North Bay Watershed Association Board Meeting

November 6, 2020

1. Welcome and Call to Order – Roll Call and Introductions

2. General Public Comments

This time is reserved for the public to address the Committee about matters NOT on the agenda and within the jurisdiction of the Committee.

3. Agenda Review and Approve October 2, 2020 Minutes

Proposed Action: Approve

Agenda Item	Proposed Action
1. **Welcome and Call to Order – Roll Call and Introductions** *Jack Gibson, Chair*	N/A
2. **General Public Comments**	N/A
3. **Agenda Review and Approve October 2, 2020 Minutes**	Approve
4. **Treasure's Report**	Accept
5. **Guest Presentation–San Francisco Bay Area Advanced Quantitative Precipitation Information System (AQPI) and Benefits to Rainfall-Based Flood Warning System in Marin County** *Jay Jasperse, Chief Engineer, Sonoma Water and Roger Leventhal, Senior Engineer, County of Marin* Jay will provide an overview and progress update on Advanced Quantitative Precipitation Information System (AQPI), an advanced weather and water forecasting system for precipitation and coastal flooding in the San Francisco Bay Area. Roger will present how AQPI will greatly improve a unique flash flood forecasting model developed for Marin.	Presentation

Agenda Items (continued)	Proposed Action
6. **Executive Director Report** *Andy Rodgers, Executive Director* Andy will provide an update on active projects, communications, committees, activities, and developing initiatives since October 2 Board meeting.	Questions/input
7. **Board Information Exchange** *Board Members* Members will highlight issues and share items of interest.	N/A
8. **Agenda Items for Future Meetings** *Andy Rodgers, ED* Andy will outline ideas for next and future Board meeting topics and solicit feedback	N/A
9. **Announcements/Adjourn** Next Board Meeting: December 4, 2020	

4. Treasure’s Report

Proposed Action: Accept

Northbay Watershed Association
Treasurer's Report
October 1 - October 31, 2020

Revenues:	
Membership -Stewardship - General Benefits - FY2021	5,878.08
REFUND of 2020 Conference Registrations	(1,328.64)
Misc Revenue	
Total Revenues	**4,549.44**
Expenses:	
Executive Director Professional Services:	28,200.00
Admin Professional Fees & Expenses:	
Operating Expense - General Benefit - website, etc..	
SFEI - Website Maintenance	
NCRCD 2020 Conference Support	
Sheraton Sonoma - NBWA 2020 Conference	
Data Instricts - NBWA Outreach & Support	1,975.00
Horizon - Strategic Planning	12,500.00
Total Expenses	**42,675.00**
Change this period	(38,125.56)
Fund Balance as of July 1, 2020	$ 275,906.91
Fund Balance as October 31, 2020	$ 237,781.35

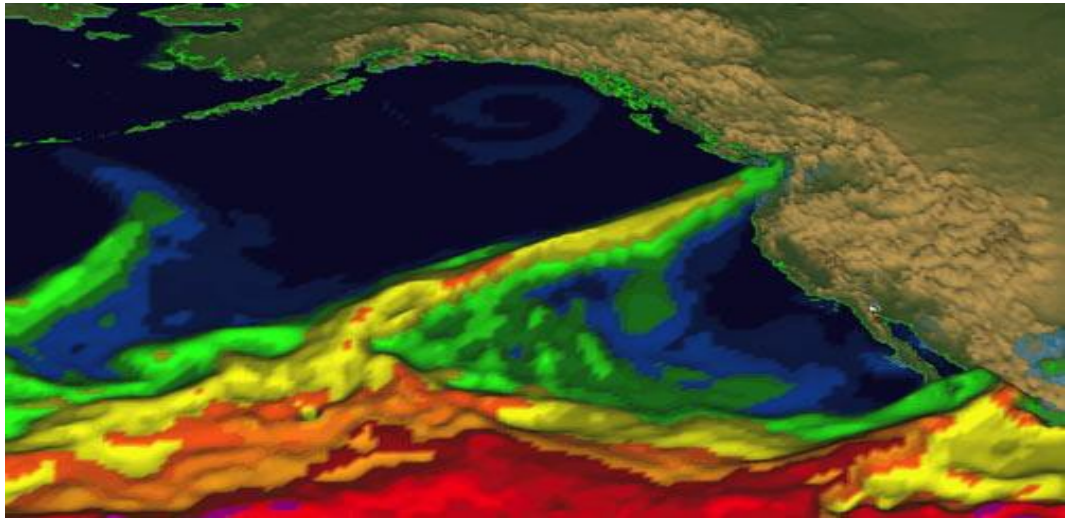
5. Guest Presentation–San Francisco Bay Area Advanced Quantitative Precipitation Information System (AQPI) and Benefits to Rainfall-Based Flood Warning System in Marin County

Jay Jasperse, Chief Engineer, Sonoma Water and Roger Leventhal, Senior Engineer, County of Marin

Jay will provide an overview and progress update on Advanced Quantitative Precipitation Information System (AQPI), an advanced weather and water forecasting system for precipitation and coastal flooding in the San Francisco Bay Area.

Roger will present how AQPI will greatly improve a unique flash flood forecasting model developed for Marin.

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

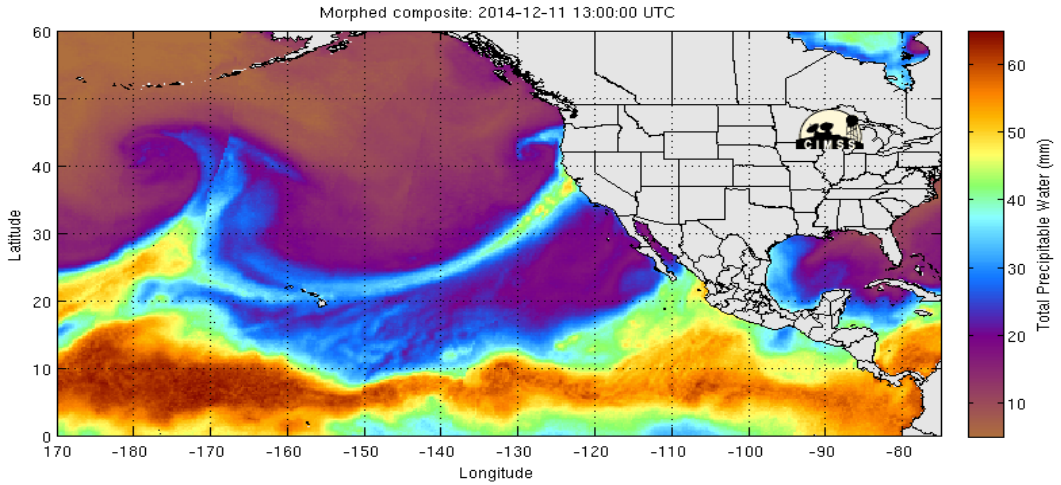
Overview of Presentation

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

"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."

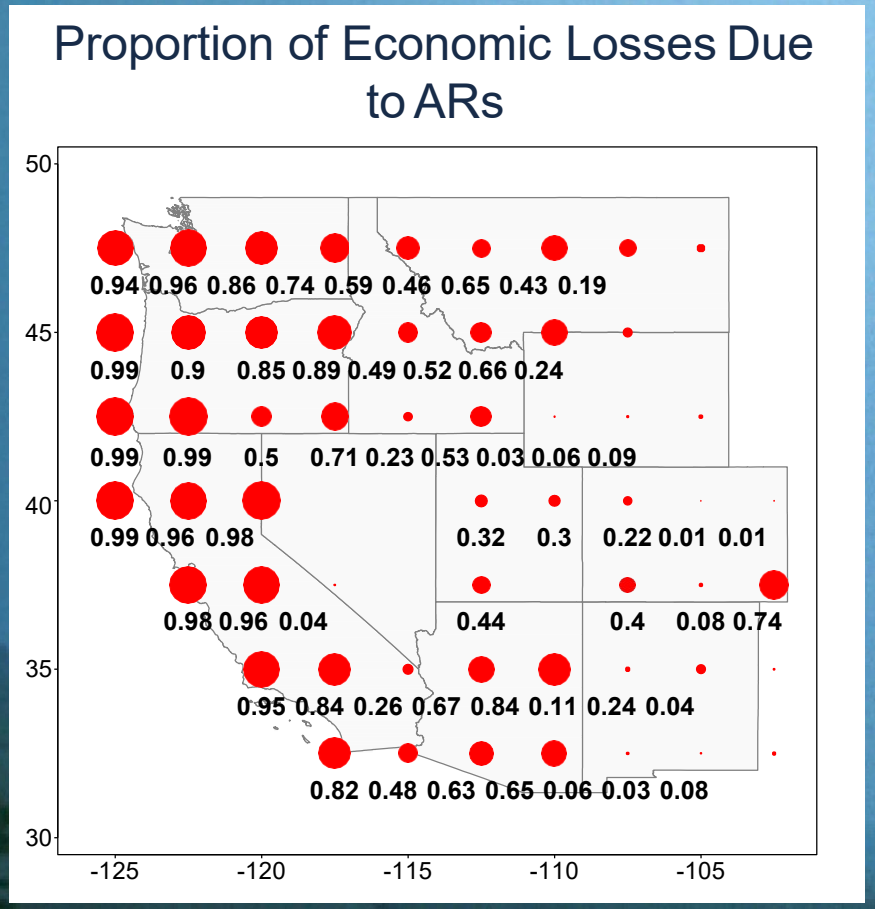
Mike Anderson, State Climatologist, California Department of Water Resources, Division of Flood Management

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

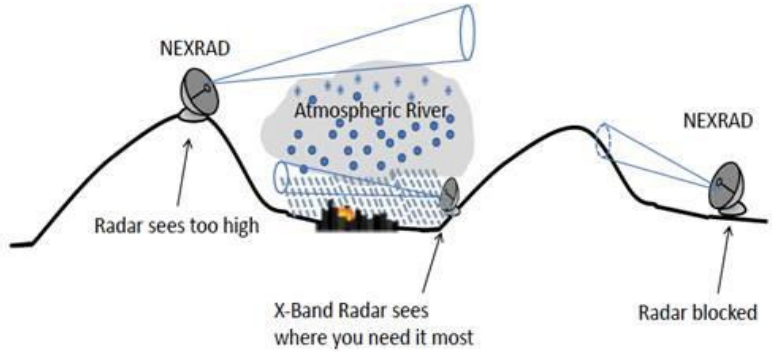
Post-Fire debris flows pose a serious hazard. This case killed >20 people near Montecito, CA.

T. Corringham, 2018

Center for Western Weather and Water Extremes

SCRIPPS INSTITUTION OF OCEANOGRAPHY

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**

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

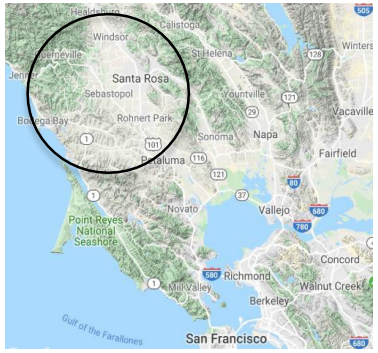
- Advanced weather radars and surface meteorology deployments
- Integration of observations and forecast models
- Precipitation, streamflow, and coastal storm surge forecasts
- Decision Support Tools - Integrate & disseminate observations & forecast information

X-band Radar

C-band Radar

Surface Met

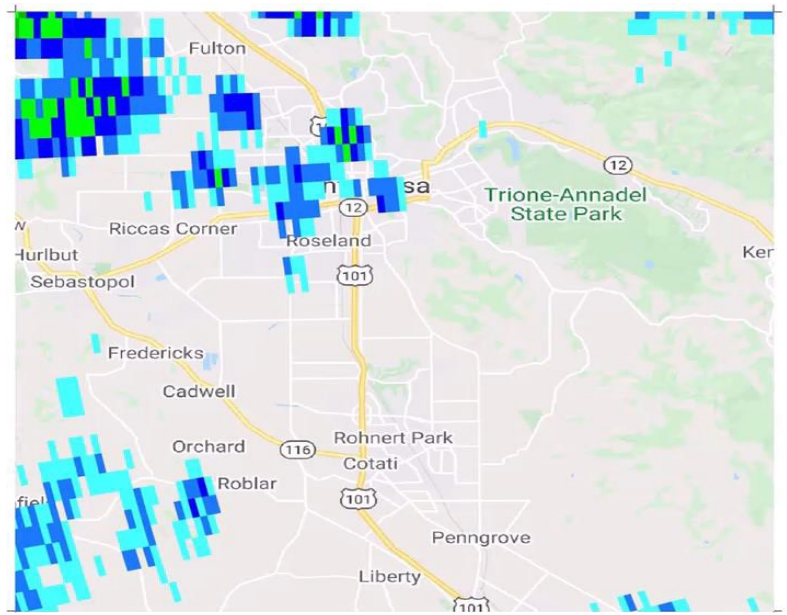
SF Bay AQPI Radar Locations and Range



Sonoma County - Radar Comparison

February 14, 2019

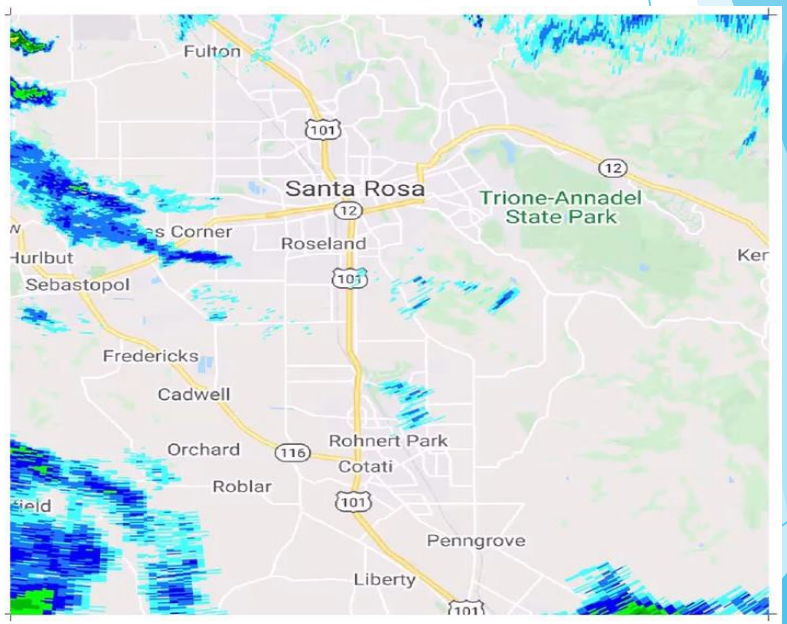
NEXRAD (existing) Radar



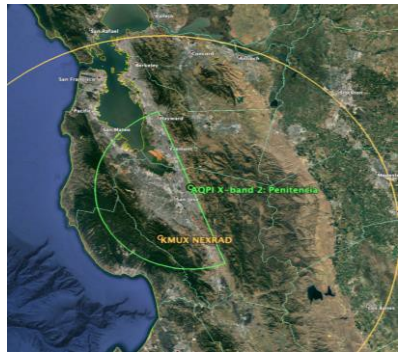
Rainfall

- Heavy
- Moderate
- Light

AQPI Sonoma Radar



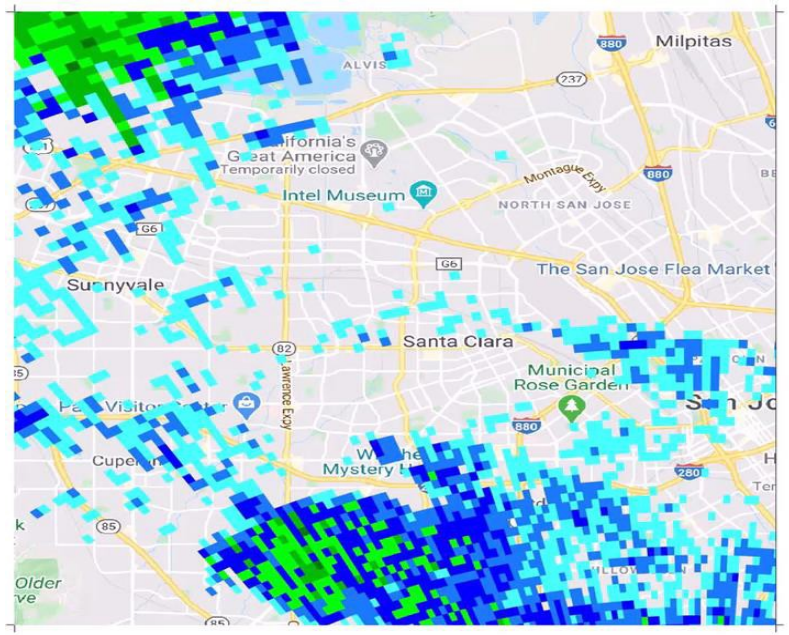
- AQPI radar fills a gap not covered by existing radars, with more detail and frequency
- AQPI radar covers several wildfire burn areas near Santa Rosa



Santa Clara County - Radar Comparison

February 14, 2019

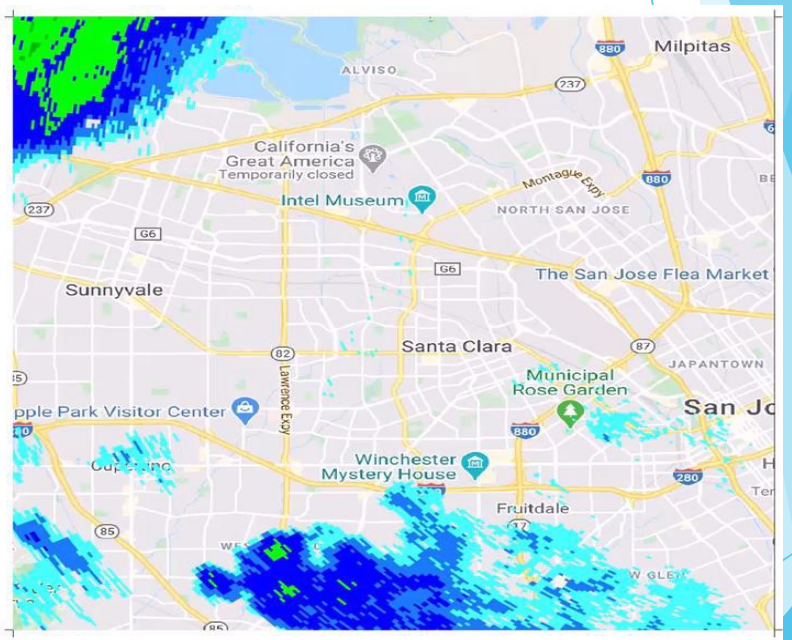
NEXRAD (existing) Radar



Rainfall

- Heavy
- Moderate
- Light

AQPI Santa Clara Radar

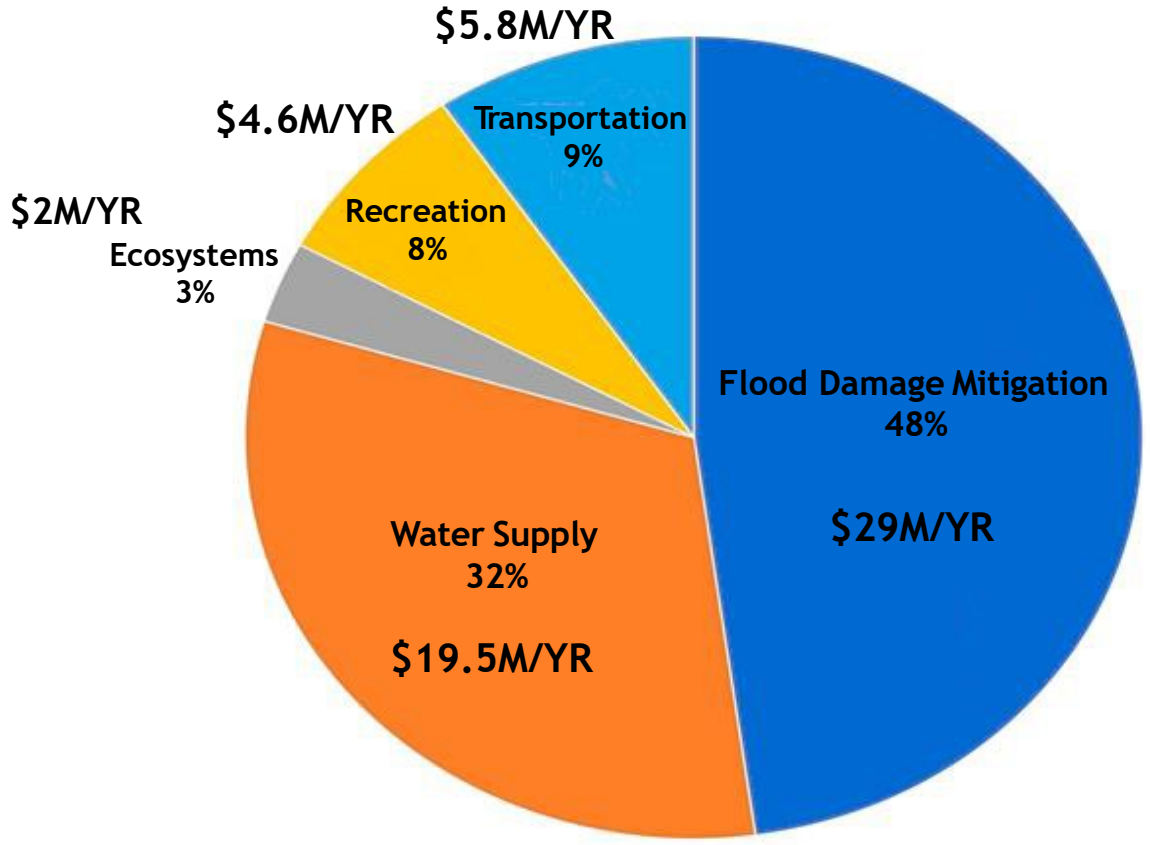


- NEXRAD is on a mountain top and doesn't see the rain close to the ground in the Santa Clara – San Jose area
- AQPI radar provides more detail on exactly where and when it's raining and not raining

SF Bay Area AQPI Benefits Summary

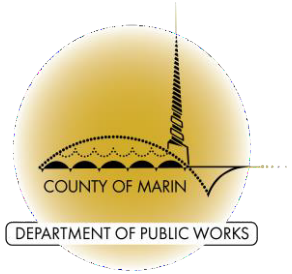
- NOAA estimates $60.9M in avoided costs per year
- Provides severe weather detection, tracking, & forecasting
- Improved situational awareness reduces risks to public safety & protects water quality and resources
- Improves early warning and emergency response support
- Leverages investments in observation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

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

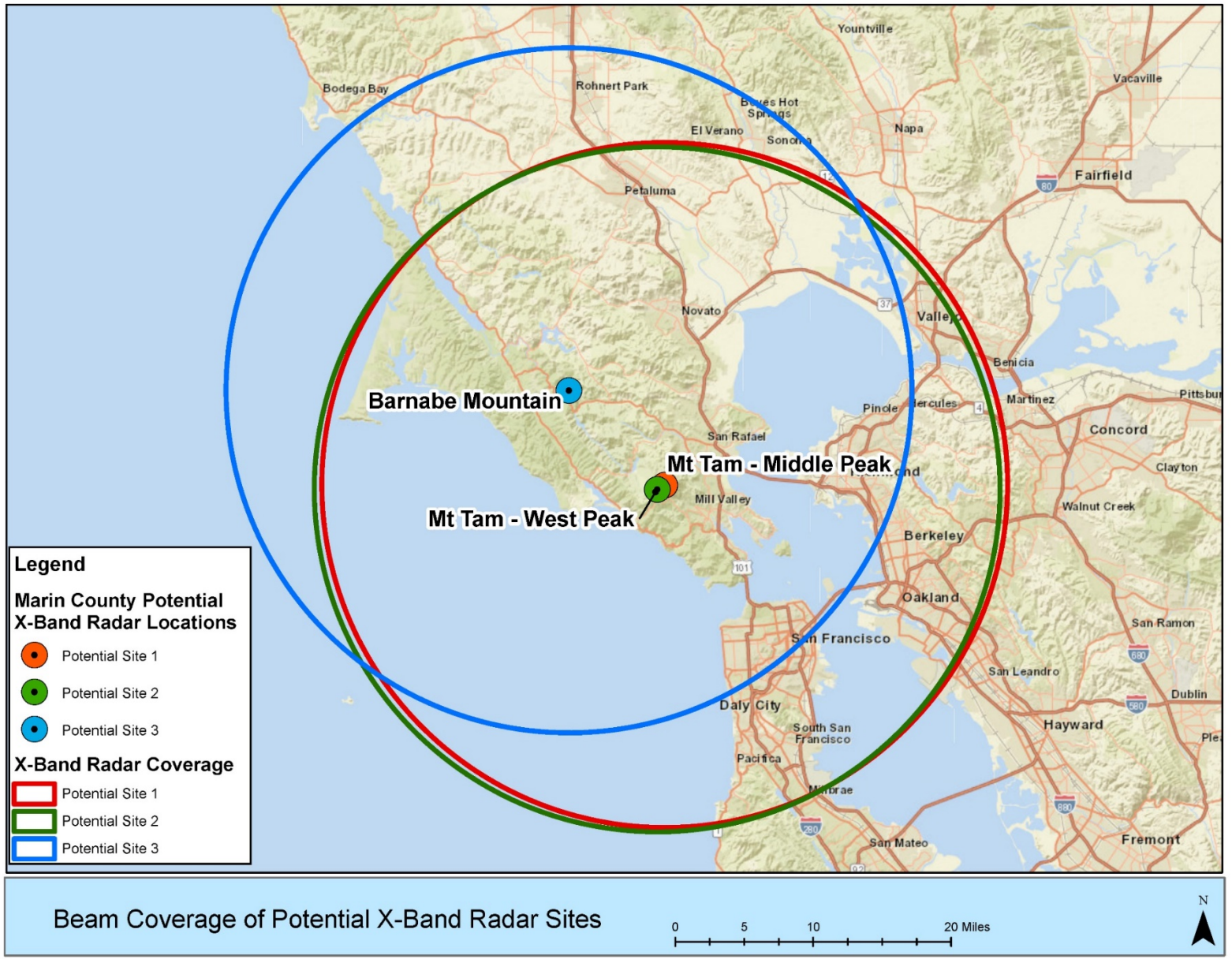


Rainfall Based Flash Flood Trigger Model - Based on Statistical Analysis of Historic Storm Events for Marin County, California

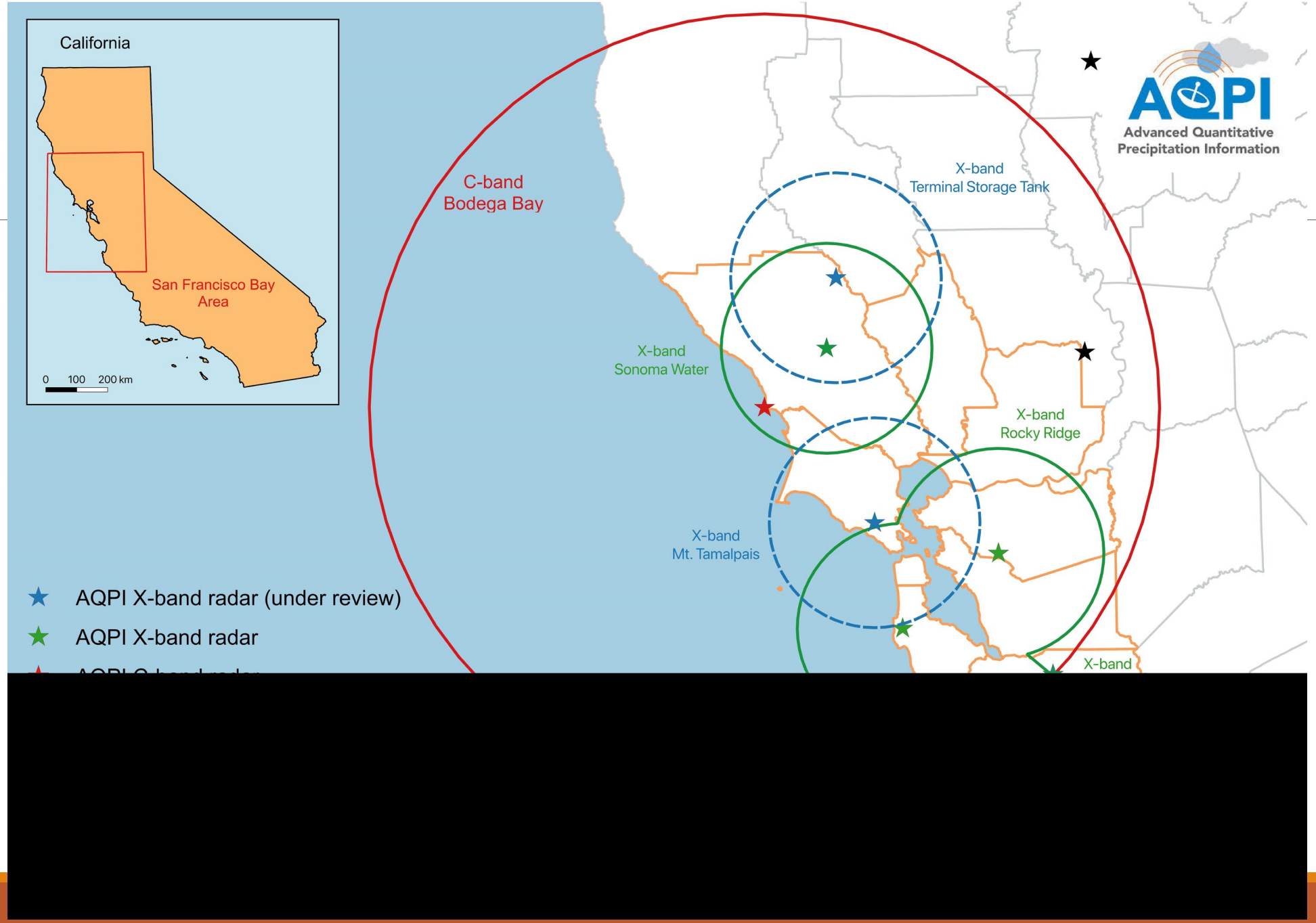
Roadway flooding at "King" tides Dec 2012

Roger Leventhal, P.E.
Senior Engineer
Marin County DPW

NBWA
November 6, 2020



Department of Public Works
3501 Civic Center Drive, Suite 304
San Rafael, CA 94903
415.473.6528 T - 415.473.3232 TTY
marincounty.org/dpw


California
San Francisco Bay Area
0 100 200 km
C-band
Bodega Bay
X-band
Terminal Storage Tank
X-band
Sonoma Water
X-band
Rocky Ridge
X-band
Mt. Tamalpais
X-band
AQPI
Advanced Quantitative Precipitation Information
AQPI X-band radar (under review)
AQPI X-band radar

SF Bay Area AQPI System

Decision Support Tools - Integrate & disseminate observations & forecast information to…

- Emergency response & flood managers
- Water and wastewater managers
- Fire smoke detection capabilities (*new)*

For DPW - The next generation flooding models will use real time radar linked to hydraulic models…but until then…

X-band Radar

C-band Radar

Surface Met

Department of Public Works
3501 Civic Center Drive, Suite 304
San Rafael, CA 94903
415.473.6528 T - 415.473.3232 TTY
marincounty.org/dpw

The New Marin DPW Flash Flood Forecast Model *(beta)*

Need a reliable practical flood forecast tool to support efficient operation of flood responses

Marin's steep smaller watersheds, microclimate, geology – drive flash flooding

beta Solution – Uses statistical analysis of past events to predict flooding

Department of Public Works
3501 Civic Center Drive, Suite 304
San Rafael, CA 94903
415.473.6528 T - 415.473.3232 TTY
marincounty.org/dpw

Marin County, CA

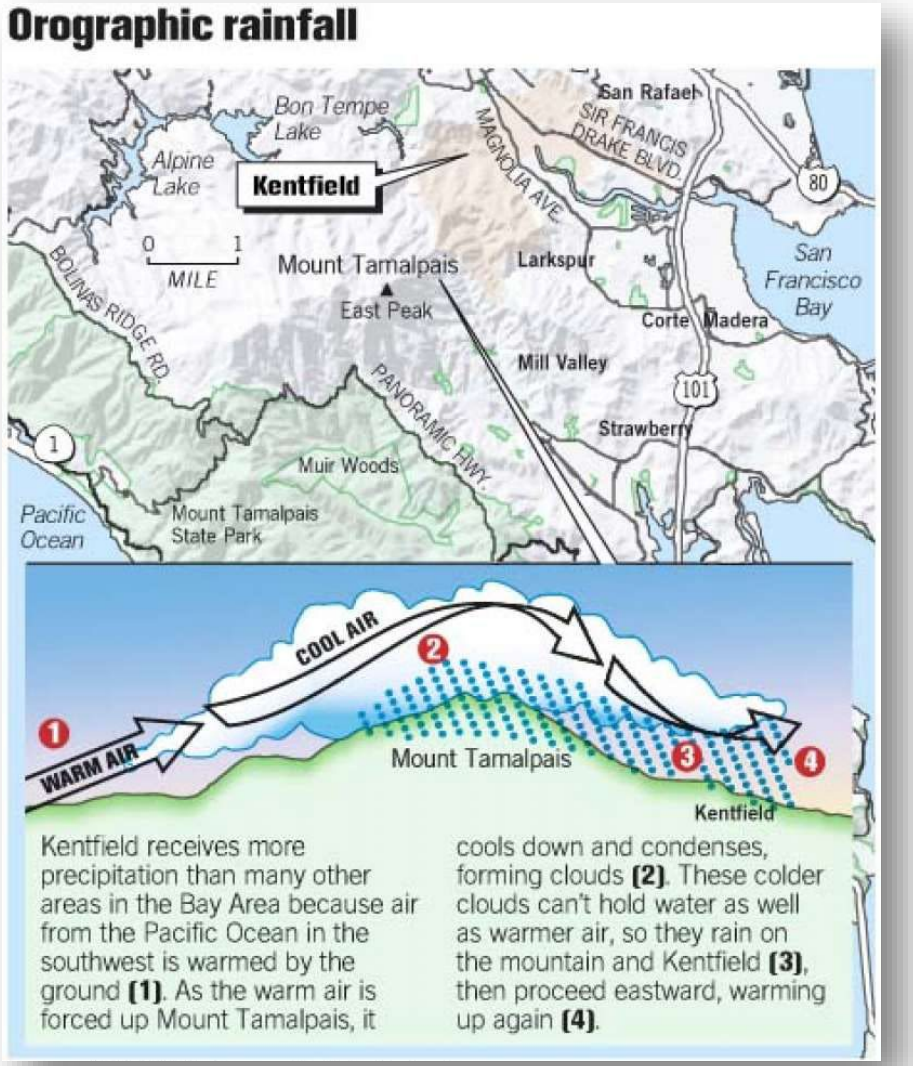
Steep hills grading to river valleys and old marsh

Geologically active – high sediment loads

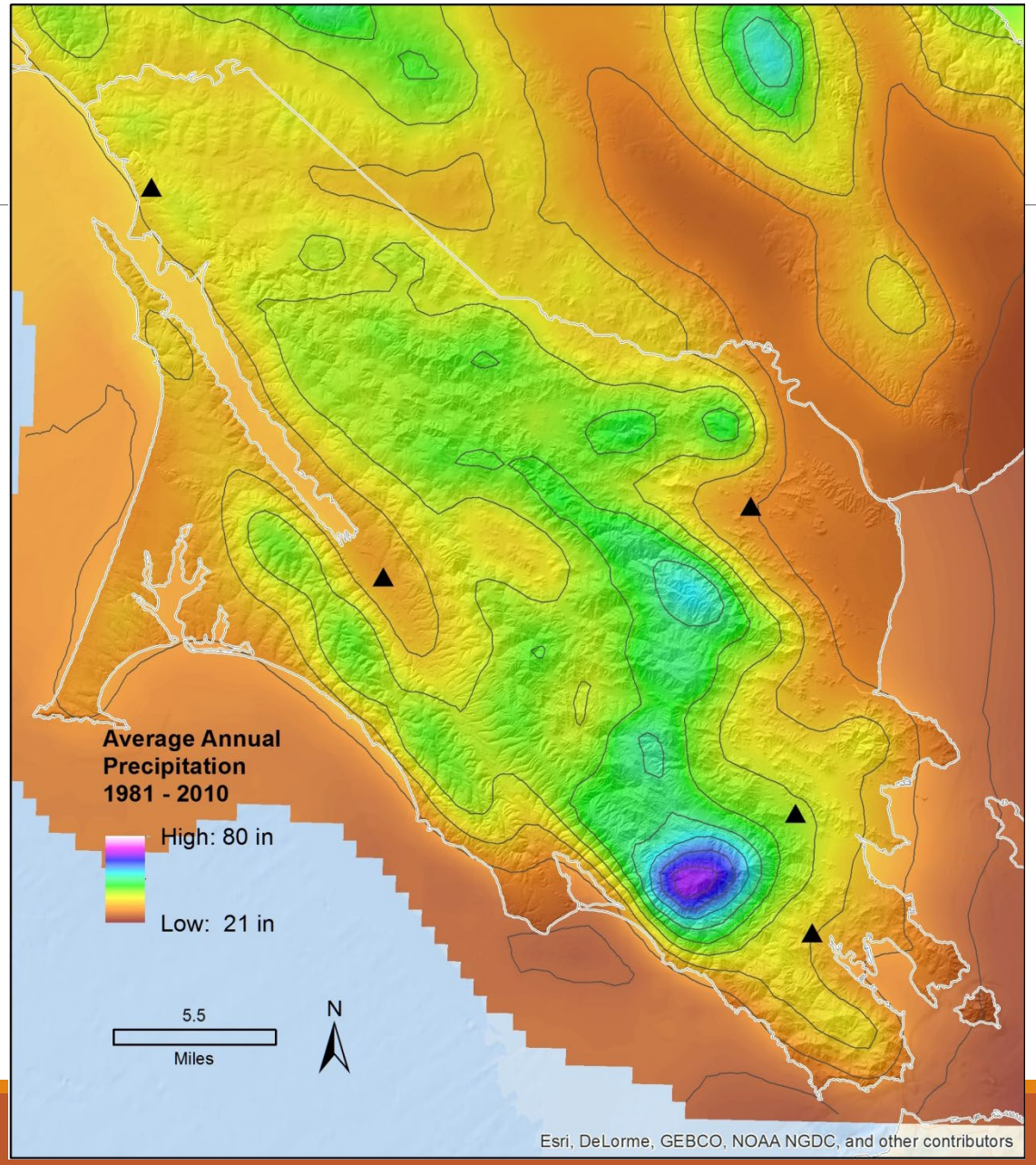
Vulnerable to SLR

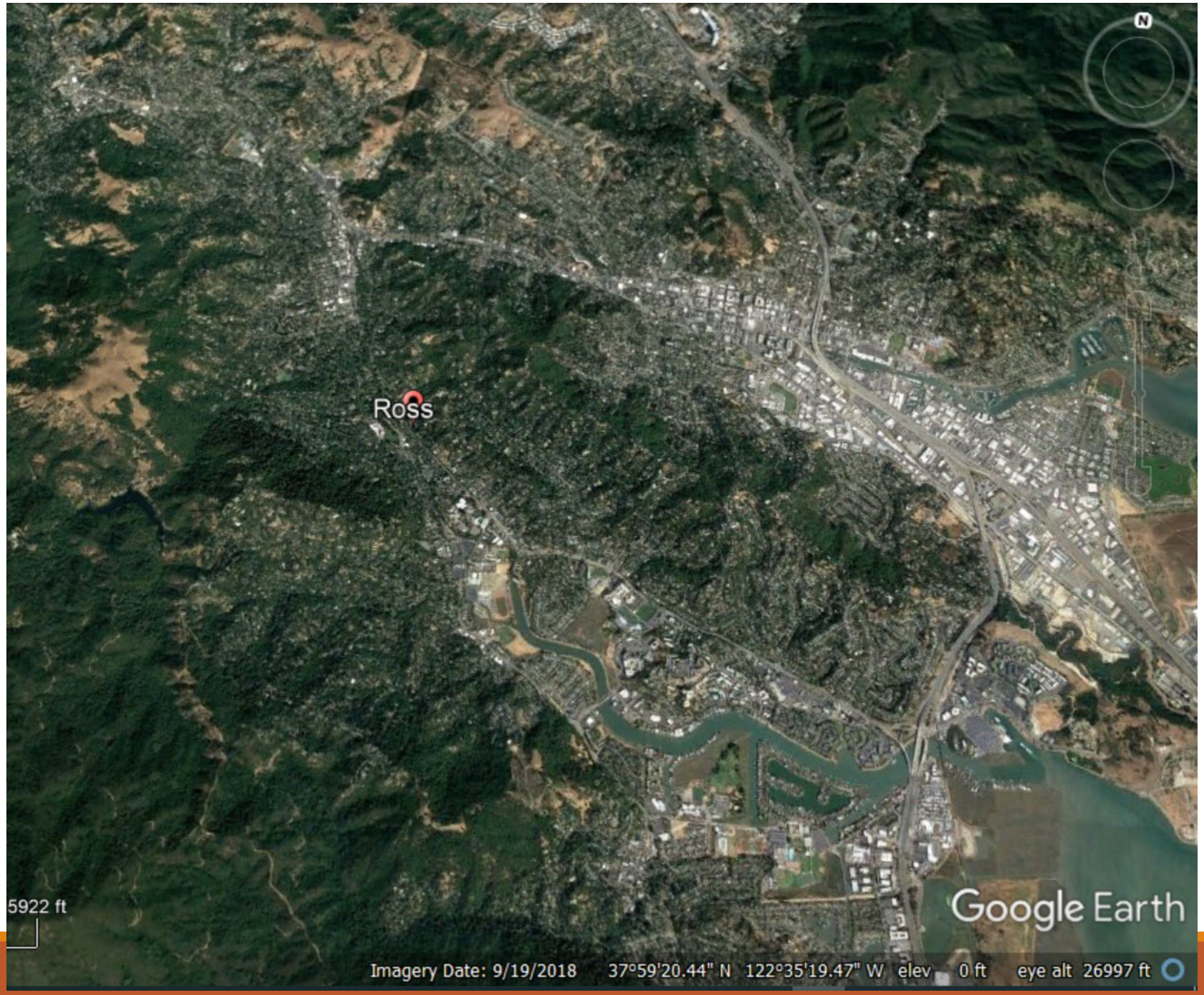
Open to Pacific Ocean and Bay

Marin County Rainfall

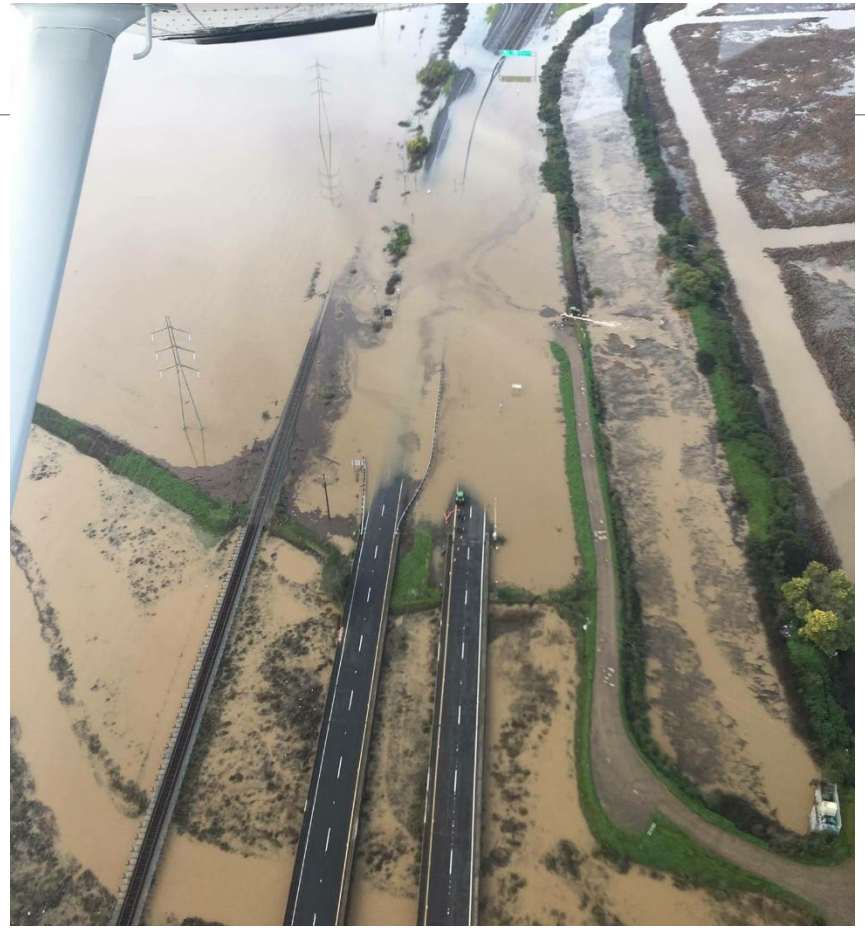


Rainfall MAP – Marin




N
Ross
5922 ft
Google Earth
Imagery Date: 9/19/2018 37°59'20.44" N 122°35'19.47" W elev 0 ft eye alt 26997 ft

Historic Flooding



Highway 37 2017

Department Emergency Operations Center

Civic Center EOC

Expensive to open and staff 24/7

Overtime pay

Limited staff = quick burnout maybe 3 to 5 days realistically

One solution…borrow a trigger from another County

Contra Costa County
Flood Control
& Water Conservation District

Flood Forecasting

CONDITIONS TO LOOK FOR

1. Compare the rainfall for the year and 24-hour forecast with the following criteria.

   a. **7**" of rain for the season starting on July 1 (year).

   b. **5**" of rain in the last 30 days (month).
   3" of rain in the last 7 days (week).

   c. **2**" of rainfall is forecast in the next 24 hours (day).

2. If these conditions are met, flooding may occur sometime in the next 24 hours. Warnings on TV and radio should be monitored. Your Personal Evacuation Plan

But didn’t really work for Marin

- ✓ The CCC 7-5-3-2 (-1” for us)
  - Too conservative and doesn’t account for Marin rainfall variability
  - Based on analysis of two or maybe events (so not statistically valid?)

Marin Storm Events – Spiky

Very early draft results for Novato…

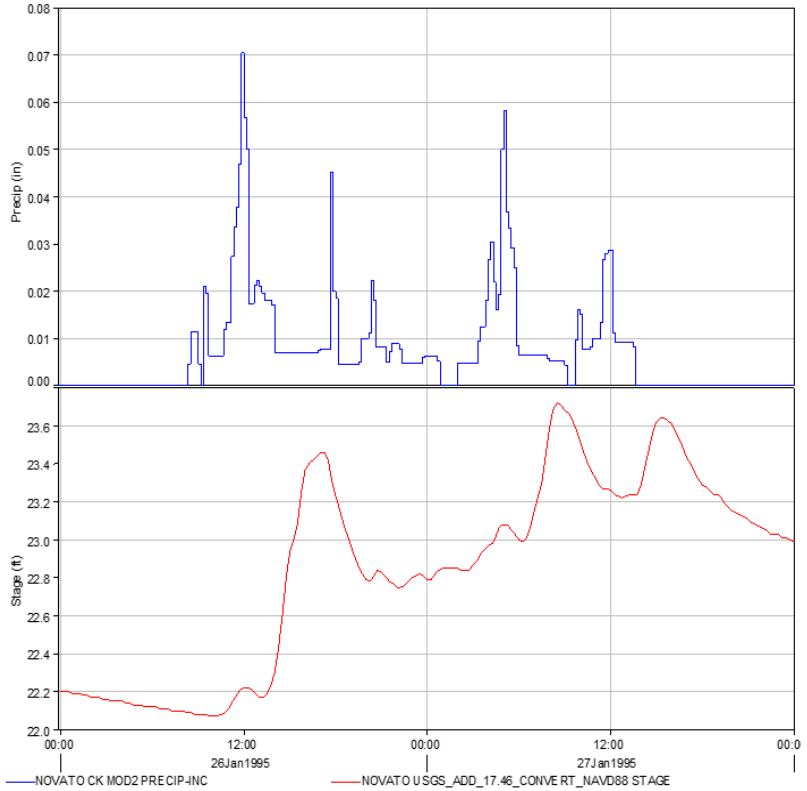


Figure 3: Event with multiple spikes - losing information only looking at one spike?

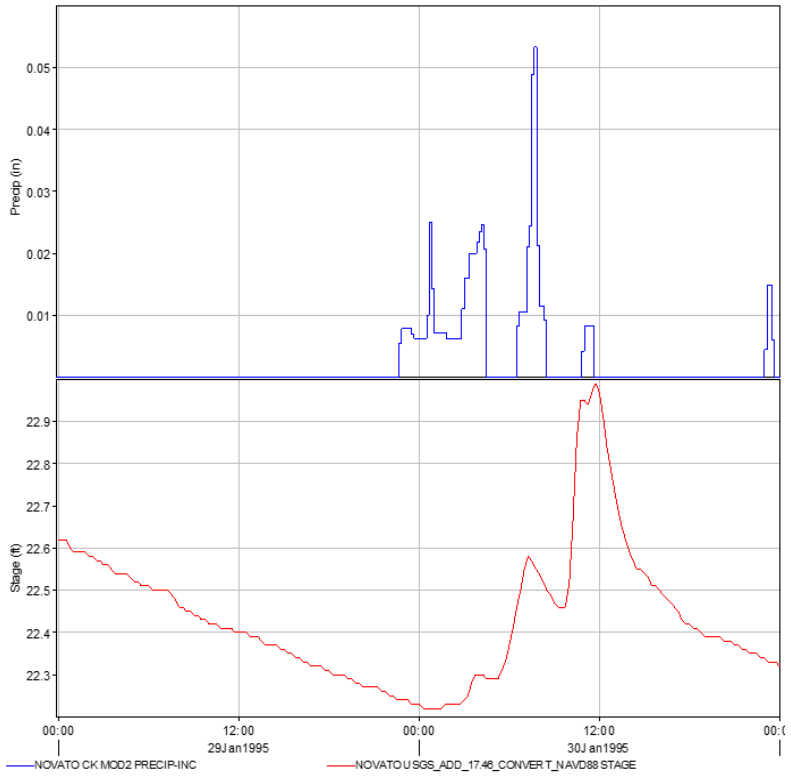


Figure 4: 10-minute peak intensity causes spike in stage. Does intensity matter more than antecedent rainfall?

So a 360 minute average forecast depths from NWS – maybe not all the useful?

Step 1- The Event Analyzer

Developed an event analyzer that works in DSS to divide into user specified “events”

User specifies the…

- interevent time
- minimum threshold values for storm depth and duration
- antecedent days
- event rainfall durations (10 min to 360 minutes typ)

Most work was cleaning up the data

Complete Output for Each “Event”

1. Event total rainfall
2. Antecedent rainfalls (6 user specified days)
3. Average and maximum depths for user specified durations (usually 10 to 360 minutes)
4. Calc’ed Parameter – (Max/Avg) for each user specified duration - peakiness
5. Tide at peak and at gauge
6. Wind speed and direction

Partial output table (25 year) - 290 events

Interstorm Duration (hr): 48
Minimum Event Duration (min): 30
Minimum Event Depth (in): 0.2
Maximum Precipitation to Stage Lag (min): 180
Stage Thresholds (ft): 26, 27, 28.5, 30

					Antecedent Precipitation Depth (in)						
			Duration	Total Storm	30 day	20 day	10 day	7 day	3 day	1 day	WY to
175	08Jun2005 18:00	09Jun2005 01:30	00:07:30	0.20	0.68	0.00	0.00	0.00	0.00	0.00	42.37
176	26Oct2005 08:30	28Oct2005 22:40	02:14:10	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
177	07Nov2005 11:50	08Nov2005 05:10	00:17:20	0.56	0.44	0.44	0.28	0.12	0.00	0.00	0.44
178	24Nov2005 22:30	25Nov2005 08:30	00:10:00	0.28	1.00	0.56	0.00	0.00	0.00	0.00	1.00
179	28Nov2005 17:00	01Dec2005 20:40	03:03:40	2.64	0.96	0.28	0.28	0.28	0.00	0.00	1.28
180	17Dec2005 09:00	04Jan2006 06:30	17:21:30	20.68	2.92	2.64	0.00	0.00	0.00	0.00	3.92
181	13Jan2006 18:30	14Jan2006 08:50	00:14:20	0.40	20.84	13.32	0.43	0.00	0.00	0.00	24.76
182	17Jan2006 18:00	21Jan2006 03:00	03:09:00	0.60	16.70	10.68	0.40	0.40	0.00	0.00	25.15
183	27Jan2006 00:00	04Feb2006 05:50	08:05:50	0.92	12.58	1.12	0.60	0.00	0.00	0.00	25.75

Sample Novato watershed event table – 48 hour IE

Partial output table (25 year record)

Average depths --->

Maximum depths (in) for durations (mins)									Stage Thresholds Exceeded (Yes/No	
10 minute	30 minute max	60 minute	120 minute	240 minute max	360 minute max	Peak Stage			approach backwater	minor
0.06	0.09	0.12	0.18	0.20	0.23	19.48	24Nov2005 22:20	No	No	No
0.12	0.28	0.46	0.62	0.92	1.15	20.83	01Dec2005 16:50	No	No	No
0.21	0.52	0.95	1.72	2.59	3.12	30.86	31Dec2005 06:20	Yes	Yes	Yes
0.03	0.06	0.09	0.11	0.18	0.22	20.42	14Jan2006 09:20	No	No	No
0.04	0.07	0.10	0.15	0.17	0.25	20.60	18Jan2006 10:35	No	No	No
0.04	0.08	0.14	0.18	0.20	0.21	20.70	30Jan2006 12:20	No	No	No
0.18	0.36	0.54	0.86	1.23	1.46	23.70	27Feb2006 19:05	No	No	No
0.11	0.21	0.32	0.48	0.76	0.97	22.94	05Mar2006 20:50	No	No	No
0.07	0.15	0.24	0.36	0.39	0.40	21.47	20Mar2006 10:05	No	No	No
0.04	0.09	0.15	0.25	0.37	0.40	21.13	25Mar2006 02:05	No	No	No

Sample Novato watershed event table – 48 hour IE (page 2)

Now goes into the Statistical Analyzer

User provides the event table in Excel

Plus whatever NWS forecast depth(s) for whatever intervals match the event table

Best statistical match (so far) was MLR on event table to predict flood peaks

Used tried NLR and machine learning – did worse but want to revisit all stats

Statistical Analyzer Input Table

Drop storm sizes less than 1.000 inches

NY2006 Event Inputs

Export the full model to Excel

Storm Duration (hours)	429.000
Total Storm Depth (in)	20.600
30 Day Antecedent (in)	2.900
20 Day Antecedent (in)	2.600
10 Day Antecedent (in)	0.
7 Day Antecedent (in)	0.
3 Day Antecedent (in)	0.
1 Day Antecedent (in)	0.
Water Year To Date (in)	4.000
10 Minute Max Depth (in)	0.200

7 known antecedent

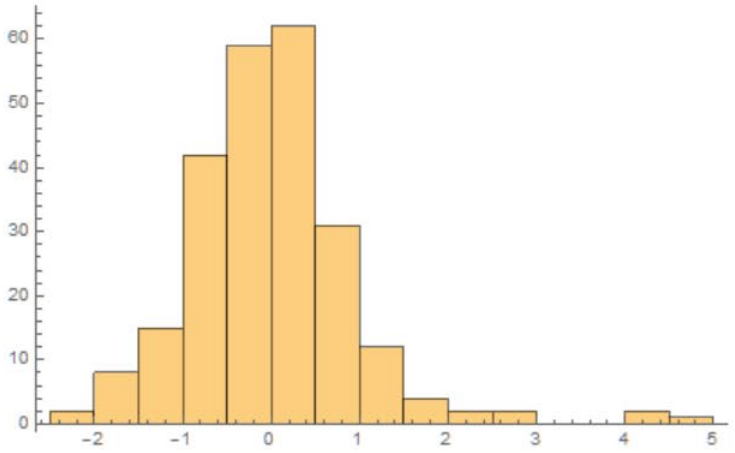
Up to 14 NWS forecast values

30 Minute Max Depth (in)	0.500
60 Minute Max Depth (in)	0.950
120 Minute Max Depth (in)	1.700
240 Minute Max Depth (in)	2.600
360 Minute Max Depth (in)	3.100
10 Minute Avg Depth (in)	0.020
30 Minute Avg Depth (in)	0.020
60 Minute Avg Depth (in)	0.050
120 Minute Avg Depth (in)	0.100
240 Minute Avg Depth (in)	0.200
360 Minute Avg Depth (in)	0.300

48 hours
N: 242
R^2: 0.754839
Adjusted R^2: 0.74086

R^2 = 0.75

	Estimate	Standard Error	t-Statistic	P-Value
1	20.2735	0.151439	133.873	1.04271×10^{-218}
TotalStormDepth	0.719549	0.0889394	8.09034	3.52402×10^{-14}
Duration30Days	0.0416591	0.039921	1.04354	0.297804
Duration20Days	−0.00425979	0.0592081	−0.071946	0.942708
Duration10Days	0.276136	0.0770099	3.58572	0.000411184
Duration5Days	0.00822838	0.1215	0.067723	0.946065
Duration3Days	0.244058	0.246345	0.990717	0.322874
Ten	−0.044429	2.67811	−0.0165896	0.986778
Thirty	0.635959	2.76663	0.229868	0.818401
Sixty	−1.22964	2.33503	−0.526603	0.598982
OneHundredTwenty	2.81487	1.40244	2.00712	0.0459176
TwoHundredForty	−0.695829	1.24541	−0.558715	0.576904
ThreeHundredSixty	−0.472137	0.78319	−0.602839	0.547215
Duration	−0.0179768	0.0482394	−0.372657	0.70975



FittedModel[20.2735 − 0.0179768 Duration + 0.276136 Duration10Days − 0.00425979 Duration20Days + 0.0416591 Duration30Days + 0.244058 Duration3Days + ≪1≫ + ≪1≫ − ≪19≫ Sixty − 0.044429 Ten + 0.635959 Thirty − 0.472137 ThreeHundredSixty + 0.719549 TotalStormDepth − 0.695829 TwoHundredForty]

Statistical Analyzer Input Table – NY2006

NY2006 Event Inputs (not spiky)

Drop storm sizes less than 1.000 inches

Export the full model to Excel

Storm Duration (hours)	429.000
Total Storm Depth (in)	20.600
30 Day Antecedent (in)	2.900
20 Day Antecedent (in)	2.600
10 Day Antecedent (in)	0.
7 Day Antecedent (in)	0.
3 Day Antecedent (in)	0.
1 Day Antecedent (in)	0.
Water Year To Date (in)	4.000
10 Minute Max Depth (in)	0.200

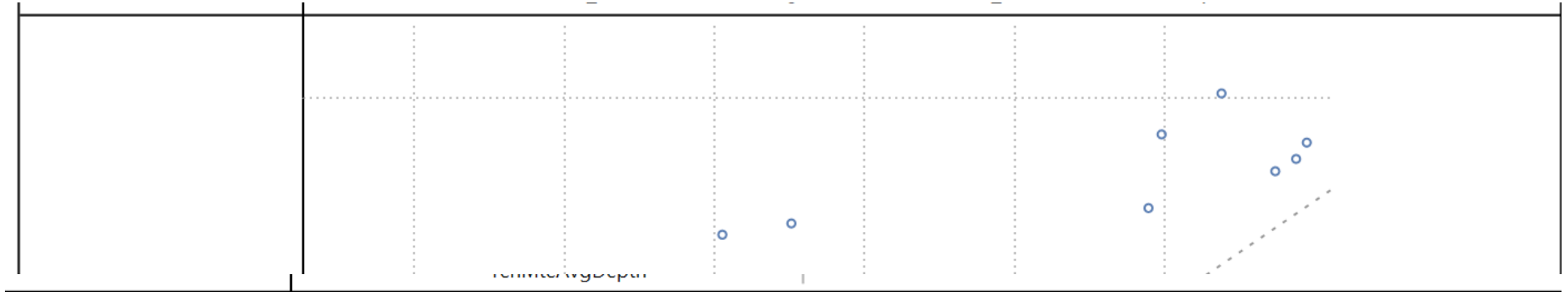
30 Minute Max Depth (in)	0.500
60 Minute Max Depth (in)	0.950
120 Minute Max Depth (in)	1.700
240 Minute Max Depth (in)	2.600
360 Minute Max Depth (in)	3.100
10 Minute Avg Depth (in)	0.020
30 Minute Avg Depth (in)	0.020
60 Minute Avg Depth (in)	0.050
120 Minute Avg Depth (in)	0.100
240 Minute Avg Depth (in)	0.200
360 Minute Avg Depth (in)	0.300

Model	Building a parsimonious model from StormDuration, TotalStormDepth, ThirtyDayAnt, TwentyDayAnt, TenDayAnt, SevenDayAnt, ThreeDayAnt, OneDayAnt, WYToDate, TenMteMaxDepth, ThirtyMteMaxDepth, SixtyMteMaxDepth, OneHundredTwentyMteMaxDepth, TwoHundredFortyMteMaxDepth, ThreeHundredSixtyMteMaxDepth, TenMteAvgDepth, ThirtyMteAvgDepth, SixtyMteAvgDepth, OneHundredTwentyMteAvgDepth, TwoHundredFortyMteAvgDepth, ThreeHundredSixtyMteAvgDepth, $\frac{\text{TenMteMaxDepth}}{\text{TenMteAvgDepth}}$, $\frac{\text{ThirtyMteMaxDepth}}{\text{ThirtyMteAvgDepth}}$, $\frac{\text{SixtyMteMaxDepth}}{\text{SixtyMteAvgDepth}}$, $\frac{\text{OneHundredTwentyMteMaxDepth}}{\text{OneHundredTwentyMteAvgDepth}}$, $\frac{\text{TwoHundredFortyMteMaxDepth}}{\text{TwoHundredFortyMteAvgDepth}}$, $\frac{\text{ThreeHundredSixtyMteMaxDepth}}{\text{ThreeHundredSixtyMteAvgDepth}}$
Predicted value with 95% confidence interval	30.9215 31.9876 33.0538
Number of events	159
R^2	0.764215
Parameter table	

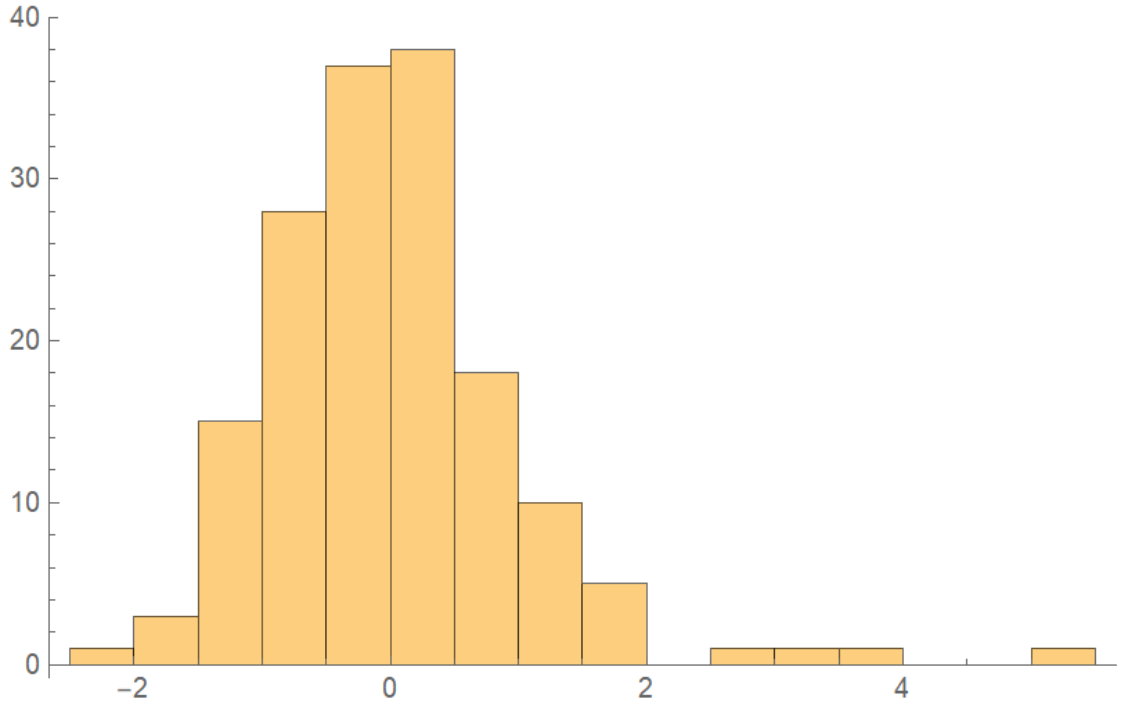
	Estimate	Standard Error	t-Statistic	P-Value
1	20.1237	0.281513	71.4841	3.28091×10^{-117}
StormDuration	−0.00436284	0.00209677	−2.08075	0.0391688
TotalStormDepth	0.561086	0.0653067	8.59156	1.0701×10^{-14}
TenDayAnt	0.279064	0.0503933	5.53772	1.34935×10^{-7}
OneDayAnt	1.71543×10^{-11}	0.	∞	$0. \times 10^{-324}$
TenMteMaxDepth	−10.0985	3.35793	−3.00735	0.00309426
OneHundredTwentyMteMaxDepth	2.05736	0.573888	3.58494	0.000456253
OneHundredTwentyMteAvgDepth	−22.5974	12.7499	−1.77236	0.0783786
TwoHundredFortyMteAvgDepth	10.2349	5.56262	1.83995	0.0677655
$\frac{\text{TenMteMaxDepth}}{\text{TenMteAvgDepth}}$	0.0912133	0.0303669	3.00371	0.0031294

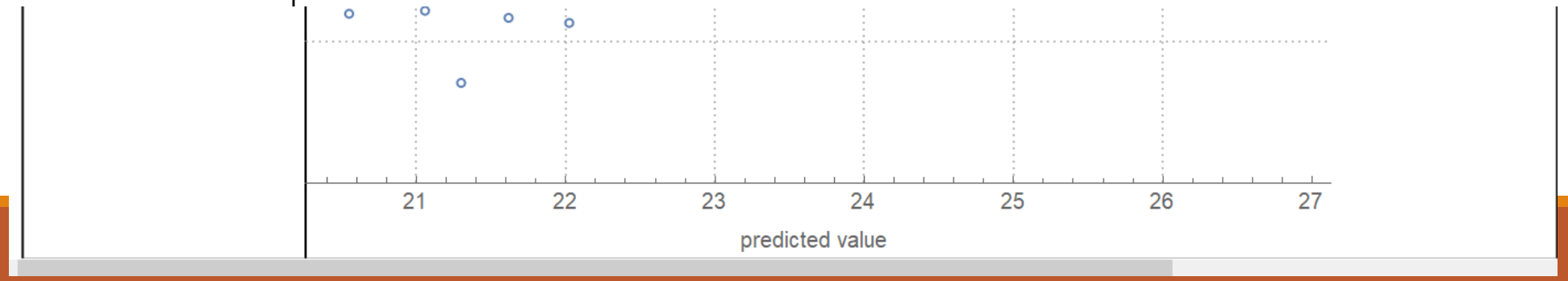
Test Case Result

- ✓NY 2006 Storm Event – predicted stage = 31.9 ft (CI - 30.9 – 33) actual is 30.86 ft NAVD88
- ✓R2 values range from 0.6 to 0.88 – not bad for hydrology



Residuals





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No Warnings or Advisories In Effect for this Point.
For warnings and/or advisories in effect for adjacent areas to this point, see /mtr

Change Table Font Size Increase Decrease

Forecast For Lat/Lon: 37.9550/-122.5440 (Elev. 197 ft)
Kentfield CA
Forecast Created at: 2pm PST Dec 14, 2018

Custom Weather Forecast Table

	Fri Dec 14				Sat Dec 15				Sun Dec 16				Mon Dec 17				Tue Dec 18				Wed Dec 19		
Weather		Rain Showers	Likely Rain Showers	Chance Rain Showers					Likely Rain	Rain	Rain Showers		Chance Rain Showers	Slight Chance Rain Showers									
Daily-Temp		High **59** Low **--**			High **59** Low **48**				High **59** Low **52**				High **58** Low **49**				High **59** Low **44**				High **60** Low **44**		
Chance of Precip	--	75%	60%	30%	40%	35%	40%	40%	65%	85%	95%	80%	25%	15%	5%	5%	5%	5%	10%	10%	5%	5%	5%
Precip		0.15"	0.16"	0.04"	0.07"	0.05"	0.03"	0.04"	0.13"	0.42"	1.04"	0.12"	0.01"	0.01"	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"	0.00"
12-hr Snow Total		--	0"		0"	0"			0"	0"			0"	0"									
6-Hour	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm
Temp		51	58	50	49	54	58	53	52	56	58	50	49	54	56	45	44	52	57	45	44	52	58
Cloudiness		96%	80%	84%	91%	81%	71%	75%	91%	100%	100%	100%	61%	61%	47%	47%	49%	49%	35%	35%	44%	44%	36%
Dewpoint		48	52	48	48	52	53	51	52	54	54	48	48	50	48	43	43	48	48	43	43	48	48
Relative Humdity		91%	81%	95%	98%	92%	85%	95%	97%	92%	86%	95%	97%	86%	74%	92%	97%	84%	71%	92%	97%	84%	71%
Wind		S 16	S 14	W 5	N 3	E 6	S 9	S 9	SE 15	S 22	S 23	S 13	NW 5	NE 3	E 2	NW 0	N 0	S 1	S 1	NE 1	NE 2	NE 2	E 2
Snow Level (ft)		6671	6451	5621	6194	7023	7402	7370	7539	8158	7940	5996	5011	4967	5415	5433	6659	7350	7599	7861	7598	7723	7856

Standard NWS forecast is 6 hour (360 minutes avg? depths)

Useful for other analysis

- ✓Is there a CC signal in higher intensity events that drive a lot of Marin flooding?
- ✓Allows us to develop future design storms – design life in flooded streets world
- ✓More accurate coincident analysis of storm and tide events
- ✓Help verify connected future H&H models with radar

Next Steps

First draft done last Nov – then it didn't rain all year so gathered dust

Unable to test last year – maybe this year?

Need to make many improvements to interface and model to be done w/ time and money

Hire a statistician evaluate methods and results

6. Executive Director Report

Andy will provide an update on active projects, communications, committees, activities, and developing initiatives since October 2 Board meeting.

Executive Director Report

- October 2020 update

Executive Director Report

- Administrative Activities
  - Standing meetings w Board Chair Gibson & JTC Chair Choo
  - Standardize communications & documentation
  - Format and update distribution lists
  - Continue transition of website maintenance
- Communications
  - Board members and member agency staff
  - Regional partners
- Committees
  - Identify compelling topics/projects supportive of NBWA roles
    - Provide direct tangible member agency and regional benefits
    - Leverage archive of NBWA successes
  - Schedule regular JTC meetings starting early 2021

Executive Director Report

One Water Approach for North Bay – Next Steps

- Distribute summary memo to Board and Technical Committee
- Technical committee to further consider:
  - One Water application and branding for North Bay
  - Refinement of primary One Water opportunities
  - Approach to educational materials and programs
  - Funding opportunities
  - Regional BMPs for regulatory compliance

Executive Director Report

On Deck

- FY 21/22 Work Plan
- Annual conference

7. Board Information Exchange

Members will highlight issues and share items of interest.

8. Agenda Items for Future Meetings

Andy will outline ideas for next and future Board meeting topics and solicit feedback.

Announcements/Adjourn

Next Board Meeting: December 4, 2020

www.nbwatershed.org