

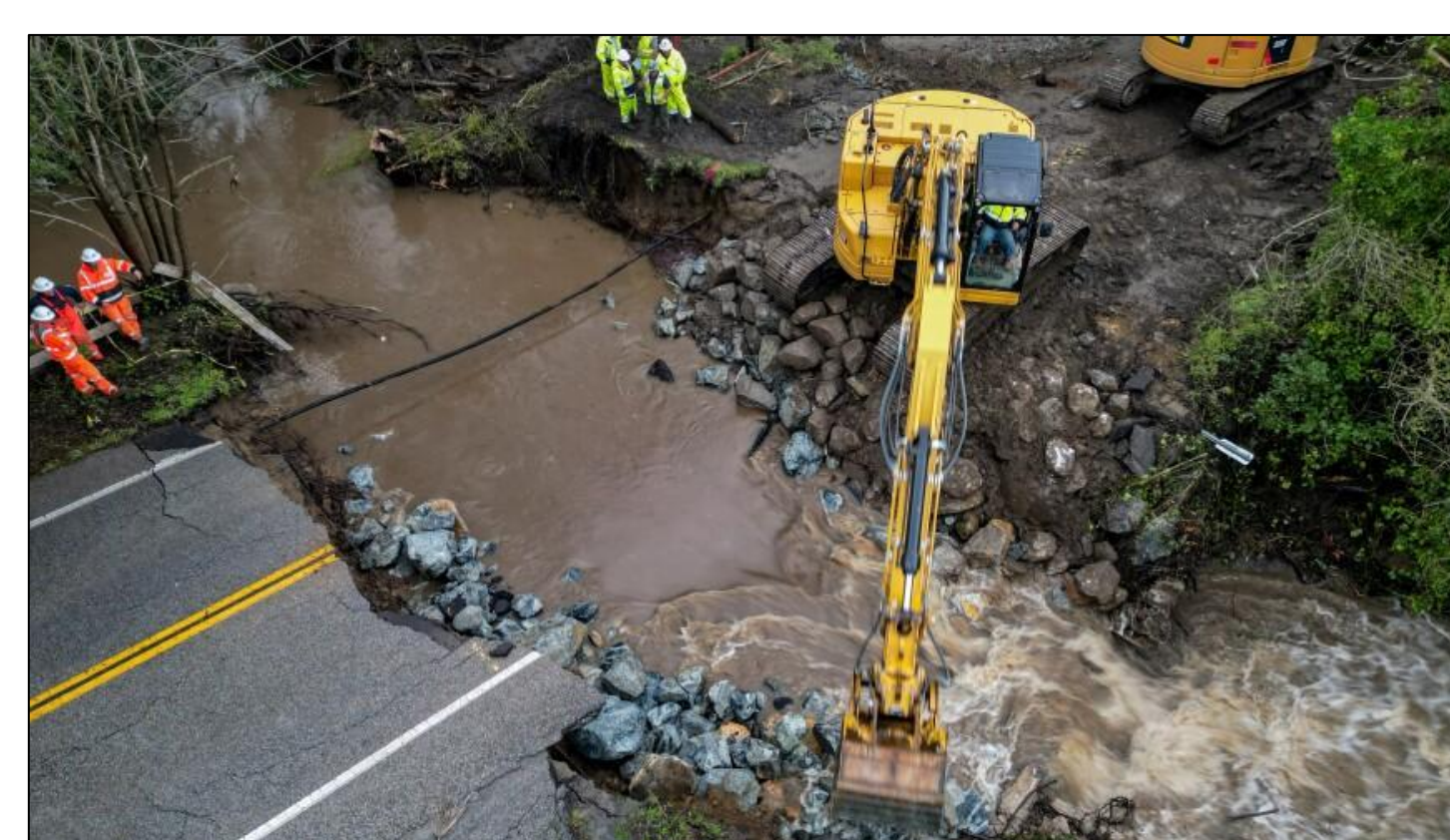
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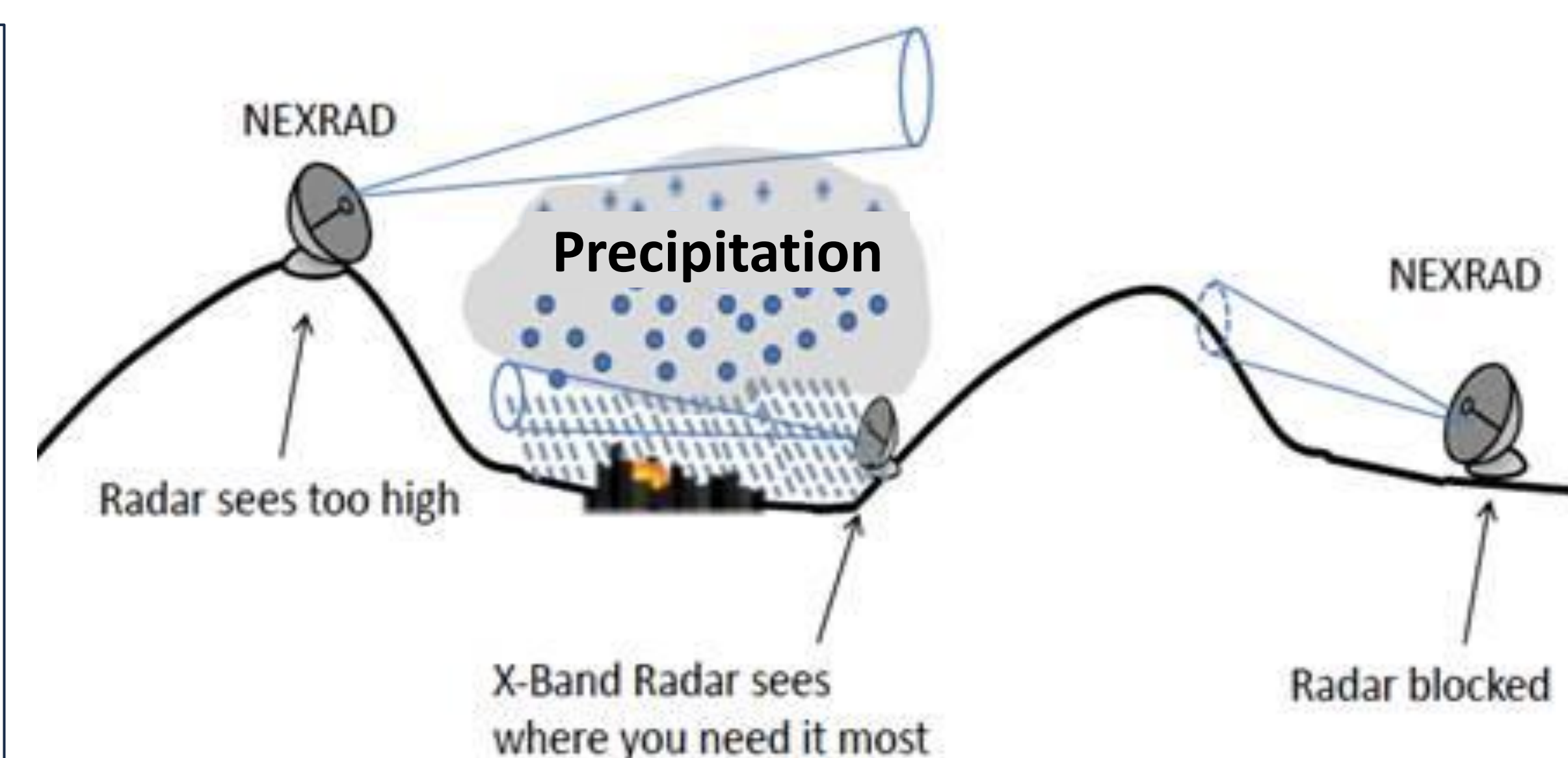
AQPI is a CA state-funded effort to augment radar coverage, produce radar-derived products, and develop decision support tools for stakeholders in the Greater San Francisco Bay Area. It is funded by the California Department of Water Resources and Sonoma Water. CW3E forecast products available from: <https://cw3e.ucsd.edu/>

Why is AQPI Needed?

- Radar Beam Blockage and Overshoot:** NEXRAD radar can be blocked by terrain, overshoot areas of precipitation, or see precipitation that is not reaching the surface (see schematic below)
- Radar Resolution:** NEXRAD spatial and temporal resolution are not sufficient for stakeholder operations in a high-density, high-value urban environment
- Coastal Concerns:** flooding / inundation due to precipitation, waves, tides, etc
- Weather Forecasting:** operational staffing, logistics planning, wastewater and water resource management



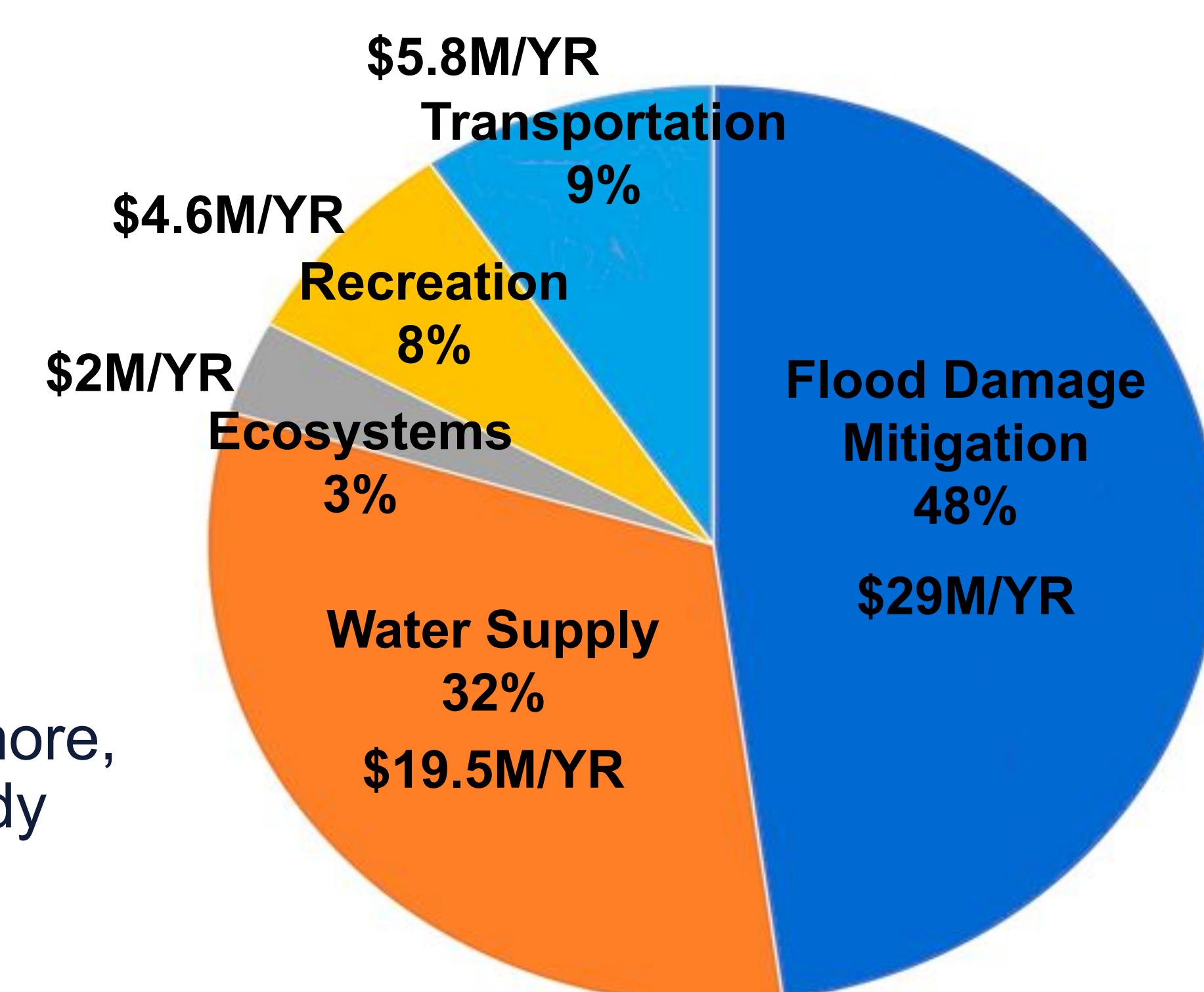
NEXRAD radar, typically located at higher elevations, can overshoot lower-elevation precipitation or see higher-elevation precipitation that is more intense than that reaching the surface.



Who Needs AQPI?

- Water Agencies
- Municipal Utility Districts
- Wastewater Management
- Emergency Response
- Flood Management
- Public Works Departments

According to Johnson et al. (2020; <https://doi.org/10.1111/jfr3.12573>), AQPI can produce ~60.9 M/YR in Benefits and avoided costs. Furthermore, AQPI supports NOAA's WeatherReady Nation Initiative

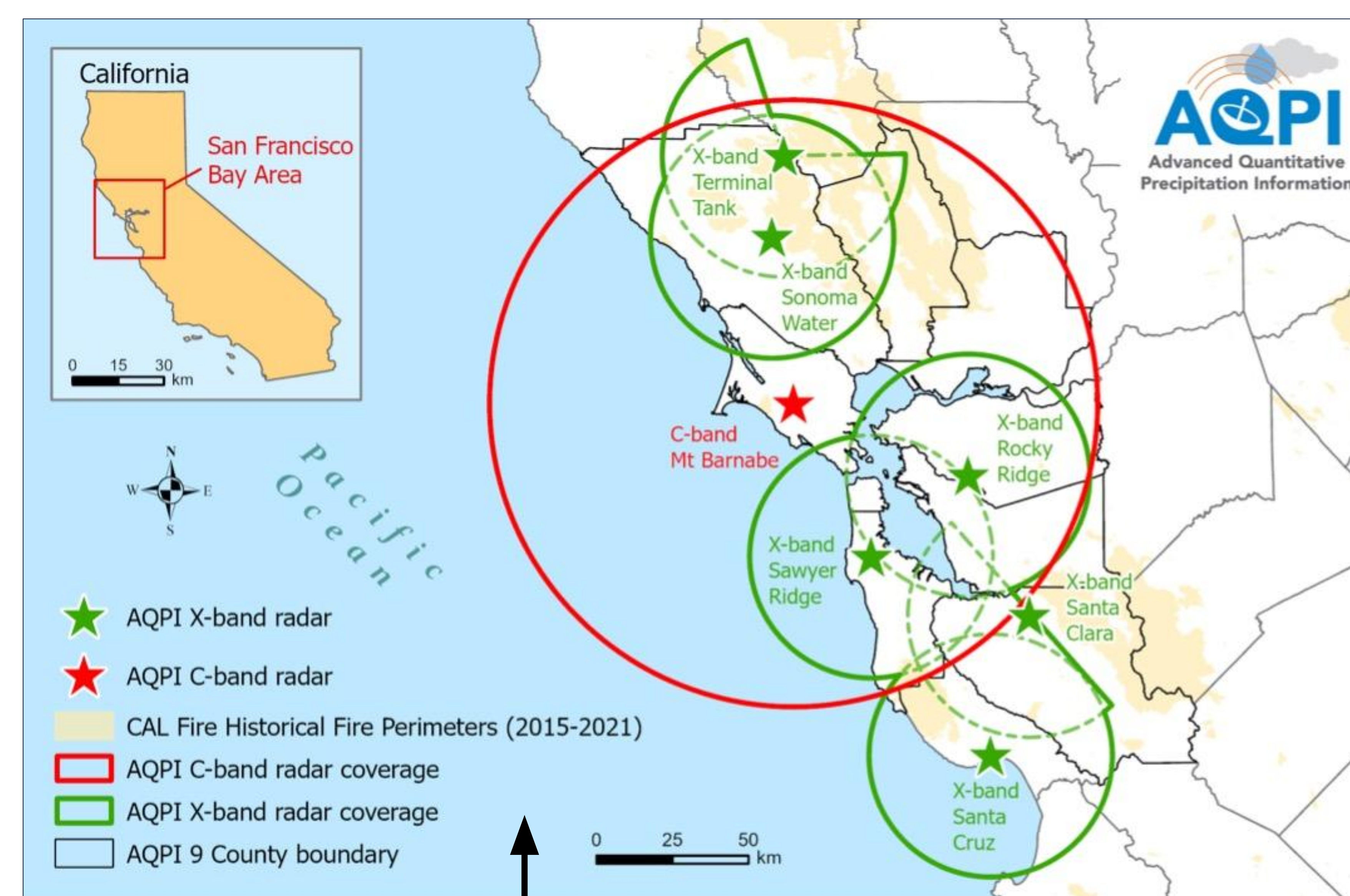


Contact and Data Access

Contact: Jon Rutz (jrutz@ucsd.edu), AQPI Technical Lead

AQPI Radar Data Access:
https://psl.noaa.gov/data/obs/sitemap/ScanRadar/scan_radar_dual.php

Observations



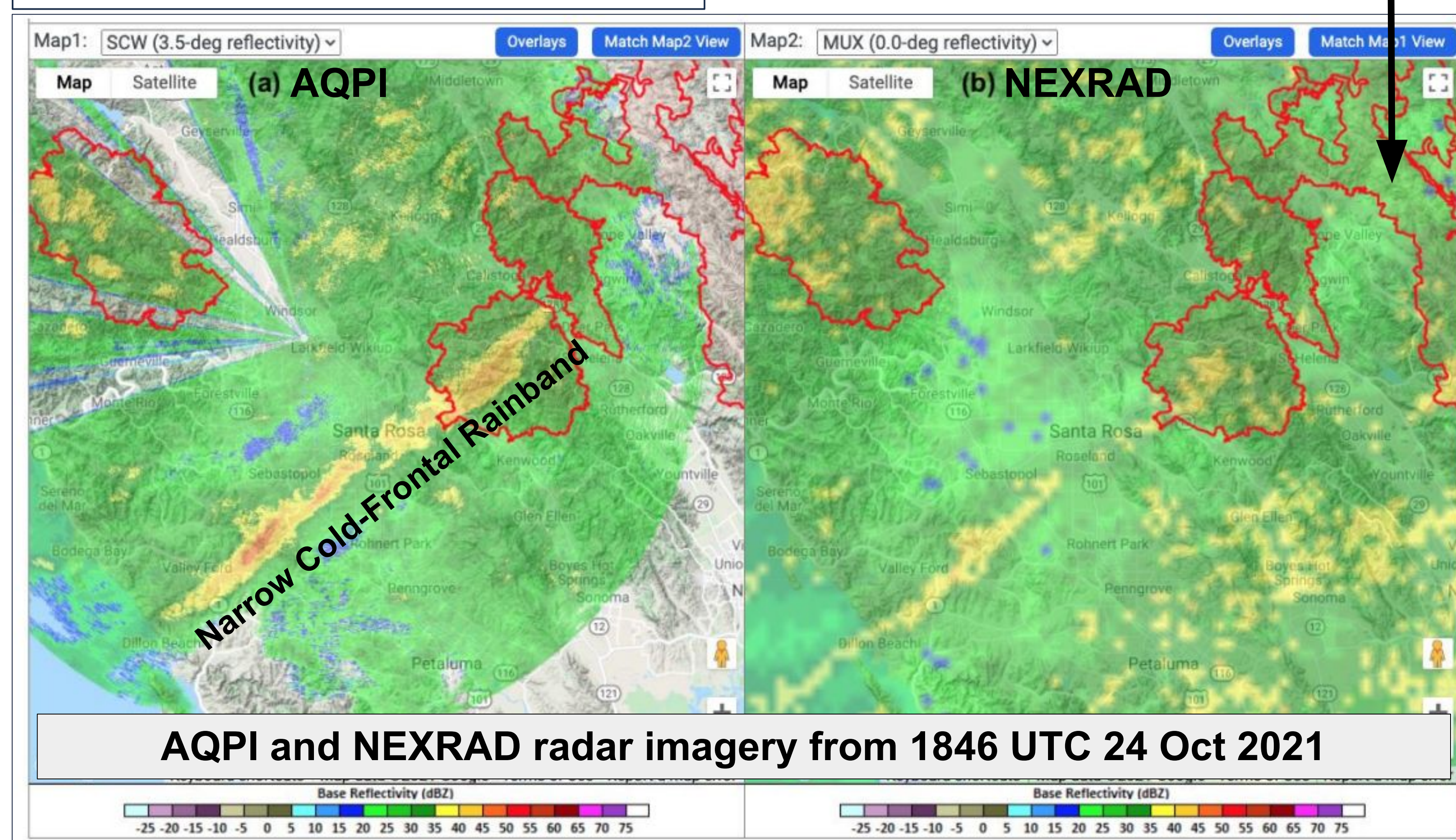
Radar Installation Status

Final (above) and current (below)

- Sonoma Water (X-band)
 - Santa Clara (X-band)
 - Rocky Ridge (X-band)
 - Sawyer Ridge (X-band)
 - Santa Cruz (X-band)
 - Terminal Tank (X-band)
 - Mt Barnabe (C-band)
- Complete In Process Not Begun

NEXRAD / AQPI Radar Comparison

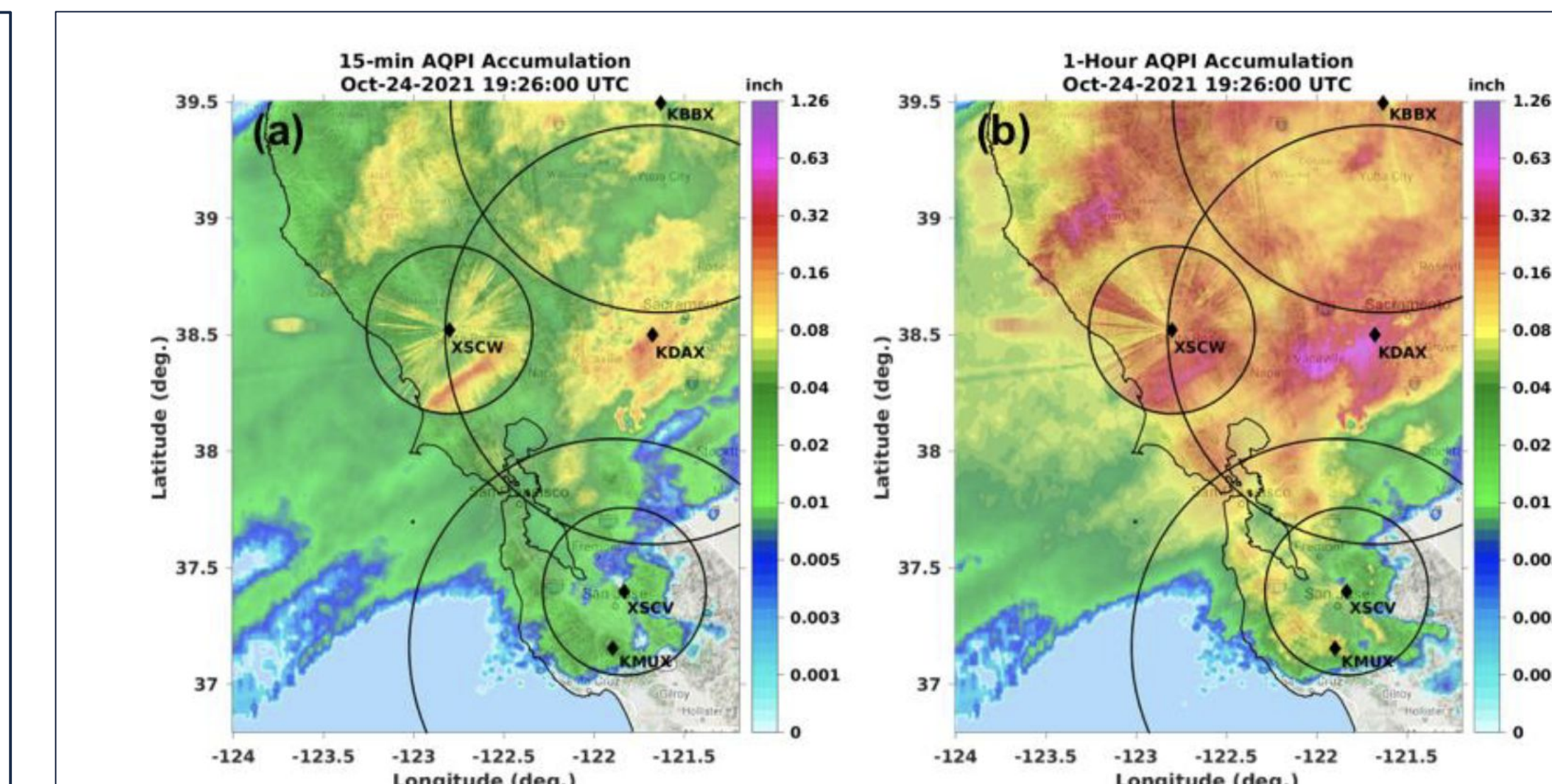
Below shows an example of a narrow cold-frontal rainband (NCFR) that caused urban flooding in Santa Rosa, CA. The NCFR and its extension into a burn area (red outline) is more clearly seen using the AQPI Santa Rosa X-band (left) vs. the NEXRAD (right). These side-by-side comparisons can be created for any available data.



Radar-Derived Products

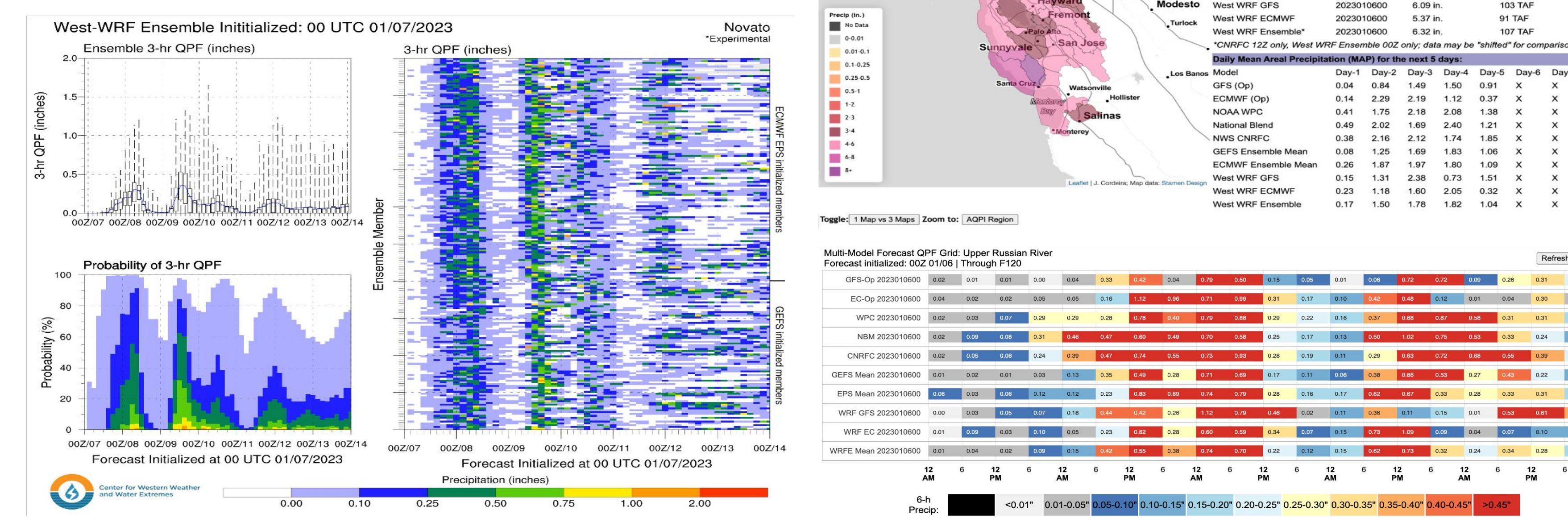
Quantitative Precip Estimate (QPE)

High-quality QPE, which accounts for bright banding and other issues, can be used to force hydrology and hydraulics (H&H) models run by AQPI stakeholders, improving their efficiency.



Weather Forecasting

Stakeholder needs go beyond 0-6 hour forecasts aided by additional radars. CW3E has developed longer-range forecast products to augment AQPI decision support tools.



CoSMoS (Coastal Storm Modeling System)

An NWM-coupled coastal inundation model produced hourly from the HRRR at 18-h lead time (36-h every 6 h) for elevations < 10m. It accounts for tides, wind, pressure, oceanic sea level anomalies, and fluvial inputs (waves and precipitation not yet included; future goals).



Summary and Vision

AQPI data will flow directly & indirectly into stakeholder operations: H&H models driven by high-quality QPE, ensemble-based atmos forecasts, and CoSMoS. A nowcast (benefitting from radar DA), other radar-derived products, and long-range forecast products will support decision support tools. **AQPI could be useful for considering similar infrastructure elsewhere in the world.**