

# WATER SUPPLY OUTLOOK



## CALIFORNIA AND NORTHERN NEVADA

**APRIL  
2011**



California Nevada River Forecast Center  
NOAA - National Weather Service  
Sacramento, California

## DEFINITIONS:

**Acre-Feet:** The volume equal to one acre covered one foot deep (43,560 cubic feet).

**Forecast Period:** Generally, April 1<sup>st</sup> through July 31<sup>st</sup>, unless otherwise noted.

**April-High Forecast Period:** For the Lake Tahoe Stage Rise, the period from April 1<sup>st</sup> to the highest recorded lake stage level.

**April 1st Average:** The April 1<sup>st</sup> snowpack average is used as a reference point because it is normally the end of the winter snowfall season and the beginning of the spring runoff season.

**Residual Period:** The forecast period from the first of the current month through September 30<sup>th</sup>.

**Probability Forecasts:** Precipitation and snowfall accumulation of known probability as determined by analysis of past records are utilized in the preparation of probability runoff forecasts. The forecasts include an evaluation of the standard error of the prediction model. The forecasts are presented at three levels of probability as follows:

- **Most Probable Volume:** Given the current hydrometeorological conditions to date, this is the best estimate of what the actual runoff volume will be this season.
- **Most Probable Volume (% Normal):** Most probable volume in percent of the 1961-1990 average.
- **Reasonable Maximum Volume:** Given current hydrometeorological conditions, the seasonal runoff that has a 10 percent chance of being exceeded.
- **Reasonable Minimum Volume:** Given current hydrometeorological conditions, the seasonal runoff that has a 90 percent chance of being exceeded.

**SNOTEL:** Acronym for SNOW TELemetry. This is a automated snow measurement system operated by the USDA - Natural Resources Conservation Service. These sites use meteor burst communications technology to transmit hydrometeorological information such as snow water equivalent from snow pillows, accumulated precipitation and maximum, minimum and average air temperature.

**Water equivalent:** The depth of water that would result from melting the snowpack at a point.

**Water Year:** The period from October 1<sup>st</sup> through September 30<sup>th</sup>.

# General Outlook

April 1, 2011

A series of winter storms arrived during March, adding generous accumulations to an already good mountain snowpack. Storage in California's major reservoirs is near average or above average. April-July runoff projections now range from above to much above average. Considering snowpack conditions, storage and forecast spring runoff, the water supply outlook is excellent for California this year.

The Upper Sacramento, Northern Sierra and the central Sierra received the most precipitation during March—with region-wide averages in excess of 200 percent. The Tulare Lake region received about 160 percent of a March average. Seasonal precipitation (October 1, 2010 to March 31, 2011) remains greatest in the south and ranges from 122 percent for the Upper Sacramento River basin to 168 percent for the Tule. It is about 111 percent of average for the Klamath basin and is much above average for the east side Sierra Nevada and northern Nevada watersheds.

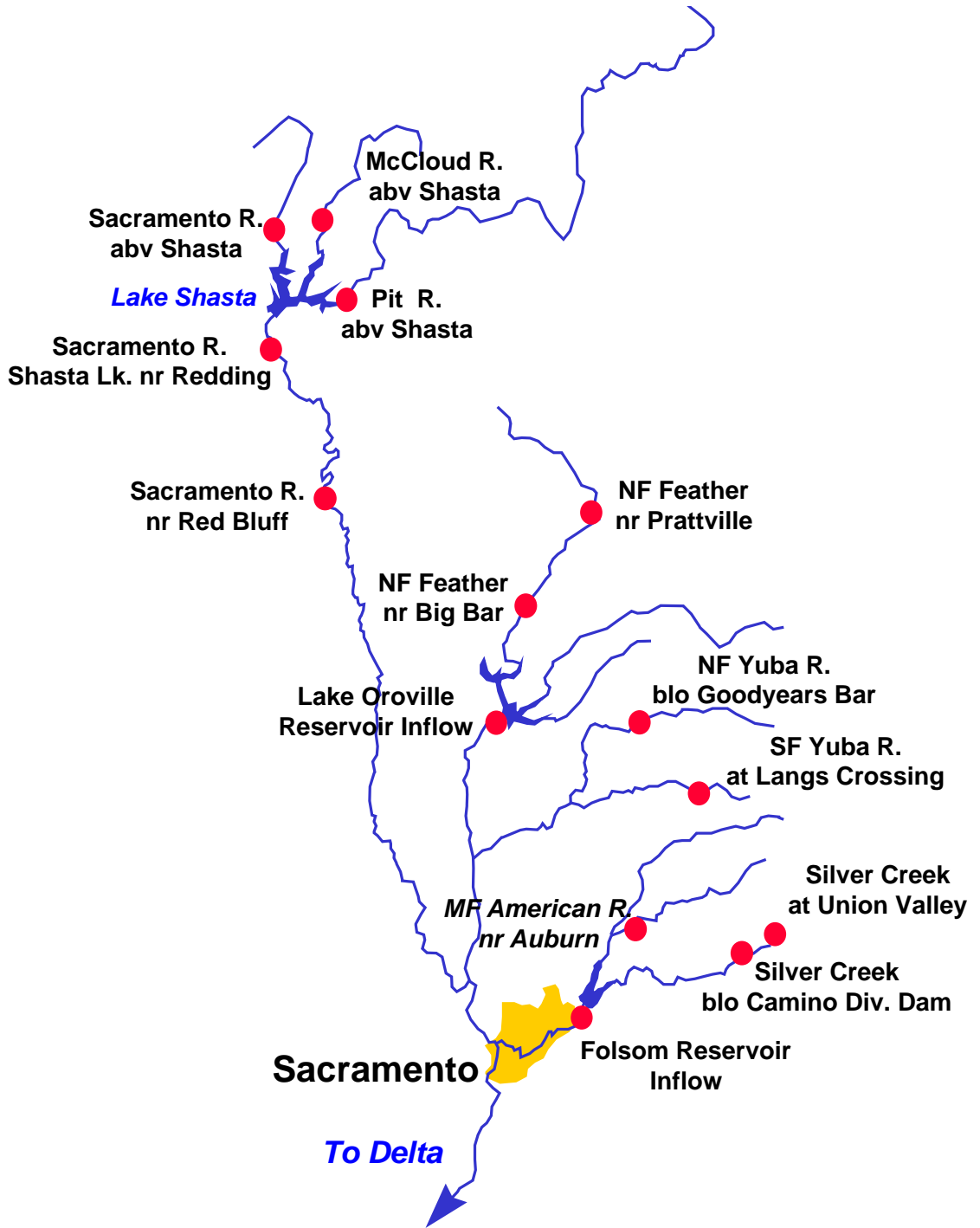
According to California Cooperative Snow Surveys, the snowpack is the fifth largest in the last 60 years and the highest since 1995. In many basins, the percent average water content at the lower elevations exceeds that of the higher altitudes. Measurements from snow courses, based on the April 1<sup>st</sup> surveys, show that the pack was 171 percent of average for the Upper Sacramento-northern Sierra, 176 percent for the central and 183 percent for the southern Sierra. Snow packs in the Tahoe-Truckee are about 171 percent of the average-to-date, the Carson-Walker at 154 percent and the Humboldt basin at 131 percent. It is 138 percent of the average-to-date for the Upper Klamath Lake basin.

March runoff was much above average for most snow basins in the Upper Sacramento/Sierra Nevada. Amounts range from 147 percent for the Trinity-Sacramento, 183 percent for the San Joaquin drainage, and 154 percent for the Tulare Lake watershed. East side Sierra basins received 116 percent of a March average, and the Humboldt River at Palisade, 73 percent. The Upper Klamath Lake inflow recorded 87 percent of a March average.

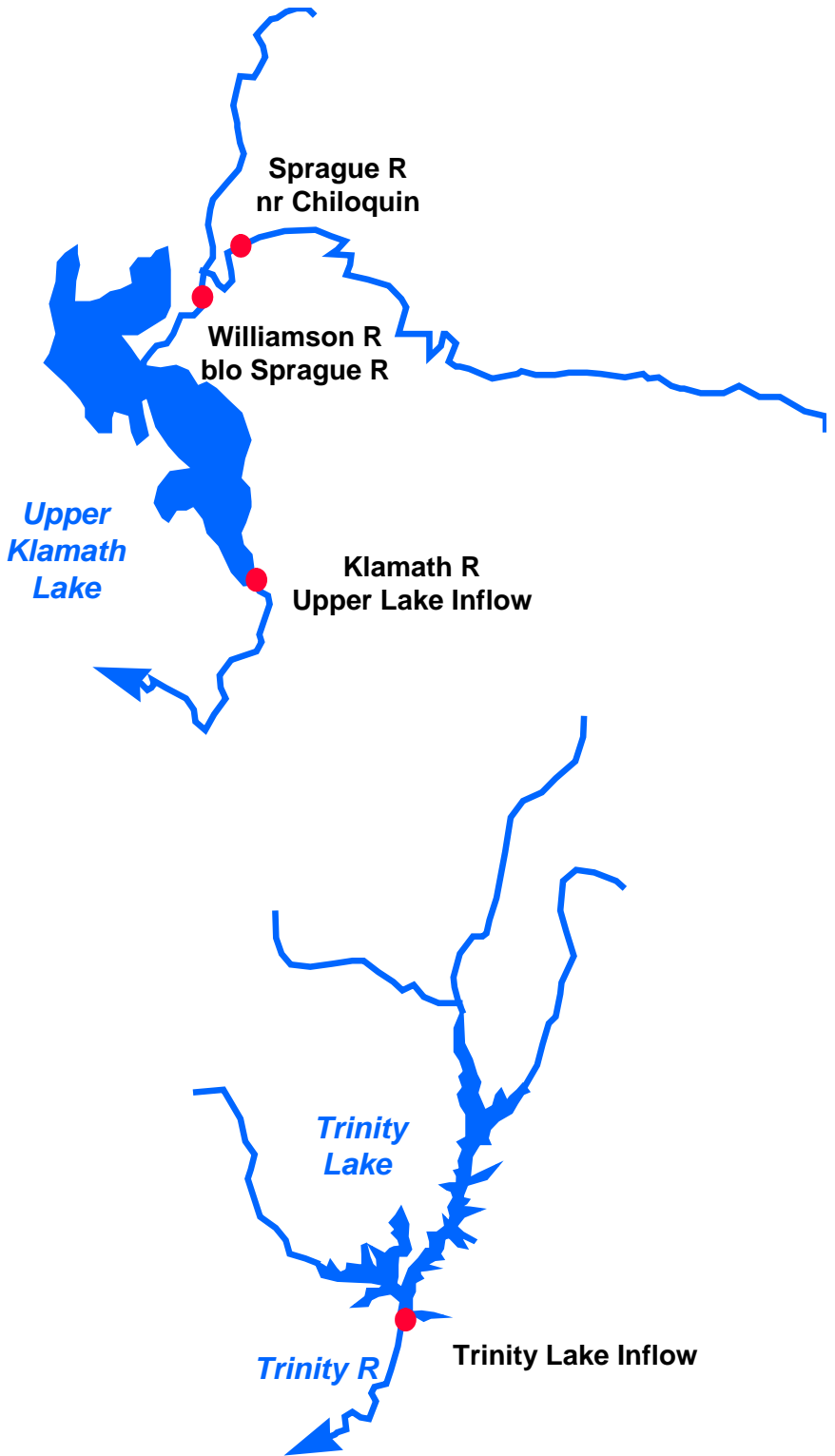
Overall reservoir storage in the Upper Sacramento/West Slope Sierra continues to be excellent at 113 percent of average compared to 94 percent last year. Stored water in the Sacramento region was at 106 percent of average for the date (as opposed to 89 percent for the date last year), the San Joaquin at 123 percent (102 percent last year), and the Tulare Lake watershed at about 132 percent (91 percent last year). East-side Sierra reservoirs were at 112 percent of average. The lake level at Lake Tahoe stood at 6225.63 feet (or 2.63 feet above its natural rim altitude of 6223.0 feet) as of March 31. Usable storage was 319,800 acre-feet or 82 percent of average. It was 42,500 acre-feet (11 percent of average) at this time last year. Storage at Lahontan Reservoir in Nevada stands at 79 percent of average as of March 31 while Rye Patch Reservoir is at 52 percent (20 percent at this time last year). Storage at Upper Klamath Lake is about 109 percent of average.

Most forecasts are 30 to 55 percent higher than a month ago. April through July runoff projections now range from 115 percent for the Pit River basin to 188 percent of average for the Kern. Forecasts vary from 160 to 211 percent of average for the east side Sierra Nevada basins and 146 to 154 percent for forecast points on the main stem Humboldt River. The April through September forecast for the Upper Klamath Lake inflow is 122 percent.

# Sacramento River Basin



# Upper Klamath and Trinity River Basins



# Water Supply Forecasts

## COASTAL BASINS

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
Williamson River Sprague, blo	Apr-Sep	475	123	535	415	385
Sprague River Chiloquin, nr	Apr-Sep	310	135	360	260	230
Upper Klamath Falls River Inflow	Apr-Sep	630	122	735	525	515
Lost River Gerber Reservoir Inflow	Apr-Jul	24	142	36	12.0	16.9
Clear Lake Reservoir Inflow	Apr-Jul	56	137	84	28	41
Scott River Fort Jones, nr	Apr-Jul	255	141	305	205	181
Trinity R River Trinity Lake	Apr-Jul	1000	157	1170	830	635

Trinity River - Inflow at Lewiston Lake Distribution (kAF) Exceedence									
Probability	Oct-Mar	Apr	May	Jun	Jul	Aug	Sep	Apr-Jul	Water Yr
90%	775	250	325	200	55	13	8	830	1626
50%	775	300	390	240	70	16	10	1000	1801
10%	775	350	460	280	80	20	15	1170	1980

## SACRAMENTO RIVER BASIN

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
<b>SACRAMENTO RIVER ABOVE BEND BRIDGE</b>						
Pit River Montgomery Ck, nr	Apr-Jul	1080	115	1330	880	940**
Mccloud River Shasta Lake, abv	Apr-Jul	520	141	630	410	370
Sacramento River Delta	Apr-Jul	450	155	580	320	290
Shasta Dam	Apr-Jul	2300	128	2850	1750	1790
Bend Bridge, abv, Red Bluff, n	Apr-Jul	3200	131	4030	2370	2440

# Water Supply Forecasts

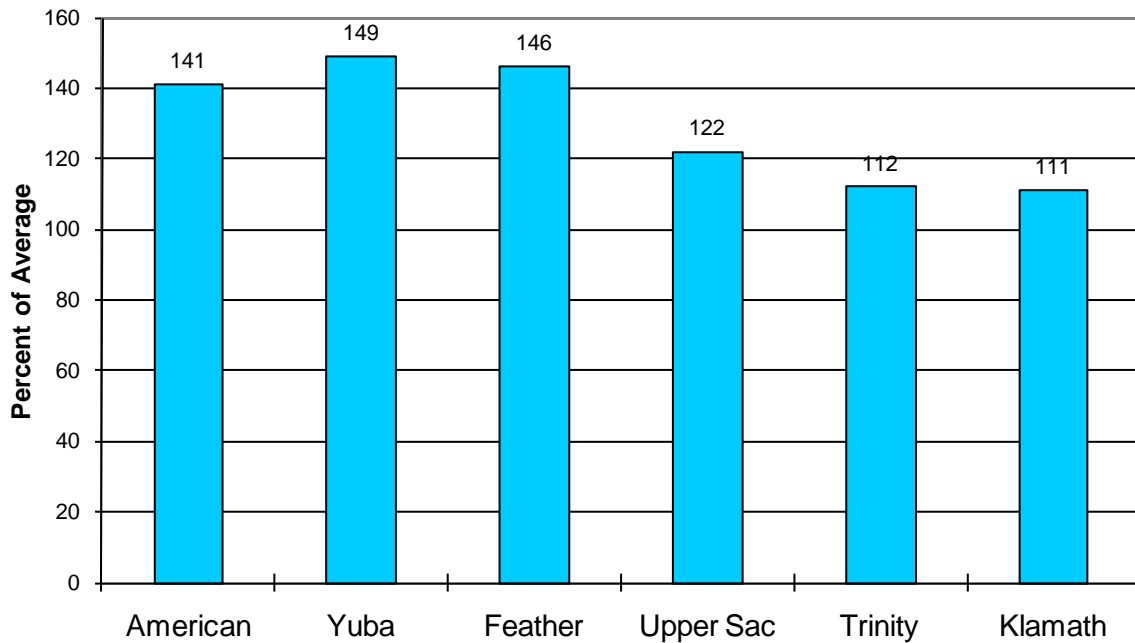
		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
<b>FEATHER RIVER ABOVE OROVILLE RESERVOIR</b>						
North Fork Feather River						
Prattville, nr	Apr-Jul	460	138	565	355	333*
Big Bar	Apr-Jul	1600	166	1940	1260	962*
Feather River						
Oroville Dam	Apr-Jul	2900	165	3460	2340	1760
<b>YUBA RIVER ABOVE SMARTVILLE</b>						
North Yuba River						
Goodyears Bar, blo	Apr-Jul	470	172	540	400	273*
South Yuba River						
Langs Crossing	Apr-Jul	385	171	450	320	225*
Yuba River						
Englebright Reservoir	Apr-Jul	1680	169	2140	1350	995
<b>AMERICAN RIVER ABOVE FOLSOM RESERVOIR</b>						
Middle Fork American River						
Auburn, nr	Apr-Jul	830	169	980	710	490*
Silver Creek						
Union Valley	Apr-Jul	175	179	205	160	98*
Camino Dam, blo	Apr-Jul	270	171	330	240	158*
American River						
Folsom Reservoir	Apr-Jul	2100	171	2450	1850	1230

\*30 Year Averages for 1971-2000 are incomplete. Those forecast points with an asterisk have incomplete averages, so 1961-1990 averages are listed. The new averages will be incorporated into this report when the complete data sets become available.

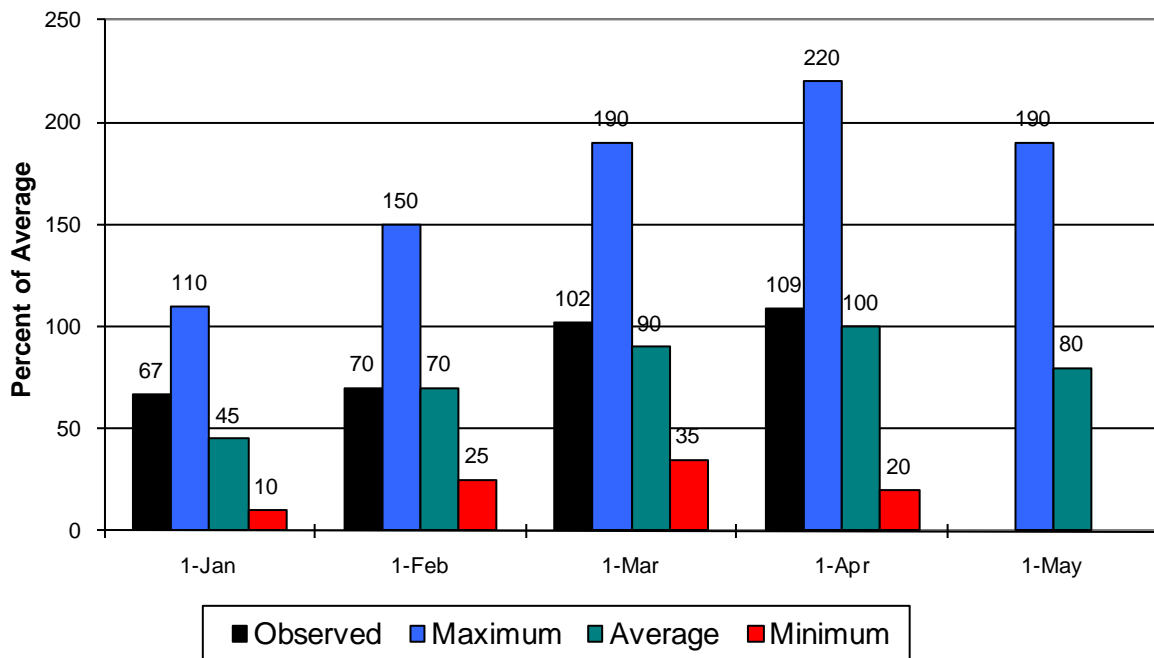
\*\* Pit River 30-year average is full natural flow.

# Sacramento/Trinity/Klamath River Basins

## Seasonal Basin Precipitation October 1 to Date



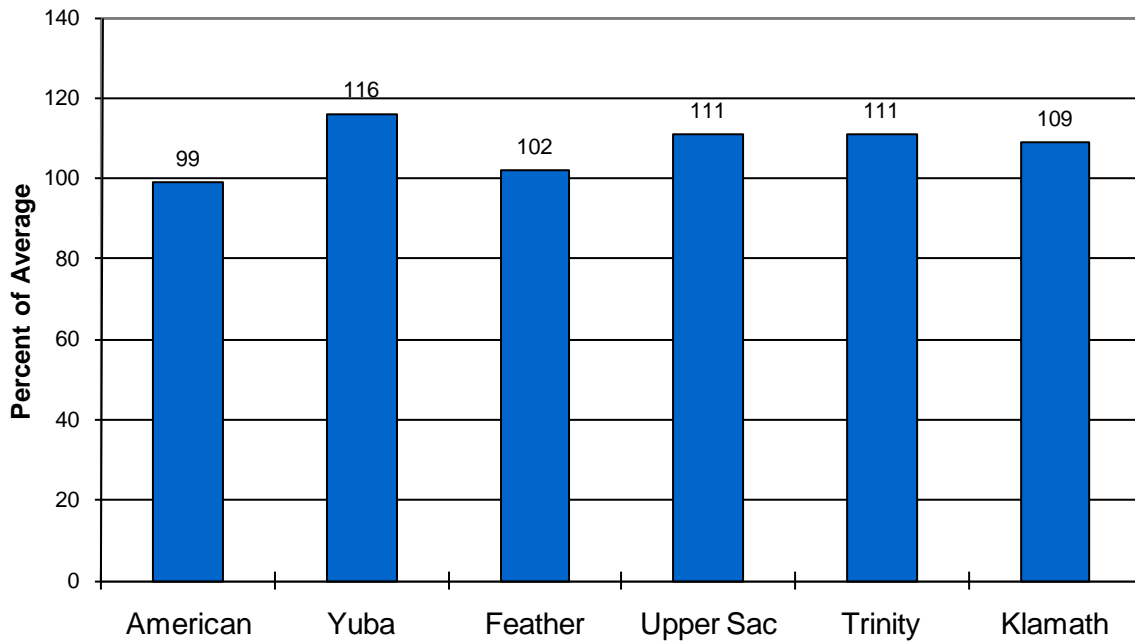
## Seasonal Basin Snowpack Water Content in % of April 1 Average



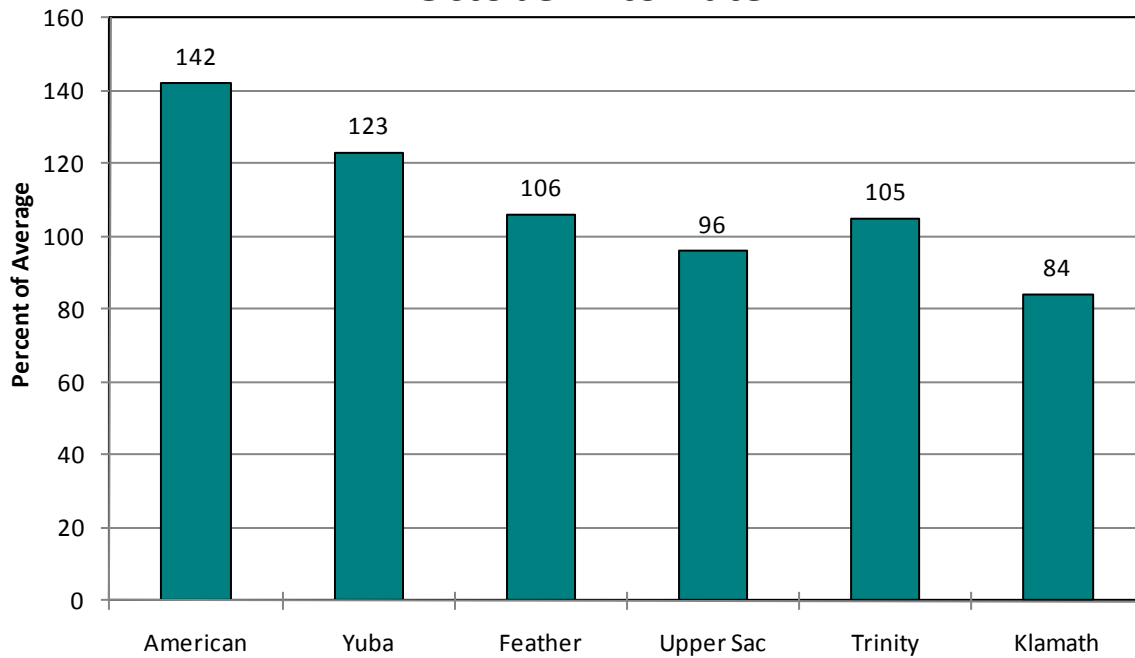


# Sacramento/Trinity/Klamath River Basins

## Basin Reservoir Storage Contents of Major Reservoirs in % of Average



## Seasonal Basin Runoff October 1 to Date



# San Joaquin Basin



# Water Supply Forecasts

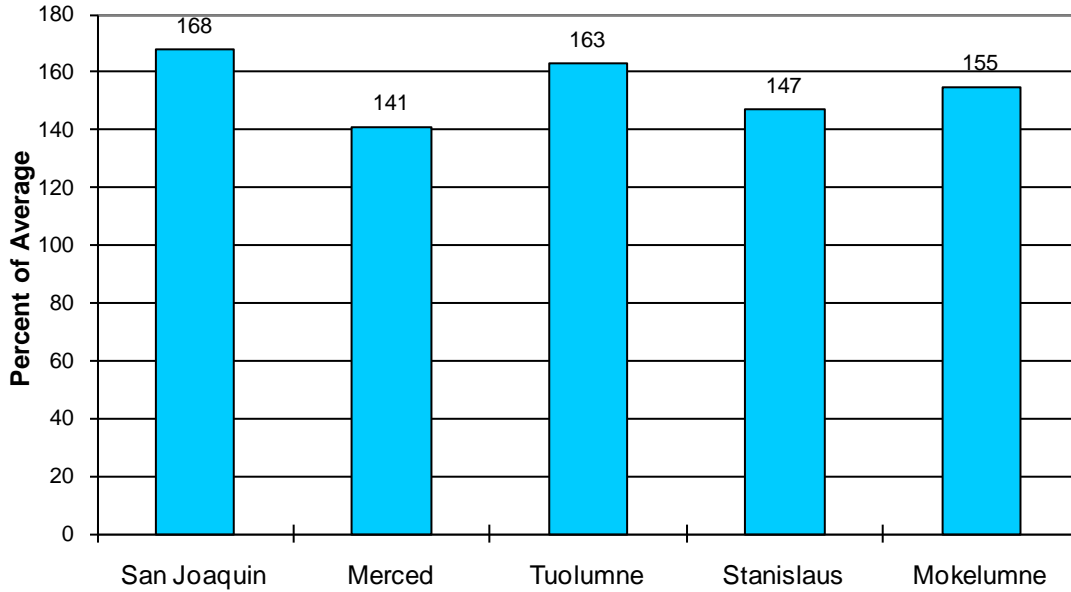
## SAN JOAQUIN BASIN

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
South Fork San Joaquin River						
Hooper Ck, blo, Florence Lake	Apr-Jul	320	167	450	225	192*
San Joaquin River						
Millerton Lake	Apr-Jul	2280	180	2750	1900	1270
Merced River						
Pohono Bridge, at, Yosemite, nr	Apr-Jul	650	181	825	500	360*
Merced Falls, blo	Apr-Jul	1130	175	1450	875	645
Tuolumne River						
Hetch Hetchy, nr	Apr-Jul	1000	168	1250	825	596*
La Grange, nr	Apr-Jul	2050	167	2500	1700	1230
Middle Fork Stanislaus River						
Beardsley Dam, blo	Apr-Jul	550	172	700	450	320*
Stanislaus River						
New Melones Dam	Apr-Jul	1150	165	1500	950	695
North Fork Mokelumne River						
West Point	Apr-Jul	670	161	780	560	416*
Mokelumne River						
Pardee Reservoir	Apr-Jul	750	163	875	680	460
Cosumnes River						
Michigan Bar	Apr-Jul	250	203	310	220	123

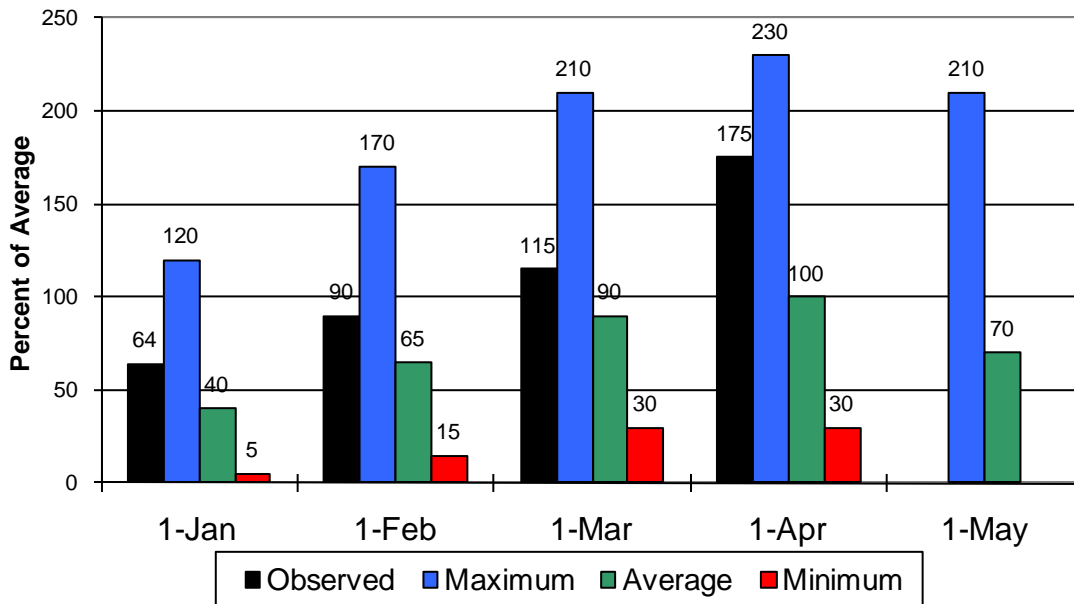
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# San Joaquin Basin

## Seasonal Basin Precipitation October 1 to Date

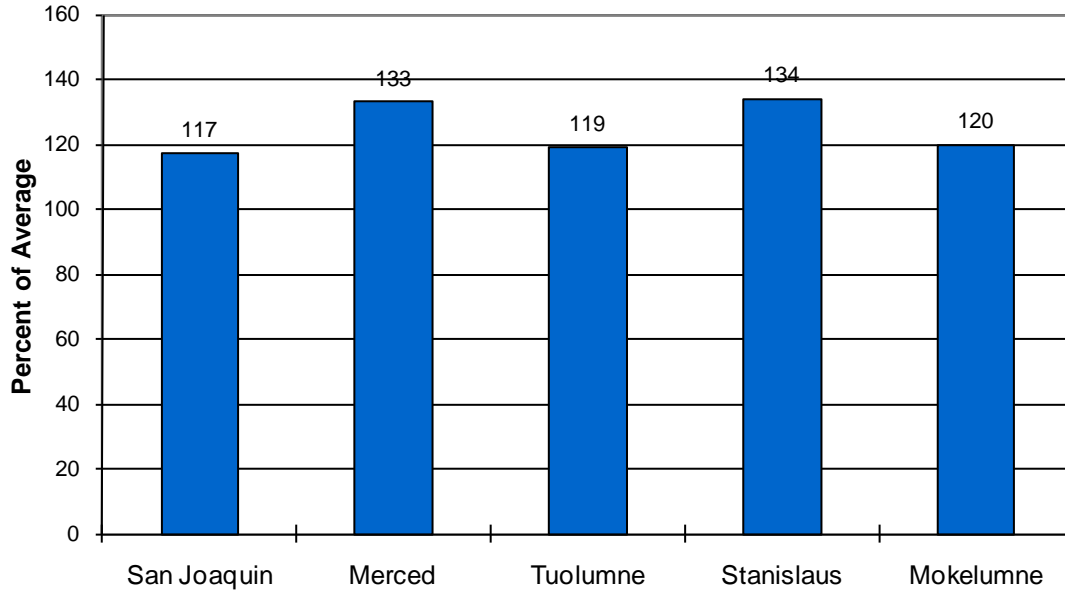


## Seasonal Basin Snowpack Water Content in % of April 1 Average

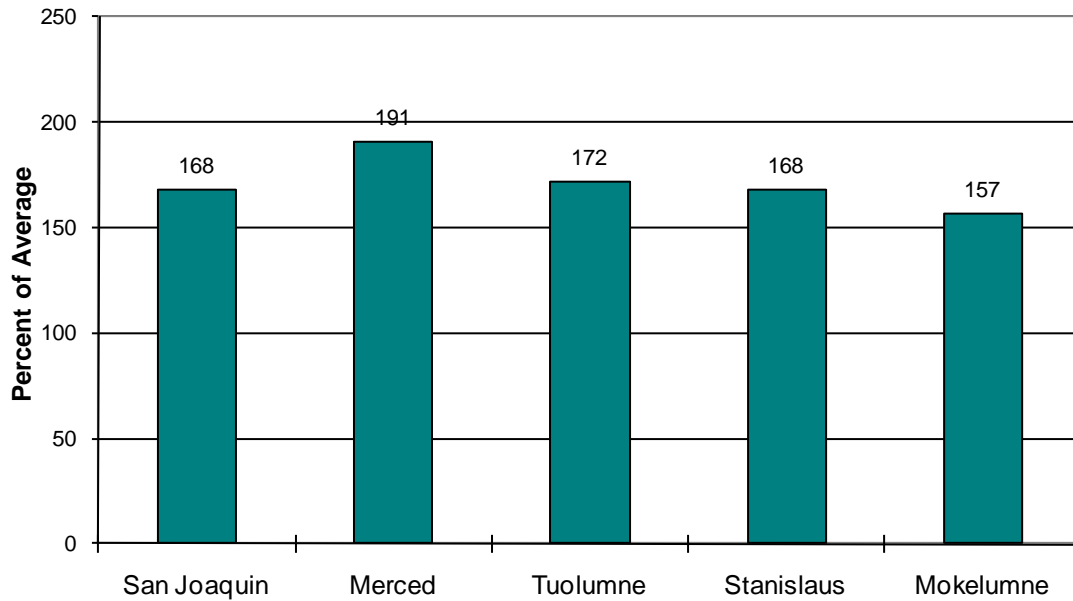


# San Joaquin Basin

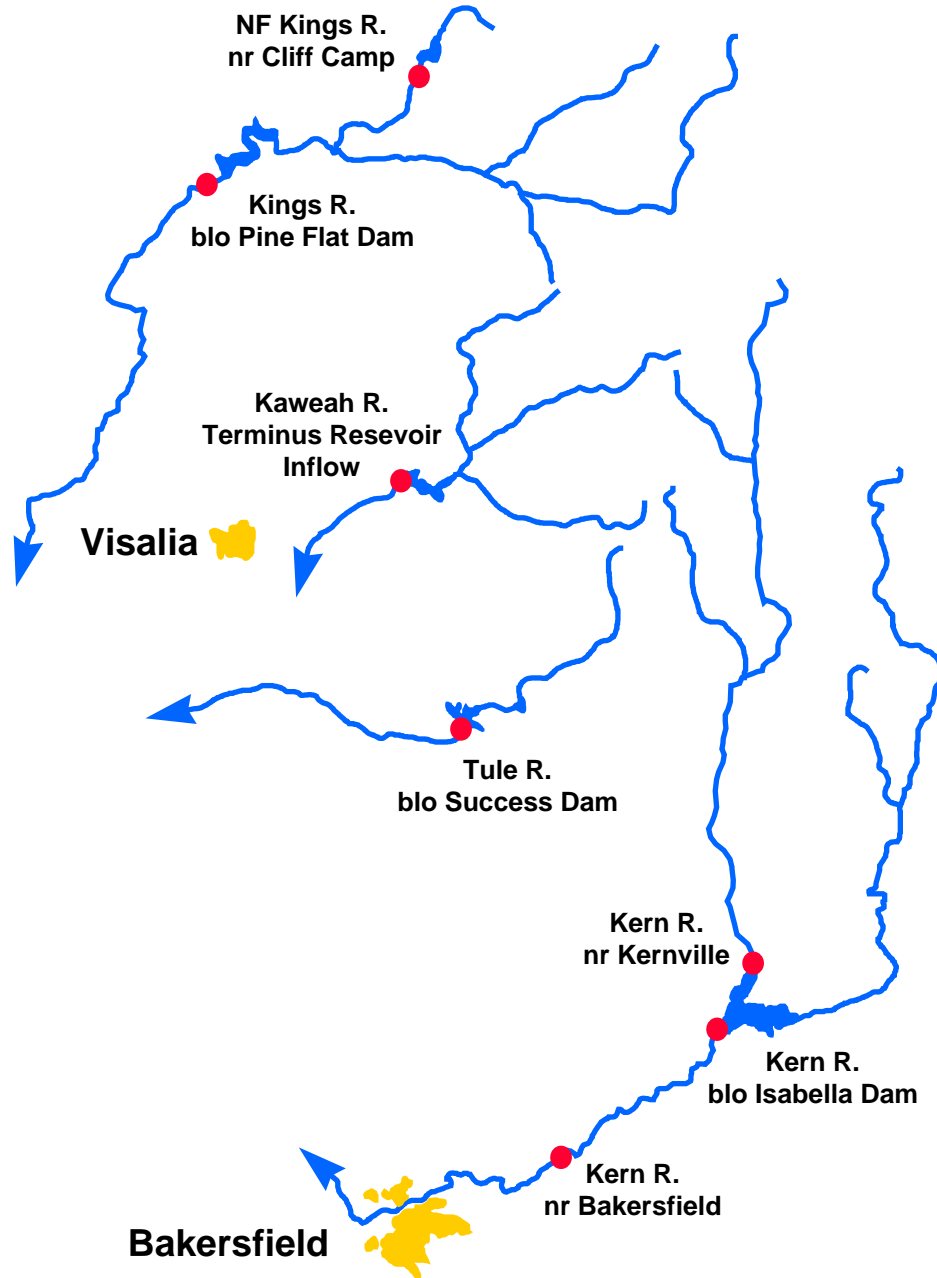
## Basin Reservoir Storage Contents of Major Reservoirs in % of Average



## Season Basin Runoff October 1 to Date



# Tulare Basin



# Water Supply Forecasts

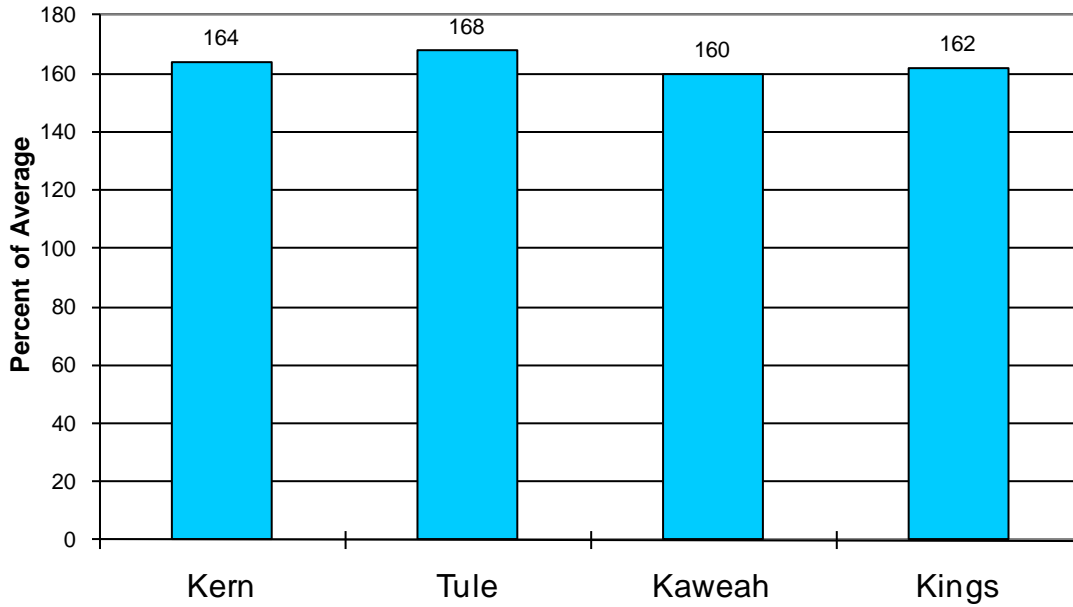
## TULARE LAKE BASIN

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
<b>Kern River</b>						
Kernville, nr	Apr-Jul	700	176	900	600	398*
Isabella Dam, blo	Apr-Jul	900	188	1100	750	480
Bakersfield, nr	Apr-Jul	930	190	1150	775	490
<b>Tule River</b>						
Success Dam	Apr-Jul	120	182	180	80	66
<b>Kaweah River</b>						
Terminus Dam	Apr-Jul	520	179	700	400	290
<b>North Fork Kings River</b>						
Cliff Camp, nr	Apr-Jul	430	179	550	325	240*
<b>Kings River</b>						
Pine Flat Dam, blo	Apr-Jul	2200	176	2600	2000	1250

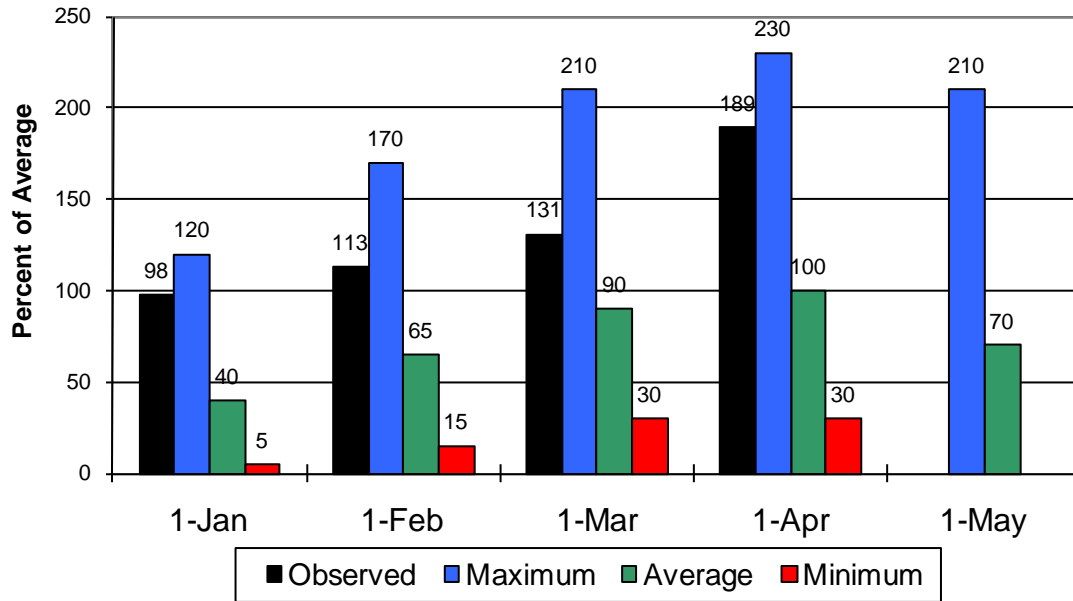
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# Tulare Lake Basin

## Seasonal Precipitation October 1 to Date



## Seasonal Basin Snowpack Water Content in % of April 1 Average

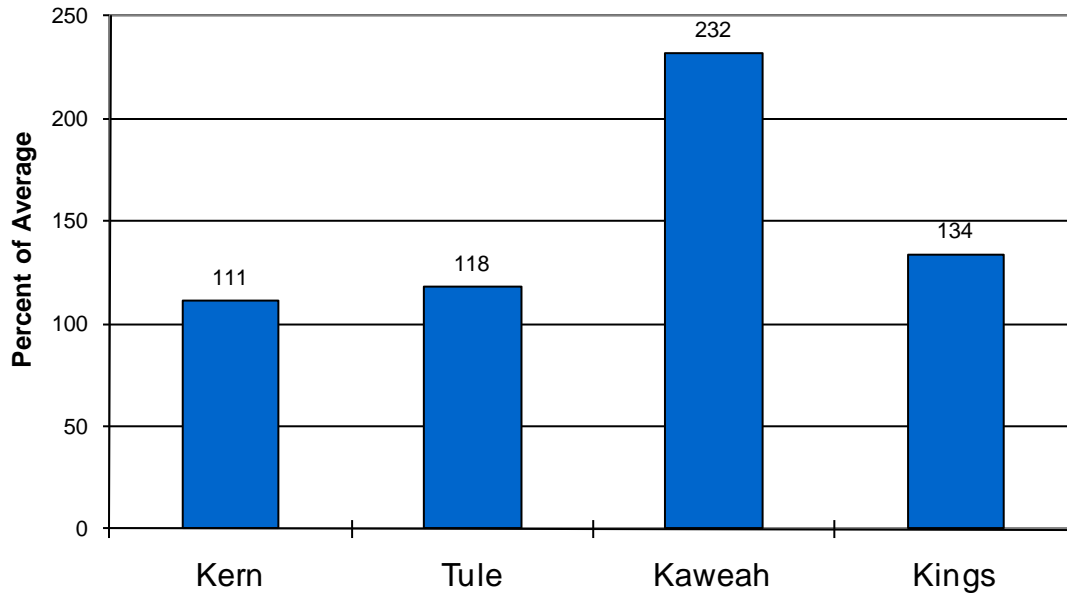




# Tulare Lake Basin

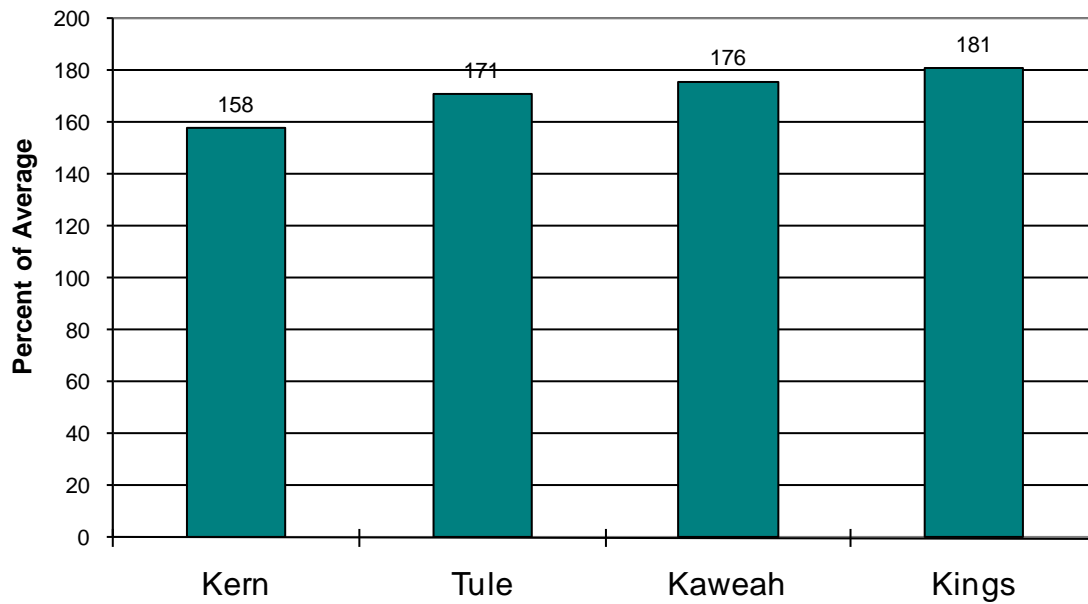
## Basin Reservoir Storage

Contents of Major Reservoirs in % of Average

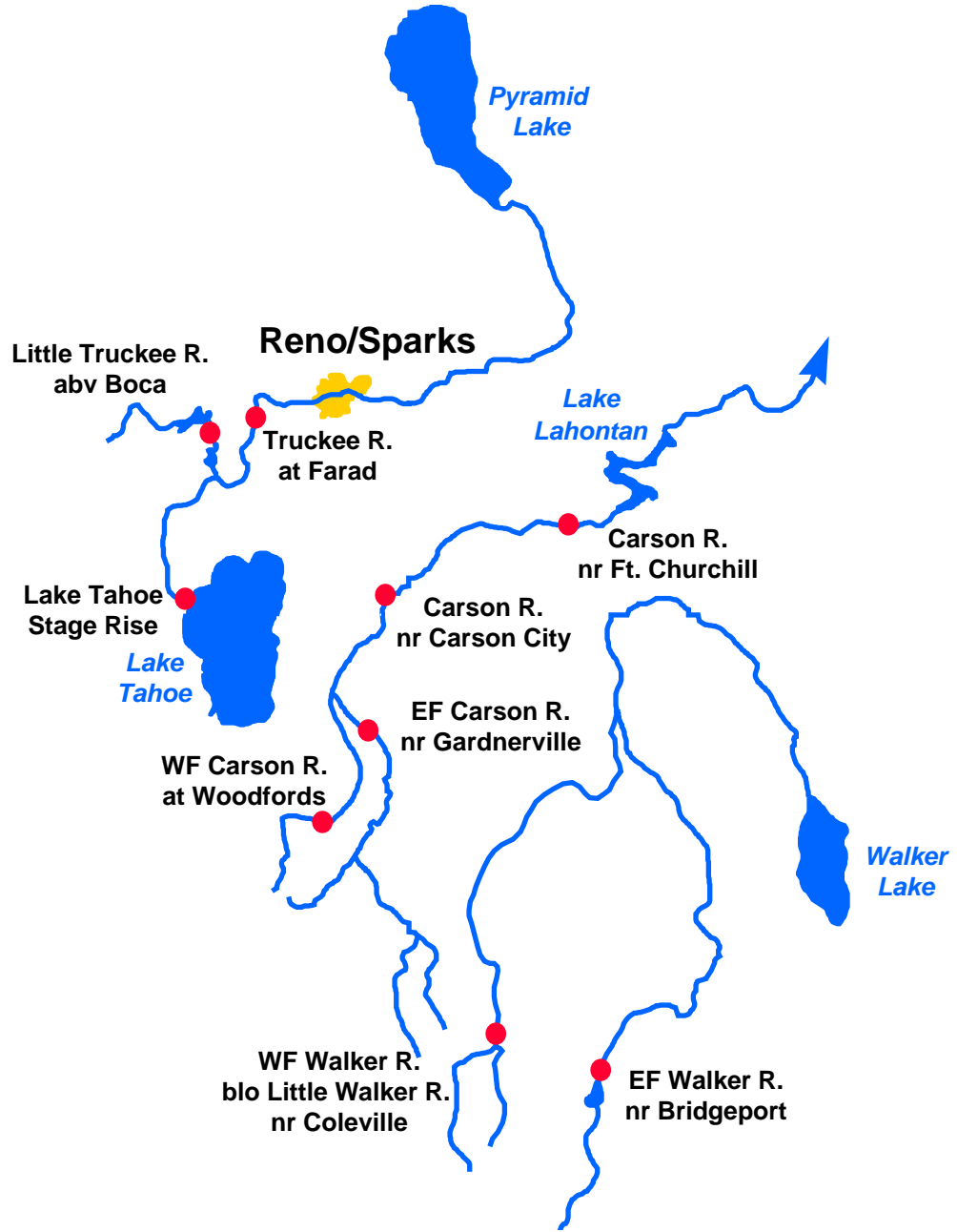


## Seasonal Basin Runoff

October 1 to Date



# East Side Sierra Nevada Basins



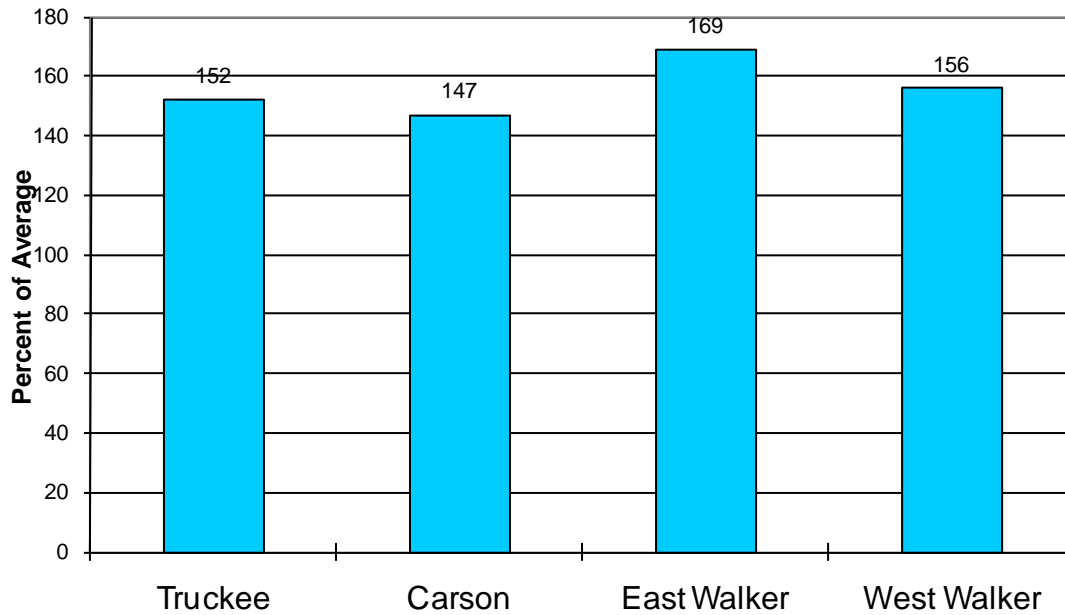
# Water Supply Forecasts

## EAST SIDE SIERRA NEVADA BASINS

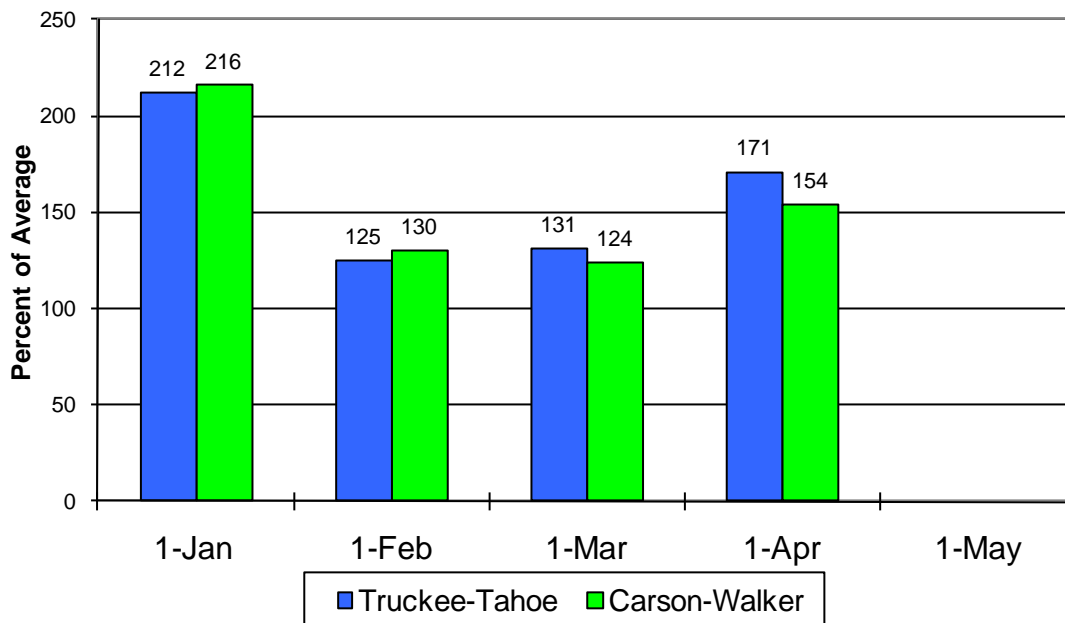
		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
<b>Truckee River</b>						
Truckee River						
Lake Tahoe Stage Rise	Apr-High	2.3	167	2.9	1.72	1.38
Little Truckee River						
Stampede Dam	Apr-Jul	135	169	197	73	80
Truckee River						
Farad	Apr-Jul	470	181	585	355	260
<b>Carson River</b>						
East Fork Carson River						
Gardnerville, nr	Apr-Jul	330	175	380	280	189
West Fork Carson River						
Woodfords	Apr-Jul	95	170	112	78	56
Carson River						
Carson City, nr	Apr-Jul	365	194	465	280	188
Fort Churchill, nr	Apr-Jul	375	211	510	265	178
<b>Walker River</b>						
East Walker River						
Bridgeport, nr	Apr-Aug	135	201	172	98	67
West Walker River						
Ltl Walker, blo, Coleville, nr	Apr-Jul	250	160	280	220	156

# East Side Sierra Nevada Basins

## Seasonal Basin Precipitation October 1 to Date

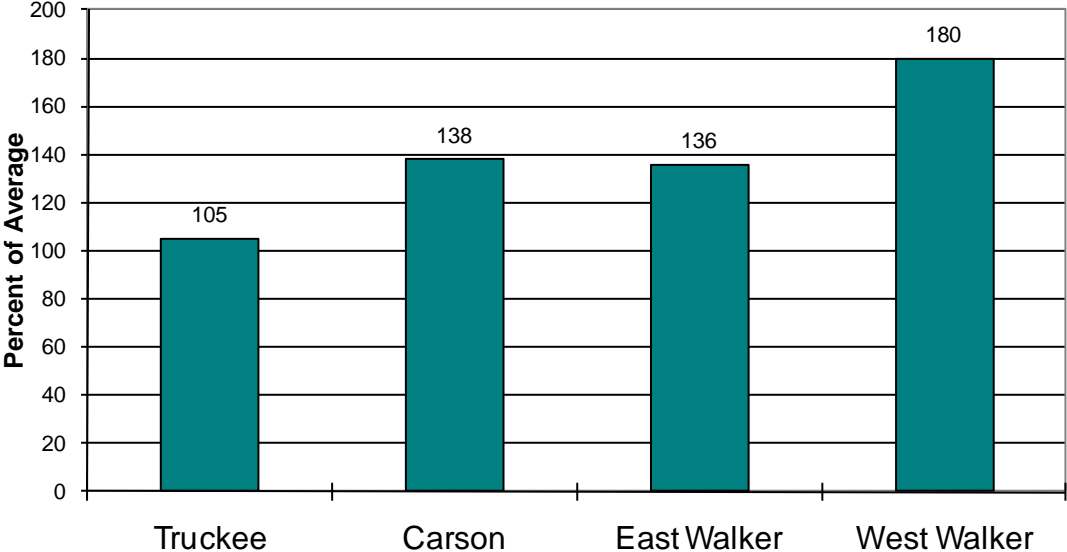


## Basin Snowpack % of Average SWE to Date

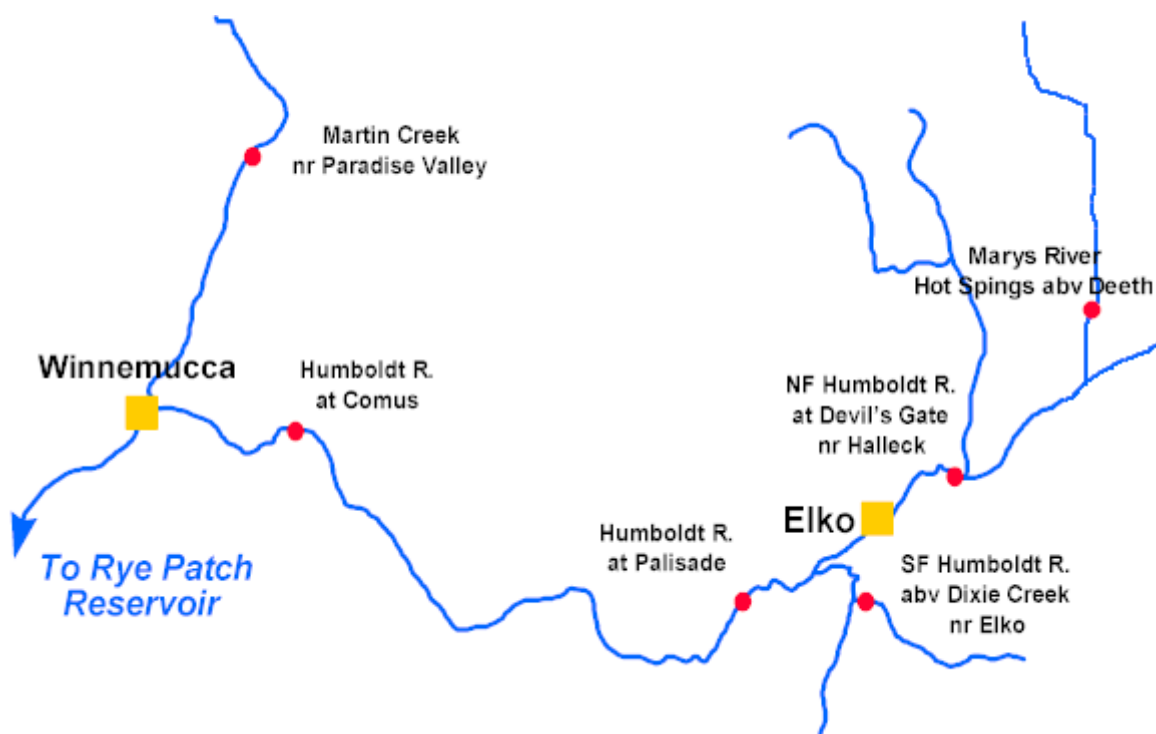


# East Side Sierra Nevada Basins

## Seasonal Basin Runoff October 1 to Date



# Humboldt River Basin



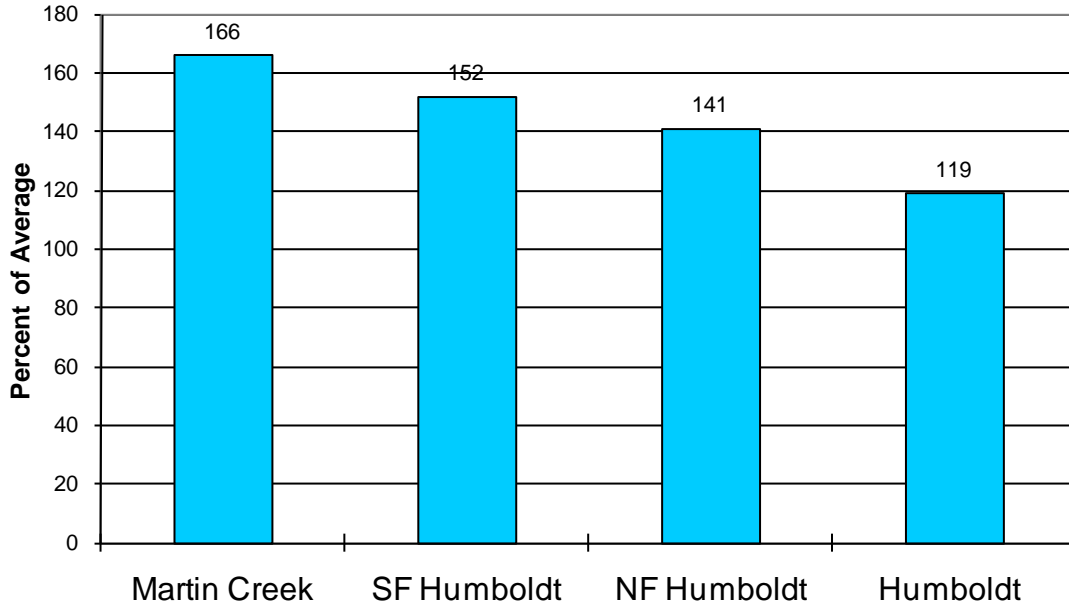
## Water Supply Forecasts

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
<b>North Fork Humboldt River</b>						
Devils Gate, at, Halleck, nr	Apr-Jul	52	153	66	38	34*
<b>South Fork Humboldt River</b>						
Dixie Creek, abv, Elko, nr	Apr-Jul	110	145	166	54	76
<b>Marys River</b>						
Hot Springs, abv, Deeth, nr	Apr-Jul	57	146	73	41	39
<b>Humboldt River</b>						
Elko, nr	Apr-Jul	225	146	295	157	154
Palisade	Apr-Jul	375	150	475	275	250
Comus	Apr-Jul	330	147	445	215	225
Imlay, nr	Apr-Jul	290	154	430	150	188
<b>Martin Ck</b>						
Paradise Valley, nr	Apr-Jul	30	160	42	17.6	18.7

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# Humboldt River Basin

## Seasonal Basin Precipitation October 1 to Date



## Basin Snowpack % of Average SWE to Date

