

WATER SUPPLY OUTLOOK



CALIFORNIA AND NORTHERN NEVADA

**MARCH
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 1st through July 31st, unless otherwise noted.

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

April 1st Average: The April 1st 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 30th.

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 1st through September 30th.

General Outlook

March 1, 2011

Wet and cold weather finally returned to California during the middle of February after six weeks of relatively dry conditions that began shortly after the beginning of January. The return of winter conditions reversed the decline of the high-altitude pack and the percent of April 1st average snow pack is now above average for the Sacramento, San Joaquin and Tulare Lake regions. The large snow pack should produce good spring runoff for many areas in California.

Several watersheds in the northern and central Sierra Nevada received near normal precipitation during February while much below average precipitation fell in the Trinity, Upper Sacramento and Kern River basins. Seasonal precipitation (October 1, 2010 to February 28, 2011) is heaviest in the south and ranges from 96 percent for the Upper Sacramento River basin to 170 percent for the Kern. It is just below average for the Klamath basin and remains above average for the east side Sierra Nevada and northern Nevada watersheds.

Measurements taken by the California Cooperative Snow Surveys show that March 1st averages now stand at approximately 120 percent for the Upper Sacramento-northern Sierra, 133 percent for the central and 145 percent for the southern Sierra. Snow packs in the Tahoe-Truckee are about 131 percent of the percent of the average-to-date, the Carson-Walker at 124 percent and the Humboldt basin at 105 percent. It is 90 percent of the average-to-date for the Upper Klamath Lake basin.

Runoff from the Upper Sacramento River basin to the Tuolumne was below a February average despite the return of wet conditions during the latter half of the month. With the exception of the Tule River, all streams from the Merced to the Kern were near average for February. Amounts range from 58 percent for the Trinity-Sacramento, 88 percent for the San Joaquin drainage, and 97 percent for the Tulare Lake watershed. East side Sierra basins received 83 percent of a February average, and the Humboldt River at Palisade, 95 percent. The Upper Klamath Lake inflow recorded 65 percent of a February average.

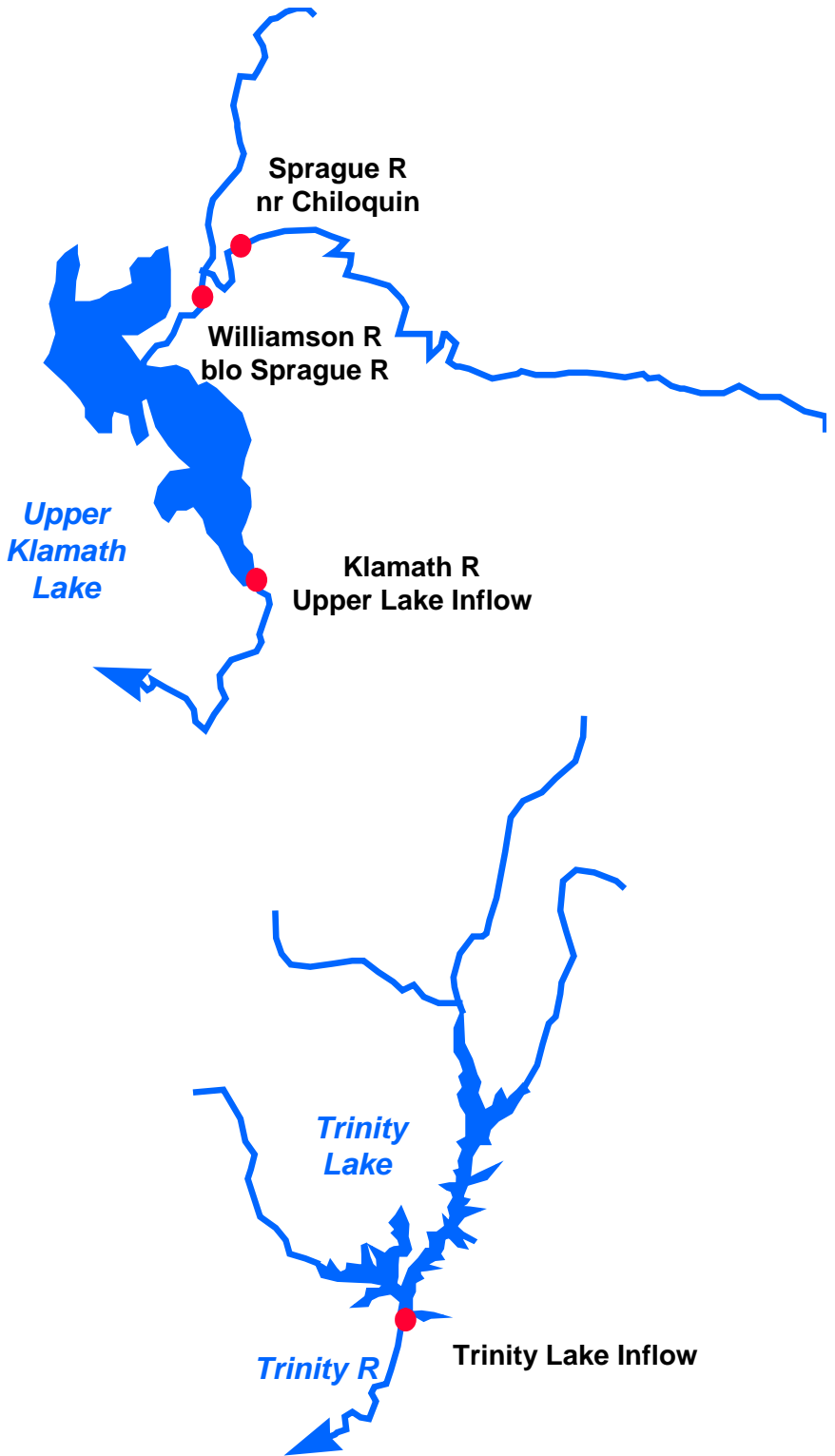
Reservoir storage has improved significantly from this time last year. Stored water in the Sacramento region as of February 28 was at 107 percent of average for the date (as opposed to 86 percent for the date last year), the San Joaquin at 122 percent (98 percent last year), and the Tulare Lake watershed at about 117 percent (87 percent last year). East-side Sierra reservoirs were at 120 percent of average. The lake level at Lake Tahoe stood at 6224.84 feet (or 1.84 feet above its natural rim altitude of 6223.0 feet) as of February 28. Usable storage was 223,500 acre-feet or 58 percent of average. It was 24,300 acre-feet (6 percent of average) at this time last year. Storage at Lahontan Reservoir in Nevada stands at 67 percent of average as of February 28 while Rye Patch Reservoir is at 39 percent. Storage at Upper Klamath Lake is about 103 percent of average.

Forecasts are about 10 to 15 percent higher than a month ago for most of the west and east side Sierra Nevada. Outlooks decreased 10 to 15 percent from February 1st for the Kern River basin as well as the Humboldt. April through July runoff projections now range from 88 percent for the Trinity and Pit River basins to 146 percent of average for the Kern. Forecasts vary from 123 to 149 percent of average for the east side Sierra Nevada basins and 106 to 120 percent for forecast points on the main stem Humboldt River. The April through September forecast for the Upper Klamath Lake inflow is 97 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	375	97	450	260	385
Sprague River Chiloquin, nr	Apr-Sep	235	102	310	160	230
Upper Klamath Falls River Inflow	Apr-Sep	500	97	645	355	515
Lost River Gerber Reservoir Inflow	Mar-Jul	39	105	62	16.0	37
Clear Lake Reservoir Inflow	Mar-Jul	85	106	145	30	80
Scott River Fort Jones, nr	Apr-Jul	165	91	260	125	181
Trinity River Trinity Lake Inflow	Apr-Jul	580	91	870	450	635

Probability	Oct-Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Apr-Jul	Water Yr
90%	532	128	163	182	81	23	8	6	450	1125
50%	532	165	210	235	105	30	10	8	580	1295
10%	532	248	315	353	158	45	20	15	870	1685

SACRAMENTO RIVER BASIN

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
SACRAMENTO RIVER ABOVE BEND BRIDGE						
Pit River Montgomery Ck, nr	Apr-Jul	910	97	1330	700	940**
McCloud River Shasta Lake, abv	Apr-Jul	375	101	515	280	370
Sacramento River Delta	Apr-Jul	280	97	450	180	290
Shasta Dam	Apr-Jul	1720	96	2620	1200	1790
Bend Bridge, abv, Red Bluff, nr	Apr-Jul	2270	93	3400	1510	2440

Water Supply Forecasts

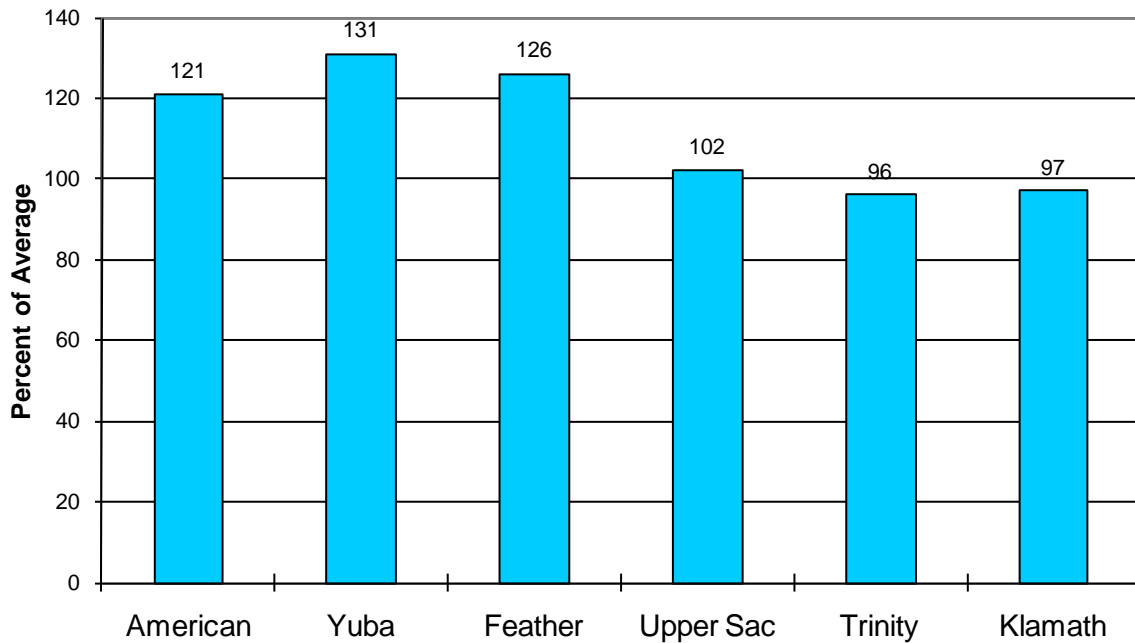
		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
FEATHER RIVER ABOVE OROVILLE RESERVOIR						
North Fork Feather River						
Prattville, nr	Apr-Jul	325	98	430	230	333*
Big Bar	Apr-Jul	985	102	1515	700	962*
Feather River						
Oroville Dam	Apr-Jul	1850	105	2870	1200	1760
YUBA RIVER ABOVE SMARTVILLE						
North Yuba River						
Goodyears Bar, blo	Apr-Jul	315	115	475	240	273*
South Yuba River						
Langs Crossing	Apr-Jul	260	116	390	200	225*
Yuba River						
Englebright Reservoir	Apr-Jul	1120	113	1700	800	995
AMERICAN RIVER ABOVE FOLSOM RESERVOIR						
Middle Fork American River						
Auburn, nr	Apr-Jul	570	116	880	390	490*
Silver Creek						
Union Valley	Apr-Jul	130	133	190	100	98*
Camino Dam, blo	Apr-Jul	210	133	300	155	158*
American River						
Folsom Reservoir	Apr-Jul	1500	122	2300	1000	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.

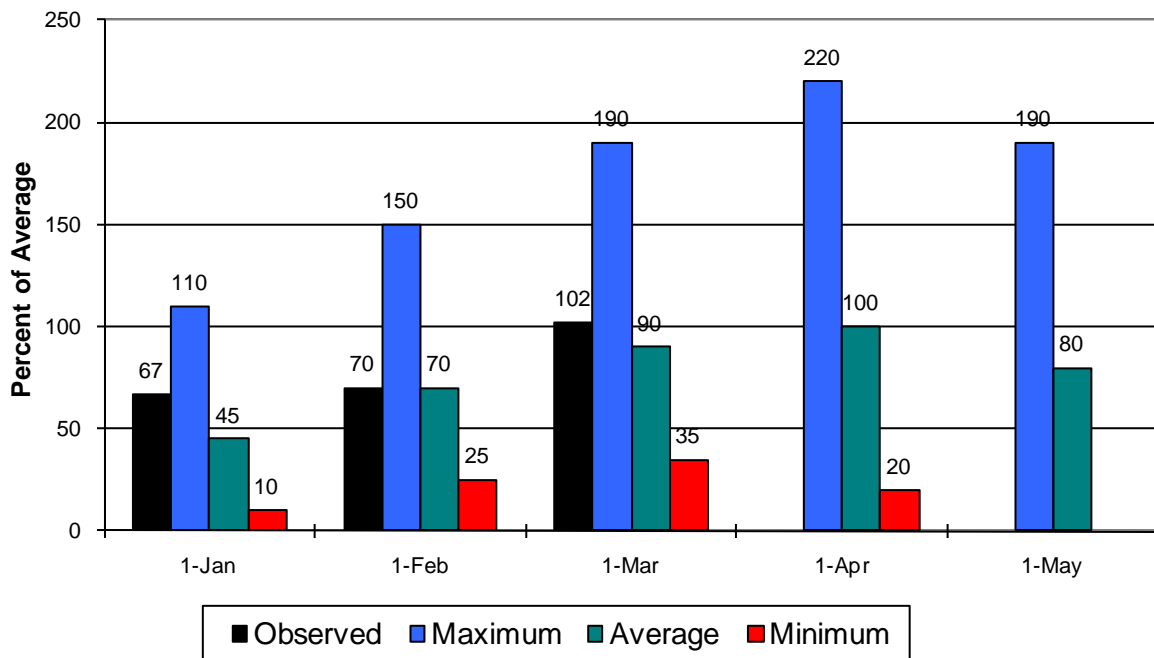
** Pit River 30-year average is full natural flow.

Sacramento/Trinity/Klamath River Basins

Seasonal Basin Precipitation October 1 to Date

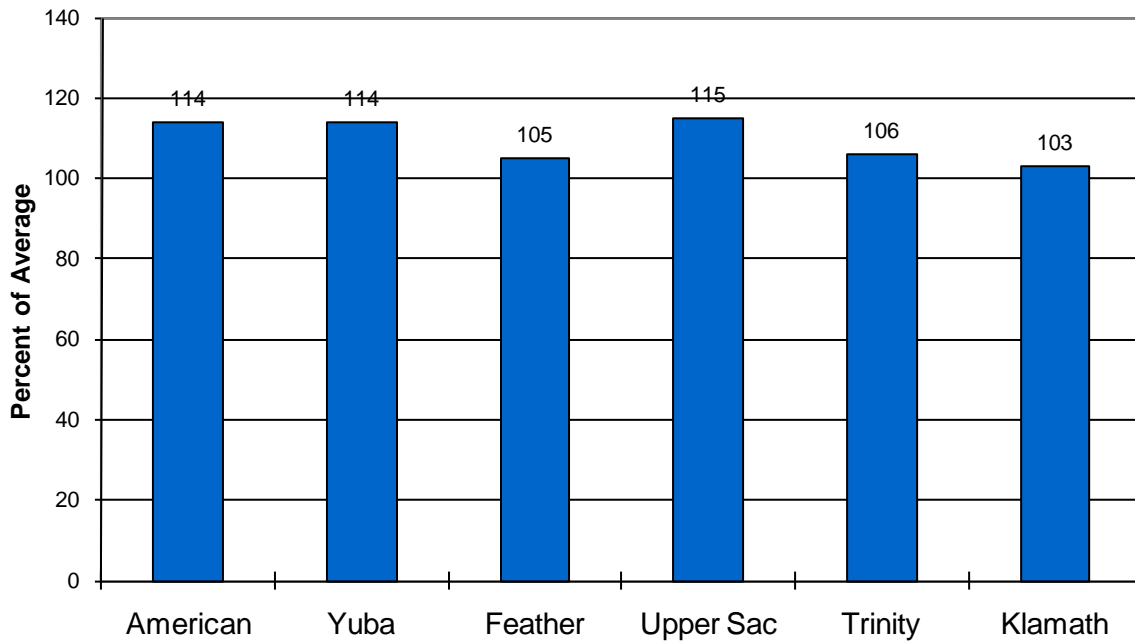


Seasonal Basin Snowpack Water Content in % of April 1 Average

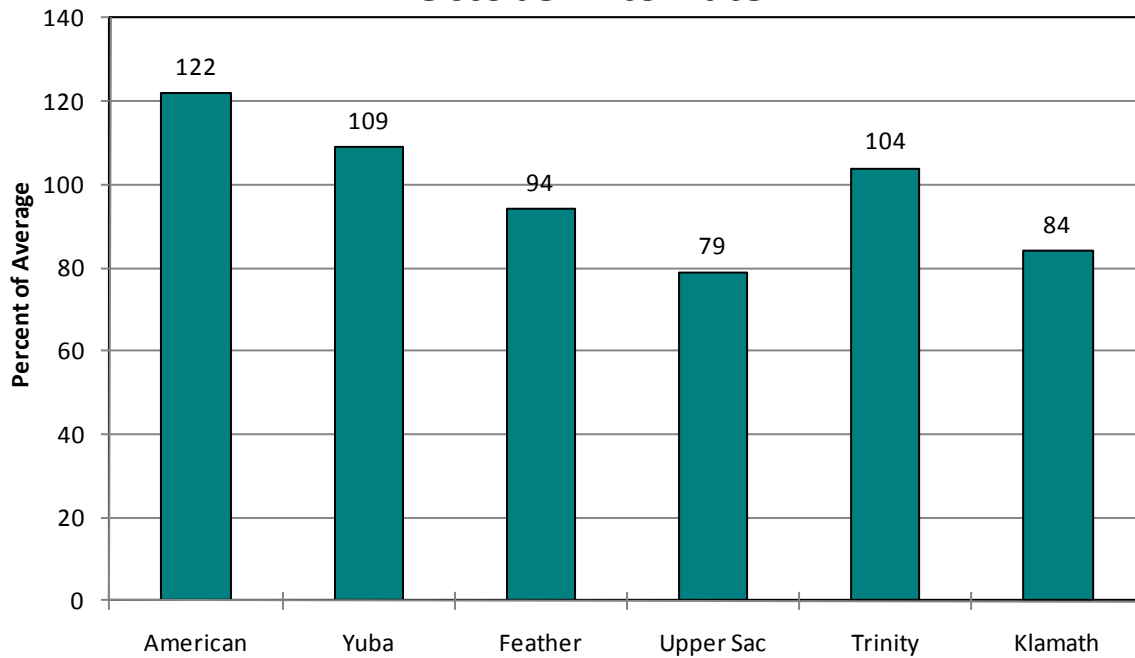


Sacramento/Trinity/Klamath River Basins

Basin Reservoir Storage Contents of Major Reservoirs in % of Average



Seasonal Basin Runoff October 1 to Date



San Joaquin Basin



Water Supply Forecasts

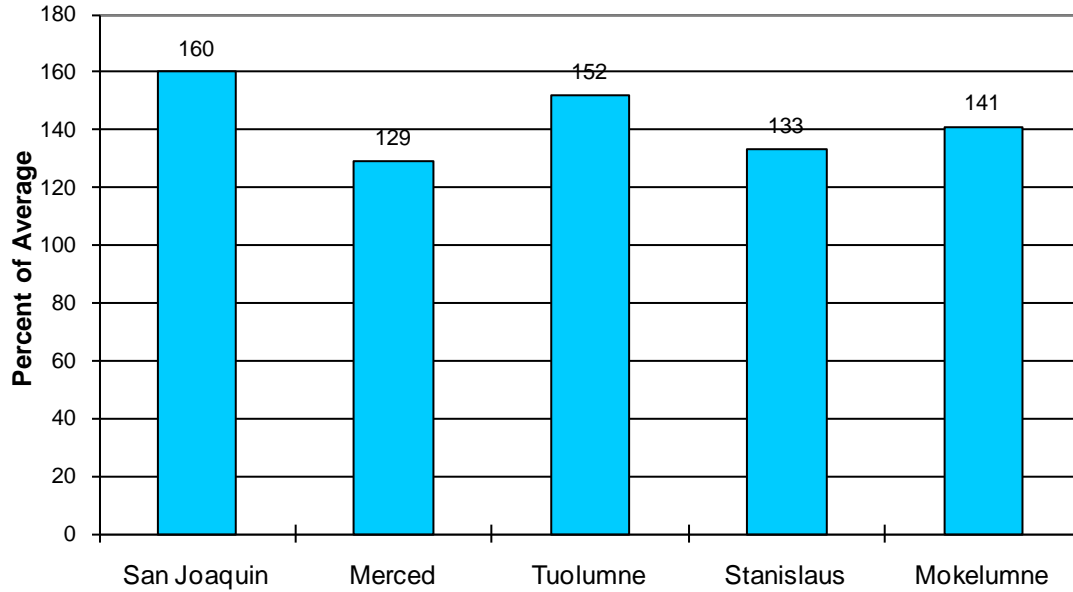
SAN JOAQUIN BASIN

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
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South Fork San Joaquin River						
Hooper Ck, blo, Florence Lk, nr	Apr-Jul	275	143	350	200	192*
San Joaquin River						
Millerton Lake	Apr-Jul	1800	142	2250	1250	1270
Merced River						
Pohono Bridge, at, Yosemite, nr	Apr-Jul	500	139	650	375	360*
Merced Falls, blo	Apr-Jul	850	132	1150	650	645
Tuolumne River						
Hetch Hetchy, nr	Apr-Jul	800	134	1050	600	596*
La Grange, nr	Apr-Jul	1580	128	2150	1200	1230
Middle Fork Stanislaus River						
Beardsley Dam, blo	Apr-Jul	400	125	575	300	320*
Stanislaus River						
New Melones Dam	Apr-Jul	850	122	1200	675	695
North Fork Mokelumne River						
West Point	Apr-Jul	500	120	690	330	416*
Mokelumne River						
Pardee Reservoir	Apr-Jul	550	120	780	410	460
Cosumnes River						
Michigan Bar	Apr-Jul	150	122	300	75	123

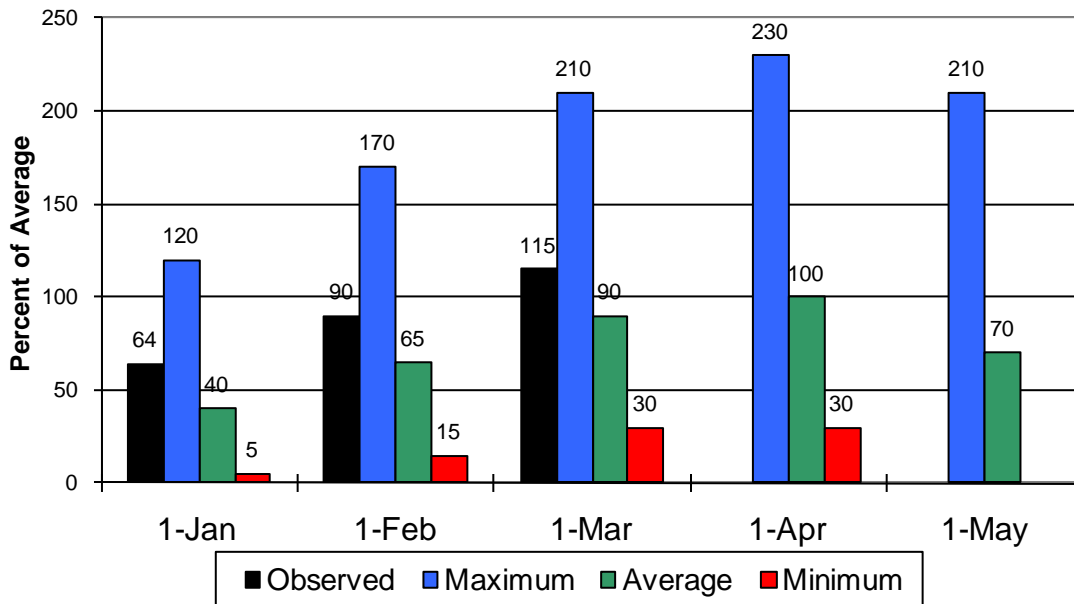
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San Joaquin Basin

Seasonal Basin Precipitation October 1 to Date

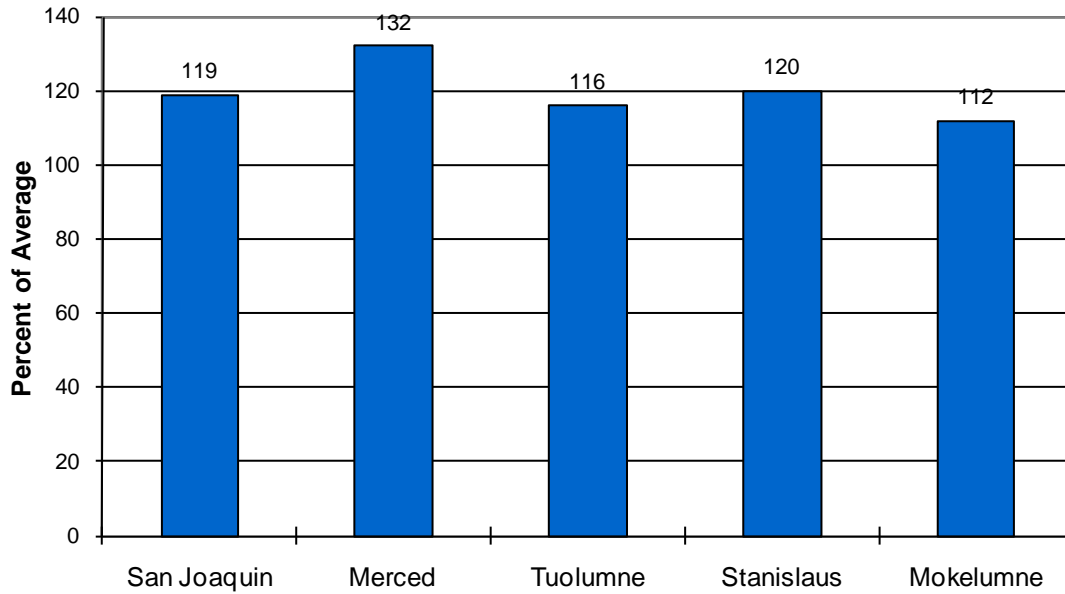


Seasonal Basin Snowpack Water Content in % of April 1 Average

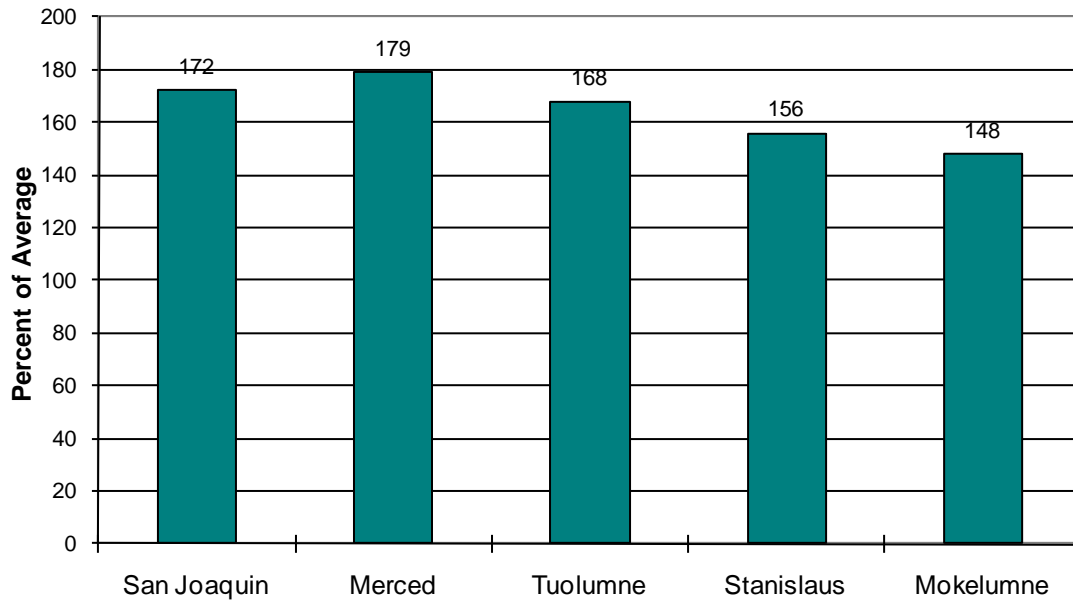


San Joaquin Basin

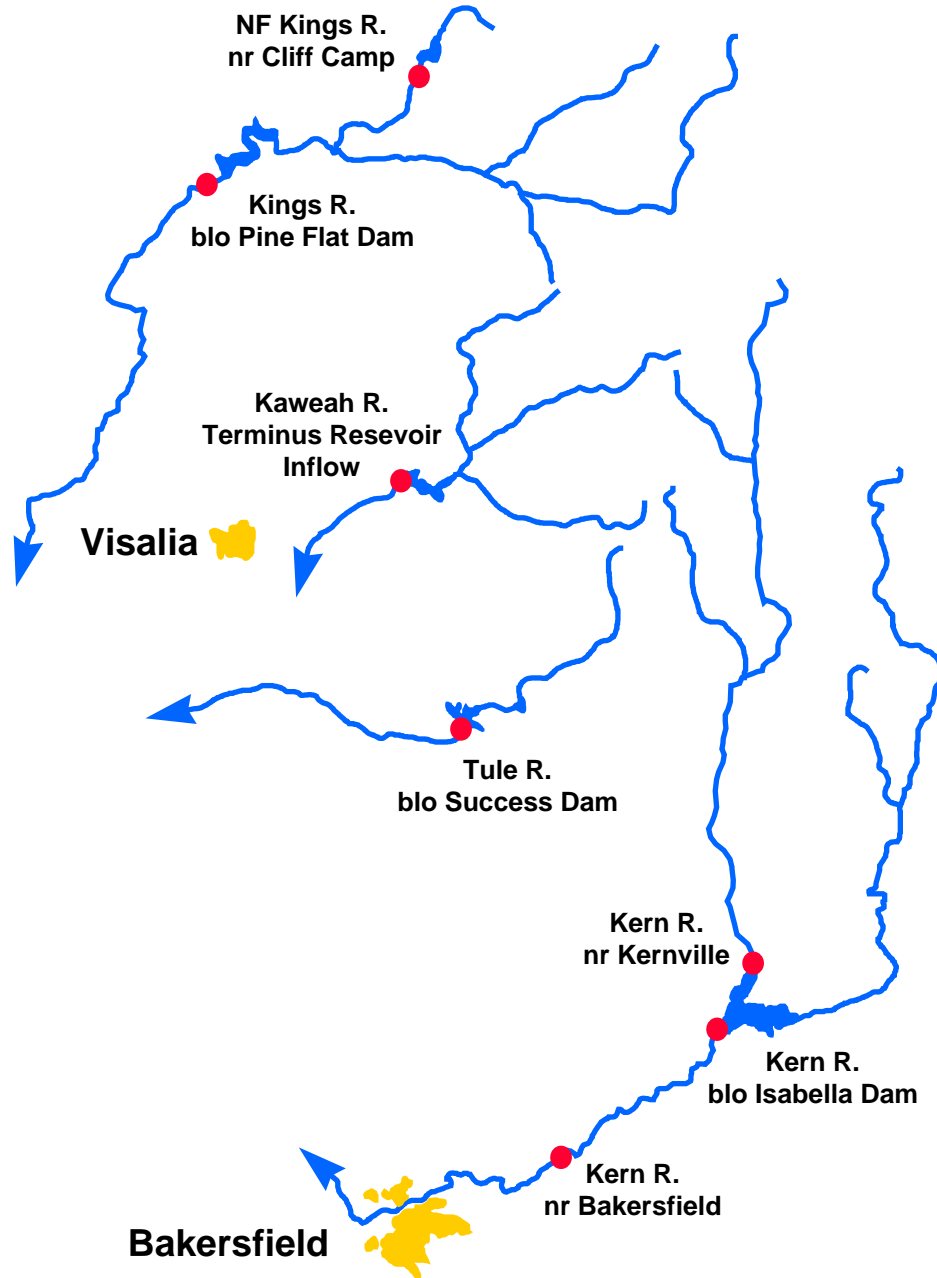
Basin Reservoir Storage Contents of Major Reservoirs in % of Average



Season Basin Runoff October 1 to Date



Tulare Basin



Water Supply Forecasts

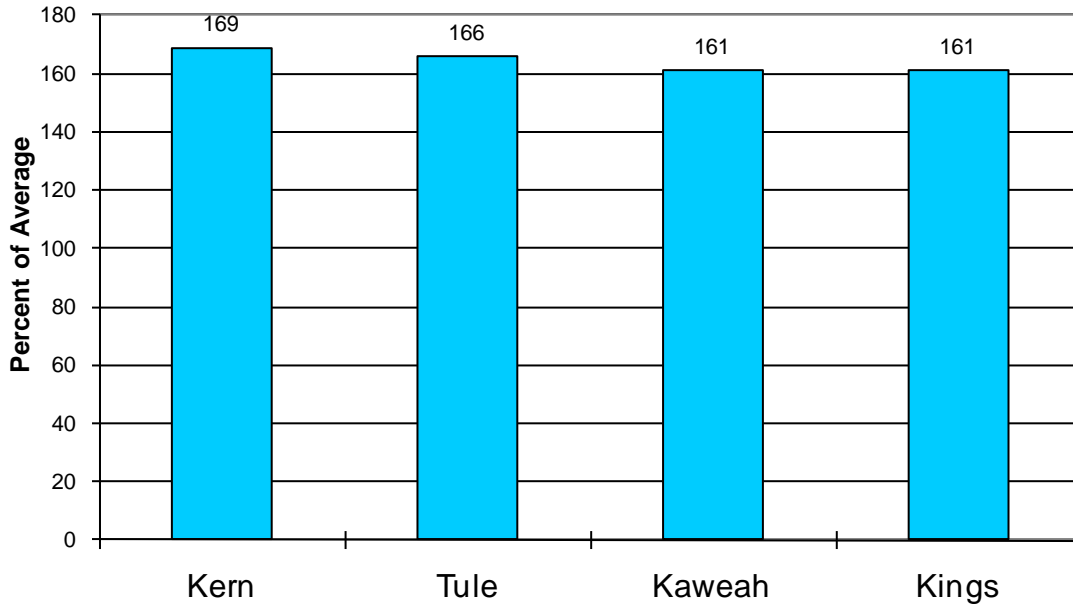
TULARE LAKE BASIN

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
Kern River						
Kernville, nr	Apr-Jul	525	132	700	400	398*
Isabella Dam, blo	Apr-Jul	650	135	850	475	480
Bakersfield, nr	Apr-Jul	675	138	875	500	490
Tule River						
Success Dam	Apr-Jul	80	121	120	50	66
Kaweah River						
Terminus Dam	Apr-Jul	400	138	525	300	290
North Fork Kings River						
Cliff Camp, nr	Apr-Jul	325	135	425	250	240*
Kings River						
Pine Flat Dam, blo	Apr-Jul	1750	140	2150	1330	1250

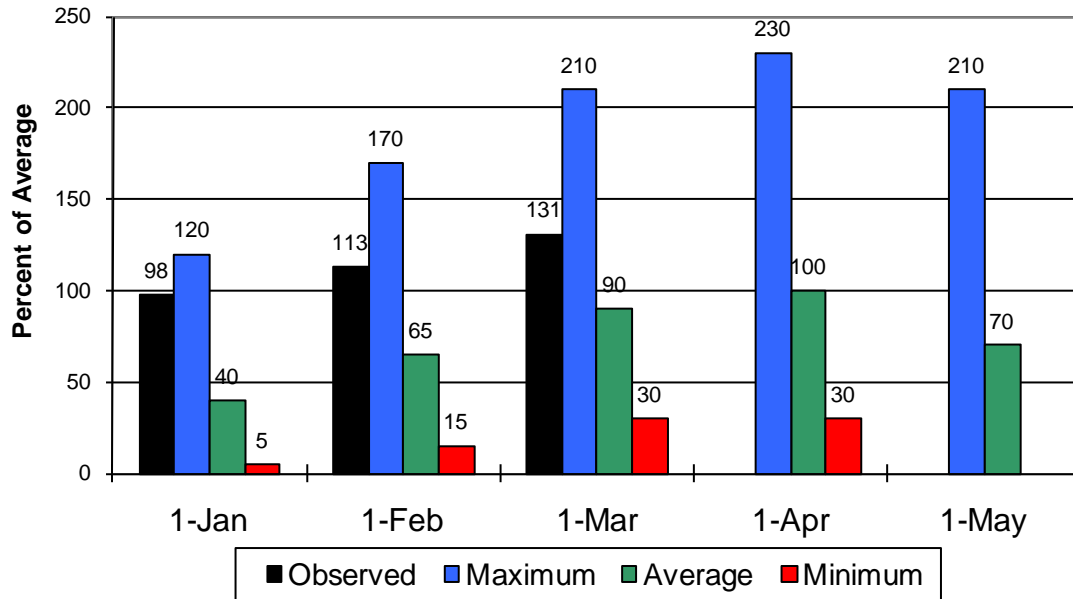
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Tulare Lake Basin

Seasonal Precipitation October 1 to Date



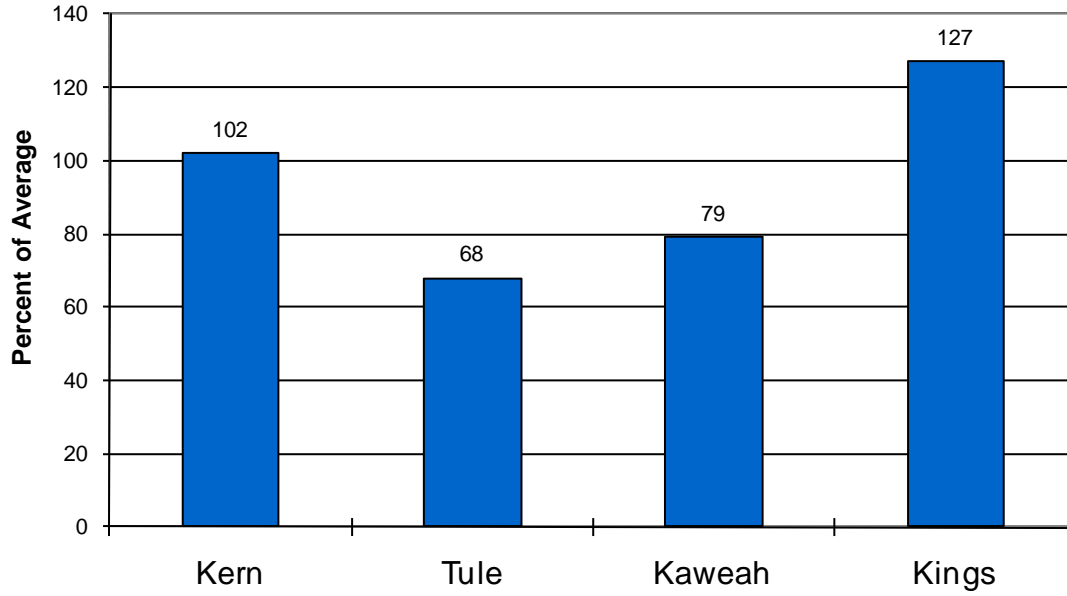
Seasonal Basin Snowpack Water Content in % of April 1 Average



Tulare Lake Basin

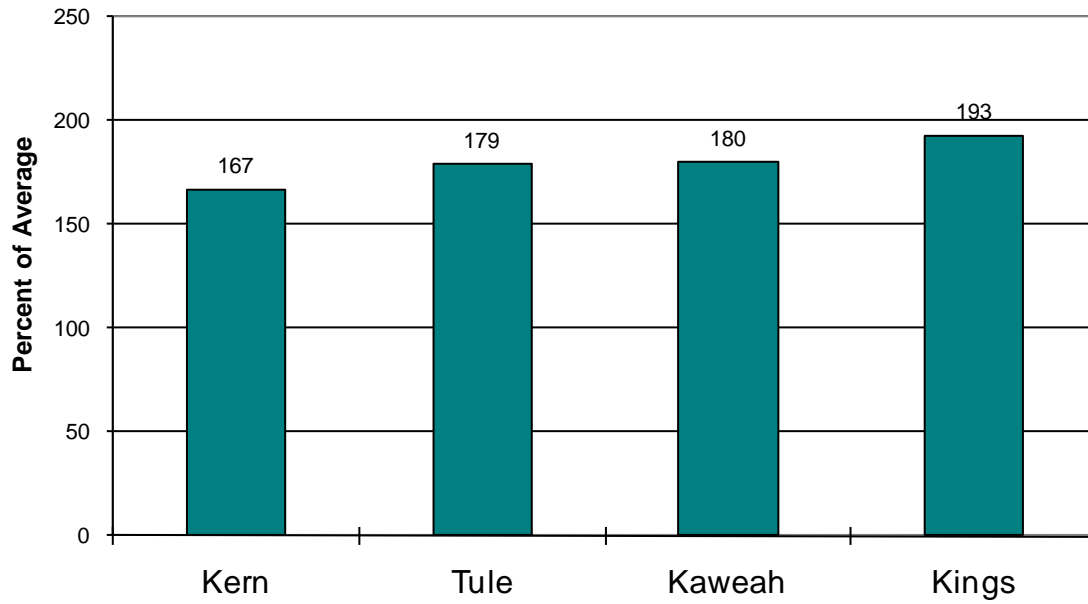
Basin Reservoir Storage

Contents of Major Reservoirs in % of Average

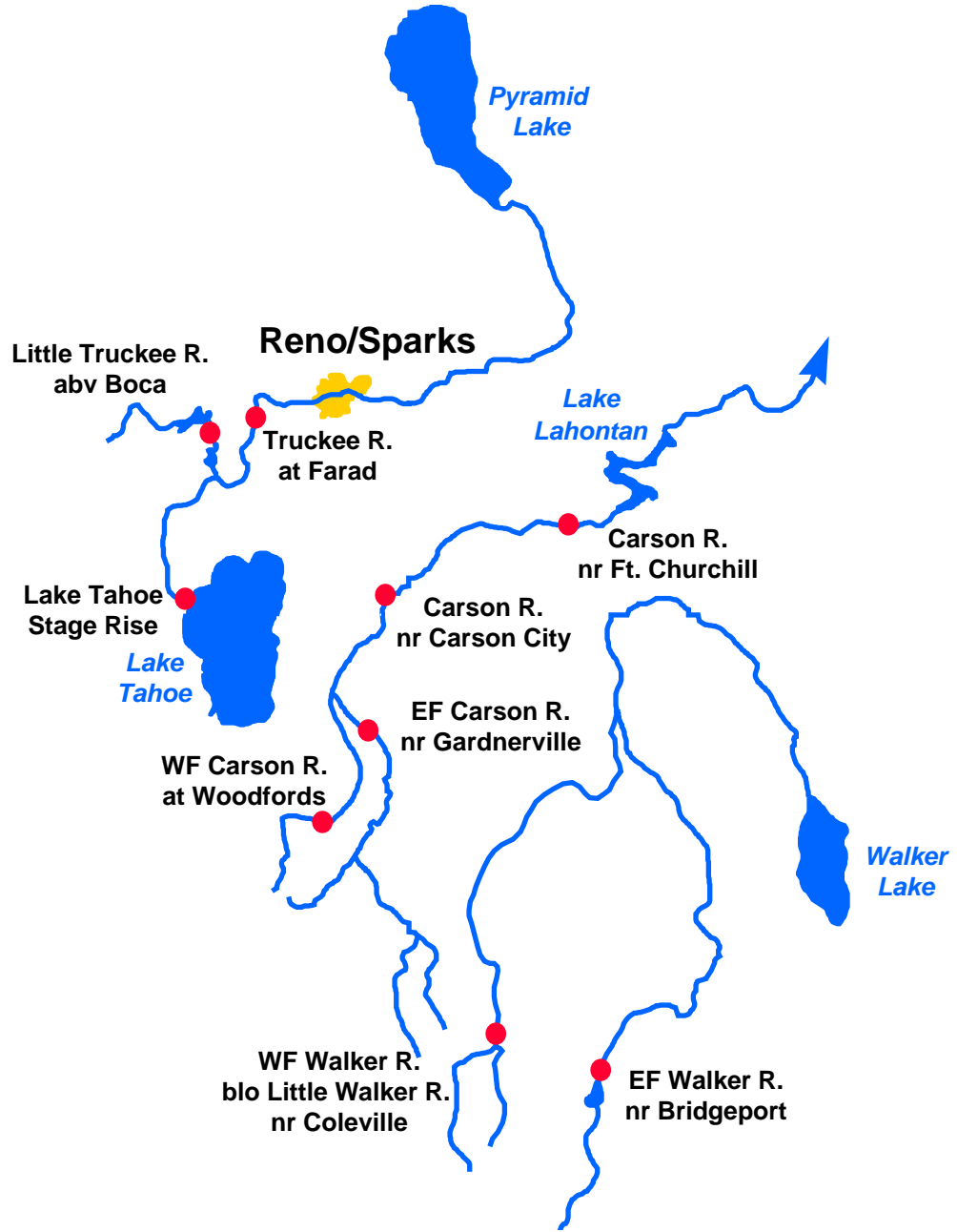


Seasonal Basin Runoff

October 1 to Date



East Side Sierra Nevada Basins



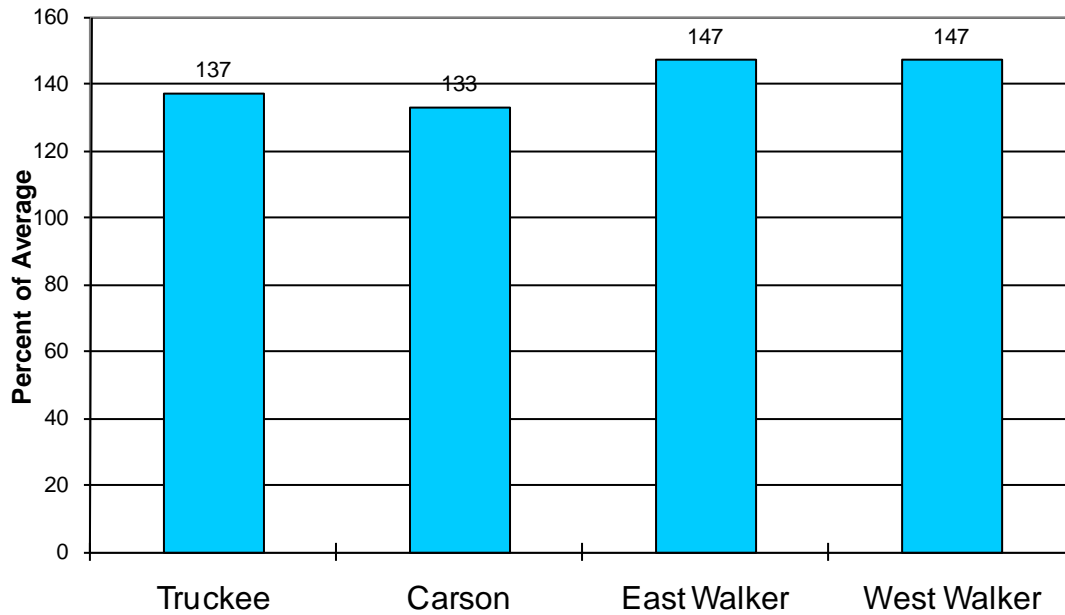
Water Supply Forecasts

EAST SIDE SIERRA NEVADA BASINS

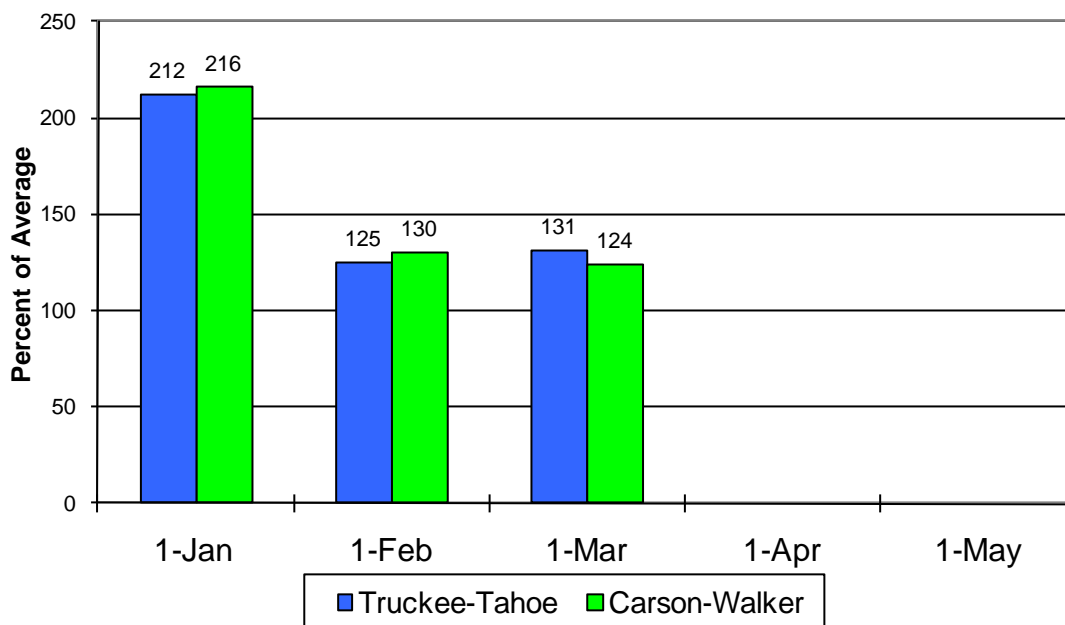
		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
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Truckee River						
Truckee River Lake Tahoe Stage Rise	Apr-High	1.70	123	2.6	0.85	1.38
Little Truckee River Stampede Dam	Apr-Jul	108	135	170	46	80
Truckee River Farad	Apr-Jul	340	131	505	174	260
Carson River						
East Fork Carson River Gardnerville, nr	Apr-Jul	250	132	345	156	189
West Fork Carson River Woodfords	Apr-Jul	74	132	100	48	56
Carson River Carson City, nr	Apr-Jul	260	138	390	138	188
Fort Churchill, nr	Apr-Jul	255	143	425	137	178
Walker River						
East Walker River Bridgeport, nr	Apr-Aug	100	149	137	63	67
West Walker River Ltl Walker, blo, Coleville, nr	Apr-Jul	215	138	275	155	156

East Side Sierra Nevada Basins

Seasonal Basin Precipitation October 1 to Date

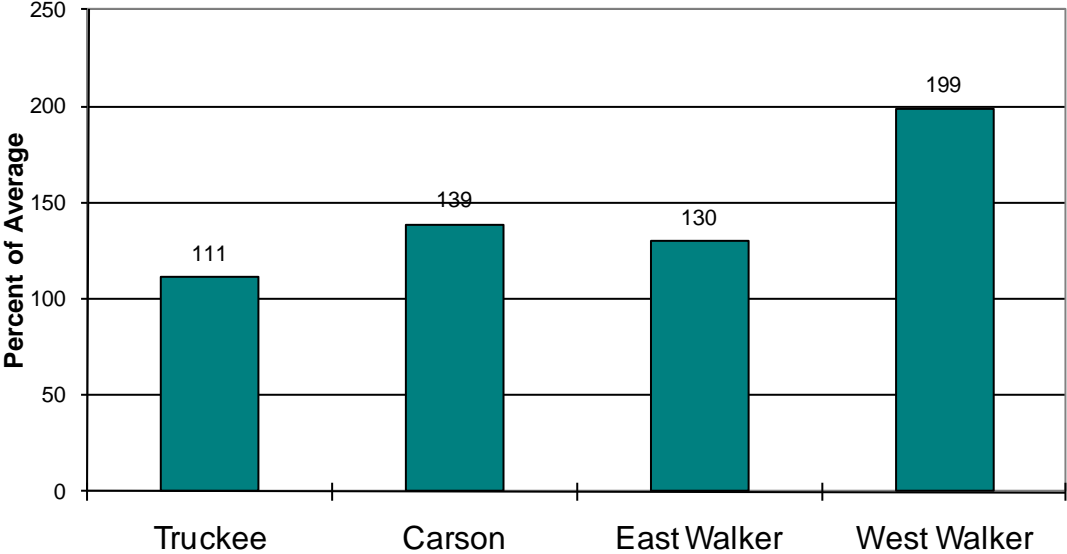


Basin Snowpack % of Average SWE to Date

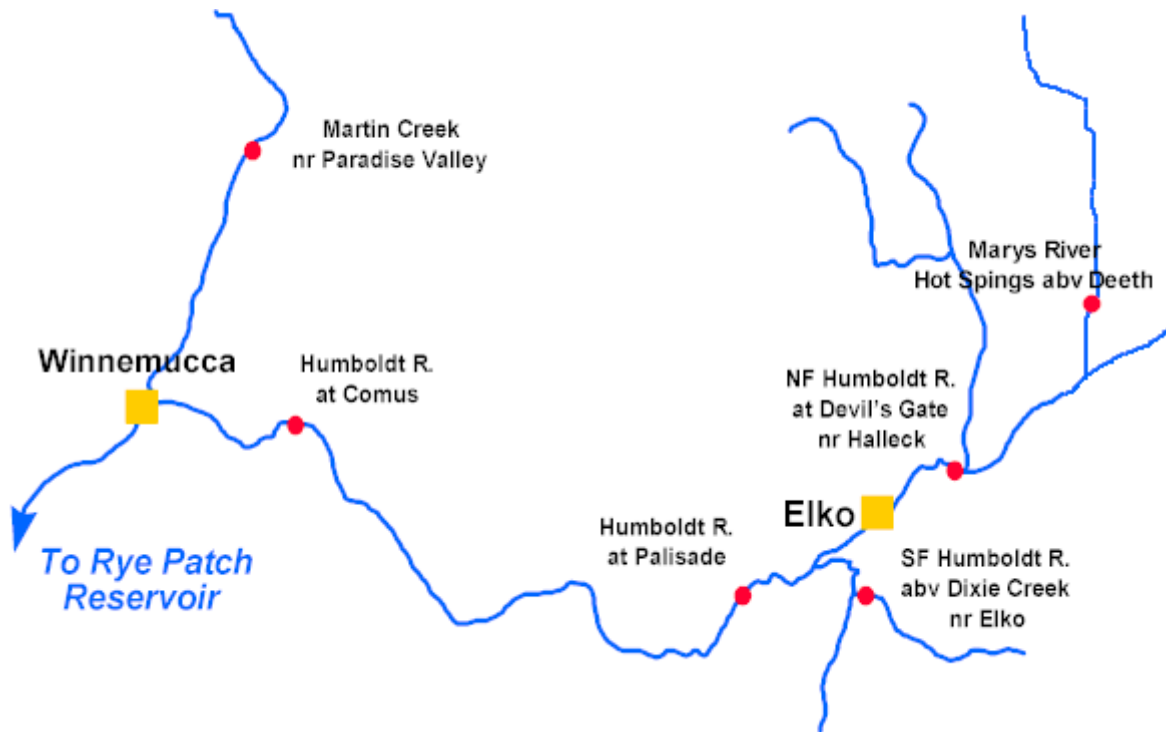


East Side Sierra Nevada Basins

Seasonal Basin Runoff October 1 to Date



Humboldt River Basin



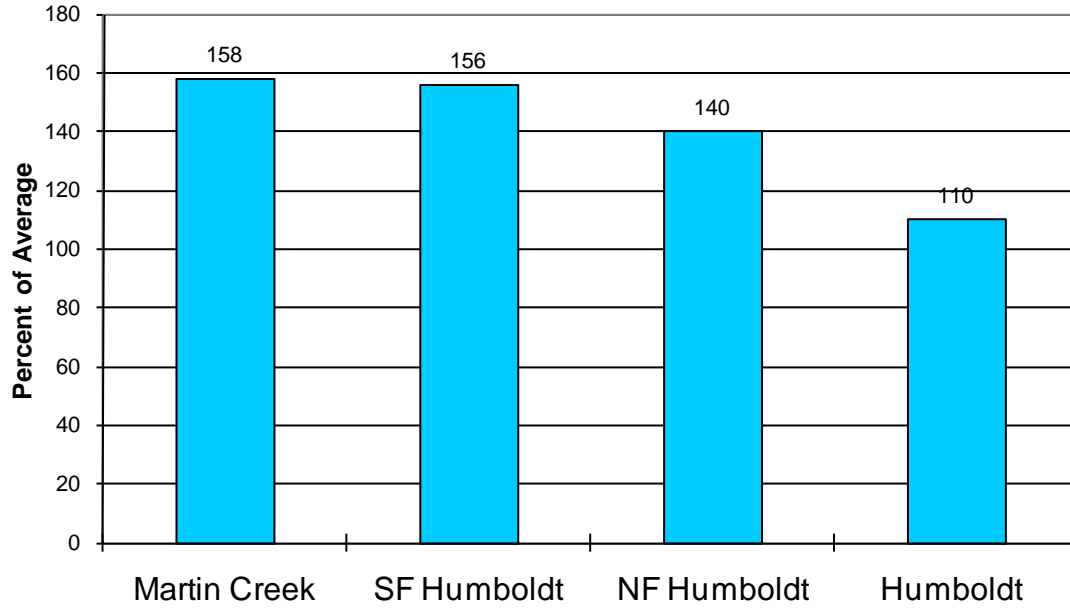
Water Supply Forecasts

		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
North Fork Humboldt River						
Devlis Gate, at, Halleck, nr	Apr-Jul	39	115	64	14.5	34*
South Fork Humboldt River						
Dixie Creek, abv, Elko, nr	Apr-Jul	81	107	137	25	76
Marys River						
Hot Springs, abv, Deeth, nr	Apr-Jul	45	115	62	28	39
Humboldt River						
Elko, nr	Apr-Jul	180	117	265	95	154
Palisade	Apr-Jul	300	120	405	195	250
Comus	Apr-Jul	260	116	380	141	225
Imlay, nr	Apr-Jul	200	106	340	60	188
Martin Creek						
Paradise Valley, nr	Apr-Jul	20	107	36	6.3	18.7

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Humboldt River Basin

Seasonal Basin Precipitation October 1 to Date



Basin Snowpack % of Average SWE to Date

