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CODOS UPDATE FOR WOLF CREEK PASS: MARCH 28, 2012

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SUMMARY

Colorado's substantially sub-par reservoir of SWE now contains two significant (D5 and D4) and one minor (D6) dust layers at/near the snowpack surface statewide, and is vulnerable to continued prolonged periods of dry, sunny weather combined with reduced snow albedo. This Update presents site-by-site and [summary](#) analyses of snowmelt rates at CODOS and other Snotel sites for Water Years 2006-2011.



Snowpack conditions in the Upper Rio Grande and upper San Juan River watersheds are likely still mixed, with some cold content persisting in the alpine terrain at the same time that isothermal snow in the subalpine portion of the Basin has begun releasing snowmelt runoff. Merged dust layers D6/D5/D4 are reducing snow albedo throughout the watershed. The Wolf Creek Summit Snotel site has shown no recent decline in SWE but the Beartown Snotel site on the Rio Grande main stem is experiencing loss of SWE. The Rio Grande at Del Norte stream gauge shows two mild surges associated with reduced snow albedo and warm weather, while the San Juan River at Pagosa Springs gauge shows stronger surges. Should dry weather continue to dominate this spring season, and dust-enhanced snowmelt rates approach the average or maximum rates discussed below, snow all gone (SAG) may occur early at these Snotel sites and throughout the upper Rio Grande and San Juan River watersheds producing early peak streamflows, early passage of runoff center of mass, and steep descending limbs on the Rio Grande and San Juan river hydrographs.

SNOWPACK DISCUSSION

We have no new first-hand snowpack observations to present. Our next visit to the Wolf Creek Summit site will be in early April, as weather and dust conditions dictate.

MELT RATE

The [table below](#) presents Water Year analyses of snowmelt behavior at the Snotel station adjoining this CODOS site beginning with WY 2006. The date of Peak SWE and subsequent number of days to "snow all gone" (SAG) are shown for each Water Year. Then, the amount of additional SWE received *after* the date of Peak SWE is added to Peak SWE to calculate an "adjusted daily mean loss [of] SWE" rate during the snowmelt season that Year. Finally, the mean air temperature during the period from Peak SWE to SAG, as measured at the Snotel site, is shown for each Water Year. A [current Snotel plot](#) is presented below the table. The intent of this table is to refresh memories of snowmelt rates during the past several dust-influenced Spring seasons, and to assess this year's snowpack conditions in light of those past years.

As of Tuesday, March 27, 2012, the Wolf Creek Summit Snotel reports no loss of SWE since March 21, following the upward bump in SWE produced by the March 18 snowstorm that delivered D5. At zero, this recent melt rate falls well short of the mean daily loss rates shown in the table below, and very far short of the maximum SWE loss rate last Spring of 1.48" per day, over a 5-day period ending June 19, 2011.

Further, although we do not routinely visit the site, the **Beartown Snotel** data (see [snowmelt table](#) and [SNOTEL graph](#)) also reflects upper Rio Grande basin snowmelt behavior. As of March 27, this Snotel reports a loss of 2.0" SWE since March 21st, a rate of 0.3" per day, still short of the mean daily loss rates shown in the table, and very far short of the maximum SWE loss rate last Spring of 1.74" per day, over a 5-day period ending June 8, 2011.

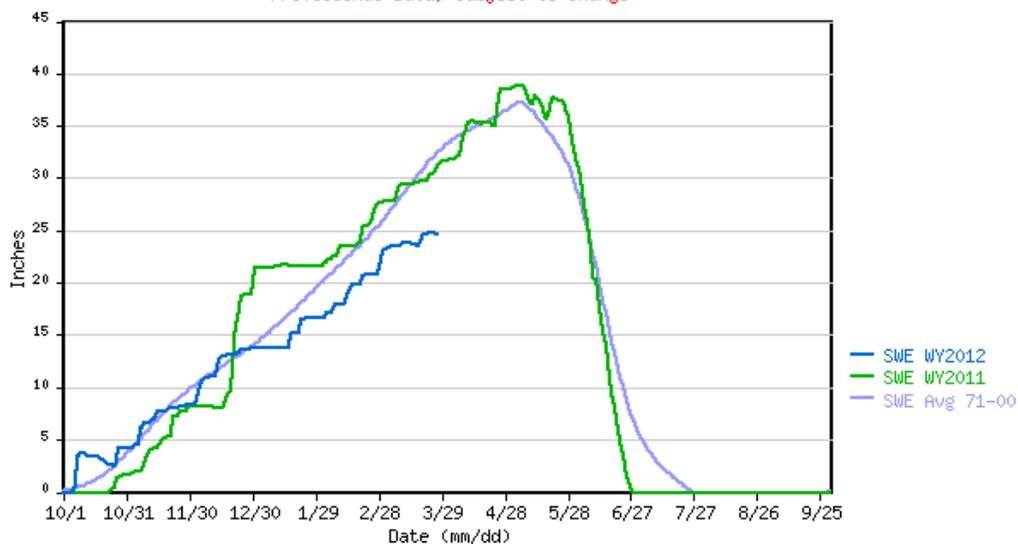
Wolf Creek Summit SNOTEL Snowmelt Season Summary Data

	Date	Peak	Days	Post-Peak	Adjusted	Period
	Peak SWE	SWE	to SAG	Added	Daily	Mean
				SWE	Loss	Temp
					SWE	
WY 2006	5/1/2006	25.7	40	1.2	0.67	7.7
WY 2007	4/26/2007	32.3	59	5.6	0.64	6.5
WY 2008	4/26/2008	47.5	71	3.7	0.72	6.7
WY 2009	5/6/2009	35.9	49	3.5	0.80	7.1
WY 2010	5/5/2010	37.1	44	1.4	0.88	7.1
WY 2011	5/5/2011	38.9	54	4.5	0.80	7.4
Max	5/6	47.5	71	5.6	0.88	7.7
Min	4/26	25.7	40	1.2	0.64	6.5
Range	11	21.8	31	4.4	0.23	1.1

Adjusted Daily Mean Loss SWE rates include additional SWE received after date of Peak SWE

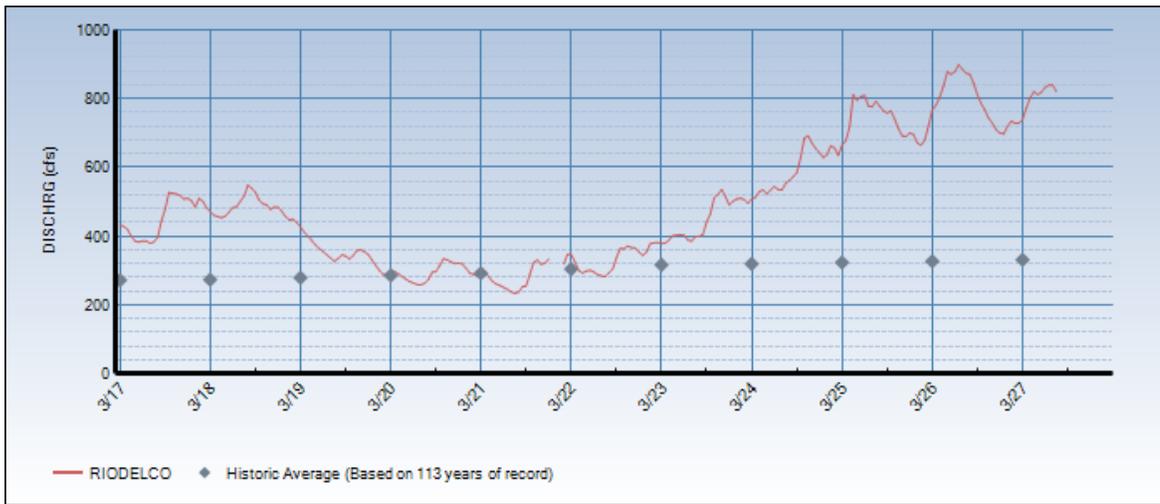
06M17S SNOTEL as of 03/27/2012

*** Provisional Data, Subject to Change ***



STREAM FLOWS

Streamflow data reflect a variety of processes influencing runoff rates, but recent data from the Rio Grande at Del Norte stream gauge does include the influence of the reduction of snow albedo by D4 and very warm temperatures from March 7-17, a decline flows with restoration of higher snow albedo (with cooler weather) on March 18, and then another increase in flows with the subsequent warmup and reduction in snow albedo as D5 emerged and merged with D4. Event D6 may also be contributing to the most recent data. The [San Juan River at Pagosa Springs gauge](#) shows a similar, but somewhat more amplified response to the same sequence of weather and dust events.



FORECAST

As of Tuesday afternoon forecasters at the Grand Junction National Weather Service anticipate continued warm and generally dry weather through the remainder of this week, with the warmest temperatures of the week on Saturday. The northern mountains may experience some light showers and more cloudiness than the southern half of the state. Snowmelt rates are likely to continue to increase through Saturday.

By Saturday afternoon an approaching trough and associated cold front are expected to generate another episode of strong pre-frontal SW'ly winds for the State. Winds will sustain and become W'ly on Sunday. Dust source areas in the Colorado Plateau may yield to these SW'ly and W'ly winds and produce another dust event beginning Saturday afternoon. This weekend's cold front may, once again, *not* deliver a significant winter storm. However, a return to cooler, more seasonable temperatures by Sunday/Monday does seem likely. In the absence of new snow with this weekend cold front, a dry D7 event, should it occur, would generally fall directly onto already exposed and merged D6/D5/D4 dust, further reducing snowpack albedo throughout the Colorado mountains.