COLORADO
WATER SUPPLY CONDITIONS UPDATE

FROM THE OFFICE OF THE STATE ENGINEER: COLORADO DIVISION OF WATER RESOURCES
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December 2012

The Surface Water Supply Index (SWSI) developed by this office and the U.S.D.A. Natural Resources Conservation Service (NRCS) is used as an indicator of mountain-based water supply conditions in the major river basins of the state. It is based on snowpack, reservoir storage, and precipitation for the winter period of November through April (December 1 through May 1). During the winter period, snowpack is the primary component in all basins except the South Platte basin, where reservoir storage is given the most weight.

The statewide SWSI values for November (December 1) range from a high value of -2.8 in the South Platte Basin to a low value of -3.8 in the Gunnison and Colorado basins. November conditions range from moderate drought to severe drought in all basins. Each basin had a very low snowpack with probabilities of nonexceedance (PN) all less than 10[1]. The December 1 snowpack represents very early snow season conditions and there is still time for improvement prior to spring runoff. Water year accumulated precipitation (October and November) continued to be below normal (historical median) in all basins.

The dramatic change in SWSI value in the South Platte Basin compared to last month is partially due to the transition from summer to winter SWSI and reliance on snowpack rather than streamflow in SWSI computation.

The following SWSI values were computed for each of the seven major basins for December 1, 2012, and reflect the conditions during the month of November. Additional information about SWSI calculations and the NRCS National Water and Climate Center SWSI by HUC are included on Page 10.

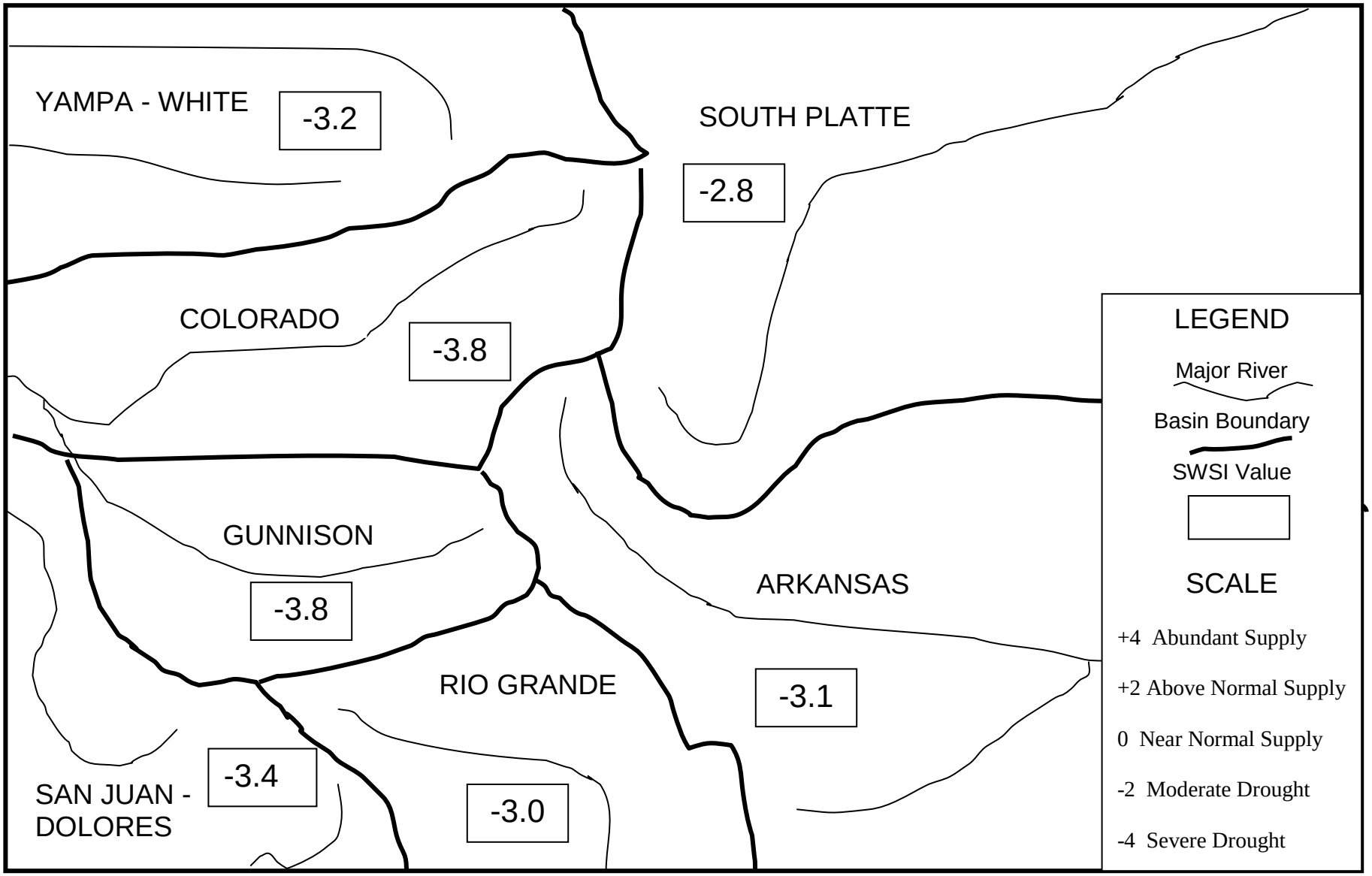
Basin	December 1 SWSI	Change from Previous Month	Change from Previous Year
South Platte	-2.8	-3.2	-4.3
Arkansas	-3.1	-1.3	-2.9
Rio Grande	-3.0	-0.1	-3.4
Gunnison	-3.8	-0.4	-2.8
Colorado	-3.8	-0.9	-4.3
Yampa/White	-3.2	0.2	-4.2
San Juan/Dolores	-3.4	0.0	-2.8

SWSI Scale

-4	-3	-2	-1	0	1	2	3	4
Severe Drought		Moderate Drought		Near Normal Supply		Above Normal Supply		Abundant Supply

[1] At least 90 percent of recorded values are higher than a PN of 10.

SURFACE WATER SUPPLY INDEX FOR COLORADO



December 1, 2012

Basinwide Conditions Assessment

The SWSI value for the month was -2.8. December 1 snowpack is very low with a nonexceedance probability (PN) of 1. Cumulative storage in the major plains reservoirs (Julesburg, North Sterling, and Prewitt) is at 34% of capacity. Cumulative storage in the major upper-basin reservoirs (Cheesman, Eleven Mile, Spinney, and Antero) is at 82% of capacity.

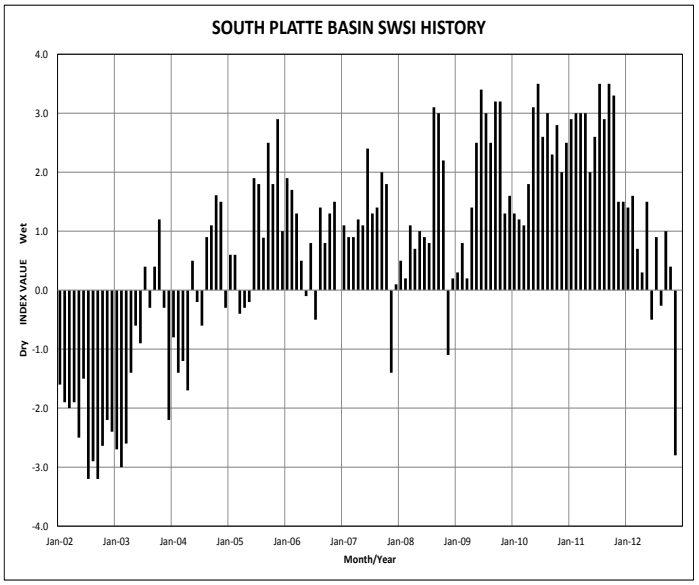
November felt like a very dry, very warm, and very long month in the South Platte basin. Aside from an event on November 10 and 11 that produced between 0.1 and 0.33 inches of precipitation over the basin, no significant precipitation occurred. Temperatures also remained well above the seasonal norms.

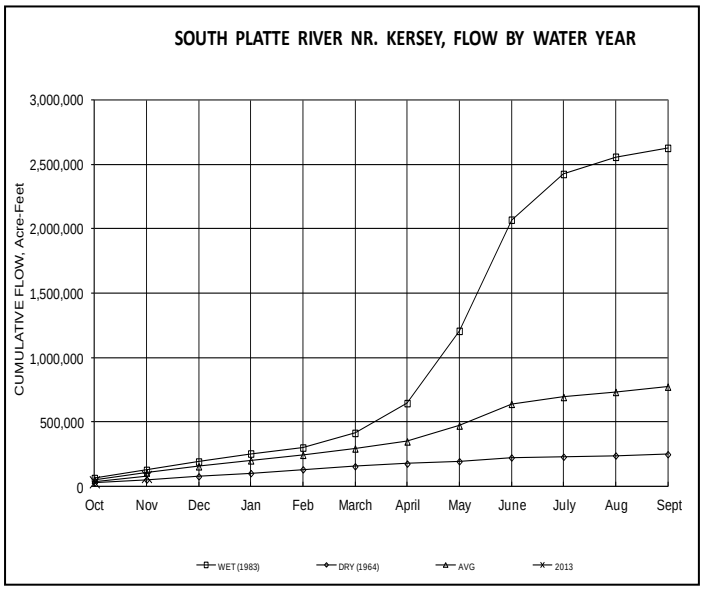
The mainstem and tributary river calls moved from direct flow to storage rights with the start of the new Irrigation Year on November 1, but still mirrored the warm and dry weather conditions as they were more senior than normal for the month. Another sign of the warm dry conditions were several requests to divert direct flow water rights for irrigation of winter wheat, alfalfa, and grass hay or sod. These requests were examined individually to determine if the water would be beneficially used. Other than for winter wheat, most of these requests were denied as the available information indicated the other crops had entered winter dormancy.

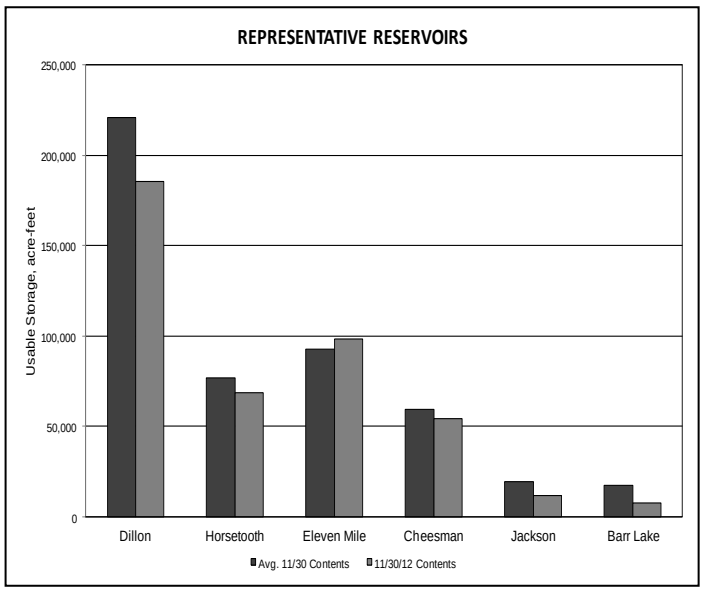
Stream flows at both the Kersey and Julesburg index gages remained below average for November, but were better than the November 2002 mean flows. The Kersey gage monthly mean stream flow was 698 cfs or 94% of the historic mean of 740 cfs and well above the November 2002 mean of 536 cfs. The November Julesburg gage monthly mean stream flow value was 46 cfs or 14% of the historic mean of 335 cfs. This compares to a November 2002 mean of 16 cfss.

Outlook

The reservoir fill picture for the South Platte, while not extremely bleak, is not very rosy either. Overall, the storage at the end of November was at 67% of the end of November average. However, projecting the amount stored in November forward indicates that, without some significant runoff producing precipitation, many of the major reservoirs in the basin will not fill before direct flow rights begin diverting next March or April.





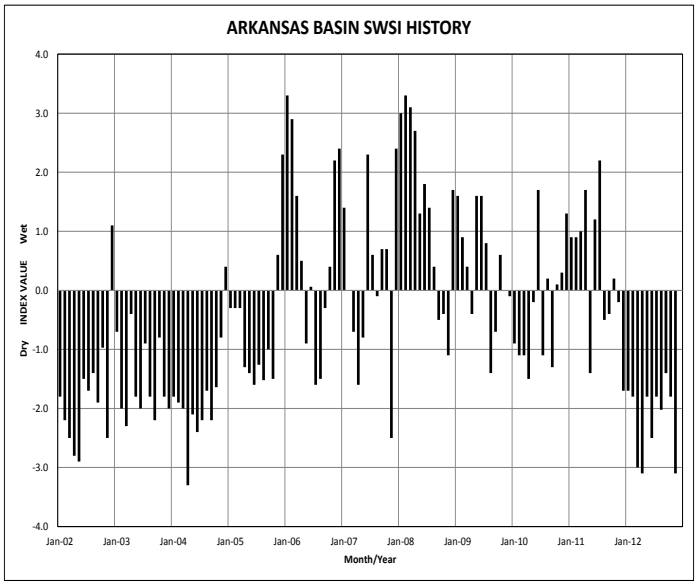


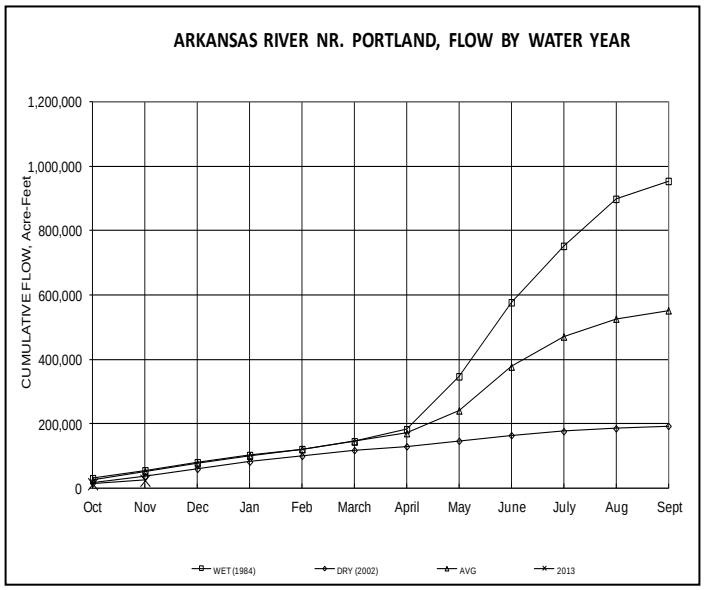
Basinwide Conditions Assessment

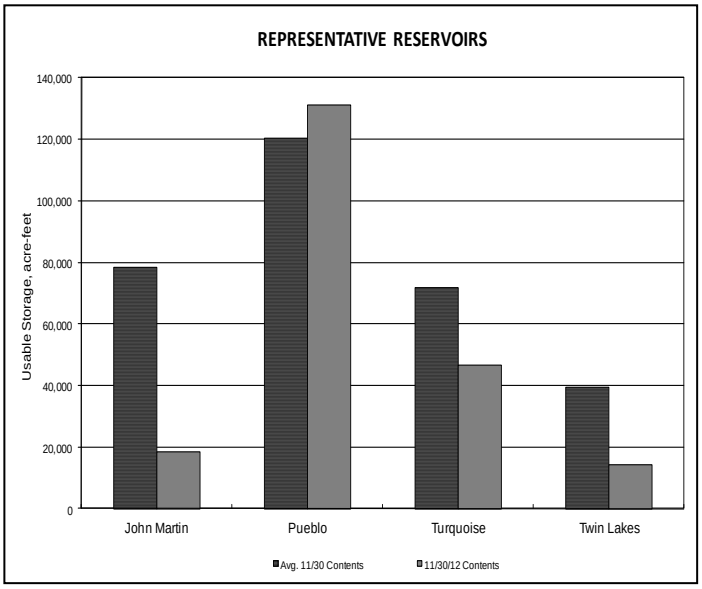
The SWSI value for the month was -3.1. Snowpack accounts for the majority of the SWSI in the Arkansas Basin and was very low with a PN of 1. Water year cumulative precipitation, the other major component of the Arkansas Basin's winter SWSI, was also very low (PN of 5).

Winter Compact storage began in John Martin Reservoir on November 1, 2012. The Pueblo Winter Water Program began operation on November 15, 2012 with storage taking place initially in Pueblo and John Martin Reservoirs and under the Colorado Canal system in Lake Meredith. Storage in John Martin Reservoir during November totaled approximately 925 acre-feet for Conservation Storage and 1,837 acre-feet for Winter Water participants. Storage overall under the Pueblo Winter Water Program in November totaled approximately 9,765 acre-feet in all storage locations.

Severe drought conditions are taking their toll on storage in the major reservoirs. The Pueblo Winter Water Program storage was only about half what it was in November 2011 and Conservation Storage in John Martin Reservoir was only about 60% of the amount stored during the same period in 2011.







Basinwide Conditions Assessment

The SWSI value for the month was -3.0. Snowpack accounts for the majority of the winter SWSI in the Rio Grande Basin and was very low with a PN of 8.

Warm and dry. Precipitation has been inconsistent all year, with a single-day event followed by extended periods of nearly cloudless skies. Excellent weather conditions for outdoor activity, but drying on the local terrain. Precipitation during November in Alamosa was only 0.08 inches, 0.34 inches below normal. A spotty snowstorm on November 10 brought brief white hues that didn't last very long. So far, snowpack accumulation in the basin is very poor.

November streamflow was near the same level as 2002 at the same dates. Most gauging stations are averaging about 40 to 60% of normal. Flow at the gaging station Rio Grande near Del Norte averaged 180 cfs (65% of normal). The Conejos River near Mogote had a mean flow of 42 cfs (43% of normal). A very rare condition for gaging stations in the upper Rio Grande basin during November: gage pools with open water and accurate data recorded without ice influence and ice breaking bars collecting dust in the corner

Outlook

Weather conditions have been generally very pleasant with sunny days and warm temperatures this autumn. These conditions may persist, National Weather Service forecasts are inconclusive as to the expected precipitation, but temperatures in the Rocky Mountain region will be above normal for at least the next three months.

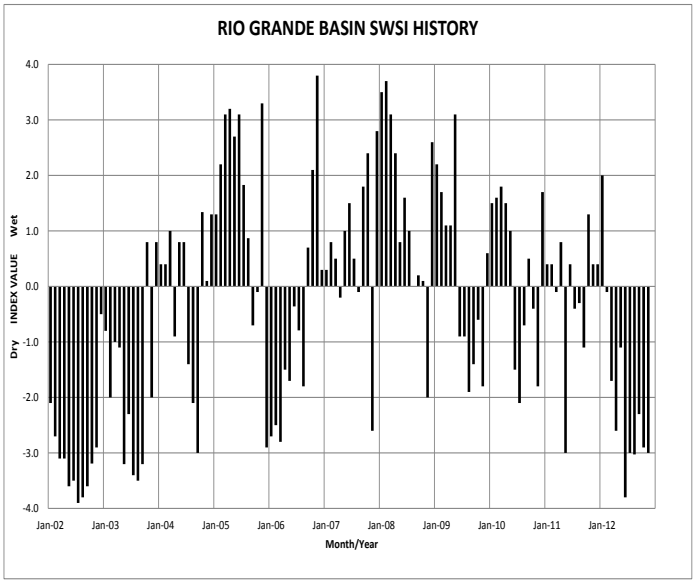
Administrative/Management Concerns

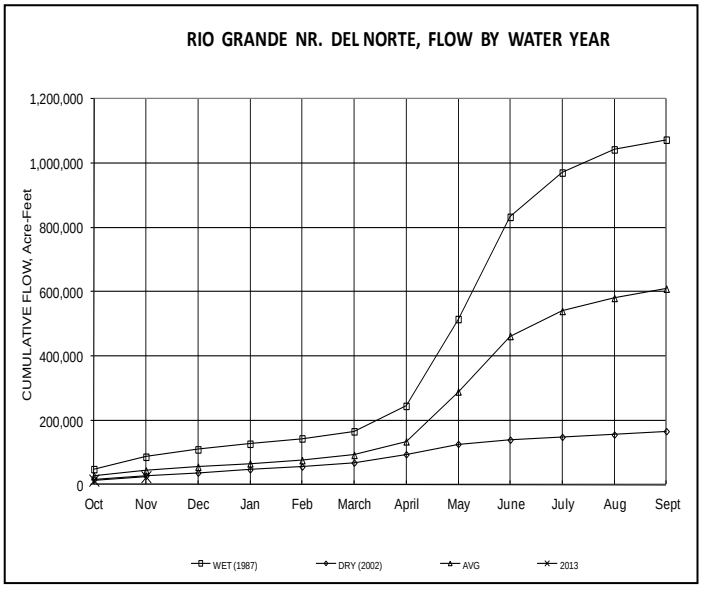
Colorado will slightly over-deliver on the amount required to meet the Rio Grande Compact delivery requirement to New Mexico and Texas during 2012. Individually, the Rio Grande basin is just about dead-on with their delivery requirement, while the Conejos is expected to over-deliver slightly.

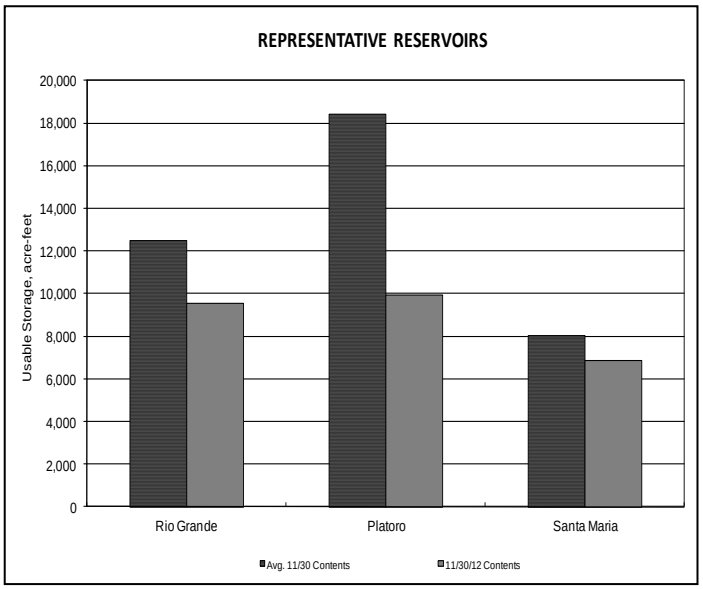
December 1st was the deadline for annual submittal of meter readings on irrigation wells in Water Division 3. Compliance has been generally good, with a few stragglers still working out data submittal issues with the staff.

Public Use Impacts

Warm weather conditions continued into early December when a snowstorm brought bitter cold to the Valley.



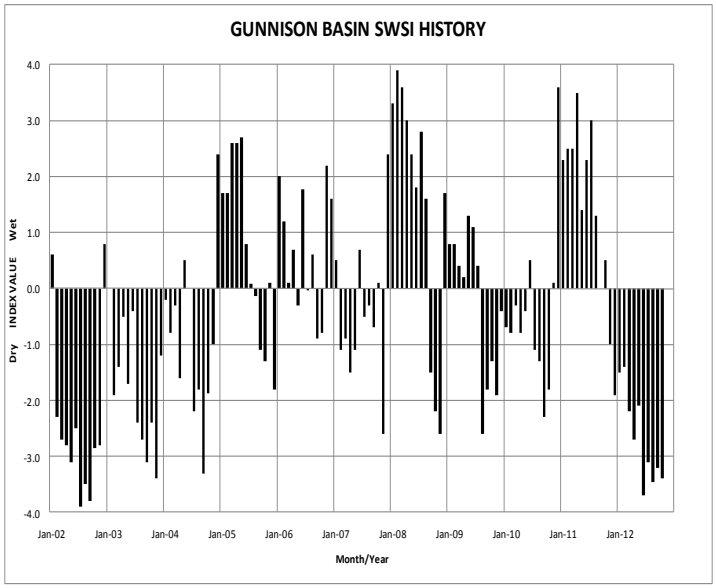




Basinwide Conditions Assessment

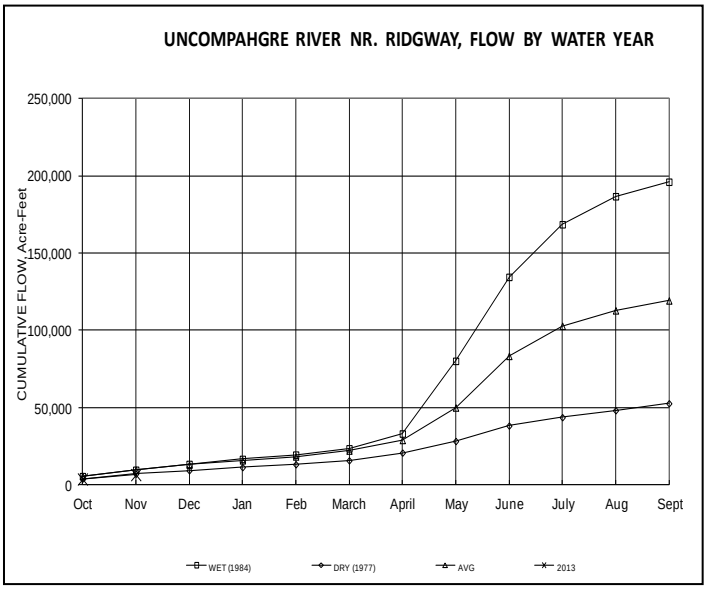
The SWSI value for the month was -3.8, the lowest in the state. Flow at the gaging station Uncompahgre River near Ridgeway was 47 cfs, as compared to the long-term average of 68 cfs. Storage in Taylor Park, Crawford, and Fruitland reservoirs totaled 79% of the long term average as of the end of November. The snowpack was very low with a PN of 2.

Conditions in November were unfortunately similar to October with less than 50 percent of average precipitation basin wide. We finally experienced the first major storm of the season in early November, but following that storm almost no precipitation fell in the basin. On December 1st, average snowpack in the basin sits at 39 percent of the 1981 to 2011 average. A few Snotel stations in the southern basin (Idarado & Slumgullion) contain the lowest recorded snow water equivalent (SWE) at the beginning of December for the past 32 years. Temperatures basin wide ran 5 to 7 degrees above average in November, which did not affect streamflows as much as in October because most crop consumptive use ceased the first week of November.



Outlook

The year's first snowpack projections were released by the NRCS on December 10th. The most probable end of season Gunnison basin snowpack predictions range from 56 to 105 percent of average based on a historical range of what the remaining season could bring. If the remaining accumulation period brings an average amount of snow, the basin would end the season at 82 percent of the average peak. The likelihood of ending the season at or above average is very low considering that in the past 30 years no season that was this dry on December 10th ended with greater than 90 percent of the average peak SWE.

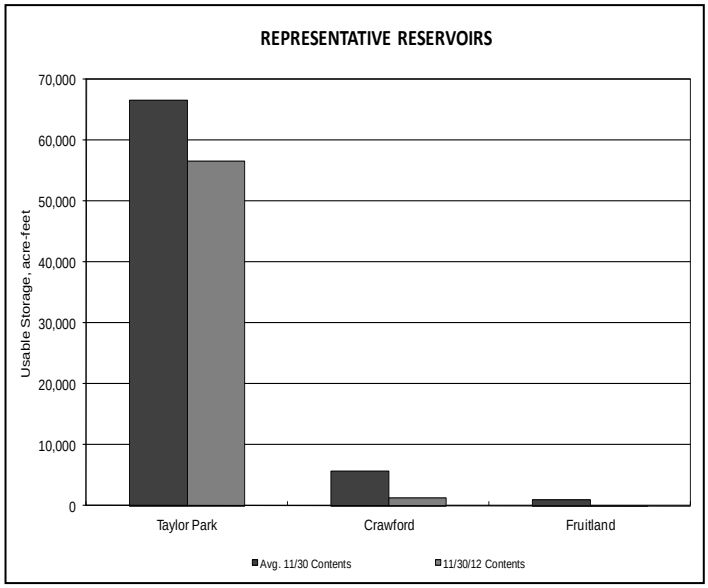


Administrative/Management Concerns

Reservoirs in the basin began filling slowly with the closing of outlets at the end of the irrigation season. In addition, calls on most tributaries were lifted on November 1st. After last season, the prospect for a dry year has many concerned including some municipal providers who are exploring options for substitute supplies in 2013.

Blue Mesa officially hit bottom at 323,414 acre-feet (940,800 acre-feet capacity) on November 10th and has slowly filled since, adding roughly 3000 acre feet in content. Flows in the Black Canyon continue to be maintained above 300 cfs by releases from Crystal Reservoir, which has also kept the flow in the Gunnison at Whitewater above the 750 cfs endangered fish target.

Although flow in the lower Gunnison could drop below the 750 cfs target, the threat of a Redlands Power Canal (RPC) call has diminished for the next couple of months as they are in the process of repairing turbines before they can divert a full supply again.



Pubic Use Impacts

The early ski season for Telluride and Crested Butte has been dismal with season total snowfall on December 1st at only 17 inches and 15 inches respectively (and that's what the resorts are reporting). Here's hoping the January report is more rosy!

Basinwide Conditions Assessment

The SWSI value for the month was -3.8. Flow at the gaging station Colorado River near Dotsero was 695 cfs, as compared to the long-term average of 1,118 cfs. Storage in Green Mountain, Ruedi, and Williams Fork reservoirs totaled 73% of normal as of the end of November. The snowpack PN was a very low 4.

Outlook

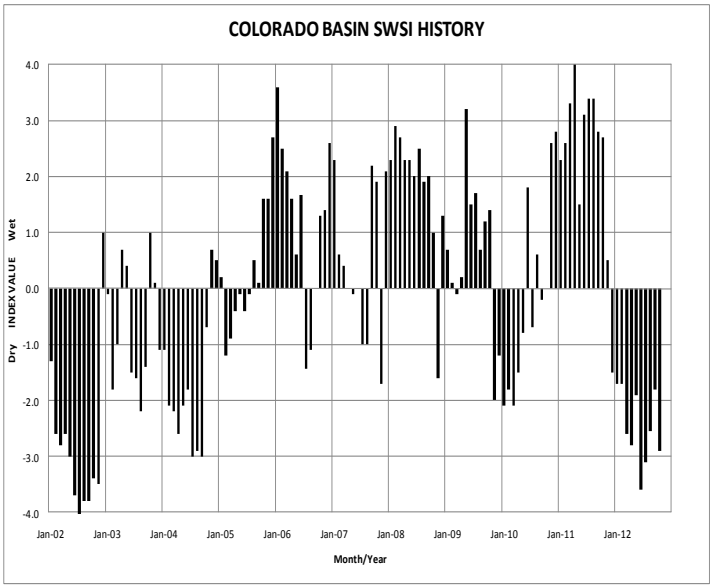
Colorado and Roaring Fork River flows will continue to run significantly below average through December. Williams Fork and Green Mountain Reservoirs will continue to boost releases slightly in support of the Shoshone Outage Protocol. Free river conditions will exist on the Colorado from here forward pending a Shoshone Hydro Power Plant call. Ruedi Reservoir closed water year 2012 at a storage content of 75 percent of average. Accordingly, the minimum flow release of approximately 39 cfs will be maintained. Lack of precipitation throughout the fall is reflected in the Roaring Fork and Upper Colorado River Basin snowpack reporting 28 percent of average snow water equivalent as of December 1st. The western Colorado forecast through the month of December calls for near average chance of precipitation.

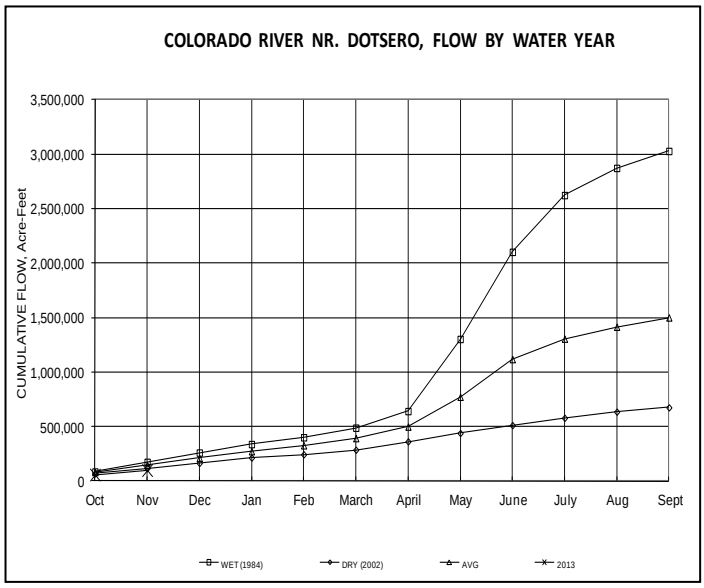
Administrative/Management Concerns

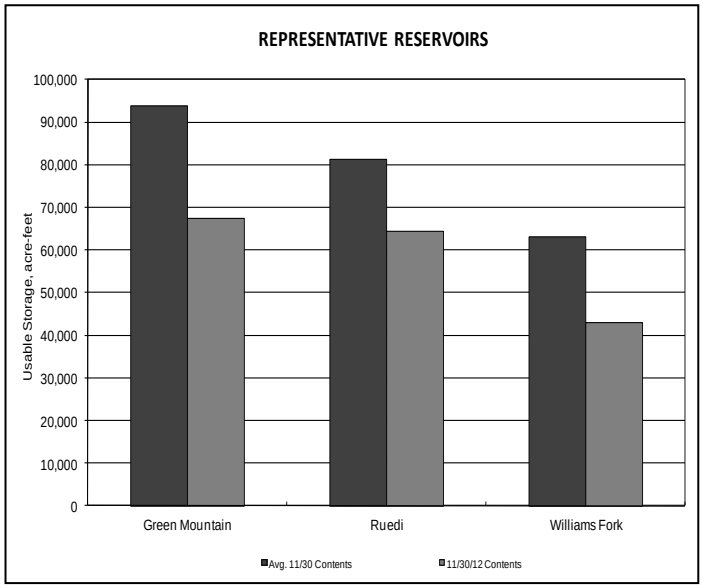
Shoshone Power plant will operate at half capacity through December, potentially placing a call late in the month. Williams Fork and Green Mountain Reservoir operators are boosting flows under voluntary participation in the Shoshone Outage Protocol. A call remains in place by the Blue River Diversion Project on the main stem of the Blue River.

Public Use Impacts

Most ski areas have opened with the exception of Aspen Mountain, Aspen Highlands, Buttermilk, and Sunlight Mountain scheduled to open in mid-December.



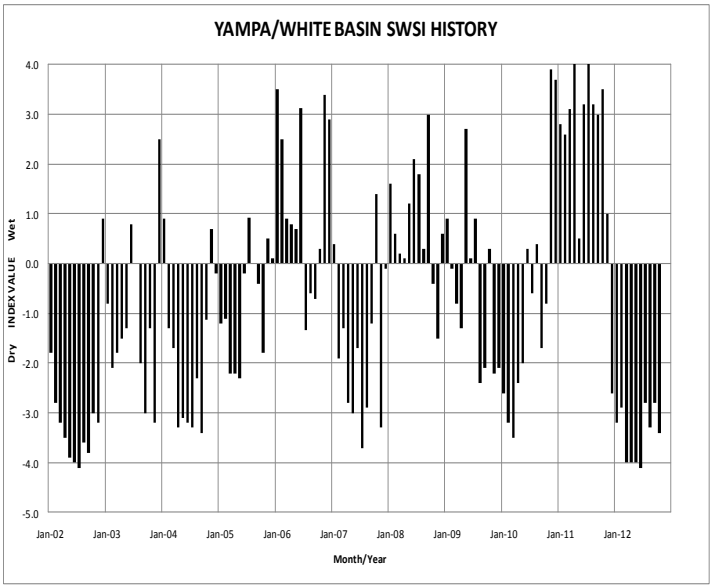




Basinwide Conditions Assessment

The SWSI value for the month was -3.2. Flow at the gaging station Yampa River at Steamboat was 84 cfs, as compared to the long-term average of 132 cfs. The snowpack PN is below normal at 18.

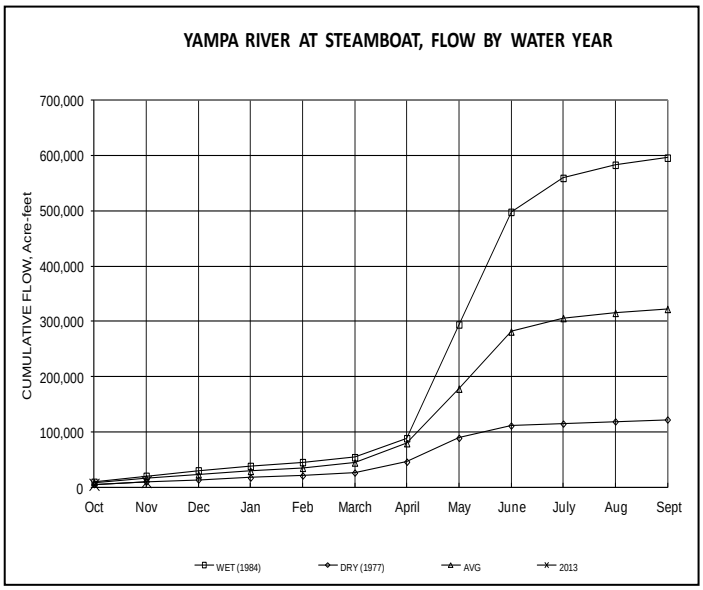
November precipitation was well below average in the Yampa, White, and North Platte River basins. Precipitation for the month, as measured at the SNOTEL sites operated by NRCS, was reported at 43% of average for the Yampa, White, and North Platte River basins. Total precipitation for the water year as a percent of average to date in the combined basins at the end of November was 56%. Streamflows in the Yampa, White, and North Platte River basins remain below average at this time and most of the Division 6 area is experiencing severe to extreme drought conditions as classified by the US Drought Monitor. Most Division 6 DWR stream gaging stations have been closed for the winter at this time.



Outlook

As of November 30th Fish Creek Reservoir was storing approximately 1,836 AF, 44% of capacity. The capacity of Fish Creek Reservoir is 4,167 AF. Yamcolo Reservoir was storing 3,490 AF at the end of November 2012. The capacity of Yamcolo Reservoir is 9,580 AF. On November 30th Elkhead Creek Reservoir was storing 16,432 AF. The capacity of Elkhead Creek Reservoir is 24,778 AF. On November 30, 2012, Stagecoach Reservoir was storing 28,787 AF, 79% of capacity.

Water stored in Fish Creek Reservoir is used primarily for municipal purposes, Yamcolo Reservoir for irrigation purposes, and Elkhead Creek Reservoir for municipal, industrial, recreational, and fish recovery releases. Stagecoach Reservoir is primarily used for recreation though a significant amount of stored water is allocated for municipal, industrial, irrigation and augmentation uses.



Public Use Impacts

At Stagecoach Reservoir boating is closed for the season and will re-open May 1st, 2013 conditions permitting. There is some early season ice on the reservoir in the coves.

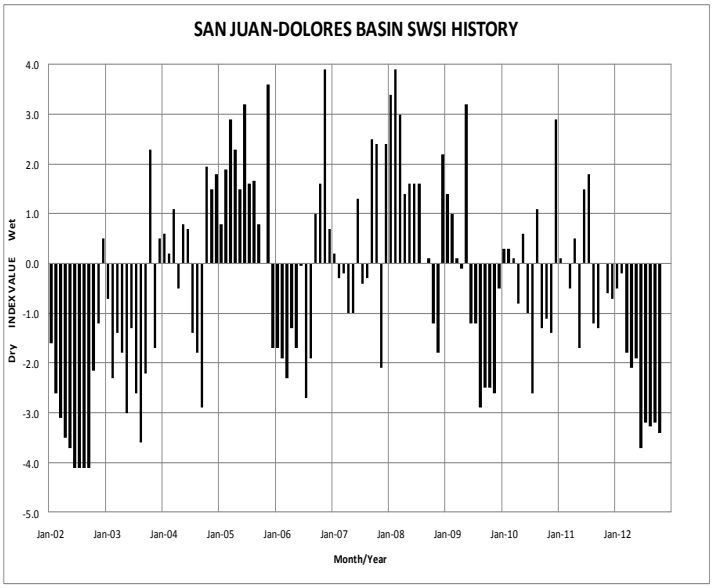
Steamboat Lake is reporting excellent fishing with few anglers. Boating is closed for the season and will re-open May 1st, 2013 conditions permitting. Snow is beginning to fall as of early December, however most of the park is bare ground.

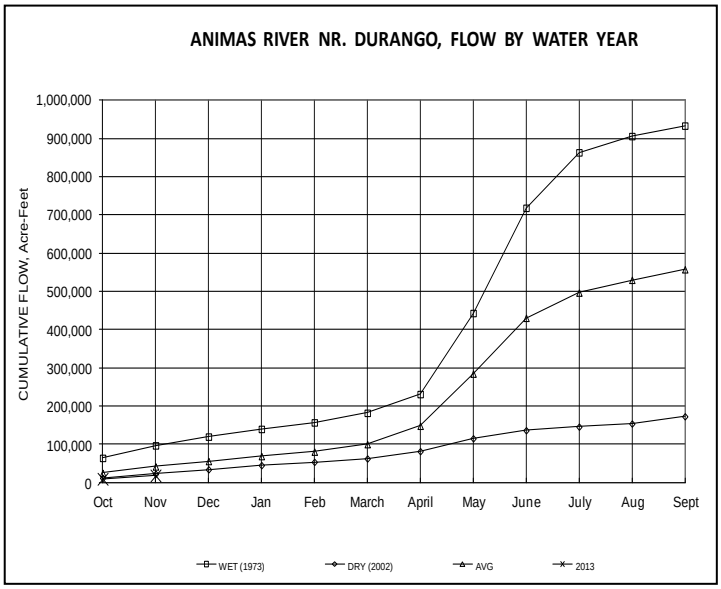
Basinwide Conditions Assessment

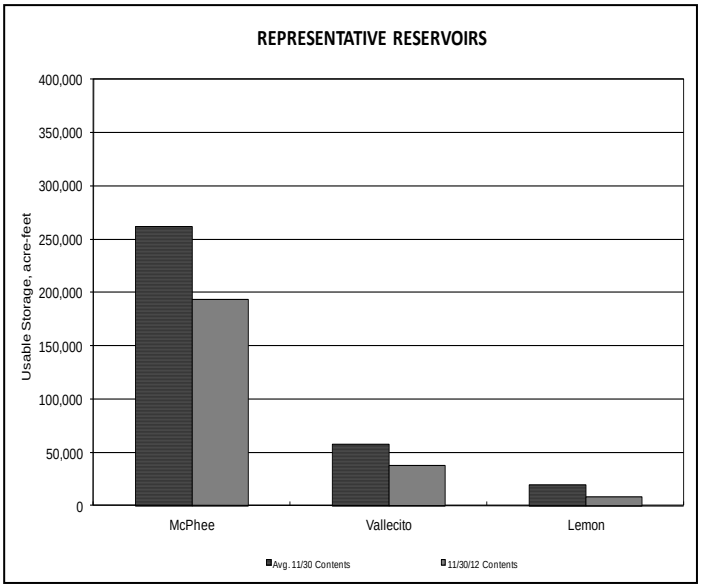
The SWSI value for the month was -3.4. Flow at the Animas River at Durango averaged 150 cfs (52% of average). The flow at the Dolores River at Dolores was estimated to average 31 cfs (37% of average). The La Plata River at Hesperus averaged 3.5 cfs (33% of average). Precipitation in Durango was 0.71 inches for the month, 38% of the 30-year average of 1.88 inches. The snowpack PN for the month was very low at 5.

Precipitation to date in Durango, for the water year, is 0.95 inches, 28% of the 30-year average of 3.35 inches. The average high and low temperatures for the month of November in Durango were 56° and 22°. In comparison, the 30-year average high and low for the month is 51° and 23°. At the end of the month Vallecito Reservoir contained 37,650 acre-feet compared to its average content of 52,464 acre-feet (72% of average). McPhee Reservoir was up to 193,252 acre-feet compared to its average content of 266,044 (73% of average), while Lemon Reservoir was up to 7,970 acre-feet as compared to its average content of 19,849 acre-feet (40% of average).

Precipitation (0.71-inches) was well below average for November in Durango. There are 83 years out of 118 years of record where there was more precipitation than this year. The flows on the Animas River were well below average this November. The total flow this November was the lowest on record out of 102 years. The total flow was 9,209 acre-feet. The second lowest monthly total flow occurred in 1934. The total flow for the month of November, 1934 was 9,374 acre-feet. The other basins within the division did not fare much better. There are 100 years out of 103 years of record where there was more flow at the Dolores River at Dolores and 94 years out of 96 years of record where there was more flow at the La Plata River at Hesperus. The NRCS is reporting snow-water-equivalent of 45% of average at the end of the month.







ADDITIONAL INFORMATION ABOUT COLORADO SWSI CALCULATIONS - Dec-12

The SWSI for each basin is based on probability of nonexceedance (PN) curves for each of three components: reservoir storage, snowpack, and water year cumulative precipitation. The weighting, or importance, for each component in the SWSI calculation varies by basin as shown below.

Winter SWSI Component Weights

Basin	Reservoir Storage	Snowpack	Water Year Cumulative Precipitation
South Platte	0.55	0.27	0.18
Arkansas	0.15	0.51	0.34
Rio Grande	0.05	0.63	0.32
Gunnison	0.10	0.54	0.36
Colorado	0.15	0.51	0.34
Yampa/White	None	0.60	0.40
San Juan/Dolores/Animas	0.10	0.54	0.36

The PN curves were developed in the 1980s and are generally based on a period of record of 1950-1979. As reservoir storage (and streamflow for the summer SWSI) is affected by human action, the reservoir storage PN curves may not reflect current practices for reservoir operation. DWR and NRCS are currently considering options for modifying the SWSI to address this and other concerns about its computation.

SWSI BY HUC FROM NRCS NATIONAL WATER & CLIMATE CENTER

Included below is the SWSI generated by the NRCS National Water and Climate Center, based on data as of December 1. The SWSI below is a predictive indicator of surface water availability for the spring and summer water use seasons. It is calculated by combining reservoir storage with forecasts of spring and summer streamflow, based on current snowpack and other hydrologic variables. The scale of -4 to +4 is the same as shown on Page 1.