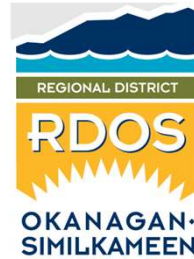




Associated
Environmental



Platinum
member



Meadow Valley Aquifer Study

Report to Environment and Infrastructure Committee
Regional District Okanagan Similkameen

Marta Green, P.Geo.; Steve Colebrook, M.Sc.; Dylan Riley, GIT

Thursday August 4, 2022 11:00 AM

From this study, we looked to answer two questions:

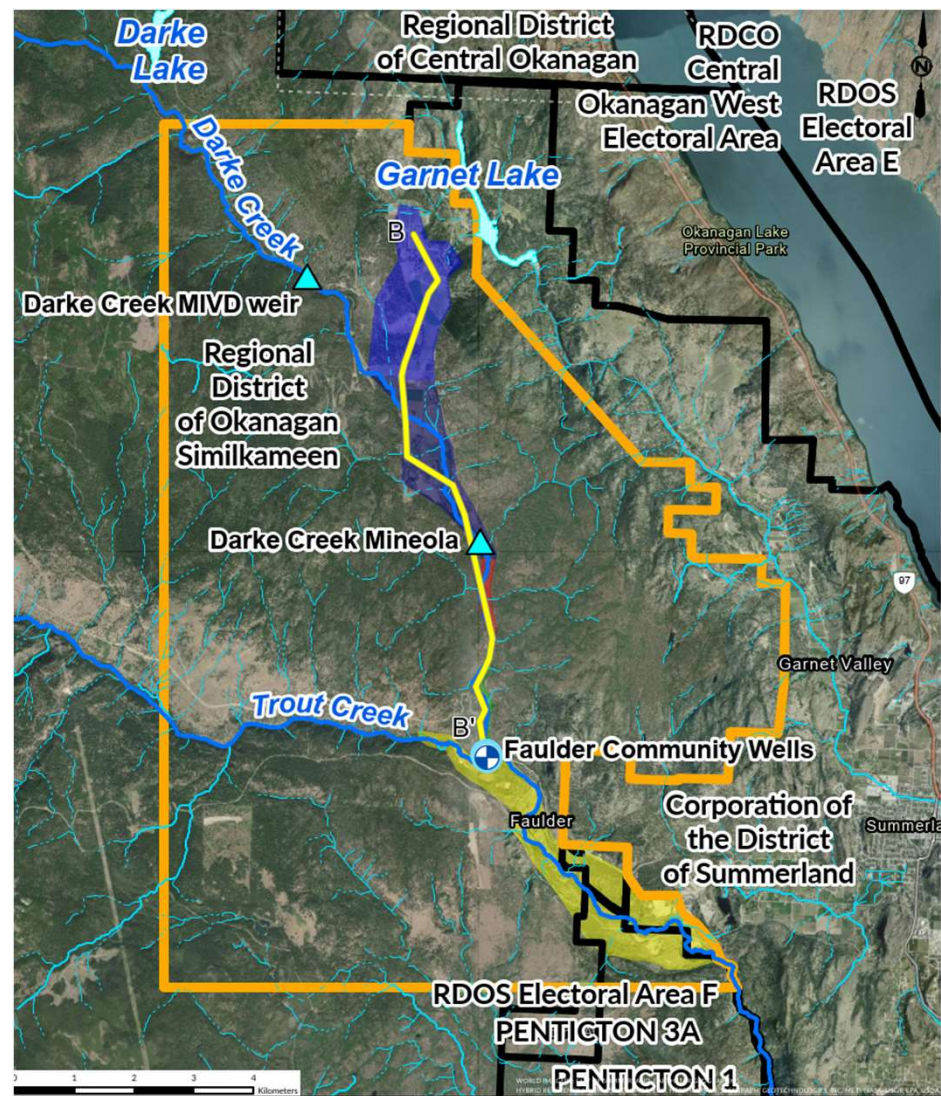
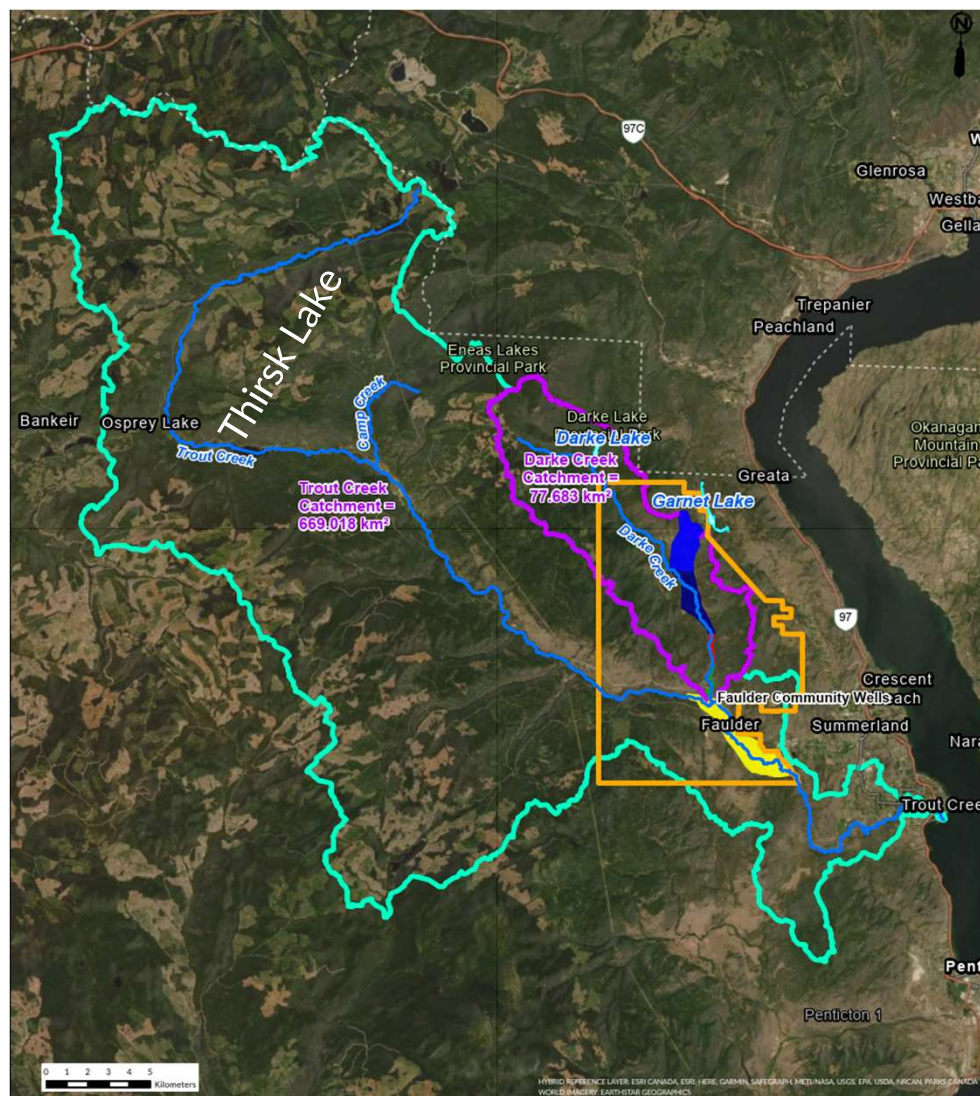
Is there enough groundwater supply, now and into the future while considering growth and climate change, to support:



1. The Faulder Community Water Service Area?

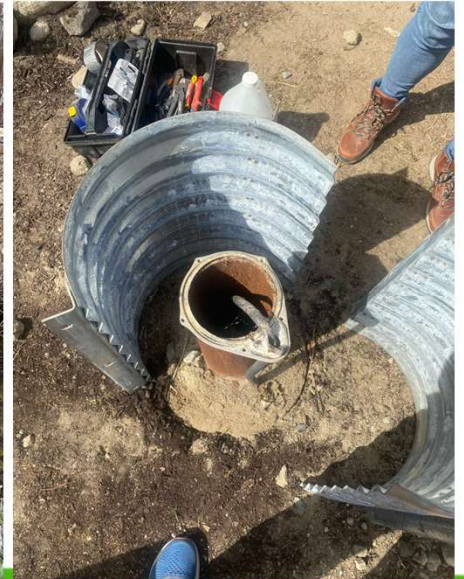
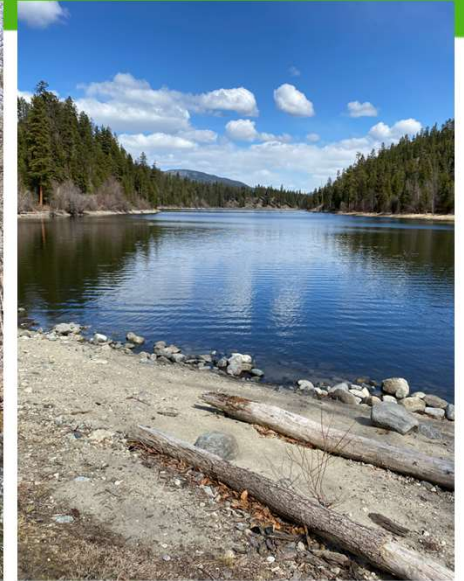
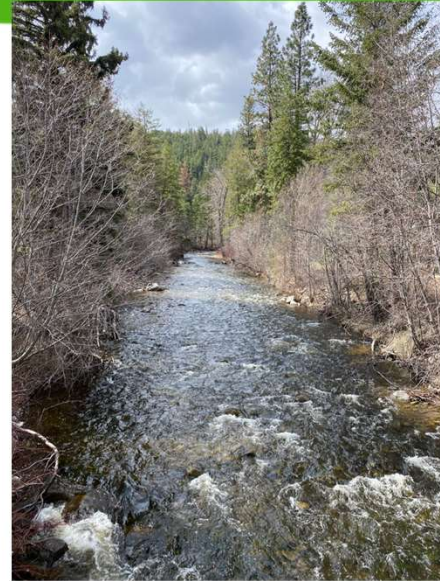


2. Other areas of Aquifer #299(within Electoral Area F) that rely on private water wells and Meadow Valley Irrigation District?



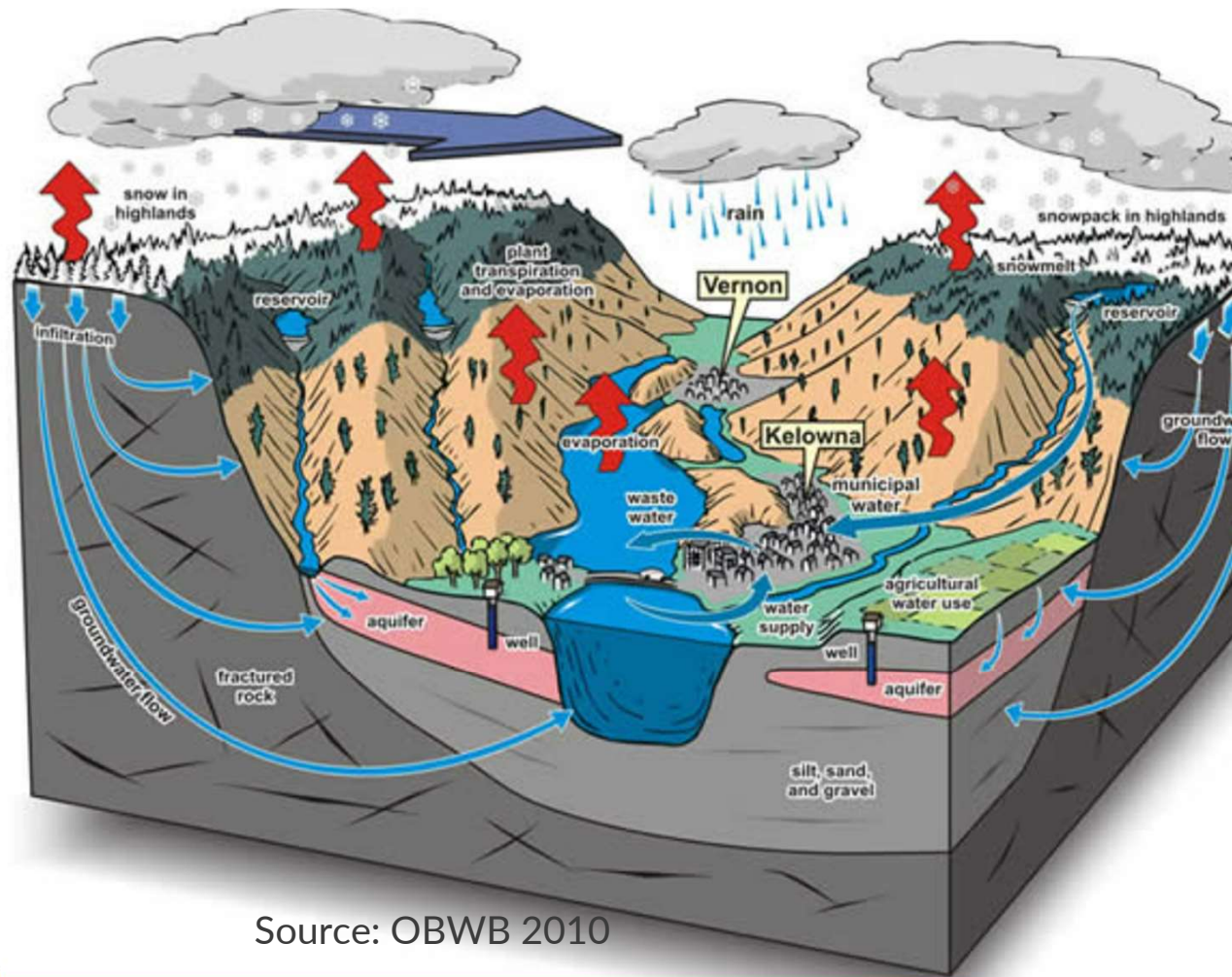
Work Completed

- Reviewed background information
- Visited the study area, and interviewed residents
- Collected three water levels and installed two dataloggers
- Drew cross sections, synthesized Darke Creek flow data
- Completed water demand model with future climate scenarios



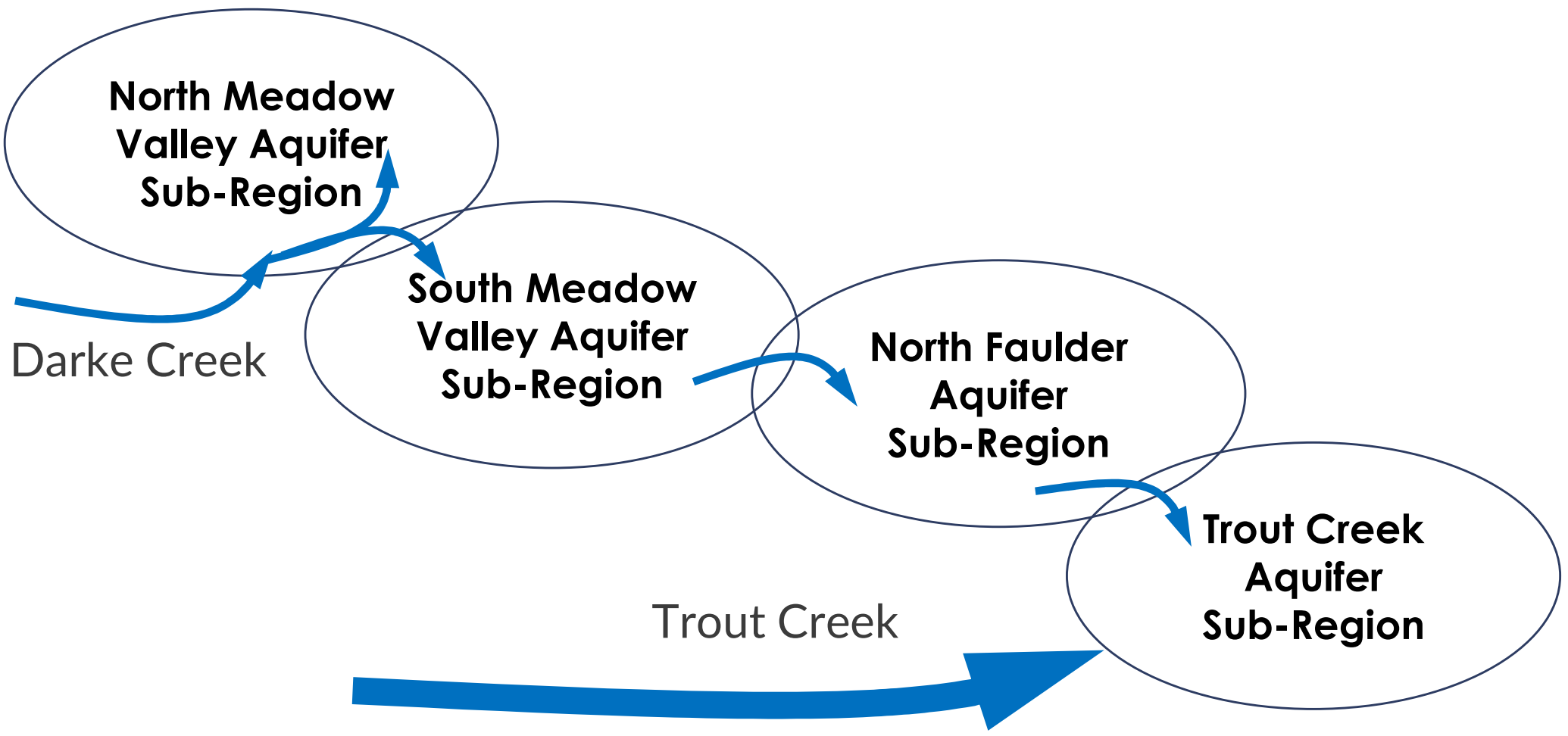
Groundwater Hydrogeology Concepts

- Part of the Water Cycle
- Recharged by infiltrating rain and snowmelt
- Exists in spaces between sand grains or in bedrock fractures
- Slow moving
- Ultimately discharging back to surface water bodies
- Losing stream: type that loses water as it flows downstream by infiltration



Source: OBWB 2010

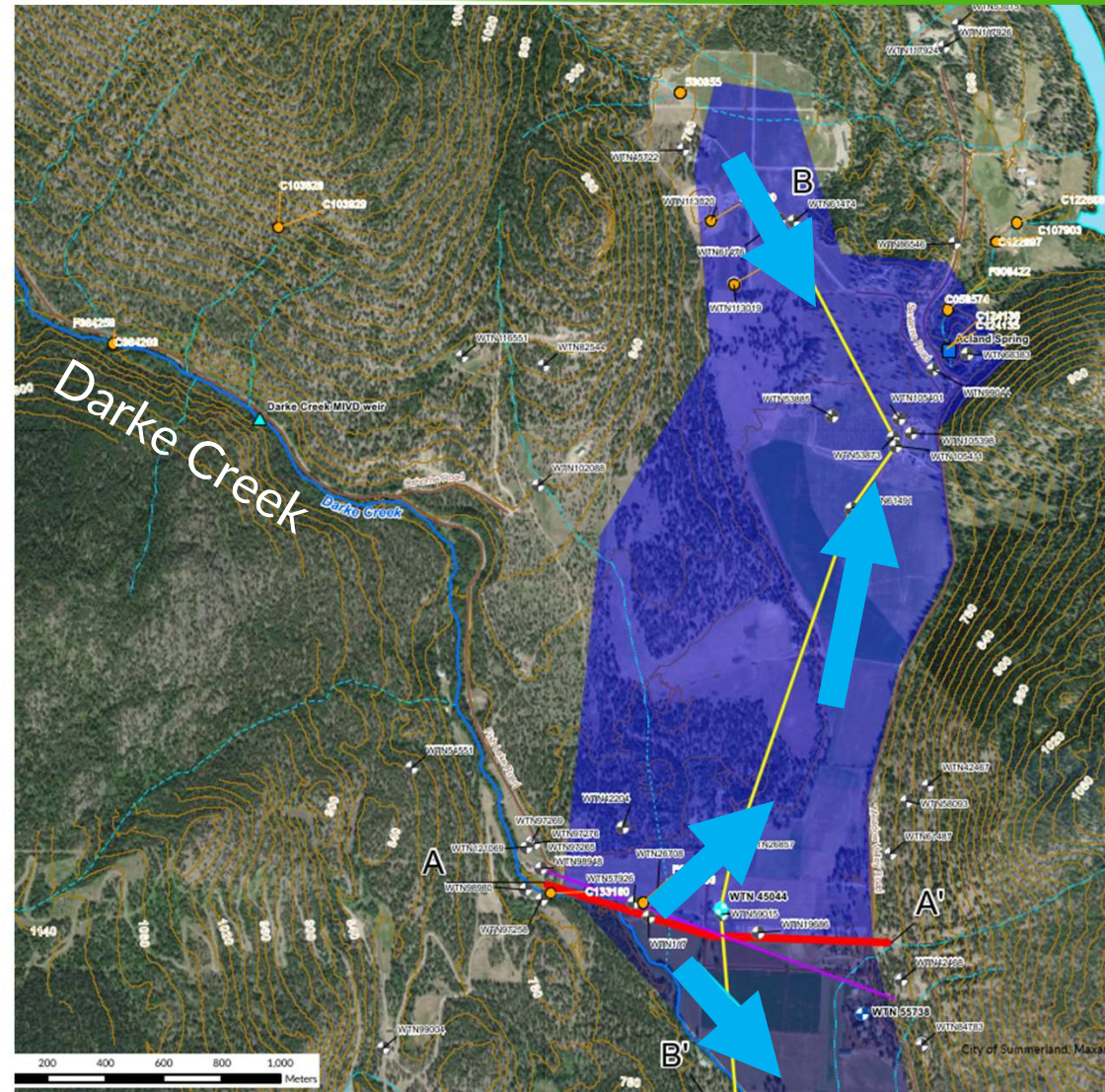
Conceptual Model of Groundwater Flow



North Meadow Valley Aquifer Sub-Region

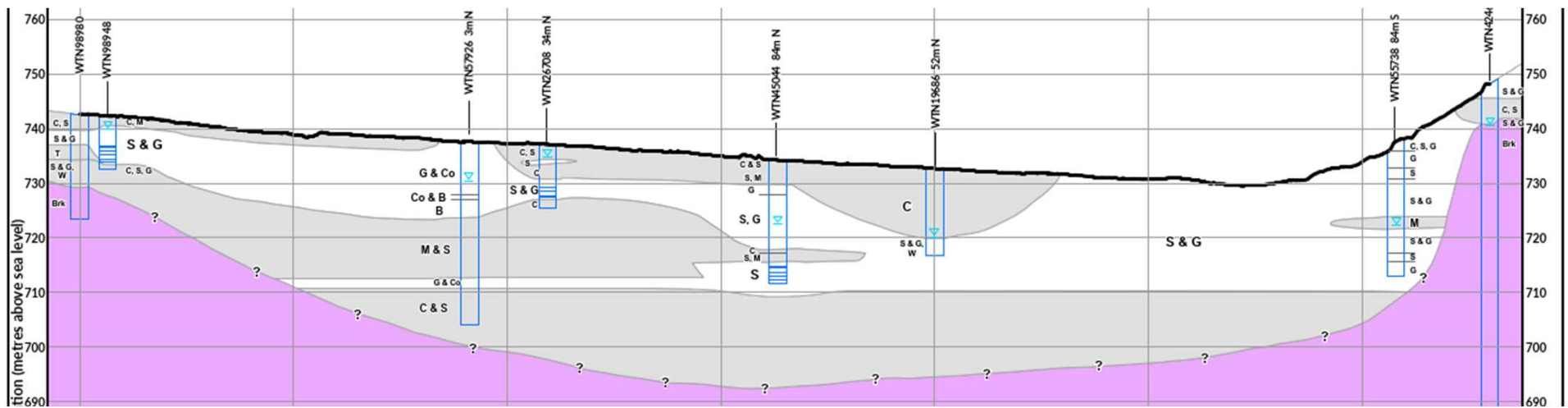
Likely fully allocated in dry years

- Recharge from Darke Creek (losing stream reaches)
- Groundwater divide at Fish Lake Road
- Groundwater flow is radial and then to North, discharging to Acland Spring (and possible Garnet Lake)



North Meadow Valley Aquifer Sub-Region

Likely fully allocated in dry years

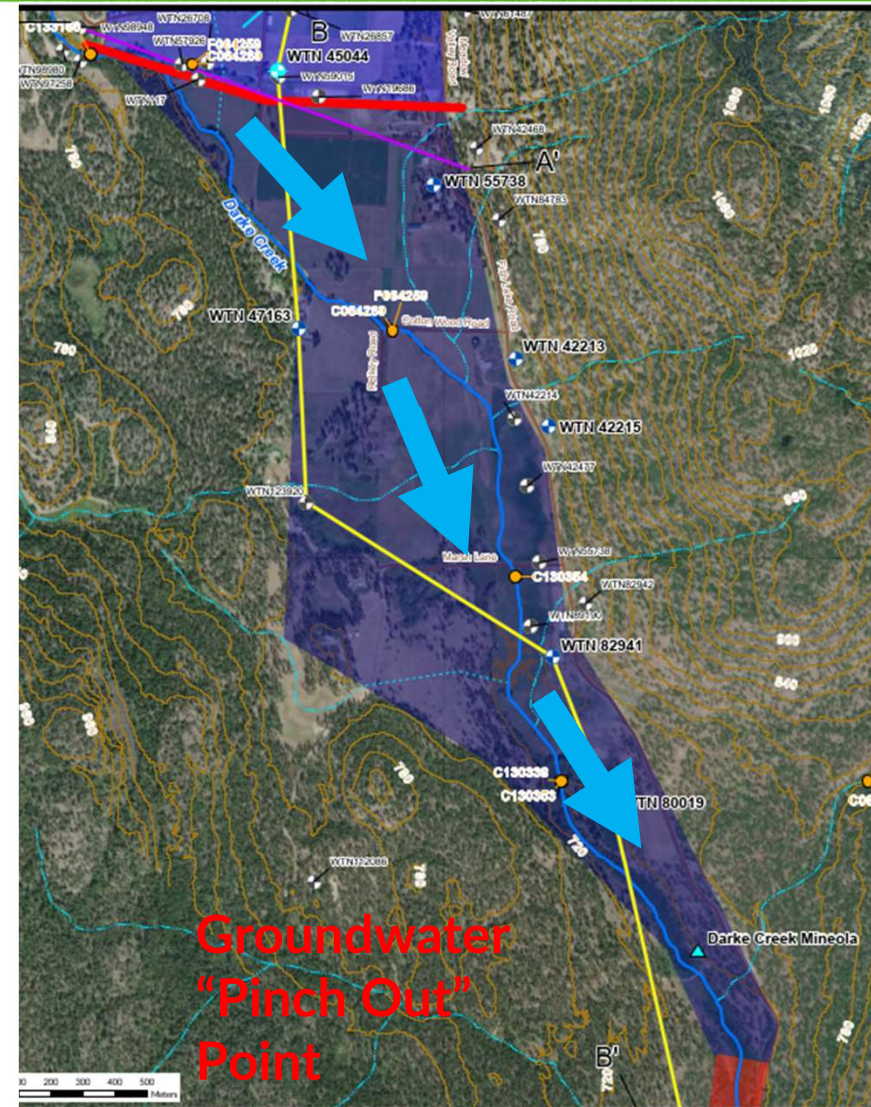


- Aquifer is thin at about 10m thick
- Low water levels in Darke Creek and wells in some years
- Impacts to others in sub-region
- Likely no impact to other sub-regions

South Meadow Valley Aquifer Sub-Region

Likely fully allocated in dry years

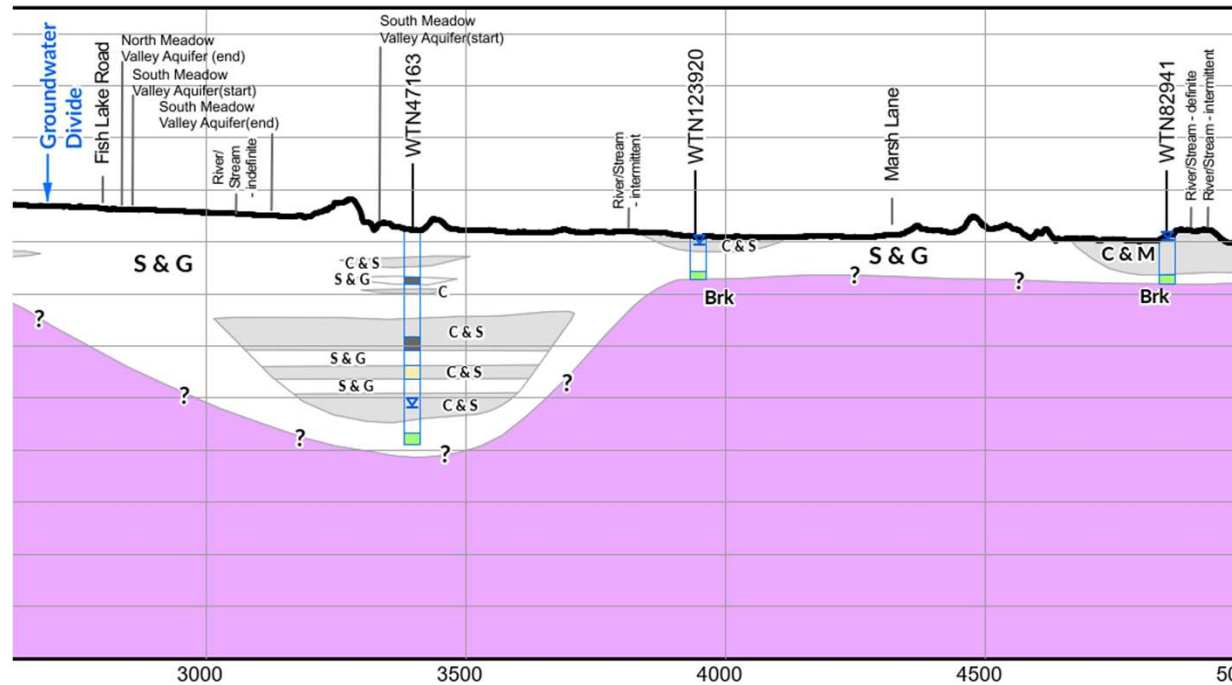
- Also recharged from Darke Creek.
- Groundwater divide at Fish Lake Road
- Groundwater flow is radial and then south to North Faulder Aquifer in wet years.
- In dry years, no groundwater flow to North Faulder



South Meadow Valley Aquifer Sub-Region

Likely fully allocated in dry years

- Aquifer is thin and short, with wells installed to bedrock.
- Low levels in Darke Creek and groundwater wells in dry years
- Impacts other users in sub-region and those in North Faulder



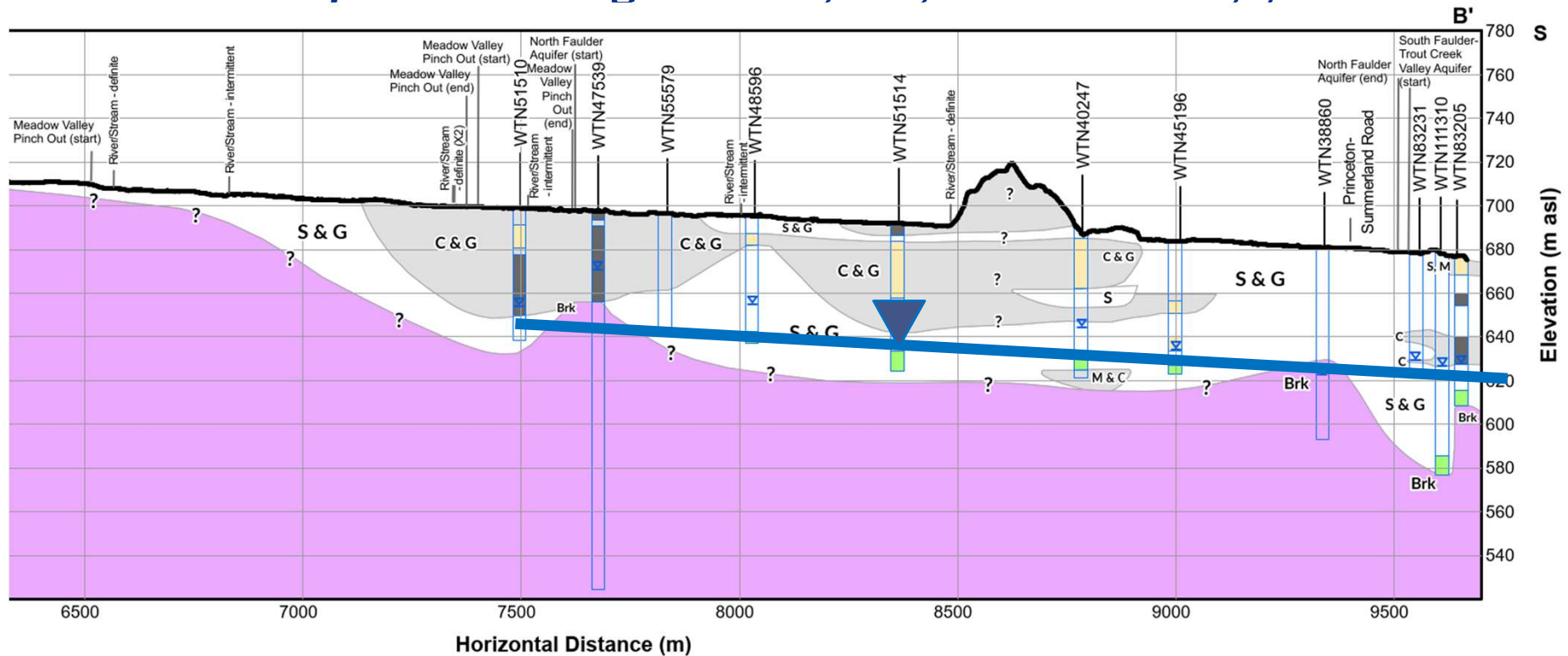
North Faulder Aquifer Sub-Region

Likely fully allocated in dry years

- Recharges from Darke Creek after “Groundwater Pinch-Out” point
- Additional input via groundwater flow from South Meadow Aquifer during wet years only.
- Groundwater flows south towards Trout Creek Aquifer.



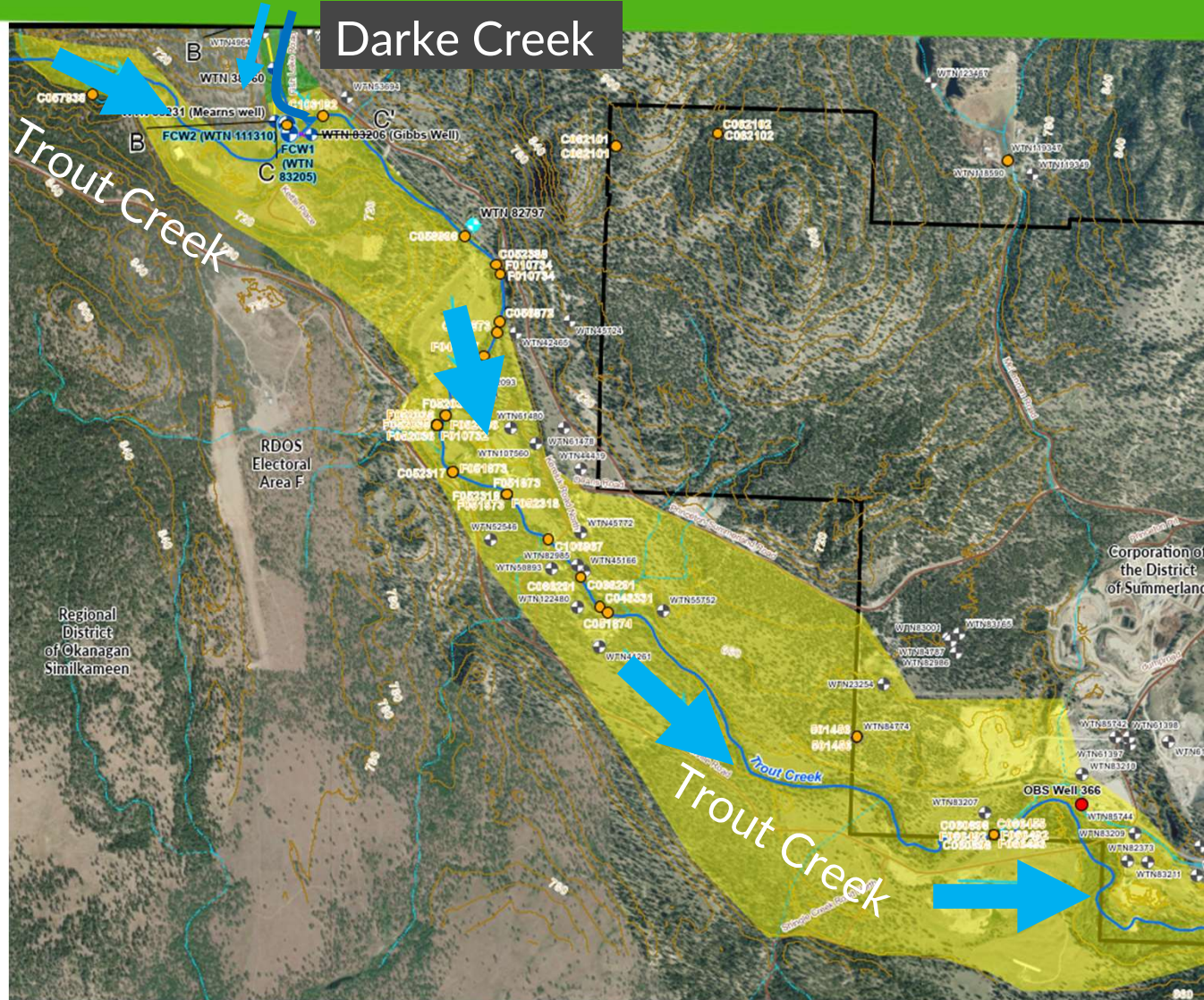
North Faulder Aquifer Sub-Region: Likely fully allocated in dry years



- Surficial aquifer is thin (10m), wells already screened to bottom of surficial aquifer, and many wells are screened into bedrock. Local reports of dry wells in dry years.

**Trout Creek Valley Aquifer
Sub-Region - Likely NOT
fully allocated for
individual domestic wells**

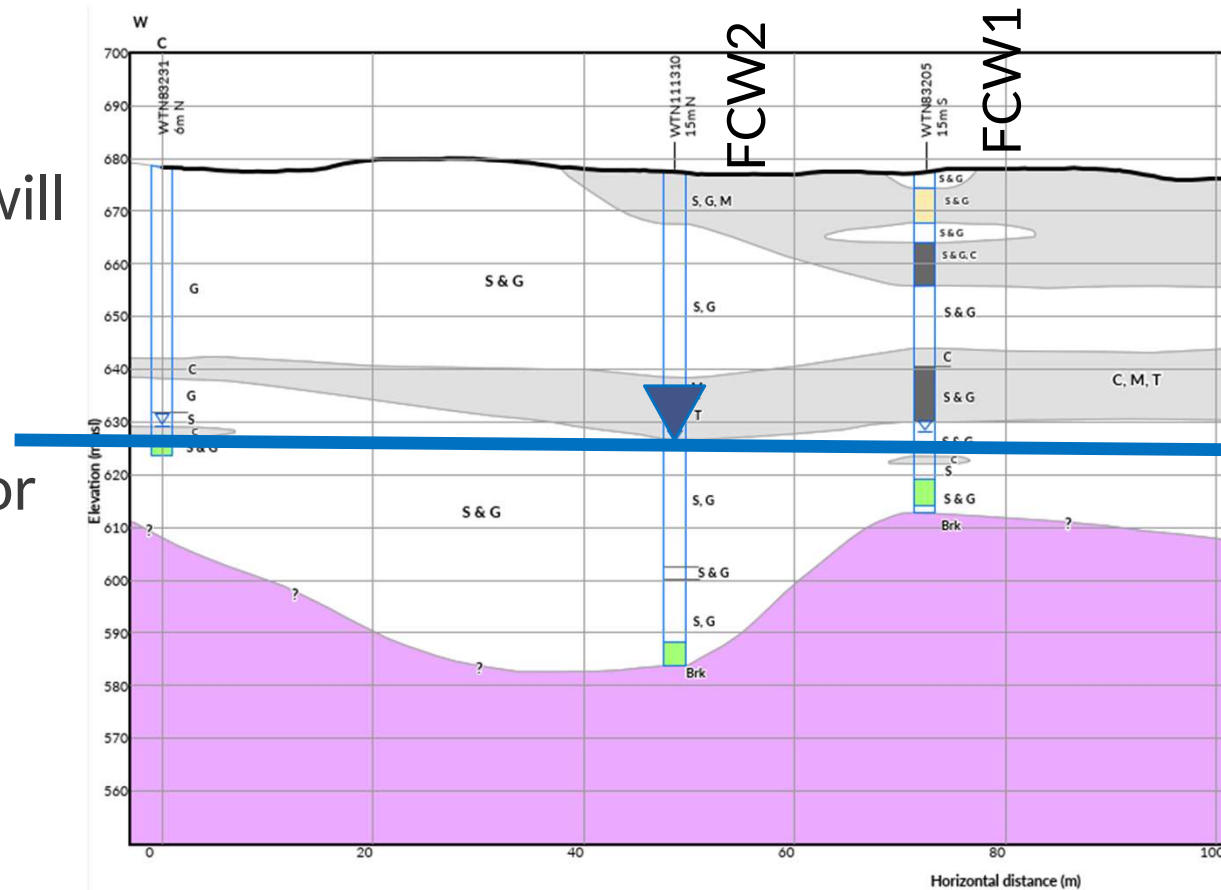
- Recharge from Trout Creek losing reaches upstream of Faulder.
- Minor contribution from Meadow Valley/Darke Creek losing reaches.
- Groundwater flows southeast towards District of Summerland.



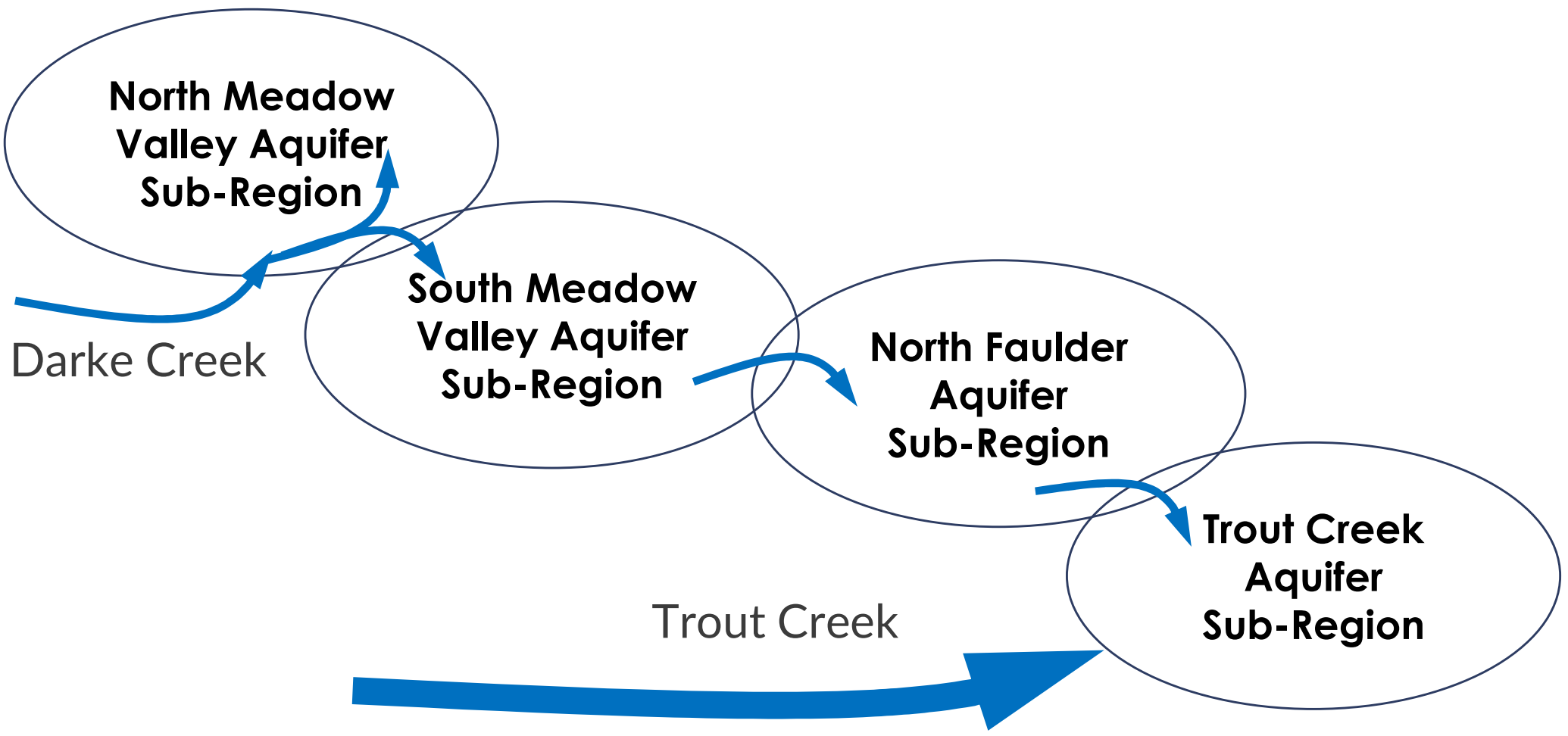
Trout Creek Valley Aquifer Sub-Region

- Likely NOT fully allocated for individual domestic wells

- Aquifer is thick (40+m)
- Faulder Community Wells will NOT be impacted by groundwater use in North Faulder Aquifer
- This is due to different major sources of recharge (Trout Creek vs Darke Creek)



Conceptual Model of Groundwater Flow



Climate Change Considerations

- Water supply impacts
 - Annual precipitation will go up
 - More rain than snow
 - Impact to groundwater recharge unknown
- Water demand impacts
 - Longer, hotter summers
 - Will increase agricultural and outdoor domestic water demands in all Sub-Regions (up to 44% increase)



FCW1 and FCW2 - Limit to growth due to water licence volume

- Licence is based on 2000 L/p/d for 81 lots and actual meters data (56,000 m³/year)
- Equal to 500 L/p/d (Cdn average)
- Expect household sizes to increase (zoning allows accessory buildings)
- Indoor water use insignificant
- Outdoor water use can vary and can exceed existing water licence if water conservation efforts not followed.
- To increase water licence volume, need to apply for a new groundwater use licence.



Recommendations – Planning

- Limit domestic groundwater use within the Meadow Valley or North Faulder Aquifer Sub-Regions
- No need to limit domestic use in Trout Creek Aquifer Sub-Region
- Promote water conservation measures in particular in the Faulder Community Water Service Area
- Look into requirements for a new groundwater use licence application with Ministry of Forests.



Recommendations – Further Data Collection

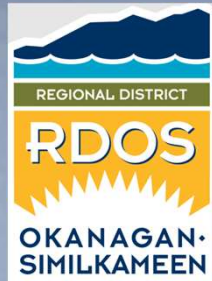
- Continue to monitor water use in FCW1 and FCW2.
- Complete additional technical studies on Trout Creek and Darke Creek
- Conduct a long-term pumping test on FCW2



Recommendations - Partnerships

- Share report with Ministry of Forests to highlight importance of losing stream reaches to Aquifer #299 recharge
- Consider starting Community Monitoring
 - For example, join Living Lakes Canada network)
 - Additional groundwater monitoring locations in South Meadow Valley and North Faulder Aquifer Sub-regions (partnership with Ministry of Forests)





Questions?

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