

# BOUNDARY REGION DROUGHT UPDATE LAST YEAR (2021) & CURRENT CONDITIONS

July 26, 2022

RDKB Watershed Service  
Kristina Anderson





# OUTLINE

RDKB Drought Plans

BC Provincial Resources

2021 Drought in Review

Current Conditions: Climate & Water

Forecasts

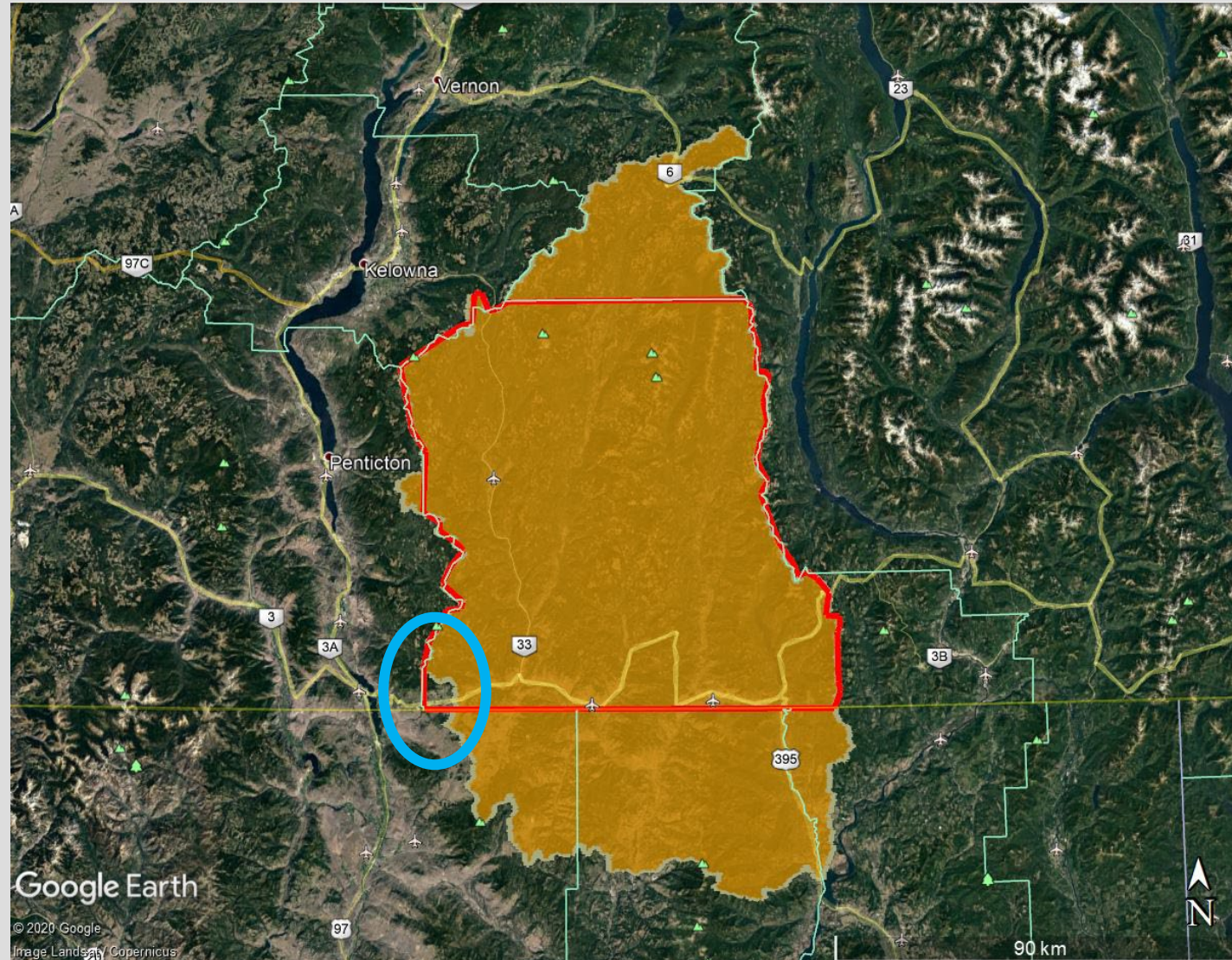
More information: [KettleRiver.ca](http://KettleRiver.ca)



Kettle River (Sept 2021)

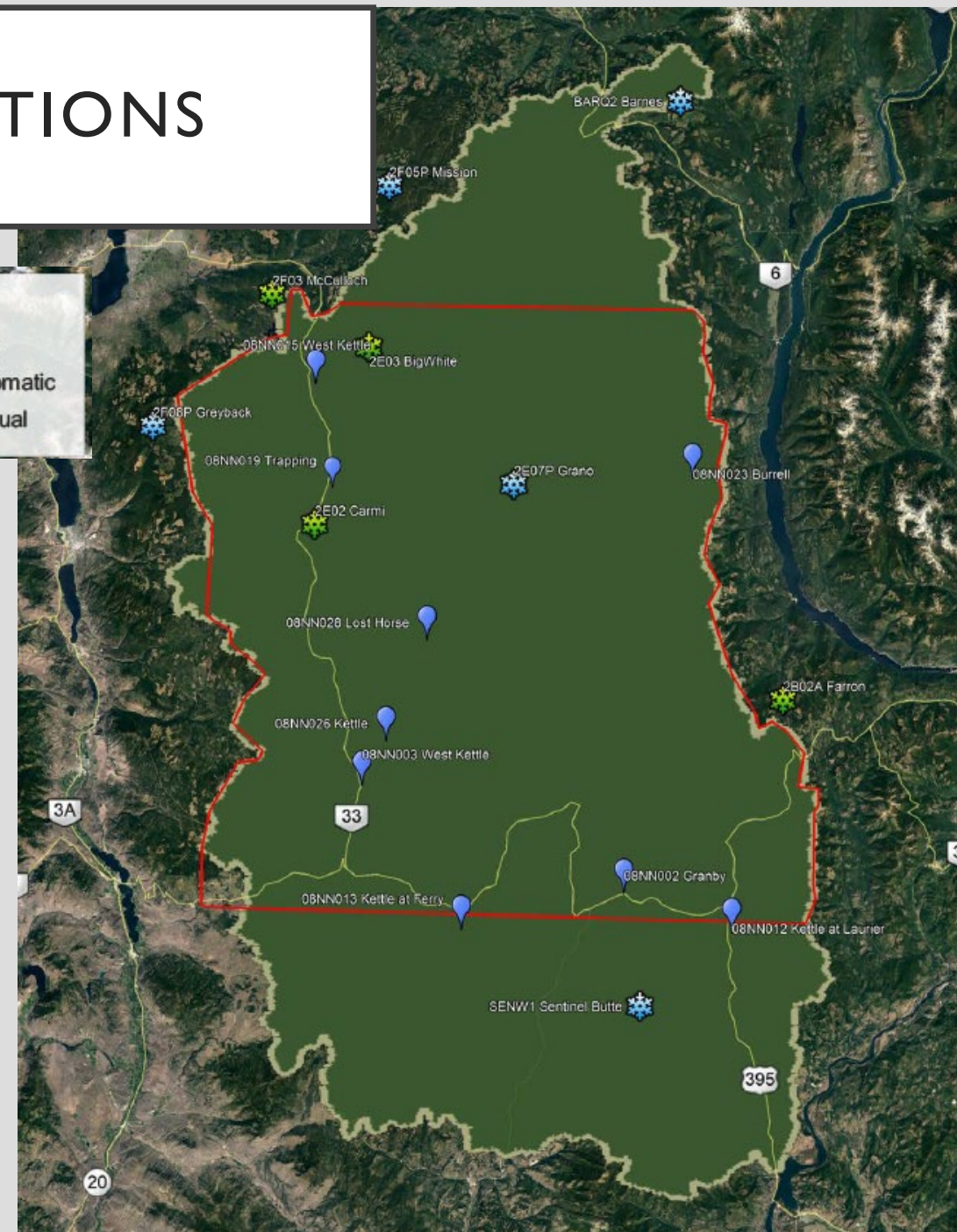
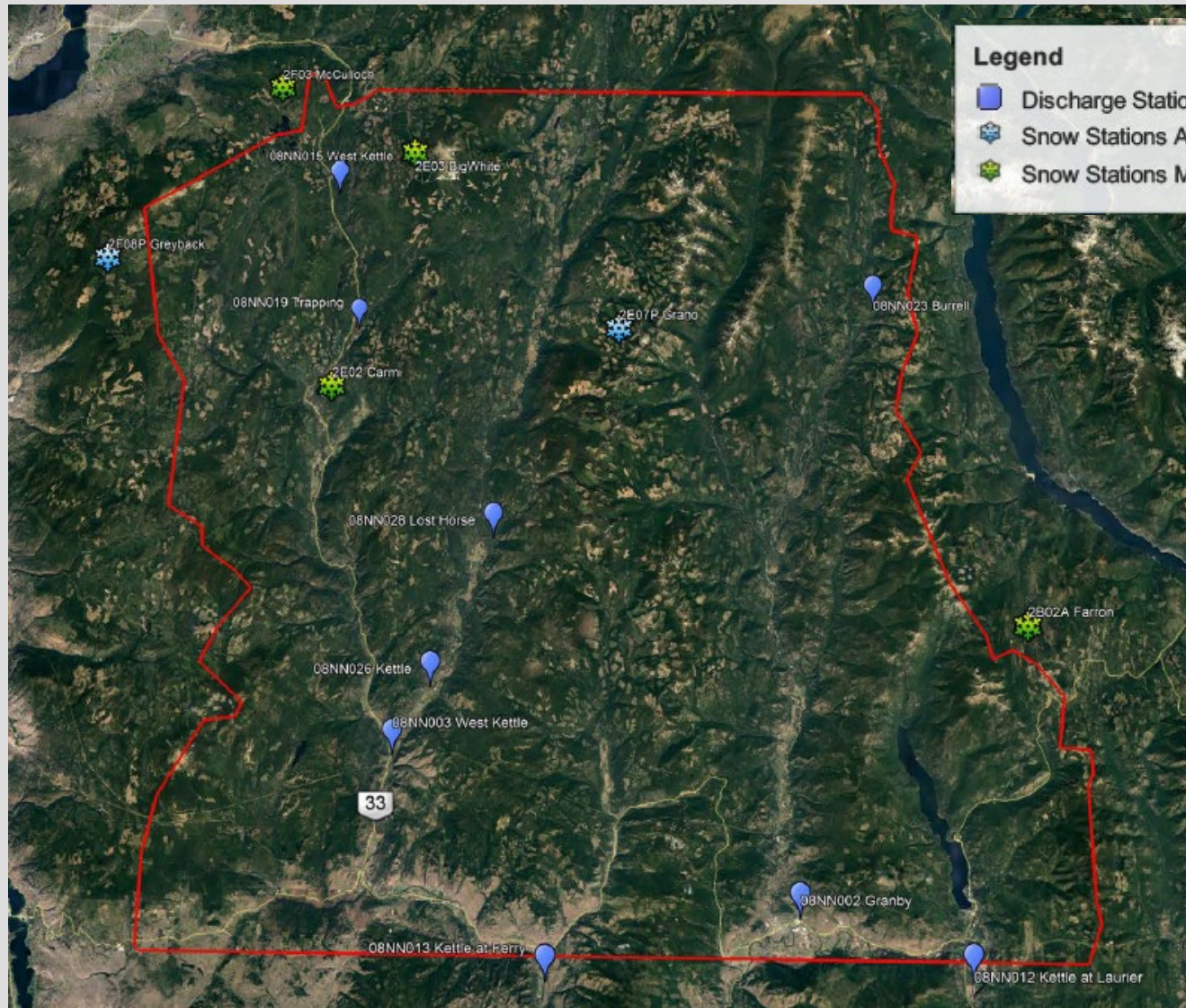


# RDKB AND THE KETTLE RIVER WATERSHED





# BOUNDARY MONITORING STATIONS





# BC PROVINCIAL RESOURCES

[Drought in BC](#)
[BC Drought Map](#)
[West Coast Stream Watch](#)
[Thompson Okanagan Stream Watch](#)
[Kootenay-Boundary Stream Watch](#)
[Historical BC Drought Information](#)
[7-Day Average Streamflow Map](#)

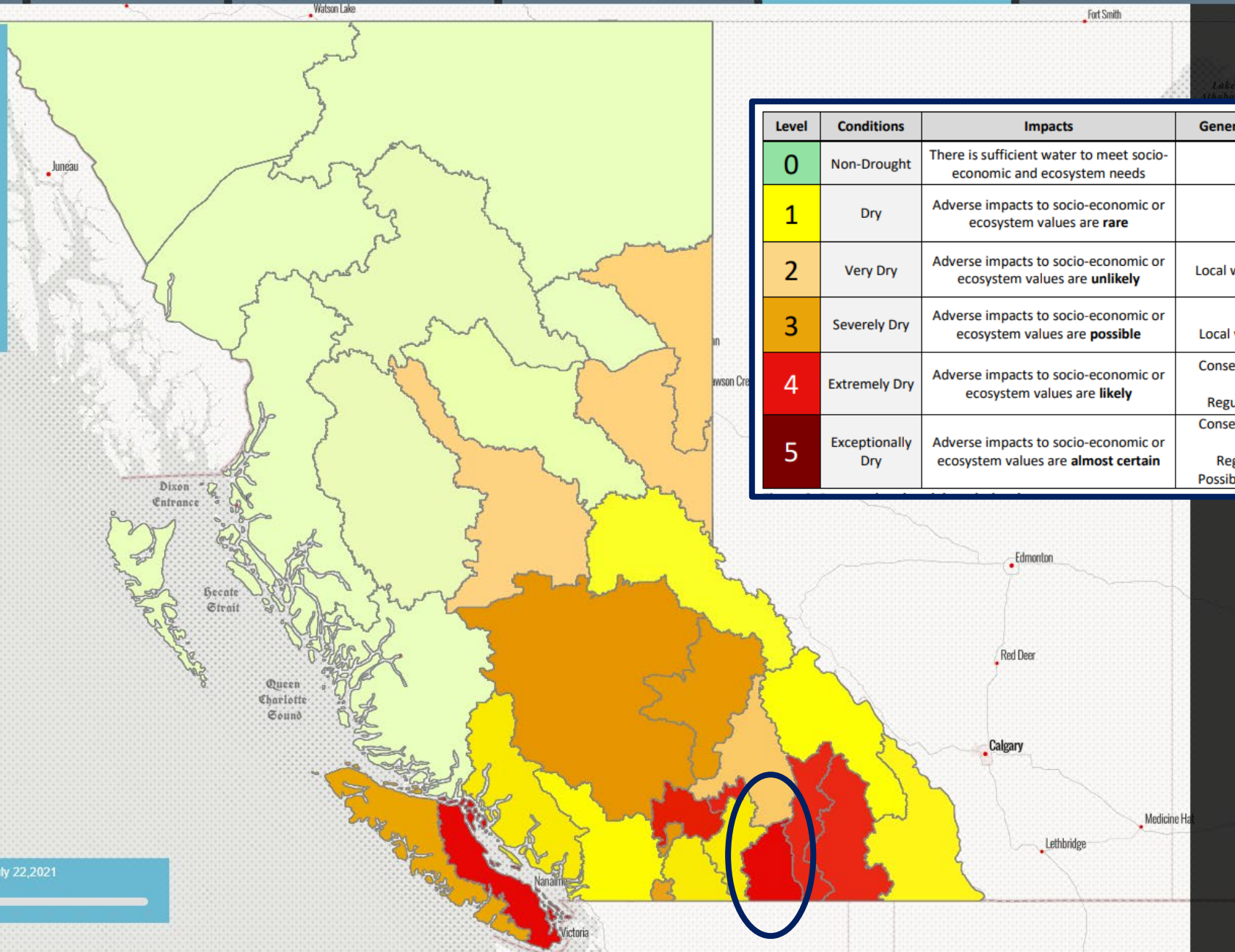
## BC Drought Levels Time Lapse 2021

- 0 - No Adverse Impacts
- 1 - Adverse Impacts Rare
- 2 - Adverse Impacts Unlikely
- 3 - Adverse Impacts Possible
- 4 - Adverse Impacts Likely
- 5 - Adverse Impacts Almost Certain

Level	Conditions	Impacts	General Response Measures
0	Non-Drought	There is sufficient water to meet socio-economic and ecosystem needs	Preparedness
1	Dry	Adverse impacts to socio-economic or ecosystem values are <b>rare</b>	Conservation
2	Very Dry	Adverse impacts to socio-economic or ecosystem values are <b>unlikely</b>	Conservation Local water restrictions where appropriate
3	Severely Dry	Adverse impacts to socio-economic or ecosystem values are <b>possible</b>	Conservation Local water restrictions likely
4	Extremely Dry	Adverse impacts to socio-economic or ecosystem values are <b>likely</b>	Conservation and local water restrictions Regulatory action possible
5	Exceptionally Dry	Adverse impacts to socio-economic or ecosystem values are <b>almost certain</b>	Conservation and local water restrictions Regulatory action likely Possible emergency response



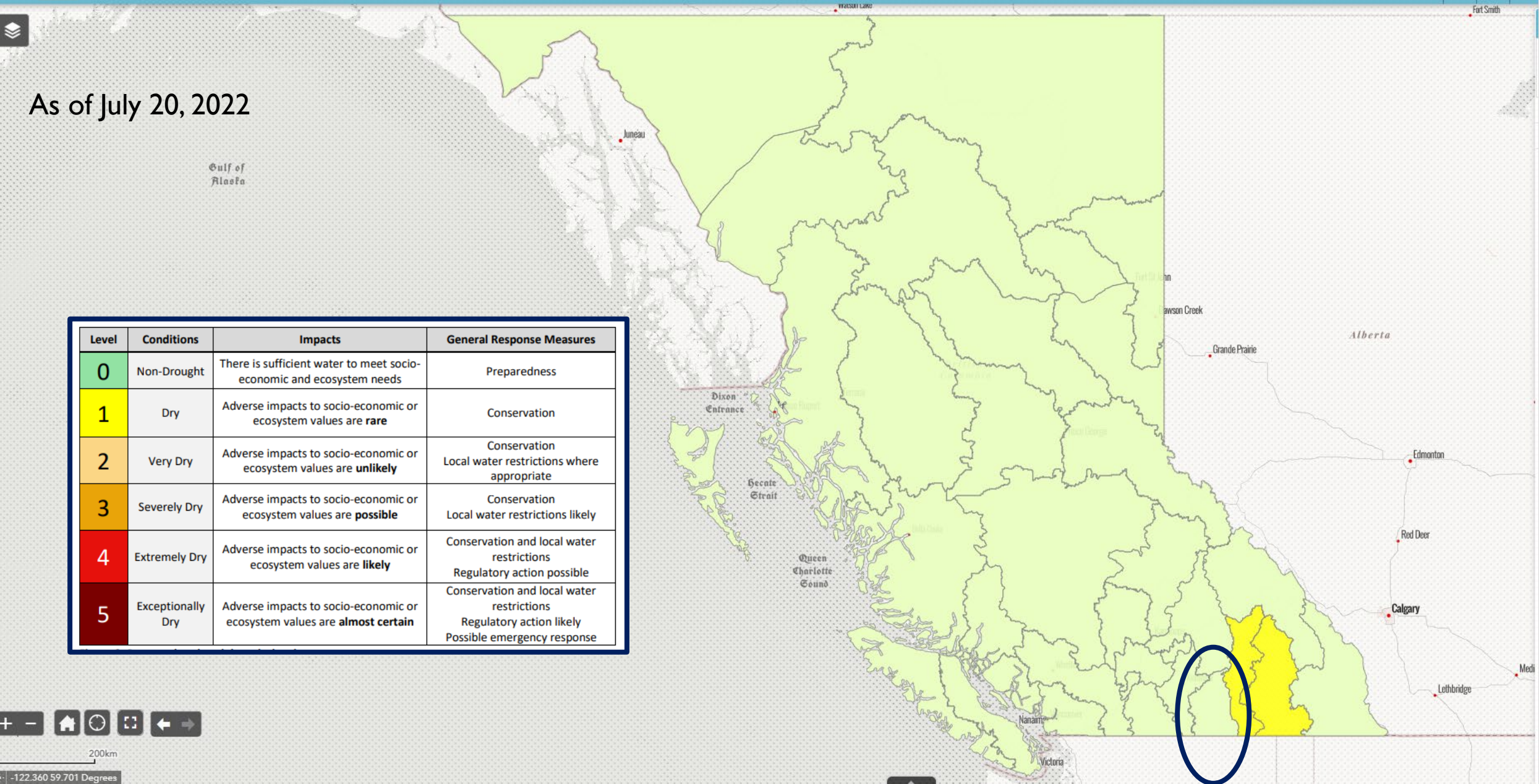
June 23, 2021 to July 22, 2021





As of July 20, 2022

Level	Conditions	Impacts	General Response Measures
0	Non-Drought	There is sufficient water to meet socio-economic and ecosystem needs	Preparedness
1	Dry	Adverse impacts to socio-economic or ecosystem values are <b>rare</b>	Conservation
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# British Columbia Drought Information Portal

Drought in BC

BC Drought Map







West Coast Stream Watch

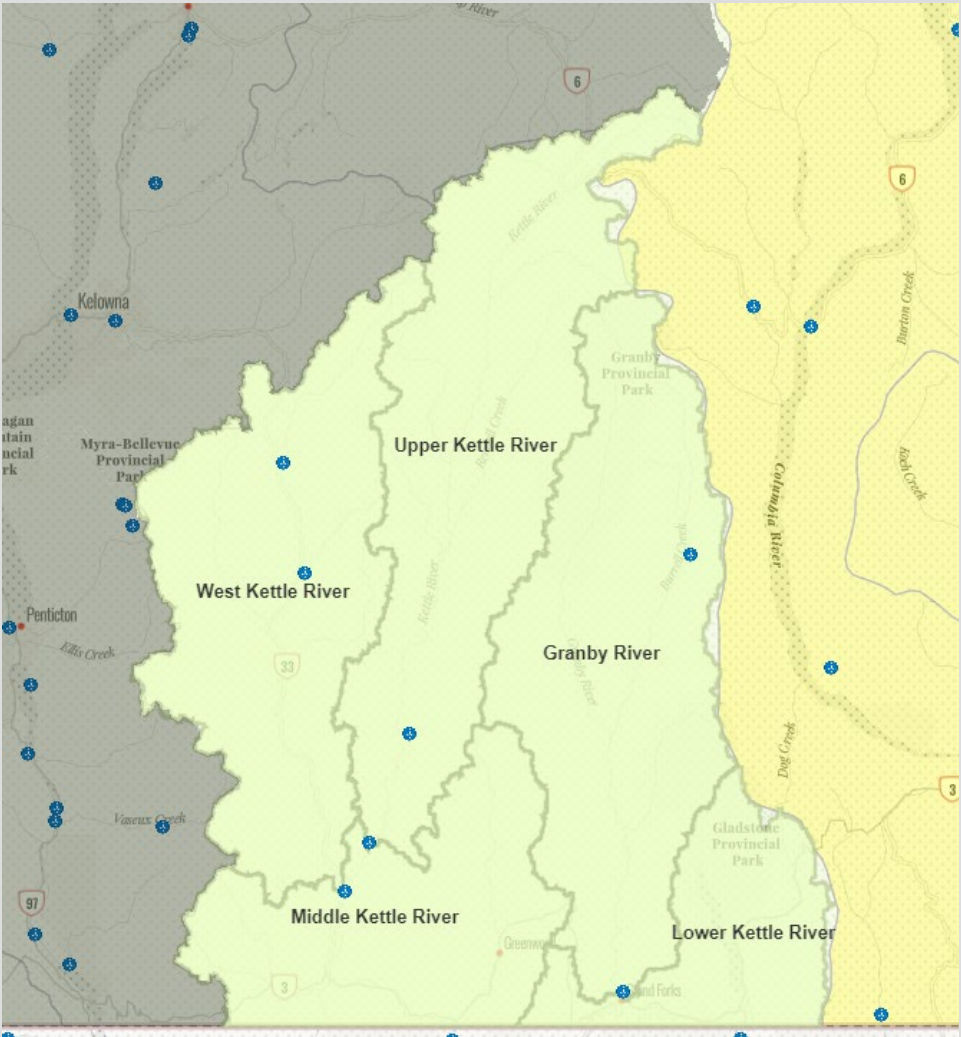
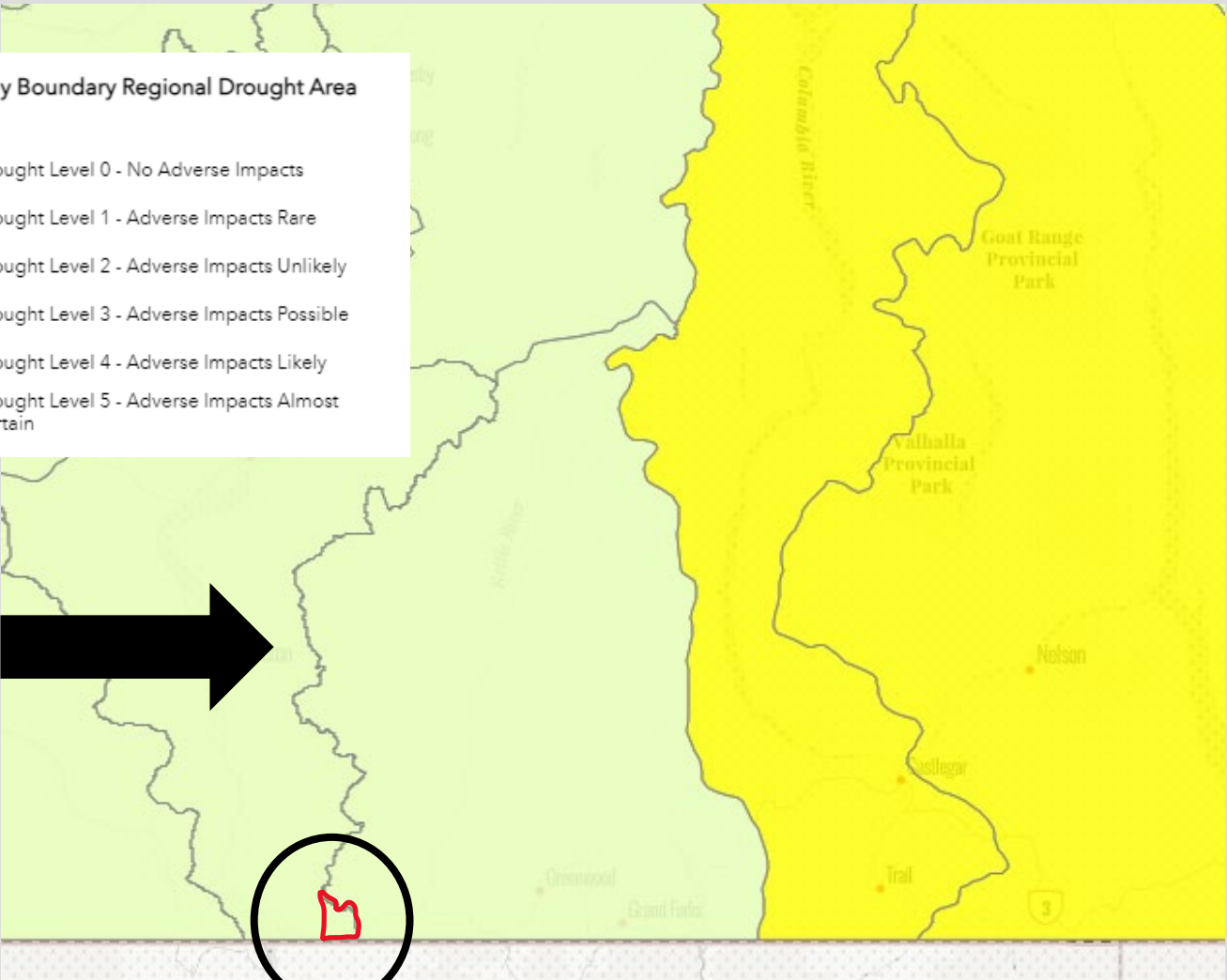
Thompson Okanagan Stream Watch

Kootenay-Boundary Stream Watch

July 20, 2022

## Kootenay Boundary Regional Drought Area Levels

-  Drought Level 0 - No Adverse Impacts
-  Drought Level 1 - Adverse Impacts Rare
-  Drought Level 2 - Adverse Impacts Unlikely
-  Drought Level 3 - Adverse Impacts Possible
-  Drought Level 4 - Adverse Impacts Likely
-  Drought Level 5 - Adverse Impacts Almost Certain

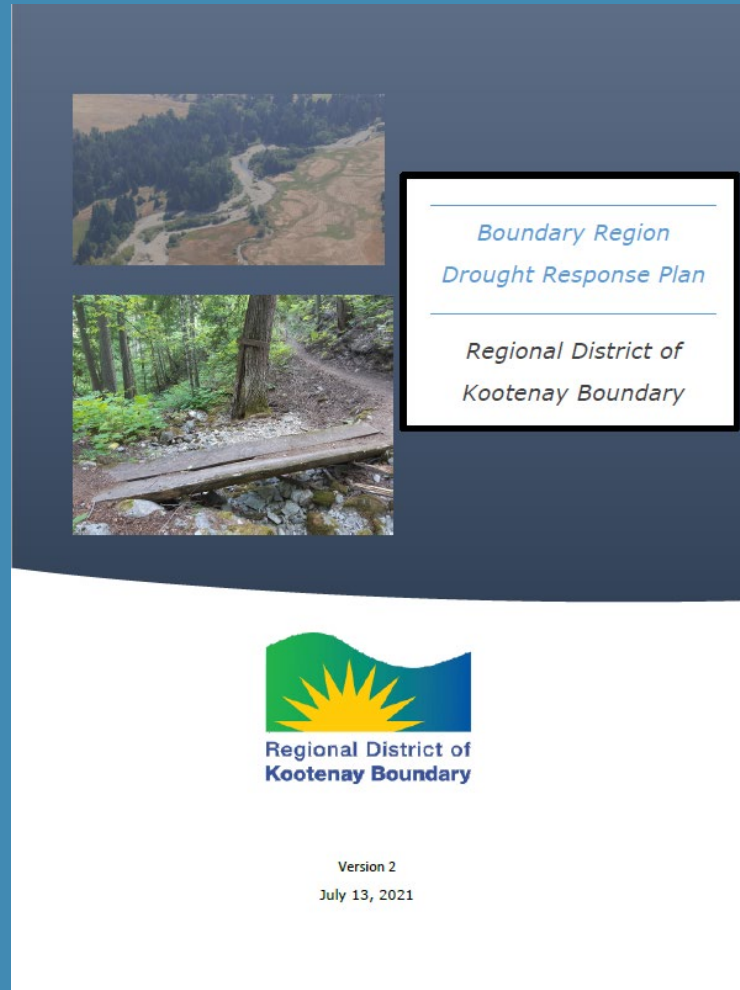




# RDKB DOCUMENTS



# DROUGHT RESPONSE PLAN



## Watershed Plans

[Boundary Region Drought Response Plan \(2021\)](#)

[Kettle River Watershed Management Plan](#)

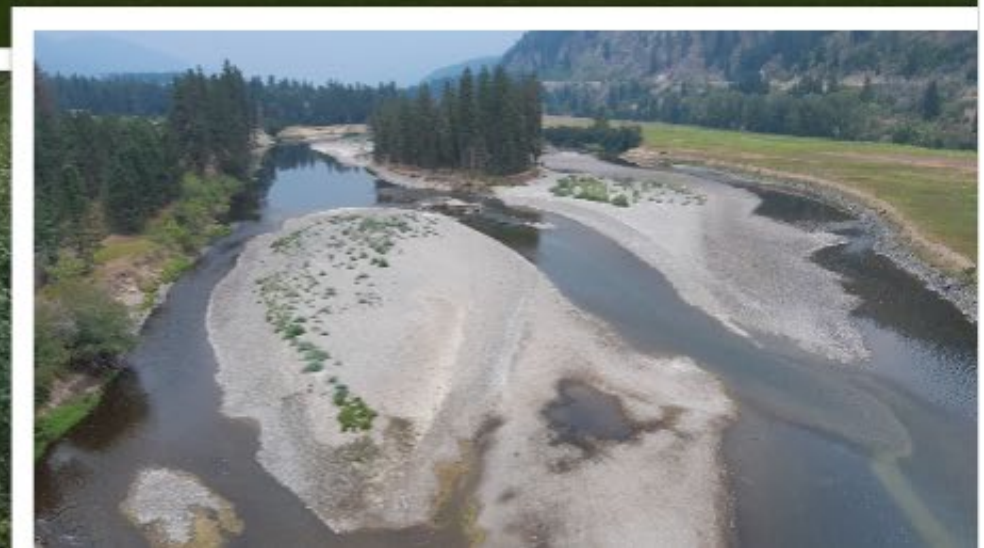
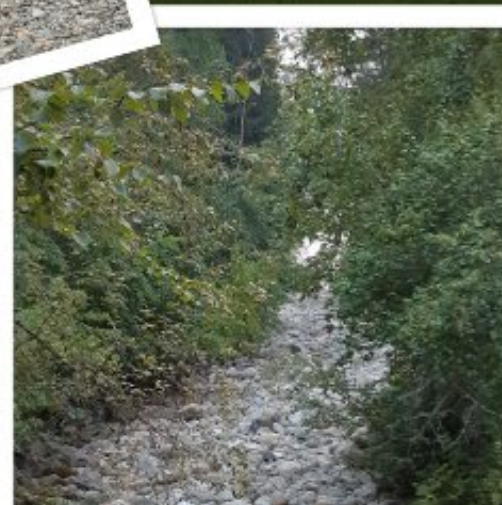
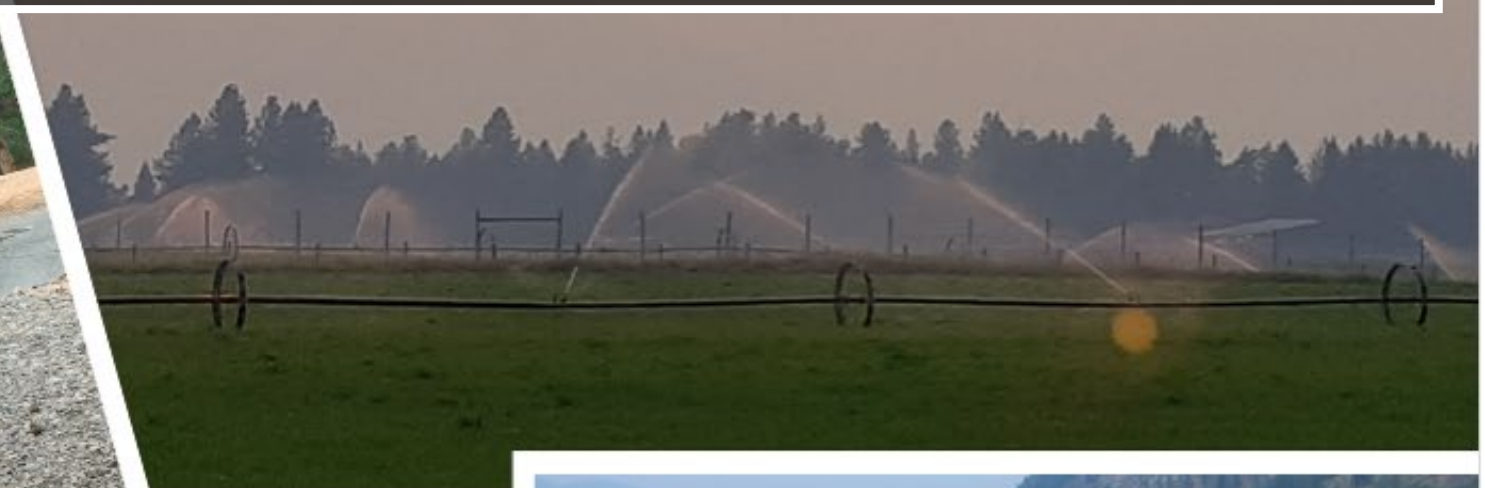
[Kettle River Watershed Drought Management Plan](#)

Recommendations identified for:

- RDKB
- Water Suppliers and Large Water Users
- All Water Users



# 2021 DROUGHT REVIEW





# BOUNDARY REGION DROUGHT SUMMARY

## 2021 DROUGHT LEVELS AT A GLANCE

Drought Levels: 0 1 2 3 4 5

BASINS 26-May 09-Jun 23-Jun 07-Jul 14-Jul 21-Jul 28-Jul 04-Aug 11-Aug 18-Aug 20-Aug 21-Aug

Level	Conditions	Impacts	General Response Measures
0	Non-Drought	There is sufficient water to meet socio-economic and ecosystem needs	Preparedness
1	Dry	Adverse impacts to socio-economic or ecosystem values are <b>rare</b>	Conservation
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Lower Columbia	1	1	1	2	3	4	4	4	4	4	4	4	4	4	4	4
West Kootenay	1	1	1	2	3	4	4	4	4	4	4	4	4	4	4	4
East Kootenay	1	1	1	1	2	2	3	3	3	3	3	2	2	2	2	2
Kettle	1	2	2	3	4	4	4	5	5	5	5	5	5	5	5	5
Middle Fraser	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3
North Thompson	0	0	0	1	3	3	4	4	4	4	4	4	4	4	4	4
South Thompson	1	1	1	2	3	3	4	4	4	4	4	4	4	4	4	4
-Salmon River	1	2	2	4	4	4	4	4	4	5	5	5	5	5	5	5
Nicola	1	1	2	3	3	4	4	4	4	4	4	4	4	4	4	4
-Coldwater River	1	1	1	3	3	4	4	4	4	4	4	4	4	4	4	4
Okanagan	1	1	1	3	3	3	3	3	4	4	4	4	4	4	4	4
Similkameen	0	0	1	2	3	3	3	3	3	3	3	3	3	3	3	3
Skagit	1	1	1	1	2	3	3	3	3	3	3	3	3	3	3	3
Lower Fraser	1	1	1	1	2	3	4	4	4	4	4	4	4	4	3	3
South Coast	1	1	1	1	3	3	4	4	4	4	4	4	4	4	3	3
Central Coast	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2	2
West Vancouver Island	1	1	1	3	3	3	4	4	4	4	5	5	5	5	5	4
East Vancouver Island	2	2	2	4	4	4	4	4	4	4	5	5	5	5	5	4
Haida Gwaii	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Prepared By: Water Management Branch - Ministry of Forests, Lands, Natural Resource Operations and Rural Development

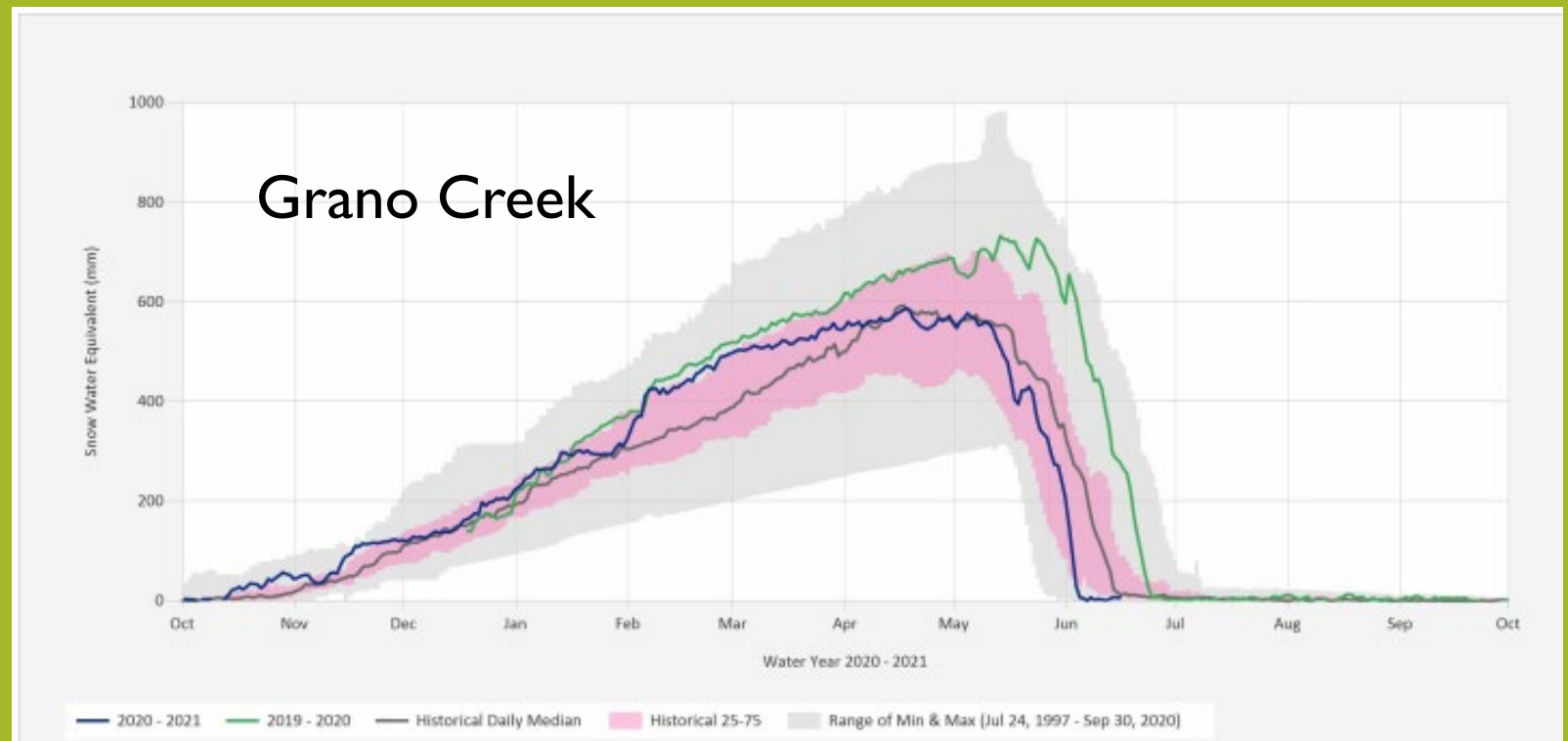
Table 4.5 Provincial designated drought levels for KRW (Province of BC, 2020). Legend drought level: 1 (green), 2 (yellow), 3 (orange) and 4 (red).

	May 1 to 31	June 1 to 15	June 15 to 30	July 1 to 15	July 15 to 30	August 1 to 15	August 15 to 31	Sept 1 to 15	Sept 15 to 30
2015									
2016									
2017									
2018									
2019									

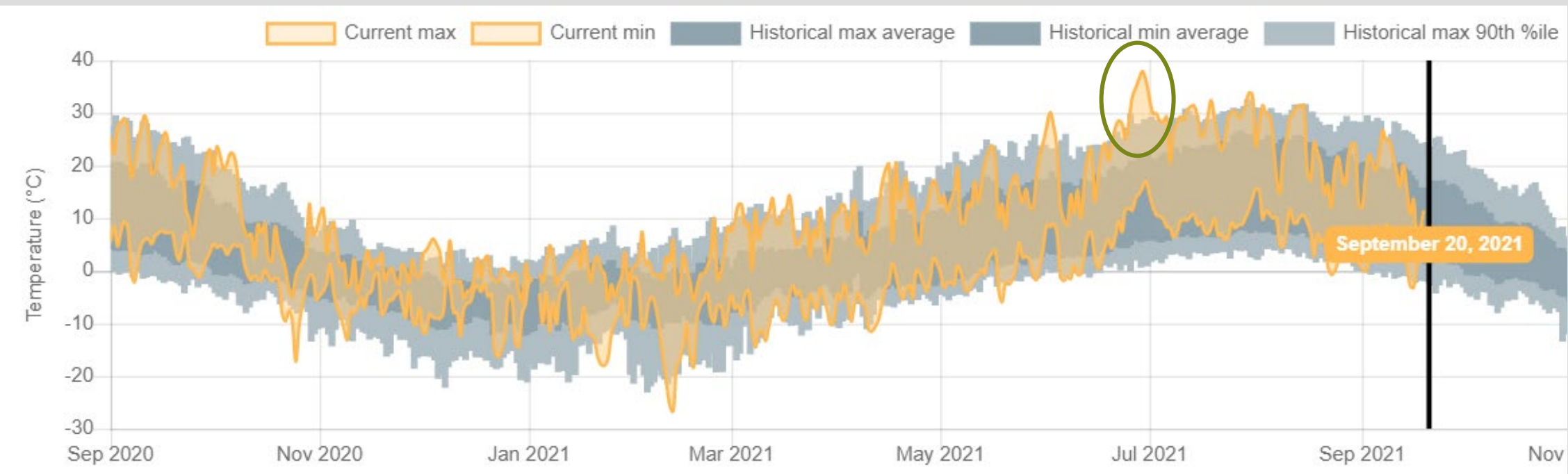
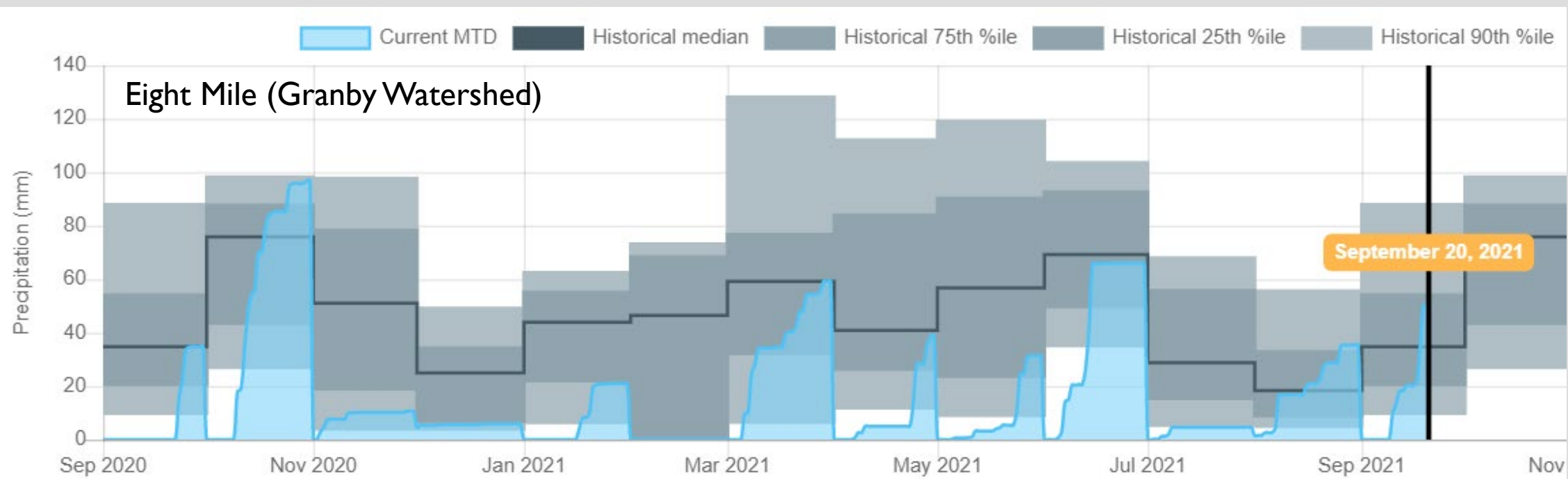
July 23<sup>rd</sup>, the KRW was separated from the ORW

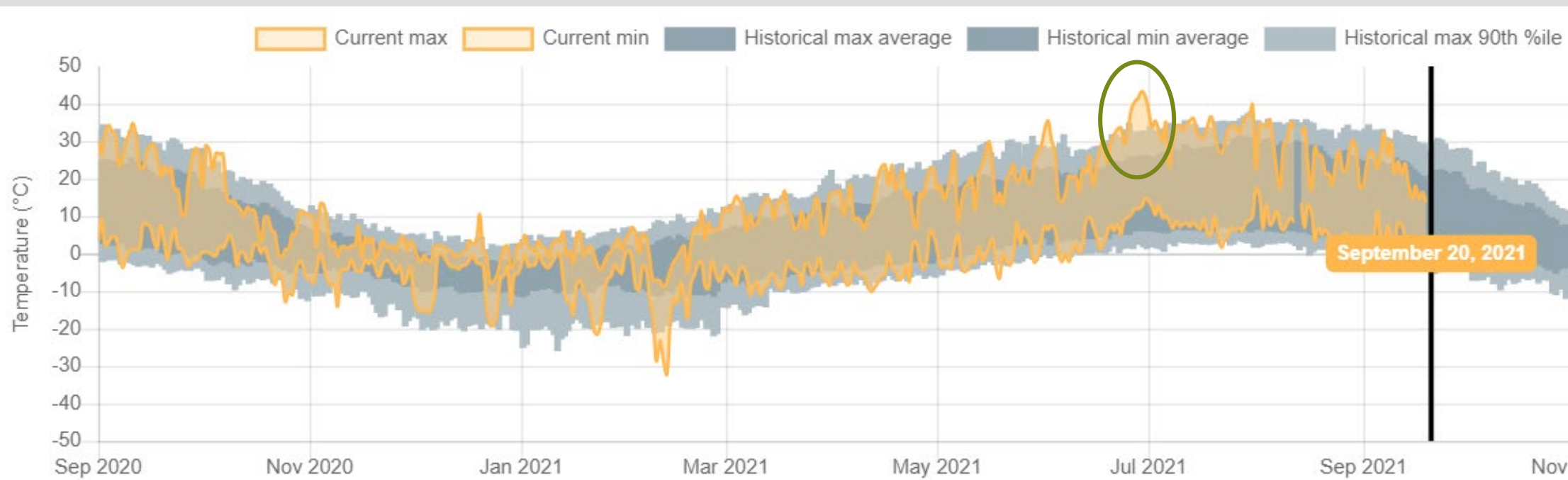
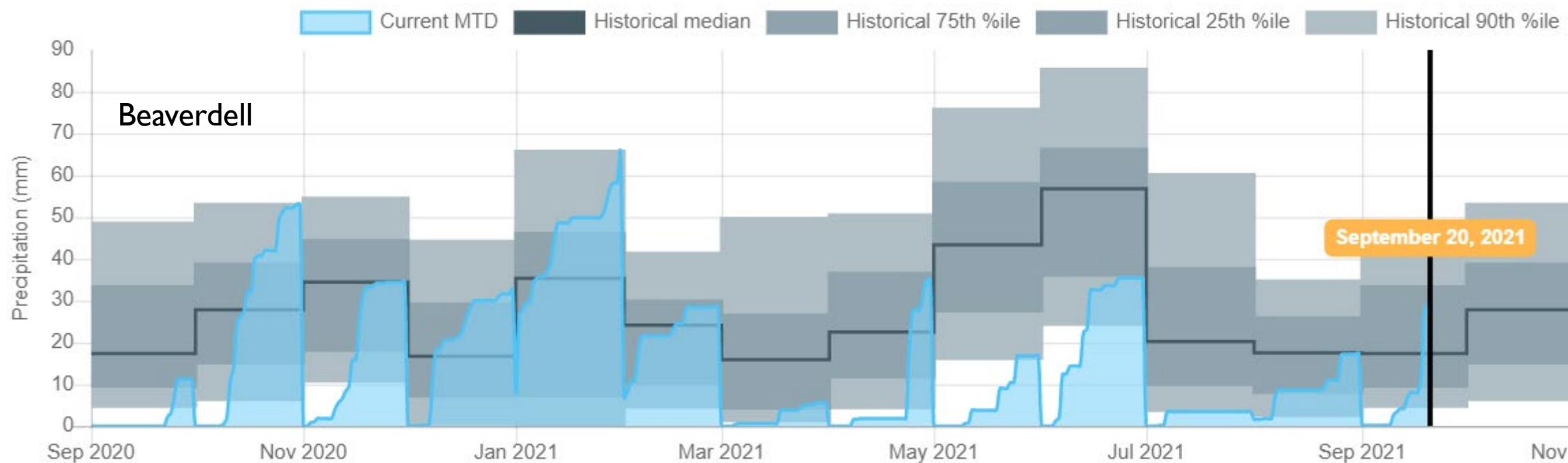
Level 4 continued until Oct 26<sup>th</sup>

# CLIMATE CONDITIONS: TEMPERATURE AND PRECIPITATION



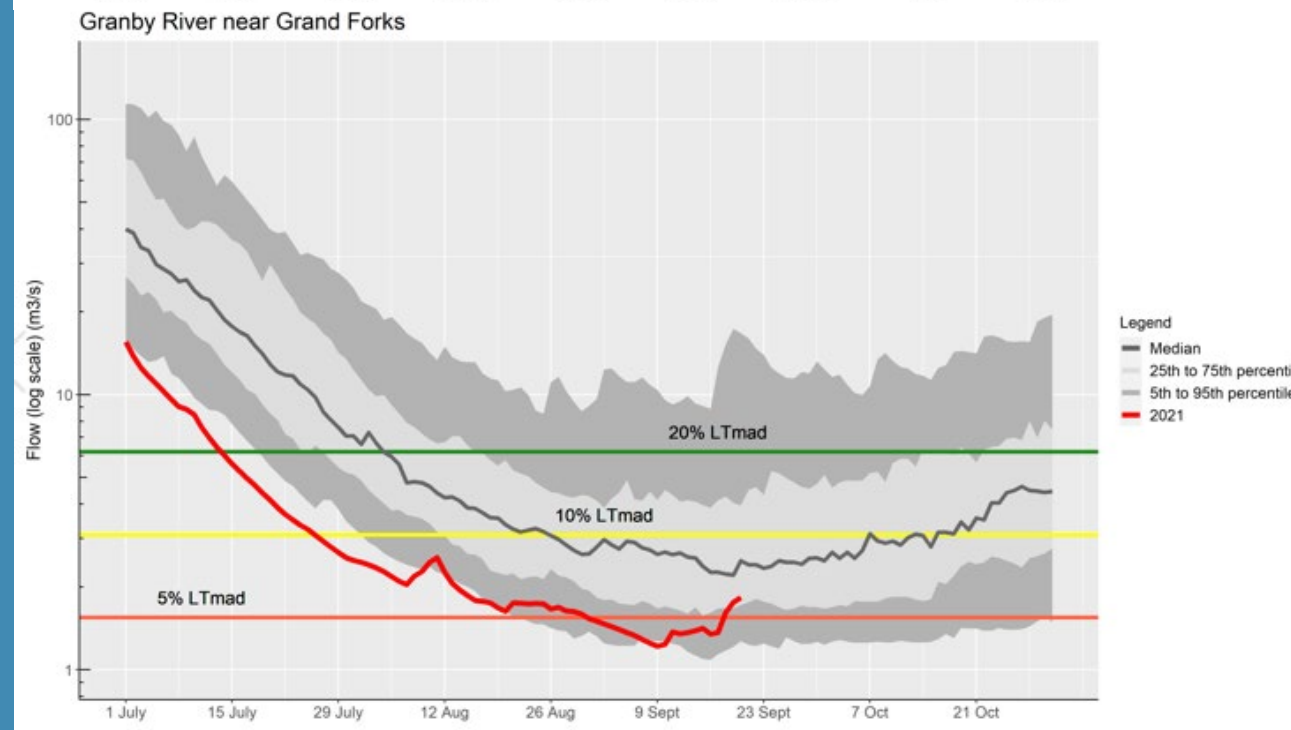
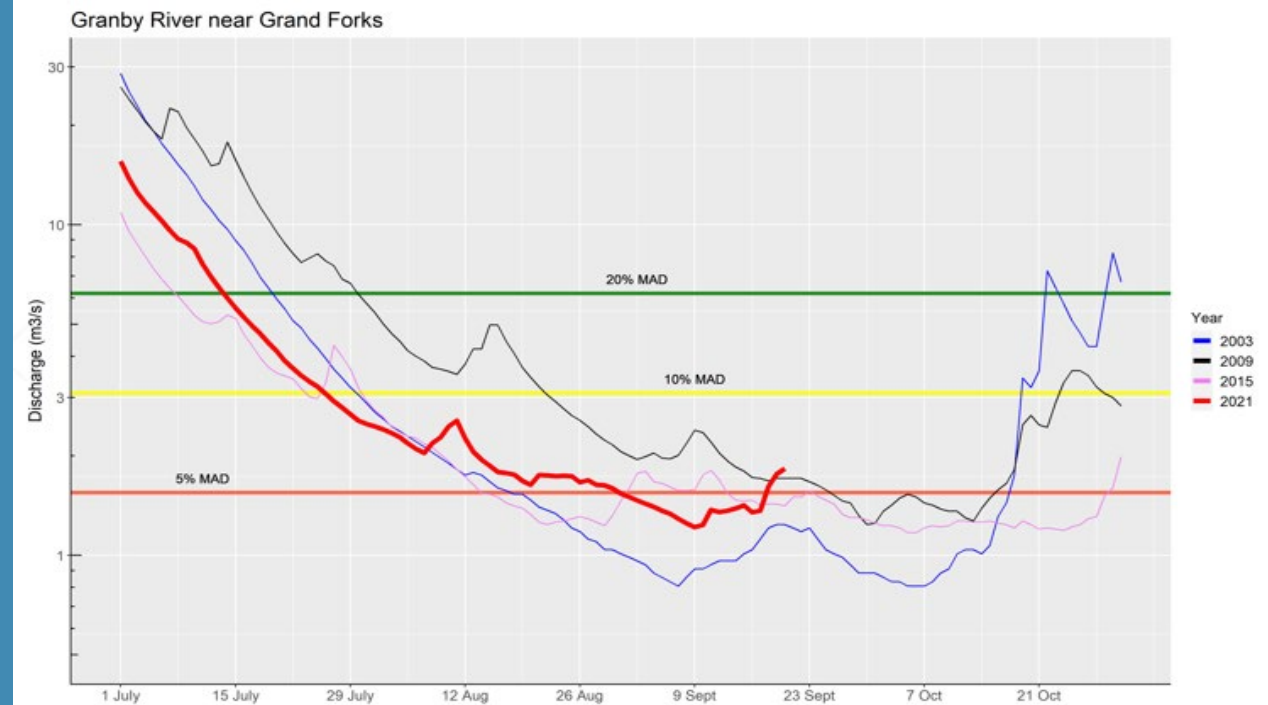
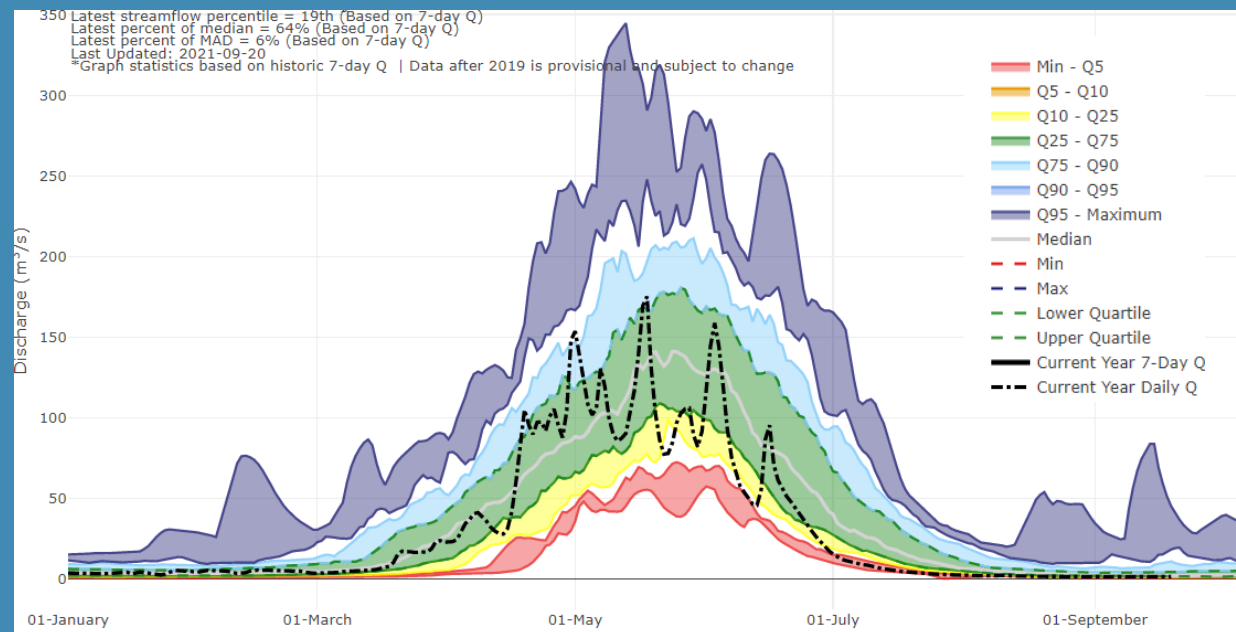






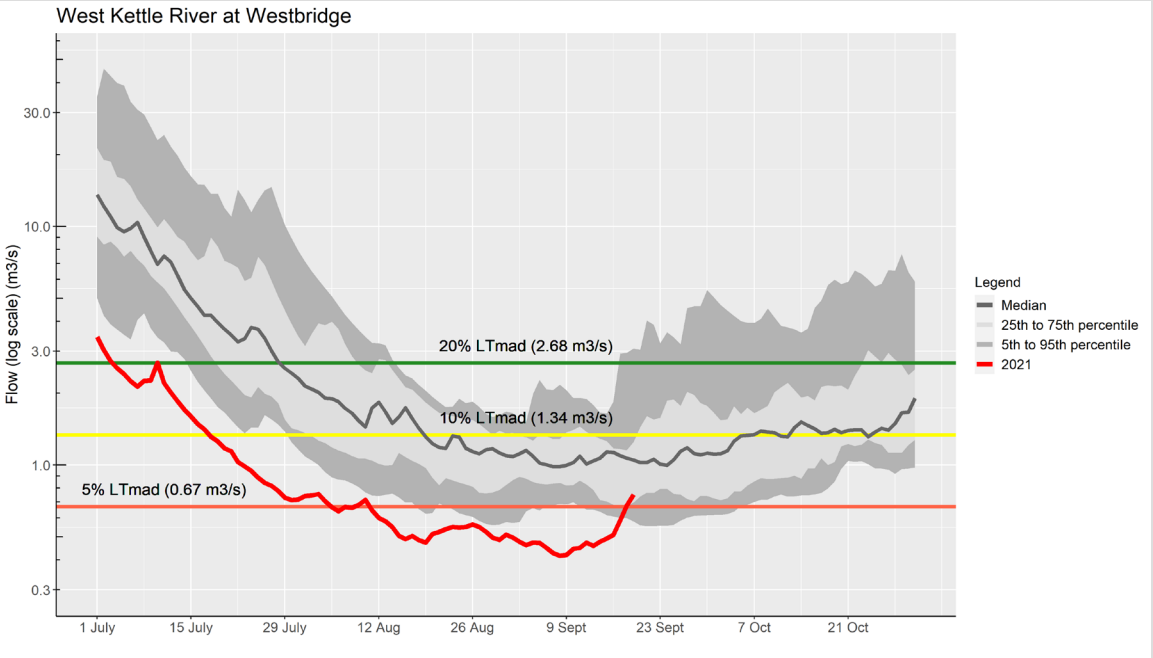
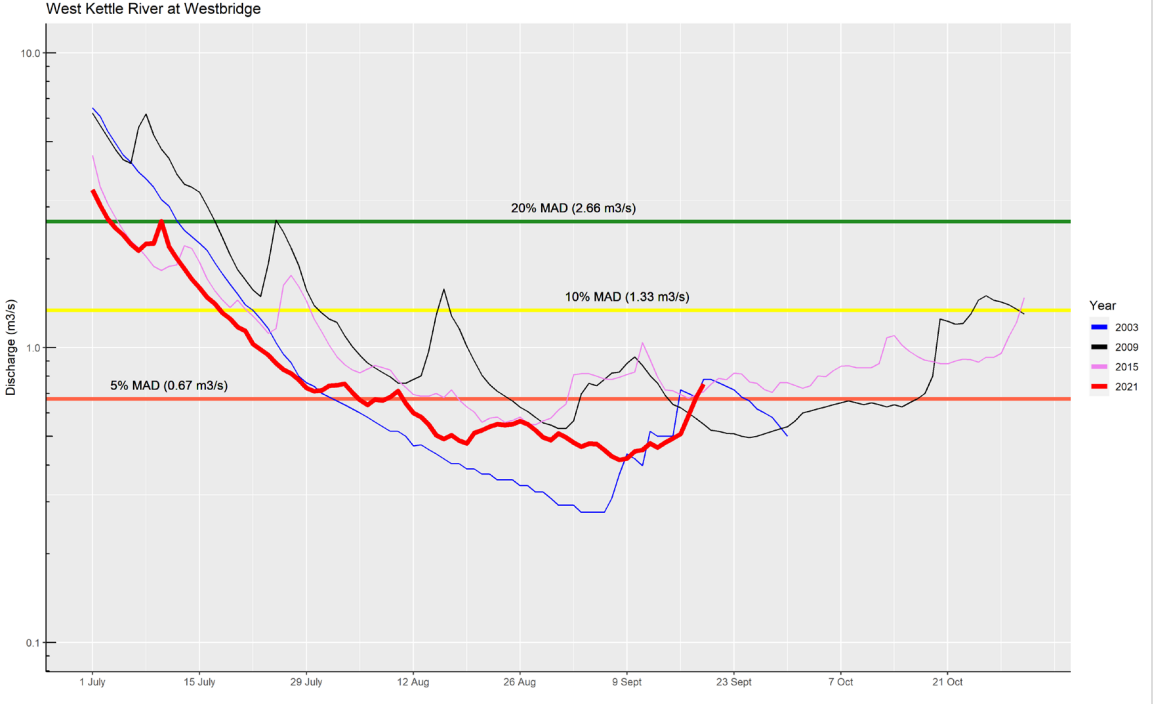
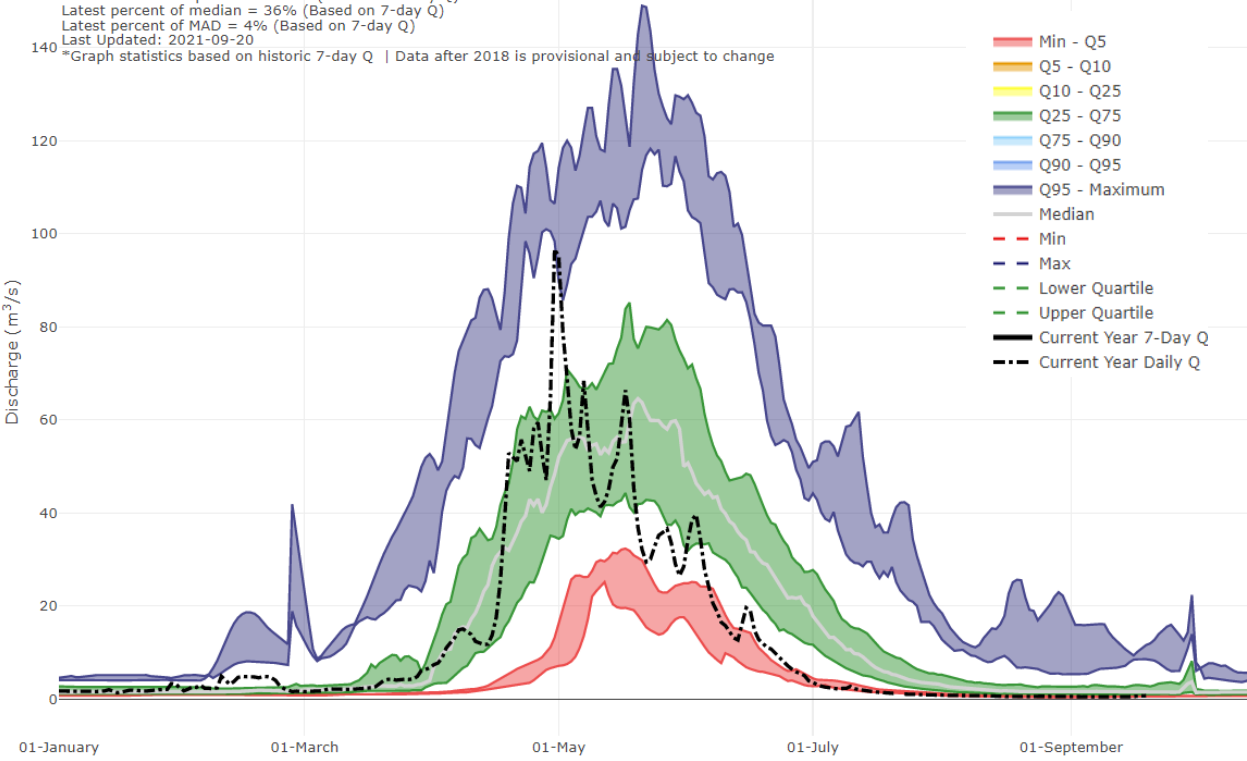


# GRANBY RIVER 08NN002



# WEST KETTLE AT WESTBRIDGE

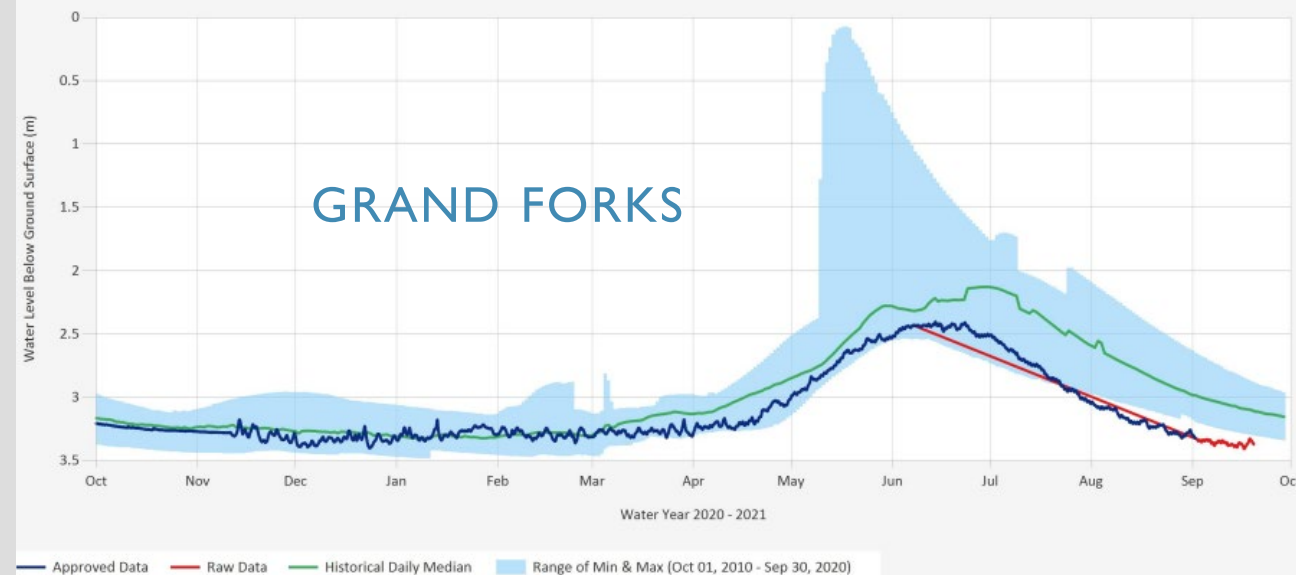
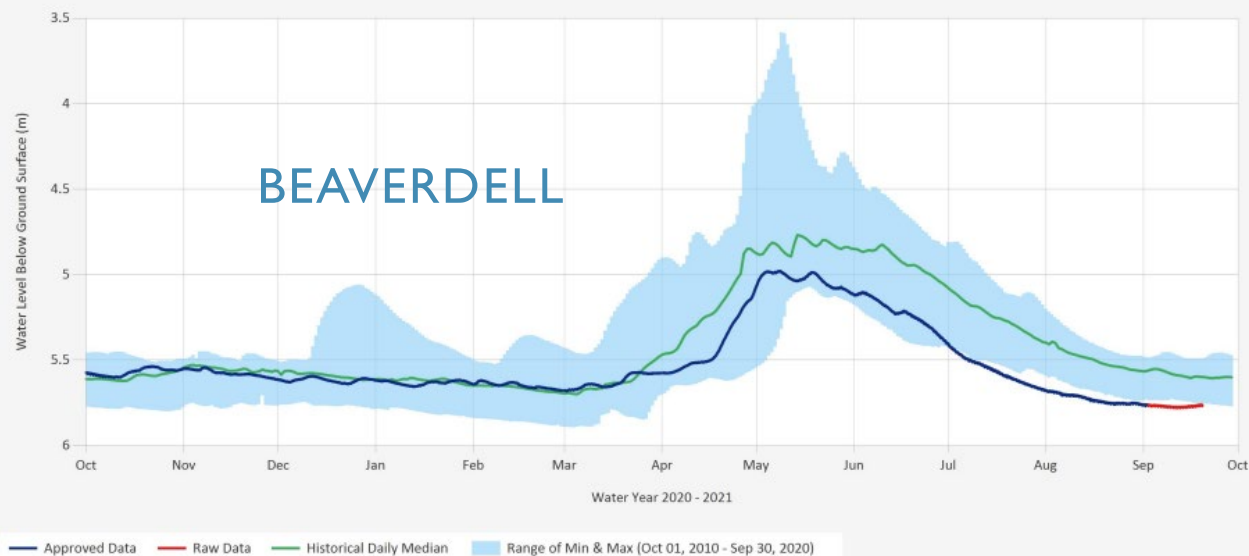
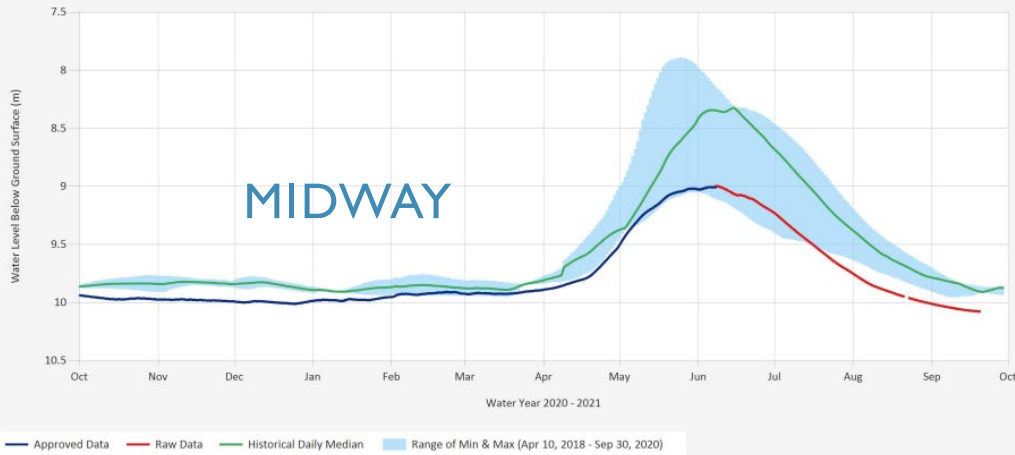
## 08NN003





# GROUNDWATER: BC OBSERVATION WELLS

SUMMARY:  
WATER LEVELS LOW FOR THIS TIME OF YEAR,  
BELOW 25<sup>TH</sup> PERCENTILE OF NORMAL



# TEMPORARY PROTECTION ORDER

WEST KETTLE RIVER, TRIBUTARIES AND  
HYDRAULICALLY CONNECTED AQUIFERS



# WATER SUSTAINABILITY ACT TEMPORARY PROTECTION ORDERS SECTION 88: FISH POPULATION ORDER

Ministerial Order No. M335

Signed: August 30, 2021

[https://www.bclaws.gov.bc.ca/civix/document/id/mo/mo/m0335\\_2021](https://www.bclaws.gov.bc.ca/civix/document/id/mo/mo/m0335_2021)

In effect until: September 30, 2021

**WHEREAS:** I, Katrine Conroy, Minister of Forests, Lands, Natural Resource Operations and Rural Development, after review of information on the decline of flow in the West Kettle River and its tributaries, consider that the flow of the water in the West Kettle River is likely to drop below 670 litres per second and is so low that the survival of the population of rainbow trout is threatened;

**AND WHEREAS:** based on the scientific evidence presented to me, I am satisfied that, without intervention on the West Kettle River, its tributaries and hydraulically connected aquifers, through such an order, the required flow for these fish populations will not be available until a significant precipitation event occurs in that area, which is not expected to occur in time to protect the survival of these populations of fish;

**AND WHEREAS:** I have given due consideration to the needs of agricultural users who may be affected by this order.

**THEREFORE, ...**

1. Effective 00:01, the day following the signature of this order, all diversion and use of water for irrigation purpose by holders of authorizations from the West Kettle River and its tributaries and by users of groundwater wells diverting from aquifers considered to be hydraulically connected to the West Kettle River and its tributaries, must cease, as follows:

a. this Order applies to the water licences listed in Appendix A to this Order and the diversion and use of water for irrigation purpose under them for irrigation of forage crops (such as grass/legume and dairy alfalfa) by their licensees; and

b. this Order applies to the groundwater wells listed in Appendix B to this Order and to persons using those wells for the diversion and use of groundwater for irrigation purpose for irrigation of forage crops (such as grass/legume and dairy alfalfa).

3. This Order remains in effect until 23:59, September 30, 2021 or until further order of the Minister.

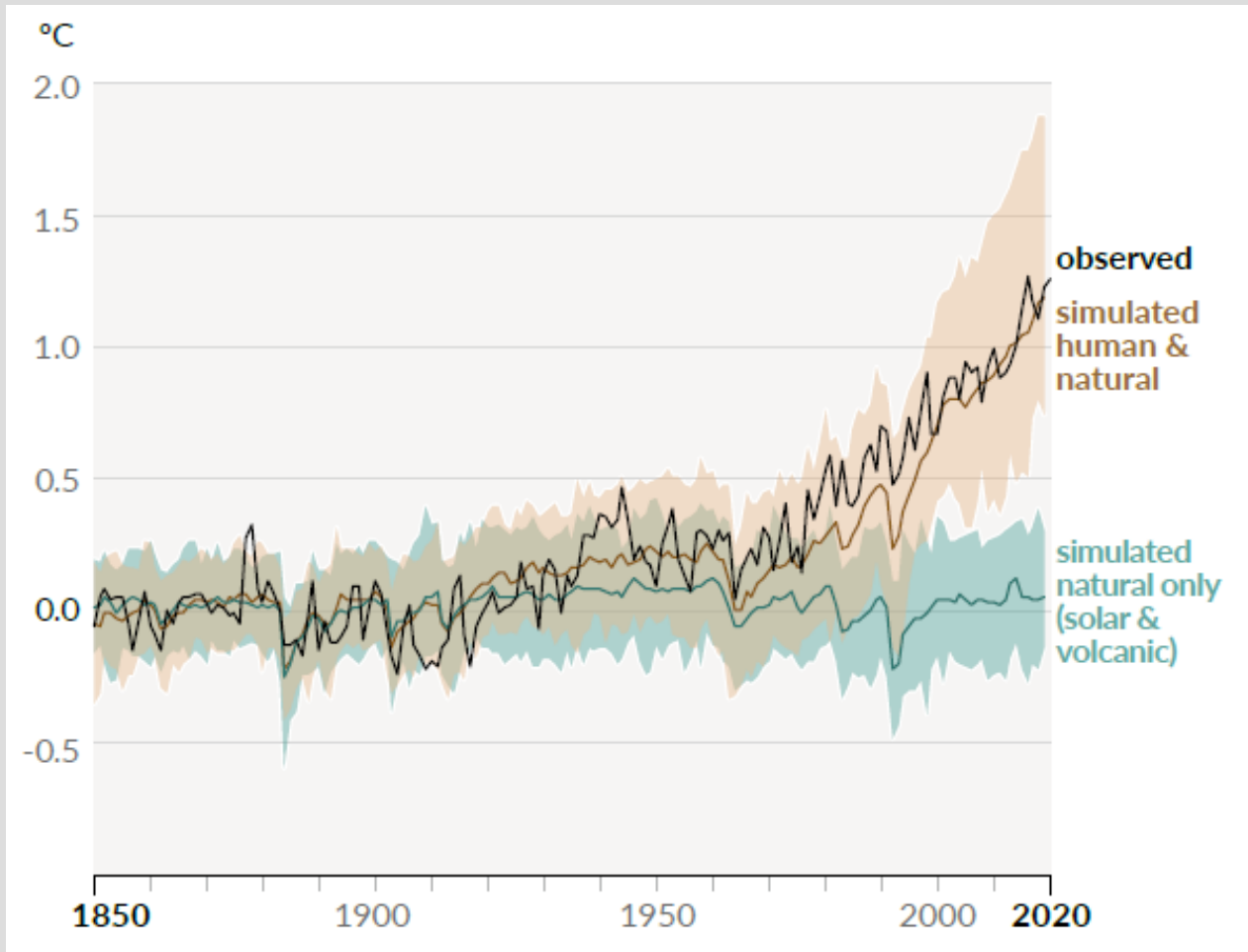


ALL IN ONE  
WATERSHED





# CHANGES IN GLOBAL SURFACE TEMPERATURE RELATIVE TO 1850-1900



Changes in global surface temperature (annual average) as observed and simulated using human and natural and only natural factors (both 1850-1900). IPCC, 2021

Intergovernmental Panel on Climate Change (IPCC)  
Climate Change 2021: The Physical Science Basis

[https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf)

low flow toilets  
fix water leaks reduce laundry loads  
soaker hose quick shower  
full laundry loads drip irrigation  
regenerative agriculture upgrade piping  
water deeply use mulch water reservoir companionate planting  
water at night water timers brick in toilet  
reduce lawnmowing reduce footprint  
xeriscaping use rain barrels  
hand water plants  
reuse bathwater grey water system  
use water sparingly  
soil moisture meter  
stop waterdrips reduce outdoor watering  
protect riparian areas

# WHAT'S HAPPENING IN THE BOUNDARY



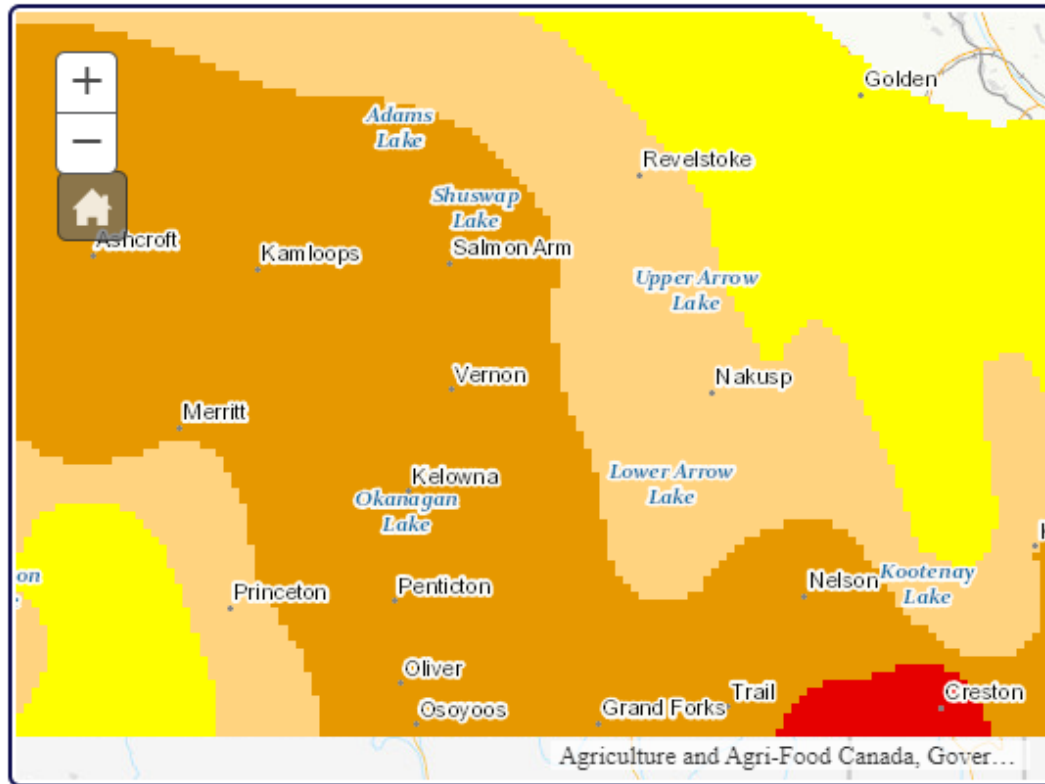
# DROUGHT ANALYSIS – MONTHLY COMPARISON

CANADA DROUGHT MONITOR

[WWW.AGR.GC.CA/ENG/AGRICULTURE-AND-THE-ENVIRONMENT/DROUGHT-WATCH-AND-AGROCLIMATE](http://WWW.AGR.GC.CA/ENG/AGRICULTURE-AND-THE-ENVIRONMENT/DROUGHT-WATCH-AND-AGROCLIMATE)

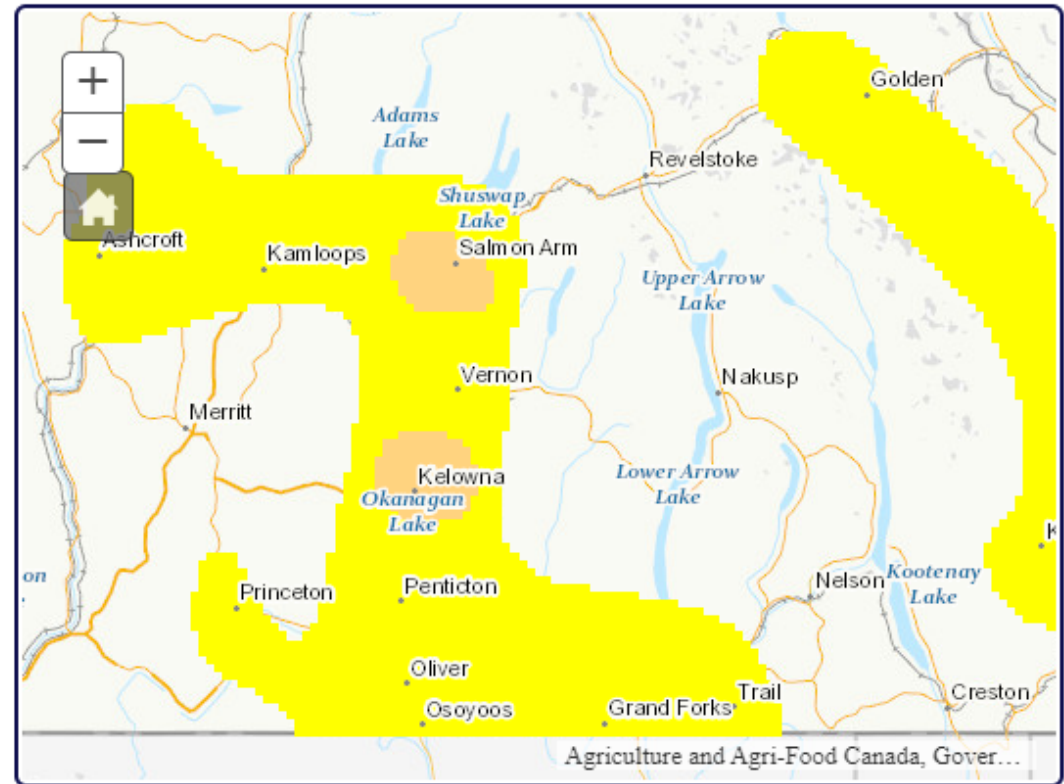
Year: 2021

Month: June



Year: 2022

Month: June



D0 - Abnormally dry



D1 - Moderate drought



D2 - Severe drought



D3 - Extreme drought

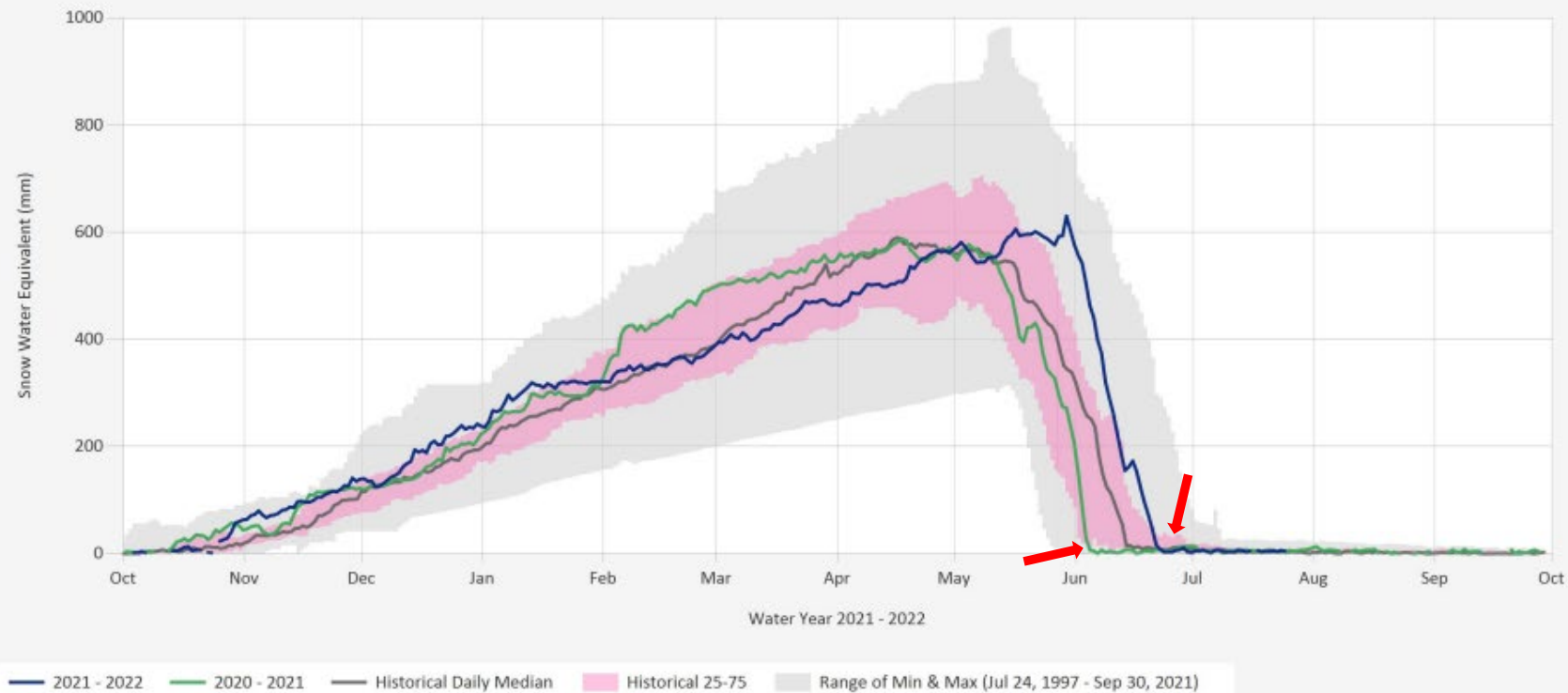


D4 - Exceptional drought



Drought Not Analyzed

# 2022 CURRENT CONDITIONS

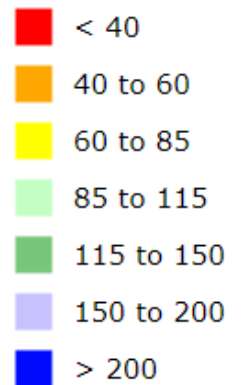




# AGROCLIMATE INTERACTIVE MAPS

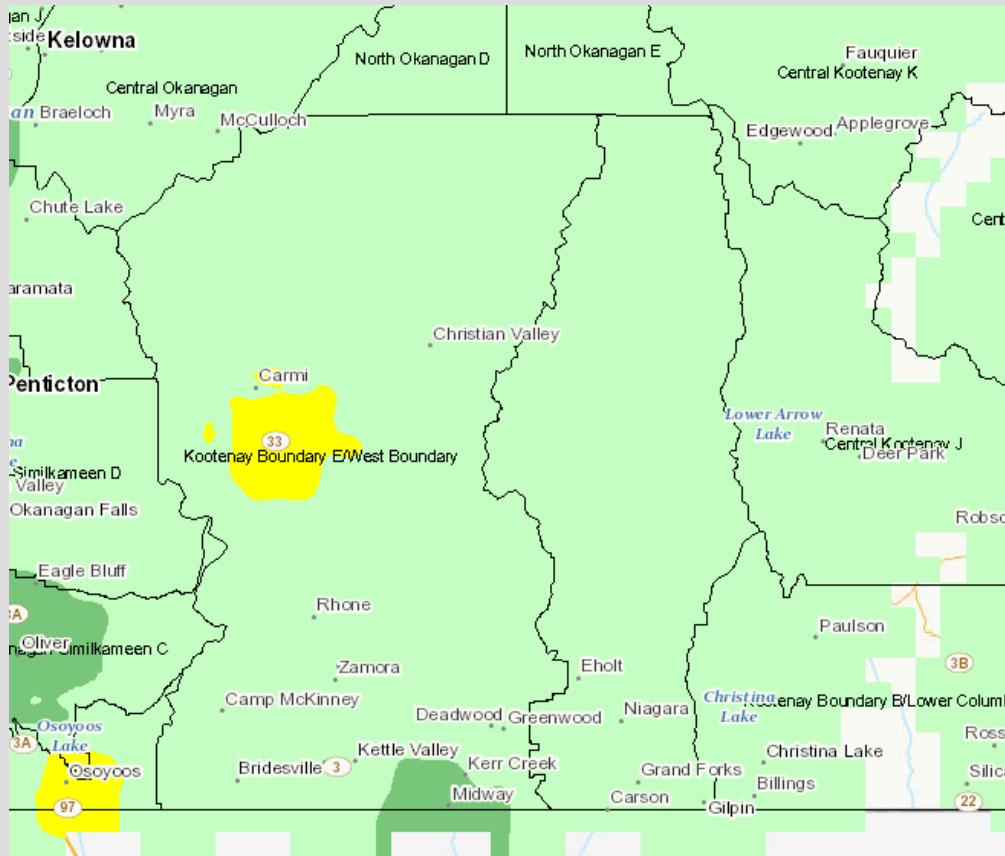
[WWW.AGR.GC.CA/ATLAS/AGCLIMATE?LANG=EN](http://WWW.AGR.GC.CA/ATLAS/AGCLIMATE?LANG=EN)

BASED ON JULY 24, 2022



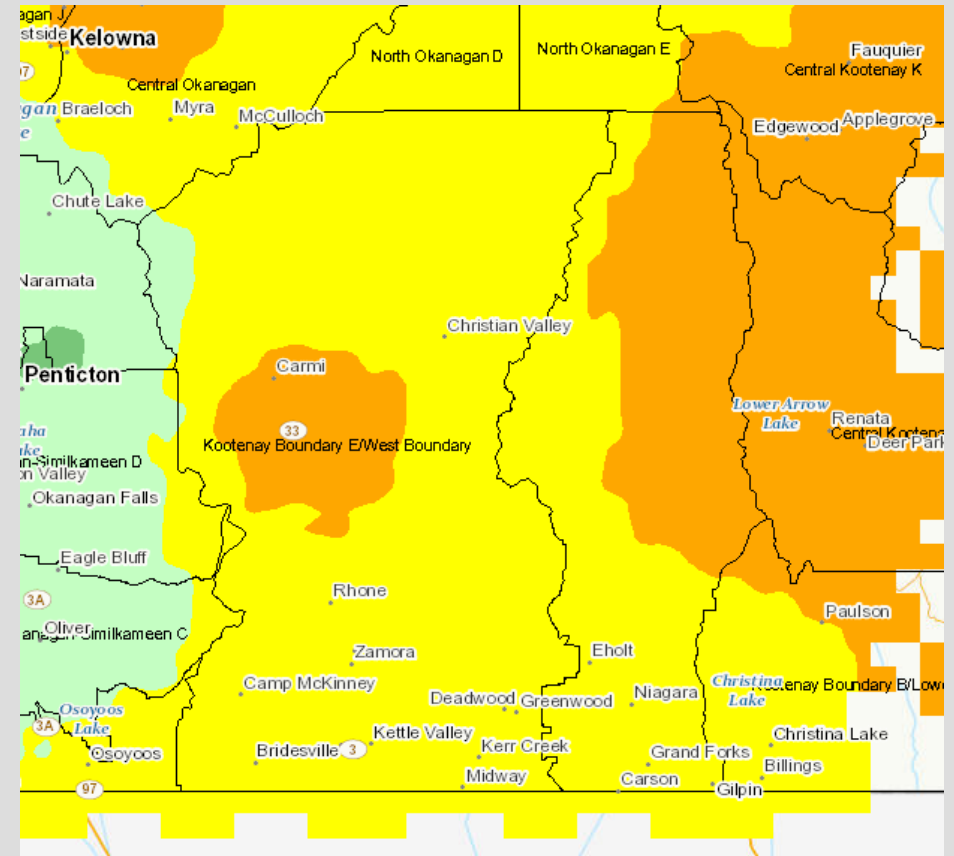
## PRECIPITATION

PERCENT OF AVERAGE (FROM APR 1<sup>ST</sup> 2022)



## PRECIPITATION

PERCENT OF AVERAGE (LAST 30 DAYS)



Historical Record: 1914 to 2019 | Regulation status: Natural

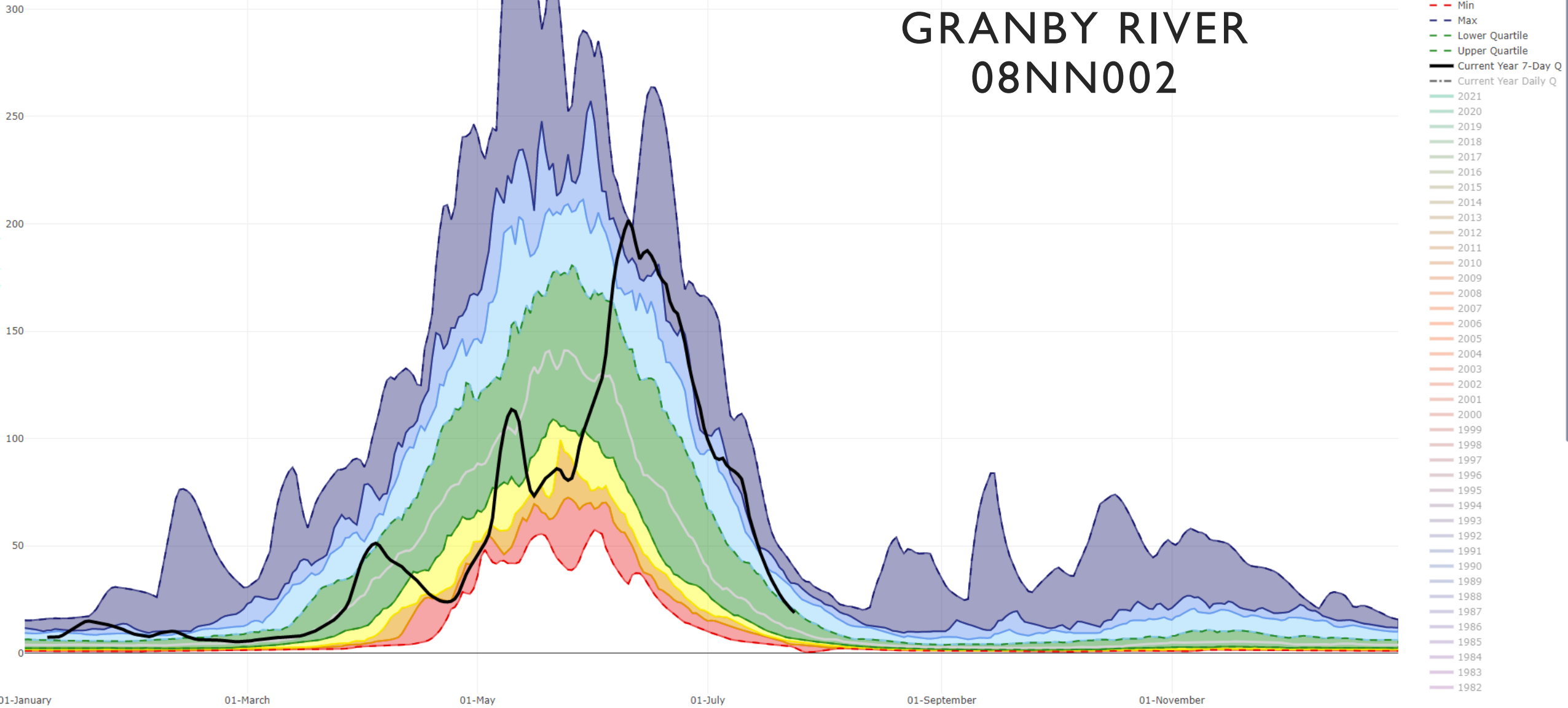
Latest streamflow percentile = 73th (Based on 7-day Q)

Latest percent of median = 172% (Based on 7-day Q)

Latest percent of MAD = NA% (Based on 7-day Q)

Last Updated: 2022-07-25

\*Graph statistics based on historic 7-day Q | Data after 2019 is provisional and subject to change





Historical Record: 1914 to 2019 | Regulation status: Natural

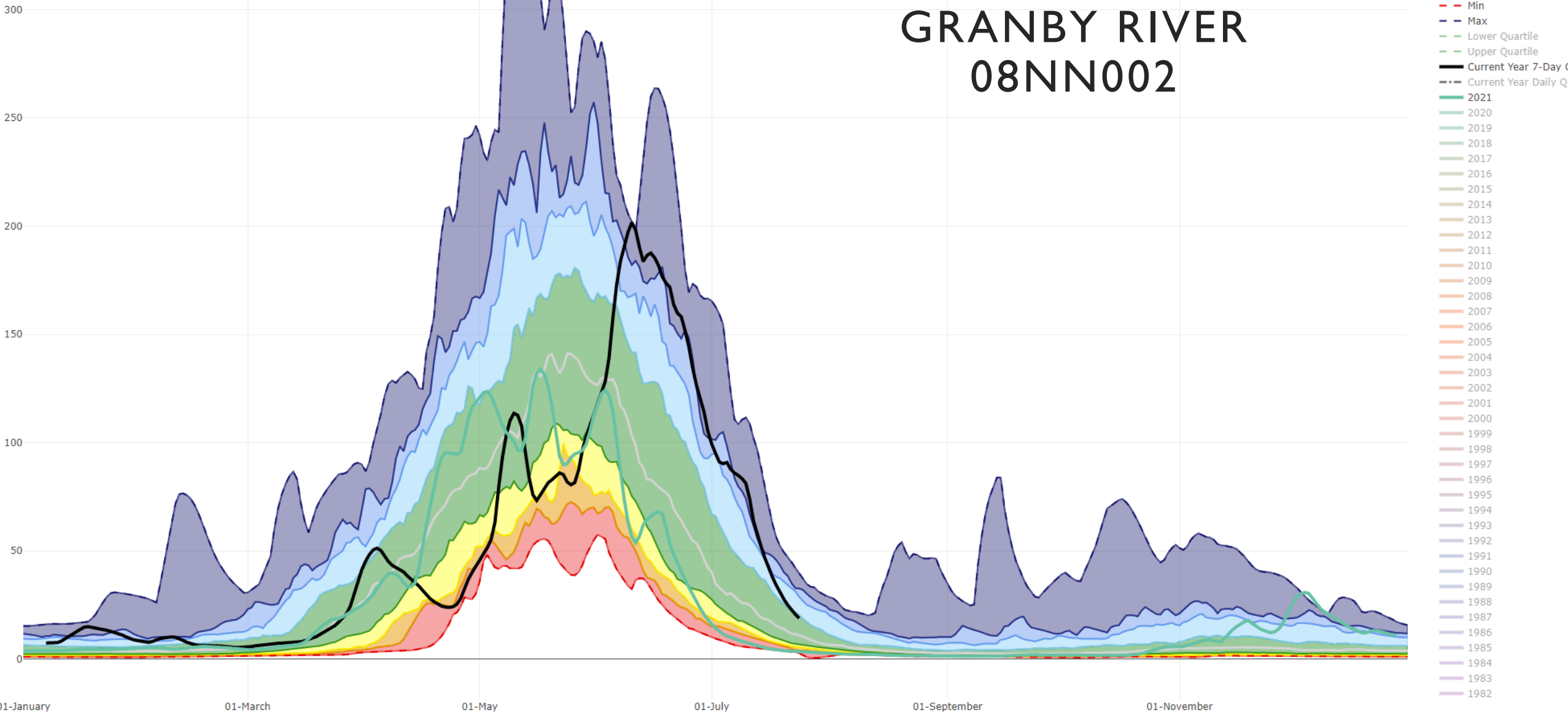
Latest streamflow percentile = 73th (Based on 7-day Q)

Latest percent of median = 172% (Based on 7-day Q)

Latest percent of MAD = NA% (Based on 7-day Q)

Last Updated: 2022-07-25

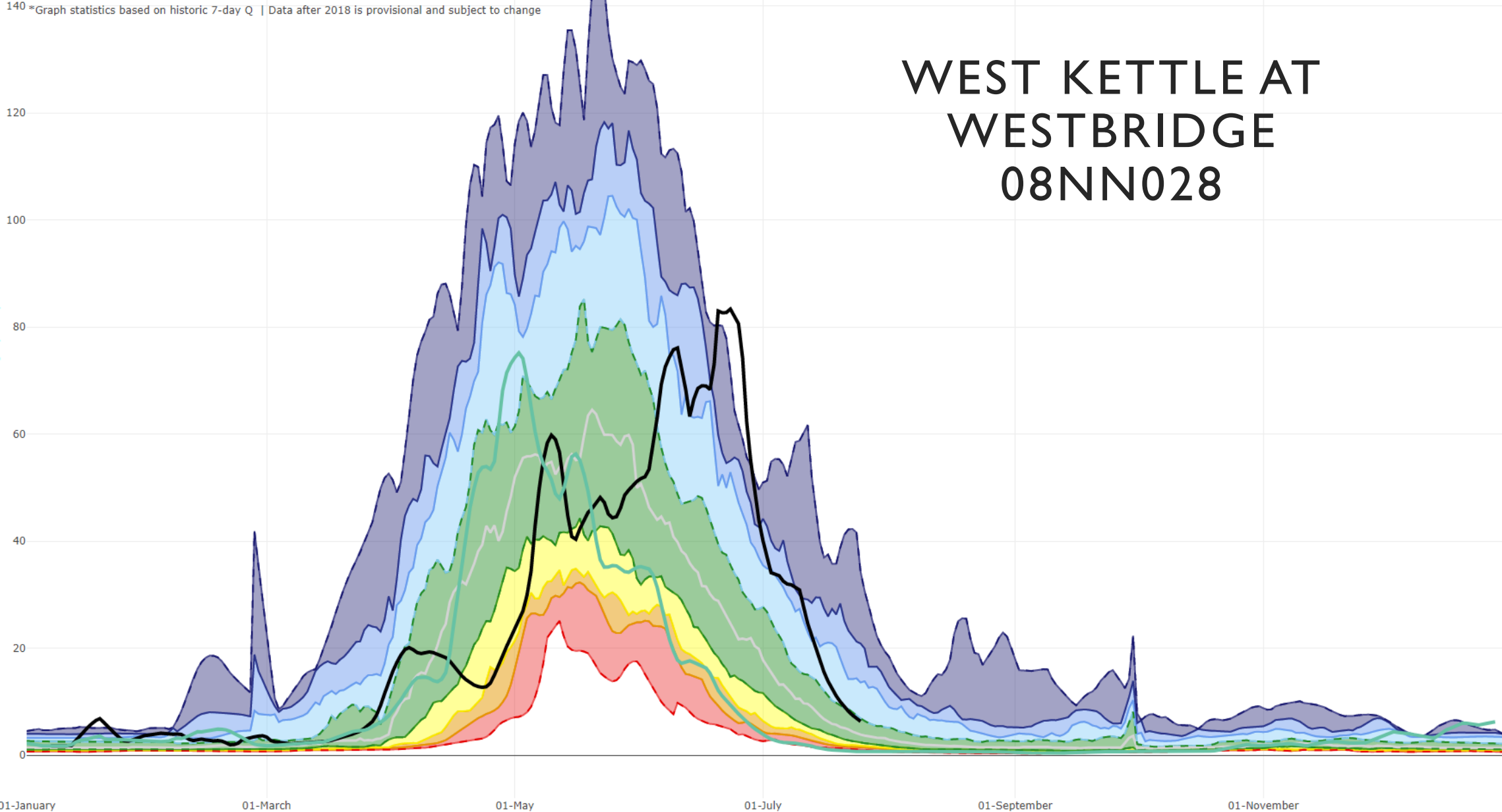
\*Graph statistics based on historic 7-day Q | Data after 2019 is provisional and subject to change



Historical Record: 1914 to 2018 | Regulation status: Regulated  
 Latest streamflow percentile = 69th (Based on 7-day Q)  
 Latest percent of median = 164% (Based on 7-day Q)  
 Latest percent of MAD = NA% (Based on 7-day Q)  
 Last Updated: 2022-07-26

\*Graph statistics based on historic 7-day Q | Data after 2018 is provisional and subject to change

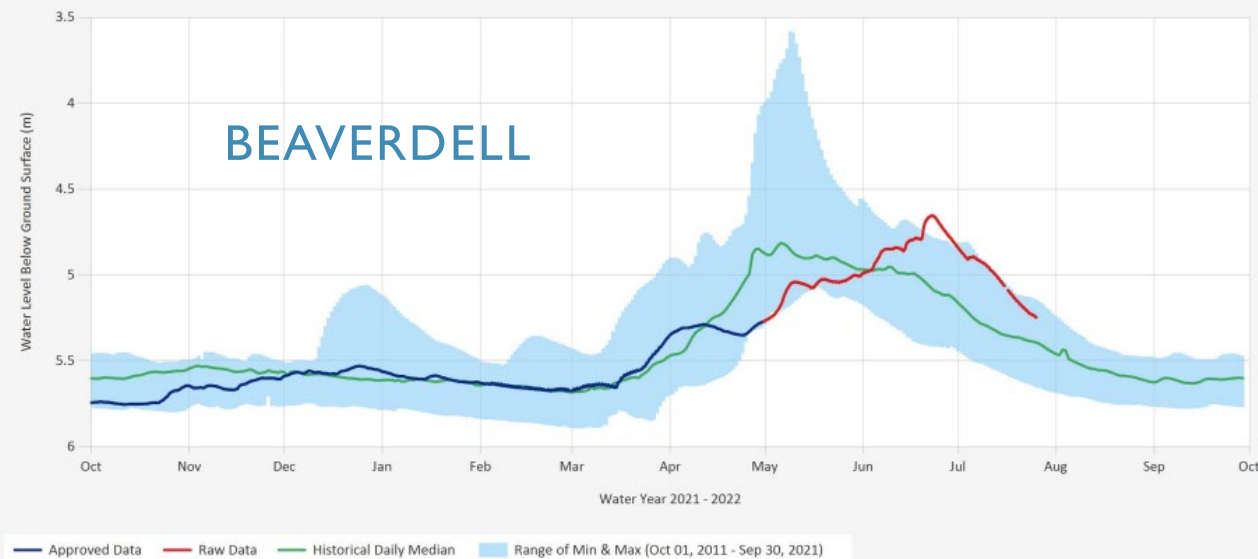
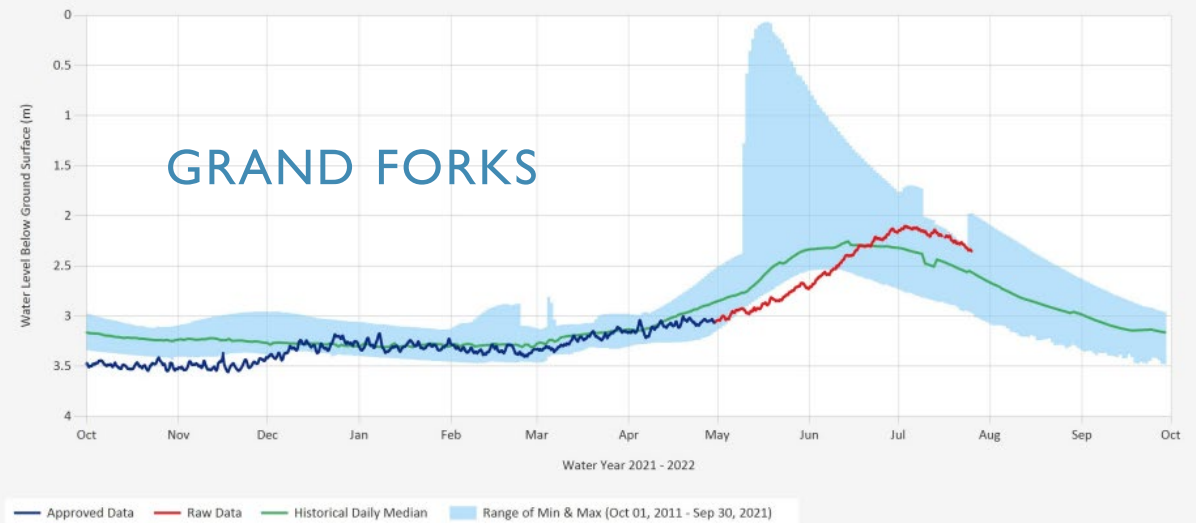
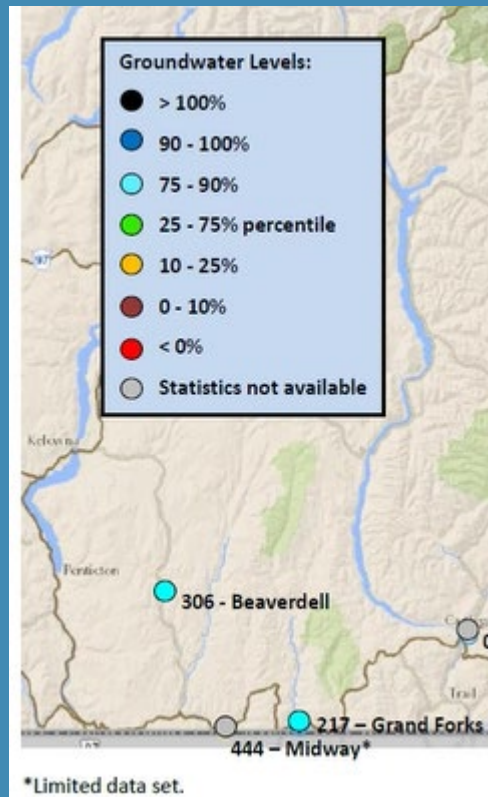
# WEST KETTLE AT WESTBRIDGE 08NN028



- Min - Q5
- Q5 - Q10
- Q10 - Q25
- Q25 - Q75
- Q75 - Q90
- Q90 - Q95
- Q95 - Maximum
- Median
- Min
- Max
- Lower Quartile
- Upper Quartile
- Current Year 7-Day Q
- Current Year Daily Q
- 2021
- 2020
- 2019
- 2018
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- 1982

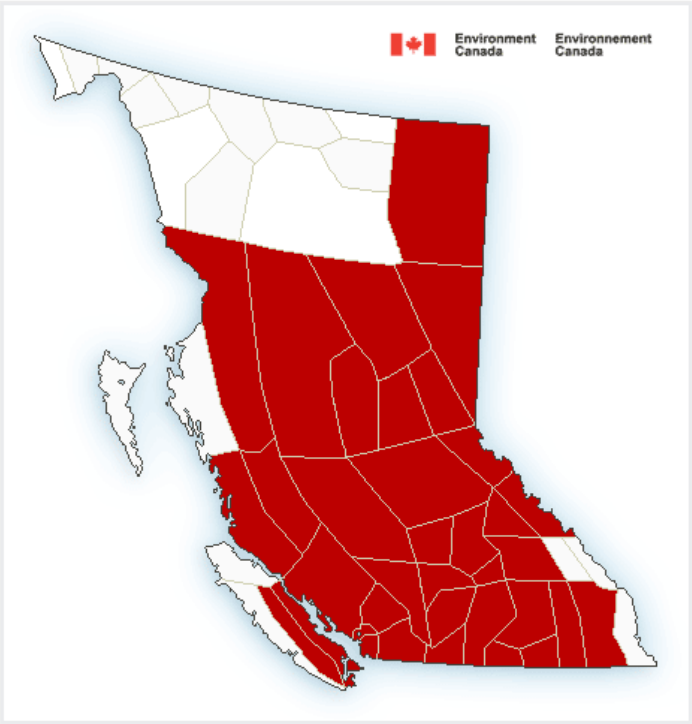


# GROUNDWATER: BC OBSERVATION WELLS




# Public Weather Alerts for British Columbia

Click on a coloured region for the latest alert



► Legend

Location

 **Warning**

 **Watch**

## Alerts for: Boundary

### Warnings

9:55 AM PDT Tuesday 26 July 2022

Heat Warning in effect for:

- Boundary

A heat wave will impact British Columbia this week.

Threat: Daytime high temperatures 35 to 40 degrees Celsius. Early morning low temperatures 18 to 20 degrees Celsius.

When: Now to Saturday.

Locations: Okanagan Valley, Similkameen, Fraser Canyon, Nicola, South Thompson, Shuswap, Boundary, Arrow Lakes - Slocan Lake, West Kootenay, Kootenay Lake, East Kootenay - south including Cranbrook and West Columbia.

Remarks: A strong ridge of high pressure will bring a heat wave to British Columbia this week. The peak daytime high temperatures are expected from Wednesday to Friday. Then, a slow cooling trend is likely this weekend to early next week.

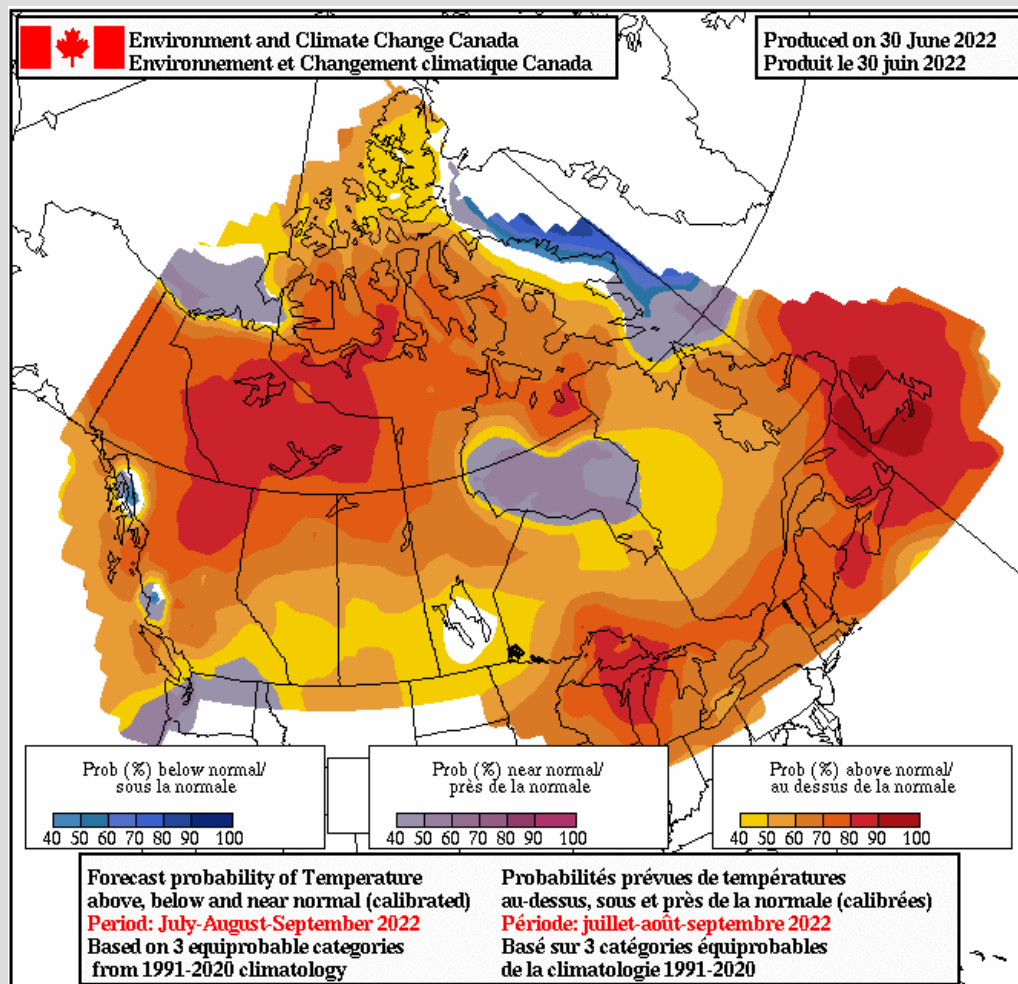


# FORECASTING

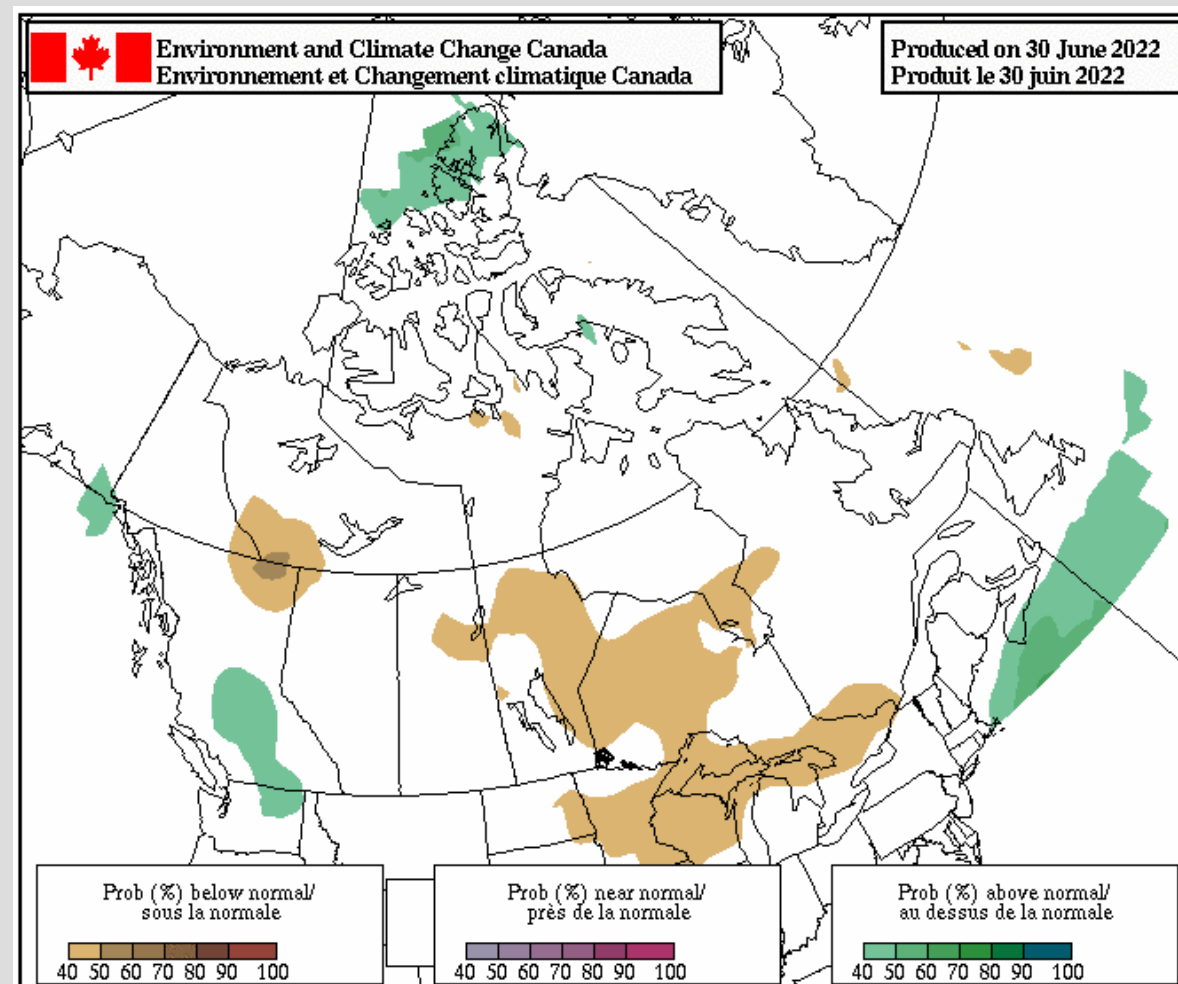
# PROBABILISTIC FORECASTS – JULY,AUG,SEPT

PRODUCED JUNE 30, 2022  
WEATHER.GC.CA/SAISONS/PROB\_E.HTML

## TEMPERATURE



## PRECIPITATION





## MORE INFORMATION

- BC Drought Information Portal (google the name)
- Kootenay Boundary Water Tool: <https://kwt.bcwatertool.ca/>
- BC Groundwater Level Data (google the name)
- North America Water Watch: <https://watermonitor.gov>
- North America Drought Monitor: <https://www.ncdc.noaa.gov/temp-and-precip/drought>

RDKB Website: [www.kettleriver.ca](http://www.kettleriver.ca)





## QUESTIONS/COMMENTS



Kristina Anderson  
RDKB Watershed Planner  
250-442-4111  
[watershedplanner@rdkb.com](mailto:watershedplanner@rdkb.com)

