Sonoma Water

Clean. Reliable. Essential. Every Day.

Central Sonoma Watershed & Matanzas Dam Project Update & Modeling

ZONE 1A ADVISORY COMMITTEE MEETING

APRIL 3, 2024

sonomawater.org

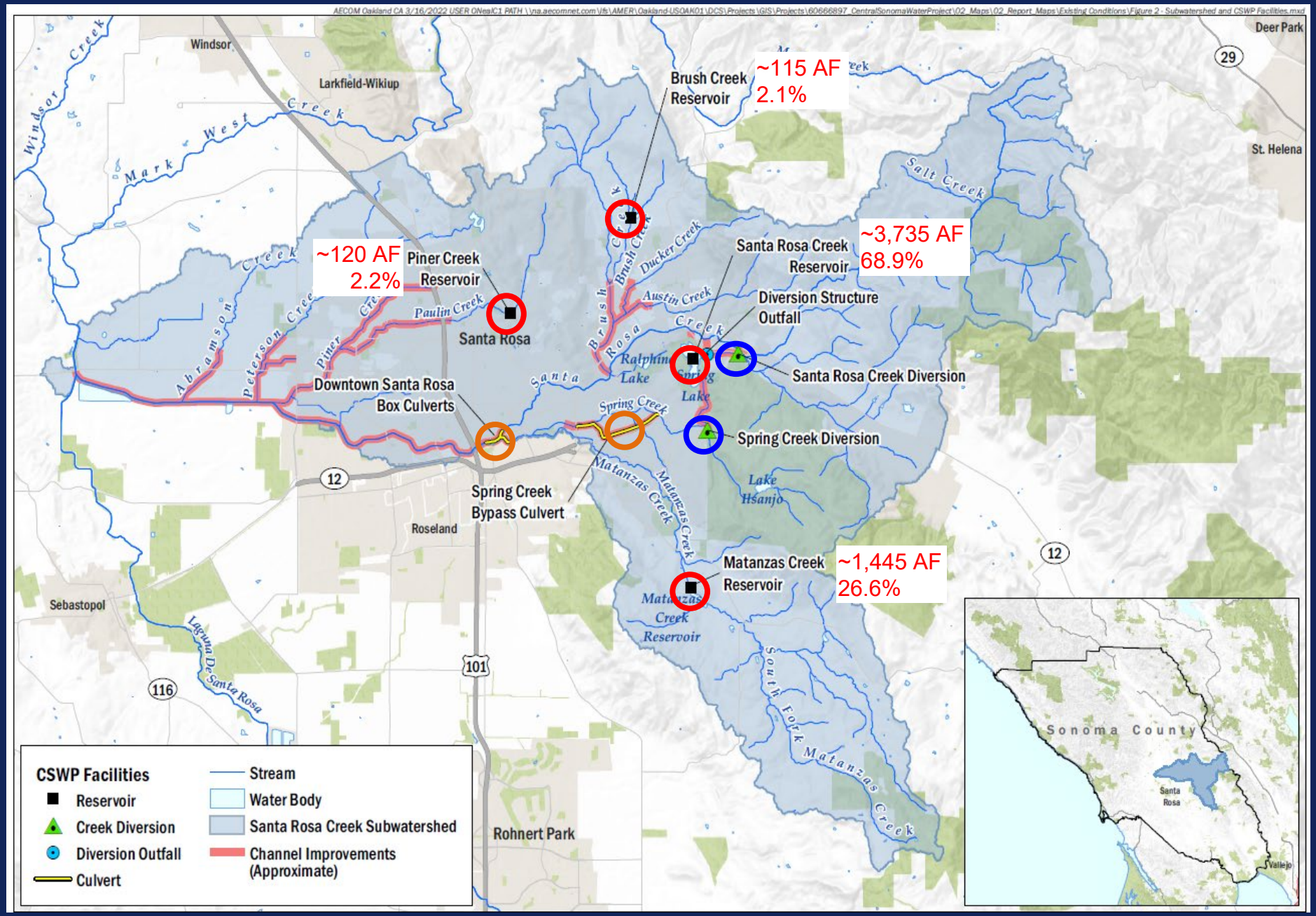
Prince Memorial Greenway October 24, 2021

Summary

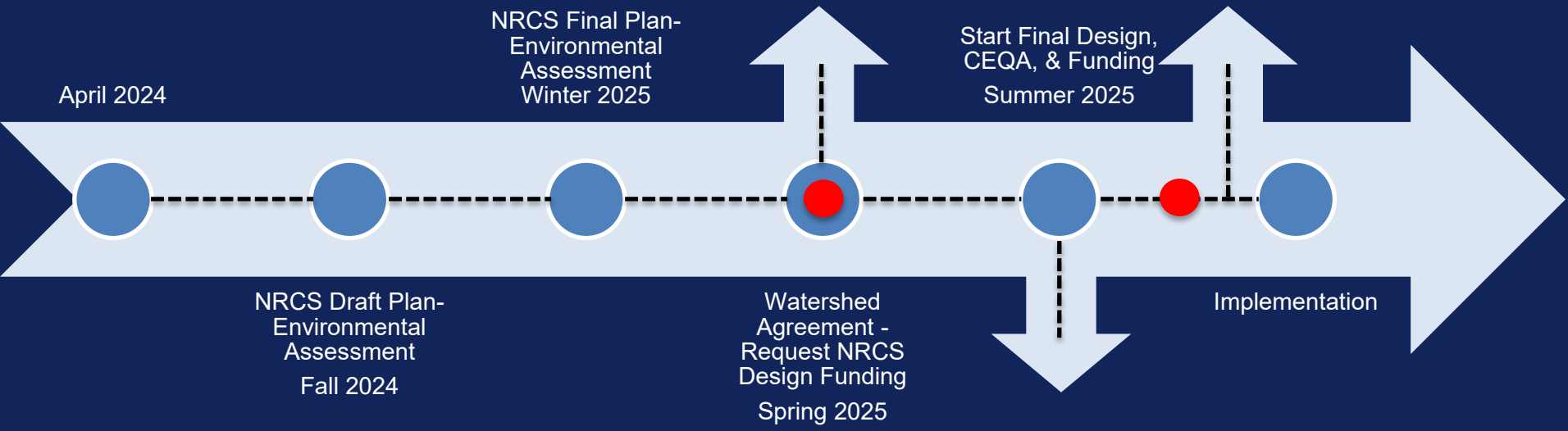
- Status of Projects
- Modeling Background

Matanzas Dam - Downstream Stability Berm (Facing North)

Sonoma Water


Brush Creek Reservoir
~115 AF
2.1%
~120 AF
2.2%
Piner Creek Reservoir
Santa Rosa
Santa Rosa Creek Reservoir
~3,735 AF
68.9%
Diversion Structure Outfall
Santa Rosa Creek Diversion
Downtown Santa Rosa Box Culverts
Spring Creek Diversion
Spring Creek Bypass Culvert
Matanzas Creek Reservoir
~1,445 AF
26.6%
Windsor
Larkfield-Wikiup
Deer Park
St. Helena
Roseland
Sebastopol
Rohnert Park
Lake Ralphine
Lake Sonoma
Lake Hsanjo
Mark West Creek
Windsor Creek
Brush Creek
Ducker Creek
Austin Creek
Salt Creek
Paulin Creek
Piner Creek
Peterson Creek
Abramson Creek
Santa Rosa Creek
Spring Creek
Matanzas Creek
South Fork Matanzas Creek
Laguna De Santa Rosa
29
12
101
116
CSWP Facilities
Reservoir
Creek Diversion
Diversion Outfall
Culvert
Stream
Water Body
Santa Rosa Creek Subwatershed
Channel Improvements (Approximate)
Sonoma County
Santa Rosa
Vallejo

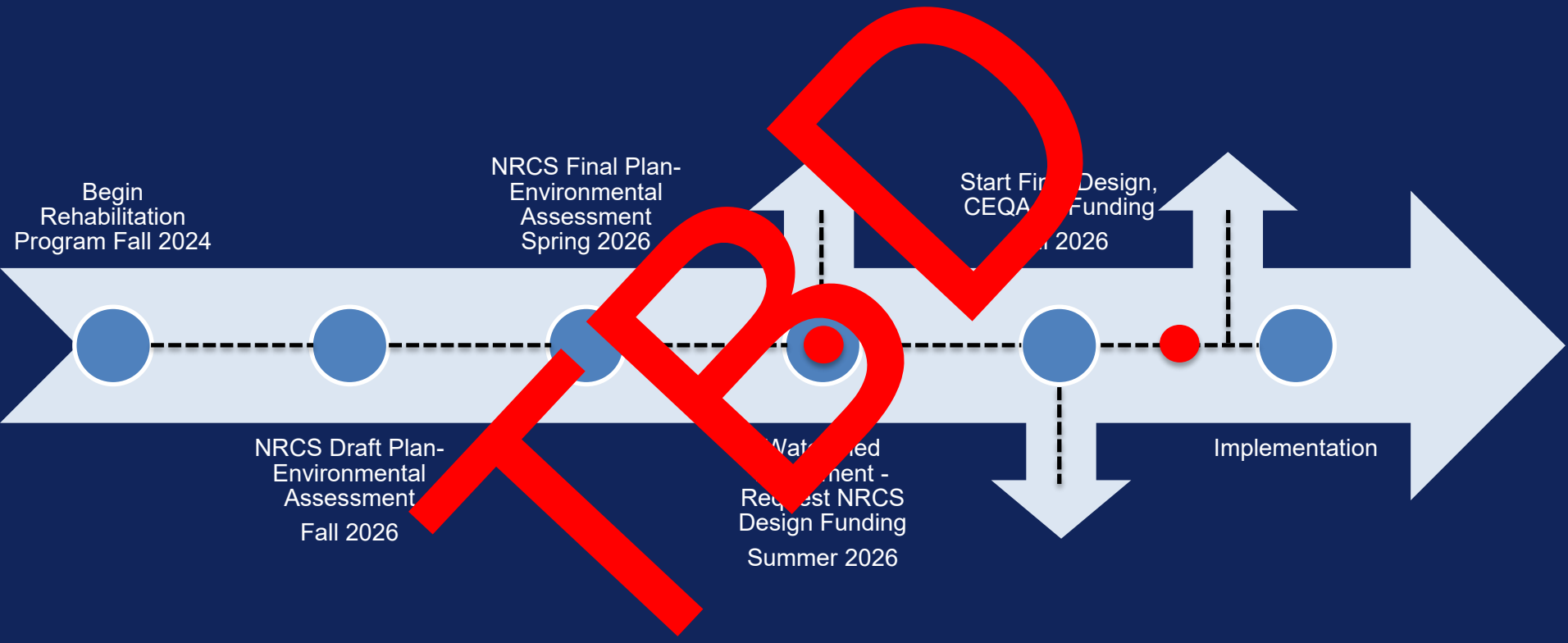
Matanzas Dam
Roadmap to implementation



Board Action

Sonoma Water

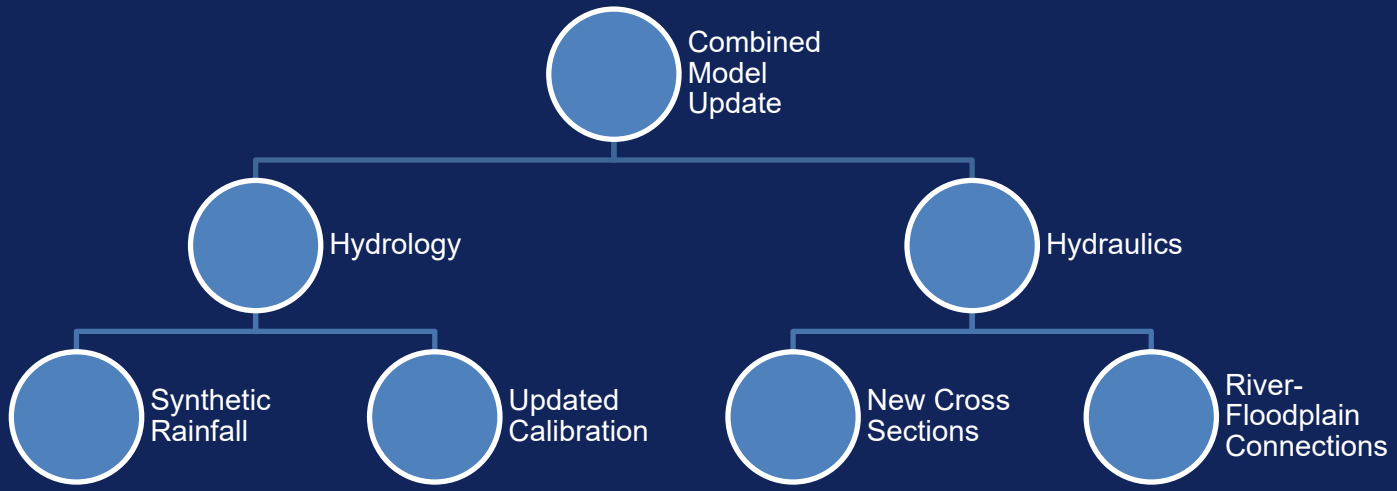
CSWP
Roadmap to implementation



Sonoma Water

Matanzas & CSWP Model Updates

- **Consistency - Matanzas Dam Rehabilitation Project and CSWP models**
- **Paired HMS and HEC-RAS models**



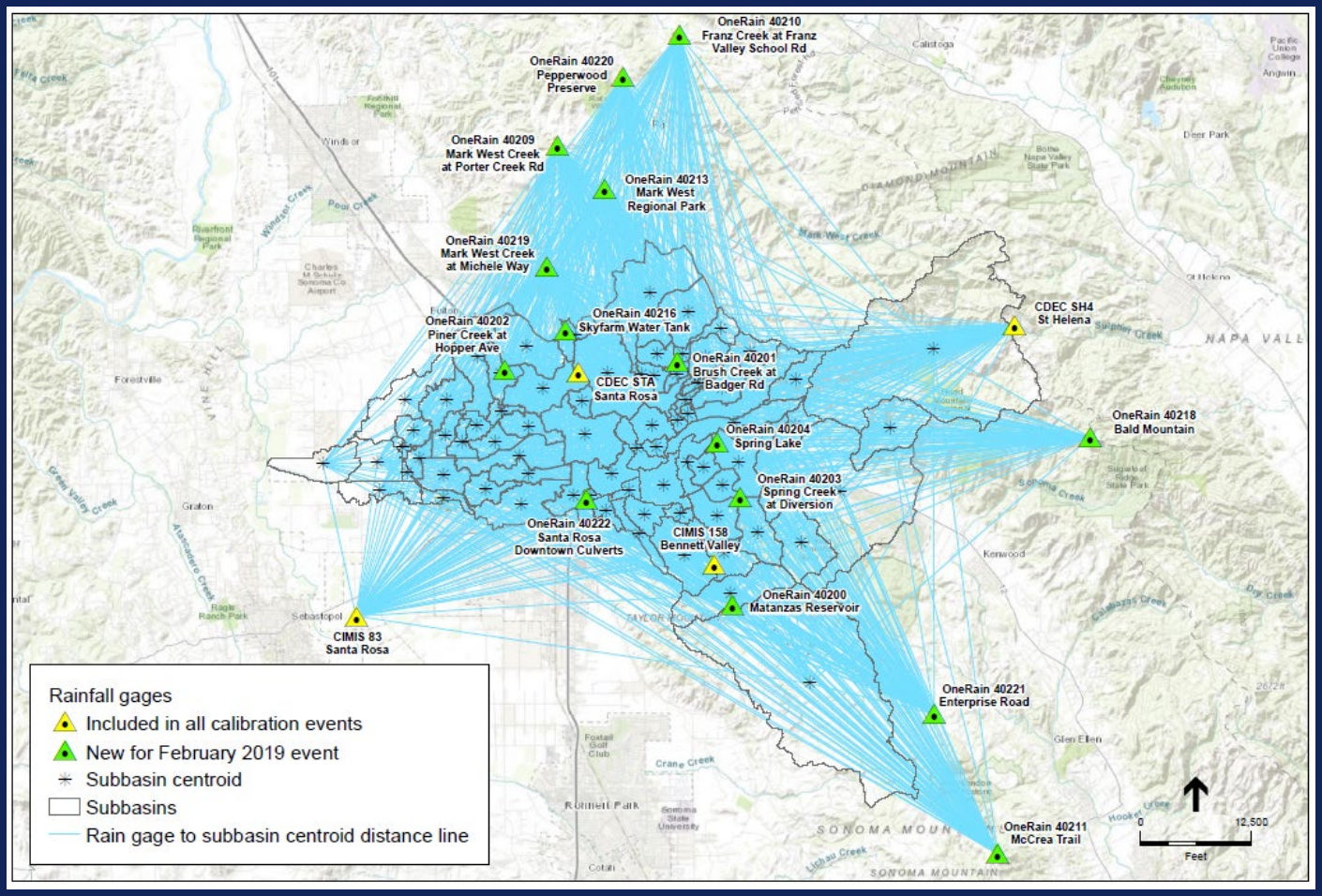
Sonoma Water

Model Updates

- **76 sub-watersheds**
- **Builds on 2017 hydrology and hydraulics study**
- **Incorporates synthetic rainfall gages* and new calibration**
- **18 new cross sections**
- **Update/Improve delineation of river to floodplain connections**
- **Updated reservoir outflow curves**
- **Compute design flows (Q2, Q5, Q25, Q50, Q100, Q500)**

Sonoma Water

Synthetic Rainfall



- **Problem – Spatial extent of rainfall network in 2005 and 2010**
- **Rainfall gage densification in 2017 to 2019**

Sonoma Water

Synthetic Rainfall

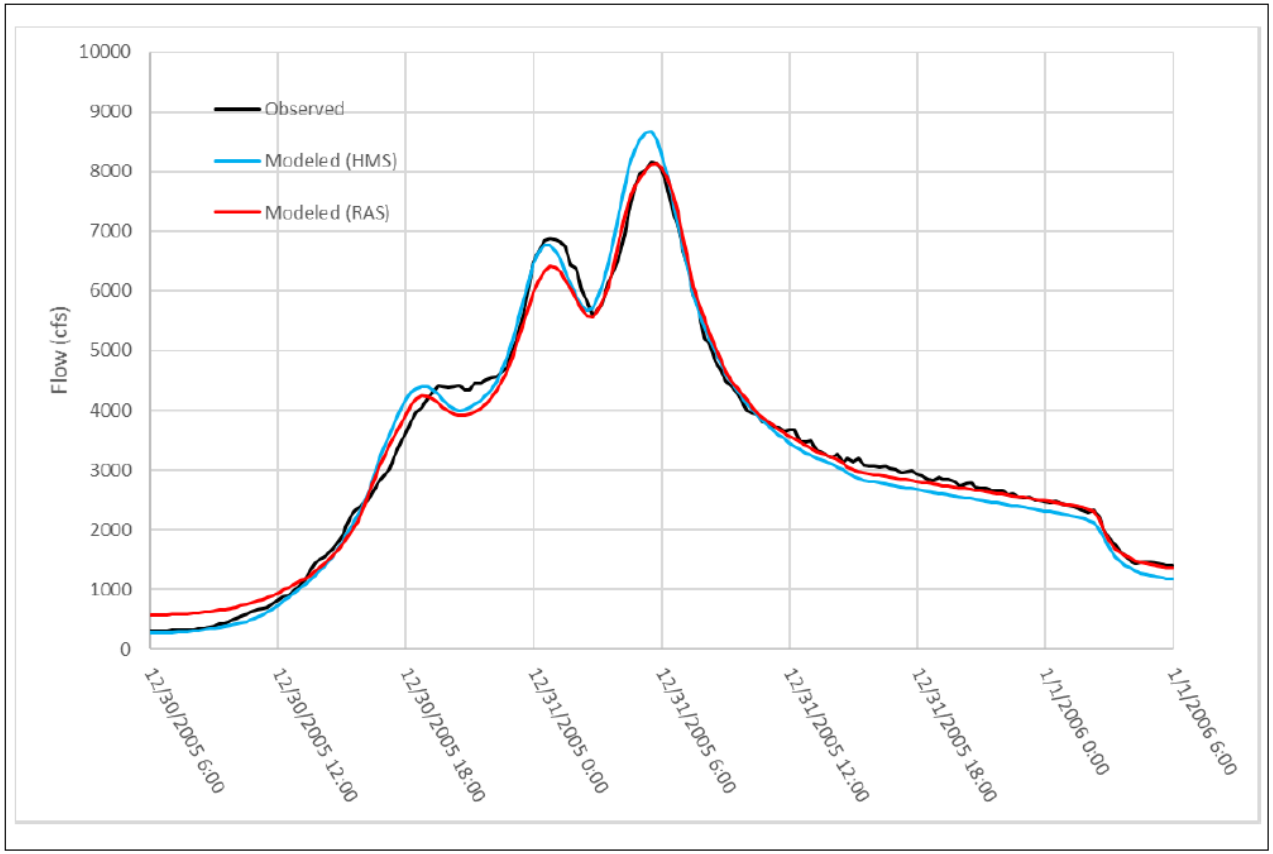
- **Establish relationships**
- **Estimate rainfall at "missing rain gages" during calibration events (2005 and 2010) to improve model rainfall input.**

TABLE 10
OCTOBER 2021 RECORDED RAINFALL AND ESTIMATED NYE 2005 AND JANUARY 2010 RAINFALL DEPTHS

Gage	Rainfall depth (in)				
	October 2021	NYE 2005 (Measured)	NYE 2005 (predicted)	January 2010 (measured)	January 2010 (predicted)
CIMIS 158 Bennett Valley	7.6	5.4	5.2	1.7	1.8
CIMIS 83 Santa Rosa	8.3	5.6	5.7	2.1	1.9
Santa Rosa STA	7.9	5.3	5.4	1.9	1.9
St Helena SH4	10.9	7.8	7.7	2.1	2.2
Piner Creek at Hopper Ave (OneRain 40202)	8.4	-	5.8	-	1.9
Skyfarm Water Tank (OneRain 40216)	8.2	-	5.6	-	1.9
Mark West Regional Park (OneRain 40213)	10.0	-	7.0	-	2.1
Mark West Creek at Michele Way (OneRain 40219)	8.2	-	5.6	-	1.9
Spring Lake (OneRain 40204)	8.8	-	6.1	-	1.9
Santa Rosa Downtown Culverts (OneRain 40222)	8.7	-	6.0	-	1.9
Spring Creek at Diversion (OneRain 40203)	9.4	-	6.6	-	2.0

Sonoma Water

Calibration Results



Central Sonoma Watershed Protection Plan D202100473.00

Figure 7

New Year's Eve 2005 Modeled and Observed Hydrographs for Santa Rosa Creek at Pierson Street (USGS 11466200)

Sonoma Water

Calibration Results

TABLE 8
PERFORMANCE RATINGS FOR RECOMMENDED STATISTICS FOR A MONTHLY TIME STEP (REPRODUCED FROM MORIASI ET AL. 2007)

Performance Rating	RSR	NSE	PBIAS (%)		
			Streamflow	Sediment	N, P
Very good	0.00 ≤ RSR ≤ 0.50	0.75 < NSE ≤ 1.00	PBIAS < ±10	PBIAS < ±15	PBIAS< ±25
Good	0.50 < RSR ≤ 0.60	0.65 < NSE ≤ 0.75	±10 ≤ PBIAS < ±15	±15 ≤ PBIAS < ±30	±25 ≤ PBIAS < ±40
Satisfactory	0.60 < RSR ≤ 0.70	0.50 < NSE ≤ 0.65	±15 ≤ PBIAS < ±25	±30 ≤ PBIAS < ±55	±40 ≤ PBIAS < ±70
Unsatisfactory	RSR > 0.70	NSE ≤ 0.50	PBIAS ≥ ±25	PBIAS ≥ ±55	PBIAS ≥ ±70

Performance metrics were analyzed for the two streamflow locations used in the model calibration. Results for these metrics and performance ratings based on the Moriasi study are shown in Table 9. The table also includes a comparison of difference in peak flow for reference.

TABLE 9
PERFORMANCE METRIC RESULTS AND RATINGS FOR FEBRUARY 2019 CALIBRATION (RAS VS. OBSERVED)

Location	RSR	NSE	PBIAS	Peak flow difference
Santa Rosa Creek at Pierson St	0.21 Very Good	0.96 Very Good	6.1% Very Good	0.2%
Matanzas Creek at Brookwood Ave	0.23 Very Good	0.95 Very Good	-4.6% Very Good	0.8%

Sonoma Water

Questions?

Sonoma Water

Carlos Diaz
Deputy Director of Engineering
Carlos.Diaz@scwa.ca.gov

Aaron Fulton
Water Agency Engineer
Aaron.Fulton@scwa.ca.gov

sonomawater.org