



**NORTH MARIN  
WATER DISTRICT**

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# Local Water Supply Enhancement

## Novato and West Marin Service Area

Marin Water Board Retreat February 2023

# North Marin Water District Service Areas



# Local Supply Studies – Long History

## Novato Supply History Snapshot

1950s – GW

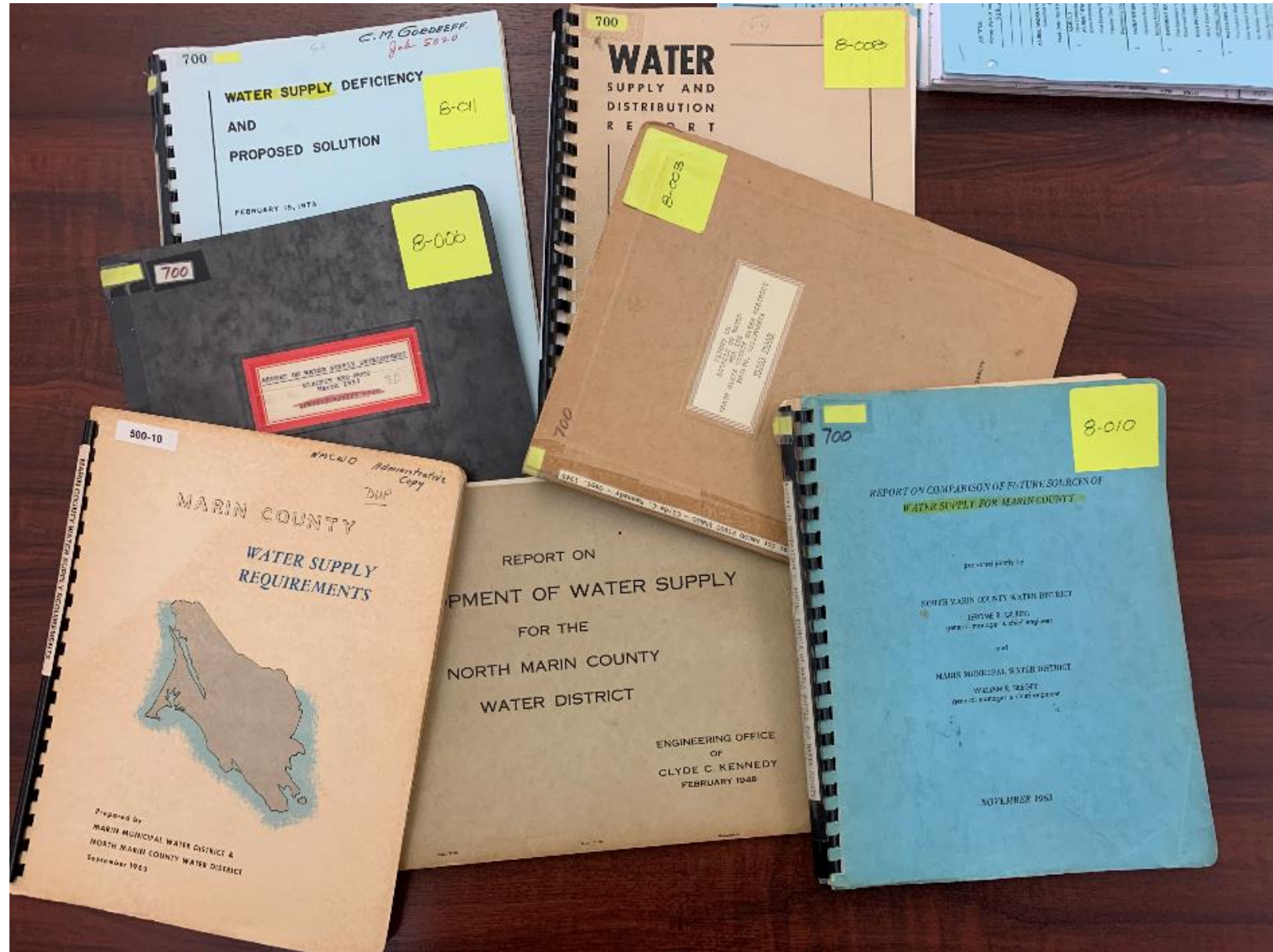
1960s – Stafford

1970s – SCWA

1980s – Stafford Raised

1990s - now: 70-85% SCWA

2011 - now – Recycled Water





# Local Water Supply Enhancement Study

Issued RFP July 2021

- *Selected West Yost*

Public Workshops

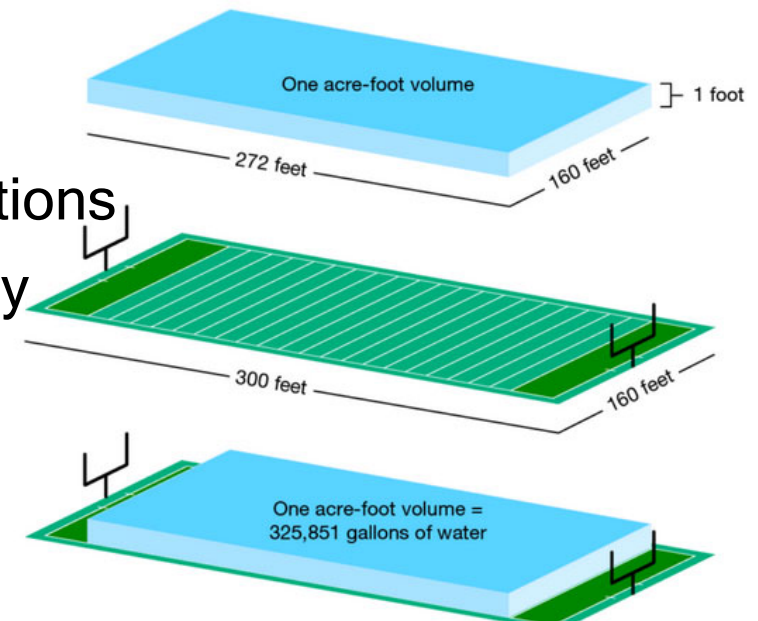
- January & April 2022

Final Report July 2022



# Local Supply Alternatives Evaluated

- Aquifer storage recovery (ASR)
- Recycled water system expansion
- Indirect Potable Reuse (IPR) water use options
- Improve Stafford Treatment Plant Efficiency
- Capture and Conveyance of Stormwater
- Increasing Stafford Lake Capacity
- Desalination



Goal: 1,000 – 2,000 AFY



# Evaluation Criteria

## Quantitative Criteria




- Cost
- Water Supply Yield

## Qualitative Criteria

- Reliability
- Operational Impacts
- Regulations and Permitting
- Public and Institutional Considerations
- Other Considerations



# Low Ranking Alternatives

- **Aquifer storage recovery (ASR)** 
  - *Estimated at 50-100 acre-feet per year (AFY)*
  - *Pumping at tens of gallons per minute*
- **Recycled water system expansion**
  - *Potential potable water offset of up to 220 AFY*
  - *Expansion is very costly*
- **Indirect Potable Reuse (IPR) water use options** 
  - *ASR limitations*
  - *Stafford Lake at opposite end of Novato*
- **Desalination** 
  - *No viable intake or brine discharge or near shore site*
  - *Economy of Scale issue*



# Potential Local Supply Alternatives

Local Water Supply Alternative	Estimated Capital Cost	Annual Yield (MGY)	Annual Yield (AFY)	Weighted Qualitative Score
Improve Stafford Treatment Plant Process Water Recapture Efficiency - Pretreatment Modification	\$70,000*	7 - 23	20 - 70	4.6
Increase Stafford Lake Storage Capacity - Spillway Notch Slide Gate	\$944,000	237	726	4.4
Divert Captured Stormwater Into Stafford Lake	\$2.46M - \$13.64M	80 - 257	245 - 788	3.2
*Includes performance testing				





# Improve Stafford Treatment Plant Process

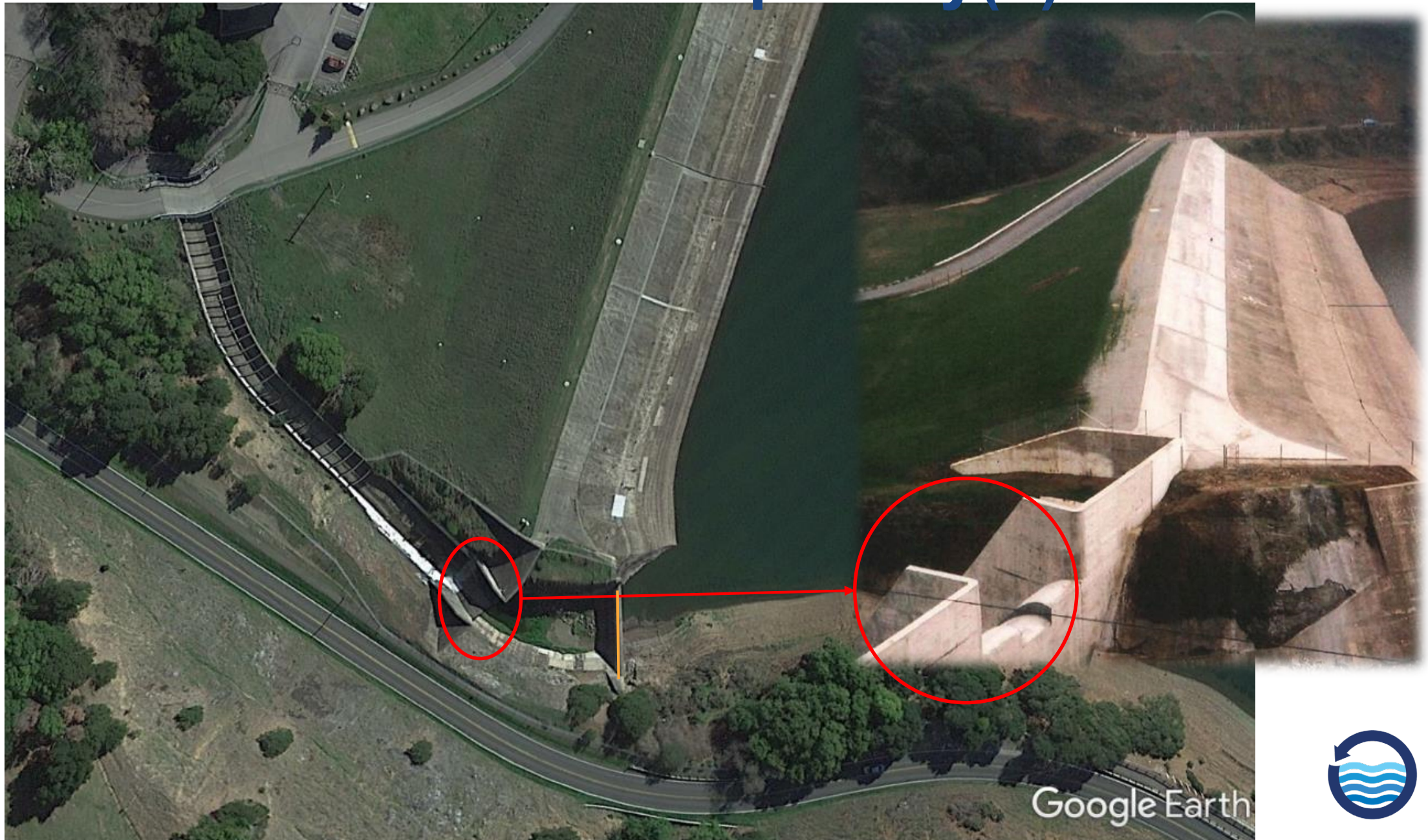
## Water Recapture Efficiency

- District staff previously conducted plant-scale study of modifying hydrocyclone return to reduce reject flow volume
- Conducting plant-scale study of modified hydrocyclone operation with external technical support to confirm capital/operations changes needed
- Raw water intake also may need modifications for more consistent intake water quality





# Stafford Dam Spillway(s)





# Stafford Dam Spillway Notch





# Slide Gate on Spillway Notch



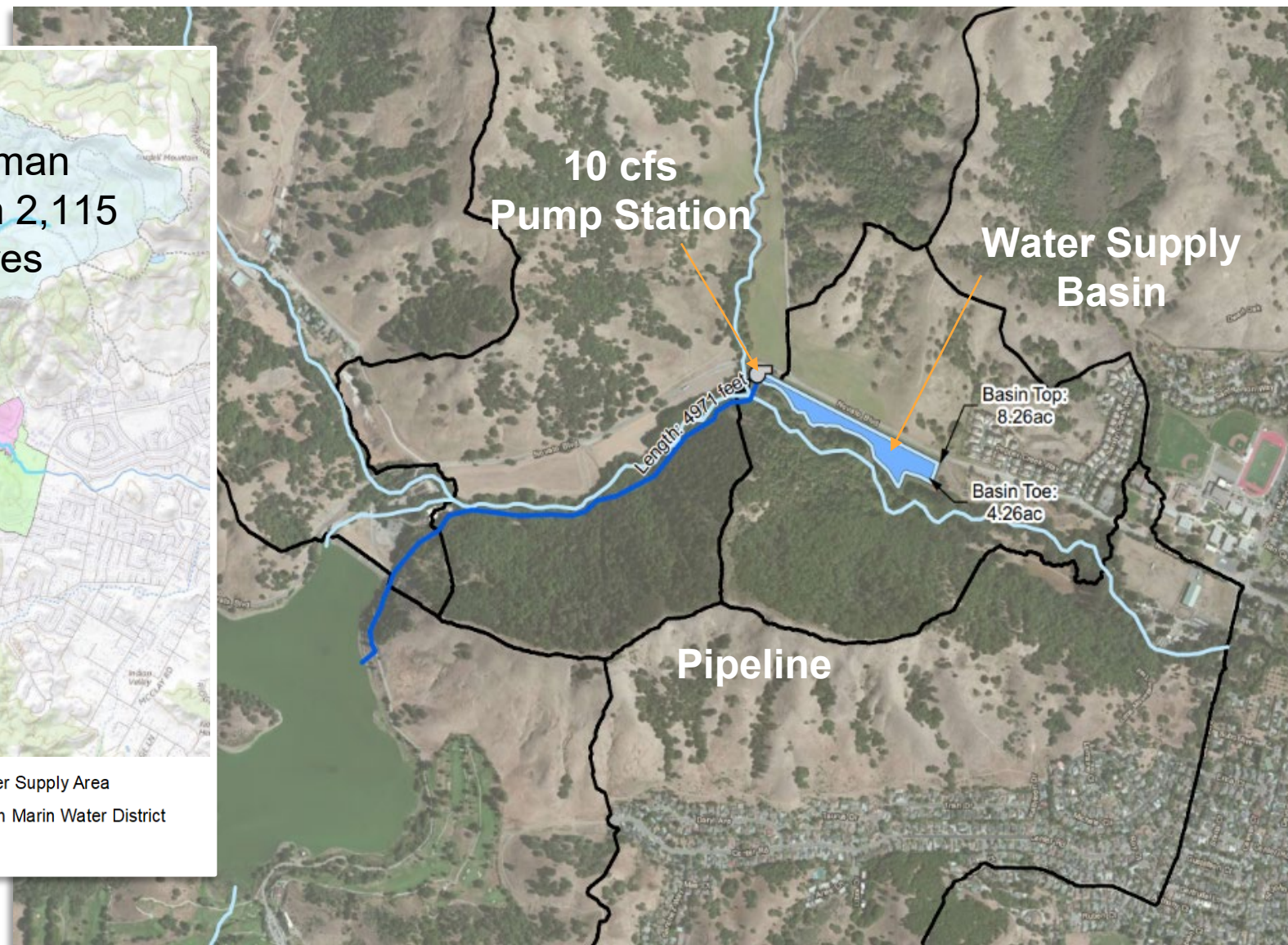
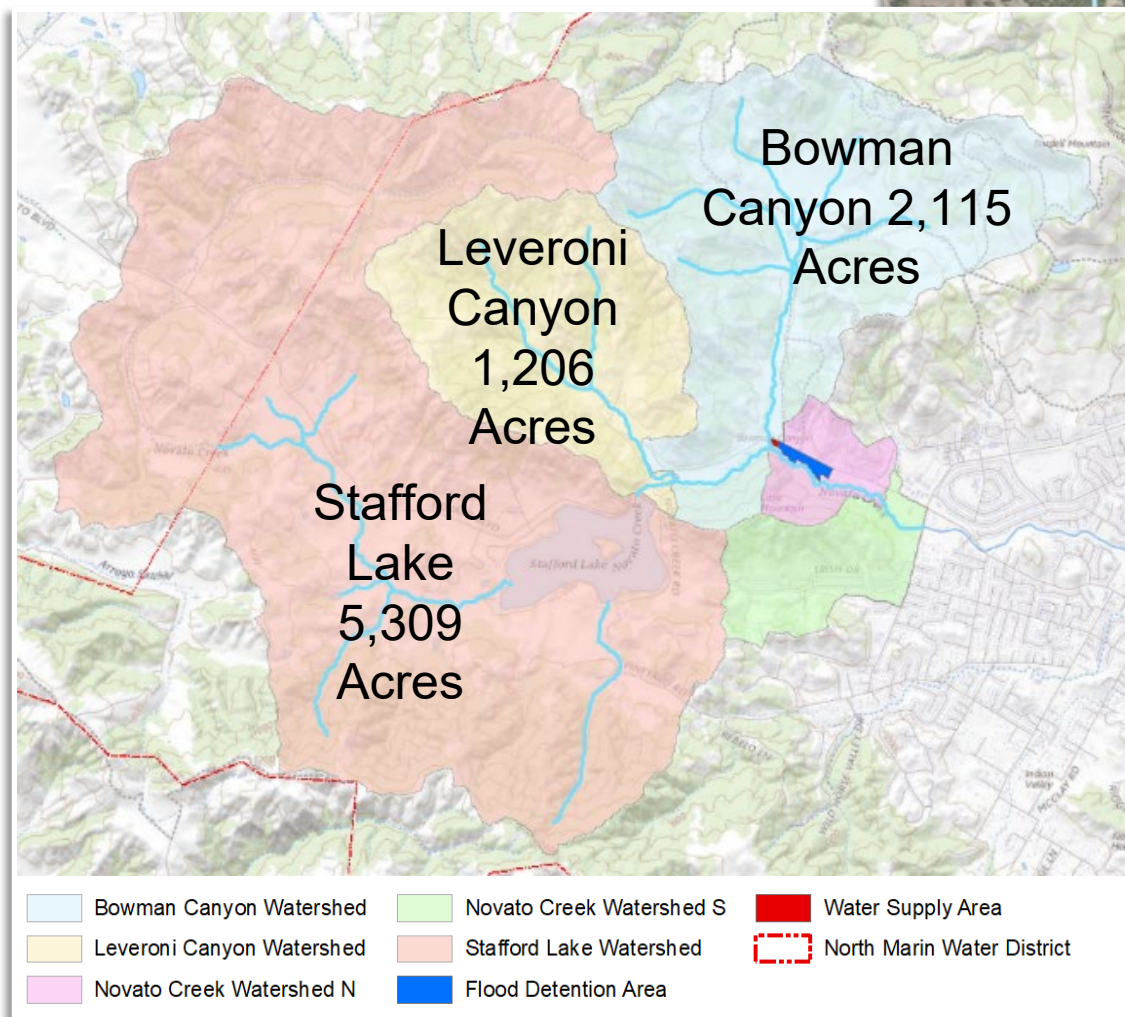


# Stafford Dam Spilling January 9th





# Divert Captured Stormwater



# FY2022-23 CIP

## FY2022-23 CIP – Supply Enhancements\*

Project #	Project Name	FY23 Budget**
1.6610.23	Water Supply Enhancements – STP Modifications	\$50,000
1.6610.24	Water Supply Enhancements – Dam	\$50,000
4XXX.00	Stafford Dam Master Plan	\$25,000
-	<i>Drought Contingency Plan (NBWRA)</i>	\$9,000

\*CIP projects 1.6610.22, 1.6610.xx, and 1.6600.97 (\$125,000 total) could also include supply enhancement efforts.

\*\*\$1.5M earmarked for top priority





# Adjustable Spillway Gate Scoping

## *Regulatory/Permitting*

- Division of Safety of Dams
- State Water Resources Control Board
- CA Department Fish & Wildlife

## *Engineering Assessments*

- Spillway Gate Type Selection:
- Concrete evaluation of the spillway structure
- Hydraulic and Hydrological (H&H) evaluations
- Dam and Spillway Analysis (Stability and Seepage)
- Electrical and SCADA System
- Security Enhancements

## *Environmental Documentation*

- CEQA
- Biological, Geological, Hydrological

## *Stakeholder Coordination and Approval*

## *Other Considerations*

State of California DEPARTMENT OF WATER RESOURCES Division of Safety of Dam California Natural Resources Agency

**APPLICATION FOR APPROVAL OF PLANS AND SPECIFICATIONS FOR THE CONSTRUCTION OR ENLARGEMENT OF A DAM AND RESERVOIR**

DSOD Office Use Only	
Dam Number	Application Filed
Applicant must NOT fill in the above blanks.	

For additional information concerning the filling out and filing of this form, refer to Part 1, Division 3 of the California Water Code and Chapter 1, Division 2, Title 23 of the California Code of Regulations. This is not an application to appropriate water. To secure the right to appropriate water, application should be made to the State Water Resources Control Board on forms the Board will provide upon request.

I, \_\_\_\_\_ of \_\_\_\_\_  
Name of individual signing application Address  
County of Marin, State of California, hereby make application for the approval of plans and specifications for the ☐ construction ☒ enlargement of Novato Creek Dam  
Name of dam and reservoir  
dam and reservoir.

The owner of the dam and reservoir is North Marin Water District  
Name of owner  
of P.O. Box 147, Novato, CA County of Marin, State of California  
Address

If the owner is a corporation, give name and address of president and secretary:  
\_\_\_\_\_  
\_\_\_\_\_

The applicant is acting for the owner in the legal capacity of \_\_\_\_\_  
Agent, Lessee, Trustee, Engineer, etc.

**Location of Dam**  
(Enter the location of the dam's upper right abutment contact or the center of the reservoir for tanks)

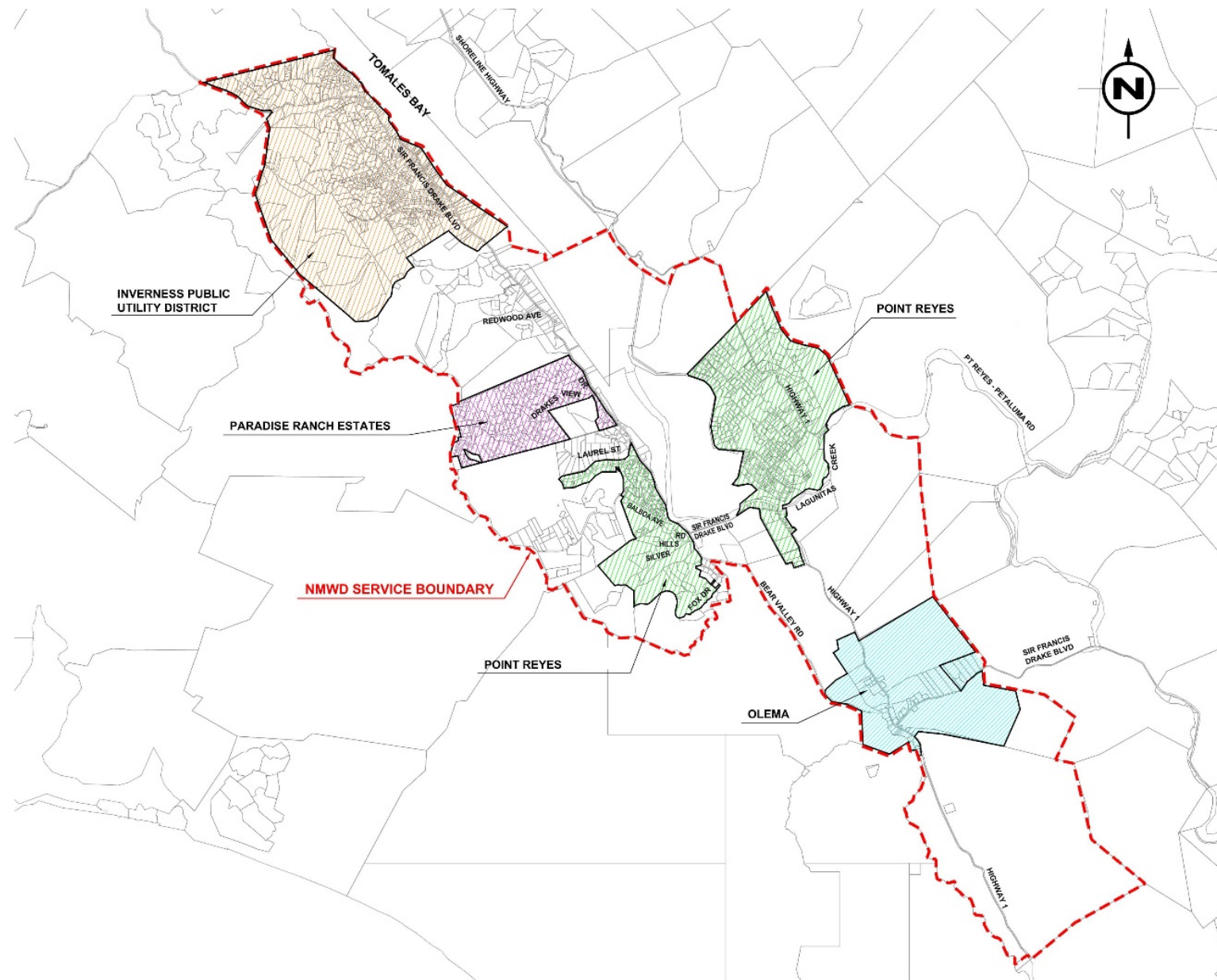
1. The dam is located at Latitude 38.12 Longitude -122.64  
Enter to 5 decimal places Enter to 5 decimal places  
and is located on Novato Creek tributary to n/a  
Creek, river or offstream Creek or river

**Description of Dam and Reservoir**





# West Marin Water Service Area





# Water Supply Sources

Gallagher Well Field



Coast Guard Well #4





# Coast Guard Wells

## Well No. 2

- Drilled in 1973\*
- \*rescreened in 2021
- Depth = 60 feet
- Production = 320 gpm

## Well No. 4

- Drilled in 2012
- Depth = 60 feet
- Production = 350 gpm

## *Well No. 3*

- *Used as monitoring well*



# Gallagher Wells

## Well No. 1

- Drilled in 1993\*
- \*put into service in 2014
- Depth = 55 feet
- Production = 120 gpm

## Well No. 2\*\*

- Drilled in 2022
- Depth = 60 feet
- Production = 150+ gpm

*\*\*permit to operate/DDW approval  
(10/31/22)*





# West Marin Groundwater



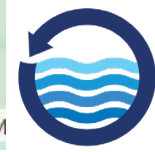
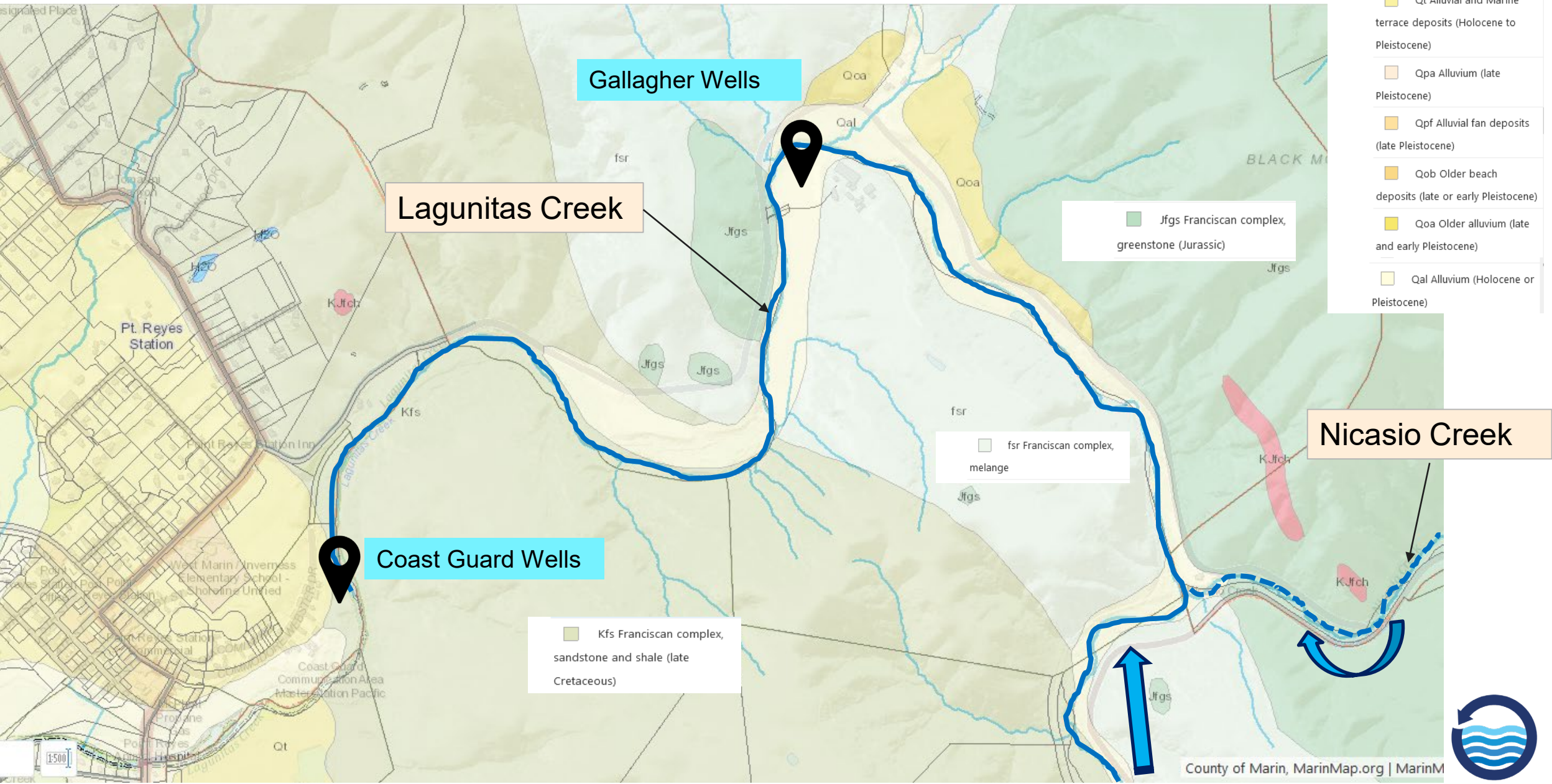
The State and USGS have done significant mapping and analysis of other Groundwater Basins in CA (DWR Bulletin 118)

- *Lagunitas Creek Basin identified by state in 1952*

- ❖ NMWD Has Done Numerous Subsurface Investigations and Test Wells since the 1970s
- ❖ Unconfined Shallow Aquifer (50-60 ft)
- ❖ Alluvial sands and gravels underlain by bedrock









# Lagunitas Creek Watershed



- Largest Watershed in Marin
- Very little impervious areas
- Very few wells
- Natural recharge via direct rainfall and through subsurface flows in Lagunitas Creek



# Watershed Management

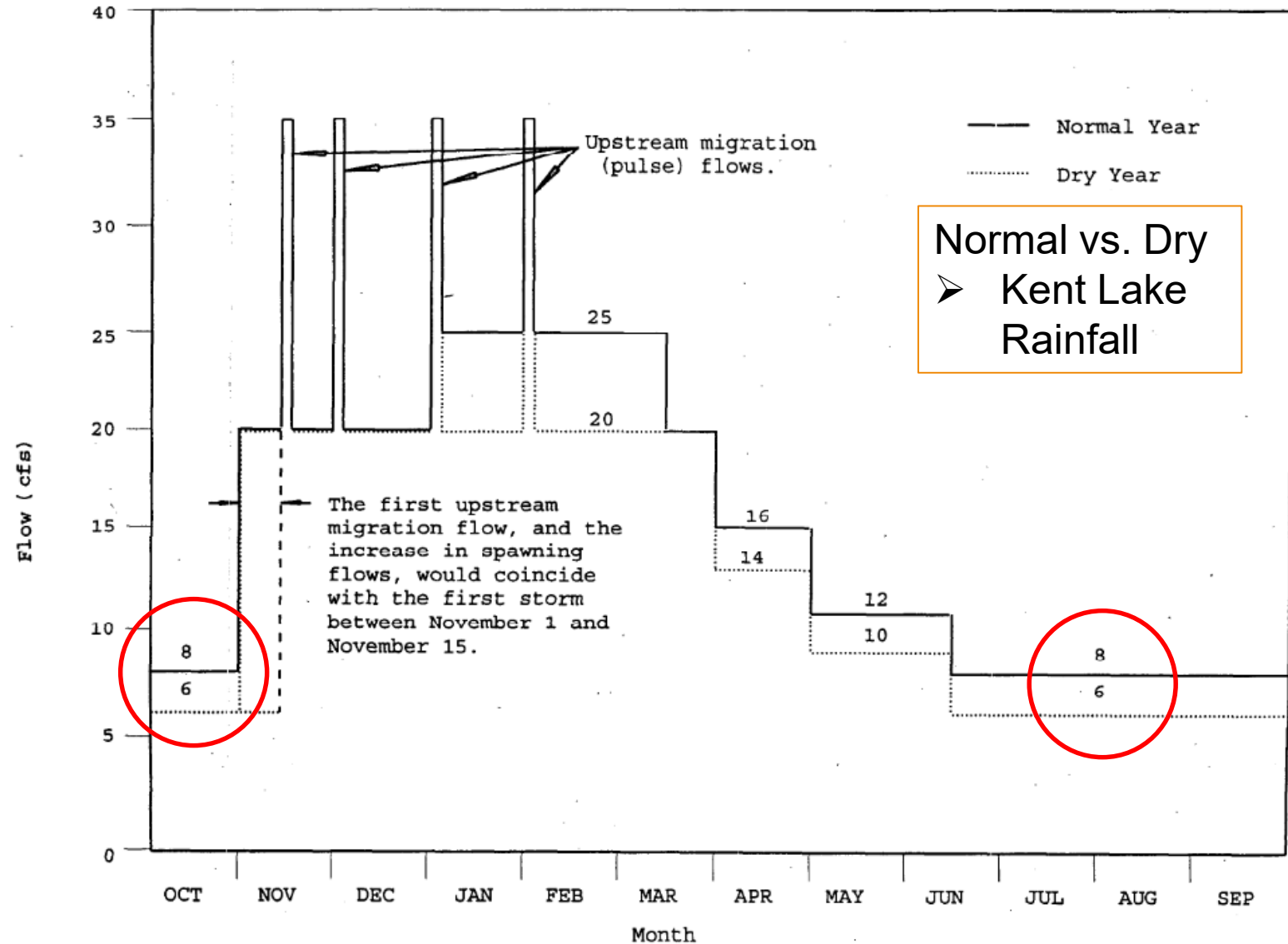
ORDER: WR 95-17

## LAGUNITAS CREEK

Order Amending Water Rights and Requiring Changes in Water Diversion Practices to Protect Fishing Resources and to Prevent Unauthorized Diversion and Use of Water

October 26, 1995

STATE WATER RESOURCES CONTROL BOARD  
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY







Questions?



**NORTH MARIN  
WATER DISTRICT**