DRAFT SUBJECT TO CHANGE

Tuolumne River Basin Snowpack Summary
ASO Updates

Water Year 2019

July 2 to July 3

USDA Agricultural Research Service, Boise, Idaho
NASA Jet Propulsion Lab, Pasadena, California

Summary

Model results were created from *iSnobal* and input from NOAA's High Resolution Rapid Refresh atmospheric model. Model snow depths were updated with ASO snow depths on 05/04.

The total amount of water stored in the snowpack as of July 3 is estimated to be **208.7 TAF**, which represents a change of **−11.7 TAF** of snow storage during the reporting period.

	Current			Report Period		Water Year		
Basin	SWE [TAF]	SWE [% total]	SWE [in]	SWI [TAF]	ΔSWE [TAF]	SWI [TAF]	Precip [in]	Rain [% precip]
Tuolumne	146.2	70.1	6.0	17.8	-8.6	85.8	0.1	∼100
Cherry Creek	47.2	22.6	7.7	4.9	-2.3	28.1	0.1	∼100
Eleanor	15.4	7.4	3.7	1.6	-0.7	15.2	0.2	∼100
Extended Tuolumne	208.7	100	6.0	24.3	-11.7	129.1	0.1	∼∼100

Table 1: Snow storage and surface water inputs.

In cooperation with

Results

SWE [in], 2019-7-3

Elevation	Extended Tuolumne	Tuolumne	Cherry Creek	Eleanor
3000	0.0	0.0	-	-
4000	0.0	0.0	0.0	0.0
5000	0.0	0.0	0.0	0.0
6000	0.0	0.0	0.0	0.0
7000	0.5	0.2	1.3	0.2
8000	5.1	2.9	9.5	9.4
9000	10.5	8.4	20.2	22.6
10000	10.6	10.4	18.5	23.0
11000	14.1	14.1	-	-
12000	17.6	17.6	-	-
13000	0.0	0.0	-	-
mean	6.0	6.0	7.7	3.7

Table 2: Mean depth of SWE by elevation band.

Change in SWE [in], 2019-7-2 to 2019-7-3

Elevation	Extended Tuolumne	Tuolumne	Cherry Creek	Eleanor
3000	0.0	0.0	-	-
4000	0.0	0.0	0.0	0.0
5000	0.0	0.0	0.0	0.0
6000	0.0	0.0	0.0	0.0
7000	0.0	0.0	-0.1	0.0
8000	-0.3	-0.2	-0.4	-0.5
9000	-0.5	-0.4	-1.0	-1.0
10000	-0.8	-0.7	-0.7	-1.1
11000	-0.7	-0.7	-	-
12000	-0.5	-0.5	-	-
13000	0.0	0.0	-	-
mean	-0.4	-0.4	-0.3	-0.2

Table 3: Change in depth of SWE by elevation band.

SWE volume, percent of basin total by elevation band, 2019-7-3

Elevation	Extended Tuolumne	Tuolumne	Cherry Creek	Eleanor
3000	0.0	0.0	-	-
4000	0.0	0.0	0.0	0.0
5000	0.0	0.0	0.0	0.0
6000	0.0	0.0	0.0	0.0
7000	1.2	0.3	3.8	1.9
8000	19.1	10.3	39.7	39.6
9000	46.3	43.6	52.2	54.5
10000	23.5	31.8	4.2	3.9
11000	8.6	12.3	-	-
12000	1.2	1.8	-	-
13000	0.0	0.0	-	-

Table 4: Percent of SWE volume by elevation.

SWE [TAF], 2019-7-3

Elevation	Extended Tuolumne	Tuolumne	Cherry Creek	Eleanor
3000	0.0	0.0	-	-
4000	0.0	0.0	0.0	0.0
5000	0.0	0.0	0.0	0.0
6000	0.1	0.0	0.0	0.0
7000	2.5	0.4	1.8	0.3
8000	39.9	15.0	18.7	6.1
9000	96.7	63.7	24.6	8.4
10000	49.0	46.4	2.0	0.6
11000	18.0	18.0	-	-
12000	2.6	2.6	-	-
13000	0.0	0.0	-	-
mean	208.7	146.2	47.2	15.4

Table 5: Volume of SWE by elevation band.

SWI [TAF] by elevation, 2019-7-2 to 2019-7-3

	Extended Tuolumne	Tuolumne	Cherry Creek	Eleanor
3000	0.0	0.0	0.0	0.0
4000	0.0	0.0	0.0	0.0
5000	0.0	0.0	0.0	0.0
6000	0.0	0.0	0.0	0.0
7000	0.4	0.1	0.3	0.1
8000	4.3	1.7	2.0	0.7
9000	10.3	7.1	2.4	0.8
10000	7.2	7.0	0.2	0.1
11000	1.8	1.8	0.0	0.0
12000	0.2	0.2	0.0	0.0
13000	0.0	0.0	0.0	0.0
total	24.3	17.8	4.9	1.6

Table 6: Volume of SWI during the report period.

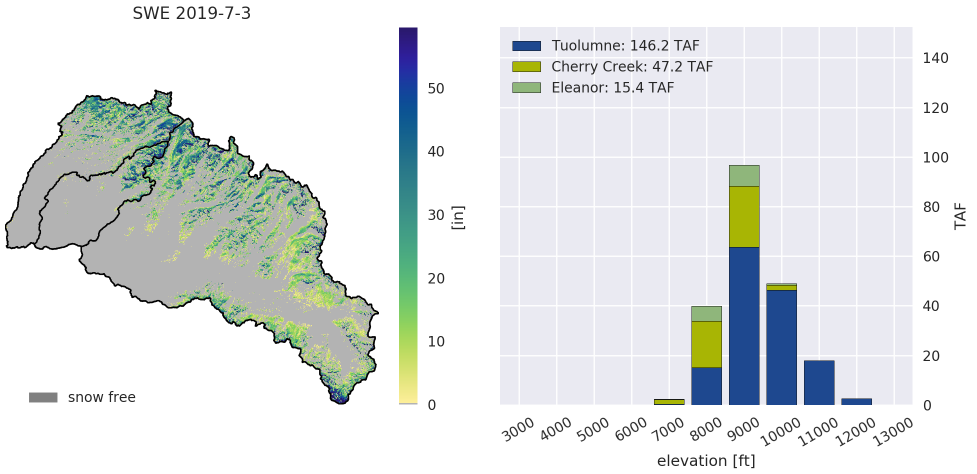

Figure 1: Current SWE as a depth (left), and volume by elevation band (right).

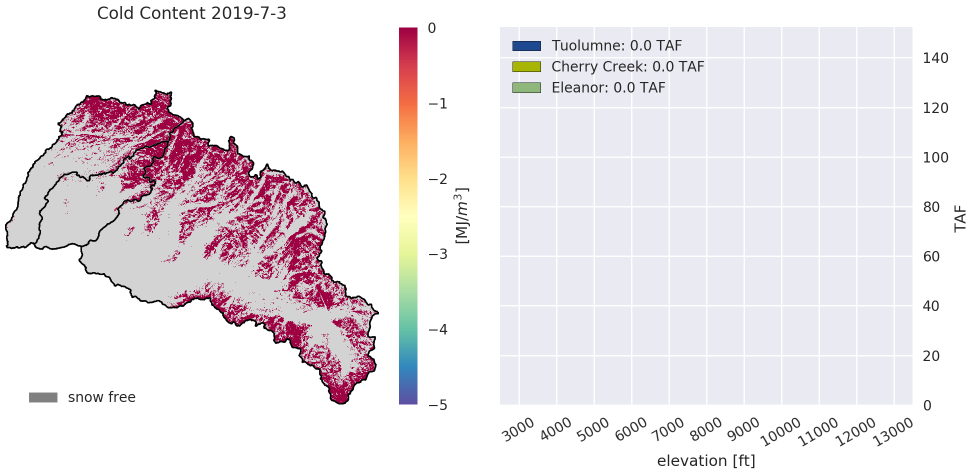

Figure 2: Snowpack cold content (left), and volume of snow that is unavailable for melt, based on the cold content, by elevation band (right). Snow that requires enough additional energy inputs to reach 0°C that it is unavailable for melt appears as blue in the left panel. Storage volume in the right panel indicates the amount of unavailable snow, on the same y-axis limit as the total storage.

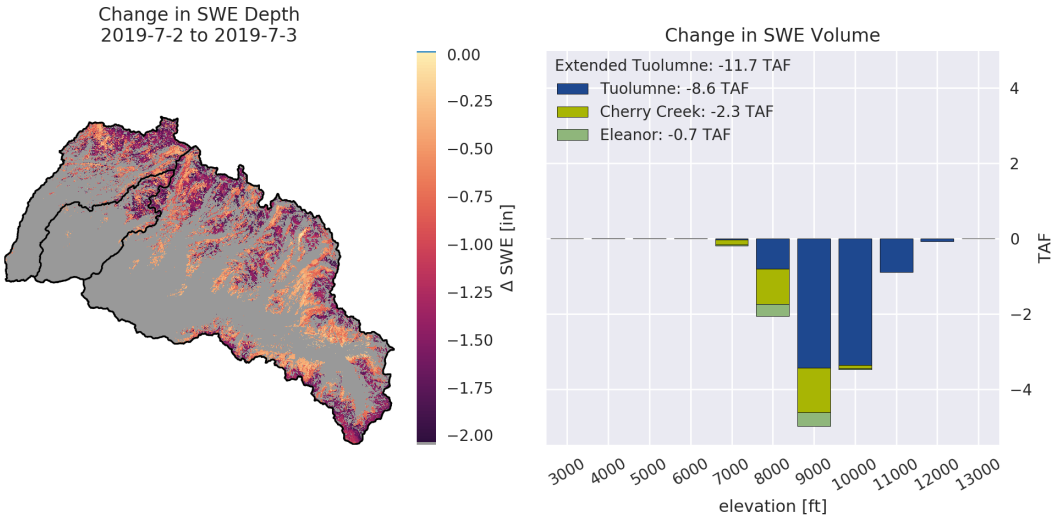

Figure 3: Change in SWE during the reporting period, as a depth (left) and as a function of elevation band (right). Changes include effects of including depth updates if those occurred during the report period.

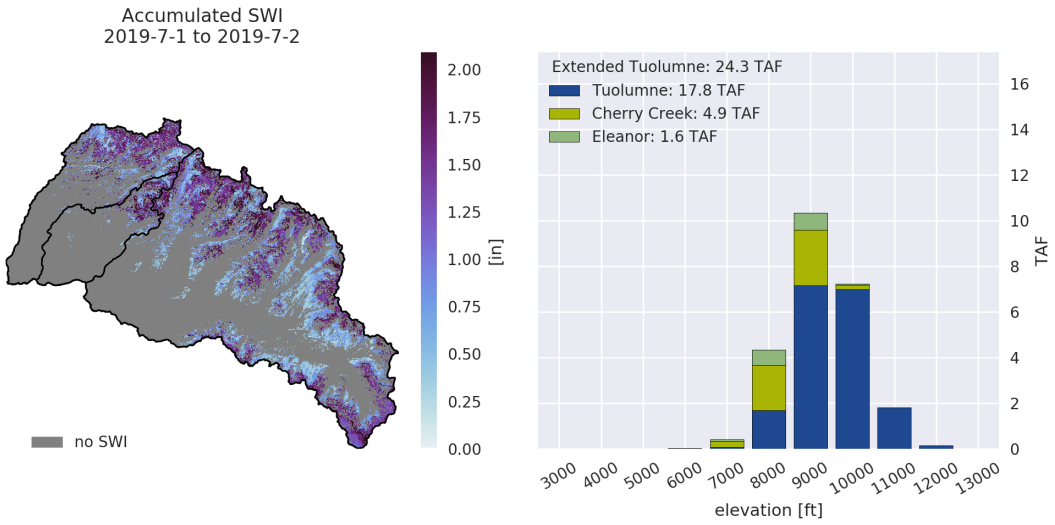

Figure 4: Current Surface Water Inputs (SWI) for the reporting period, as a depth (left) and as a function of elevation band (right).

Snow Depth Update

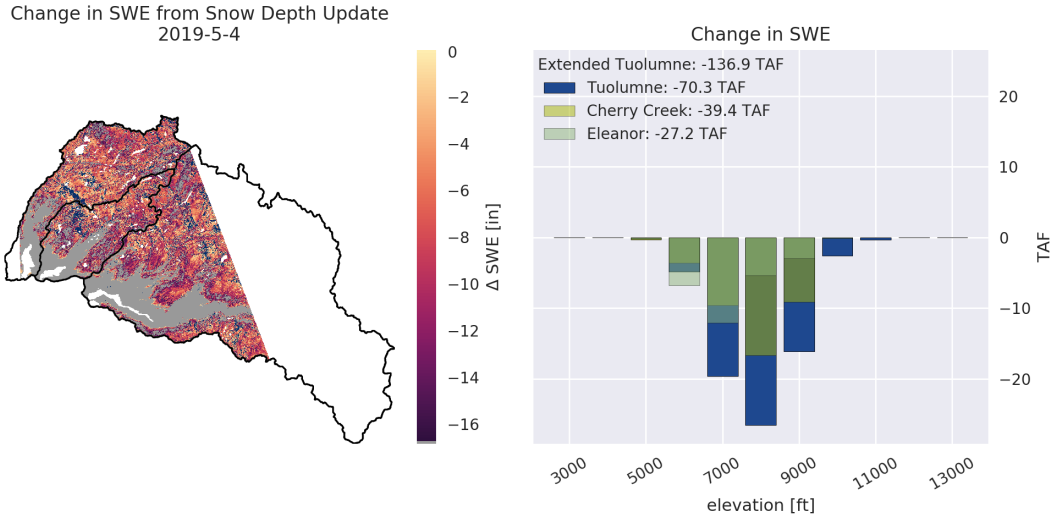

Figure 5: Change in SWE as a result of the snow depth update, as a depth (left) and as a function of elevation band (right).

Change in SWE [TAF] by elevation, from 20190504 update

	Extended Tuolumne	Tuolumne	Cherry Creek	Eleanor
3000	0.0	0.0	0.0	0.0
4000	-0.1	-0.0	-0.0	0.0
5000	-0.6	-0.3	-0.3	-0.0
6000	-15.2	-4.8	-3.6	-6.8
7000	-41.2	-19.6	-9.6	-12.1
8000	-48.5	-26.5	-16.7	-5.3
9000	-28.2	-16.1	-9.1	-2.9
10000	-2.7	-2.6	-0.1	-0.1
11000	-0.4	-0.4	0.0	0.0
12000	-0.0	-0.0	0.0	0.0
13000	0.0	0.0	0.0	0.0

Glossary

SWE: Snow Water Equivalent

ΔSWE: change in SWE during the reporting period

SWI: Surface Water Inputs, total of all water inputs to the basin (combination of snowmelt that exits the base of the snowpack and rain on bare ground)

Rain: approximate percent of precipitation that fell as rain

Cold Content: energy required to bring the snowpack to 0°C

STATEMENT OF INTENT: This report is created as a product of a research agreement between the USDA-ARS Northwest Watershed Research Center and the NRCS National Water and Climate Center. This report is intended to demonstrate the capabilities of real time physically-based snow modeling and the tools being developed within the scope of that research agreement. USDA-ARS provides the data to the best of its knowledge and shall not be liable for any consequences of any kind, including, but not limited to, lost revenues and profits, that arise from using the products provided.

Contact:
Mark Robertson, mark.robertson@ars.usda.gov, (208) 422-0729
Scott Havens, scott.havens@ars.usda.gov, (208) 422-0739

Published: 2019-7-16 15:25, v0.8.4