

Snow Surveys Roles and Responsibilities During Floods: **Useful Products for You and Your Family**



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Chief, Snow Surveys Section

May 2011

Golden Guardian 2011 – FOC Workshop

Overview of DWR's Seasonal Forecasting

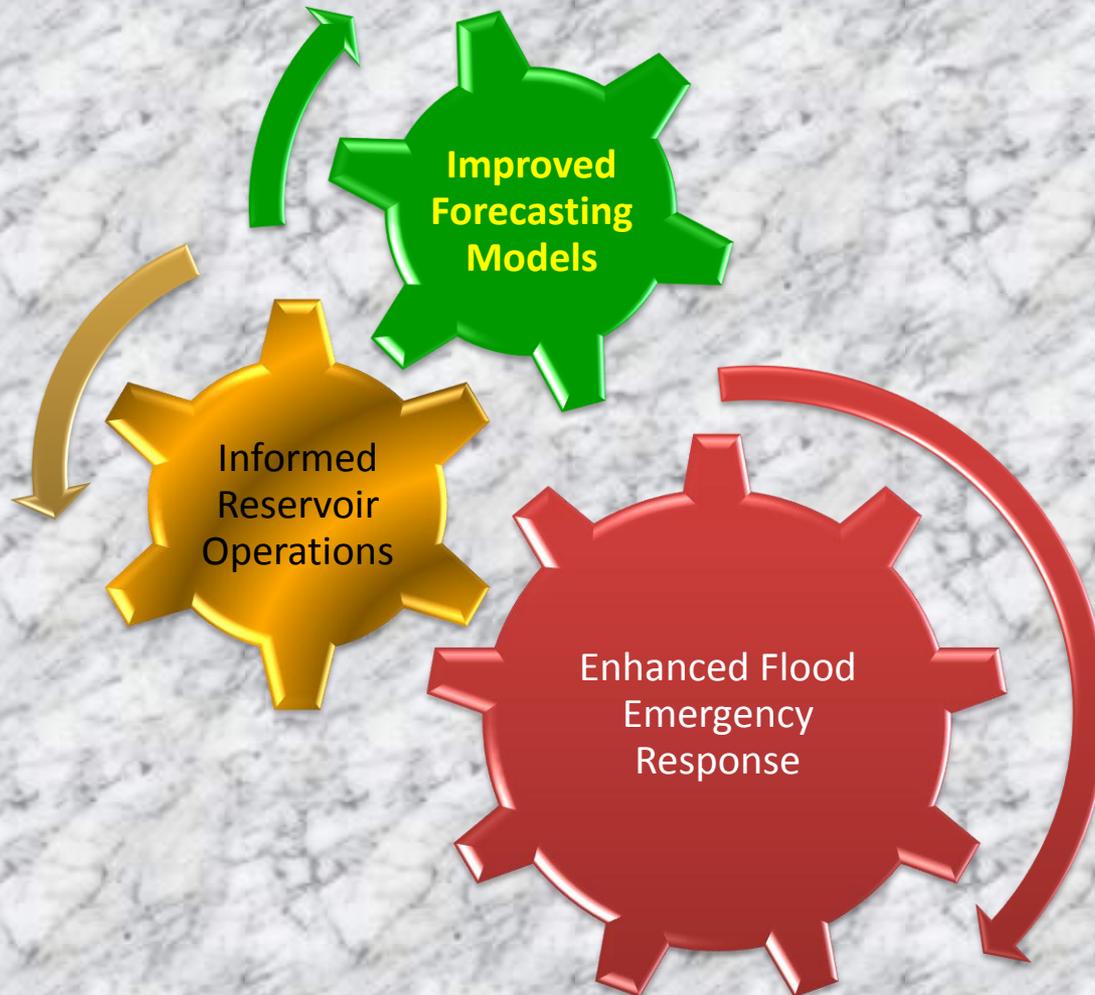
- 1. What do we forecast? What Products Are Available and what do they mean?**
- 2. When do we produce the forecasts?**
- 3. Snowmelt vs. Rain Storm Flood**

Snow Surveys Products



<http://cdec.water.ca.gov/snow/>

Seasonal Runoff & Snowmelt Runoff Forecasts Assist Flood Reservation Operations



Weekly B120 Update

<http://cdec.water.ca.gov/cgi-progs/iodir/b120up>

STATE OF CALIFORNIA
 DEPARTMENT OF WATER RESOURCES
 CALIFORNIA COOPERATIVE SNOW SURVEYS
WATER SUPPLY FORECAST UPDATE
 2011 April-July Unimpaired Runoff
 (1,000 Acre-feet)

Runoff forecasts are unimpaired (full natural) flows which represent the natural water production of the river basin, unaltered by upstream diversions, storage, or export or import of water to or from other watersheds. The median (50%) forecast assumes median conditions after the date of forecast. Runoff exceedance levels are derived from historical data. The 90 percent exceedance level and the 10 percent exceedance level together comprise a range about the median forecast in which the actual runoff should fall 8 times out of 10. Forecasts are stated in 1,000's of acre-feet and percent of (50-year) average. The averages are for the period 1956 to 2005. This product is available on the Internet at <http://cdec.water.ca.gov/cgi-progs/iodir/b120up>.

	Feb 1	%Avg	Feb 8	%Avg	
Shasta Lake, Total Inflow					average = 1819
90% Exceedance	1100	60%	1050	58%	
50% Exceedance	1560	86%	1500	82%	
10% Exceedance	2560	141%	2480	136%	
Sacramento River, above Bend Bridge (near Red Bluff)					average = 2494
90% Exceedance	1400	56%	1330	53%	
50% Exceedance	2100	84%	2010	81%	
10% Exceedance	3770	151%	3620	145%	
Feather River at Oroville					average = 1782
90% Exceedance	870	49%	820	46%	
50% Exceedance	1570	88%	1490	84%	
10% Exceedance	3010	169%	2860	161%	
Yuba River near Smartsville					average = 1006
90% Exceedance	630	63%	600	60%	
50% Exceedance	1030	102%	990	98%	
10% Exceedance	1720	171%	1650	164%	
American River, below Folsom Lake					average = 1240
90% Exceedance	750	60%	720	58%	
50% Exceedance	1300	105%	1240	100%	
10% Exceedance	2320	187%	2210	178%	
Mokelumne River, Inflow to Pardee Reservoir					average = 461
90% Exceedance	370	80%	370	80%	
50% Exceedance	510	111%	500	108%	
10% Exceedance	810	176%	790	171%	
Stanislaus River, below Goodwin Res. (blw New Melones)					average = 702
90% Exceedance	590	84%	580	83%	
50% Exceedance	820	117%	790	113%	
10% Exceedance	1280	182%	1230	175%	
Tuolumne River, below La Grange Res. (blw Don Pedro)					average = 1220
90% Exceedance	1080	89%	1060	87%	
50% Exceedance	1470	121%	1420	116%	
10% Exceedance	2260	185%	2170	178%	

	Feb 1	%Avg	Feb 8	%Avg	
Merced River, below Merced Falls (blw Lake McClure)					average = 632
90% Exceedance	580	92%	560	89%	
50% Exceedance	760	120%	730	115%	
10% Exceedance	1270	201%	1200	190%	
San Joaquin River, below Millerton Lake					average = 1254
90% Exceedance	1330	106%	1290	103%	
50% Exceedance	1690	135%	1630	130%	
10% Exceedance	2510	200%	2390	191%	
Kings River, below Pine Flat Reservoir					average = 1224
90% Exceedance	1280	105%	1250	102%	
50% Exceedance	1680	137%	1620	132%	
10% Exceedance	2480	203%	2370	194%	
Kaweah River, below Terminus Reservoir					average = 286
90% Exceedance	300	105%	300	105%	
50% Exceedance	400	140%	390	136%	
10% Exceedance	640	223%	620	216%	
Tule River, below Lake Success					average = 64
90% Exceedance	59	93%	58	91%	
50% Exceedance	85	134%	82	129%	
10% Exceedance	175	275%	168	264%	
Kern River, inflow to Isabella Lake					average = 461
90% Exceedance	530	115%	520	113%	
50% Exceedance	680	147%	660	143%	
10% Exceedance	1160	252%	1100	238%	



California-Nevada River Forecast Center (NWS)

Snow Melt Forecast Websites and Products

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

The collage displays several key components of the NWS California Nevada River Forecast Center's snow melt forecast products:

- San Joaquin River - Millerton Reservoir (FRAC1):** A screenshot showing a 10-day streamflow volume accumulation bar chart. The forecast for May 11, 16, and 21 shows a peak stage of 578.0 feet. A conditional simulation graph shows streamflow volume (cfs-ft) over time.
- East Fork Carson River - Gardnerville (GRD2):** A screenshot showing a 10-day streamflow volume accumulation bar chart. The forecast for May 11, 16, and 21 shows a peak stage of 9.5 feet. A conditional simulation graph shows streamflow volume (cfs-ft) over time.
- Kern River Lake Isabella:** A screenshot showing a 10-day streamflow volume accumulation bar chart. The forecast for May 11, 16, and 21 shows a peak stage of 7.0 feet. A conditional simulation graph shows streamflow volume (cfs-ft) over time.
- Forecast Date Graph:** A line graph showing forecasted temperature and precipitation data over a 5-day forecast period, with multiple ESP simulations.
- Peak 1-Day Streamflow Volume and Date Table:** A table listing various river forecast points with their respective peak dates and stages.
- Map of River Forecast Centers:** A map showing the locations of various river forecast centers across California and Nevada.

Station	Stage (ft)	Peak Date
WILKINSON RIVER	6.4	05/09
PTC	5.3	05/13
SCOTT LUTHER	3.7	05/10
PORT JONES	3.7	05/10
CECIC	5.5	05/08
MADITY	10.1	05/05
LIBERTY LK	24.8	05/01
TCI	11.6	05/10
LAURENCE	22.2	05/27
PT	44.9	05/09
PT	46.4	05/08
PT	39.4	05/05
PT	39.9	05/05
PT	34.2	05/04
PT	39.0	05/17
PT	19.1	05/07
PT	16.7	05/28
PT	14.2	05/08
PT	16.1	05/27
PT	32.0	05/16
PT	37.1	05/01
PT	32.5	05/16

State	Center
NV	NV
CA	CA
OR	OR
WA	WA
MT	MT
ND	ND
NE	NE
KS	KS
OK	OK
MO	MO
IA	IA
IL	IL
IN	IN
OH	OH
PA	PA
NY	NY
VA	VA
NC	NC
SC	SC
GA	GA
FL	FL
AL	AL
MS	MS
LA	LA
TX	TX
UT	UT
WY	WY
CO	CO
NM	NM
AZ	AZ
OK	OK
TX	TX
LA	LA
MS	MS
AL	AL
GA	GA
NC	NC
VA	VA
PA	PA
OH	OH
IN	IN
IL	IL
MO	MO
IA	IA
KS	KS
NE	NE
ND	ND
MT	MT
WY	WY
UT	UT
NM	NM
AZ	AZ
CA	CA
OR	OR
WA	WA
MT	MT
ND	ND
NE	NE
KS	KS
OK	OK
MO	MO
IA	IA
IL	IL
IN	IN
OH	OH
PA	PA
NY	NY
VA	VA
NC	NC
SC	SC
GA	GA
FL	FL
AL	AL
MS	MS
LA	LA
TX	TX
UT	UT
WY	WY
CO	CO
NM	NM
AZ	AZ
CA	CA
OR	OR
WA	WA

So What Else do we do?

CA.GOV Department of Water Resources
California Cooperative Resources

Home | **Snowpack** | Precipitation | Runoff | Reservoirs | Bulletin 129 | Water Supply Indices

MOST POPULAR LINKS

- Historical Data
- Daily Snow WEQ Summary
- Statewide Snow Water Content Summary

WATER CONDITIONS

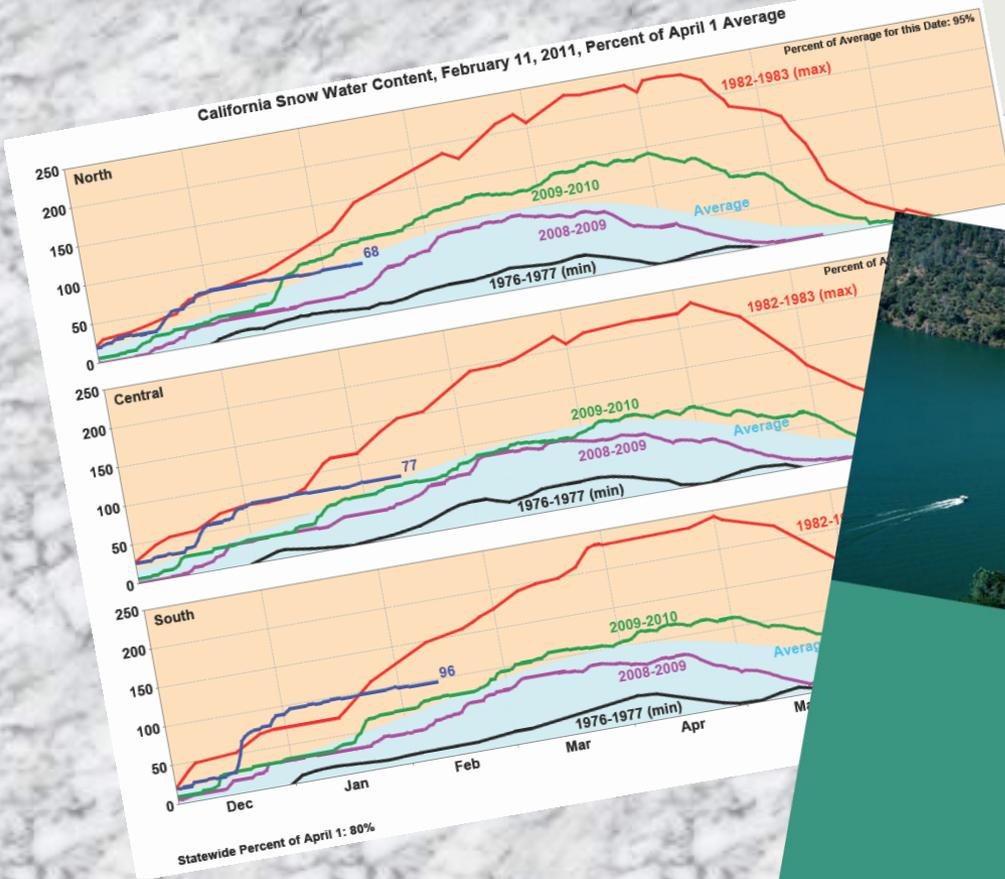
- Statewide Water Conditions

MORE INFORMATION

- Importance of Snow
- History
- The Snow Surveyor
- Data Collection
- Impact of Forecasting
- Contacting us
- Why Is the April 1 Snow Pack Important? **NEW**
- Forecasting the State's Runoff **NEW**
- Snow Surveying Demonstration Video **NEW**

ANNOUNCEMENTS

DWR Announces Results of Second Snow Survey of 2010-2011 Season
 Electronic readings today indicate that California's mountain snowpack is holding above average water content despite a dry January. Statewide, real-time sensors show that snowpack water content is 55 percent for today's date. The above-average snowpack is due to heavy storms in October, November and December. January so far has recorded only about 13 percent of average precipitation come up short any given year," said DWR Director Mark Cowin. "Our unpredictable weather and delivery restrictions make it clear that conservation must always be one of our top priorities."
ca.gov/newsreleases/2011/01/28/11snow.pdf



BULLETIN 132-07 | DECEMBER 2008

MANAGEMENT OF THE CALIFORNIA STATE WATER PROJECT

ARNOLD SCHWARZENEGGER
 Governor, State of California

MIKE CHRISMAN
 Secretary for Natural Resources
 The Natural Resources Agency

LESTER A. SNOW
 Director, Department of Water Resources

near Lake Tahoe: Electronic readings indicate that snowpack water content is 198 percent of normal for the date. "This boosts our hopes that we...

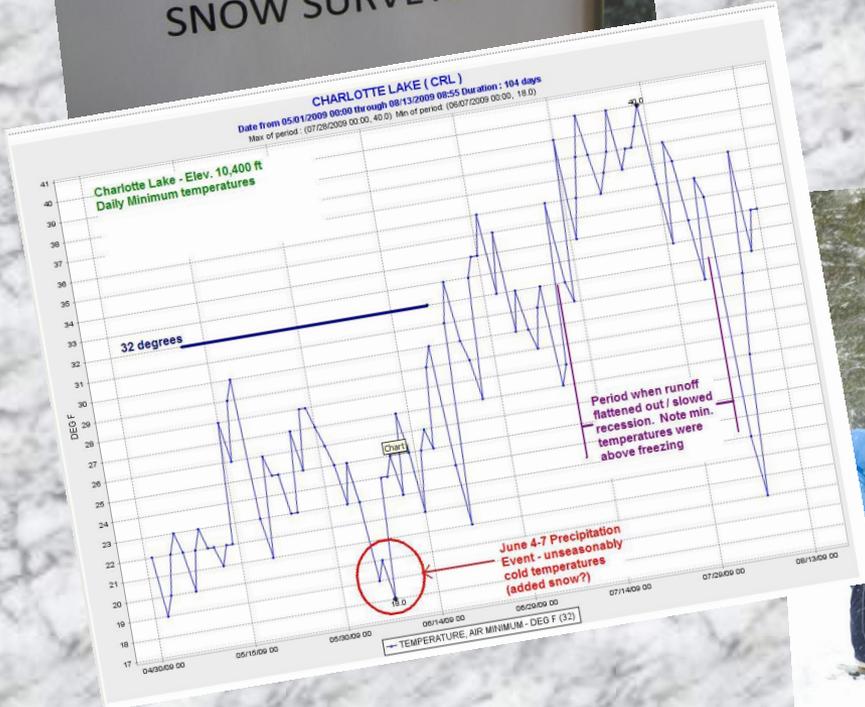
Outlook
 Snowpack is 198 percent of normal for the date. "This boosts our hopes that we...

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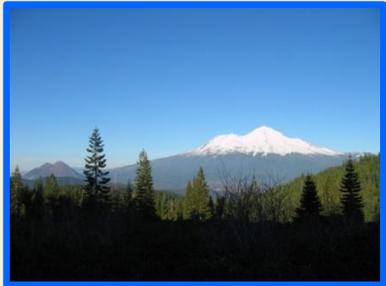
So What Else do we do?

WELCOME
CALIFORNIA
COOPERATIVE
SNOW SURVEYS



Regional Snow Melt Flood Threats

North Coast:
Mix of Snow fed and semi-arid regions. Wide range of mean annual precipitation, snow pack, and geology. Flooding is driven by heavy precipitation events.



Southern Cascades:
Mainly rainfall driven region with peak elevations around 10000 ft (other than Mt. Shasta and Mt. Lassen). Highly influenced by volcanic soils and some rain shadowed areas. Flood threats are driven by heavy precipitation events.

Northern Sierra:
Rainfall driven region. Peak elevations top out at 10000-11000 ft. Heavy rainfall/snowfall events possible. Large area of upper Feather watershed sits in rain shadowed plateau. 1986 and 1997 extreme precipitation storms caused flooding in this area.



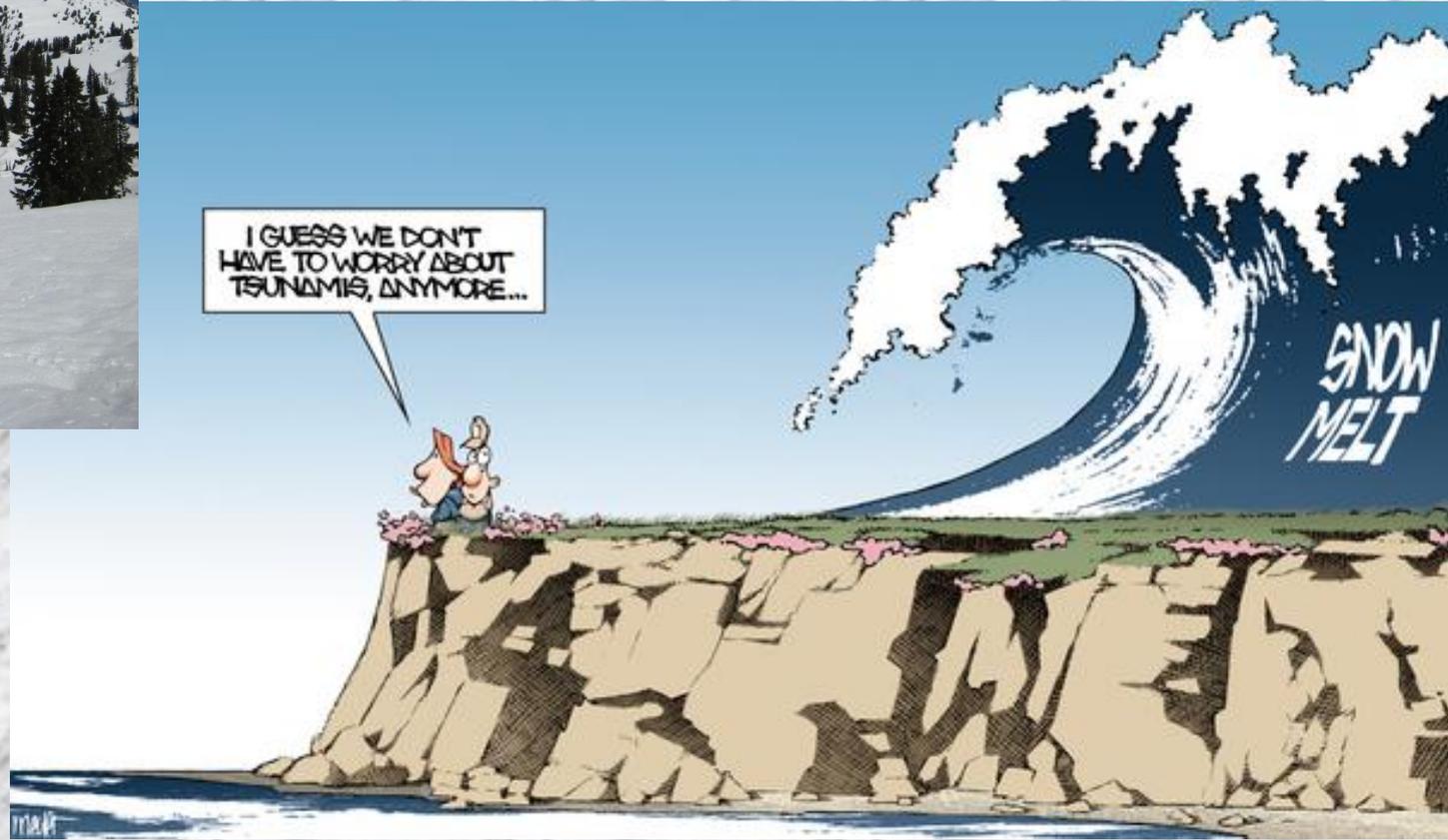
Central/Southern Sierra:
Snow melt driven basins. Large variety in size of watersheds. Characterized by high elevations (up to 14000 ft.), upper elevations consist of large areas of exposed granite batholiths. Susceptible to snow melt floods in heavy snow pack years. Limited data above 11000 ft which can account for up to 15% of watershed.



Eastern Sierra/Owens River: High elevation, snow melt driven basins. Watersheds are in rain shadow from Sierra Nevada. Rivers drain to terminal sinks in Nevada desert. Gage data is extremely limited. Most susceptible to snow melt flood events.

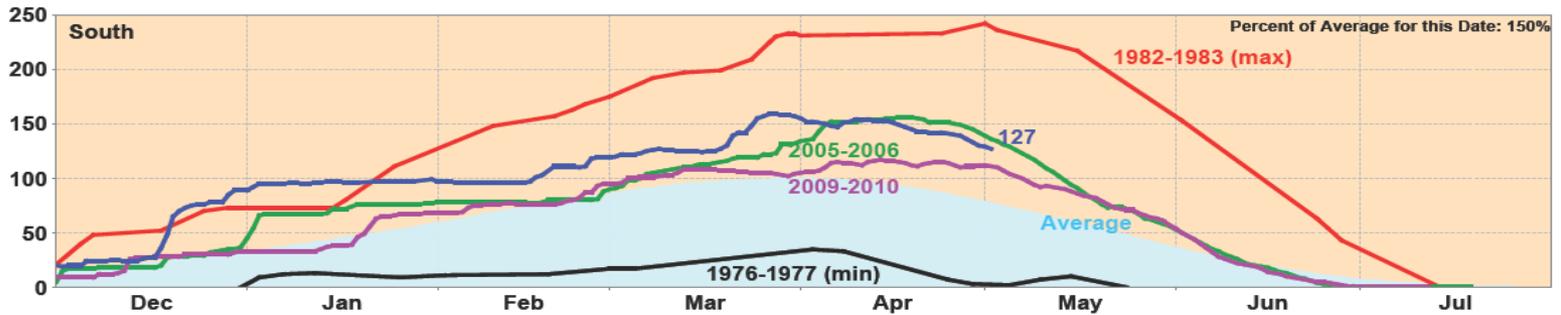
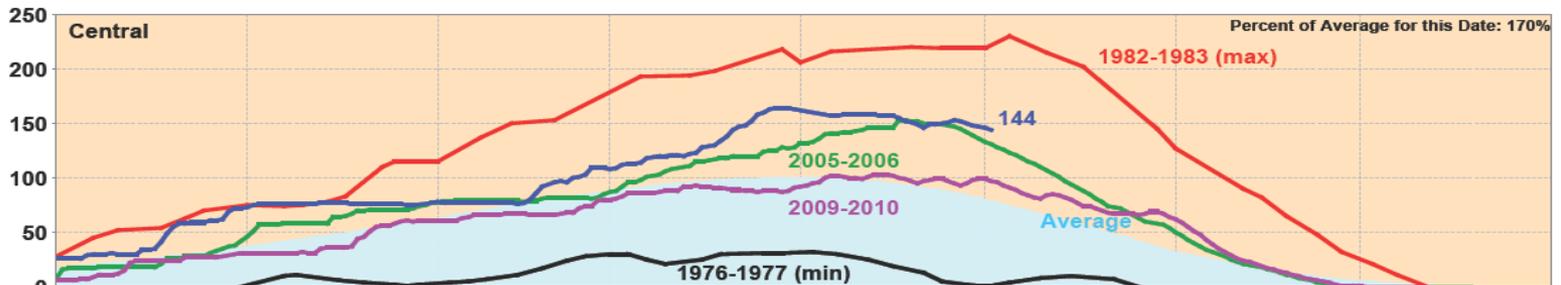
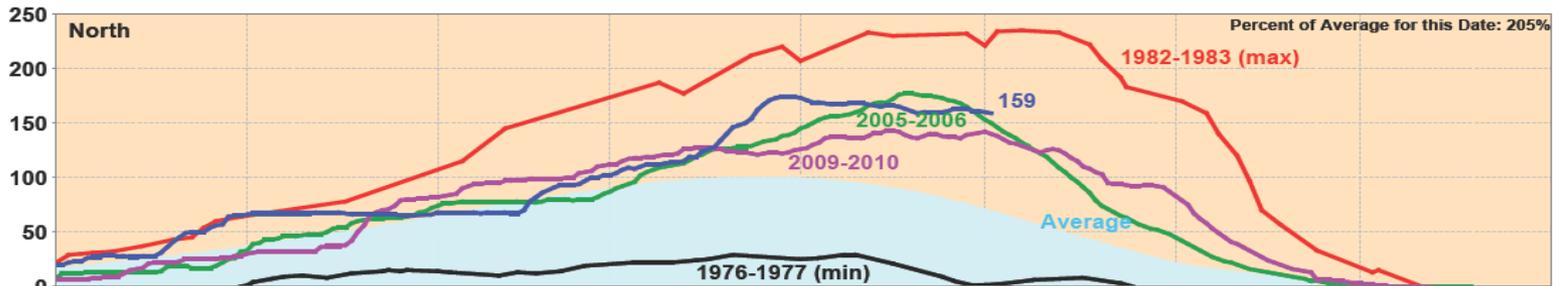


2011 Conditions



Snow Pack Conditions

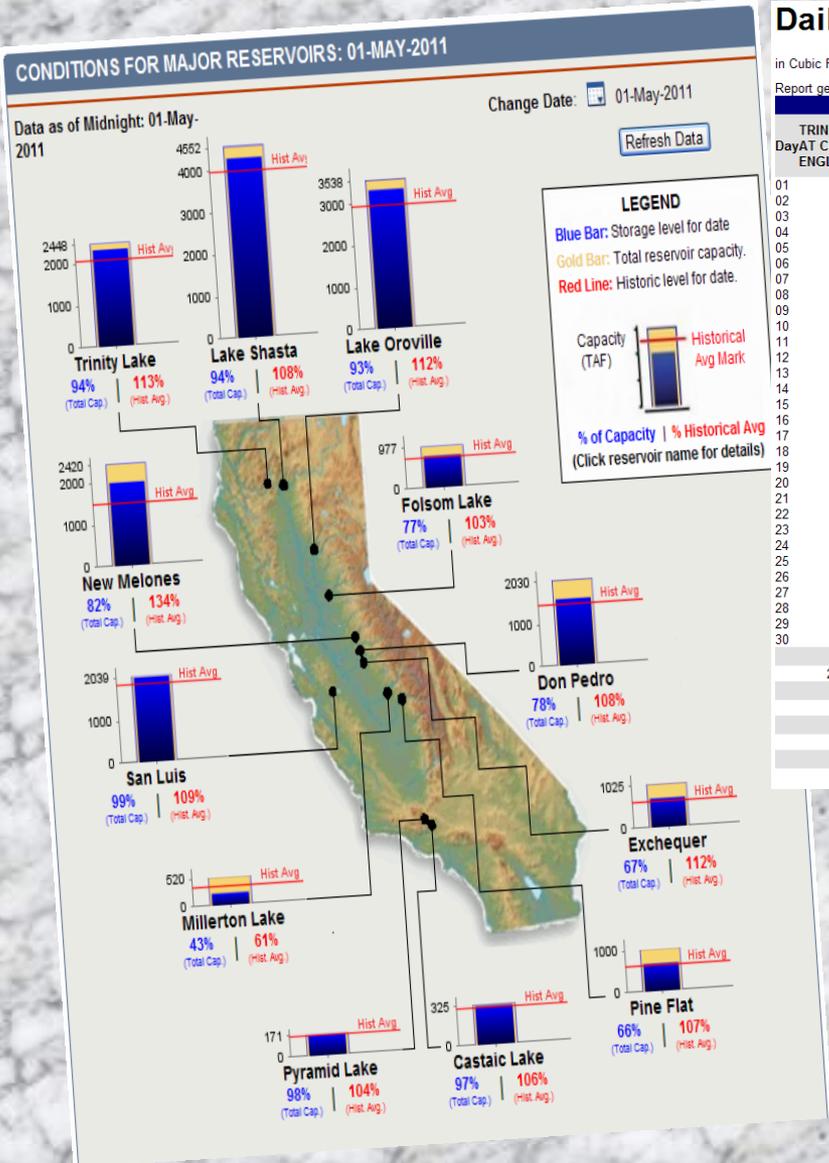
California Snow Water Content, May 2, 2011, Percent of April 1 Average



Statewide Percent of April 1: 145%

Statewide Percent of Average for Date: 190%

Runoff & Reservoir Conditions



Daily Full Natural Flows for April 2011

in Cubic Feet Per Second

Report generated: 04/28/2011 10:02

TRINITY Day AT CLAIR ENGLE	LAKE SHASTA TOTAL INFLOW	SACTO AT BEND BRIDGE	FEATHER OROVILLE	ATYUBA SMARTVILLE	AMERICAN AT FOLSOM	COSUMNES AT MICH	MOKELUMNE BAR AT PARDEE	
01	4872	14644	34590	21184	9946	15540	2888	4053
02	5577	28285	37146	23944	11138	16778	3273	4702
03	4803	19714	33664	25419	10478	16995	3419	3841
04	4418	17615	30780	22115	10380	14446	3168	5931
05	4513	21695	28496	21657	9942	14596	3010	4271
06	4608	15200	27316	20152	9596	14415	2959	4640
07	4281	13900	25020	20501	9096	13377	2821	4237
08	4095	13800	24875	18400	7873	11620	2598	3625
09	3153	11800	21269	16438	6841	10124	2286	3110
10	2907	12718	21088	13030	6106	8640	2012	2641
11	2930	12263	20740	15575	6073	8700	1836	2415
12	2990	11781	19450	13730	6184	8513	1755	2420
13	3085	12797	19619	14594	6214	8651	1710	2523
14	2828	11449	17597	12017	5559	8131	1643	2345
15	3171	14760	18996	12136	5354	7495	1522	2221
16	3449	14760	16540	11924	5339	7926	1494	2429
17	4786	11283	17730	17623	11523	11385	1598	3126
18	5952	9800	19583	28823	11660	15781	1794	3911
19	5605	10240	20510	29270	15752	16828	2051	4345
20	5270	17928	24000	25747	12085	15976	2155	4734
21	4681	20018	29060	29485	15434	18145	2328	4261
22	3972	18177	24367	27048	1333			
23	4167	18114	23865	22379	107			
24	4129	18285	24716	23501	108			
25	4275	19306	25119	24356	112			
26	4042	19102	24100	23186	102			
27		12806						
28								
29								
30								

Day	STANISLAUS AT GOODWIN	TUOLUMNE AT DON PEDRO	MERCED AT MCCLEURE	SAN JOAQUIN AT MILLERTON	KINGS AT PINE FLAT	KAWEAH AT TERMINUS	TULE AT SUCCESS	KERN AT ISABELLA
01	6393	9952	5435	7561	6651	2503	1211	3263
02	7167	10582	5462	8121	7358	2691	1284	3705
03	6856	10349	4723	8094	7606	2543	1183	3891
04	6324	8888	4225	7310	6667	2276	1050	3764
05	6640	9431	4539	7374	7156	2378	1033	3787
06	6536	9853	5301	7930	7605	2362	987	3950
07	6256	9071	3498	7973	6998	2373	969	4051
08	5184	7177	3381	6754	5764	2054	928	3609
09	3884	6403	2933	5908	5541	1782	804	3124
10	4164	6367	2672	5303	4664	1630	716	2846
11	3998	5194	2651	4998	4740	1566	692	2764
12	3981	5194	2764	4728	4740	1577	680	2517
13	3940	5626	2669	5061	4543	1585	646	2479
14	3922	5305	2345	4485	4305	1495	606	2490
15	3706	4870	2393	4692	4314	1493	585	2409
16	4012	5918	3098	5658	5244	1712	604	2702
17	5257	7011	4085	6846	6608	2042	662	3315
18	6530	9139	4606	8184	7738	2206	706	3833
19	10594	8840	4354	7727	7223	2109	717	4625
20	6532	10077	4432	8166	7033	2071	687	4549
21	6937	8849	4001	7783	6977	1905	733	4724
22	5997	8852	3624	7380	5928	1868	686	4476
23	4860	6703	3137	7565	6080	1812	642	4320
24	4379	6055	3036	5885	5808	1735	610	4236
25	4925	5439	2876	5790	5439	1669	579	4100
26	4261	4746		5777	5385	1670	580	4133
27		5418		6010	6202			
28								
29								
30								
Total To Date (in AC-FT)								
284107	399296	182958	355171	325923	101371	40820	185779	
Daily Average (in CFS)								
5509	7456	3690	6632	6086	1966	792	3602	
Historic Monthly Average (in CFS)								
3192	4481	2447	3962	3617	1087	403	1588	
% of Historic Average								
172	166	150	167	168	180	196	226	

QUESTIONS?

