California Cooperative
Snow Surveys
Bulletin 120-93

State of California
The Resources Agency

Department of
Water Resources

Water Conditions in California

Report 3 April 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

THE RESOURCES AGENCY
Douglas P. Wheeler, Secretary for Resources

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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

April 1, 1993

Water supply conditions continued to improve during March. A warm storm about mid-month melted some low elevation snow, particularly in the northern Sierra Nevada, and pushed several of the major Sacramento Basin reservoirs into flood control operation. But the snowpack remains quite large, around 150 percent of average, ensuring a good runoff year in all parts of the State.

Forecasts of April through July runoff are about 135 percent of average. They range from about 110 percent on the North Coast upward to about 150 percent in the central portion of the Sierra Nevada.

Snowpack water content decreased about 10 percent during March but still is the most since 1983. Measured amounts are about 150 percent of average, much better than the 60 percent on April 1 of last year.

Precipitation during March was slightly over average for the month, ranging from 75 percent in the San Francisco Bay area to 245 percent in the Central Coastal Area. Statewide seasonal precipitation is 150 percent of average, down slightly from a month ago. Last year, seasonal precipitation at this time was 90 percent statewide but only about 70 percent in the northern third of California.

Runoff during March was well above average, about 160 percent for the month statewide. This increased seasonal runoff since October 1 to 110 percent of average, much better than the 45 percent figure a year ago.

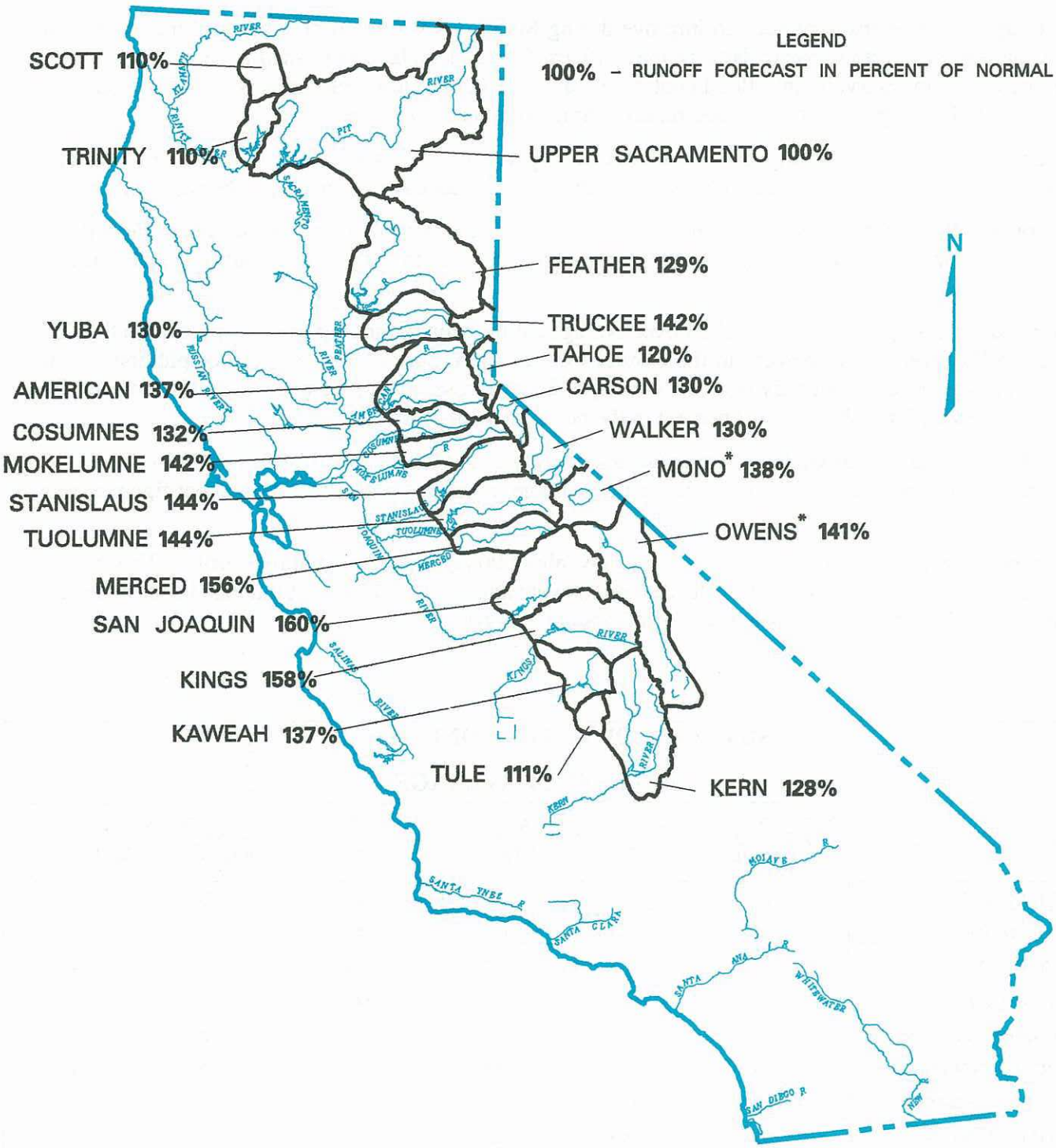
Reservoir storage continues to improve and is now about 90 percent of normal for April 1. This is a 20 percent increase (about 6 million acre-feet) over one year ago. Lake Tahoe is still about 1 foot below its natural rim, which accounts for the low North Lahontan percentage.

SUMMARY OF WATER CONDITIONS

IN PERCENT OF AVERAGE

HYDROGRAPHIC AREA	PRECIPITATION OCTOBER 1 TO DATE	APRIL 1 SNOW WATER CONTENT	APRIL 1 RESERVOIR STORAGE	RUNOFF OCTOBER 1 TO DATE	APR-JULY RUNOFF FORECAST	WATER YEAR RUNOFF FORECAST
NORTH COAST	115	110	70	100	110	105
SAN FRANCISCO BAY	145	--	120	140	--	--
CENTRAL COAST	190	--	95	195	--	--
SOUTH COAST	205	--	145	390	--	--
SACRAMENTO BASIN	135	150	95	115	120	115
SAN JOAQUIN BASIN	150	165	85	135	150	145
TULARE LAKE BASIN	145	160	90	115	145	135
NORTH LAHONTAN	145	140	20	85	135	115
SOUTH LAHONTAN	205	165	85	70	140	115
COLORADO DESERT	345	--	--	--	--	--
STATEWIDE	150	150	90	110	135	125

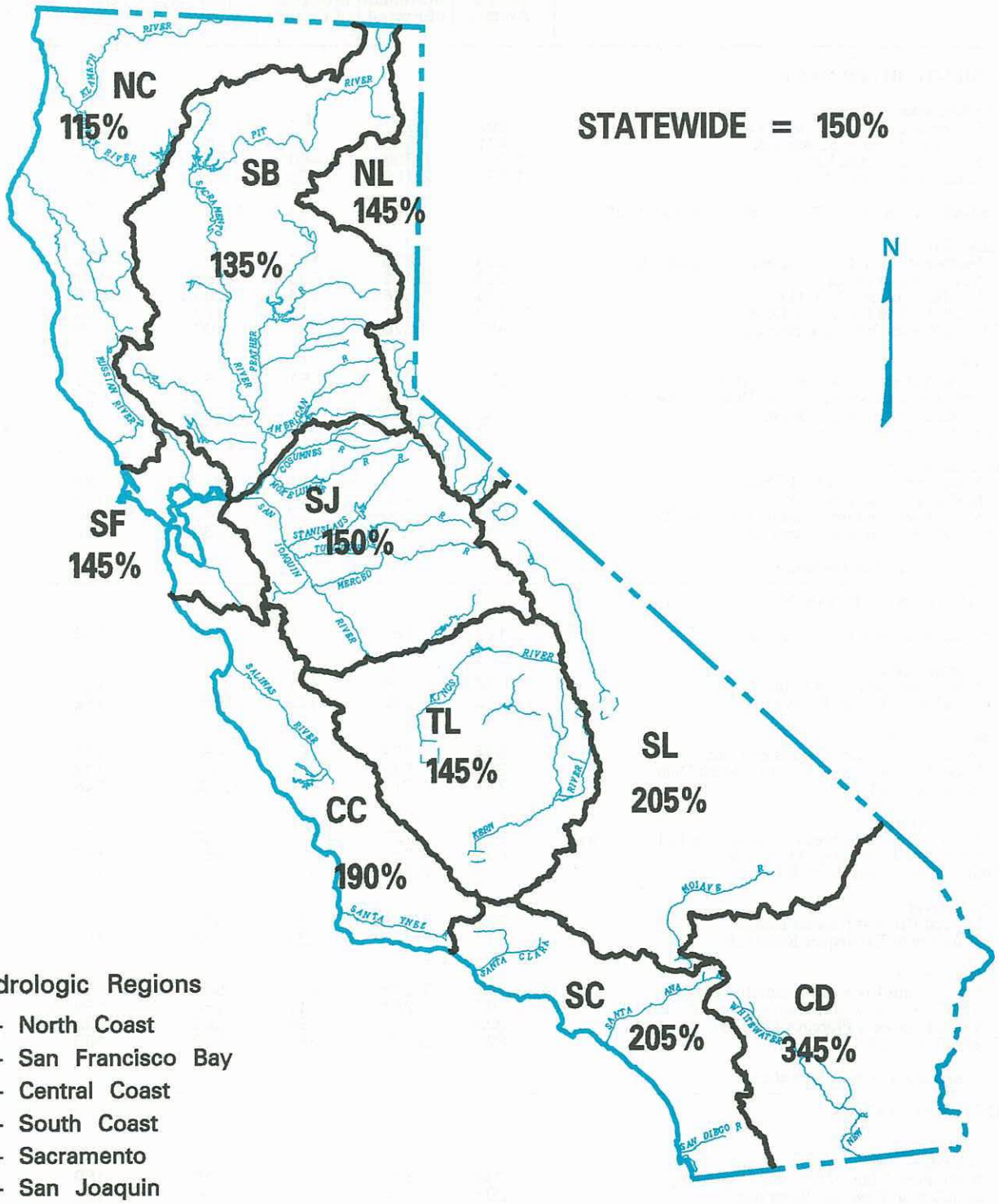
FORECAST OF APRIL – JULY
UNIMPAIRED SNOWMELT RUNOFF
APRIL 1, 1993



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

SEASONAL PRECIPITATION

IN PERCENT OF AVERAGE TO DATE
OCTOBER 1, 1992 TO MARCH 31, 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 APRIL 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
SACRAMENTO RIVER BASIN						
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	1,000	94	
Total inflow to Shasta Lake	1,824	3,189	726	1,830	100	1,470-2,470
Sacramento River above Bend Bridge, near Red Bluff	2,491	4,674	943	2,600	104	2,000-3,400
Feather River						
Feather River at Lake Almanor near Pratville	333	675	120	380	114	
North Fork at Pulga	1,028	2,416	243	1,350	131	
Middle Fork near Clio (1)	86	518	4	100	116	
South Fork at Ponderosa Dam	110	267	13	120	109	
Total inflow to Oroville Reservoir	1,857	4,676	392	2,400	129	2,060-3,100
Yuba River						
North Yuba below Goodyears Bar	286	647	51	360	126	
Inflow to Jackson Mdws and Bowman Reservoirs	112	236	25	140	125	
South Yuba at Langs Crossing	233	481	57	280	120	
Yuba River at Smartville	1,047	2,424	200	1,360	130	1,200-1,730
American River						
North Fork at North Fork Dam	262	716	43	350	134	
Middle Fork near Auburn	522	1,406	100	700	134	
Silver Creek below Camino Diversion Dam	173	386	37	240	139	
Total inflow to Folsom Reservoir	1,284	3,074	229	1,760	137	1,570-2,240
Sacramento River at Sacramento						
SAN JOAQUIN RIVER BASIN						
Cosumnes River at Michigan Bar	129	363	8	170	132	130-240
Mokelumne River						
North Fork near West Point (2)	437	829	104	590	135	
Total inflow to Pardee Reservoir	465	1,065	102	660	142	580-790
Stanislaus River						
Middle Fork below Beardsley Dam	334	702	64	480	144	
North Fork inflow to McKay's Point Dam	224	503	34	320	143	
Total inflow to Melones Reservoir	713	1,710	116	1,030	144	920-1,270
Tuolumne River						
Cherry Creek and Eleanor Creek near Hetch Hetchy	322	727	97	440	137	
Tuolumne River near Hetch Hetchy	606	1,392	153	850	140	
Total inflow to Don Pedro Reservoir	1,200	2,682	301	1,730	144	1,580-2,000
Merced River						
Merced River at Pohono Bridge	362	888	80	550	152	
Total inflow to Exchequer Reservoir	617	1,587	123	960	156	880-1,150
San Joaquin River						
San Joaquin River at Mammoth Pool (3)	1,014	2,279	235	1,550	153	
Big Creek below Huntington Lake (3)	95	264	11	150	158	
South Fork near Florence Lake (3)	202	511	58	280	139	
Total inflow to Millerton Lake	1,228	3,355	262	1,960	160	1,780-2,220
San Joaquin River near Vernalis						
TULARE LAKE BASIN						
Kings River						
North Fork Kings River near Cliff Camp	239	565	50	380	159	
Total inflow to Pine Flat Reservoir	1,203	3,114	273	1,900	158	1,720-2,120
Kaweah River at Terminus Reservoir	284	814	61	390	137	340-450
Tule River at Success Reservoir	63	256	2	70	111	55-90
Kern River						
Kern River near Kernville	373	1,203	83	450	121	
Total inflow to Isabella Reservoir	461	1,657	84	590	128	510-680

All 50-year averages are based on data for water years 1941-1990 except:
(1) 44-year average based on years 1936-79.
(2) 36-year average based on years 1936-71.
(3) 45-year average based on years 1936-80.
See inside back cover for definition of unimpaired runoff and 80 percent probability ranges.

FORECASTS OF WATER YEAR UNIMPAIRED RUNOFF FOR CENTRAL VALLEY STREAMS APRIL 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	1,610	790	500	310	230	440	6,320 (5,850-7,100)	106
8,664	17,180	3,294	2,730	1,400	2,120	1,100	760	440	300	520	9,370 (8,650-10,300)	108
780	1,269	366										
2,417	4,400	666										
219	637	24										
291	562	32										
4,617	9,492	994	1,065	565	1,360	950	900	380	170	210	5,600 (5,200-6,400)	121
564	1,056	102										
181	292	30										
379	565	98										
2,390	4,926	369	605	310	655	500	550	260	50	50	2,980 (2,800-3,350)	125
616	1,234	66										
1,070	2,575	144										
318	705	59										
2,736	6,381	349	665	355	650	620	700	360	80	40	3,470 (3,250-3,950)	127
												116
385	1,253	20	135	95	125	90	55	20	5	5	530 (480-600)	138
626	1,009	197										
748	1,800	129	125	65	155	170	250	200	40	15	1,020 (930-1,150)	136
471	929	88										
1,150	2,952	155	225	110	235	280	410	260	80	20	1,620 (1,500-1,880)	141
461	1,147	123										
770	1,661	258										
1,882	4,430	383	350	160	320	380	590	550	210	50	2,610 (2,450-2,890)	139
461	1,020	92										
966	2,859	150	230	100	150	220	350	300	90	30	1,470 (1,390-1,670)	152
1,337	2,964	308										
112	298	14										
248	653	71										
1,776	4,642	362	250	125	240	370	640	670	280	115	2,690 (2,500-2,970)	151
												145
284	607	58										
1,669	4,294	383	225	105	195	340	630	660	270	105	2,530 (2,340-2,760)	152
444	1,402	92	60	35	65	100	140	120	30	10	560 (500-620)	126
145	615	16	32	15	30	30	25	10	5	3	150 (130-170)	103
558	1,577	163										
716	2,309	175	70	35	90	140	200	170	80	45	830 (740-930)	116

* Unimpaired runoff to date

FORECASTS OF APRIL-JULY UNIMPAIRED RUNOFF FOR SELECTED CALIFORNIA STREAMS

APRIL 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
NORTH COAST AREA					
Trinity River at Lewiston	653	1,593	80	720	110
Scott River at Ft. Jones	200	*	*	220	110
Upper Klamath Lake(1)(2)(5)	509	1,151	177	570	112
LAHONTAN AREA					
Truckee River, Lake Tahoe to Farad accretion	268	713	58	380	142
Lake Tahoe Rise in feet (assuming gates closed)	1.5	3.75	0.23	1.8	120
East Carson River near Gardnerville	186	407	43	240	129
West Carson River at Woodfords	54	131	12	70	130
East Walker River near Bridgeport	63	209	7	85	135
West Walker River near Coleville	148	330	35	190	128
Owens River(3)	233	579	96	328	141

(1)Forecast period of April-September

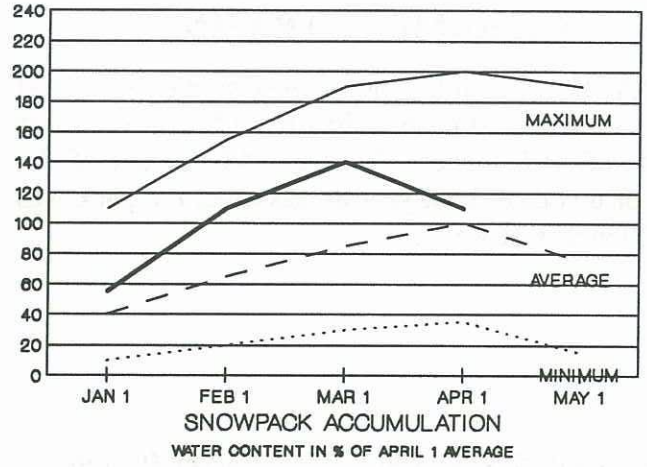
(2)Forecast by U.S. Soil Conservation Service, Portland, Or.

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

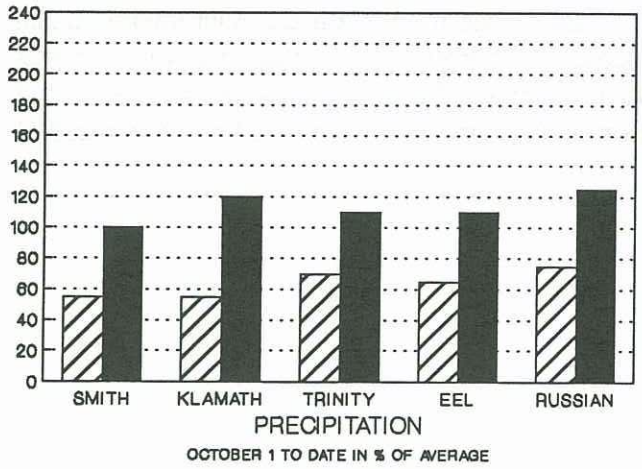
(4)Inside back cover for definition of unimpaired runoff.

(5)Average period of 30 years

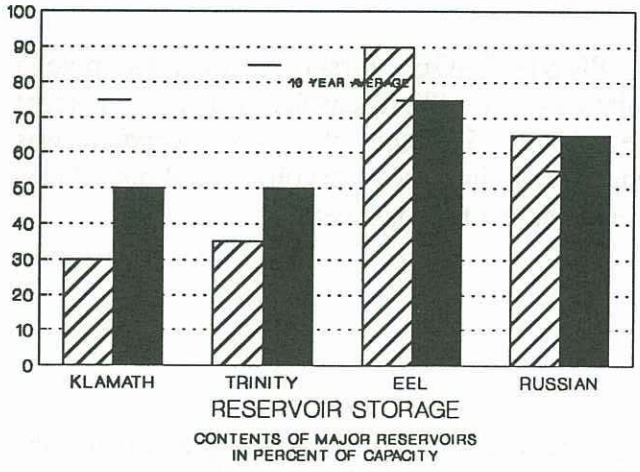
NORTH COAST AREA



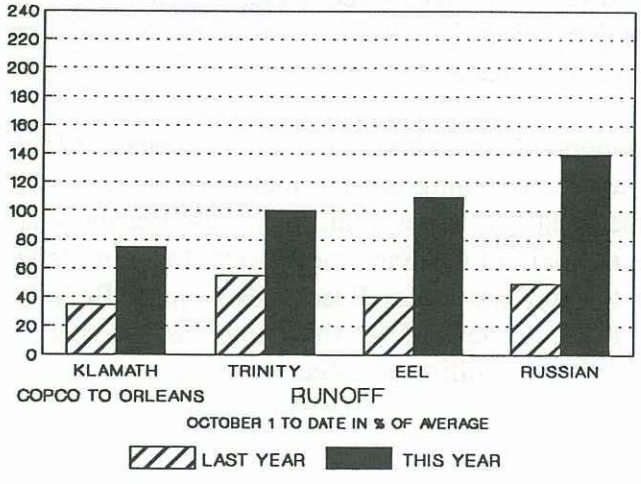
SNOWPACK - First of the month measurements made at 11 snow courses indicate an area wide snow water equivalent of 29.1 inches. This is 112 percent of the seasonal (April 1) average. Last year at this time the pack was holding 22.8 inches of water.



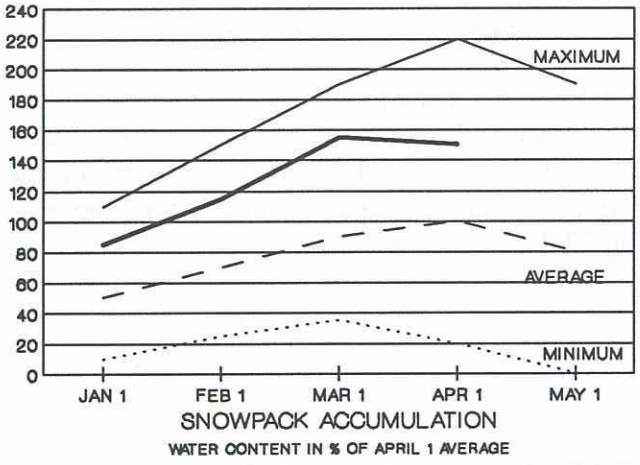
PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on this area was 115 percent of normal. Precipitation last month was about 105 percent of the monthly average. Seasonal precipitation at this time last year stood at 65 percent of normal.



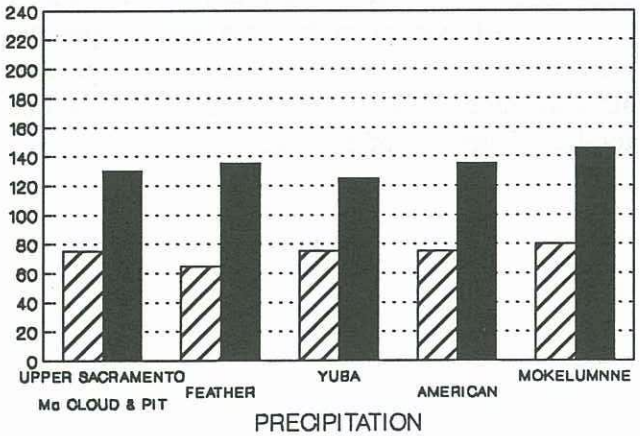
RESERVOIR STORAGE - First of the month storage in 7 reservoirs was 1.8 million acre-feet which is 70 percent of average. About 55 percent of available capacity was being used. Storage in these reservoirs at this time last year was 55 percent of average.



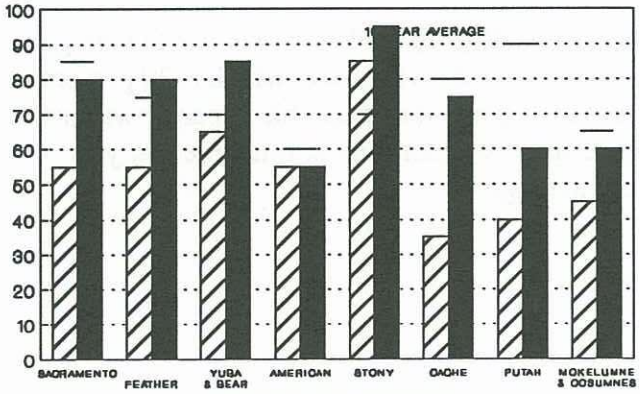
RUNOFF - Seasonal runoff of streams draining the area totaled 9.5 million acre-feet which is 100 percent of average for this period. Last year, runoff for the same period was 35 percent of average.



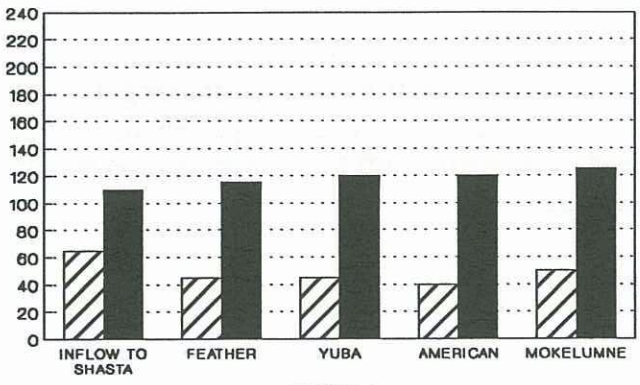
SNOWPACK ACCUMULATION
WATER CONTENT IN % OF APRIL 1 AVERAGE



PRECIPITATION
OCTOBER 1 TO DATE IN % OF AVERAGE



RESERVOIR STORAGE
CONTENTS OF MAJOR RESERVOIRS IN PERCENT OF CAPACITY



RUNOFF
OCTOBER 1 TO DATE IN % OF AVERAGE

LAST YEAR THIS YEAR

SACRAMENTO BASIN

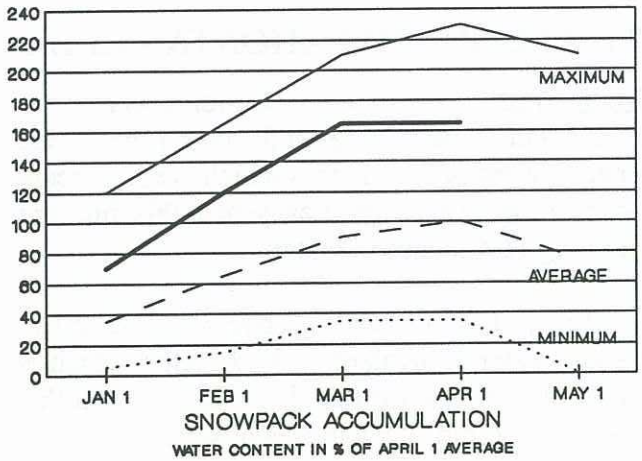
SNOWPACK - First of the month measurements made at 81 snow course indicate a basin-wide snow water equivalent of 41.6 inches. This is 148 percent of the average for this date. Last year at this time, the pack was holding 20 inches of water.

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the Sacramento Basin was 135 percent of normal. Precipitation last month was about 105 percent of the monthly average. Seasonal precipitation at this time last year stood at 75 percent of average.

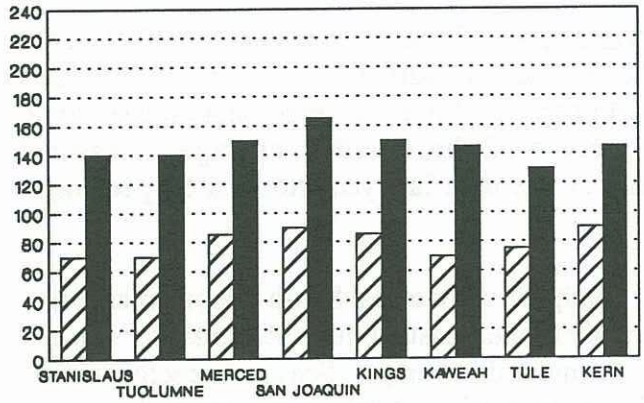
RESERVOIR STORAGE - First of the month storage in 43 reservoirs was 12.1 million acre-feet which is 97 percent of average. About 75 percent of available capacity was being used. Storage in these reservoirs was about 70 percent of average at this time last year.

RUNOFF - Seasonal runoff from streams draining into the basin totaled 12.5 million acre-feet which is 115 percent of average for this period. Last year runoff for the same period was 50 percent of average.

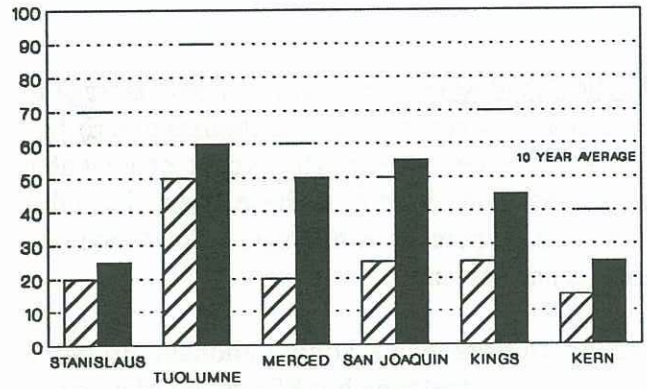
The Sacramento River Index for the year is forecast at 21.4 million acre-feet assuming median meteorological conditions for the remainder of the year. This classifies the year as "above normal" in the Sacramento-San Joaquin Delta according to the State Water Resources Control Board's Decision 1485. The SRI at this time last year was forecasted to be 9.5 million acre-feet.



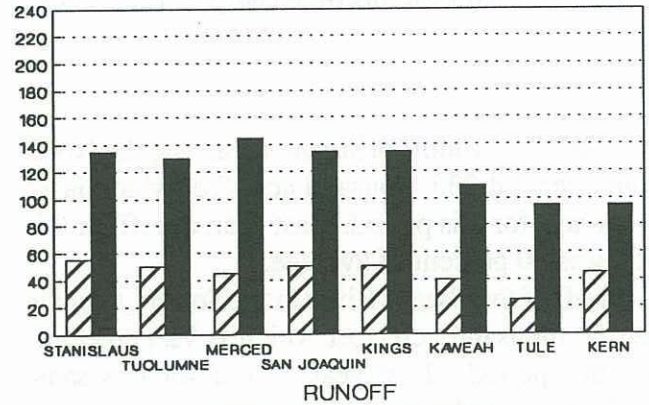
SNOWPACK ACCUMULATION
WATER CONTENT IN % OF APRIL 1 AVERAGE



PRECIPITATION
OCTOBER 1 TO DATE IN % OF AVERAGE



RESERVOIR STORAGE
CONTENTS OF MAJOR RESERVOIRS
IN PERCENT OF CAPACITY



RUNOFF
OCTOBER 1 TO DATE IN % OF AVERAGE

LAST YEAR THIS YEAR

SAN JOAQUIN AND TULARE LAKE BASINS

SNOWPACK - First of the month measurements made at 72 San Joaquin Basin snow courses indicate a basin wide snow water equivalent of 51.5 inches which is 165 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 20.1 inches of water.

At the same time, 38 Tulare Lake Basin snow courses indicated a basin-wide snow water equivalent of 33.5 inches which is 161 percent of the seasonal average. Last year at this time, the Basin was holding 12.8 inches of water.

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the San Joaquin Basin was 150 percent of normal. Precipitation last month was 115 percent of the monthly average. Seasonal precipitation at this time last year stood at 95 percent of normal.

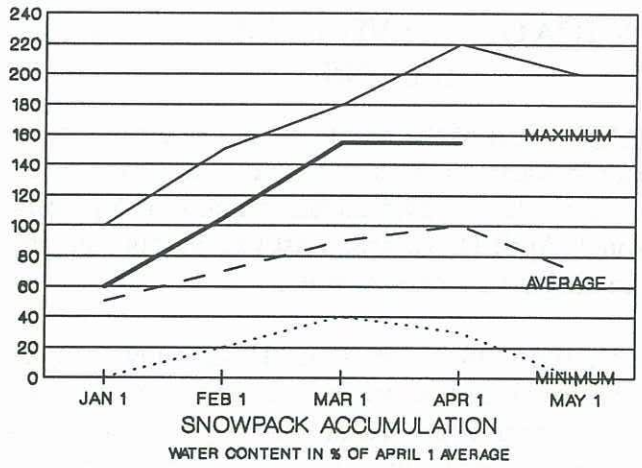
Seasonal precipitation on the Tulare Lake Basin was 145 percent of normal. Precipitation last month was 100 percent of the monthly average. Seasonal precipitation at this time last year stood at 90 percent of normal.

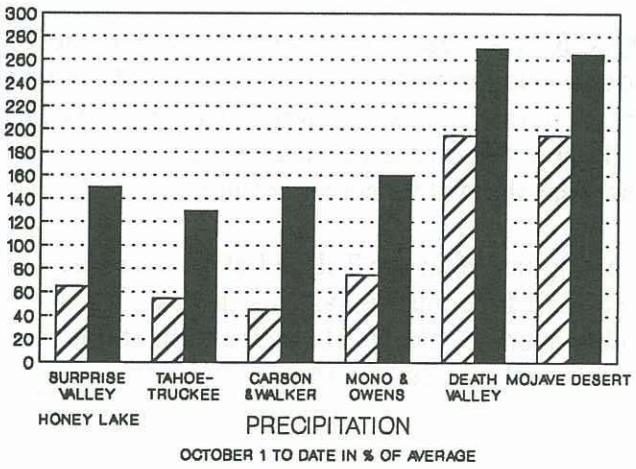
RESERVOIR STORAGE - First of the month storage in 33 San Joaquin Basin reservoirs was 6.3 million acre-feet which is 86 percent of average. About 55 percent of available capacity was being used. Storage in these reservoirs at this time last year was 70 percent of average.

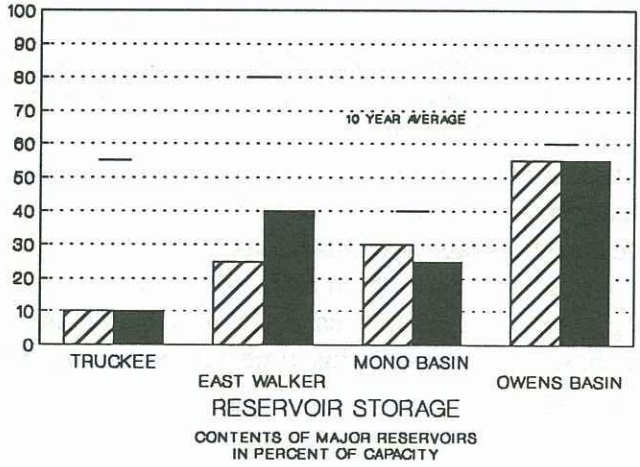
First of the month storage in 6 Tulare Lake Basin reservoirs was 796 thousand acre-feet which is 92 percent of average. About 40 percent of available capacity was being used. Storage in these reservoirs at this time last year was 50 percent of average.

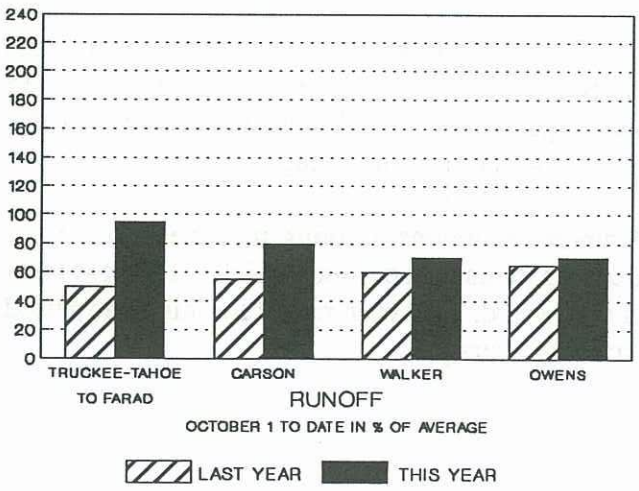
RUNOFF - Seasonal runoff of streams draining into the San Joaquin Basin totaled 3.2 million acre-feet which is 135 percent of average for this period. Last year, runoff for this same period was 45 percent of average.

Seasonal runoff of streams draining into the Tulare Lake Basin totaled 965 thousand acre-feet which is 115 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 27 North Lahontan snow courses indicate an area wide snow water equivalent of 32.5 inches which is 135 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 11.4 inches of water.

At the same time, 21 South Lahontan courses indicated an area-wide snow water equivalent of 37.9 inches which is 163 percent of the average for this date. Last year at this time, the pack was holding 15.8 inches of water.

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) over the North Lahontan area averaged 145 percent of normal. Precipitation last month was 115 percent of the monthly average. Seasonal precipitation at this time last year stood at 55 percent of normal.

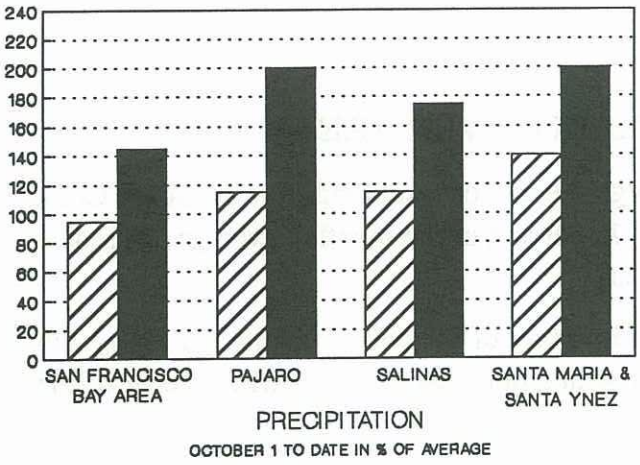
Seasonal precipitation over the South Lahontan area was 205 percent of normal. Last month's precipitation was 135 percent of the monthly average. Seasonal precipitation at this time last year stood at 140 percent of normal.

RESERVOIR STORAGE - First of the month storage in 5 North Lahontan reservoirs was 132 thousand acre-feet which is 20 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 foot below its natural rim.

First of the month storage in 8 South Lahontan reservoirs was 233 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 also 85 percent of average.

RUNOFF - Seasonal runoff of streams draining the North Lahontan area totaled 235 thousand acre-feet which is 85 percent of average for this period. Last year, runoff for this same period was 50 percent of average.

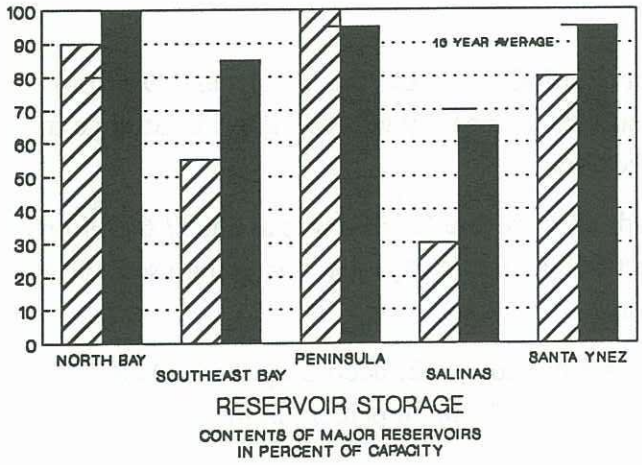
Seasonal runoff of the Owens River in the South Lahontan area totaled 50 thousand acre-feet which is 72 percent of average for this period. Last year, runoff for this same period was 65 percent of average.



SAN FRANCISCO AND CENTRAL COAST AREAS

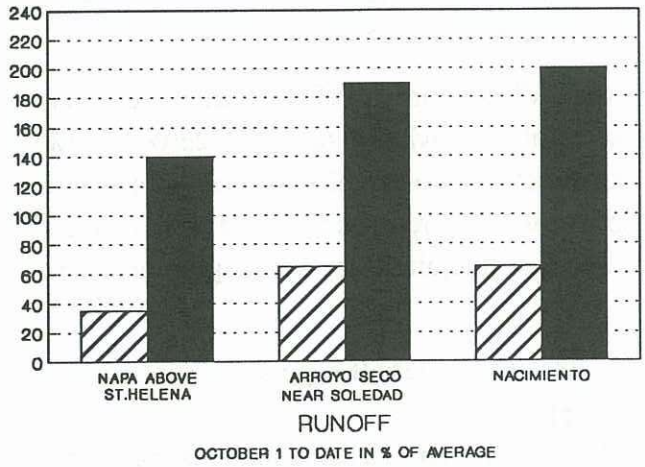
PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the San Francisco Bay area was 145 percent of normal. Precipitation last month was 75 percent of the monthly average. Seasonal precipitation at this time last year stood at 95 percent of normal.

Seasonal precipitation on the Central Coast area averaged 190 percent of normal. Precipitation last month was 245 percent of the monthly average. Seasonal precipitation at this time last year stood at 125 percent of normal.



RESERVOIR STORAGE - First of the month storage in 18 major Bay area reservoirs was 622 thousand acre-feet which is 120 percent of average. About 90 percent of available capacity was being used. Storage in these reservoirs at this time last year was 85 percent of average.

First of the month storage in 6 major Central Coast reservoirs was 670 thousand acre-feet which is 95 percent of average. About 70 percent of available capacity was being used. Storage in these reservoirs at this time last year was 55 percent of average.



RUNOFF - Seasonal runoff of the Napa River in the San Francisco Bay area totaled 88 thousand acre-feet which is 140 percent of average for this period. Last year, runoff for this same period was 35 percent of average.

Seasonal runoff of selected Central Coast streams totaled 547 thousand acre-feet which is 195 percent of average for this period. Last year, runoff for this same period was less than 65 percent of average.

LAST YEAR THIS YEAR

SOUTH COAST AND COLORADO RIVER AREAS

PRECIPITATION - Seasonal precipitation (October through the end of last month) on the South Coast was 205 percent of normal. Precipitation last month was 70 percent of the monthly average. Seasonal precipitation at this time last year was 150 percent of normal.

Seasonal precipitation in the Colorado Desert area was 345 percent of normal. Precipitation last month was over 400 percent of average. Seasonal precipitation at this time last year was 215 percent of the average.

RUNOFF - Seasonal runoff from selected South Coast streams totaled 167 thousand acre-feet which is 390 percent of average. Last year, runoff for the same period was 135 percent of average.

The April through July inflow to Lake Powell is forecasted to be 9.8 million acre-feet which will be 121 percent of normal.

RESERVOIR STORAGE - March 31 storage in 29 major South Coast area reservoirs was 1.9 million acre-feet or 145 percent of average. About 95 percent of available capacity was being used. Storage in these reservoirs at this time last year was 115 percent of average.

First of the month combined storage in Lakes Powell, Mead, Mohave and Havasu was about 37.6 million acre-feet which is 105 percent of average. About 70 percent of available capacity was being used. One year ago, these reservoirs were storing 100 percent of average.

UPPER COLORADO RIVER BASIN - The first of the month snowpack, according to the U.S. Soil Conservation Service reports was 115 percent of average and ranges from 90 percent in the Upper Green drainage to 212 percent in the Colorado Plateau.

CENTRAL VALLEY PROJECT

Based on April 1 conditions, water year forecasts for runoff into CVP reservoirs now range from 123% to 155% of average. April-July forecasts range from 125% of average on the Trinity to 159% of average for the San Joaquin above Friant. As of March 31, 1993 CVP storage was 7.0 MAF which is an increase of 1.9 MAF compared to one year ago, and is approximately 92% of normal for that date.

The Bureau of Reclamation updated the water allocations for the CVP on April 7, 1993. North of the Delta, the agricultural contractors received 100% of their contractual supply, and wildlife refuges received 100% of their level II supplies. South of the Delta, the agricultural contractors received 50% of their contractual supply, urban contractors received 75% of their historic use and wildlife refuges received 75% of their level II supplies. The Sacramento River water rights holders and San Joaquin River exchange contractors received 100% supplies.

The Friant division water allocations remain at 100% Class I, plus 100% Class II supplies.

STATE WATER PROJECT

Storage in Lake Oroville on April 1 was 2.94 MAF, 1.16 MAF higher than this same time last year, and slightly above the long term average for the date (+87 TAF). Above average precipitation and inflow to Oroville during March required use of the spillway for the first time in 7 years.

State water contractors have been approved to take up to 85% of their 1993 annual request.

MAJOR WATER DISTRIBUTION PROJECTS

RESERVOIR STORAGE

(AVERAGES BASED ON PERIOD RECORD)

RESERVOIR	CAPACITY 1,000 AF	AVERAGE STORAGE 1,000 AF	STORAGE AS OF MARCH 31 1992 1,000 AF	1993 1,000 AF	PERCENT AVERAGE
STATE WATER PROJECT					
Oroville	3,540	2,849	1,775	2,936	103
San Luis SWP	1,060	972	992	976	100
Lake Del Valle	77	37	36	40	109
Silverwood	73	67	70	72	108
Pyramid Lake	171	159	161	165	103
Castaic Lake	324	279	313	320	115
Perris Reservoir	132	116	126	125	108
CENTRAL VALLEY PROJECT					
Clair Engle Lake	2,450	2,026	821	1,271	63
Shasta Lake	4,552	3,819	2,388	3,792	99
Whiskeytown	241	213	215	226	106
Folsom	1,010	637	606	623	98
New Melones	2,420	1,727	423	511	30
Millerton Lake	521	308	378	451	146
San Luis CVP	980	827	908	829	100
COLORADO RIVER PROJECT					
Lake Mead	26,159	19,490	20,182	21,981	113
Lake Powell	25,002	14,591	13,699	13,413	92
Lake Mohave	1,810	1,639	1,672	1,691	103
Lake Havasu	619	547	574	572	105
EAST BAY MUNICIPAL UTILITY DISTRICT					
Pardee	210	178	195	194	109
Camanche	431	272	148	251	92
East Bay (4 reservoirs)	151	132	125	136	103
CITY & COUNTY OF SAN FRANCISCO					
Hetch Hetchy	360	124	112	81	66
Cherry Lake	268	108	97	110	101
Lake Eleanor	26	11	3	8	73
South Bay (4 reservoirs)	225	179	158	216	121
CITY OF LOS ANGELES(DWP)					
Crowley Lake(Long Valley)	183	122	122	122	100
Grant Lake	48	21	18	17	81
Other Aqueduct Storage(6 reservoirs)	95	69	49	49	71

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

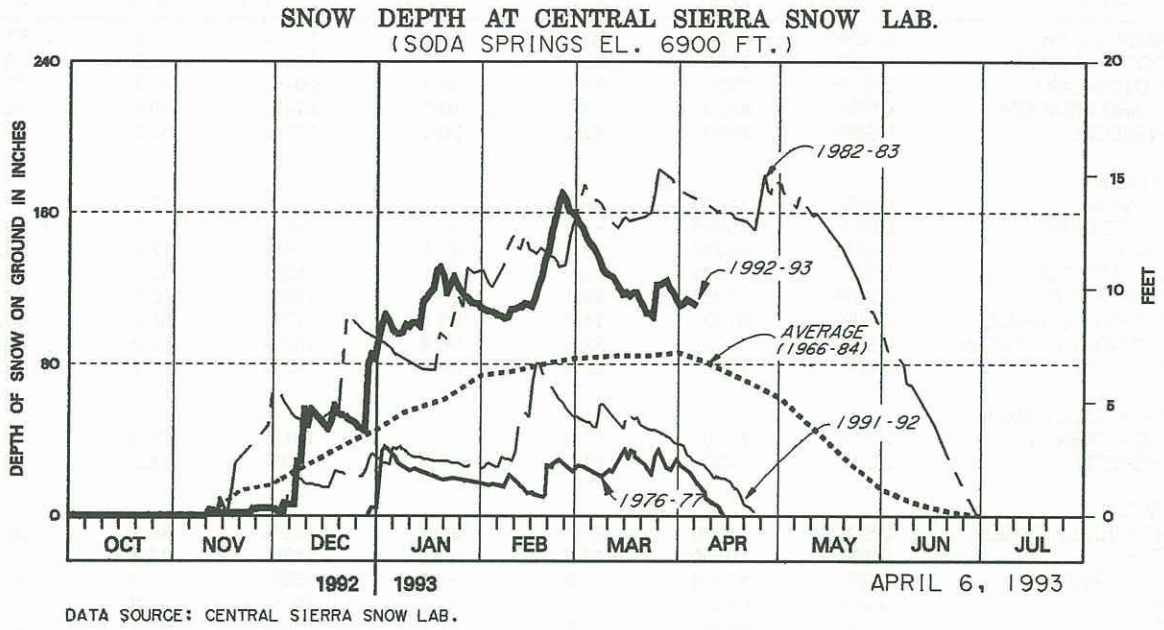
BASIN NAME / STATION NAME	AGENCY	ELEV FEET	APR 1 AVG	INCHES OF WATER EQUIVALENT TODAY	PERCENT OF APR 1	24 HRS AGO	1 WEEK AGO
TRINITY RIVER							
PETERSON FLAT	USBR	7150	----	35.4	----	35.4	35.3
RED ROCK MOUNTAIN	USBR	6700	39.6	49.1	124%	49.1	53.0
BONANZA KING	USBR	6450	40.5	----	----	----	37.0
SHIMMY LAKE	USBR	6200	40.3	58.0	144%	58.0	60.0
MIDDLE BOULDER #3	USBR	6200	28.3	24.8	88%	24.2	24.8
HIGHLAND LAKES	USBR	6030	29.9	22.1	74%	21.8	25.2
SCOTTS MOUNTAIN	USBR	5900	----	25.1	----	25.4	26.5
MUMBO BASIN	USBR	5700	22.4	28.3	126%	28.3	28.8
BIG FLAT	USBR	5100	----	21.2	----	21.2	22.8
SACRAMENTO RIVER							
CEDAR PASS	SCS	7100	18.1	24.6	136%	24.6	23.5
BLACKS MOUNTAIN	DWR	7100	----	17.6	----	18.0	17.9
SAND FLAT	USBR	6750	42.4	44.7	105%	44.7	44.5
MEDICINE LAKE	USBR	6700	----	37.0	----	37.1	37.0
ADIN MOUNTAIN	SCS	6350	13.6	16.4	121%	17.0	17.5
SNOW MOUNTAIN	USBR	5950	27.0	42.3	157%	42.3	42.1
SLATE CREEK	USBR	5600	29.0	42.5	147%	42.9	43.7
STOUTS MEADOW	USBR	5400	36.0	25.2	70%	24.8	23.3
FEATHER RIVER							
KETTLEROCK	DWR	7300	25.5	38.9	152%	39.8	38.4
GRIZZLY	DWR	6900	29.7	40.9	138%	40.7	39.4
PILOT PEAK	DWR	6800	52.6	28.4	54%	29.9	43.2
GOLD LAKE	DWR	6750	36.5	52.2	143%	52.3	50.4
HUMBUG	DWR	6500	28.0	50.6	181%	50.6	48.6
RATTLESNAKE	DWR	6100	14.0	----	----	----	----
BUCKS LAKE	DWR	5750	44.7	66.0	148%	66.2	66.7
FOUR TREES	DWR	5150	20.0	37.9	190%	37.9	39.1
YUBA & AMERICAN RIV							
LAKE LOIS	DWR	8800	----	62.1	----	62.1	60.8
SCHNEIDERS	SMUD	8750	34.5	62.3	181%	62.8	60.9
CAPLES LAKE COURSE	USBR	7800	30.9	40.9	132%	41.2	39.4
ALPHA	SMUD	7600	35.9	51.9	145%	51.9	50.5
BETA	DWR	7600	----	46.8	----	47.4	45.5
FORNI RIDGE	USBR	7600	37.0	44.5	120%	44.5	43.3
SILVER LAKE	USBR	7100	22.7	38.8	171%	38.9	37.4
CENT SIERRA SNOW LAB	USFS	6950	33.6	50.6	151%	50.6	50.1
HUYSINK	USBR	6600	42.6	46.3	109%	46.1	43.7
VAN VLECK	SMUD	6700	35.9	52.1	145%	52.7	51.3
ROBBS SADDLE	SMUD	5900	21.4	32.3	151%	32.8	31.9
GREEK STORE	USBR	5600	21.0	41.5	197%	41.5	40.5
BLUE CANYON	USBR	5280	9.0	4.3	48%	5.7	7.7
ROBBS POWERHOUSE	SMUD	5150	5.2	9.8	188%	10.6	12.3
MOKEL. & STANIS. RIV							
DEADMAN CREEK	USBR	9250	37.2	36.8	99%	37.1	35.5
HIGHLAND MEADOW	USBR	8800	47.9	66.7	139%	66.1	63.7
GIANELLI MEADOW	USBR	8350	55.5	63.8	115%	63.8	61.2
LOWER RELIEF VALLEY	DWR	8100	41.2	----	----	----	----
BLUE LAKES	SCS	8000	33.1	43.4	131%	43.4	42.5
MUD LAKE	SMUD	7900	44.9	77.8	173%	78.0	76.0
STANISLAUS MEADOW	USBR	7750	47.5	68.8	145%	68.8	66.3
BLOODS CREEK	USBR	7200	35.5	47.6	134%	47.6	44.5
BLACK SPRINGS	USBR	6500	32.0	50.6	158%	51.6	45.5
TUOLUMNE & MERCED R.							
DANA MEADOWS	DWR	9800	27.7	37.4	135%	37.4	36.0
SLIDE CANYON	DWR	9200	----	57.0	----	56.9	54.6
SNOW FLAT	DWR	8700	44.1	62.1	141%	60.8	60.0
TUOLUMNE MEADOWS	DWR	8600	22.6	32.4	143%	32.4	32.2
HORSE MEADOW	DWR	8400	48.6	66.7	137%	68.6	49.0
OSTRANDER LAKE	DWR	8200	34.8	65.4	188%	64.7	62.1
PARADISE	DWR	7650	----	----	----	----	----
GIN FLAT	DWR	7050	34.2	45.5	133%	45.6	43.3
LOWER KIBBIE	DWR	6600	27.4	36.7	134%	36.7	34.1
SAN JOAQUIN RIVER							
VOLCANIC KNOB	USBR	10100	30.1	43.8	146%	43.1	41.8
AGNEW PASS	USBR	9450	32.3	52.3	162%	52.3	51.0
KAISER POINT	USBR	9200	37.8	57.3	152%	56.7	53.0
GREEN MOUNTAIN	USBR	7900	30.8	53.9	175%	53.9	50.8

DEPARTMENT OF WATER RESOURCES - CALIFORNIA DATA EXCHANGE CENTER
TELEMETERED SNOW WATER EQUIVALENTS - APRIL 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	54.5	179%	54.1	51.3
CHILKOOT MEADOW	USBR	7150	38.0	56.9	150%	56.9	53.7
HUNTINGTON LAKE	USBR	7000	20.1	40.4	201%	40.4	37.4
GRAVEYARD MEADOW	USBR	6900	18.8	40.2	214%	40.4	38.6
POISON RIDGE	USBR	6900	28.9	50.5	175%	50.5	48.4
KINGS RIVER							
BISHOP PASS	DWR	11200	----	42.5	----	42.5	41.8
CHARLOTTE LAKE	DWR	10400	----	35.3	----	34.7	38.1
STATE LAKES	USCE	10400	29.0	47.6	164%	47.5	44.9
MITCHELL MEADOW	USCE	10375	32.9	50.1	152%	50.1	47.9
BLACKCAP BASIN	USBR	10300	34.3	53.6	156%	52.9	50.3
UPPER BURNT CORRAL	DWR	9700	34.6	58.8	170%	58.8	60.8
WEST WOODCHUCK MDW	USCE	9100	32.8	54.9	167%	54.9	49.9
BIG MEADOWS	DWR	7600	25.9	48.5	187%	49.7	45.2
KAWEAH & TULE RIVERS							
QUAKING ASPEN	DWR	7200	21.0	29.5	141%	29.9	29.4
GIANT FOREST	USCE	6400	10.0	18.0	180%	18.2	16.5
KERN RIVER							
UPPER TYNDALL CREEK	USCE	11500	27.7	34.1	123%	34.1	32.0
CRABTREE	DWR	10700	19.8	22.4	113%	22.3	20.5
CHAGOOPA PLATEAU	DWR	10300	21.8	32.7	150%	32.7	30.1
PASCOES	USCE	9150	24.9	39.9	160%	39.9	36.2
TUNNEL	DWR	8950	15.6	21.8	140%	22.0	20.8
WET MEADOW	USCE	8900	30.3	37.3	123%	37.3	36.1
CASA VIEJA MDW	DWR	8400	20.9	28.8	138%	29.4	28.1
BEACH MEADOW	DWR	7650	11.0	12.4	112%	13.3	13.1
SURPRISE VALLEY AREA							
DISMAL SWAMP	SCS	7050	29.2	34.5	118%	34.8	34.8
TRUCKEE RIVER							
MOUNT ROSE SKI AREA	SCS	8850	38.5	59.8	155%	59.6	58.1
INDEPENDENCE LAKE	SCS	8450	41.4	59.5	144%	59.0	----
BIG MEADOWS	SCS	8700	25.7	30.8	120%	30.8	29.3
INDEPENDENCE CAMP	SCS	7000	21.8	33.2	152%	33.2	31.9
INDEPENDENCE CREEK	SCS	6500	12.7	24.2	191%	24.8	24.5
LAKE TAHOE BASIN							
HEAVENLY VALLEY	SCS	8800	28.1	37.1	132%	36.9	36.4
HAGANS MEADOW	SCS	8000	16.5	26.9	163%	27.0	25.5
MARLETTE LAKE	SCS	8000	21.1	33.8	160%	33.7	31.2
ECHO PEAK	SCS	7800	39.5	61.3	155%	61.5	----
RUBICON NO. 2	SCS	7500	29.1	47.5	163%	47.1	44.7
WARD CREEK NO. 3	SCS	6750	39.4	54.8	139%	54.9	55.0
FALLEN LEAF LAKE	SCS	6300	7.0	4.7	67%	5.7	6.1
CARSON RIVER							
EBBETTS PASS	SCS	8700	38.8	47.9	123%	47.3	43.1
POISON FLAT	SCS	7900	16.2	27.2	168%	27.4	26.8
WALKER RIVER							
VIRGINIA LAKES RIDGE	SCS	9200	20.3	29.7	146%	29.7	27.9
LOBDELL LAKE	SCS	9200	17.3	20.9	121%	20.9	19.9
SONORA PASS BRIDGE	SCS	8750	26.0	35.8	138%	35.5	33.2
LEAVITT MEADOWS	SCS	7200	8.0	14.7	184%	15.5	15.1
OWENS RIVER/MONO LK.							
GEM PASS	LADWP	10750	31.7	47.7	151%	47.7	46.4
SAWMILL MEADOW	DWR	10300	19.4	----	----	----	----
COTTONWOOD LAKES	LADWP	10200	11.6	21.2	183%	21.3	20.3
BIG PINE #3	LADWP	9800	17.9	37.3	208%	36.6	35.3
SOUTH LAKE	LADWP	9600	16.0	27.1	170%	27.0	25.3
MAMMOTH PASS (RP)	USBR	9500	42.4	55.1	130%	54.9	56.7
MAMMOTH PASS-6 TANK	USBR	9500	----	----	----	----	----
ROCK CREEK	LADWP	8200	----	21.8	----	22.0	21.1

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



❄❄❄❄❄ SNOWLINES ❄❄❄❄

EQUIPMENT FAILURES have unfortunately been common this season, which is the worst for at least the last ten years for broken tubes. The early season warm rains and early March warm weather set up some very hard ice layers which tested the patience of our surveyors and the durability of our tubes.

SNOW SENSORS served as stage recorders in some mountain meadows during March. Shimmy Lake went from 60 inches of water content on March 16, to 101 inches on March 19 - not the result of a rogue snow storm but due to local flooding of the meadow. It took about two weeks for the free water to drain out of the meadow area and return to a normal condition. This event and similar rises at other locations will provide an excellent test of the water tight integrity of the instrument boxes.

LAKE SHASTA rose 5.3 feet and gained 144,000 acre feet in 24 hours between March 16th and 17th. We don't know if it's a record, but it's a lot of water in a very short period of time. Fortunately, cooler temperatures and cloud cover during the last week of the month halted the rapid melt and kept more snow sensors from floating.

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:
Don Paulsen steadies the ladder while Marty Gmelin reattaches the chimney pipe at the Huckleberry cabin in the Tuolumne River.

Photo by Matt Colwell

State of California—The Resources Agency
DEPARTMENT OF WATER RESOURCES
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FIRST CLASS