# COLORADO
# WATER SUPPLY CONDITIONS UPDATE

FROM THE OFFICE OF THE STATE ENGINEER: COLORADO DIVISION OF WATER RESOURCES
ROOM 818, 1313 SHERMAN ST., DENVER, CO 80203
303-866-3581; www.water.state.co.us

July 2014

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 streamflow, reservoir storage, and precipitation for the summer period of May through October (June 1 through November 1). During the summer period, streamflow is the primary component in all basins except the South Platte basin, where reservoir storage is given the most weight. The enclosed narratives are provided by the Division of Water Resources Office in each stream basin.

The statewide SWSI values for June (July 1) range from a high value of +3.1 in the South Platte Basin to a low value of -0.8 in the Rio Grande Basin. Water supply conditions became drier statewide compared to last month but show substantially greater water available than at this time last year. Streamflow in June exceeded the 50$^{th}$ percentile in all basins except San Juan/Dolores and Rio Grande.

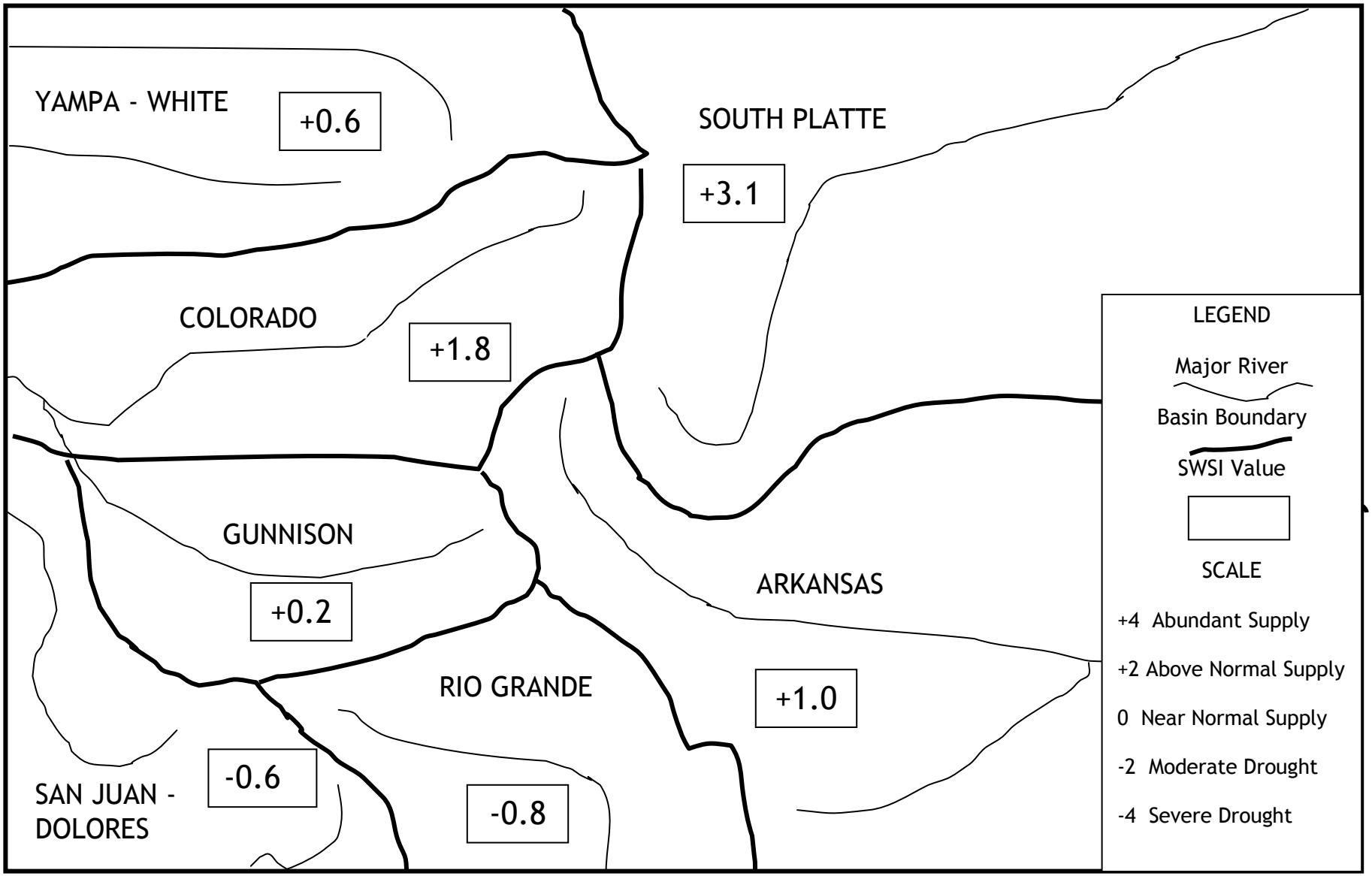
The following SWSI values were computed for each of the seven major basins for July 1, 2014. Additional information about SWSI calculations and the NRCS National Water and Climate Center SWSI by HUC are included on Page 10.

| Basin | July 1 SWSI | Change from Previous Month | Change from Previous Year |
|---|---|---|---|
| South Platte | 3.1 | -0.1 | 3.2 |
| Arkansas | 1.0 | -0.5 | 3.9 |
| Rio Grande | -0.8 | -1.3 | 3.0 |
| Gunnison | 0.2 | -2.6 | 3.4 |
| Colorado | 1.8 | -0.4 | 4.0 |
| Yampa/White | 0.6 | -0.7 | 3.9 |
| San Juan/Dolores | -0.6 | -0.1 | 3.3 |

SWSI Scale

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

# SURFACE WATER SUPPLY INDEX FOR COLORADO




**July 1, 2014**

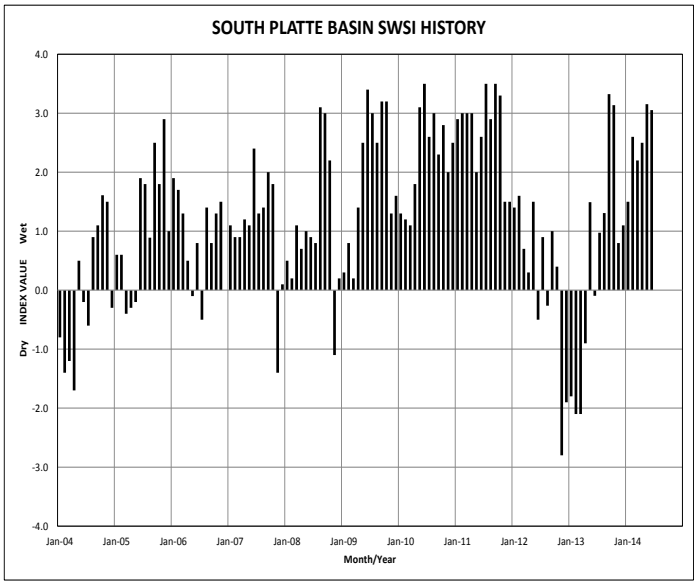
## Basinwide Conditions Assessment

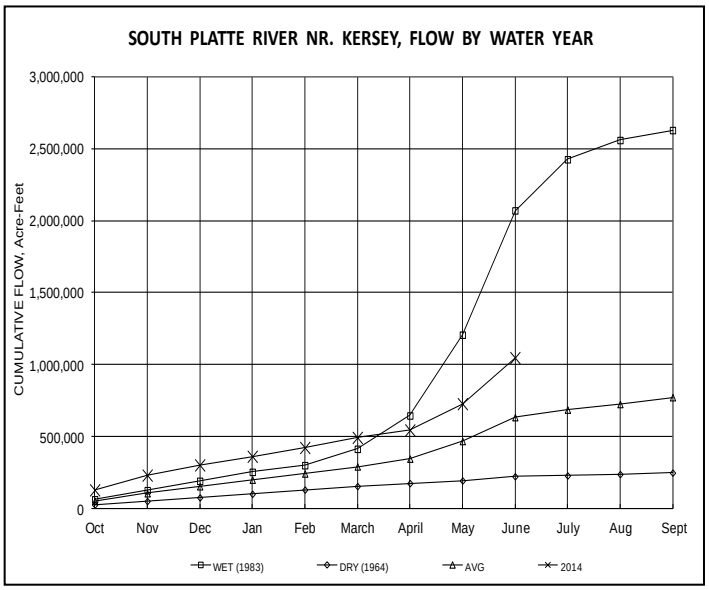
The SWSI value for the month was 3.1. For northeastern Colorado, June 2014 was a pretty normal in terms of temperature but a bit schizophrenic in terms of precipitation. Temperatures were very close to normal with more of the basin on the cooler side (1 or 2 degrees F. below normal) than on the warmer side (1 degree F. above normal). Precipitation, however, was quite variable with the Front Range, foothills, and mountains receiving 50% or less of the normal June precipitation. At the same time, precipitation on the plains was generally near normal to 200 % above normal precipitation. Precipitation amounts generally increased from west to east with the highest precipitation amounts along the eastern border of Colorado. This precipitation pattern was actually almost perfect as it helped alleviate both the low lying area flooding happening along the Cache la Poudre River between Ft. Collins and Greeley the first week of June as well as the abnormally dry to drought conditions that had been persisting in extreme northeast Colorado since March 2012.

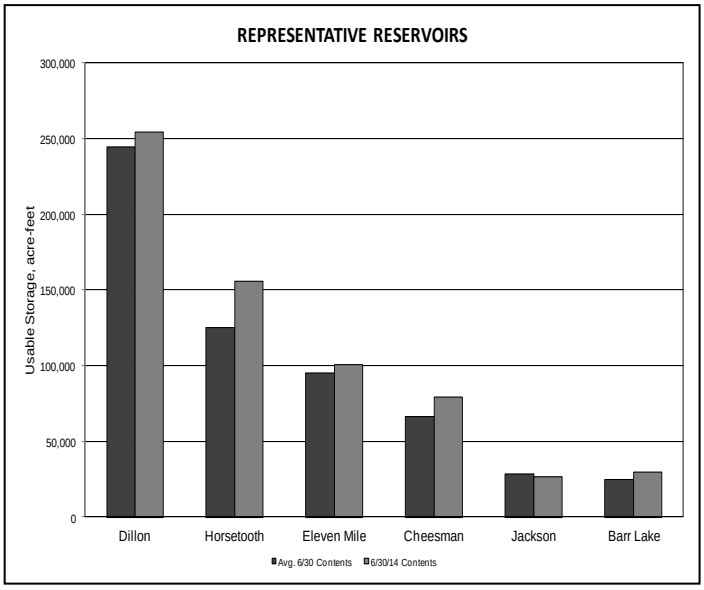
As could have been expected due to the high snowpack going into the 2014 runoff and the significant precipitation in northeastern Colorado just discussed, June stream flows were well above average at both the Kersey and Julesburg index gages. The Kersey gage monthly mean stream flow was 5210 cfs as compared to the June historic mean of 2323 cfs (224 % of the historic mean). The June Julesburg mean monthly flow was even higher as a percent of the historic mean at 322 % with a flow of 4610 cfs as compared to the 1430 cfs historic mean.

The high flows just discussed also allowed the South Platte River mainstem below metro Denver to remain under free river conditions all month. The mainstem above metro Denver was under free river conditions until June 18 when the call began alternating between a very junior (effective date 12-31-1980) call and free river. South Boulder Creek was the only significant tributary that was not also under free river for the entire month. The South Boulder Creek calls began on June 11 and went through the end of the month. The dates of these South Boulder Creek calls were still very junior and bounced between 1-1-1930 and 5-10-1945.

The very good stream conditions discussed above carried over into excellent storage conditions. The overall reservoir storage in the basin was at 96 % of capacity at the end of June. Put another way, end of June storage was at 107 % of the long term average.



Basinwide Conditions Assessment

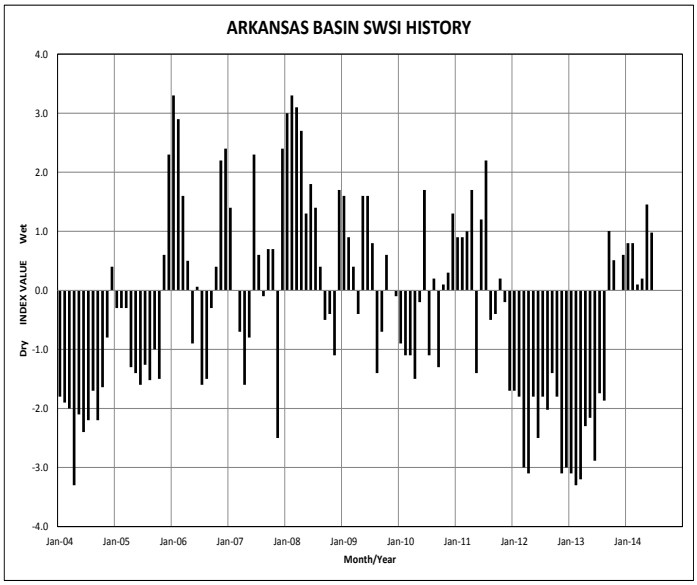
The SWSI value for the month was 1.0. Runoff during June built from the late May increase to a peak on June 3rd. The sustained runoff was very good throughout June and continued to be strong throughout June. River flows on the Purgatoire River and some of the other southern tributaries benefitted by some timely rains in June presenting a much better supply than this drainage has seen in the last three years.

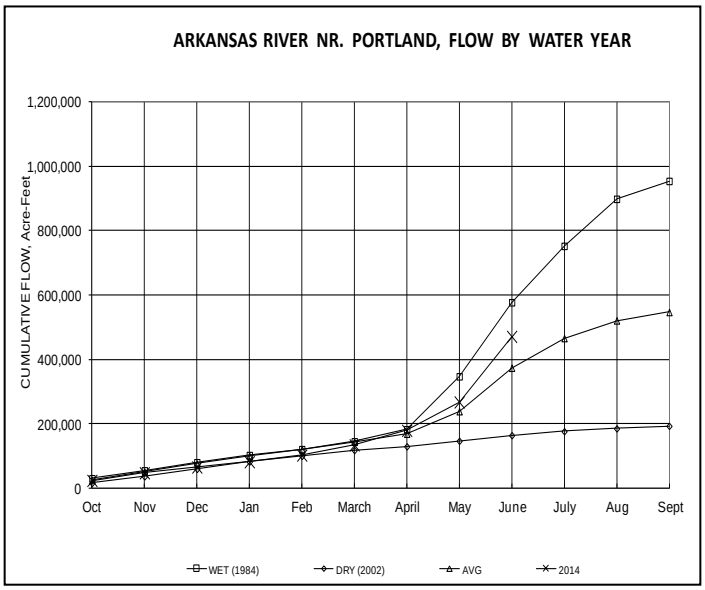
Outlook

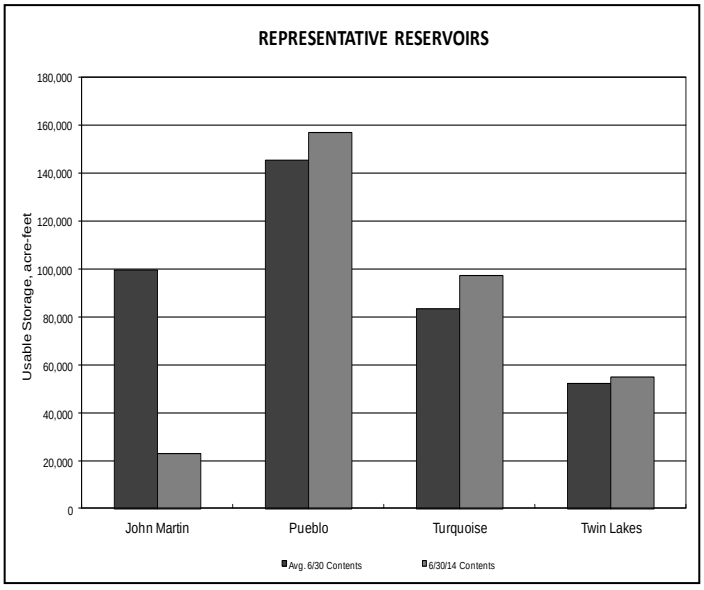
The river call began the month at the 3/2/1892 Holbrook Canal storage right followed by some successively junior calls for storage rights (Amity Canal's Great Plains right in John Martin Reservoir 8/1/1896) for the first third of June. Calls gradually became more senior through the last two thirds of June ending at a Fort Lyon Canal 3/1/1887 call for their second water right. The surface supply in June was far better than the supply over the past two years.

Administrative / Management Concerns

The Southeastern Colorado Water Conservancy District allocated approximately 44,030 acre-feet of Fryingpan Arkansas Project water, with 24,037 acre-feet allocated for municipal use and 19,993 acre-feet allocated for agricultural use.



Basinwide Conditions Assessment

The SWSI value for the month was -0.8. Flow at the gaging station Rio Grande near Del Norte averaged 2858 cfs (96% of normal). The Conejos River near Mogote had a mean flow of 721 cfs (65% of normal, due partly to direct flow storage in Platoro Reservoir). Stream flow in the northern areas of the upper Rio Grande Basin was near normal during June while the southern and eastern drainages of the Valley had only poor to fair runoff.

June precipitation in Alamosa was only 0.02 inches, 0.47 inches below normal, and one of the driest Junes on record. The mean temperature at Alamosa for the month of June was 60.6 degrees, which is 1.0 degree above normal.

Outlook

Both the Rio Grande and Conejos Rivers are producing much more water than was expected earlier in the year. The current forecast for the Rio Grande is an April-September total flow of 495,000 acre-feet, which is 115,000 acre-feet higher than the May 1st NRCS forecast for the same time period. Similarly, the Conejos system forecast has increased by over 37,000 acre-feet since May 1. This large change in forecasted runoff has resulted in curtailments on both rivers that have been increased substantially to account for the increased flows. By the second week of June, all upper Rio Grande basin streams had dropped to average or below average flows. For those drainages with storage reservoirs, releases began during early part of the month. Without substantial rainfall, stream flow in the upper Rio Grande basin will be significantly below normal levels after the reservoir releases are completed in July.

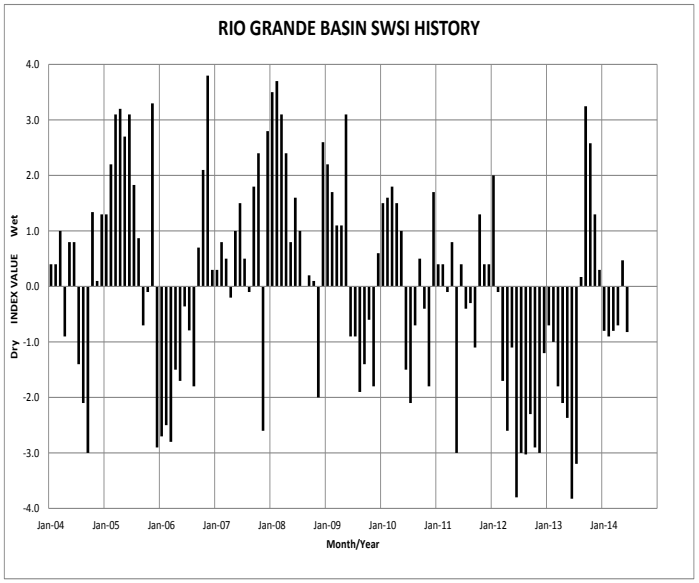
The National Weather Service has issued a 90-day outlook that predicts above average precipitation for the southwestern portion of Colorado during July-August-September, 2014.

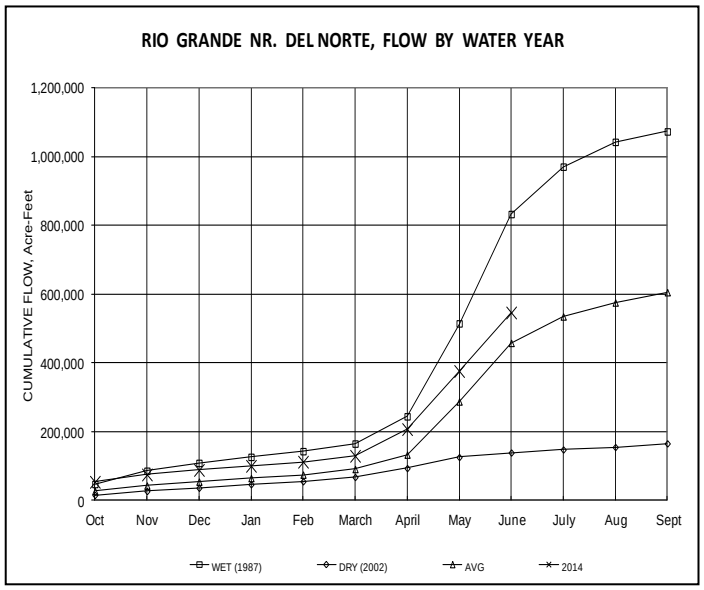
Administrative/Management Concerns

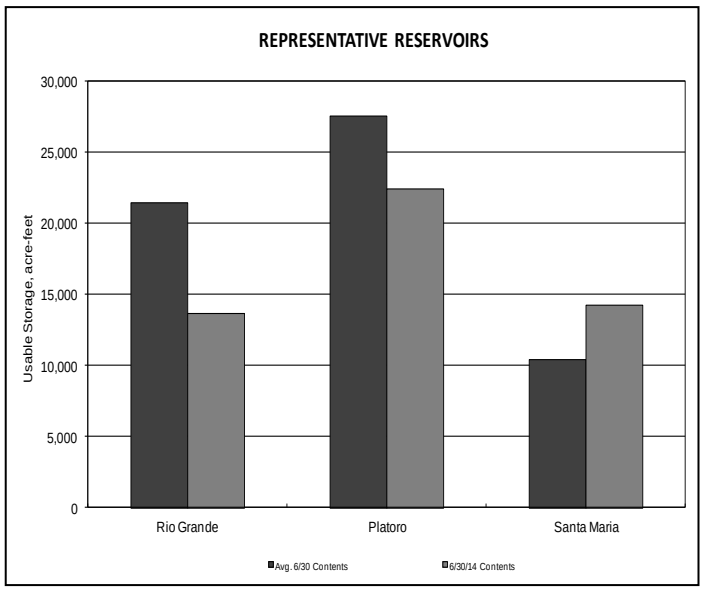
Administrators have placed limitations on the amount of available native water (curtailments) on indexed stream flows in order to meet water delivery requirements to the state line pursuant to the Rio Grande Compact. The current delivery targets are set at 25% for the Rio Grande and 32% for the Conejos River system. These percentages of available native flow are routed downstream past the ditches to the state line.

Public Use Impacts

The warm, relatively dry weather has benefited those farmers and ranchers with native grass and alfalfa crops. They were able to get their first cutting up without rain damage. Most reservoirs reached peak storage levels near the end of May or early June and have already begun to decline as releases are made for irrigation needs. As the summer progresses, recreational opportunities may be hampered by low water levels in both reservoirs and streams in the basin.



Basinwide Conditions Assessment

The SWSI value for the month was 0.2. June is typically one of the driest months in the Gunnison basin, and this June was drier than average with less than 50% of average precipitation falling basin-wide, which was similar to the entire western slope of Colorado. Oddly, June temperatures were slightly below average to average during this dry month. Streamflows on all major tributaries, including the Uncompahgre River, North Fork Gunnison River, Tomichi Creek, and the East River peaked between May 31st and June 2nd at levels much higher than the average. Streamflows steadily declined the rest of June, but remained above average on all tributaries throughout the month thanks to the near average temperatures.

Outlook

August, September, and October are forecast to have a much greater than equal chance of above average precipitation throughout the southwest, including the Gunnison basin.

Administrative/Management Concerns

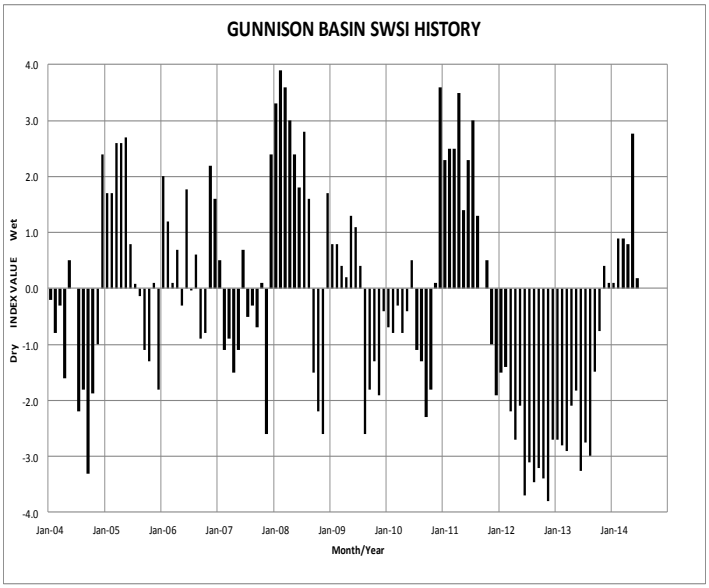
As mentioned last month, the Bureau of Reclamation (USBR) began operations to meet the Record of Decision (ROD) flow targets for the endangered fish in the lower Gunnison in late May and early June. Although the 10-day peak flow prescribed in the ROD of 14,350 cfs (measured at the Whitewater gage on the Gunnison) was not reached, flows did remain above 10,000 cfs from June 1st to June 11th, peaking at 12,900 cfs on June 6th. The USBR accomplished flows greater than the prescribed half-bankfull duration flow of 8,070 cfs for a total of 25 of the prescribed 40 days from May 30th to June 23rd. During the USBR attempt to meet the prescribed targets Crystal Dam attained a peak release of 9,548 cfs on June 6th. In order to sustain that amount of release through Crystal Dam, all three Aspinall Unit Reservoirs (Crystal, Morrow Point, and Blue Mesa) were spilling over 7,000 cfs, 2,200 cfs, and 2,200 cfs respectively at that time.

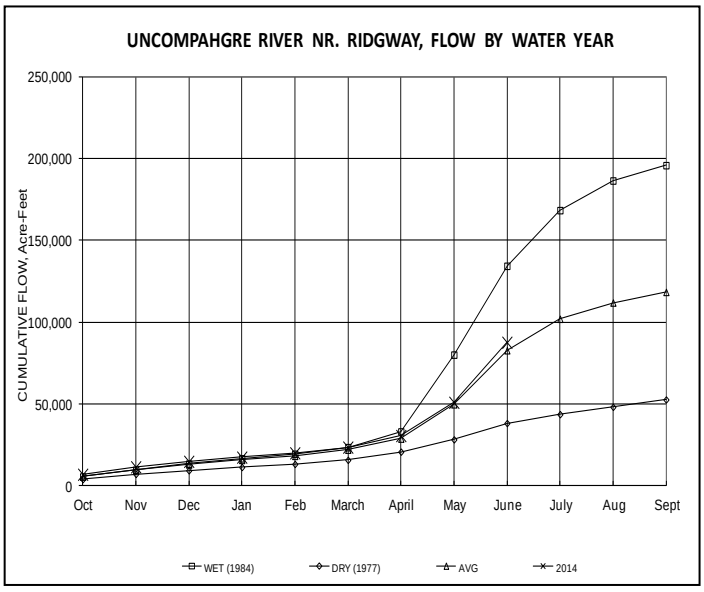
The last forecast of April to July inflow into Blue Mesa Reservoir was released in July and it predicted a total of 845,000 acre-feet (125% of average) of inflow during the period that will end on July 31st. Blue Mesa Reservoir fell throughout June, due to the large releases from the Aspinall Unit, to a content of 659,000 acre-feet on June 30th. The July USBR 24 month study indicates that Blue Mesa Reservoir will reach a minimum of 7477 ft in elevation, which is 13 ft below the icing target of 7490 ft, and corresponds to a difference in storage of approximately 90,000 acre-feet.

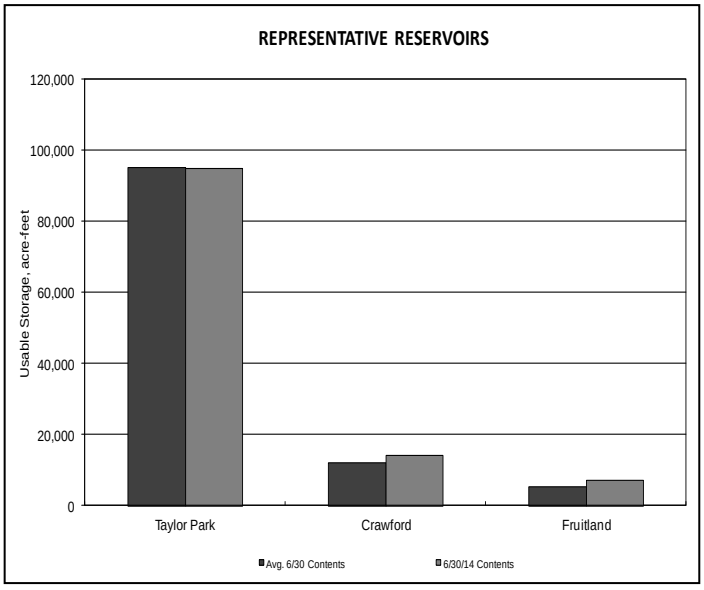
Heavy precipitation in the fall of 2013 and the resultant high soil moisture appears to have benefitted all areas in the Water Division 4. Many areas of Division 4 that were already on call by July 1st in 2012 and 2013, such as the San Miguel River, the Uncompahgre River, and Tomichi Creek, are not even close to going on call yet in 2014. The ninety-plus Grand Mesa Reservoirs all filled and spilled during the spring runoff and have remained at high levels of storage because spring runoff kept the ditch rights filled with natural flow over three weeks later than last year.

Pubic Use Impacts

The long duration of high flows in the Black Canyon and Gunnison Gorge had a significant negative impact on recreational boating and fishing conditions during June, which was detrimental to the guides since it is the most popular time to be on the river.



Basinwide Conditions Assessment

The SWSI value for the month was 1.8.

Outlook

Colorado River flows will gradually fall, but continue well above average with all tributary flows running near or above average throughout July. Average precipitation is forecast for western Colorado through July. Reservoir releases in general, will gradually decrease throughout June as inflows fall.

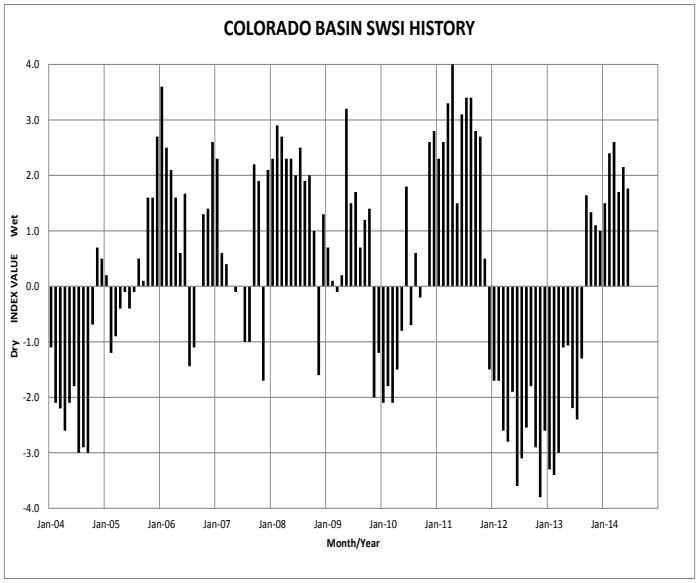
Administrative/Management Concerns

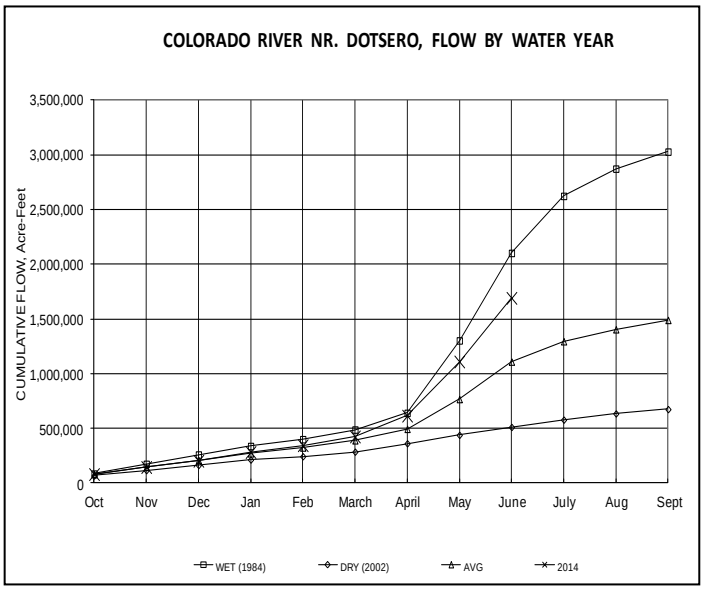
A main stem call on the Colorado River will not occur during the month of July. Grand Valley Irrigation diversions (Government Highline/Orchard Mesa Irrigation, Grand Valley Irrigation canals) continue at or near full capacity. Ruedi Reservoir and Green Mountain Reservoir releases will gradually decrease as inflows fall but remain well above average. Willow Creek reservoir will remain minimal since dropping in mid-June. Wolford Mountain releases have remained elevated, while Williams Fork Reservoir releases have dropped substantially.

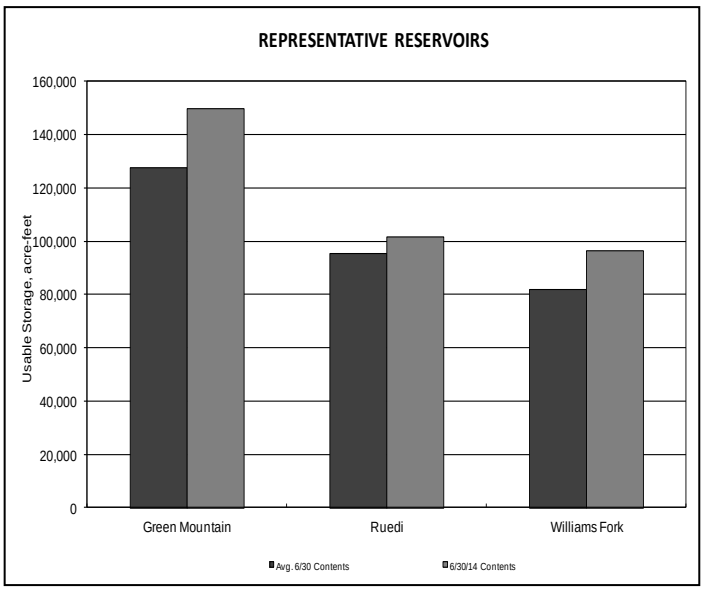
Public Use Impacts

Legislative focus on Colorado's water resources could lead to a renewed effort to incentivize efficiency and reduce agricultural irrigation water diversion amounts. Senate Bill 23, which addressed such incentives, was vetoed by the governor earlier this spring and opposed by the Colorado River District over concerns of disruption of historic irrigation agreements and deterrent to traditional ranching practices.

Meeting and input regarding the Colorado Water Plan continues with the development of West Slope principles required by Colorado River Basin Roundtable including, among other things, provision to minimize the risk of a potential Colorado River compact curtailment. Front Range water planners continue efforts to maintain the opportunity for development of additional West Slope diversions within the plan. Western Slope basin roundtables counter with provisions placed on any new trans-mountain diversions including foregoing specific yield, acceptance of hydrologic risk, conjunction with existing eastern basin supply agreements/aquifer resources and re-use, and establishment of "triggers" related to diversions.



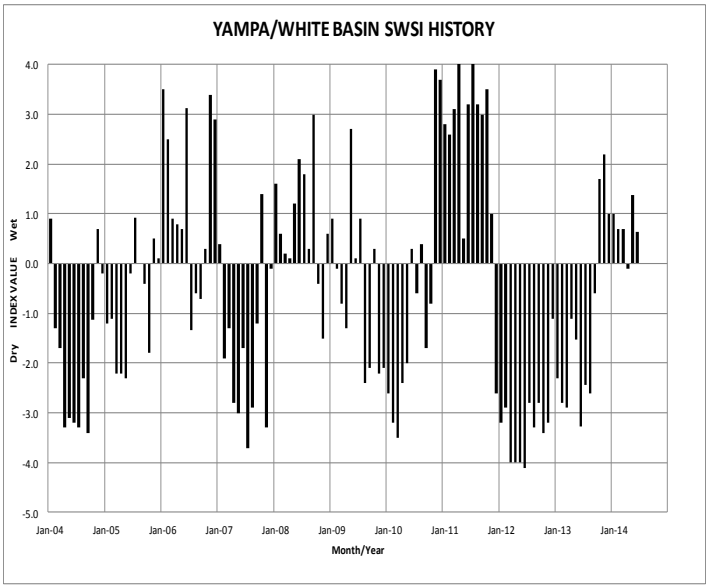



Basinwide Conditions Assessment

The SWSI value for the month was 0.6. June 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 24% 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 June fell to 109%.

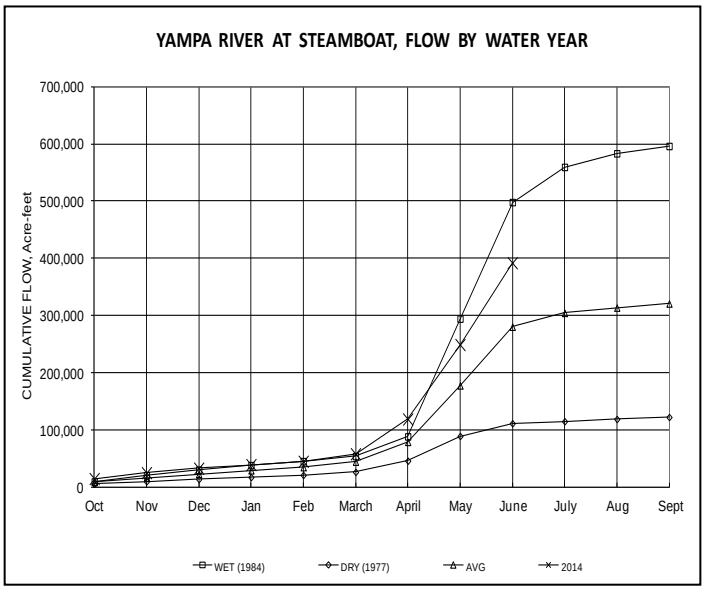
Flow in all major rivers of the Yampa, White, and North Platte River basins was above average for the month of June despite the low precipitation. Flows peaked the last week of May and those peaks were above average. Flows then receded to near average flow rates by the end of June.




Outlook

As of June 30th, Fish Creek Reservoir was full and storing 4,151 AF. Yamcolo Reservoir was storing 9,505 AF at the end of June 2013. The capacity of Yamcolo Reservoir is 9,580 AF. On June 30th, Elkhead Creek Reservoir was just below full and storing 24,062 AF. On June 30th, 2013, Stagecoach Reservoir was full and storing 36,400 AF.

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

Tubing on the Yampa River through Steamboat Springs is excellent and should remain good through July. Floating conditions on major rivers in Division 6 also remain good although the low precipitation so far this summer may affect conditions later July.

Fishing from the shore at Stagecoach Reservoir has slowed a bit due to warmer water. The Tailwater area is open but there may continue to be some construction in progress.

Swim beaches at both Steamboat Lake and Stagecoach Reservoir are now open. Steamboat Lake is full and open for boating.

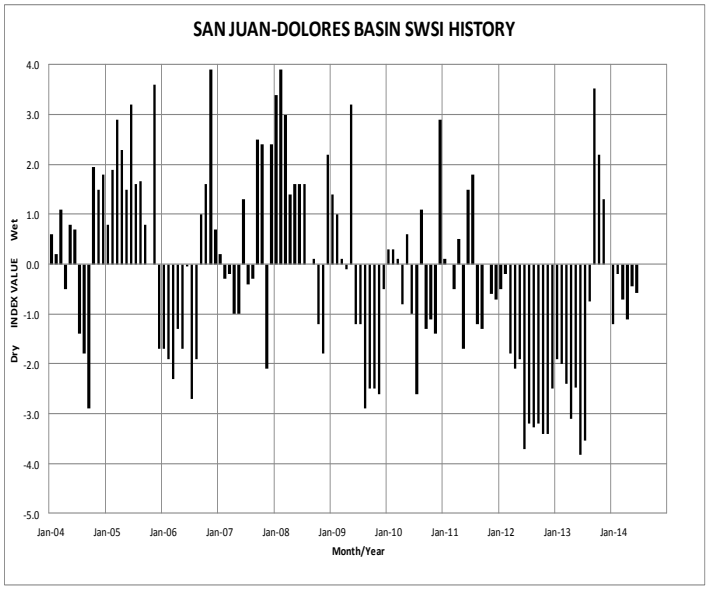
Basinwide Conditions Assessment

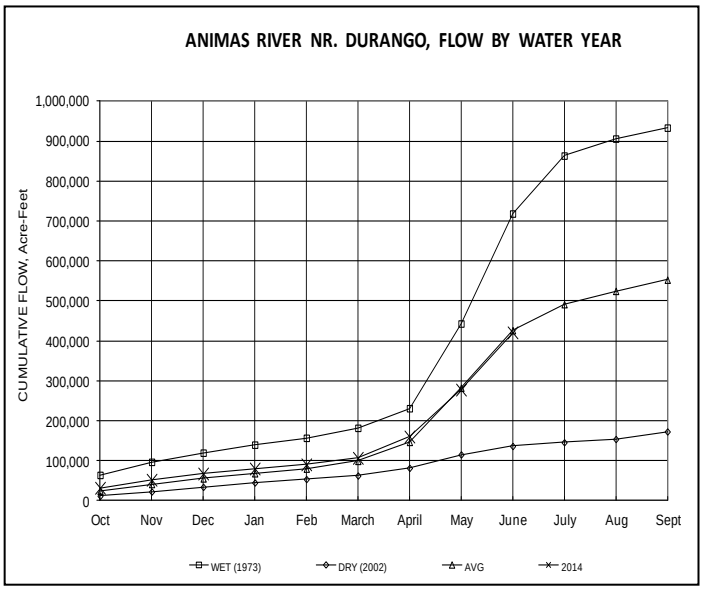
The SWSI value for the month was -0.6. Flow at the Animas River at Durango averaged 2,296 cfs (83% of average). The flow at the Dolores River at Dolores averaged 798 cfs (62% of average). The La Plata River at Hesperus averaged 34.5 cfs (28% of average).

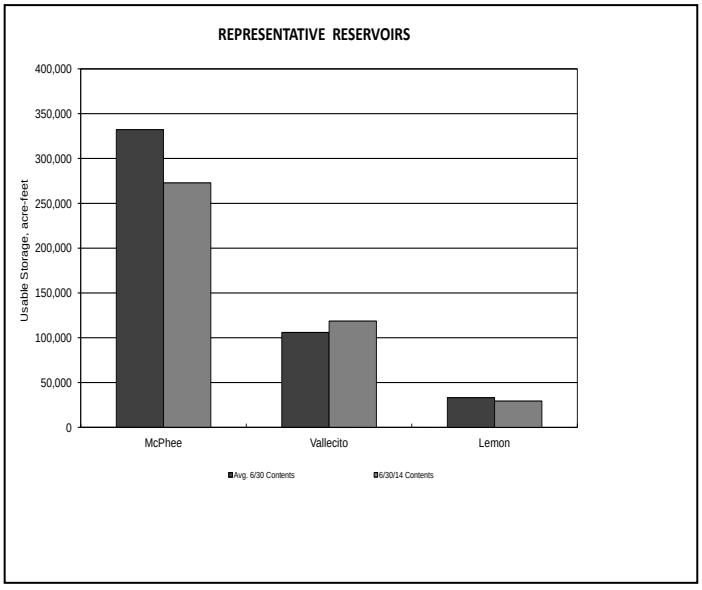
Precipitation in Durango was 0.00 inches for the month, 0% of the 30-year average of 0.66 inches. Precipitation to date in Durango, for the water year, is 8.21 inches, 62% of the 30-year average of 13.19 inches. The average high and low temperatures for the month of June in Durango were 84º and 42º. In comparison, the 30-year average high and low for the month is 82º and 46º. At the end of the month Vallecito Reservoir contained 118,545 acre-feet compared to its average content of 104,410 acre-feet (114% of average). McPhee Reservoir was up to 272,721 acre-feet compared to its average content of 337,562 (81% of average), while Lemon Reservoir was up to 29,380 acre-feet as compared to its average content of 32,992 acre-feet (89% of average).

Outlook

No precipitation was recorded for June in Durango. No surprise that June was dry as it is typically the driest month of the year in the basin. There are 9 years out of 120 years of record where there was no precipitation recorded. The flows on the Animas River were below average this month. There were 53 out of 103 years of record where the total flow past the Durango stream gauge was more than this year. The other basins within the division fared about the same. There were 69 out of 103 years of record where the total flow past the Dolores stream gauge was more than this year and 85 out of 97 years of record where the total flow past the La Plata River at Hesperus gauge was more than this year.



## ADDITIONAL INFORMATION ABOUT COLORADO SWSI CALCULATIONS - Jul-14

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

**Summer SWSI Component Weights**

| Basin | Reservoir Storage | Streamflow | Precipitation (this month only) |
|---|---|---|---|
| South Platte | 0.65 | 0.25 | 0.1 |
| Arkansas | 0.35 | 0.55 | 0.1 |
| Rio Grande | 0.05 | 0.9 | 0.05 |
| Gunnison | 0.3 | 0.6 | 0.1 |
| Colorado | 0.25 | 0.7 | 0.05 |
| Yampa/White | 0 | 0.9 | 0.1 |
| San Juan/Dolores/Animas | 0.1 | 0.85 | 0.05 |

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 July 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.