Two Seemingly Unrelated Topics

by Adam Schneider

What's in store . . .

1. Bulletin 120 Tributary Forecasts

2. New Model Development

Bulletin 120 Tributary Forecasts

APRIL 1, 2008 FORECASTS
APRIL-JULY UNIMPAIRED RUNOFF

HYDROLOGIC REGION and Watershed	Unimpaired Runoff in 1,000 Acre-Feet (1) HISTORICAL 50 Yr Avg (2)	Max of Record	Min of Record	FORECAST Apr-Jul Forecasts	Pct of Avg	80 % Probability Range (1)
SACRAMENTO RIVER						
Upper Sacramento River						
Sacramento River at Delta above Shasta Lake	298	711	39	270	90%	
McCloud River above Shasta Lake	392	850	185	360	92%	
Pit River near Montgomery Creek + Squaw Creek	1,066	2,098	480	890	83%	
Total Inflow to Shasta Lake	1,819	3,525	726	**1,560**	86%	1,210 - 2,360
Sacramento River above Bend Bridge, near Red Bluff	2,494	5,075	943	**2,120**	85%	1,600 - 3,290
Feather River						
Feather River at Lake Almanor near Prattville (3)	333	675	120	260	78%	
North Fork at Pulga (3)	1,028	2,416	243	760	74%	
Middle Fork near Clio (4)	86	518	4	60	70%	
South Fork at Ponderosa Dam (3)	110	267	13	75	68%	
Feather River at Oroville	1,782	4,676	392	**1,360**	76%	980 - 2,210
Yuba River						
North Yuba below Goodyears Bar	279	647	51	220	79%	
Inflow to Jackson Mdws and Bowman Reservoirs (3)	112	236	25	90	80%	
South Yuba at Langs Crossing (3)	233	481	57	170	73%	
Yuba River near Smartville plus Deer Creek	1,006	2,424	200	**810**	81%	540 - 1,210
American River						
North Fork at North Fork Dam (3)	262	716	43	180	69%	
Middle Fork near Auburn (3)	522	1,406	100	390	75%	
Silver Creek Below Camino Diversion Dam (3)	173	386	37	130	75%	
American River below Folsom Lake	1,240	3,074	229	**940**	76%	660 - 1,590
SAN JOAQUIN RIVER						
Cosumnes River at Michigan Bar	126	363	8	**85**	68%	40 - 205
Mokelumne River						
North Fork near West Point (5)	437	829	104	330	76%	
Total Inflow to Pardee Reservoir	461	1,065	102	**370**	80%	290 - 520
Stanislaus River						
Middle Fork below Beardsley Dam (3)	334	702	64	270	81%	
North Fork Inflow to McKays Point Dam (3)	224	503	34	180	80%	
Stanislaus River below Goodwin Reservoir (7)	702	1,710	116	**590**	84%	450 - 840
Tuolumne River						
Cherry Creek & Eleanor Creek near Hetch Hetchy	315	727	97	260	83%	
Tuolumne River near Hetch Hetchy	604	1,392	153	510	84%	
Tuolumne River below La Grange Reservoir (7)	1,220	2,682	301	**1,010**	83%	840 - 1,400
Merced River						
Merced River at Pohono Bridge	372	888	80	300	81%	
Merced River below Merced Falls (7)	632	1,587	123	**490**	78%	390 - 730
San Joaquin River						
San Joaquin River at Mammoth Pool (8)	1,026	2,279	235	880	86%	
Big Creek below Huntington Lake (9)	91	264	11	75	82%	
South Fork near Florence Lake (8)	201	511	58	170	85%	
San Joaquin River inflow to Millerton Lake	1,254	3,355	262	**1,040**	83%	830 - 1,380
TULARE LAKE						
Kings River						
North Fork Kings River near Cliff Camp (3)	239	565	50	210	88%	
Kings River below Pine Flat Reservoir	1,224	3,113	274	**1,100**	90%	920 - 1,400
Kaweah River below Terminus Reservoir	286	814	62	**260**	91%	210 - 380
Tule River below Lake Success	64	259	2	**46**	72%	32 - 96
Kern River						
Kern River near Kernville	384	1,203	83	320	83%	
Kern River inflow to Lake Isabella	461	1,657	84	**380**	82%	300 - 500

(1) See inside back cover for definition
(2) All 50 year averages are based on years 1956-2005 unless otherwise noted
(3) 50 year average based on years 1941-90
(4) 44 year average based on years 1936-79
(5) 36 year average based on years 1936-72
(6) 45 year average based on years 1936-81
(8) 50 year average based on years 1953-2002
(9) 50 year average based on years 1946-1995

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(8) 50 year average based on years 1953-2002
(9) 50 year average based on years 1946-1995
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(5) 36 year average based on years 1936-72
(6) 45 year average based on years 1936-81

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Feather River

- **Feather River at Lake Almanor near Prattville (1941-1990)**
- **North Fork at Pulga (1941-1990)**
- **Middle Fork near Clio (1936-1979)**
- **South Fork at Ponderosa Dam (1941-1990)**

Please contact Adam Schneider if you can help in any way.

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Yuba River

- **Inflow to Jackson Meadows and Bowman Reservoirs (1941-1990)**
- **South Yuba at Langs Crossing (1941-1990)**

American River

- **North Fork at North Fork Dam (1941-1990)**
- **Middle Fork near Auburn (1941-1990)**

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Mokelumne River

- **North Fork near West Point (1936-1972)**

Stanislaus River

- **Middle Fork below Beardsley Dam (1941-1990)**
- **North Fork Inflow to McKays Point Dam (1941-1990)**

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Kings River

- **North Fork Kings River near Cliff Camp (1941-1990)**

San Joaquin River

- **San Joaquin River at Mammoth Pool (1953-2002)**
- **Big Creek below Huntington Lake (1946-1995)**
- **South Fork near Florence Lake (1953-2002)**

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New Model Development

Statistical Applications of Physical Hydrologic Models and Satellite Snow Cover Observations to Seasonal Water Supply Forecasts

- *Eric Rosenberg – University of Washington*
- *Quihong Tang - University of Washington*
- *Anne Steinemann – University of Washington*
- *Dennis Lettenmaier – University of Washington*
- *Andrew Wood – 3Tier Incorporated*

New Model Development

Funding

- NASA's Water Management Program

Objectives

- To determine whether *"satellite observations of snow cover result in improved seasonal streamflow forecasts and, in turn, more efficient water management in the western United States"*

Protocol

- Develop a hybrid forecasting approach using model-simulated snow states and raw satellite data as predictors in regression models

New Model Development

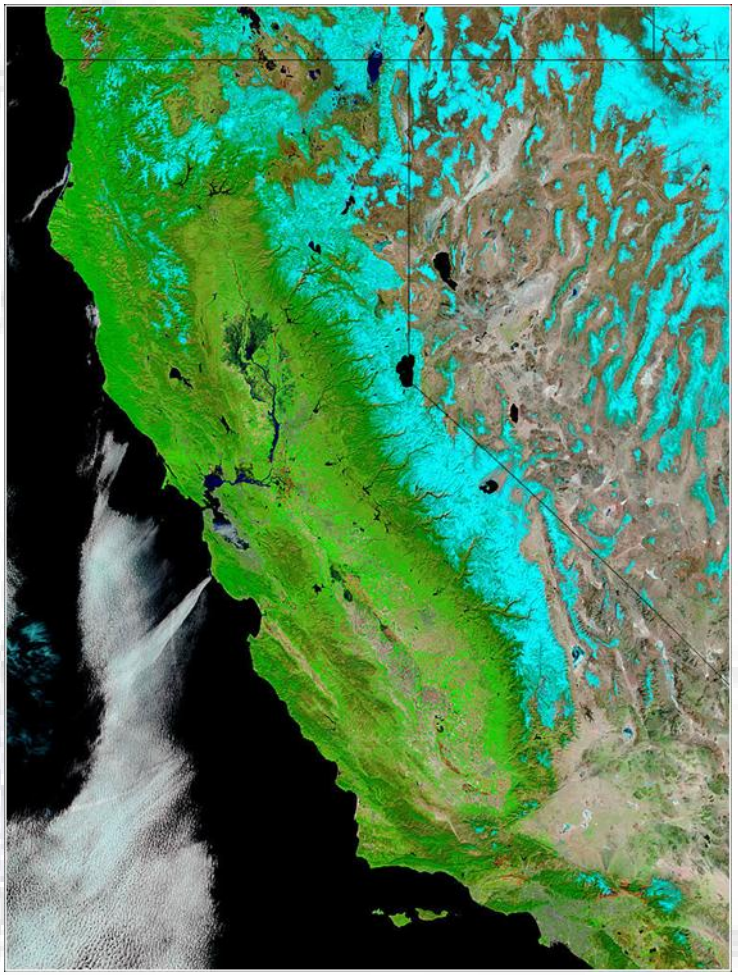
Regression models are being created using three different sets of snow inputs

1. **Model-simulated snow water equivalent and snow covered area**
   - **Variable Infiltration Capacity (VIC) model**
2. ***Model-simulated* snow water equivalent (SWE) and *observed* snow covered area (SCA)**
   - **VIC model for SWE**
   - **Moderate Resolution Imaging Spectroradiometer (MODIS) data for SCA**
3. **Observed SCA (MODIS) only**

New Model Development

Terra (born Dec 1999)

Aqua (born May 2002)



MODIS SCA Image

(March 7, 2004)

New Model Development

Project Scope

Bend	Feather
Yuba	American
Cosumnes	Mokelumne
Stanislaus	Tuolumne
Merced	San Joaquin
Kings	Kaweah
Tule	Kern

Questions?

New Model Development

Challenge

- MODIS has a short record of data (2000 to present)

Solution

- 1 km Advanced Very High Resolution Radiometer
- 1 km SCA product from the National Operational Hydrologic Remote Sensing Center