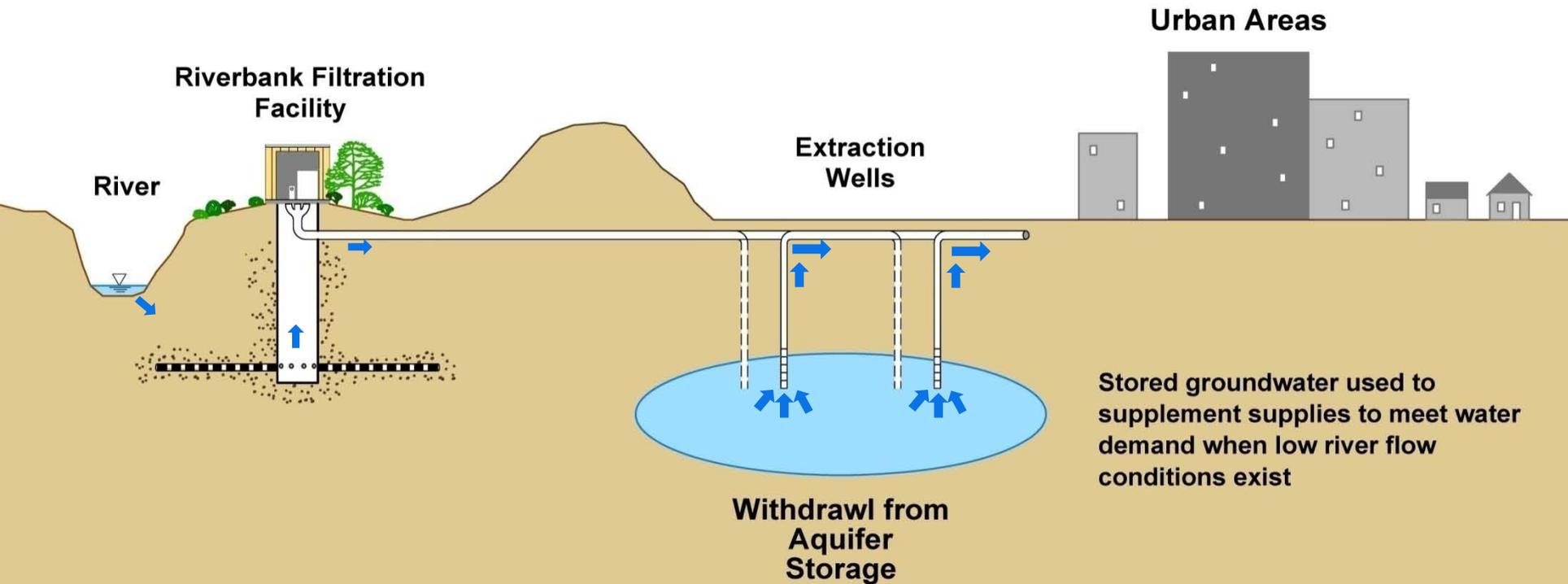
Extraction Wells

Urban Areas

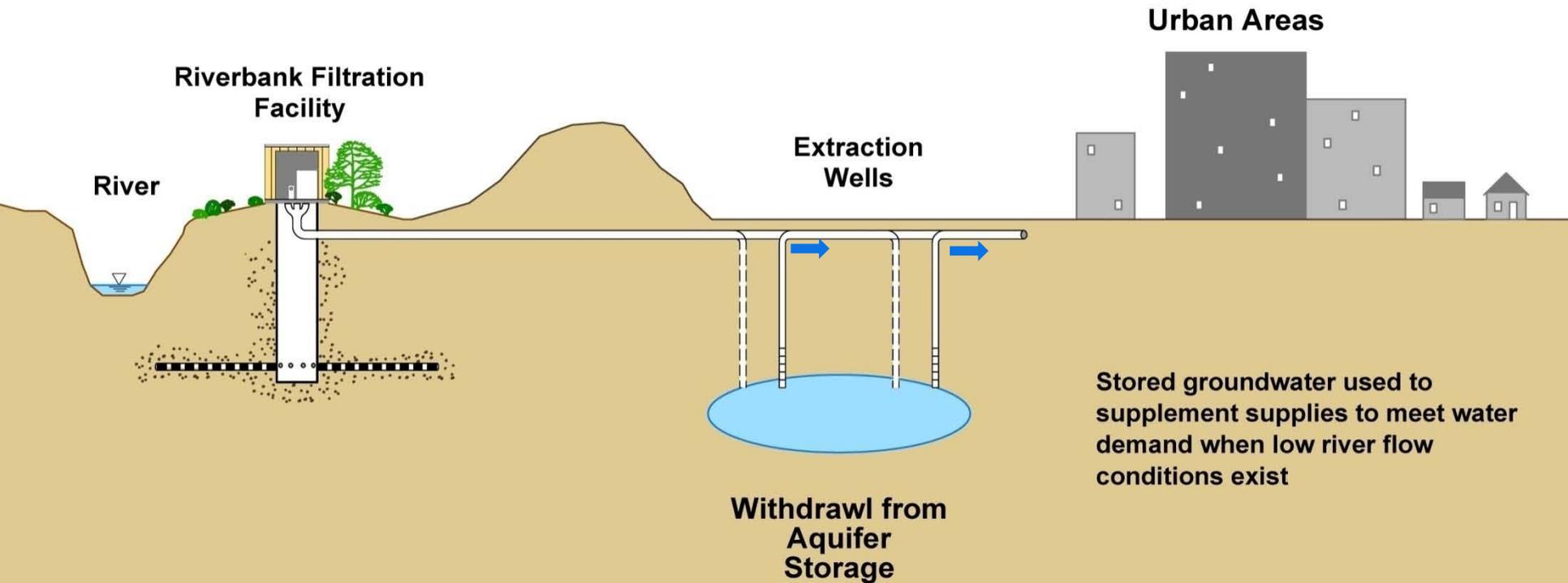
Stored groundwater used to supplement supplies to meet water demand when low river flow conditions exist

Withdrawal from Aquifer Storage

Low River Flow Conditions



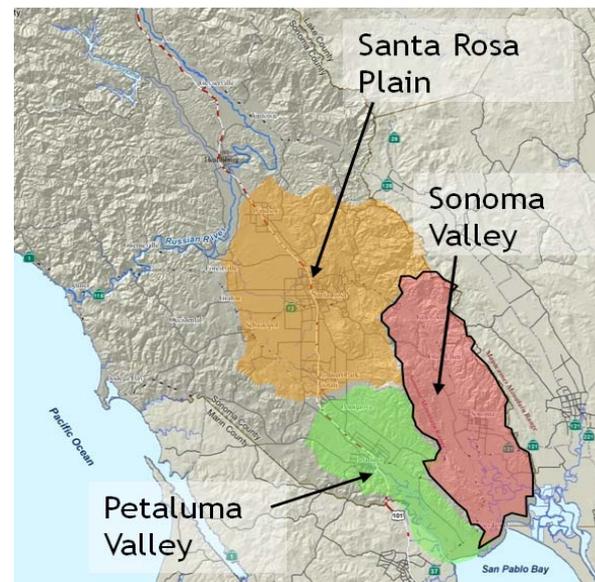
Low River Flow Conditions



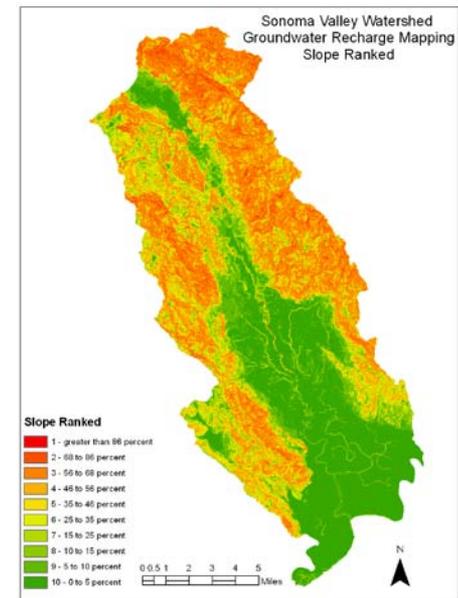
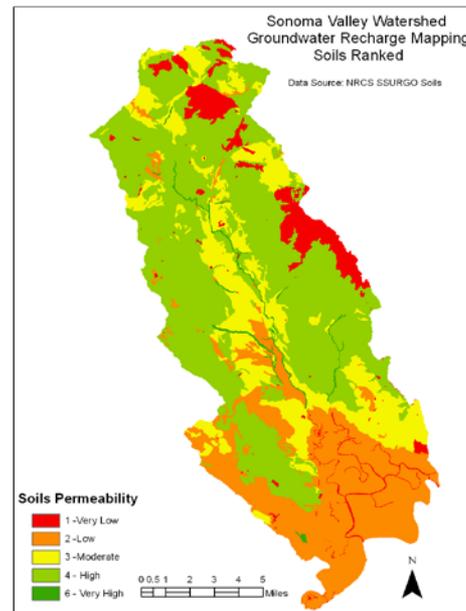
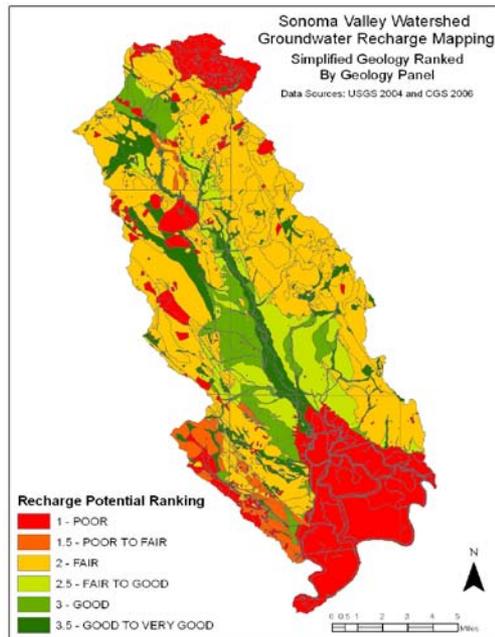
Combining Stormwater Management & Groundwater Recharge - Watershed Studies

Goals and Objectives of Scoping Studies:

- 3 Watersheds - Simultaneous Studies
- Strategically managing surface & groundwater improving flood protection & groundwater recharge
- Develop design strategies
- Grant funding opportunities
- Stakeholder Input



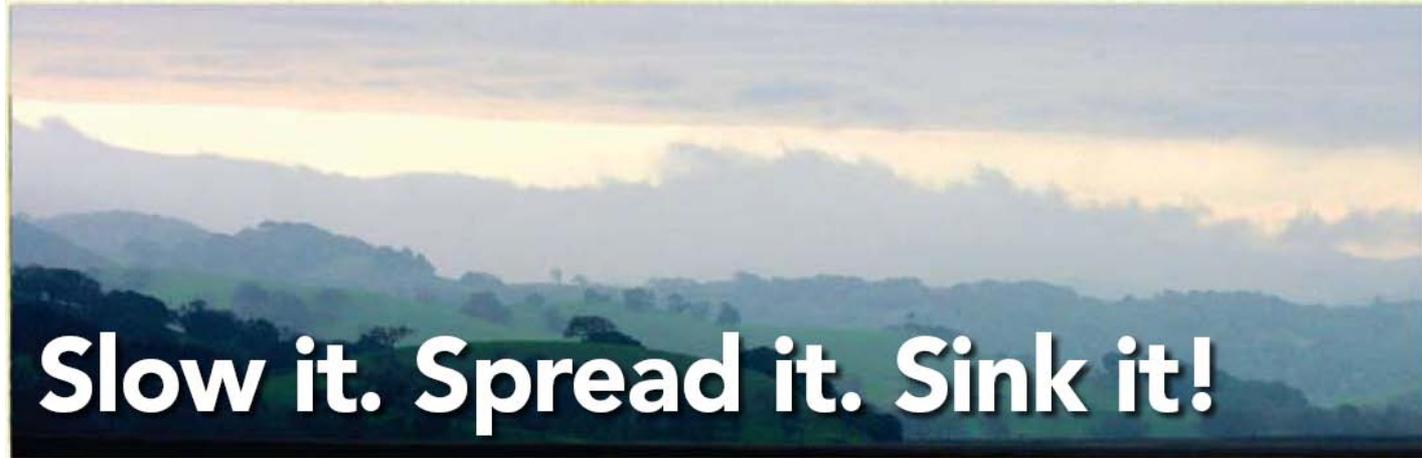
Groundwater Recharge Mapping



- Perform Groundwater Recharge Mapping in coordination with the Sonoma Ecology Center using California DWR grant funds to identify natural groundwater recharge areas and locations suitable for groundwater recharge enhancement projects
- Integrating and ranking recharge components including, Geology, Soil, Slope, and Vegetation

Groundwater Sustainability

- **Guide for property owners to implement storm water management projects that Reduce Runoff and promote Groundwater Recharge**
- **Developed by Southern Sonoma County Resource and Conservation District with funding & input from Sonoma Valley TAC and BAP**



A Homeowner's & Landowner's Guide to Beneficial Stormwater Management



Partnerships: Recent State & Federal Funding

Recent Grants and Direct Funding for Sonoma Valley

- **Recycled Water** >\$5M
- **Conservation** >\$0.2M
- **Groundwater** >\$1.3M



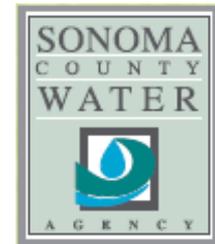
5 Yr. Review - Groundwater Management Plan

- **To Be Conducted This Year – Set Course For Next 5 Yrs.**
- **58 Actions Anticipated During Next 5 Yrs.**
- **Of These, 37 Actions Are Ongoing Or Have Some Funding**
- **City Is A Key Partner In Groundwater Management**
- **Groundwater Management Plan Is Framework For Integrated Water Management**



Final Points

- **Regional & Local Water Issues Are Inter-related**
- **Sonoma Valley Has A Vulnerable Water Supply That Requires Proactive Management**
- **Solutions Involve Increasing Water Supply “Portfolio” Via Integrated Water Management To Increase Reliability**
- **SCWA Can Assist City & Sonoma Valley Stakeholders by Providing:**
 - ✧ **Technical Resources**
 - ✧ **Funding**
 - ✧ **Coordination With Federal & State Agencies**



EXTRA SLIDES

Per gallon costs:



\$45.00



\$16.00



\$11.35



\$3.55



\$2.49

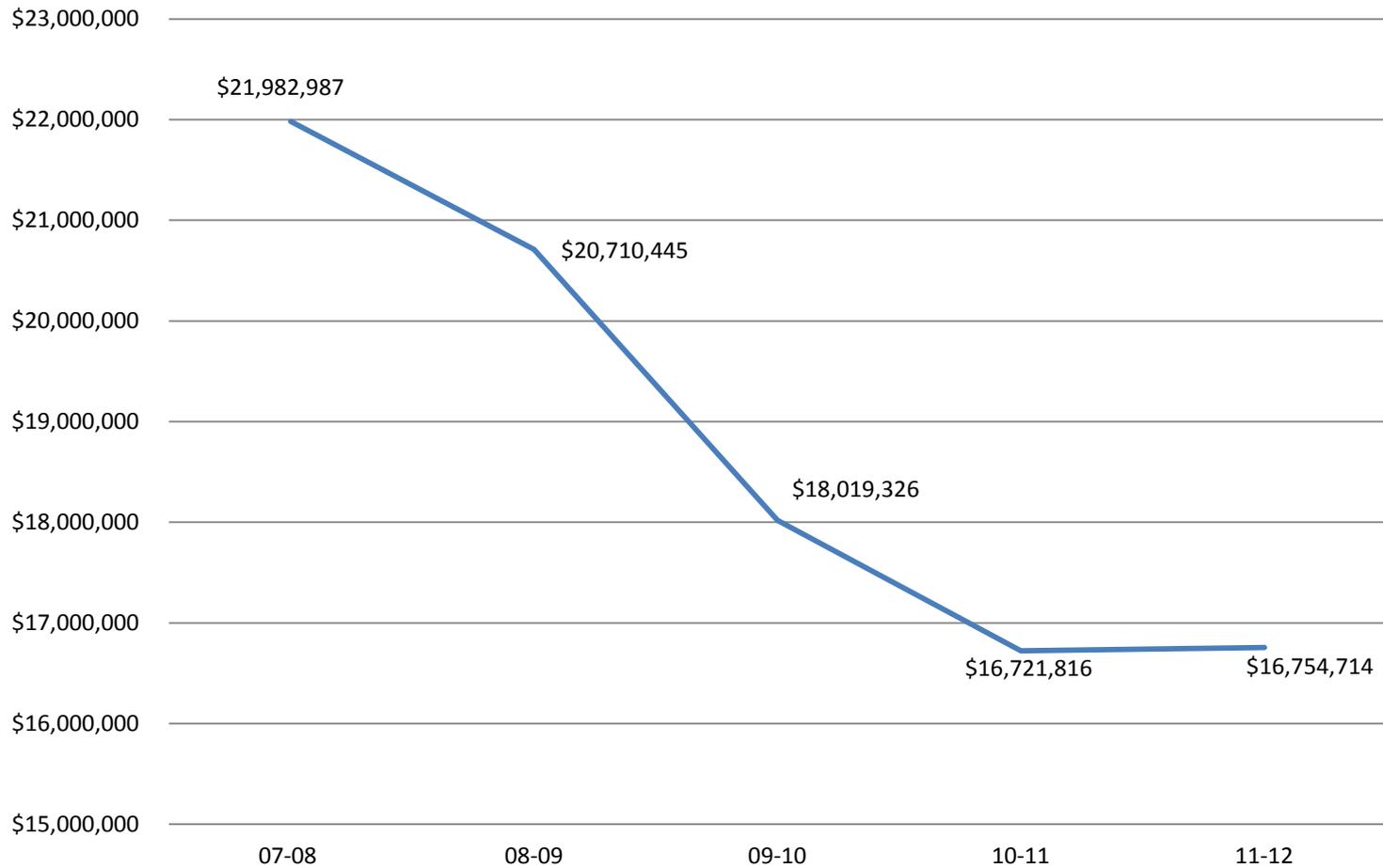


\$0.002

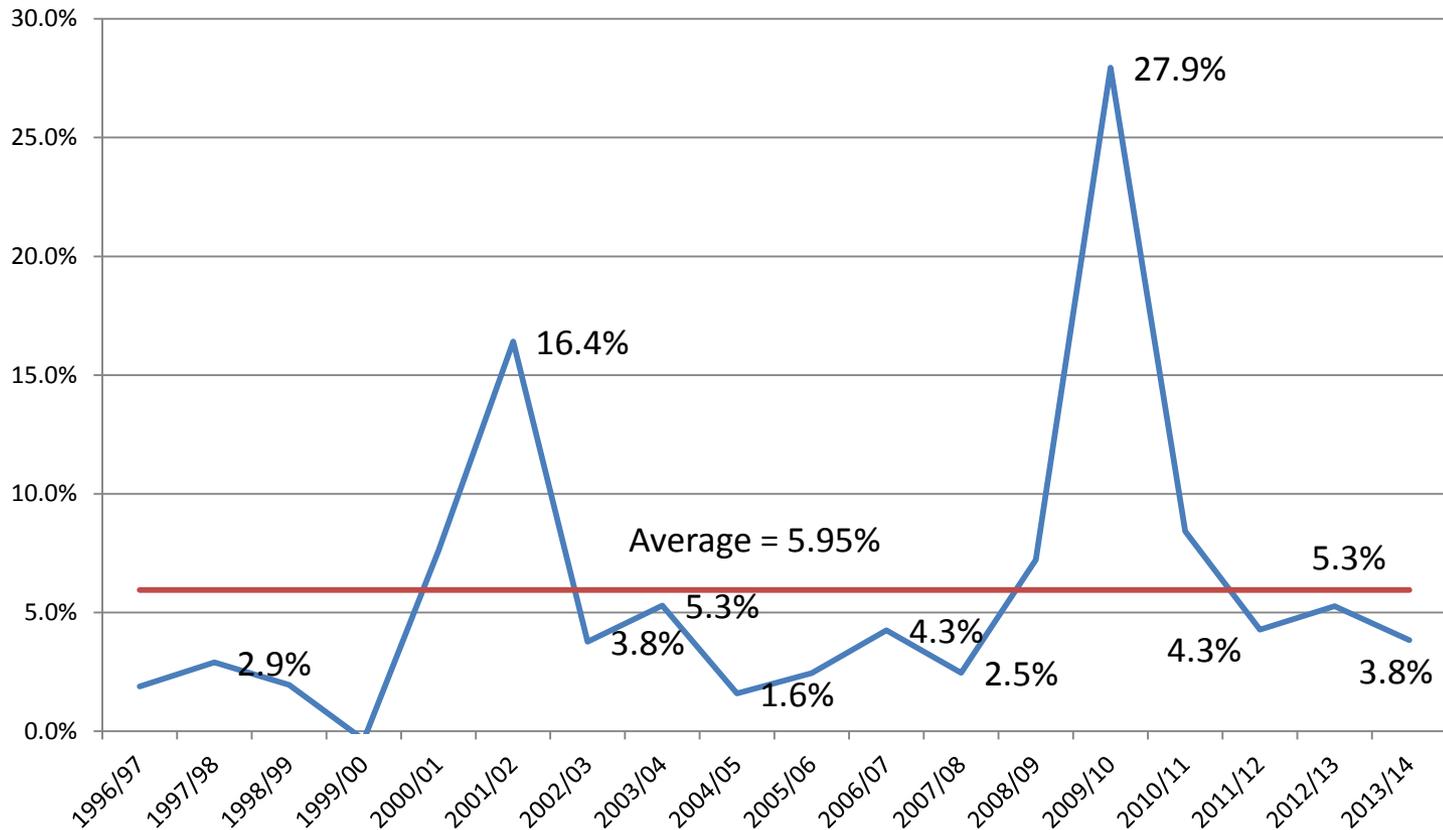
Proposed FY 13-14 Rate Changes

	Santa Rosa Aqueduct	Petaluma Aqueduct	Sonoma Aqueduct
Total O&M plus Bond and Loan Charges	1.60%	1.60%	0.78%
Aqueduct Capital Contributions to build fund balance for future projects & Local Recycled Water Tier 2 Program	3.35%	3.35%	3.06%
Total Rate Change	4.95%	4.95%	3.84%

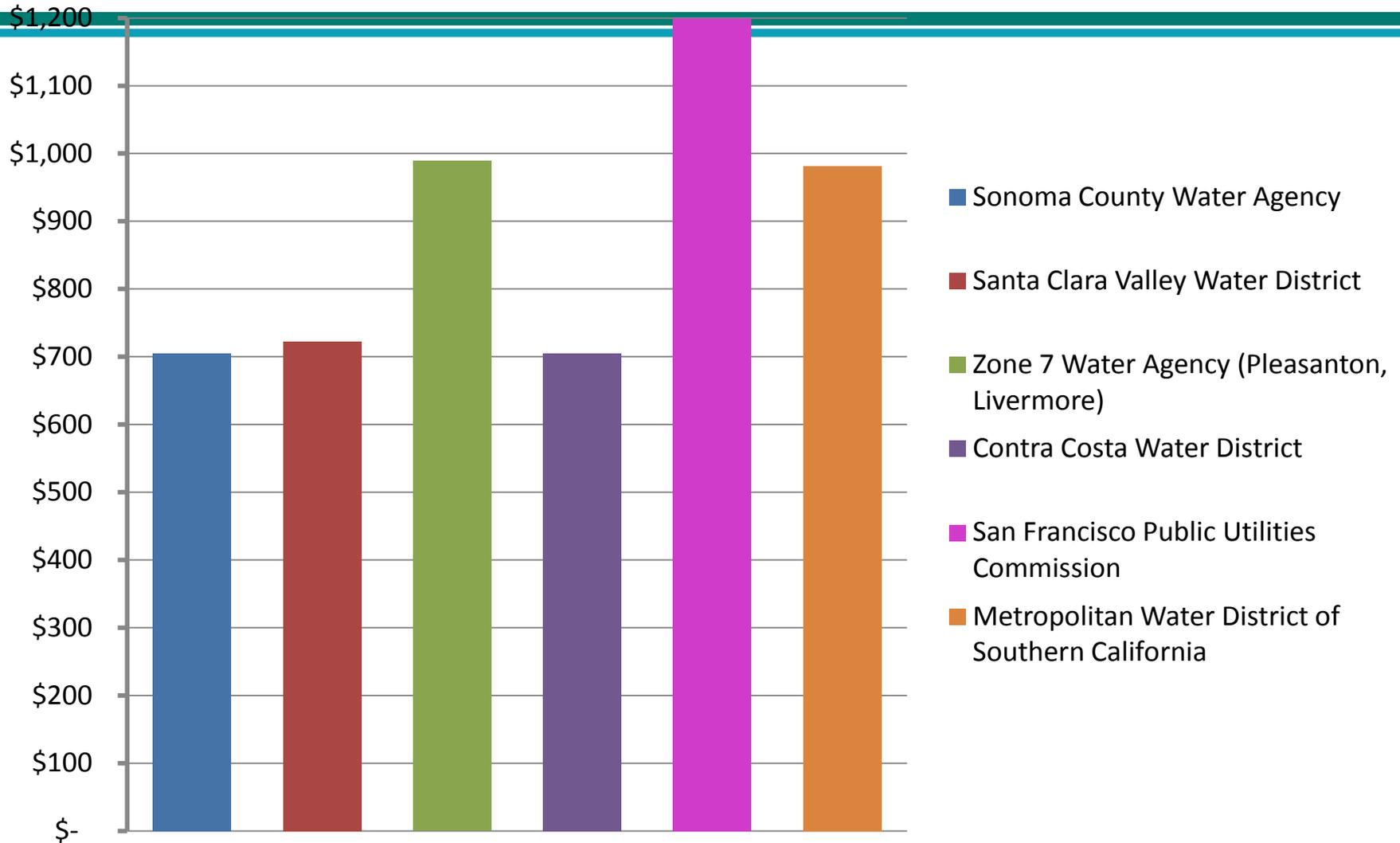
Water Agency O&M Costs



Sonoma Aqueduct Annual Rate Increases 1996 to 2013

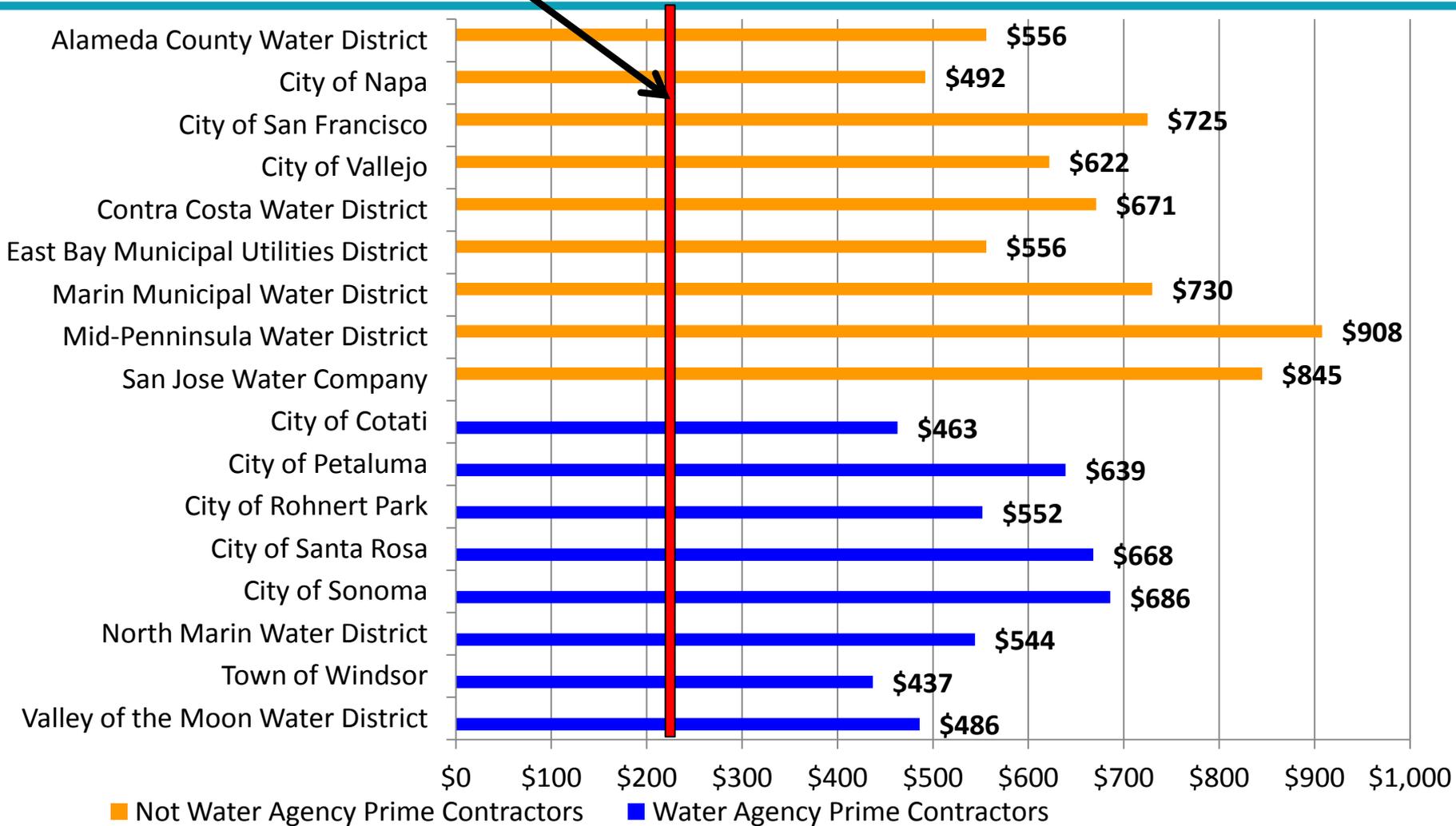


2013 Wholesale Water Rates Per Acre-Foot



2012 Average Annual Residential Water Bill

Cost of Water Agency Water



For average single-family home water use = 110,700 gallons - 2/10/12 Source: NMWD

Rate Setting Calculation

$$\frac{\text{Cost of Operations and Maintenance}}{\text{Water Sold}} = \text{Cost of Water (Dollars per acre-foot)}$$

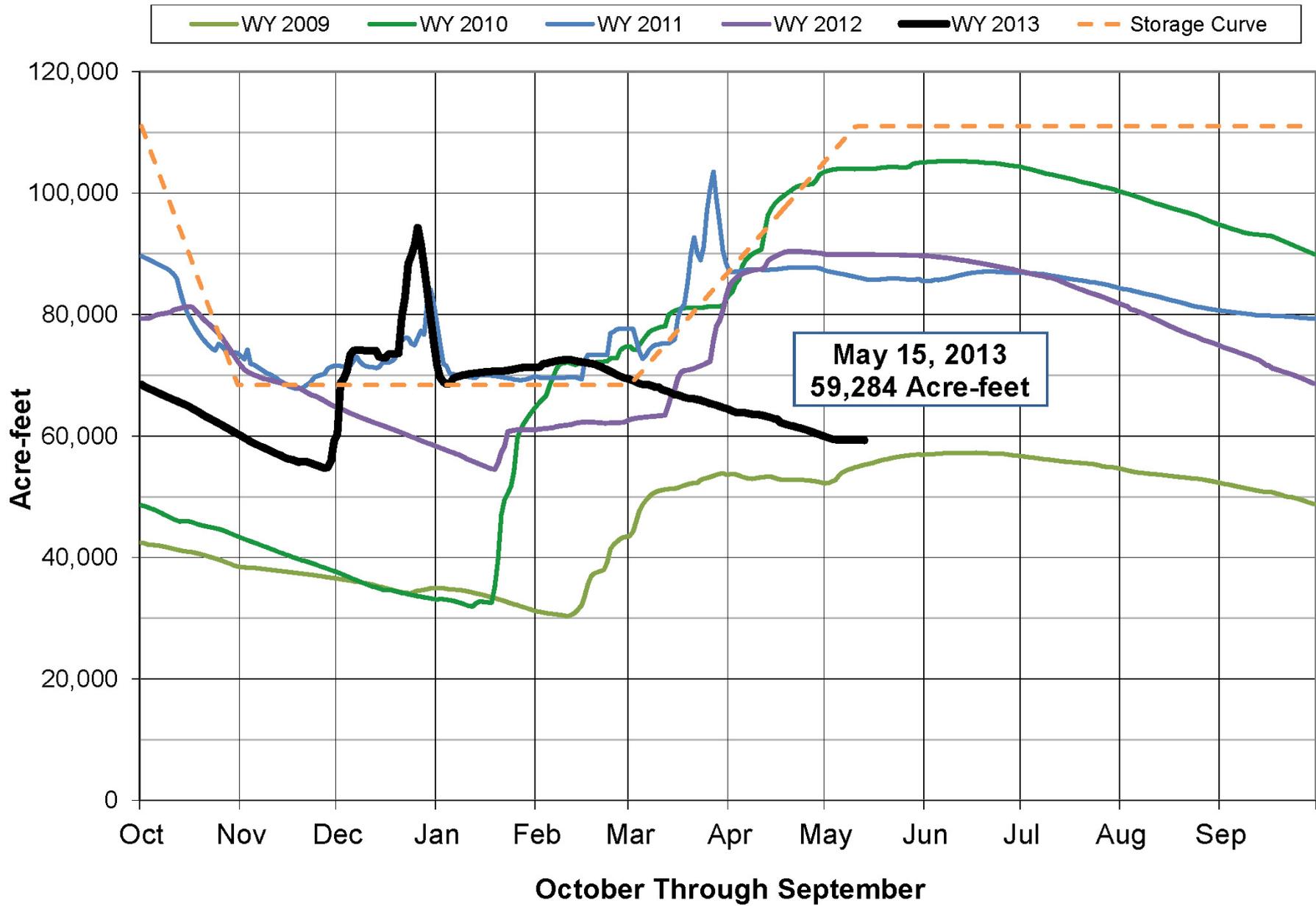
Water Sold = Lesser of:

Average of last 3
years annual
water deliveries

or

Last 12 months
of actual water
deliveries

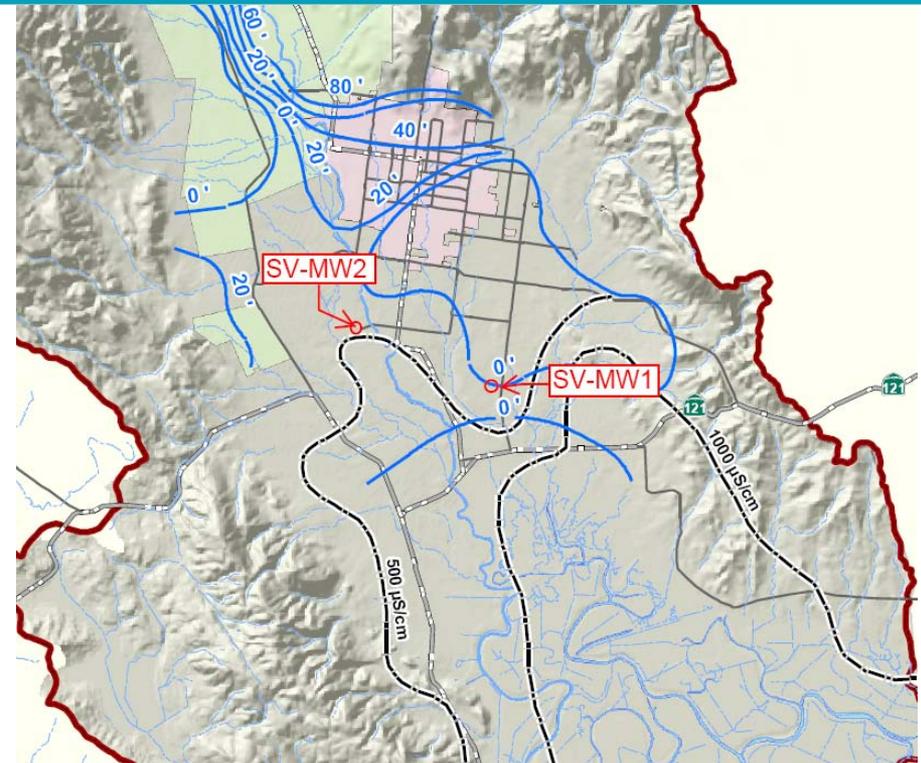
Lake Mendocino Storage



Installation of Nested Groundwater Monitoring Wells



**Project Funded By A
\$250,000 California
Department of
Water Resources
Local Groundwater
Assistance Grant**



- At margins of groundwater-level pumping depression and region of elevated salinity concentrations
- SV-MW1 located along 8th St East just north of wastewater treatment plant
- SV-MW2 located along Watmaugh Rd within 400 feet of Sonoma Creek

