California Cooperative
Snow Surveys
Bulletin 120-91

Water Conditions in California

Report 2 March 1, 1991

DEPARTMENT OF WATER RESOURCES
STATE OF CALIFORNIA

STATE OF CALIFORNIA

Department of Water Resources

Division of Flood Management

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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
South San Joaquin Irrigation District
Tri-Dam Project
Tulare Lake Basin Water Storage District
Turlock Irrigation District
Yuba County Water Agency

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, 1991

THE EARLY MARCH STORMS HAVE NOT BEEN INCORPORATED IN THIS BULLETIN The forecasts and data presented in the main body of this bulletin reflect a snapshot of conditions as they were as of the first of the month. A forecast update on Central Valley rivers reflecting post storm conditions (as of March 6) is presented on Page 16. The update forecasts have been developed using telemetered data and depict the improved prospects resulting from the early month storm. Additional updates will be made at approximately weekly intervals during the month.

FORECASTS developed from March 1 data for April through July runoff are considerably lower than those of a month ago. The greatest reductions were in the middle portion of the Central Valley - from the Feather through the Kings Rivers.

SNOWPACK on March 1was far below normal. Statewide, the snowpack was about 15 percent of average. Highest snow water contents, about 20 of average, were being held by the North Coast and North Lahontan packs. The South Lahontan snowpack was holding only about 5 percent of average as the month ended.

PRECIPITATION during February was below normal throughout most of the State. Only the South Lahontan and Colorado River areas had above normal February precipitation. The month did end, however, with heavy precipitation which continued into the new month. During the month, statewide precipitation rose from 25 to 35 percent of average.

RUNOFF has been extremely low this season and was down to only 15 percent of average on this March 1. For comparison, on March 1, 1977 statewide seasonal runoff was 20 percent of normal. Runoff had virtually ceased in the streams of the San Francisco Bay and Central Coast areas.

RESERVOIR STORAGE figures as of March 1 are higher than indicated by the other water supply parameters. Statewide storage is about half normal and varies from a low of about 15 percent in the Central Coast reservoirs to only slightly lower than average on the South Coast. Central Valley reservoirs approximate the statewide figure except in the Tulare Lake Basin whose reservoirs are holding only about a fifth of normal.

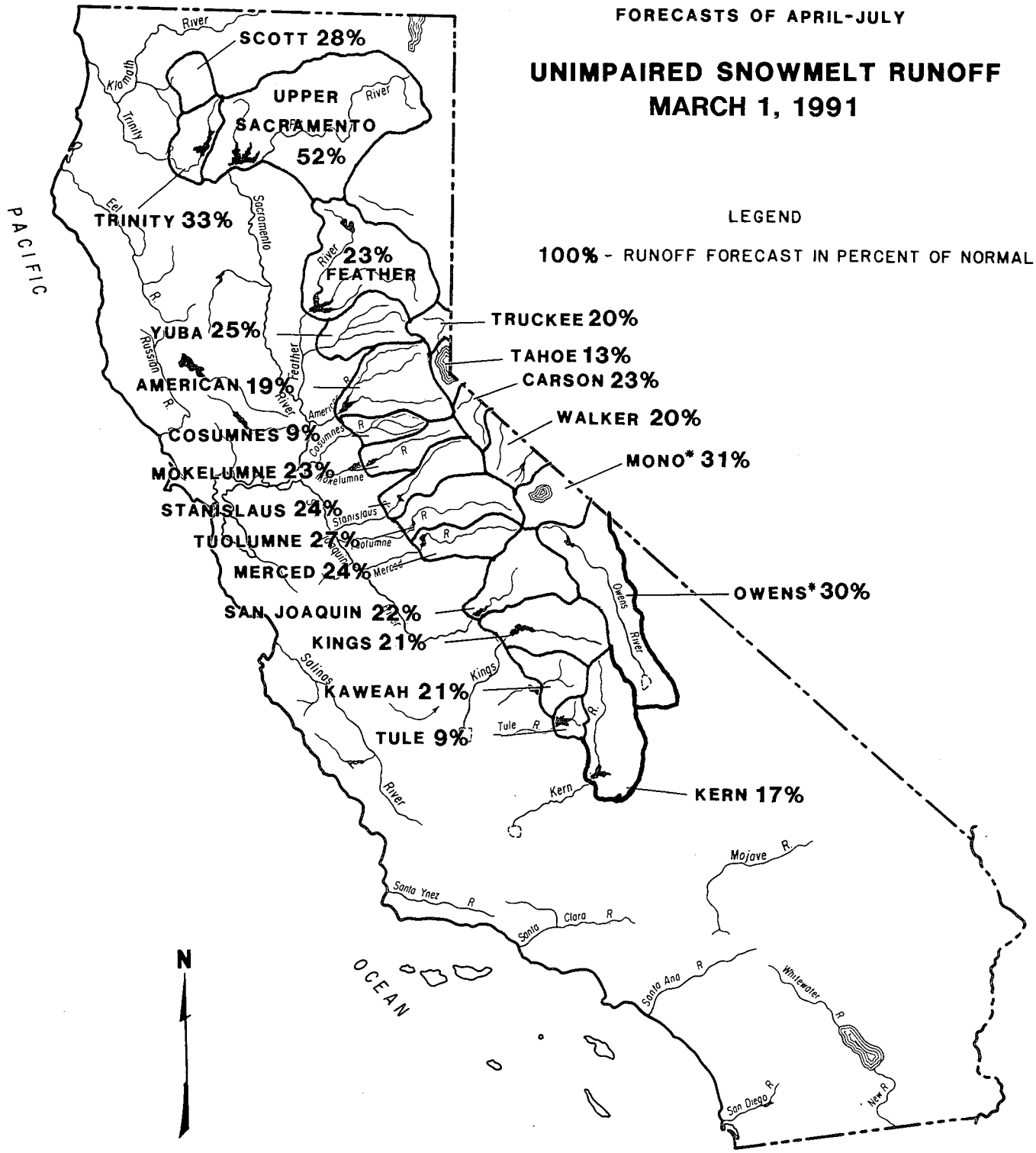
SUMMARY OF WATER CONDITIONS

IN PERCENT OF AVERAGE

HYDROGRAPHIC AREA	PRECIPITATION OCTOBER 1 TO DATE	SNOW WATER CONTENT	RESERVOIR STORAGE	RUNOFF OCTOBER 1 TO DATE	RUNOFF APR-JULY FORECAST	WATER YEAR FORECAST
NORTH COAST	35	20	55	10	35	30
SAN FRANCISCO BAY	35	--	55	2	--	--
CENTRAL COAST	35	--	15	5	--	--
SOUTH COAST	45	--	90	10	--	--
SACRAMENTO BASIN	30	10	50	20	30	30
SAN JOAQUIN BASIN	30	10	45	5	25	20
TULARE LAKE BASIN	30	10	20	20	20	20
NORTH LAHONTAN	25	15	15	30	20	20
SOUTH LAHONTAN	50	5	80	40	30	30
COLORADO DESERT	85	--	--	--	--	--
STATEWIDE	35	15	50	15	25	25

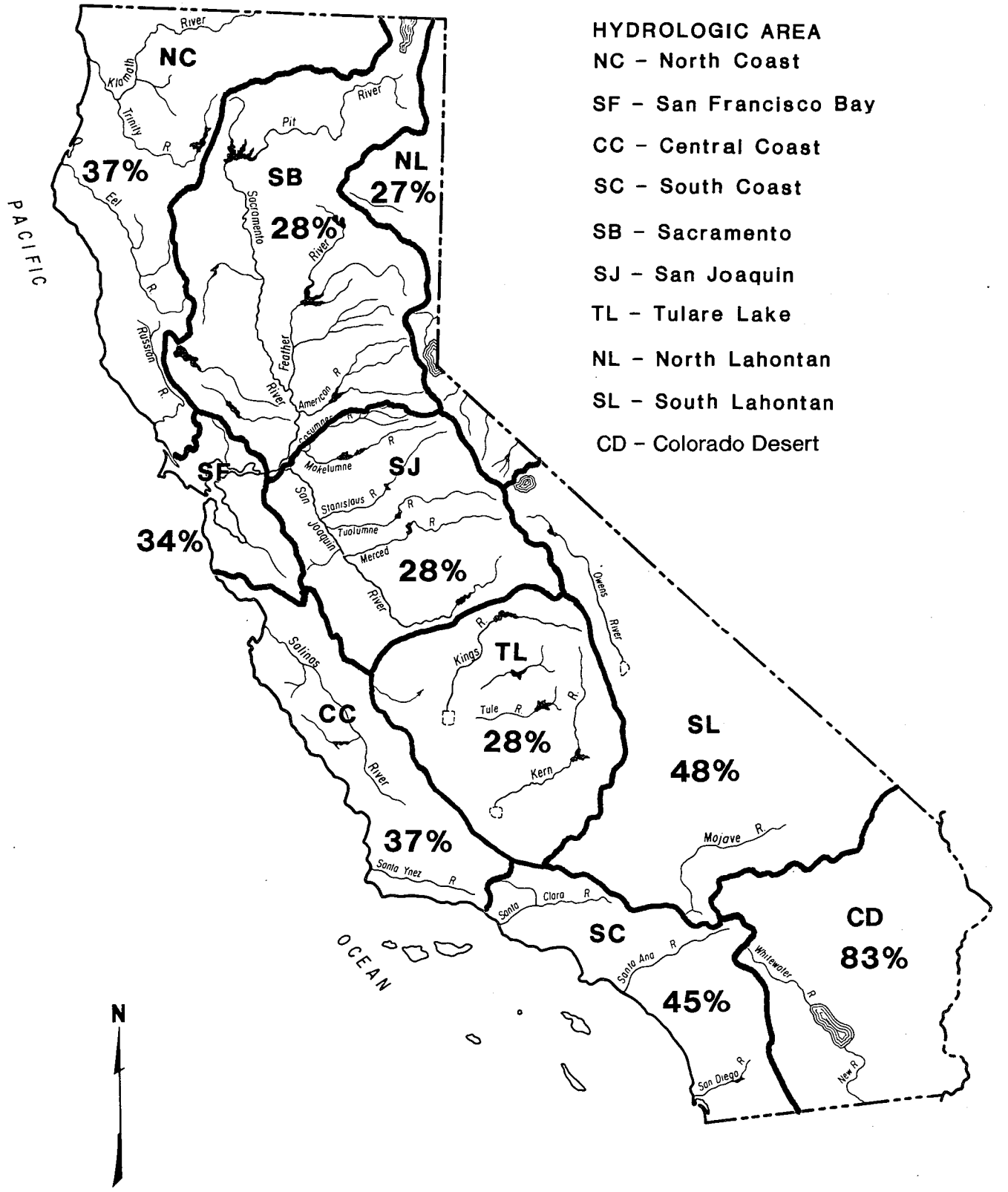
FORECASTS OF APRIL-JULY

UNIMPAIRED SNOWMELT RUNOFF
MARCH 1, 1991



* FORECAST BY DEPARTMENT OF WATER AND POWER, CITY OF LOS ANGELES FOR THE PERIOD OF APRIL THROUGH SEPTEMBER

SEASONAL PRECIPITATION IN PERCENT OF AVERAGE TO DATE
OCTOBER 1, 1990 TO MARCH 1, 1991



CALIFORNIA COOPERATIVE SNOW SURVEYS PROGRAM

FORECASTS OF APRIL-JULY UNIMPAIRED RUNOFF FOR CENTRAL VALLEY STREAMS MARCH 1, 1991

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 (2)	304	702	39	120	39	
McCloud River at Shasta Lake(2)	430	850	185	240	56	
Pit River at Shasta Lake(2)	1,075	1,796	480	620	58	
Total inflow to Shasta Lake(1)	1,880	3,189	726	970	52	700-1,780
Sacramento River above Bend Bridge, near Red Bluff	2,569	4,674	943	1,170	46	870-2,350
Feather River						
Feather River at Lake Almanor near Pratville (2)	345	675	120	150	43	
North Fork at Pulga (2)	1,080	2,416	243	380	35	
Middle Fork near Clio (3)	86	518	4	5	6	
South Fork at Ponderosa Dam (2)	116	267	13	25	22	
Total inflow to Oroville Reservoir	1,971	4,676	392	460	23	300-1,290
Yuba River						
North Yuba below Goodyears Bar (2)	298	647	51	80	27	
Inflow to Jackson Mdws and Bowman Reservoirs (2)	115	236	25	35	30	
South Yuba at Langs Crossing (2)	232	481	57	70	30	
Yuba River at Smartville	1,107	2,424	200	280	25	130-850
American River						
North Fork at North Fork Dam (2)	274	716	43	50	18	
Middle Fork near Auburn (2)	548	1,406	100	110	20	
Silver Creek below Camino Diversion Dam (2)	178	386	37	45	25	
Total inflow to Folsom Reservoir	1,366	3,074	229	260	19	150-890
Sacramento River at Sacramento						
SAN JOAQUIN RIVER BASIN						
Cosumnes River at Michigan Bar	140	363	8	12	9	4-80
Mokelumne River						
North Fork near West Point (4)	437	829	104	115	26	
Total inflow to Pardee Reservoir	490	1,065	102	115	23	70-290
Stanislaus River						
North Fork inflow to McKay's Point Dam	224	503	34	80	36	
Middle Fork below Beardsley Dam (2)	352	702	64	50	14	
Total inflow to Melones Reservoir	753	1,710	116	180	24	70-460
Tuolumne River						
Cherry Creek and Eleanor Creek near Hetch Hetchy (2)	322	727	97	100	31	
Tuolumne River near Hetch Hetchy (2)	618	1,392	153	200	32	
Total inflow to Don Pedro Reservoir	1,254	2,682	301	340	27	190-780
Merced River						
Merced River at Pohono Bridge (2)	371	888	80	100	27	
Total inflow to Exchequer Reservoir	654	1,587	123	155	24	85-380
San Joaquin River						
San Joaquin River at Mammoth Pool (2)	1,014	2,279	235	250	25	
Big Creek below Huntington Lake (2)	95	264	11	18	19	
South Fork near Florence Lake (2)	202	511	58	60	30	
Total inflow to Millerton Lake	1,296	3,355	262	290	22	190-740
San Joaquin River near Vernalis						
TULARE LAKE BASIN						
Kings River						
North Fork Kings River near Cliff Camp (2)	243	565	50	50	21	
Total inflow to Pine Flat Reservoir	1,266	3,114	273	270	21	200-700
Kaweah River at Terminus Reservoir	303	814	61	65	21	45-170
Tule River at Success Reservoir	70	256	2	6	9	2-40
Kern River						
Kern River near Kernville (2)	389	1,203	83	80	21	
Total inflow to Isabella Reservoir	492	1,657	84	85	17	65-320 *

(1) All 50-year averages are based on data for water years 1936-1985 except:
(2) 45-year average based on years 1936-80. (4) 36-year average based on years 1936-71.
(3) 44-year average based on years 1936-79. (5) 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, 1991

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
859	1,964	165										
1,286	2,353	577										
3,169	5,150	1,484										
6,090	10,796	2,479	790	210	440	340	270	190	170	320	2,730 (2,250-4,180)	45
8,856	17,180	3,294	950	270	500	400	340	230	200	360	3,250 (2,800-5,230)	37
786	1,269	366										
2,446	4,400	666										
219	637	24										
292	562	32										
4,754	9,492	994	260	100	270	200	130	70	60	110	1,200 (920-2,340)	25
565	1,056	102										
174	292	30										
357	565	98										
2,460	4,926	369	70	30	150	160	90	25	5	10	540 (310-1,250)	22
612	1,234	66										
1,066	2,575	144										
314	705	59										
2,837	6,381	349	30	25	135	150	85	20	5	10	460 (300-1,320)	16
												29
407	1,253	20	1	2	10	7	3	1	1	0	25 (10-150)	6
626	1,009	197										
776	1,800	129	7	3	30	55	50	10	0	0	155 (100-375)	20
483	929	88										
1,198	2,952	155	12	3	40	80	75	20	5	0	235 (100-580)	20
461	1,147	123										
775	1,661	258										
1,951	4,430	383	14	9	70	140	155	40	5	2	435 (250-970)	22
460	1,020	92										
1,023	2,859	150	10	3	30	55	75	20	5	2	200 (115-470)	20
1,337	2,964	308										
112	298	14										
248	653	71										
1,861	4,642	362	32	11	55	90	120	70	10	12	400 (275-950)	21
												21
282	607	58										
1,745	4,294	383	40	9	45	80	115	65	10	11	375 (290-890)	21
468	1,402	92	7	3	15	20	30	10	5	0	90 (65-220)	19
159	615	16	3	1	7	3	2	1	0	0	17 (8-90)	11
575	1,577	163										
749	2,309	175	33	10	25	30	40	10	5	12	165 (135-500)	22

* Unimpaired runoff to date Estimated Monthly distributions of runoff forecasts are estimated based on comparisons with previous water years

FORECASTS OF APRIL-JULY UNIMPAIRED RUNOFF
FOR SELECTED CALIFORNIA STREAMS
MARCH 1, 1991

DRAINAGE BASIN AND WATERSHED	April through July Unimpaired Runoff in 1,000 Acre-Feet				
	HISTORICAL			FORECASTS	
	50 Year Average(1)	Maximum of Record	Minimum of Record	April-July Forecast	Percent of Average
NORTH COAST AREA					
Trinity River at Lewiston	676	1,593	80	220	33
Scott River at Ft. Jones	200	*	*	55	28
Upper Klamath Lake(1)(2)(5)	521	1,151	177	210	41
LAHONTAN AREA					
Truckee River, Lake Tahoe to Farad accretion	278	713	58	55	20
Lake Tahoe Rise in feet (assuming gates closed)	1.5	3.75	0.23	0.2	13
East Carson River near Gardnerville	195	407	43	45	23
West Carson River at Woodfords	55	131	12	12	22
East Walker River near Bridgeport	68	209	7	7	10
West Walker River near Coleville	154	330	35	35	23
Owens River(1)(3)	310	728	131	94	30

(1)Forecast period of April-September

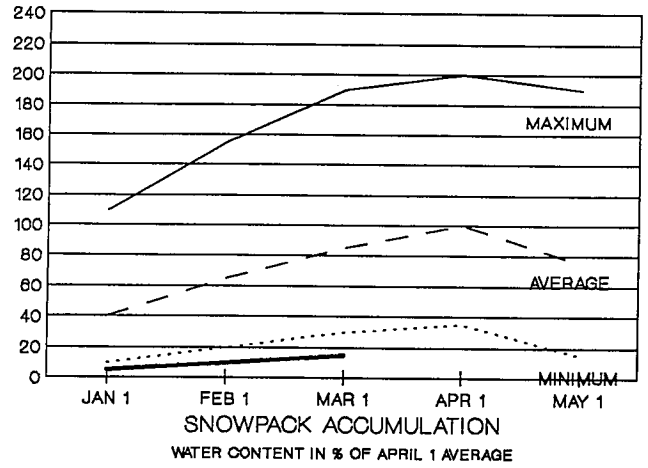
(2)Forecast by U.S. Soil Conservation Service, Portland, Or.

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

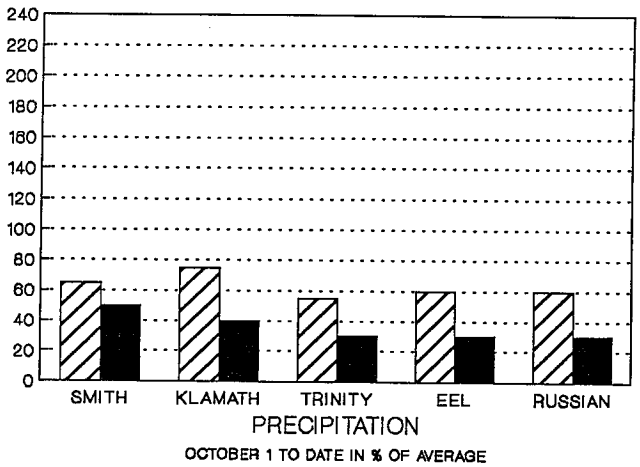
(4)Inside back cover for definition of unimpaired runoff.

(5)Average period of 25 years

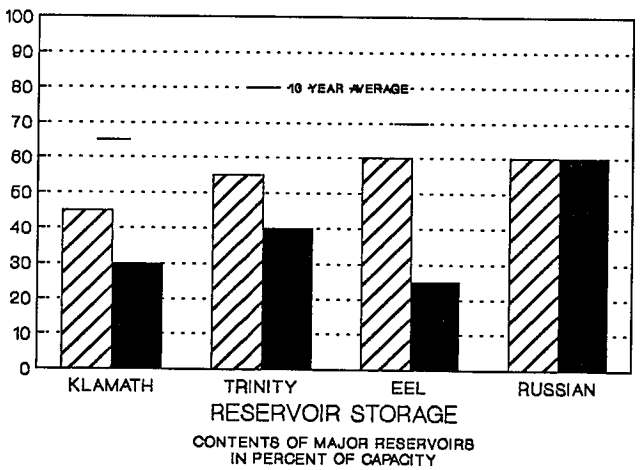
NORTH COAST AREA



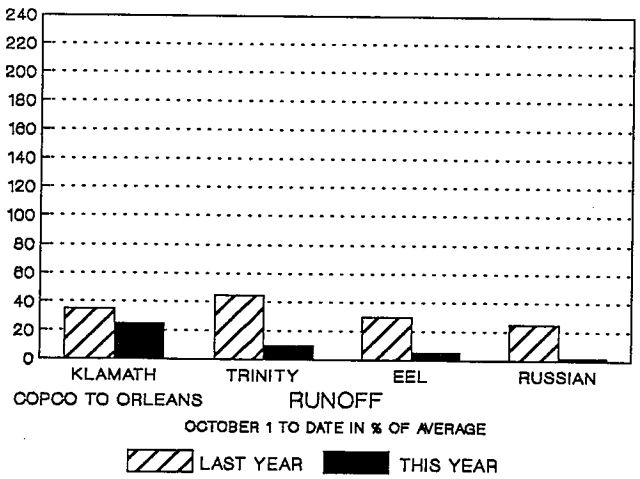
SNOWPACK - First of the month measurements made at 12 snow courses indicate an area wide snow water equivalent of 5.2 inches. This is 18 percent of the average for this date and 16 percent of the seasonal (April 1) average. Last year at this time the pack was holding 13.2 inches of water.



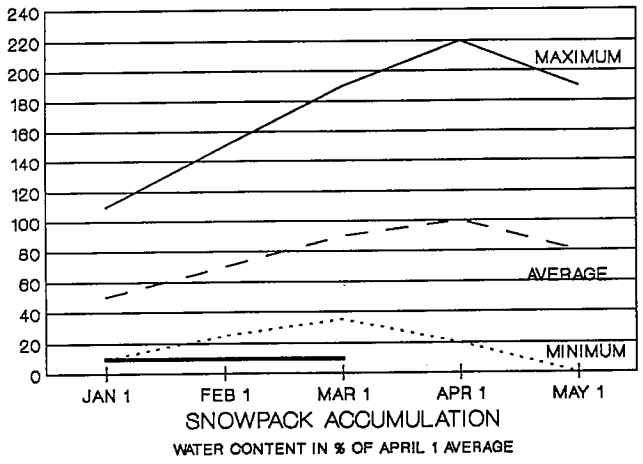
PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on this area was 37 percent of normal. Precipitation last month was about 54 percent of the monthly average. Seasonal precipitation at this time last year stood at 63 percent of normal.



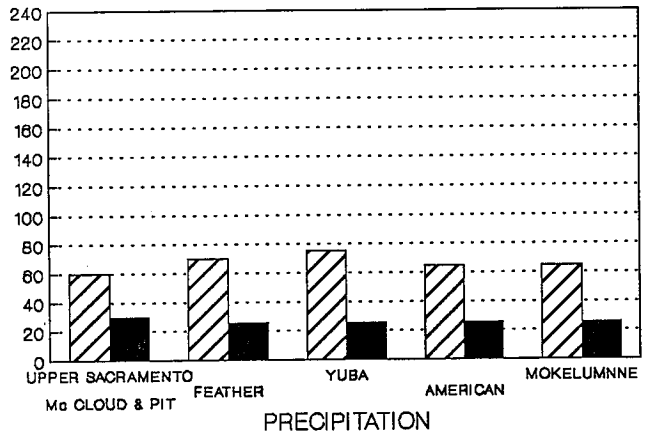
RESERVOIR STORAGE - First of the month storage in 7 reservoirs was 1.2 million acre-feet which is 53 percent of average. About 39 percent of available capacity was being used. Storage in these reservoirs at this time last year was 74 percent of average.



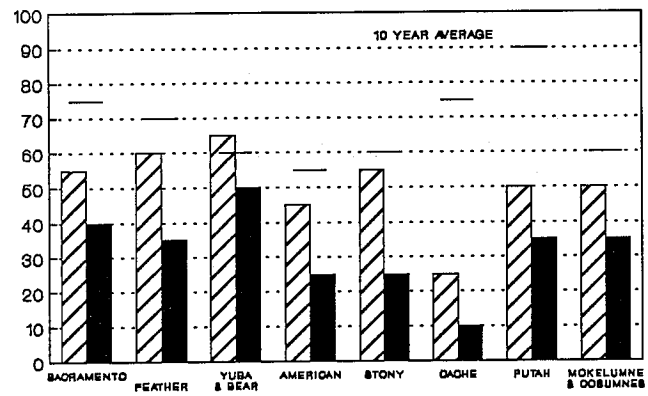
RUNOFF - Seasonal runoff of streams draining the area totaled 895 thousand acre-feet which is 12 percent of average for this period. Last year, runoff for the same period was 34 percent of average.



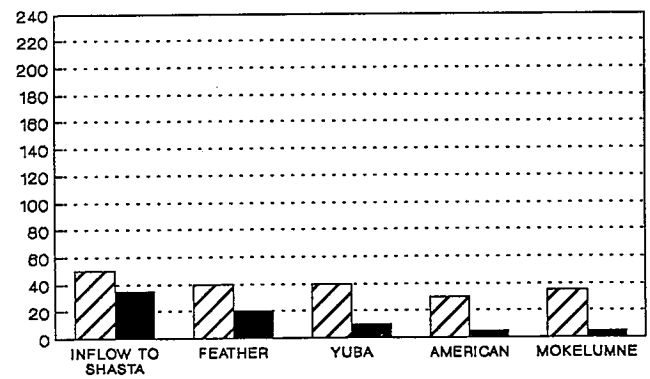
SNOWPACK ACCUMULATION
WATER CONTENT IN % OF APRIL 1 AVERAGE



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

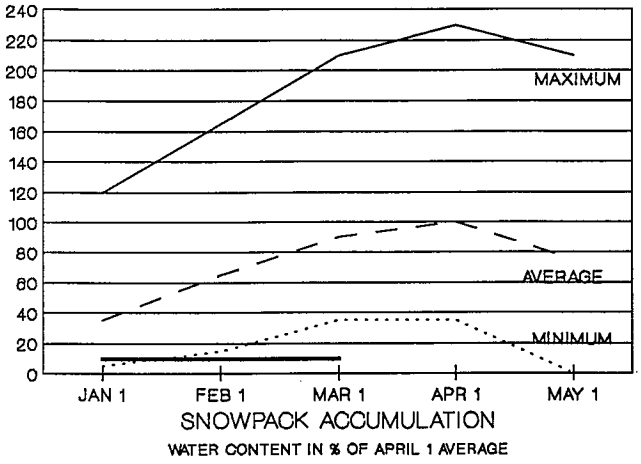
SNOWPACK - First of the month measurements made at 52 snow course indicate a basin wide snow water equivalent of 3.4 inches. This is 10 percent of the average for this date and 9 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 16.9 inches of water.

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the Sacramento Basin was 28 percent of normal. Precipitation last month was 51 percent of the monthly average. Seasonal precipitation at this time last year stood at 67 percent of normal.

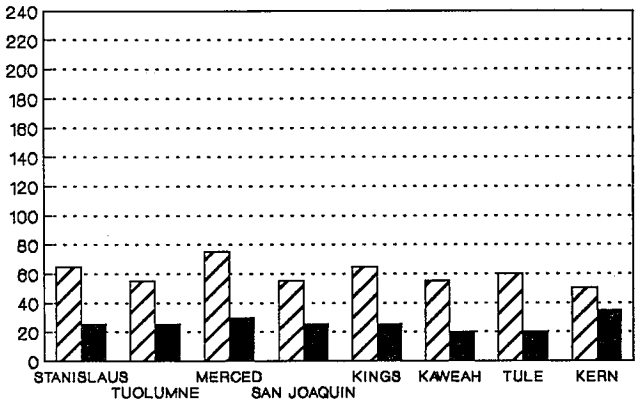
RESERVOIR STORAGE - First of the month storage in 43 reservoirs was 5.6 million acre-feet which is 49 percent of average. About 35 percent of available capacity was being used. Storage in these reservoirs was about 76 percent of average at this time last year.

RUNOFF - Seasonal runoff from streams draining into the basin totaled 1.7 million acre-feet which is 21 percent of average for this period. Last year runoff for the same period was 41 percent of average.

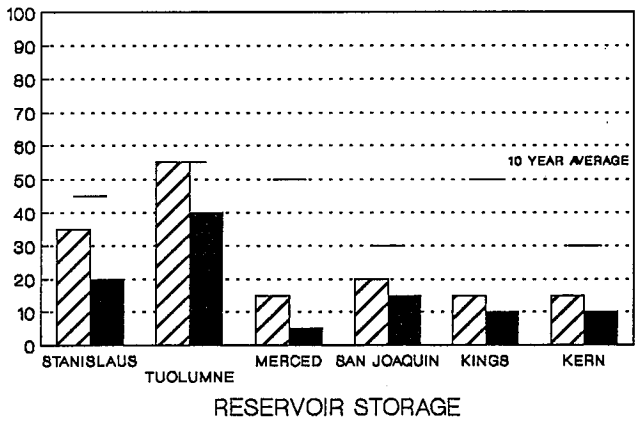
The Sacramento River Index for the year is forecast at 5.5 million acre-feet assuming median meteorological conditions for the remainder of the year. This classifies the year as "critical" in the Sacramento-San Joaquin Delta according to the State Water Resources Control Board's Decision 1485. The SRI at this time last year was forecasted to be 9.7 million acre-feet.



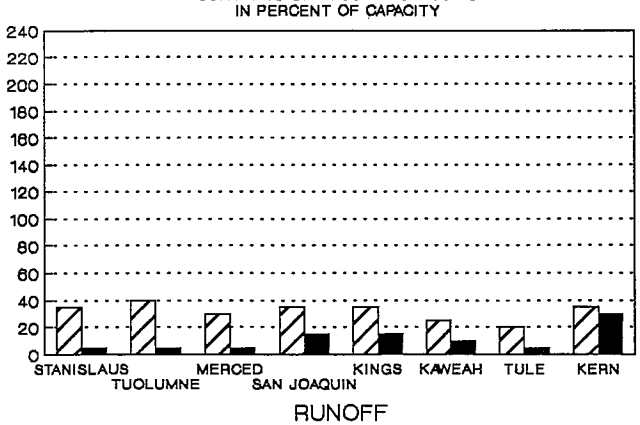
SNOWPACK ACCUMULATION
WATER CONTENT IN % OF APRIL 1 AVERAGE



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 64 San Joaquin Basin snow courses indicate a basin wide snow water equivalent of 3.8 inches which is 10 percent of average for this date and 9 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 18.1 inches of water.

At the same time, 25 Tulare Lake Basin snow courses indicated a basin wide snow water equivalent of 2.1 inches which is 10 percent of the average for this date and 10 percent of the seasonal average. Last year at this time, the Basin was holding 12.5 inches of water.

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the San Joaquin Basin was 28 percent of normal. Precipitation last month was 45 percent of the monthly average. Seasonal precipitation at this time last year stood at 65 percent of normal.

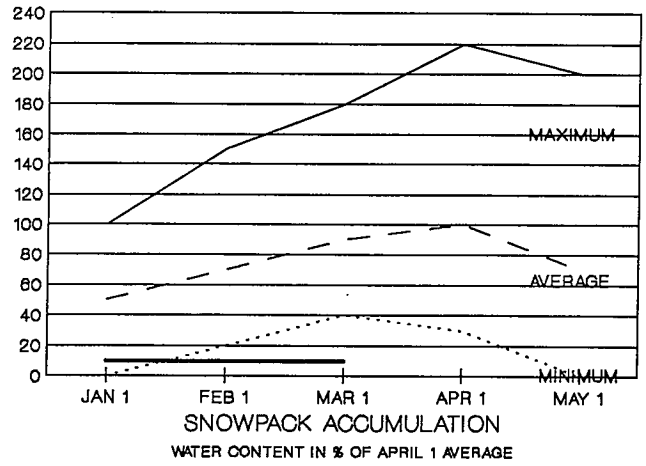
Seasonal precipitation on the Tulare Lake Basin was 28 percent of normal. Precipitation last month was only 27 percent of the monthly average. Seasonal precipitation at this time last year stood at 57 percent of normal.

RESERVOIR STORAGE - First of the month storage in 33 San Joaquin Basin reservoirs was 3.1 million acre-feet which is 43 percent of average. About 27 percent of available capacity was being used. Storage in these reservoirs at this time last year was 74 percent of average.

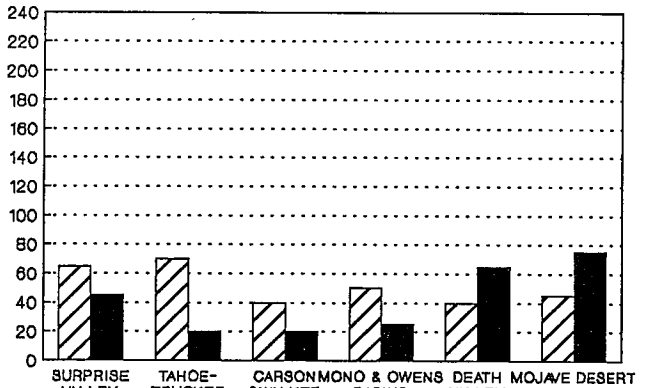
First of the month storage in 6 Tulare Lake Basin reservoirs was 186 thousand acre-feet which is 22 percent of average. About 9 percent of available capacity was being used. Storage in these reservoirs at this time last year was 36 percent of average.

RUNOFF - Seasonal runoff of streams draining into the San Joaquin Basin totaled 106 thousand acre-feet which is 6 percent of average for this period. Last year, runoff for this same period was 34 percent of average.

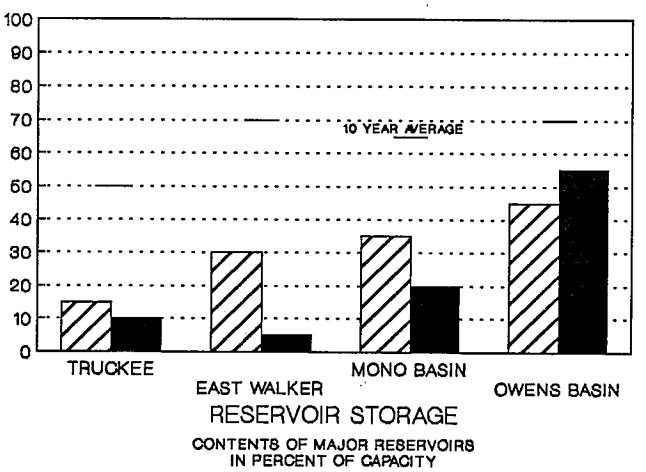
Seasonal runoff of streams draining into the Tulare Lake Basin totaled 109 thousand acre-feet which is 18 percent of average for this period. Last year, runoff for this same period was 31 percent of average.



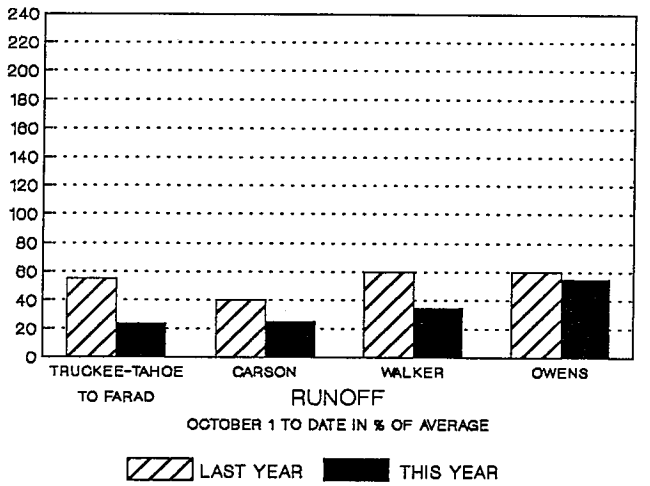
SNOWPACK ACCUMULATION
WATER CONTENT IN % OF APRIL 1 AVERAGE



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

NORTH AND SOUTH LAHONTAN AREA

SNOWPACK - First of the month measurements made at 8 North Lahontan snow courses indicate an area wide snow water equivalent of 3.2 inches which is 17 percent for this date and 15 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 16.1 inches of water.

At the same time, 22 South Lahontan courses indicated an area wide snow water equivalent of 1.6 inches which is 5 percent of the average for this date and 5 percent of the seasonal (April 1) average. Last year at this time, the pack was holding 12.6 inches of water.

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) over the North Lahontan area averaged 30 percent of normal. Precipitation last month was just 35 of the monthly average. Seasonal precipitation at this time last year stood at 54 percent of normal.

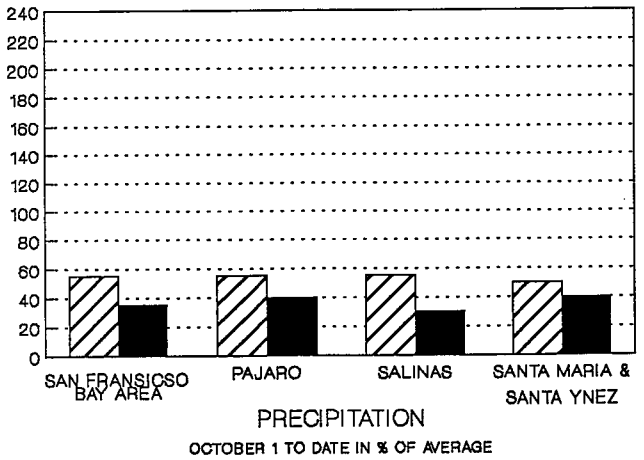
Seasonal precipitation over the South Lahontan area averaged 48 percent of normal. Last month's precipitation was 115 percent of the monthly average. Seasonal precipitation at this time last year stood at 47 percent of normal.

RESERVOIR STORAGE - First of the month storage in 5 North Lahontan reservoirs was 108 thousand acre-feet which is 17 percent of average. About 10 percent of available capacity was being used. Storage in these reservoirs at this time last year was 28 percent of average.

First of the month storage in 8 South Lahontan reservoirs was 223 thousand acre-feet which is 78 percent of average. About 55 percent of available capacity was being used. Storage in these reservoirs at this time last year was 74 percent of average.

RUNOFF - Seasonal runoff of streams draining the North Lahontan area totaled 58 thousand acre-feet which is 28 percent of average for this period. Last year, runoff for this same period was 56 percent of average.

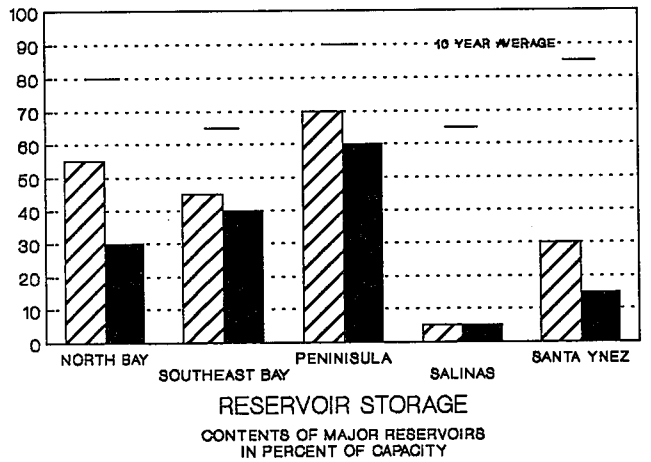
Seasonal runoff of the Owens River in the South Lahontan area totaled 31 thousand acre-feet which is about 54 percent of average. Last year, runoff during this same period was 60 percent of average.



SAN FRANCISCO AND CENTRAL COAST AREAS

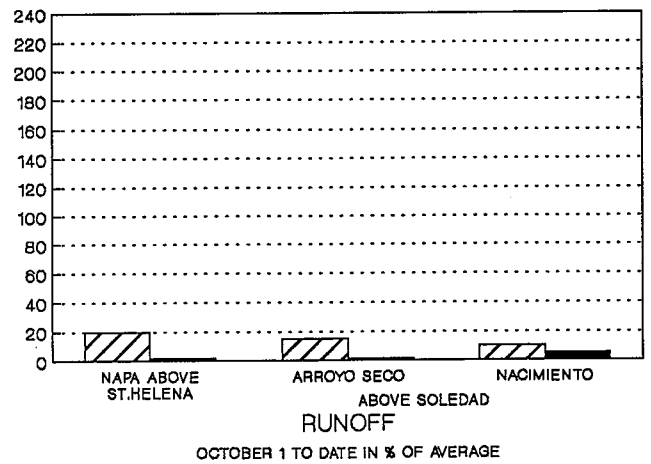
PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the San Francisco Bay area was 34 percent of normal. Precipitation last month was 80 percent of the monthly average. Seasonal precipitation at this time last year stood at 55 percent of normal.

Seasonal precipitation on the Central Coast area averaged 37 percent of normal. Precipitation last month was 79 percent of the monthly average. Seasonal precipitation at this time last year was 52 percent of average.



RESERVOIR STORAGE - First of the month storage in 18 major Bay area reservoirs was 278 thousand acre-feet which is 55 percent of average. About 40 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 major Central Coast reservoirs was 91 thousand acre-feet which is 14 percent of average. About 10 percent of available capacity was being used. Storage in these reservoirs at this time last year was 19 percent of average.



RUNOFF - Seasonal runoff of selected streams draining the San Francisco Bay area totaled less than a thousand acre-feet which is only 2 percent of average for this period. Last year, runoff for this same period was 21 percent of average.

Seasonal runoff of selected Central Coast streams totaled 10 thousand acre-feet which is 4 percent of average for this period. Last year, runoff for this same period was 12 percent of average.

LAST YEAR THIS YEAR

SOUTH COAST AND COLORADO RIVER AREAS

PRECIPITATION - Seasonal precipitation (October 1 through the end of last month) on the South Coast was 45 percent of normal. Precipitation last month was 85 percent of the monthly average. Seasonal precipitation at this time last year stood at 53 percent of normal.

Seasonal precipitation on the Colorado Desert area was 83 percent of normal. Precipitation last month was 150 percent of the monthly average. Seasonal precipitation at this time last year was 25 percent of average.

RESERVOIR STORAGE - First of the month storage in 29 South Coast reservoirs was 1.2 million acre-feet which is 90 percent of average. About 59 percent of available capacity was being used. Storage in these reservoirs at this time last year was 99 percent of average.

First of the month combined storage in Lakes Powell, Mead, Mohave and Havasu was 37.6 million acre-feet which is 102 percent of average. About 70 percent of available capacity was being used.

RUNOFF - Seasonal runoff of selected South Coast streams totaled 3 thousand acre-feet which is 10 percent of average. Last year, runoff for the same period was 15 percent of average.

UPPER COLORADO

The March 1 snowpack in the Upper Colorado River Basin, according to U.S. Soil Conservation Service Snotel reports, was 84 percent of average and ranges from 106 percent in the Animas Basin to 76 percent in the Duschene Basin. The April through July inflow to Lake Powell is forecast to be 4.4 million acre-feet which is 54 percent of normal.

CENTRAL VALLEY PROJECT

Aided by the wide spread and heavy precipitation of March 1-4, water year forecasts for runoff into major CVP storage reservoirs ranged from 22 percent to 52 percent of average. CVP storage on September 1, 1990 was 4.0 million acre-feet. As of February 28, 1991 it had decreased to only 3.8 million acre-feet, which is about 49 percent of normal for this date.

On the basis of the February water supply forecasts, the CVP announced deficiencies of 25 percent on deliveries to water rights holders on the Sacramento and at the Mendota Pool. Most other contractors will have 75 percent deficiencies except those whose contracts specify lesser amounts. At this time, no change in the announced water deficiencies has been made on the basis of the March forecasts. The Friant Division water supply has increased from 10% to 25% Class I.

STATE WATER PROJECT

State Water Project storage for March 1, 1991 was at a record low for that time of year. On March 1, conservation storage (Oroville plus the State share of San Luis) was 932 thousand acre-feet(TAF), or only 20 percent full. The SWP also has about 250 TAF in ground water conservation storage.

On February 23, 1991 the Department of Water Resources modified delivery approvals to only 10% of municipal & industrial requests. (In early February, agricultural contractors were notified that there would be no further agricultural deliveries from the SWP in 1991.) The Department is developing a water bank to take care of critical agricultural and urban needs throughout the State.

The storms on March 1 through March 6 increased conservation storage by about 232 TAF. On March 2, flow into the Delta increased to the point that excess conditions were declared in the Delta.

MAJOR WATER DISTRIBUTION PROJECTS

RESERVOIR STORAGE

(AVERAGES BASED ON PERIOD RECORD)

RESERVOIR	CAPACITY 1,000 AF	AVERAGE STORAGE 1,000 AF	STORAGE AS OF FEBRUARY 28 1990 1,000 AF	1991 1,000 AF	PERCENT AVERAGE
STATE WATER PROJECT					
Oroville	3,540	2,660	1,935	938	35
San Luis SWP	1,060	940	728	94	10
Lake Del Valle	77	33	34	37	110
Silverwood	73	66	72	67	101
Pyramid Lake	171	162	161	167	103
Castaic Lake	324	263	283	168	64
Perris Reservoir	132	114	126	125	109
CENTRAL VALLEY PROJECT					
Clair Engle Lake	2,450	1,939	1,340	961	50
Shasta Lake	4,550	3,446	2,429	1,543	45
Whiskeytown	241	208	206	187	90
Folsom	1,010	590	378	167	28
New Melones	2,420	1,669	800	373	22
Millerton Lake	521	309	205	183	59
San Luis CVP	980	767	932	588	77
COLORADO RIVER PROJECT					
Lake Mead	26,300	19,709	21,771	20,149	102
Lake Powell	25,000	15,070	18,196	15,241	101
Lake Mohave	1,810	1,639	1,676	1,703	104
Lake Havasu	619	537	540	552	103
EAST BAY MUNICIPAL UTILITY DISTRICT					
Pardee	210	177	196	137	77
Camanche	432	263	187	140	53
East Bay (4 reservoirs)	151	129	126	123	95
CITY & COUNTY OF SAN FRANCISCO					
Hetch Hetchy	360	133	92	25	19
Cherry Lake	269	105	119	27	26
Lake Eleanor	28	10	2	1	8
South Bay (4 reservoirs)	223	172	124	78	45
CITY OF LOS ANGELES(DWP)					
Crowley Lake(Long Valley)	183	126	90	103	82
Grant Lake	48	23	20	11	51
Other Aqueduct Storage(6 reservoirs)	95	67	60	71	107

DEPARTMENT OF WATER RESOURCES - CALIFORNIA DATA EXCHANGE CENTER
TELEMETERED SNOW WATER EQUIVALENTS - MARCH 1, 1991

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	33.0	----	----	.0	.0
RED ROCK MOUNTAIN	USBR	6700	44.0	12.7	29%	12.1	12.1
BONANZA KING	USBR	6450	40.5	6.9	17%	6.3	6.7
SHIMMY LAKE	USBR	6200	49.9	8.5	17%	7.2	9.1
MIDDLE BOULDER #3	USBR	6200	27.1	7.8	29%	7.2	7.2
HIGHLAND LAKES	USBR	6030	34.0	3.5	10%	3.6	5.3
SCOTTS MOUNTAIN	USBR	5900	27.0	1.8	7%	1.8	3.2
MUMBO BASIN	USBR	5700	25.8	1.9	7%	1.9	3.4
BIG FLAT	USBR	5100	20.0	5.3	26%	5.6	5.6
SACRAMENTO RIVER							
CEDAR PASS	SCS	7100	18.1	6.1	34%	5.8	5.7
BLACKS MOUNTAIN	DWR	7286	8.6	1.2	14%	1.2	1.1
SAND FLAT	USBR	6750	42.4	5.5	13%	5.5	5.5
MEDICINE LAKE	USBR	6700	32.7	3.8	12%	3.8	3.7
ADIN MOUNTAIN	SCS	6350	13.6	2.4	18%	2.3	3.3
SNOW MOUNTAIN	USBR	5950	27.0	.0	0%	.0	.0
SLATE CREEK	USBR	5600	30.0	3.9	13%	----	----
STOUTS MEADOW	USBR	5400	42.5	1.1	3%	.0	.0
FEATHER RIVER							
KETTLEROCK	DWR	7300	25.5	2.3	9%	2.4	3.7
GRIZZLY	DWR	6900	29.7	2.8	9%	2.8	2.9
PILOT PEAK	DWR	6800	52.6	2.3	4%	.0	.0
GOLD LAKE	DWR	6750	36.5	10.1	28%	9.0	9.2
HUMBUG	DWR	6500	28.0	8.2	29%	7.4	7.4
RATTLESNAKE	DWR	6100	14.0	.0	0%	.0	.0
BUCKS LAKE	DWR	5750	44.7	7.4	17%	6.1	7.2
FOUR TREES	DWR	5150	20.0	.0	0%	.0	.0
YUBA & AMERICAN RIV							
LAKE LOIS	DWR	8800	----	1.7	----	1.6	1.4
SCHNEIDERS	SMUD	8750	34.5	----	----	----	7.7
CAPLES LAKE COURSE	USBR	7800	30.9	5.5	18%	4.9	6.1
ALPHA	SMUD	7600	35.9	----	----	----	6.5
FORNI RIDGE	USBR	7600	37.0	4.7	13%	4.7	4.7
SILVER LAKE	USBR	7100	22.7	3.8	17%	3.4	4.9
CENT SIERRA SNOW LAB	USFS	6950	33.6	3.5	10%	2.4	4.2
HUYSINK	USBR	6600	42.6	3.7	9%	3.7	4.3
VAN VLECK	SMUD	6700	35.9	----	----	----	5.9
ROBBS SADDLE	SMUD	5900	21.4	----	----	----	----
GREEK STORE	USBR	5600	21.0	4.7	22%	4.3	6.9
BLUE CANYON	USBR	5280	9.0	.0	0%	.0	.0
ROBBS POWERHOUSE	SMUD	5150	5.2	----	----	----	.0
MOKEL. & STANIS. RIV							
DEADMAN CREEK	USBR	9250	37.2	3.1	8%	2.6	2.9
HIGHLAND MEADOW	USBR	8800	47.9	6.8	14%	5.6	5.9
GIANELLI MEADOW	USBR	8350	55.5	9.6	17%	6.9	6.7
LOWER RELIEF VALLEY	DWR	8100	41.2	3.8	9%	2.0	3.2
BLUE LAKES	SCS	8000	33.1	5.2	16%	4.7	4.6
MUD LAKE	SMUD	7900	44.9	----	----	----	9.9
STANISLAUS MEADOW	USBR	7750	47.5	6.4	13%	5.0	6.0
BLOODS CREEK	USBR	7200	35.5	6.3	18%	5.7	5.9
BLACK SPRINGS	USBR	6500	32.0	5.7	18%	4.7	4.7
TUOLUMNE & MERCED R.							
DANA MEADOWS	DWR	9800	27.7	4.6	17%	4.2	3.6
SLIDE CANYON	DWR	9200	----	10.3	----	8.2	7.4
SNOW FLAT	DWR	8700	44.1	7.2	16%	7.2	5.9
TUOLUMNE MEADOWS	DWR	8600	22.6	.0	0%	.0	.0
HORSE MEADOW	DWR	8400	48.6	5.8	12%	4.5	4.5
OSTRANDER LAKE	DWR	8200	34.8	7.9	23%	5.9	5.2
PARADISE	DWR	7650	----	----	----	----	----
GIN FLAT	DWR	7050	34.2	6.2	18%	4.3	4.8
LOWER KIBBIE	DWR	6600	27.4	2.2	8%	.0	.0
SAN JOAQUIN RIVER							
VOLCANIC KNOB	USBR	10100	30.1	3.3	11%	2.0	2.0
AGNEW PASS	USBR	9450	32.3	2.0	6%	.0	.0
KAISER POINT	USBR	9200	37.8	3.5	9%	2.6	2.4
GREEN MOUNTAIN	USBR	7900	30.8	4.7	15%	3.7	4.5
TAMARACK SUMMIT	USBR	7600	30.5	4.9	16%	3.0	4.5

DEPARTMENT OF WATER RESOURCES - CALIFORNIA DATA EXCHANGE CENTER
TELEMETERED SNOW WATER EQUIVALENTS - MARCH 1, 1991

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
CHILKOOT MEADOW	USBR	7150	38.0	9.1	24%	6.3	7.3
HUNTINGTON LAKE	USBR	7000	20.1	6.5	32%	4.7	5.3
GRAVEYARD MEADOW	USBR	6900	18.8	1.8	9%	.0	.0
POISON RIDGE	USBR	6900	28.9	4.9	17%	1.8	4.5
KINGS RIVER							
BISHOP PASS	DWR	11200	----	3.9	----	2.0	1.3
CHARLOTTE LAKE	DWR	10400	----	3.6	----	2.4	2.5
STATE LAKES	USCE	10400	29.0	----	----	----	----
MITCHELL MEADOW	USCE	10375	32.9	----	----	----	----
BLACKCAP BASIN	USBR	10300	34.3	2.6	8%	1.3	.0
UPPER BURNT CORRAL	DWR	9700	34.6	8.5	25%	5.9	5.2
WEST WOODCHUCK MDW	USCE	9100	32.8	----	----	----	----
BIG MEADOWS	DWR	7600	25.9	3.8	15%	1.6	3.1
KAWEAH & TULE RIVERS							
QUAKING ASPEN	DWR	7200	21.0	7.4	35%	5.5	6.4
GIANT FOREST	USCE	6400	10.0	----	----	----	----
KERN RIVER							
UPPER TYNDALL CREEK	USCE	11500	27.7	----	----	----	----
CRABTREE	DWR	10700	19.8	----	----	----	----
CHAGOOPA PLATEAU	DWR	10300	21.8	4.6	21%	2.6	2.0
PASCOES	USCE	9150	24.9	----	----	----	----
TUNNEL	DWR	8950	15.6	2.8	18%	1.2	.0
WET MEADOW	USCE	8900	30.3	----	----	----	----
CASA VIEJA MDW	DWR	8400	20.9	4.6	22%	3.3	2.0
BEACH MEADOW	DWR	7650	11.0	.0	0%	.0	.0
SURPRISE VALLEY AREA							
DISMAL SWAMP	SCS	7050	29.2	9.8	34%	9.6	9.6
TRUCKEE RIVER							
MOUNT ROSE SKI AREA	SCS	8850	38.5	5.4	14%	4.9	4.6
INDEPENDENCE LAKE	SCS	8450	41.4	5.5	13%	4.5	4.4
BIG MEADOWS	SCS	8700	25.7	3.4	13%	3.2	3.5
INDEPENDENCE CAMP	SCS	6500	21.8	3.1	14%	2.9	3.3
INDEPENDENCE CREEK	SCS	6500	12.7	3.6	28%	3.6	3.6
LAKE TAHOE BASIN							
HEAVENLY VALLEY	SCS	8800	28.1	----	----	----	.3
HAGANS MEADOW	SCS	8000	16.5	.1	1%	.0	2.1
MARLETTE LAKE	SCS	8000	21.1	4.5	21%	4.2	4.2
ECHO PEAK	SCS	7800	39.5	7.7	19%	6.9	7.5
RUBICON NO. 2	SCS	7500	29.1	3.8	13%	3.4	3.4
WARD CREEK NO. 3	SCS	6750	39.4	5.4	14%	5.0	5.7
FALLEN LEAF LAKE	SCS	6300	7.0	.0	0%	.0	.0
CARSON RIVER							
EBBETTS PASS	SCS	8700	38.8	5.6	14%	4.9	4.9
POISON FLAT	SCS	6900	16.2	4.9	30%	1.8	4.5
WALKER RIVER							
VIRGINIA LAKES RIDGE	SCS	9200	20.3	1.9	9%	1.6	1.0
LOBDELL LAKE	SCS	9200	17.3	3.1	18%	3.1	3.1
SONORA PASS BRIDGE	SCS	8750	26.0	2.5	10%	1.5	3.2
LEAVITT MEADOWS	SCS	7200	8.0	.3	4%	----	----
OWENS RIVER/MONO LK.							
GEM PASS	LADWP	10750	31.7	5.2	16%	3.9	2.0
SAWMILL MEADOW	DWR	10300	19.4	2.6	13%	1.3	1.3
COTTONWOOD LAKES	LADWP	10200	11.6	2.6	23%	1.7	1.3
BIG PINE #3	LADWP	9800	17.9	1.3	7%	.0	.0
SOUTH LAKE	LADWP	9600	16.0	1.8	11%	1.2	1.7
MAMMOTH PASS (RP)	USBR	9500	42.4	8.2	19%	----	----
ROCK CREEK	LADWP	8200	----	.0	----	.0	.0

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
LAHONTAN	50	70	90	100	70

Water Supply Forecast Update
1991 April- July Unimpaired Runoff
(1,000 Acre-Feet)

A series of strong Pacific storms began at the end of February and extended into March 5, bringing liberal amounts of rain and snow to the entire State. As a result the forecasts of April through July runoff have improved significantly, from around 25 percent to 40 percent of average generally. The updated forecasts are presented on this page.

The Sacramento River Index forecast also improved from a 5.5 million acre-feet median water year forecast on March 1 to a median forecast of 7.3 million acre-feet for conditions as of March 6.

	Mar 1	%A-J	Mar 6	%A-J
Shasta Lake-Total Inflow		Avg=		1880
90% Exceedence	700	37	880	47
50% Exceedence	970	52	1120	60
10% Exceedence	1780	95	1900	101
Feather River @ Oroville		Avg=		1971
90% Exceedence	300	15	590	30
50% Exceedence	460	23	790	40
10% Exceedence	1290	65	1600	81
Yuba River @ Smartville		Avg=		1107
90% Exceedence	130	12	300	27
50% Exceedence	280	25	470	42
10% Exceedence	850	77	980	89
American River @ Folsom		Avg=		1365
90% Exceedence	150	11	340	25
50% Exceedence	260	19	500	37
10% Exceedence	890	65	1100	81
Mokelumne River @ Pardee		Avg=		490
90% Exceedence	70	14	130	27
50% Exceedence	115	23	190	39
10% Exceedence	290	59	370	76
Stanislaus River @ Melones		Avg=		752
90% Exceedence	70	9	180	24
50% Exceedence	180	24	300	40
10% Exceedence	460	61	580	77
Tuolumne River @ Don Pedro		Avg=		1254
90% Exceedence	190	15	370	30
50% Exceedence	340	27	530	42
10% Exceedence	780	62	950	76

	Mar 1	%A-J	Mar 6	%A-J
Merced River @ Exchequer		Avg=		654
90% Exceedence	85	13	180	28
50% Exceedence	155	24	270	41
10% Exceedence	380	58	480	73
San Joaquin River @ Friant		Avg=		1296
90% Exceedence	190	15	360	28
50% Exceedence	290	22	520	40
10% Exceedence	740	57	960	74
Kings River @ Pine Flat		Avg=		1266
90% Exceedence	200	16	350	28
50% Exceedence	270	21	510	40
10% Exceedence	700	55	910	72
Kaweah River @ Terminus		Avg=		303
90% Exceedence	45	15	80	26
50% Exceedence	65	21	135	45
10% Exceedence	170	56	230	76
Tule River @ Success		Avg=		70
90% Exceedence	2	3	6	9
50% Exceedence	6	9	17	24
10% Exceedence	40	57	45	64
Kern River @ Isabella		Avg=		492
90% Exceedence	65	13	100	20
50% Exceedence	85	17	180	37
10% Exceedence	320	65	350	71

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 the period 1931-1980 (50 years, except for data sites established after 1931.)

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 (1936-1985). For more details, contact California Cooperative Snow Surveys, P.O. Box 942836, Sacramento, CA 94236-0001, (916) 445-2196.

On the Front Cover
Crews from Yosemite National Park and DWR rebuild an avalanche damaged back country shelter.

Photo by Dave Hart

FIRST CLASS