



# Verification Activities in the CNRFC

Alan Takamoto

Second RFC Verification Workshop  
Salt Lake City, UT  
November 18, 2008



# RVF statistics sent to OCWWS



Start Time	End Time	RFC	River	Response	Pairing	Interval	Leadtime	Start	Leadtime	End	Location	Max Fcst	Min Fcst	Max Obs	Min Obs	RMSE	MeanErr	MeanAbsError	Count
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	CREC1	99.9	0	0.607279	-0.063637	0.360606	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	FTDC1	99.9	0	0.275241	-0.112121	0.196970	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	ORIC1	99.9	0	0.280422	0.059091	0.162121	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	SLOW	1 hr	0hr	6hr	BTY03	99.9	0	0.121065	0.039844	0.090052	60						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	SLOW	1 hr	0hr	6hr	WMS03	99.9	0	0.057735	0.012121	0.027273	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	ONSC1	99.9	0	0.177538	-0.026752	0.121449	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	FTJC1	99.9	0	0.280872	0.042857	0.160317	63						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	SEIC1	99.9	0	0.239419	0.076786	0.151786	56						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	H00C1	99.9	0	0.200000	-0.060606	0.142424	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	MEDIUM	1 hr	0hr	6hr	KLMC1	99.9	0	1.032187	-0.103279	0.526230	61						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	ARCC1	99.9	0	0.304511	-0.006061	0.157576	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	BRGC1	99.9	0	0.321219	0.050000	0.192424	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	MRNC1	99.9	0	0.432281	-0.089252	0.259328	66						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	MEDIUM	1 hr	0hr	6hr	SCOC1	99.9	0	0.271747	0.073846	0.160000	65						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	MEDIUM	1 hr	0hr	6hr	FRNC1	99.9	0	0.209762	0.052308	0.132308	65						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	NVRC1	99.9	0	0.558752	0.013559	0.335593	59						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	HOPC1	99.9	0	0.352846	0.038333	0.241667	60						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	HEAC1	99.9	0	0.651282	-0.138542	0.375208	60						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	MEDIUM	1 hr	0hr	6hr	GUEC1	99.9	0	0.165046	0.034231	0.100000	52						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	SHEC1	99.9	0	0.593060	0.073802	0.230469	60						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	PRBC1	99.9	0	0.359871	0.030796	0.153478	62						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	BRDC1	99.9	0	0.172711	0.024294	0.066129	62						
2006-01-01 00:00:00	2006-01-31 23:59:59	CNRFC	FAST	1 hr	0hr	6hr	RDRC1	99.9	0	0.151338	0.022581	0.058065	62						

Takes time to qc data. Use MBRFC's "adbpg.pl" program.



# QPF Verification Graphics

<http://www.cnrfc.noaa.gov/qpf.php>



## Forecast QPF

## Observed QPE

## Verification (QPF-QPE)

### Entire CNRFC Area QPF

This forecast precipitation grid is created by the CNRFC HAS and mapped to a 4km grid using climatological normal monthly precipitation weighting. QPF is issued between 12 and 18 UTC.

◀ Prev Day  
▶ Next Day

### Entire CNRFC Area QPE

This observed precipitation grid is created from quality-controlled precipitation gage data only and mapped to a 4km grid using climatological normal monthly precipitation weighting.

◀ Prev Day  
▶ Next Day

### Entire CNRFC Area Verification

This precipitation verification grid is created by subtracting the QPE from the QPF to generate a 4km bias grid using climatological normal monthly precipitation weighting.

◀ Prev Day  
▶ Next Day

QPF      QPE      Verification

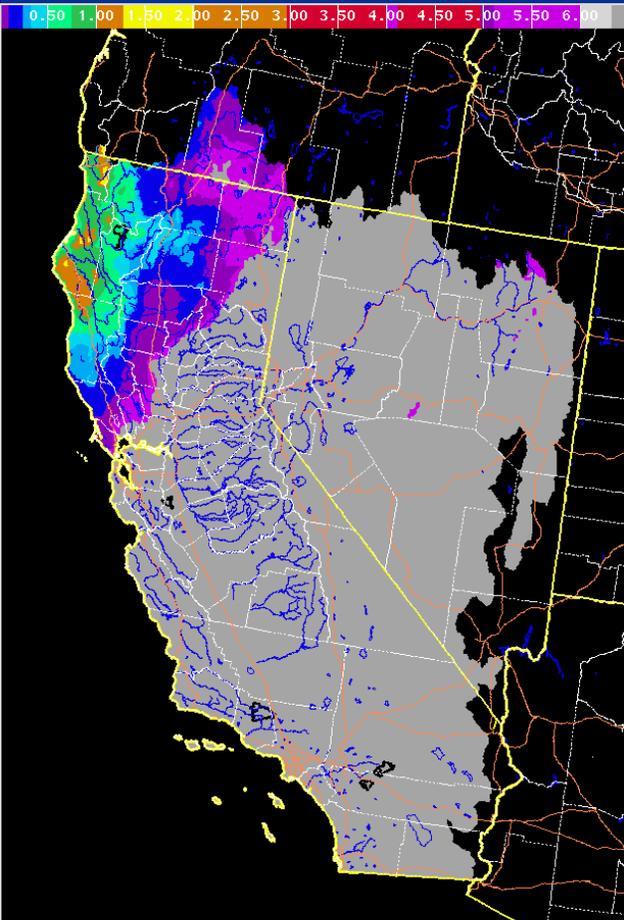
QPF      QPE      Verification

QPF      QPE      Verification

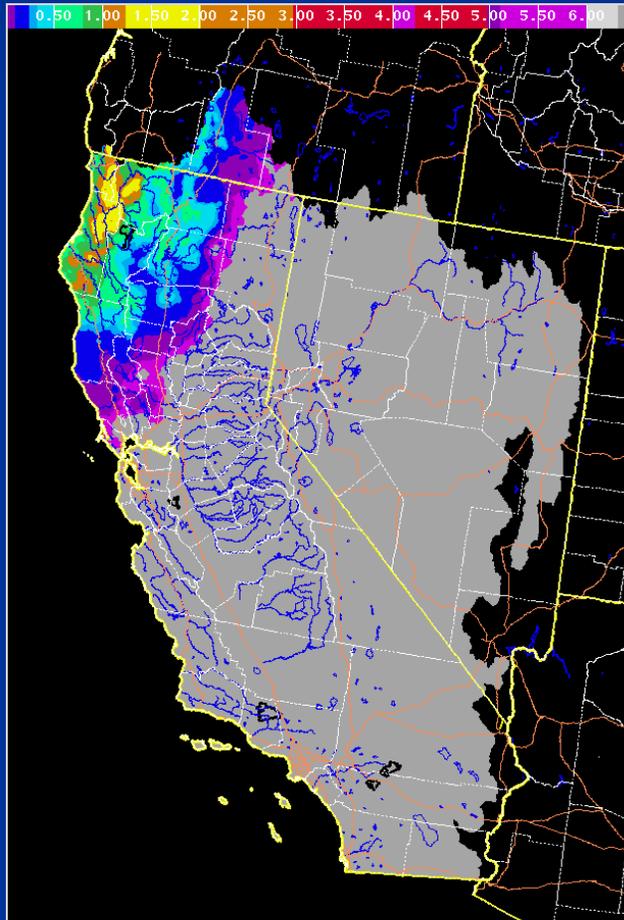
24-Hour Precipitation Forecast Ending 4 AM PST (5 AM PDT) 07/18/07

24-Hour Observed Precipitation Ending 4 AM PST (5 AM PDT) 07/18/07

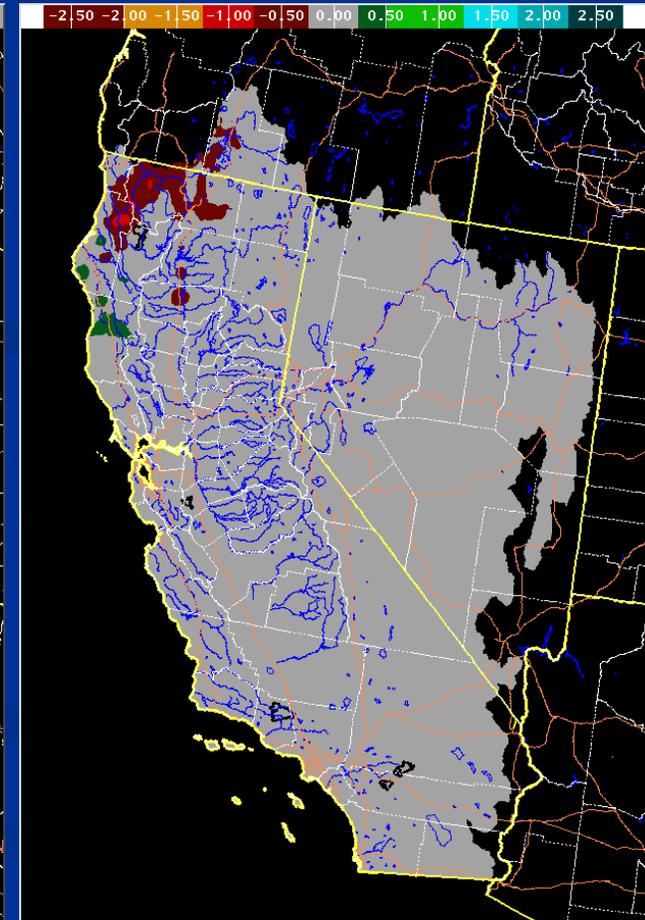
24-Hour Precipitation Verification (QPF - QPE) Ending 4 AM PST (5 AM PDT) 07/18/07



24 Hr Forecast Total Ending Wed 07/18/2007 05:00 AM PDT



24 Hr Observed Total Ending Wed 07/18/2007 05:00 AM PDT

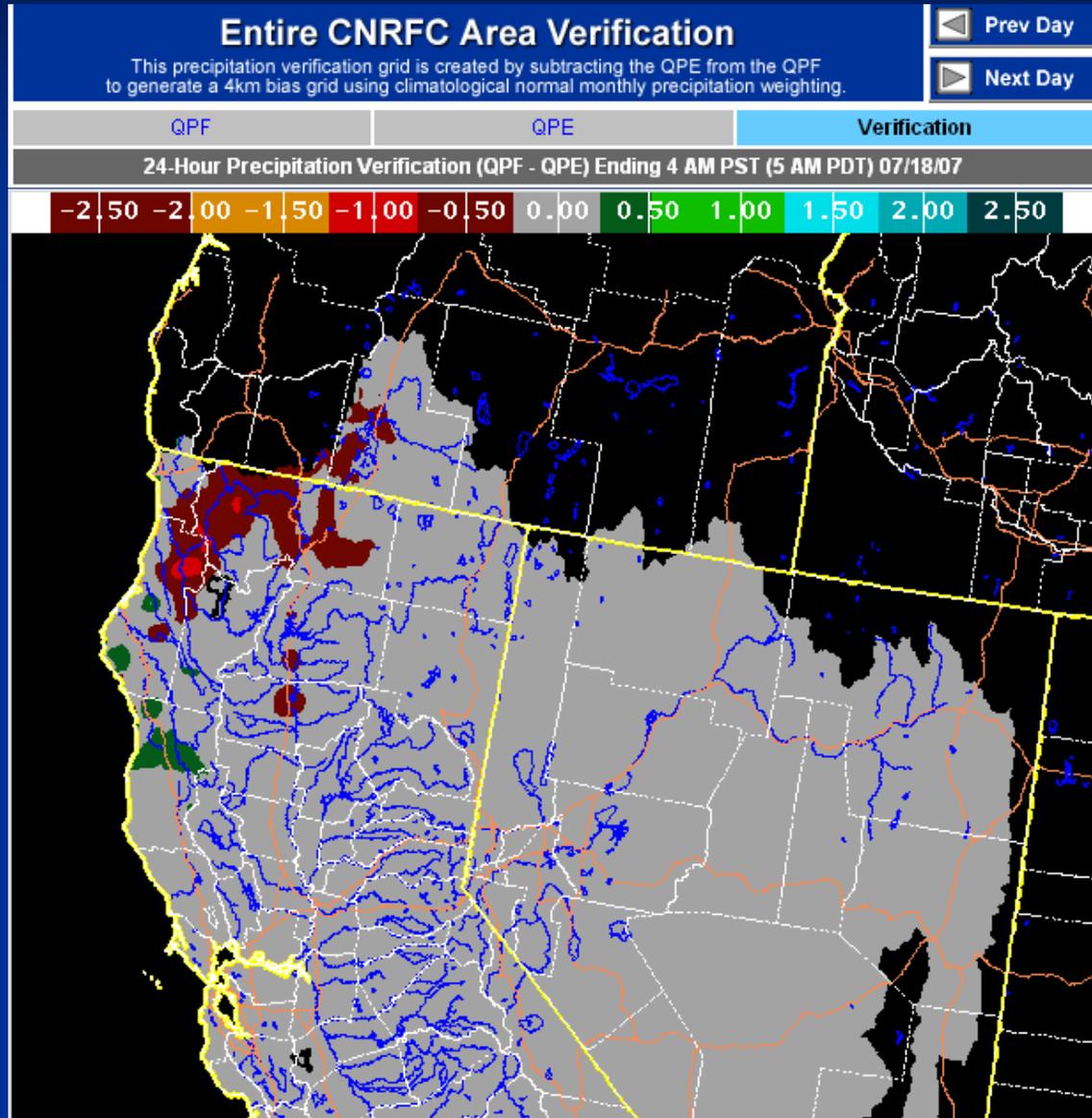


24 Hr Precip Verify Ending Wed 07/18/2007 05:00 AM PDT

# QPF Verification Graphics



## Verification (QPF-QPE)



# Temperature Forecasts used in Snowmelt



April Tabular Temperatures - MHS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
4cast Hi:	58	58	65	63	72	68	64	63	62	53	49	50	53	57	58	61	49	44	44	48	54	54	60	67	66	66	74	75	72	67
Obs Hi:	61	58	69	70	77	80	61	63	55	58	52	51	65	47	54	69	53	49	46	58	44	54	64	71	63	68	81	80	75	72
Avg Hi:	55							57							59								61							63
4cast Lo:	37	35	35	35	33	39	42	42	40	36	32	32	32	36	35	38	38	30	30	32	35	36	35	36	36	36	41	45	45	44
Obs Lo:	40	33	31	40	34	37	48	41	33	29	36	32	26	39	32	32	40	32	28	23	34	32	32	35	41	36	39	43	48	37
Avg Lo:	31							32							33									35						36

May Tabular Temperatures - MHS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
4cast Hi:	60	53	48	51	56	61	64	80	76	72	73	72	70	70	79	78	75	72	68	70	70	67	70	78	78	77	73	73	82	83	83
Obs Hi:	52	52	50	52	60	73	80	81	78	74	74	71	68	80	84	80	76	76	73	71	62	65	74	79	80	83	75	74	84	87	89
Avg Hi:	63							65							68								70								72
4cast Lo:	38	39	34	32	35	37	35	41	44	40	41	41	40	40	41	43	44	44	45	41	42	42	38	45	44	46	46	46	45	44	50
Obs Lo:	38	38	27	33	35	42	50	44	45	43	43	39	36	35	40	45	42	40	42	48	39	38	34	50	44	47	48	40	37	44	47
Avg Lo:	36							38							40								42								43

June Tabular Temperatures - MHS

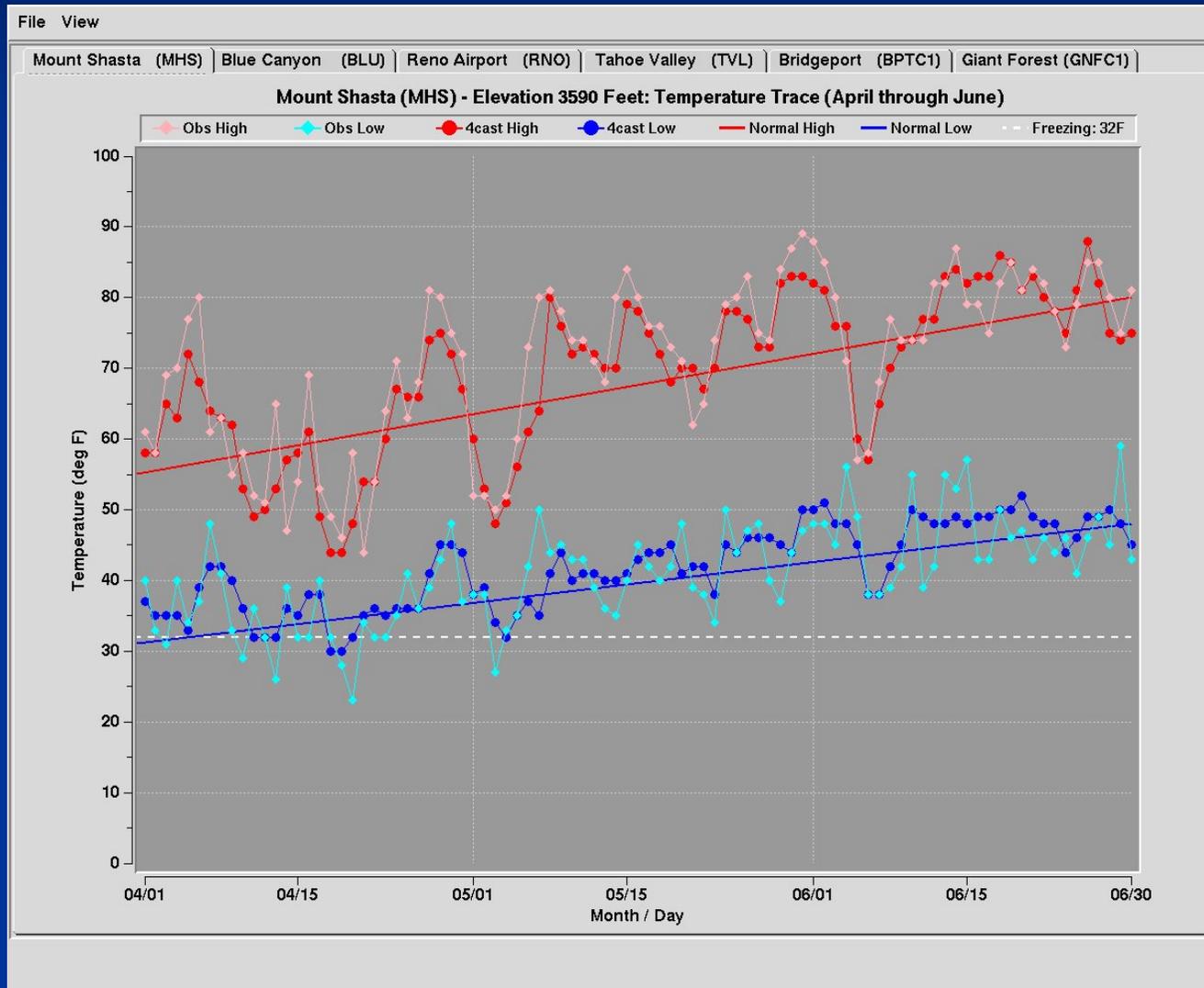
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
4cast Hi:	82	81	76	76	60	57	65	70	73	74	77	77	83	84	82	83	83	86	85	81	83	80	78	75	81	88	82	75	74	75	
Obs Hi:	88	85	80	71	57	58	68	77	74	74	74	82	82	87	79	79	75	82	85	81	84	82	78	73	79	85	85	80	75	81	
Avg Hi:	72							74							76								78								80
4cast Lo:	50	51	48	48	45	38	38	42	45	50	49	48	48	49	48	49	49	50	50	52	49	48	48	44	46	49	49	50	48	45	
Obs Lo:	48	48	45	56	49	38	38	39	42	55	39	42	55	53	57	43	43	50	46	47	43	46	44	46	41	46	49	45	59	43	
Avg Lo:	43							45							46								47							48	

Exit

Print and Exit



# Temperature Forecasts used in Snowmelt

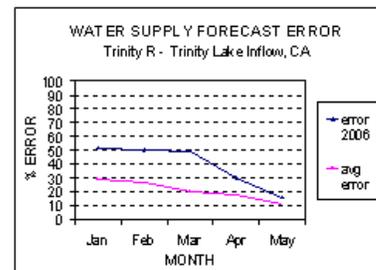
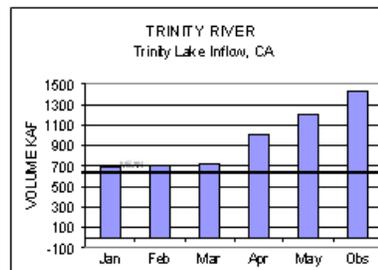
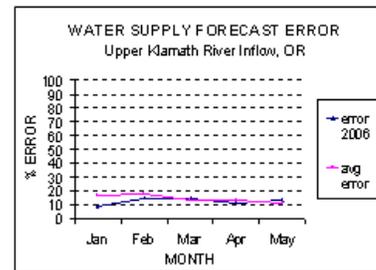
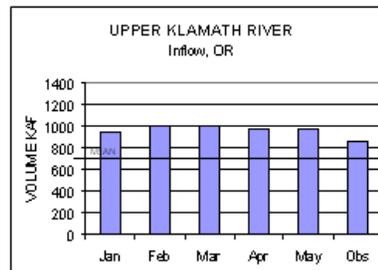


# Water Supply Verification Product

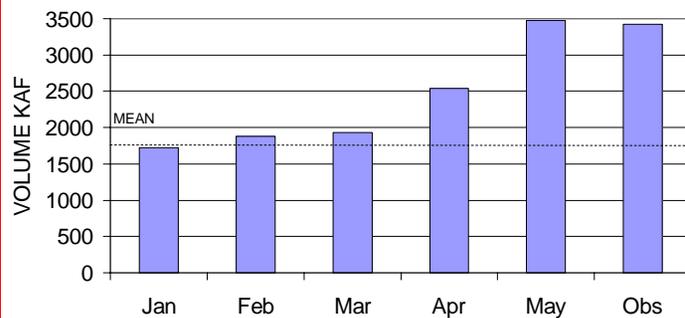
Per ROML W-14-99



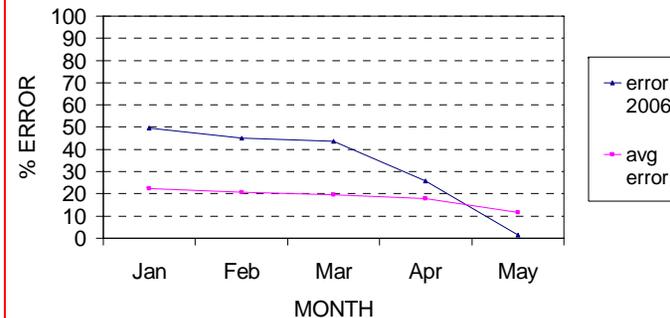
2006  
 APRIL-JULY VOLUME (UPPER KLAMATH RIVER IS MAR-SEP)  
 WATER SUPPLY FORECASTS  
 CALIFORNIA-NEVADA RIVER FORECAST CENTER



**SACRAMENTO RIVER**  
 Shasta Lake nr Redding, CA



**WATER SUPPLY FORECAST ERROR**  
 Sacramento R - Shasta Lk, nr Redding, CA





# Historical Graphical River Forecast



The screenshot shows a web browser window displaying the National Weather Service California Nevada River Forecast Center website. The page title is "Historical Graphical River Forecast". The interface includes a search bar, a "Get Local Forecast for:" section, and a "Historical Graphical River Forecast" section with the following steps:

- 1 Select Location:** A dropdown menu showing "TRUCKEE RIVER - VISTA (VISN2)".
- 2 Select Forecast Date:** Month: Dec, Day: 28, Year: 2005.
- 3 Select Forecast Time Cycle (Greenwich Mean Time):** Time Cycle: 00z-06z.
- 4 Display Option (single image or loop):** Display: Single Plot.
- 5 Input Selection and Retrieve Graphical RVF:** A "Generate a Plot" button.

Below the steps is a "Help" section with the text: "Learn More About Results and the Interface (Click Help Button)".

At the bottom of the page, there are links for "Webmaster", "US Dept of Commerce", "National Oceanic and Atmospheric Administration", "National Weather Service", "California-Nevada River Forecast Center", "Disclaimer", "Information Quality", "Credits", "Glossary", "Privacy Policy", "Freedom of Information Act", "About Our Organization", and "Career Opportunities".

[http://www.cnrfc.noaa.gov/rfc\\_guidance.php](http://www.cnrfc.noaa.gov/rfc_guidance.php)



Example:  
5-day deterministic  
River Forecast  
Guidance from  
routine NWSRFS  
river basin run

- River/Reservoir Data
- River Guidance
- Flash Flood Guidance
- AHPS/ESP Traces
- WFO Hydro Products
- Water Supply
- River Flood Outlook
- Weather
- Quick Summary
- CNRFC/HPC QPF
- Watches/Warnings
- Satellite Imagery
- Radar Imagery
- Observations
- Weather Forecasts
- Numerical Models
- Climate
- Data and Indices
- Climate Forecasts
- El Niño and MJO
- Teleconnections
- Hydroclimatology
- Local Info and Links
- Research & Outreach
- Storm Summaries
- Publications
- Newsletter
- Links
- RFC Map
- WFO Map
- Miscellaneous Links
- Information
- About Us
- Flood Forecasting
- Flash Flooding
- Water Supply
- Spring Snowmelt
- Acronyms
- NWS Glossary
- Contact Us
- Webmaster Email



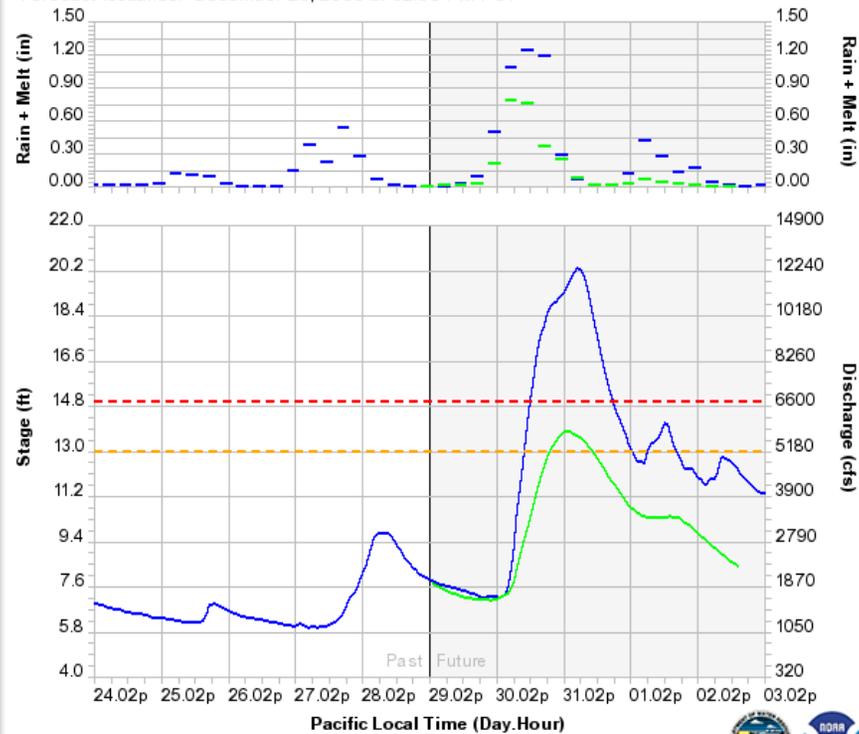
### TRUCKEE RIVER - VISTA (VISN2)

Latitude: 39.52° N Longitude: 119.70° W Elevation: 4368 Feet  
Location: Washoe County in Nevada

Forecast — Observed —

Previous Forecast	Next Forecast
Thursday 12/29/2005 12-18 UTC	Friday 12/30/2005 00-06 UTC
Selected Date: Thursday 12/29/2005 18-00 UTC	

VISN2 - TRUCKEE - VISTA, NR (MS: 13.0 / FS: 15.0)  
Forecast Issuance: December 29, 2005 at 02:08 PM PST



Observed — Forecast — Monitor — Flood —  
Generated 07/18/2008 at 10:28 AM PDT

California Department of Water Resources  
NWS / California Nevada River Forecast Center



#### Verification - Historical Graphical RVF

Month:  Day:  Year:  Cycle:

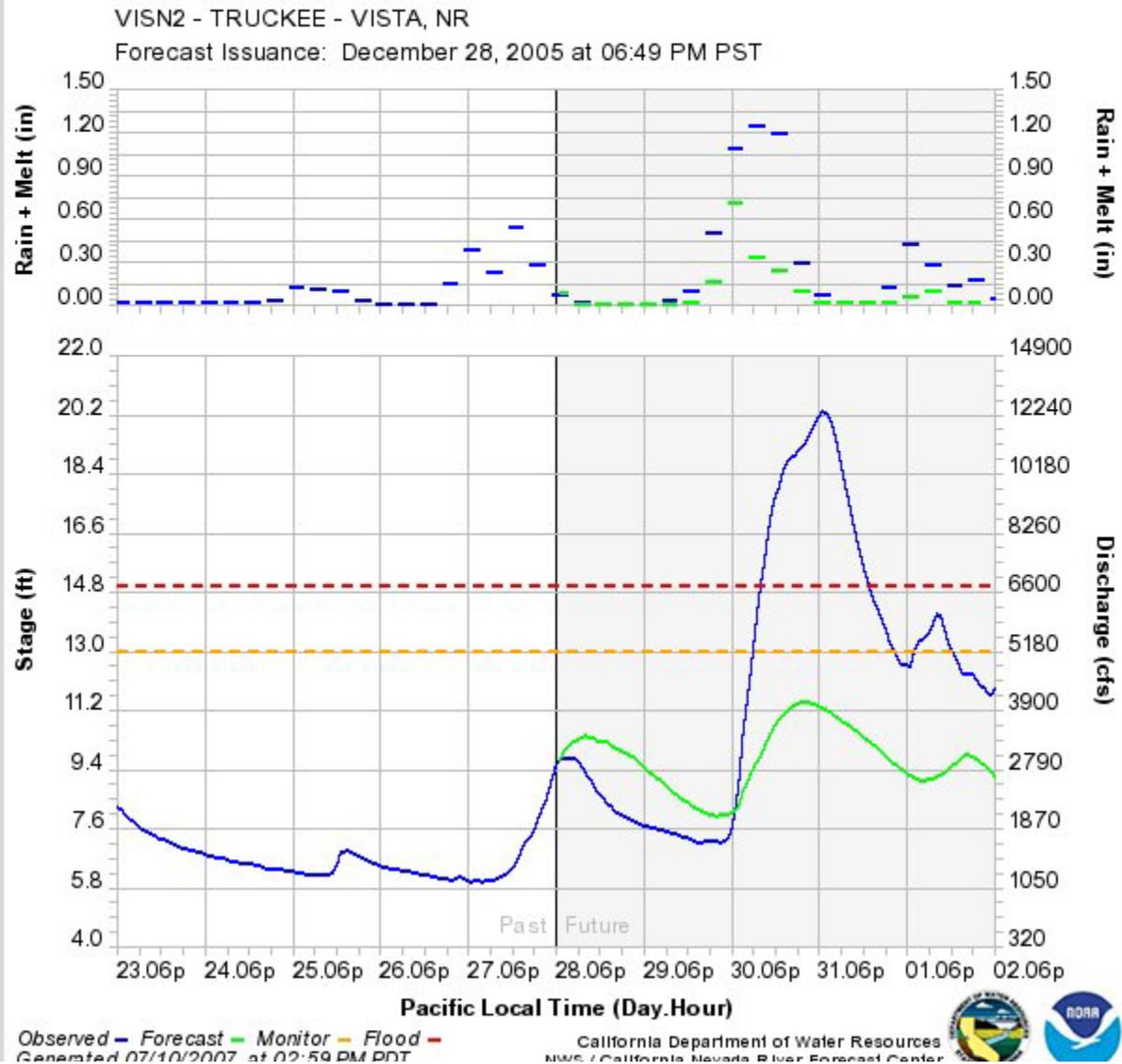
To view other verification locations, use our [Historical Graphical River Forecast Interface](#)

[http://www.cnrfc.noaa.gov/rfc\\_guidance.php](http://www.cnrfc.noaa.gov/rfc_guidance.php)

1610  
2119  
2208



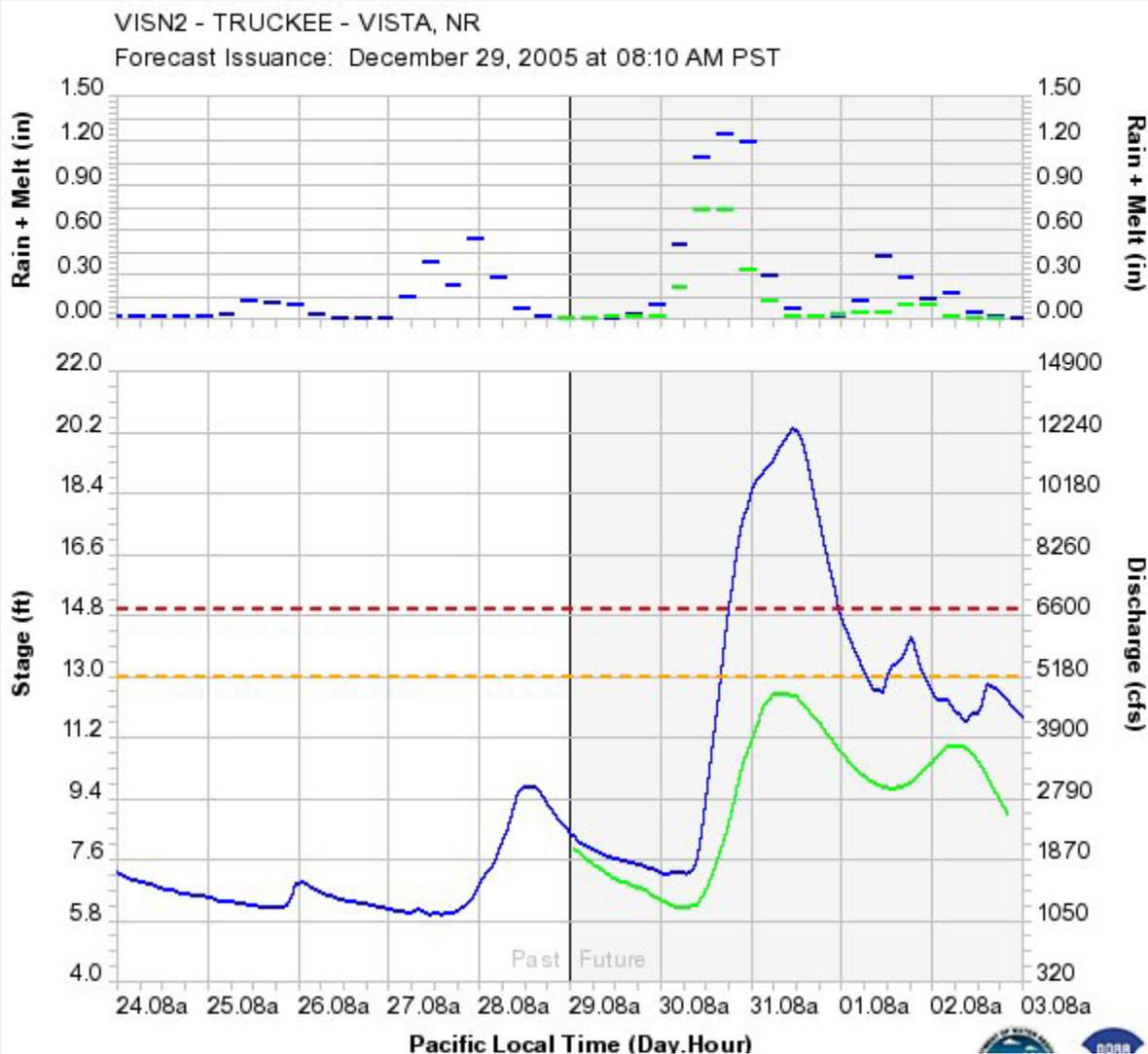
Dec 28, 2005  
18:49 hours





249  
1610  
2119  
2208

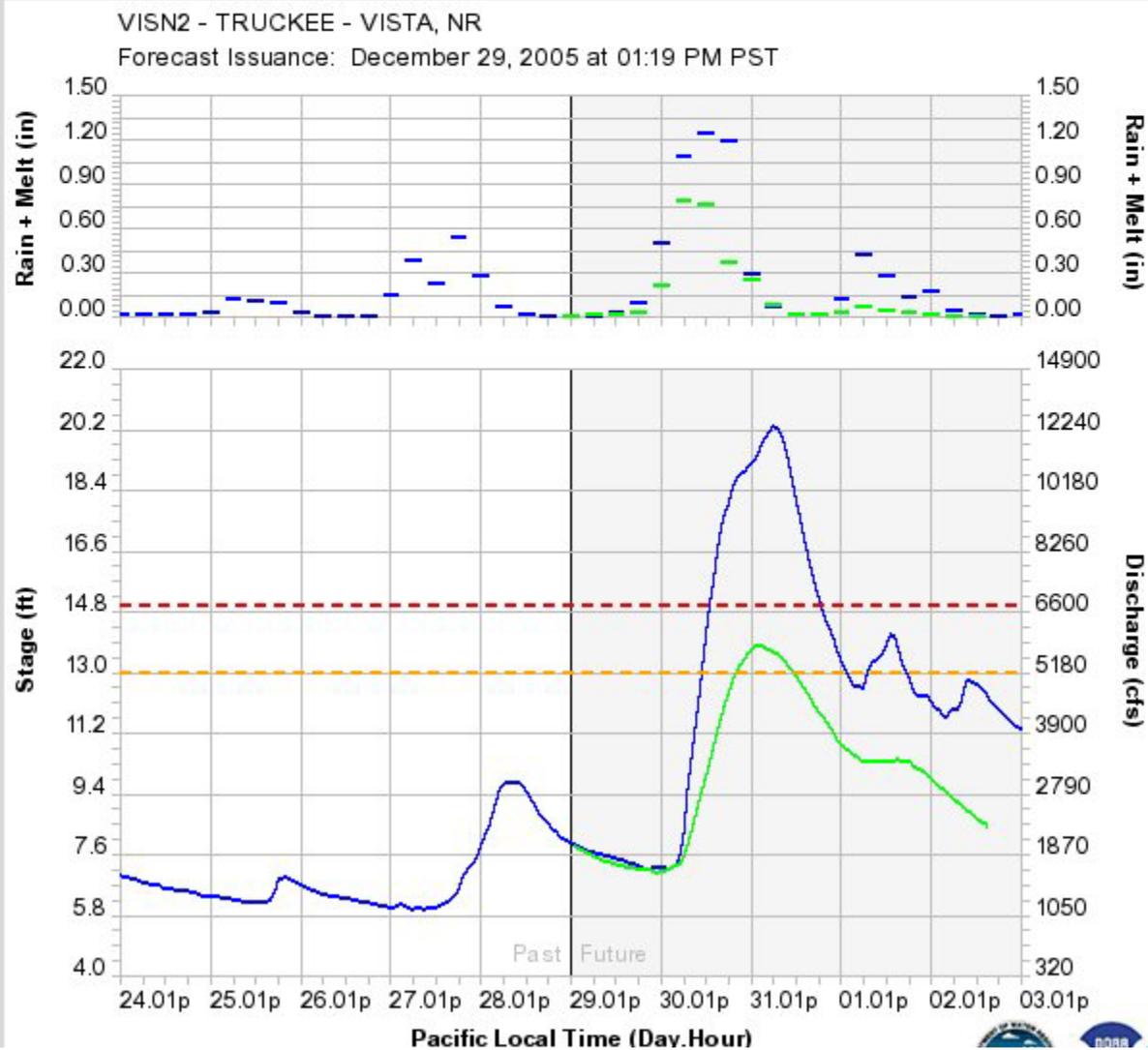
Dec 29, 2005  
08:10 hours





249  
1610  
2119  
2208

Dec 29, 2005  
13:19 hours



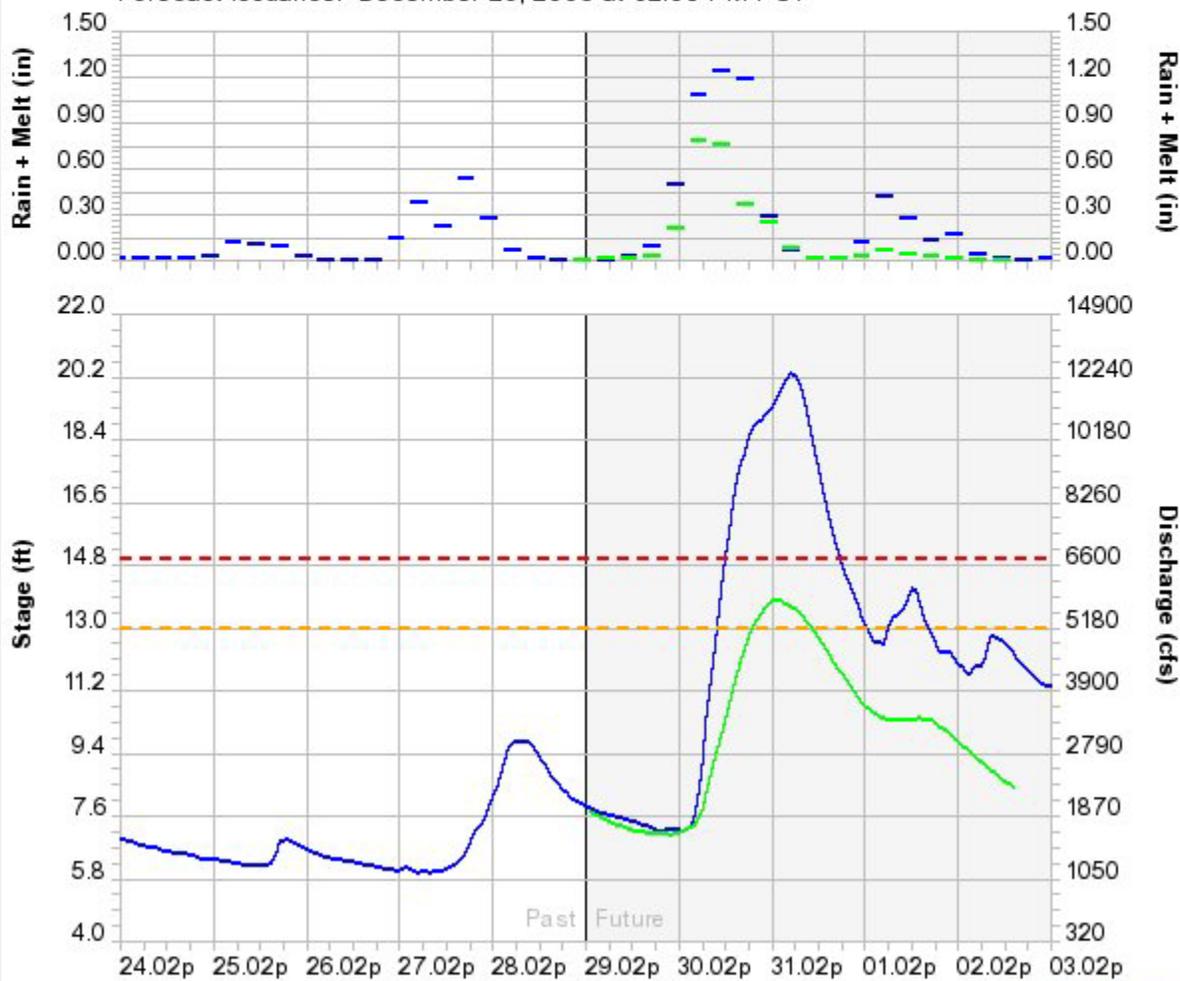


249  
1610  
2119  
2208

Dec 29, 2005  
14:08 hours

VISN2 - TRUCKEE - VISTA, NR

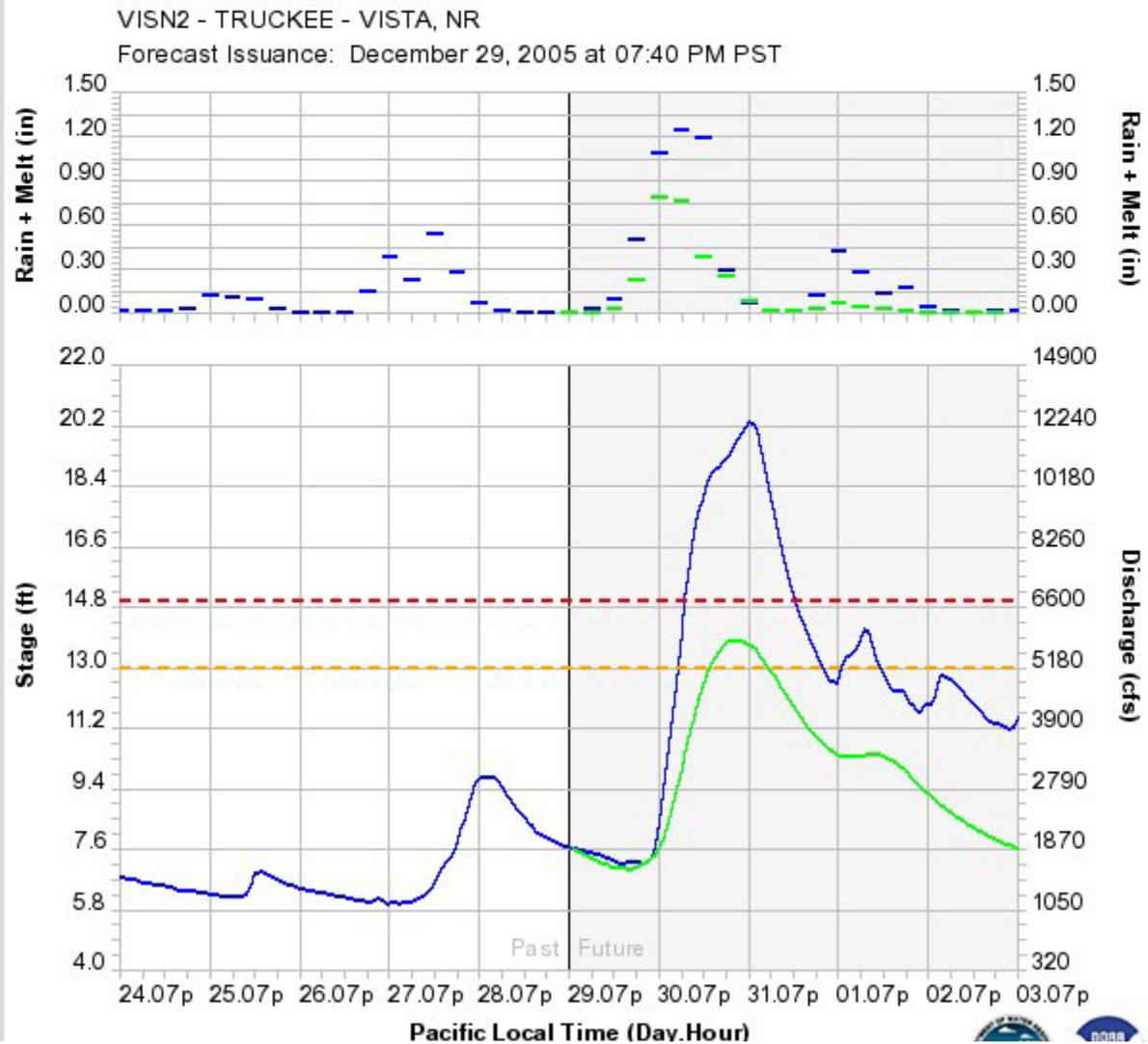
Forecast Issuance: December 29, 2005 at 02:08 PM PST





340  
1525  
1754  
2203  
2209

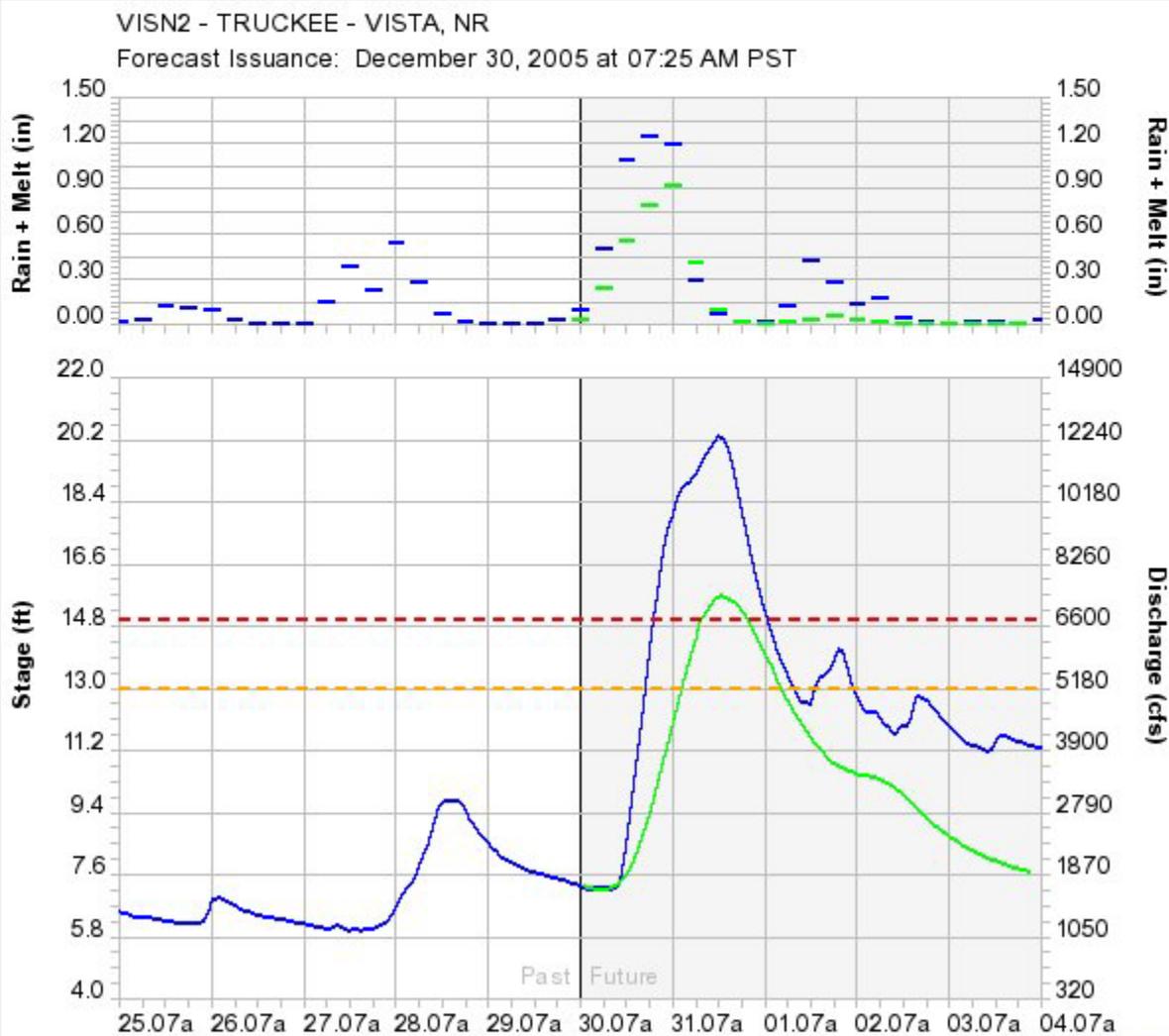
Dec 29, 2005  
19:40 hours





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2209

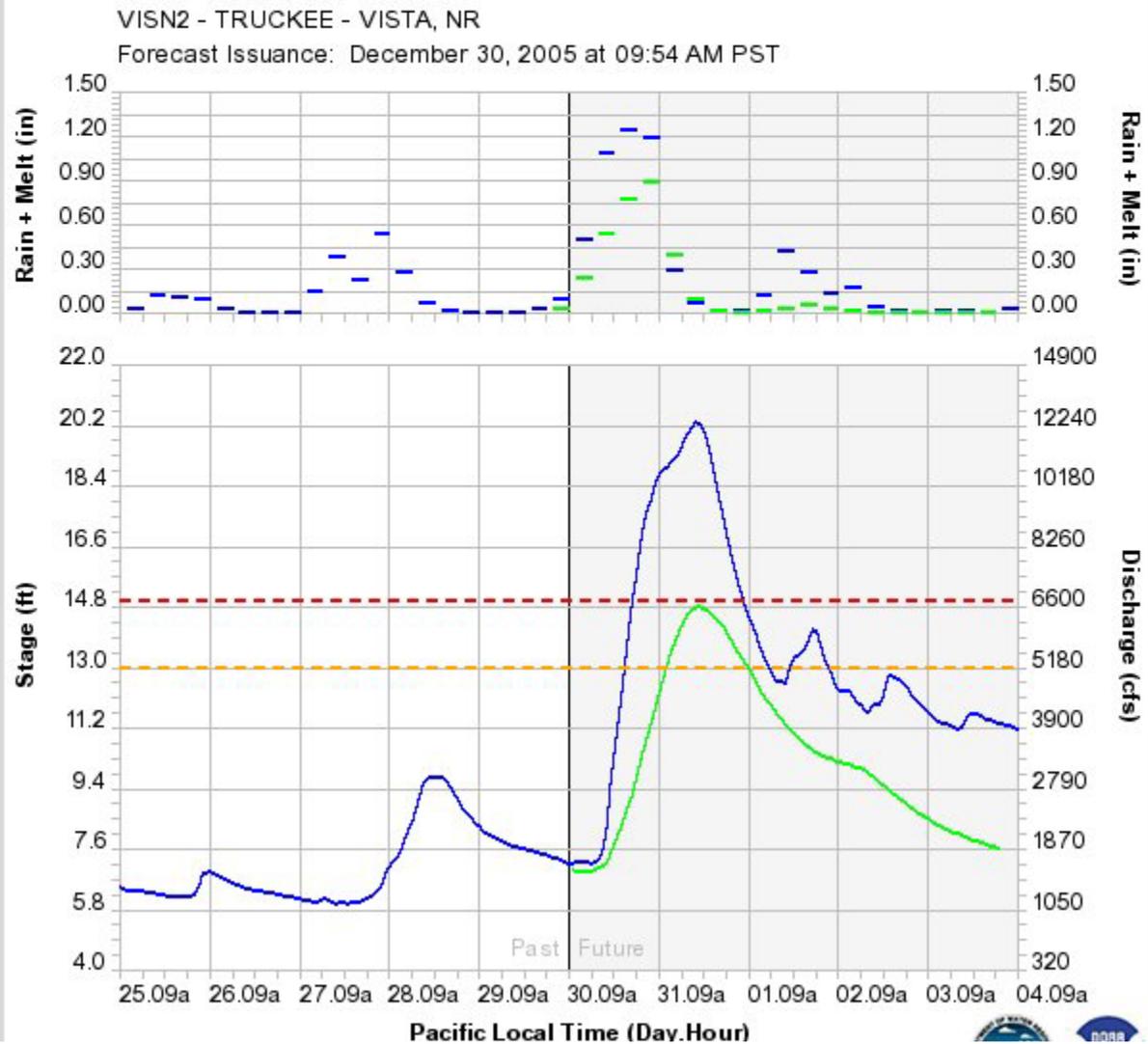
Dec 30, 2005  
07:25 hours





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1525  
1754  
2203  
2209

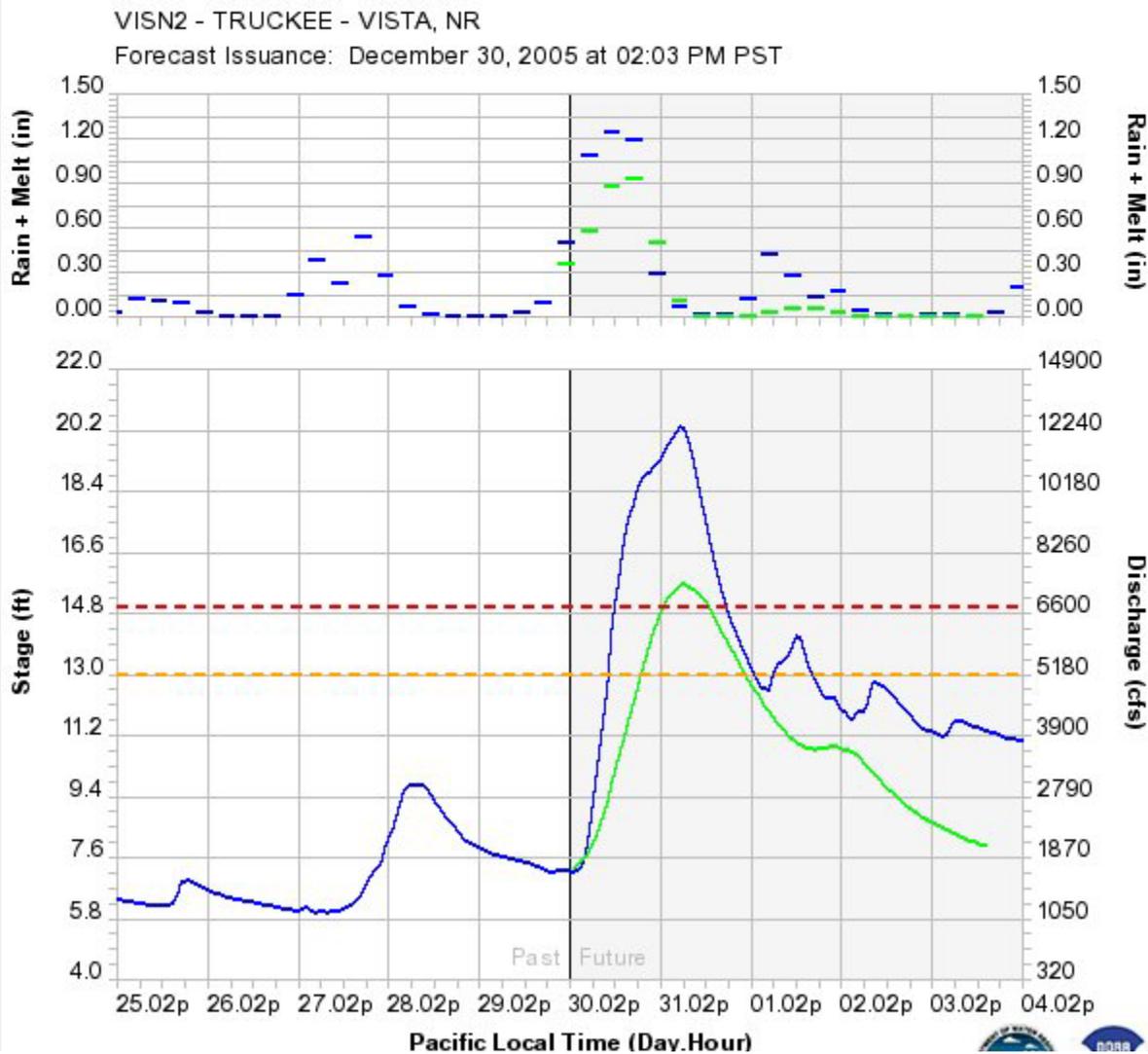
Dec 30, 2005  
09:54 hours





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1525  
1754  
2203  
2209

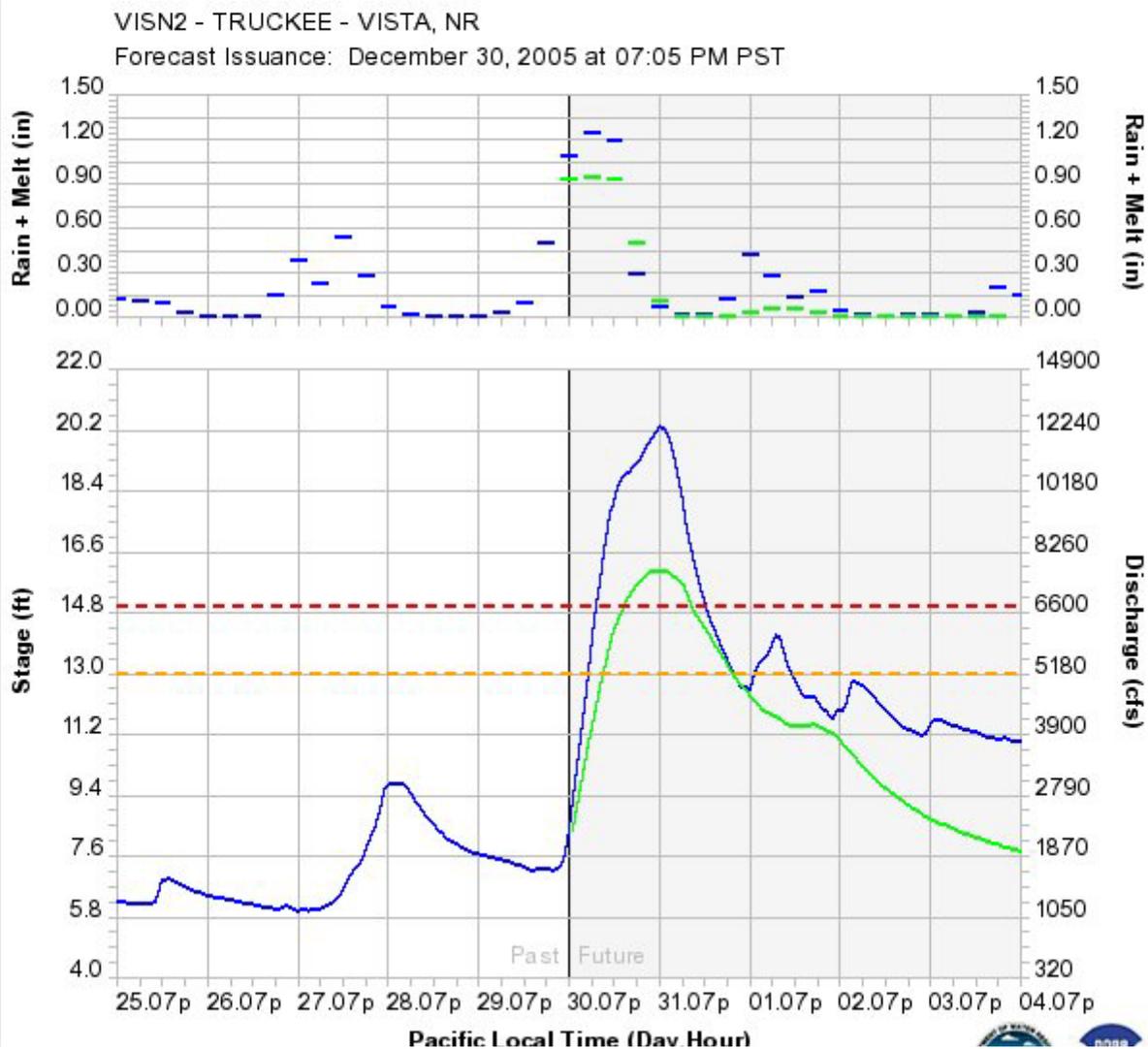
Dec 30, 2005  
14:03 hours





305  
705  
931  
1217  
1435  
1556  
1656  
1757

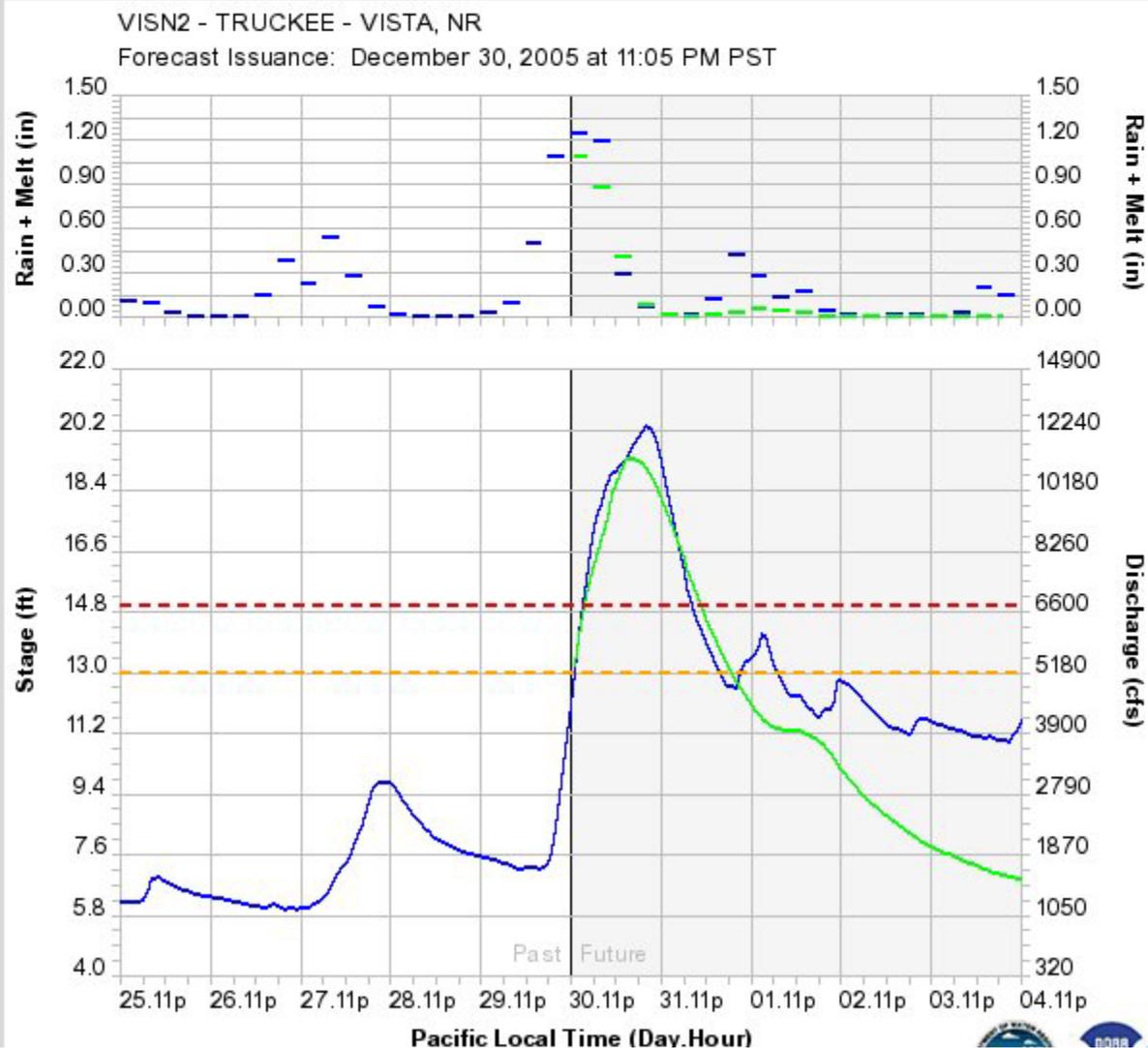
Dec 30, 2005  
19:05 hours





305  
705  
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1656  
1757

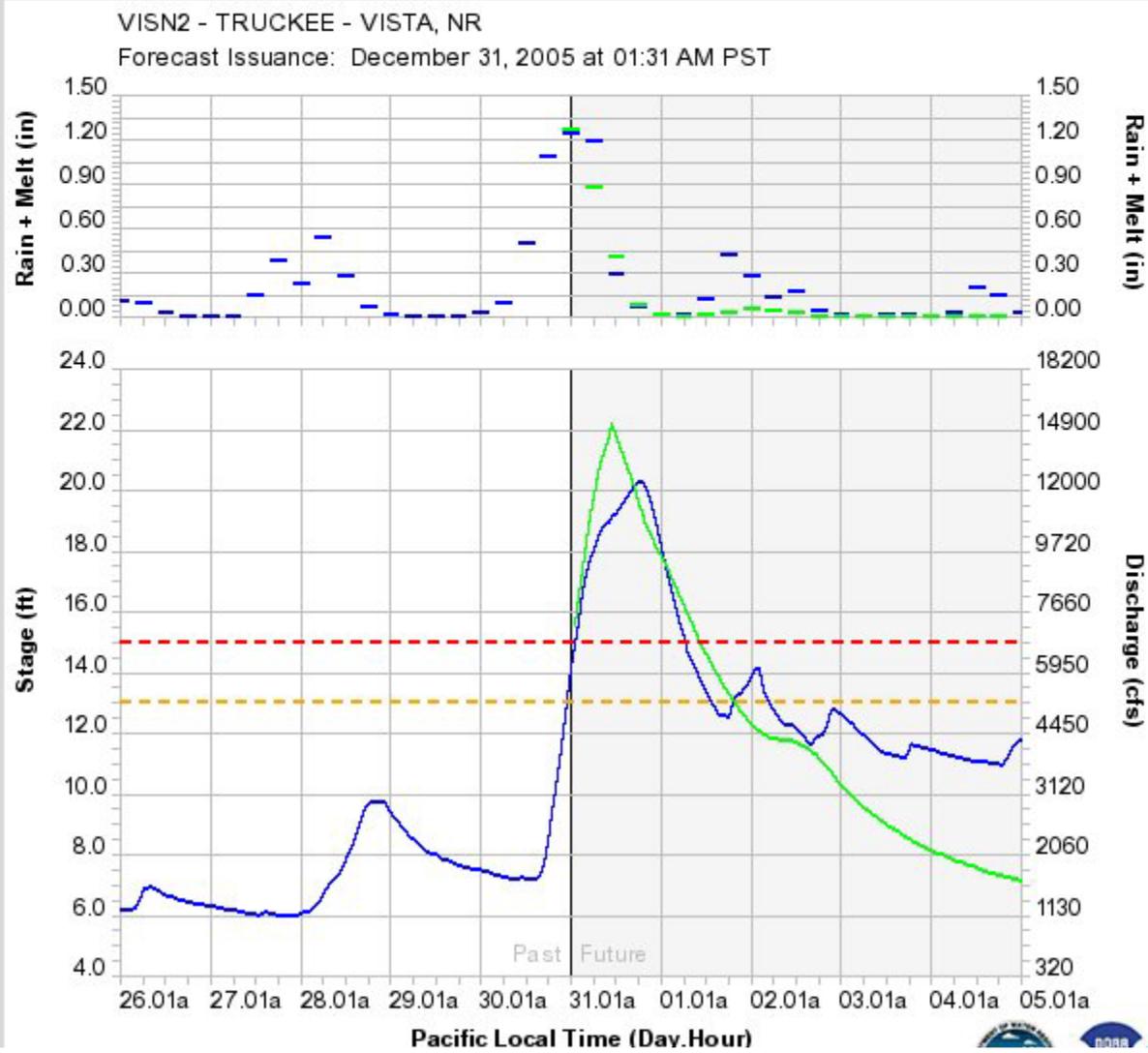
Dec 30, 2005  
23:05 hours





305  
705  
931  
1217  
1435  
1556  
1656  
1757

Dec 31, 2005  
01:31 hours



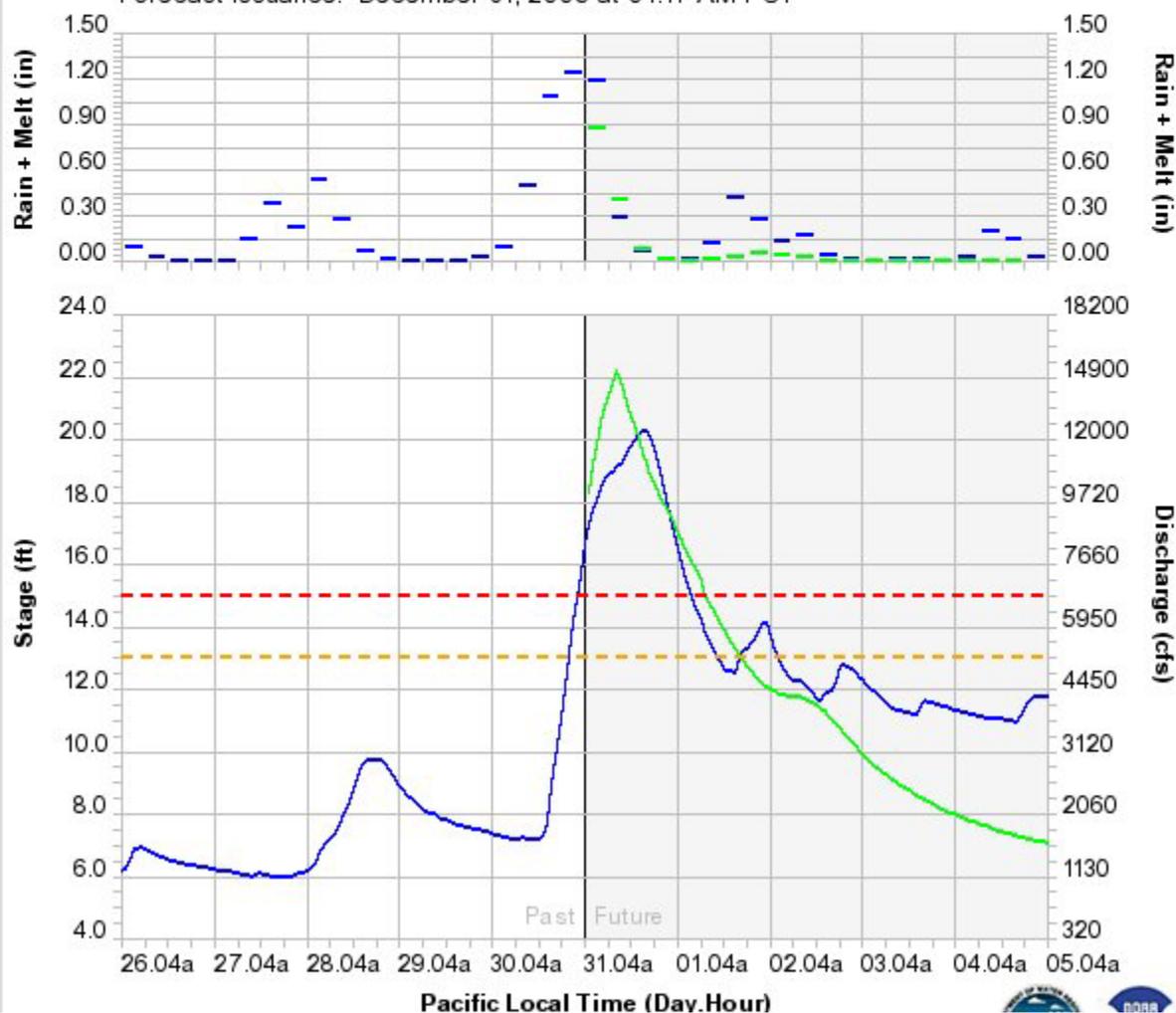


305  
705  
931  
1217  
1435  
1556  
1656  
1757

Dec 31, 2005  
04:17 hours

### VISN2 - TRUCKEE - VISTA, NR

Forecast Issuance: December 31, 2005 at 04:17 AM PST



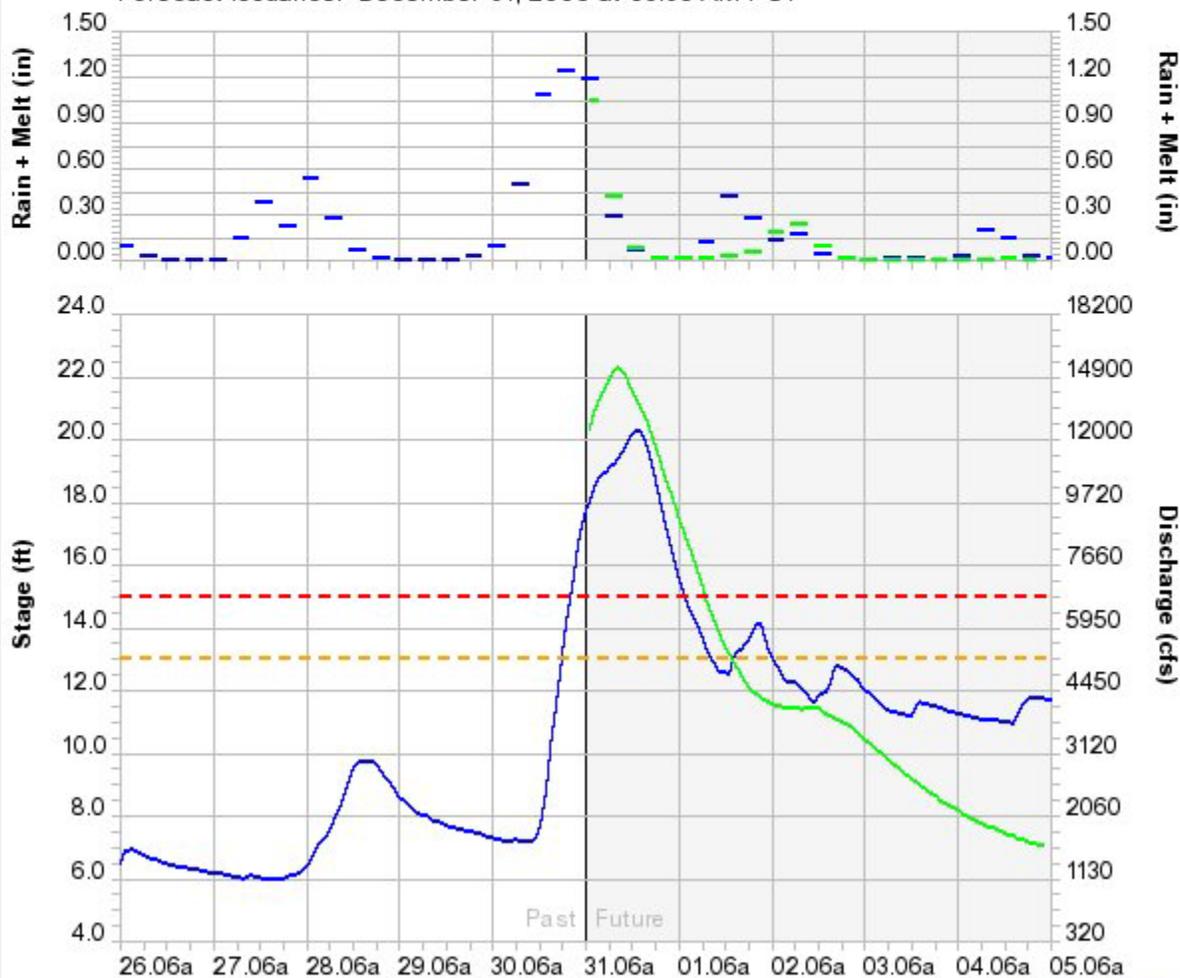


305  
705  
931  
1217  
1435  
1556  
1656  
1757

Dec 31, 2005  
06:35 hours

VISN2 - TRUCKEE - VISTA, NR

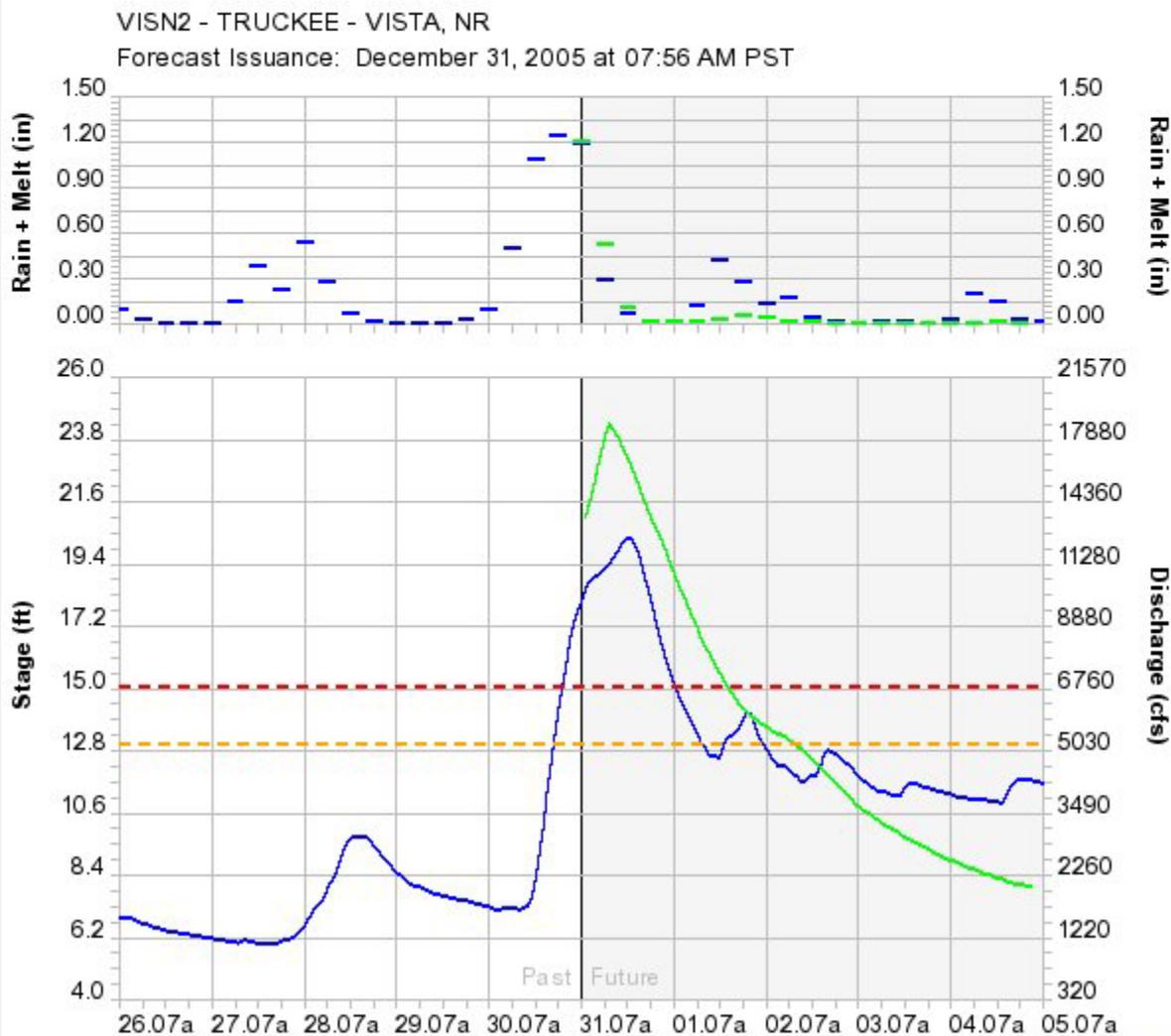
Forecast Issuance: December 31, 2005 at 06:35 AM PST





305  
705  
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1217  
1435  
1556  
1656  
1757

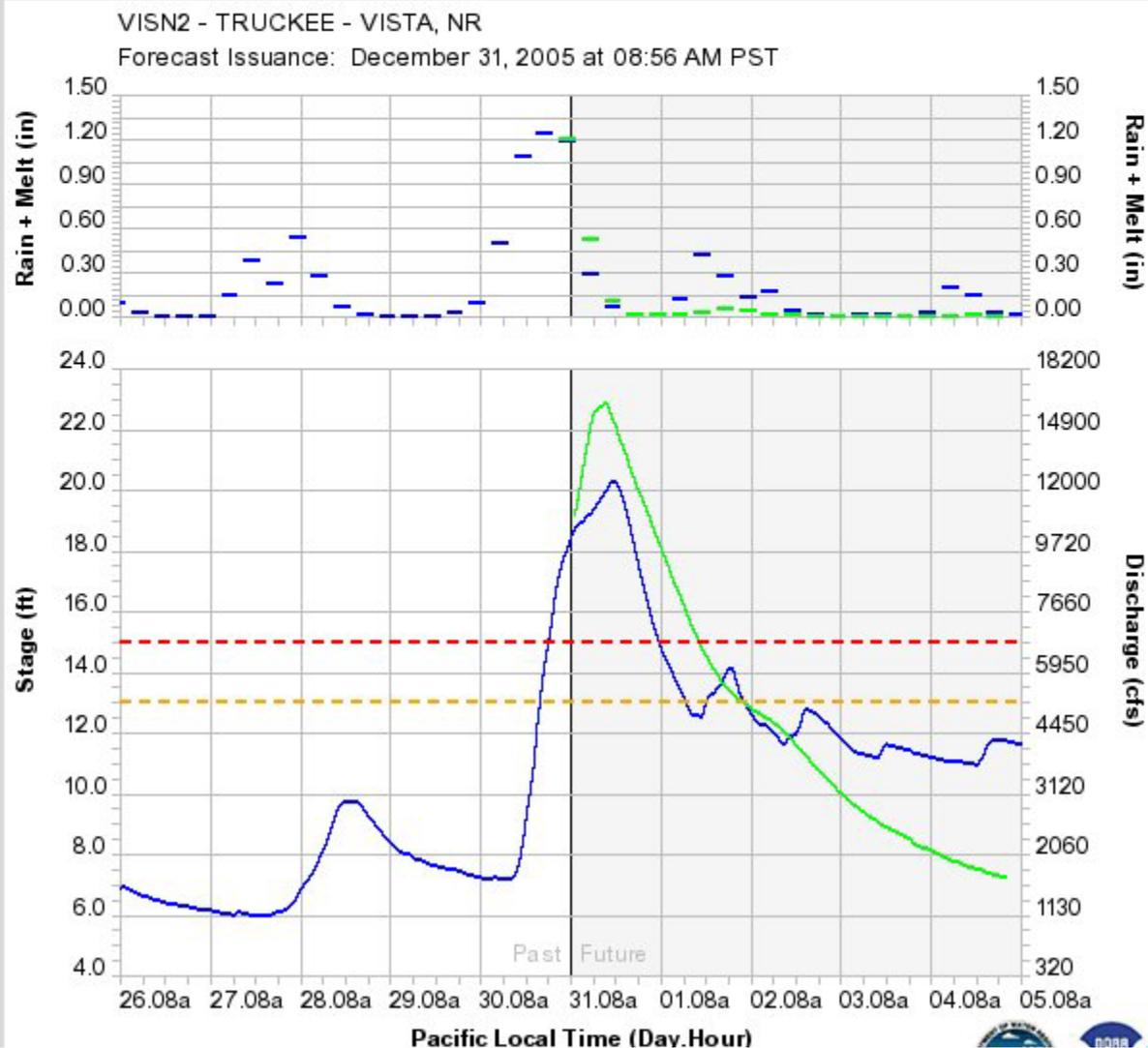
Dec 31, 2005  
07:56 hours





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705  
931  
1217  
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1656  
1757

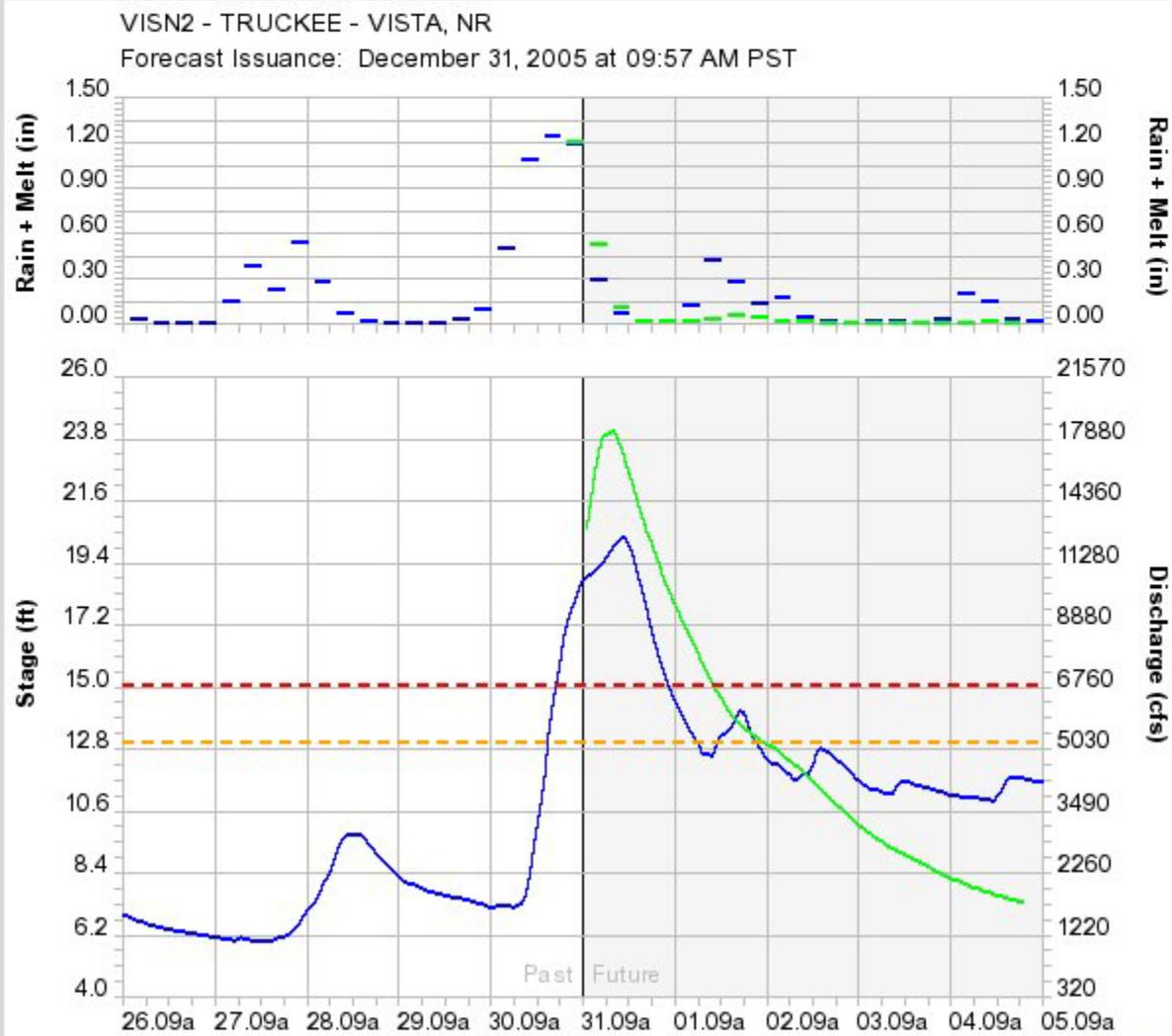
Dec 31, 2005  
08:56 hours





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705  
931  
1217  
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1556  
1656  
1757

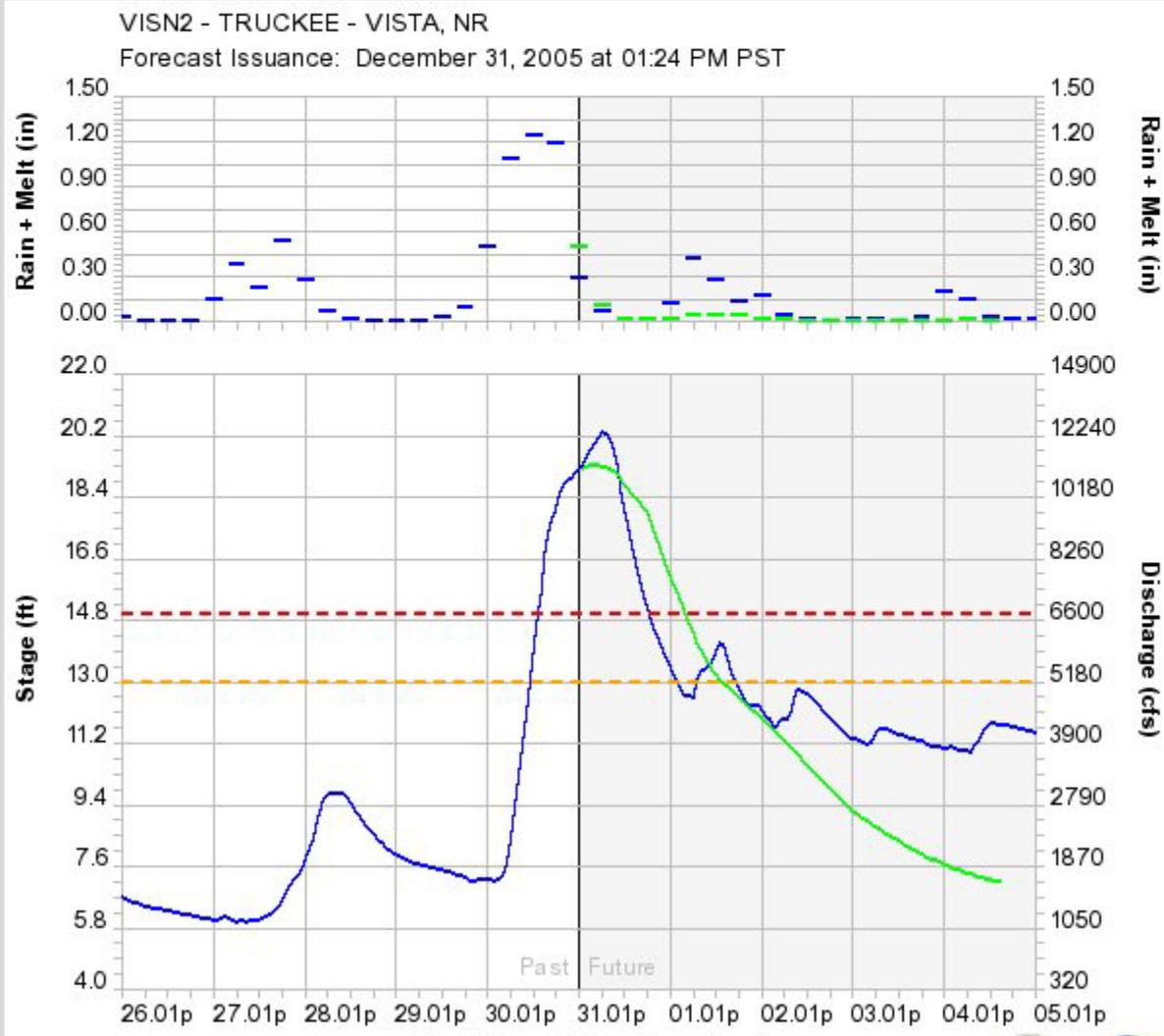
Dec 31, 2005  
09:57 hours





1217  
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1656  
1757  
2124  
2134  
2210

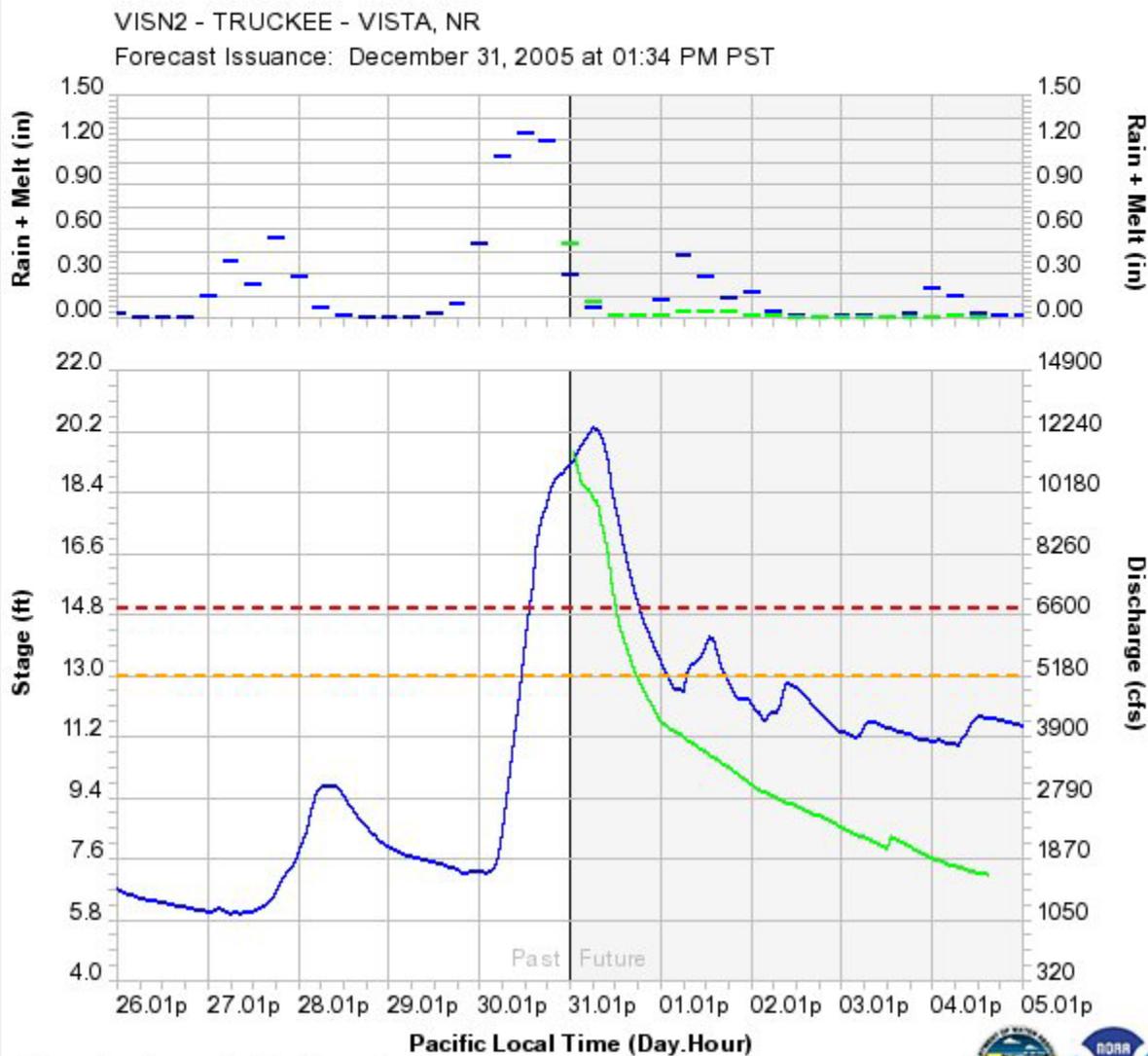
Dec 31, 2005  
13:24 hours





1217  
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1656  
1757  
2124  
2134  
2210

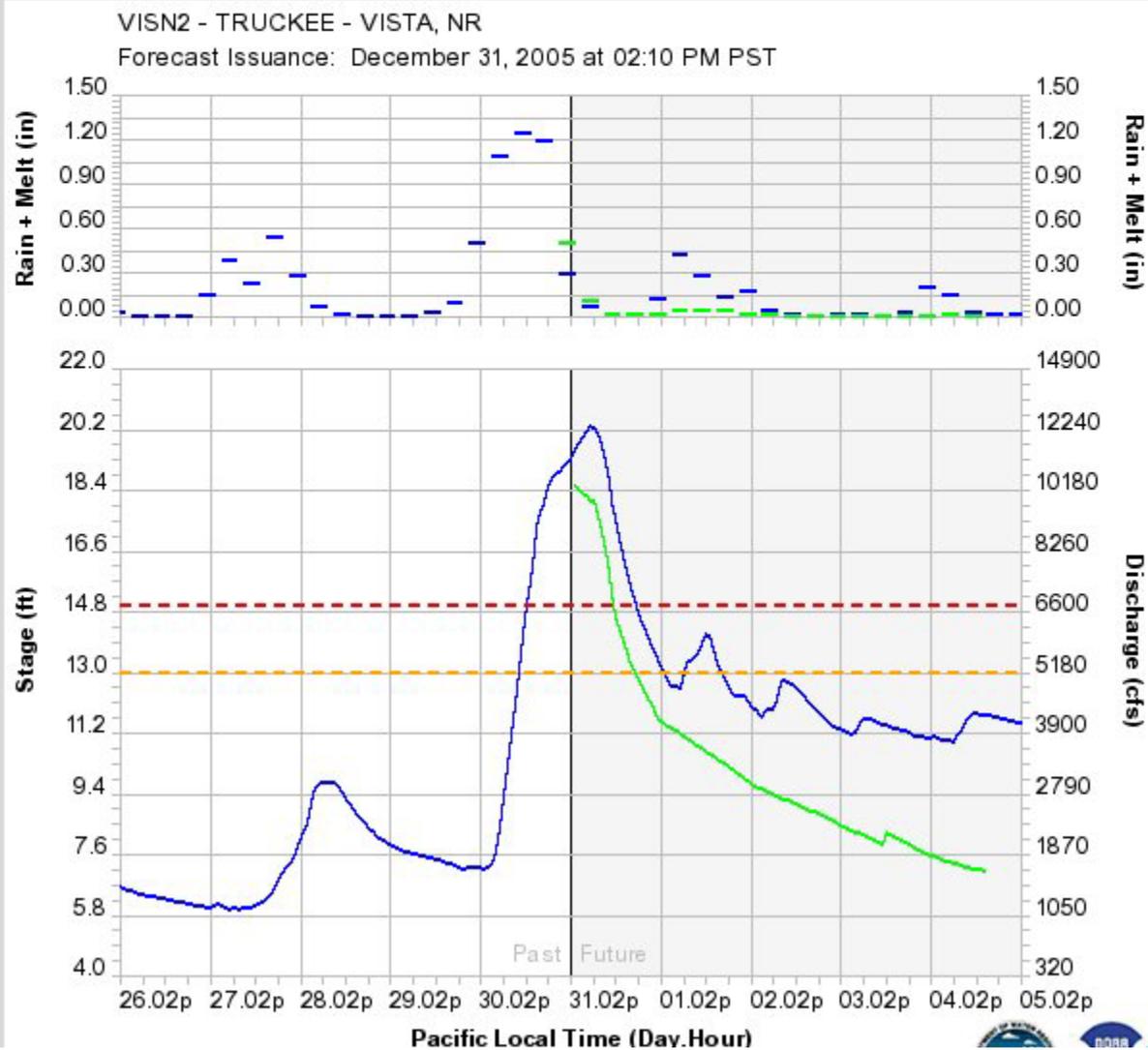
Dec 31, 2005  
13:34 hours





1217  
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1556  
1656  
1757  
2124  
2134  
2210

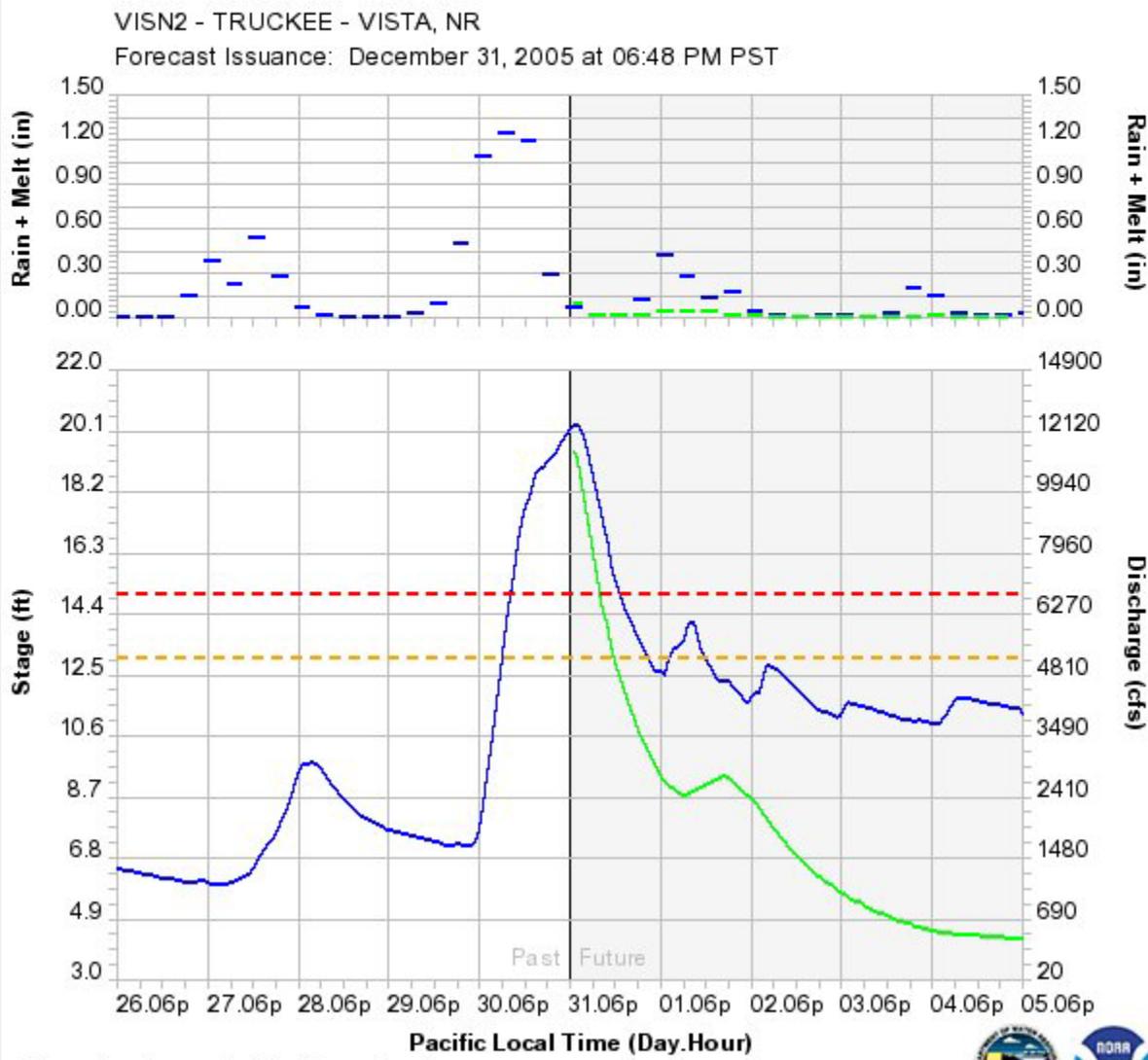
Dec 31, 2005  
14:10 hours





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257  
908  
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1614  
1627  
1732

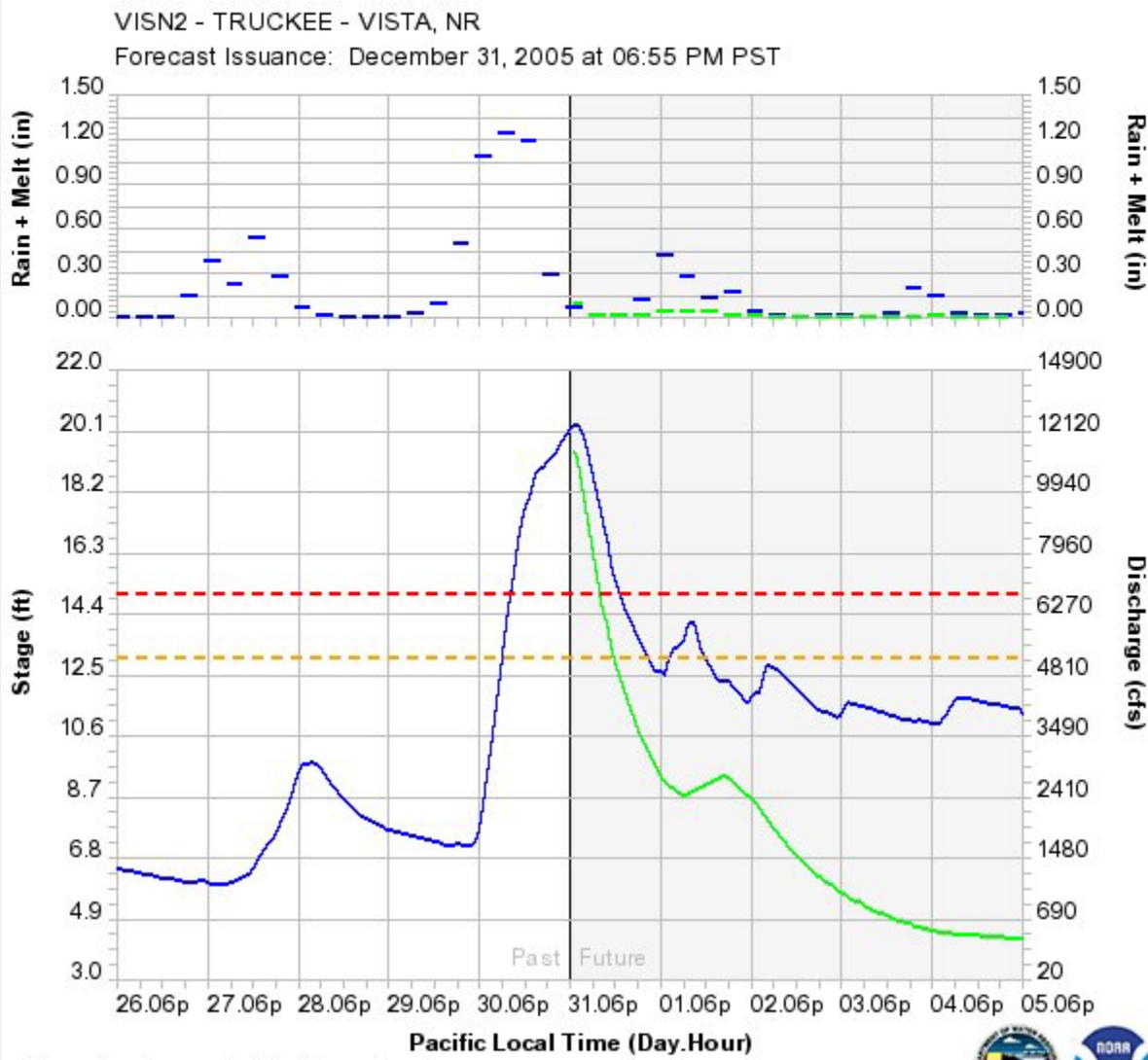
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18:48 hours





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1156  
1614  
1627  
1732

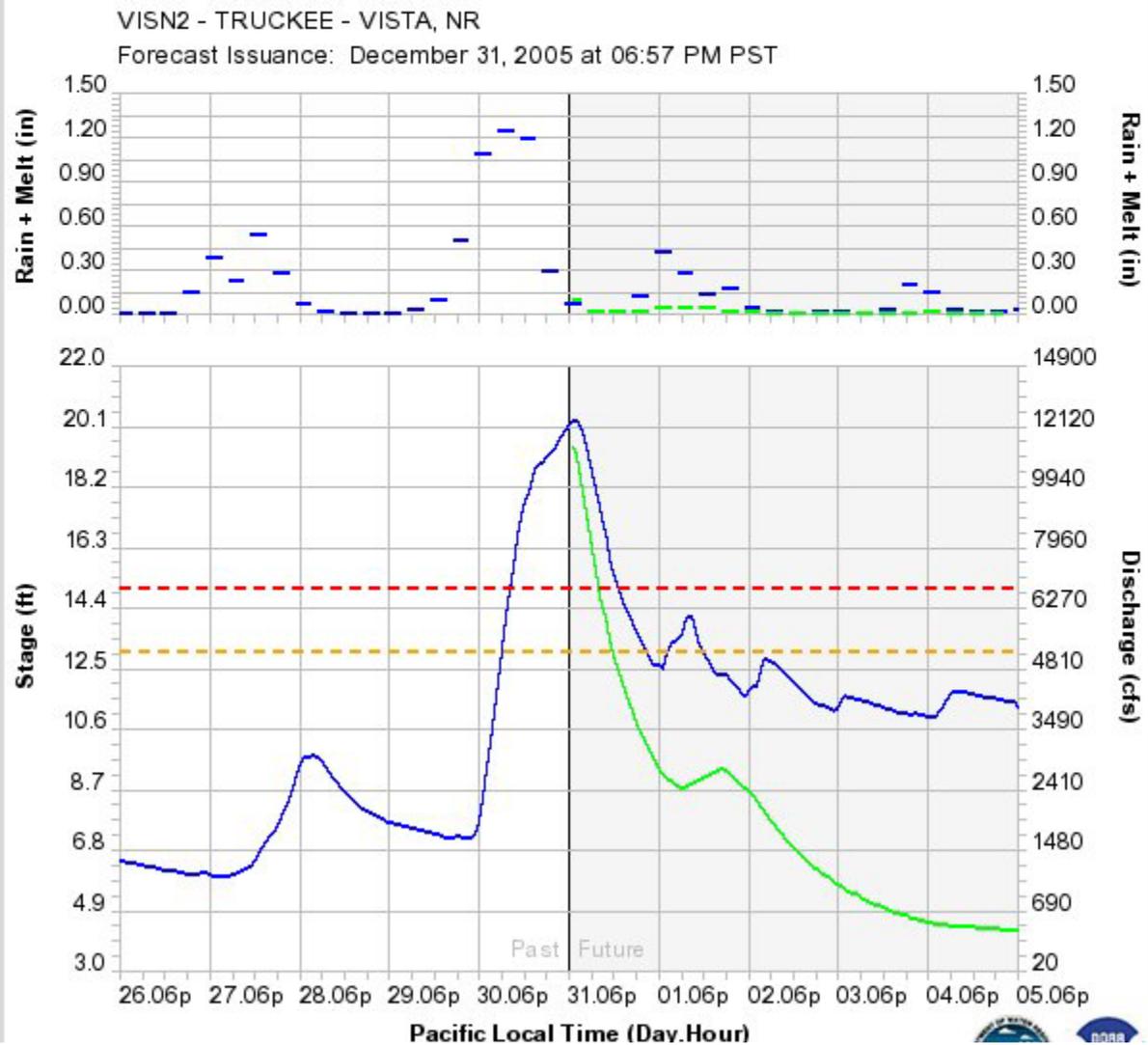
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18:55 hours





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257  
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1156  
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1627  
1732

Dec 31, 2005  
18:57 hours

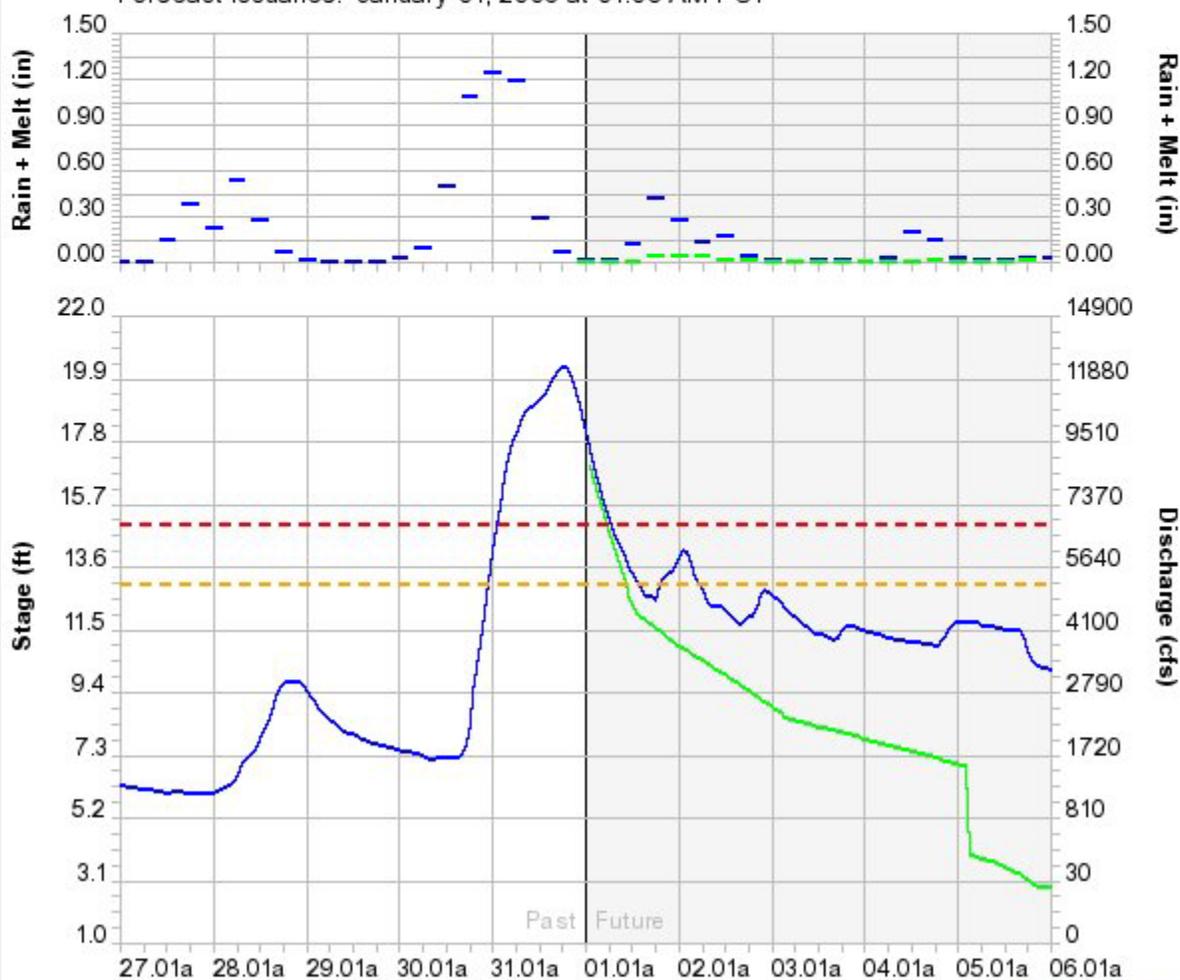




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1732

Jan 1, 2006  
01:08 hours

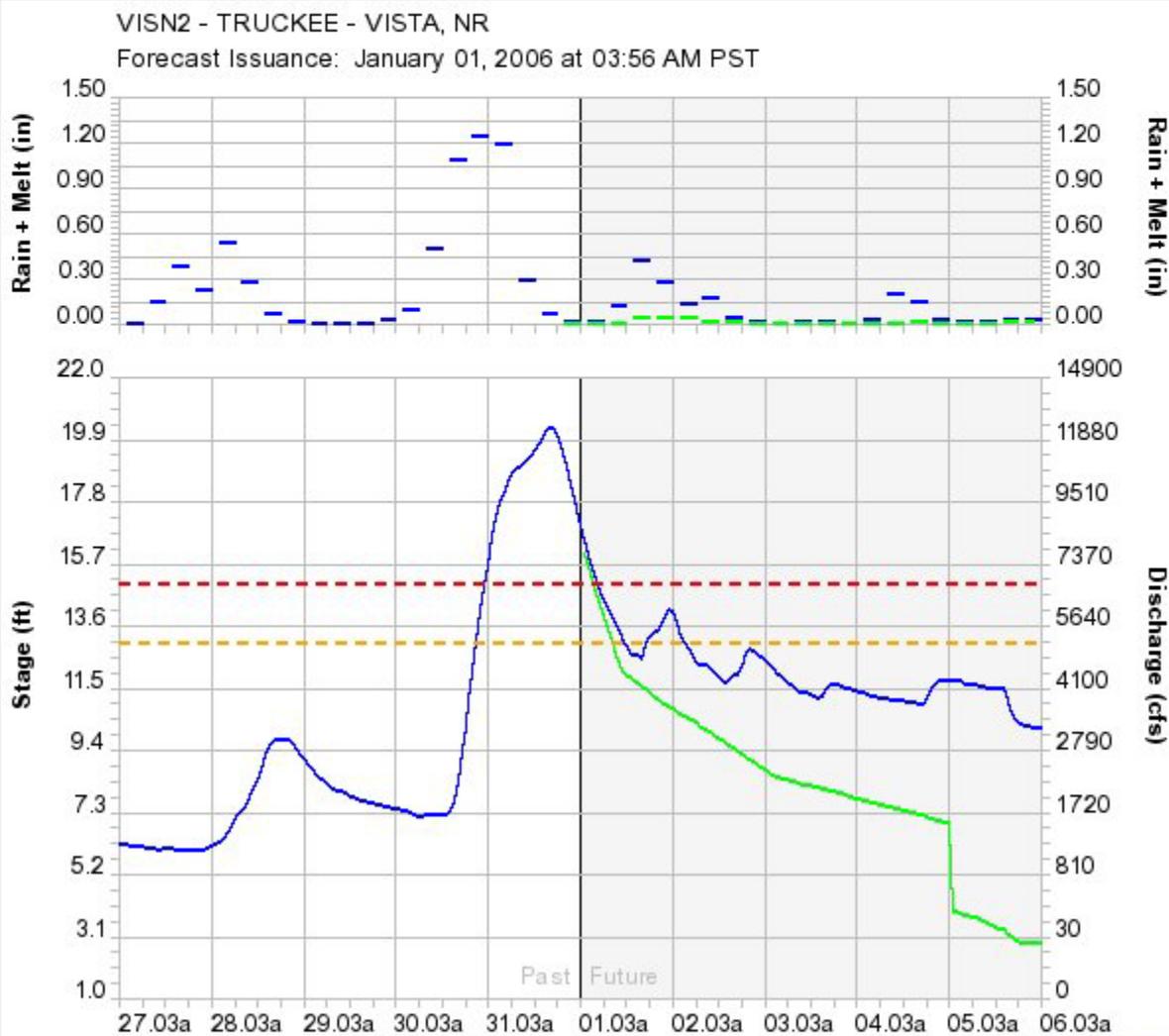
VISN2 - TRUCKEE - VISTA, NR  
Forecast Issuance: January 01, 2006 at 01:08 AM PST





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257  
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1627  
1732

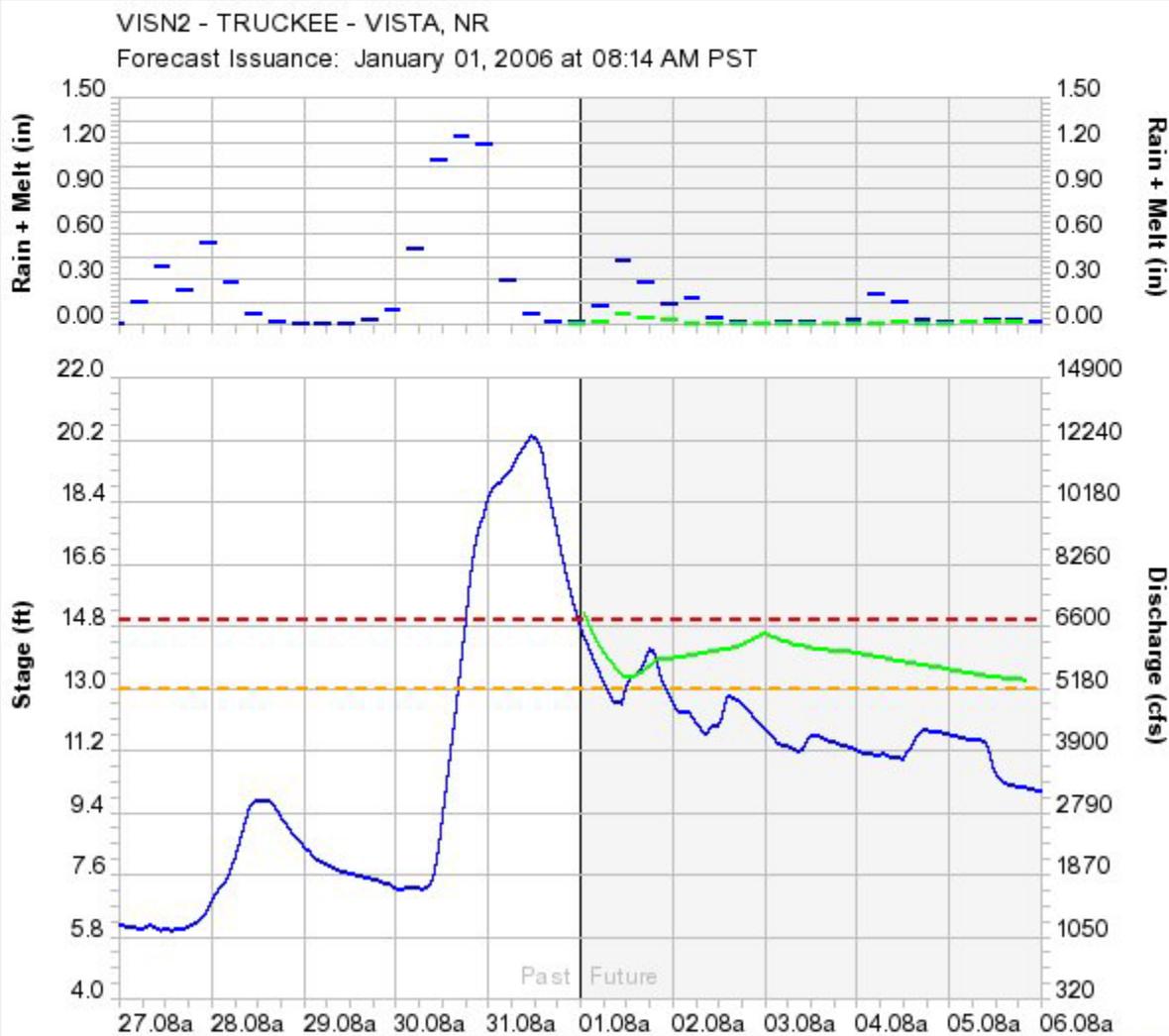
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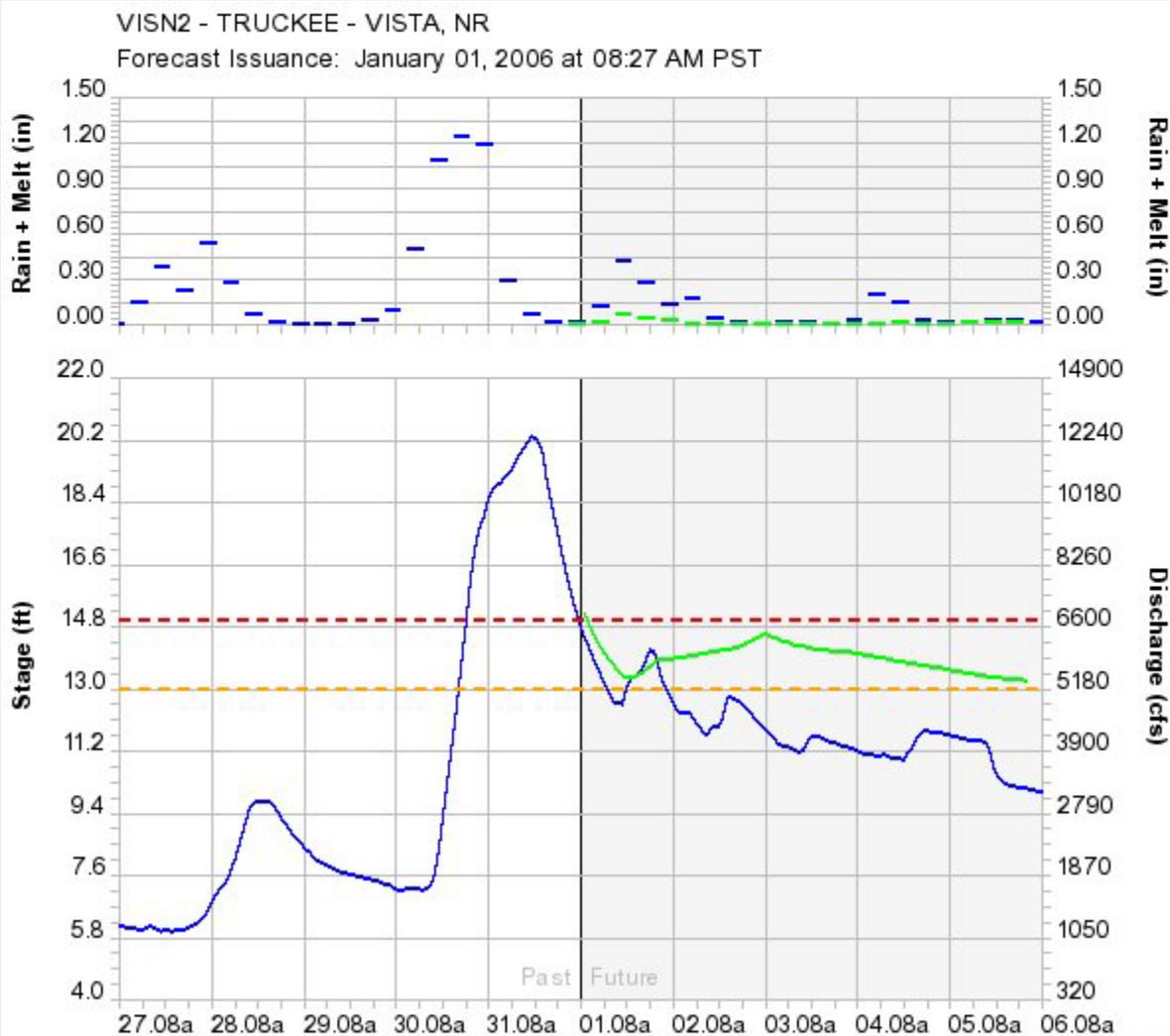
Jan 1, 2006  
08:14 hours





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908  
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1614  
1627  
1732

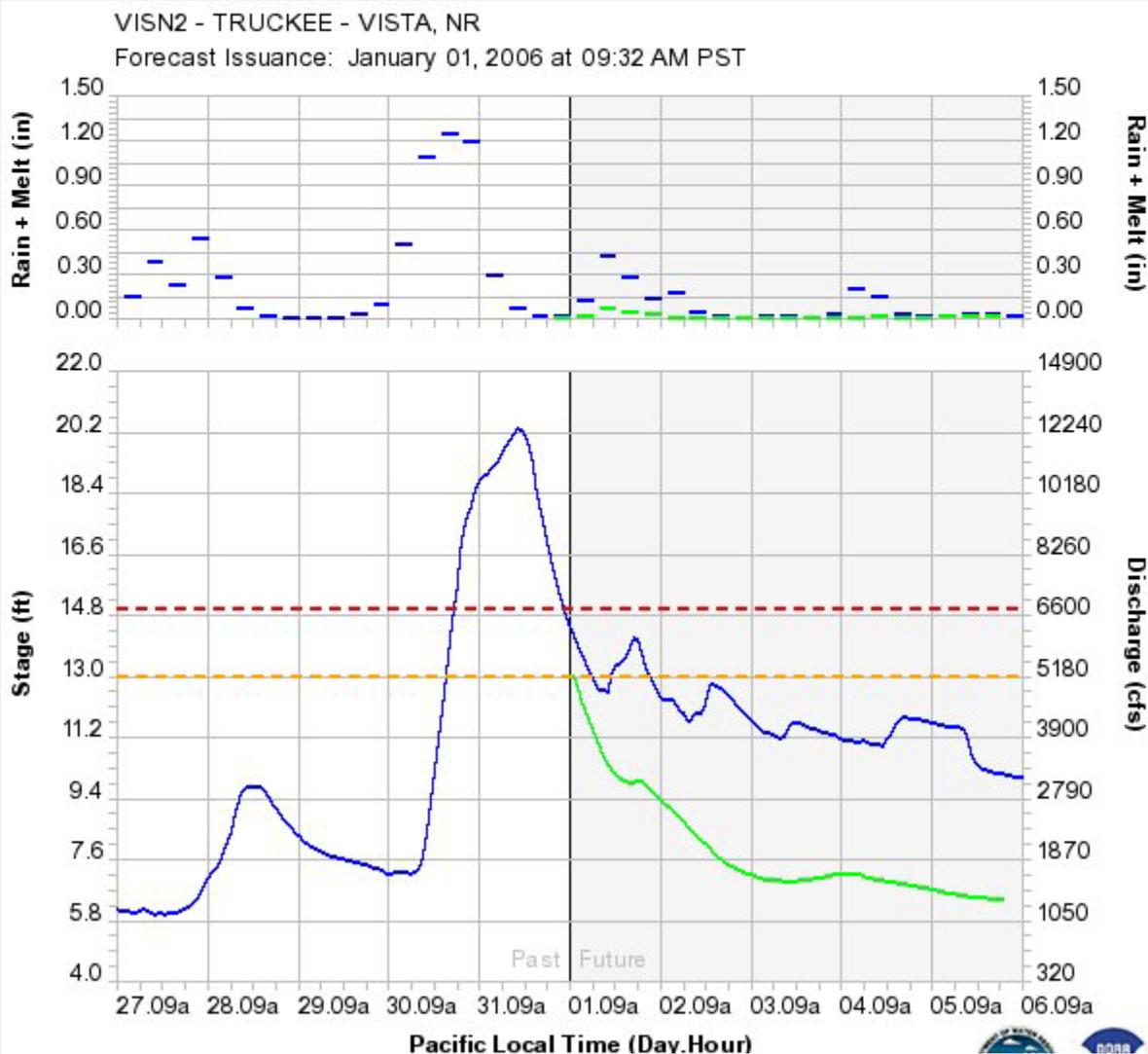
Jan 1, 2006  
08:27 hours





248  
255  
257  
908  
1156  
1614  
1627  
1732

Jan 1, 2006  
09:32 hours





257  
908  
1156  
1614  
1627  
1732  
2127  
2143

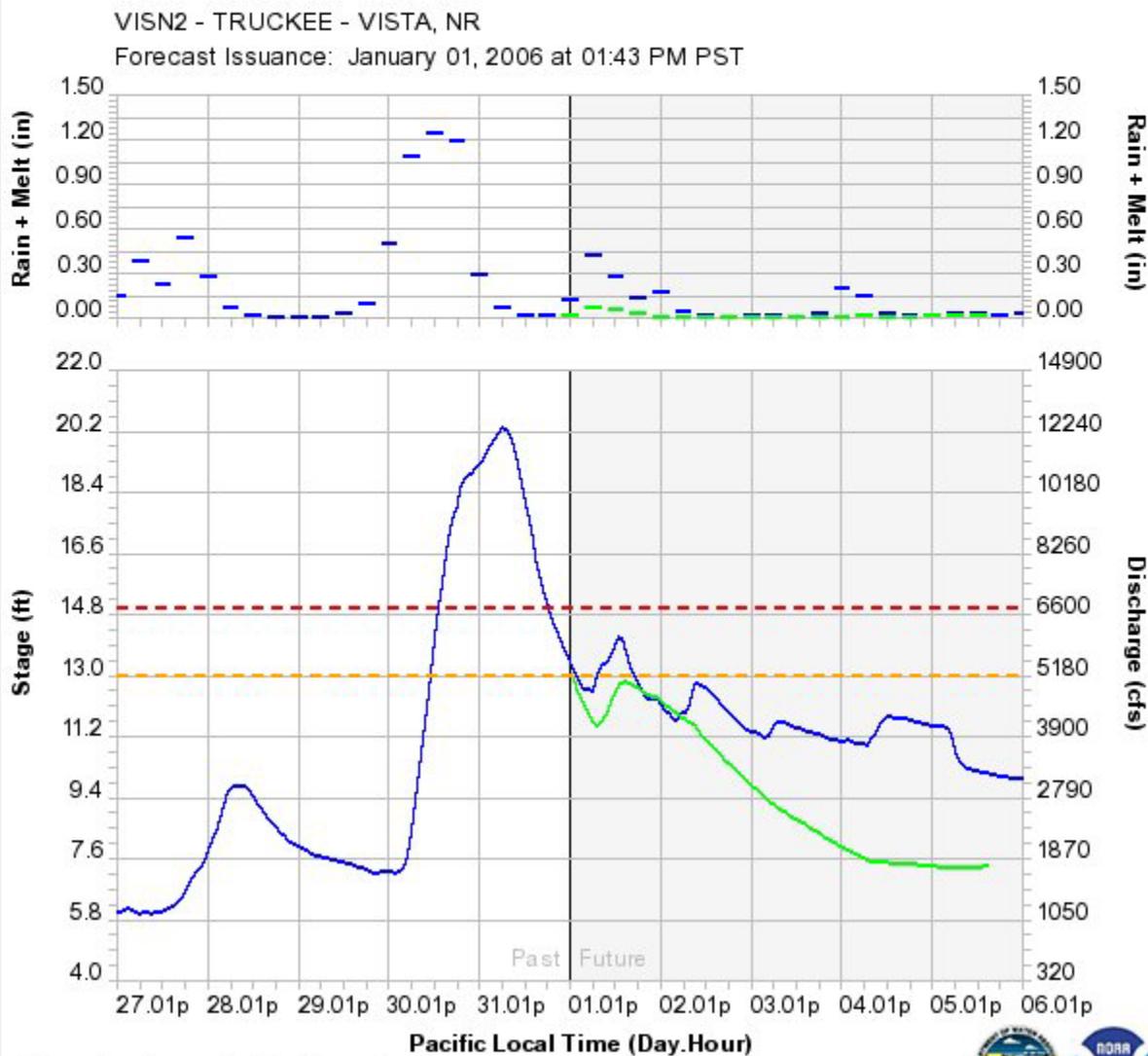
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13:27 hours





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908  
1156  
1614  
1627  
1732  
2127  
2143

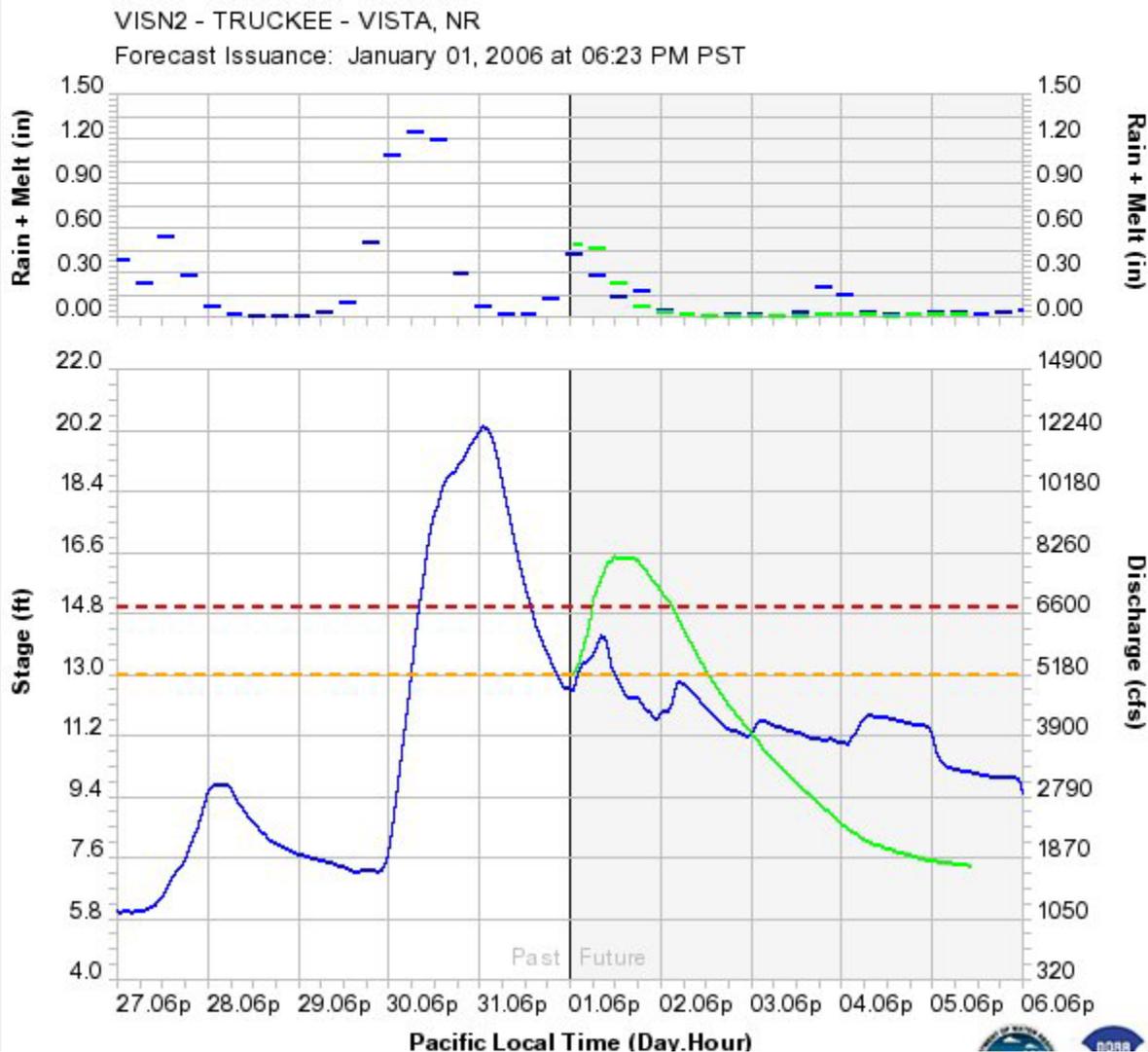
Jan 1, 2006  
13:43 hours





223  
229  
529  
955  
1643  
1840  
2115

Jan 1, 2006  
18:23 hours







# Example 1: Tide Bulletin

Jul 27, 07 11:50

Text 1: -1:RNORVFSAC

Page 1/2

FGUS56 KRSA 261329  
RVFSAC

ISSUED: THU JUL 26 2007 645 AM PDT

NEXT: FRIDAY MORNING JUL 27 ABT 7 AM

### DELTA TIDE FORECAST

CALIFORNIA NEVADA RIVER FORECAST CENTER... NATIONAL WEATHER SERVICE  
AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES... SACRAMENTO CA.

ALL STAGES ARE BELOW MONITOR LEVEL.

FORECASTS ARE BASED ON PRESENT AND FORECASTED METEOROLOGICAL  
AND HYDROLOGIC CONDITIONS AT TIME OF ISSUANCE.

#### TIDE FORECAST

RIO VISTA THU 07/26		ANTIOCH THU 07/26	
9 30 AM	2.6	9 30 AM	2.1
4 15 PM	5.3	4 00 PM	4.9
8 00 PM	4.9	7 30 PM	4.4
FRI 07/27		FRI 07/27	
1 45 AM	7.1	1 15 AM	6.7
10 30 AM	2.5	10 15 AM	1.9
5 00 PM	5.6	4 30 PM	5.1
8 45 PM	4.8	8 15 PM	4.5
SAT 07/28		SAT 07/28	
2 30 AM	7.3	2 15 AM	7.0
MALLARD ISLAND THU 07/26		VENICE ISLAND THU 07/26	
7 30 AM	1.6	11 45 AM	2.6
1 45 PM	4.8	6 00 PM	5.1
5 45 PM	4.2	9 30 PM	4.9
11 45 PM	6.6		
FRI 07/27		FRI 07/27	
8 15 AM	1.4	3 30 AM	6.9
2 30 PM	5.1	12 30 PM	2.5
6 30 PM	4.4	6 45 PM	5.4
		10 30 PM	4.9
SAT 07/28		SAT 07/28	
12 30 AM	6.9	4 15 AM	7.1

ALL THOSE AFFECTED BY RIVER CONDITIONS SHOULD REMAIN  
RAPID CHANGES AND FOR POSSIBLE FORECAST REVISIONS.

gwl

```
.AR RVBC1 20070726 P DH07/DC200707260645/HG 4.3
.AR RVBC1 20070726 P DH0930/DC200707260645/HGIFEZZ
.AR RVBC1 20070726 P DH1615/DC200707260645/HGIFEZZ
.AR RVBC1 20070726 P DH2000/DC200707260645/HGIFEZZ
.AR RVBC1 20070727 P DH0145/DC200707260645/HGIFEZZ
.AR RVBC1 20070727 P DH1030/DC200707260645/HGIFEZZ
.AR RVBC1 20070727 P DH1700/DC200707260645/HGIFEZZ
.AR RVBC1 20070727 P DH2045/DC200707260645/HGIFEZZ
.AR RVBC1 20070728 P DH0230/DC200707260645/HGIFEZZ
.AR ATIC1 20070726 P DH07/DC200707260645/HG 3.5
.AR ATIC1 20070726 P DH0930/DC200707260645/HGIFEZZ
.AR ATIC1 20070726 P DH1600/DC200707260645/HGIFEZZ
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Friday July 27, 2007

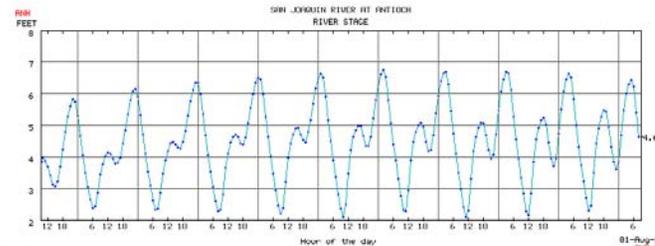


### SAN JOAQUIN RIVER AT ANTIOCH (ANH)

Elevation: 10' - SAN JOAQUIN R barm - Operator: CA Dept of Water Resources/O & M

Query executed Wednesday, 08/08/2007 08:06 PDT

[Earlier](#)



[Later](#) | [Latest](#)



Example 1  
(Continued):  
"CORRTIDE"  
guidance  
issued by  
State  
CADWR  
for tide  
bulletin

CORRTIDEWTR (07/26/07 0545)

ANH		Mech	Pres	Wind	Flow			Corrected Forecast
	Astronomical Forecast	Corr	Corr	Corr	Corr			
07/26/2007	08:27:00	1.6	0.31	-0.02	0.18	0.00	07/26/2007 09:15:00	2.1
	14:54:00	4.7	-0.02	-0.01	0.19	0.00	15:45:00	4.9
	18:29:00	3.9	0.33	0.00	0.20	0.00	18:30:00	4.4
07/27/2007	00:18:00	6.1	0.42	-0.04	0.25	0.00	07/27/2007 01:00:00	6.7
	09:12:00	1.5	0.31	-0.06	0.19	0.00	09:45:00	1.9
	15:28:00	4.9	-0.02	-0.04	0.23	0.00	16:15:00	5.1
	19:20:00	3.9	0.33	-0.03	0.29	0.00	19:30:00	4.5
07/28/2007	01:08:00	6.3	0.42	-0.03	0.30	0.00	07/28/2007 01:45:00	7.0
	09:56:00	1.4	0.31	-0.03	0.21	0.00	10:30:00	1.9
	15:59:00	5.0	-0.02	-0.03	0.21	0.00	16:30:00	5.2
	20:08:00	3.8	0.33	-0.03	0.21	0.00	20:15:00	4.3
07/29/2007	01:58:00	6.5	0.42	-0.03	0.21	0.00	07/29/2007 02:30:00	7.1
	10:36:00	1.4	0.31	-0.03	0.21	0.00	11:00:00	1.9
	16:34:00	5.2	-0.02	-0.03	0.21	0.00	17:00:00	5.4
	20:56:00	3.7	0.33	-0.03	0.21	0.00	21:00:00	4.2
07/30/2007	02:45:00	6.6	0.42	-0.03	0.21	0.00	07/30/2007 03:00:00	7.2
	11:11:00	1.4	0.31	-0.03	0.21	0.00	11:30:00	1.9
	17:03:00	5.3	-0.02	-0.03	0.21	0.00	17:15:00	5.5
	21:47:00	3.6	0.33	-0.03	0.21	0.00	21:45:00	4.1
07/31/2007	03:29:00	6.5	0.42	-0.03	0.21	0.00	07/31/2007 03:45:00	7.1

IST		Mech	Pres	Wind	Flow			Corrected Forecast
	Astronomical Forecast	Corr	Corr	Corr	Corr			
07/26/2007	19:22:00	5.3	0.10	0.00	0.19	0.00	07/26/2007 16:30:00	5.6
	23:13:00	4.6	1.16	-0.03	0.26	0.00	21:45:00	6.0
07/27/2007	04:15:00	5.8	0.00	-0.03	0.26	0.00	07/26/2007 23:45:00	6.0
	15:03:00	4.5	2.22	-0.03	0.22	0.00	06:00:00	6.9
	19:53:00	5.4	0.10	-0.03	0.24	0.00	17:30:00	5.7
07/28/2007	00:03:00	4.7	1.16	-0.03	0.33	0.00	07/27/2007 23:00:00	6.2
	05:02:00	5.8	0.00	-0.03	0.33	0.00	01:30:00	6.1
	15:40:00	4.5	2.22	-0.03	0.23	0.00	08:30:00	6.9
	20:22:00	5.5	0.10	-0.03	0.23	0.00	18:30:00	5.8
07/29/2007	00:47:00	4.7	1.16	-0.03	0.23	0.00	07/29/2007 00:00:00	6.1
	05:50:00	5.9	0.00	-0.03	0.23	0.00	03:00:00	6.1
	16:09:00	4.6	2.22	-0.03	0.23	0.00	10:45:00	7.0
	20:54:00	5.5	0.10	-0.03	0.23	0.00	19:30:00	5.8
07/30/2007	01:28:00	4.7	1.16	-0.03	0.23	0.00	07/30/2007 00:45:00	6.1
	06:33:00	5.9	0.00	-0.03	0.23	0.00	04:30:00	6.1
	16:33:00	4.6	2.22	-0.03	0.23	0.00	13:00:00	7.0
	21:19:00	5.5	0.10	-0.03	0.23	0.00	20:30:00	5.8
07/31/2007	02:16:00	4.7	1.16	-0.03	0.23	0.00	07/31/2007 02:00:00	6.1

MAL		Mech	Pres	Wind	Flow			Corrected Forecast
	Astronomical Forecast	Corr	Corr	Corr	Corr			
07/26/2007	06:31:00	1.7	-0.32	-0.01	0.18	0.00	07/26/2007 08:30:00	1.6
	12:42:00	4.8	-0.12	-0.01	0.17	0.00	15:00:00	4.8
	16:38:00	3.9	0.08	0.00	0.20	0.00	18:00:00	4.2
	22:42:00	6.4	-0.01	-0.04	0.25	0.00	00:15:00	6.6
07/27/2007	07:17:00	1.6	-0.32	-0.06	0.19	0.00	07/27/2007 09:00:00	1.4
	13:35:00	5.0	-0.12	-0.04	0.22	0.00	15:15:00	5.1
	17:37:00	4.1	0.08	-0.03	0.29	0.00	18:45:00	4.4
	23:25:00	6.6	-0.01	-0.03	0.32	0.00	00:30:00	6.9
07/28/2007	07:59:00	1.5	-0.32	-0.03	0.21	0.00	07/28/2007 09:15:00	1.4
	14:18:00	5.1	-0.12	-0.03	0.21	0.00	15:45:00	5.2
	18:33:00	4.1	0.08	-0.03	0.21	0.00	19:30:00	4.4
07/29/2007	00:11:00	6.7	-0.01	-0.03	0.21	0.00	07/29/2007 01:00:00	6.9



Jul 27, 07 11:50 Text 1: -1:RNORVFSAC Page 1

PNR556 KRSA 261329  
07/26/07

ISSUED: THU JUL 26 2007 645 AM PDT

NEXT: FRIDAY MORNING JUL 27 APT 7 AM

DELTA TIDE FORECAST

CALIFORNIA NEVADA RIVER FORECAST CENTER... NATIONAL WEATHER SERVICE  
AND THE CALIFORNIA DEPARTMENT OF WATER RESOURCES... SACRAMENTO CA.

ALL STAGES ARE BELOW MONITOR LEVEL.

FORECASTS ARE BASED ON PRESENT AND FORECASTED METEOROLOGICAL  
AND HYDROLOGIC CONDITIONS AT TIME OF ISSUANCE.

TIDE FORECAST

REC VISTA	ANTICIC
THU 07/26	THU 07/26
9 30 AM 2.6	9 30 AM 2.1
4 15 PM 5.3	4 00 PM 4.9
8 00 PM 4.9	7 30 PM 4.4
FRI 07/27	FRI 07/27
1 45 AM 7.1	1 15 AM 6.7
10 30 AM 2.5	10 15 AM 1.9
5 00 PM 5.6	4 30 PM 5.1
8 45 PM 4.8	8 15 PM 4.5
SAT 07/28	SAT 07/28
2 30 AM 7.3	2 15 AM 7.0

MALLARD ISLAND

THU 07/26	VENICE ISLAND
THU 07/26	THU 07/26
7 30 AM 1.6	11 45 AM 2.6
1 45 PM 4.8	6 00 PM 5.1
5 45 PM 4.2	9 30 PM 4.9
11 45 PM 6.6	
FRI 07/27	FRI 07/27
8 15 AM 1.4	3 30 AM 6.9
2 30 PM 5.1	12 30 PM 2.5
6 30 PM 4.4	6 45 PM 2.4
	10 30 PM 4.9
SAT 07/28	SAT 07/28
12 30 AM 6.9	4 15 AM 7.1

ALL THOSE AFFECTED BY RIVER CONDITIONS SHOULD REMAIN ALERT FOR  
RAPID CHANGES AND FOR POSSIBLE FORECAST REVISIONS.

gwl

.AR RVBCL 20070726 F DH07/DC200707260645/HG 4.3 OBSERVED  
.AR RVBCL 20070726 F DH0930/DC200707260645/HG1FEZZ 2.6  
.AR RVBCL 20070726 F DH1615/DC200707260645/HG1FEZZ 5.3  
.AR RVBCL 20070726 F DH2000/DC200707260645/HG1FEZZ 4.9  
.AR RVBCL 20070727 F DH0145/DC200707260645/HG1FEZZ 7.1  
.AR RVBCL 20070727 F DH1030/DC200707260645/HG1FEZZ 2.5  
.AR RVBCL 20070727 F DH1700/DC200707260645/HG1FEZZ 5.6  
.AR RVBCL 20070727 F DH2045/DC200707260645/HG1FEZZ 4.8  
.AR RVBCL 20070728 F DH0230/DC200707260645/HG1FEZZ 7.3  
.AR ATICL 20070726 F DH07/DC200707260645/HG 3.5 OBSERVED  
.AR ATICL 20070726 F DH0930/DC200707260645/HG1FEZZ 2.1  
.AR ATICL 20070726 F DH1600/DC200707260645/HG1FEZZ 4.9  
.AR ATICL 20070726 F DH1930/DC200707260645/HG1FEZZ 4.4  
.AR ATICL 20070727 F DH0115/DC200707260645/HG1FEZZ 6.7

Friday July 27, 2007



## Example 2: Probabilistic Water Supply Forecast, Long-term

Jul 27, 07 11:48		Text 1: RNOESPRSA					Page 1/1
FGUS66 KRSA 061516 ESPRSA							
WATER SUPPLY OUTLOOK		Jun 1 2007					
COASTAL BASINS							
	Period	MP	MP%	RMAX	RMIN	AVG	
Williamson River							
Sprague, blo	Mar-Sep	340	67	380	300	505	
Sprague River							
Chiloquin, nr	Mar-Sep	144	47	175	115	305	
Upper Klamath Falls River							
Inflow	Mar-Sep	475	66	515	435	715	
Lost River							
Gerber Reservoir Inflow	May-Jul	1.50	23	2.6	0.40	6.4	
Clear Lake Reservoir Inflow	May-Jul	4.0	21	7.0	1.00	19.3	
EASTSIDE SIERRA - HUMBOLDT BASIN							
Truckee River							
Lake Tahoe Stage Rise	Apr-High	0.45	33	0.56	0.44	1.38	
Ltl Truckee River							
Boca Res, abv, Truckee, nr	Apr-Jul	25	31	32	22	80	
Truckee River							
Farad	Apr-Jul	100	38	128	90	260	
EF Carson River							
Gardnerville, nr	Apr-Jul	70	37	88	63	189	
WF Carson River							
Woodfords	Apr-Jul	20	36	25	18.0	56	
Carson River							
Carson City, nr	Apr-Jul	43	23	58	40	188	
Fort Churchill, nr	Apr-Jul	38	21	53	34	178	
East Walker River							
Bridgeport, nr	Apr-Aug	18.0	27	30	9.0	67	
West Walker River							
Ltl Walker, blo, Coleville, nr	Apr-Jul	61	39	78	53	156	
Humboldt River							
Elko, nr	Apr-Jul	45	29	70	30	154	
Palisade	Apr-Jul	80	32	120	60	250	
Comus	Apr-Jul	60	27	100	40	225	
<p>* 30 Year Averages for 1971-2000 are incomplete. Those forecast points with an asterik have incomplete averages, so 1961-1990 averages are listed. The new averages will be incorporated into this product when the complete data sets become available.</p> <p>MP Most probable volume in 1000 acre-feet.            MP% Most probable volume in percent of the 71-00 average.            RMAX Volume that has a 10 percent chance of being exceeded.            RMIN Volume that has a 90 percent chance of being exceeded.            AVG Average volume for the 71-00 period.</p> <p>All forecast volumes reflect natural flow. Actual observed flow may be affected by upstream water management.</p> <p>CNRFC/at/tm</p>							





Example 3:  
ESP Probabilistic  
inflow guidance  
histogram from  
“build-your-own”  
AHPS/ESP trace  
analysis available  
on CNRFC website.  
Long-term  
ensemble guidance

CNRFC - Hydrology - AHPS - AHPS/ESP Trace Analysis - Your Created Product - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

file:///C:/Documents%20and%20Settings/Alan%20Takamoto/My%20Documents/WR.Verification/build.trace.f

CNRFC Customize Links Google Windows Marketplace Windows Media Windows

www.nws.noaa.gov

National Weather Service  
California Nevada  
River Forecast Center

HOME NEWS ORGANIZATION SEARCH Enter Search Here Go

Forecast By  
"City, St" or Zip Code  
City, St Go

Hydrology  
Precipitation Data  
River/Reservoir Data  
River Guidance  
Flash Flood Guidance  
AHPS/ESP Traces  
WFO Hydro Products  
Water Supply  
River Flood Outlook  
Weather  
Quick Summary  
CNRFC/MPC QPF  
Watches/Warnings  
Satellite Imagery  
Radar Imagery  
Observations  
Weather Forecasts  
Numerical Models  
Climate  
Data and Indices  
Climate Forecasts  
El Niño and MJO  
Teleconnections  
Hydroclimatology  
Local Info and Links  
Research & Outreach  
Storm Summaries  
Publications  
Newsletter  
Links  
RFC Map  
WFO Map  
Miscellaneous Links  
Information  
About Us  
Flood Forecasting  
Flash Flooding  
Water Supply  
Spring Snowmelt  
Acronyms  
Contact Us  
Webmaster Email

**AMERICAN RIVER - FOLSOM LAKE (FOLC1)**  
Latitude: 38.70° N Longitude: 121.17° W Elevation: 350 Feet  
Location: Sacramento County in California  
*Monitor Stage: N/A* *Flood Stage: 466.0 Feet*

**1 Month Chances of Exceeding River Levels**

AMERICAN RIVER - FOLSOM LAKE (FOLC1) - 1 Month Chances of Exceeding River Levels  
Latitude: 38.8 Longitude: 121.0  
Forecast for the period 6/26/2007 - 5/26/2008  
This is a conditional simulation based on the current conditions as of 6/25/2007

Month	>= 90%	75 - 90%	50 - 75%	25 - 50%	10 - 25%
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0

Volume (AC-FT)

Exceedance Probability

- 10 - 25%
- 25 - 50%
- 50 - 75%
- 75 - 90%
- >= 90%

NOAA

http://www.nws.noaa.gov/



Example 3  
(Continued):  
ESP Probabilistic  
inflow guidance  
text output from  
“build-your-own”  
AHPS/ESP trace  
analysis available  
on CNRFC website.  
Long-term  
ensemble guidance

CNRFC - Hydrology - AHPS - AHPS/ESP Trace Analysis - Your Created Product - Mozilla Firefox

file:///C:/Documents%20and%20Settings/Alan%20Takamoto/My%20Documents/WR.Verification/build.trace.f

www.nws.noaa.gov

### National Weather Service California Nevada River Forecast Center

HOME NEWS ORGANIZATION SEARCH Enter Search Here Go

Forecast By "City, St" or Zip Code  
City, St Go

Hydrology  
Precipitation Data  
River/Reservoir Data  
River Guidance  
Flash Flood Guidance  
AHPS/ESP Traces  
WFO Hydro Products  
Water Supply  
River Flood Outlook  
Weather  
Quick Summary  
CNRFC/HPC QPF  
Watches/Warnings  
Satellite Imagery  
Radar Imagery  
Observations  
Weather Forecasts  
Numerical Models  
Climate  
Data and Indices  
Climate Forecasts  
El Niño and MJO  
Teleconnections  
Hydroclimatology  
Local Info and Links  
Research & Outreach  
Storm Summaries  
Publications  
Newsletter  
Links  
RFC Map  
WFO Map  
Miscellaneous Links  
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About Us  
Flood Forecasting  
Flash Flooding  
Water Supply  
Spring Snowmelt  
Acronyms  
Contact Us  
Webmaster Email

#### AMERICAN RIVER - FOLSOM LAKE (FOLC1)

Latitude: 38.70° N Longitude: 121.17° W Elevation: 350 Feet  
Location: Sacramento County in California

Monitor Stage: N/A Flood Stage: 466.0 Feet

**CAUTION:**  
*The Information Obtained Has NOT Been Reviewed by the CNRFC.  
Some Forecast Points Need a Bias Adjustment Before Use.*

# ESP Forecast Information  
#  
# Analysis Period: 6/26/2007 24 - 6/1/2008 24 (PST)  
# Forecast Parameters: Volume (Sum) - (AC-FT)  
#  
# Forecast Interval: 1 Month  
# Forecast Point: AMERICAN-FOLSOM RES  
#  
# AMERICAN-FOLSOM RES 0.90 0.75 0.50 0.25 0.10 Units  
#-----  
07/01/2007 - 07/31/2007 899.98 900.70 924.39 1091.17 1287.65 (AC-FT)  
08/01/2007 - 08/31/2007 0.00 0.00 0.00 63.64 1504.92 (AC-FT)  
09/01/2007 - 09/30/2007 2224.53 2366.21 3198.49 4565.92 9750.13 (AC-FT)  
10/01/2007 - 10/31/2007 6129.74 8074.93 9997.14 14950.91 36306.18 (AC-FT)  
11/01/2007 - 11/30/2007 7472.11 11559.23 38508.83 67942.05 243154.38 (AC-FT)  
12/01/2007 - 12/31/2007 13279.11 33411.34 81051.40 173396.36 765094.94 (AC-FT)  
01/01/2008 - 01/31/2008 20550.42 55022.83 188801.73 453563.66 874948.75 (AC-FT)  
02/01/2008 - 02/29/2008 45479.30 79426.34 220995.97 399993.78 718173.88 (AC-FT)  
03/01/2008 - 03/31/2008 111656.00 195873.98 288171.59 562934.06 832839.69 (AC-FT)  
04/01/2008 - 04/30/2008 200252.70 250153.64 344938.28 499122.22 631853.12 (AC-FT)  
05/01/2008 - 05/31/2008 163058.47 273202.97 509767.56 702447.88 936567.19 (AC-FT)

AHPS / ESP Trace Analysis Took 1 Second(s) To Create Your Product. Thank You.

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## Example 4: ESP Probabilistic 5-day snowmelt volume forecasts out to 20 days.

### Forecast of Runoff Volumes for the Snowmelt Season

Issued Wednesday, April 11, 2007

Produced by the NWS California Nevada River Forecast Center and the California Dept. of Water Resources

**Remarks:** Unsettled conditions will bring valley rain and high elevation snows today and again this weekend over the northern and central sections. Otherwise, temperatures will moderate closer to normal during the intervening dry periods.

Forecasts reflect predicted short-term precipitation and temperature as well as the predicted shift from normal climatology provided by NOAA's Climate Prediction Center.

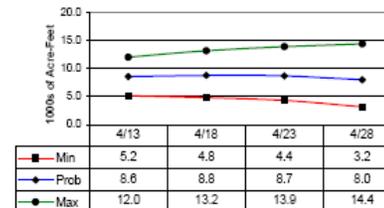
Min: Reasonable minimum (90 percent chance of being exceeded)  
 Prob: Most probable volume (50 percent chance of being exceeded)  
 Max: Reasonable maximum (10 percent chance of being exceeded)  
 Pk Vol/Date: Most probable peak 1-day volume of runoff (in thousands of acre-feet) and the date of occurrence

*Indicated values are unimpaired flow volumes in thousands of acre-feet in 5-day intervals for the next 20 days. The date indicated above each column is the mid-point of the 5-day interval.*

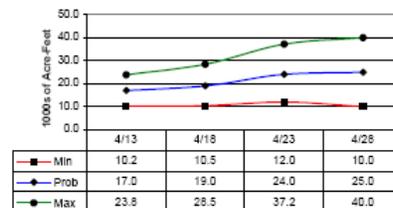
Williamson River at Chiloquin



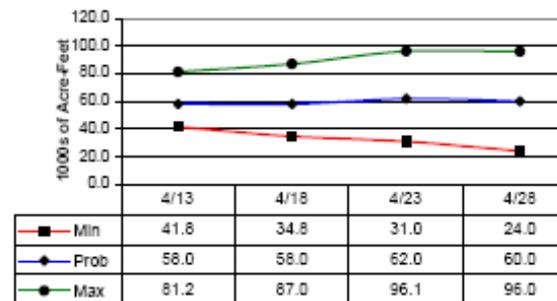
Scott River at Fort Jones



Trinity River at Lewiston



Shasta Reservoir Inflow





## Additional Verification Projects



Regional and National Verification case study: 2006 New Year's Flood Event on the Truckee and Russian River Basins already presented.

Verification of other significant flood events:

January 7-11, 2005 Southern California significant precipitation event.

Heavy precipitation event May 17-19, 2005 Northern California