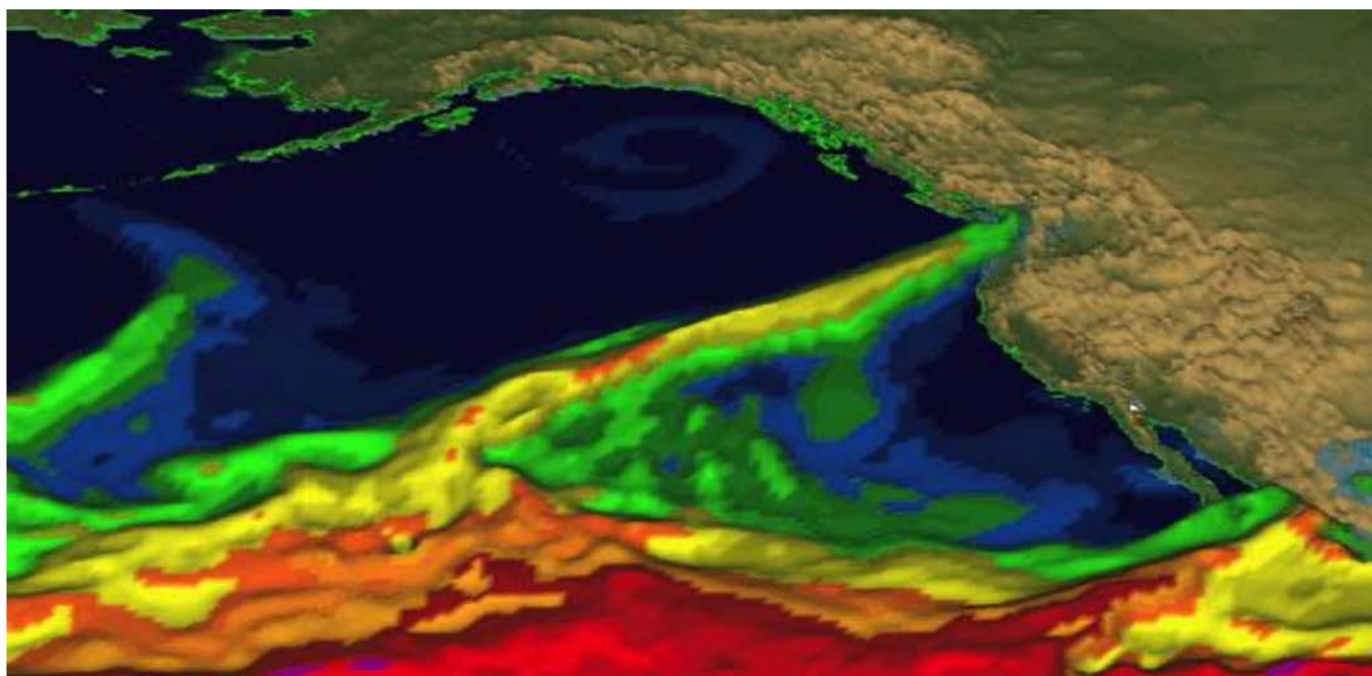




Improving Monitoring and Forecasting of Precipitation and Coastal Flooding in the San Francisco Bay Area

# San Francisco Bay Area Advanced Quantitative Precipitation Information System Bay Planning Coalition 15 March 2022





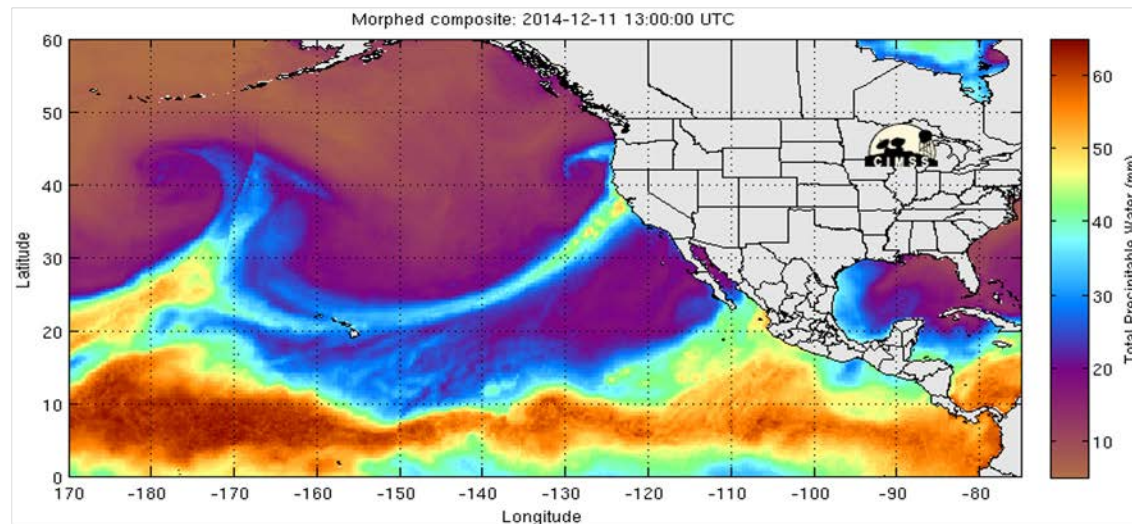
Improving Monitoring and Forecasting of Precipitation and Coastal Flooding in the San Francisco Bay Area

*“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



# Project Team

## Bay Area Partners

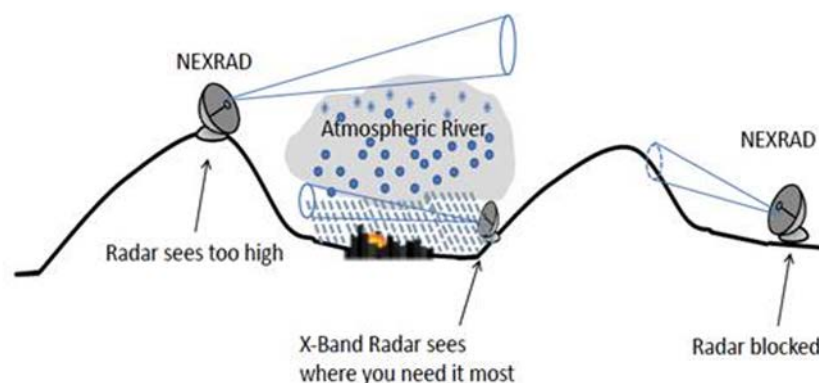
California Department of Water Resources  
Sonoma Water  
Valley Water  
San Francisco Public Utilities Commission  
East Bay Municipal Utilities District  
Discharge and Parks  
Alameda County Public Works  
District 7  
Water District  
Contra Costa County  
Zone 7 Water Agency  
Marin County Flood Control,  
Municipal Water District  
Napa County  
San Mateo County  
Solano County  
Bay Area Flood Protection Agency  
Association  
National Weather Service

## Technical Partners

- NOAA
  - Physical Sciences Laboratory
  - Global Systems Laboratory
  - National Severe Storm Laboratory
  - Cooperative Institute for Research in the Atmosphere (CIRA)
  - Cooperative Institute for Research in Environmental Sciences (CIRES)
- USGS
  - Pacific Coastal and Marine Science Center
- Colorado State University
  - Department of Economics/Resource Economics
- Scripps Institution of Oceanography
  - Center for Western Weather and Water Extreme



# 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

# SF Bay Area AQPI System Components

- ▶ New 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



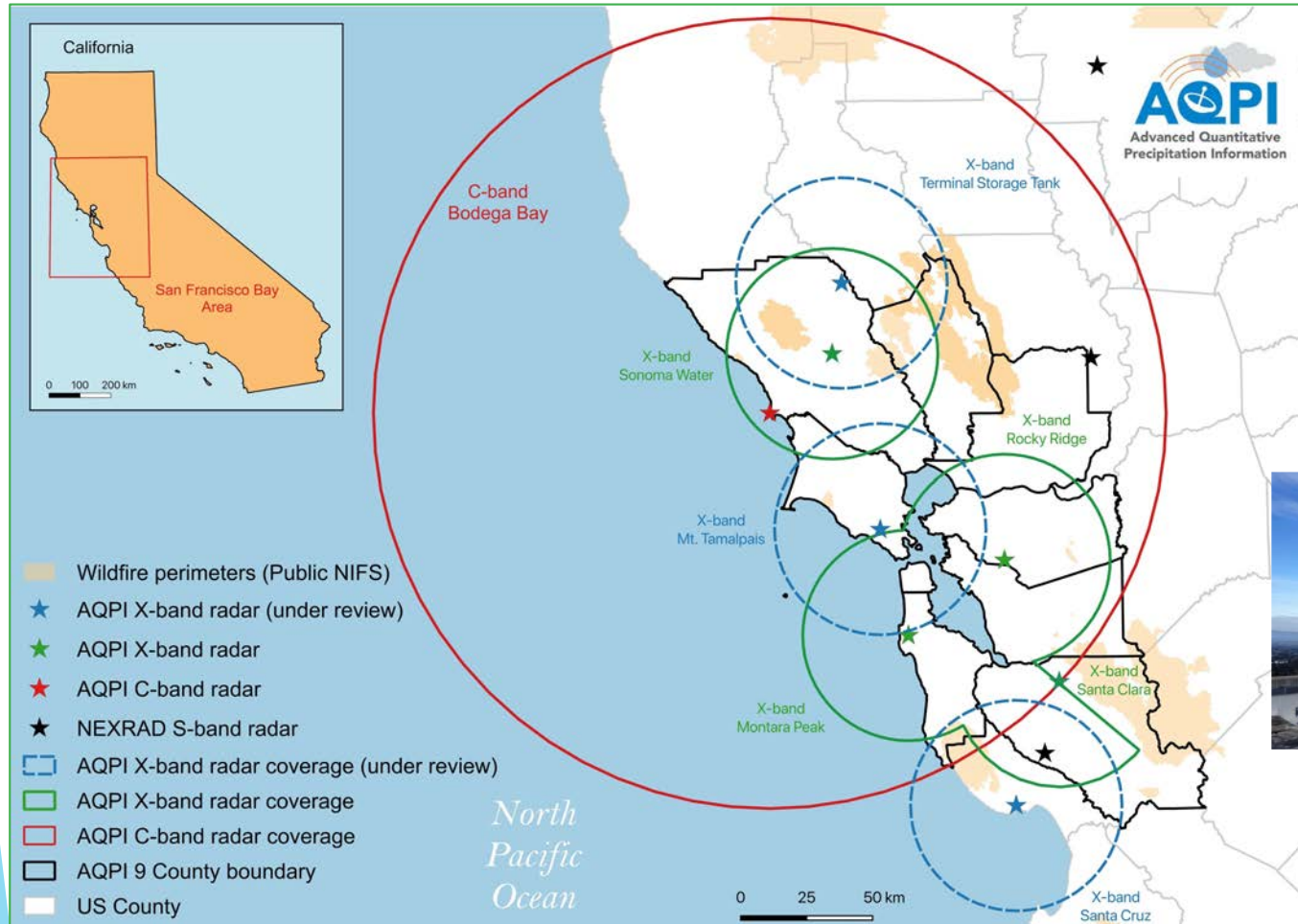
C-band Radar



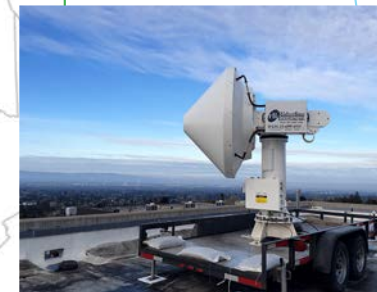
Surface Met



# AQPI Radar network

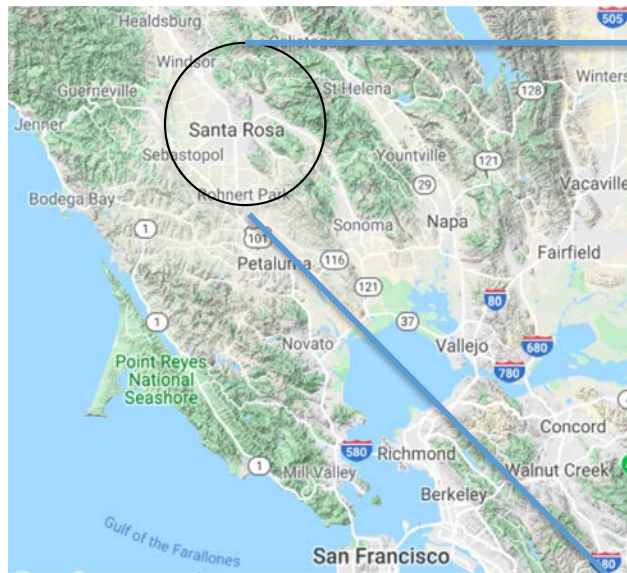


- 4 X-band radars
- 1 C-band
- Separate funding will provide 3 additional X-band systems



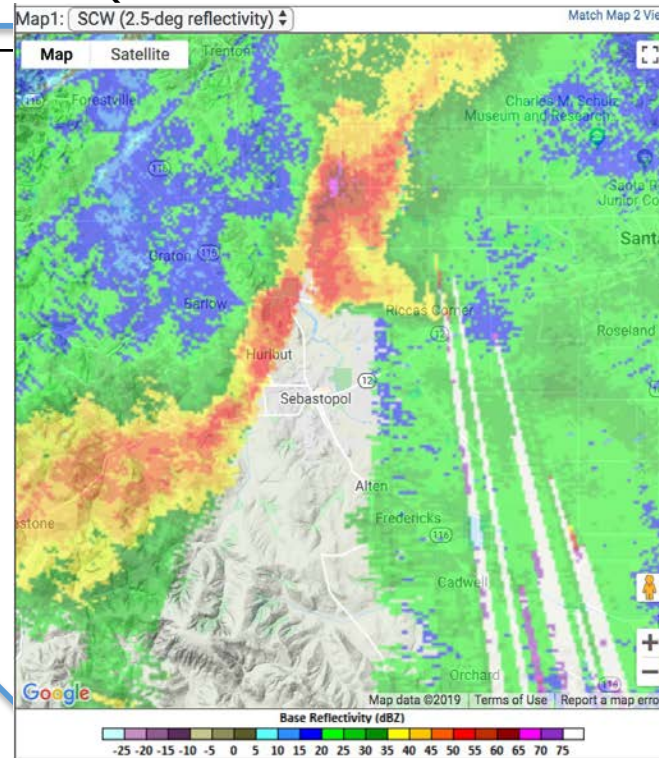


# Value of AQPI Radar in the North Bay

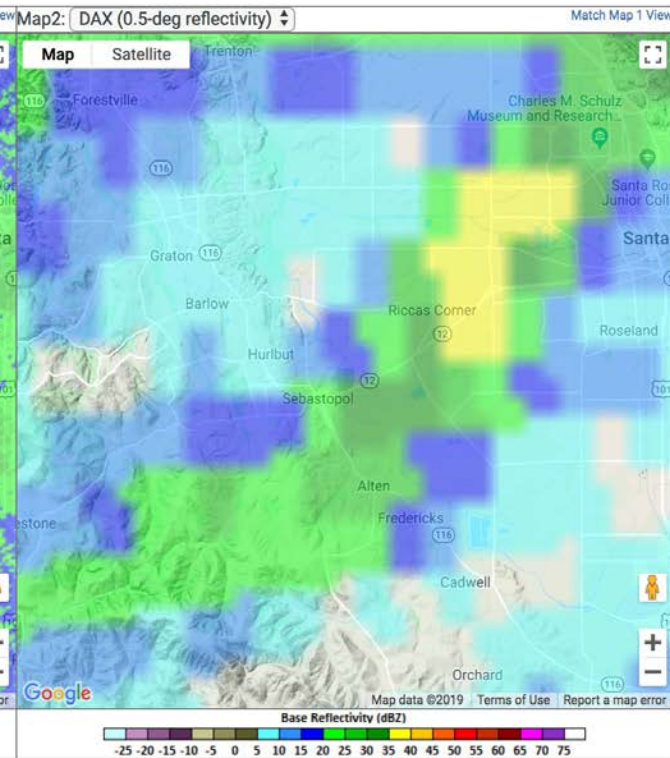


d.

AQPI Sonoma X-band



KDAX NEXRAD

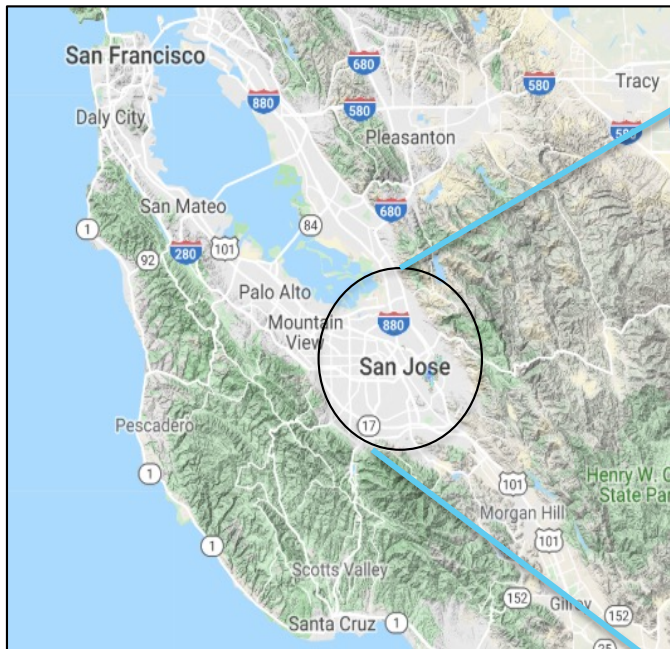


AQPI radar fills a gap not covered by NEXRAD  
AQPI radar covers several wildfire burn areas near Santa Rosa

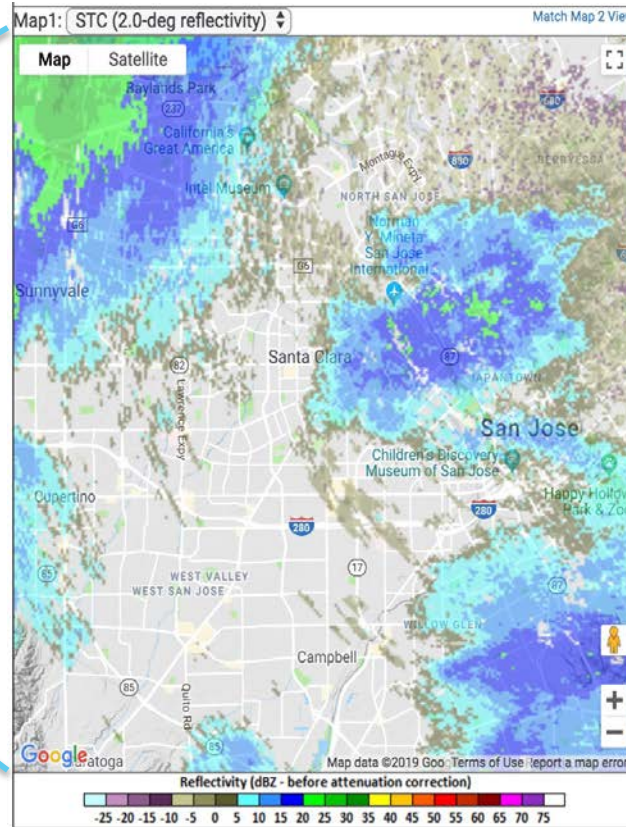
November 26, 2019



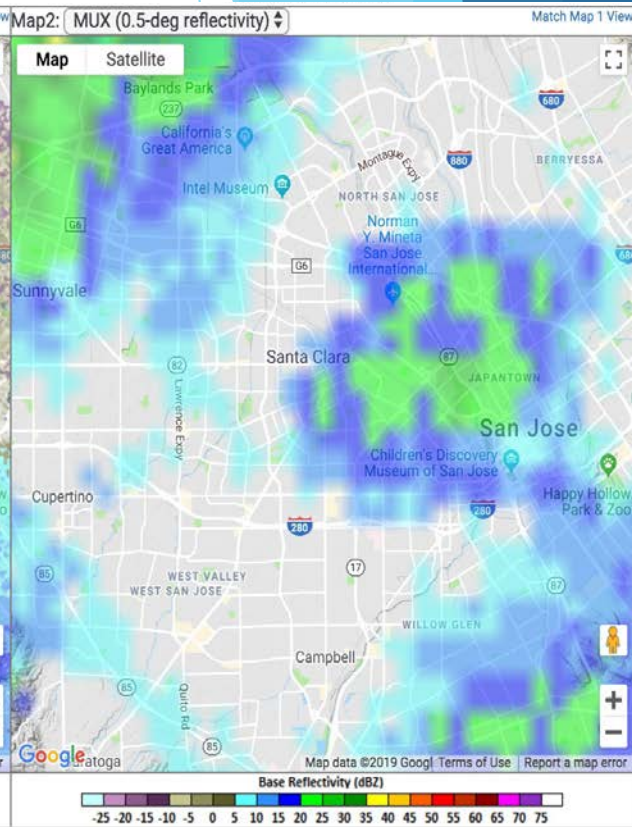
# Value of AQPI Radar in the South Bay



AQPI Santa Clara X-band



KMUX NEXRAD



- AQPI radar has higher space and time resolution - better picture of the overall rainfall pattern
- AQPI radar sees closer to the ground – more accurate rainfall estimates

February 14, 2019



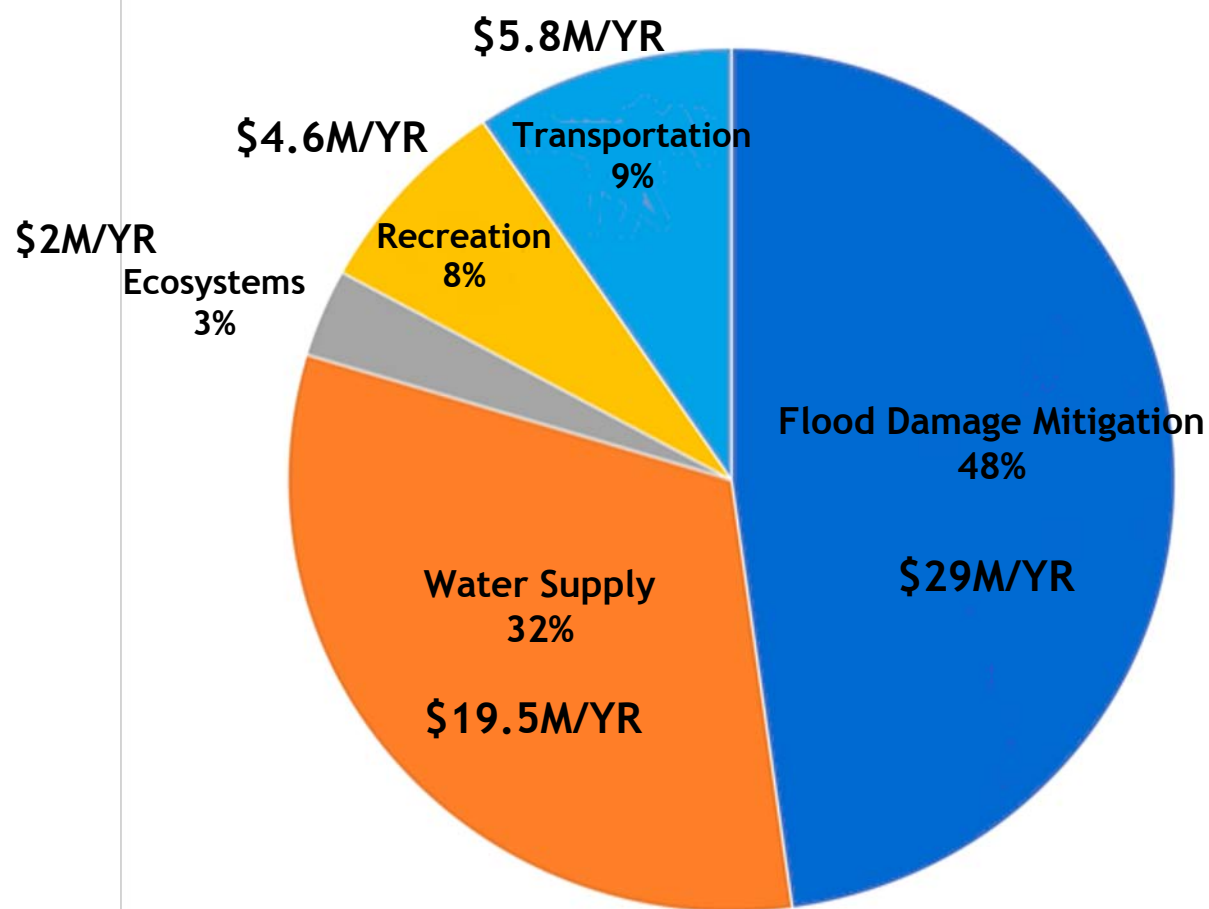
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## SF Bay Area AQPI Benefits Summary

- ▶ 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
- ▶ Supports Biden Administration's Executive Order to improve climate resilience

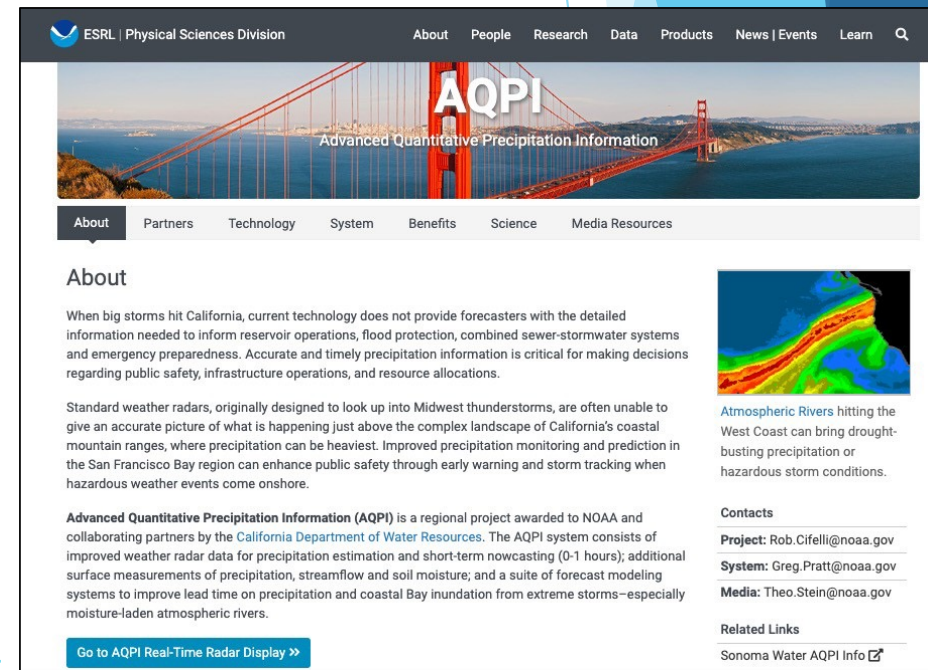


## Annual Benefits / Avoided Costs By Category



## AQPI and other Web Sites

- Sonoma Water  
<https://www.sonomawater.org/aqpi/>
- NOAA Physical Sciences Laboratory  
<https://psl.noaa.gov/aqpi/>
- National Water Model Map  
<https://water.noaa.gov/map>
- Contra Costa County Flood Control's RainMap  
<https://www.ccflood.us/rainmap.html>







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