Ministry of Water, Land and Resource Stewardship

NAME OF Policy:	Decisions on Applications for Water Diversion and Use in the Blueberry, Upper Beatton, and Lower Sikanni Chief Watersheds: Phase Two
APPLICATION:	Review of applications to divert and use water from a stream and issuance of related authorizations within the Blueberry pilot area.
ISSUANCE:	Executive Director, Water Protection and Sustainability Branch, Ministry of Water, Land and Resource Stewardship, and Director, Water Management Branch, Ministry of Water, Land and Resource Stewardship
IMPLEMENTATION:	Ministry of Water, Lands and Resource Stewardship (WLRS), BC Energy Regulator (BCER)
LEGISLATIVE REFERENCES:	*Water Sustainability Act* (Ch. 15, S.B.C 2014) [WSA] Water Sustainability Regulation (B.C. Reg. 36/2016) [WSR]
RELATED POLICIES:	Not applicable
RELATIONSHIP TO PREVIOUS Policies:	This policy replaces an interim policy in the form of Comptroller's Guidance, dated April 1, 2023.
Policy Amendment PROCESS:	To amend this policy a request must be made in writing to the Executive Director, Water Protection and Sustainability Branch, Ministry of Water, Land and Resource Stewardship and the Director, Water Management Branch, Ministry of Water, Land and Resource Stewardship.

Ted Zimmerman Executive Director Water Protection and Sustainability Branch Ministry of Water, Land and Resource Stewardship	Connie Chapman Director Water Management Branch Ministry of Water, Land and Resource Stewardship
Date	Date

APPROVED AMENDMENTS:		
Effective date	Approval date	Description/Summary of Changes:

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1. POLICY STATEMENT

This policy provides guidance to help statutory decision makers in the BC Ministry of Water, Land and Resource Stewardship (WLRS) and the BC Energy Regulator (BCER) implement, on a pilot basis, a quantitative Environmental Flow Needs Framework (EFN Framework), starting on November 28, 2023, when reviewing and making decisions under *Water Sustainability Act* s. 9 (Licences) and s. 10 (Use approvals) in the pilot area that includes the Blueberry, Upper Beatton, and Lower Sikanni Chief water management basins.

2. REASON FOR POLICY

On January 18, 2023, Blueberry River First Nations (BRFN) and the Government of British Columbia (Province) reached a historic agreement that will guide them forward in a partnership approach to land, water and resource stewardship. The Blueberry River First Nations Implementation Agreement (Agreement) was developed in response to the 2021 B.C. Supreme Court decision, Yahey v. British Columbia, that found the Province had infringed upon BRFN Treaty 8 rights due to the cumulative impacts of decades of industrial development. The court directed the parties to negotiate a collaborative approach to land management and natural resource development that protects these rights.

BRFN have long expressed concern that water over-extraction, among other factors, impairs their ability to use streams and surface water in their traditional territory in a manner promised in Treaty 8 and otherwise affects their treaty rights. In response to this concern, BRFN and the Province agreed to jointly develop a quantitative EFN approach and process, described in Schedule P of the Agreement. The parties agreed to pilot this approach when reviewing and making decisions on applications for new water diversion and use within the management basins of the Blueberry River, the Upper Beatton River, and the Lower Sikanni Chief River (pilot area)[1] as shown in Figure 1.

Schedule P contemplates that implementation of this new EFN approach will occur in three phases:

1. An interim phase and approach implemented on April 1, 2023;
2. A pilot phase for implementation of the new quantitative EFN thresholds and Pilot Water Allocation Tool (PWAT) within the pilot area;
3. A permanent phase starting after review of the pilot phase results (to be completed by December 31, 2024) and implementation of any recommended improvements.

[1] The Agreement states that inclusion of the Middle Beatton River in the pilot area is subject to consultation with the Doig River First Nation. As agreement on the application of the EFN Framework has not been reached, the Middle Beatton has not been included in the pilot area.

This guidance applies specifically to Phase 2 which includes the full implementation and testing of the quantitative EFN thresholds and PWAT in allocation decisions. The parties have agreed that this phase starts on November 28, 2023.

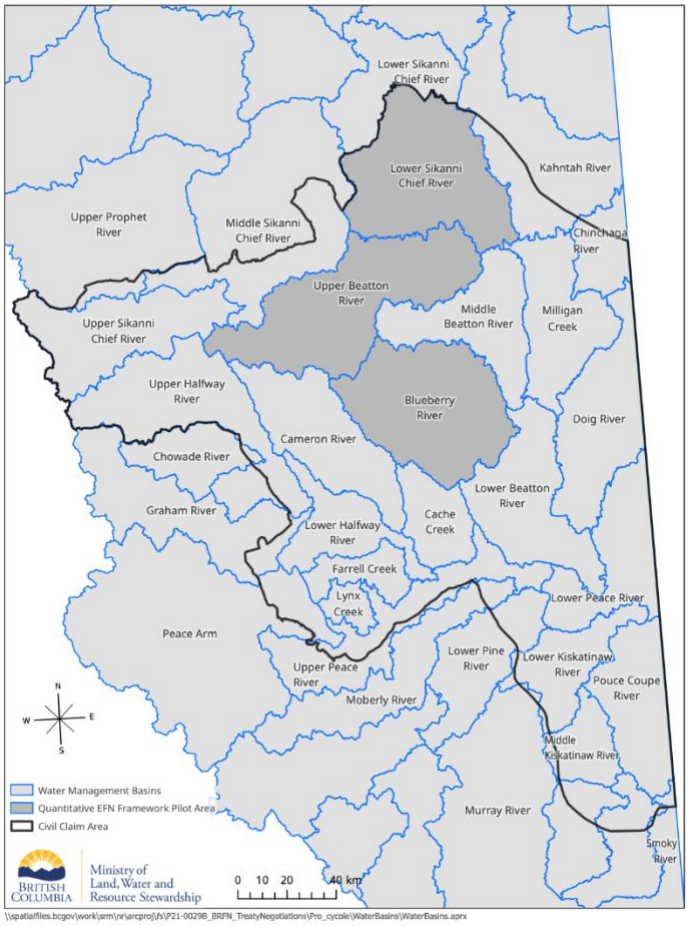

Figure 1. Pilot area for implementation of the EFN Framework

3. KEY CONSIDERATIONS

During Phase 2 decision makers are advised to consider the commitments in Schedule P:

- To consult with BRFN on every WSA s. 9 and s. 10 application within the pilot area.[2]
- To jointly and cooperatively develop a quantitative EFN approach and process to be applied to water use authorizations issued by the Province under the *Water Sustainability Act* within the 'pilot' area.

[2] Consultation will be based on processes that reflect Section 8.2 and Article 9 of the Blueberry River First Nations Implementation Agreement.

- To apply the new quantitative EFN Framework, including use of the new Pilot Water Allocation Tool (PWAT) in water allocation decisions and the application of MWA and EBF values, below which no water diversion will be authorized, to new authorizations.
- That 'Should the Provincial statutory decision maker determine to not apply the EFN framework or portions of it to a water use authorization, they will produce a rationale document detailing the reasons for not applying the EFN framework and will provide that rationale document to BRFN.'
- To implement and evaluate the EFN Framework.

Article 23.14 (No Fettering) of the Agreement specifies that '. . . without limitation, nothing in this Agreement shall be interpreted or construed as limiting or fettering in any way any statutory discretion or constitutional duty . . . While the Province is prepared to recommend a decision to a statutory decision maker, their decision cannot be fettered.'

4. APPLICATION

This guidance applies to the review of applications submitted on or after November 28, 2023 and the issuance of any related authorizations under WSA s. 9 (Licences) or s. 10 (Licences) for the diversion and use of water from a stream within the pilot area consisting of the Blueberry, Upper Beatton, and Lower Sikanni Chief water management basins.

5. EXCLUSIONS

The parties to the Agreement have agreed that the EFN Framework does not apply to:

- Water use purposes that are exempt or authorized under the *Water Sustainability Act* (WSA) or the Water Sustainability Regulation[3] (e.g., domestic use of water from a stream, firefighting); and
- Applications for existing use groundwater received prior to March 1, 2022.

The EFN Framework is currently designed for application to flowing water sources. During Phase 2 the EFN Framework does not therefore apply to water diversion and use from an aquifer, a dugout connected to an aquifer, or a lake lacking an outlet to a stream.

In reviewing and deciding on applications to divert and use water from an excluded source, as identified above, the decision maker is advised to refer to existing provincial allocation guidance.

[3] See exclusions in WSA s. 6 (Use of water) and Water Sustainability Regulation s. 31 – 35.1.

6. DEFINITIONS

Schedule P of the Agreement introduces the following new terms[4] that currently apply only within the Blueberry, Upper Beatton, and Lower Sikanni Chief water management basins:

> 'Ecosystem Base Flow (EBF)' means a flow at which any human-induced reductions in flow would result in not meeting aquatic ecosystem objectives[5].
>
> 'Environmental Flow Needs (EFN)' in relation to a stream, means the volume and timing of water flow required for the proper functioning of the aquatic ecosystem of the stream. In relation to Schedule P, the determination of EFN is based on a formula that includes 'percent of natural flow' and 'ecosystem base flow' components.
>
> 'EFN Framework' means the use of the Pilot Water Allocation Tool (PWAT) to generate weekly diversion threshold values based on EFN and the application of these values in allocation decisions.
>
> 'Maximum cumulative percentage water allocation value (MWA)' means the cumulative maximum amount of water that can be authorized for diversion from a watershed. This includes the sum of volumes from a proposed point of diversion (POD) and from all authorized diversion upstream of that POD.

The following definition, not included in Schedule P, may help decision makers implement this Phase 2 EFN approach and guidance:

> 'Maximum instantaneous withdrawal (MIW)' means the maximum rate, calculated as a percentage of natural or naturalized instantaneous flow and expressed in m^3/sec, at which the authorization holder may divert water.

7. PROCEDURES

7.1 The EFN Framework

The EFN Framework includes both the use of the new Pilot Water Allocation Tool (PWAT) developed as a component of the Agreement and the consideration in water allocation decisions of the weekly diversion thresholds and EBF values generated by the PWAT. The intent during the pilot phase is to apply, evaluate, and refine the application of this EFN Framework within the pilot area.

[4] The definitions of these terms in Schedule P are updated in this policy to reflect the evolution in the project team's understanding of the EFN Framework approach, the PWAT outputs, and the way in which these outputs inform allocation decisions. The updated definitions are intended to provide clarity to decision makers and do not affect the outcomes envisioned in Schedule P.

[5] Note that Schedule P does not identify specific aquatic ecosystem objectives.

The PWAT is a map-based decision support tool that incorporates information extracted from the Northeast Water Tool (NEWT), the Water Survey of Canada (WSC) and the BC e-Licensing system, and applies some of the methodology developed by Alberta Environment and detailed in 'A Desk-top Method for Establishing Environmental Flows in Alberta Rivers and Streams' (2011) and 'Surface Water Allocation Directive' (2019).

The Alberta desktop method uses site-specific natural or naturalized hydrology data and enables users to estimate an ecologically-based flow regime based on a combination of 'per cent of natural flow' and 'ecosystem base flow' components. The Alberta directive seeks to minimize downstream impacts to the aquatic environment by setting limits on the amount of water available for diversion and use. The directive establishes instantaneous cumulative diversion limits based on percent exceedance values of natural flow in the stream. It establishes different rules for each of three stream classes based on mean annual discharge (MAD). These rules are built into the PWAT and illustrated in Figure 2.

'Streamflow exceedance value' refers to the probability that a specific streamflow would be equaled or exceeded. For example, the Q80 streamflow exceedance value can be interpreted as the streamflow likely to be equaled or exceeded 80% of the time for a specified time interval, based on historic streamflow data. Q80 is a low flow and Q95 is an extremely low flow. For those more familiar with percentiles, the Q80 streamflow exceedance value is analogous to the 20th percentile, which refers to the point at which streamflow exceeds 20% of all recorded flows within a specified time interval.

Stream Class	**Mean Annual Discharge (MAD)**	**Streamflow Threshold Exceedance (Q) Values and Corresponding MWA Values**		
	m^3/s	>Q80	≤Q80 to >Q95	≤Q95
large	≥10	15%	5%	5%
medium	≥2 - <10	15%	5%	0%
small	<2	10%	0%	0%

Figure 2. Maximum cumulative percentage water allocation (MWA) values based on weekly streamflow exceedance (Q) values for three classes of streams.

Figure 2 illustrates the streamflow exceedance and withdrawal values that are the foundation of the EFN Framework. The maximum cumulative percentage water allocation (MWA) values represent the proportion of streamflow that can be authorized for diversion and use. These values are different for different streamflow exceedance bands (>Q80, ≤Q80 to >Q95, and ≤Q95) and for

large, medium, and small streams based on mean annual discharge (MAD). An MWA of '0' percent corresponds to the ecosystem base flow (EBF) for that stream class.

In large streams (defined as those with MAD of 10 m^3/sec or greater):

- When streamflow is greater than the Q80 exceedance value, the MWA is 15% of the flow, i.e. up to 80% of the time up to 15% of the flow is available for diversion and use. The remaining 85% of the flow supports the health of the aquatic ecosystem;
- When streamflow is equal to or less than the Q80 exceedance value, the MWA is 5% of the flow, i.e. between 80% and 100% of the time up to 5% of the flow is available for diversion and use; and
- There is no EBF. The EFN Framework assumes some water is available for diversion from large watersheds even during the lowest flow periods (although it is recommended that decision makers exercise caution when authorizing diversion during low flow periods, and authorized diversion may still be subject to orders under WSA s. 86-87, s. 88, or s. 93).

In medium-sized streams (defined as those with MAD equal to or greater than 2 m^3/s and less than 10 m^3/s):

- When streamflow is greater than Q80, the MWA is 15% of the flow; up to 15% of flow is available for diversion and use;
- When streamflow is equal to or less than Q80 and greater than Q95, the MWA is 5% of the flow;
- When streamflow is equal to or less than Q95, no water from the stream is available for diversion and use; and
- The EBF is the Q95 value. At no time should diversion occur when flows are at or less than the Q95 value or cause flows to fall below the Q95 value.

In small streams (defined as those with MAD less than 2 m^3/s):

- When streamflow is greater than Q80, the MWA is 10% of the flow;
- When streamflow is equal to or less than Q80, no water from the stream is available for diversion and use; and
- The EBF is the Q80 value. At no time should diversion occur when flows are at or less than the Q80 value, or cause flows to fall below the Q80 value.

Implementation of the EFN Framework requires conversion of MWA percentages into maximum instantaneous withdrawal (MIW) values expressed in m^3/sec.

7.2 Alternative EFN Approaches

While the intent in the pilot phase is to test and evaluate the use of the EFN Framework, Schedule P specifies that 'the new EFN framework does not prevent an alternative EFN approach or methodology being applied by the Provincial statutory decision maker instead of the

geographically specific EFN Policy[6], where the alternate approach or methodology is produced by a Qualified Professional[7].'

It is recommended that decision makers and applicants engage with BRFN when proposing an alternative EFN approach. Schedule P includes the commitment that decision makers who choose not to apply the EFN Framework will document and share their rationale with BRFN and with the applicant.

7.3 Pilot Water Allocation Tool Inputs and Outputs

The Pilot Water Allocation Tool (PWAT) is available to water users, water managers, BRFN, and other interested parties. It allows potential new water users to explore the availability of water prior to applying for new water diversion and use and provides relevant information to water officers and water managers when reviewing and deciding on an application. It also provides transparent access to information on water supply and demand for BRFN and interested members of the public.

The PWAT allows users to input details about proposed water use at a proposed point of diversion (POD) on a stream within the pilot area. It uses historic streamflow data and information about existing authorized water use to generate information about the historic variability of water supply and demand at that POD. This information is presented for each week of the year and for each of nine streamflow exceedance bands (i.e., 0-10% exceedance, 11-20% exceedance, …, 81-95% exceedance).

For each proposed POD, the outputs generated by the PWAT include streamflow analytics, a watershed report, and a potential diversion schedule. Details on the PWAT and its use are available in a separate document, Pilot Water Allocation Tool User Guide (Foundry Spatial, 2023).

7.4 Watershed Report

The watershed report generated by the PWAT describes watershed characteristics and provides other information intended to inform the decision to grant an application or not, and the drafting of authorization terms and conditions.

The MWA values provided in this report are intended to ensure that cumulative water diversion by all users within the watershed does not adversely affect aquatic ecosystem values. While the full MWA is available for diversion and use, it is recommended that decision makers retain some available water within each of the streamflow exceedance bands as a buffer against increasing future hydroclimatic variability.

[6] The term 'geographically specific EFN Policy' in Schedule P, refers to the policy developed for application within the watersheds described in Schedule P i.e., the Blueberry, Upper Beatton, and Lower Sikanni Chief watersheds.
[7] As defined under the *Professional Governance Act* regulating professional agrologists, applied science technologists and technicians, biologists, engineers and geoscientists, and forest professionals.

7.5 PWAT-Generated Diversion Schedule

The diversion schedule generated by the PWAT for each proposed POD identifies for each week of the year and for each of the nine streamflow exceedance bands:

- A proposed maximum weekly and maximum instantaneous withdrawal (MIW) rate, based on the quantity of water requested by the user, the natural instantaneous discharge for weekly exceedance, and the streamflow exceedance thresholds described in Figure 2, and
- A proposed ecological base flow (EBF) value, based on a streamflow exceedance value corresponding to low (Q80) and/or extremely low (Q95) streamflow, depending on the stream size.

The quantity of water available at the proposed POD may be equal to or less than the quantity requested by the applicant.

7.6 Authorization Diversion Schedule

The recommended approach is that terms and conditions in all authorizations granted during the pilot period specify for *each week* during which the authorization holder may divert and use water and for *each streamflow exceedance band*:

- a maximum rate of diversion in units of m^3/day, to be applied uniformly over the week, and
- a maximum instantaneous rate of diversion in units of m^3/sec, and
- An EBF streamflow threshold (in units of m^3/sec) below which the authorization holder must not start to divert water. If the streamflow falls below the EBF streamflow threshold during diversion the authorization holder must suspend diversion.

The recommended approach is to attach the diversion schedule to the authorization. At the discretion of the decision maker, it may be appropriate, particularly for persons using smaller quantities of water or installing less sophisticated diversion works, to specify maximum authorized quantities and EBF thresholds in the body of the authorization.

It is recommended that the diversion schedule associated with a new authorization be uploaded to the PWAT. This will enable the PWAT to incorporate this new diversion data into future calculations of cumulative demand associated with subsequent applications.

7.7 Adjusting the Diversion Schedule

The PWAT provides a template that allows decision makers, at their discretion, to adjust the diversion schedule attached to an authorization from the schedule generated by the PWAT. Where the decision maker includes diversion threshold and/or EBF values that differ from those generated by the PWAT, it is important to document the rationale for such a choice as part of the decision record and to upload the modified diversion schedule into the PWAT.

7.7.1 Site Specific Information

The EFN Framework was developed for use where no site-specific information is available. Where relevant site-specific information is available it may supplement or supersede the information generated by the PWAT. It may, for example, indicate that a site has high ecological or cultural value and requires a higher level of protection, or that a stream can support more diversion than suggested by the PWAT.

Decision makers may, at their discretion, adjust the diversion threshold values generated by the PWAT where reliable site-specific information is available. It is recommended that in so doing, they consider that the intent of the EFN Framework is to ensure that water diversion and use does not adversely affect aquatic ecosystems and related treaty rights.

It is recommended that any site-specific information produced by an applicant and used to support an allocation decision be shared with BRFN and made available to the public.

7.7.2 Winter Diversion

Note that the PWAT is intended to generate information about estimated water availability during seasons of open water, whereas winter flows are typically low and real-time winter flow information is unreliable. Ice buildup in the pilot area can start as early as late October and last until early April. It is therefore recommended that decision makers use caution when authorizing winter (typically November to March) diversion for consumptive use purposes from small and medium stream size classes.

7.7.3 Existing Use of Water from an Aquifer

The PWAT does not currently include information about groundwater supply and demand. The recommended approach is that decision makers establish more conservative weekly or instantaneous diversion thresholds and/or EBF values when authorizing diversion from a stream that is likely hydraulically connected to an aquifer with multiple users.

7.7.4 Pump Capacity

The diversion schedule generated by the PWAT may identify different MIWs for each week and each streamflow exceedance band. Water users with a variable speed pump may be able to maximize the quantity of water they divert by pumping at the maximum authorized MIW rate for each week. Water users with a single speed pump may only be able to divert water during weeks that their pumping rate is at or below the authorized MIW rate.

7.7.5 Risk Management

The diversion schedule generated by the PWAT provides information about the reliability of water supply. The quantity of water represented by the Q50 MIW, for example, is only available 50 percent of the time, on average. If the decision maker were to authorize diversion and use of the full amount of water represented by the Q50 MIW, the supply to the most junior

authorization-holders would be unreliable. It is recommended that decision makers encourage applicants for whom water supply reliability is important to create storage or to consider a more reliable source of water.

7.7.6 Potential Compliance Challenges

Some applicants (e.g., persons using gravity-fed irrigation or watering livestock directly from a stream) propose to divert water without a pump and will not easily be able to comply with terms and conditions requiring them to suspend use. Others (e.g., livestock watering in general, irrigation of high-value perennial crops, waterworks, camps) may suffer significant negative impacts if required to suspend water diversion and use. It is recommended that decision makers encourage such applicants to create storage and/or consider a more reliable source of water.

7.8 Measuring and Reporting Streamflow

It is recommended that terms and conditions in new authorizations[8] granted in the pilot area include streamflow measuring and reporting requirements.

Streamflow measuring is intended to help the authorization holder comply with authorization terms and conditions, including how much water to divert, the rate of diversion, and when to suspend diversion. Timely reporting of streamflow information is intended to support compliance and adaptive water management, as well as to help improve the PWAT.

The decision maker has the discretionary authority to specify the timing, location, and form of such measuring, taking into consideration factors including but not limited to:

- The difference between the MWA and the quantity of water available;
- The quantity of water diverted;
- The size of the source;
- The timing of diversion and use;
- Proximity to an appropriate WSC or other hydrometric station;
- The cost of measuring; and
- Any history or expectation of consecutive use approvals.

It is recommended that the decision maker document a clear rationale for the choice of measuring location, methodology, timing, and frequency as part of the decision record.

[8] See sections on ‘Application’ and ‘Exclusions’ to confirm applications to which this policy applies.

7.8.1 Timing of Measurement

It is recommended that terms and conditions in new authorizations[9] granted within the pilot area require the authorization-holder or a qualified person[10] to measure instantaneous flows immediately before they start to divert water and weekly during the period they divert water. Such measurement enables authorization holders to identify which percentile band current streamflow falls within (as described in their authorization) and the maximum quantity and rate of diversion currently allowed under their authorization.

Authorization holders are not expected to measure streamflow during periods when they are not authorized to divert water or during periods when they are not diverting water, for example when streamflow is not adequate to support diversion.

7.8.2 Measurement Method

Where the proposed POD is close to a real time WSC gauge in or adjacent to the pilot area it may be appropriate for the authorization holder to monitor index flows at this gauge. Where authorization terms and conditions specify that an authorization holder is required to monitor WSC index flows, it is recommended that they also require the authorization holder to carry out spot measurements of streamflow at the POD or a specified alternative location at times including but not limited to:

- Periods of low flow;
- Winter; and
- Other periods that the WSC gauge does not provide real time data.

Where an authorization holder is required to measure streamflow at the POD or another specified location, the recommended approach is that streamflow be measured to standards described in the Manual of British Columbia Hydrometric Standards (RISC 2018) and that appropriate data quality control standards be applied. Alternatively the decision maker may refer an authorization holder to User's Guide to Measuring Streamflow (Climaterra, 2023), a manual describing simpler methods for measuring streamflow (e.g., date-stamped photographs taken at a specified location).

It is recommended that the decision maker provide details with respect to appropriate stream flow measurement techniques and/or equipment in the letter confirming the issuance of a new authorization. The decision maker may also require an authorization-holder to submit a satisfactory measurement and monitoring plan prepared or approved by a qualified person.

7.8.3 Private Hydrometric Stations

An authorization holder may choose to operate a continuous real-time hydrometric station at the POD or at a specified alternative location. Several authorization holders may jointly operate one

[9] See sections on 'Application; and "Exclusions' to confirm applications to which this policy applies.

[10] A qualified person in this context is any person able to carry out streamflow measurement to the standards outlined in the RISC manual or as described in Climaterra (2023).

such station, so long as each is in compliance with the terms and conditions of their own authorization.

It is recommended that where an authorization requires the authorization holder to operate a private real-time hydrometric station the authorization also requires the authorization holder to carry out spot measurements of streamflow at the POD or specified alternative location during periods of low flow and during winter or other periods that the station does not provide real-time data.

It is recommended that only the persons responsible for the operation of a private hydrometric station be authorized to rely on streamflow measurements from that station.

7.8.4 Q95 and Q80 Flows

The EFN Framework proposes that on medium-sized streams, some water diversion can be authorized when stream flows are between the Q80 and Q95 levels. It also proposes that authorized diversion must not commence if flows are at or below the Q95 level and must immediately stop if flows drop to the Q95 level. In medium-sized streams, measurement of stream flow at the POD is critical as flows approach the Q95 level.

The EFN Framework proposes that on small streams authorized diversion must not commence if flows are at or below the Q80 level and must immediately stop if flows drop to the Q80 level. In small streams, measurement of streamflow at the POD is critical as flows approach the Q80 level.

7.8.5 High Flows

Streamflow measurement is less critical when there is abundant water in the stream and may be difficult or dangerous during the highest flows. It is therefore recommended that decision makers consider authorization terms and conditions that allow authorization holders to use date-stamped photographs to measure streamflow during high flow periods at the specified location and at specified times.

7.9 Reporting Streamflow

Timely access to real-time streamflow information is critical to ensuring that water diversion does not cause streamflow at the POD to drop below the EBF values. For this reason, it is recommended that terms and conditions of authorizations granted within the pilot area require the authorization holder to submit streamflow data within 48 hours of measurement. Authorization holders can submit these measurements online directly to the PWAT. Persons unable to submit streamflow measurements online may submit them by email to a BCER or WLRS regional office. In such cases those offices are responsible for uploading streamflow measurements to the PWAT.

7.10 Recording and Reporting Water Diversion Activity

In order to support compliance with this policy, it is important that authorization holders record and report the days on which they divert water, the daily quantity of water they divert, and the instantaneous rate at which they divert water.

It is recommended that terms and conditions in authorizations issued in the pilot area require the authorization holder to keep daily records of water diversion throughout the period that they are authorized to divert water, including days during which no water is withdrawn.

Reporting options depend on the capacity of existing systems. The eSubmission system operated by BCER currently enables persons authorized under WSA s. 10 (Use Approvals) to submit monthly diversion quantities on a quarterly basis. In 2024 this system may be enhanced to allow persons authorized under WSA s. 9 (Licences) to submit daily diversion records – currently submitted on a quarterly basis via email. The eLicensing system operated by WLRS does not currently enable persons to input diversion information; planned enhancements are expected to allow users to input instantaneous and weekly diversion information.

With respect to reporting, it is recommended that authorization terms and conditions specify that authorization holders must 'report in the format currently determined by the decision maker', retain all records of diversion, and provide those records to the decision maker upon request.

It is recommended that the decision maker describe appropriate standards and the current format for keeping and reporting records of water diversion in the letter confirming the issuance of a new authorization.

7.11 Making Authorizations Available

Some authorizations require the authorization holder to have a copy of their authorization available for inspection. Such clauses are particularly common for industrial use purposes including water well drilling and transportation or utility corridor management, for water sales, and for mining and oil and gas purposes and sub-purposes. In order to support compliance with and enforcement of streamflow measuring requirements and diversion thresholds, it is recommended that decision makers consider including such clauses in authorizations within the pilot area.

7.12 Applications for Multiple PODs in One Authorization

Both the BC Energy Regulator (BCER) and the Ministry of Water, Land and Resource Stewardship (WLRS) issue authorizations to divert and use water from more than one POD, for example for dust control or water sales. If the PODs are close together and on the same source authorizations issued by BCER specify the total maximum authorized quantity that can be diverted from the source, with the authorization holder able to divert that water from any of the PODs. If PODs are not close together or not on the same source WLRS will often specify the total maximum authorized quantity that can be diverted from one or more PODs and one or more

sources. In such cases WLRS typically authorizes a small maximum daily quantity of water. If diversion from a proposed POD poses a risk to EFN, WLRS will typically exclude that POD from the authorization. In some situations BCER and WLRS specify a maximum authorized quantity from each POD, for example, when an applicant can provide relevant information.

Authorizations with multiple PODs make it difficult for the PWAT to accurately represent authorized water diversion. It is therefore recommended that if an applicant is seeking to divert water from multiple PODs, the decision maker ensure that all of the proposed PODs are within a single watershed, at a scale to be determined by the decision maker.

It is also recommended that where relevant information is available, new authorizations that allow for diversion from more than one POD within a watershed specify a maximum authorized quantity from each POD. Such authorizations would typically include a diversion schedule for each POD, with each diversion schedule specifying a maximum authorized daily quantity, an MIW, and an EBF value for that POD. They would require the authorization holder to measure and report streamflow values and maintain and submit records of water diversion for each POD.

7.13 Licence Term Limits

The recommended approach during the pilot phase is to consider including term limits (i.e., expiry dates) on licences granted within the pilot area. The BC Energy Regulator currently includes term limits in most authorizations for oil and gas use purposes. WSA s. 26 (1) (h) enables decision makers, on application by the authorization holder, to extend the term of an authorization while maintaining the same date of precedence.

Considerations include:

- The intent of the parties to ‘provide assurance of effective water management within BRFN territory’ and ‘protect the health of the aquatic environment, including fish and wildlife resources, and . . . ensure the ability of BRFN to utilize the streams and surface water in their traditional territory in a manner promised in Treaty 8.’
- The likelihood that climate change impacts will include shifts in the timing, duration, and/or frequency of high and low flow periods, reducing the long-term effectiveness of diversion thresholds and EBFs that are based on historic data. For example, for a medium-sized stream, the EBF is the Q95 value. The numerical value of the EBF for any given week — in m^3/sec — is based on historic data. Calculations based on a future data record will likely generate a different numerical value. If — for a given week — there is less water in the stream than in the past, an EBF based on historic data will more frequently allow more diversion than is good for the aquatic ecosystem. If there is more water in the stream than in the past, the EBF based on historic data may constrain water diversion and use more than is necessary to protect aquatic ecosystems.
- The prevalence of small (class 1) and medium-sized (class 2) watersheds within the pilot area, the significant hydrometric variability of such streams, the lack of reliable historic hydrometric data for such streams, the resulting tentative nature of MWA and EBF values generated for such streams, and the potential that new data may indicate the need for different MWA and EBF values to adequately protect aquatic ecosystems.

7.14 Communication with Applicants and Authorization-holders

It is recommended that Water Officers, Natural Resource Officers, and decision makers communicate early with applicants and ensure that persons granted new authorizations within the pilot area understand that their maximum authorized quantity is variable and linked to streamflow. It is also important that authorization holders understand terms and conditions related to monitoring and reporting, and that climate change will likely result in increased supply variability, including reduced snowpack and related loss of winter storage in the form of snow.

It is recommended that in the letter confirming the issuance of a new authorization decision makers inform new authorization holders about current and potential future supply variability and the potential need to suspend diversion during periods of low flow.

7.14.1 Notifications

The PWAT can send email or SMS notifications regarding streamflow conditions in the pilot area to government, BCER, BRFN, authorization holders and other interested persons. For example, water program staff and/or authorization holders may set up requests to be notified when flows at the Blueberry River WSC gauge or streamflow measurements submitted to the PWAT indicate that flows are approaching or at Q80 or Q95 levels. It is recommended that decision makers inform new authorization holders of this service in the letter confirming the issuance of a new authorization.

8. REFERENCES

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9. APPENDICES

9.1 Applications for Diversion from a Hydraulically Connected Aquifer

Although the EFN Framework does not apply to the review of applications to divert water from an aquifer, such diversion can have an impact on environmental flows. For this reason, it will be important to explore a way to incorporate groundwater into the EFN Framework. The Agreement calls for collaboration between B.C. and BRFN in reviewing and identifying opportunities to improve this EFN Framework.

The following section is for information rather than guidance; during the pilot phase decision makers are advised to refer to existing provincial allocation guidance when reviewing and deciding on applications to divert and use water from an aquifer.

The diversion of water from a well determined to be hydraulically connected to a stream captures groundwater that would have flowed into the stream and/or induces infiltration from the stream into the aquifer. This process is termed *streamflow depletion.* It is particularly important in relation to periods of low streamflow, when much of or all the water in a stream can consist of baseflow provided by groundwater. In small and medium-sized streams in the pilot area, diversion from hydraulically connected wells and dugouts may cause streamflow depletion that affects EBFs. In addition, some aquifers considered to be 'confined' have been found to discharge water to streams, including the incised streams that occur in northeastern BC.

Suspension of groundwater diversion may sometimes increase streamflow and help restore environmental flows within a meaningful time frame. Another way to maintain environmental flows may be to limit the annual quantity of water diverted from hydraulically connected aquifer(s). Gleeson and Richter (2017) suggest that in the absence of detailed assessments, a presumptive standard be applied to protect ecosystem flows from the impacts of groundwater diversion, and that 'high levels of ecological protection will be provided if groundwater pumping decreases monthly natural baseflow by less than 10% through time.' This presumptive standard suggests that streamflow depletion should not exceed 10% of baseflows in hydraulically connected stream reaches.

In order to apply this presumptive standard in reviewing an application for diversion from a hydraulically connected aquifer, a possible analytical approach would be to:

1. Quantify depletion from existing pumping.
2. Quantify baseflow on streams with depletion apportioned to them.
3. Quantify depletion from the proposed new well.
4. Compare existing and proposed depletion with 10% of baseflow for streams.

A methodology for steps 1-3 is described in the provincial guidance for determining the likelihood of hydraulic connection (Province of British Columbia, 2016). The PWAT can provide weekly flow metrics for a stream(s) proximal to a proposed well by treating the nearest location on the stream(s) as a proposed POD. Many parts of this analysis would likely rely on estimates rather than raw data. The presumptive standard applied in step 4 would inform the maximum annual authorized quantity of water specified in the authorization for diversion from an aquifer.