

**COASTSIDE COUNTY WATER DISTRICT**

**766 MAIN STREET**

**HALF MOON BAY, CA 94019**

**SPECIAL MEETING OF THE BOARD OF DIRECTORS**

**Thursday, October 28, 2021 - 9:00 a.m.**

**AGENDA**

Due to the Covid-19 pandemic, and in accordance with Assembly Bill 361, which modifies California Government Code Section 54953, the Boardroom will not be open to the public for the October 28, 2021, Special Meeting of the Board of Directors of the Coastside County Water District. This meeting will be conducted remotely via teleconference only.

The Public may watch and/or participate in the public meeting by joining the meeting through the Zoom Videoconference link provided below. The public may also join the meeting by calling the below listed teleconference phone number.

How to Join Online or by Phone

*The meeting will begin at 9:00 a.m.*

Whether you participate online or by telephone, you may wish to “arrive” early so that staff can address any technology questions prior to the start of the meeting.

**ONLINE:**

Join Zoom Meeting

<https://us06web.zoom.us/j/89932913571?pwd=VGRRGZWRHNTM4amtzVVhqNHJZQzREdz09>

Meeting ID: 899 3291 3571

Passcode: 794461

One tap mobile

+16699006833,,89932913571#,,,,\*794461# US (San Jose)

Dial by your location

+1 669 900 6833 US (San Jose)

Meeting ID: 899 3291 3571

Passcode: 794461

Find your local number: <https://us06web.zoom.us/j/k9ce4VO7T>

*This agenda and accompanying materials can be viewed on Coastside County Water District's website located at: [www.coastsidewater.org](http://www.coastsidewater.org).*

The Board of the Coastside County Water District reserves the right to take action on any item included on this agenda.

- 1) ROLL CALL
- 2) PUBLIC COMMENT
- 3) BOARD WORKSHOP  
Strategic Planning Session: Review of Local Water Source Alternatives
- 4) ADJOURNMENT

## **STAFF REPORT**

**To:** Coastside County Water District Board of Directors

**From:** Mary Rogren, General Manager

**Agenda:** October 28, 2021

### **Report**

**Date:** October 26, 2021

**Subject:** **BOARD WORKSHOP**  
**Strategic Planning Session: Review of Local Water Source Alternatives**

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### **Recommendation:**


Information Only.

### **Background:**

The District has engaged Robert Schultz, Principal Hydrogeologist with Geo Blue Consulting to review and summarize background information including historical studies on the District's local water source alternatives as well as to provide a hydrological perspective on options that may be available to the District.

During the Board Workshop, Mr. Schultz will provide an overview of the various local water source alternatives and will lead a discussion with the Board on strategizing ways to optimize use of local water sources.

A copy of Mr. Schultz's slide deck that he will review in the meeting is attached.



# Strategic Planning Session: Review of Local Water Source Alternatives

Coastside County Water District  
October 2021

Geo Blue Consulting  
geoblueconsulting.com 415-755-3200



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# CCWD Local Water Source Alternatives

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## Section 1: Introduction



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## Presentation and Workshop Objective

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Summarize background information necessary for the CCWD Board of Directors to strategize on potential opportunities to optimize use of local water sources.



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# Summary of Workshop

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1. Introduction
2. Recap of Past Alternatives Analyses
3. Local Surface Water
4. Surface Water Projects and Studies
5. Local Groundwater
6. Groundwater Projects and Studies
7. Other Local Water Projects and Studies
8. Recommendations



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# CCWD Local Water Source Alternatives

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## Section 2: Previous Alternatives Analyses





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# Historical Studies of Source Alternatives

## EIP 1981

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- Crystal Springs Reservoir Connection - Selected alternative
- Pilarcitos Lake – Emergency supply to San Francisco, deemed at time as unavailable from SF Water Department
- Denniston Dam (proposed) or other Major Dam Sites - Not recommended due to high cost, marginal water production (est. 342 MGY), and conflicts with LCP, including loss of agricultural land.
- Minor Impoundment Projects (i.e., ponds) – Not recommended due to unreliable water quality and quantity, high cost, conflicts with LCP, including conversion of agricultural land and use of viable pond sites that would otherwise be used to support agriculture.

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## Historical Studies of Source Alternatives EIP 1981 (continued from previous slide)

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- Treated Water Storage (i.e., large number of hilltop tanks)– Poor water quality, high cost, and aesthetic impacts.
- Surface Water – DWR determined no available unappropriated rights, plus dry year restrictions for riparian rights holders, fish and wildlife. Although surface water diversions remain possible.
- Groundwater – Concerns noted in the 1981 analysis were subsequently addressed by the 2003 Todd Engineers study. EIP states that District's Coastal Commission permit limits pumping from Denniston wells to 130 MGY. Groundwater pumping from wells in the Lower Pilarcitos subbasin would be limited to sustainable yield, and would need to be protective of pre-existing and environmental uses.

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## Historical Studies of Source Alternatives EIP 1981 (continued from previous slide)

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- Desalination – High capital and operational costs rendered this alternative impractical.
- Water Conservation - Recommended.
- Wastewater Reclamation – Pending and current regulations and technological improvements have addressed many concerns noted in the 1981 analysis.



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# Historical Studies of Source Alternatives

## Teter 2002, Updated 2004

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- Stream Impoundments on Local Creeks:
  - Pilarcitos Creek – Pilarcitos Canyon Wells are sufficient to capture available surface water – impoundment not needed to capture available water
  - Frenchmans, Arroyo Leon/Mills & Purisima Creeks: insufficient flow relative to the cost of a dam
- Offstream Impoundments – concept not advanced
- Dam at Denniston – storage portion of water rights permit abandoned because Crystal Springs project was preferred
- Pilarcitos Lake and Crystal Springs Reservoir – no surplus water



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## Historical Studies of Source Alternatives

### Teter 2002, Updated 2004

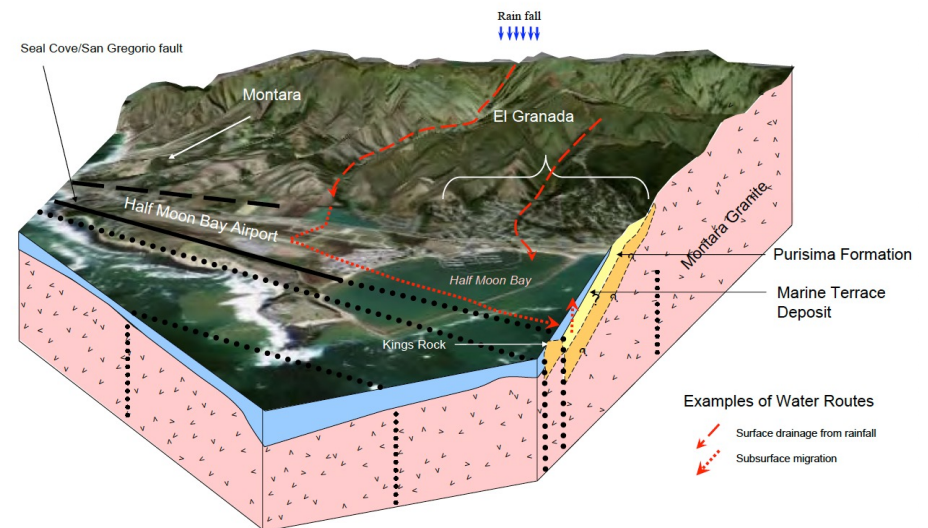
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- Direct Diversion from Local Creeks:
  - Denniston project, including diversion from San Vicente Creek. Project recommended.
  - Diversion from Pilarcitos Creek in Half Moon Bay during winter, pump water to Nunes WTP.
- Groundwater:
  - Denniston wells operated during summer, use surface water during winter. Allow recharge to groundwater basin each winter.
  - Amesport/Cunha School Wells: project was abandoned.
  - Lower Pilarcitos Wells: recommended project. Economically feasible and Teter recommended further investigation of environmental feasibility.

# Midcoast Groundwater Studies by San Mateo County

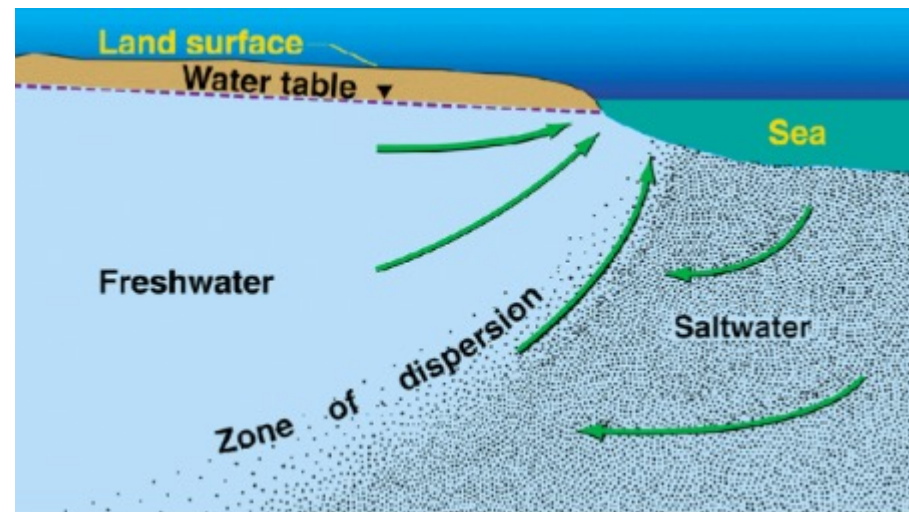
- Multi-year groundwater study by County to assess impacts from development
- Reports by Balance Hydrologics (2002/2010) and Kleinfelder (2008)
- Study area: “Midcoast” north from Frenchman’s Creek
- Did not identify surplus groundwater available on an ongoing basis
- Localized seasonal groundwater surpluses during average rainfall years, no available water in dry years



# Midcoast Groundwater Studies by San Mateo County (continued from previous slide)

## Key Concepts from Midcoast GW Study

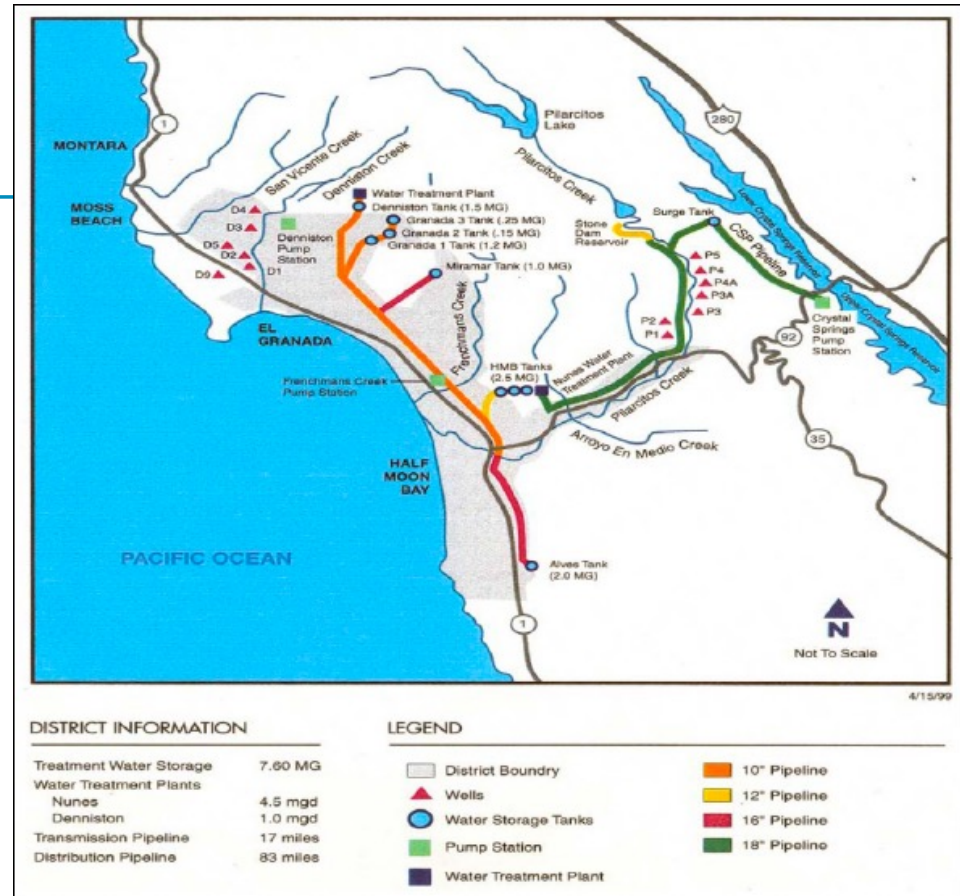
- Source of all groundwater is rainfall
- Groundwater recharge primarily from streamflow (including alluvial gravel groundwater) across marine terrace aquifer
- Monitoring recommended relative to saltwater intrusion and due to uncertainty in surface-groundwater separation



# CCWD Service Area and Facilities

## Facilities

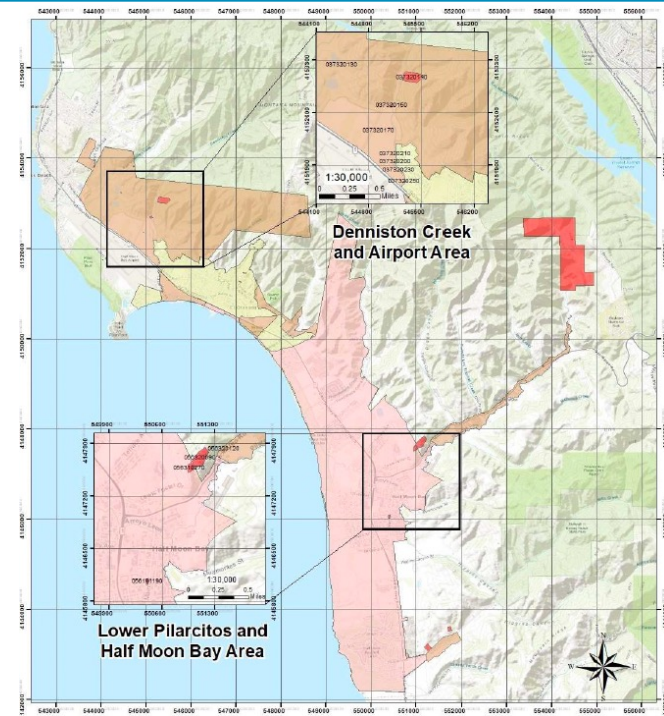
- Surface water diversions from Upper Pilarcitos and Denniston
- Groundwater wells at Denniston
- SFPUC Connection
- Nunes and Denniston WTPs



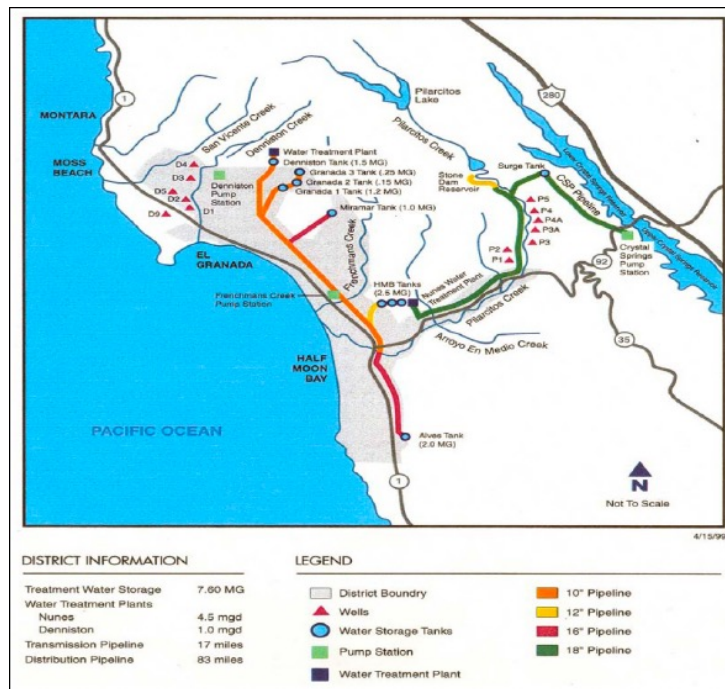


# CCWD Owned Parcels and Service Area

- Nunes and Pilarcitos Canyon parcels are outside of service area
- New local water sources unlikely to be located near District-owned parcels



# CCWD Facilities – Strengths and Weaknesses



## Strengths

- Connection to SFPUC water system
- Seasonal surface water
- Coastal aquifer

## Weaknesses

- Limited surface storage capacity
- Local surface water susceptible to drought
- Relatively small groundwater basins along coastal terrace



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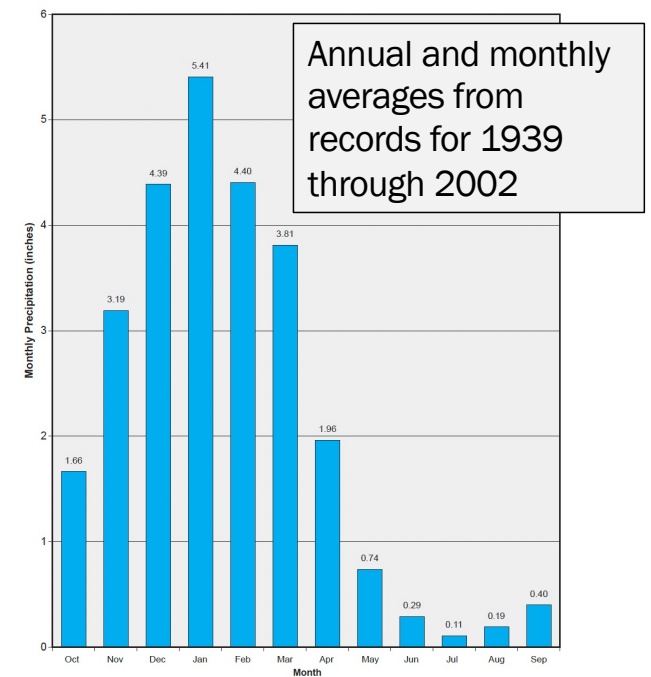
# CCWD Local Water Source Alternatives

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## Section 3: Local Surface Water

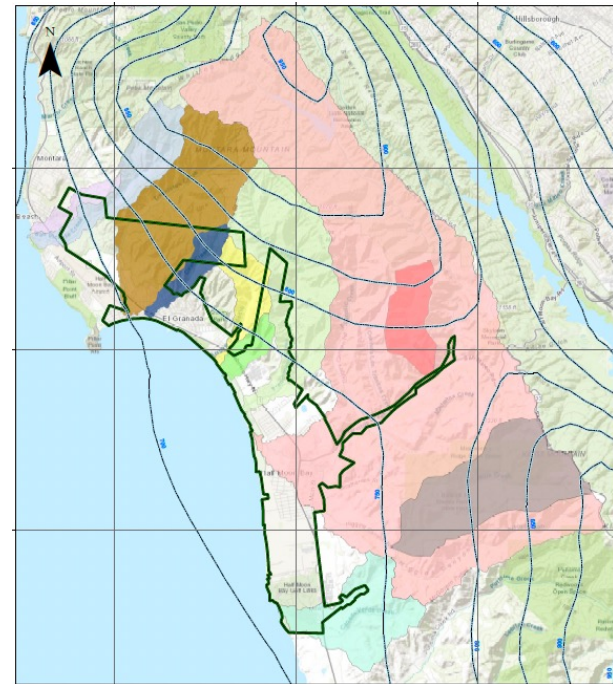
# Local Hydrology - Rainfall

- Seasonal
- Approximately 26 inches rainfall per year on the coast
- Recurring droughts
- Strong orographic effect
- Approximately 37 inches at elevation



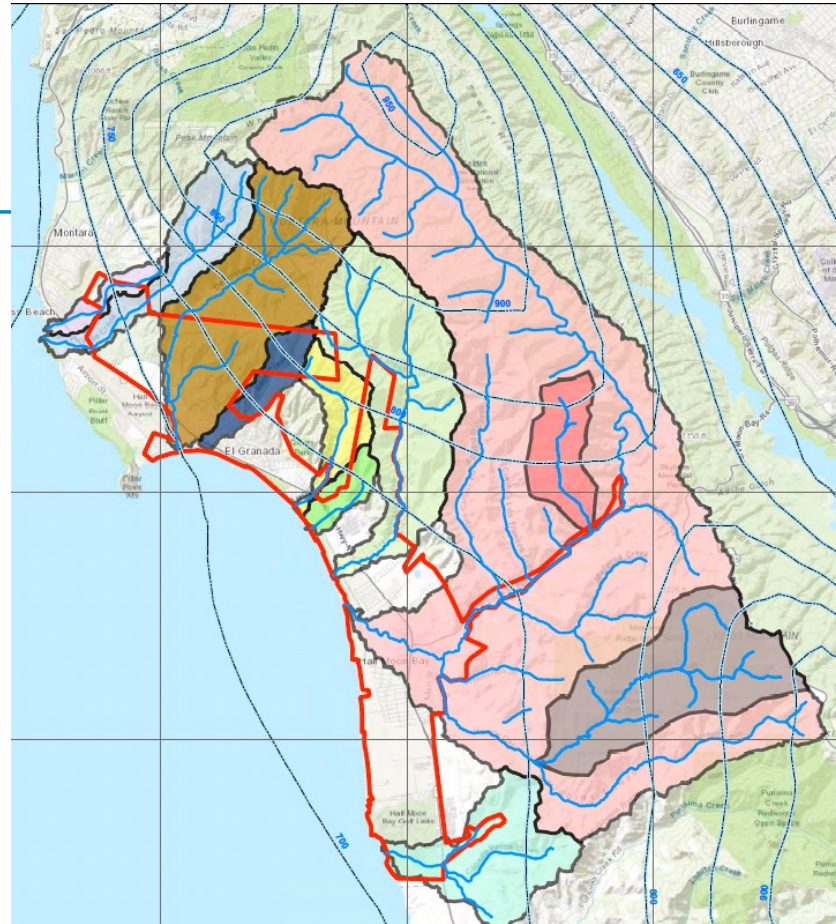
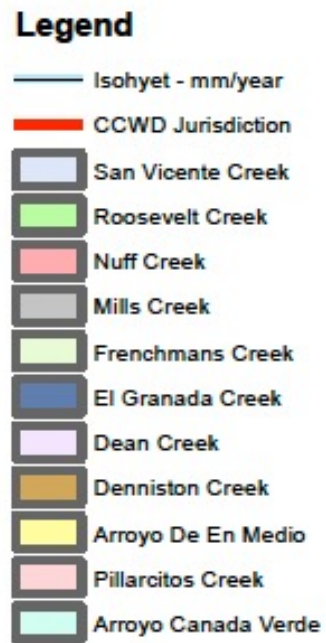
## Local Hydrology – Watersheds

- 9 primary watersheds, Pilarcitos and Denniston are largest and current supply sources
- 30-40% more rainfall on mountain tops, compared to locations on coastal terrace
- Average annual rainfall 32.4 inches in Pilarcitos Creek watershed
- Rainfall = ultimate source of all local water supply; surface and ground water



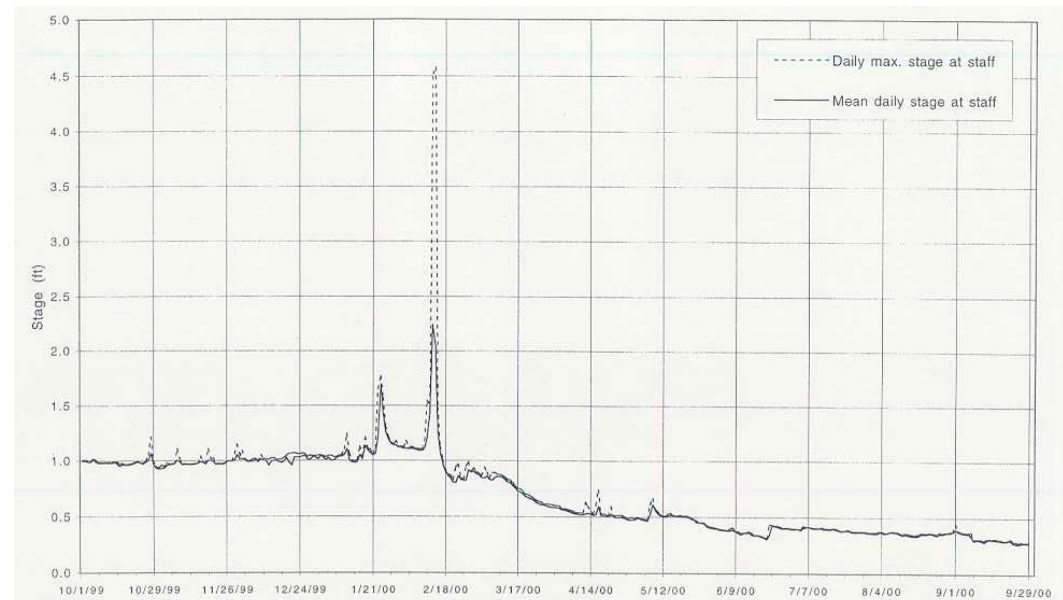


# Local Hydrology – Watersheds



## Local Hydrology – Streams and Streamflow

- Typically, 3 to 6 major storm systems each winter
- Flashy streamflow (rapid stage increase and decrease)
- Increased runoff-rainfall ratios with antecedent rainfall
- Perennial flow limited to larger watersheds





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# CCWD Local Water Source Alternatives

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## Section 4: Surface Water Projects and Studies



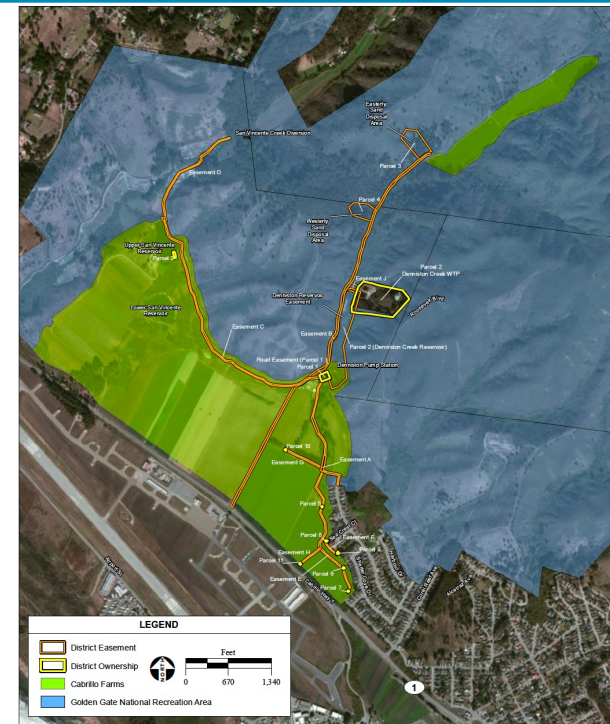
# Denniston Diversion and WTP

- Seasonally significant source
- Symbiotic relationship with farmer

TOTAL CCWD PRODUCTION (MG) ALL SOURCES- FY 2021					
	CCWD Sources			SFPUC Sources	
	DENNISTON WELLS	DENNISTON RESERVOIR	PILARCITOS WELLS	PILARCITOS LAKE	CRYSTAL SPRINGS RESERVOIR
<b>JUL</b>	0.02	2.54	0.00	28.80	36.06
<b>AUG</b>	0.00	0.00	0.00	49.75	20.27
<b>SEPT</b>	0.00	0.00	0.00	1.31	60.84
<b>OCT</b>	0.00	0.00	0.00	0.00	63.97
<b>NOV</b>	0.00	0.00	3.91	14.39	29.52
<b>DEC</b>	2.26	12.69	11.17	14.25	4.16
<b>JAN</b>	1.73	13.04	11.06	1.99	10.86
<b>FEB</b>	0.78	16.51	10.87	0.00	9.60
<b>MAR</b>	1.98	17.11	10.47	0.00	13.08
<b>APR</b>	1.40	12.72	0.00	0.00	44.48
<b>MAY</b>	0.88	3.90	0.00	0.00	60.44
<b>JUN</b>	0.00	0.00	0.00	0.00	64.08
<b>TOTAL</b>	9.05	78.51	47.48	110.49	417.36
<b>% MONTHLY TOTAL</b>	0.0%	0.0%	0.0%	0.0%	100.0%
<b>% ANNUAL TO DATE TOTAL</b>	1.4%	11.8%	7.2%	16.7%	63.0%
				CCWD vs SFPUC- annual	20.4%

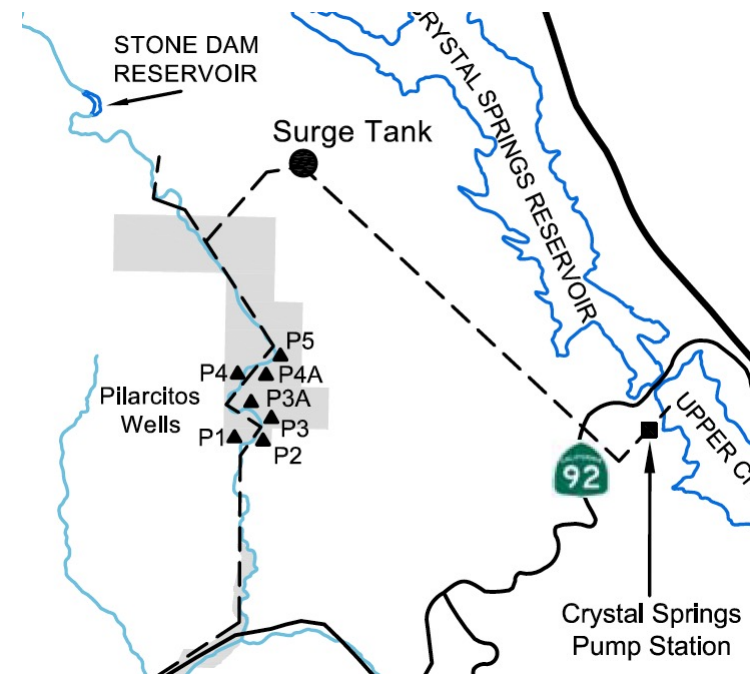
# Denniston-San Vicente Surface Water Project

- Divert surface water from San Vicente Creek, pipe to Denniston WTP, add treated water to distribution system
- Long-term, ongoing project commitment
- CCWD working with CDFW and GGNRA
- Dickson Environmental to provide additional updates



# Pilarcitos Canyon Well Field

- Surface water diversion wells
- Seasonal diversion right
- On district-owned parcels
- Well replacements recommended
- Volume of water seasonally diverted from Pilarcitos Creek could be increased





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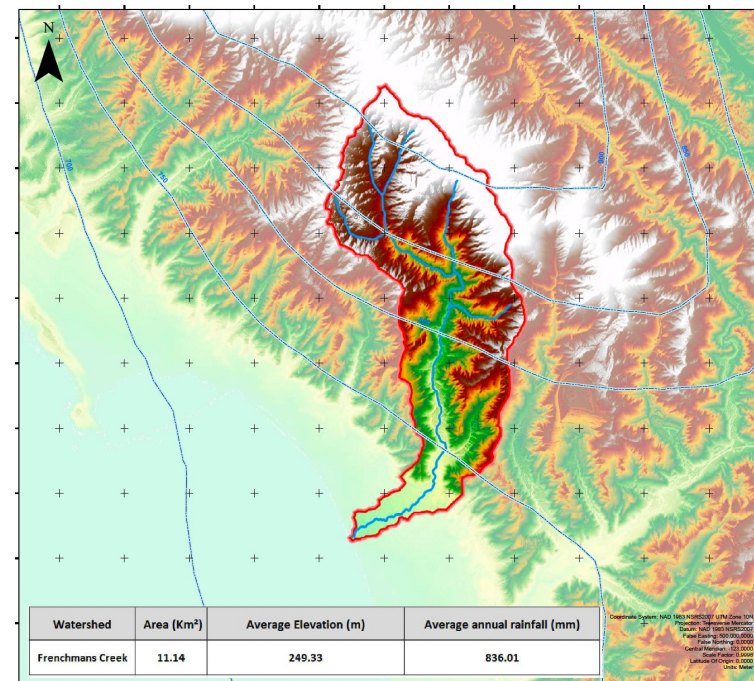
## Quarry/Nuff Creek Not Advanced At This Time

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- San Mateo County approved mine expansion plan in 2013
- Water Rights application submitted in 2013
- Pilarcitos Quarry sold to Vulcan Materials in 2014
- Vulcan holds renewable lease from property owner
- Amendments to Expansion Plan submitted by Vulcan to San Mateo County in 2017 and 2018
- Mining operations projected to continue for next 60 to 100 years
- Mine expansion to include 80 acre-feet (26 MG) water storage
- Stormflow from Nuff Creek, if permitted, might be sufficient for diversion to storage for a total of 2 to 3 days each year

# Frenchman's Creek Not Advanced At This Time

- Seasonal water source
- Smaller watershed than Pilarcitos or Denniston
- No existing infrastructure
- Treated water line could not be used to transport raw water to a WTP
- Multiple water right holders





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## Surface Water Summary

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- Denniston and San Vicente Creeks have not been fully appropriated
- Treatment and distribution system facilitate expansion of diversion in Denniston and San Vicente Creeks
- Smaller watersheds have less water and are also more developed



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# CCWD Local Water Source Alternatives

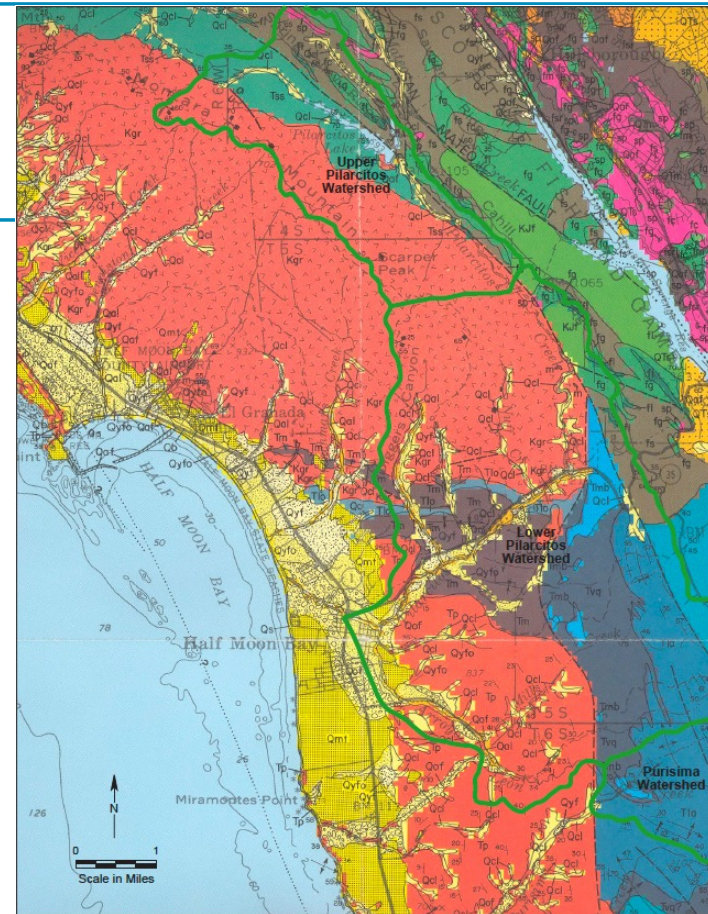
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## Section 5: Local Groundwater



# Local Hydrogeology – Water-Bearing Formations

- Alluvium (light yellow): sands and gravels along stream channels
- Marine Terrace Deposits (dark yellow): sand and gravel of variable thickness, less than 90 feet
- Purisima sandstone, siltstone and mudstone (orange): underlies terrace deposits, poor water quality
- Montara granite (red stippled): fractured and weathered to approximately 100 feet, generally unreliable over long-term
- *Marine Terrace Deposits is sole aquifer unit currently used by CCWD*





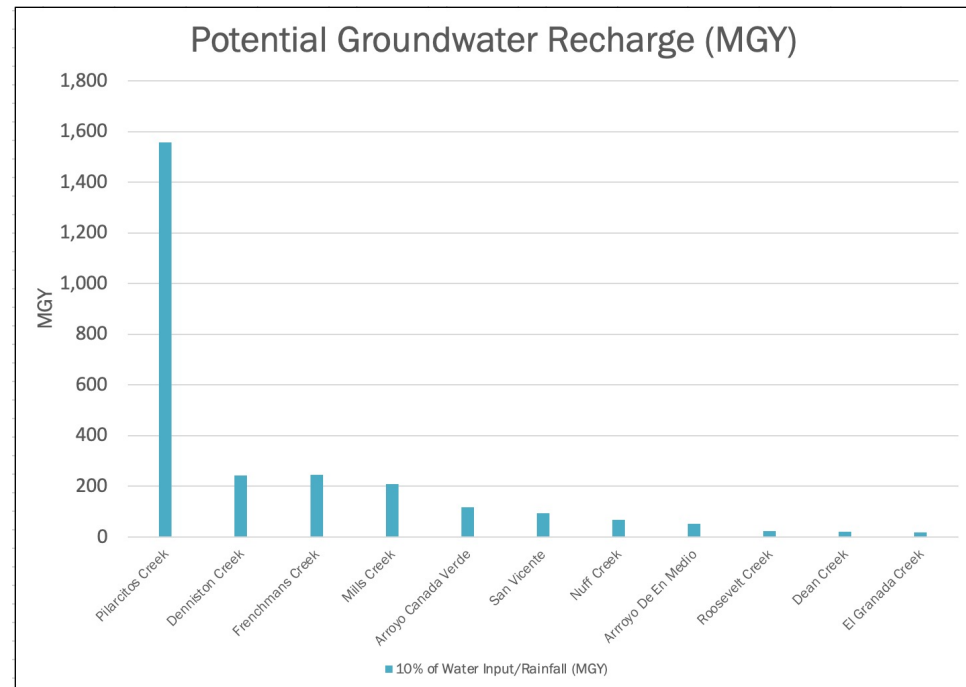
# Local Geology – Groundwater Basins/Sub-basins

- Coastal/Half Moon Bay Terrace Groundwater Basin: political demarcation
- Pilarcitos Sub-Basin: “shoe-string” aquifer, crosses coastal terrace geomorphic region
- Limited or no hydrologic connection north-south along coast



# Water Balance Components

- Rainfall is source of all fresh water in the region
- More captured precipitation = greater stream flow = greater groundwater recharge
- Sustainable groundwater yield from Pilarcitos: order of magnitude greater than other watersheds





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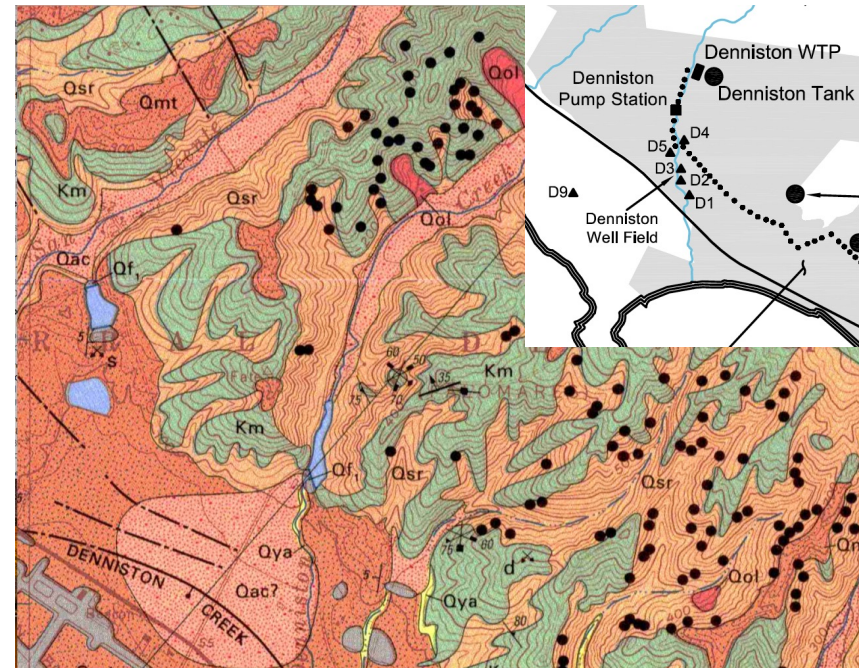
# CCWD Local Water Source Alternatives

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## Section 6: Groundwater Projects and Studies

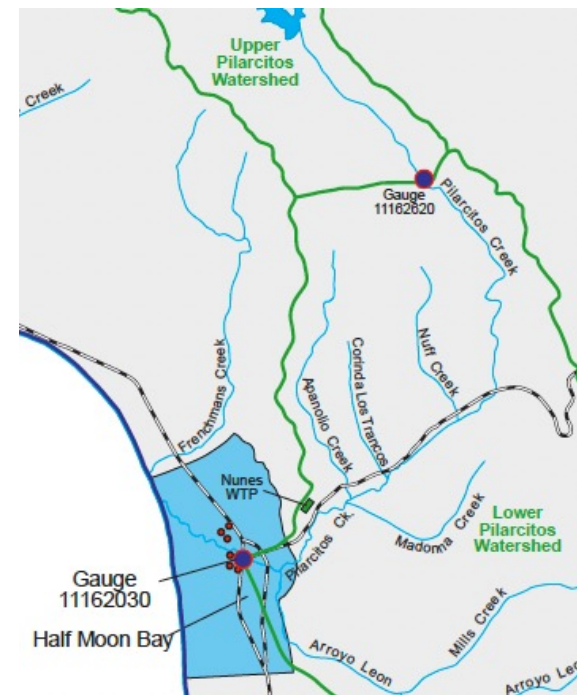
# Denniston Wellfield

- Seasonal source
- Extends operating period for Denniston WTP
- Interconnected surface-water not reported as depleted
- Saltwater intrusion not reported
- Shared resource with other pumpers
- Well replacements recommended
- Wellfield expansion could be evaluated



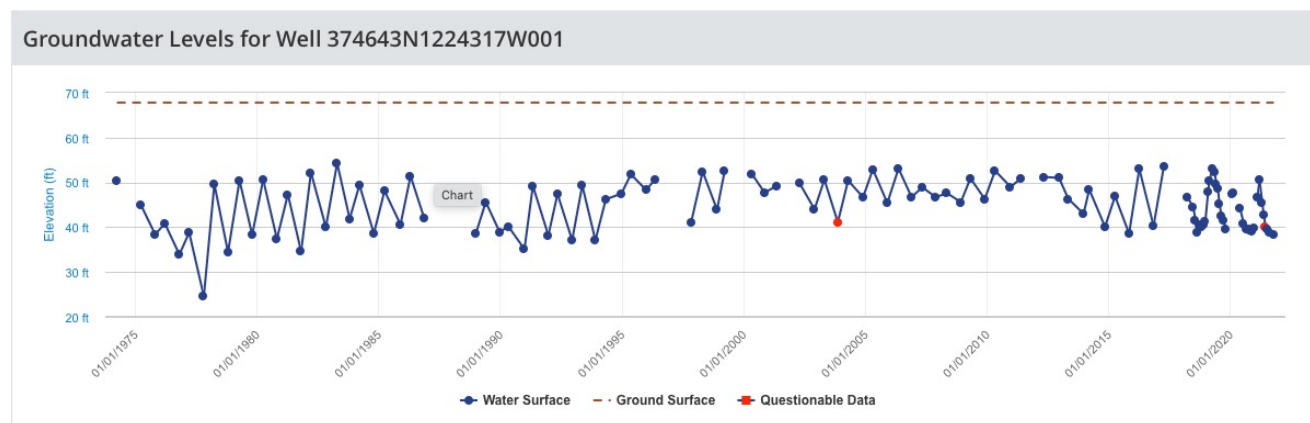
# Lower Pilarcitos Groundwater Study 2003 Yield and Cost Estimates

- 2003 Lower Pilarcitos Groundwater Study by Todd Engineers for CCWD
- 424 MGY is estimated long-term sustainable yield from groundwater basin
- 129 to 259 MGY (drought-normal) using 5 wells west of Hwy 1
- \$3.1MM construction cost estimate (2003)
- Recommended installation of pilot well and pumping test



# Lower Pilarcitos Groundwater Study

- Typical seasonal groundwater level fluctuation of approximately 10 feet
- Long-term records suggest stable water level trends
- Water quality generally adequate
- Seasonal recharge





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## Bedrock Wells at Quarry or Pilarcitos Canyon Not Advanced At This Time

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- Low yield from bedrock wells
- High risk of insufficient long-term production
- Limited groundwater recharge from surface infiltration of rainfall, due to steep slopes and dense vegetation
- Groundwater recharge from stream bottom infiltration, flows primarily into alluvial gravels and sands – not to bedrock
- Ultimate source of water from a bedrock well is rainfall
- Bedrock well drilling is generally high risk, low reward



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## Groundwater Summary

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- Groundwater is available
- Groundwater is apparent lowest cost per MGY alternative
- Some seasonality anticipated; however, potential optimization and resource management could reduce the effects of seasonal groundwater level declines on dry season production totals





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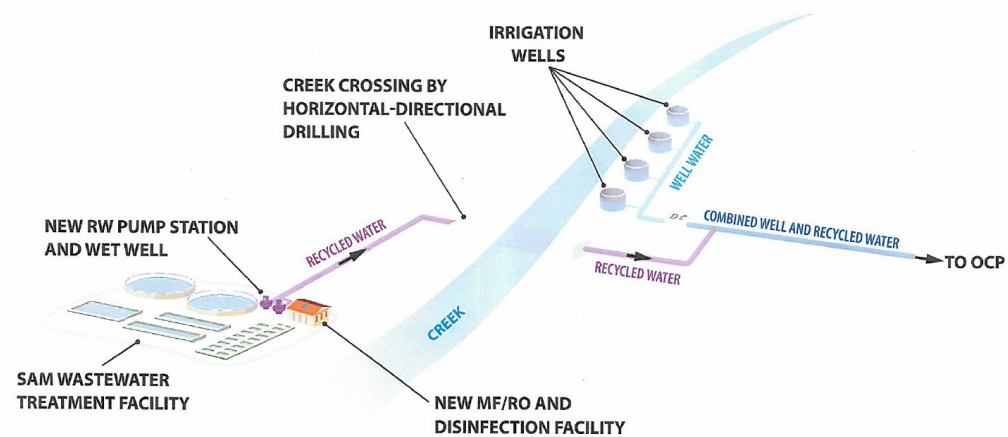
# CCWD Local Water Source Alternatives

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## Section 7: Other Local Water Projects and Studies

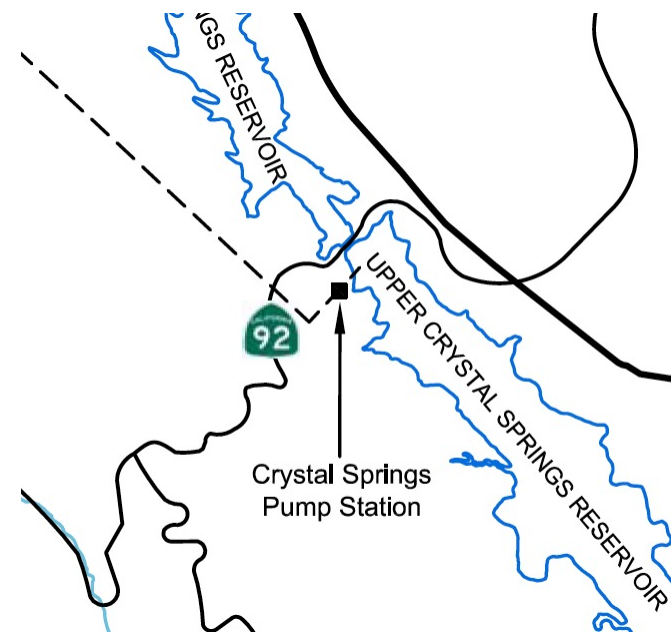
# Recycled Water

- 2002 and more recent studies
- OCGC and Skylawn identified as potential customers
- 365 MGY potential supply
- \$10.84MM cost estimate (2002)
- \$6.02MM cost estimate (2010) for 292 MGY plant
- Relatively low cost to upgrade treatment
- Purple pipe distribution system would represent major investment
- State advancing regulations for direct potable reuse
- Multiple stakeholders



# Contractual Water

- SFPUC supplied 73% of the District's water on average over last 10 years
  - 56% from Crystal Springs Reservoir
  - 17% from Pilarcitos Reservoir
- Key terms of SFPUC Agreement
  - 1984 "Settlement Agreement"
  - 2009 New Agreement – 25 Years (expires 2034 – can be extended for two additional 5-year terms)





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## Contractual Water

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- SFPUC Agreement – Key Terms (continued)
  - Supply assurance – perpetual commitment
  - Serves 27 Bay Area Agencies
    - (2009) 1.7 million customers; 30,000 businesses
    - Santa Clara and San Jose are temporary and interruptible customers
  - Supply Guarantee = 184 MG/day (normal years)
  - District’s “ISG” = 2.175 MG/day
  - Provides for drought allocations in a drought emergency (Tier 1/Tier 2)
    - 1/3 of the water goes to “Retail” Customers – City/County of San Francisco
    - 2/3 of the water goes to Wholesale Customers (BAWSCA)



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## Contractual Water

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- SFPUC Agreement – Key Terms (continued)
  - System Reliability – Commitment to “WSIP” – Water System Improvement Program - \$4.8 Billion (completion May 2023)
  - 46% of SFPUC’s budget (“rates”) – covers debt service
  - Also \$134M BAWSCA Bond for WSIP – CCWD portion of Annual Debt Service-\$144K
  - CCWD Specific Terms (2009 Agreement):
    - SFPUC to prioritize supply to CCWD from Pilarcitos Reservoir
    - CCWD received a credit for receiving untreated water



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## Contractual Water

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- SFPUC/BAWSCA Opportunities?
  - Tier II Drought Allocation Relief (or new methodology?)
  - “Wheeling” water, etc.?
  - Investment in New Sources
- Other?



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## Desalination Not Advanced At This Time

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- Not seriously considered by CCWD
- High construction costs
- High operating costs
- Likely only utilized during droughts or emergencies



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# CCWD Local Water Source Alternatives

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## Section 8: Recommendations



# Local Source Alternatives Ranking

Potential projects to produce 100 MGY+, implementable within 50 years						
Water Source/Project	Expected Yield in MGY (Normal Rainfall Year)	Drought Reliability Ranking	Water Quality Ranking	Conceptual Relative Construction Cost Ranking**	\$K/MGY	Score
Lower Pajaritos Well Field	259	3	2	3 (\$3.1 MM; 2003)	12	8
Recycled Water	365	3	3	2 (\$10.84 MM; 2002)	30	8
Dennison-San Vicente Surface Water Diversion and Pipeline	472	2	3	3 (\$20 MM)	42	8

Potential projects to produce 50 MGY+, implementable within 50 years						
Water Source/Project	Expected Yield in MGY (Normal Rainfall Year)	Drought Reliability	Water Quality	Conceptual Relative Construction Cost	\$K/MGY	Score
Pajaritos Canyon Well Replacements	55	1	3	2 (\$3 MM)	55	6
Denniston Well Replacements	130	2	2	2 (\$5 MM)	38	6
Drill New Well(s) In Denniston/Airport Aquifer	60	2	2	2 (\$7 MM)	117	6

## Ranking:

1 = Unreliable/Poor/High Cost

2 = Moderate

3 = Good/Low Cost Relative to Future Yield

\* based on CCWD experience

\*\* = Construction cost ranking adjusted for total yield (i.e., greater yield increases ranking to account for efficiencies and cost savings elsewhere for the District).



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## Conclusions

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- Surface water diversions at Pilarcitos and Denniston diversify CCWD's water portfolio
- Groundwater pumping at Denniston extends the seasonal availability of local water supply
- Pilarcitos and Denniston are the largest watersheds in CCWD's jurisdiction



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## Recommendations

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1. Continue acquisition of rights to water in San Vicente and Denniston Creeks
2. Consider implementing next-step recommendations in 2003 Lower Pilarcitos Groundwater Study (pilot well, pumping tests, streamflow survey)
3. Consider replacement of surface water wells in Upper Pilarcitos Canyon
4. Conduct evaluation of Denniston wellfield and implement improvements to maximize production
5. Work with stakeholders to develop potentially feasible recycled water alternatives



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# Next Steps

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# End of Presentation

Geo Blue Consulting  
geoblueconsulting.com 415-755-3200