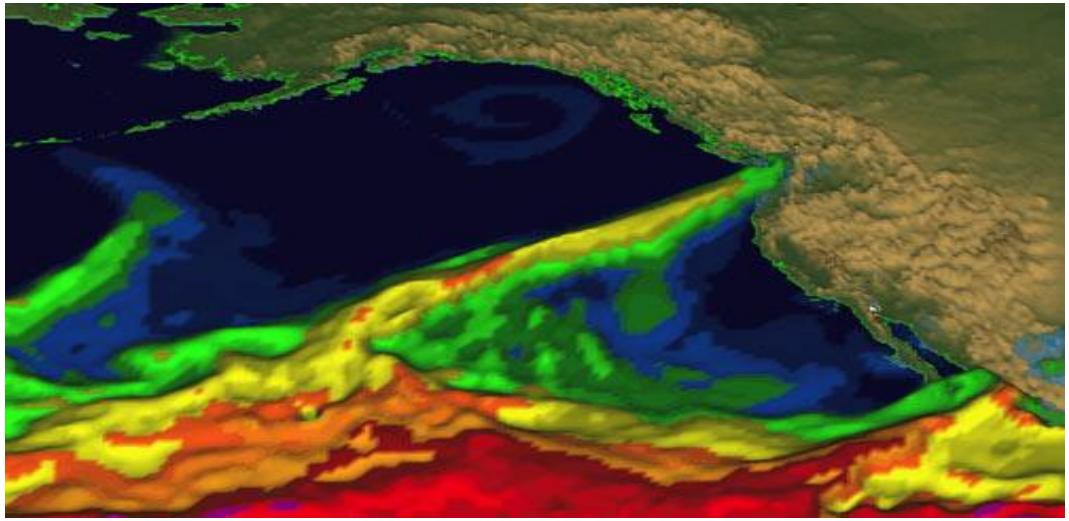
Improving Monitoring and Forecasting of Precipitation and Coastal Flooding in the San Francisco Bay Area

San Francisco Bay Area Advanced Quantitative Precipitation Information System (SF Bay Area AQPI)



North Bay Watershed Association, November 6, 2020
Jay Jasperse, P.E. Chief Engineer, Sonoma Water

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Overview of Presentation

- Motivation for the project
- Description of the AQPI project
- Anticipated benefits of the project

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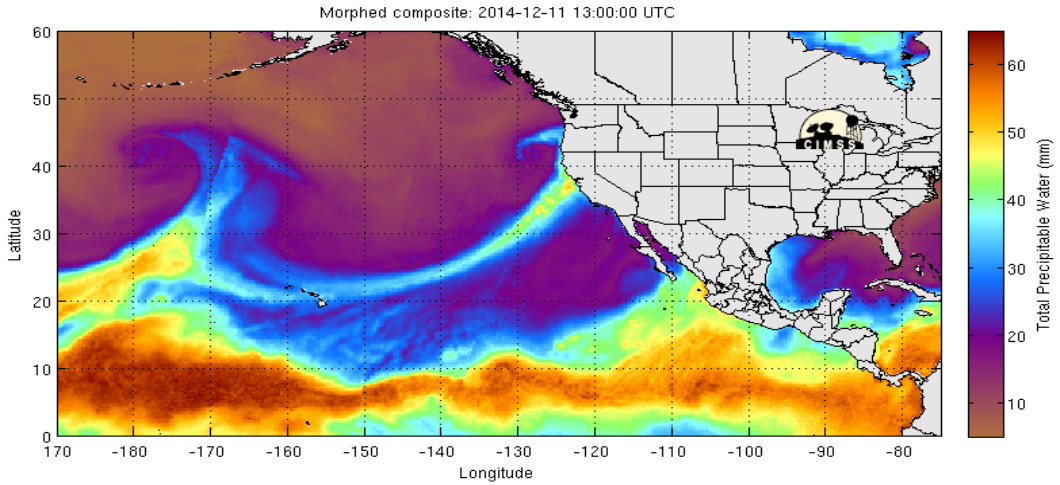
"AQPI represents a key demonstration of aligning federal, state, and local agencies' expertise and resources to provide critical information for flood emergency response and integrated water management tailored to a specific region's needs."

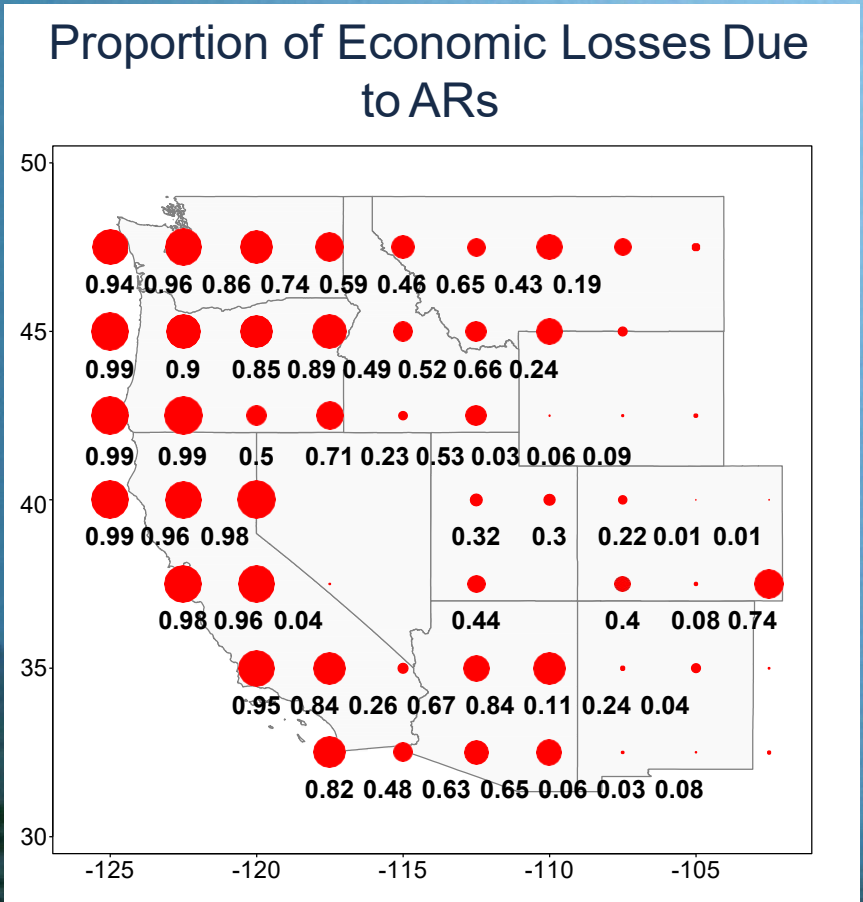
Mike Anderson, State Climatologist, California Department of Water Resources, Division of Flood Management

Impacts of Atmospheric Rivers (ARs)



- Provide 30-50% of California's annual rainfall
- Lack of ARs lead directly to droughts
- Cause >80% of flood damages in the Western US, typically >95% in CA
- Cause >$1B in annual damage costs
- Increased frequency and intensity due to Climate Change

ARs drive economic flood losses



84% of insured losses in the 11 western states were caused by ARs

Post-Fire debris flows pose a serious hazard. This case killed >20 people near Montecito, CA.

T. Corringham, 2018

Center for Western Weather and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY

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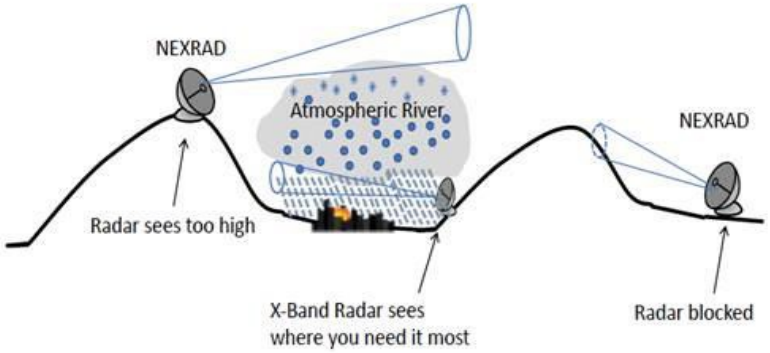
SF Bay Area AQPI – A New Technology to Respond to Extreme Weather



Why is it needed?

- Existing radar is not optimal for West Coast terrain
- Public safety benefits
- Economic loss minimized

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SF Bay Area AQPI System Overview

- State-of-the-art weather and water forecasting system
- Advanced forecast products and new decision support tools
- Supports planning and response decision-making in the SF Bay Area for:
  - Emergency response & flood managers
  - Water and wastewater managers

Bay Area Advanced Quantitative Precipitation Information (AQPI) Project

- **Prop 84 grant awarded by DWR**
  - $19M over 4 years
  - Sonoma Water is grant administrator
  - Involves NOAA, CSU, USGS, & Scripps
  - Bay Planning Coalition provides stakeholder/partner coordination & outreach services
- Local Partner Agency Committee

SF Bay Area AQPI System Components

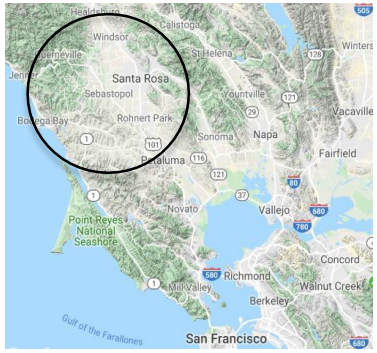
- Advanced weather radars and surface meteorology deployments
- Integration of observations and forecast models
- Precipitation, streamflow, and coastal storm surge forecasts
- Decision Support Tools - Integrate & disseminate observations & forecast information

X-band Radar

C-band Radar

Surface Met

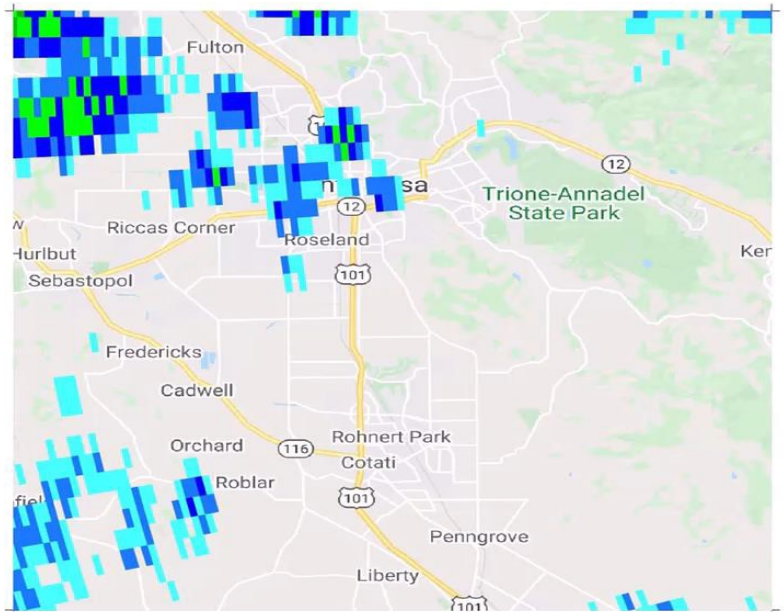
SF Bay AQPI Radar Locations and Range



Sonoma County - Radar Comparison

February 14, 2019

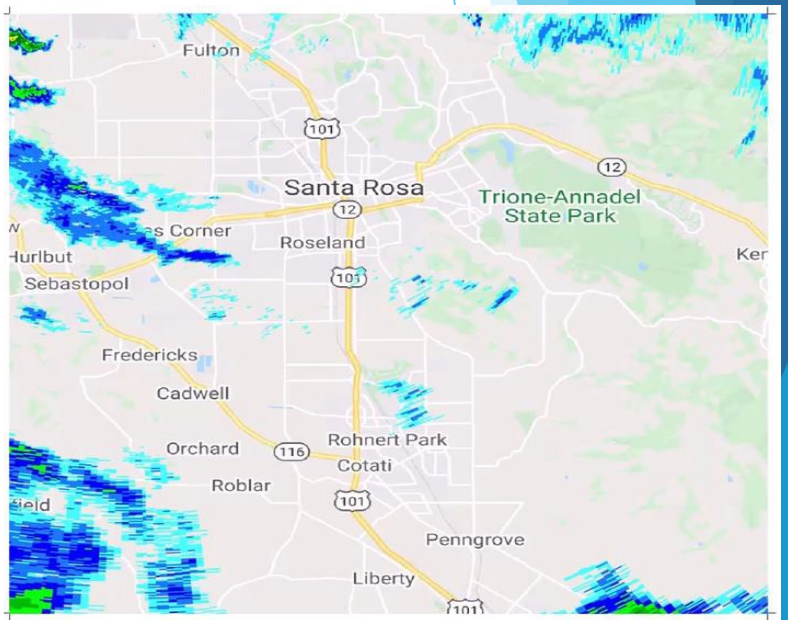
NEXRAD (existing) Radar



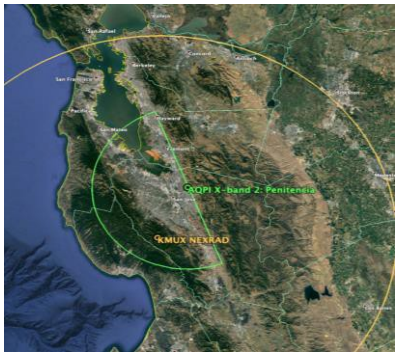
Rainfall

- Heavy
- Moderate
- Light

AQPI Sonoma Radar



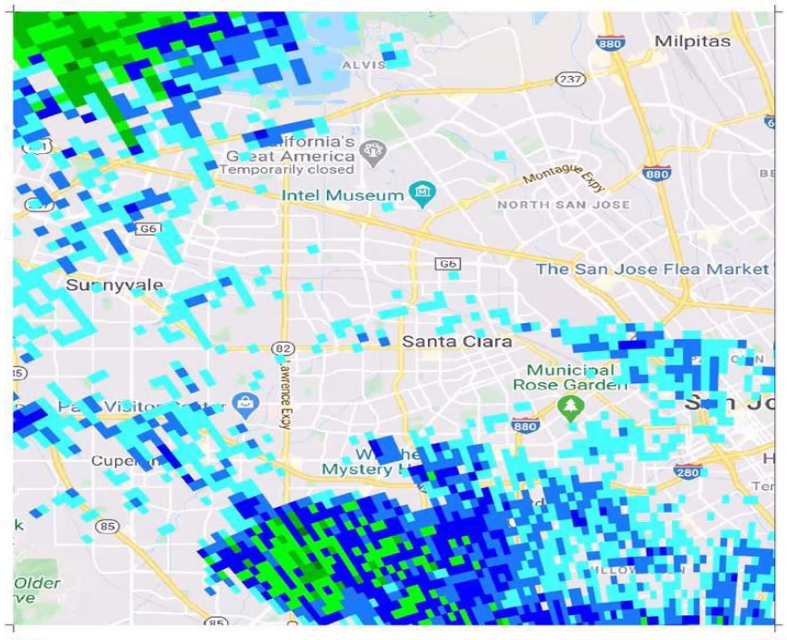
- AQPI radar fills a gap not covered by existing radars, with more detail and frequency
- AQPI radar covers several wildfire burn areas near Santa Rosa



Santa Clara County - Radar Comparison

February 14, 2019

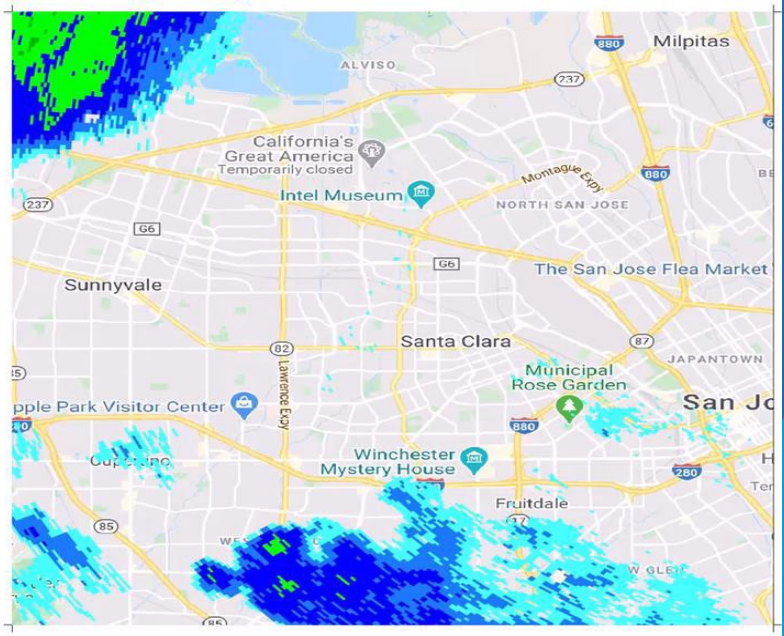
NEXRAD (existing) Radar



Rainfall

- Heavy
- Moderate
- Light

AQPI Santa Clara Radar



- NEXRAD is on a mountain top and doesn't see the rain close to the ground in the Santa Clara – San Jose area
- AQPI radar provides more detail on exactly where and when it's raining and not raining

SF Bay Area AQPI Benefits Summary

- NOAA estimates $60.9M in avoided costs per year
- Provides severe weather detection, tracking, & forecasting
- Improved situational awareness reduces risks to public safety & protects water quality and resources
- Improves early warning and emergency response support
- Leverages investments in observation networks established by local agencies
- Supports NOAA's Weather Ready Nation Initiative

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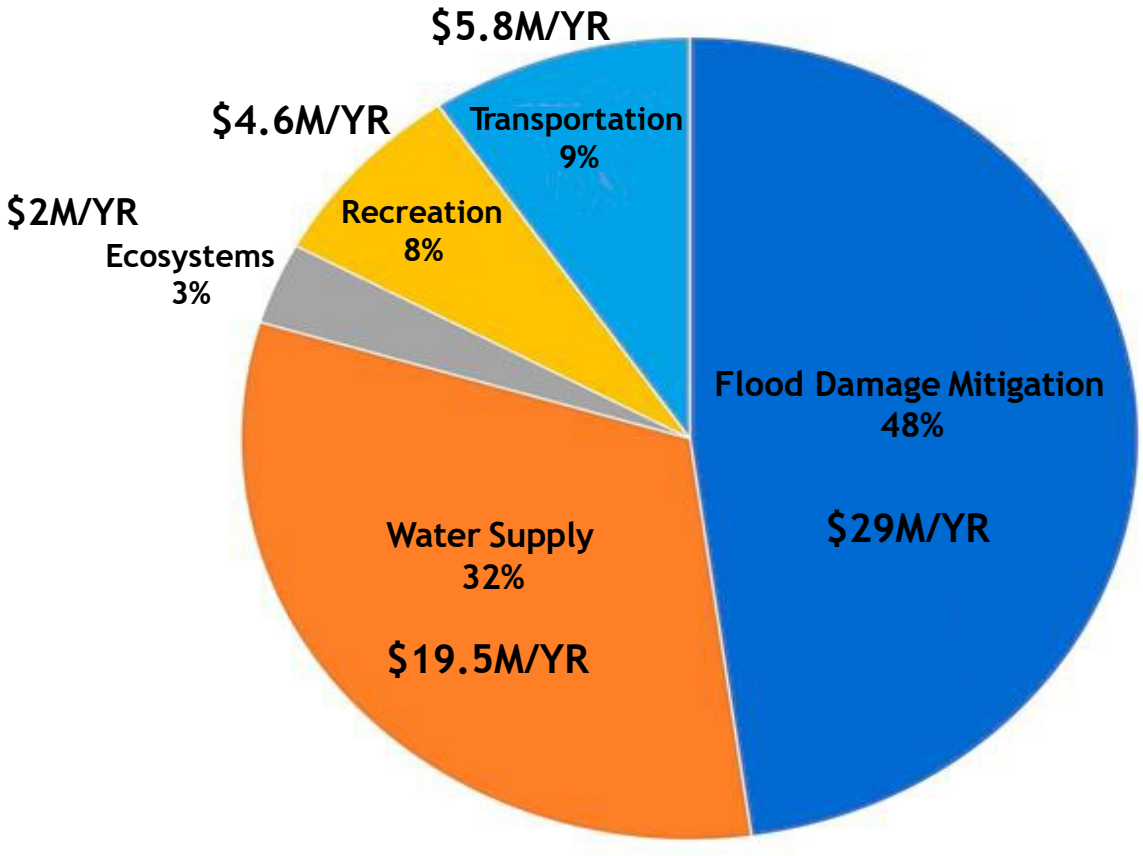
Annual Benefits / Avoided Costs By Category



Johnson LE, Cifelli R, White A. Benefits of an advanced quantitative precipitation information system. J Flood Risk Management. 2020;13 (Suppl. 1):e12573. https://doi.org/10.1111/jfr3.12573

SF Bay Area AQPI Project Team Partners and Supporters