Water Supply Outlook

California and Northern Nevada

May
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

May 1, 2011

The month of April was atypical in regards to precipitation and snowmelt for California. The central and southern Sierra Nevada recorded much above average April runoff even though much below average precipitation fell during the month. However, seasonal precipitation is still much above average. Snow packs at the highest elevations remain excellent as of May 1st with the high altitude pack melting little during April. The snow pack remains extensive and deep with persistent cool weather slowing melt. The statewide May 1 snow course average was 144 percent of the April 1 average. This reflects a small decrease since last April 1. The combination of a very wet water year and much above average snow pack conditions should translate into ample water supplies for California.

From a regional perspective, the Trinity-Upper Sacramento region received the most precipitation during April, about 103 percent of the monthly average. The northern Sierra received 90 percent of an April average, the central Sierra--42 percent and the southern Sierra--48 percent. In terms of individual basins, the Pit River basin received the most precipitation during the month, about 180 percent, while the Kern recorded only 17 percent. Seasonal precipitation (October 1, 2010 to April 30, 2011) still is greatest in the south and ranges from 136 percent for the Upper Sacramento River basin to 154 percent for the Tule. It is about 112 percent of average for the Klamath basin and remains much above average for the east side Sierra Nevada and northern Nevada watersheds.

Snow melt was not significant in the Sierra Nevada due to a month dominated by cool temperatures. However, reduction of the percent snow water equivalent was noticeable at the lowest elevations. Measurements from snow courses, based on the May 1st surveys, show that the pack was 202 percent of average for the Upper Sacramento-northern Sierra, 189 percent for the central and 182 percent for the southern Sierra. Snow packs in the Tahoe-Truckee are about 197 percent of the average-to-date, the Carson-Walker at 162 percent and the Humboldt basin at 203 percent. It is 197 percent of the average-to-date for the Upper Klamath Lake basin.

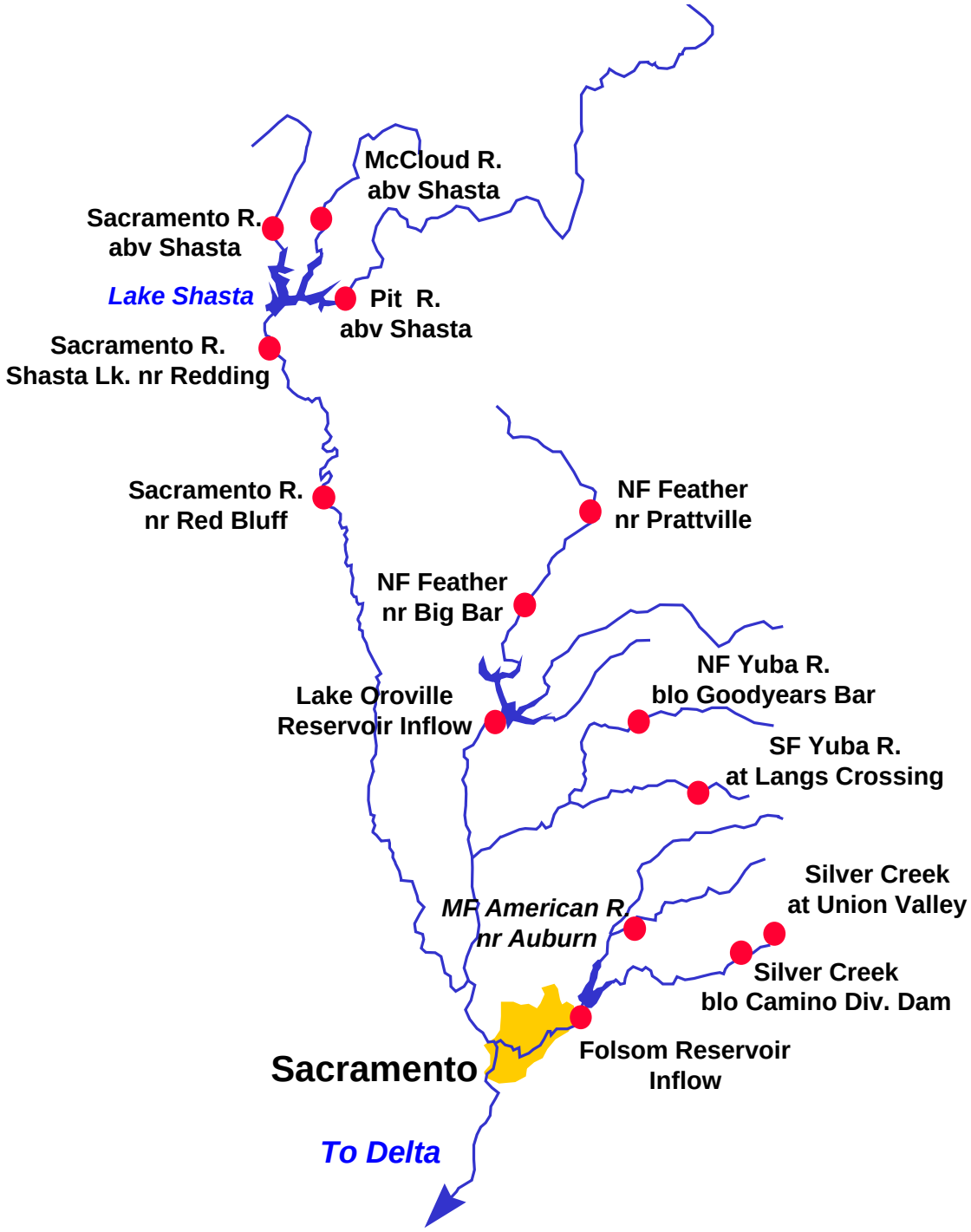
Flows for April in the Trinity-Sacramento, San Joaquin and Tulare regions were 163, 165 and 185 percent, respectively. April flows exceeded 200 percent for two rivers--the Cosumnes and the Kern. East side Sierra basins received 180 percent of an April average, and the Humboldt River at Palisade, 127 percent. The Upper Klamath Lake inflow recorded 96 percent of an April average.

There was a gain of about 0.925 million acre feet of storage during the month to reservoirs in the Sacramento, San Joaquin River and Tulare Lake watersheds, to end at 112 percent of average or 83 percent of capacity. Last year at this time, storage stood at 100 percent. Stored water in the Sacramento region was at 109 percent of average for the date (as opposed to 98 percent for the date last year), the San Joaquin at 116 percent (102 percent last year), and the Tulare Lake watershed at about 112 percent (103 percent last year). East-side Sierra reservoirs were at 126 percent of average. The lake level at Lake Tahoe stood at 6226.04 feet (or 3.04 feet above its natural rim altitude of 6223.0 feet) as of April 30. Usable storage was 369,700 acre-feet or 92 percent of average. It was 80,120 acre-feet (20 percent of average) at this time last year. Storage at Lahontan Reservoir in Nevada stands at 78 percent of average as of April 30 while Rye Patch Reservoir is at 65 percent (27 percent at this time last year). Storage at Upper Klamath Lake is about 104 percent of average.

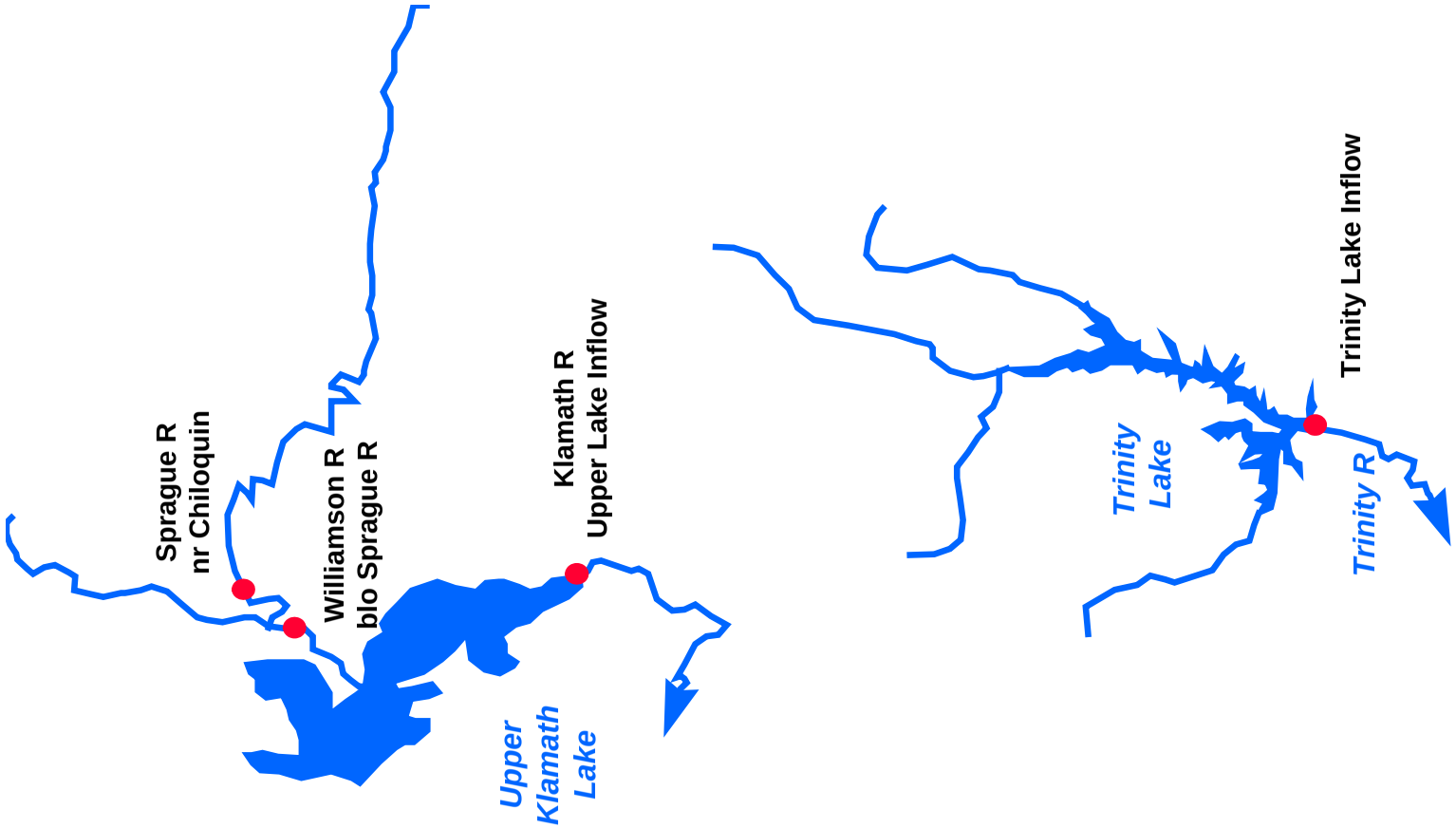
Spring runoff forecasts generally increased 3 to 12 percent from last month in the upper Sacramento/northern Sierra and decreased 0 to 8 percent in the central and southern Sierra Nevada. April through July runoff projections range from 127 percent of average for the Pit River basin to 188 percent for the Kern. Forecasts vary from 167 to 213 percent of average for the east side Sierra Nevada basins. May 1st forecasts were revised upward for the Humboldt basin to reflect the much above precipitation received in the basin during April. Forecasts range from 164 to 173 percent for points on the main stem Humboldt River. The May through September forecast for the Upper Klamath Lake inflow is 132 percent.

Mid-month updates are scheduled for selected east side Sierra Nevada forecast points and the Upper Klamath Lake Inflow. These will be posted on the CNRFC web page. This will be the last Water Supply Outlook for Water Year 2011.

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	May-Sep	350	131	400	300	267
Sprague River						
Chiloquin, nr	May-Sep	225	145	270	180	155
Upper Klamath Falls River						
Inflow	May-Sep	450	132	545	355	340
Lost River						
Gerber Reservoir Inflow	May-Jul	10.0	156	20	1.00	6.4
Clear Lake Reservoir Inflow	May-Jul	27	140	44	11.0	19.3
Scott River						
Fort Jones, nr	Apr-Jul	255	141	290	220	181
Trinity R River						
Trinity Lake	Apr-Jul	1000	157	1110	900	635

Trinity River – Inflow at Lewiston Lake Distribution (kAF) Exceedence

Probability	Oct-Apr	May	Jun	Jul	Aug	Sep	Apr-Jul	Water Yr
90%	1020	305	285	50	10	8	900	1710
50%	1020	355	335	65	20	15	1000	1810
10%	1020	405	385	85	28	25	1110	1920

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	1190	127	1320	1100	940**
Mccloud River						
Shasta Lake, abv	Apr-Jul	520	141	570	480	370
Sacramento River						
Delta	Apr-Jul	440	152	530	350	290
Shasta Dam	Apr-Jul	2400	134	2800	2000	1790
Bend Bridge, abv, Red Bluff, nr	Apr-Jul	3280	134	3600	2960	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	480	144	550	410	333*
Big Bar	Apr-Jul	1640	170	1880	1400	962*
Feather River						
Oroville Dam	Apr-Jul	3050	173	3420	2680	1760
YUBA RIVER ABOVE SMARTVILLE						
North Yuba River						
Goodyears Bar, blo	Apr-Jul	490	179	530	450	273*
South Yuba River						
Langs Crossing	Apr-Jul	395	176	460	330	225*
Yuba River						
Englebright Reservoir	Apr-Jul	1730	174	1960	1500	995
AMERICAN RIVER ABOVE FOLSOM RESERVOIR						
Middle Fork American River						
Auburn, nr	Apr-Jul	880	180	990	800	490*
Silver Creek						
Union Valley	Apr-Jul	175	179	195	160	98*
Camino Dam, blo	Apr-Jul	275	174	320	245	158*
American River						
Folsom Reservoir	Apr-Jul	2250	183	2530	2050	1230

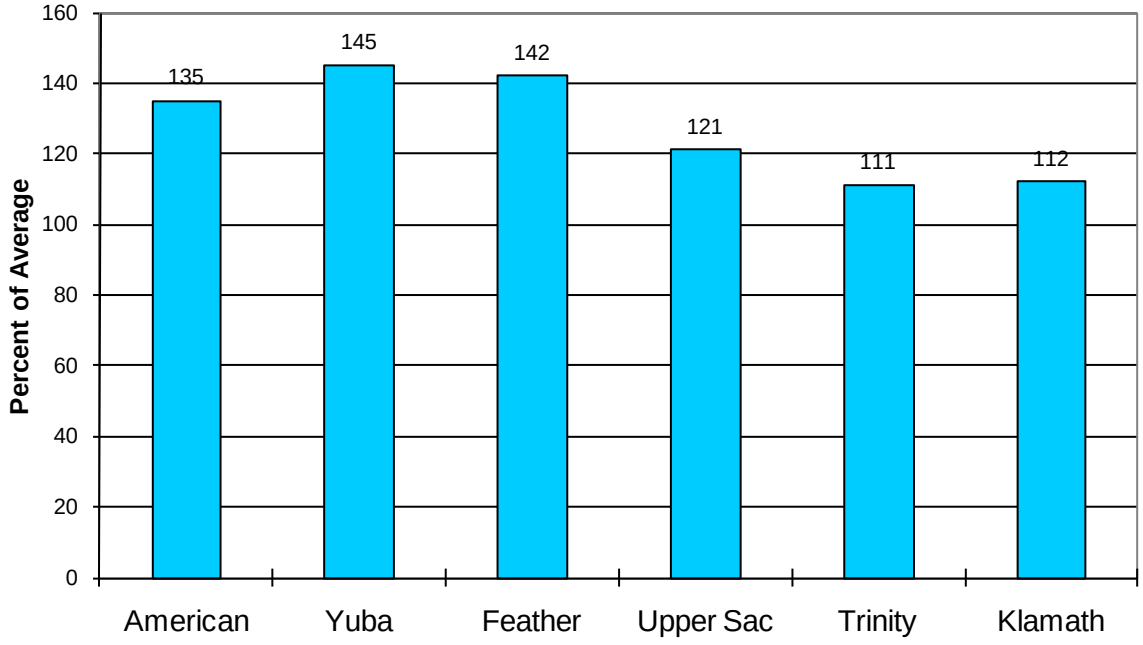
***30 Year Averages for 1971-2000 are incomplete. Those forecast points with an asterisk have incomplete averages, so 1961-1990 averages are listed. The new averages will be incorporated into this report when the complete data sets become available.**

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

Sacramento/Trinity/Klamath River Basins

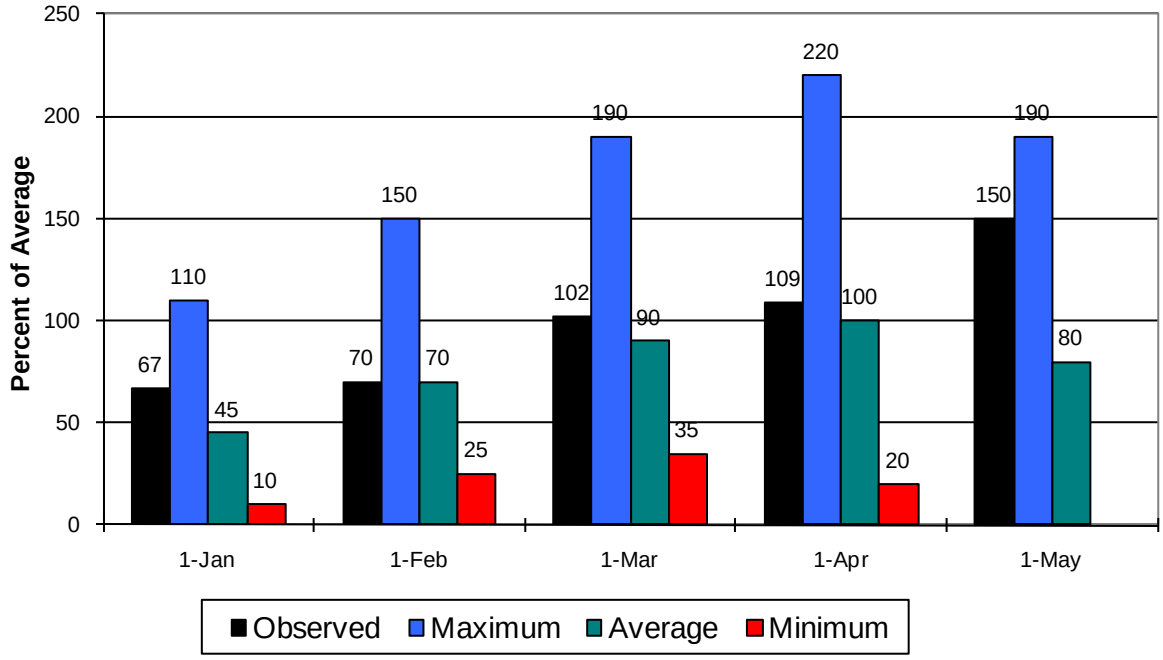
Seasonal Basin Precipitation

October 1 to Date



Seasonal Basin Snowpack

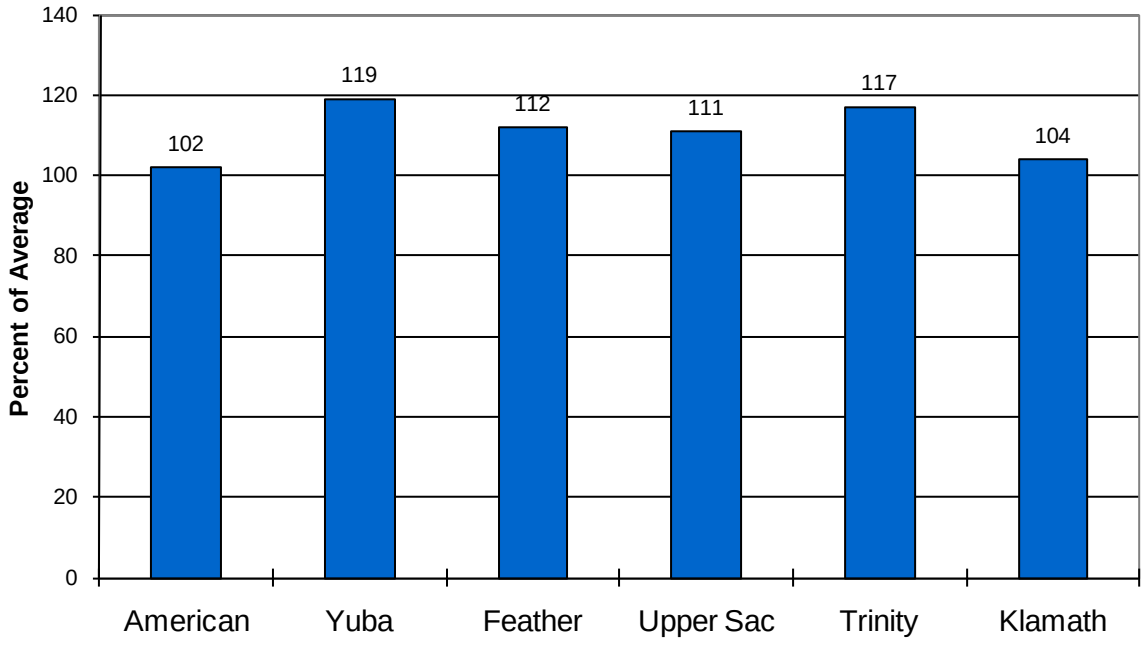
Water Content in % of April 1 Average



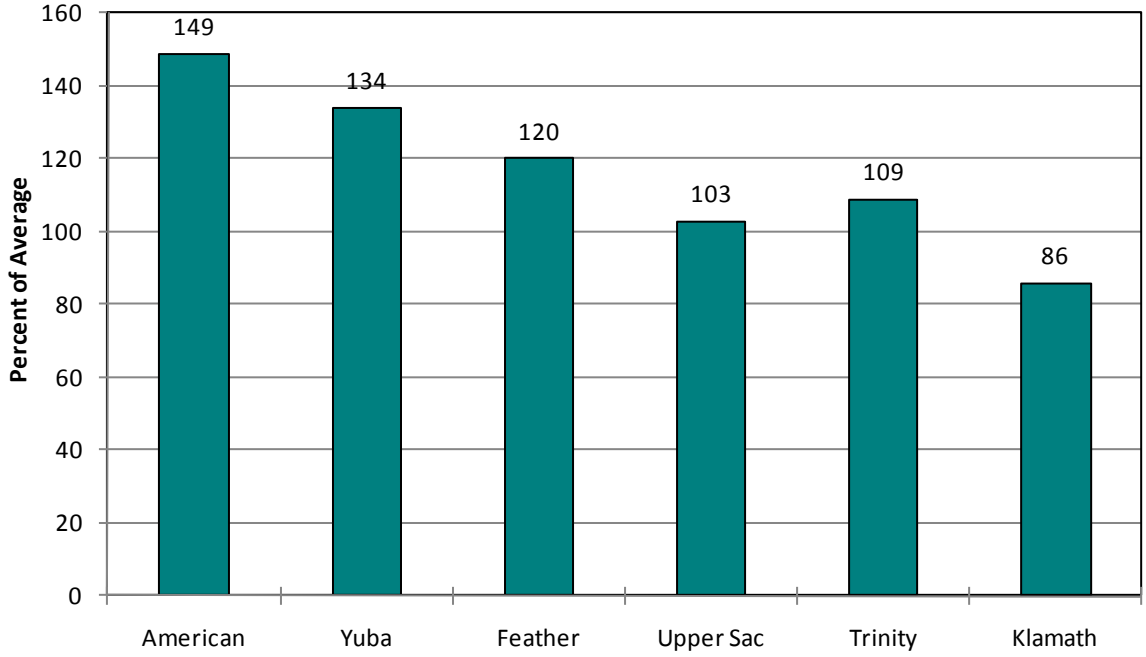
Sacramento/Trinity/Klamath River Basins

Basin Reservoir Storage

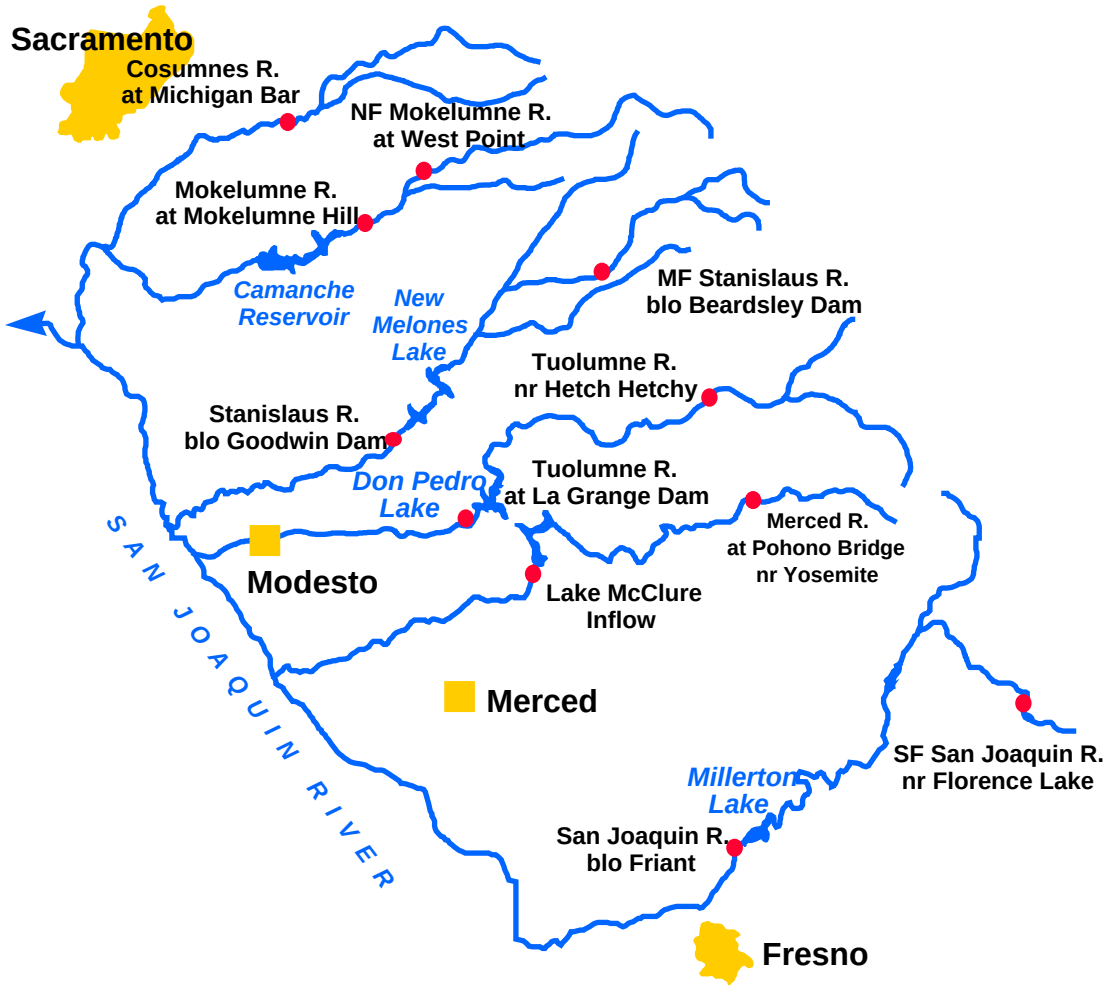
Contents of Major Reservoirs in % of Average



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 Lk, nr	Apr-Jul	310	161	370	280	192*
San Joaquin River						
Millerton Lk	Apr-Jul	2200	173	2400	2000	1270
Merced River						
Pohono Bridge, at, Yosemite, nr	Apr-Jul	640	178	700	550	360*
Merced Falls, blo	Apr-Jul	1100	171	1230	980	645
Tuolumne River						
Hetch Hetchy, nr	Apr-Jul	980	164	1100	900	596*
La Grange, nr	Apr-Jul	2030	165	2300	1900	1230
Middle Fork Stanislaus River						
Beardsley Dam, blo	Apr-Jul	540	169	600	480	320*
Stanislaus River						
New Melones Dam	Apr-Jul	1150	165	1280	1050	695
North Fork Mokelumne River						
West Point	Apr-Jul	670	161	730	580	416*
Mokelumne River						
Pardee Reservoir	Apr-Jul	750	163	810	700	460
Cosumnes River						
Michigan Bar	Apr-Jul	260	211	290	230	123

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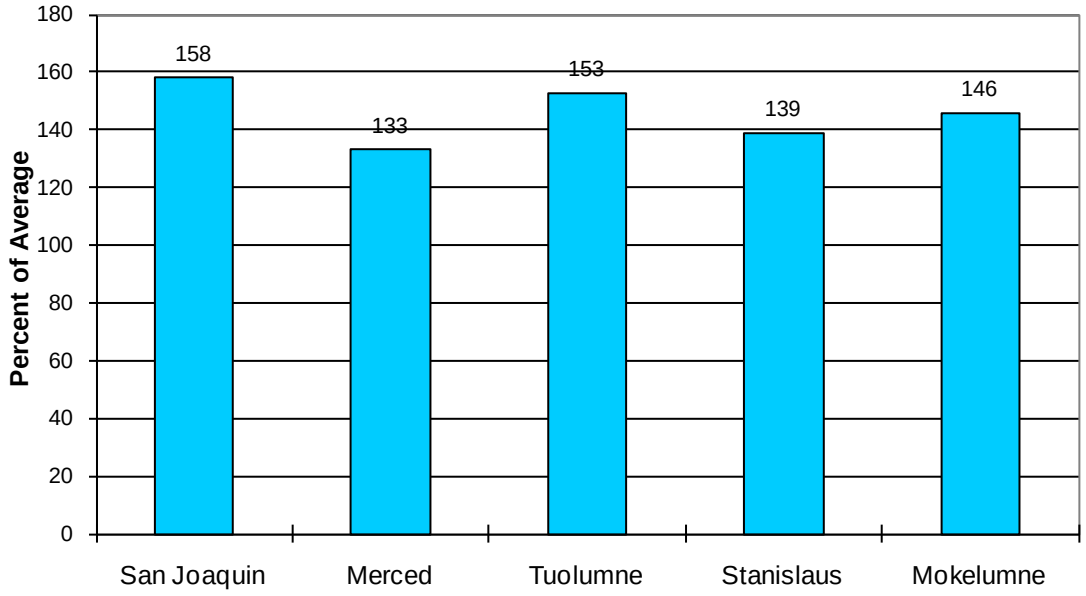
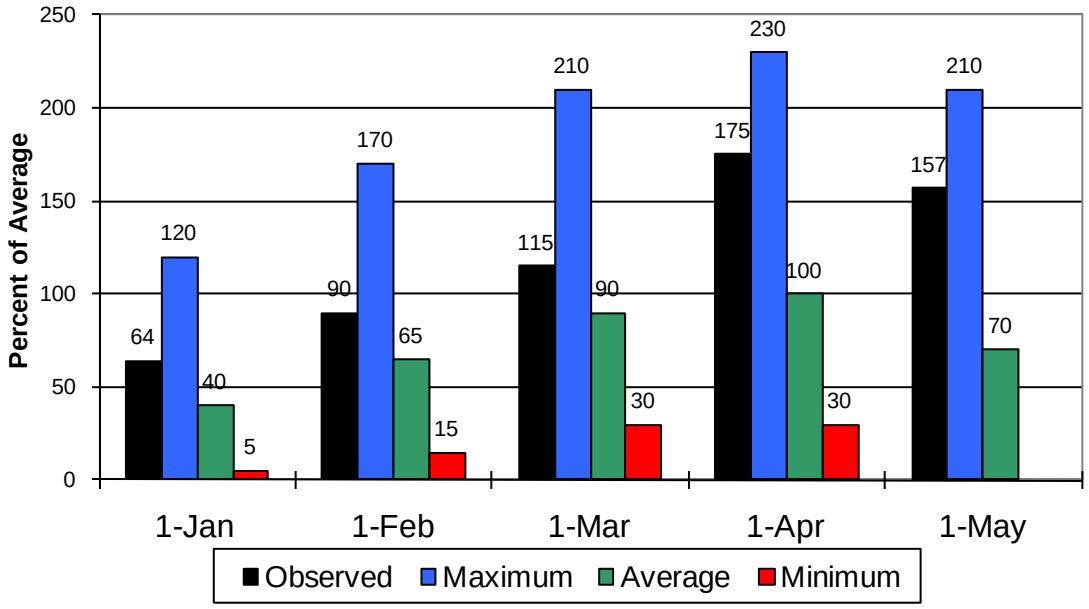
San Joaquin Basin

Seasonal Basin Precipitation
October 1 to Date

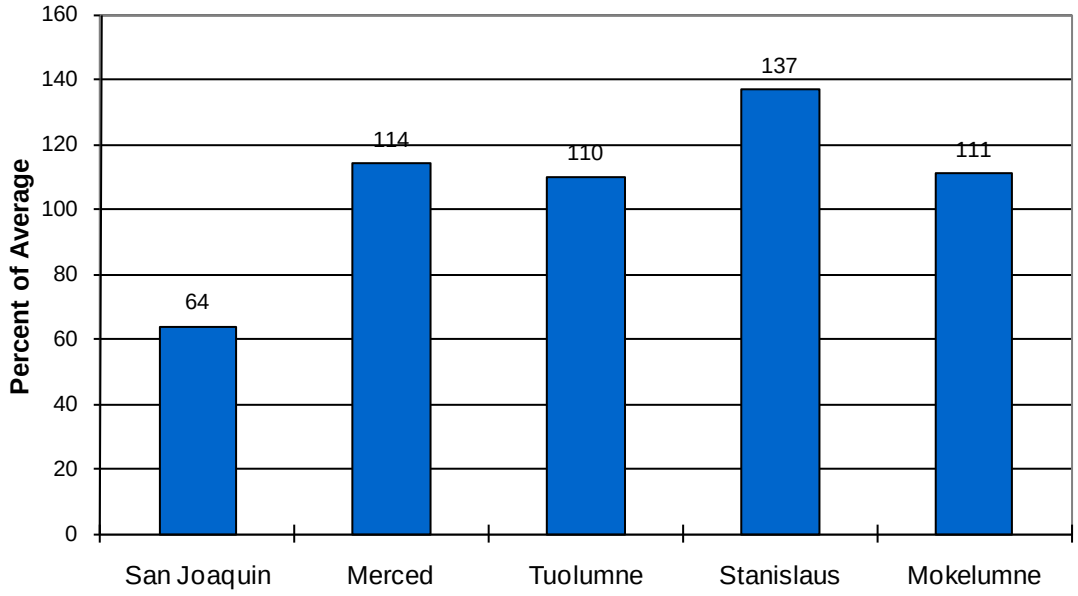


Seasonal Basin Snowpack
Water Content in % of April 1 Average

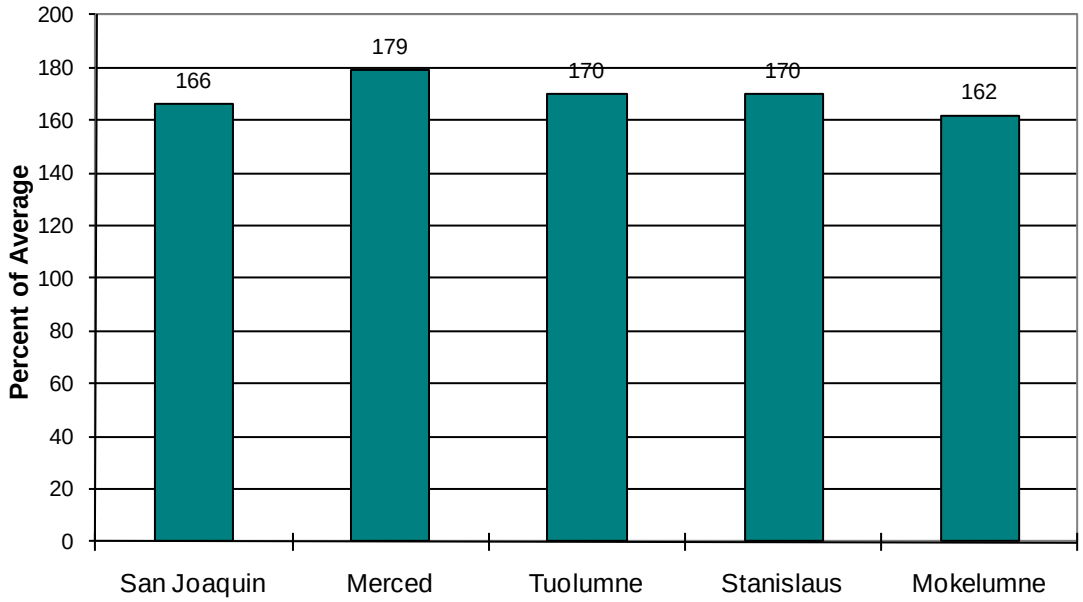


San Joaquin Basin

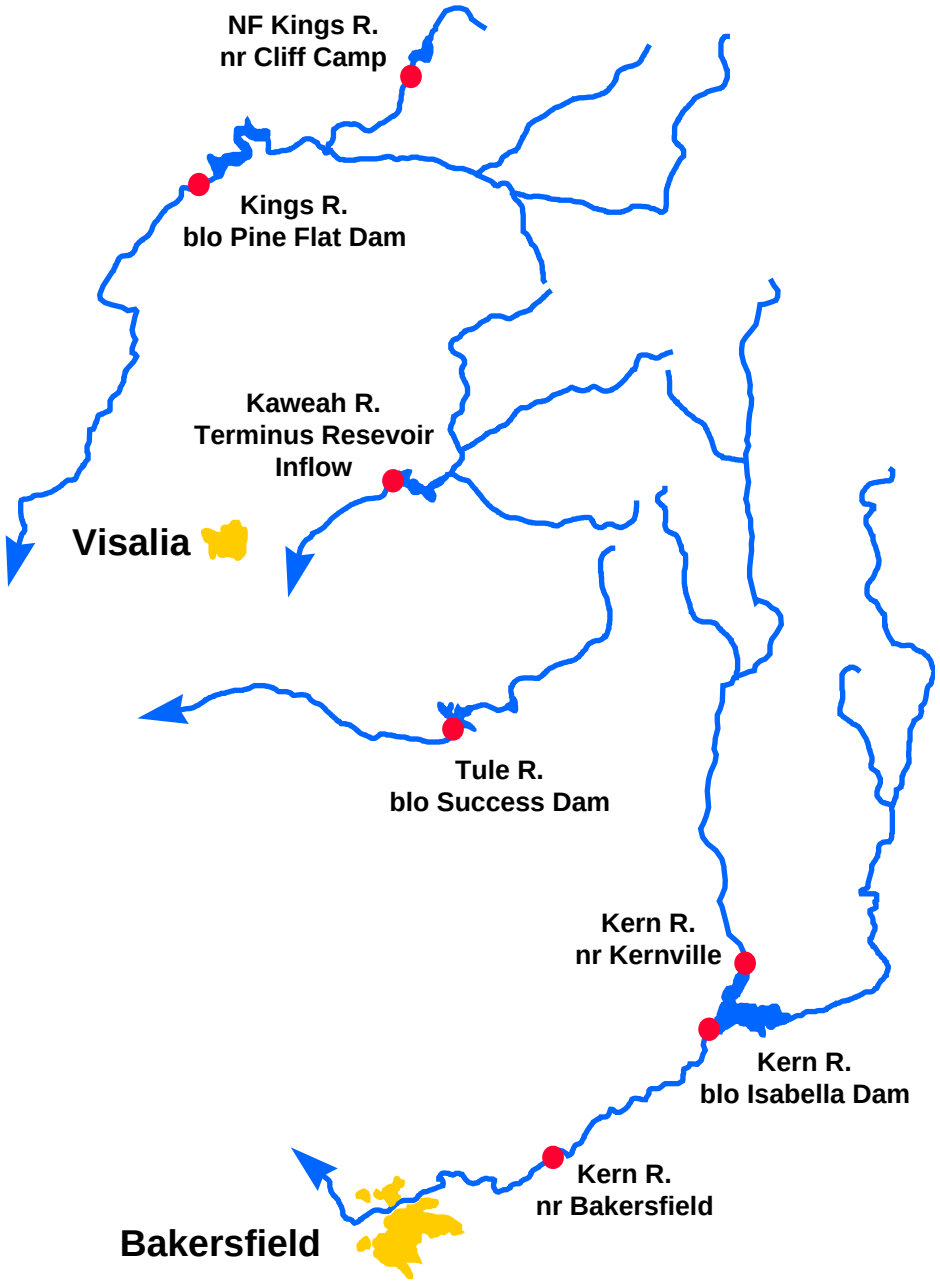
Basin Reservoir Storage
Contents of Major Reservoirs in % of Average



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	700	176	760	600	398*
Isabella Dam, blo	Apr-Jul	900	188	1000	750	480
Bakersfield, nr	Apr-Jul	930	190	1030	760	490
Tule River						
Success Dam	Apr-Jul	115	174	140	95	66
Kaweah River						
Terminus Dam	Apr-Jul	500	172	550	430	290
North Fork Kings River						
Cliff Camp, nr	Apr-Jul	410	171	500	350	240*
Kings River						
Pine Flat Dam, blo	Apr-Jul	2130	170	2300	1950	1250

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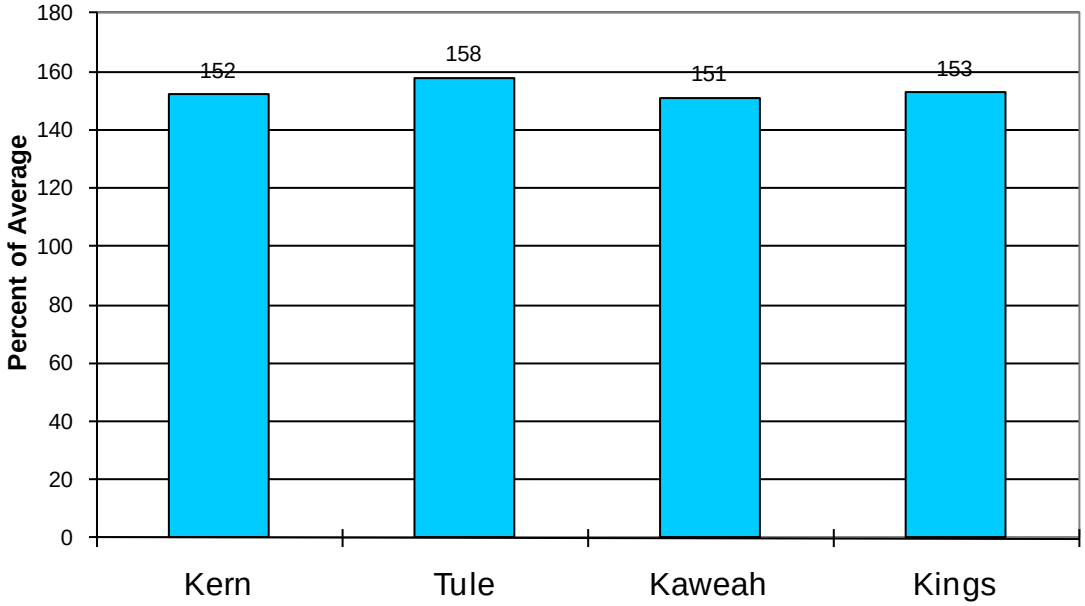
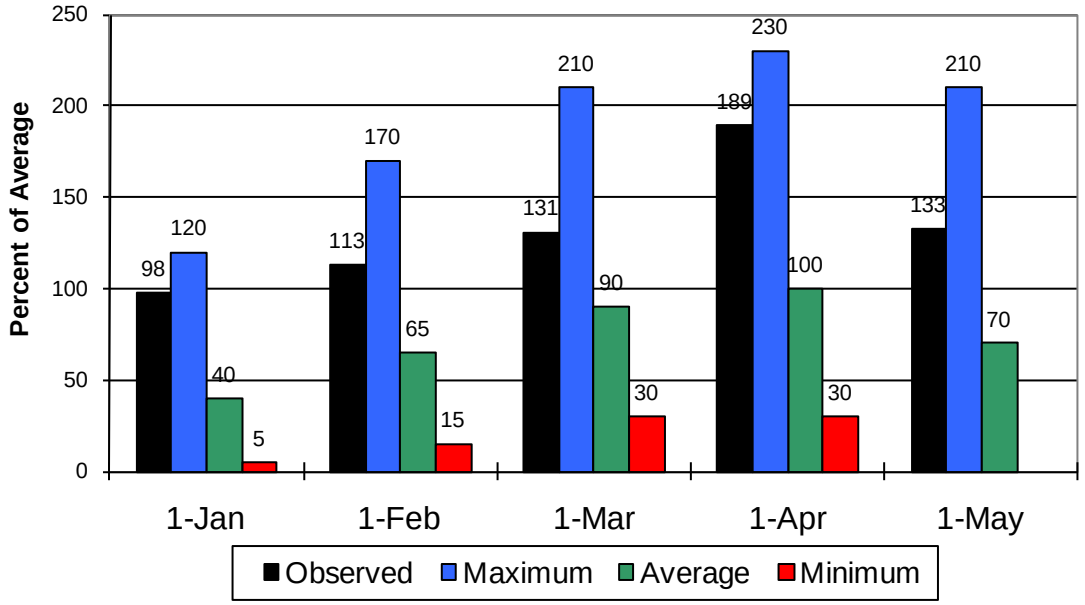
Tulare Lake Basin

Seasonal Precipitation
October 1 to Date



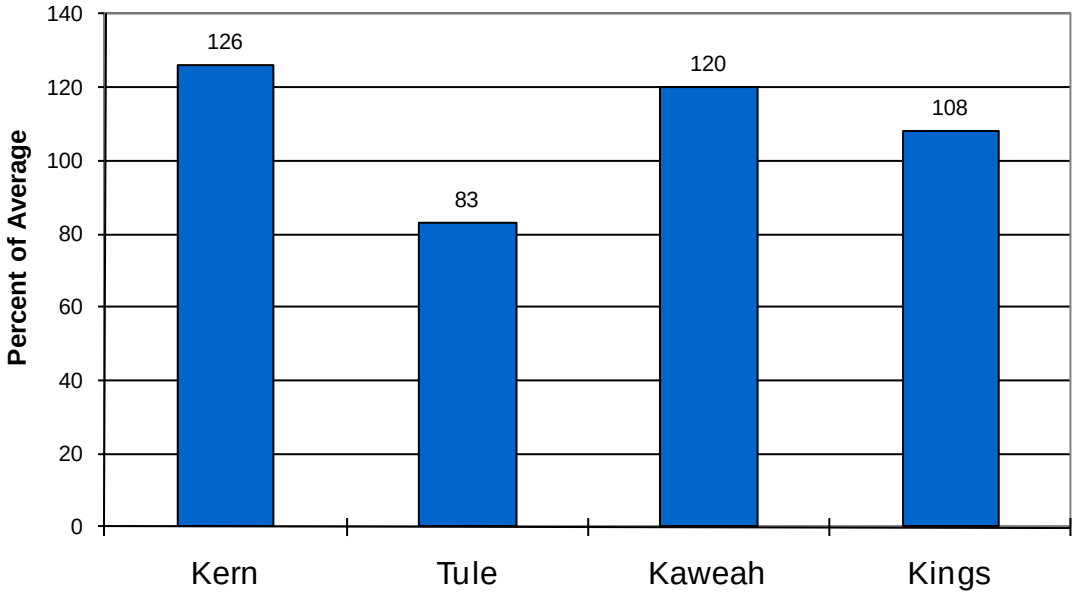
Seasonal Basin Snowpack
Water Content in % of April 1 Average



Tulare Lake Basin

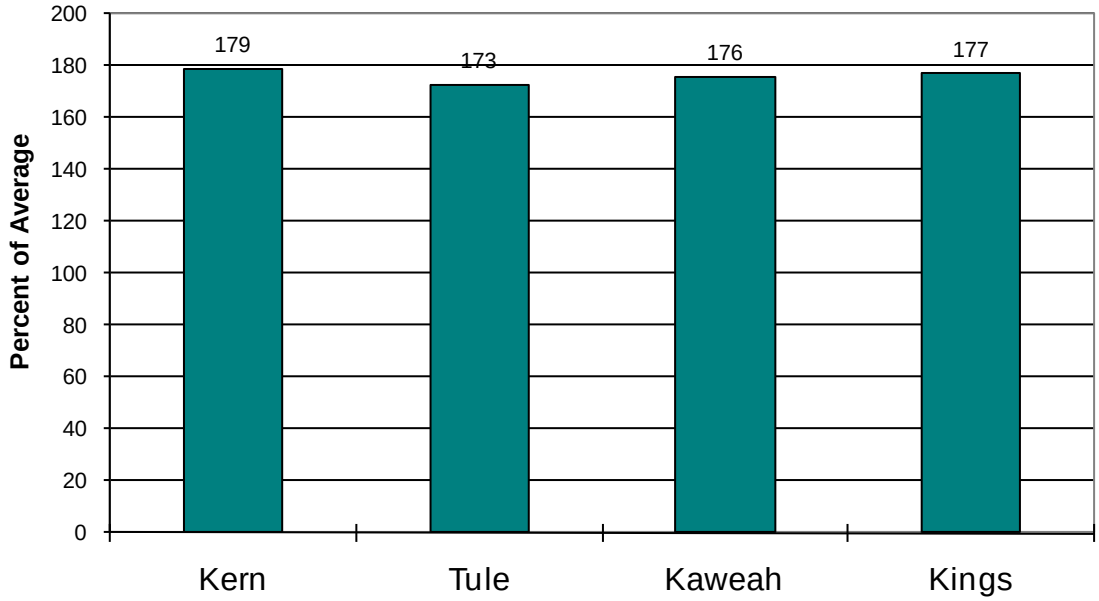
Basin Reservoir Storage

Contents of Major Reservoirs in % of Average

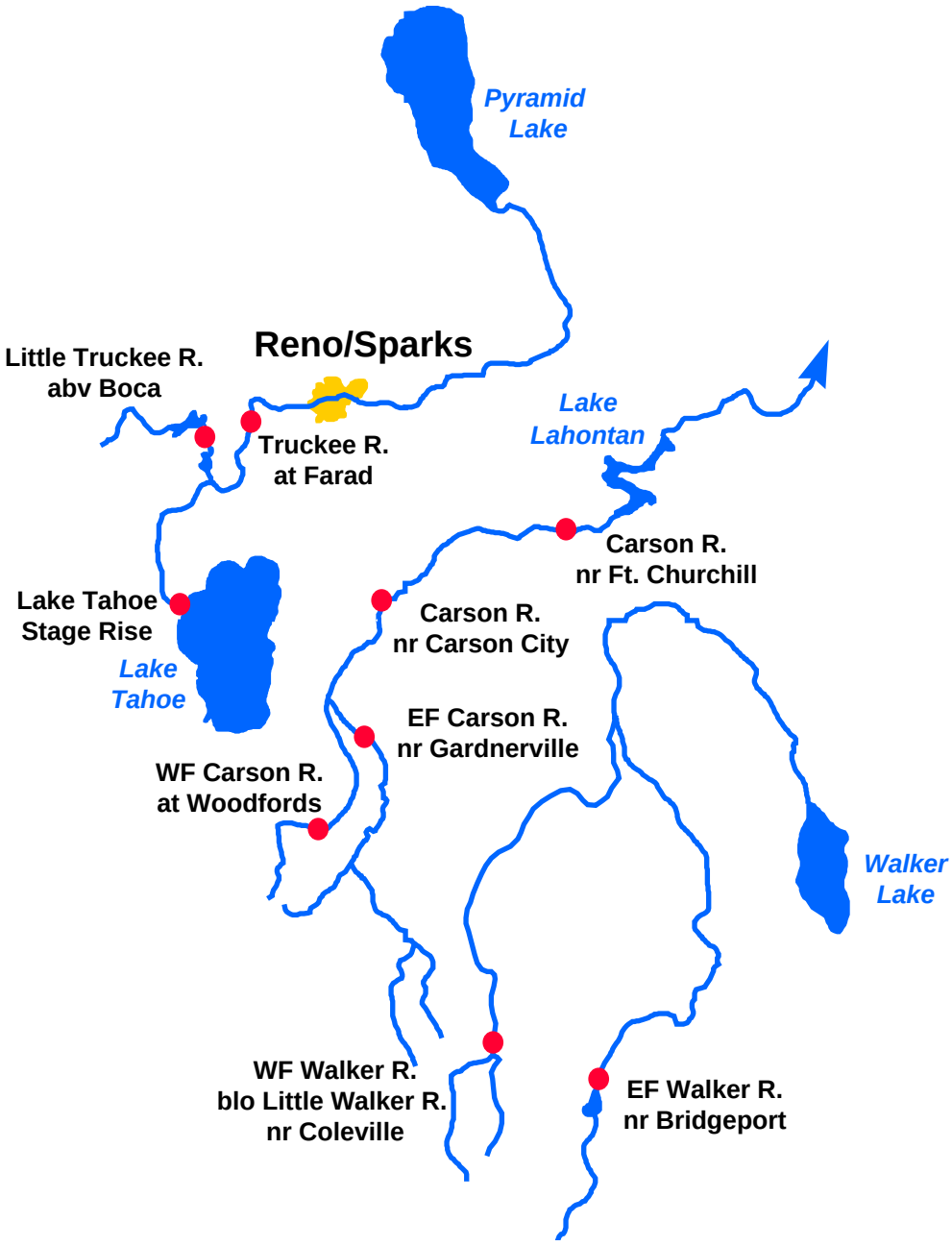


Seasonal Basin Runoff

October 1 to Date



East Side Sierra Nevada Basins



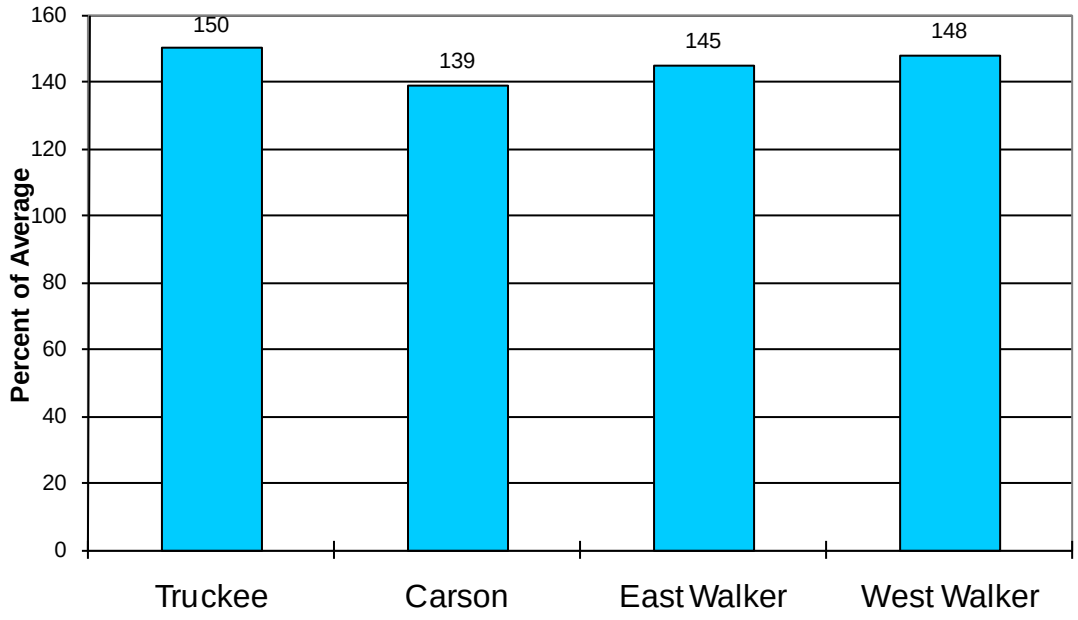
Water Supply Forecasts

EAST SIDE SIERRA NEVADA BASINS

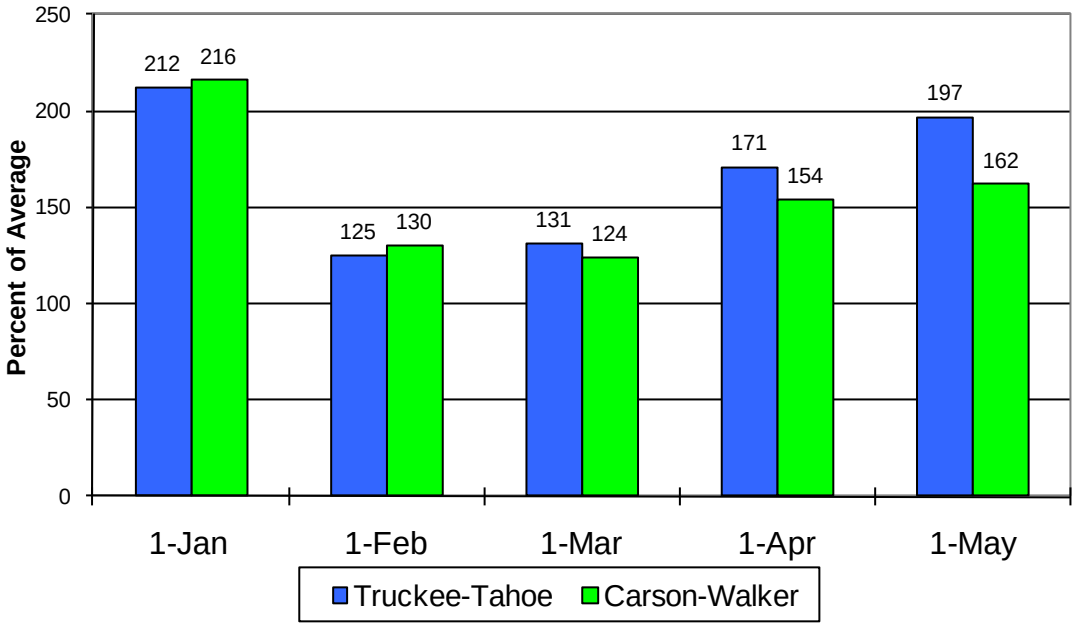
		Most Prob Vol KAF	Most Prob Vol %Norm	Reas Max Vol KAF	Reas Min Vol KAF	30 Year Avg KAF
Truckee River						
Truckee River						
Lake Tahoe Stage Rise	Apr-High	2.5	181	2.8	2.2	1.38
Little Truckee River						
Stampede Dam	Apr-Jul	145	181	199	91	80
Truckee River						
Farad	Apr-Jul	490	188	560	420	260
Carson River						
East Fork Carson River						
Gardnerville, nr	Apr-Jul	335	177	395	275	189
West Fork Carson River						
Woodfords	Apr-Jul	100	179	114	86	56
Carson River						
Carson City, nr	Apr-Jul	370	197	445	300	188
Fort Churchill, nr	Apr-Jul	380	213	490	285	178
Walker River						
East Walker River						
Bridgeport, nr	Apr-Aug	140	209	175	105	67
West Walker River						
Ltl Walker, blo, Coleville, nr	Apr-Jul	260	167	290	230	156

East Side Sierra Nevada Basins

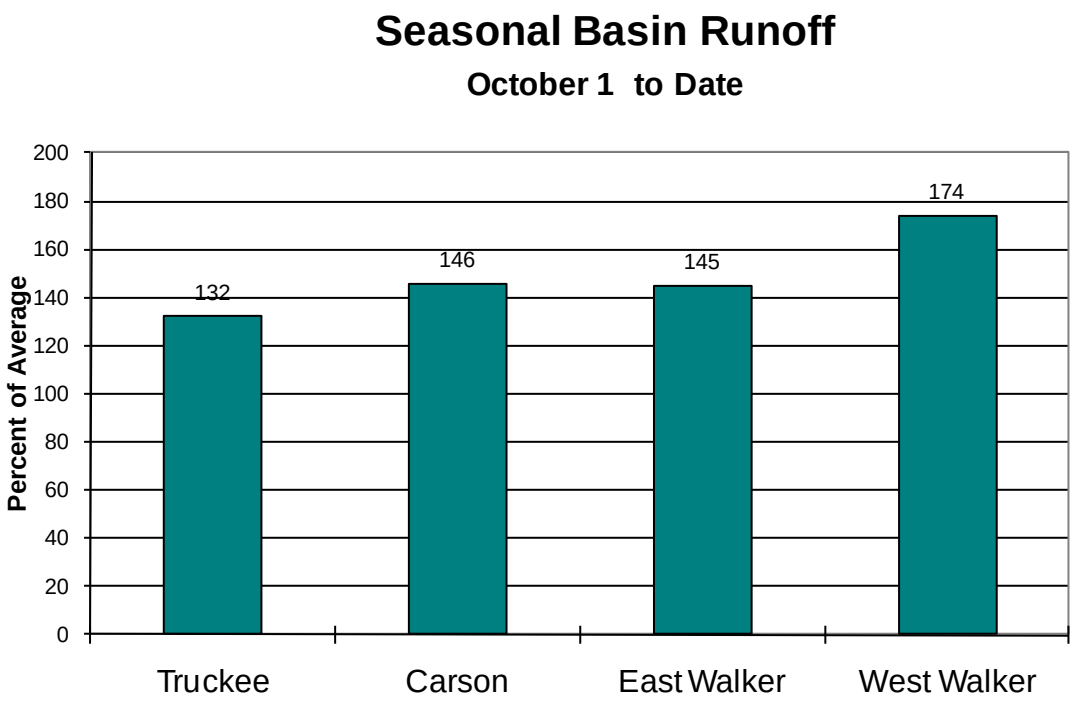
Seasonal Basin Precipitation
October 1 to Date



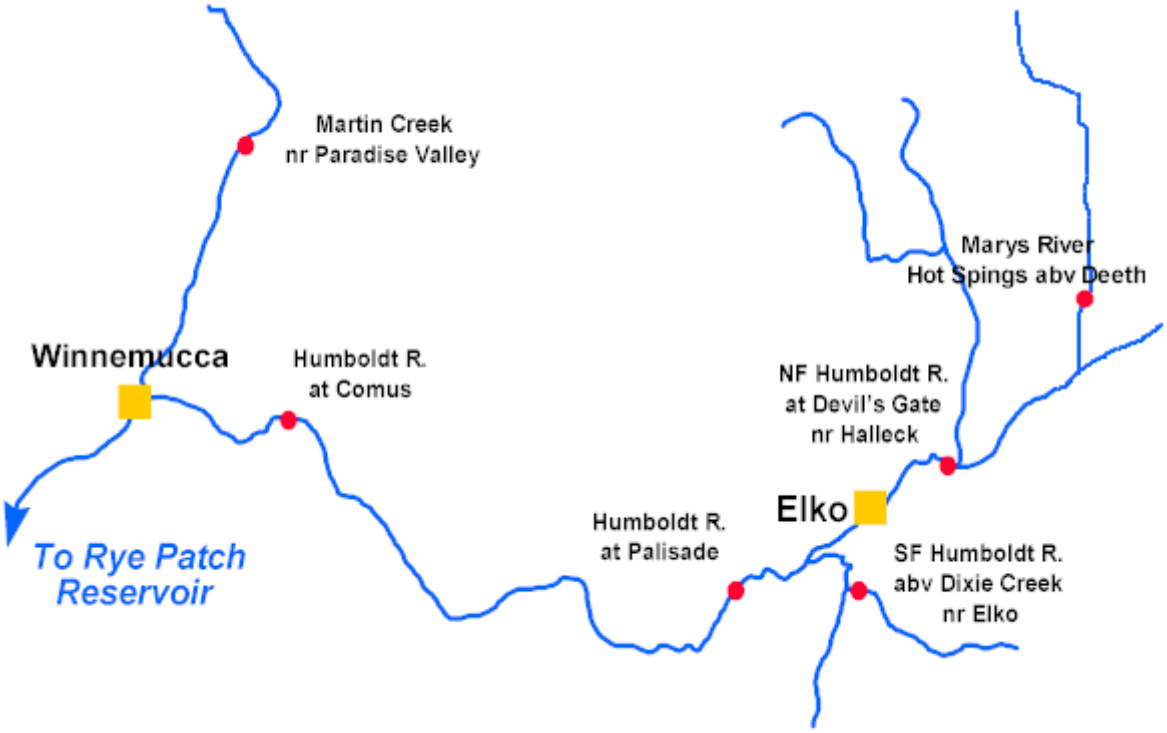
Basin Snowpack
% of Average SWE to Date



East Side Sierra Nevada Basins



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						
Devils Gate, at, Halleck, nr	Apr-Jul	60	176	73	47	34*
South Fork Humboldt River						
Dixie Creek, abv, Elko, nr	Apr-Jul	125	164	178	72	76
Marys River						
Hot Springs, abv, Deeth, nr	Apr-Jul	68	174	90	46	39
Humboldt River						
Elko, nr	Apr-Jul	260	169	310	210	154
Palisade	Apr-Jul	410	164	500	320	250
Comus	Apr-Jul	370	164	460	280	225
Imlay, nr	Apr-Jul	325	173	450	200	188
Martin Creek						
Paradise Valley, nr	Apr-Jul	35	187	43	27	18.7

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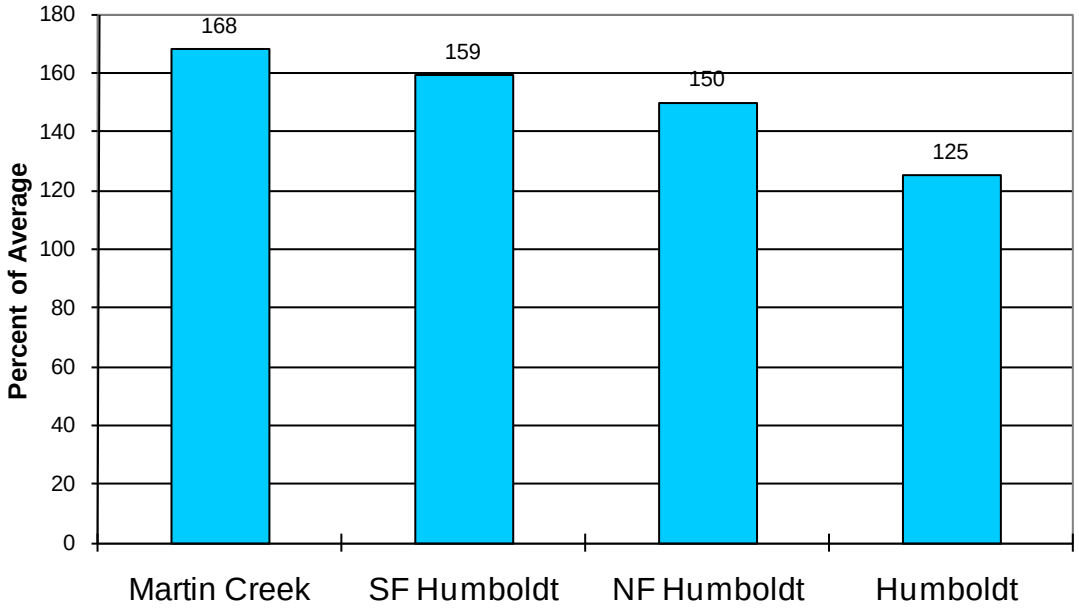
Humboldt River Basin

Seasonal Basin Precipitation
October 1 to Date



Basin Snowpack
% of Average SWE to Date