MINUTES
WATER RESOURCES COMMITTEE
Tuesday, September 6, 2022, at 9 a.m.
UNITED WATER CONSERVATION DISTRICT
Boardroom, 1701 N. Lombard Street, Oxnard CA 93030

Committee Members Present:
Chair Daniel Naumann
Director Lynn Maulhardt

Committee Members Absent:
Director Gordon Kimball

Staff Present:
Mauricio Guardado, Jr., general manager
Dr. Maryam Bral, chief engineer
Dan Detmer, water resources manager
Dr. Zachary Hanson, hydrogeologist
Kathleen Kuepper, hydrogeologist
John Lindquist, supervising hydrogeologist
Josh Perez, chief human resources officer
Zachary Plummer, technology systems manager
Dr. Bram Sercu, senior hydrologist
Dr. Jason Sun, principal hydrogeologist – modeler
Vanessa Vasquez, administrative assistant
Brian Zahn, chief financial officer

Public Present: (see attached)
Jennifer Tribo, City of Ventura
Martin Gramckow, Marathon Land

OPEN SESSION: 9:00 a.m.
Chair Naumann called the Water Resources Committee Meeting to order at 9:00 a.m.

1. **Public Comment**
   Chair Naumann asked if there were any public comments for the Water Resources Committee. None were offered.

2. Approval of Minutes - Motion

Motion to approve the May 31, 2022, Water Resources Committee meeting minutes, Director Maulhardt; Second, Director Naumann. Voice vote: two ayes (Maulhardt and Naumann); none opposed; one absent (Kimball). Motion carries 2/0/1.

3. Summary of Solute Transport Model Development and Application

Dr. Jason Sun detailed the conversion of the Coastal Plain Model to MODFLOW USG-Transport model, followed by calibration to chloride concentration detected in the Southern Oxnard basin. Preliminary modeling results of various Extraction Barrier and Brackish Water Treatment (EBB Water) Project pumping rates were presented.

Director Maulhardt asked Dr. Sun if the picture shown was correct for the Dudek modeling approach for coastal seawater intrusion. Water Resources Manager Dan Detmer explained the difference between the model results reported by Dudek for the Oxnard Basin GSP versus the more recent modeling conducted by Dr. Sun for United. Director Maulhardt said he was pleased with the clarity that the slides provided.

Chair Naumann asked if Dr. Sun was providing a ten-year review? Dr. Sun said it is a review from 1985 through 2019 and explained the clock shown on the video.

Mr. Martin Gramckow asked about the water budget for the Oxnard Basin and the flux rate for seawater intrusion. Mr. Gramckow, Dr. Sun, and Mr. Detmer engaged in a brief discussion about past and present water budget estimates and the evolving understanding of seawater intrusion.

4. Baseline Water Quality Sampling for EBB Water Project

Hydrogeologist Kathleen Kuepper provided an update to the Committee and presented preliminary water quality results from the EBB Water comprehensive baseline groundwater sampling.

Chair Naumann said he is happy to see positive results from the report presented. Chair Naumann asked what concentrations of constituents are of concern? Mrs. Kuepper showed the slide indicating the primary and secondary maximum contaminant levels (MCLs) specified by the State for drinking water.

5. CA Water Boards Prop 1 Round 3 grant proposal

Mr. Detmer provided an update on recent work towards completion of a full grant proposal for support for Phase 1 implementation of the Extraction Barrier and Brackish Water Treatment (EBB Water) Project.

Director Maulhardt and Chair Naumann said the graphics on a slide showing flow of water were unclear due to the similarity of the blue colors used, and requested the colors

be changed to improve clarity of the chart. Mr. Detmer said he would change colors for clarity going forward.

Chair Naumann said he liked the information provided and wanted to know if there is anything Directors can do to support the project. Mr. Detmer said United and the Navy (a project partner) continue to develop visual aids that will improve public and regulatory agency understanding of the project's goals and methods. He also thanked the Directors for their support.

6. Extraction Barrier Brackish Water Phase 1 Project Progress and Upcoming Work

Dr. Bral provided an update on recent work towards developing the EBB Water Project, including coordination with the U.S. Navy on land and access agreements, completion of a full Prop 1 grant proposal for support for Phase 1, the issuance of RFPs for design and permitting work, and discussions with Calleguas MWD for potential discharge to its Salinity Management Pipeline.

Director Maulhardt said the presentation includes all elements and everything is being tied together as a whole. General Manager Mauricio Guardado agreed.

Director Maulhardt and Chair Naumann requested that Board presentation for projects be specific and to the point without too many details regarding graphics, tasks, and other details.

7. Water Resources Department Update

Mr. Detmer stated that due to time constraints, did the Committee have any questions on monthly reports submitted with regard to Agenda Item 7. The Committee had no questions or comments.

8. Groundwater Sustainability Agencies Update

Mr. Detmer stated that due to time constraints, did the Committee have any questions on monthly reports submitted with regard to Agenda Item 8. The Committee had no questions or comments.

Mr. Guardado quickly mentioned activities of interest taking place outside the District.

FUTURE AGENDA ITEMS

Committee members offered no suggestions.

ADJOURNMENT

Chair Naumann adjourned the meeting at 10:33 am.

I certify that the above is a true and correct copy of the minutes of the Water Resources Committee Meeting of September 6, 2022.

ATTEST: _____

Daniel Naumann, Chair

3. SUMMARY OF SOLUTE TRANSPORT MODEL DEVELOPMENT AND APPLICATION

Presented by Jason Sun, Ph.D., P.E, Principal Hydrogeologist/Modeler

Water Resources Committee Meeting

September 6, 2022

Groundwater Model Refresher

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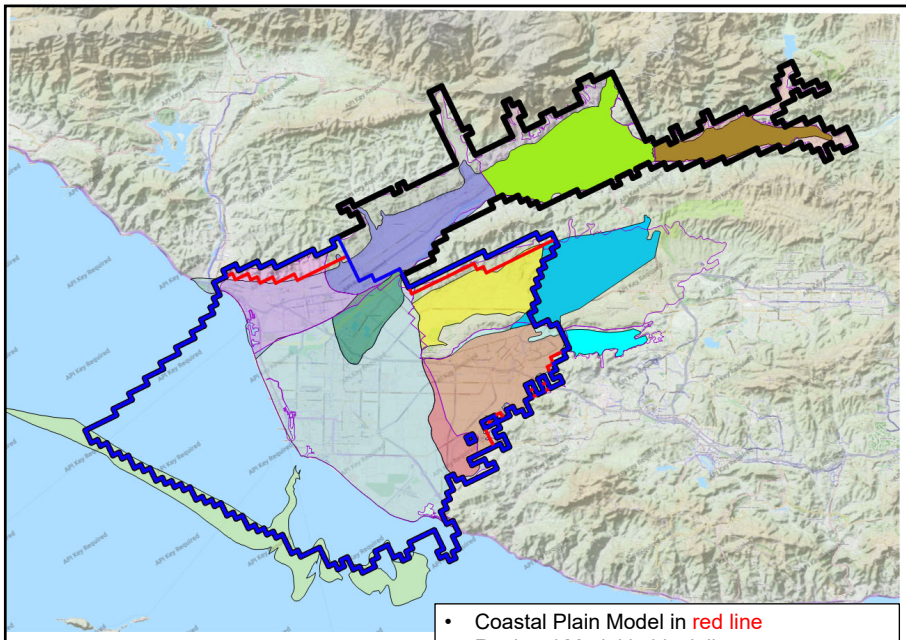

- Coastal Plain Model in red line
- Regional Model in black line
- Upgraded Coastal Plain Model in Blue line

Coastal Plain Model
Nov. 2013 to 2018

Regional Model
July 2019 to August 2020

Coastal Plain Model Update
March 2022

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UWCD GROUNDWATER MODELS

Coastal Plain Model	Regional Model	Coastal Plain Model Upgrade
Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)
GSPs for FCGMA	GSPs for Fillmore, Piru and Mound	
Monthly	Daily	Monthly
1985-2015	1985-2019	1985-2019
Jun-2018	Aug-2020	Mar-2022

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Directions After FCGMA GSPs

- The seawater intrusion is limiting the sustainable yield in Oxnard Plain
- New sources of water
- Pumping management/optimization
- …….

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UWCD GROUNDWATER MODELS

Coastal Plain Model	Regional Model	Coastal Plain Model Upgrade	USG Model
Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow + **Transport** + **Density**
GSPs for FCGMA	GSPs for Fillmore, Piru and Mound		Brackish water
Monthly	Daily	Monthly	Monthly
1985-2015	1985-2019	1985-2019	1985-2019
Jun-2018	Aug-2020	Mar-2022	Completed/Ongoing

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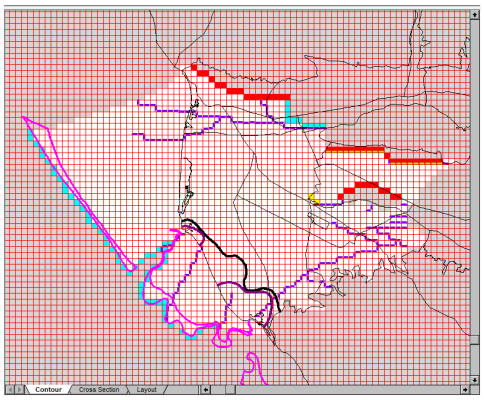
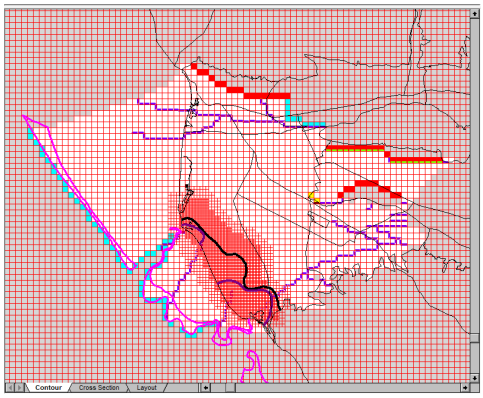
Numerical Conversion

- Incorporate model layer refinement
- Model grid refinement from 2000 ft to 500 ft



Uniform grid size: 2000 ft

MODFLOW-NWT



Grid sizes: 2000 ft, 1000 ft, 500 ft

MODFLOW-USG-Transport

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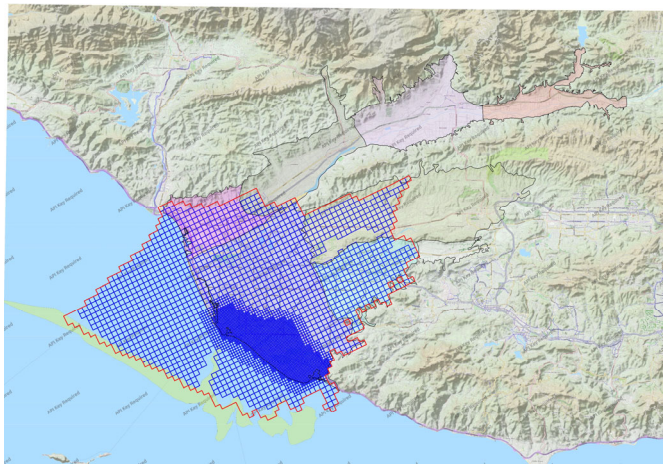
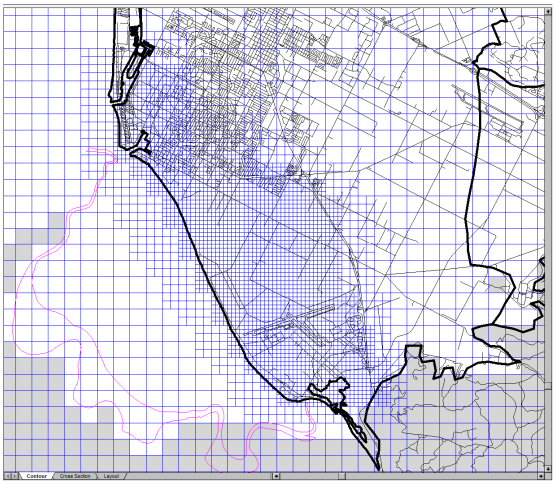
USG MODEL IS AN UNSTRUCTURED GRID (2000, 1000, 500 FT)
MODEL BASED ON THE COASTAL PLAIN MODEL





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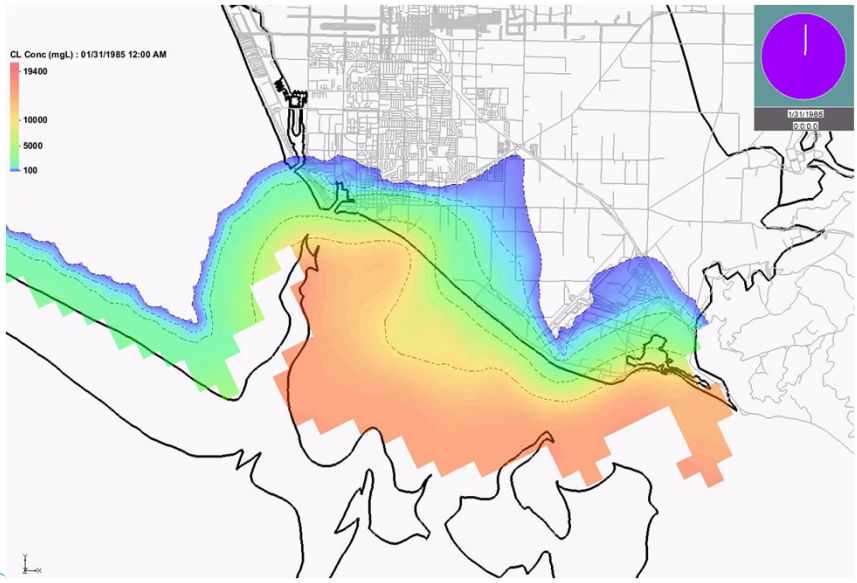
OXNARD AQUIFER



UWCD diverted significant amount of water in 1990s for recharge and TEMPORARILY pushed back the seawater intrusion front

In dry years, the seawater intrusion front continued to move inland

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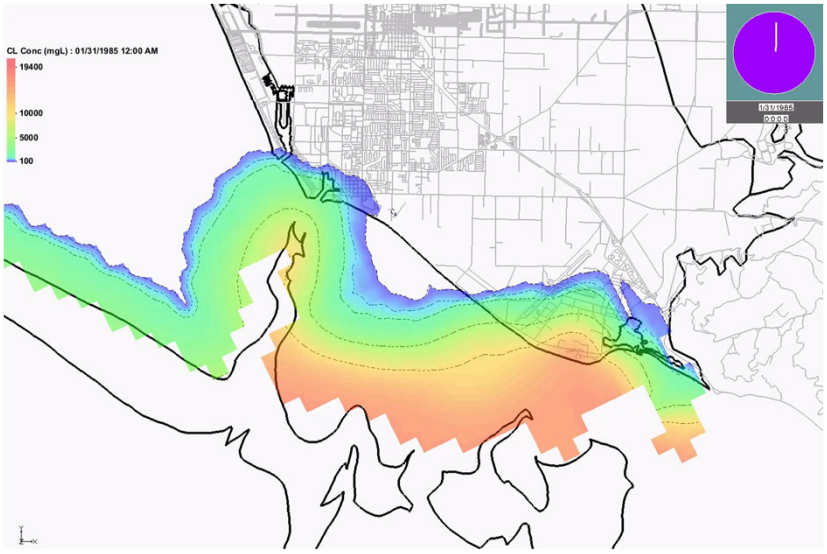
MUGU AQUIFER



The seawater intrusion in the Mugu aquifer was less affected by UWCD's groundwater recharge

The simulation shows a vertical migration from Oxnard to Mugu aquifers

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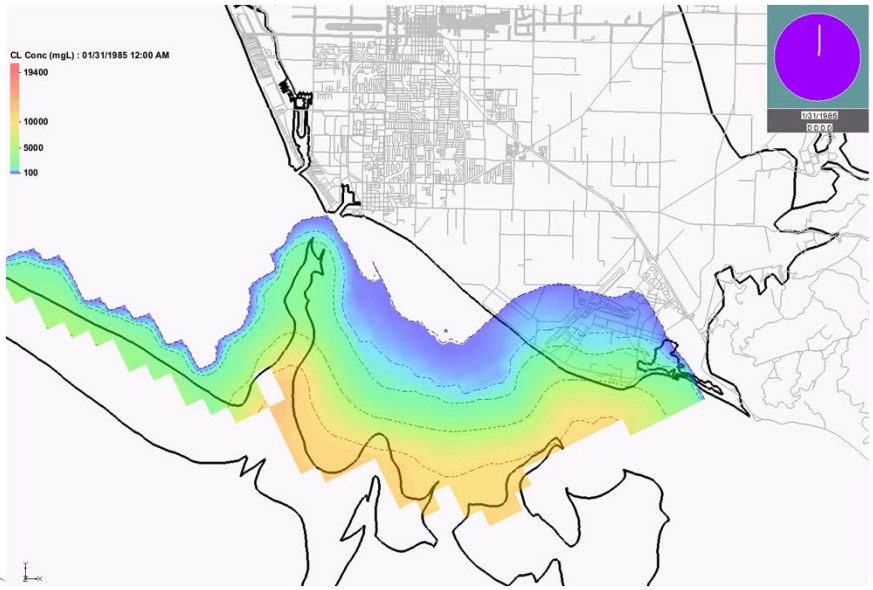
UPPER FOX CANYON AQUIFER



The seawater intrusion in the Mugu canyon area is from downward flow from the Mugu aquifer

The seawater intrusion in other area enters through the submarine outcrop

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EXTRACTION BARRIER AND BRACKISH (EBB) WATER TREATMENT PROJECT

- UWCD was awarded Water Boards Proposition 1 Grant to improve mapping of geology and improve groundwater models in order to evaluate the proposed EBB Water project
- UWCD completed the Prop 1 Round 2 Feasibility Study in December 2021, and concluded the project is feasible
- UWCD was invited to apply for a Prop 1 Round 3 implementation grant, and submitted the Round 3 proposal in July 2022

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EBB Water Simulation Assumptions (Feasibility Study)

- The extraction barrier wells are assumed to operate for 50 years
- The product water from the treatment plant is assumed to be 50% of the extracted water
- Project extraction rates from 3,500 to 20,000 AFY
- FCGMA GSP simulation run based on no pumping cutback (base case) is used for simulations
- 1930-1969 hydrology with 2070 climate factor adjustment is used

Scenario	Extraction rate (AFY)	Treated water for usage (AFY)	Treated water usage (AFY)			Oxnard well number	Mugu well number	Oxnard Extraction (AFY)	Mugu Extraction (AFY)
			Navy	PTP	PV				
No Action	0	0	0	0	0	0	0	0	0
Phase 1	3500	0	0	0	0	5	2	2500	1000
5K W	5000	0	0	0	0	6	4	3000	2000
5K T	5000	2500	1500	500	500	6	4	3000	2000
10K	10000	5000	1500	1750	1750	12	10	6000	4000
15K	15000	7500	1500	3000	3000	16	12	10000	5000
20K	20000	10000	1500	4250	4250	20	20	14000	6000

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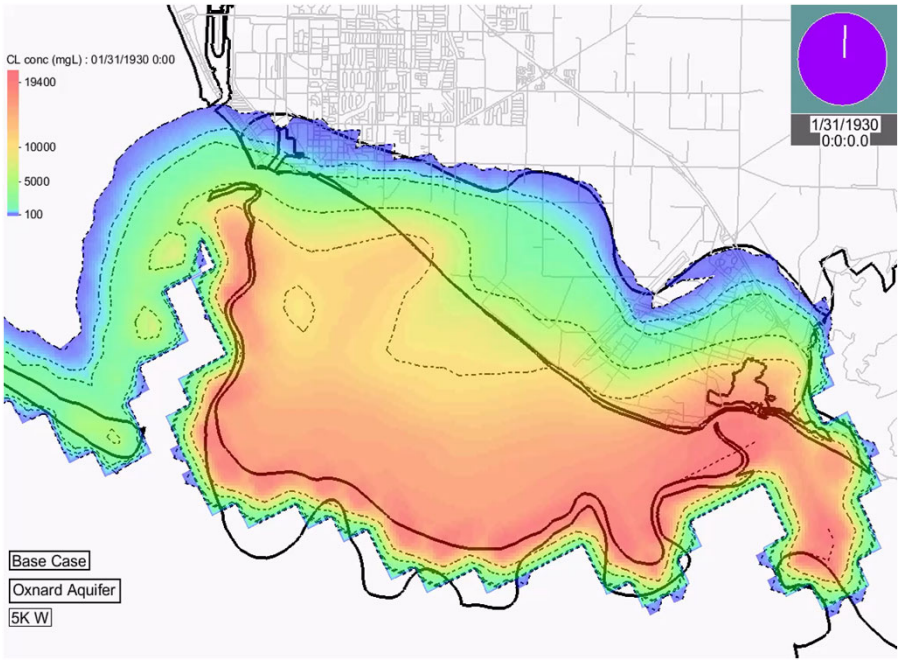
Extraction Barriers at 5,000 AFY

3,000 AFY in Oxnard aquifer

Simulated chloride concentration in Oxnard aquifer in 50 years



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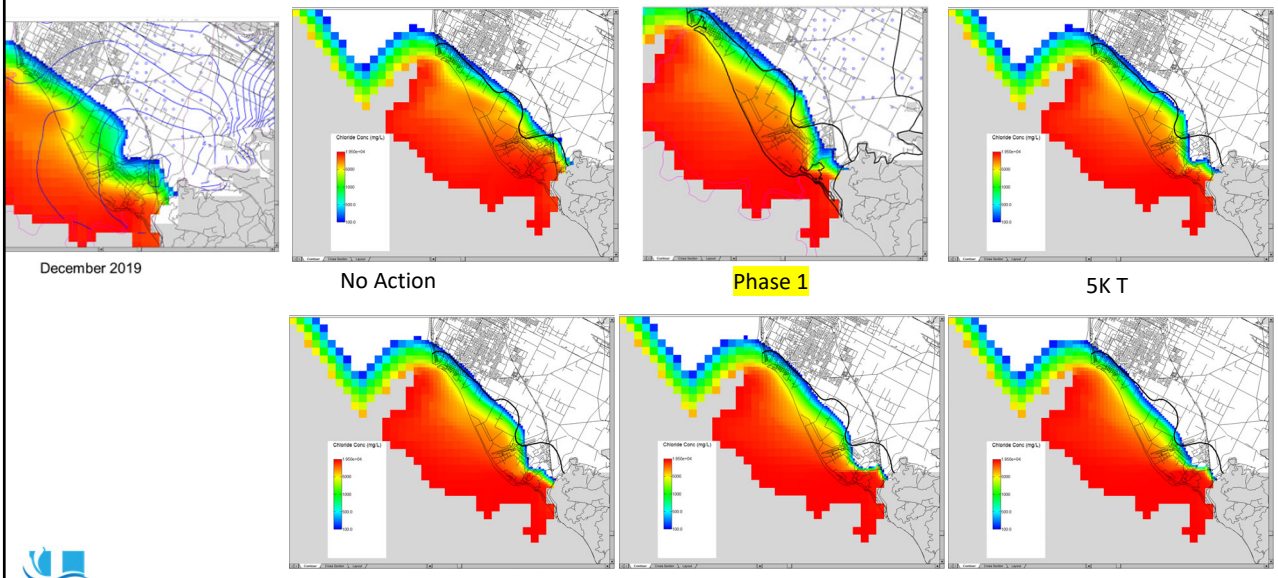
Oxnard Aquifer



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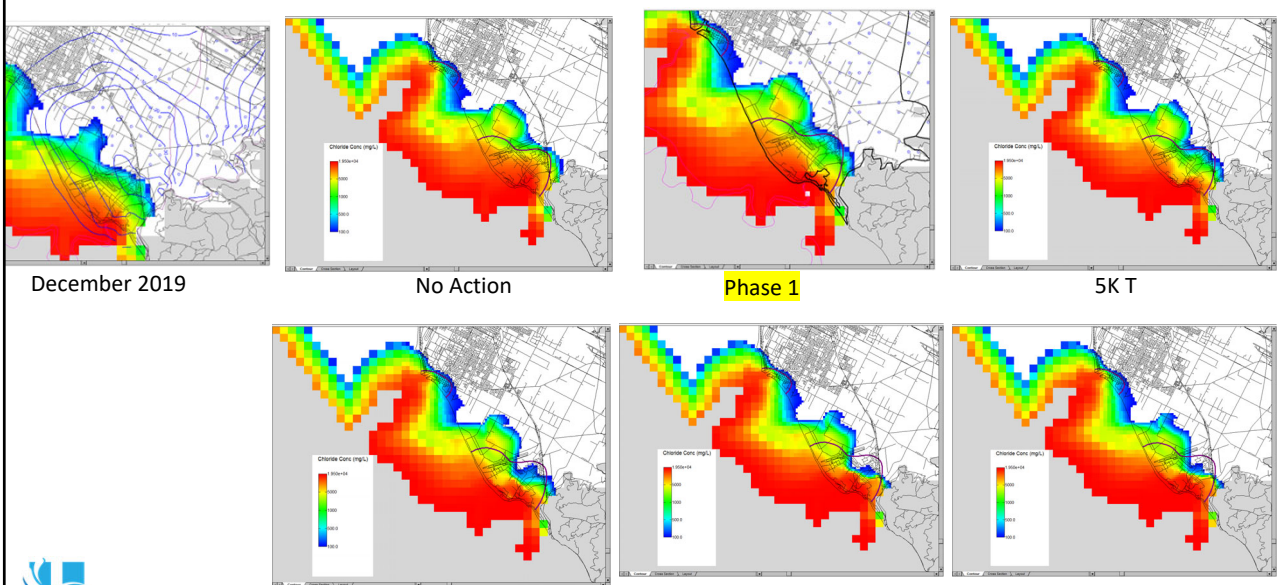
Mugu Aquifer



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EBB Water Publications

- UWCD, Technical Memorandum. Geological Model Refinements Near Naval Base Ventura County Point Mugu. September 2021
- UWCD, Technical Memorandum. Oxnard Coastal Plain Model: MODFLOW-USG. October 2021
- UWCD, Extraction Barrier and Brackish Water Treatment Project Feasibility Study: Groundwater Modeling. December 2021
- UWCD, Phase 1 Extraction Barrier and Brackish Water Treatment Project Feasibility Study: Groundwater Modeling. July 2022

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Perched Aquifer Model (PAM)

- The seawater intrusion (in confined aquifers) has been simulated with the MODFLOW-USG based Coastal Plain Model in the Prop 1 Grant project
- To better analyze the vertical leakage from the Semi-perched aquifer down to Oxnard aquifer, and shallow groundwater flow in the unconfined aquifer, a “zoom-in” model focused on the Semi-perched aquifer is needed.
- The PAM Model is built based on the MODFLOW-USG based Coastal Plain Model

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UWCD GROUNDWATER MODELS

Coastal Plain Model	Regional Model	Coastal Plain Model Upgrade	USG Model	PAM
Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow (MODFLOW-NWT)	Flow + **Transport** + **Density**	Flow + **Transport** + **Density**
GSPs for FCGMA	GSPs for Fillmore, Piru and Mound		Brackish water	Brackish water
Monthly	Daily	Monthly	Monthly	Monthly
1985-2015	1985-2019	1985-2019	1985-2019	1985-2019
Jun-2018	Aug-2020	Mar-2022	Completed/Ongoing	In the Works

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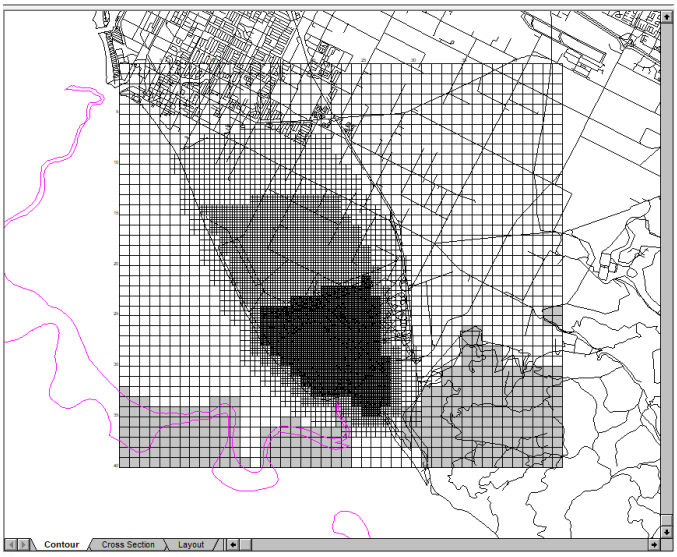

Perched Aquifer Model (PAM)

- MODFLOW-USG
- 7 model layers:
  Semi-perched aquifer: Layers 1 to 5
  Aquitard : Layer 6
  Oxnard aquifer: Layer 7
- Grid sizes: 125, 250, 500, and 1000 ft
- Monthly time step

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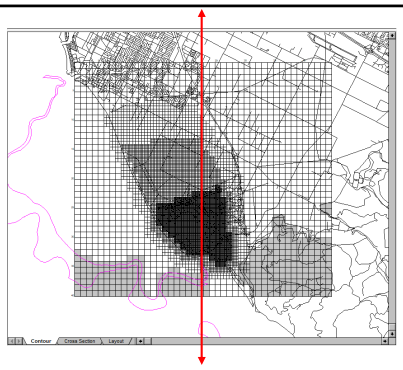
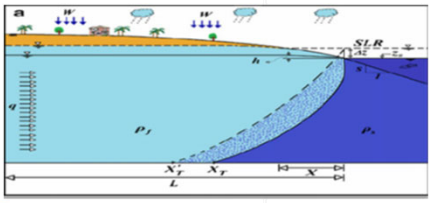
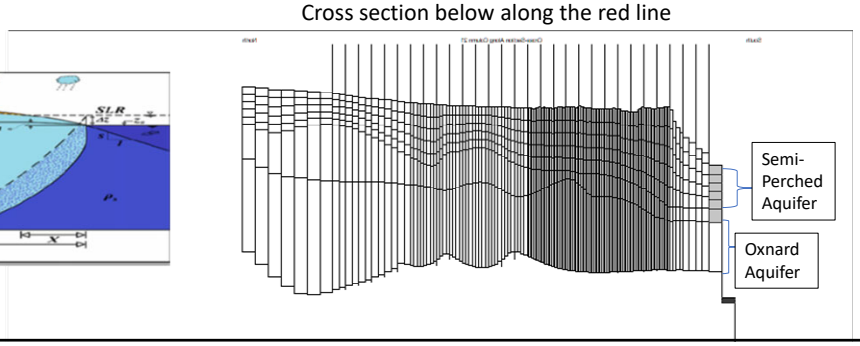
Saltwater Wedge in Aquifer

Goal:
To evaluate the potential for vertical migration of contaminants from the shallow Semi-perched aquifer to Oxnard aquifer due to EBB Water project pumping



Cross section below along the red line





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Ongoing Modeling Works

- Complete the Perched Aquifer Model (PAM)
- Add subsidence simulation
- Analyze project options for basin optimization
- Support City of Ventura on IPR project

2022											
January	February	March	April	May	June	July	August	September	October	November	December
EBB Water Phase 1 Study and Tech Memo											
				Local geological data, WL, and chloride conc data collection for PAM							
						Perched Aquifer Model (PAM)					
					Subsidence						
Projects and Basin Optimization											
IPR project for City of Ventura											

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Questions/Comments

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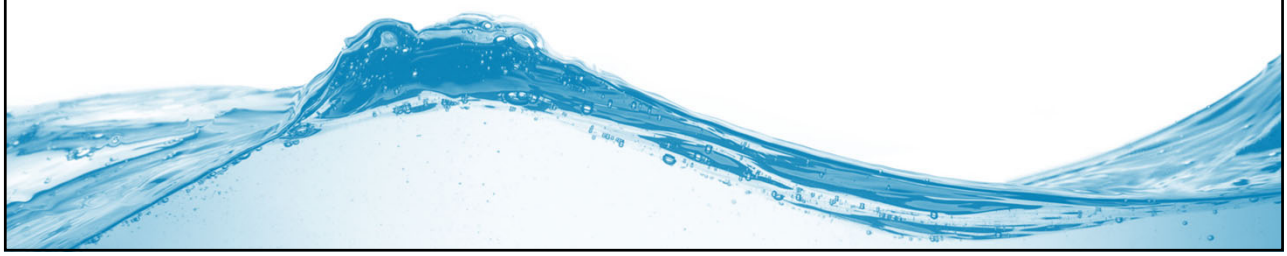
4. BASELINE WATER QUALITY SAMPLING FOR EBB WATER PROJECT

Presented by Kathleen Kuepper, PG

Water Resources Committee Meeting

September 6, 2022



OUTLINE

EBB Water Project Baseline Sampling Event

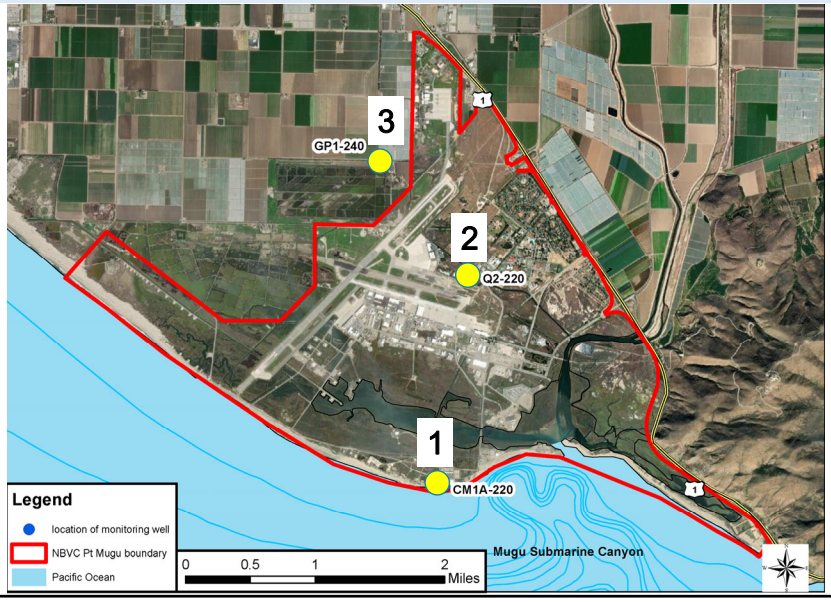
1. Sampling locations and project area
2. Sampling methods and event details
3. Preliminary water quality results
   a. Inorganic Constituents and General Parameters
   b. Organic Constituents and Other Contaminants
   c. Constituent of Special Interest – PFAS
   d. Radionuclides
   e. Microbial Indicators

SAMPLING LOCATIONS AND PROJECT AREA

Project Location:
NBVC Point Mugu

Purpose: Establish background levels for expanded list of constituents

Sampling Target Depth:
Monitoring wells screened in Oxnard aquifer
(180-240 feet below ground surface)



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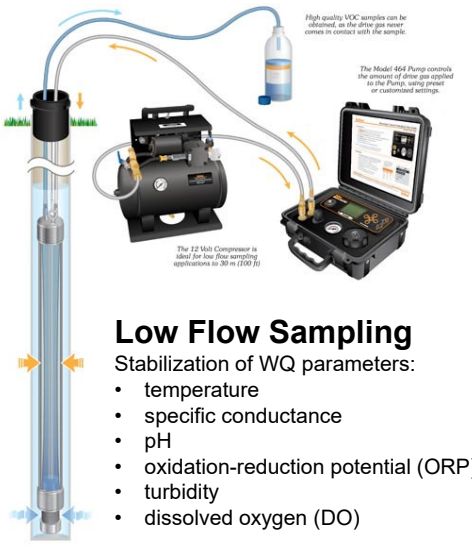
SAMPLING METHODS AND EVENT DETAILS



Low Flow Sampling

Stabilization of WQ parameters:

- temperature
- specific conductance
- pH
- oxidation-reduction potential (ORP)
- turbidity
- dissolved oxygen (DO)

Sampled over 300 hundred constituents

4

PRELIMINARY WATER QUALITY RESULTS

Inorganic Constituents and General Parameters

Constituent	#3 Well Result	#2 Well Result	#1 Well Result	Units	MCL (Secondary)
Total Dissolved Solids	820	**2,100**	**31,000**	mg/l	1,000
Specific Conductance	1,200	**2,900**	**45,000**	µS/cm	1,600
Chloride	40	**680**	**19,000**	mg/l	500
Sulfate	380	330	**2,200**	mg/l	500
Apparent Color	**25**	**15**	**100**	ACU	15
Odor	**17**	ND	ND	TON	3
Aluminum	**1,900**	**460**	ND	µg/l	200
Turbidity	**34**	**6.8**	**85**	NTU	5
Methylene blue active substances (MBAS)	ND	ND	**0.81**	mg/l	0.5

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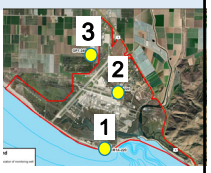
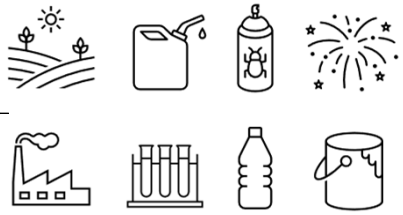
PRELIMINARY WATER QUALITY RESULTS

Organic Constituents and Other Contaminants



No samples detected organic contaminants

- Volatile organic compounds (VOCs)
- Pesticides
- Polychlorinated biphenyls (PCBs)
- Non-Volatile Synthetic Organic Contaminants (SOCs)
- Explosives
- Disinfectant Byproducts (DBPs)



Constituent	#3 Well Result	#2 Well Result	#1 Well Result	Units
Total Organic Carbon	0.79	0.63	ND	mg/l
Dissolved Organic Carbon	0.2	0.54	ND	mg/l

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PRELIMINARY WATER QUALITY RESULTS

Constituent of Special Interest:
Per- and polyfluoroalkyl substances (PFAS)

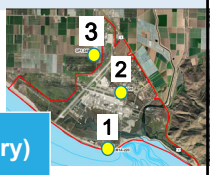
Constituent	#3 Well Result	#2 Well Result	#1 Well Result	Units	Notification Limit
Perfluorobutanesulfonic acid (PFBS)	ND	ND	ND	ug/L	0.5
Perfluorooctanesulfonic acid (PFOS)	ND	ND	ND	ug/L	0.0065
Perfluorooctanoic acid (PFOA)	ND	ND	ND	ug/L	0.0051

ND=Analyte not detected at or above the minimum reporting limit.

7

PRELIMINARY WATER QUALITY RESULTS

Radionuclides



Constituent	#3 Well Result	#2 Well Result	#1 Well Result	Units	MCL (Primary)
Gross Alpha	ND	2.62	ND	pCi/L	15
Gross Beta	5.33	7.61	ND	pCi/L	50 pCi/L (trigger) 4 millirem/yr
Uranium	0.7	1.5	ND	pCi/L	20
Radium 226	ND	ND	ND	pCi/L	
Radium 228	ND	ND	ND	pCi/L	
Radium 226, 228 Combined	ND	ND	ND	pCi/L	5
Strontium 90	ND	ND	ND	pCi/L	8
Tritium	ND	ND	ND	pCi/L	20,000

ND=Analyte not detected at or above the minimum reporting limit.

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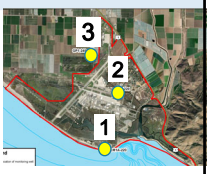
PRELIMINARY WATER QUALITY RESULTS



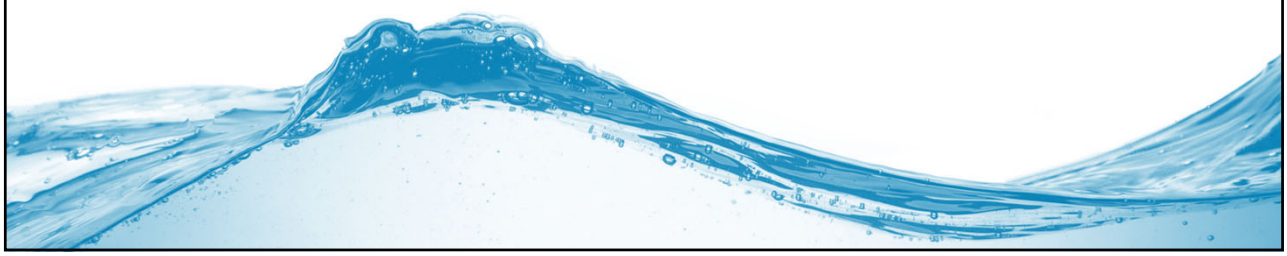
Microbial Indicators

Constituent	#3 Well Result	#2 Well Result	#1 Well Result	Units
Total Coliform Bacteria	ND	11	4.1	MPN/100 mL
Enterococci	ND	ND	ND	MPN/100 mL
E. Coli Bacteria	ND	ND	ND	MPN/100 mL
Fecal Coliform Bacteria	ND	ND	ND	MPN/100 mL

ND=Analyte not detected at or above the minimum reporting limit.

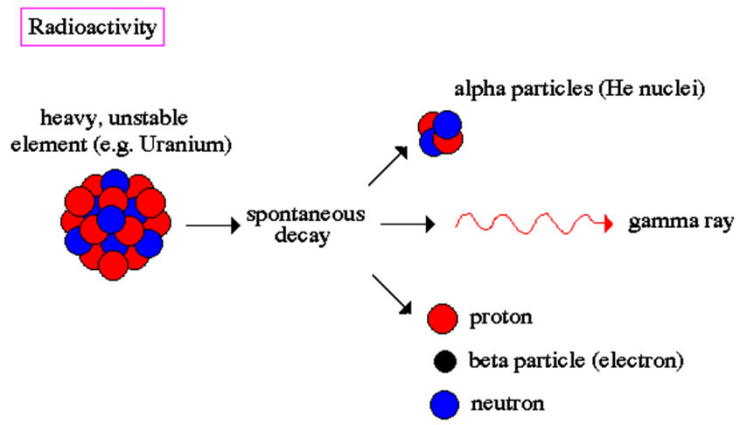
9

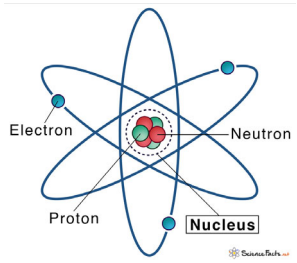
QUESTIONS?



PRELIMINARY WATER QUALITY RESULTS

Radionuclides





https://www.buildinggreen.com/news-article/how-much-radiation-does-it-take-two-kilomockingbird

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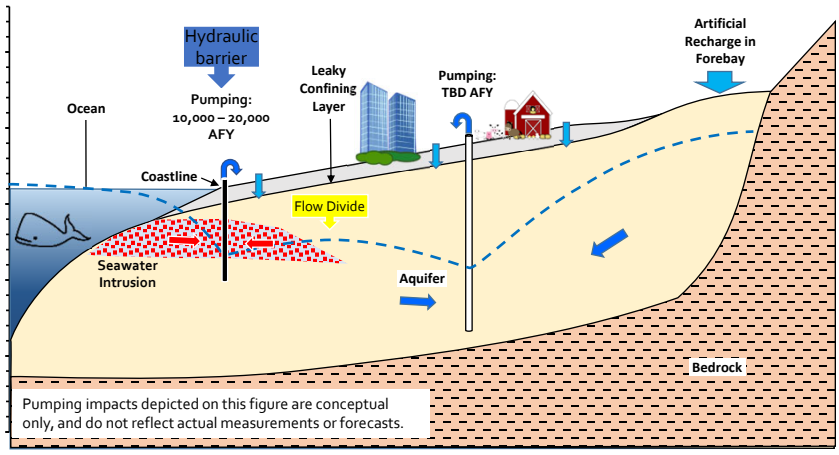
United Water
CONSERVATION DISTRICT

5. CA Water Boards Prop 1 Round 3 Grant Proposal

Extraction Barrier Project Area

Extraction Barrier Concept

Benefits- remove saline water from drinking water aquifers, no water intake structures

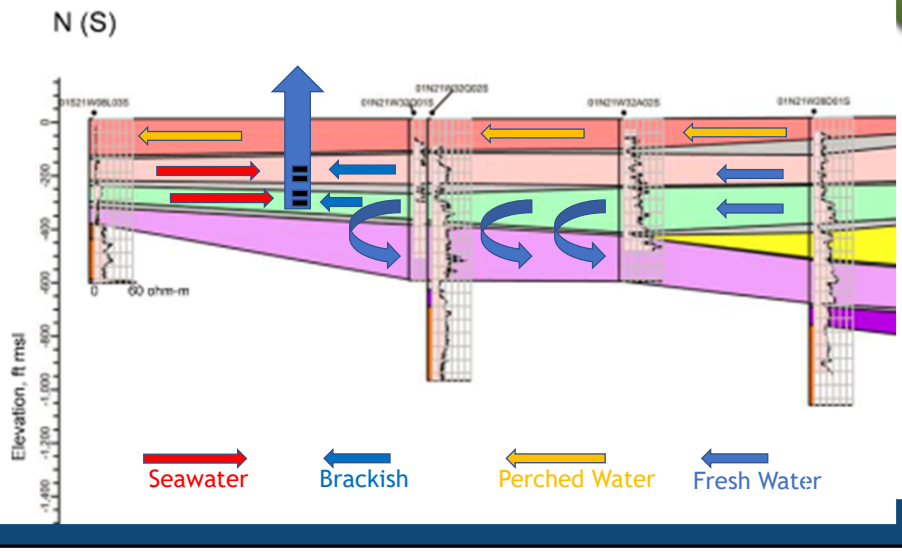


Pumping impacts depicted on this figure are conceptual only, and do not reflect actual measurements or forecasts.

Optimal Conceptual Flow with Project Section N-N' Detail

Model pumping rates in Oxnard aquifer that avoid significant vertical flow down from perched aquifer

Model Mugu aquifer pumping rates to draw, over time, fresh water over area of mergence with lower aquifers



Water Board Support

- United submitted full Prop 1 Round 2 Planning Grant proposal in March 2019, prelim award notice in October, grant agreement executed in June 2021.
- The Round 2 grant funded improved modeling tools and project feasibility study, completed in December 2021.
- Technical Advisory Committee (TAC) helped review the work and advise on critical regulatory elements (FCGMA, DDW, Regional WQ Board, Water Boards, U.S. Navy).
- Feasibility study concluded that project was indeed feasible.

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Prop 1 Round 3 Implementation Grant

- Concept proposal submitted in September 2021
- In April 2022 United was invited to submit a full proposal
- Full proposal was completed and submitted in July 2022

Phase 1 of the EBB Water project is being designed to implement an extraction barrier of modest scale and to answer some remaining questions related to project permitting, engineering, operation and scale.

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Phase 1B Extraction Barrier

- Currently no UAS extraction wells exist in the project area, we need production wells to better assess:
  - Degree of connection between aquifers
  - Potential flow between aquifers, especially between the Semi-perched aquifer and the underlying Oxnard aquifer
  - Aquifer properties in the greater project area
  - Water quality representative of the full aquifer thickness
  - Stability of water quality parameters over time
- Additional monitoring wells are also planned for the Semi-perched and confined aquifers (SGM Grant, DWR via FCGMA)

Phase 1B Project

Five Oxnard aquifer wells
Two Mugu aquifer wells
No treatment of extracted groundwater

Intended discharge location is at or near Laguna Road bridge (west arm of Mugu Lagoon)
Alternative discharge is to Calleguas SMP

Target production is 3,500 AFY
(2,170 gpm, 3.1 mgd, 4.8 cfs).

United Water CONSERVATION DISTRICT

Project Phasing

Phase 1A (Exploration Phase)	• Feasibility Study (**2019 SWRCB Prop 1 Round 2 Planning Grant**) • Design, CEQA, Permits • Fieldwork (land and environmental surveying, geotech exploration)
Phase 1B (Implementation Phase)	• Monitoring Wells (**2022 DWR SGM Grant**) • Extraction Wells, Pipelines, and Point of Groundwater Discharge (**2022 SWRCB Prop 1 Round 3 Implementation Grant - *award pending***)
Phase 2 (Build-out Phase)	• Expanded extraction well field and monitoring wells • Water treatment and brine disposal • Treated water distribution to Navy and Oxnard Plain

Continued Regulatory Engagement

- FCGMA, GSA for the Oxnard basin, regulates pumping in the basin and will also likely require monitoring and contingency plans for project operations
- Division of Drinking Water wants to confirm source water for eventual drinking water facility if free of organic contaminants and surface water influence
- Regional Water Quality Control Board
  - Regulates discharge from Phase 1 operations and brine
  - Helps regulate contaminant sites on NBVC Point Mugu
  - Interest in basin salt balance for TMDLs and Salt and Nutrient Management Plans
- Also potential for CA Coastal Commission and State Lands Commission involvement

Grant Funding

- Concept proposal (2021 September) was for new monitoring wells and up to four productions wells. Total budget was $8.45 million with up to 50% grant match.
  - $4.1 million for production wells
  - $1.1 million for monitoring wells
  - $1.7 million for well infrastructure and discharge
  - $1.2 million for design and permitting
  - Other related project and administrative costs
- United's engineers and hydrogeologists later concluded that a larger Phase 1 project is preferred

Final Proposal July 2022

- United's final proposal was for a larger project, totaling $18.6 million for construction of 7 extraction wells and control systems, discharge pipes, and funding for related design, permitting, sampling and reporting activities
- The Prop 1 Round 3 funding request was for $8.4 million, or 46% of the estimated project cost
- Water Boards staff indicated that funding requests can be larger than what was in the concept proposals, but offered no assurance that funding will be increased
- Intent is to build and operate this initial phase of the EBB Water project before major additional investments are made for well field expansion, water treatment facilities and water distribution

6. Extraction Barrier and Brackish Water Phase 1 Project Progress and Upcoming Work

Water Resources Committee Meeting
September 6, 2022

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Phase 1 Project

Phase 1A — Exploration and Development Phase

- Field Exploration Activities (Planning, Design and Permitting Efforts)
- District's Right-of-Access through License Agreement 1A (2022-2025)

Phase 1B — Implementation Phase

- Construction of Seven (7) Groundwater Extraction Wells, Installation of up to Six (6) Monitoring Well Clusters, and Discharge of Extracted Water

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Phase 1 A Scope of Work

- **Task 1 – Site Access**
  - Right of Access (District's Staff, Consultants and Contractors) through Multi-day Defense Biometric Identification System (DBIS)
- **Task 2 – Land Surveying**
  - Topographic Mapping (LiDAR, Aerial Surveys, Bathymetric Surveys, others)
  - Collection of Above and Below Ground Utility Features
  - Potholing and Utility Markings
- **Task 3 – Geotechnical Exploration**
  - Exploration Borings
  - Soil Sampling and Test Pits Excavation
- **Task 4 – Environmental Surveying**
  - Environmental Surveying in the 500-ft Environmental Survey Zone
  - Information Gathering to Support Permitting Efforts (CEQA and NEPA) for Future Phases
  - Site-specific Biological Surveys
  - Wetland Delineation/Confirmation
  - Cultural and Paleontological Pedestrian Field Surveys
  - Additional Surveys, as needed

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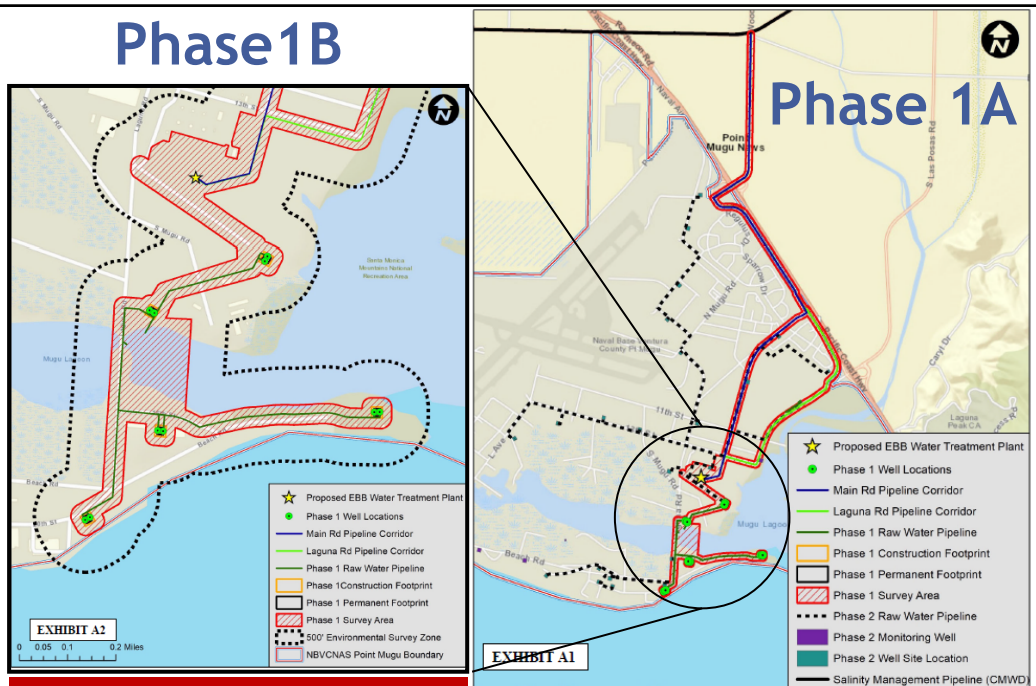

Discharge Options for Extracted Water

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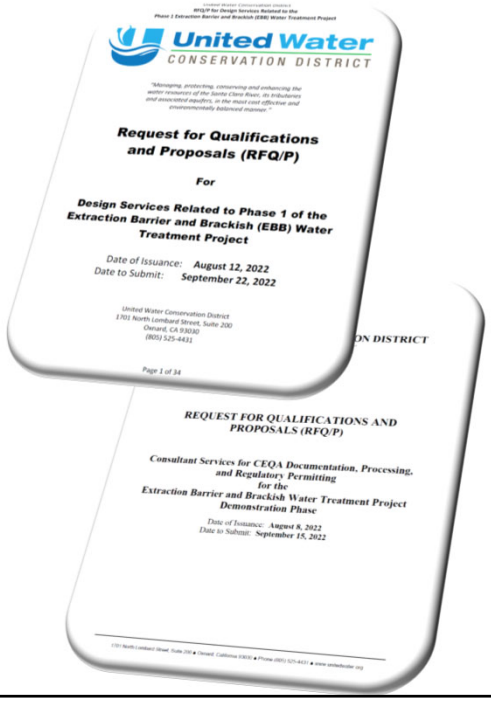
Phase 1 Project

Requests for Qualifications/ Proposals:

- ❑ CEQA and Permitting Services
  - Released on Aug 8
  - Proposals due on Sept 15
- ❑ Design Services
  - Released on Aug 12
  - Proposals due on Sept 22



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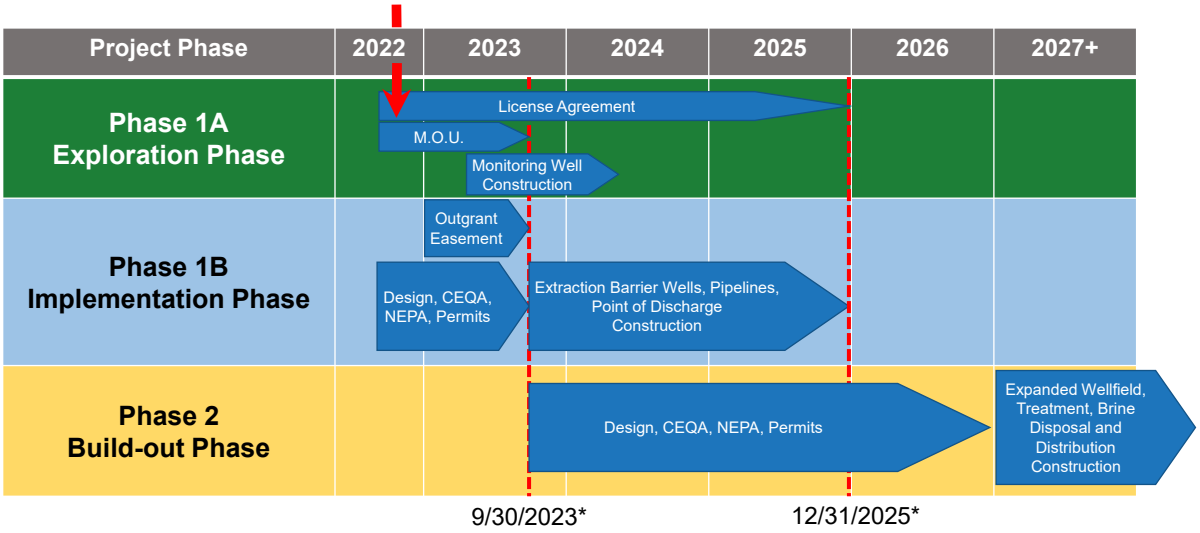
Project Timeline



* As set by SWRCB Prop 1 GWGP Round 3 Grant (pending award announcement)

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Phase 1 Project Estimated Budget

Project Activity	Phase 1A	Phase 1B
	FY22-23	FY23-24, FY 24-25, FY25-26
Project Administration	$288,000	$1,667,000
Planning/ Design/ Engineering	$1,165,000	$1,442,000
Env. Documentations/ Permits	$600,000	$1,261,000
Construction/ Implementation	-	$14,195,000
Total (Estimate)	**$2,053,000**	**$18,565,000***

* SWRCB Prop 1 R3 Grant funding request is $8.44 million.

* Installation costs of monitoring well clusters is not included in the project cost.

* SGM grant award of $1.3 million partially covers the cost of monitoring well clusters.

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