

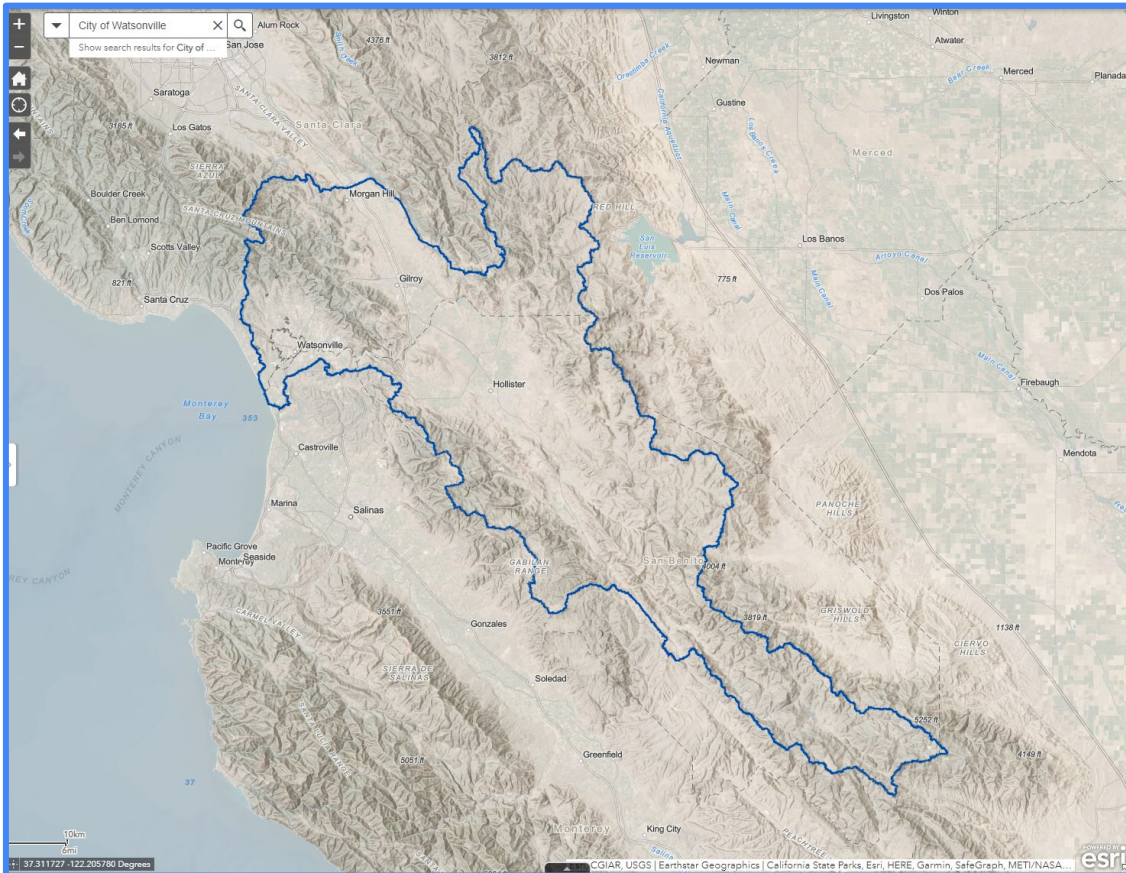


# **2023 Atmospheric River Weather Event**

## Flooding Report and Recovery Efforts

**February 21, 2023**

# Pajaro River Watershed



## The Pajaro River watershed comprises:

- 1300 sq mi

## Includes:

- Santa Cruz County
- Monterey County
- Santa Clara County
- San Benito County

## Multi-agency coordination:

- County of Santa Cruz-Zone 7
- County of Santa Cruz OR3
- Monterey County
- Monterey County Water Resources Agency
- Pajaro Regional Flood Management Agency
- City of Watsonville



# FEMA Coordination and Flood Mapping

## Legend

### Emergency







### Emergency Shelters

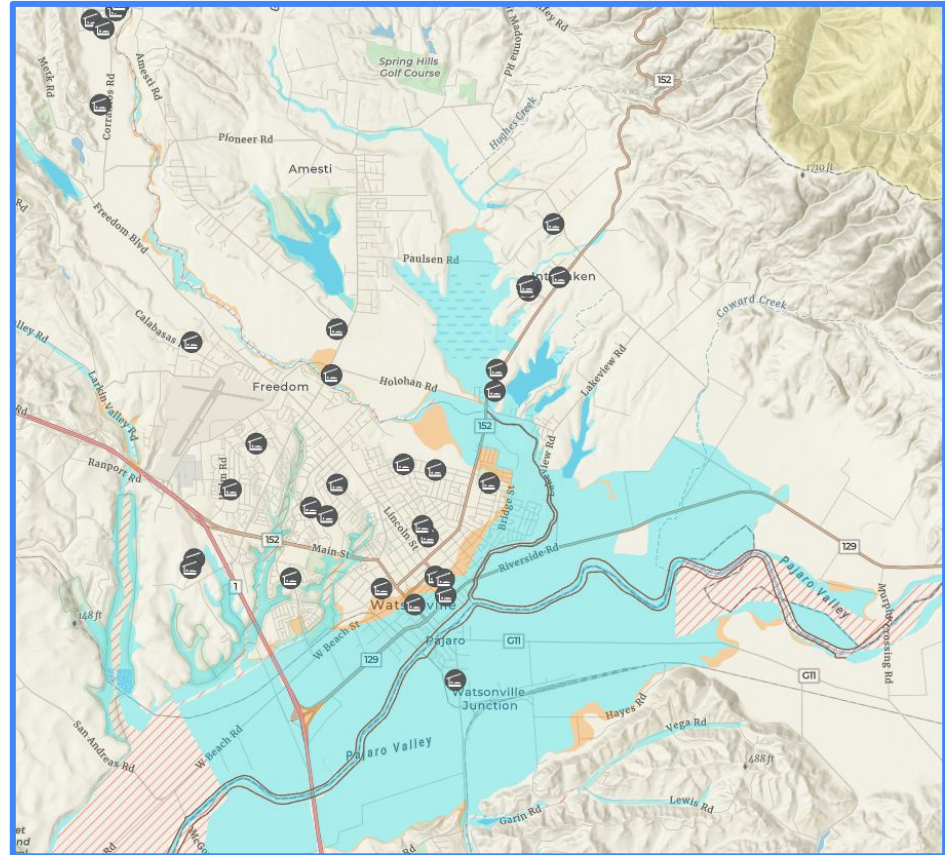


### Levees



### FEMA Flood Zones

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee

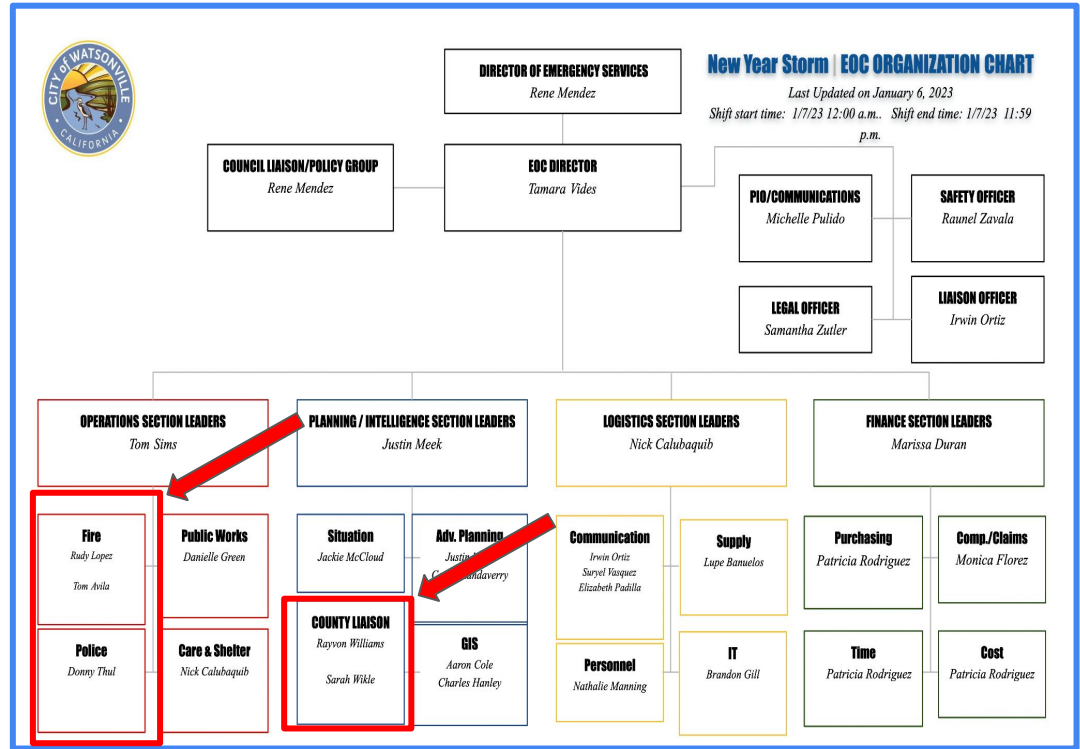


# Multi Agency Coordination

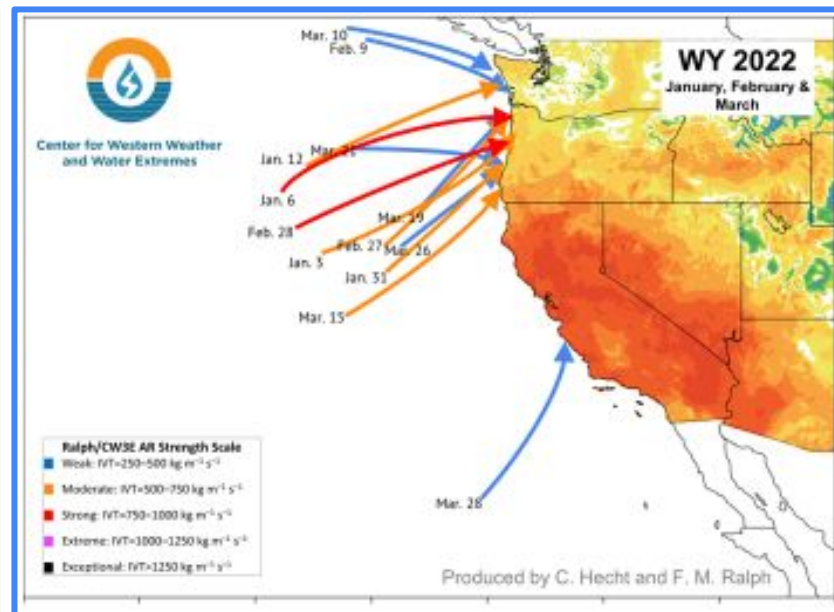
ICS System

Law and Fire Branch

County EOC - City EOC



# Review Storm Events



Produced by C. Hecht and F. M. Ralph

# Review Storm Events

**December 30-31, 2022** – Flooding in San Lorenzo River, Soquel Creek, Aptos Creek, Corralitos & Salsipuedes Creek, Landslides, road failures

**County of Santa Cruz Emergency Proclamation - 1/3/2023**

**City of Watsonville Emergency Proclamation - 1/3/2023**

**January 4-5, 2023** – Not as significant Rain as forecasted, Extreme winds, slope failures, Coastal Damage (Alignment of High Tide, Storm Surge, and Extreme Ocean Swells)

**County of Santa Cruz Emergency Proclamation – 1/6/2023**

**January 8-9, 2023** – Significant Flooding in San Lorenzo River, Soquel Creek, Aptos Creek, Corralitos & Salsipuedes Creek, Flood Risk of Pajaro River (Levee Repair and Reinforcement Actions), Landslides, road failures

**January 13-14, 2023** -Flooding in San Lorenzo River, Aptos Creek, Corralitos & Salsipuedes Creek, Flood Risk of Pajaro River, Landslides, road failures

**Presidential Disaster Declaration - 1/14/2023**

# Multiple Atmospheric Events

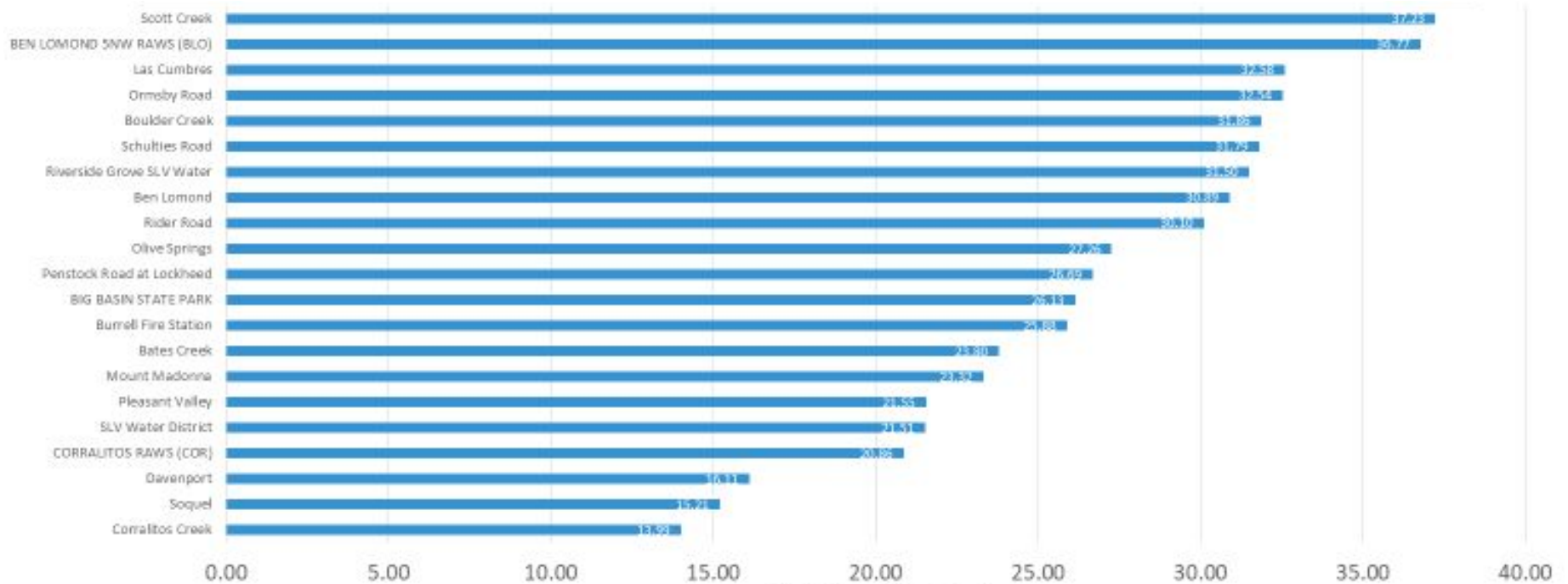
**December 30-31, 2022** - Flooding in Corralitos, Salsipuedes, and upstream watersheds resulted in overtopping of Corralitos Creek in unleveed reach downstream of Green Valley Road. Once overtopped, brought rush of water and mud debris that ultimately flooded Bay Village neighborhood.

**January 4-5, 2-23** - Not as significant rain event as forecast by NOAA. Corralitos Creek did not overtop, no flooding in Bay Village Neighborhood.

**January 8-9, 2023** - Significant flooding on Corralitos, Salsipuedes and upstream watersheds. Corralitos overtopped in same location, though this time without significant mud or debris. Flood risk on Pajaro River.

**January 13-14, 2023** - Flooding on Corralitos, Salsipuedes Creek, but did not overtop, therefore no flooding in Bay Village Neighborhood. Flood risk on Pajaro River.

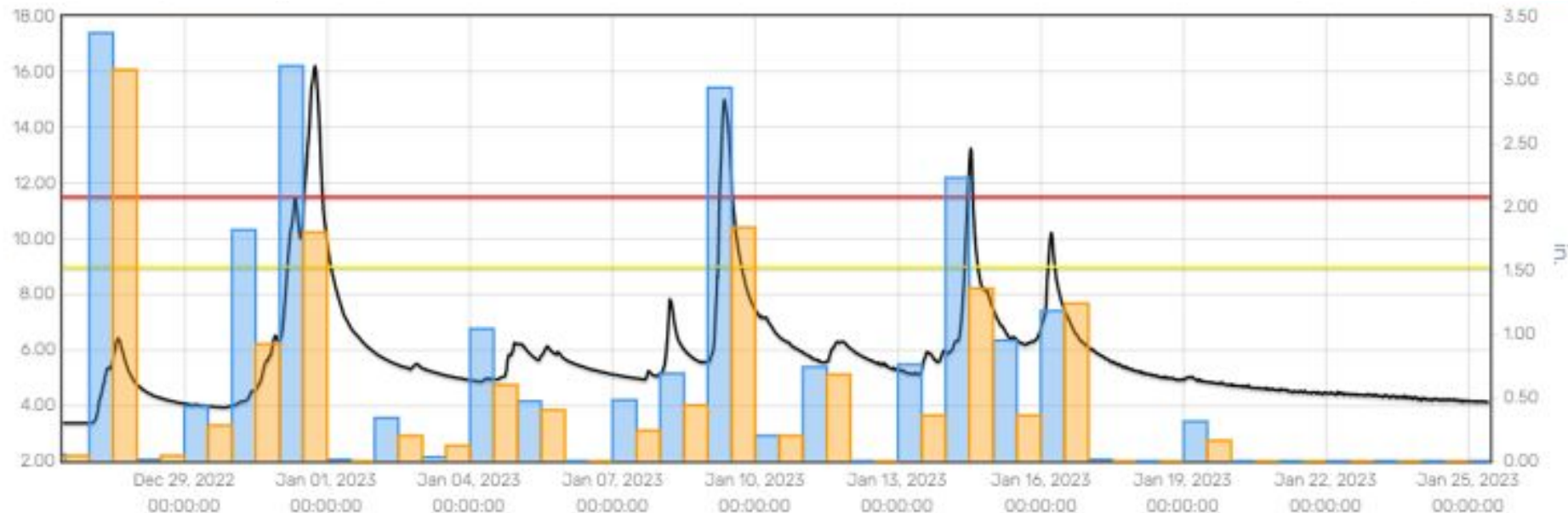
# Rainfall Totals - 12/26/22 thru 1/17/23





# Corralitos Creek at Freedom

Dec 26, 2022 - January 25, 2023



# Flood Warning System

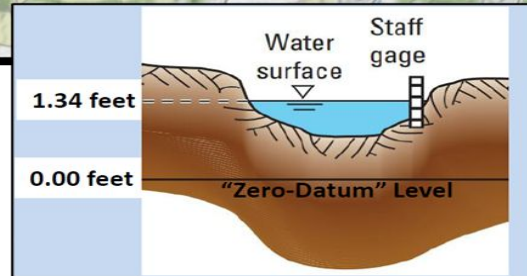
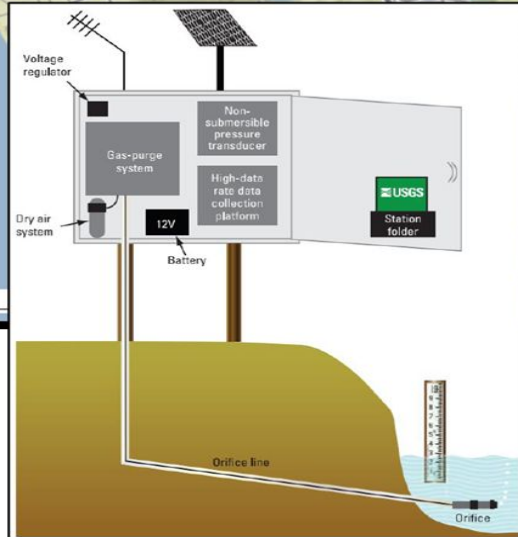
2023-01-27 15:47:11

Corralitos @ Freedom

Salsipuedes

Chittenden

Main St.



Monitor Stage: 25.0 Feet

Flood Stage: 32.0 Feet

PRODUCT NOTE: Ensemble forecasts produced by CNRFC only consider meteorological uncertainty and do not account for hydrologic uncertainty.

Short-Range Peak Exceedance Plot

Product Information

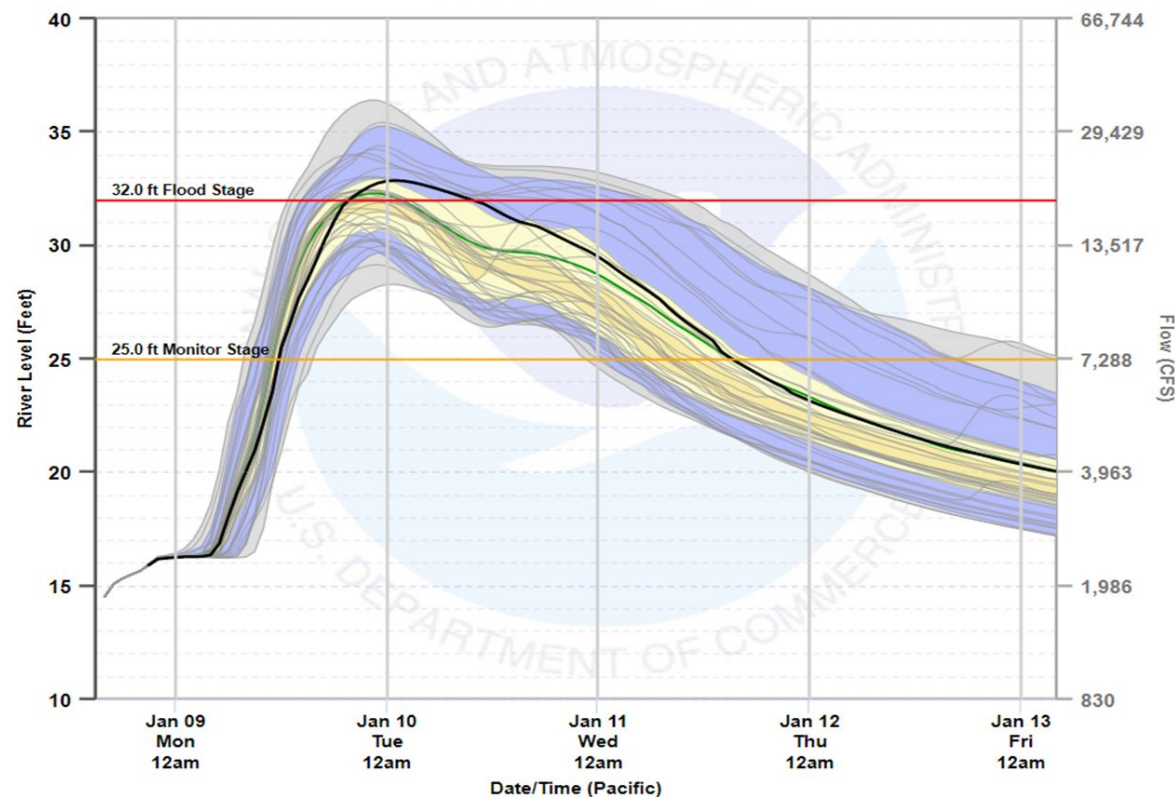
Plot Type:

Ensemble Forecast

CSV Ensemble File Download (Data in feet): AROC1

# Hourly River Level Probabilities PAJARO RIVER - CHITTENDEN (AROC1)

Created: 01/08/2023 at 9:17 PM PST



## Chance of River Level Exceedance (Feet)

Forecast Period:

01/08/2023 4 pm - 01/13/2023 4 am

Max	36.38
5%	35.37
10%	34.33
25%	32.95
50%	32.02
75%	30.87
90%	29.93
95%	29.22
Min	28.27

Flood Stage  
32.0 ft 52%

25.0 ft 97.5%

Custom Thresholds

Show: 5 Days 10 Days

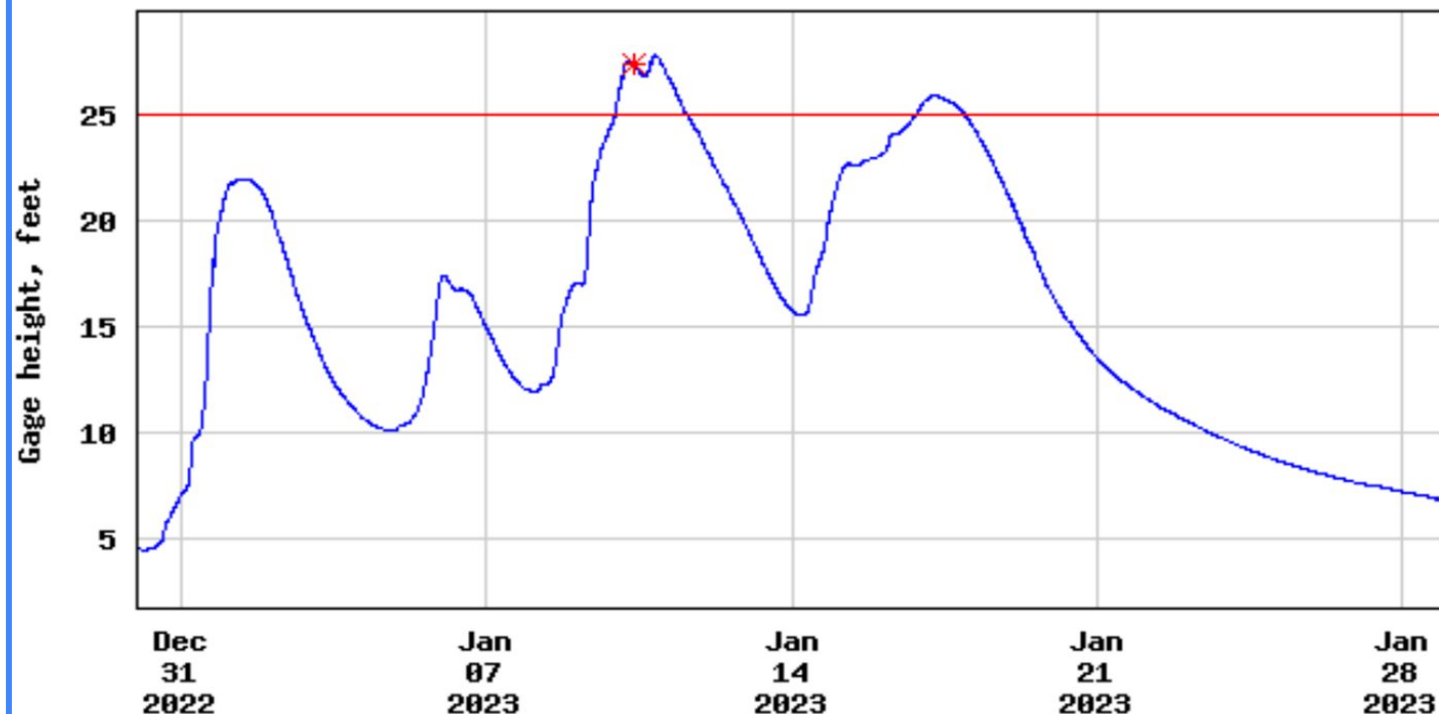
Export Image

Export Chart Data (CSV)

Scale To Threshold(s)

- ☒ Official Forecast (Deterministic)
- ☒ Ensemble Mean
- ☒ Model Traces
- ☒ Hourly Probabilities
  - 0-5% chance
  - 5-25% chance
  - 25-40% chance
  - 40-60% chance

# USGS 11159000 PAJARO R A CHITTENDEN CA



----- Provisional Data Subject to Revision -----

— Gage height

\* Measured gage height — Monitor Stage



### PAJARO RIVER - CHITTENDEN (AROC1)

Latitude: 36.90° N Longitude: 121.60° W  
Location: Santa Cruz County in California

Elevation: 82 Feet  
River Group: Central Coast

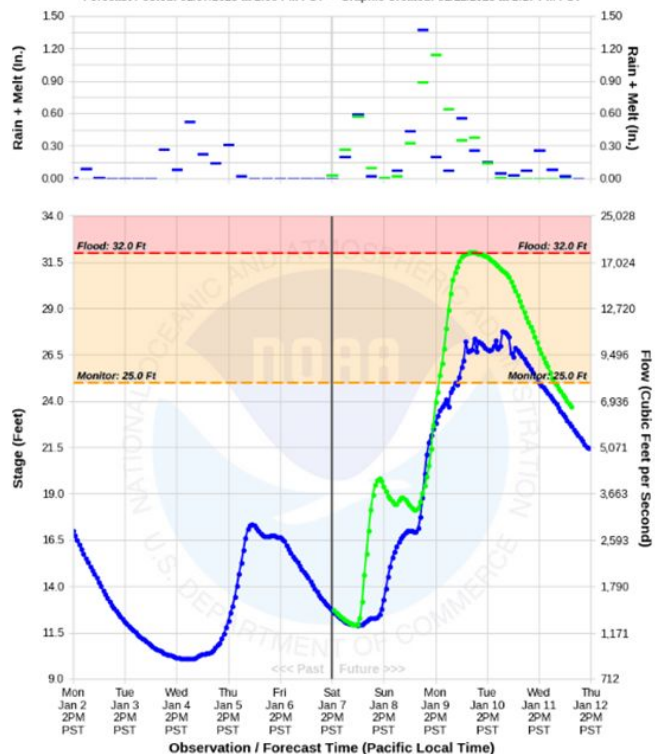
Forecast — Observed — Ensemble Verification Plot

Previous Forecast	Next Forecast
◀ Saturday 01/07/2023 12-18 UTC	Sunday 01/08/2023 00-06 UTC ▶

Selected Date: Saturday 01/07/2023 18-00 UTC

#### Pajaro River - Chittenden (AROC1) River Forecast Verification Plot

Forecast Posted: 01/07/2023 at 2:00 PM PST • Graphic Created: 01/12/2023 at 2:17 PM PST



— Observed — Forecast — Monitor — Flood

California Department of Water Resources  
NOAA / NWS / California Nevada River Forecast Center

### PAJARO RIVER - CHITTENDEN (AROC1)

Latitude: 36.90° N Longitude: 121.60° W  
Location: Santa Cruz County in California

Elevation: 82 Feet  
River Group: Central Coast

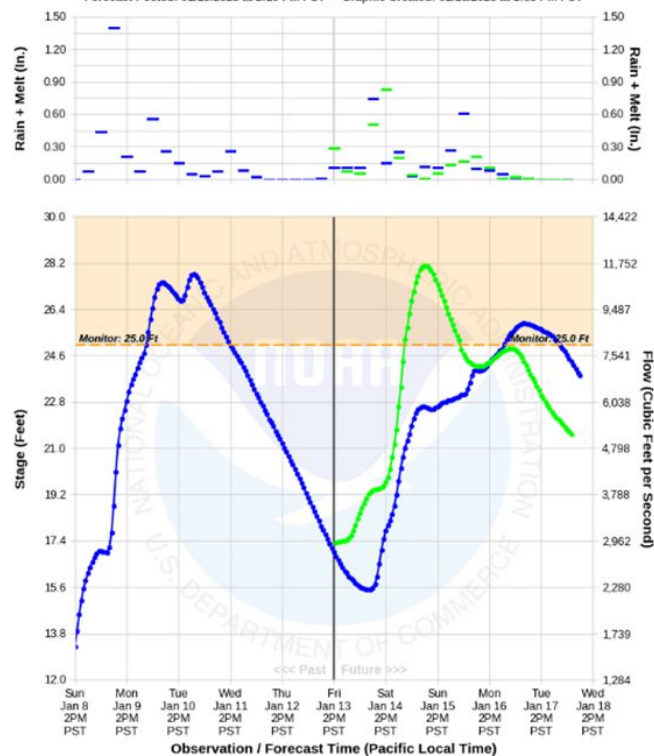
Forecast — Observed — Ensemble Verification Plot

Previous Forecast	Next Forecast
◀ Friday 01/13/2023 12-18 UTC	Saturday 01/14/2023 12-18 UTC ▶

Selected Date: Friday 01/13/2023 18-00 UTC

#### Pajaro River - Chittenden (AROC1) River Forecast Verification Plot

Forecast Posted: 01/13/2023 at 2:19 PM PST • Graphic Created: 01/18/2023 at 1:53 PM PST

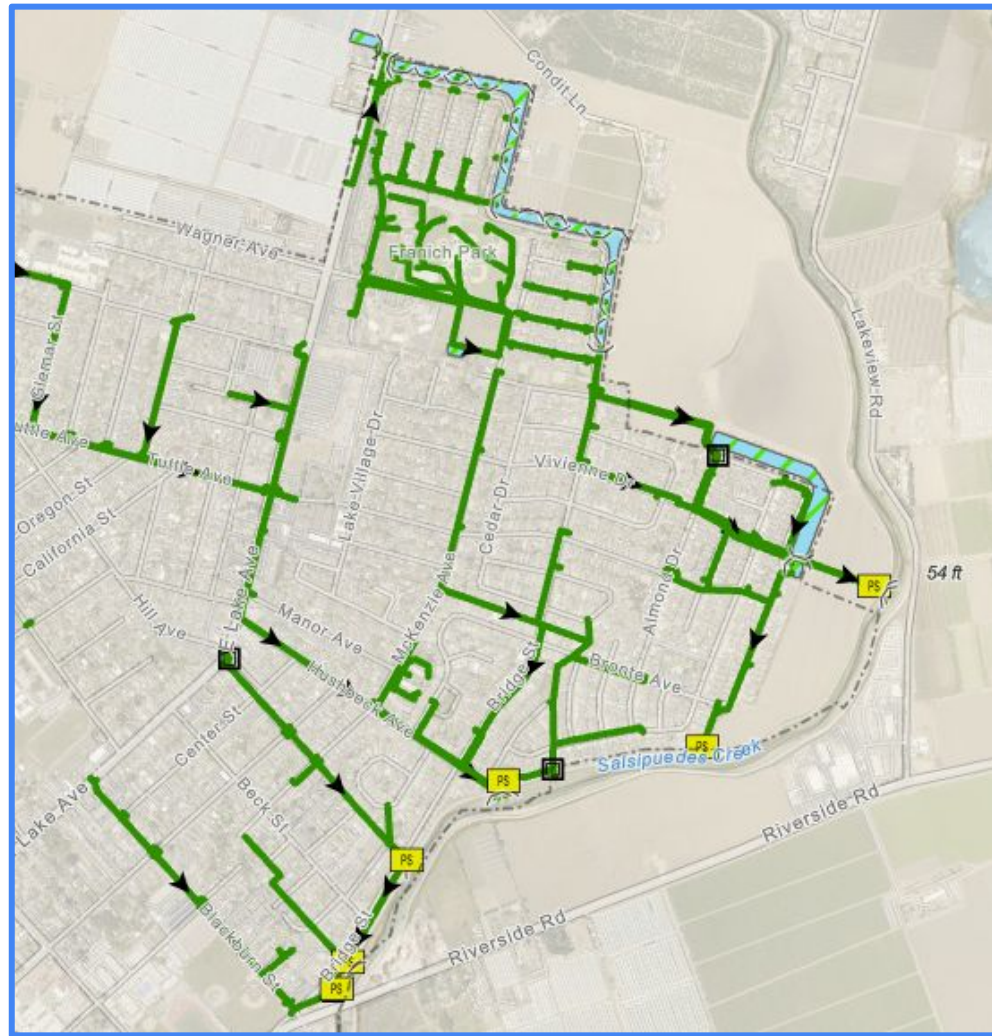


— Observed — Forecast — Monitor

California Department of Water Resources  
NOAA / NWS / California Nevada River Forecast Center

# Storm Sewer System Function

- Designed to convey stormwater collected from roadway during rain events
- Gravity fed to creek when levels low enough
- As creek levels rise, sluice gates are closed and storm sewers are drained by pump



# Pump Station Operation & Maintenance

- Pump stations designed with more pumps than required for redundancy
- Continuous monitoring and automatic alarm calls outs for stand by staff 24-7.
- Monthly checks of pump stations
- Pump operating noise: normal vs. generator power

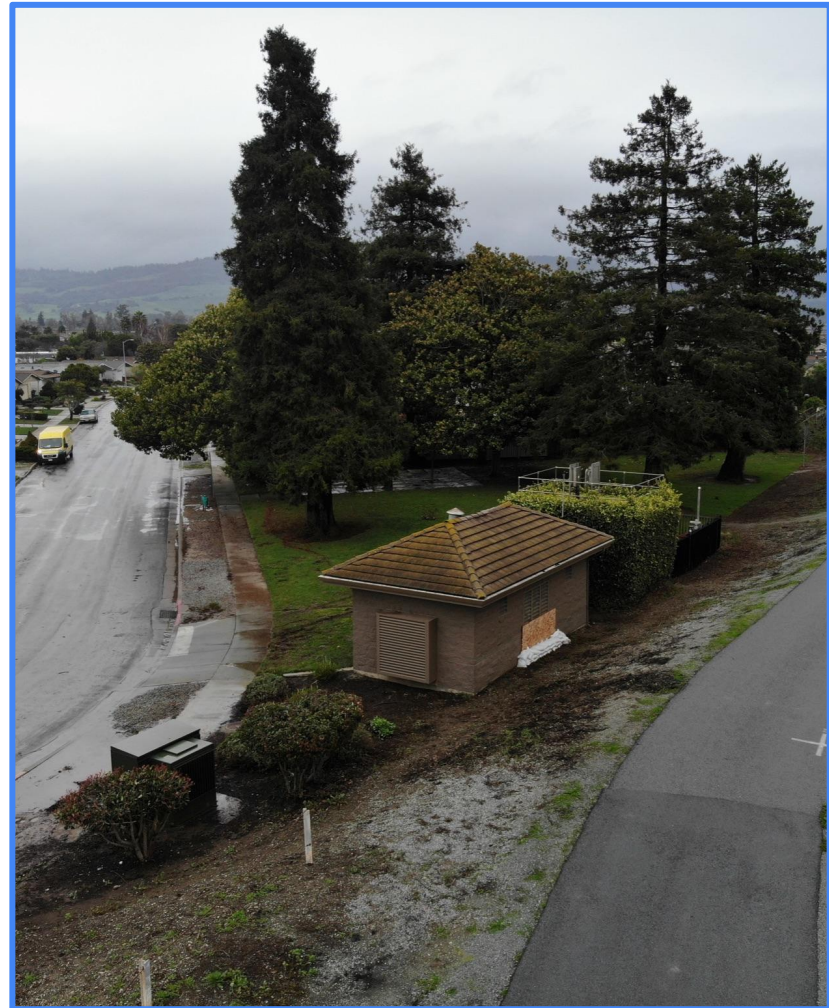




# December 30-31st Atmospheric River Event

- **5 operations staff on call** and available the entire weekend, as well as **1 electrical maintenance staff**.
- Staff on-site December 30th through 31st. All 6 staff on site by afternoon of 31st.
- Continuously monitoring creek levels, pump operation, and drainage inlets.

***ALL PUMP STATIONS OPERATED AS  
INTENDED THROUGH THE  
ATMOSPHERIC RIVER EVENTS***





# Why Did Bay Village Neighborhood Flood?



## **Weather Forecast**

## **Location**

100 Year flood plain

## **What happened?**

Corralitos Creek breached its banks resulting in sudden and unexpected flow across farm fields carrying mud and debris.

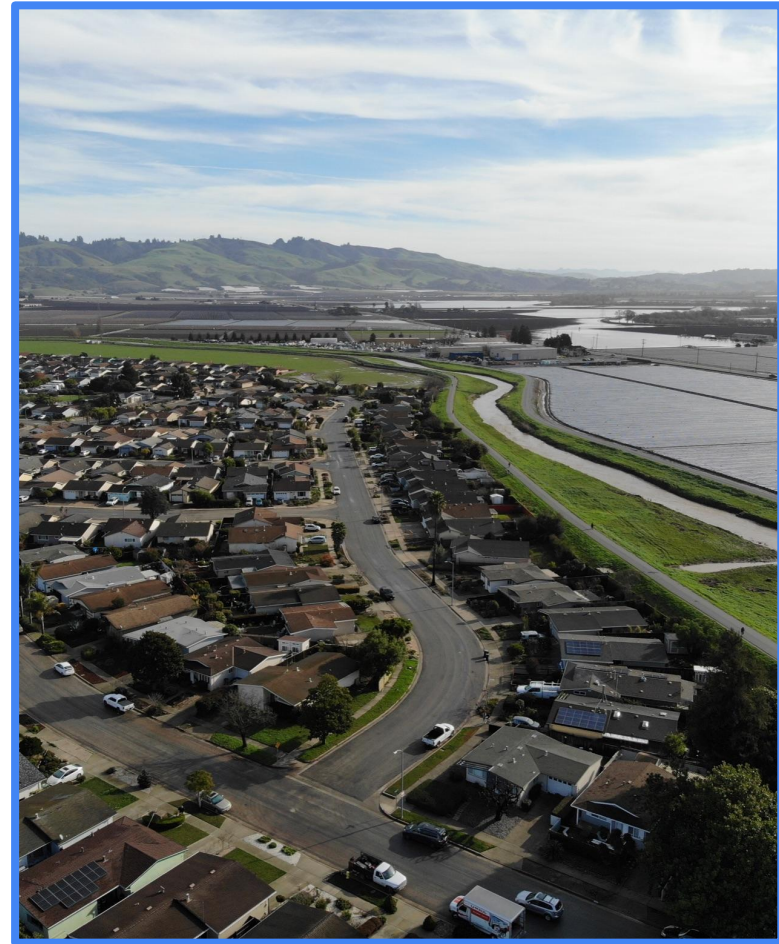
## **Climate Change**

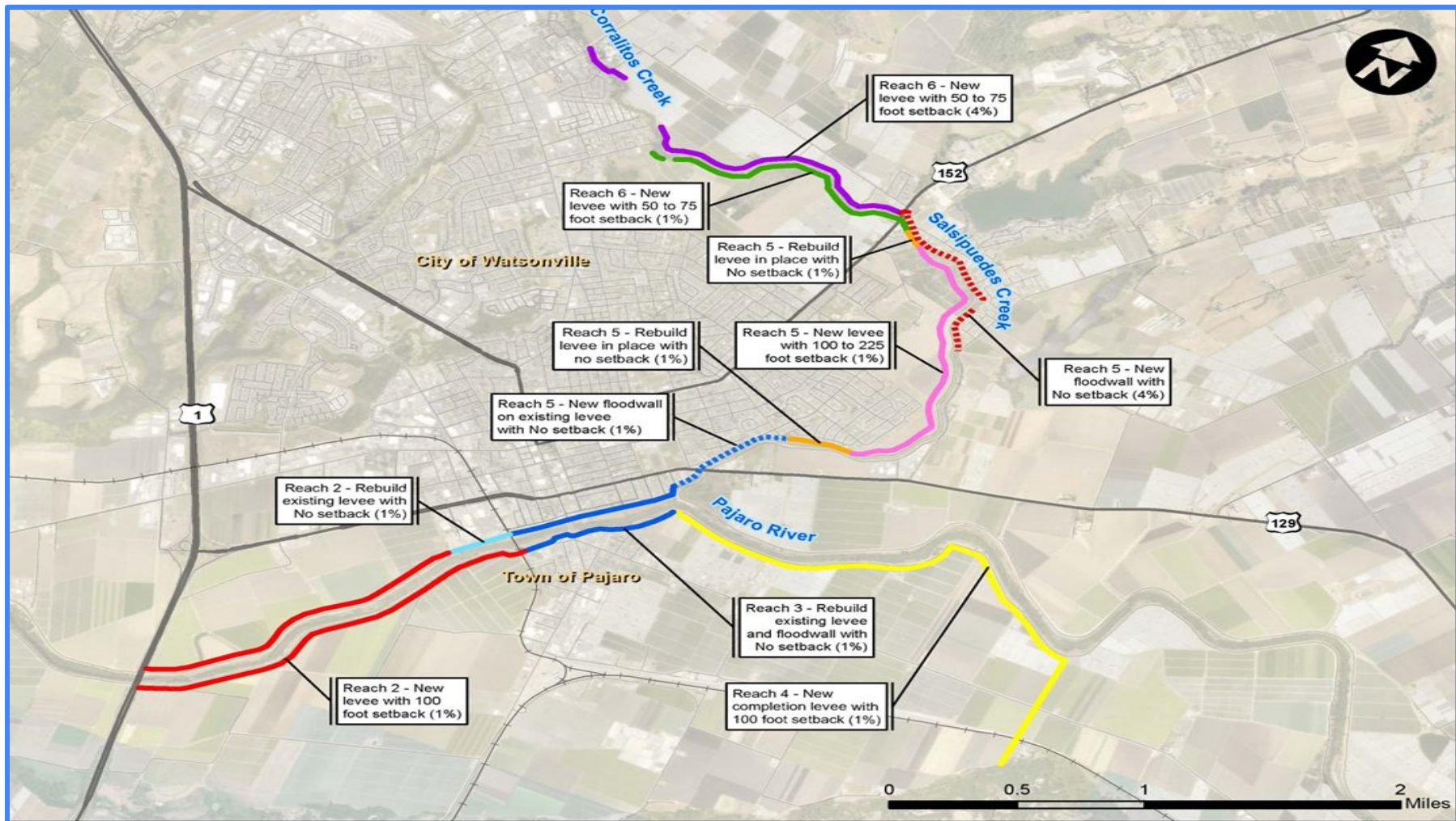
Shorter rainy season

Higher intensity

# What Does This Mean

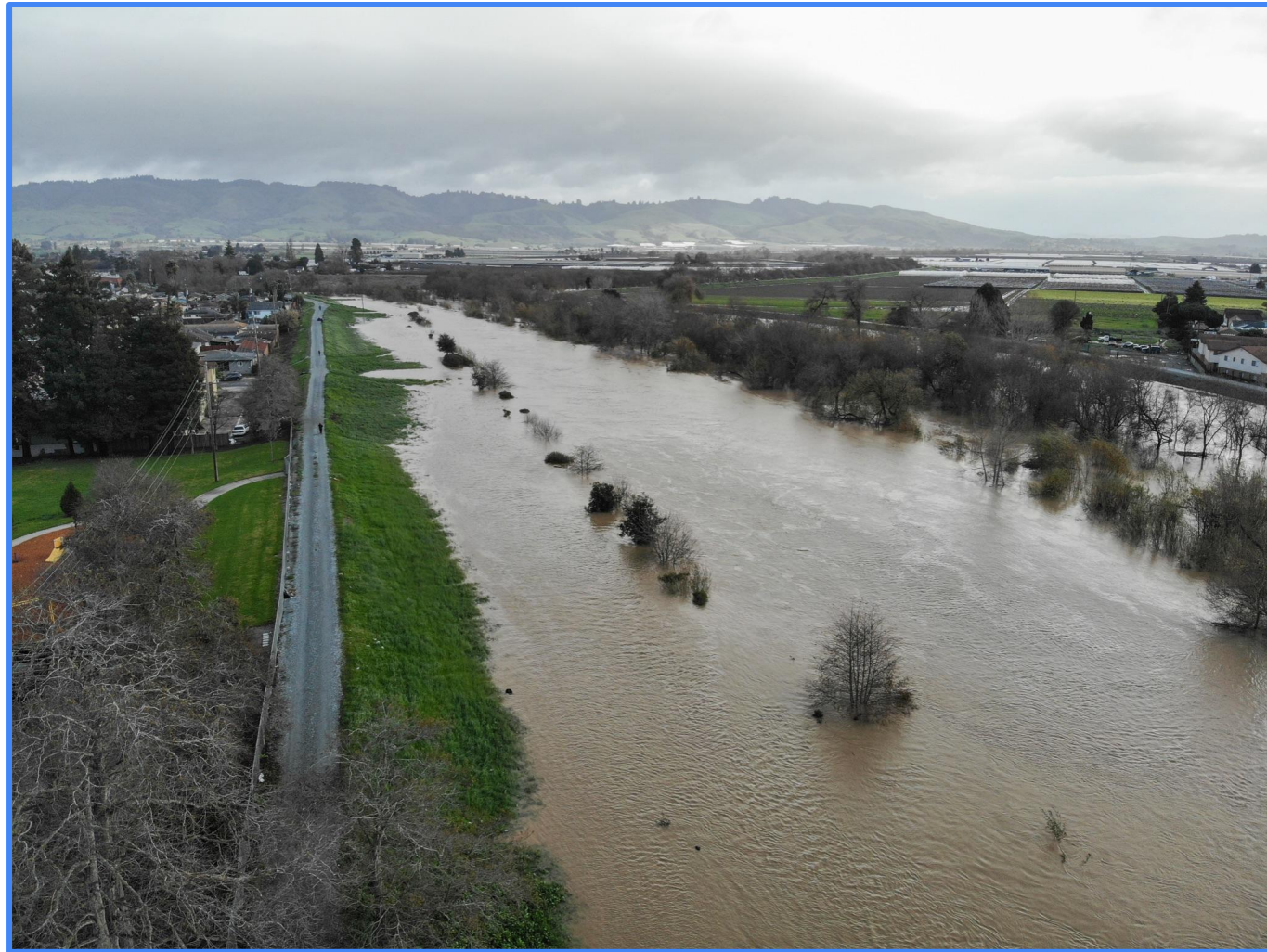
- Flooded areas matched FEMA 100-year flood maps and historical flooding patterns.
- Highlights the importance of flood insurance for residents in the FEMA flood zone and the CRS program
- \$400 million Levee Project by US Army Corps and PRFMA JPA is a critical infrastructure need that is already in progress. First Phase of construction anticipated to begin 2025.







# Questions





# Dec 30-31: Rain Totals

4 pm Dec 30 through 4 am Jan 1

Weather Forecast Office  
San Francisco Bay Area

Issued Dec 30, 2022 7:08 PM PST

