



Lower Santa Margarita River IPR Project Project Completion Report

San Diego Integrated Regional Water Management Regional Advisory Committee
November 6, 2024

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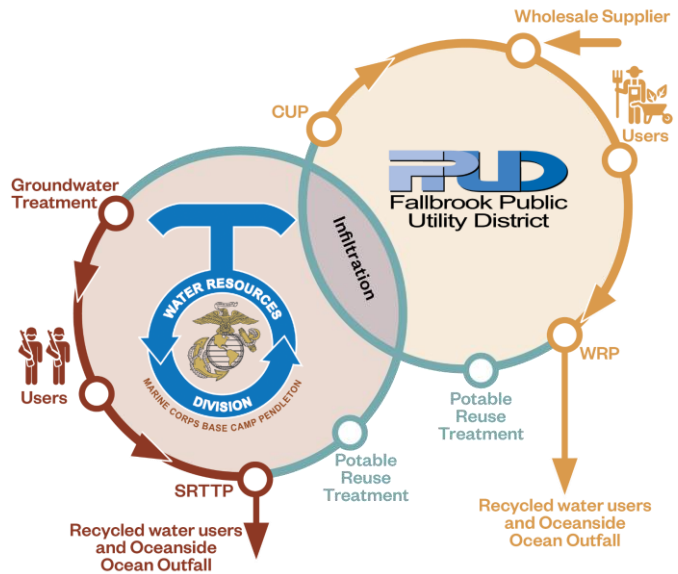
Acknowledgements

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 - Jack Bebee
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- Stetson Engineers
 - Steve Reich
 - Ann Easterbrook
- Independent Consultants
 - Debbie Burris
 - Michael Welch

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Discussion Topics

- Project Background
- Grant Process/Schedule
- Feasibility of IPR Projects
- Treatment Train Selection and Pilot Equipment
- Pilot Test Results
- Conceptual Layout
- Summary and Next Steps



Project Background

Agency Locations

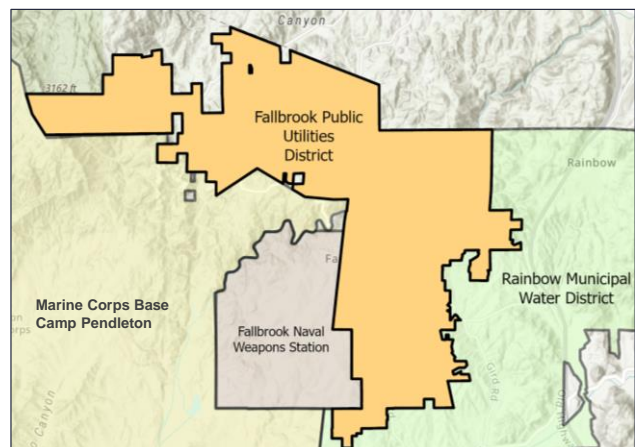


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Fallbrook Public Utility District



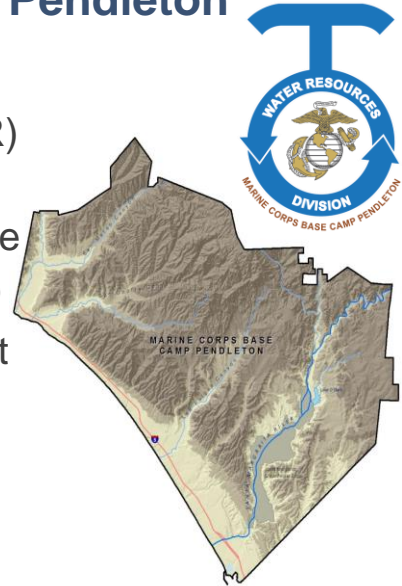
- Water and sewer service to 35,000 residents in the City of Fallbrook
- Agriculture uses about 40% of the water
- Fallbrook Water Reclamation Plant (WRP) treats an average of 1.5 mgd
 - 0.5 mgd of recycled water
 - 1 mgd discharged to ocean
- Potential partnership with Rainbow Municipal Water District (RMWD)



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United States Marine Corps, Camp Pendleton

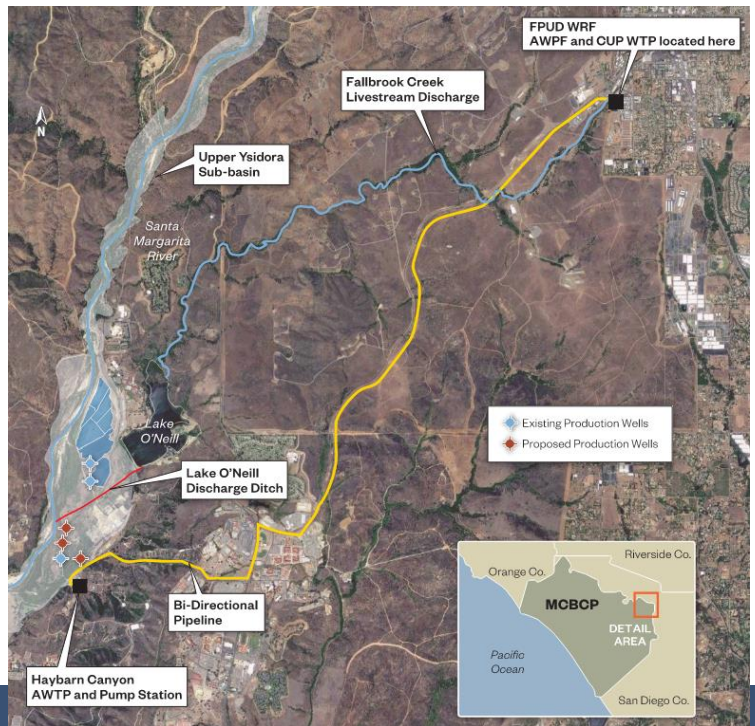
- Groundwater supply only
- Recharged by Santa Margarita River (SMR)
- Built SMR Conjunctive Use Project (SMRCUP) with FPUD to increase recharge
- Excess SMRCUP water delivered to FPUD
- Southern Regional Tertiary Treatment Plant (SRTTP) treats average of 2.7 mgd
- Approximately 1.1 mgd recycled water and 1.6 mgd ocean discharge



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FPUD Project Initial Concept

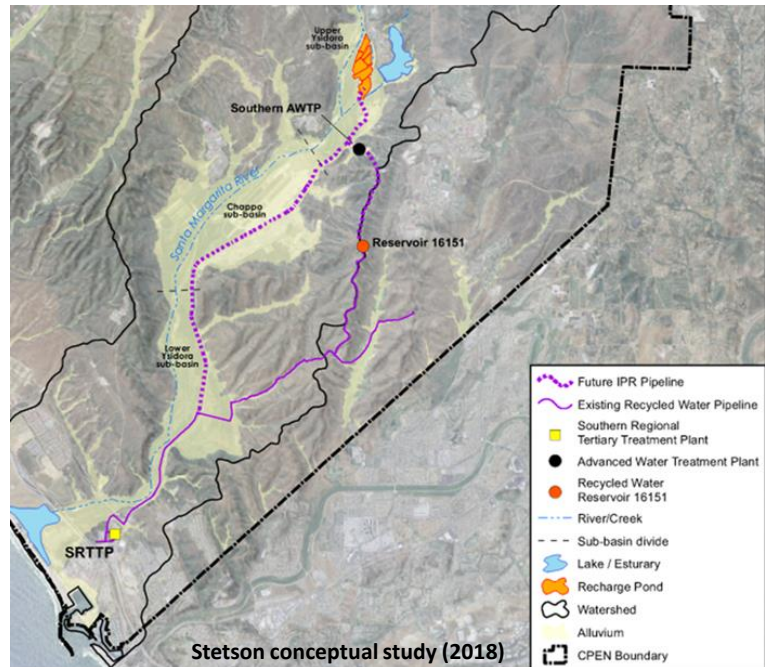
- Fallbrook WRP
- IPR treatment
- Stream discharge to Fallbrook Creek
- Lake O'Neill
- Discharge Ditch (Surface Spreading)
- CPEN extraction wells
- FPUD SMRCUP Water Treatment Plant



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CPEN Project Initial Concept

- SRTTP
- Existing pipelines to IPR treatment at Southern AWTP
- New pipeline to spreading basin
- Recharge Pond #3
- CPEN extraction wells
- Southern AWTP or FPUD SMRCUP Water Treatment Plant



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Prop 1 Round 1 IRWM Implementation Grant Process

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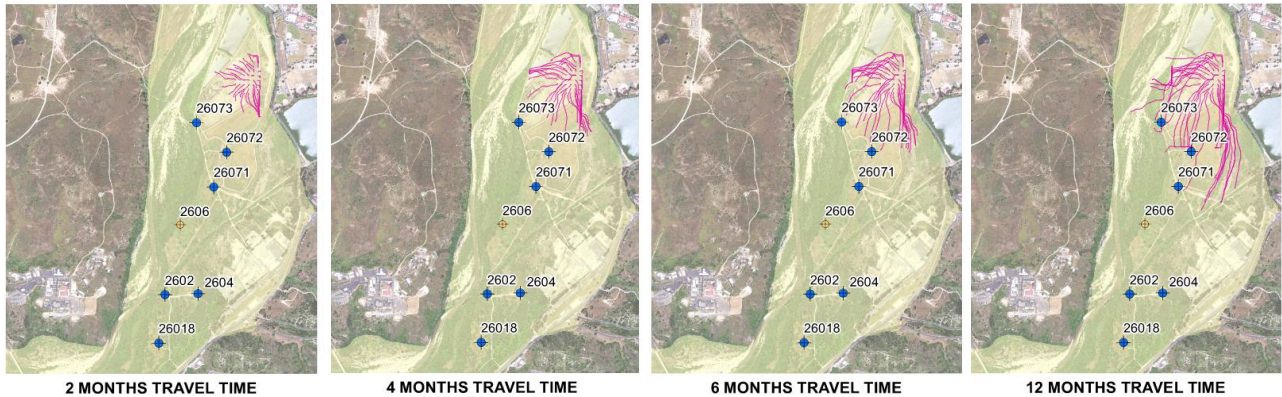
Grant Process/Project Schedule

- Grant Awarded June 27, 2020
 - Decision Support Tool Project
 - \$687,500 with 50% minimum match
 - Completion deadline September 30, 2025
- Feasibility Studies Completed July 14, 2021
- Design Completed January 19, 2022
- Implementation
 - Piloting Conducted from February 28, 2022 to August 8, 2022
- Final Report Completed June 30, 2023



Feasibility of IPR Projects

Groundwater Modeling (Stetson, 2023)



- Recharge Pond #3
- Wet condition shown
- Modeled response retention time was just over 7 months (217 days)



FPUD and CPEN IPR Projects Issues Table

Topic	FPUD	CPEN	Regulatory Agency
Recovery of recharge water	✓	✓	N/A
Recycled water quality	✓	✓	RWQCB and DDW
Meeting TP in stream discharged	✓	--	RWQCB
Meeting TN in stream discharge	✓	--	RWQCB
Meeting California Toxics Rule requirements	✓	--	RWQCB
Wet weather flows from Lake O'Neill reach SMR	✓	--	RWQCB and DDW
TOC based on RWC and diluent	✓	✓	DDW
Pathogen (12/10/10)	✓	✓	DDW
Response retention time	✓	✓	DDW
Alternative discharge and off-spec water	✓	✓	RWQCB and DDW



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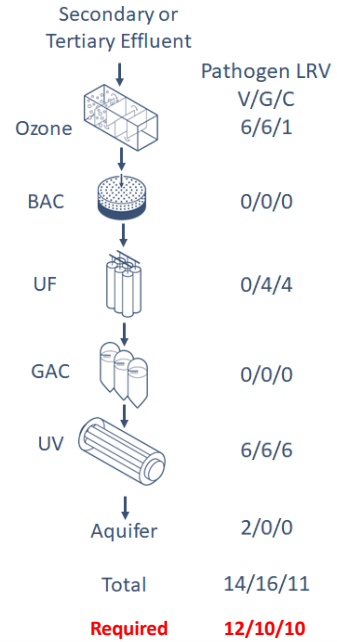
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Treatment Train Selection and Pilot Equipment

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Benefits of Carbon-Based Advanced Treatment Train

Treatment Barrier	Pathogens	Chemicals	Other Benefits
Ozone	✓	✓	Reduce TOC UF design
BAC	✗	✓	
UF	✓	✗	
GAC	✗	✓	Reduce TOC
UV	✓	✓	
Aquifer	✓	✓	Reduce TOC



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Pilot Equipment



Ozone Pilot Unit
(Intuitech)



BAC and GAC Filter Pilot Unit
(Intuitech)



UF Pilot Unit
(Suez Zeeweed)



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Pilot Test Plan

Testing Phases

- Phase 1 – Startup and troubleshooting (13 weeks)
- Phase 2 – Stable operation (8 weeks)

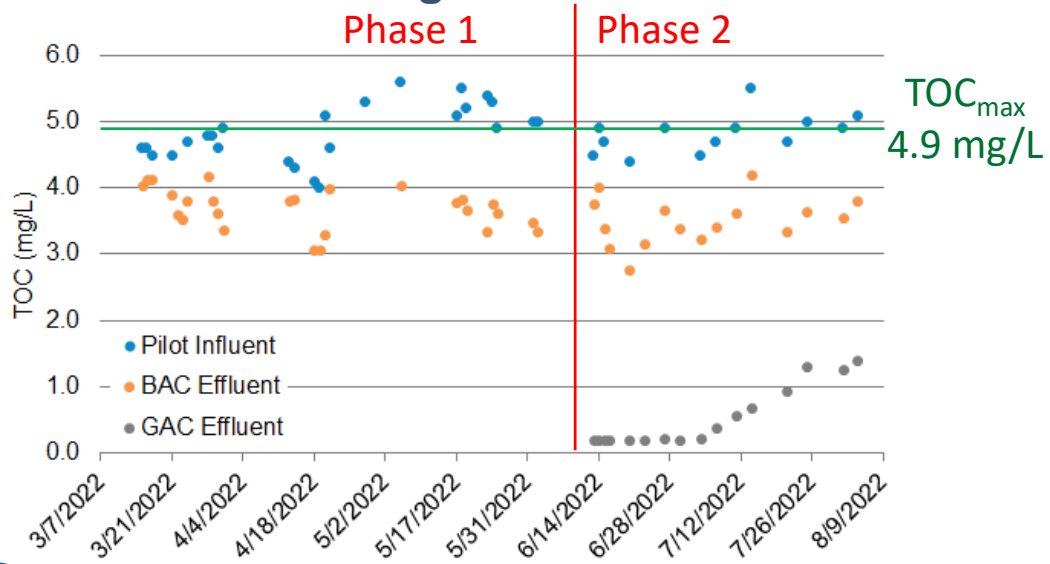
Key Operating Parameters

- O_3/TOC ratio: 1.0
- BAC EBCT: 15 minutes
- UF Flux: 36 gfd
- GAC EBCT: 21 minutes



SRTTP Pilot Test Results

TOC Reduction Through the Pilot Plant



GAC Breakthrough Summary

Parameter	GAC Influent Concentration	Breakthrough Limit	Approximate Bed Volumes to Reach Limit Based on Pilot Data
PFOA	7.4 – 12 ng/L	5.1 ng/L ¹ (4.0 ng/L) ²	31,000 (21,000)
PFOS	8.3 – 14 ng/L	6.5 ng/L ¹ (4.0 ng/L) ²	63,000 (30,000)
PFHxS	9.8 – 18 ng/L	3.0 ng/L ¹	10,000
PFBS	14 – 23 ng/L	500 ng/L ¹	Not applicable
TOC	2.8 – 4.2 mg/L	4.9 mg/L ³	Not applicable

¹ Notification Level

² Proposed USEPA MCL

³ Estimated maximum TOC assuming 10.6 MGD of diluent and 40% removal by soil aquifer treatment



Conceptual Layout

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Layout at SRTTP

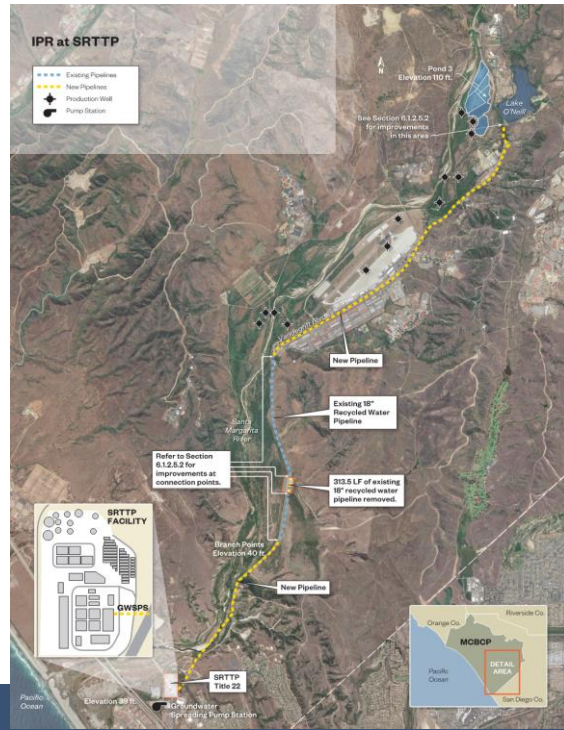
- CBAT train
- Design flow: 2.2 mgd



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Conveyance to Recharge Ponds

- Approximately 8 miles to recharge ponds
- Elevation gain of 71 ft



Summary and Next Steps

Summary and Next Steps

Discussion Topics Summary

- Only CPEN IPR was feasible
- Satisfied water quality goals
- Source water affects
- PFHxS breakthrough probably would control GAC replacement
- Conceptual design of CPEN IPR facility was developed
- Conceptual piping alignment was proposed

Next Steps

- Discussions between CPEN and FPUD about implementation
- Potential FPUD agreement with Rainbow Municipal Water District
- Secure federal funding to advance to design and construction

Thank You!

