



ASO + M3 Works Modeling Report

Windy Gap River Basin

Model date: May 16, 2023

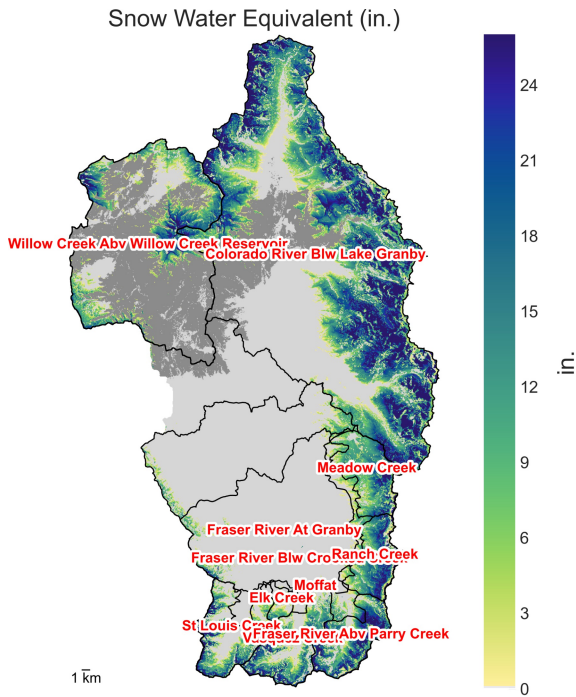
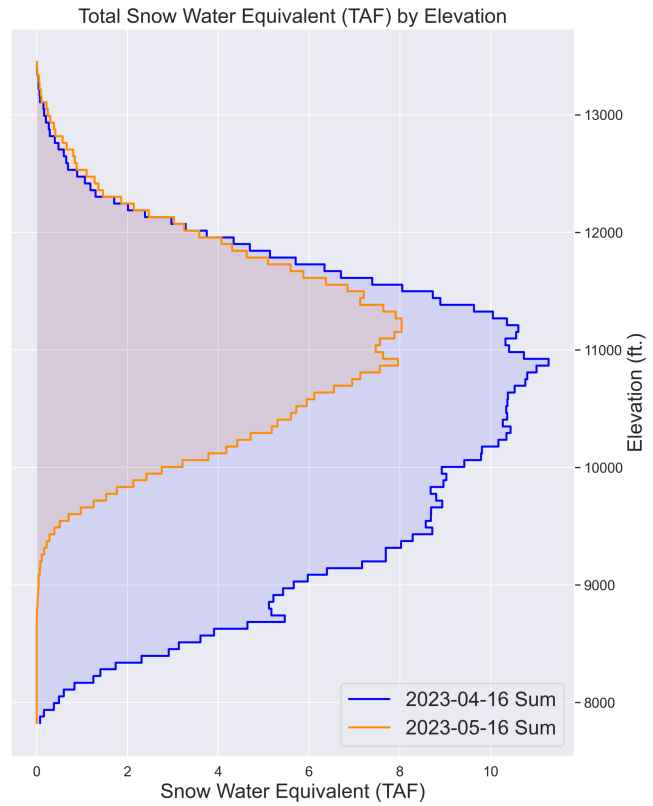


Historical data and reports can be found at:
data.airbornesnowobservatories.com

WINDY GAP RIVER BASIN MAY 16, 2023 MODELING REPORT

Current model date: May 16, 2023
Model Total Snow Water Equivalent: 252.4 TAF
Model Mean Snow Water Equivalent: 6.0 in.
Model Mean Cold Content: -0.0 MJ/m²

Model reporting period: April 16 - May 16, 2023
Change in Total Snow Water Equivalent: -285.7 TAF
Change in Mean Snow Water Equivalent: -6.8 in.
Accumulated Total Surface Water Input: 407.3 TAF
Accumulated Total Precipitation: 135.0 TAF
Change in Mean Cold Content: 0.7 MJ/m²



DESCRIPTION	TOTAL	FRASER RIVER BLW CROOKED CREEK	MOFFAT	RANCH CREEK	FRASER RIVER AT GRANBY	WILLOW CREEK ABV WILLOW CREEK RESERVOIR	VASQUEZ CREEK
Mean SWE in.	6.0	5.4	9.3	13.7	4.2	2.9	8.6
Total SWE TAF	252.4	64.9	63.3	11.6	66.5	20.6	11.2

ST LOUIS CREEK	COLORADO RIVER BLW LAKE GRANBY	MEADOW CREEK	FRASER RIVER ABV PARRY CREEK	ELK CREEK
7.2	9.9	11.3	14.5	3.2
9.5	165.1	11.8	15.5	0.7

The model has been updated with ASO survey data, a brief summary of the changes to the model are provided:
 April 16 update summary: removed 59.8 TAF of Snow Water Equivalent

State of the Snowpack

Interpretation Notes

Elevation bands are in increments of 1000 ft, e.g., 4000 is 4000 - 5000 ft.

Mean SWE is calculated over the total basin area. Mean cold content is calculated over the snow covered area to reflect the ripeness of the existing snowpack.

Surface Water Input (SWI) includes liquid water leaving the bottom of the snowpack and rain on bare ground.

Forcing data is created with the Spatial Modeling for Resources Framework (SMRF) using the High Resolution Rapid Refresh (HRRR) output fields as inputs.

The darker grey shading in the spatial figures displays where vegetation parameters have been adjusted to account for altered energy dynamics due to fire damage.

Model Results

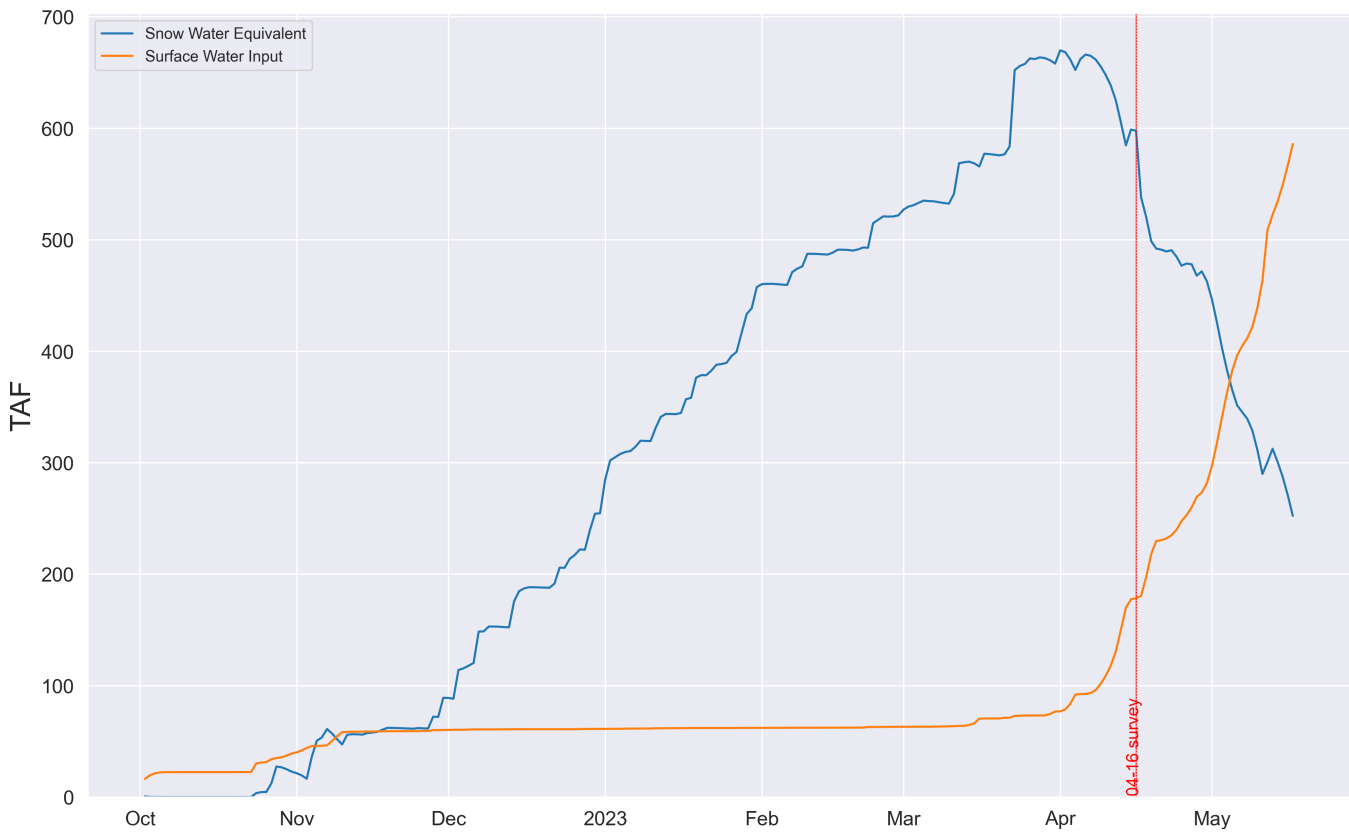
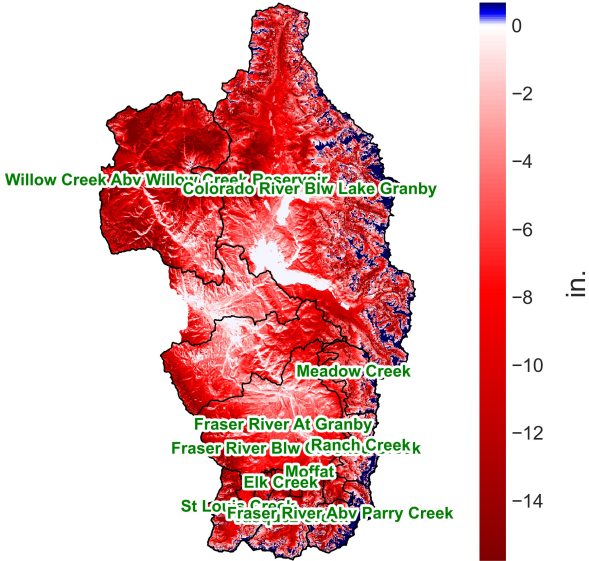


Fig.3 Water Year timeseries. Vertical lines indicated ASO survey dates.

Change in Snow Water Equivalent (in.)



Change in Total Snow Water Equivalent (TAF) per Elevation band

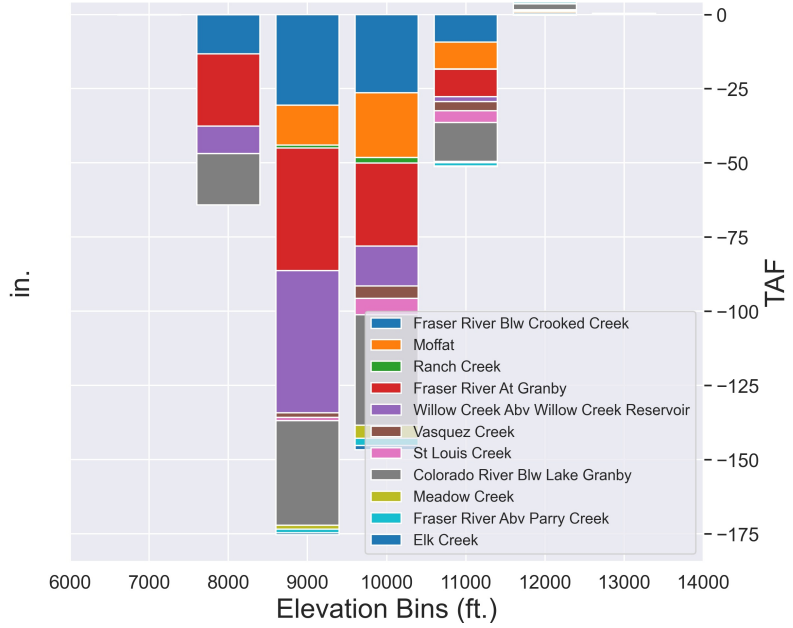
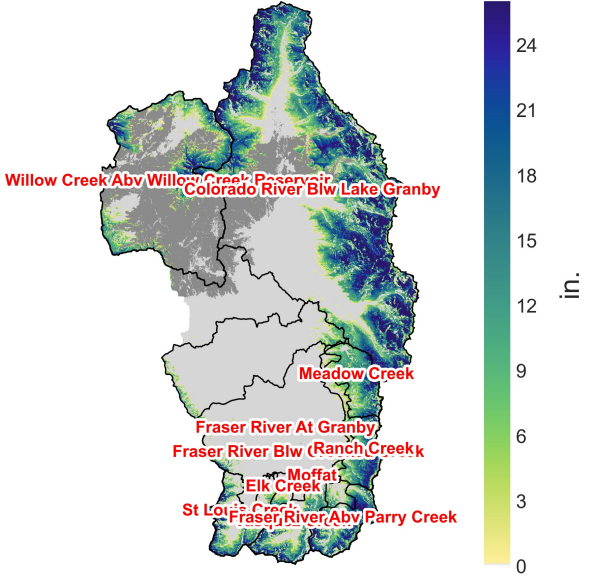


Fig.4 Change in Snow Water Equivalent from 2023-04-16 to 2023-05-16

Snow Water Equivalent (in.)



Total Snow Water Equivalent (TAF) per Elevation band

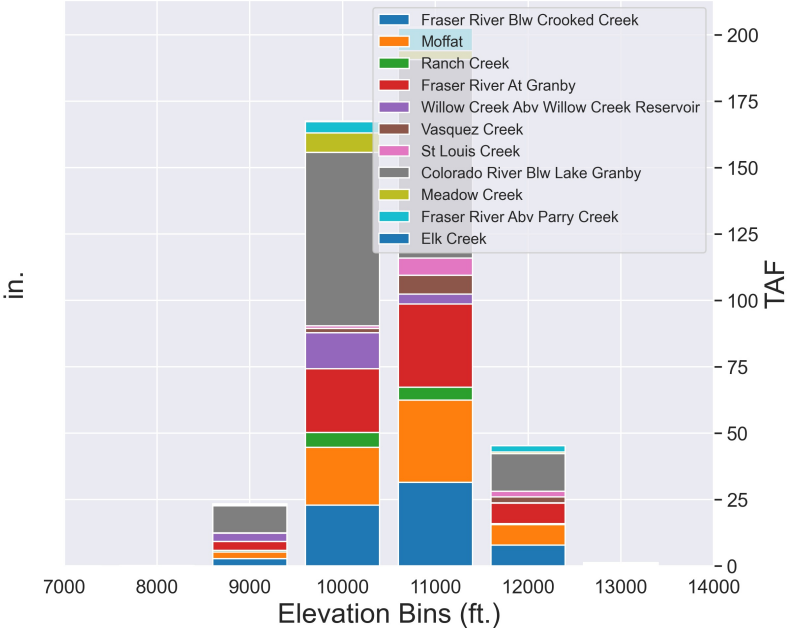


Fig.5 Snow Water Equivalent as of 2023-05-16

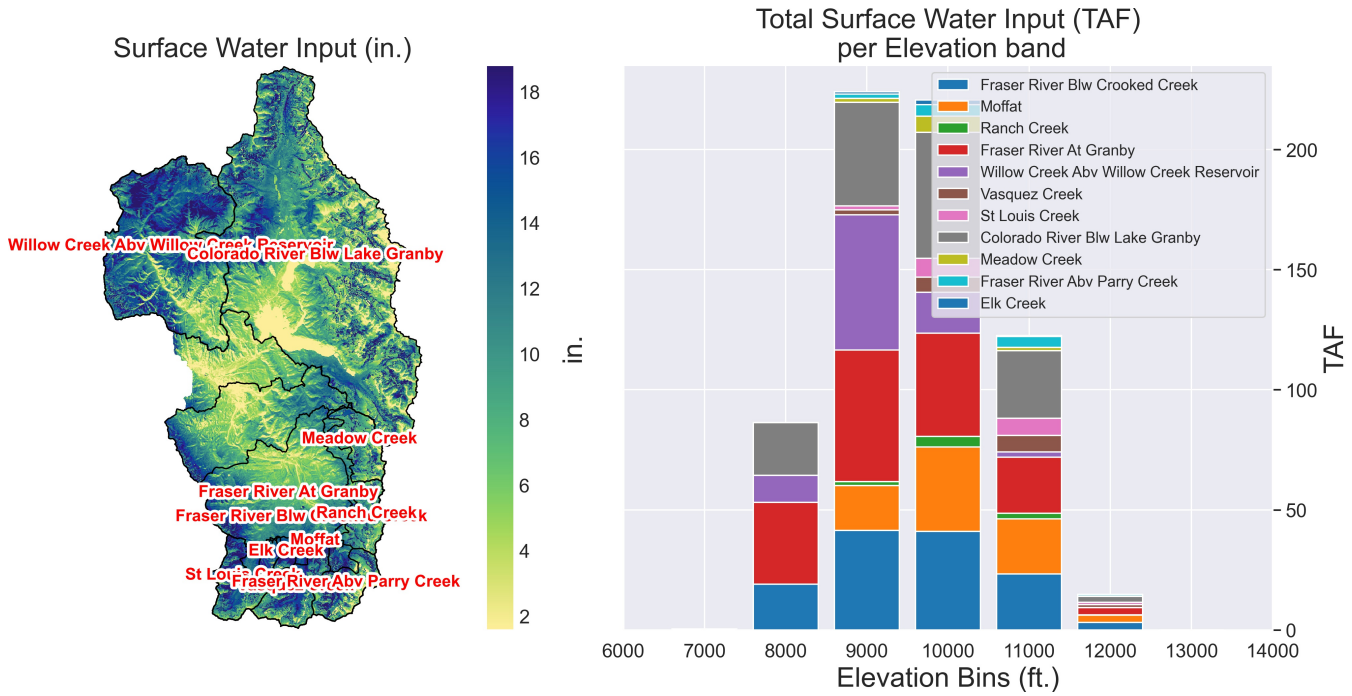


Fig.6 Accumulated Surface Water Input from 2023-04-16 to 2023-05-16

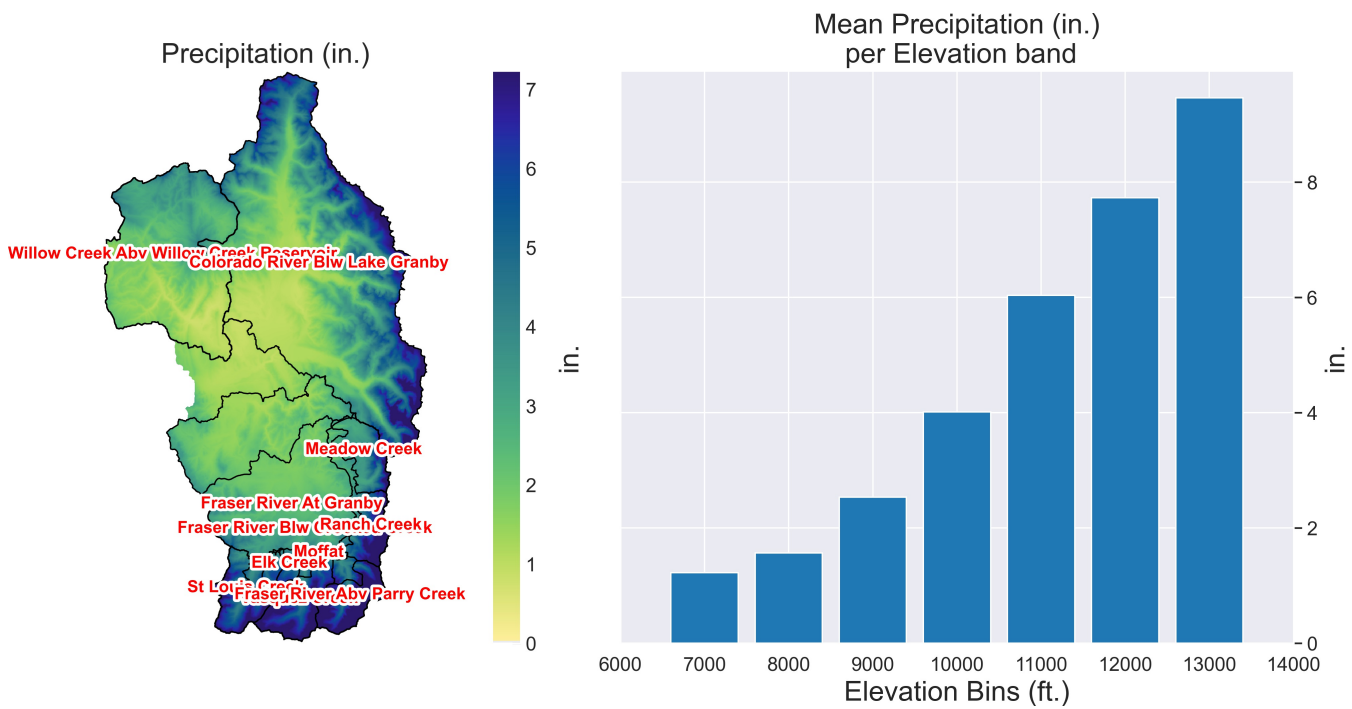


Fig.7 Accumulated Precipitation from 2023-04-16 to 2023-05-16. Precipitation fields are locally interpolated using SMRF with underlying data from HRRR.

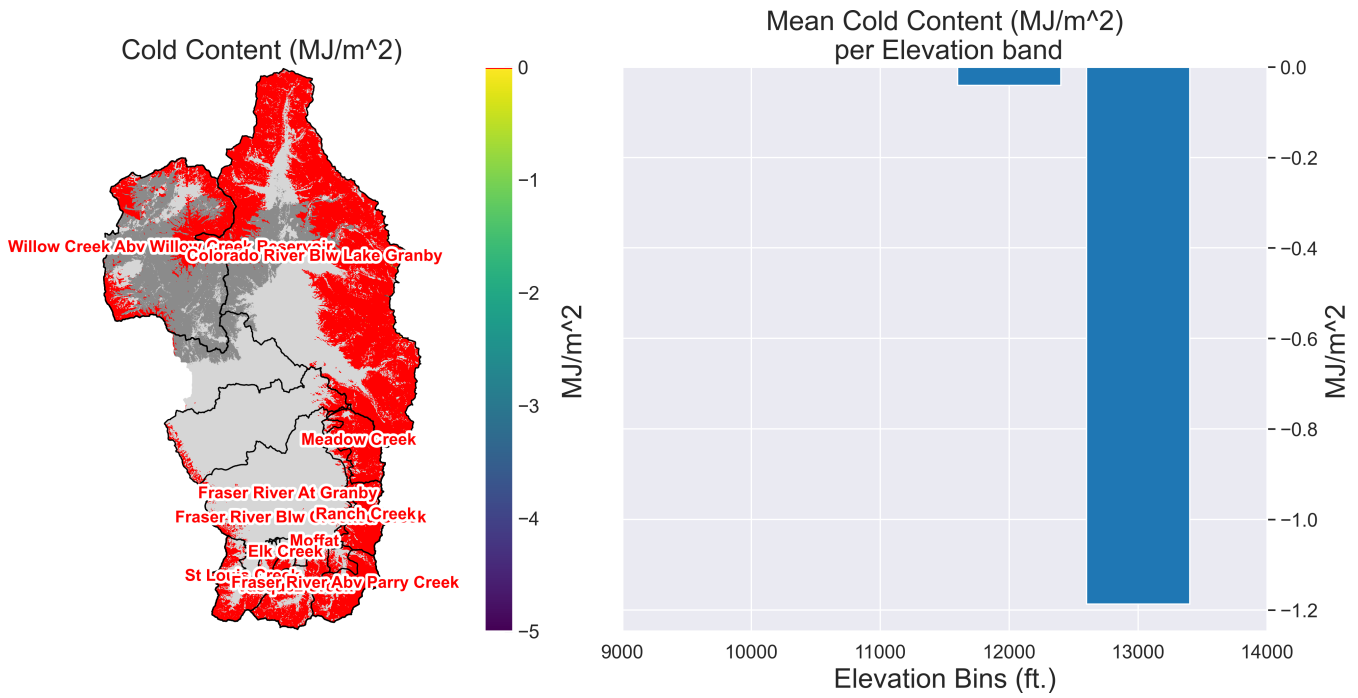


Fig.8 Cold Content as of 2023-05-16

Very little cold content remains in the Windy Gap basin. The remaining un-ripe snow exists only above 10262 ft., and represents approximately 0.40% of the basin SWE.

WINDY GAP RIVER BASIN MAY 16, 2023 MODELING REPORT

Model to station comparisons are a comparison of 50 meter cells to a point within the basin. Some differences are expected when comparing modeled and measured snowpack behavior at these different spatial scales. ASO 3m snow depth measurements at each station are indicated by the red '+' symbols. Absence of these symbols indicates that the station location or data quality are suspect, and they were not used in the ASO survey validation and report.

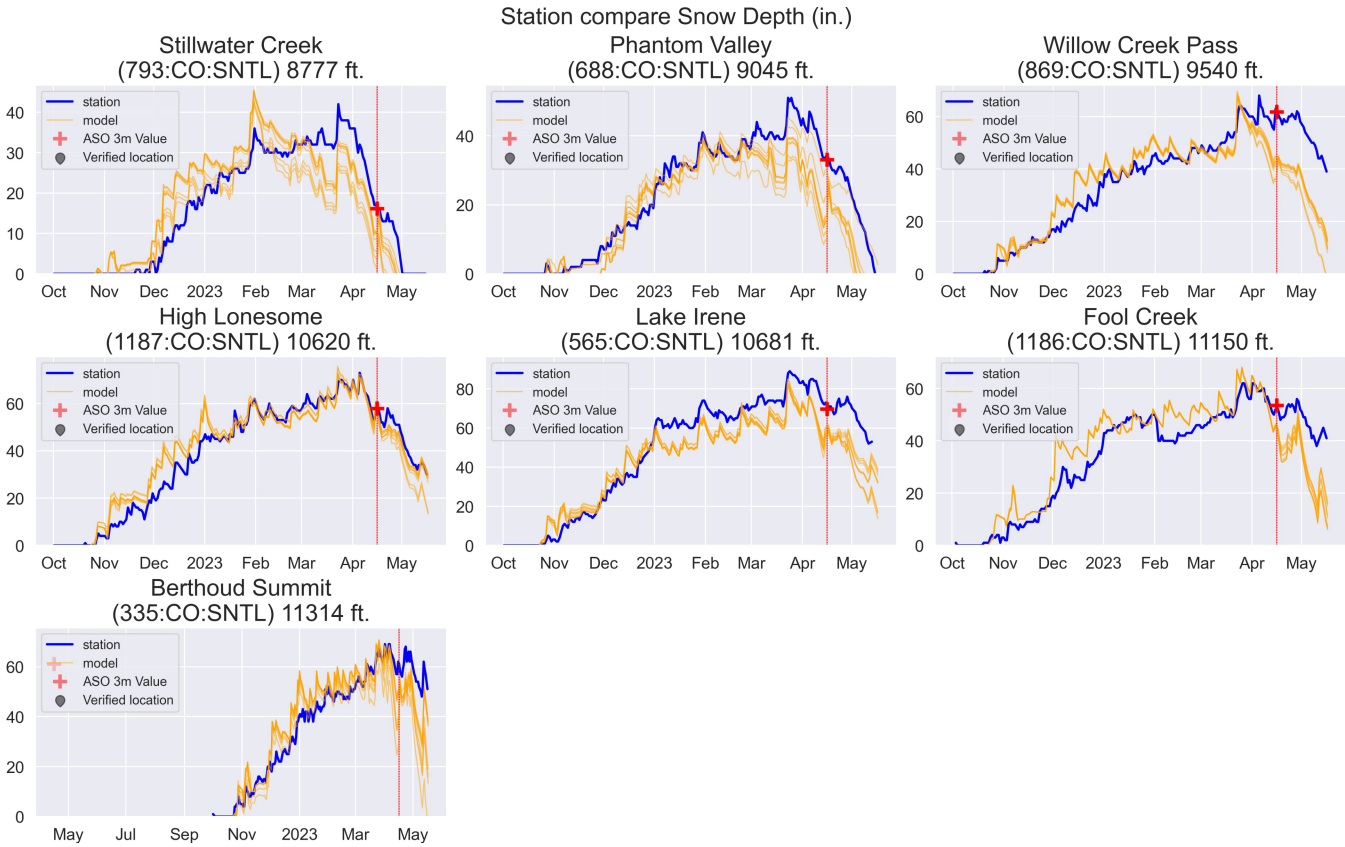


Fig.9 Comparison of modeled and measured Snow Depth. Comparisons of model pixels to measured station data are performed with the 9 nearest model pixels to give a more spatially complete view of model behavior.

WINDY GAP RIVER BASIN MAY 16, 2023 MODELING REPORT

Model Description

Modeled data is generated using the Automated Water Supply Model (AWSM). Underlying forcing data is sourced from the High Resolution Rapid Refresh model (HRRR). AWSM simulates the snowpack state using the physically based, distributed energy and mass balance snow model, iSnoBal.

For more information on the Airborne Snow Observatories Inc. visit airbornesnowobservatories.com.

More information about M3 Works can be found at m3works.io.

Additional Details

Total Snow Water Equivalent values (TAF) on 2023-05-16

ELEVATION RANGE	TOTAL	FRASER RIVER BLW CROOKED CREEK	MOFFAT	RANCH CREEK	FRASER RIVER AT GRANBY	WILLOW CREEK ABV WILLOW CREEK RESERVOIR	VASQUEZ CREEK	ST LOUIS CREEK
8000 - 8999	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9000 - 9999	16.7	2.7	2.5	0.6	3.3	3.1	0.1	0.0
10000 - 10999	102.8	22.8	21.8	5.7	23.9	13.6	1.6	1.0
11000 - 11999	109.9	31.4	31.0	4.9	31.3	3.8	7.1	6.4
12000 - 12999	22.1	7.8	7.8	0.4	7.6	0.1	2.3	2.0
13000 - 13999	0.7	0.2	0.2	0.0	0.2	0.0	0.0	0.0

Total Snow Water Equivalent values (TAF) on 2023-05-16 cont.

ELEVATION RANGE	COLORADO RIVER BLW LAKE GRANBY	MEADOW CREEK	FRASER RIVER ABV PARRY CREEK	ELK CREEK
8000 - 8999	0.1	0.0	0.0	0.0
9000 - 9999	10.1	0.5	0.3	0.0
10000 - 10999	65.4	7.3	4.3	0.2
11000 - 11999	74.8	3.3	8.4	0.5
12000 - 12999	14.2	0.7	2.4	0.0
13000 - 13999	0.5	0.0	0.2	0.0

Accumulated Total Surface Water Input values (TAF) from 2023-04-16 to 2023-05-16

ELEVATION RANGE	TOTAL	FRASER RIVER BLW CROOKED CREEK	MOFFAT	RANCH CREEK	FRASER RIVER AT GRANBY	WILLOW CREEK ABV WILLOW CREEK RESERVOIR	VASQUEZ CREEK	ST LOUIS CREEK
7000 - 7999	1.6	0.0	0.0	0.0	0.3	0.0	0.0	0.0
8000 - 8999	77.3	19.0	0.0	0.0	34.1	11.3	0.0	0.0
9000 - 9999	156.7	41.5	18.7	1.6	54.8	56.3	2.1	1.6
10000 - 10999	112.5	41.1	35.1	4.3	43.0	17.0	6.4	7.8
11000 - 11999	53.7	23.3	22.9	2.3	23.3	2.3	6.8	7.1
12000 - 12999	5.6	3.1	3.1	0.1	3.0	0.1	1.2	0.9
13000 - 13999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

WINDY GAP RIVER BASIN MAY 16, 2023 MODELING REPORT

Accumulated Total Surface Water Input values (TAF) from 2023-04-16 to 2023-05-16 cont.

ELEVATION RANGE	COLORADO RIVER BLW LAKE GRANBY	MEADOW CREEK	FRASER RIVER ABV PARRY CREEK	ELK CREEK
7000 - 7999	0.0	0.0	0.0	0.0
8000 - 8999	22.0	0.0	0.0	0.0
9000 - 9999	43.2	1.7	1.8	0.9
10000 - 10999	52.5	6.7	4.8	2.0
11000 - 11999	28.1	1.4	4.5	0.5
12000 - 12999	2.4	0.1	0.7	0.0
13000 - 13999	0.0	0.0	0.0	0.0

Change in Total Snow Water Equivalent values (TAF) from 2023-04-16 to 2023-05-16

ELEVATION RANGE	TOTAL	FRASER RIVER BLW CROOKED CREEK	MOFFAT	RANCH CREEK	FRASER RIVER AT GRANBY	WILLOW CREEK ABV WILLOW CREEK RESERVOIR	VASQUEZ CREEK	ST LOUIS CREEK
7000 - 7999	-0.9	0.0	0.0	0.0	-0.1	0.0	0.0	0.0
8000 - 8999	-58.4	-13.3	0.0	0.0	-24.4	-9.3	0.0	0.0
9000 - 9999	-126.4	-30.6	-13.4	-1.0	-41.3	-47.8	-1.5	-1.2
10000 - 10999	-78.7	-26.4	-21.8	-1.9	-27.9	-13.5	-4.2	-5.5
11000 - 11999	-24.0	-9.3	-9.0	-0.2	-9.3	-1.6	-3.1	-4.0
12000 - 12999	2.5	0.5	0.5	0.0	0.5	-0.0	-0.1	-0.1
13000 - 13999	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0

Change in Total Snow Water Equivalent values (TAF) from 2023-04-16 to 2023-05-16 cont.

ELEVATION RANGE	COLORADO RIVER BLW LAKE GRANBY	MEADOW CREEK	FRASER RIVER ABV PARRY CREEK	ELK CREEK
7000 - 7999	0.0	0.0	0.0	0.0
8000 - 8999	-17.2	0.0	0.0	0.0
9000 - 9999	-35.3	-1.3	-1.3	-0.6
10000 - 10999	-37.2	-4.4	-2.5	-1.4
11000 - 11999	-13.1	-0.4	-1.1	-0.2
12000 - 12999	2.0	0.1	0.6	0.0
13000 - 13999	0.1	0.0	0.1	0.0