Study documents '12 drought conditions on Fork and Crystal

By Brent Gardner-Smith
Aspen Journalism

Due to water diversions during the hot and dry summer of 2012, sections of the Roaring Fork River through Aspen and the Crystal River above Carbondale were running significantly below the levels a state water agency says are necessary to protect the environment, according to a recent study.

The Colorado Water Conservation Board (CWCB) holds an instream flow right of 32 cubic feet per second (cfs) for the upper Roaring Fork River for the reach between Difficult and Maroon creeks — the amount of water needed "to protect the environment to a reasonable degree."

But measurements taken in July, September and October showed the river at the Mill Street bridge in Aspen running at 4.7 cfs in July, 17 cfs on Sept. 5, 19 cfs on Sept. 18 and 26 cfs on Oct. 16.

"The upper Roaring Fork River was found most vulnerable to low flows in the segment located near the city of Aspen between the Aspen Club and the confluence with Castle Creek," states a report from S.K. Mason Environmental, LLC. "In July, diversions depleted incoming streamflow on this section by 80 percent."

The CWCB's instream flow right on the Crystal River below Avalanche Creek to the confluence with the Roaring Fork is 100 cfs.

But measurements taken on the Crystal River at Thomas Road, just above the Pitkin-Garfield county line, showed flows in the Crystal at 4 cfs on Sept. 4 and as low as 1 cfs on Sept. 22.

"Several miles of the Crystal River between Thompson Creek and Prince Creek are particularly prone to de-watering. September flows at several locations on this segment were so low that they were nearly unmeasurable," the report states.

The "snapshot" assessment of the flows in the Fork and Crystal rivers was done by S.K. Mason Environmental for Public Counsel of the Rockies and its Friends of Rivers and Renewables initiative, as well as the Roaring Fork Conservancy, which has been studying conditions in the watershed.

Funding for the study came from Pitkin County's Healthy Rivers and Streams program and the CWCB.

The county's river board is set to discuss the study at a meeting on Thursday.

Much of the streamflow information in the study was taken by hand to add to the available data from existing streamflow gauges on the river.

Data was manually collected at six sites on the Roaring Fork and added to data from two existing stream gauges.

On the Crystal, data was manually gathered at 12 sites and then added to data from two existing gauges.

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The Fork's flow

About 40 percent of the water that would normally flow down the Roaring Fork River below Lincoln Creek is diverted each year under the Continental Divide through a tunnel that starts at Grizzly Reservoir. So the Roaring Fork River is already a shadow of its natural self when it flows past Difficult Creek.

On July 25, 2012, the Independence Pass Tunnel was diverting and the Fork was flowing at 25 cfs below Difficult Creek, which is under the 32 cfs set by the state for environmental reasons.

Below the Salvation Ditch, the river was flowing at 7.6 cfs. The Salvation Ditch diverts water river-right above the Aspen Club and sends it to property owners along the ditch, as far as lower Woody Creek.

This indicates the Salvation Ditch, which has a decreed right to divert 59 cfs, was diverting 17.4 cfs on July 25 and leaving 7.6 cfs in the river.

The river shrunk still more that day below the Wheeler Ditch, which has a decreed right to divert 10 cfs of water for use by the city of Aspen.

On July 25, the Fork dropped from 7.6 cfs to 5.2 cfs below the Wheeler ditch head gate, indicating the Wheeler was diverting 2.4 cfs that day.

The river then apparently picked up 12.4 cfs at its confluence with Hunter Creek and flowed down to Castle Creek with 17.6 cfs — still below the 32 cfs instream flow right held by the CWCB.

Another 53.4 cfs flowed into the Fork from Castle Creek and another 52 came in from Maroon Creek, leaving the Fork at 123 cfs below Maroon Creek.

On Sept. 5 and 6, the Fork dropped from 31 cfs above the Salvation Ditch to 24 cfs and then down to 17 cfs below the Wheeler and other small irrigation diversions.

On Oct. 16, the Fork went from 38 cfs above the Salvation ditch to 34 cfs, and then down to 26 cfs below the Wheeler ditch.

The higher flows in October reflect the late-season "Cameo call" from irrigators near Grand Junction, which can force less water to be diverted off the top of the Fork.

Drying up the Crystal

The Crystal River is not subject to trans-basin diversions like the Fork, but local diversion structures for irrigation uses regularly leave some sections nearly dry, and have done so for decades.

There are major diversions on the Crystal at 12 locations below Avalanche Creek ranging from the Sweet Jessup Canal, with a decreed right of 75 cfs, to the Helms Ditch with a decreed right of 6 cfs.

The Crystal is an "over-appropriated" river, meaning there are frequently more water rights on paper than there is wet water to divert.

This "produces a system that frequently fails to fulfill existing water allocations or meet recommended flows for the maintenance of ecological integrity," the S.K. Mason Environmental report states.

On Sept. 22 and 23, the Crystal River was flowing at 68 cfs above the Sweet Jessup Ditch, already well below the 100 cfs instream flow right held by the CWCB.

The Sweet Jessup then apparently diverted 10 cfs from the river. Then, not too far down river, the East Mesa Ditch diverted another 32 cfs, according to the study. East Mesa has a decreed diversion right of 41.8 cfs.

When the Crystal River reached the Lowline Ditch, it went from 24 cfs down to 7 cfs, indicating the Lowline was diverting 17 cfs. The Lowline has a decreed diversion right of 40.5 cfs.

After two other diversions to the Ella and Helms ditches, the Crystal was left flowing at just 1 cfs at Thomas Road, which is about a mile into Pitkin County.

"During September, flow in the river channel near Thomas Road was extremely low," the S.K. Mason Environmental report states. "Importantly, dry river sections prohibit movement of migrating fish during important fall spawning periods."

Low flows also lead to warmer water temperatures, which can hurt fish.

Measurements taken on Sept. 4 and 5 showed the Crystal dropping from 77 cfs to 59 cfs below the Sweet Jessup, to 29 cfs below the East Mesa Ditch, to 24 cfs below the Lowline Ditch, and then down to only 4 cfs near Thomas Road.

The Crystal River on Sept. 22 and 23 then picked up about 7 cfs of water coming in river-right from Thomas Creek, but the river never got above 22 cfs as it flowed through Carbondale.

The report recommends locations for new streamflow gauges to better monitor the de-watered sections of the Fork and the Crystal, and it warns there are no easy solutions for the dry sections of river.

"Faced with the many pressures created by growing local population, increasing Front Range demands on trans-basin supplies, and the effects of climate change on Rocky Mountain water yields, the challenge of managing rivers in a way that meets the need of human communities without causing considerable impact to ecological function is greater than ever," the report found.

Editor's note: Aspen Journalism and the Aspen Daily News are collaborating on coverage of land and water in Pitkin County.

bgardnersmith@mail.com

Attachment D