Making a difference...together

WATER ADVISORY COMMITTEE
Notice of Meeting on **Thursday, September 2, 2021 at 1:30 p.m.**
Goldstream Meeting Room, 479 Island Highway, Victoria, BC

For members of the **public who wish to listen to the meeting** via telephone please call **1-833-353-8610** and enter the **Participant Code 1911461 followed by #.** You will not be heard in the meeting room but will be able to listen to the proceedings.

Elise Cote (Chair)	Mike Doehnel	Wilf Scheuer
Jennifer Todd (Vice Chair)	Tayler Krawczyk	Heather Thompson
Gord Baird	Craig Nowakowski	David Timothy
Jeremy Caradonna	John Rogers	Mike Turner
Celine Davis	Karen Sander	

AGENDA

1. **TERRITORIAL ACKNOWLEDGEMENT**

2. **APPROVAL OF AGENDA**

3. **ADOPTION OF MINUTES** 3

   ***Recommendation**: That the minutes of the June 3, 2021 and June 22, 2021 Water Advisory Committee meetings be adopted.*

4. **CHAIR'S REMARKS**

5. **PRESENTATIONS/DELEGATIONS**

   This meeting will be held without the public present. A phone in number is provided above that will allow the public to listen to the meeting.

   Presentation and Delegation requests can be made online or complete this printable form (PDF). Requests must be received no later than 4:30 p.m. two calendar days prior to the meeting.

6. **UPDATES FROM WORKING GROUPS**

   - Long term water supply and demand management
   - Water Quality
   - Major Capital Projects
   - Water Rates

7. **COMMITTEE BUSINESS**

   7.1. Provincial Drought Level 4 – Capital Regional District Water Service Impacts [Verbal Report/Discussion]

*To ensure quorum, advise **DENISE DIONNE at 250-360-3087**, if you cannot attend.*

IWSS-297445977-7377

7.2. Greater Victoria Water Supply Area Wildfire Management and Water System Capacity [Verbal Report/Discussion]

Reference Material:

Attachment A: Excerpt from the Greater Victoria Water Supply Area (GVWSA) Management Plan – Section 5: Wildfires **.....10**

Attachment B: Report to Regional Water Supply Commission, September 16, 2020: Wildfires in the GVWSA **.....24**

Attachment C: Report to Regional Water Supply Commission, May 19, 2021: Wildfires in the GVWSA – Follow Up **.....40**

7.3. Summary of Regional Water Supply Commission Recommendations.....55

Recommendation: *That the Summary of Recommendations be received for information.*

7.4. Water Watch Report 57

Recommendation: *That the August 23, 2021 water watch report be received for information.*

8. COMMITTEE MEMBERSHIP

Membership Expiring December 31, 2021 – all are concluding their first 2 year term

- Heather Thompson- Environmental
- Jennifer Todd - Environmental
- Karen Sander – Other Organizations – Environmental/Community Engagement
- Mike Turner – Fish Habitat Protection
- Elise Cote (Chair) – Resident / Ratepayer

9. NEW BUSINESS

10. ADJOURNMENT

Next Meeting: Thursday, December 2, 2021

Making a difference...together

MINUTES OF A MEETING OF THE Water Advisory Committee, held Thursday, June 3, 2021 at 1:30 p.m., Goldstream Meeting Room, 479 Island Highway, Victoria, BC, Victoria, BC

MEMBERS PRESENT: E. Cote (Chair) (EP); G. Baird; J. Caradonna (EP); C. Davis (EP); M. Doehnel; T. Krawczyk (EP); C. Nowakowski (EP); J. Rogers (EP); K. Sander (EP); W. Scheuer (1:39 PM) (EP); H. Thompson (EP); D. Timothy (EP)

Staff: T. Robbins, General Manager; A. Constabel, Senior Manager, Watershed Protection; D. Dionne, Administrative Coordinator (Recorder)

REGRETS: J. Todd; M. Turner

EP = Electronic Participation

The meeting was called to order at 1:30 p.m.

1. TERRITORIAL ACKNOWLEDGEMENT

Chair Cote provided the Territorial Acknowledgement to open the meeting and acknowledged the recent discovery of the remains of 215 children on the grounds of the former residential school in Kamloops. She also stated that she is committed to rereading the Truth and Reconciliation Commission report.

2. APPROVAL OF AGENDA

MOVED by G. Baird, **SECONDED** by C. Davis,
That the agenda be approved.

CARRIED

3. ADOPTION OF MINUTES

MOVED by M. Doehnel, **SECONDED** by C. Davis,
That the minutes of the March 4, 2021meeting be adopted.

CARRIED

4. CHAIR'S REMARKS

Chair Cote stated that the working groups are doing really good work and that the Agriculture Water Rates group would like to call a meeting before September to discuss its findings.

5. PRESENTATIONS/DELEGATIONS

There were no presentations or delegations.

6. UPDATES FROM WORKING GROUPS

- Long term water supply and demand management

  There was no report from this group.

- Water Quality

  There was no report from this group. T. Robbins advised that there is a report going to the June 16, 2021 Regional Water Supply Commission meeting that provides an update on the tap sampling program.

- Major Capital Projects

  There was no report from this group.

- Water Rates

  M. Doehnel reported that the group met three times and worked on a presentation to provide to the Committee. The group decided to review and hear the discussion under Item 7.2 today prior to making its presentation to the group.

  He also reported that the group has not reviewed anything related to First Nations water rates. T. Robbins advised that there have been discussions internally related to First Nations water rates and service agreements for both sewer and water. He further stated that staff are looking at presenting options to the Saanich Peninsula Water Commission for a sub-regional solution for First Nations water rates. He noted that it is a dynamic topic and staff should have a better idea of timing for that report and a better sense of what the options might look like over the next couple of months.

  Discussion ensued regarding the vacancy on the Committee for a First Nations representative and that the Committee felt it is important to have this representation when it comes discussions involving First Nations water rates. The Committee requested to have a more fulsome discussion regarding First Nations representation at its next meeting.

7. COMMITTEE BUSINESS

7.1. Options & Implications for Developing Reserve Fund for GVWSA Land Acquisition

A. Constabel presented the report providing a background and a summary of work to date. She advised that the report, with any recommendations from this Committee, will be presented to the Regional Water Supply Commission at its June 16, 2021 meeting.

Discussion ensued and staff responded to questions from the Committee. The following is a summary of the Committee's feedback to be included in the report to the Regional Water Supply Commission:

- Q: Was the Leech Water Supply Area (WSA) purchase financed? Are there barriers to obtaining financing for $20 million going forward?

  A: Yes, the $64 million Leech land acquisition was financed. No, financing of $20 million is not expected to be a barrier now or in future.

- Q: Does Capital Regional District (CRD) have right of first refusal on any of the priority lands? A reserve fund could be established for any right of first refusal lands.

  A: Only on one parcel owned by Kapoor Lumber Company. [The parcel is 155 ha and the right of first refusal was negotiated as part of the 1998 land exchange between the CRD/Province/Kapoor Lumber.]

- Q: Does the CRD invest reserve funds, or do the funds sit without earning any interest? Funds invested now would be subject to inflation.

  A: Yes. [Collectively across the CRD, all positive balances receive a small amount of internal interest based on investments (typically GICs).]

- Q: Do the current low interest rates influence the decisions on whether to finance or not?

  A: Yes, staff consider the interest rate in making recommendations and decision making.

- Q: There is a discrepancy if Regional Parks has a land acquisition reserve fund but the GVWSA does not. Shouldn't the need/strategy be the same?

  A: Some differences include: Parks raises funds through requisitions; the GVWSA lands of interest are specific and fixed.

- Members of the public would support a reserve fund given the value and management of undeveloped private forest land in the region.

- The CRD could undertake multi criteria analysis or intangibles analysis, to try to bring together direct/tangible and indirect/intangible aspects to valuing land parcels to the CRD.

- The purchase of the Leech WSA should be included as a reference or example in the report to the Commission.

MOVED by G. Baird, **SECONDED** by D. Timothy,
That the report be received for information and that staff be directed to include comments from the Water Advisory Committee's discussion in the report to the Regional Water Supply Commission.

CARRIED

7.2. Agriculture Water Rate Review – Discussion

T. Robbins stated that staff are seeking feedback from the Committee on the approach and principles for the Request for Proposals (RFP) process as laid out in the discussion document. He provided an overview of the five proposed options.

The Committee questioned whether the CRD subsidized other property usage, similar to the District of Summerland's approach which includes categories for cemetery,

playing fields, golf courses, greenhouses. The CRD, in some cases, does subsidize the same categories, depending on whether the property has a BC Assessment farm classification.

T. Robbins stated that staff would like to issue the RFP in July and procure a consultant to proceed with obtaining stakeholder feedback through the engagement process. A report could then go to the Regional Water Supply Commission in the fall. The Committee discussed consultant type, purpose and stakeholder engagement.

The Committee supported the principles in the document, but would like to ensure that the Water Rate working group has an opportunity to provide its feedback to the chosen consultant.

The Committee requested that staff set up a Water Advisory Committee special meeting to further discuss the Agriculture Water Rate review and to receive information from the Water Rate working group.

MOVED by M. Doehnel, **SECONDED** by G. Baird,
That the Agriculture Water Rate discussion documentation be received for information.

CARRIED

7.3. Summary of Regional Water Supply Commission Recommendations

MOVED by M. Doehnel, **SECONDED** by G. Baird,
That the Summary of Recommendations be received for information.

CARRIED

7.4. Water Watch Report

T. Robbins provided an update on the current water supply outlook and noted that there are no concerns with water storage going into the warmer season.

C. Davis and J. Caradonna left the meeting

MOVED by J. Rogers, **SECONDED** by M. Doehnel,
That the May 25, 2021 Water Watch report be received for information.

CARRIED

8. NEW BUSINESS

MOVED by M. Doehnel, **SECONDED** by G. Baird,
That staff be directed to find out what categories (Cemetery, Park, Playfield, Golf Course, Greenhouse) in the Capital Regional District are receiving the agriculture water rate and report back through the Agriculture Rate Review Request for Proposals process.

CARRIED

9. ADJOURNMENT

MOVED by G. Baird, **SECONDED** by M. Doehnel,
That the June 3, 2021 meeting be adjourned at 3:03 p.m.

CARRIED

CHAIR

SECRETARY

Making a difference...together

MINUTES OF A SPECIAL MEETING OF THE Water Advisory Committee, held Tuesday, June 22, 2021 at 12 p.m., Goldstream Meeting Room, 479 Island Highway, Victoria, BC, Victoria, BC

MEMBERS PRESENT: E. Cote (Chair) (EP); G. Baird; J. Caradonna (EP); C. Davis (EP); M. Doehnel; J. Rogers (EP); K. Sander (EP); W. Scheuer; H. Thompson (EP); M. Turner (EP)

Staff: T. Robbins, General Manager; D. Dionne, Administrative Coordinator (Recorder)

REGRETS: T. Krawczyk; C. Nowakowski; D. Timothy; J. Todd

EP = Electronic Participation

The meeting was called to order at 12:04 p.m.

1. TERRITORIAL ACKNOWLEDGEMENT

Chair Cote provided the Territorial Acknowledgement.

2. APPROVAL OF AGENDA

MOVED by G. Baird, **SECONDED** by W. Scheuer,
That the agenda be approved as circulated.

CARRIED

3. CHAIR'S REMARKS

The Chair thanked the agricultural water rate working group for its work on the presentation to the Committee. She also thanked the Committee and staff for making time for a second meeting this month.

4. PRESENTATIONS/DELEGATIONS

There were none.

5. SPECIAL MEETING BUSINESS

5.1. Agriculture Water Rate Review – Working Group Presentation

Presentation attached.

J. Caradonna presented the findings of the agricultural water rate review working group.

Discussion ensued and the working group and staff responded to questions regarding:

- Farm uses and farm eligibility
- Urban food production currently not benefitting from lower water rates
- Other community garden uses
- Guiding principles and criteria
- Rebate or incentive versus rate reduction

- Process for applying for the agricultural water rate
- Assessing current practices of municipalities for applying for a lower water rate
- How to apply funds from possible financial benefits related to a revised water rate structure
- Simplifying types of farming activities allowed
- Aligning farming activity classifications with what other levels of government already have in place
- Subsidize regionally to keep food prices low
- Importance of clarity and transparency

MOVED by G. Baird, **SECONDED** by J. Caradonna,
That the Water Advisory Committee receive the presentation for information and that staff include the information presented in the agricultural water rate review request for proposals.

CARRIED

6. ADJOURNMENT

MOVED by G. Baird, **SECONDED** by W. Scheuer,
That the June 22, 2021 meeting be adjourned at 1:02 p.m.

CARRIED

_____
CHAIR

_____
SECRETARY

ATTACHMENT A

Greater Victoria Water Supply Area Management Plan

Capital Regional District | January 2019

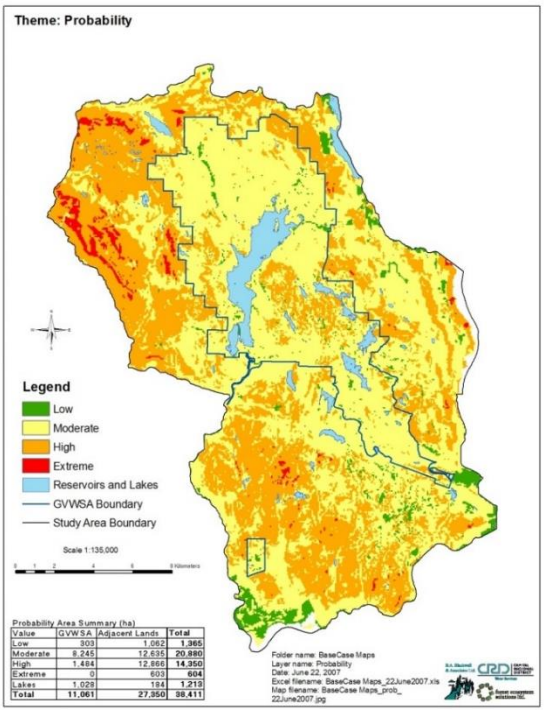
Capital Regional District Integrated Water Services
479 Island Highway, Victoria BC V9B 1H7
T: 250.474.9600 www.crd.bc.ca

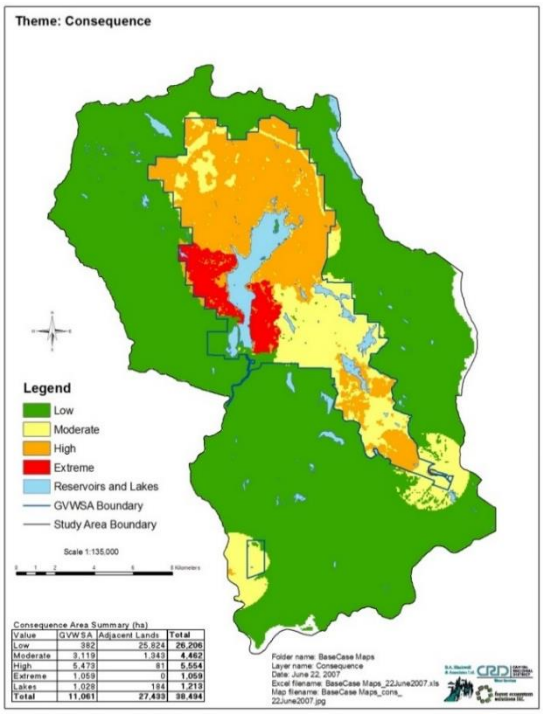
5 Wildfire

5.1 Wildfire Risk

"Large forest fires in the Greater Victoria Water Supply Area are considered a significant risk to water quality. A large-scale fire has the potential to increase the amount of surface erosion and nutrients entering the reservoir, which could dramatically affect water quality by stimulating algal blooms and increasing turbidity and colour." (1999 Strategic Plan for Water Management Vol 3. Watershed Management)

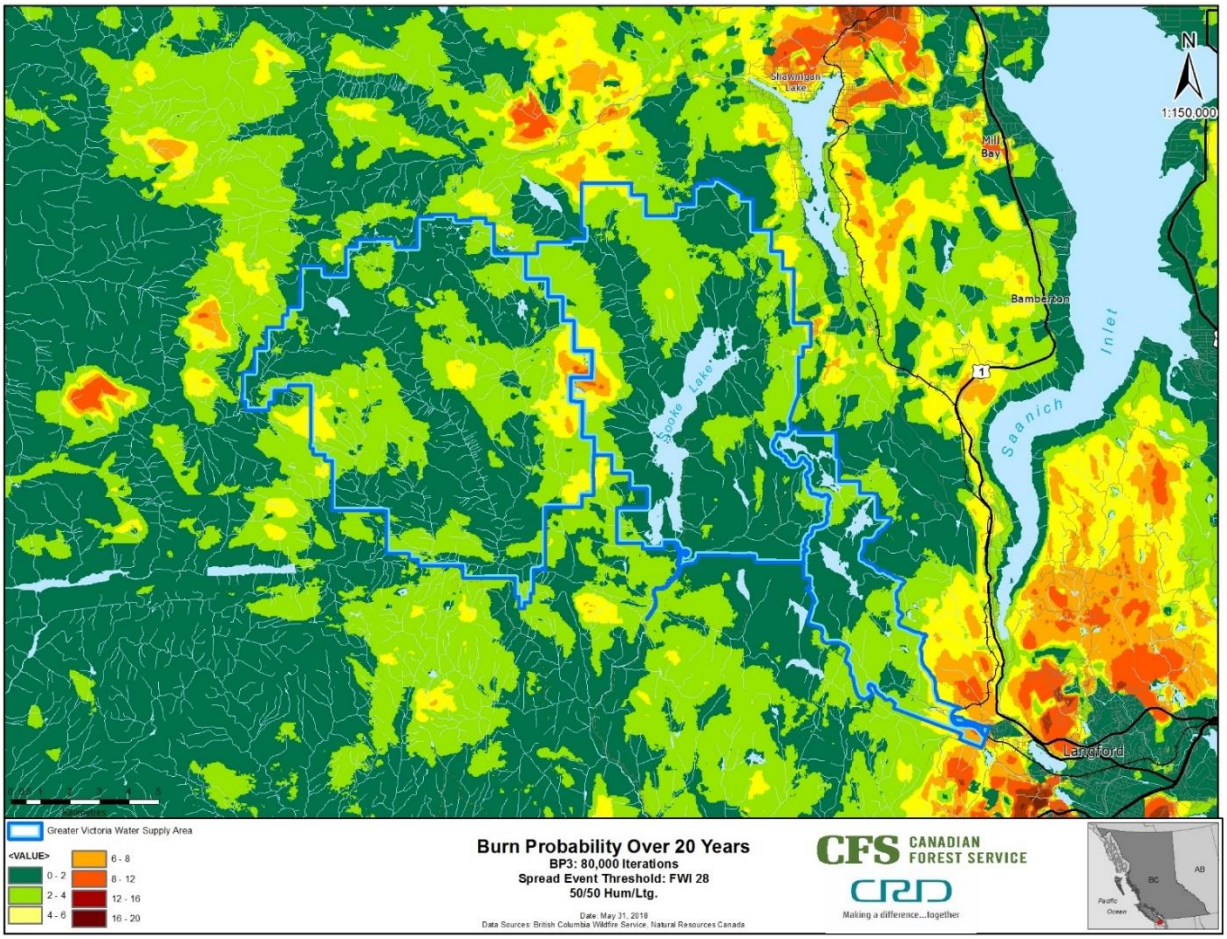
The risk of wildfire to the forested water supply area has been recognized from the earliest days of the management of the GVWSA. A wildfire risk assessment in 2007 (IWS Report # 1102) for the Sooke and Goldstream WSAs and adjacent lands identified the probability of a wildfire starting, spreading, and being difficult to suppress and the consequences to water quality and other values. The probability and consequence maps from this assessment are presented below. This risk assessment recommended the four step strategy for risk mitigation set out in the Forest Fuel Management section below.





ATTACHMENT A

In 2018, Watershed Protection funded a wildfire behaviour modelling study of the GVWSA and adjacent lands by the Canadian Forest Service. This study used terrain, the history of fire starts from humans and lightning and fire weather conditions up to 2017, and the latest designation of coastal forest fuel types to model wildfire spread with 80,000 fire starts under a random set of fire weather conditions. This modelling generated a map of burn probability for the GVWSA and surrounding lands and a graph of the relative frequency of wildfire size based on the fire weather conditions at the time and fuel types in the area 'burned' (see below). The burn probability in the GVWSA suggested that ridges and high points were more likely to burn given that lightning was more likely to generate a fire than human activity in a closed watershed. The modelling also showed that even without human intervention most wildfires remained small, but under the right fire weather, fuel, and topographic conditions a wildfire could burn up to 3,000 ha.

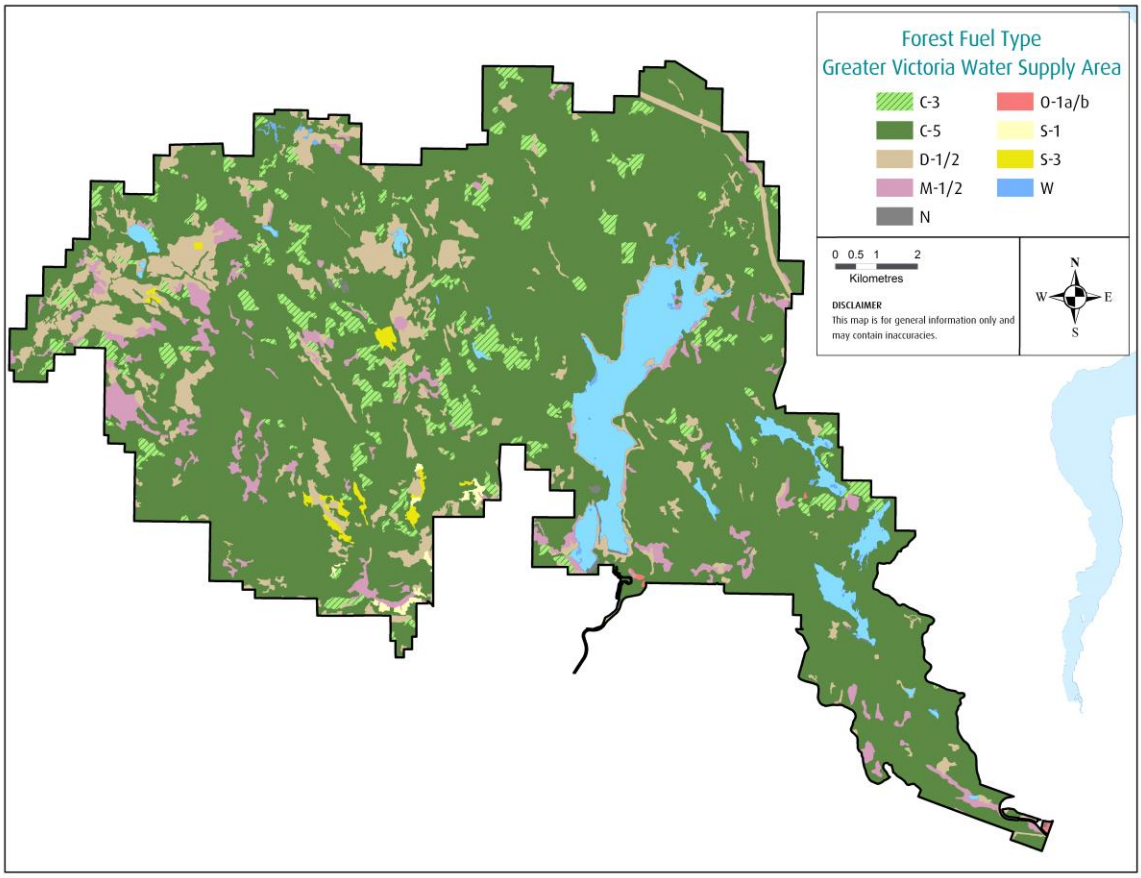


5.2 Wildfire Environment

The 2015 GVWSA Wildfire Management Plan details the fire environment in the GVWSA. The following is a summary:

Climate: The GVWSA experiences a warm climate with very dry summers with 75% of the average precipitation (1634 mm/year at Sooke Dam) falling between October and March. Significant drought has occurred in the past, and local climate records reaching back 100 years show warming across all seasons, decreased precipitation during the summer and fall, and increased precipitation during winter. Outflow winds flowing from east (inland) to west (ocean) bring very dry continental air that amplify fire risk conditions during the fire season. [6]

Forest Fuel: The forest fuels of the Sooke, Goldstream and more recently the Leech WSA have been mapped to the Canadian Forest Fire Danger Rating System (CFFDRS) by the Canadian Forest Service in 1999, by BA Blackwell & Assoc. in 2006, and again by the Canadian Forest Service in 2018. The most recent estimation of forest fuel types found in the GVWSA follows.



[6] Fire Season is defined by the BCWS as April 1 to October 31.

Note: the species composition is less important to fuel type interpretation than the overall size and quantity, and vertical or horizontal arrangement of fuel within the stand.

Fuel Type	Description	CFFDRSName
C3	Classic fully stocked Jack or Lodgepole Pine. Higher density stocking with higher crown base heights, low-moderate surface fuels and limited duff.	Mature Jack or Lodgepole Pine
C5	Though not similar in species, this is the predominant coastal fuel type, typified by moderate duff and surface loading, high crown base heights, and high canopy closure.	Red and White Pine
C7	Ponderosa Pine or Douglas fire stands, typically with fairly high surface fuels dominated by grass, and open enough to be strongly affected by wind.	Ponderosa Pine/ Douglas Fir
D-1/2	Fully or very predominately deciduous stands. Typically higher levels of soil moisture present, richer sites with moderate or better duff. High moisture content in leaves and boles leads to slower surface fires expected.	Deciduous (leafless/green)
M-1/2	A mix of Spruce/Balsam and deciduous species. Fire behavior varies considerably based on percentage composition. Applicable in cases where conifer crown base height is low and well intermixed with deciduous species (advanced regeneration for example)	Boreal Mixedwood (leafless/green)
O-1a/b	Applicable to open stands where the predominant fuel is grass and/or thin woody plants (eg fireweed). Fire intensities highly dependent on moisture content	Grass (matted/standing)
S1	Slash, generally composed of moderate fuel loading of finer debris (branches and tops), scattered broadly across the blocks	Slash (Jack or Lodgepole Pine)
S3	Slash, generally composed of heavy fuel loading, of fine to coarse debris, including tops, branches, decay, and breakage, scattered broadly across the block or in accumulations	Slash (Coastal cedar/hemlock/Douglas fir)

Fire Behaviour: Moderate to high intensity surface wildfires with intermittent crowning and moderate rates of spread can be expected under high to extreme conditions. On southwest facing slopes, in fuel types with a cured grass component, high rates of spread can be expected. During peak drying periods, a moderate crown fire potential exists when associated with strong winds, steep topography and/or outflow weather conditions, but only infrequent stand replacement fires are expected over the broader terrain. Understanding potential fire behaviour in GVWSA fuels is an important knowledge gap that limits understanding of the risk that wildfire poses for water quality in the GVWSA. There is currently work being undertaken by the CFS and the BCWS to better understand the C5 fuel type and refine or redefine this fuel type to better fit the attributes of this forest type. The 2018 Wildfire Risk Analysis completed by the CFS is a good example, as its conclusions define the GVWSA as a high risk, low probability landscape, highlighting the need to pay attention to outflow events, and days where the FWI is over 28.[7] Days with these conditions are the days where spread events are likely to occur; spread events being responsible for the vast majority of the damage on the few large coastal fires. On a local level, CRD staff continue to engage in cross training

[7] Perrakis DDB, Stohmann R, Taylor SW, Canadian Forest Service. 2018: Wildfire risk analysis for the CRD Greater Victoria Water Supply Area.

and support to BCWS suppression efforts in order to gain understanding of the types of fires experienced in this fuel type and the influences of weather and local variability on the fire behavior. These measures support a net gain of knowledge of fire on the GVWSA land base, and improve the safety and response capability of CRD staff.

Fire History: Based on studies of tree rings, and charcoal particles in lake sediment cores [8], the Sooke WSA exhibited a mixed severity regime of wildfire prior to European settlement. This type of regime is characterized by variation in the frequency, size, and severity of fires. Evidence from sediment cores in Begbie Lake just north of Sooke Lake Reservoir indicates that over the past couple of thousand years the fire interval varied from 90 to 400 years with large wildfires occurring on average every 270 years. Since 1920, records indicate 419 wildfires in the GVWSA and surrounding area ranging in size from a few hectares to 3,000 ha with the largest fires prior to 1950. The following table shows the recorded cause of these fires. Human caused fires include prescribed fire for forest management activities.

Cause	No. of Fires Since 1920	Percent
Human caused	329	78%
Lightning	66	16%
Unknown	24	6%
Total	419	

2012 Koksilah Wildfire V60811 (22 ha) - north of the GVWSA on TimberWest lands

In terms of recent history, there have been a number of small wildfires within or near the GVWSA in the last 20 years. Within the GVWSA no individual fire has exceeded 1 ha.

[8] Brown KJ, Hebda NJR, Scoups G, Conder N, Smith KAP and Trofymow, JA. 2017: Long-term climate, vegetation and fire regime change in a managed municipal water supply area, British Columbia, Canada.

ATTACHMENT A

Recent Wildfires Within or Near the GVWSA

Year	Cause	No. of Fires	Size (ha)
1997	Lightning	5	0.1
	Human	1	0.1
1998	Human	1	0.1
1999	Human	7, 1, 1	0.1, 0.3, 3.0
	Lightning	3	0.1, 0.2, 0.4,
2000	Human	7, 1	0.1, 0.2
2001	Human	2	0.1
2002	Human	4, 1, 1, 1	0.1, 0.2, 0.3, 0.5
2003	Human	2, 1	0.1, 15.0
2005	Human	1	0.1
2007	Human	1, 1	0.5, 0.7
2008	Human	6	0.1
	Lightning	4	0.1
2009	Human	3	0.1
2010	Human	5	0.1
	Lightning	1	1.4
2011	Human	1	0.1
2012	Human	1	22.0
2014	Human	1	0.2
2016	Human	5, 1, 1	0.1, 0.3, 1.0
2017	Human	1, 1	0.1, 1.2

2014 Wildfire in the northeast of the GVWSA (0.2 ha) from trespassing hunters

5.3 Wildfire Management Program

Given the risks to water supply from large scale fires, the GVWSA wildfire management program is the largest and most well developed watershed protection program.The program includes wildfire management planning; prevention; detection; response; forest fuel management; and, burned area rehabilitation. Each of these program areas are described below.

Planning

A comprehensive GVWSA Wildfire Management Plan fully incorporating the Leech Water Supply Area was completed in November 2015. The plan details GVWSA climate, weather, forest fuels, potential fire behaviour, fire history, and current strategies for wildfire prevention, detection, suppression, fuel management and provides recommendations to enhance the wildfire management program.

Each spring the GVWSA Wildfire Preparedness Plan is updated and distributed to staff and external agencies providing operational procedures for wildfire reporting, patrols, standby and suppression; contact lists; work restrictions; and, suppression equipment inventory and staging.

Wildfire Prevention

Wildfire prevention activities begin with restrictions to public access and enforcement of the Greater Victoria Water Supply Area Protection Bylaw to reduce the probability of fire starts as a result of public access.

A network of 8 fire weather stations determines the daily Fire Danger Rating in each of the Water Supply Areas which restricts operational work and requires fire (spark) watch to reduce the probability of operational fire starts. The Fire Danger Rating is also posted outside of all main GVWSA entrance gates.

Wildfire Detection

It is important for the GVWSA Wildfire Management program to detect any fires early, to increase the probability of controlling the fire. Fire starts are currently detected by ground patrols and air patrols and detection is further aided by use of the BC Lightning Location System. A capital project to procure and implement an infrared camera for wildfire detection is planned to further this program. The use of "drone" technology may also assist in wildfire detection and suppression efforts in future.

- Ground patrols: Initial attack crews patrol the Sooke, Goldstream and Leech WSAs during fire season (April 1 – October 31) with the number of crews scheduled based on the Fire Danger Rating. Crews use vantage points to look for fire and enforce access closures. An initial attack crew consists of two staff equipped with a four wheel drive (4WD) truck holding a 450 L water tank, pump, hose, and hand tools.

- Air patrols: A 45-minute air patrol is flown by contracted fixed wing aircraft based out of Victoria International Airport once per day during higher Fire Danger Ratings and twice per day during the most extreme Fire Danger Ratings. The air patrol has the advantage of seeing all 3 WSAs as well as adjacent lands in one flight, and also calling in unknown vehicles or suspicious behavior for ground patrols to respond to.
- BC Lightning Location System: When lightning is forecast, CRD staff monitor the BC Lightning Location software for lightning strikes within or near the GVWSA and direct ground or air patrols to assess the location and respond if ignition is found.
- Infrared Detection: Implementation of a high sensitivity infrared camera is planned at a strategic location(s) in the GVWSA to aid in early and accurate fire size and location detection.

The annual *GVWSA Wildfire Preparedness Plan* contains further details on annual detection activities.

Wildfire Response

Integrated Water Services has a well-developed wildfire suppression program with a capacity to provide sustained response for a Type 3 Incident (9 to 25 fireline personnel). The strategy of the wildfire suppression program is early detection and rapid response to control any fire starts at an initial attack stage (fire is held, contained or suppressed within 24 hours). The suppression program includes the following elements:

- Planning – preparation of annual preparedness plans, seasonal staff hiring and staging, equipment staging, reporting daily wildfire preparedness status and fire weather conditions.
- Training – approximately 30 Integrated Water Services and 20 Regional Parks staff are trained in basic wildfire suppression (basic annual training and practice, fitness testing (Pack Test standard and WXFit standard). Select staff train as crew leaders with incident command system training, and practical experience gained from export opportunities on BC Wildfire Service fires. The staff complement also includes a tree faller, Class 3 water tender drivers and heavy equipment operators to assist with wildfire suppression.
- Standby - staff on standby for fireline roles at prescribed Fire Danger levels.
- Equipment - well maintained equipment that is the same or compatible with provincial and industry equipment for seamless fire support including:
    - Mobile water delivery units: 5 initial attack 4WD units, 1 large water truck (9,000 L), 2 medium size water trucks (2,700 L), water tanks mounted on the skidder and gravel truck
    - Fixed water tanks – 2 in the Sooke WSA and 1 in the Leech WSA

  - Mobile sprinkler system that can be deployed around facilities
  - Pumps, hoses, adaptors, portable drop tanks, helicopter buckets, chainsaw kits
  - Fire suppressant – a small amount of suppressant is stored on site (gel that acts to make water more effective by adhering to surfaces and forming a protective layer that cools and protects objects from heating and burning). Any application of suppressant or retardant (red powder) by CRD or BC Wildfire Service will be approved in advance by the General Manager in consultation with Water Quality staff.
- Vantage Points – maintenance of approximately 25 natural vantage points for detection and monitoring of wildfires
- Pumping Stations - maintenance of access to approximately 30 water source locations within the GVWSA
- Service and Partnership Agreements
  - Wildfire Response Agreement with the BC Wildfire Service (BCWS) to provide unlimited support on wildfire suppression in the GVWSA for an annual fee.
  - Wildfire Resource Agreement with the BCWS for CRD to receive training and firefighting opportunity with the BCWS and for CRD to provide wildfire suppression support on an expense/rate basis.
  - Memorandum of Understanding - South Vancouver Island Fire Management Organization – participating landholders in the South Island including private forest landholders and government agencies have agreed to terms of co-operation in reporting, initial attack, sustained wildfire suppression and payment for action on each other's lands.
  - Working relationships with neighbouring municipal and volunteer fire halls including Langford, Sooke, Shawnigan, Malahat, Colwood and Metchosin.

Forest Fuel Management

Forest fuel management refers to the reduction of the amount and type of forest fuels (small trees, branches, needles, downed woody material, combustible shrubs) available to a wildfire. If located strategically, forest fuel management can reduce the intensity and rate of spread of wildfire, improve probability of suppression success, and reduce the threat to water quality and water supply facilities.

A Wildfire Risk Assessment for the GVWSA was conducted in 2007 and fully documented in 2014. The findings showed the probability of wildfire was greatest in areas of young dense forest on steep slopes and higher elevations; to the north, east and south of the Sooke Water Supply Area due to likelihood of ignition on adjacent private land, and in the Leech Water Supply Area where there is a high likelihood of ignition from trespass and high forest fuel loading (illustrated at the beginning of the Wildfire section).

The assessment showed the consequences of wildfire were greatest: in the southern portion of the Sooke Water Supply Area due to the impact of an extensive burned area near the water supply intake; adjacent to water disinfection facilities at Japan Gulch and Sooke River Road due to the importance of these facilities to the water supply system; and adjacent to reservoirs in the Goldstream Water Supply Area (illustrated at the beginning of the Wildfire section).

The assessment recommended four key wildfire risk reduction strategies:

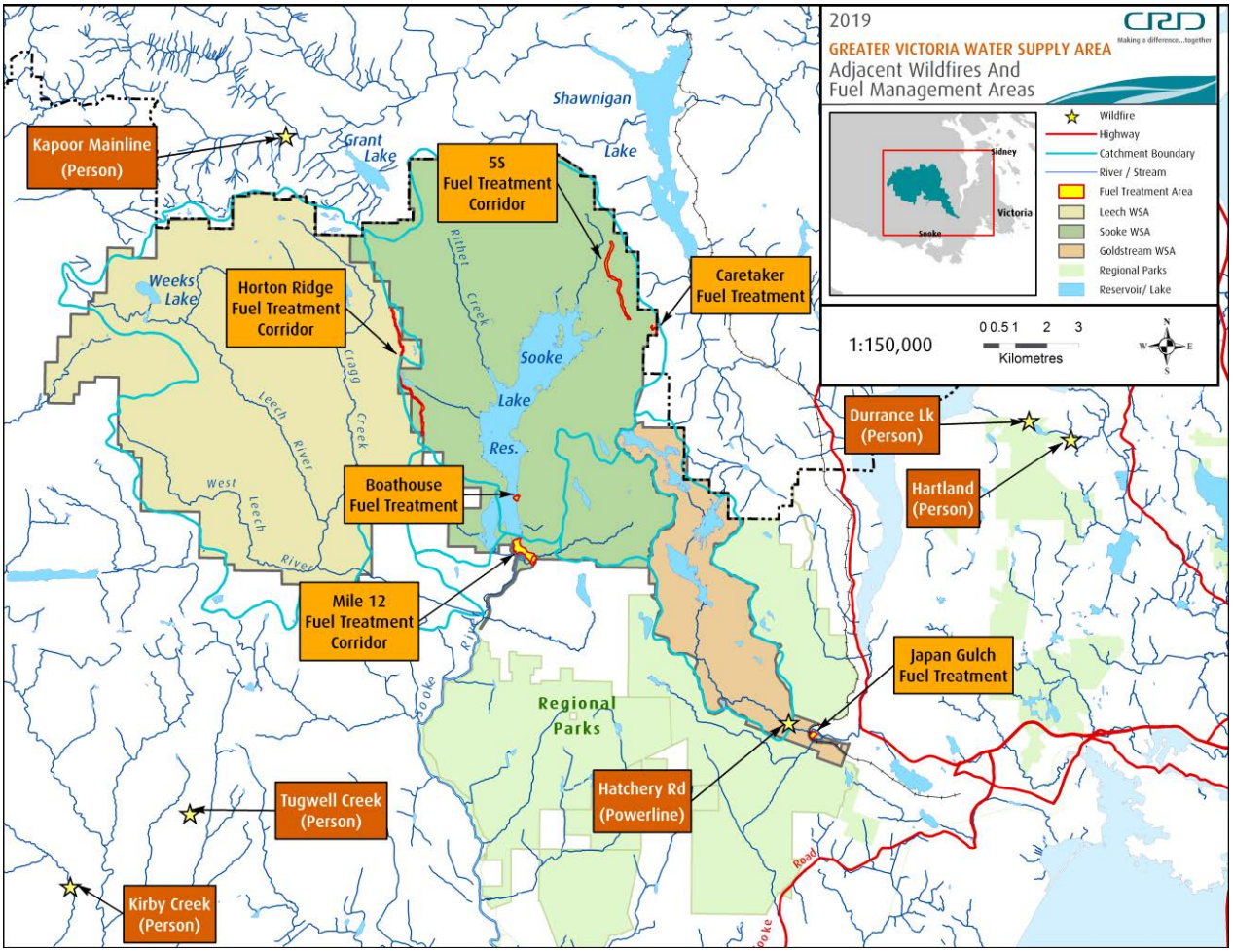
1. Carry out forest fuel reduction measures around key water supply facilities using provincial Fire Smart principles (Fire Smart refers to removal or reduction of forest fuels adjacent to manmade structures).
2. Continue to improve the CRD's capability for preventing, detecting and suppressing wildfires and rehabilitating burned areas.
3. Identify wildfire containment zones in high risk areas and expand existing fuel breaks around these areas.
4. Identify priority areas within the Water Supply Area for forest fuel reduction treatments to increase the protection of the wildfire containment zones and reduce fuels in these areas.

Since the Wildfire Risk Assessment was undertaken, the following fuel management actions and treatments have been implemented:

- Initial and ongoing Fire Smart treatment around key water supply facilities – the Japan Gulch Treatment Facility, Mt. McDonald Communications Facility, Sooke Caretaker's Facility, Mt. Healy Communications Facility, Sooke Boathouse Facility and fire weather/ hydrometerological stations. Some Fire Smart treatments required cooperation with CRD Regional Parks and BC Parks to implement fuel reduction in adjacent parks.
- The wildfire containment zones strategy recommended by B.A. Blackwell and Associates was further reviewed and refined to a strategic priority order of:
    a) landscape level fuel break corridors concentrating on providing protection from wildfire originating from adjacent properties to the east, south and north, and between the Leech Water Supply Area and Sooke Water Supply Area;
    b) forest fuel management in priority areas within the Leech Water Supply Area; and,
    c) forest fuel management in priority areas within the Sooke Water Supply Area.

ATTACHMENT A

Sections of **forest fuel reduction corridors** (forest thinning and removal of understory material, not complete tree clearing) have been implemented in the northeast, east and south of the GVWSA, with a new corridor between the Leech and Sooke Water Supply Area (Horton Ridge) implemented in three phases over 2015 - 2018. The next focus for fuel management in 2018 – 2019 will be reduction of fuels along the 5S corridor to the northeast of the GVWSA. Further fuel management planning will be conducted to determine and prescribe next projects to reduce and maintain forest fuel loading.



Location of Fuel Reduction Corridors and Fire Smart Treatments around Facilities

2017 Horton Forest Fuel Reduction Corridor (thinning and pruning shown)

Additional or supplemental to the fuel reduction corridors, the most cost effective method of reducing and maintaining reduced fuel loading is through the use of prescribed fire. This can take several forms including burning of piled debris, and lower intensity ground fire. Low intensity ground fire can be used in such a way that it reduces understory and surface fuels, but leaves mature trees undamaged, especially fire resistant species such as mature Douglas Fir. The cost of prescribed burn as a fuel reduction treatment is much less than the manual labour used to date on the fuel reduction corridors, but does require careful selection of fuel and weather conditions to ensure a successful outcome.

Smoke Management

Burning is undertaken within the GVWSA to cost effectively mitigate accumulations of woody debris from forest fuel reduction activities or as prescribed burning activities. The CRD is signatory to the South and East Vancouver Island Fuel-Smoke Management Burn Plan under the Open Burning Smoke Control Regulation. Under the Plan, the Leech WSA and western portion of the Sooke WSA are within the area designated as Low Smoke Sensitivity. The majority of the remaining portion of the WSA is within Moderate Smoke sensitivity with a small portion within High Smoke Sensitivity. The Plan allows burning in Low and Moderate sensitivity areas under flexible venting conditions compliant with Appendix A of the Plan. Burning under flexible venting conditions as permitted under the Plan will be conducted in a manner that will minimize smoke release and reduce the potential for negative impacts of smoke on human health, visual values and public health and safety. Notifications are provided within the CRD and with surrounding fire departments and land holders prior to ignition.

Burned Area Rehabilitation

Also referred to as post wildfire response, this is an area of more recent focus. While much effort has been directed to wildfire prevention, detection and suppression, the response after wildfire is likely to have a large role in the resulting water quality impacts to drinking water supply reservoirs. A recent study assessed the water quality impact (in terms of debris flow and sediment delivery) of different intensities of wildfire adjacent to the south basin of Sooke Lake Reservoir. Based on this assessment, a site specific post wildfire rehabilitation plan was developed for this area of the GVWSA in 2016 to reduce the potential for sediment, ash, and debris to be washed into streams and the reservoir from rains in the first years after the fire. Unique materials required to carry out the plan (wood straw and turbidity curtains) have been procured and are being stored near Sooke Lake Reservoir. The knowledge and rehabilitation principles from this plan will be used as a template for post-wildfire preparedness planning in other parts of the GVWSA in coming years.

Burned Area Impacts in 2012 Koksilah Wildfire near the GVWSA

ATTACHMENT B

Making a difference...together

RWSC 20-07

REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, SEPTEMBER 16, 2020

SUBJECT **August 17, 2020 Lightning Strike Wildfires in the Greater Victoria Water Supply Area**

ISSUE SUMMARY

To report on conditions and wildfire management activities related to two lightning-caused fires in the Greater Victoria Water Supply Area.

BACKGROUND

A lightning storm passed through the Greater Victoria Water Supply Area (GVWSA) and southern Vancouver Island on the night of Sunday, August 16, 2020, after a day of high air temperatures and dry outflow wind conditions. Nineteen lightning strikes were recorded in the GVWSA of which two near Horton Ridge caused fires within the watershed catchments of Sooke Lake Reservoir and Deception Reservoir overnight. The two fires were referred to as the Healey Fire and the Rithet Fire. The fires were detected on the morning of Monday, August 17 and grew to a total of 8 hectares (ha) before being largely contained by end of Tuesday, August 18. CRD staff and BC Wildfire Service (BCWS) worked together on suppression, aided by a shift to lower temperatures, higher humidity, and relatively calm conditions. Suppression efforts included considerable air support on the fires including one load of fire retardant dropped in four lines, and several hours of water drops. Approximately 20 millimeters (mm) of rain on Wednesday and Thursday greatly assisted with the suppression and mop up effort. The fires were patrolled until Sunday, August 30 and called “out” by the BCWS Incident Commander on August 31. Water quality parameters measured in Sooke Lake Reservoir, nearest the burned areas, have not detected any effects on water quality from the burned area or retardant. The burned areas have been assessed and a remediation plan is being developed which will be implemented prior to fall rains. Water quality monitoring will continue through the first significant fall rains however no water quality concerns are anticipated as a result of the fires.

Fire Weather Conditions and Fire Hazard

The wildfire danger condition in the GVWSA on the weekend of August 15 and 16 had just reached Extreme at one station due to periodic rains through the summer. However, the weather conditions on the afternoon and evening of Sunday August 16, were conducive to fire starts and spread as humidity had dropped below the air temperature, a condition known as “crossover”.

Lightning Strikes and Fire Starts

The BCWS lightning locator application recorded a total of 19 lightning strikes in the GVWSA on the night of Sunday, August 16. Fortunately, fire starts occurred at only two sites, both on Horton Ridge to the west of Sooke Lake Reservoir (Appendix B: Map 1). The fire starts on Mount Healey were the first reported. A fire at a second, much more isolated site, dubbed Rithet, was discovered during the response to the Mount Healey fire.

Suppression Response

A total of 24 CRD staff responded to the fires on Monday morning. An intermediate helicopter was hired to provide assistance bucketing water to the fires from Deception Reservoir. The fires were immediately reported to BCWS, which responded with staff, contract crews and air suppression resources. BCWS assumed command of the wildfire mid-morning on Monday. Watershed Protection staff continued to work on the fire throughout the week, although most staff were released back to regular duties on Wednesday after the fires were largely contained.

A load of fire retardant was dropped on the Mount Healey fire on Monday afternoon to try and prevent further spread. This was followed up on Monday afternoon by water drops on both fires from seven skimmer aircraft over approximately 2.5 hours. These air suppression efforts played a major role in constraining the size of the fires.

Throughout the suppression response there were no safety incidents and only one minor injury (bruised leg) with no time loss.

Weather greatly assisted containment, suppression and mop up efforts. Weather conditions on Monday and Tuesday were relatively stable with low wind speeds, lower temperature, and higher relative humidity. About 28 mm of rain fell on Thursday and Friday. By the weekend, mop up activities were no longer required although the sites were patrolled daily by both BCWS and Watershed Protection staff.

Images of the areas burned and a detailed overview of weather conditions, wildfire preparedness, and a log of wildfire response actions and resources is provided in Appendix A.

Location and Characteristics of the Fires

Both wildfires were located in areas identified by wildfire models as increased risk for lightning and burn probability. The fire locations are described as extensive areas of moss covered rock outcrops interspersed with trees and shrubs. The fires behaved largely as expected, spreading slowly across the moss but flaring up when reaching areas with accumulations of fuel. The understory salal burned readily. Although the fine fuels were dry, it was fortunate that the larger and deeper fuels were not as dry as in recent past years, and that wind speeds remained relatively calm throughout the week.

The rugged steep terrain hampered ground suppression and mop up, although there was good road access to Mount Healey. The isolated location of the Rithet fire required an access foot trail and helipad to be constructed.

The Mount Healey fire eventually grew to just under 6 ha (Appendix C: Map 2). Most of the area burned was within the catchment of Deception Reservoir, which is not used for water supply. Portions of the fire did burn into the catchment of Sooke Lake Reservoir and onto adjacent private managed forest land. The fire did not spread toward the Capital Regional District (CRD) communications facility on Mount Healey. This was likely due to FireSmart fuel management and clearing for radio sightlines as well as containment priorities. However, the tower-mounted wildfire infrared camera appears to have been damaged by lightning strike activity. The Rithet fire burned approximately 2 ha within the catchment of Sooke Lake Reservoir (Appendix D Map 3).

A review of the available information on lightning and wildfires in the GVWSA indicates that rocky uplands, such as Horton Ridge have had multiple lightning strikes and fires since the 1930's, although lightning storms are relatively infrequent. The most recent previous event occurred on August 17, 2008 when four fires were started by lightning strikes clustered near Horton Ridge. Based on this history, a forest fuel reduction corridor has been put in place along a road on Horton Ridge to facilitate access for suppression and slow the spread of wildfire. This is one of a series of forest fuel reduction corridors put in place or underway to protect the GVWSA (Appendix E: Map 4).

BC Wildfire Service (BCWS)

There was excellent support from the BCWS on the Healey and Rithet wildfires in the GVWSA. BCWS responded to the GVWSA wildfires under the terms of the current CRD-BCWS Wildfire Response Agreement. For 2020, the fee for unlimited BCWS response is $7,100 or $0.35 per hectare. While there has yet to be a final tally of costs, the resources provided by the BCWS, particularly the air support, were substantial.

The handover of incident command to BCWS was appropriate and timely, however caused some delays in the field. In addition, the CRD had some difficulty in obtaining accurate information from BCWS on strategies and resources, and there could have been more timely participation of CRD staff in decisions important to the GVWSA such as the use of fire retardants and water sources to be used. Learnings from these fires will help fine tune the relationship with BCWS and will further enhance the wildfire response in the GVWSA.

Use of Fire Retardant

The chemical fire retardant (commercially called PHOS-CHECK LC95A) used by BCWS on the Mount Healey fire on Monday, August 17 has the active chemical ingredient ammonium polyphosphate which is an inorganic salt at approximately 15% concentration. Approximately 11,000 L of retardant was dropped, meaning about 1,700 L of the active ingredient was applied with colouring to make it visible. When flames come into contact with the retardant, the resulting reaction releases a combination of water and carbon dioxide that cools and suffocates the fire[1]. The retardant is applied by air in the path of the fire to contain it. The purpose of retardants and other suppressants applied by air is to contain and slow down the fire or suppress its behavior to buy time and allow for safe deployment of ground suppression resources.

BCWS consulted with CRD staff prior to utilizing retardant, although the time for decision making was short. The issue of when and where to apply chemical retardants in the GVWSA has been pre-planned by Watershed Protection and Water Quality staff in terms of mapping of exclusion zones where retardant is never to be applied (Appendix E: Map 4); and required water quality monitoring protocols if retardant is applied. The decision whether to allow application of fire retardant is necessarily situation dependent and was made collaboratively between senior staff. The decision making principle is based on causing least harm – weighing the risk of a large scale wildfire impacting water quality against the risk from retardant potentially reaching and impacting the water supply.

The retardant contains chemicals that are similar to those used as agricultural fertilizer and pose no direct risk to public health. Unless deposited directly and in large amounts into a small fish

[1] Province of British Columbia – Water Quality – Fire Retardants Used to Fight Wildfires

bearing stream, there is no environmental toxicity associated with this product. As a potent fertilizer, any significant amount of retardant reaching Sooke Lake Reservoir could stimulate algal growth and lead to short and mid-term water quality deterioration.

A post-fire water quality assessment with additional and targeted water quality monitoring in Sooke Lake Reservoir and potentially affected tributary streams began on Friday, August 21. The data analysis has not yet detected any measurable water quality impact as a result of the retardant application and the wildfires. This post-fire water quality assessment will continue once currently dry streams begin to flow after the onset of the fall rains.

CRD Emergency Operations Centre

The CRD Emergency Operations Centre (EOC) was activated on the morning of Tuesday, August 18 in support of wildfire response in the region. There were several other wildfires burning west of Sooke River as a result of the lightning storm, in addition to the fires in the GVWSA. The EOC provided a coordinating role with Corporate Communications on the wildfires in the GVWSA as well as senior CRD staff. The involvement of the EOC allowed CRD Integrated Water Services (IWS) staff to focus on wildfire response and updates to the Water Commissions.

Public Communications

Given that the incident command on the wildfires was the responsibility of the BCWS, it was decided that the CRD would provide supplemental information on the provincial communications about the fires in the GVWSA. However, given the level of media interest, IWS staff provided an interview to give an update on the status of the fires.

Recovery and Rehabilitation

An assessment of the two burned areas is being undertaken following the Post-wildfire Natural Hazards Risk Analysis in BC methodology[2] and early results indicate less than 0.5 ha of high burn severity, and approximately 4 ha of moderate burn severity. Soil hydrophobicity (water repellence), erosion and debris flow potential are being calculated, however given the amount of exposed bedrock and shallow soils there does not appear to be any significant risk of soil and debris being transported from the burned areas. Any movement of sediment and nutrients downslope will most likely be taken up by forest vegetation as the burned sites are about a kilometer away from Sooke Lake Reservoir (Appendix E: Map 4).

Rehabilitation will be undertaken by spreading wood “straw”, an engineered and kiln dried wood product designed for erosion control on the high and moderate burn severity areas. CRD has wood straw in inventory and has ordered additional product for the rehabilitation. The need for grass seeding and/or planting will be re-assessed in the following year or two after allowing for natural regeneration. Grass seeding in particular has been shown in post-wildfire rehabilitation studies to be ineffective in the first year.

[2] Hope, G., P. Jordan, R. Winkler, T. Giles, M. Curran, K. Soneff, and B. Chapman. 2015. Post-wildfire natural hazards risk analysis in British Columbia. Prov. B.C., Victoria, B.C. Land Management Handbook 69. www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/LMH69.htm

The CRD, with the help of the BC Wildfire Service, was successful in responding to and suppressing two wildfires that started as a result of a lightning storm that passed through the region on August 17. The CRD 2020 GVWSA Wildfire Preparedness Plan was followed and adequate wildfire preparedness resources in patrol, equipment and on standby were in place. CRD staff monitored lightning and weather and responded quickly to detect and deploy to the wildfires. BCWS responded quickly, prioritized the GVWSA wildfires over others on southern Vancouver Island, and provided significant ground and air support resources.

The fires were kept to small size and contained within two days. The FireSmart fuel management around the Mt. Healey communication facility and the clearing of radio site lines, helped protect the facility from heat and fire damage.

Lessons learned from the incident will be used to refine wildfire response and suppression procedures and assess the need for additional forest fuel management on Horton Ridge. The burned areas provide an opportunity to test and monitor rehabilitation methods in order to better prepare for the impacts of future wildfires. The learnings from this event will also help improve the working relationship with the BCWS on wildfires in the GVWSA.

RECOMMENDATION

That the Regional Water Supply Commission receive the report for information.

Submitted by:	Annette Constabel, M.Sc., R.P.F., P.M.P., Senior Manager, Watershed Protection
Concurrence:	Ted Robbins, B. Sc., C. Tech., General Manager, Integrated Water Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

ATTACHMENTS

Appendix A: Details of Lightning Strike Wildfires in the GVWSA
Appendix B: Map 1: 2020 Wildfire Locations - Horton Ridge
Appendix C: Map 2: Mount Healey Fire Perimeter
Appendix D: Map 3: Rithet Fire Perimeter
Appendix E: Map 4: GVWSA Risk Mitigation Features

ATTACHMENT B
Appendix A

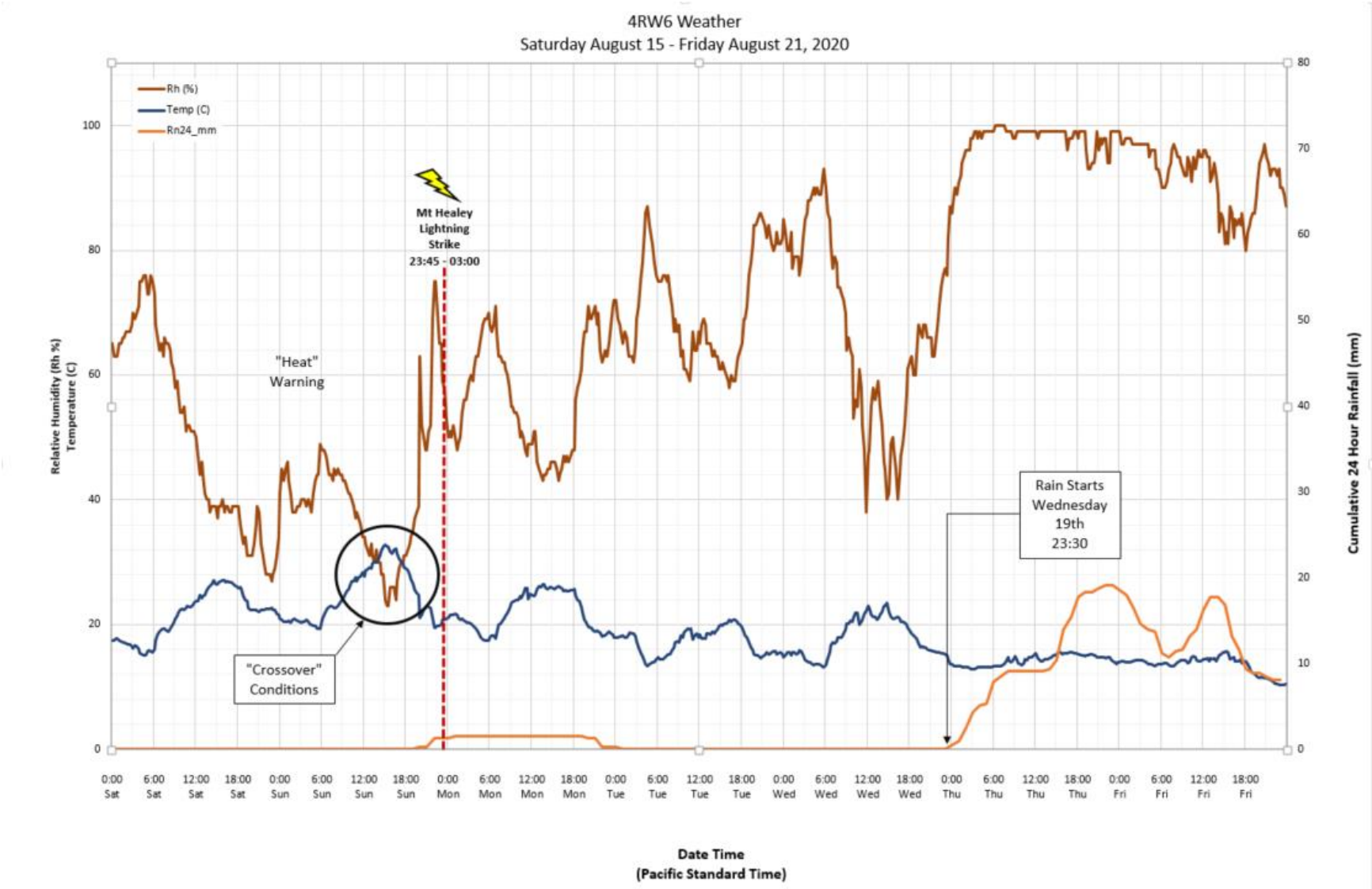
Fire Weather, Wildfire Preparedness, Log of Actions, and Suppression Resources
Wildfires on Horton Ridge in the GVWSA – August 17 to 31, 2020

Fire Weather Conditions and Fire Hazard

The following table and graph show the weather and fire conditions recorded at the nearest weather station at similar elevation and position (4RW weather station) to the fire locations for the period before and during the wildfires.

Date/Time	Status	Temp.	Relative humidity	Total Rain	Windspeed (km/hr)	Wind Direction	Fire Danger Rating	Fine Fuel Moisture Code
Sunday August 16	Hot weather with outflow winds	28ºC	34 %	0 mm	9 – 18	NE (outflow)	High	91
Afternoon-overnight	Evening thunderstorm with lightning strikes	High of 33ºC	Low of 21 %	1.5 mm	max gusts of 36	SW	n/a	n/a
Monday Aug 17	Two fires detected – suppression begins	25ºC	49 %	0 mm	6 – 18 max gusts to 30	NE (outflow)	High	83
Tuesday Aug 18	Fires grow somewhat overnight – suppression continues	18ºC	65 %	0 mm	7 - 29	W	High	84
Wednesday Aug 19	Fires contained – mop up	23ºC	47 %	0 mm	6 - 18	NE then SW	High	88
Thursday Aug 20	Mop up and rains douse all flames	15ºC	99 %	19 mm	5 - 11	NE then SW	Low	22
Friday August 21	Rain and patrol for hotspots	14ºC	94 %	8 mm	6 - 30	SW	Low	8
Saturday Aug 22 – Sunday Aug 30	Patrol, heat scanning for hotspots, minor amounts of rain							
Monday Aug 31	Fire declared “out”							

Index No


4RW6 Weather
Saturday August 15 - Friday August 21, 2020
Rh (%)
Temp (C)
Rn24_mm
Mt Healey Lightning Strike 23:45 - 03:00
"Heat" Warning
"Crossover" Conditions
Rain Starts Wednesday 19th 23:30
Relative Humidity (Rh %) Temperature (C)
Cumulative 24 Hour Rainfall (mm)
Date Time (Pacific Standard Time)

Index No

Wildfire Preparedness

The 2020 GVWSA Wildfire Preparedness Plan sets out the number and position of wildland firefighting resources deployed based on Fire Danger Rating. The highest danger rating in the GVWSA for this time period was Extreme and this was the level of preparedness for Sunday and Monday August 16 and 17 with the following in place as per the plan:

Ground Patrol: 3 initial attack crews on shifts of: 06:00 – 14:00; 10:00 – 18:00; 13:00 – 21:00
Air Patrol: twice daily at 10:00 and 15:00
Standby: total of 9 including the Duty Officer
Equipment:

Type	Location
Water Tender (16,600L)	Field Operations Centre (FOC)
Gravel Truck/Tender (6,800 L)	FOC
Mini Tender (2,700 L)	Sooke Dam
Mini Tender (2,700 L)	Sooke Fire Cache
Skidder (1,500 L)	Goldstream Boathouse
Sprinkler Trailer (General)	FOC

Wildfire Response – Highlight of Log of Actions

Sunday August 16

Although lightning was not forecasted at last report on Friday, Watershed Protection (WP) staff note and watch lightning storms on Sunday, following publicly available lightning location information. A compiled view of lightning strikes that night taken from Mount Tolmie looking west is shown below. The storm resulted in nine fire starts in the region and 16 on southern Vancouver Island. Some of the major strikes shown on the right hand side of the compilation may have started the GVWSA fires.

Compilation courtesy of Adam Lee photography

Monday August 17

06:00 Early patrol tries to get BCWS lightning locator information at the FOC and departs splitting up in two directions
06:55 Patrol reports smoke visible from the Kapoor Mile 10 vantage point, calls in fire report to the office and requests resources. Photo above of initial fire sighting (Healey fire):
07:14 Healey fire reported to BCWS (Initial Fire Report) – numbered V61186
08:00 First CRD crews with fire suppression resources arrive at Mt Healey
08:45 BCWS representative arrives at the FOC to discuss fires and resources
09:00 CRD contract helicopter begins bucketing Healey fire using Deception Reservoir
10:18 Rithet fire detected by staff enroute to Healey fire
10:19 CRD signs over Incident Command of the fires to BCWS
10:20 CRD air patrol calls in other fires outside the GVWSA as well as the Rithet fire
11:30 Observations of rank 3 (moderately vigorous ground fire) wildfire behavior indicating likely fire spread without air suppression resources
13:00 BCWS/CRD discuss use of retardant. Preference for no retardant but priority to limit fire spread. CRD Water Quality approves use of retardant on the fires if deemed necessary.
13:10 Staff arrive at Rithet fire – numbered V61180
13:10 11,000 L of fire retardant laid out in 4 lines around Healey fire

CRD and BCWS resources (ground and air support) continue to roll out to fires.

Rithet fire receives limited further ground resources due to difficult access, lower priority and smaller size – access trails constructed and a location chosen for a helicopter landing pad.

16:00 Amphibious air tankers (7) skim water (3,000 L per load) from Shawnigan and Cowichan Lakes and apply water to both fires from the air in multiple passes (6 loads per hour) for approximately 2.5 hours. Approximately 300,000 L of water were dropped on the fires.

Total Deployment

CRD	BCWS
24 personnel, 2 water tenders, 1 intermediate helicopter	Two 8 person contract crews, 3 officers, 1 light helicopter, 1 intermediate helicopter, air tankers


Healey Fire - Monday


Rithet Fire - Monday

Tuesday August 18

08:30 The CRD EOC is officially opened and a task number requested and provided by EMBC.

Limited fire spread overnight, continuation of ground fire suppression with helicopter air support with containment of both fires achieved by end of day. BCWS provides one Incident Commander for each fire. The helicopter pad at the Rithet fire is constructed.

Total Deployment

CRD	BCWS
23 personnel, 2 water tenders	One 20 person unit crew, two 8 person contract crews, 4 contract fallers, 3 officers, 1 intermediate helicopter, I medium helicopter, 1 heavy helicopter

Wednesday August 19

Fires remain contained and suppression within the fire area begins, along with start of mop-up meaning extinguishing all flames and cooling hotspots with water within the fire area.

Total Deployment

CRD	BCWS
13 personnel, 2 water tenders	One 20 person unit crew, two 8 person contract crews, 4 contract fallers, 2 officers

Thursday August 20
Mop up continues aided by approximately 20 mm of rainfall that begins in the late afternoon.

Total Deployment

CRD	BCWS
11 personnel, 1 water tender	One 20 person unit crew, two 8 person contract crews, 2 officers

Friday August 21
An additional 8 mm of rain falls. Mop up activities largely complete. Demobilization and patrol begins.

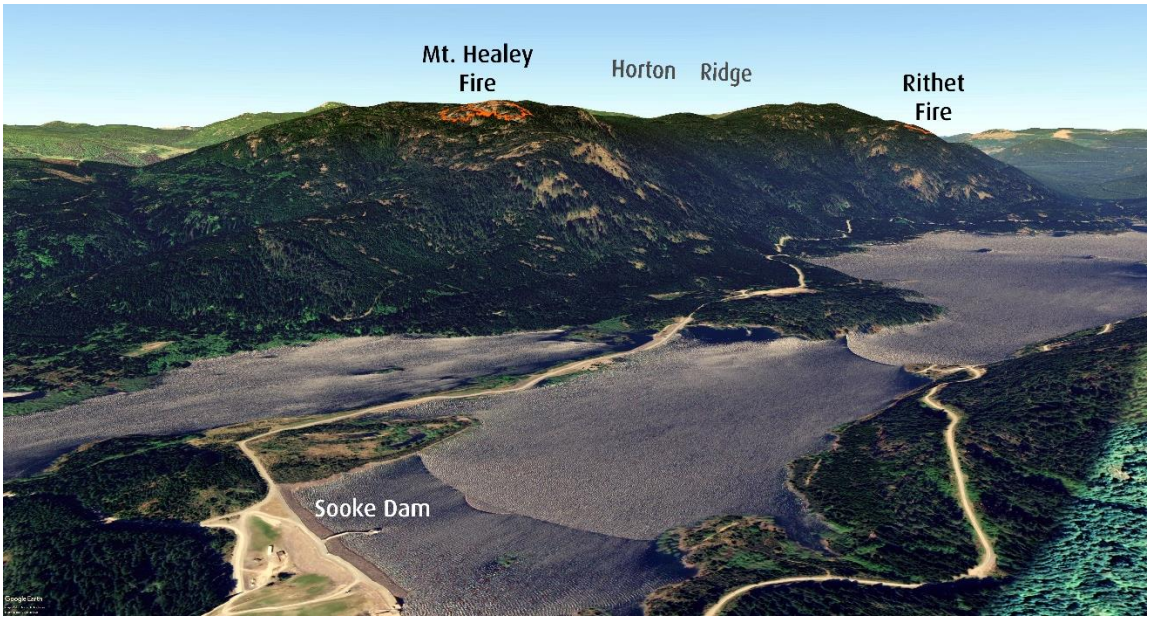
Total Deployment

CRD	BCWS
7 personnel, 1 water tender	Two 3 person Initial attack crews

Saturday Aug 22 – Sunday Aug 30
Daily patrol by CRD and BCWS, heat scanning for hotspots, minor amounts of rain.
Fire declared out by BCWS on Monday Aug 31.

View of Healey fire (V61186) relative to the Communications Facility, Sooke Lake Reservoir, Intake Tower and Deception Reservoir.

View of Rithet fire (V11860) relative to Sooke Lake Reservoir.



A rendered view of the location of the two fires relative to Sooke Lake and Deception Reservoirs.

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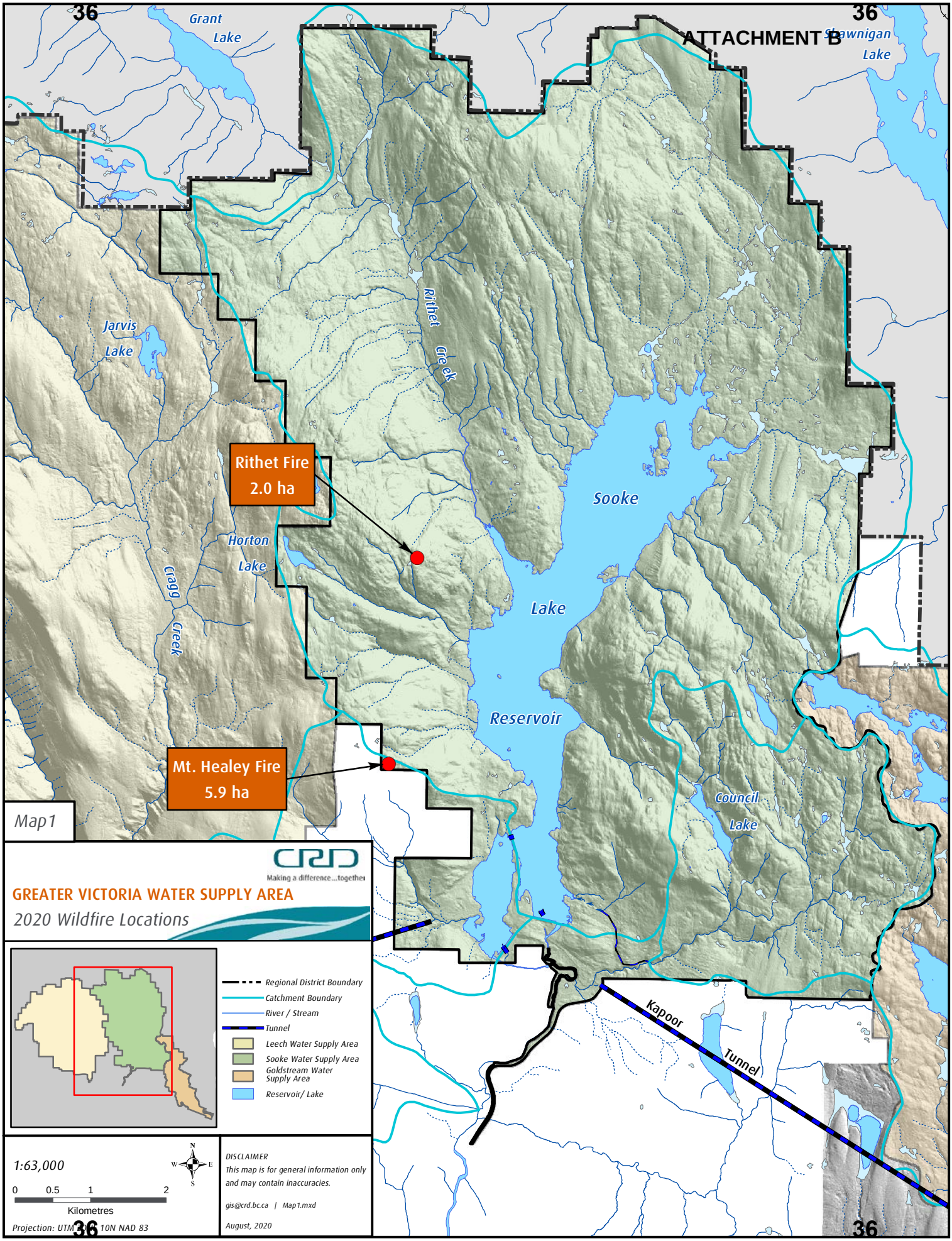
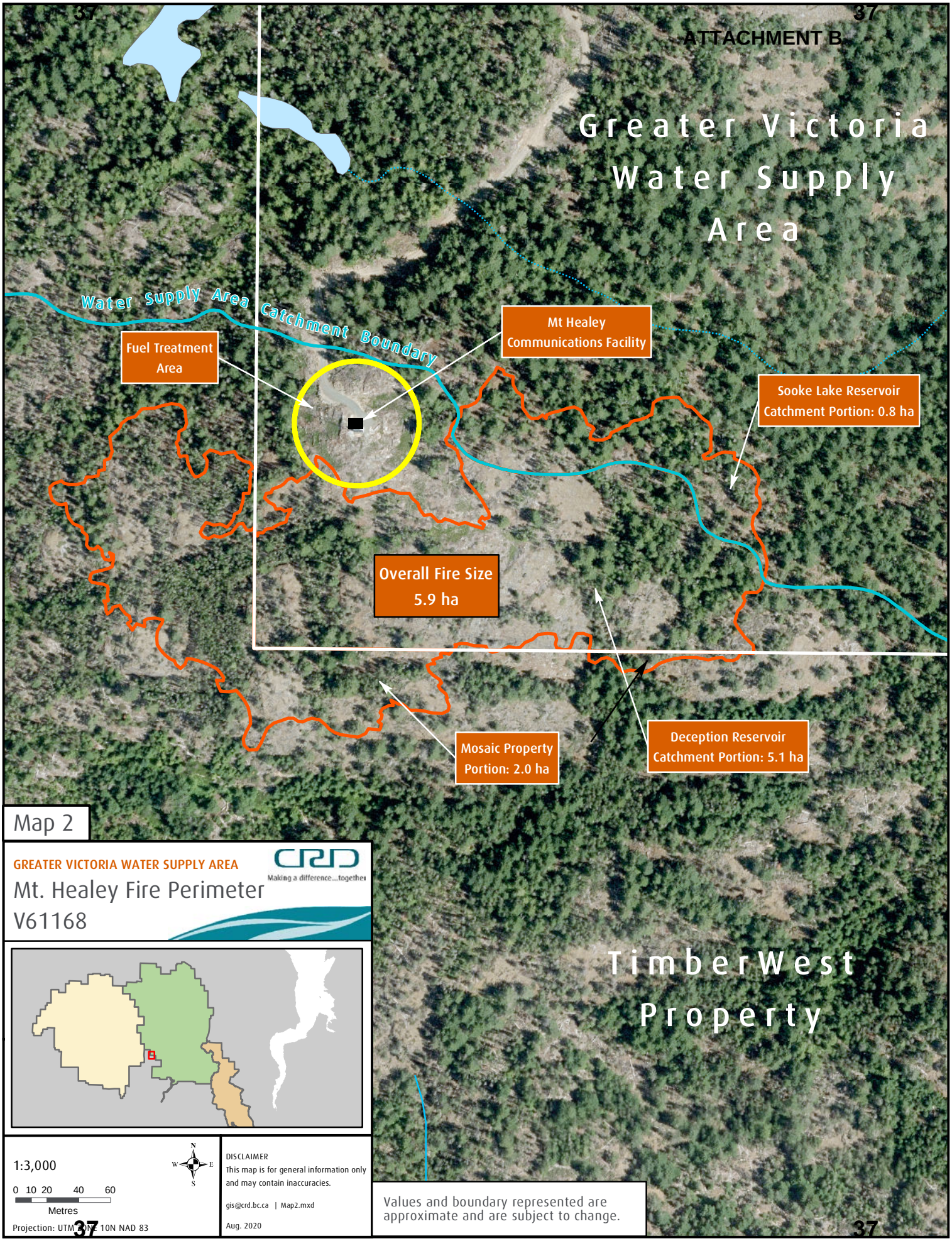

ATTACHMENT B
36
36
Grant Lake
Shawnigan Lake
Jarvis Lake
Rithet Creek
Rithet Fire
2.0 ha
Horton Lake
Cragg Creek
Sooke Lake Reservoir
Mt. Healey Fire
5.9 ha
Council Lake
Kapoor Tunnel
Map1
GREATER VICTORIA WATER SUPPLY AREA
2020 Wildfire Locations
Making a difference...together
Regional District Boundary
Catchment Boundary
River / Stream
Tunnel
Leech Water Supply Area
Sooke Water Supply Area
Goldstream Water Supply Area
Reservoir/ Lake
1:63,000
0 0.5 1 2
Kilometres
Projection: UTM 10N NAD 83
DISCLAIMER
This map is for general information only and may contain inaccuracies.
gis@crd.bc.ca | Map1.mxd
August, 2020
36
36



Map 2

GREATER VICTORIA WATER SUPPLY AREA

Mt. Healey Fire Perimeter

V61168

CRD Making a difference...together

1:3,000

0 10 20 40 60

Metres

Projection: UTM Zone 10N NAD 83

DISCLAIMER

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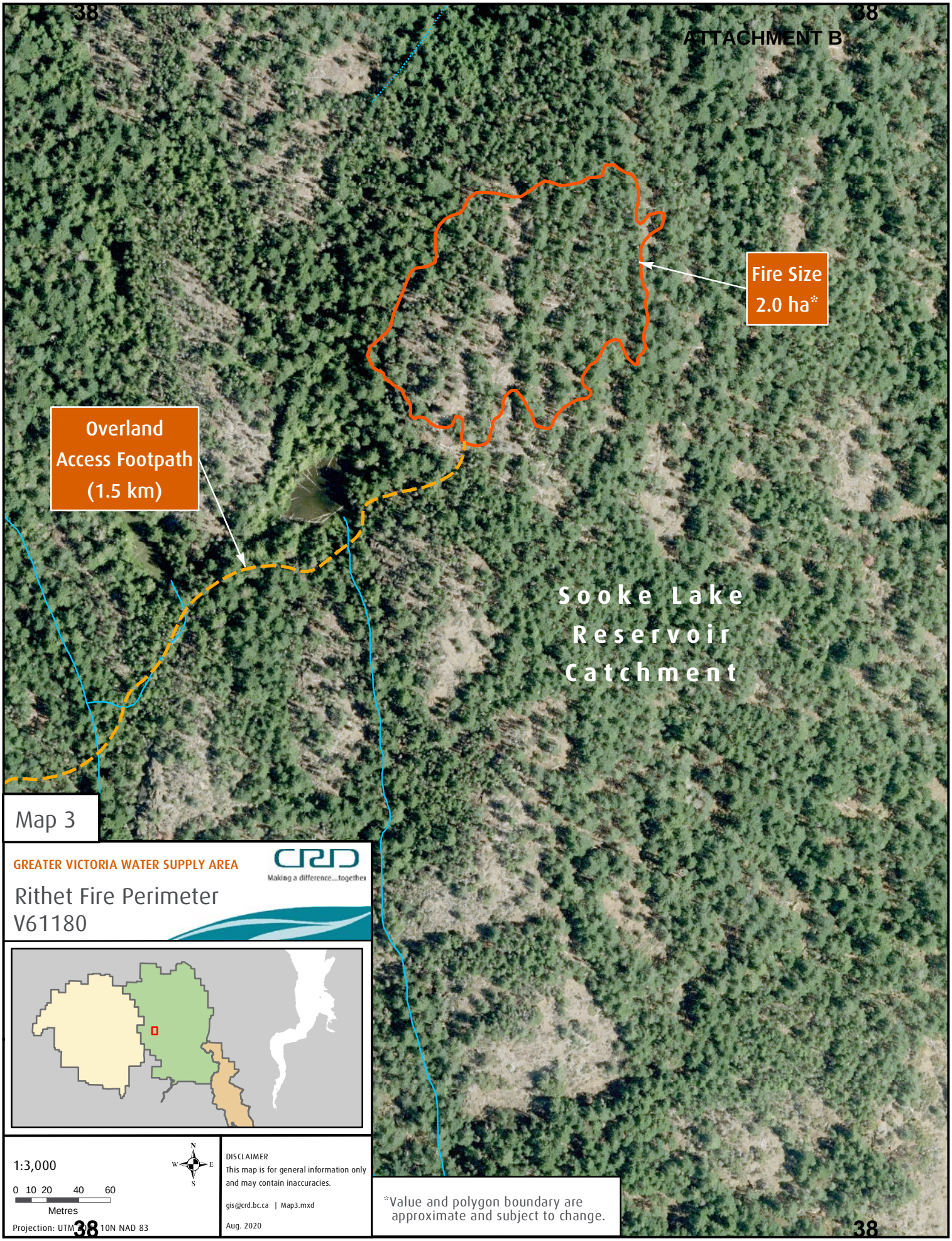
gis@crd.bc.ca | Map2.mxd

Aug. 2020

Values and boundary represented are approximate and are subject to change.

ATTACHMENT B



Map 3

GREATER VICTORIA WATER SUPPLY AREA

CRD
Making a difference...together

Rithet Fire Perimeter
V61180

1:3,000

0 10 20 40 60
Metres

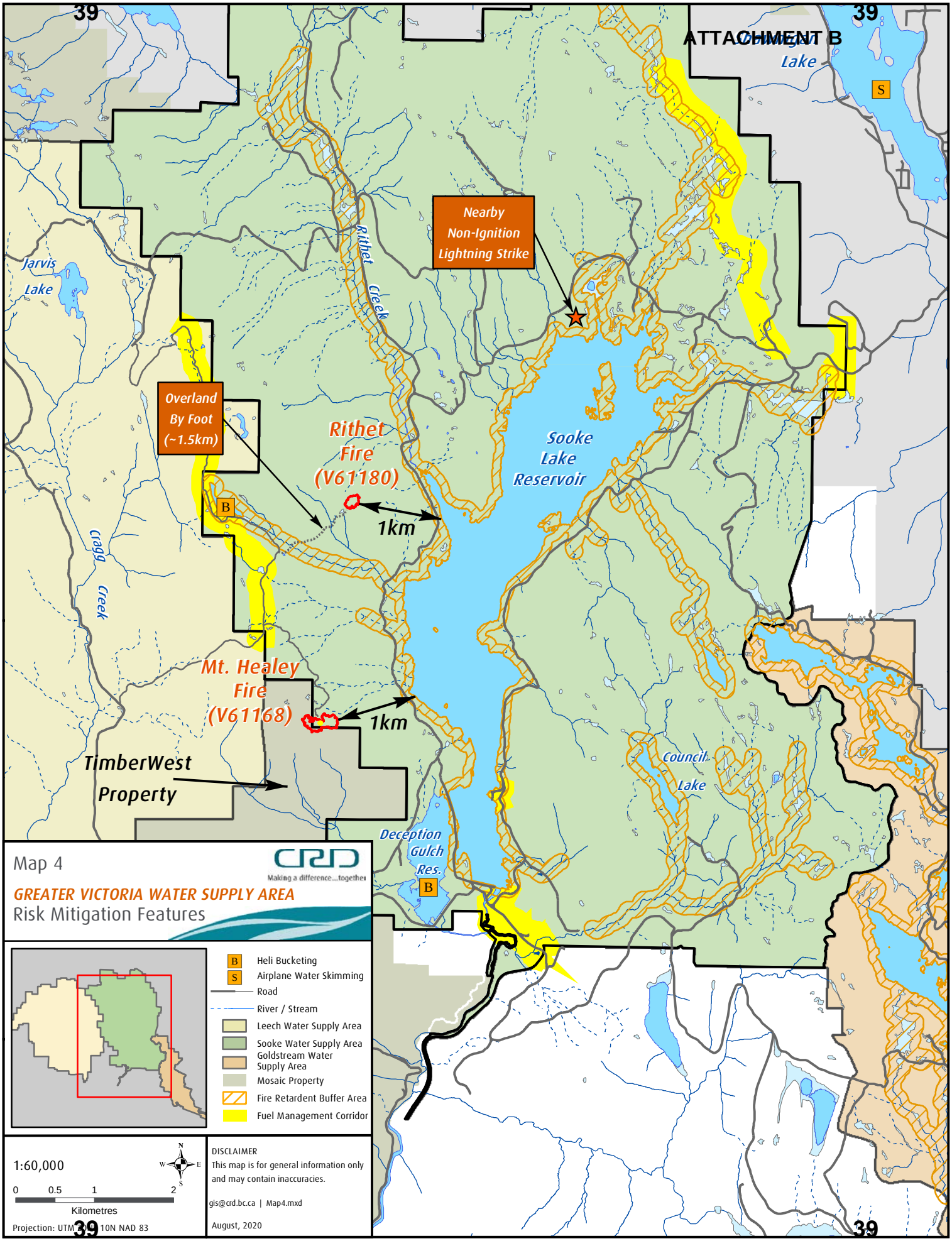
Projection: UTM Zone 10N NAD 83

DISCLAIMER
This map is for general information only and may contain inaccuracies.

gis@crd.bc.ca | Map3.mxd

Aug. 2020

*Value and polygon boundary are approximate and subject to change.



Map 4

Making a difference...together

GREATER VICTORIA WATER SUPPLY AREA

Risk Mitigation Features

- B — Heli Bucketing
- S — Airplane Water Skimming
- Road
- River / Stream
- Leech Water Supply Area
- Sooke Water Supply Area
- Goldstream Water Supply Area
- Mosaic Property
- Fire Retardent Buffer Area
- Fuel Management Corridor

1:60,000

0 0.5 1 2

Kilometres

Projection: UTM Zone 10N NAD 83

DISCLAIMER

This map is for general information only and may contain inaccuracies.

gis@crd.bc.ca | Map4.mxd

August, 2020

ATTACHMENT C

Making a difference...together

RWSC 21-05

REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, MAY 19, 2021

SUBJECT **Greater Victoria Water Supply Area 2020 Wildfires Follow Up**

ISSUE SUMMARY

To provide the Regional Water Supply Commission with a follow up on the outcomes of the August 17, 2020 wildfires in the Greater Victoria Water Supply Area (GVWSA) and lessons learned.

BACKGROUND

At its September 16, 2020 meeting, after reviewing the report "August 17, 2020 Lightning Strike Wildfires in the Greater Victoria Water Supply Area", the Regional Water Supply Commission (the Commission) requested that staff provide a subsequent report on the outcome of the wildfires in terms of financial impact, rehabilitation and lessons learned.

A lightning storm on the evening of Sunday August 16 caused two wildfires on Horton Ridge in the GVWSA. Staff monitored the lightning Sunday evening, the fires were detected early on Monday morning and contained by the end of Tuesday. Suppression and mop up carried on through Wednesday and Thursday aided by significant rainfall during Thursday and Friday. Given difficult terrain and the fire weather conditions, provincial air support was required and BC Wildfire Service (BCWS) was given Incident Command of the fires midmorning on Monday. In terms of Capital Regional District (CRD) effort, Watershed Protection dedicated all available staff and Regional Parks provided two staff to fire suppression efforts Monday through Wednesday, with tapering off of resources Thursday and Friday and resumption of regular activities and patrol beginning on Saturday.

Financial Impact

CRD Fire Response Cost

Given the timing of the lightning and wildfires, most of CRD's fire response effort occurred during regular working hours (529 person hours), however there were long days during the response period (329 overtime hours) and extra time needed for water quality sampling beyond the regular sampling routines (43 overtime hours).

Emergency Management BC (EMBC) will reimburse 100% of eligible costs to local authorities for expenses and staff time "over and above normal day-to-day costs" to respond to emergencies caused by natural hazards. Factors considered by EMBC in response eligibility include the type and size of the event, the nature of expenditure, contract and equipment rates and compensation through other means. CRD has submitted a cost claim to EMBC for extraordinary costs of $36,825 and answered initial questions. There has not yet been a final answer on acceptance of the claim and reimbursement.

CRD Extraordinary Fire Response Cost Summary

Cost Item	Cost ($) (GST excluded)	Submitted to EMBC?
Supplies and helicopter	10,032	Yes
Firefighting overtime	14,892	Yes
Water quality overtime	842	Yes
Water quality external lab costs	11,059	Yes
Eligible Costs Submitted to EMBC	**$ 36,825**	

BC Wildfire Service Fire Response Cost

CRD is signatory to a Fire Response Agreement with BC Wildfire Service that provides unlimited provincial firefighting response to naturally occurring wildfires in the GVWSA for an annual fee ($7,100 in 2020). It should be noted that BCWS provided significant ground (initial attack crews and unit crews) and air resources (helicopters, skimmers and air tankers) to suppress the wildfires over a two-day period. Those costs have not been supplied to the CRD, but are much greater than CRD's costs. A letter of appreciation was sent to BCWS by the CRD Board Chair and the Commission Chair in September 2020, and acknowledged by BCWS with a commitment to continue strengthening the relationship with the CRD in the future.

Recovery Cost

Based on a post-fire risk assessment of the burned areas, wood straw was spread on moderate and high burn severity areas prior to the first fall rains to mitigate potential erosion. Photo plot cameras have been deployed to monitor for erosion and the progression of re-vegetation over the course of the growing season(s).

Recovery efforts were conducted with regular staff time at no additional cost with the exception of supplies, helicopter time and minor contractor assistance as outlined below.

CRD Extraordinary Recovery Cost Summary

Cost Item	Cost ($)
Wood straw (176 bales)	3,996
Helicopter time to sling wood straw bales to the burned areas	8,265
Contract help spreading wood straw (T'Sou-ke silviculture crew)	1,411
Total to Date	**$ 13,672**

Recovery costs can be eligible for 80% reimbursement from EMBC, however eligible costs are defined as "rebuilding or restoring public facilities, structures and public works or replacing materials that are essential to the functions and operation of the local authority." Examples given include bridges, buildings and other hard assets. Based on this definition, the GVWSA recovery costs do not qualify, therefore the recovery costs to prevent erosion and support revegetation of the site are not being submitted to EMBC for reimbursement.

Water Quality Monitoring

The first phase of the post-fire water quality assessment focused on sampling creeks downstream of the fires that are tributaries to Sooke Lake Reservoir and sampling various locations in Sooke Lake Reservoir. The parameters tested spanned a large spectrum of organic and inorganic parameters that could potentially be impacted by any soil erosion and chemical application. The results were compared to long-established baseline data from Sooke Lake Reservoir and tributary creeks.

Staff introduced a second phase of post-fire water quality assessments following the next period of rainfall that occurred from September 23 to 26, 2020. With a total rainfall of 132 millimeters (mm) during this period, any measurable short-term water quality impact from the wildfires would certainly be triggered by this large rain event. The sampling sites included several Sooke Lake Reservoir sites as well the tributary creeks that could have been affected by the fires. This phase also included two creeks in the Deception catchment, of which one was downstream of the Healey Fire (Deception Creek) and the other was not downstream of a fire (Muckpile Creek). The purpose was to compare results to identify any other potential water quality impacts from the fire.

The sampling sites associated with the Mount Healey Fire were: Sooke Reservoir Forebay, Marble Creek, Deception Creek and Muckpile Creek. The sampling sites associated with the Rithet Fire were: Sooke Reservoir North Basin, Sooke Reservoir Rithet Creek Mouth, Sooke Reservoir Horton Creek Mouth, Rithet Creek, Horton Creek, Cobble Creek, Second Creek and 15S Creek. See Appendix A for maps showing the sampling sites.

Results of the water quality sampling indicate no measurable impact from the wildfires on water quality. Most results were within the normal range of concentrations expected after the first post-summer rainfall and runoff event. Turbidity, suspended solids and nutrient results in all sampling locations during these sampling events showed no indication of soil erosion impacting water quality. Analyses of biological indicators such as algae concentrations were also consistent with these conclusions.

A comparison of water quality data from Deception Creek downstream of the Healey fire, and neighbouring Muckpile Creek with no upstream burned area, also concluded that there was no detectable wildfire impact. The water characteristics of Muckpile Creek have a somewhat different natural signature compared to Deception Creek, but not as a result of the wildfires.

After this post-fire water quality assessment, water quality monitoring resumed at the normal sampling sites and at the normal frequencies in accordance with the regular source water monitoring program. Any possible but improbable long-term effects of these wildfires on water quality will be detected by this monitoring regime.

Rehabilitation

Snow from this past winter has only recently left the area but signs of natural revegetation of the burned area is already evident. Photos in Appendix B show the current level of revegetation. Notably there are no signs of mass erosion or woodstraw movement at either burn location. Beyond monitoring the sites for natural regeneration, a small direct seeding trial of arbutus is being undertaken and the area is planned to be brushed for invasive species later in the season – primarily Scotch broom that already had a minor presence prior to the fires. It is not anticipated

that planting will be needed or desired, however this will be re-evaluated at the end of the growing season.

Lessons Learned

1. Need for CRD Presence in BC Wildfire Service (BCWS) Command Structure

   In review of the wildfire response it is clear that CRD required BCWS support, but that CRD wanted more information from BCWS and to exert more influence in management of wildfires on GVWSA lands. BCWS, according to the terms of the Fire Response Agreement, requires CRD to submit to BCWS Incident Command if the fire(s) is beyond CRD's capacity to suppress. BCWS has recently expressed that they cannot, under their current policies consider unified command (defined as an incident commander from each agency working together). However BCWS does see the necessity and value of CRD presence in the command structure as an agency representative, a role which is already described in the Fire Response Agreement as a "Site Representative". The Site Representative is defined as an individual authorized to act on behalf of and make decisions for the CRD with respect to *fire response operations and activities*.

   The need for greater influence in wildfire management on GVWSA lands does not stem from presuming CRD has greater expertise in wildfire management, but that CRD staff have greater knowledge of watershed management, the lands and the values and objectives for the GVWSA related to regional water supply. This knowledge relates to tactical decisions that need to be made quickly during the response such as: where should water be drawn from?; where can fuel be stored?; where can helicopters land and fly?; and, when and where can retardants or foams be deployed?

   CRD staff had access to the BCWS Incident Commanders in the field and Coastal Fire Centre staff during the summer 2020 wildfires, however liaison between our agencies may be improved by making available and designating a CRD Site Representative during future wildfire responses where BCWS is given or takes command. The CRD Site Representative(s) would provide GVWSA information, tactical decision making regarding fire response and act as a liaison between the BCWS Command Post and the CRD. The CRD Site Representative in the BCWS Command Post is not a delegation of authority for operational, strategic or corporate decisions that rest with General Managers (GM), the CAO or the Commission/Board. These matters will be raised by the Site Representative through the IWS Department Operations Centre, to the CRD Emergency Operations Centre and GM Advisory Group as appropriate.

2. Develop Best Management Practice for Wildfire in the GVWSA

   The 2015 GVWSA Wildfire Management Plan contains the policies and strategies to guide wildfire management in the GVWSA. A short reference document based on the plan that could be consulted by staff at all levels and provided to external agencies that clarifies important strategic and tactical information about managing wildfires in the GVWSA will be developed. This would also be in the Site Representative's toolbox and part of their role to communicate to staff and BCWS.

3. Communications

   As with many emergency response incidents, a number of communication issues were identified including: lack or timeliness of information from the field to the office; lack of briefings when resources appeared mid-shift; designated radio channels too busy; lack of communication between: crews on Healey fire; from BCWS Incident Commander to CRD; BCWS to crew members when Incident Command changed; between pump operator and crew. These issues lead to a recommendation to pre-plan briefings and communications as much as possible (templates and checklists); and to dedicate a resource during a response to ensure a communication plan that details for CRD response who, how and what is communicated and implemented at all levels of the response.

4. Equipment

   In general, the wildfire suppression equipment for wildfire response in the GVWSA was sufficient, appropriately stationed, ready for deployment and performed well. Given two wildfires at the same time, the following minor equipment recommendations were made by staff:
   - a larger inventory of chainsaws for brushing, small stem cutting and bucking
   - a larger inventory of 5/8 inch hose
   - procurement of more comfortable and cooler two piece (shirt and pants) Nomex fire resistant safety clothing rather than the existing Nomex coveralls that are worn over top of work clothes
   - an extra sanitation facility kept in readiness to be deployed at any incident site

The CRD, with the help of the BC Wildfire Service, was successful in responding to and suppressing the summer 2020 wildfires in the GVWSA. CRD staff monitored the lightning and weather and responded quickly to detect and deploy to the fires. BCWS responded quickly, prioritized the GVWSA wildfires over others on southern Vancouver Island, and provided significant ground and air support resources. The fires were kept to small size and contained within two days. The lessons learned are being used to: develop additional tools and information that can be made available to Incident Command for future fires; make minor equipment inventory upgrades; and, fine tune the working relationship in fire response with BCWS.

<u>Other Follow-up</u>

1. Coordination with CRD Regional Parks regarding Mill Hill Fire recovery

   Similar to Integrated Water Services (IWS), natural vegetation response is being monitored in Mill Hill Regional Park to determine if any subsequent treatments are warranted. CRD Parks and IWS are jointly facilitating a University of Victoria graduate student project studying the response in the two fire areas using time series photographs.

2. Collaboration with Mosaic Forest Management on neighbouring TimberWest property for joint forest fuel management projects

   The boundary areas between Mosaic managed forest property and the GVWSA have not currently been identified by staff as priority areas for forest fuel management. Where fuel management projects adjacent to the boundary are considered in future, Mosaic will be

contacted to determine if there is interest in joint projects that target similar forest fuel types that span administrative boundaries.

CONCLUSION

The Regional Water Supply Commission requested follow up information regarding the two wildfires that occurred in 2020 in terms of cost recovery, rehabilitation, lessons learned and other details. Extraordinary costs to fight the fires of $36,825 were submitted to Emergency Management BC for reimbursement. Recovery and natural regeneration of the burned areas is being monitored. Lessons learned are being used to develop additional tools and information for Incident Command, make minor additional equipment purchases, and fine tune fire response roles in working with BCWS on wildfires in the GVWSA.

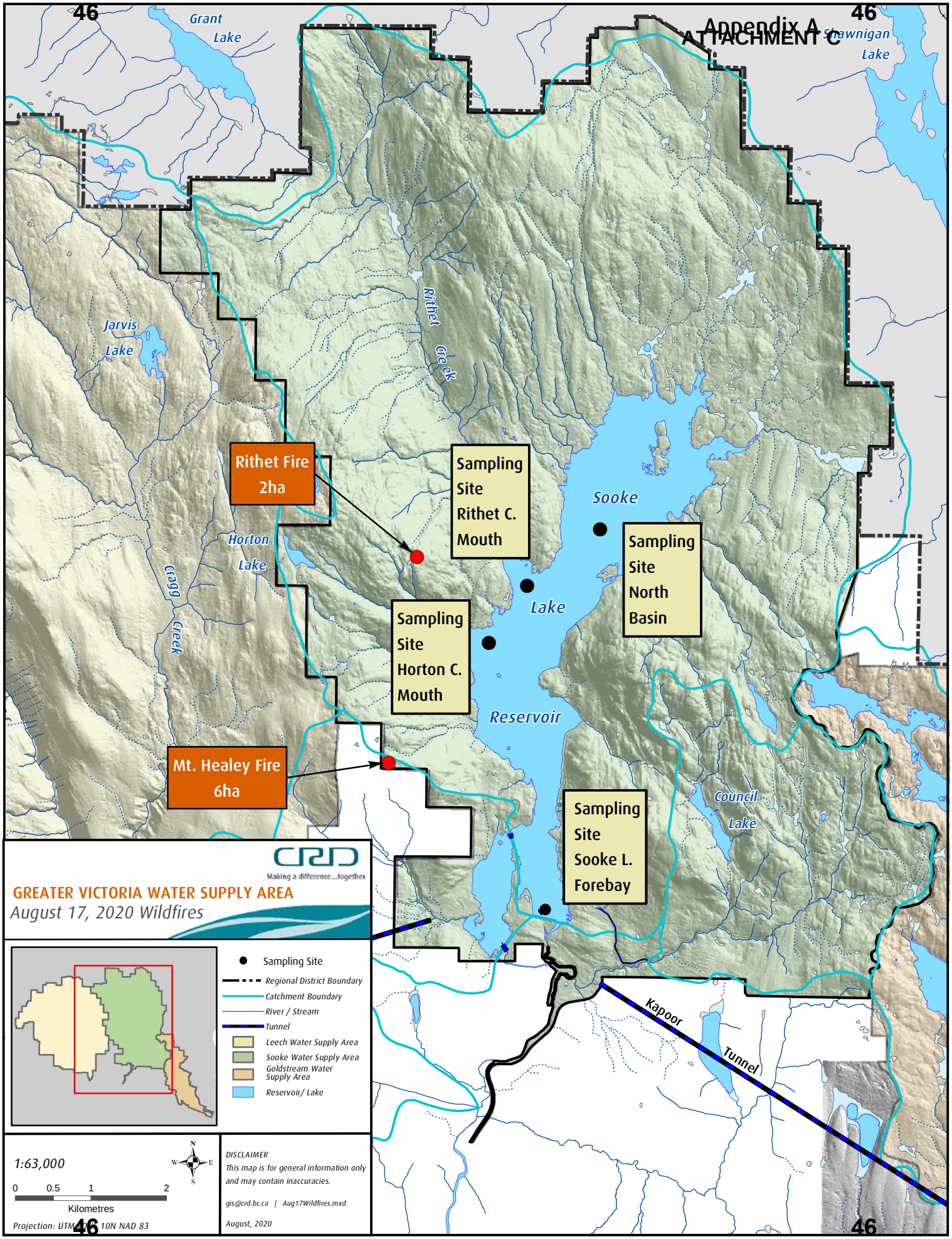
RECOMMENDATION

That the Regional Water Supply Commission receive the report for information.

Submitted by:	Annette Constabel, M.Sc., R.P.F., Senior Manager, Watershed Protection
Concurrence:	Ted Robbins, B. Sc., C. Tech., General Manager, Integrated Water Services
Concurrence:	Robert Lapham, M.C.I.P., R.P.P., Chief Administrative Officer

ATTACHMENTS

Appendix A: Maps showing water quality sampling sites
Appendix B: Burned area recovery photos


46
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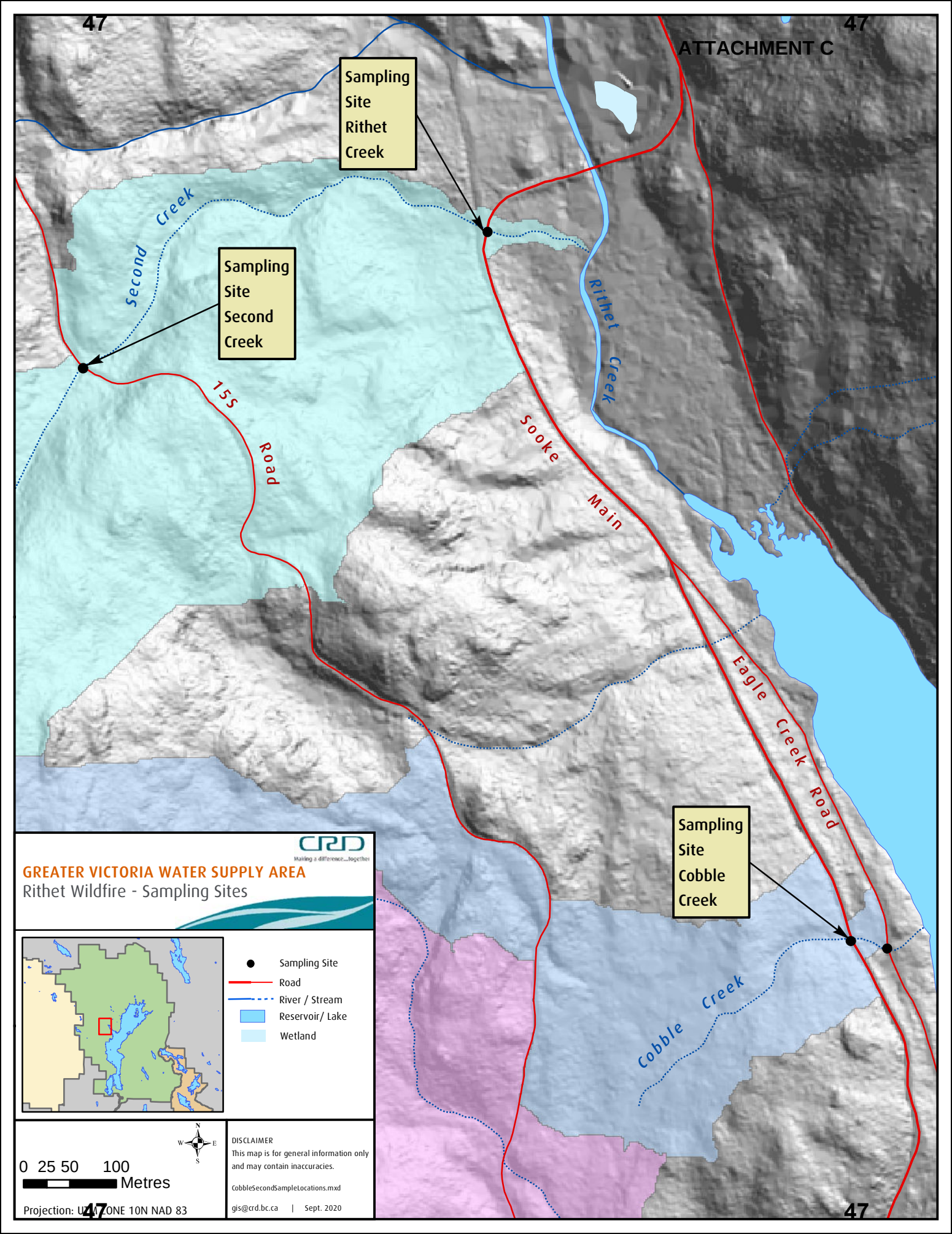
Grant Lake
Shawnigan Lake
Jarvis Lake
Rithet Creek
Rithet Fire 2ha
Sampling Site Rithet C. Mouth
Sooke Lake Reservoir
Sampling Site North Basin
Horton Lake
Cragg Creek
Sampling Site Horton C. Mouth
Mt. Healey Fire 6ha
Sampling Site Sooke L. Forebay
Council Lake
Kapoor Tunnel
46
46
GREATER VICTORIA WATER SUPPLY AREA
August 17, 2020 Wildfires
Making a difference...together
Sampling Site
Regional District Boundary
Catchment Boundary
River / Stream
Tunnel
Leech Water Supply Area
Sooke Water Supply Area
Goldstream Water Supply Area
Reservoir/ Lake
1:63,000
0 0.5 1 2
Kilometres
Projection: UTM 10N NAD 83
DISCLAIMER
This map is for general information only and may contain inaccuracies.
gis@crd.bc.ca | Aug17Wildfires.mxd
August, 2020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ATTACHMENT C
Sampling Site Rithet Creek
Sampling Site Second Creek
Sampling Site Cobble Creek
Second Creek
Rithet Creek
155 Road
Sooke Main
Eagle Creek Road
Cobble Creek
CRD
Making a difference...together
GREATER VICTORIA WATER SUPPLY AREA
Rithet Wildfire - Sampling Sites
Sampling Site
Road
River / Stream
Reservoir/ Lake
Wetland
N
W
E
S
0 25 50 100
Metres
Projection: UTM ZONE 10N NAD 83
DISCLAIMER
This map is for general information only and may contain inaccuracies.
CobbleSecondSampleLocations.mxd
gis@crd.bc.ca | Sept. 2020
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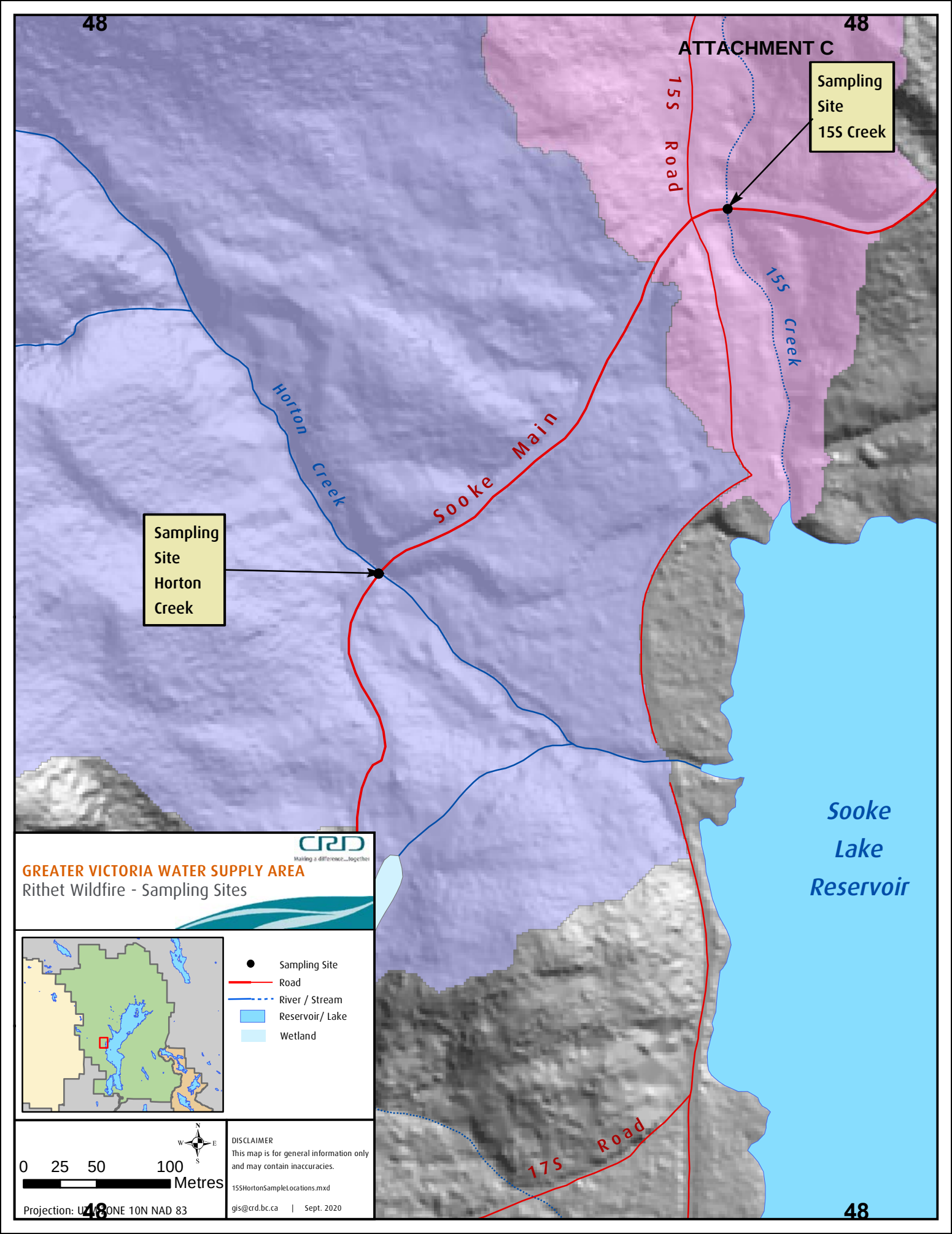
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ATTACHMENT C
Sampling Site 15S Creek
15S Road
15S Creek
Horton Creek
Sooke Main
Sampling Site Horton Creek
Sooke Lake Reservoir
17S Road
48
48
GREATER VICTORIA WATER SUPPLY AREA
Rithet Wildfire - Sampling Sites
Sampling Site
Road
River / Stream
Reservoir/ Lake
Wetland
N
W
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S
0 25 50 100
Metres
Projection: UTM ZONE 10N NAD 83
DISCLAIMER
This map is for general information only and may contain inaccuracies.
15SHortonSampleLocations.mxd
gis@crd.bc.ca | Sept. 2020

49

ATTACHMENT C

Deception Creek

Deception Road

Sampling Site Deception Creek

Leech Tunnel

Macdonald Main

Muckpile Cr.

35S

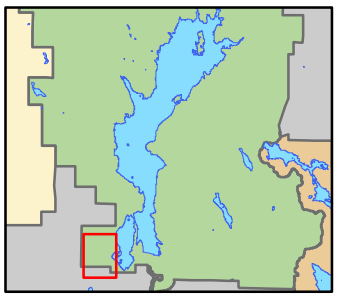
Sooke Main

Sampling Site Muckpile Creek

CRD
Making a difference...together

GREATER VICTORIA WATER SUPPLY AREA

Mt. Healey Wildfire - Sampling Sites



- Sampling Site
- Road
- River / Stream
- Reservoir/ Lake
- Wetland

N
W E
S

0 25 50 75
Metres

Projection: UTM ZONE 10N NAD 83

DISCLAIMER
This map is for general information only and may contain inaccuracies.

DeceptionCrSampleLocations.mxd

gis@crd.bc.ca | Sept. 2020

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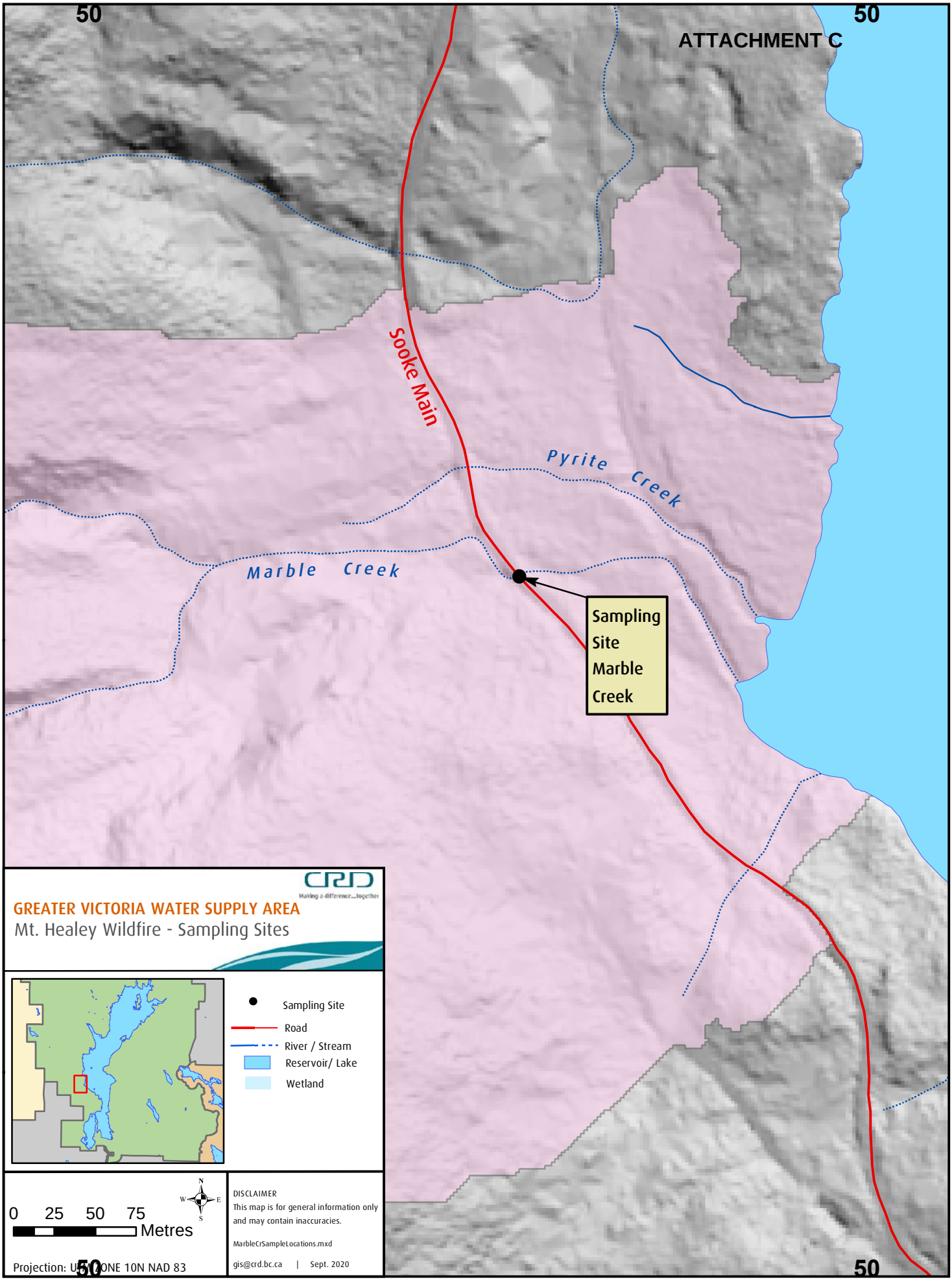
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ATTACHMENT C
Sooke Main
Pyrite Creek
Marble Creek
Sampling Site Marble Creek
GREATER VICTORIA WATER SUPPLY AREA
Mt. Healey Wildfire - Sampling Sites
Sampling Site
Road
River / Stream
Reservoir/ Lake
Wetland
0 25 50 75
Metres
DISCLAIMER
This map is for general information only and may contain inaccuracies.
MarbleCrSampleLocations.mxd
gis@crd.bc.ca | Sept. 2020
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Burned Areas Revegetation Photos (May 7, 2021)

Mount Healey Burned Area Overview

Green unburned area in front with evidence of previous fuel management; example of fire killed trees, fire scorched trees and green trees within the burn area. Light areas where wood straw was deployed. Sooke Lake Reservoir in the background.

Comparison of burned and unburned area. The dominant salal understory was mostly completely burned. Looking carefully new vegetation can be seen coming up in the foreground.

Mount Healey Revegetation Close-ups

Burned hairy manzanita (Arctostaphylos columbiana) with lupine (Lupinus nootkatensis) and other new growth underneath.

Even where woodstraw was heavily applied, new vegetation is growing through.

Rithet Burned Area

Mt. Healey Burned Area

Arbutus seeding trial - cone protectors nailed into the soil to prevent seeds from being consumed by rodents. Cones and nails will be removed when seedlings established.

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Making a difference...together

REGIONAL WATER SUPPLY COMMISSION
Wednesday, July 21, 2021 at 11:30 AM

MEETING HOTSHEET (ACTION LIST)

The following is a quick snapshot of the FINAL **Regional Water Supply Commission** decisions made at the meeting. The minutes will represent the official record of the meeting.

3. ADOPTION OF MINUTES

That the minutes of the June 16, 2021 meeting be adopted.

CARRIED

7. WATER ADVISORY COMMITTEE BUSINESS

7.1. Draft Minutes of the June 22, 2021 Water Advisory Committee Special Meeting

That the Draft Minutes of the June 22, 2021 Water Advisory Committee special meeting be received for information.

CARRIED

8. COMMISSION BUSINESS

8.1. Regional pH and Corrosion Study Update

That the Regional Water Supply Commission receive this report for information.

CARRIED

8.2. Greater Victoria Water Supply Area Wildlife Program

That the Regional Water Supply Commission receive the report for information.

CARRIED

8.3. Water Conservation Initiative – Once Through Cooling Project

That staff be directed to:

1. Continue with the Regional Water Supply Demand Management Program Outreach, specifically the commercial sector based free water use assessments, that provide custom business cases for the replacement of inefficient fixtures, including once-through cooling equipment; and

CARRIED

55

That staff be directed to:

2. Include a once-through cooling equipment replacement rebate program in the 2022-2026 budgets, in the amount of $20,000 per year.

CARRIED
Opposed: Baird, Young, Stock, Duncan, Harper, Morrison, Mersereau, De Vries

Motion Arising:
That staff recommend a program of reduced rebates to fit within the approved $20,000 per year budget.

CARRIED
Opposed: Duncan

Staff to follow up on whether new once-through cooling units continue to be installed.
G. Harris

8.4. Summary of Recommendations from Other Water Commissions

That the summary of recommendations from other water commissions be received for information.

CARRIED

8.5. Water Watch Report

That the July 12, 2021 water watch report be received for information.

CARRIED

9. NOTICE(S) OF MOTION

9.1. Motion with Notice (June 16, 2021) – Commissioner Isitt

That the Regional Water Supply Commission direct staff to provide a report, in a closed meeting, on land acquisition priorities.

CARRIED

11. MOTION TO CLOSE THE MEETING

That the meeting be closed for Legal Advice in accordance with Section 90 (1)(i) of the Community Charter.

CARRIED

12. RISE AND REPORT

The Commission rose from its closed session without report.

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File No. 902-03

CAPITAL REGIONAL DISTRICT - INTEGRATED WATER SERVICES

Water Watch

Issued August 23, 2021

Water Supply System Summary:

1. Useable Volume in Storage:

Reservoir	August 31 5 Year Ave		August 31/20		August 22/21		% Existing Full Storage
	ML	MIG	ML	MIG	ML	MIG	
Sooke	68,342	15,035	69,288	15,243	66,741	14,683	72.0%
Goldstream	5,795	1,275	6,728	1,480	7,287	1,603	73.5%
Total	74,137	16,310	76,016	16,724	74,028	16,286	72.2%

2. Average Daily Demand:

For the month of August	213.8 MLD	47.03 MIGD
For week ending August 22, 2021	201.9 MLD	44.42 MIGD
Max. day August 2021, to date:	252.2 MLD	55.49 MIGD

3. Average 5 Year Daily Demand for August

Average (2016 - 2020)	196.9 MLD [1]	43.33 MIGD [2]

[1]MLD = Million Litres Per Day [2]MIGD = Million Imperial Gallons Per Day

4. Rainfall August:

Average (1914 - 2020):	29.3 mm
Actual Rainfall to Date	5.1 mm (17% of monthly average)

5. Rainfall: Sep 1- Aug 22

Average (1914 - 2020):	1,622.7 mm
2020/2021	1,613.5 mm (99% of average)

6. Water Conservation Action Required:

CRD's Stage 1 Water Conservation Bylaw is now in effect through to September 30, 2021.
Visit our website at www.crd.bc.ca/water for scheduling information.

If you require further information, please contact:

Ted Robbins, B.Sc., C.Tech
General Manager, CRD - Integrated Water Services
or
Glenn Harris, Ph D., RPBio
Senior Manager - Environmental Protection

Capital Regional District Integrated Water Services
479 Island Highway
Victoria, BC V9B 1H7
(250) 474-9600

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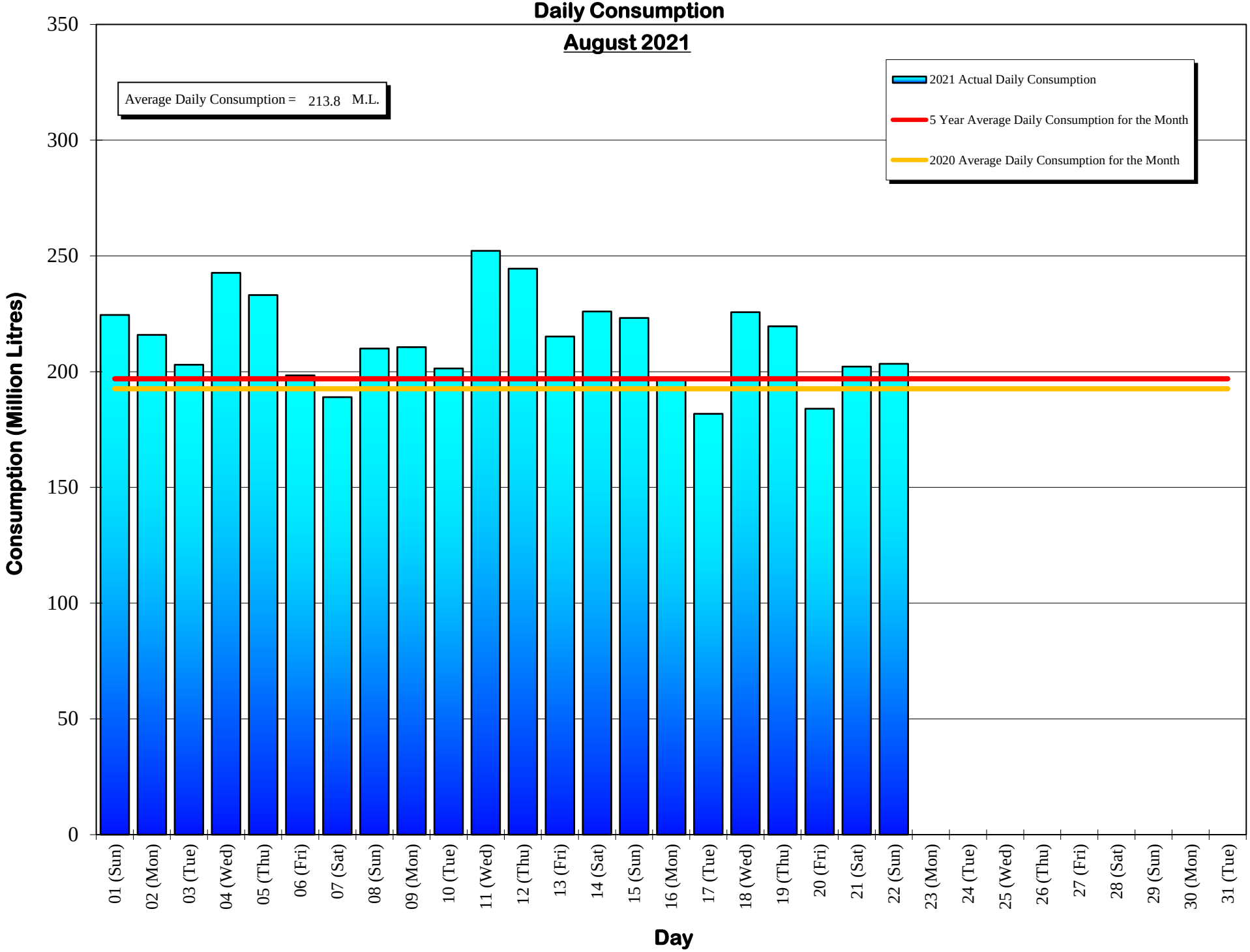
Daily Consumption

August 2021



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Daily Consumptions: - August 2021

Date	Total Consumption			Air Temperature @ Japan Gulch		Weather Conditions	Precipitation @ Sooke Res.: 12:00am to 12:00am		
	(ML) [1.]		(MIG) [2.]	High (°C)	Low (°C)		Rainfall (mm)	Snowfall [3.] (mm)	Total Precip.
01 (Sun)	224.5		49.4	29	16	Sunny / Hazy	0.0	0.0	0.0
02 (Mon)	215.9		47.5	28	14	Sunny / Hazy	0.0	0.0	0.0
03 (Tue)	203.0		44.7	32	16	Sunny / Hazy	0.0	0.0	0.0
04 (Wed)	242.7		53.4	31	14	Sunny	0.0	0.0	0.0
05 (Thu)	233.1		51.3	29	17	Sunny / P. Cloudy	0.0	0.0	0.0
06 (Fri)	198.4		43.6	24	15	Sunny / P. Cloudy / Showers	0.5	0.0	0.5
07 (Sat)	189.0		41.6	22	13	Cloudy / Showers / P. Sunny	4.6	0.0	4.6
08 (Sun)	210.0		46.2	23	14	Sunny / P. Cloudy	0.0	0.0	0.0
09 (Mon)	210.6		46.3	24	13	Sunny / P. Cloudy	0.0	0.0	0.0
10 (Tue)	201.4		44.3	28	15	Sunny	0.0	0.0	0.0
11 (Wed)	252.2	<=Max	55.5	32	17	Sunny	0.0	0.0	0.0
12 (Thu)	244.5		53.8	35	18	Sunny / Hazy	0.0	0.0	0.0
13 (Fri)	215.2		47.3	33	19	Sunny / Hazy	0.0	0.0	0.0
14 (Sat)	226.0		49.7	31	19	Sunny / Hazy	0.0	0.0	0.0
15 (Sun)	223.2		49.1	32	14	Sunny	0.0	0.0	0.0
16 (Mon)	196.6		43.3	21	13	Cloudy	0.0	0.0	0.0
17 (Tue)	181.8	<=Min	40.0	24	13	Sunny / P. Cloudy	0.0	0.0	0.0
18 (Wed)	225.7		49.7	23	12	Sunny	0.0	0.0	0.0
19 (Thu)	219.6		48.3	25	14	Sunny / P. Cloudy	0.0	0.0	0.0
20 (Fri)	184.0		40.5	19	14	Sunny / P. Cloudy	0.0	0.0	0.0
21 (Sat)	202.2		44.5	21	14	Sunny / P. Cloudy	0.0	0.0	0.0
22 (Sun)	203.4		44.8	19	12	Sunny / P. Cloudy	0.0	0.0	0.0
23 (Mon)									
24 (Tue)									
25 (Wed)									
26 (Thu)									
27 (Fri)									
28 (Sat)									
29 (Sun)									
30 (Mon)									
31 (Tue)									
TOTAL	4703.0 ML		1034.69 MIG				5.1	0	5.1
MAX	252.2		55.49	35	19		4.6	0	4.6
AVG	**213.8**		47.03	26.6	14.8		0.2	0	0.2
MIN	181.8		39.99	19	12		0.0	0	0.0

1. ML = Million Litres 2. MIG = Million Imperial Gallons 3. 10% of snow depth applied to rainfall figures for snow to water equivalent.

Average Rainfall for August (1914-2020)	29.3 mm
Actual Rainfall: August	5.1 mm
% of Average	17%
Average Rainfall (1914-2020): Sept 01 - Aug 22	1,622.7 mm
Actual Rainfall (2020/2021): Sept 01 - Aug 22	1,613.5 mm
% of Average	99%

Number days with precip. 0.2 or more
2

Water spilled at Sooke Reservoir to date (since Sept. 1) = 8.02 Billion Imperial Gallons
= 36.50 Billion Litres

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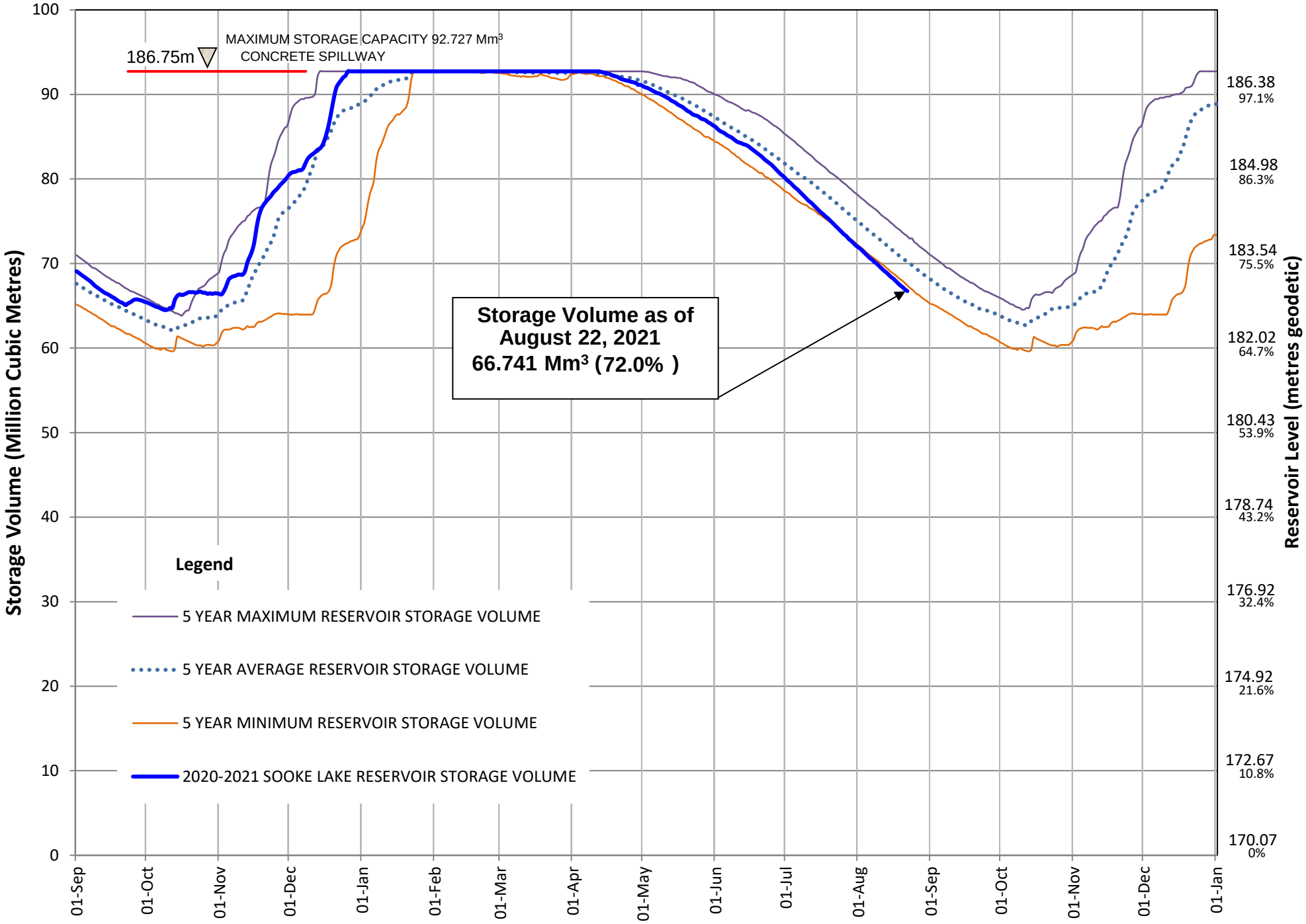
60 60

SOOKE LAKE RESERVOIR STORAGE SUMMARY
2020 / 2021



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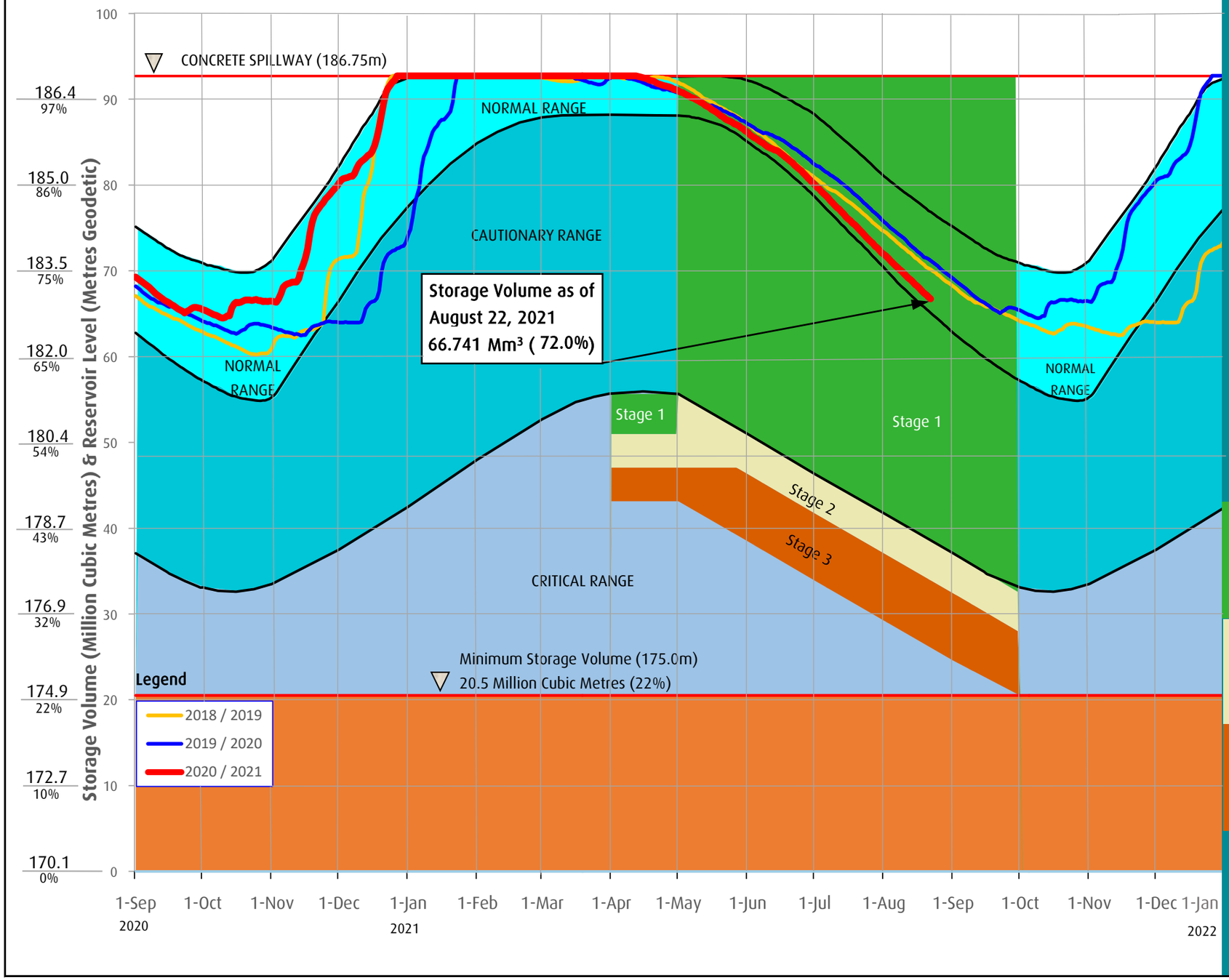
Sooke Lake Reservoir Storage Level
Water Supply Management Plan



FAQs

How are water restriction stages determined?

Several factors are considered when determining water use restriction stages, including,

1. Time of year and typical seasonal water demand trends;
2. Precipitation and temperature conditions and forecasts;
3. Storage levels and storage volumes of water reservoirs (Sooke Lake Reservoir and the Goldstream Reservoirs) and draw down rates;
4. Stream flows and inflows into Sooke Lake Reservoir;
5. Water usage, recent consumption and trends; and customer compliance with restriction;
6. Water supply system performance.

The Regional Water Supply Commission will consider the above factors in making a determination to implement stage 2 or 3 restrictions, under the Water Conservation Bylaw.

At any time of the year and regardless of the water use restriction storage, customers are encouraged to limit discretionary water use in order to maximize the amount of water in the Regional Water Supply System Reservoirs available for nondiscretionary potable water use.

Stage 1 is normally initiated every year from May 1 to September 30 to manage outdoor use during the summer months. During this time, lawn watering is permitted twice a week at different times for even and odd numbered addresses.

Stage 2 Is initiated when it is determined that there is an acute water supply shortage. During this time, lawn water is permitted once a week at different times for even and odd numbered addresses.

Stage 3 Is initiated when it is determined that there is a severe water supply shortage. During this time, lawn watering is not permitted. Other outdoor water use activities are restricted as well.

For more information, visit www.crd.bc.ca/drinkingwater

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Capital Regional District Integrated Water Services

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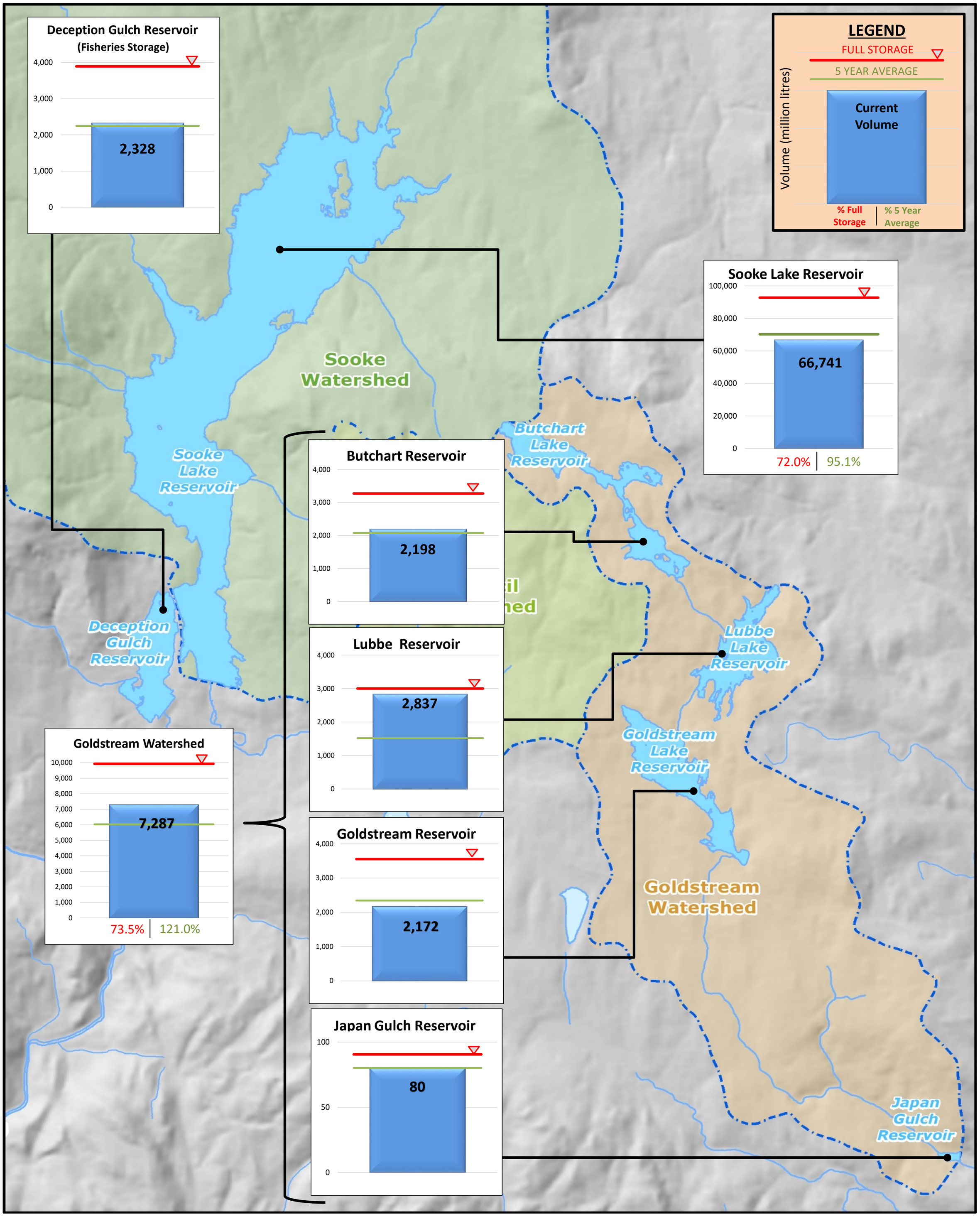
Useable Reservoir Volumes in Storage for August 22, 2021



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