



California Cooperative  
Snow Surveys  
Bulletin 120-93

State of California  
The Resources Agency

Department of  
Water Resources

# Water Conditions in California

## Report 2 March 1, 1993



**Douglas P. Wheeler**

Secretary for Resources  
The Resources Agency

**Pete Wilson**

Governor  
State of California

**David N. Kennedy**

Director  
Department of Water Resources

**STATE OF CALIFORNIA**

Pete Wilson, Governor

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**COOPERATING AGENCIES**

**Public Agencies**

- Buena Vista Water Storage District
- Central California Irrigation District
- East Bay Municipal Utility District
- Friant Water Users Association
- Kaweah Delta Water Conservation District
- Kern Delta Water District
- Kings River Conservation District
- Lower Tule River Irrigation District
- Merced Irrigation District
- Modesto Irrigation District
- Nevada Irrigation District
- North Kern Water Storage District
- Northern California Power Agency
- Oakdale Irrigation District
- Omochumne-Hartnell Water District
- Oroville-Wyandotte Irrigation District
- Placer County Water Agency
- Sacramento Municipal Utility District
- San Bernardino County Flood Control District
- South San Joaquin Irrigation District
- Tri-Dam Project
- Tulare Lake Basin Water Storage District
- Turlock Irrigation District
- Yuba County Water Agency
- West Basin Municipal Water District

**Private Organizations**

- J.G. Boswell Company
- Kaweah River Association
- Kings River Water Association
- St. Johns River Association
- Tule River Association
- U.S. Tungsten Corporation
- State Water Contractors

**Public Utilities**

- Pacific Gas and Electric Company
- Southern California Edison Company
- Sierra Pacific Power Company

**Municipalities**

- City of Bakersfield  
Water Department
- City of Los Angeles  
Department of Water and Power
- City and County of San Francisco  
Hetch Hetchy Water and Power

**State Agencies**

- California Department of Forestry  
& Fire Protection
- California Department of Water Resources

**Federal Agencies**

- U.S. Department of Agriculture  
Forest Service(14 National Forests)  
Pacific Southwest Forest and Range  
Experiment Station  
Soil Conservation Service
- U.S. Department of Commerce  
National Weather Service
- U.S. Department of Interior  
Bureau of Reclamation  
Geological Survey, Water Resources  
Division  
National Park Service(3 National Parks)
- U.S. Department of Army  
Corps of Engineers

**Other Cooperative Programs**

- Nevada Cooperative Snow Surveys
- Oregon Cooperative Snow Surveys

## SUMMARY OF WATER CONDITIONS

March 1, 1993

February marked the third consecutive month of much above average precipitation, assuring a good water supply year. The snowpack continued to gain at a pace about double normal for the month. The improvement in reservoir storage, coupled with the largest snowpack in ten years, was enough to officially end the California drought of the past six years.

**Forecasts** of April through July runoff are about 40 percent above average due to the heavy snowpack, assuming normal future weather. Forecasted water year runoff percentages are less than spring snowmelt runoff, but are generally over average.

**Snowpack** water content is the most since 1983. Snow densities are less than a month ago because of the addition of much fresh snow during the last half of February. The seasonal accumulation is approximately 180 percent of normal and 160 percent of the April 1 average. The snowpack was 70 percent of average at this time last year.

**Precipitation** during February was around 160 percent of average, ranging from near normal on the North Coast to far above average in Southern California. Seasonal precipitation statewide is 155 percent of average, unchanged from a month ago. Last year seasonal precipitation stood at 85 percent.

**Runoff** in February was exactly average for the month statewide. But runoff ranged from about 55 percent in the North Lahontan area to over 360 percent on the South Coast. Runoff to date since October 1 is about 95 percent of average, much better than the 40 percent one year ago.

**Reservoir storage** continued to improve during the month and now stands at 85 percent, 5 million acre-feet higher than a year ago. The low 15 percent amount in the North Lahontan area is because Lake Tahoe, the area's major reservoir, is still below its natural rim.

### SUMMARY OF WATER CONDITIONS

#### IN PERCENT OF AVERAGE

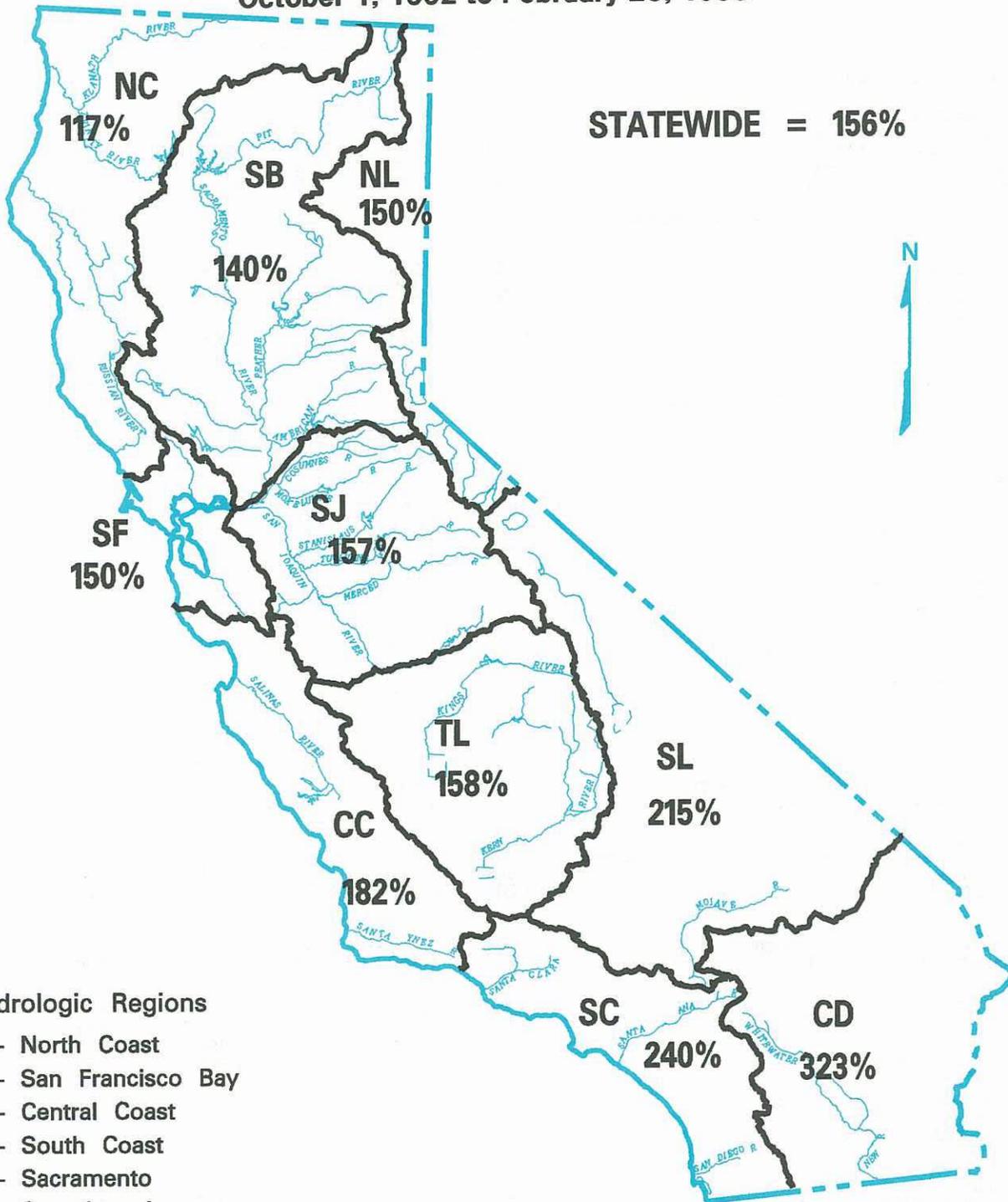
HYDROGRAPHIC AREA	PRECIPITATION OCTOBER 1 TO DATE	MARCH 1 SNOW WATER CONTENT	MARCH 1 RESERVOIR STORAGE	RUNOFF OCTOBER 1 TO DATE	APR-JULY RUNOFF FORECAST	WATER YEAR RUNOFF FORECAST
NORTH COAST	115	155	60	90	120	95
SAN FRANCISCO BAY	150	--	120	160	--	--
CENTRAL COAST	180	--	95	230	--	--
SOUTH COAST	240	--	150	430	--	--
SACRAMENTO BASIN	140	175	90	95	135	110
SAN JOAQUIN BASIN	155	185	75	120	150	140
TULARE LAKE BASIN	160	200	65	100	145	135
NORTH LAHONTAN	150	175	15	45	140	115
SOUTH LAHONTAN	215	175	85	65	135	110
COLORADO DESERT	325	--	--	--	--	--
STATEWIDE	155	180	85	95	140	120

**FORECAST OF APRIL – JULY  
UNIMPAIRED SNOWMELT RUNOFF  
MARCH 1, 1993**



\* FORECAST BY DEPARTMENT OF WATER AND POWER, CITY OF LOS ANGELES

**SEASONAL PRECIPITATION**  
**In Percent of Average to Date**  
**October 1, 1992 to February 28, 1993**



**Hydrologic Regions**

- NC - North Coast
- SF - San Francisco Bay
- CC - Central Coast
- SC - South Coast
- SB - Sacramento
- SJ - San Joaquin
- TL - Tulare Lake
- NL - North Lahontan
- SL - South Lahontan
- CD - Colorado Desert

WATER YEAR IS OCTOBER 1 THROUGH SEPTEMBER 30

**FORECASTS OF APRIL-JULY UNIMPAIRED RUNOFF  
FOR CENTRAL VALLEY STREAMS  
MARCH 1, 1993**

DRAINAGE BASIN AND WATERSHED	April through July Unimpaired Runoff in 1,000 Acre-Feet					
	HISTORICAL			FORECASTS		
	50 Year Average	Maximum of Record	Minimum of Record	April-July Forecast	Percent of Average	80% Prob. Range
<b>SACRAMENTO RIVER BASIN</b>						
Upper Sacramento River						
Sacramento River at Shasta Lake	297	702	39	300	101	
McCloud River at Shasta Lake	411	850	185	400	97	
Pit River at Shasta Lake	1,062	1,796	480	1,120	105	
Total inflow to Shasta Lake	1,824	3,189	726	2,050	112	1,470-2,850
Sacramento River above Bend Bridge, near Red Bluff	2,491	4,674	943	2,820	113	2,050-3,900
Feather River						
Feather River at Lake Almanor near Pratville	333	675	120	450	135	
North Fork at Pulga	1,028	2,416	243	1,500	146	
Middle Fork near Clio (1)	86	518	4	140	163	
South Fork at Ponderosa Dam	110	267	13	160	145	
Total inflow to Oroville Reservoir	1,857	4,676	392	2,830	152	2,350-3,700
Yuba River						
North Yuba below Goodyears Bar	286	647	51	400	140	
Inflow to Jackson Mdws and Bowman Reservoirs	112	236	25	160	143	
South Yuba at Langs Crossing	233	481	57	320	137	
Yuba River at Smartville	1,047	2,424	200	1,520	145	1,250-2,020
American River						
North Fork at North Fork Dam	262	716	43	390	149	
Middle Fork near Auburn	522	1,406	100	800	153	
Silver Creek below Camino Diversion Dam	173	386	37	260	150	
Total inflow to Folsom Reservoir	1,284	3,074	229	1,930	150	1,500-2,590
<i>Sacramento River at Sacramento</i>						
<b>SAN JOAQUIN RIVER BASIN</b>						
Cosumnes River at Michigan Bar	129	363	8	180	140	130-250
Mokelumne River						
North Fork near West Point (2)	437	829	104	610	140	
Total inflow to Pardee Reservoir	465	1,065	102	700	151	570-890
Stanislaus River						
Middle Fork below Beardsley Dam	334	702	64	490	147	
North Fork inflow to McKay's Point Dam	224	503	34	320	143	
Total inflow to Melones Reservoir	713	1,710	116	1,050	147	840-1,330
Tuolumne River						
Cherry Creek and Eleanor Creek near Hetch Hetchy	322	727	97	450	140	
Tuolumne River near Hetch Hetchy	606	1,392	153	880	145	
Total inflow to Don Pedro Reservoir	1,200	2,682	301	1,800	150	1,550-2,200
Merced River						
Merced River at Pohono Bridge	362	888	80	570	157	
Total inflow to Exchequer Reservoir	617	1,587	123	1,000	162	870-1,250
San Joaquin River						
San Joaquin River at Mammoth Pool (3)	1,014	2,279	235	1,500	148	
Big Creek below Huntington Lake (3)	95	264	11	140	147	
South Fork near Florence Lake (3)	202	511	58	280	139	
Total inflow to Millerton Lake	1,228	3,355	262	1,900	155	1,560-2,350
<i>San Joaquin River near Vernalis</i>						
<b>TULARE LAKE BASIN</b>						
Kings River						
North Fork Kings River near Cliff Camp	239	565	50	370	155	
Total inflow to Pine Flat Reservoir	1,203	3,114	273	1,830	152	1,480-2,230
Kaweah River at Terminus Reservoir	284	814	61	400	141	320-500
Tule River at Success Reservoir	63	256	2	80	127	60-110
Kern River						
Kern River near Kernville	373	1,203	83	460	123	
Total inflow to Isabella Reservoir	461	1,657	84	600	130	470-820

All 50-year averages are based on data for water years 1941-1990 except:

(1) 44-year average based on years 1936-79.

(3) 45-year average based on years 1936-80.

(2) 36-year average based on years 1936-71.

See inside back cover for definition of unimpaired runoff and 80 percent probability ranges.

**FORECASTS OF WATER YEAR UNIMPAIRED RUNOFF  
FOR CENTRAL VALLEY STREAMS  
MARCH 1, 1993**

Water Year October through September Unimpaired Runoff in 1,000's Acre-Feet

HISTORICAL			DISTRIBUTION								FORECASTS	
50 Year Average	Maximum of Record	Minimum of Record	October through January	February	March	April	May	June	July	August and September	Water Year Forecast	Percent of Average
856	1,964	165										
1,244	2,353	577										
3,145	5,150	1,484										
5,987	10,796	2,479	1,600	840	870	870	580	350	250	440	5,800 (4,900-7,100)	97
8,664	17,180	3,294	2,730	1,400	1,330	1,200	830	460	330	520	8,800 (7,500-10,700)	102
780	1,269	366										
2,417	4,400	666										
219	637	24										
291	562	32										
4,617	9,492	994	1,065	565	750	1,100	1,000	500	230	210	5,420 (4,750-6,600)	117
564	1,056	102										
181	292	30										
379	565	98										
2,390	4,926	369	605	305	340	530	600	330	60	50	2,820 (2,450-3,520)	118
616	1,234	66										
1,070	2,575	144										
318	705	59										
2,736	6,381	349	665	355	450	650	760	420	100	40	3,440 (2,850-4,330)	126
385	1,253	20	140	95	80	90	65	20	5	5	500 (420-600)	130
626	1,009	197										
748	1,800	129	125	70	100	170	270	220	40	5	1,000 (850-1,220)	134
471	929	88										
1,150	2,952	155	220	110	150	280	420	280	70	20	1,550 (1,300-1,880)	135
461	1,147	123										
770	1,661	258										
1,882	4,430	383	350	160	240	360	600	590	250	50	2,600 (2,300-3,100)	138
461	1,020	92										
966	2,859	150	230	105	135	200	360	330	110	30	1,500 (1,350-1,800)	155
1,337	2,964	308										
112	298	14										
248	653	71										
1,776	4,642	362	250	125	190	340	640	630	290	115	2,580 (2,150-3,100)	145
284	607	58										
1,669	4,294	383	230	100	160	280	620	630	300	100	2,420 (2,000-2,850)	145
444	1,402	92	60	35	50	100	140	120	40	15	560 (460-680)	126
145	615	16	30	17	25	30	30	15	5	3	155 (125-200)	107
558	1,577	163										
716	2,309	175	70	35	65	130	210	170	90	50	820 (670-1,080)	115

\* Unimpaired runoff to date

**FORECASTS OF APRIL-JULY UNIMPAIRED RUNOFF FOR SELECTED CALIFORNIA  
STREAMS  
MARCH 1, 1993**

DRAINAGE BASIN AND WATERSHED	April through July Unimpaired Runoff in 1,000 Acre-Feet				
	HISTORICAL			FORECASTS	
	50 Year Average	Maximum of Record	Minimum of Record	April-July Forecast	Percent of Average
<b>NORTH COAST AREA</b>					
Trinity River at Lewiston	653	1,593	80	760	116
Scott River at Ft. Jones	200	*	*	260	130
Upper Klamath Lake(1)(2)(5)	521	1,151	177	555	109
<b>LAHONTAN AREA</b>					
Truckee River, Lake Tahoe to Farad accretion	268	713	58	400	149
Lake Tahoe Rise in feet (assuming gates closed)	1.5	3.75	0.23	2.0	133
East Carson River near Gardnerville	186	407	43	250	134
West Carson River at Woodfords	54	131	12	75	139
East Walker River near Bridgeport	63	209	7	90	143
West Walker River near Coleville	148	330	35	190	128
Owens River(1)(3)	233	579	96	318	136

(1)Forecast period of April-September

(2)Forecast by U.S. Soil Conservation Service, Portland, Or.

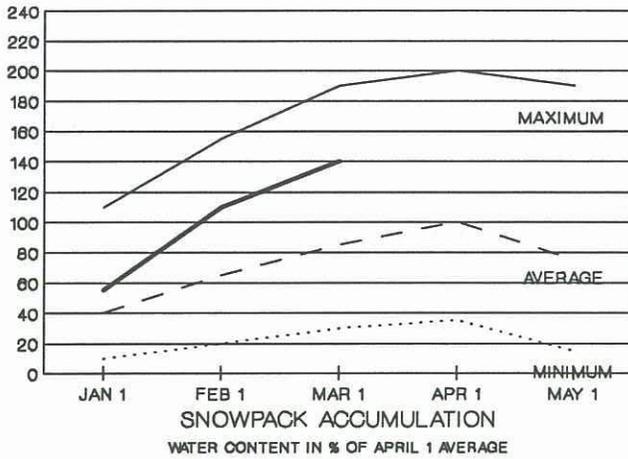
(3)Forecast by Dept. of Water and Power, City of Los Angeles

(4)Inside back cover for definition of unimpaired runoff.

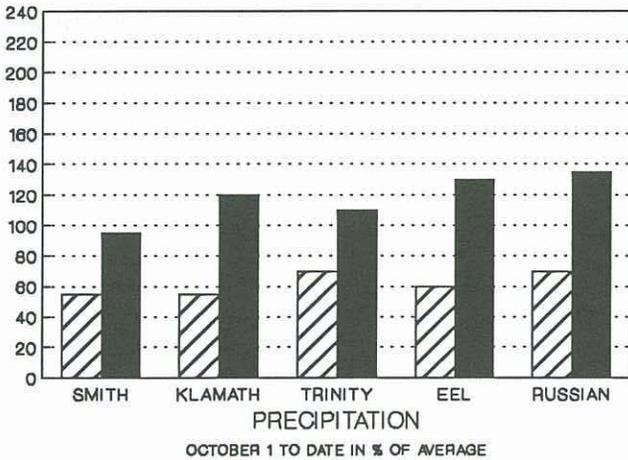
(5)Average period of 25 years

## NORTH COAST AREA

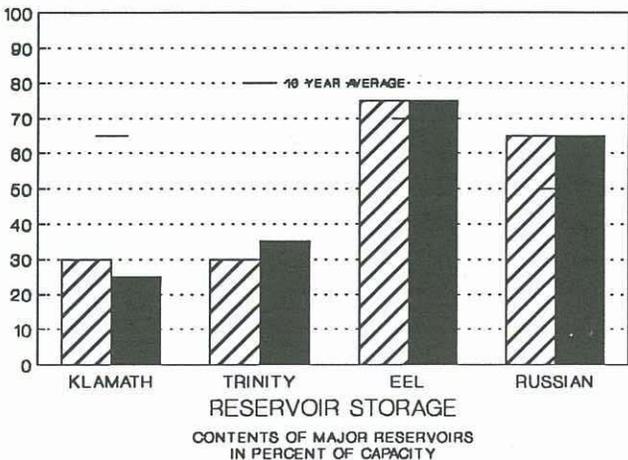
**SNOWPACK** - First of the month measurements made at 11 snow courses indicate an area wide snow water equivalent of 38.3 inches. This is 155 percent of the March 1 average and 140 percent of the seasonal (April 1) average. Last year at this time the pack was holding 20.7 inches of water.



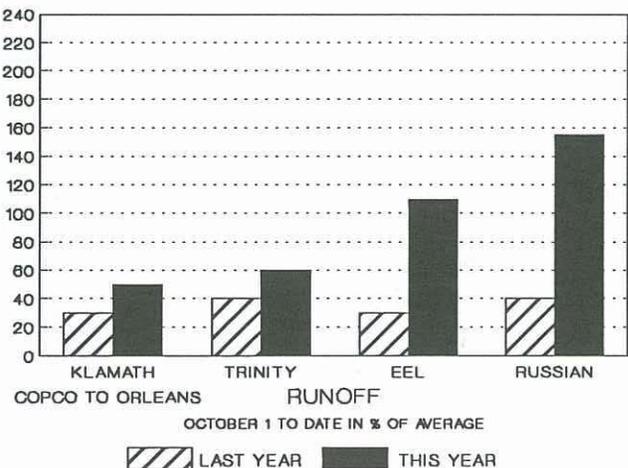
**PRECIPITATION** - Seasonal precipitation (October 1 through the end of last month) on this area was 115 percent of normal. Precipitation last month was about 115 percent of the monthly average. Seasonal precipitation at this time last year stood at 60 percent of normal.



**RESERVOIR STORAGE** - First of the month storage in 7 reservoirs was 1.4 million acre-feet which is 60 percent of average. About 45 percent of available capacity was being used. Storage in these reservoirs at this time last year was 45 percent of average.

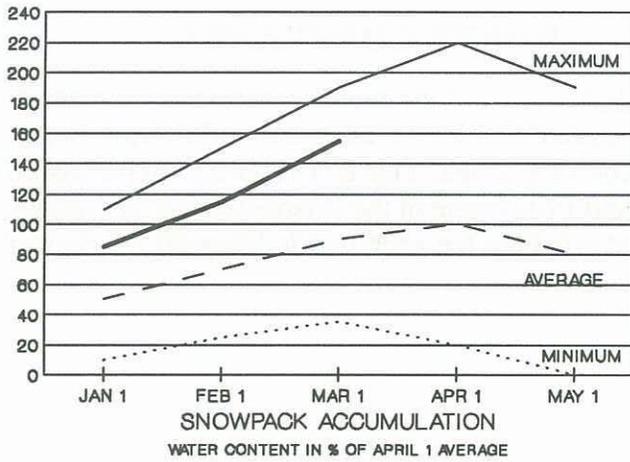


**RUNOFF** - Seasonal runoff of streams draining the area totaled 6.9 million acre-feet which is 90 percent of average for this period. Last year, runoff for the same period was 30 percent of average.

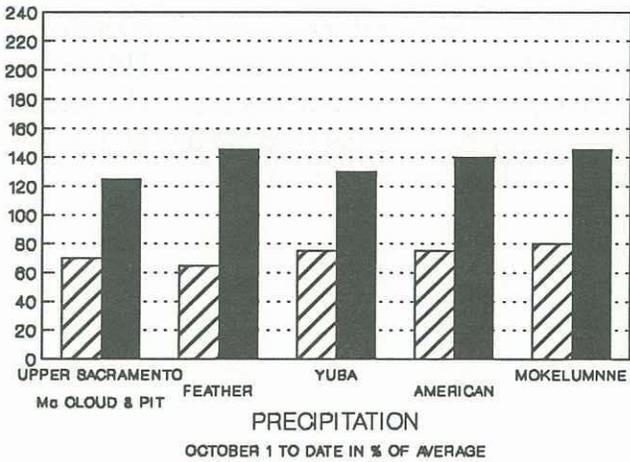


## SACRAMENTO BASIN

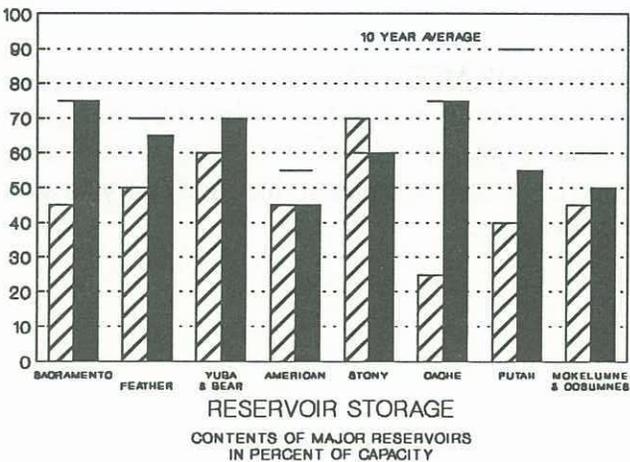
**SNOWPACK** - First of the month measurements made at 65 snow course indicate a basin-wide snow water equivalent of 48.7 inches. This is 175 percent of the average for this date and 155 percent for April 1. Last year at this time, the pack was holding 22.3 inches of water.



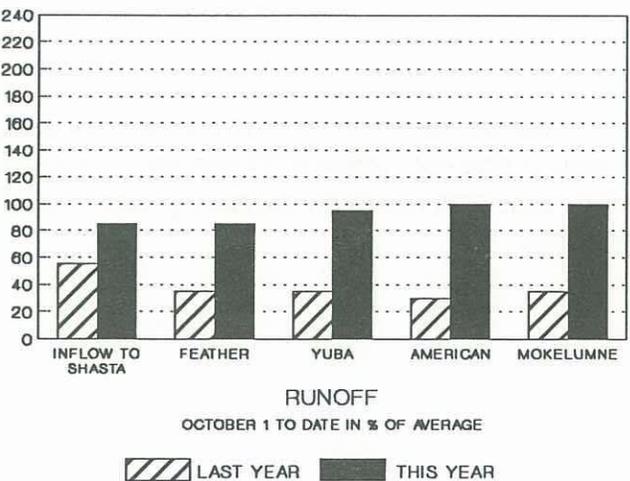
**PRECIPITATION** - Seasonal precipitation (October 1 through the end of last month) on the Sacramento Basin was 140 percent of normal. Precipitation last month was about 145 percent of the monthly average. Seasonal precipitation at this time last year stood at 75 percent of average.



**RESERVOIR STORAGE** - First of the month storage in 43 reservoirs was 10.6 million acre-feet which is 92 percent of average. About 65 percent of available capacity was being used. Storage in these reservoirs was about 65 percent of average at this time last year.



**RUNOFF** - Seasonal runoff from streams draining into the basin totaled 7.7 million acre-feet which is 95 percent of average for this period. Last year runoff for the same period was 45 percent of average.



The Sacramento River Index for the year is forecast at 20.5 million acre-feet assuming median meteorological conditions for the remainder of the year. This continues to classify the year as "above normal" in the Sacramento-San Joaquin Delta according to the State Water Resources Control Board's Decision 1485. The SRI at this time last year was forecasted to be 10.1 million acre-feet.

## SAN JOAQUIN AND TULARE LAKE BASINS

**SNOWPACK** - First of the month measurements made at 63 San Joaquin Basin snow courses indicate a basin wide snow water equivalent of 51.7 inches which is 165 percent of the seasonal (April 1) average and 185 percent of average for this date. Last year at this time, the pack was holding 18.8 inches of water.

At the same time, 36 Tulare Lake Basin snow courses indicated a basin-wide snow water equivalent of 37.1 inches which is 200 percent of the average for this date and 175 percent of the seasonal average. Last year at this time, the Basin was holding 12.2 inches of water.

**PRECIPITATION** - Seasonal precipitation (October 1 through the end of last month) on the San Joaquin Basin was 155 percent of normal. Precipitation last month was 155 percent of the monthly average. Seasonal precipitation at this time last year stood at 80 percent of normal.

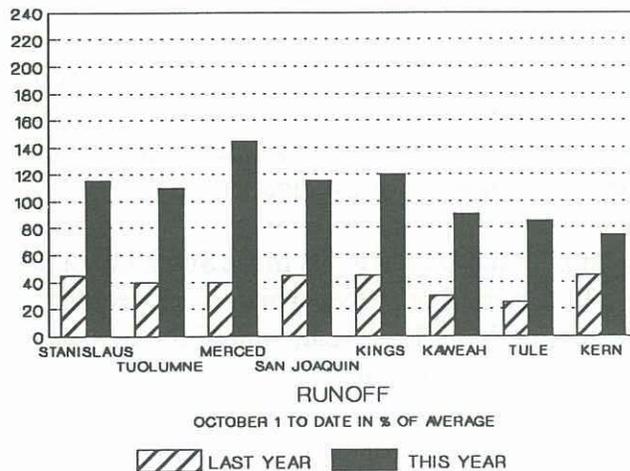
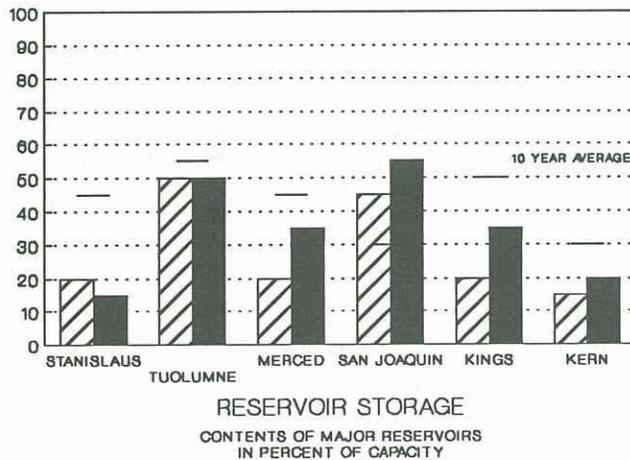
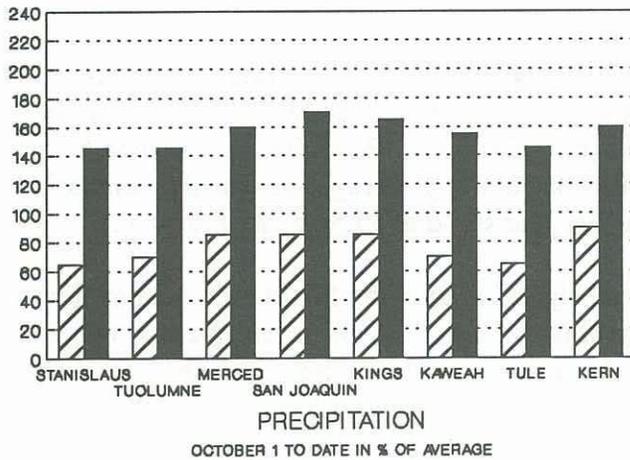
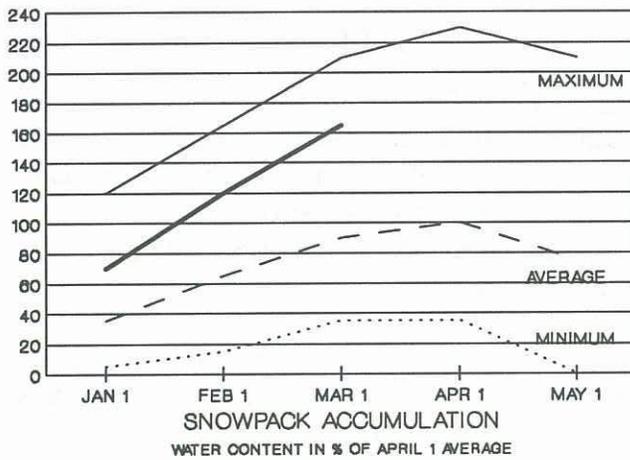
Seasonal precipitation on the Tulare Lake Basin was 160 percent of normal. Precipitation last month was 160 percent of the monthly average. Seasonal precipitation at this time last year stood at 85 percent of normal.

**RESERVOIR STORAGE** - First of the month storage in 33 San Joaquin Basin reservoirs was 5.3 million acre-feet which is 75 percent of average. About 45 percent of available capacity was being used. Storage in these reservoirs at this time last year was 65 percent of average.

First of the month storage in 6 Tulare Lake Basin reservoirs was 550 thousand acre-feet which is 65 percent of average. About 25 percent of available capacity was being used. Storage in these reservoirs at this time last year was 45 percent of average.

**RUNOFF** - Seasonal runoff of streams draining into the San Joaquin Basin totaled 2.0 million acre-feet which is 120 percent of average for this period. Last year, runoff for this same period was 40 percent of average.

Seasonal runoff of streams draining into the Tulare Lake Basin totaled 584 thousand acre-feet which is 100 percent of average for this period. Last year, runoff for this same period was 40 percent of average.



## NORTH AND SOUTH LAHONTAN AREA

**SNOWPACK** - First of the month measurements made at 13 North Lahontan snow courses indicate an area wide snow water equivalent of 39.0 inches which is 175 percent of average for this date and 150 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 17.2 inches of water.

At the same time, 13 South Lahontan courses indicated an area-wide snow water equivalent of 38.8 inches which is 175 percent of the average for this date. Last year at this time, the pack was holding 13.5 inches of water.

**PRECIPITATION** - Seasonal precipitation (October 1 through the end of last month) over the North Lahontan area was 150 percent of normal. Precipitation last month was 150 percent of the monthly average. Seasonal precipitation at this time last year stood at 55 percent of normal.

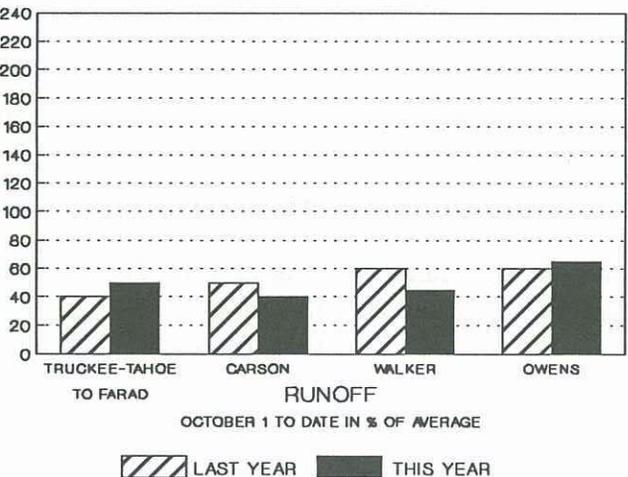
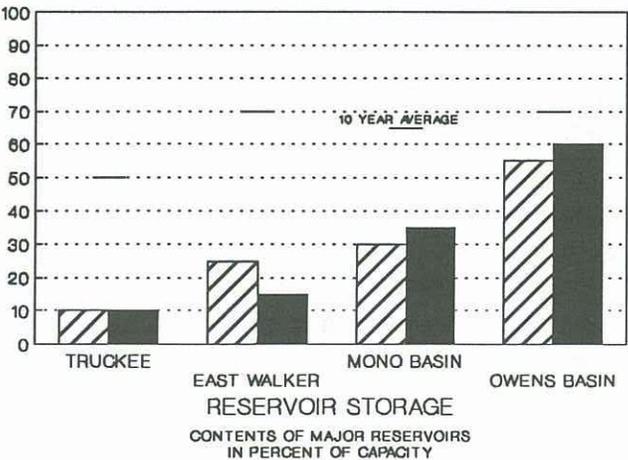
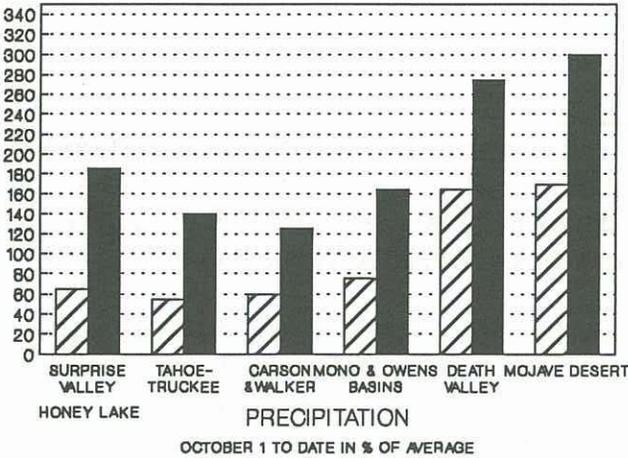
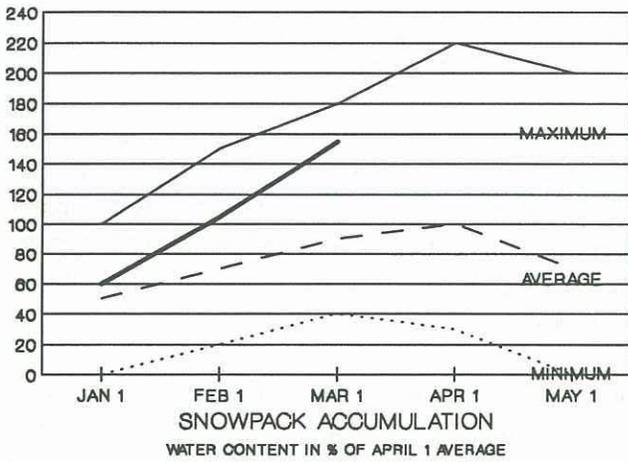
Seasonal precipitation over the South Lahontan area was 215 percent of normal. Last month's precipitation was 270 percent of the monthly average. Seasonal precipitation at this time last year stood at 120 percent of normal.

**RESERVOIR STORAGE** - First of the month storage in 5 North Lahontan reservoirs was 96 thousand acre-feet which is 15 percent of average. About 10 percent of available capacity was being used. Storage in these reservoirs at this time last year was 15 percent of average. Lake Tahoe was 1.5 feet below its natural rim on March 1.

First of the month storage in 8 South Lahontan reservoirs was 245 thousand acre-feet which is 85 percent of average. About 60 percent of available capacity was being used. Storage in these reservoirs at this time last year was 80 percent of average.

**RUNOFF** - Seasonal runoff of streams draining the North Lahontan area totaled 94 thousand acre-feet which is 45 percent of average for this period. Last year, runoff for this same period was 50 percent of average.

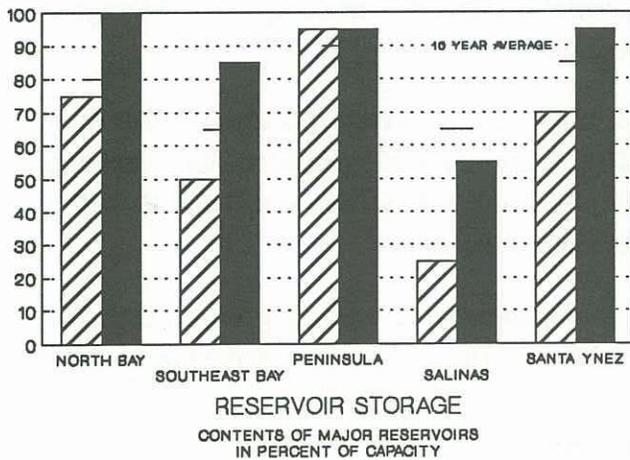
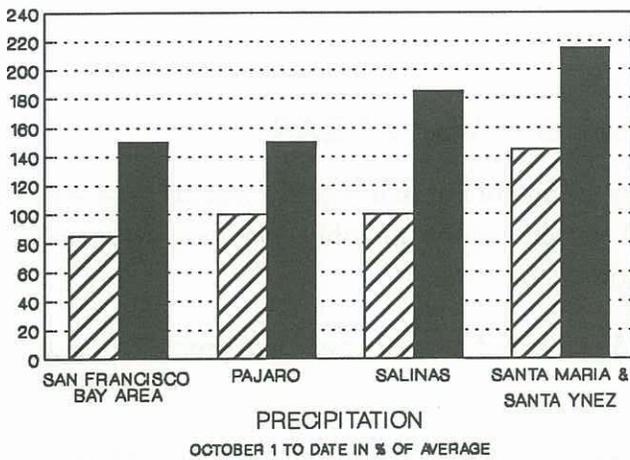
Seasonal runoff of the Owens River in the South Lahontan area totaled 36 thousand acre-feet which is 65 percent of average for this period. Last year, runoff for this same period was 60 percent of average.



## SAN FRANCISCO AND CENTRAL COAST AREAS

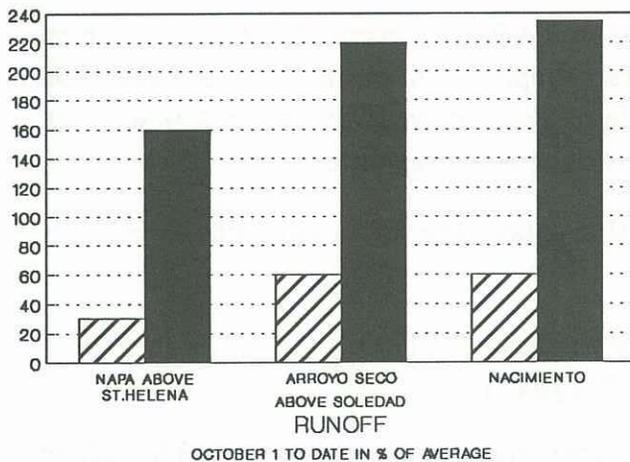
**PRECIPITATION** - Seasonal precipitation (October 1 through the end of last month) on the San Francisco Bay area was 150 percent of normal. Precipitation last month was 135 percent of the monthly average. Seasonal precipitation at this time last year stood at 85 percent of normal.

Seasonal precipitation on the Central Coast area averaged 180 percent of normal. Precipitation last month was 210 percent of the monthly average. Seasonal precipitation at this time last year stood at 115 percent of normal.



**RESERVOIR STORAGE** - First of the month storage in 18 major Bay area reservoirs was 602 thousand acre-feet which is 120 percent of average. About 85 percent of available capacity was being used. Storage in these reservoirs at this time last year was 80 percent of average.

First of the month storage in 6 major Central Coast reservoirs was 623 thousand acre-feet which is 95 percent of average. About 65 percent of available capacity was being used. Storage in these reservoirs at this time last year was 50 percent of average.



**RUNOFF** - Seasonal runoff of the Napa River in the San Francisco Bay area totaled 81 thousand acre-feet which is 160 percent of average for this period. Last year, runoff for this same period was 30 percent of average.

Seasonal runoff of selected Central Coast streams totaled 489 thousand acre-feet which is 230 percent of average for this period. Last year, runoff for this same period was 60 percent of average.

▨ LAST YEAR ■ THIS YEAR

## **SOUTH COAST AND COLORADO RIVER AREAS**

**PRECIPITATION** - Seasonal precipitation (October through the end of February) on the South Coast was 240 percent of normal. February precipitation was 240 percent of the monthly average. Seasonal precipitation at this time last year stood at 125 percent of normal.

Seasonal precipitation in the Colorado Desert area was 325 percent of normal. Seasonal precipitation at this time last year was 155 percent of the average.

**RUNOFF** - Seasonal runoff from selected South Coast streams totaled 130 thousand acre-feet which is 430 percent of average. Last year, runoff for the same period was 125 percent of average.

**RESERVOIR STORAGE** - March 1 storage in 29 major South Coast area reservoirs was 1.9 million acre-feet or 150 percent of average. About 95 percent of available capacity was being used. Storage in these reservoirs at this time last year was 110 percent of average.

First of the month combined storage in Lakes Powell, Mead, Mohave and Havasu was about 36.8 million acre-feet which is nearly average. About 70 percent of available capacity was being used. One year ago, these reservoirs were storing 36.0 million acre-feet. The April through July inflow to Lake Powell is forecasted to be 10.1 million acre-feet which will be 125 percent of average.

**UPPER COLORADO RIVER BASIN** - The first of the month snowpack, according to the U.S. Soil Conservation Service reports was 117 percent of average and ranges from 83 percent in the Green River Basin above Flaming Gorge to 147 percent in the Upper Gunnison.

### **CENTRAL VALLEY PROJECT**

Based on March 1 conditions, water year forecasts for runoff into CVP reservoirs now range from 109% to 147% of average. As of February 28, 1993 CVP storage was 6.1 million acre feet which is an increase of 1.7 million acre feet compared to one year ago, and is approximately 86% of normal for that date.

The Bureau of Reclamation announced water allocations for the CVP on February 15, 1993. Agricultural contractors north of the Delta received 50% of their contract supply; south of the Delta received 25%. Urban contractors received 75% of historical use. Wildlife refuges received 75% of level II supplies. Sacramento River and San Joaquin Exchange contractors received 100% supplies.

Friant Division received 100% Class I, plus 30% Class II supplies. The Friant allocations were later increased to 100% Class I, plus 75% Class II.

USBR will announce updated water allocations for the CVP on March 12, 1993.

### **STATE WATER PROJECT**

On March 1, conservation storage (Oroville plus the State's share of San Luis) had increased to 3.51 million acre-feet, which is 76 percent of capacity. The water supply picture continued to improve greatly during the month of February to the extent that the approved level of water deliveries to State contractors was raised to 70 percent of requests.

## MAJOR WATER DISTRIBUTION PROJECTS

### RESERVOIR STORAGE

(AVERAGES BASED ON PERIOD RECORD)

RESERVOIR	CAPACITY	AVERAGE STORAGE 1,000 AF	STORAGE AS OF FEBRUARY 28		PERCENT AVERAGE
			1992 1,000 AF	1993 1,000 AF	
<u>STATE WATER PROJECT</u>					
Oroville	3,540	2,660	1,535	2,510	94
San Luis SWP	1,060	956	695	990	104
Lake Del Valle	77	33	34	40	120
Silverwood	73	66	71	70	106
Pyramid Lake	171	162	162	162	100
Castaic Lake	324	263	310	316	120
Perris Reservoir	132	114	125	124	108
<u>CENTRAL VALLEY PROJECT</u>					
Clair Engle Lake	2,450	1,939	684	895	46
Shasta Lake	4,550	3,446	1,966	3,459	100
Whiskeytown	241	208	209	198	95
Folsom	975	590	502	505	85
New Melones	2,420	1,669	374	368	22
Millerton Lake	521	309	283	449	145
San Luis CVP	980	758	698	645	85
<u>COLORADO RIVER PROJECT</u>					
Lake Mead	26,300	19,709	20,650	21,515	109
Lake Powell	25,000	15,070	13,745	12,944	86
Lake Mojave	1,810	1,639	1,654	1,709	104
Lake Havasu	619	537	549	599	112
<u>EAST BAY MUNICIPAL UTILITY DISTRICT</u>					
Pardee	210	177	200	180	101
Camanche	432	263	126	194	74
East Bay (4 reservoirs)	151	129	123	135	104
<u>CITY &amp; COUNTY OF SAN FRANCISCO</u>					
Hetch Hetchy	360	133	125	79	59
Cherry Lake	269	105	94	90	86
Lake Eleanor	28	10	3	5	48
South Bay (4 reservoirs)	223	172	144	213	124
<u>CITY OF LOS ANGELES(DWP)</u>					
Crowley Lake(Long Valley)	183	130	118	123	95
Grant Lake	48	30	16	17	57
Other Aqueduct Storage(6 reservoirs)	95	75	52	56	75

DEPARTMENT OF WATER RESOURCES - CALIFORNIA DATA EXCHANGE CENTER  
TELEMETERED SNOW WATER EQUIVALENTS - March 1 1993

BASIN NAME STATION NAME	AGENCY	ELEV FEET	APR 1 AVG	TODAY	INCHES OF WATER EQUIVALENT		
					PERCENT OF APR 1	24 HRS AGO	1 WEEK AGO
<b>TRINITY RIVER</b>							
PETERSON FLAT	USBR	7150	----	34.7	----	34.9	30.4
RED ROCK MOUNTAIN	USBR	6700	39.6	53.0	134%	53.0	51.0
BONANZA KING	USBR	6450	40.5	42.5	105%	42.3	40.4
SHIMMY LAKE	USBR	6200	40.3	----	----	62.9	59.6
MIDDLE BOULDER #3	USBR	6200	28.3	28.1	99%	28.7	28.7
HIGHLAND LAKES	USBR	6030	29.9	38.6	129%	39.4	41.3
SCOTT'S MOUNTAIN	USBR	5900	----	33.6	----	33.5	32.6
MUMBO BASIN	USBR	5700	22.4	36.6	163%	36.7	36.0
BIG FLAT	USBR	5100	----	29.4	----	29.4	28.8
<b>SACRAMENTO RIVER</b>							
CEDAR PASS	SCS	7100	18.1	23.7	131%	23.6	21.7
BLACKS MOUNTAIN	DWR	7100	----	19.6	----	19.4	18.5
SAND FLAT	USBR	6750	42.4	40.7	96%	40.6	----
MEDICINE LAKE	USBR	6700	----	32.6	----	32.5	31.1
ADIN MOUNTAIN	SCS	6350	13.6	21.1	155%	21.1	20.7
SNOW MOUNTAIN	USBR	5950	27.0	55.7	206%	55.7	53.5
SLATE CREEK	USBR	5600	29.0	47.2	163%	46.9	43.9
STOUTS MEADOW	USBR	5400	36.0	56.3	156%	56.3	50.3
<b>FEATHER RIVER</b>							
KETTLEROCK	DWR	7300	25.5	40.0	157%	39.8	37.8
GRIZZLY	DWR	6900	29.7	41.8	141%	41.6	39.5
PILOT PEAK	DWR	6800	52.6	64.1	122%	63.6	58.7
GOLD LAKE	DWR	6750	36.5	53.6	147%	53.6	50.9
HUMBUG	DWR	6500	28.0	52.7	188%	52.6	49.9
RATTLESNAKE	DWR	6100	14.0	----	----	----	----
BUCKS LAKE	DWR	5750	44.7	67.4	151%	66.8	----
FOUR TREES	DWR	5150	20.0	51.7	259%	51.6	46.9
<b>YUBA &amp; AMERICAN RIV</b>							
LAKE LOIS	DWR	8800	----	54.2	----	54.2	52.9
SCHNEIDERS	SMUD	8750	34.5	54.4	158%	54.7	51.3
CAPLES LAKE COURSE	USBR	7800	30.9	41.5	134%	41.5	38.5
ALPHA	SMUD	7600	35.9	53.0	148%	53.0	49.8
BETA	DWR	7600	----	45.2	----	45.2	42.9
FORNI RIDGE	USBR	7600	37.0	44.1	119%	44.1	41.9
SILVER LAKE	USBR	7100	22.7	43.1	190%	43.1	39.4
CENT SIERRA SNOW LAB	USFS	6950	33.6	52.8	157%	52.6	49.0
HUYSINK	USBR	6600	42.6	43.7	103%	43.3	38.0
VAN VLECK	SMUD	6700	35.9	56.6	158%	56.7	52.6
ROBBS SADDLE	SMUD	5900	21.4	38.3	179%	38.4	35.0
GREEK STORE	USBR	5600	21.0	48.9	233%	48.9	43.8
BLUE CANYON	USBR	5280	9.0	24.4	271%	24.4	20.9
ROBBS POWERHOUSE	SMUD	5150	5.2	22.0	423%	22.2	19.9
<b>MOKEL. &amp; STANIS. RIV</b>							
DEADMAN CREEK	USBR	9250	37.2	34.6	93%	34.6	32.2
HIGHLAND MEADOW	USBR	8800	47.9	55.9	117%	55.9	52.7
GIANELLI MEADOW	USBR	8350	55.5	60.0	108%	60.0	56.3
LOWER RELIEF VALLEY	DWR	8100	41.2	----	----	----	----
BLUE LAKES	SCS	8000	33.1	39.1	118%	39.1	36.7
MUD LAKE	SMUD	7900	44.9	67.3	150%	67.1	63.4
STANISLAUS MEADOW	USBR	7750	47.5	59.4	125%	59.2	55.7
BLOODS CREEK	USBR	7200	35.5	42.1	119%	41.9	38.8
BLACK SPRINGS	USBR	6500	32.0	46.9	146%	46.9	43.3
<b>TUOLUMNE &amp; MERCED R.</b>							
DANA MEADOWS	DWR	9800	27.7	34.2	124%	34.2	30.8
SLIDE CANYON	DWR	9200	----	50.9	----	51.0	47.0
SNOW FLAT	DWR	8700	44.1	56.2	127%	56.2	50.3
TUOLUMNE MEADOWS	DWR	8600	22.6	30.0	133%	30.0	26.8
HORSE MEADOW	DWR	8400	48.6	55.6	114%	53.6	57.5
OSTRANDER LAKE	DWR	8200	34.8	59.5	171%	59.5	53.6
PARADISE	DWR	7650	----	----	----	----	----
GIN FLAT	DWR	7050	34.2	45.0	132%	44.9	40.3
LOWER KIBBIE	DWR	6600	27.4	40.1	146%	41.1	37.9
<b>SAN JOAQUIN RIVER</b>							
VOLCANIC KNOB	USBR	10100	30.1	39.9	132%	39.9	35.3
AGNEW PASS	USBR	9450	32.3	48.4	150%	48.4	42.5
KAISER POINT	USBR	9200	37.8	49.2	130%	48.6	43.1
GREEN MOUNTAIN	USBR	7900	30.8	52.8	171%	52.8	47.6

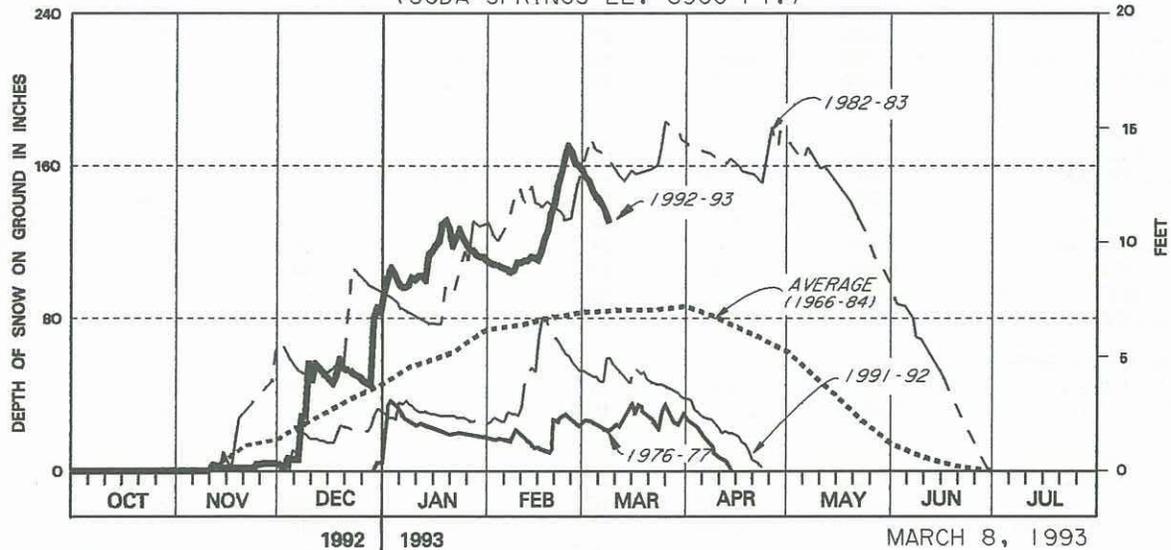
DEPARTMENT OF WATER RESOURCES - CALIFORNIA DATA EXCHANGE CENTER  
TELEMETERED SNOW WATER EQUIVALENTS - March 1 1993

BASIN NAME STATION NAME	AGENCY	ELEV FEET	APR 1 AVG	TODAY	INCHES OF WATER EQUIVALENT PERCENT OF APR 1	24 HRS AGO	1 WEEK AGO
TAMARACK SUMMIT	USBR	7600	30.5	53.7	176%	53.5	48.2
CHILKOOT MEADOW	USBR	7150	38.0	55.9	147%	55.9	49.8
HUNTINGTON LAKE	USBR	7000	20.1	41.4	206%	41.2	36.4
GRAVEYARD MEADOW	USBR	6900	18.8	43.0	229%	42.8	38.0
POISON RIDGE	USBR	6900	28.9	56.2	195%	56.2	49.1
KINGS RIVER							
BISHOP PASS	DWR	11200	----	38.6	----	38.6	33.4
CHARLOTTE LAKE	DWR	10400	----	34.4	----	33.9	29.3
STATE LAKES	USCE	10400	29.0	----	----	41.9	37.5
MITCHELL MEADOW	USCE	10375	32.9	----	----	45.7	41.2
BLACKCAP BASIN	USBR	10300	34.3	46.4	135%	46.4	41.8
UPPER BURNT CORRAL	DWR	9700	34.6	56.9	164%	56.9	51.0
WEST WOODCHUCK MDW	USCE	9100	32.8	----	----	47.9	42.8
BIG MEADOWS	DWR	7600	25.9	39.6	153%	39.7	35.1
KAWEAH & TULE RIVERS							
QUAKING ASPEN	DWR	7200	21.0	34.2	163%	34.2	29.6
GIANT FOREST	USCE	6400	10.0	----	----	24.8	20.3
KERN RIVER							
UPPER TYNDALL CREEK	USCE	11500	27.7	----	----	30.4	27.2
CRABTREE	DWR	10700	19.8	18.7	95%	18.6	16.2
CHAGOOPA PLATEAU	DWR	10300	21.8	30.1	138%	30.1	26.8
PASCOES	USCE	9150	24.9	----	----	35.4	31.1
TUNNEL	DWR	8950	15.6	23.0	147%	23.0	20.2
WET MEADOW	USCE	8900	30.3	----	----	38.4	33.7
CASA VIEJA MDW	DWR	8400	20.9	28.8	138%	28.8	25.5
BEACH MEADOW	DWR	7650	11.0	21.1	192%	21.1	18.7
SURPRISE VALLEY AREA							
DISMAL SWAMP	SCS	7050	29.2	32.6	112%	32.7	31.6
TRUCKEE RIVER							
MOUNT ROSE SKI AREA	SCS	8850	38.5	55.7	145%	55.6	52.5
INDEPENDENCE LAKE	SCS	8450	41.4	----	----	----	----
BIG MEADOWS	SCS	8700	25.7	30.8	120%	30.9	28.8
INDEPENDENCE CAMP	SCS	7000	21.8	34.6	159%	34.4	30.9
INDEPENDENCE CREEK	SCS	6500	12.7	24.4	192%	24.1	21.7
LAKE TAHOE BASIN							
HEAVENLY VALLEY	SCS	8800	28.1	35.1	125%	35.1	33.6
HAGANS MEADOW	SCS	8000	16.5	29.3	178%	28.9	26.6
MARLETTE LAKE	SCS	8000	21.1	31.8	151%	31.7	29.6
ECHO PEAK	SCS	7800	39.5	61.7	156%	61.7	59.2
RUBICON NO. 2	SCS	7500	29.1	40.1	138%	40.0	36.5
WARD CREEK NO. 3	SCS	6750	39.4	54.2	138%	54.2	49.5
FALLEN LEAF LAKE	SCS	6300	7.0	16.3	233%	16.4	15.8
CARSON RIVER							
EBBETTS PASS	SCS	8700	38.8	40.8	105%	40.8	38.2
POISON FLAT	SCS	7900	16.2	27.9	172%	27.9	26.8
WALKER RIVER							
VIRGINIA LAKES RIDGE	SCS	9200	20.3	25.2	124%	25.1	21.9
LOBDELL LAKE	SCS	9200	17.3	19.3	112%	19.3	18.0
SONORA PASS BRIDGE	SCS	8750	26.0	----	----	31.2	----
LEAVITT MEADOWS	SCS	7200	8.0	21.2	265%	21.2	20.1
OWENS RIVER/MONO LK.							
GEM PASS	LADWP	10750	31.7	44.4	140%	44.4	41.2
SAWMILL MEADOW	DWR	10300	19.4	15.7	81%	16.4	17.0
COTTONWOOD LAKES	LADWP	10200	11.6	----	----	----	----
BIG PINE #3	LADWP	9800	17.9	34.0	190%	34.0	29.4
SOUTH LAKE	LADWP	9600	16.0	25.3	158%	25.1	22.0
MAMMOTH PASS (RP)	USBR	9500	42.4	50.0	118%	50.0	45.5
MAMMOTH PASS-6 TANKS	USBR	9500	----	----	----	----	----
ROCK CREEK	LADWP	8200	----	20.9	----	20.9	17.8

NORMAL SNOWPACK ACCUMULATION EXPRESSED AS A PERCENT OF APRIL 1ST AVERAGE

AREA	JANUARY	FEBRUARY	MARCH	APRIL	MAY
CENTRAL VALLEY NORTH	45	70	90	100	75
CENTRAL VALLEY SOUTH	45	65	85	100	80
NORTH COAST	40	60	85	100	80

**SNOW DEPTH AT CENTRAL SIERRA SNOW LAB.  
(SODA SPRINGS EL. 6900 FT.)**



DATA SOURCE: CENTRAL SIERRA SNOW LAB.

\*\*\*\*\* SNOWLINES \*\*\*\*\*

WATER MANAGERS may not realize the dedication demonstrated in field data collection. During the March survey personnel from one cooperating agency skied for 16 straight hours, much of the time in heavy snow and wind, collecting the data. However, the agency will remain nameless as part of that time was spent skiing in a circle.

SNOW SAMPLING was very difficult for many of our cooperating snow surveyors this last month. It has been ten years for many of us since we've had snow this deep and layered with which to contend. Following are some tips for multiple sampling:

- \* Swab the snow tubes inside and out with MAXI-GLIDE the day before you go into the field. MAXI-GLIDE can be obtained at shops that rent or sell skis. It is used on skis to prevent the snow from sticking.
- \* Only sample the snow for each part of the multiple sample to depths that allow you to get a 90% core.
- \* Leave the snow in the tube when moving between points, dumping it out of the tube just as you are ready to get the next sample...this will keep the tubes cold. When starting the survey, if the tubes have been warm, lay them down in the snow.
- \* PLEASE...DO NOT stand on the driving wrench handles. If you learned this technique somewhere or someplace, disregard. Multiple sampling will eliminate the need for such heroics which are damaging to the tubeset and potentially hazardous to the snow surveyor. Also, do not bang the sides of the tubes with wrenches, rocks, trees, etc in attempting to dislodge the snow core.

If you continue to have trouble or need training, call Dave Hart at the Snow Survey office at (916) 653-4541.

**SNOWPACK** - Snow data is a major index of spring and summer runoff from Sierra Nevada watersheds. April 1 data historically reflects the magnitude of the snowpack at or near the maximum seasonal accumulation. Averages are based on April 1 data for the period 1941-1990 (50 years, except for data sites established after 1941).

**PRECIPITATION** - averages are based on April 1 data for the period 1941-1990 (50 years, except for data sites established after 1941).

**RUNOFF AND FORECASTS** - Runoff data and runoff forecasts are shown as unimpaired values. Unimpaired runoff represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds. Forecast of runoff assumes median conditions subsequent to the date of forecast.

Runoff probability ranges are statistically derived from historical data. The 80 percent probability range is comprised of the 90 percent exceedence level value and the 10 percent exceedence level value. This means that actual runoff should fall within the stated limits eight times out of ten.

Runoff averages for most streams are based on the 50 year period 1941-1990. For more details contact California Cooperative Snow Surveys, P. O. Box 942836, Sacramento, CA 94236-0001, (916) 653-8292.

**On the front cover:**

Steve Brougher, Jim Frazier and Randy Westmoreland of Stanislaus National Forest at Huckleberry Lake cabin in the Cherry Creek area of Tuolumne River watershed.

Photo by Jim Frazier

State of California – The Resources Agency  
DEPARTMENT OF WATER RESOURCES  
P.O. Box 942836  
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# FIRST CLASS

