

A scenic view of a mountain valley with a waterfall and dense forest. The image shows a large, rocky mountain peak on the left, a deep valley with a waterfall in the center, and a dense forest of evergreen trees in the foreground and middle ground. The sky is clear and blue.

# What's New at the CNRFC?

## California Cooperative Snow Surveys

## 62<sup>nd</sup> Annual Meeting of Cooperators

## November 2016

**Brett Whitin, P.E.**  
**Senior Hydrologic Forecaster**  
**National Weather Service**  
**California Nevada River Forecast Center**  
**Sacramento, CA**



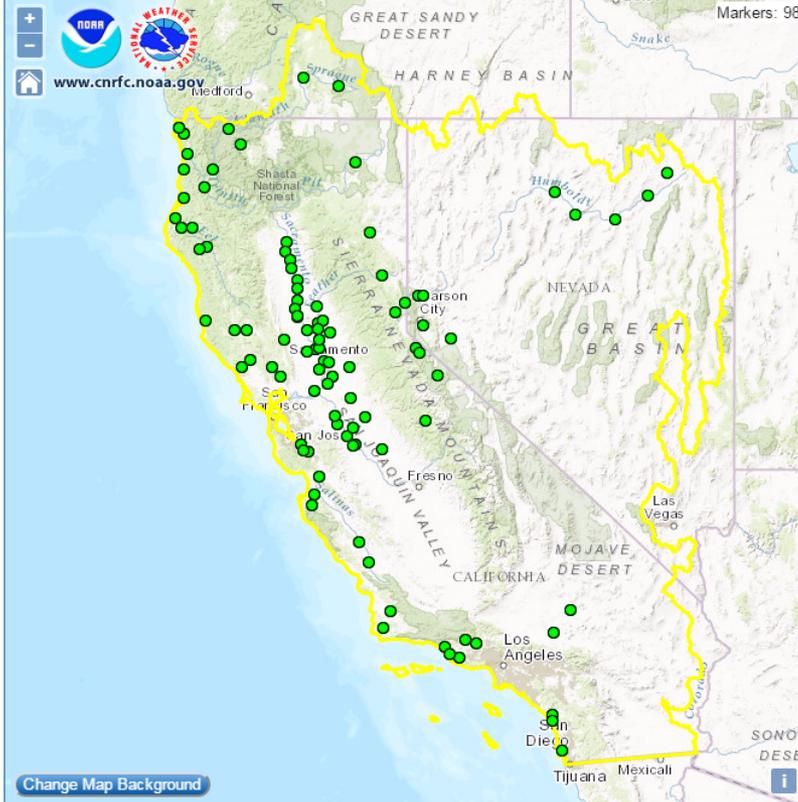
# What's New?



- Re-calibrated some basins in the San Joaquin and Tulare
- Verification/reliability info on seasonal volume forecasts for many watersheds in the Sierra
- The National Water Model (NWM) is now running – CNRFC ingesting over 130 points for display in CHPS – we will be evaluating the performance of the NWM



**Geographic Overlays**
 CNRFC Boundary
  States
  Counties
  Lakes
  Rivers  
 Drainage Basins
  National Parks
  Burn Areas
 2016 ■ 2015 ■ 2014 ■



Change Map Background

No Monitor or Flood Stage Available
  98 Normal Conditions
  0 Above Monitor Stage
  0 Above Flood Stage
  0 Above Danger Stage

The number inside each circle above represents the number of gages with forecast conditions inside that category.

[KML](#) [XML](#) File Downloads

River Forecast Data for Fcst and Other Pts ▼

[Download KML](#)
[Download XML](#)

Download Overlay Files

CNRFC Boundary ▼

[Download KML](#)

► Rivers/Reservoirs

► Water Resources

► Snow Data

▼ Observed Precipitation (QPE)

**Radar Data**

Radar Reflectivity
  Animate

Fri Oct 28 10:38 AM PDT (28/1738Z)

Select radar time: [< Prev](#) [Next >](#)

Short-Range Point Data  Values  Dots

Raw data updated: Fri Oct 28 2016 11:16 AM PDT

QC data updated: Fri Oct 28 2016 08:00 AM PDT

Most Recent Hours (Raw):

1  2  3  6  12  24  48  72  96  120  144  168

6-Hour Totals (QC'd = Quality-Controlled)

Ending 18Z Ending 00Z Ending 06Z Ending 12Z

(11 AM PDT) (5 PM PDT) (11 PM PDT) (5 AM PDT)

Raw  Raw  Raw  Raw

QC'd  QC'd  QC'd  QC'd

24-Hour Totals (QC'd = Quality-Controlled)

Raw - Ending 12 UTC (5 AM PDT)

QC'd - Ending 12 UTC (5 AM PDT)

Short-Range Gridded Data

Images created: Fri Oct 28 2016 08:02 AM PDT

6-Hour
  24-Hour
  48-Hour
  72-Hour
  7-Day

Monthly/Water Year Archive (starts Oct 1996)

Month/Year: Oct ▼ 2016 ▼ [◀](#) [▶](#)

		% Avg	Value	Departure	Normal
Point	Monthly	<input type="checkbox"/>	<input type="checkbox"/>		
	WY	<input type="checkbox"/>	<input type="checkbox"/>		
Grid	Monthly	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	WY	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Basin Avg	Monthly	<input type="checkbox"/>			
	WY	<input type="checkbox"/>			
Forecast Group	Monthly	<input type="checkbox"/>			
	WY	<input type="checkbox"/>			

Custom Multi-Year Precipitation  
 Departure from Normal Precipitation (in.) ▼  
 From Water Year: 2016 ▼ to: 2016 ▼

► Forecast Precipitation (QPF)

► Observed Temperatures

► Forecast Temperatures

► Freezing Levels

► Flash Flood Guidance

► Water Temperatures

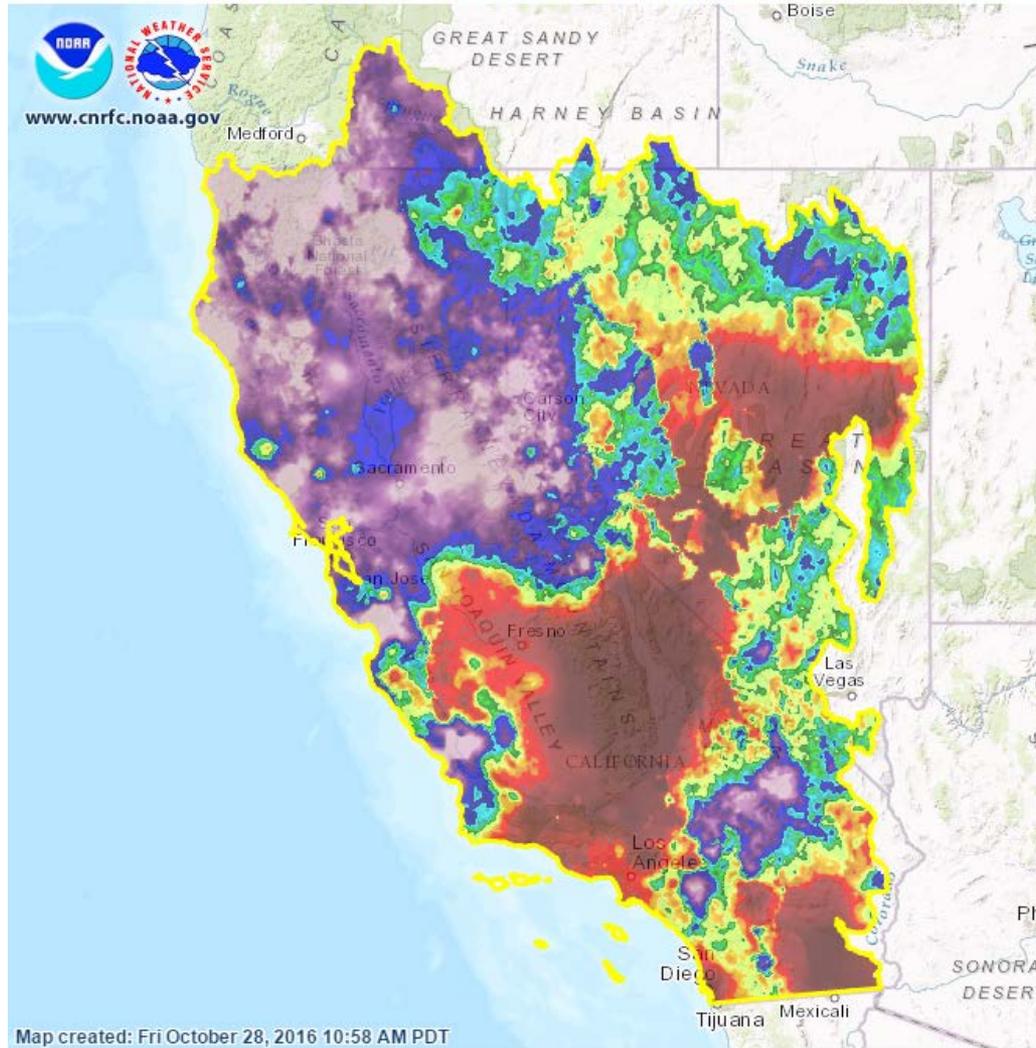
► Climate/Drought



# Water Year 2017



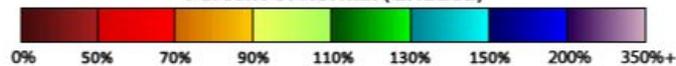
## Water Year-to-Date Precip % of Average - Oct 2016



Map created: Fri October 28, 2016 10:58 AM PDT

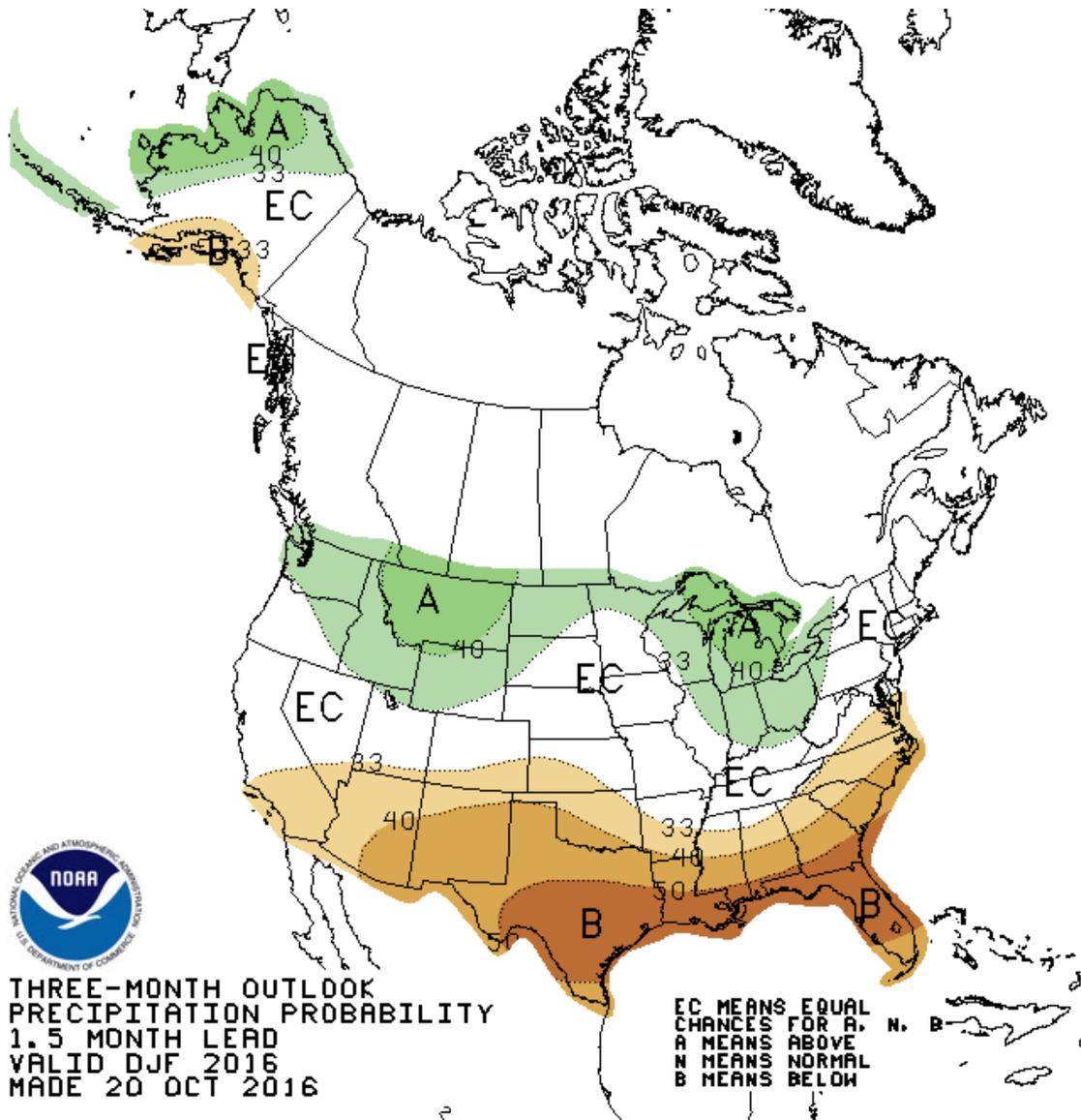
Valid: Thu Oct 27 2016 at 05:00 AM PDT

Percent of Normal (Gridded)





# Water Year 2017

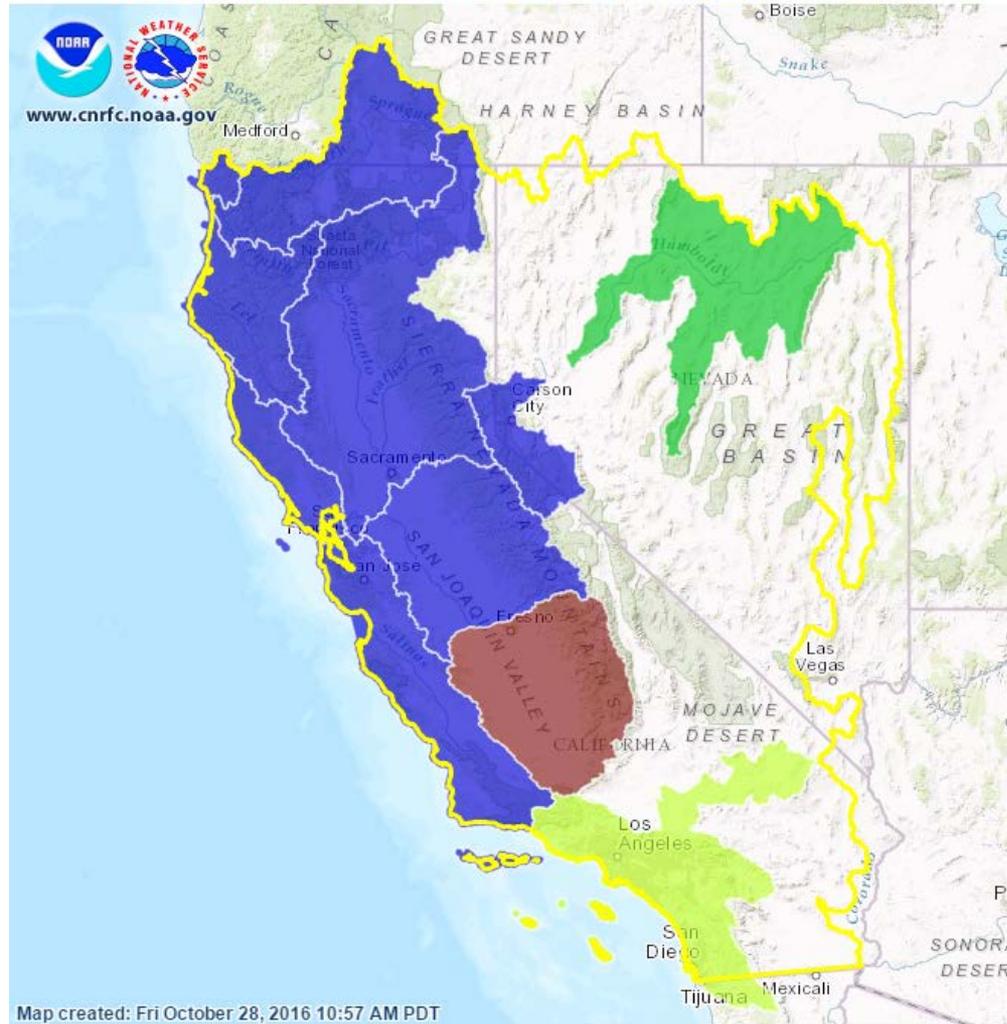




# Water Year 2017

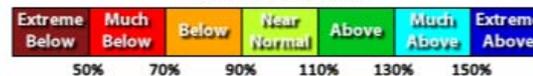


## WY Precip % of Normal (Forecast Groups) - Oct 2016



Valid: Thu Oct 27 2016 at 05:00 AM PDT

### Percent of Normal

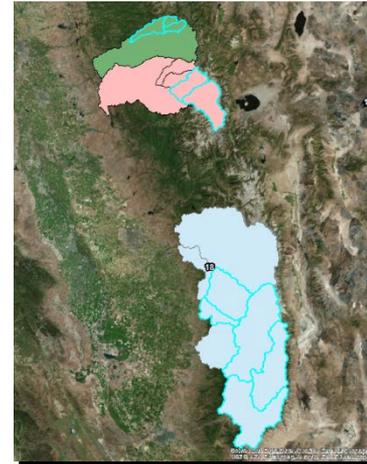




# 2016 Calibrations



- **Recalibrate**
  - Kings, Tule, Mill Creek, Dry Creek (Lemoncove), Dry Creek (Snelling), Little Dry Creek (Friant), Dry Creek (Modesto)
  - Cosumnes (Somerset, El Dorado, Michigan Bar, McConnell)
  - Mokelumne (Benson's Ferry)
- **Revise North Fork Stanislaus**
  - Break out New Spicer Meadows - NSWC1
  - Break out NF Stanislaus Riv. Diversion Reservoir - NDVC1
  - Break out NF Stanislaus nr Avery (McCays inflow) - AVYC1
  - New Melones Local (NMSC1L)
- **Revise Tuolumne**
  - Break out Grand Canyon of the Tuolumne (TGCC1) from Hetch Hetchy (HETC1)
  - Hetch Hetchy Local (HETC1L)
- **Revise Kern**
  - Break out Kern near Kernville (KKVC1)
  - Break out South Fork Kern (SKRC1)
  - Isabella Local (ISAC1L)
- **Revise Kaweah**
  - Break out Kaweah near Three Rivers (KTRC1)
  - Terminus Local (TMDC1L)







# 2016 Basin Divisions

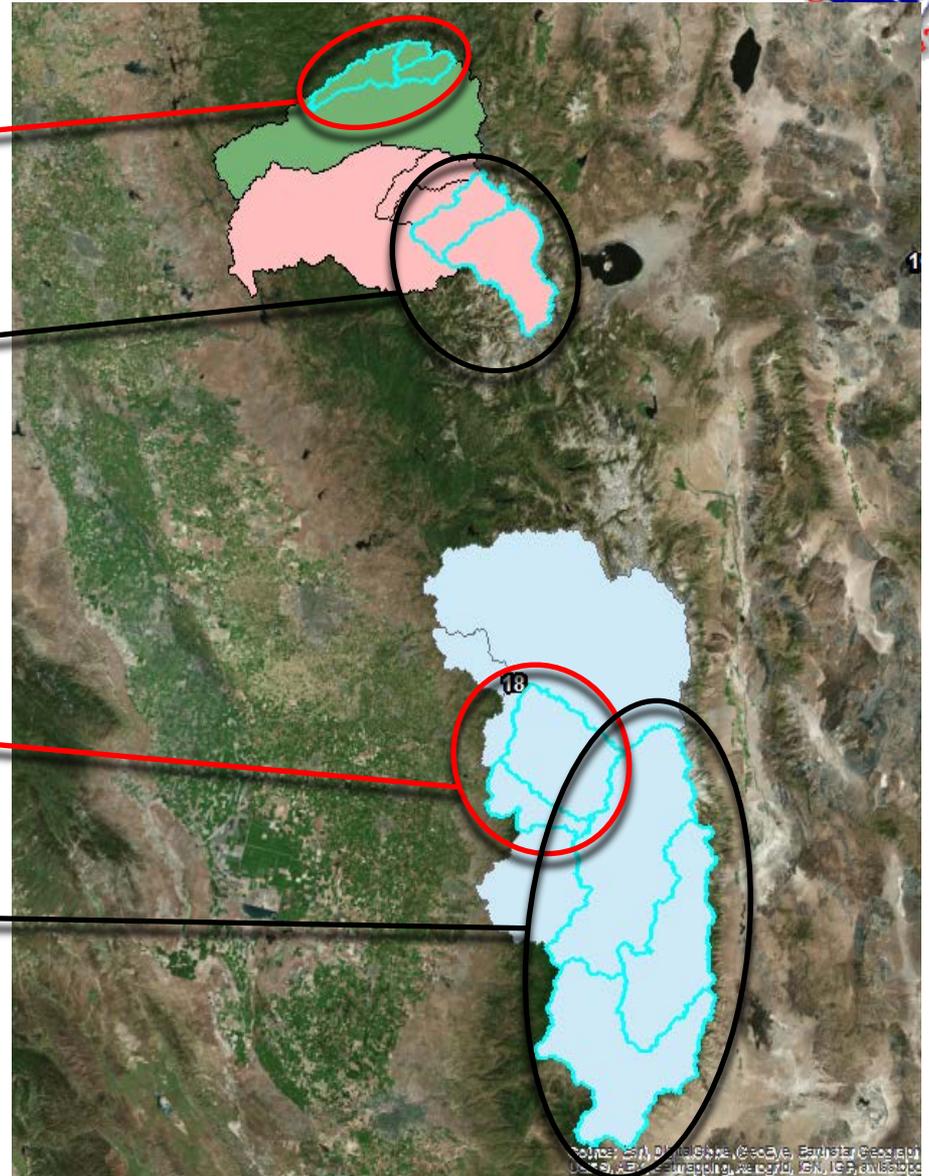


**NF Stanislaus**

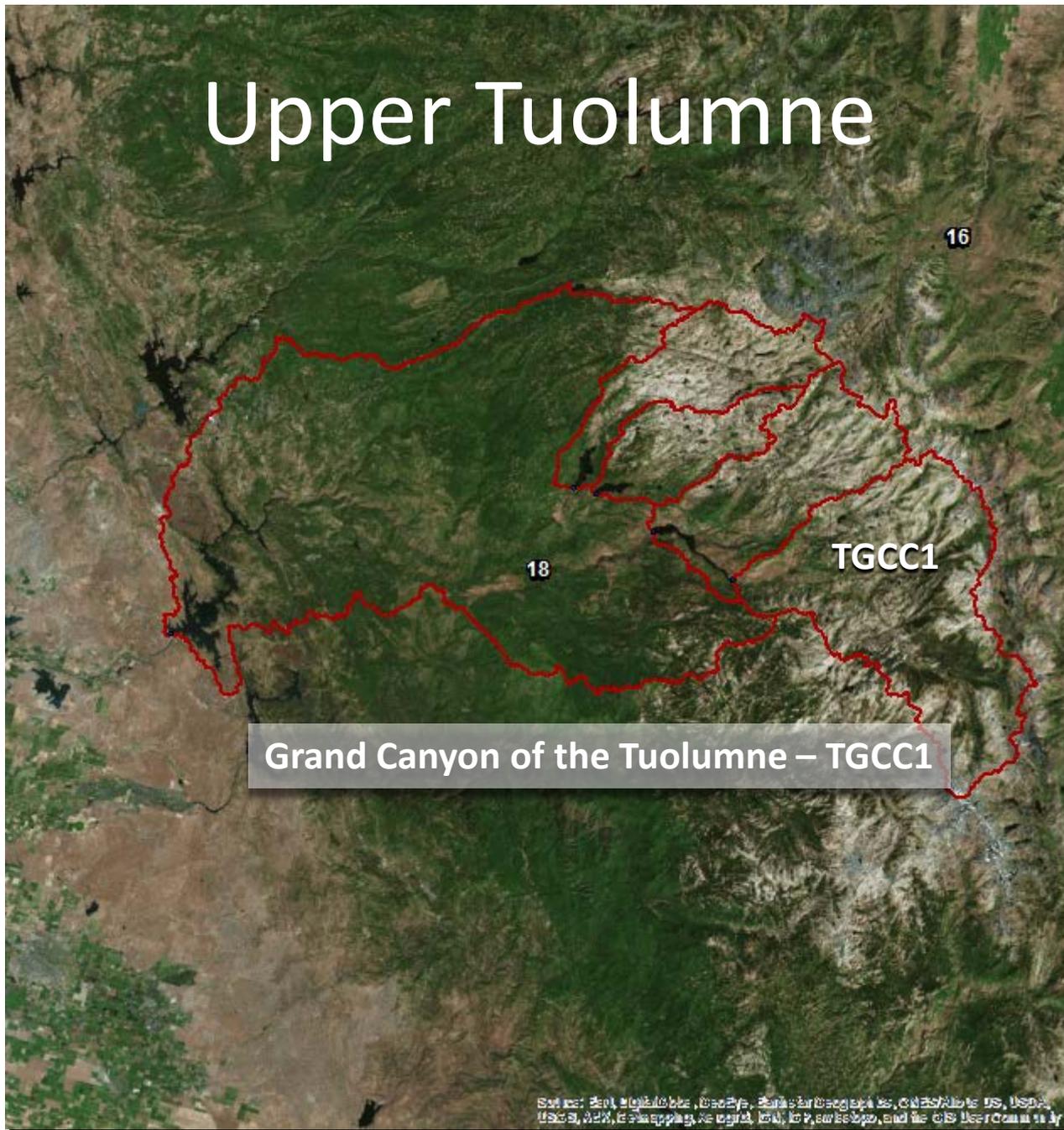
**Tuolumne**

**Kaweah**

**Kern**



# Upper Tuolumne



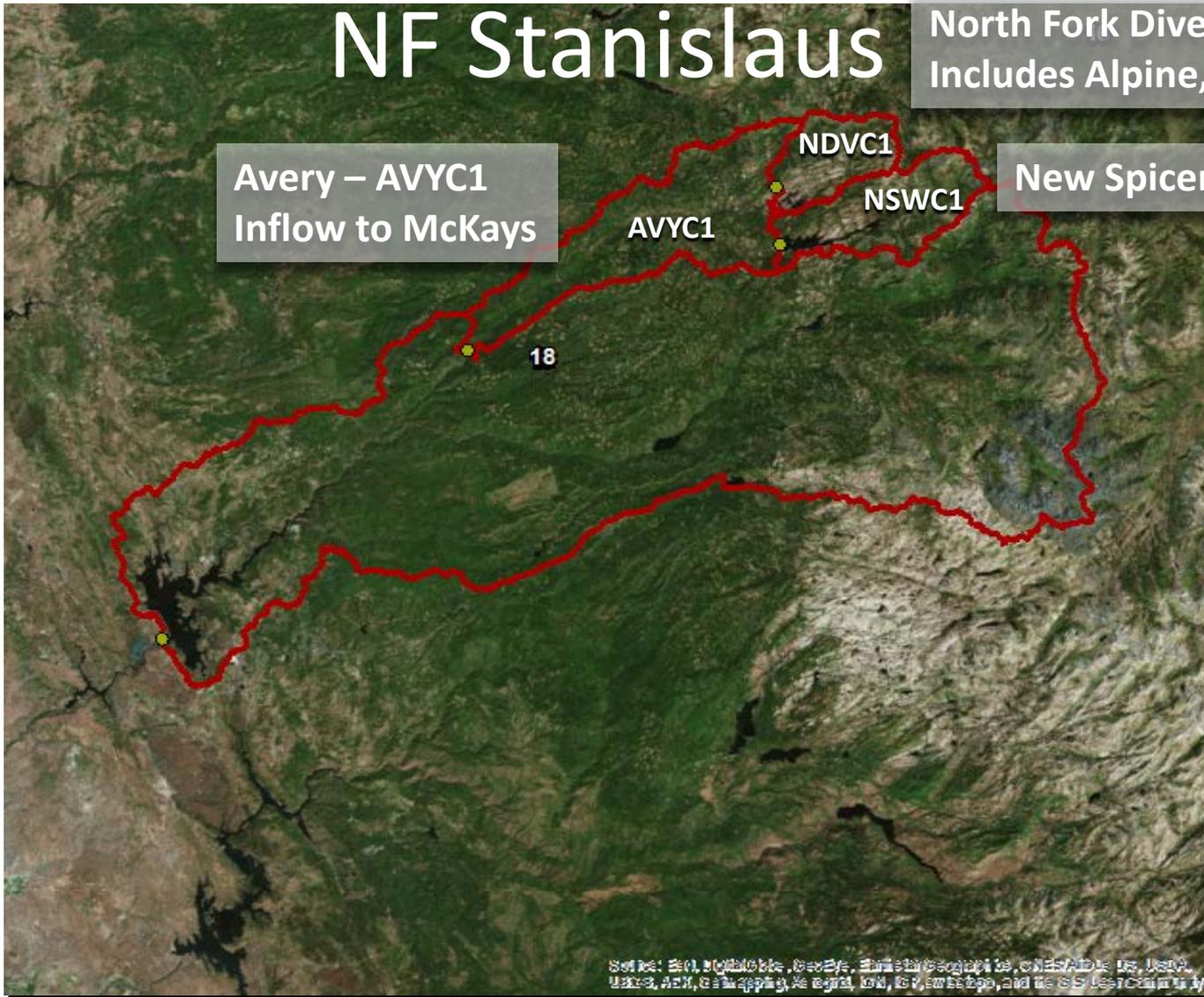
Grand Canyon of the Tuolumne – TGCC1

# NF Stanislaus

North Fork Diversion Dam – NDVC1  
Includes Alpine, Union, and Utica

Avery – AVYC1  
Inflow to McKays

New Spicer Meadows – NSWC1



Source: Esri, DigitalGlobe, GeoEye, Earthstar (Earthstar), CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# Kaweah River

Kaweah near Three Rivers – KTRC1

KTRC1

18

Terminus Local – TMDC1L

TMDC1L

# Kern River

Kern near Kernville— KKVC1

KKVC1

South Fork Kern— SKRC1

SKRC1

ISAC1L

Isabella Local— ISAC1L

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, Aero, GeoMapping, AeroGRID, IGN, ICG, swisstopo, and the GIS User Community



# Long Range Verification



**NORMAL**

All River Guidance (Flood Forecast) Points Are Currently and Forecast to Remain Below Critical Stages

**NORMAL**

Recently-Issued CNRFC Text Products:

Text Product Description	( ID )	Date/Time Issued to Web
--------------------------	--------	-------------------------

Home Page Version: [Interactive Map](#) | [Legacy](#)

[Download PNG](#)

[Show Data Table](#)

[Enlarge Map](#)

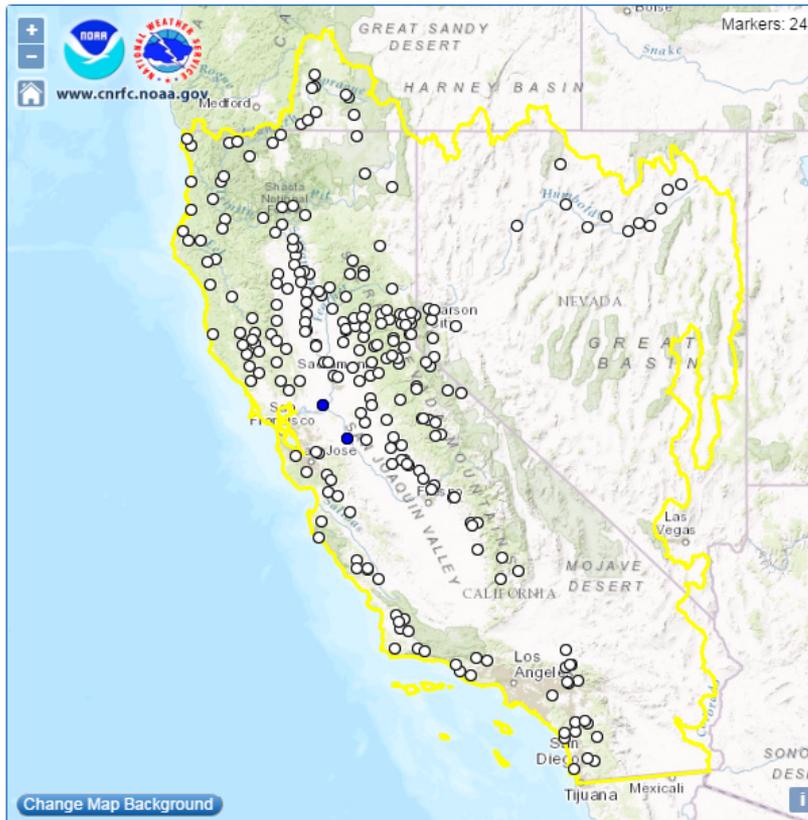
[PERMALINK](#)

[Go](#)

**Geographic Overlays**

- CNRFC Boundary
- States
- Counties
- Lakes
- Rivers
- Drainage Basins
- National Parks
- Burn Areas

2016 2015 2014



**Rivers/Reservoirs**

Forecasts  Show only critical stages (fost pts only)  
 Data updated: Tue Oct 25 2016 12:50 PM PDT  
 Ens. fcast updated: Tue Oct 25 2016 08:39 AM PDT  
 Forecast Points  Other Points  Ensemble

**Observed Data**  
 Data updated: Tue Oct 25 2016 12:56 PM PDT  
 Show only critical stages (applies to fost pts only)

	Latest Hour	1 Hr Ago	2 Hrs Ago	3 Hrs Ago
Forecast Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reservoirs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Forecast + Observed Data**  
 Fcast data updated: Tue Oct 25 2016 12:50 PM PDT  
 Obs data updated: Tue Oct 25 2016 12:56 PM PDT  
 Forecast Points  Show only critical stages  
 Link to  observed  forecast  
 Latest Hour  1 Hr Ago  2 Hrs Ago  3 Hrs Ago

**Significant River Flood Outlook**  
 Data updated: Tue Oct 25 2016 11:00 AM PDT  
 Valid: 10/25/2016 - 10/30/2016  
 Latest Flood Outlook Product (updated daily)

- [Water Resources](#)
- [Snow Data](#)
- [Observed Precipitation \(QPE\)](#)
- [Forecast Precipitation \(QPF\)](#)
- [Observed Temperatures](#)
- [Forecast Temperatures](#)
- [Freezing Levels](#)
- [Flash Flood Guidance](#)
- [Water Temperatures](#)

Ensemble Location     Water Resources Index

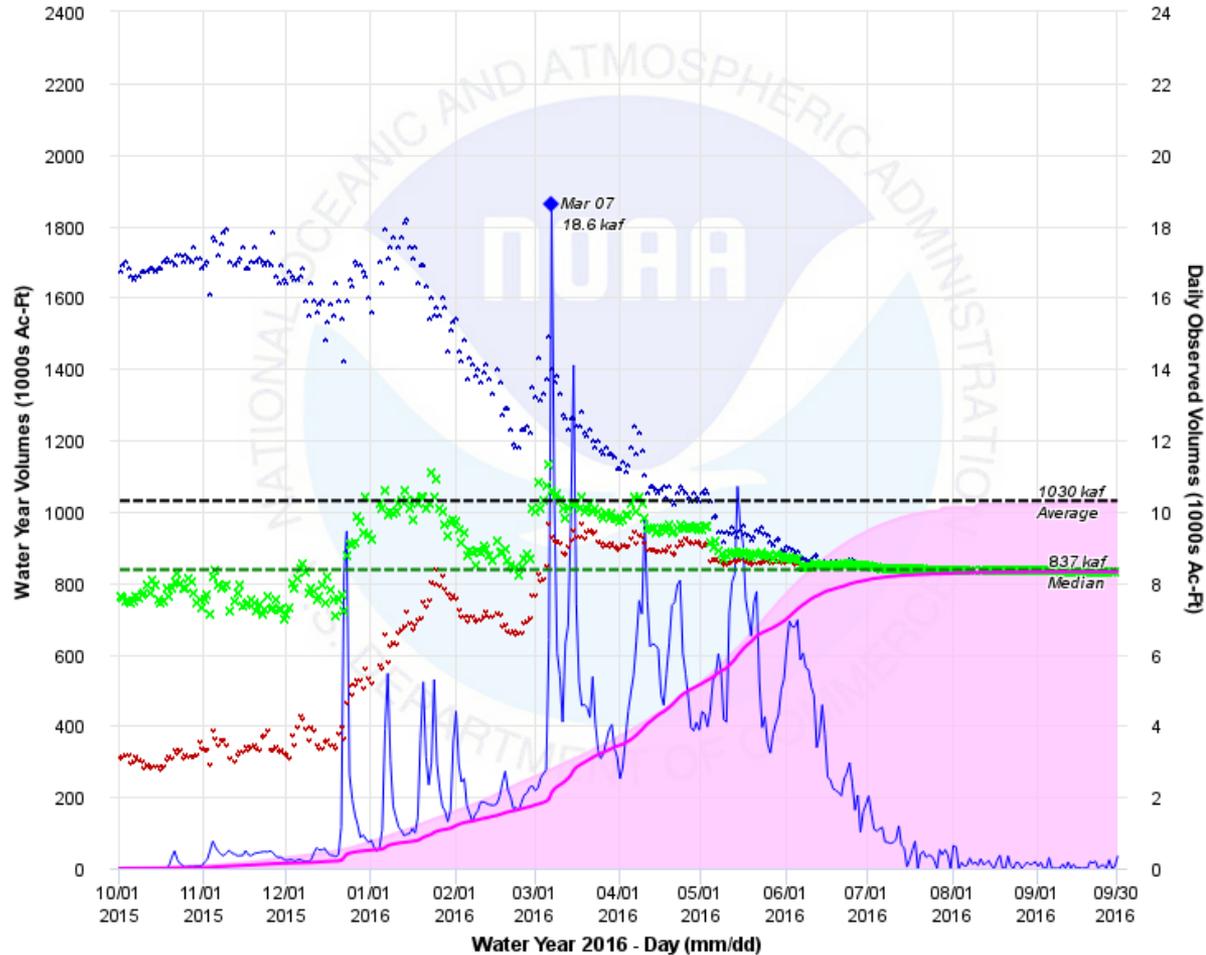


# Long Range Verification



MERCED - EXCHEQUER (EXQC1) 09/30/2016  
Most Probable: **831 kaf** | **81% of Average** | **99% of Median**

Created: 09/30/2016 at 01:21 PM PDT



Observed to Date Percent of Average: 81% (831 kaf)    Water Year to Date Average: 1030 kaf

-- WY Volume Average    - - WY Volume Median    - - WY to Date Obs    WY to Date Avg    - - Daily Obs    ◆ Obs Peak  
 ▲ ESP WY Vol Fcst 10%    ▲ ESP WY Vol Fcst 25%    × ESP WY Vol Fcst 50%    ▲ ESP WY Vol Fcst 75%    ▼ ESP WY Vol Fcst 90%



# Long Range Verification

HOME HYDROLOGY WEATHER CLIMATE RESEARCH/OUTREACH LINKS SEARCH ABOUT US

5-Day Peaks	<b>10-Day Traces</b>	10-Day Probability	10-Day Accum Vol	4x5-Day Probability
Monthly Probability	Seasonal trend Plot	WY Trend Plot	WY Accum Vol	Multi WY Accum Vol
Historical Flows	Verification	Build Your Own		

[Back to Ensemble Products Map](#)

[<< Previous Ensemble Location \(POHC1\)](#) | [Next Ensemble Location \(DSNC1\) >>](#)

## MERCED RIVER - EXCHEQUER RESERVOIR (EXQC1)

Latitude: 37.58° N

Longitude: 120.27° W

Elevation: 442 Feet

Location: Mariposa County in California

River Group: San Joaquin

Issuance Time:

Oct 25 2016 at 8:45 AM PDT

### 10-Day Traces Plot

[CSV Ensemble File Download: EXQC1](#)

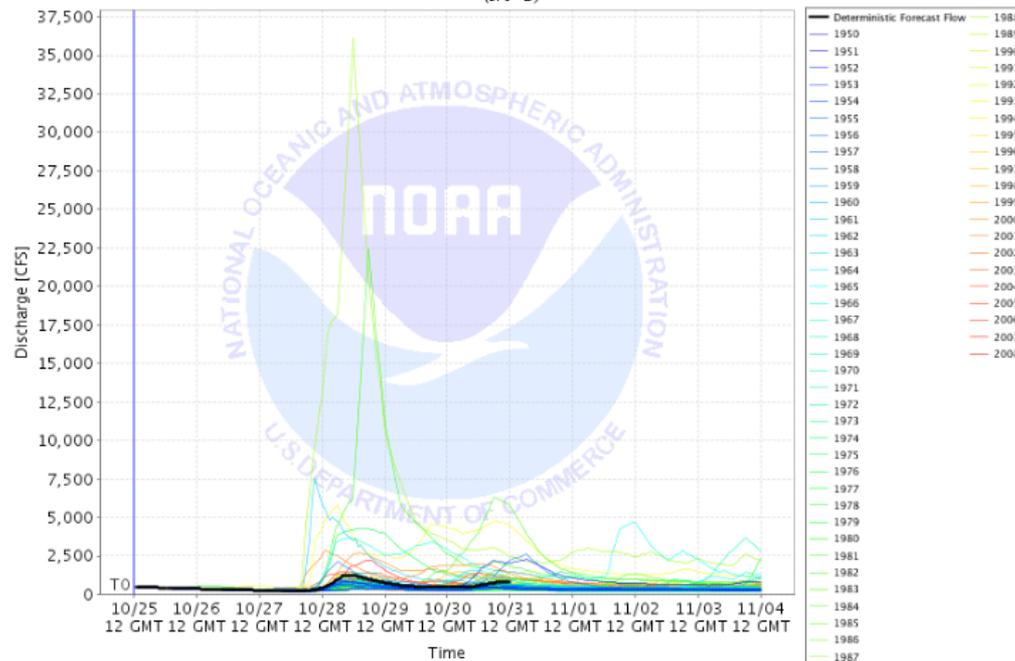
MEFP-based Traces with Deterministic Forecast for MERCED-NEW EXCHEQUER DAM

Latitude: 37.585 Longitude: -120.26722

Forecast for the period 10/25/2016 - 11/04/2016

This is a conditional simulation based on the current conditions as of 10/25/2016

(src=D)





# Water Year and Seasonal

5-Day Peaks	10-Day Traces	10-Day Probability	10-Day Accum Vol	4x5-Day Probability
Monthly Probability	Seasonal Trend Plot	WY Trend Plot	WY Accum Vol	Multi WY Accum Vol
Historical Flows	<b>Verification</b>	Build Your Own		

[Back to Ensemble Products Map](#)

[<<< Previous Ensemble Location \(POHC1\) | Next Ensemble Location \(DSNC1\) >>>](#)

## MERCED RIVER - EXCHEQUER RESERVOIR (EXQC1)

Latitude: 37.58° N

Longitude: 120.27° W

Elevation: 442 Feet

Location: Mariposa County in California

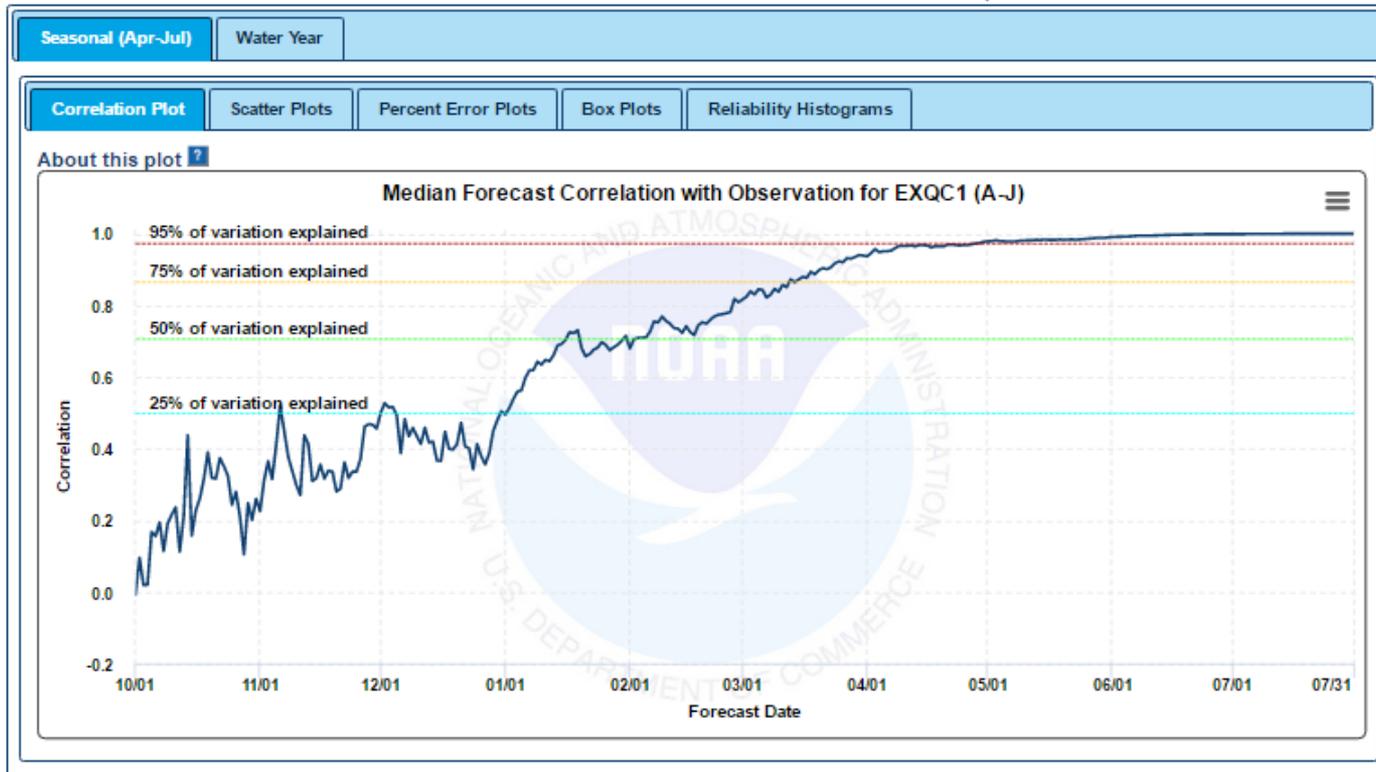
River Group: San Joaquin

Issuance Time:

May 09 2016 at 7:55 AM PDT

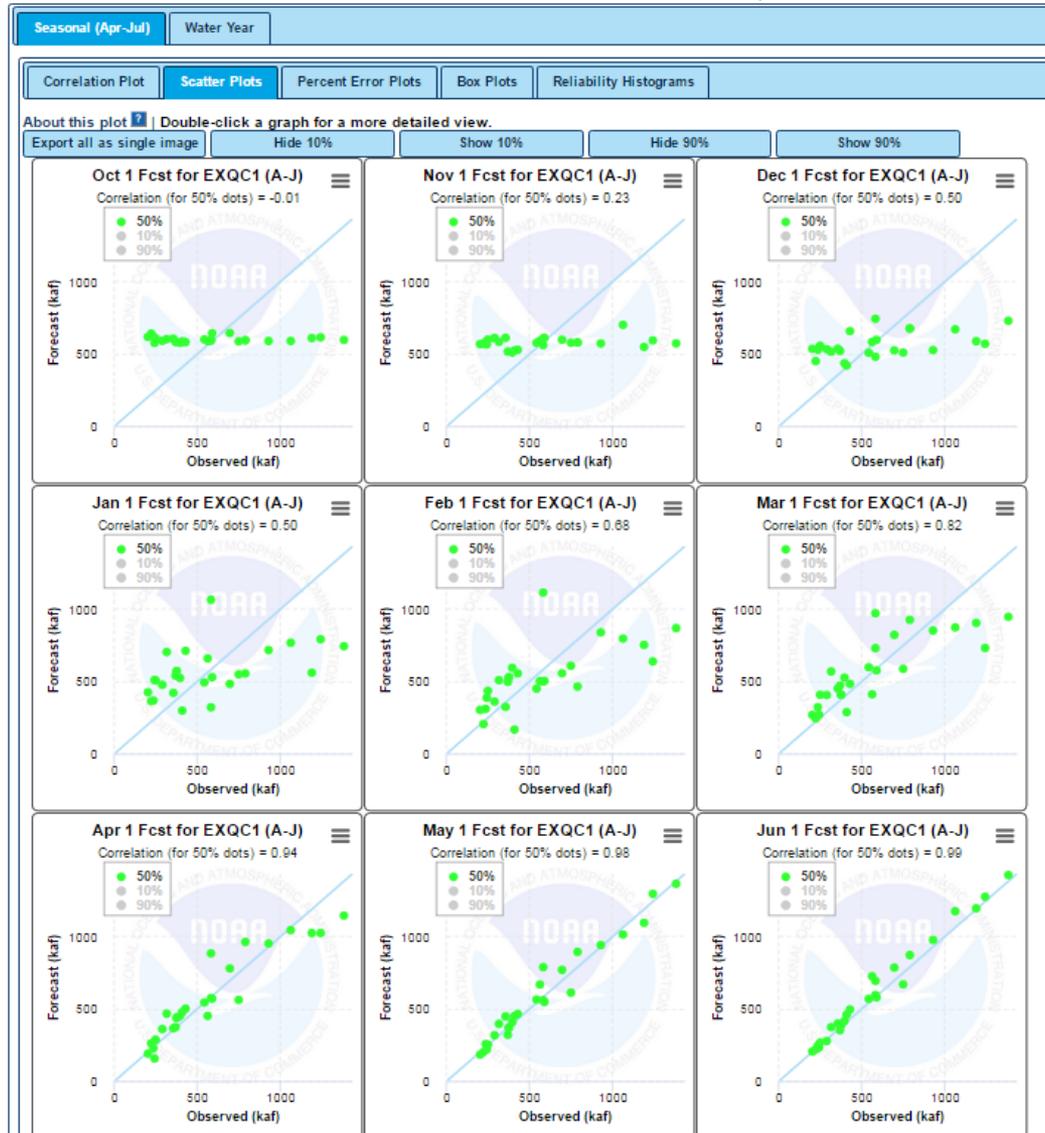
### Water Resources Verification

[About These Plots and Help ?](#)



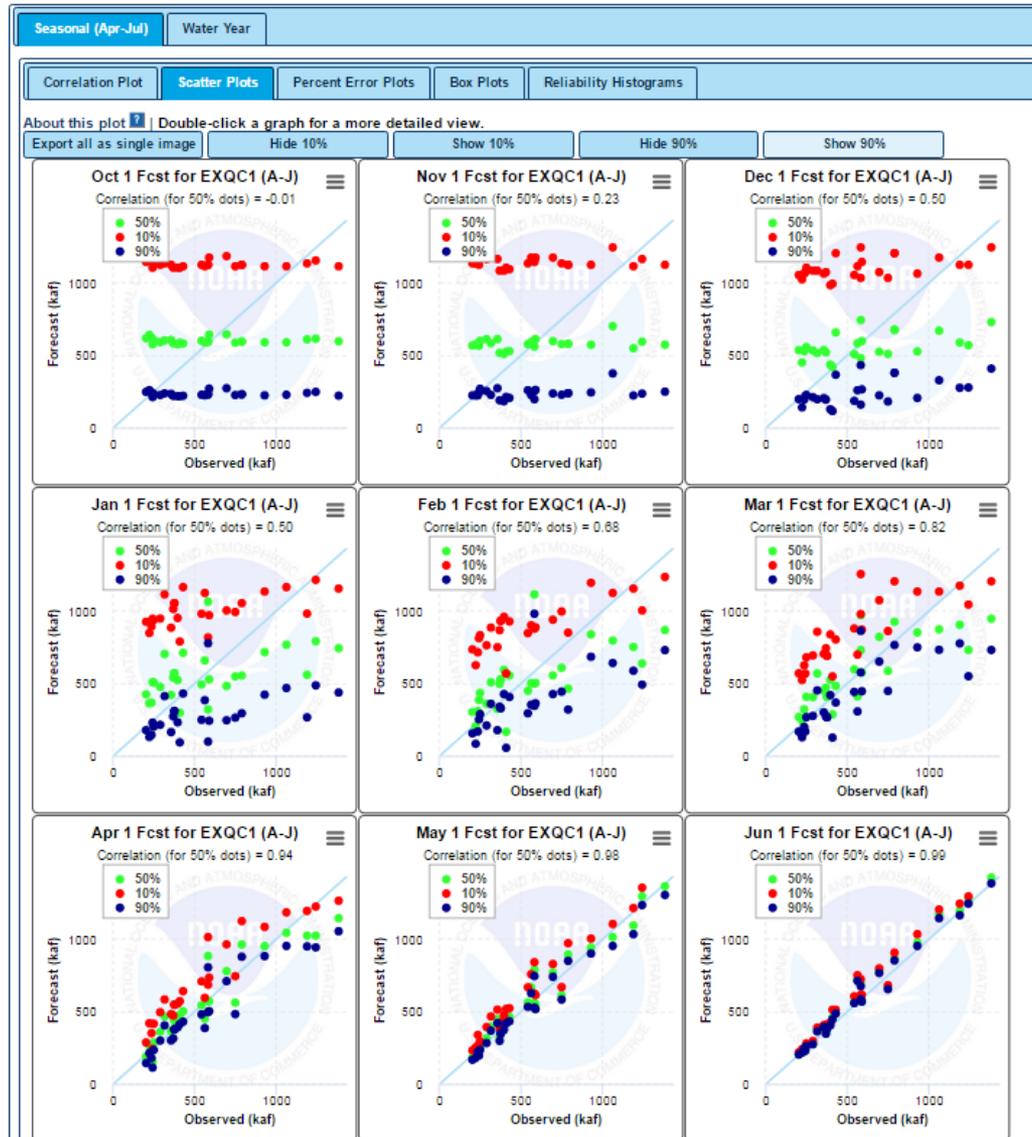


# Verification - Scatter Plots



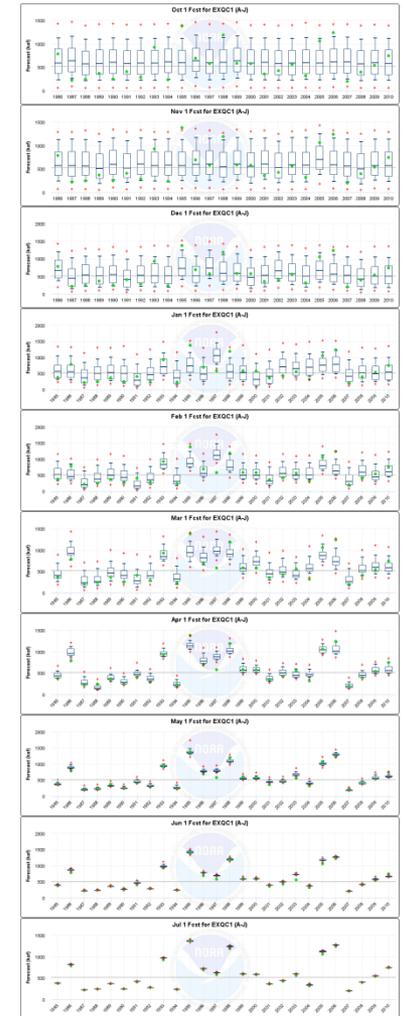
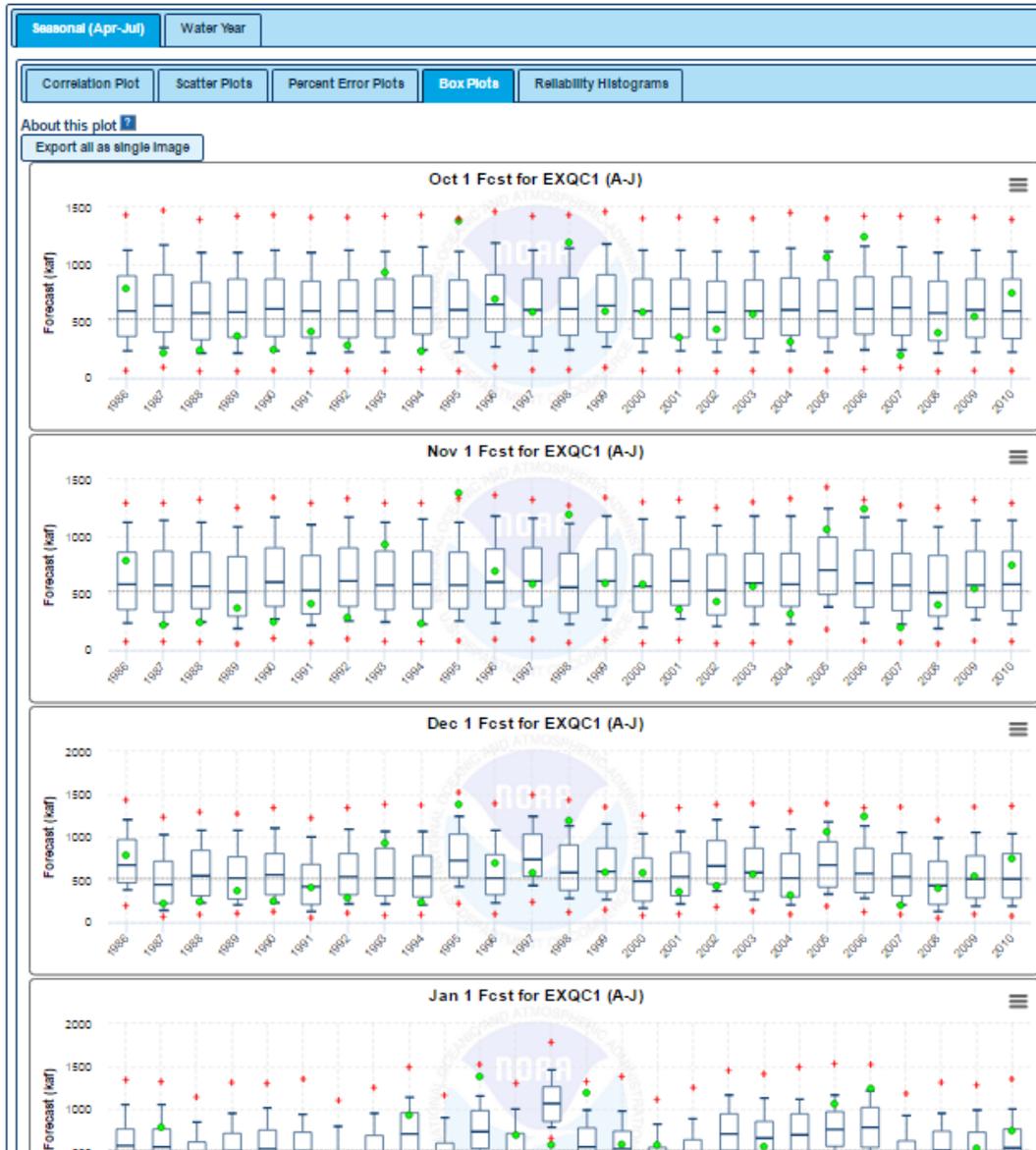


# Verification - Scatter Plots





# Verification - Box Plots

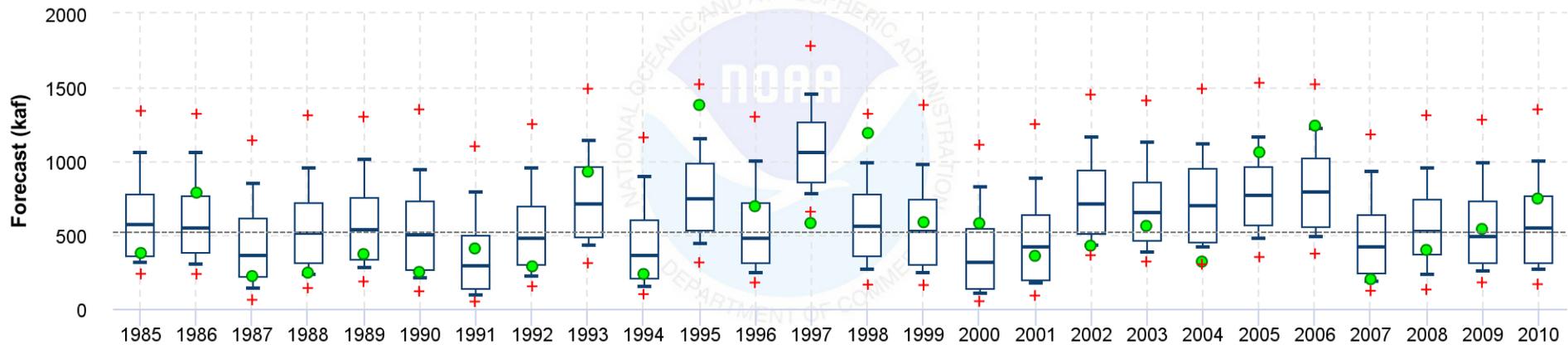




# Verification - Box Plots

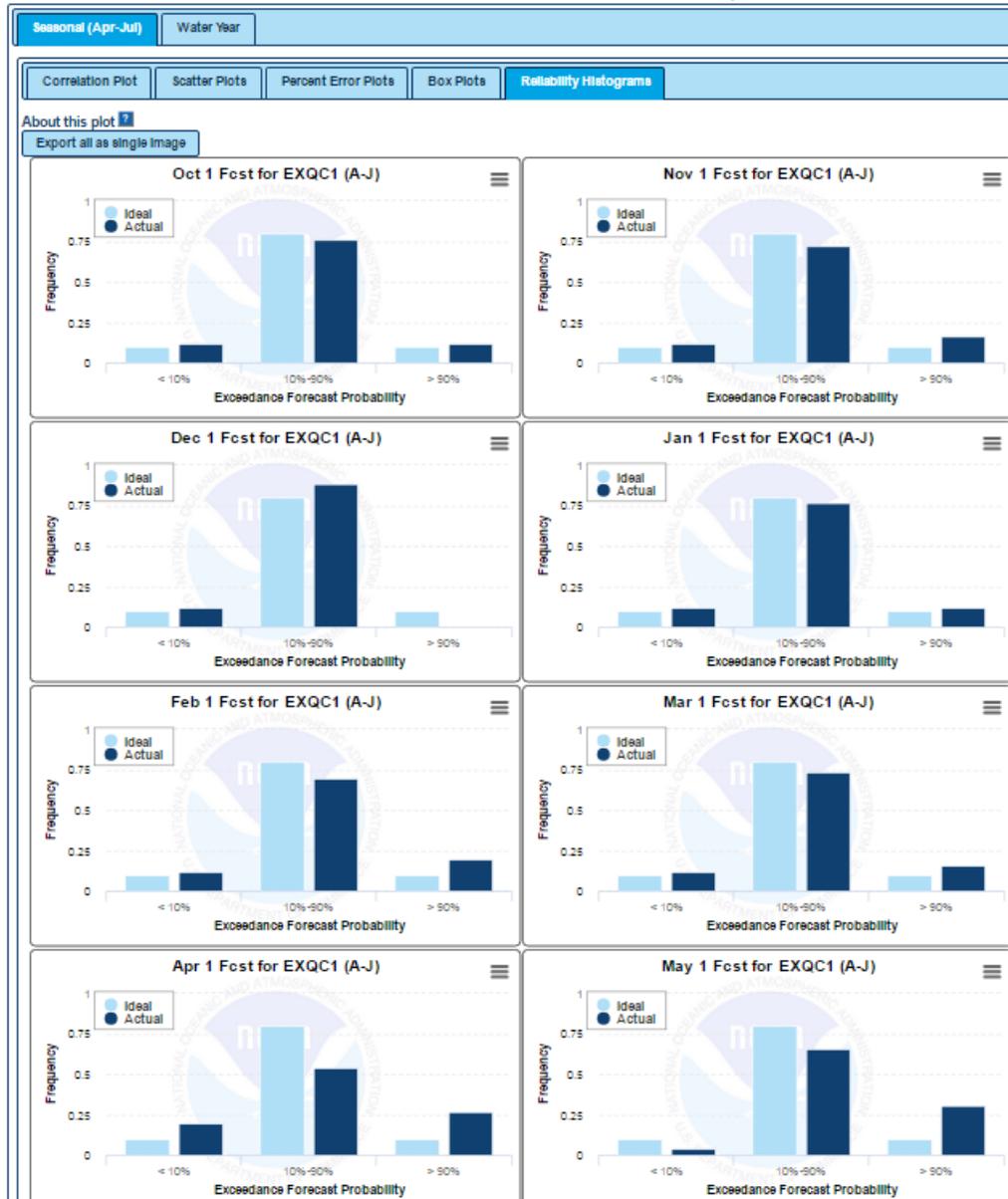


Jan 1 Fcst for EXQC1 (A-J)





# Verification - Reliability





# Rob Hartman Retirement 1982-2016





# Rob Hartman 2.0





# California Nevada River Forecast Center



**THANK YOU!**