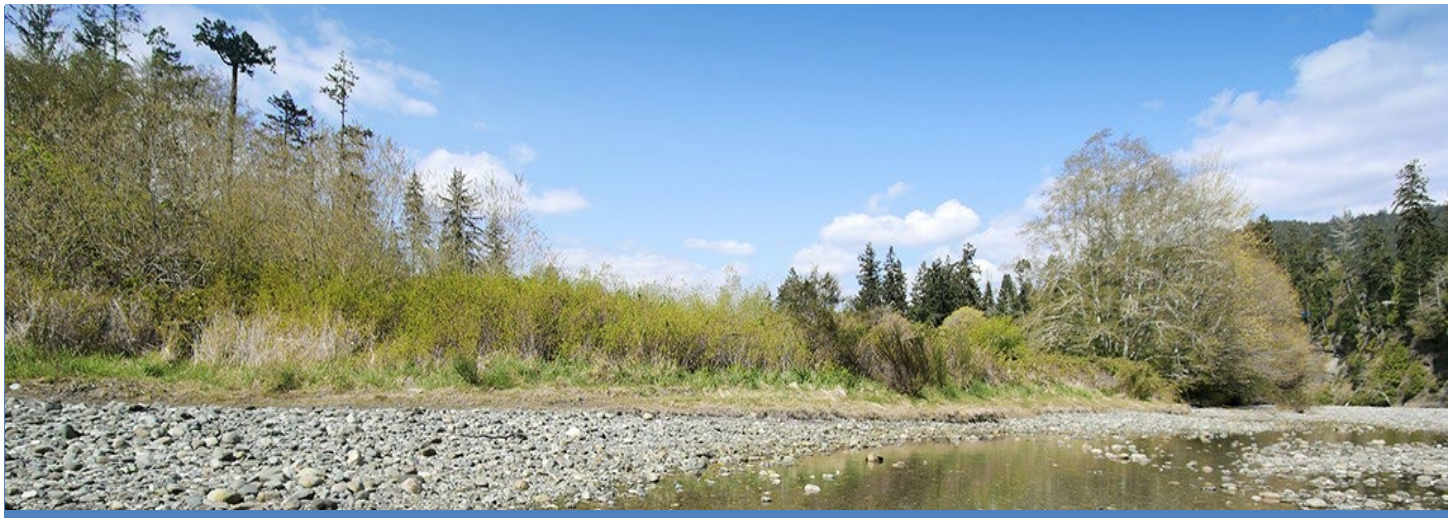
British Columbia Drought and Water Scarcity Response Plan



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Prepared by the Ministry of Water, Land and Resource Stewardship

B.C. Drought Response Plan Authorship and Editions

This plan was originally authored in 2010 and is revised annually. The 2021 edition included considerable changes to drought level definitions and criteria. These changes were made to better align with federal and North American drought monitoring frameworks, more accurately describing the severity of water scarcity in given areas compared to the approach used/taken prior to 2021. In 2023, government consolidated responsibility for the *Water Sustainability Act* (WSA) under the Ministry of Water, Land and Resource Stewardship (WLRS). The April 2024 edition features an updated B.C. Government drought response governance structure and revised descriptions of provincial ministry accountabilities.

Accessibility

This document has been formatted to maximize accessibility.

Acknowledgements

Thank you to the many agencies and individuals who invested their time in reviewing this year's draft and providing their thoughtful feedback.

Legal Disclaimer

This plan does not address emergency response measures as defined in the *Emergency and Disaster Management Act* (2023). The declaration of any drought level or condition and subsequent response does not imply municipal or provincial compensation for economic loss.

Many factors may influence local water supply availability, including but not limited to precipitation, topography, geography, microclimates, storage capacity, water utility systems and population demands. The information in this plan is, by design, general in nature and should not be relied upon as specific advice for responding to specific circumstances.

Water suppliers, First Nations, local governments, improvement districts, other authorities and water licensees should consider the appropriateness of the suggestions in this plan and adapt them to suit their specific local conditions and requirements. All readers are invited to consider this information with their specific circumstances in mind and to make their own determinations as to applicability. Please seek professional or legal advice where appropriate, for example, to inform drought plan or bylaw development.

While best effort is made to provide accurate information in this plan at the time of publication, the Province cannot guarantee its currency, accuracy, completeness, or its applicability to or suitability for individual circumstances. Readers of this plan are encouraged to take steps to confirm information that is critical to their circumstances.

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Acronyms Used in this Document

AAFC	Agriculture and Agri-Food Canada
ADM	Assistant Deputy Minister
ADMEC	Assistant Deputy Ministers' Emergency Committee
ADMCDREM	Assistant Deputy Ministers' Committee on Disaster Risk and Emergency Management
ADMWF	Assistant Deputy Ministers' Water Forum
AF	British Columbia Ministry of Agriculture and Food
BCAC	BC Agriculture Council
BCER	BC Energy Regulator
BCWC	BC Water Committee
CEFT	Critical Environmental Flow Threshold
DAT	Drought Advisory Tables
DFO	Fisheries and Oceans Canada
DMCDREM	Deputy Ministers' Committee on Disaster Risk and Emergency Management
DMCNR	Deputy Ministers' Committee on Natural Resources
DRI	Drought Research Initiative
DWPA	*Drinking Water Protection Act*
ECCC	Environment and Climate Change Canada
EDMA	*Emergency and Disaster Management Act*
EHU	Essential Household Use
EMCR	British Columbia Ministry of Emergency Management and Climate Readiness
ENV	British Columbia Ministry of Environment and Climate Change Strategy
FITFIR	First-in-time, First-in-right
FNHA	First Nations Health Authority
FNESS	First Nations' Emergency Services Society
FOR	British Columbia Ministry of Forests
GCPE	Government Communications and Public Engagement
HLTH	British Columbia Ministry of Health
IIABC	Irrigation Industry Association of British Columbia
ISC	Indigenous Services Canada

FN/LG/WS	First Nations, Local government, and/or water suppliers
LGA	*Local Government Act*
MAD	Mean Annual Discharge
(M-DEC / DM-EC)	Ministers' – Deputies' Emergency Council / Deputy Ministers' Emergency Council
MOTI	British Columbia Ministry of Transportation and Infrastructure
MUNI	British Columbia Ministry of Municipal Affairs
NDMC	National Drought Mitigation Centre
NIDIS	National Integrated Drought Information System
OPHO	Office of the Provincial Health Officer
PECC	Provincial Emergency Coordination Centre
PREOC	Provincial Regional Emergency Operations Centre
PTDWG	Provincial Technical Drought Working Group
RFC	River Forecast Centre
RHA	Regional Health Authority
RTDWG	Regional Technical Drought Working Groups
SARA	*Species at Risk Act*
SWS	Significant Water Shortage
TPO	Temporary Protection Order
WHSC	BC Water Committee Water Hazards Sub-Committee
WLRS	British Columbia Ministry of Water, Land and Resource Stewardship
WSA	*Water Sustainability Act*

1. Overview

1.1. What is Drought?

Drought is a recurrent feature of climate involving a deficiency of precipitation (for example, rain or snow) over an extended period, resulting in a water shortage for activities, communities or aquatic ecosystems.[1] In British Columbia, combinations of insufficient snow accumulation, hot and dry weather or a delay in rainfall may cause drought.

While there are many definitions of drought, one of its important features is that it is a temporary deviation from normal, or expected, conditions. Individual drought events vary in their magnitude and duration. While most droughts develop slowly and have no obvious start and end dates, rapid-onset flash droughts can also occur.

Low summer streamflow may also result in an imbalance between the amount of water naturally available and the demand for water, including water for irrigation and for aquatic ecosystem health. An imbalance between water availability and demand is sometimes referred to as water scarcity.

Drought conditions can affect communities and individuals in different ways. Drought can lead to reduced water availability for household and business use, also impacting Indigenous communities' access to traditional foods and medicines. Lower streamflows may cause warmer river temperatures, affecting fish and other aquatic life. Low streamflows can also affect the growth of agricultural crops by limiting the water available for irrigation. Impacts to both fish populations and crop growth can affect food security. Low flows and extended periods of low precipitation can also have impacts on groundwater levels. Aquifers, particularly those at shallow depths, may develop a lower water table due to drought, in any given year and from previous drought seasons, as there may not be enough water to recharge the aquifer.

If natural water sources or adequate storage are not available in a community, it may also lead to insufficient supplies for firefighting. Drought season in B.C. coincides with summer tourism, which is associated with an increased demand for water. Reduced water availability during the summer can have significant economic impacts where communities rely on the summer tourism industry.

Drought can be defined as meteorological, hydrological, ecological, agricultural or socio-economic; each of which implies different impacts. Definitions of these different types of

[1] Adapted from definitions in National Drought Mitigation Centre. What is Drought? Accessed at What is Drought? | National Drought Mitigation Center (unl.edu), accessed April 12, 2024.

drought were developed in conjunction with other western and northern provinces and territories through the Western Water Stewardship Council and can be found in Appendix 1. The focus of this document is on **hydrological drought**.

By being prepared to respond to drought, communities are better able to protect water resources for potable use (drinking water), sanitation, fire protection, agriculture, industry, fish, aquatic ecosystems and a range of economic activities.

1.2. Low Flows and Drought

Low flows in a river or stream can occur during prolonged dry weather. In many watersheds, low flows occur periodically and are a natural component of the hydrology of the area. For example, low flows typically occur seasonally during the summer dry season on the south coast of B.C., or during winter in cold climates throughout the interior, mountainous areas, or the north.

A drought is characterized by more than just seasonal low flows. It indicates a period of unusually dry conditions. While droughts include low flows, a seasonal low-flow event is not necessarily a drought.[2] Low flows and drought can result in water scarcity events that can impact water users, fish or the environment. Both require attention, particularly in watersheds with many competing uses and limited storage.

1.3. About the Drought and Water Scarcity Response Plan

This plan focuses primarily on response to hydrological drought and water scarcity. This includes the actions taken preceding, during and immediately following a hydrological drought to reduce its impacts. The plan aims to assist with ensuring water needs for people and aquatic ecosystems are met in times of drought and water scarcity. The plan:

- Provides context and outlines the principles that informed the plan's development;
- Outlines the responsibilities of agencies at the provincial and regional/local levels;
- Briefly recommends actions to take prior to the onset of drought;
- Describes drought indicators, the six provincial drought levels and recommended actions;
- Includes the Drought Indicators Criteria used to determine which provincial drought level is in effect and an overview of actions that should be taken by different levels of government and water users;
- Describes emergency response actions should they be necessary; and
- Recommends actions to undertake after drought conditions have subsided.

[2] United States Environmental Protection Agency. Definitions and Characteristics of Low Flows. Accessed at https://www.epa.gov/ceam/definition-and-characteristics-low-flows#drought, accessed April 22, 2021.

While this plan does include some discussion on drought preparedness -- actions taken before a drought to increase the level of readiness by all parties -- this is not the primary focus of the plan. Issues around drought preparedness and water conservation during normal conditions are addressed in several other provincial government policies and guidelines.

This plan is primarily intended to guide the operational preparedness and response actions of staff in provincial government agencies. It provides general recommended actions for federal government agencies, Indigenous governments, local governments and water licensees under the WSA (Appendix 2).

In providing guidance to provincial staff, it is important to note that the Province's ability to regulate water during drought does not depend on an area's drought level. Provisions under the WSA can be applied independently of an area's drought level and can be used to deal with conflicts and concerns in a single water source or with significant water shortages (SWS) in a specific area. In addition, it is critical to understand that bylaws and water restriction stages implemented by local authorities and First Nations are based on highly local drought conditions, including available storage in local water infrastructure. Often these will not match the provincial drought levels at the regional scale.

1.4. Context

Drought response in B.C. is based on existing legislation and regulations. The B.C. Drought and Water Scarcity Response Plan is supported by established legal authorities provided in the *Water Sustainability Act* (WSA), the *Drinking Water Protection Act* (DWPA), the *Environmental Management Act* (EMA), the *Local Government Act* (LGA), the *Emergency and Disaster Management Act* (EDMA) and their supporting regulations. However, the actions available under these enactments are independent of this Plan. Appendix 3 provides an inventory of key provincial legislation and programs relevant to drought management.

This plan was developed, in part, by drawing from experience with previous droughts, including the summers of 2009, 2015 and 2023, which were characterized by extremely low flows in many streams and low groundwater levels in wells across B.C.

1.5. Principles

The following principles guided development of this plan:

Partnership: Federal, provincial, Indigenous and local governments, along with locally affected groups and individuals, need to work together to manage drought. B.C. is a large and climatically diverse province. In any year, drought may strike some

geographic areas and watersheds while others experience normal conditions or even flooding.

Our response to drought must occur at two levels: At the federal and provincial level, agencies' roles include communication and coordination; science, including monitoring and forecasting; and emergency support services. At the local level, water providers, local governments, Indigenous governments and other authorities undertake duties including data collection, water conservation promotion and enforcement, and emergency response.

Knowledge: Sound science, traditional knowledge, education and innovation are the foundation for adapting to changing environmental conditions. In times of drought, this includes using the best available information on stream water, groundwater, snowpack and soil conditions to assess current and forecasted circumstances.

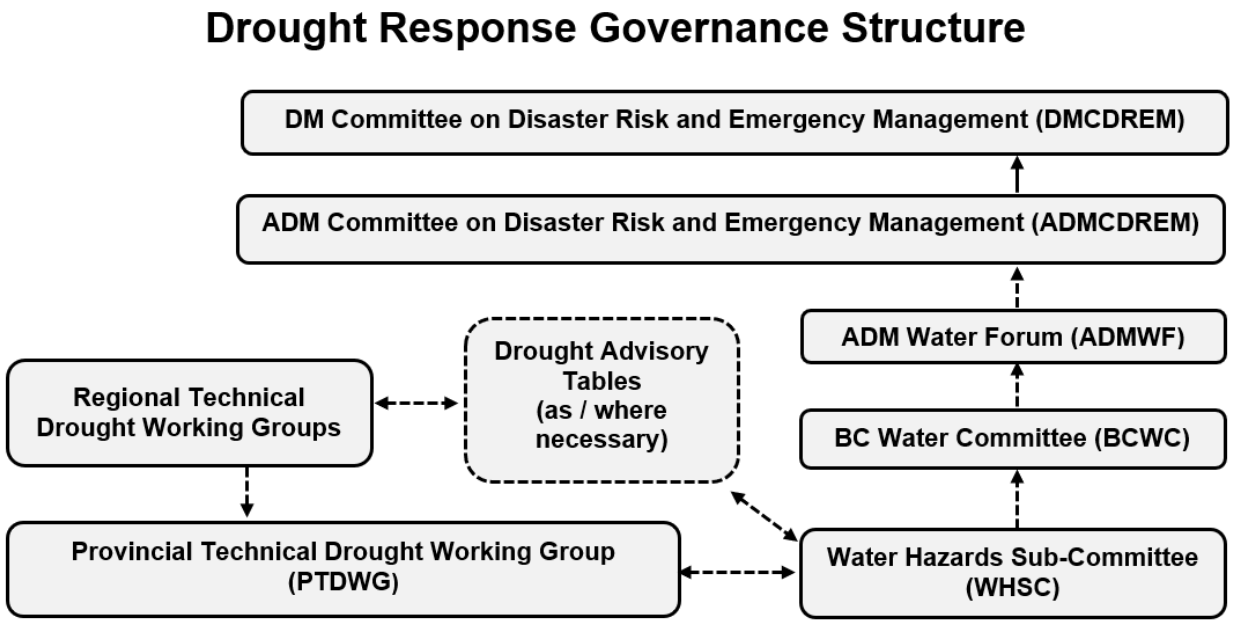
Stewardship: All British Columbians are responsible for the sustainability of water and aquatic ecosystems. This means that all water users in drought-affected areas are asked to cooperate and contribute to the goal of conservation. Wherever possible, reductions in water use will be achieved through voluntary measures, recognizing that at times it may be necessary to turn to regulatory responses to protect fish, aquatic ecosystems and the rights of water users.

Timely communication: Communicating early in the season is essential to ensuring cooperation and effective water conservation. Providing timely, clear and appropriate information ensures that communities and water users are aware of environmental conditions, can take on shared responsibility, have the opportunity to implement conservation measures and are notified in advance of essential regulatory responses by government.

2. Drought Management Responsibilities

Drought impacts are complex and affect many different sectors of society. As a result, First Nations, local, provincial and federal agencies may share responsibilities for managing and responding to drought. The working groups and committees with responsibilities for drought are subject to change. Figure 1 outlines the current key provincially led drought response committees and how they work together. Additional partners engage in drought response activities through various other committees and working groups. Where regions are referenced, their geographic boundaries are delineated according to the B.C. government Natural Resource Regions. Roles and responsibilities for drought coordination committees are described below in Table 1.

Figure 1: Key coordinating bodies and groups involved in B.C. drought response.



Dotted arrows indicate a communication / issues management relationship. Solid arrow indicates a formal reporting relationship.

Table 1: Key Provincial Level Drought Coordination Committees Described in Figure 1.

Who	Responsibilities
Deputy Ministers' Committee on Disaster Risk and Emergency Management (DMCDREM)	• Resolves higher complexity issues • Provides strategic guidance and approval for regulatory, policy and financial decisions during both drought preparation and response
Assistant Deputy Ministers' Committee on Disaster Risk and Emergency Management (ADMCDREM)	• Decision-making committee with respect to strategic drought response • Ensures broad corporate objectives related to emergency management are met • Elevates emergency management matters of higher government-level issues and recommendations to DMCDREM
Assistant Deputy Ministers' Water Forum (ADMWF)	• Provides corporate leadership to ensure freshwater management programs, policies and decisions are optimized and aligned with government priorities
BC Water Committee (BCWC)	• Executive Director level committee, responsible for B.C. Drought and Water Scarcity Response Plan • Ensures government's water programs are delivered effectively across provincial agencies
Water Hazards Sub-Committee (WHSC)	• A sub-committee to the BCWC, the WHSC provides operational direction for year-round cross-government agency cooperation and action on water hazard planning and response • Ensures that roles and responsibilities during water scarcity and drought conditions are clearly defined and communicated • Supports the effective functioning of the PTDWG, DATs and working groups • Identifies trends, issues and gaps, conducts post-event debriefs and elevates issues and recommendations to ADMs when necessary
Provincial Technical Drought Working Group (PTDWG)	• Technical expert level committee which formalizes drought levels at the regional and watershed scale, incorporating input from the RTDWGs • Discusses and coordinates pan-provincial and regional communication actions related to drought preparedness and response • Discusses and coordinates provincial and federal regulatory actions to mitigate the risk or impacts of drought

	• Coordinates cross-agency projects that may support data collection, monitoring, development of technical tools, implementation of regulatory tools, or impact and risk assessments on drought • Refers issues to the WHSC, as appropriate, to support operational drought response actions
Regional Technical Drought Working Groups (RTDWG)	• Technical staff convened at the regional or watershed level, and may include technical experts from First Nations, provincial, local and federal governments • Shares technical science and knowledge that supports drought management actions • Collaborates on drought response coordination actions • Develops and implements regional/watershed level communication plans • Develops technical information that supports local communities to implement water use schedules or other voluntary conservation measures • Supports pre-drought preparedness, particularly in drought-vulnerable regions • Recommends regional or watershed drought levels for consideration by the PTDWG • Identifies streams and/or species at higher risk of drought impacts, including developing watershed watch lists • Coordinates regional projects that may support data collection, monitoring, development of technical tools, and impact and risk assessments on drought
Drought Advisory Tables (DATs)	• Drought Advisory Tables (DATs) is a term used to describe conversations between the Province and parties anticipated to be negatively affected by drought, through either existing committees or new conversations, at a scope and scale appropriate to the parties affected and the risks • DATs can be convened at a watershed, sub-watershed or regional scale, or achieved through an existing committee including drought as a standing item of focus • Initiated by the Province, invitations to meet could be extended to senior representatives from First Nations, provincial, local and federal governments, agencies, sectors and interest groups • DATs discuss strategies to address drought and water scarcity issues at a local scale with the goal of improving drought preparedness and resilience • Conversations involve sharing information on drought-related conditions, impacts, emerging concerns, water supply and quality challenges, responsive actions being taken

2.1. Provincial Level Response

Various agencies work together to effectively respond to drought and reduce its impacts. Key committees which are provincial in their scope are described below. Appendix 4 outlines the many provincial and federal agencies that are also involved in drought management.

2.1.1. Water Hazards Sub-Committee

The Water Hazards Sub-Committee (WHSC) is an Executive Director sub-committee responsible for finding solutions to challenges in support of regional drought response. The range of work is wide, from recommending to the BCWC changes to the drought response governance structure, to finding solutions to challenges raised by the PTDWG, RTDWGs and DATs that cannot be resolved through regional effort alone. The WHSC also works to ensure that lines of communication between the Province and other agencies responding to drought, such as federal agencies, First Nations governments and key sector organizations, are coordinated and aligned. As drought progresses and new challenges arise that cannot be addressed by regional decision makers alone, the WHSC is the next to act.

2.1.2. Provincial Technical Drought Working Group

The Provincial Technical Drought Working Group (PTDWG) consists of members from regional cross-government technical drought working groups with membership from AF, ENV, WLRS and other provincial, First Nation and federal agencies. The PTDWG formalizes drought levels at the regional and watershed scale, incorporating technical input from the Regional Technical Drought Working Groups (RTDWG). This is discussed in more detail in Section 4. The PTDWG ensures that regional teams can coordinate drought responses across the province. This group also ensures that actions set out in this plan are considered and delegated to the appropriate person or body for further action.

Meeting Frequency

The WHSC meets regularly at whatever frequency is needed to support year-round drought mitigation, preparation, response and recovery. The PTDWG meets monthly prior to the onset of drought and bi-weekly, or more frequently, if drought conditions or low streamflows occur and more immediate action is required. If circumstances warrant, subgroups of the PTDWG may be established and meet on an as-needed basis to address specific issues, such as confirming a region-specific drought level.

2.2. Regional Level Response

Regional responses are essential in managing drought. At the regional/local level, emphasis is placed on collecting information, delivering programs, communicating with residents and responding to emergencies.

Engineers, Water Managers and Comptroller of Water Rights

Engineers, Water Managers (as defined by the WSA), and the Comptroller of Water Rights may restrict water use by lower priority licensees or those with conditional clauses in their water licence. These individuals hold the authority, designated under the WSA, to regulate non-licensed water use, including use approvals, transitioning groundwater users, domestic groundwater users and unauthorized water users, and make statutory decisions on priority of water rights under s. 22 of the WSA. The Comptroller of Water Rights also establishes Critical Environmental Flow Threshold (CEFT) orders under s. 87 for streams under a s. 86 SWS order (either minister or LGIC order).

Water Bailiffs

Water bailiffs have an important role at the local level. Under s. 38 in the WSA, the Comptroller of Water Rights or a water manager can appoint a water bailiff to act on behalf of the Province to manage conflicts in a stream before or during a drought. Water bailiffs are given the authority to enter any land, to regulate and control the diversion and use of water by all users (authorization holders as well as users that are not authorization holders), and to control all diversion works on streams or aquifers.

2.2.1. Regional Technical Drought Working Groups

Regional Technical Drought Working Groups (RTDWG) are convened by regional provincial government staff to provide a coordinated regional or watershed-based drought response. The focus of RTDWGs is current low water flows, as well as long-term preparedness strategies. The responsibilities of a RTDWG may include:

- Sharing information on drought conditions and impacts, including but not limited to streamflow and aquifer conditions, aquatic ecosystem health, fish population health, habitat assessments, water use demand, and impacts on water users (including agriculture) as the season progresses;
- Discussing and recommending regional or watershed drought levels;
- Discussing and collaborating on drought response coordination actions, including developing information exchange protocols, scheduling voluntary water use reductions, and documenting conservation efforts;
- Developing and implementing a regional/watershed level communication plan to ensure timely information on regional/watershed drought risks and impacts are shared with local communities and water users;
- Working with AF staff to develop a communication plan with the agricultural sector;
- Developing technical information that supports local communities to implement water use schedules or other voluntary conservation measures;
- Coordinating with the Provincial Regional Emergency Operations Centre (PREOC) and/or Provincial Emergency Coordination Centre (PECC) as necessary;
- Identifying streams and/or species at higher risk of drought impacts, including developing watershed watch lists; and

- Coordinating regional projects that may support data collection, monitoring, development of technical tools, and impact/risk assessments on drought (e.g. installation of hydrometric monitoring stations).

Membership is adapted to suit local circumstances and may include:

- B.C. Government regional drought response staff (multi-agency);
- Local governments;
- Indigenous governing organizations;
- First Nations natural resource staff; and/or
- Fisheries and Oceans Canada (where regional/watershed attendance is feasible).

The scale at which RTDWGs operate may vary. They usually operate at the provincial natural resources regional scale but can also, or alternatively, be convened at a sub-watershed scale, depending on local climate, geography and other circumstances.

2.2.2. Drought Advisory Tables

Drought Advisory Tables (DATs) are convened as necessary, at a scale and in a manner appropriate to the parties affected and the drought risk anticipated. DAT members are invited to share information on emerging drought risks and to collaborate on drought preparedness, communications and responses. DATs are initiated by provincial regional staff. Invitees may include senior leadership from First Nations, local, provincial and federal governments, special agencies, health authorities, water suppliers and sector groups (for example business, agriculture, recreation, industry etc.).

As DATs are about facilitating conversations, the description of their structure is intentionally flexible to be adaptive to the key parties and issues. In some regions, the intention of a DAT may be achieved through the addition of drought as a standing item to an existing committee's (for example, a local watershed board) scope of discussion. In other circumstances, it may be more effective to convene a DAT at a watershed, sub-watershed, or regional scale. Provincial staff will tailor DAT membership based on regional conditions and local circumstances to better support local preparedness for drought and water scarcity.

2.3. First Nations and Local Authorities

First Nations are a separate and distinct level of government with their own laws and legal systems. Their inherent right of self-determination may be expressed through their own laws and stewardship practices regarding drought management and response, distinct to each community. This plan must not be read to speak for Indigenous Peoples. References in this plan to Indigenous organizations are included only to assist with relationship building at the local level.

Through the *Declaration on Rights of Indigenous Peoples Act* (Declaration Act), the Province has adopted a distinctions-based approach to advancing reconciliation and implementing the United Nations Declaration on Rights of Indigenous Peoples. A distinction-based approach means that the Province's work with First Nations, Métis, and Inuit people will be conducted in a manner that acknowledges the specific rights, interests, priorities and concerns of each, while respecting and acknowledging these distinct Peoples with unique cultures, histories, rights, laws, and governments. The Province endeavours to approach drought response in a culturally relevant way, integrating Indigenous local and intergenerational knowledge wherever possible, through consultation and cooperation with Indigenous Peoples.

Other local authorities involved in drought management include municipal governments, regional districts, Health Authorities and the First Nations Health Authority. Some First Nations, local authorities and water suppliers have entered into collaborative partnerships or formal agreements to facilitate collaborative management and decision-making to protect and enhance the health of watersheds and sustainably manage local water sources. Examples include the Okanagan Basin Water Board and Cowichan Watershed Board.

The structure of governance arrangements for water varies from region to region and First Nation to First Nation, as do climatic and geographic conditions. Local authorities and First Nations governments may be able to take a lead role in:

- Gathering available drought information from the community;
- Identifying information gaps;
- Identifying vulnerable aquatic ecosystems;
- Targeting water management needs;
- Implementing water conservation strategies (for example, seasonal and/or escalating outdoor watering restrictions);
- Managing community water supplies and local water infrastructure;
- Communicating on drought conditions to the local community; and
- Participating as part of Regional Drought Teams in the coordination of drought response.

Early and frequent communication about water supply conditions and responses is key to successful drought management. Local authorities and First Nations governments may choose to use a combination of communication tools, water supply and demand data, regulatory instruments and other tools to advocate for water conservation across their community. This may include communicating directly with residents about drought management goals, actions, water supply status and forecasts, as well as one-on-one meetings with major water users in the community to discuss water conservation plans and their role in implementation.

Local Drought Management Plans are often developed by local authorities, First Nations governments and water suppliers to help manage their water supply in times of drought. These plans can include:

- Documentation on the water system profile;
- Evaluation of the potential impacts of drought on the region's economy;
- Data requirements, frequency of data collection, and reporting protocols on local water supplies and climate;
- Clear definitions of local stages of water restrictions, and corresponding local responses including emergency response and contingency plans;
- Streams or aquatic ecosystems of concern; and
- Communication plans.

See Appendix 2 and 3 in *Dealing with Drought: A Handbook for Water Suppliers in B.C.* for more information on local drought management plans, water conservation plans and emergency drought planning.

2.4. Emergency Activations

During emergencies, Indigenous and local governments lead local responses. If the emergency is beyond their capacity, EMCR Regional Duty Managers and/or PREOCs are available to provide support. This support includes emergency management professionals who can assist Indigenous and local governments with response planning, coordination and logistics. There are six PREOCs in B.C., one in each EMCR region.

EMCR Provincial Duty Managers and the PECC, located at EMCR headquarters in Victoria, are also available to provide support. The PECC can provide support by:

- Coordinating resources and communications;
- Requesting assistance from the provincial government; and
- Contacting other provinces or the federal government for support.

2.4.1. Declared State of Emergency by the Province

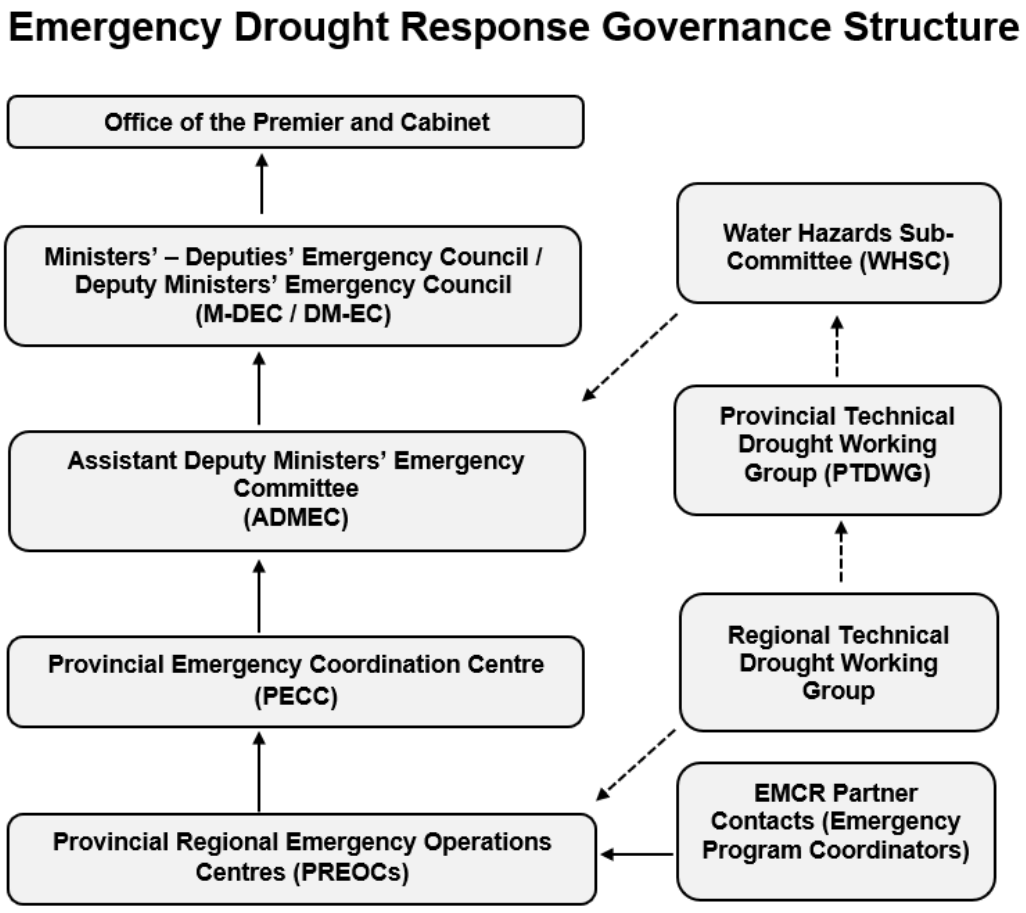
The declaration of a state of emergency enables certain powers available under the *Emergency and Disaster Management Act* (EDMA) during emergency response and recovery periods. During a state of emergency declared by the Province, which may be provincial or local in scale, the provincial response structure changes to reflect changes to decision-making powers. The ADM Committee on Disaster and Risk Emergency Management (ADMCDREM) becomes the ADM Committee on Emergency Management (ADMCEM); the Deputy Ministers' Committee on Disaster and Risk Emergency Management (DMCDREM) becomes the Deputies' Emergency Council (DMEC). Drought Advisory Table(s) activities within areas under a state of emergency will likely be temporarily paused, to allow a shift in

member participation to multijurisdictional emergency management committees convened under EDMA. See Figure 2.

2.4.2. Emergency Declarations by Local Authorities

Declaring a State of Local Emergency (SOLE) enables local authorities in the Province of British Columbia to exercise the emergency response powers listed in EDMA. The emergency response powers can be used by the local authority to take actions including restricting non-essential water use, ordering the evacuation of residents from an area, prohibiting travel, and entering private property when an emergency threatens lives, property, or objects or sites of heritage value within the local authority's jurisdiction.

Figure 2: Key coordinating bodies and groups involved in B.C. drought response during a state of emergency.



Dotted arrows indicate a communication / issues management relationship. Solid arrows indicate a formal reporting relationship.

Table 2: Key Emergency Drought Coordination Committees Described in Figure 2.

Who	Responsibilities
Office of the Premier and Cabinet	• Activates the Ministers' Emergency Council and Deputy Ministers' Emergency Council
Ministers' – Deputies' Emergency Council / Deputy Ministers' Emergency Council (M-DEC / DM-EC)	• Provides executive level policy decisions and strategic direction, validates the need for a declaration of a state of provincial emergency and authorizes extraordinary funds to support emergency management activities • Ensures support of all provincial ministries, Crown corporations and agencies for an integrated government emergency response • Approves cross-government communications approach in preparation for, response to and recovering from emergency event(s), as appropriate • Directs ADMEC to ensure coordinated response and recovery
Assistant Deputy Ministers' Emergency Committee (ADMEC)	• Develops cross-government communications approach for emergency response • Coordinates cross-government provincial response to provincial emergency events • Oversees operational response to significant provincial emergency events
Provincial Emergency Coordination Centre (PECC)	• Coordinates emergency response resources and communications • Requests assistance from the provincial government, and • Contacts other provinces or the federal government for support
Provincial Regional Emergency Operations Centres (PREOCs)	• Staffed with emergency management professionals • Assists Indigenous and local governments with response planning, coordination and logistics
Water Hazards Sub-Committee (WHSC)	• BCWC sub-committee of Executive Directors steering water hazard response • In an emergency, WHSC communicates directly to the ADMEC
Provincial Technical Drought Working Group (PTDWG)	• Communicates with WHSC and RTDWG regarding local conditions during an emergency
Regional Technical Drought Working Group (RTDWG)	• Communicates with PTDWG regarding local conditions during an emergency
Emergency Program Coordinators	• Local government appointed individuals that engage with EMCR during an emergency

3. Pre-Drought Preparedness

Droughts can vary dramatically in duration and severity and can be difficult to forecast. Droughts may result in social and economic upheaval and can require the concerted efforts of numerous parties in order to have an effective response. It is best to be proactive and not delay preparing for drought.

Note: The escalation of a drought level by the Province is not needed to take non-regulatory and regulatory actions.

During normal conditions, there are many tasks that communities and individual water users can do to prepare for drought. For example, targeting water use efficiency improvements within households, across agricultural irrigation systems or other industries can be beneficial for times when water becomes scarce.

At the provincial level, the main activities undertaken to prepare for drought include:

- Monitoring and characterizing streamflows and flow thresholds for aquatic ecosystem health, lake levels, aquifer levels and to improve groundwater data; (WLRS in partnership with other organizations);
- Delivering seasonal volume forecasts based on data from meteorological, hydrometric and snowpack sources and the use of hydrological models (WLRS);
- Providing regular updates on streamflow and groundwater data on the internet (ENV and WLRS);
- Developing, refining and maintaining hydrological hazard and risk models to guide community planning and emergency response (WLRS);
- Monitoring water levels in priority aquifers through the Provincial Observation Well Network (ENV and WLRS);
- Monitoring snowpack conditions using automated and manual techniques to support streamflow forecasting (ENV and WLRS);
- Monitoring the Drought Code and Fire Danger Class (WLRS and FOR Wildfire Branch);
- Maintaining infrastructure and systems that support monitoring, data collection and data processing (ENV and WLRS);
- Conducting data quality assurance and auditing on water- and snow-related data collected using up-to-date standards (ENV and WLRS);
- Working with water suppliers and local communities to ensure that they have the necessary information to respond when drought conditions are forecast (WLRS, MUNI, Drinking Water Officers);
- Providing local governments and water suppliers with planning tools to prepare for drought (WLRS, HLTH, MUNI, Health Authorities);

- Supporting Indigenous Communities and Peoples to ensure they have the necessary planning tools and information to prepare for and respond to drought (ISC, FNHA, FNESS)
- Implementing the DWPA, for example, supporting water systems in developing emergency response plans that include plans for drought management and response (WLRS and HLTH in partnership with the regional health authorities);
- Maintaining a list of available contractors -- for example, environmental monitors or qualified persons -- in each region that can be called in as needed (All);
- Preparing and updating factsheets, guidelines, and information on funding and other support programs to aid agricultural producers to understand, prepare for and manage drought (AF); and
- Maintaining and updating provincial drought management policies, procedures and plans, including this document (WLRS, AF, HLTH, MUNI).

At the regional level, the main activities undertaken by provincial agencies (in collaboration with federal agencies, local governments, water suppliers, First Nations and water users) to prepare for drought may include:

- Establishing DATs;
- Gathering available local information on historic droughts, water supply and climate conditions, and identifying any gaps in information;
- Identifying streams and aquatic ecosystems vulnerable to drought impacts and calculating the flow thresholds for aquatic ecosystem health for those streams;
- Encouraging water conservation, stewardship and education through local media;
- Continuously promoting improvements to the efficiency of agricultural irrigation systems;
- Encouraging agricultural producers to consider water status from the previous season when planning the next year's production, as well as other important factors including soil moisture levels, reservoir levels, streamflows, snowpack and groundwater levels;
- Encouraging agricultural producers to review information on crop selection, irrigation efficiency and water conservation.

As part of drought preparedness, water suppliers' or First Nations' responsibilities may include:

- Establishing a water supply monitoring program, completing a water supply and demand analysis, and developing, updating and practicing implementing local drought management plans and emergency response and contingency plans on an annual basis. (Note that emergency response and contingency plans are required under the DWPA);
- Establishing water conservation strategies and water use reduction targets;

- Implementing water conservation programs to continuously improve water use efficiency;
- Incorporating water conservation into planning and daily operations;
- Developing local government bylaws to limit water use seasonally or in stages, based on projections of water availability through watering restrictions. This can be beneficial as local governments can enforce bylaws by issuing fines for non-compliance.

4. Drought Response Levels, Indicators and Actions

4.1. Drought Levels

The B.C. Drought and Water Scarcity Response Plan has historically categorized drought into four response levels targeted at the water basin and watershed/stream levels. In 2021, the Province updated the provincial drought level rating scale to generally correspond to the North American Drought Monitor's six-level framework and to provide more information and transparency on water scarcity conditions across the province.

The likelihood and extent of drought is assessed based on how streamflows and precipitation differ from normal values, in addition to other indicators. The timing of when provincial drought monitoring and reporting occurs depends on the conditions present in any individual year and can vary considerably from year to year.

B.C. is a place of extreme biogeoclimatic diversity. The province is divided into basins which are each assigned a drought level through the core drought season. Drought levels are based on hydrologic factors and may not represent localized drought conditions and impacts (for example, agricultural drought due to local weather conditions). As local conditions may vary, different response actions may be taken at a watershed level, compared to the basin level.

The drought levels are defined in Figure 3, and their corresponding impacts and response actions are summarized in Table 3. Figure 4 shows an example map, for illustrative purposes, of drought levels by watershed basin. Provincial drought levels are formalized by the PTDWG, with consideration of input and feedback from interested parties, and are based on streamflow levels, precipitation records and a range of supplemental indicators where appropriate. Actions outlined in the B.C. Drought and Water Scarcity Response Plan are based on these levels. Targeted drought actions are further discussed in Section 4.5 and Appendix 2.

Figure 3: Description of drought levels in British Columbia.

Level 0: Green

At Level 0, conditions are average or wetter than average. Emphasis is on preparedness**,** taking proactive steps in advance of potential droughts to increase readiness of water users and communities where drought may occur.

Level 1: Yellow

At Level 1, conditions are starting to become dry, and the likelihood for adverse impacts to socio-economic or ecosystem values is rare. Emphasis is on stewardship, voluntary conservation through education, communication and planning, and investigating unauthorized water uses.

Level 2: Peach

At Level 2, conditions are becoming very dry. Potential adverse impacts to ecosystem or socio-economic values are unlikely. Emphasis continues to be on voluntary conservation and restricting or curtailing unauthorized use. Water suppliers may consider invoking water restrictions where appropriate. If serious impacts are occurring in an area, the provincial government may begin considering regulatory action.

Level 3: Orange

At Level 3, conditions are becoming severely dry. Potentially serious ecosystem or socio-economic impacts are possible in some circumstances. All unauthorized use should be curtailed. Water suppliers are much more likely to impose watering restrictions, and data collection for regulatory action by the provincial government may start to occur.

Level 4: Red

At Level 4, conditions are extremely dry, and adverse impacts to socio-economic or ecosystem values are likely. Voluntary measures and increasing use of watering restrictions will continue. These may be augmented by regulatory action by the provincial government where necessary to reduce water user conflicts or protect the environment.

Level 5: Maroon

At Level 5, conditions are exceptionally dry, and adverse impacts to socio-economic or ecosystem values are almost certain. All efforts should be made to conserve water and protect critical environmental flows.

Table 3: B.C.'s Drought Response Levels, corresponding impacts and general response actions.

Level	Impacts	General Response Actions
0	There is sufficient water to meet socio-economic and ecosystem needs	Preparedness actions
1	Adverse impacts to socio-economic or ecosystem values are **rare**	Conservation actions
2	Adverse impacts to socio-economic or ecosystem values are **unlikely**	Conservation actions including local water restrictions where appropriate
3	Adverse impacts to socio-economic or ecosystem values are **possible**	Conservation actions including local water restrictions where appropriate
4	Adverse impacts to socio-economic or ecosystem values are **likely**	Conservation actions including local water restrictions and regulatory action where appropriate
5	Adverse impacts to socio-economic or ecosystem values are **almost certain**	Conservation actions including local water restrictions, regulatory action and emergency response measures where appropriate

How do Provincial drought levels relate to local drought levels and water restrictions?

Provincial drought levels are not the same as local watering restriction stages. Provincial drought levels are based on hydrologic factors and may not represent localized drought conditions and impacts.

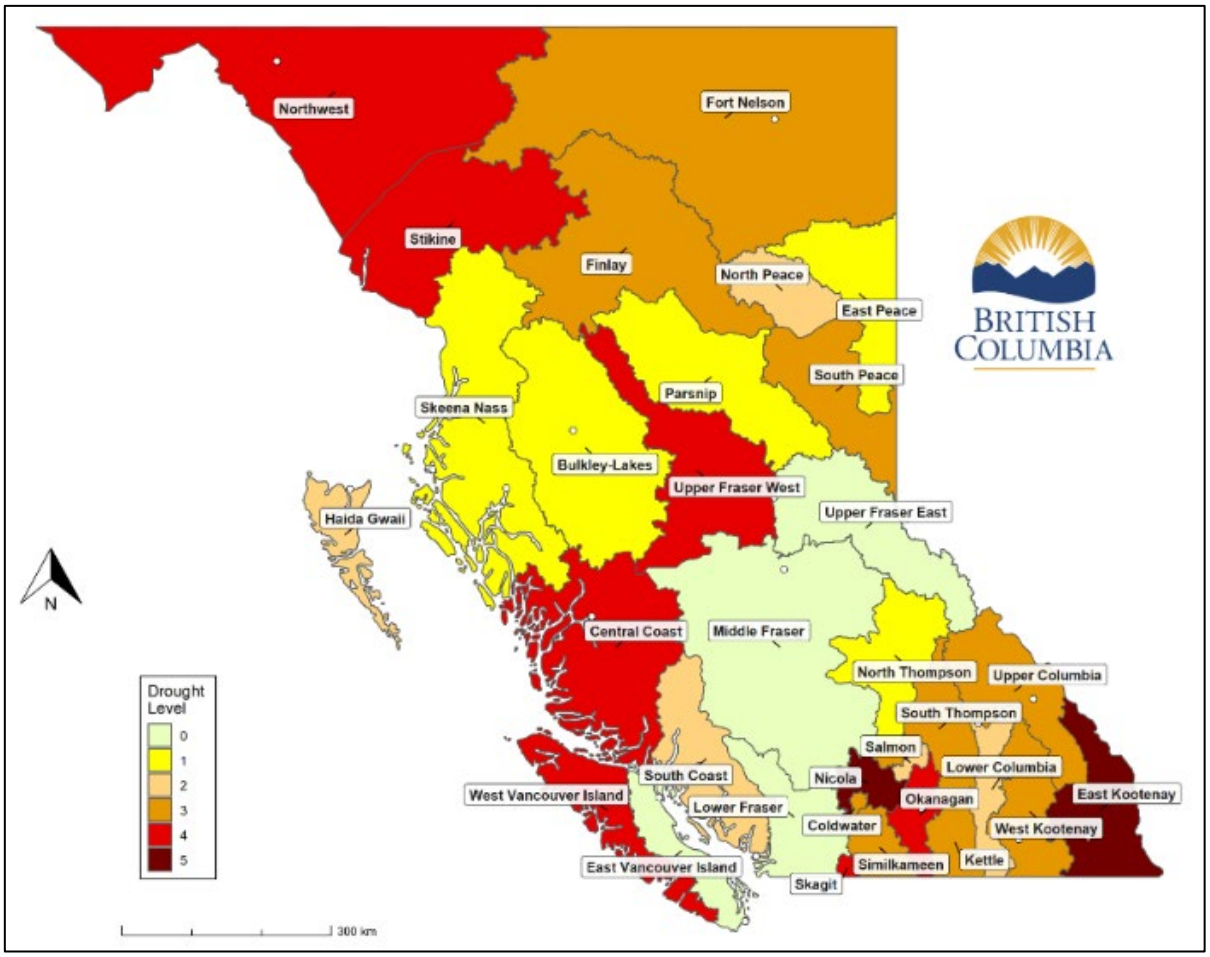
Generally, local authorities and First Nations governments, not the provincial government, set the local drought-related water restrictions to be implemented by water purveyors and water utilities. These water restrictions are based on local drought conditions, water supply availability, the storage capacity of local water infrastructure, and other community supply and demand factors.

Although local water restriction stages and provincial drought levels will both tend to increase as drought worsens, local water stages are not required to mirror provincial drought levels overlapping the same area. The Province could, however, consider it necessary to implement special measures regarding local drought levels and water use restrictions under a state of emergency.

Please note that low risk to drinking water supply does not necessarily mean that there is adequate water from local water sources for aquatic ecosystem health. Conservation measures may still need to be taken to protect groundwater or stream levels for aquatic ecosystem health.

Further action, including emergency responses, may be required in the event that a community or system experiences complete loss or near loss of supply. More information can be found in the regional drought plans and in the document, [Dealing with Drought: A Handbook for Water Suppliers in B.C.]

Figure 4: British Columbia watershed basin map (illustrative purposes).



4.2. Drought Indicators Criteria

The Drought Indicators Criteria described in this section assist decision makers with determining when it is necessary to elevate drought levels in any particular region or watershed in the province.

Measuring drought is a complex process, particularly in a place like B.C. with its geographic diversity and complex regional microclimates. Most indicators also require comparison to other droughts, which demands access to robust sets of historical climatic data.

Analysis of previous droughts in the province indicate that there are three major factors typically involved with drought occurrence: low winter snow accumulation (as measured in early spring), spring weather (spring temperatures and the rate of snowmelt) and summer weather (low precipitation during July and August). For significant drought to occur, two of the three factors often need to occur. For severe drought (as in 1929, 1931, 1955, 2003, 2009 and 2015), all three factors often need to occur in addition to sequential years of reduced precipitation. As a result, multiple indicators usually need to be considered to determine if drought is occurring or is likely to occur.

B.C.'s drought indicators refer to the causative factors (snow conditions, spring and summer precipitation, preceding drought) and the resultant factors (streamflow, lake and reservoir levels). The Drought Indicators Criteria are comprised of two early season indicators, two core drought season indicators and additional supplemental indicators. Early season indicators are used to support forecasting for drought risk and may be used to support setting early season drought levels.

The early season indicators are as follows:

- Basin Snow Indices; and
- Seasonal Volume Runoff Forecasts.

Core drought season indicators are used for setting drought levels during core drought season. Core drought season typically begins following spring freshet and ends with the onset of winter conditions. The core indicators are as follows:

- 30-Day Precipitation (Percentiles); and
- 7-Day Average Streamflow (Percentiles).

The core drought season indicators were chosen because current and historical data tends to be readily available; they are relatively easy to use and communicate; and they can be used to speak consistently about water supply in particular watersheds while also allowing for meaningful comparisons across the province. Core drought season indicators have quantitative thresholds that correspond to drought levels, described in Table 5. Data is provided by WLRS's River Forecast Centre (RFC) and Environment and Climate Change Canada (ECCC). Although early season indicators are used to inform the risk of drought, assessing drought and setting drought levels relies primarily on the drought season core indicators.

The following provides a very brief description of each of the early and core season indicators:

4.2.1. Basin Snow Indices

These indices are calculated as the mean of snow water equivalent values for representative snow courses and snow pillows in major river basins in B.C. Data is expressed as a percentage of the 30-year normal where the normal is the mean snow water equivalent value from historic station data, for a specific date, taken over a moving 30-year window that shifts every decade. For example, the 30-year normal for 2021 uses data from the time period between 1991-2020. The critical reporting dates for snow basin indices are the first days of the month from January through to May.

4.2.2. Seasonal Volume Runoff Forecasts

This indicator is based on multi-variate statistical analysis and represents quantitative forecasts of seasonal runoff (for example, March-August, April-August, or March-June, April-June) for river basins. These forecasts have the advantages of being quantitative, consistent, repeatable and having definable confidence limits.

4.2.3. 30-Day Precipitation

This value shows how the amount of precipitation that fell over the last 30 days, for a particular period, compares to the same period within the historic record and is reported in percentiles. Percentiles that are close to the 50^{th} percentile are near normal; percentiles that are very low (below the 10^{th} percentile) indicate that a very small amount of precipitation has fallen over the last 30 days relative to what normally falls for the same period within the historical record. For example, a 30-day precipitation percentile value of 5 indicates more precipitation fell historically during that same time, 95% of the time.

4.2.4. 7-Day Average Streamflow

This indicator looks at 7-day average streamflows in selected systems, expressed in percentiles. It uses a weekly average streamflow for a number of different streams in a particular region or watershed. Data is primarily sourced from indicator Water Survey of Canada hydrometric stations and reviewed or validated by provincial hydrologists.

In addition to the core indicators, the PTDWG may also refer to additional information from the supplemental indicators. Although there are no quantitative thresholds associated with these supplemental indicators, supplemental indicators can be very helpful at the regional scale and may be used to help assess current and forecasted drought conditions. Supplemental indicators may be used to provide important situational awareness to help guide activities and planning, particularly at higher drought levels (Levels 4 and 5).

Supplemental indicators that **may** be considered include:

- Air temperatures;
- Stream water temperature;
- Aquifer levels;
- Reservoir inflows, storage or lake levels;
- Forecasts of streamflows from hydrologic models;
- Soil moisture deficits;
- Measured flows at discontinued hydrometric stations;
- Multi-year trends;
- Percent mean annual discharge (% MAD);
- Precipitation deficits at longer timescales (2-6 months);
- Reports of low flows;
- Likelihood of impacts and/or reports of drought-induced impacts on ecosystems, species of concern or species at risk;
- Scientific drought indicators (e.g., Palmer Drought Severity Index, Standardized Precipitation Index);
- Short- and long-term weather forecasts;
- Streamflow characteristics at longer timescales (for example, cumulative streamflow over 1-6 month periods); and
- Wildfire danger class ratings and wildfire "drought codes".

Table 4 provides a summary of the different indicators and their time of use. Tables 5 and 6 set out the quantitative thresholds for the core indicators.

Table 4: Drought Indicators Criteria Summary.

	Timing of Use	
	Early Season	**Core Drought Season**
Indicator	Basin Snow Measures	7-Day Average Streamflow (Percentiles)
	Seasonal Volume Runoff Forecasts	30-Day Precipitation (Percentiles)
	All supplemental indicators listed above may be used throughout early season or core drought season, as appropriate.	

**These criteria differ from those used for the regulatory tools under the WSA.*

Table 5: Early Season Forecast Indicator Thresholds and Levels.

Thresholds	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Basin Snow Measures* (% of normal)	>80%	80-65%	<65%	NA	NA	NA
Seasonal Volume Runoff Forecasts (% of normal)	>80%	80-61%	60-45%	<45%	<45%	NA

**Basin Snow Measures would not normally be relied on as a basis for elevating drought response to Level 3 (Orange). However, the PTDWG may decide that this elevation is warranted in the case of exceptionally low results.*

Table 6: Core Drought Season Indicator Thresholds and Levels.

Indicator	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
30-Day* Precipitation (Percentiles)	>30th	21st - 30th	11th - 20th	6th – 10th	2nd – 5th	< 2nd
7-Day Average Streamflow (Percentiles)**	>30th	21st - 30th	11th - 20th	6th – 10th	2nd – 5th	< 2nd

**The 30-day time scale is used for this criterion, but other timescales (60, 90 or 180 days, 1-year or 2-year) may also be referred to.*
***7-day average streamflow (percentiles) refers to the low flow period (typically July through September).*

4.3. Moving from One Level to Another

The PTDWG determines when to elevate the drought level – Level 0 (Green) through to Level 5 (Maroon) – in any particular watershed or geographic area based on consideration of the Drought Indicators Criteria.

The PTDWG, in collaboration with the RTDWG, considers the current and forecasted status of all the core indicators in the Drought Indicators Criteria to determine the severity of the drought. Each measure and index serves only as a relative guide. The River Forecast Centre recommends drought levels, which can be based on what the majority of indicators show or any one particular indicator. To formalize drought levels, the PTDWG may also consider supplemental indicators and other information, as appropriate.

During drought years, drought levels are adjusted weekly or biweekly to facilitate a smooth transition for water users and to allow time for conservation measures to take effect. In some instances, the PTDWG may determine that it is necessary to leapfrog over one level to a higher one. For example, it may be necessary to move directly from Level 1 to Level 3 or Level 4. One reason this may occur is the rapid deterioration of a stream.

Re-assessment of drought conditions may also lead to easing back of drought levels, such as a movement from Level 3 to Level 2 due to changing conditions. For example, basin-wide drought level forecasts based on low snowpack may be eased by above-average precipitation in spring.

4.4. Drought Regulatory Tools

The Province of B.C. manages the diversion and use of freshwater (surface and groundwater) through the WSA. Under the WSA, a person must not divert or use water unless they have acquired a private right through an authorization for example, a licence or use approval, or unless that diversion and use is authorized under the Act or its regulations. Any diversion and use of water under the WSA remains subject to the Act and its regulations, including any direction or order administered under the legislation.

During a drought, water licence holders may be asked to voluntarily reduce their water use. If voluntary water conservation measures are not sufficient to meet all water use demands and protect critical environmental flows, or if the survival of a fish population is at risk, the WSA provides authority for statutory officials to regulate both stream water and groundwater use. Implementing regulatory tools to address drought may affect the ability of water users to exercise their water rights. Under the WSA, the Province can apply the following regulatory tools during water scarcity, alone or in combination.

The WSA gives the decision maker the discretion, when deciding on water authorizations, to include special terms and conditions. These authorizations are issued with specific requirements that allow the user to divert and use water in specific circumstances. Enforcing these special clauses is an early regulatory action that government can take during times of water scarcity. The following is an example of the wording that may be found in a licence term/condition:

“The diversion of water authorized under this licence may be restricted or prohibited at any time by an Order in writing under the *Water Sustainability Act*, in order to maintain a minimum flow in a stream for the preservation of fish or for maintaining the health of aquatic ecosystems.”

Water rights in BC may be exercised under a system of priorities according to their date of precedence. This is commonly referred to as 'First in Time, First in Right' or FITFIR. Under s. 22 of the WSA, FITFIR may be enforced during times of water scarcity to reduce or restrict water diversion and use from a stream (and any hydraulically connected aquifer) or an aquifer (and any other hydraulically connected aquifer). In general, the oldest rights have priority over the newer rights, regardless of the purpose of the water use. Enforcement of FITFIR must still allow water use of up to 250 litres of water per day, per private dwelling, for essential household use (EHU).

Note: Implementing any of these regulatory tools is not dependent on the region being at a specific drought level.

4.4.1. WSA powers of engineers and officers

WSA s. 93 authorizes a broad suite of powers, given to engineers and officers, to take action with respect to water diversion and use and water works. These actions come in the form of orders which may be issued to curtail unauthorized water use, enforce FITFIR, address dangerous situations (for example, dams about to overflow or uncontrolled artesian flow), require testing, allow for inspections or require remediation to mitigate impacts.

Suspend water diversion and use that is not authorized

One of the actions statutory officials can take at any time is to suspend water diversion and use that is not authorized or is no longer authorized under an applicable authorization, statutory provision or regulation. This includes taking action against water users who are exceeding their allocation of water.

4.4.2. WSA Temporary Protection Orders

Temporary Protection Orders (TPOs) temporarily suspend the rights of water licensees in order to protect critical environmental flows and fish populations. TPOs are only considered when curtailment could effectively restore flows, and only after all other options have been exhausted. The Province strives to find the best balance between restoring flows to protect the survival of fish populations and minimizing impacts to water users.

- **WSA s. 86, order declaring a significant water shortage, combined with WSA s. 87, order protecting a critical environmental flow threshold**

The WSA includes two regulatory tools (ss. 86 and 87) that are applied together during water scarcity to give priority of water rights to CEFTs. These tools are used when there is potential for significant or irreversible harm to an aquatic ecosystem due to low water flow.

Under s. 86 of the WSA, the minister or the Lieutenant Governor in Council (LGIC) can make an order declaring a significant water shortage in an area if one or more streams in an area

have fallen or are at risk of falling below their CEFT. The term of an order set by the minister cannot exceed 90 days, whereas an order set by the LGIC can have any term limit.

Once a significant water shortage order is declared in an area, WSA s. 87 establishes that the Comptroller of Water Rights must, by order, determine the CEFT for each stream that meets a set of specific criteria. Once a s. 87 order has established the CEFT for a stream, the CEFT has precedence over the rights of other water users.

- **WSA s. 88 Fish Population Protection Order**

WSA s. 88(1) authorizes the minister, after considering agricultural needs, to make an order respecting the diversion and use of water from a specified stream or hydraulically connected aquifer if the minister considers that the flow in a stream is so low that the survival of a fish population may become threatened. This flow threshold is sometimes referred to as Fish Population Survival Threshold. A fish population protection order is a powerful tool that can be used to regulate specific water users, regardless of their FITFIR priority date, when its application is expected to yield immediate, direct benefits to a fish population whose survival is threatened.

4.5. Drought Response Actions

This section provides a high-level summary of actions that may be undertaken at each level of drought. A much more detailed inventory of actions is provided in Appendix 2. The activities that follow are intended as general guidance for provincial drought response actions.

Note: Deviation from specific actions listed in the framework below may be necessary to respond to changing conditions.

Level 0 (Green)

At Level 0, conditions are normal, and emphasis is on drought preparedness. The recommended actions at both the provincial and local level are summarized in Section 3 of this document (pre-season preparedness). Note that some local authorities and First Nations will initiate seasonal summer water restrictions every year, particularly where summer precipitation is typically low and storage capacities are limited.

Level 1 (Yellow)

At Level 1, conditions are dry. Emphasis is on stewardship and voluntary conservation through education, communication, and planning. As a general guideline, water users should target a reduction in water use. The overall objective is to begin preparations under the precautionary assumption that streamflow conditions may deteriorate further.

Suggested actions include:

- ✓ issue information bulletins to local governments, water suppliers, First Nations governments (all First Nations communications should go through the First Nations Health Authority and be directed to the Ministry of Indigenous Relations and Reconciliation), industry and stewardship groups, major licensees and other key stakeholder in impacted water basins and specific watersheds/streams;
- ✓ review water conservation advice, guidelines and materials for local government, water suppliers and agricultural producers, and update as appropriate;
- ✓ where appropriate, advise agricultural producers to take early actions such as filling reservoirs and filling soil profiles with freshet water, if available;
- ✓ use direct and indirect communications to request water licensees voluntarily work together, conserve, share water and consider in-stream needs;
- ✓ local governments are more likely to initiate or escalate outdoor watering restrictions;
- ✓ increase monitoring effort as required on streamflow conditions and aquifer levels in impacted geographic regions.

Level 2 (Peach)

At Level 2, conditions are becoming very dry. Emphasis continues to be on voluntary conservation, but increasing use of watering restrictions may be imposed by water service providers. As a general guideline, water users should aim to reduce use for all non-essential needs.

Suggested actions include:

- ✓ issue province-wide news release and targeted news releases in impacted geographic regions;
- ✓ intensify communication efforts, as appropriate, based on current conditions; issue updated province-wide news release and post it on River Forecast Centre website;
- ✓ continue to issue local media releases and/or targeted advertising to advise of watering restrictions, encourage conservation, provide updates on local water supply status and forecast future conditions specific to the community;
- ✓ provide regular direct updates to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions;
- ✓ assess vulnerability of water supplies;
- ✓ advise high-volume water licensees (or all licensees on high-risk streams) directly of conditions via mail or email and request that they implement voluntary conservation measures;
- ✓ local governments implement next-stage watering restrictions to achieve targeted reduction in water use and enforce compliance through bylaws;
- ✓ determine list of streams at risk and, where feasible, calculate flow thresholds for aquatic ecosystem health (if not already done) for these streams. Assess hydraulic connectivity between these streams and adjoining aquifers;

- ✓ Provincial government may take regulatory action.

Level 3 (Orange)

At Level 3, conditions are becoming severely dry. Actions in Level 3 overlap with some of the actions in Level 2, as it's possible that there may not be sufficient time to deliver key Level 2 actions before the drought level increases to 3. Once more, water users should aim to reduce use for all non-essential needs.

Suggested actions include:

- ✓ intensify communication efforts, as appropriate, based on current conditions; issue updated province-wide news release and post it on River Forecast Centre website;
- ✓ continue to issue local media releases and/or targeted advertising to advise of watering restrictions, encourage conservation, provide updates on local water supply status and forecast future conditions specific to the community;
- ✓ provide regular direct updates to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions;
- ✓ assess vulnerability of water supplies;
- ✓ advise high-volume water licensees (or all licensees on high-risk streams) directly of conditions via mail or email and request that they implement voluntary conservation measures. This is especially important if this action was not taken during Level 2. If this is the second time staff are contacting water users, then communications may include a more urgent tone and could reference changing conditions since the previous message;
- ✓ local governments implement next-stage watering restrictions, if appropriate, to achieve targeted reduction in water use. Some local governments only have three stages of watering restrictions, so if the stage was raised at Drought Level 2, it might be premature to increase to the highest stage at this time;
- ✓ provide access to waiver for agricultural producers seeking to meet minimum production levels to maintain farm status for tax purposes, thereby avoiding unnecessary use of water;
- ✓ review list of streams at risk and, where feasible, calculate flow thresholds for aquatic ecosystem health (if not already done) for these streams. Assess hydraulic connectivity between these streams and adjoining aquifers; and
- ✓ Provincial government may take regulatory action where necessary.

Level 4 (Red)

At Level 4, voluntary measures and increasing use of restrictions will continue but may be augmented by regulatory responses by the provincial government. This may include mandatory reductions or cessation of water use. Water users should work together to reduce use, wherever possible, in order to ensure that community and ecosystem needs will be met.

Suggested actions include:

- ✓ Province-wide or targeted regional media release is almost certainly necessary;
- ✓ increase frequency of communication by all levels of government and water suppliers with all water users through media, advertising, internet, email updates and other channels;
- ✓ continue to issue information bulletins to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions;
- ✓ local governments implement progressively stricter watering restrictions to achieve targeted reduction, including outdoor watering bans where necessary;
- ✓ likely that the provincial government may implement regulatory action under the WSA or other statutes, as appropriate, if voluntary measures are not enough to protect water users, aquatic ecosystems and fish;
- ✓ consider diverting available water from annual crops to perennial crops and higher value crops to keep them alive for future years; and
- ✓ assist communities seeking alternative or temporary water supplies.

Level 5 (Maroon)

Level 5 shares some key actions with Level 4, but the focus shifts to a higher likelihood of regulatory action and preparation for possible emergency response. Regulatory actions may include mandatory reductions or cessation of water use. Water users should work together to reduce use, wherever possible, in order to ensure that community and ecosystem needs will be met.

Suggested actions include:

- ✓ increase frequency of communication by all levels of government and water suppliers with all water users through media, advertising, internet, email updates and other channels;
- ✓ continue to issue information bulletins to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions;
- ✓ local governments should implement the strictest watering restrictions unless their use is fully supported by storage;
- ✓ highly likely that the provincial government may implement regulatory action under the WSA or other statutes as appropriate, if voluntary measures are not enough to protect water users, aquatic ecosystems and fish;
- ✓ consider diverting available water from annual crops to perennial crops and higher value crops to keep them alive for future years;
- ✓ provide assistance to communities seeking alternative or temporary water supplies; and
- ✓ prepare for emergency response where risk of loss of supply exists. Refer to section 4.6. Loss or Failure of Supply for Water Suppliers.

4.6. Loss or Failure of Supply for Water Suppliers

Drought can cause loss, near loss, or failure of a community's potable water supply or supply for firefighting. In this event, drought response turns to an emergency response to protect public health and safety.

Water Suppliers / Local Government Water Suppliers

Most local governments are water suppliers, but not all water suppliers are local governments. It is important to differentiate between them because local government water suppliers have authority and tools to prepare and respond to drought that other water suppliers do not have. For example, local government water suppliers can issue fines for non-compliance with watering restrictions while non-government water suppliers cannot.

All water suppliers, however, are required to have an Emergency Response and Contingency Plan per s. 10 of the *Drinking Water Protection Act* (DWPA).

Local governments and other water suppliers should monitor their water systems closely to ensure that sufficient mitigation measures are being taken to prevent the loss or failure of water supplies. If drinking water sources become depleted and water suppliers anticipate a possible loss of supply, they should contact the Drinking Water Officer at their health authority and follow the steps outlined in their Emergency Response and Contingency Plan, as required by the DWPA. Health authorities also report conditions to WLRS. Depending on circumstances, it may be necessary for water suppliers to impose comprehensive and closely monitored watering restrictions, allocate water on a per capita basis, or seek use of alternative water supplies. Water suppliers can find guidance on developing emergency drought plans or an Emergency Response and Contingency Plan in Appendix 7.

Where loss or failure is imminent, water suppliers should contact the local Drinking Water Officer at their regional health authority. Resources on emergency management in B.C. can be found in Appendix 7.

Note: All emergency situations that affect the health and safety of the public should be reported to EMCR at 1-888-344-5888.

5. Recovery Actions

Following the end of the core drought season, emphasis should shift to maintaining the resource recovery after action reviews and applying lessons learned to improve long-term water sustainability. Recovery actions may begin in some regions even if other regions of the province are still in drought. Some tasks to consider include:

- The PTDWG should clearly communicate that drought levels are no longer being published outside of the core drought season;
- Water suppliers should restore operations and ensure that drought-driven systems improvements and modifications are in compliance with relevant standards;
- Provincial and federal data and information providers may review the effectiveness of systems to monitor and characterize streamflows, water levels, snowpack and groundwater during the drought and implement any identified improvements;
- The WHSC, PTDWG, and other involved parties should hold a post-drought debrief to assess the equity, efficiency and effectiveness of communications, information, actions and monitoring that were undertaken. Lessons learned should be documented, which may result in recommended improvements to:

    - Terms of reference for the various drought-related committees;
    - This plan (B.C. Drought and Water Scarcity Response Plan);
    - Other provincial policies, guidelines and fact sheets; and
    - Amendments to provincial legislation and municipal bylaws.

- Water suppliers should revisit established water conservation strategies and reduction targets to continuously improve community water use efficiency;
- The RTDWGs should review efficacy of flow restoration achieved by voluntary conservation measures and/or WSA orders, if implemented;
- The RTDWGs should review quantitative impacts on fish and aquatic ecosystems as related to indices of streamflow state, such as delayed spawning access or impacts on smolt production; and
- The Province should recognize local groups and individuals who demonstrated a strong stewardship ethic during the drought.

6. Future Refinements

This plan is considered a living document and may be updated and revised based on experiences and learning. Changes may be made based on the approval of the BCWC and in consultation with the PTDWG.

Appendix 1: Definitions of Types of Drought

Meteorological Drought is generally defined by comparing the rainfall in a particular place and at a particular time with the average rainfall for that place. Meteorological drought leads to a depletion of soil moisture, and this almost always has an impact on crop production. When we define drought this way, we only consider the reduction in rainfall amounts and do not take into account the effects of the lack of water reservoirs, human needs or agricultural needs.[3]

Hydrological Drought is typically described by a reduction in lake storage, a decrease of streamflow discharge and a lowering of groundwater levels over large areas.[4] Hydrological droughts occur as a product of a period of unusually dry conditions, which can result in water scarcity. Hydrological drought affects uses that depend on groundwater and streamflows. Changes in water levels affect ecosystems, hydroelectric power generation, and recreational, industrial and urban water use.[5]

Agricultural Drought occurs when there is not enough water available for a particular crop to grow or livestock to thrive at a particular time. Agricultural drought may be driven by a lack of precipitation and/or inefficient use of water. Agricultural drought is typically seen after meteorological drought, but hydrological drought may also be a factor.[6]

Socio-Economic Drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply. The supply of many economic goods, such as water, forage, food grains, fish and hydroelectric power, depends on weather. Severity and impact are affected by water demand, the extent of water use efficiency measures and the ability to bring new supplies online.[7]

Ecological drought is a prolonged and widespread deficit in naturally available water supplies — including changes in natural and managed hydrology — that create multiple stresses across ecosystems.[8]

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[3] This definition was agreed to by a working group of staff from B.C., Alberta, Saskatchewan and Manitoba during the Western Water Stewardship Council Technical Workshop on Drought Preparedness held in Calgary on May 4, 2009 and adapted from the National Drought Mitigation Center (University of Nebraska) http://drought.unl.edu/Home.aspx

[4] United States Environmental Protection Agency. Definitions and Characteristics of Low Flows. Accessed at https://www.epa.gov/ceam/definition-and-characteristics-low-flows#drought, accessed April 22, 2021.

[5] This definition was agreed to by a working group of staff from B.C., Alberta, Saskatchewan and Manitoba during the Western Water Stewardship Council Technical Workshop on Drought Preparedness held in Calgary on May 4, 2009 and adapted from the National Drought Mitigation Center (University of Nebraska) http://drought.unl.edu/Home.aspx

[6] Ibid.

[7] Ibid.

[8] National Drought Mitigation Center (2016) What is Drought? Understanding and Defining Drought, accessed on June 12, 2018, from http://drought.unl.edu/Education/DroughtIn-depth/TypesofDrought.aspx

Appendix 2: Detailed Action Tables

Note: See Acronyms Used in this Document (page v) for a list of terms.

Level 1 (Yellow) Actions

	Impacts	Adverse impacts to socio-economic or ecosystem values are rare
	General Response Actions	Conservation

Actions	Lead Responsibility
Communication and Coordination	
Notify PTDWG; reaffirm duties and responsibilities; schedule regular meetings for duration of dry season	WLRS
Update drought communications plans based on streamflow conditions and forecasts in impacted geographic regions	WLRS, AF, GCPE
Initiate direct contact and information exchange protocols between WLRS and DFO	WLRS, DFO
Initiate direct contact and implement information exchange protocols between WLRS and key contact(s) in water suppliers in impacted geographic regions	WLRS (Regional Operations), FN/LG/WS
Initiate direct contact and implement information exchange protocols between AF and key agricultural industry groups in impacted geographic regions	AF
Initiate direct contact and information exchange between WLRS and key contact(s) in the FOR-Wildfire Management Branch in impacted geographic regions to coordinate on wildfire threats and potential impact on water supplies, including use of water in fire fighting	WLRS, Office of Fire Commissioner
Issue province-wide news release and targeted news releases in impacted geographic regions	WLRS, GCPE
Issue information bulletin to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions	WLRS, AF
Issue and distribute Low Streamflow Advisories, as required, in impacted geographic regions	WLRS
Provide regular updates via email to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in drought areas	WLRS, AF

Update WLRS drought and RFC internet sites to provide up-to-date streamflow and groundwater data and information	WLRS
Use local media releases and/or targeted advertising to advise of watering restrictions, encourage conservation, provide updates on local water supply status and forecast future conditions	FN/LG/WS
Review water conservation advice, guidelines and materials for local government and water suppliers (FN/LG/WS), and update as appropriate	WLRS, MUNI
Designate local spokesperson to coordinate interaction with the public and media on local issues	WLRS, GCPE
Review water conservation advice, guidelines and materials for agricultural producers and irrigators and update as appropriate	AF
Where appropriate, encourage agricultural producers to take early actions such as filling reservoirs and, where possible, filling the soil reservoir	AF
Other Actions	
Notify local governments and water suppliers that they should communicate with residents and businesses to request voluntary conservation efforts	EMCR, WLRS, MUNI
Implement appropriate watering restrictions to achieve targeted reduction in water use	FN/LG/WS
Temporarily cease issuing major new water licences or short-term use approvals, as appropriate	WLRS (Regional Operations)
Request provincial agencies to conserve water at public facilities, particularly outdoors	WLRS
Use direct and indirect communications to request water licensees voluntarily work together, conserve, share water and consider in-stream needs	WLRS (Regional Operations)
Review inventory list of sensitive ecoregions and streams, and identify likely fish-sensitive periods	WLRS (Regional Operations)
Promote drought preparedness materials and tools, such as the use of irrigation system scheduling techniques and community-led irrigation management, through AF's website, e-bulletins (provincial and regional), AgriService BC social media posts, and agricultural magazines	AF
Monitoring	
Increase monitoring effort, as capacity allows, on streamflow conditions and aquifer levels in prioritized geographic regions	WLRS, WLRS (Regional Operations), DFO

Monitor stream conditions for additional information such as dry riffles, dewatered spawning redds, reported fish deaths, water temperature etc. in prioritized geographic regions	WLRS, WLRS (Regional Operations), DFO
Monitor community water supply level	FN/LG/WS
Monitor water use by authorization holders (licensees and use approval holders)	WLRS (Regional Operations), FN/LG/WS, BCER
Monitor and enforce compliance with restrictions and allocations through bylaws	FN/LG/WS
Documentation and Preparation for Next Level	
Develop a database of water licensees and short-term use approval holders on streams that have or may have Low Streamflow Advisories issued	WLRS, WLRS (Regional Operations)
Identify and prepare to use additional communication channels for next level, including social media (for example, social media) and mass media advertising	WLRS, GCPE
Identify possible community groups and key local groups that may assist with information distribution in next phase	WLRS (Regional Operations)
Inform Deputy Minister's Committee on Natural Resources (DMCNR) and Minister of WLRS of possible move to the next drought level (Level 2: Peach)	WLRS, WLRS (Executive)
Document conservation actions taken to date; maintain registry of groups and individuals contacted	WLRS, WLRS (Regional Operations), AF

Level 2 (Peach) and 3 (Orange) Actions

		Impacts	Adverse impacts to socio-economic or ecosystem values range from “unlikely” to “possible”
		General Response Actions	Conservation actions including local water restrictions where appropriate

Actions	**Lead Responsibility**
Communication and Coordination	
Intensify communication efforts, as appropriate, based on current streamflow conditions; issue updated province-wide news release and targeted news releases with updated information and conservation requests in impacted geographic regions	WLRS, AF, GCPE
Hold media news conference to announce activation of additional drought measures and to provide updated information; outline media plan to notify public of changes to streamflows and additional conservation measures	WLRS, GCPE
Continue to issue local media releases and/or targeted advertising to advise of watering restrictions, encourage conservation, provide updates on local water supply status and forecast future conditions specific to the community	FN/LG/WS
Continue provision of regular updates on streamflow and groundwater data on the internet; increase frequency of updates as appropriate	WLRS
Advise high-volume water licensees (or all licensees on high-risk streams) directly of conditions via mail or email and request they implement voluntary conservation measures	WLRS (Regional Operations), AF
Provide regular updates via email to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions; intensify frequency of updates as appropriate	EMCR, WLRS, WLRS (Regional Operations), AF, BCER
Begin using additional communication channels, as appropriate, to inform water users and the public about drought conditions, including print advertising, social media, community and agricultural associations etc.	WLRS, AF, GCPE
Ensure ongoing direct contact between key contacts in WLRS and EMCR; review information exchange protocols on drought and emergency response	EMCR, WLRS, HLTH, MUNI
Provide agricultural producers with information on drought conditions and drought preparedness and management resources via AF’s website, e-bulletins (provincial and regional), AgriService BC social media posts and agricultural magazines	AF

Prepare information on provincial and federal support programs that may assist producers to help prepare for, manage and respond to drought	AF
Organize workshops for producers in affected areas to provide guidance on water conservation activities and water use efficiency improvements	AF, WLRS (Regional Operations)
Submit drought assessment reports as necessary to deputy ministers and other senior executives	EMCR, WLRS (Executive)
Other Actions	
Impose restrictions, as appropriate, based on priority water licence rights and in addition to voluntary water conservation requests	WLRS (Regional Operations), BCER
Limit the number of, or impose restrictions on, new licences; regulate storage or invoke conditions on existing licences	WLRS (Regional Operations)
Implement next-stage watering restrictions to achieve targeted reduction in water use	FN/LG/WS
Eliminate filling of public fountains (not including drinking fountains) and watering of public parks, gardens, medians and other similar areas	FN/LG/WS
Limit new connections or uses as appropriate	FN/LG/WS
Ensure that water bailiffs are appointed and active on appropriate streams in drought areas; complete any necessary briefings or training with water bailiffs	WLRS (Regional Operations)
Modify flood prevention, flow augmentation and power generation reservoir activities, as appropriate, to minimize impact of drought	B.C. Hydro, FN/LG/WS
Provide water suppliers with advice on water conservation	MUNI, WLRS, Health Authorities
Provide technical assistance and expertise to water suppliers experiencing problems due to water shortages	WLRS
Commence reporting on status of water supplies and forecasted future scenarios to WLRS	FN/LG/WS, Potential help from Health Authorities
Request provincial government agencies elevate efforts to conserve water at public facilities	EMCR, WLRS
Monitoring	
Monitor and enforce compliance with next stage restrictions and allocations through bylaws	FN/LG/WS
Prioritize and intensify monitoring of stream conditions in impacted regions as capacity allows; identify most efficient alternatives for monitoring	WLRS, WLRS (Regional Operations), DFO

Continue to monitor water use by communities and water licensees; increase monitoring as required	WLRS (Regional Operations), FN/LG/WS
Monitor and enforce compliance with restrictions and allocations through bylaws; increase enforcement effort as appropriate	FN/LG/WS
Documentation and Preparation for Next Level	
Identify additional groups and associations that may assist with actions at next level	WLRS (Regional Operations)
Inform Deputy Minister's Committee on Natural Resources, Minister of WLRS, and EMCR of possible move to next drought and identify impacted geographic regions	EMCR, WLRS, WLRS (DM Office)
Identify and document needs of agricultural water users in areas at risk of receiving regulatory action	AF
Document conservation actions taken to date; maintain registry of groups and individuals contacted; record potential social, environmental and economic impacts	EMCR, WLRS, WLRS (Regional Operations), AF
Begin to prepare and package supporting information for decision makers should implementation of regulatory tools be required in the next levels	WLRS

Level 4 (Red) and 5 (Maroon) Actions

	Impacts	Adverse impacts to socio-economic or ecosystem values range from “likely” to “almost certain”
	General Response Actions	Conservation actions including local water restrictions, regulatory action and in level 5, emergency response measures where appropriate

Actions	Lead Responsibility
Communication and Coordination	
Increase frequency of communication by all levels of government and water suppliers, with all water users, through media, advertising, internet, email updates and other forums	WLRS, AF, FN/LG/WS
Increase frequency of communication between WLRS and EMCR regarding geographic areas of concern	EMCR, WLRS, Office of Fire Commissioner
Continue to issue information bulletins to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions	WLRS, AF, BCER
Continue to issue and distribute Low Streamflow Advisories as required in impacted geographic regions	WLRS
Continue to provide regular updates via email to local governments, water suppliers, Indigenous governments, industry and stewardship groups, major licensees and other key local groups in impacted geographic regions	EMCR, WLRS, AF, WLRS (Regional Operations), BCER
Continue to update WLRS drought and RFC internet sites to provide up-to-date streamflow and groundwater data and information	WLRS, WLRS (Regional Operations)
Submit drought assessment reports as necessary to deputy ministers and other senior executives	EMCR, WLRS, WLRS (DM & ADMs), WLRS (Regional Operations)
Continue to provide agricultural producers with information on drought conditions and drought preparedness and management resources via AF’s website, e-bulletins (provincial and regional), AgriService BC social media posts, agricultural magazines, and public meetings/forums.	AF
Other Actions	
Use consensus building process to confirm priorities for water use reductions in drought affected areas	WLRS (Regional Operations), AF, FN/LG/WS
Implement next-stage watering restrictions to achieve targeted reduction in water use	FN/LG/WS

Implement regulatory tools under the WSA or other statutes, as appropriate, if voluntary measures are not enough to protect water users, aquatic ecosystems and fish	WLRS
Restrict use by lower priority water users or those with conditional clauses in their water licences	WLRS (Regional Operations), BCER
Review emergency response plans and prepare for implementation; ensure alternative water supplies are identified and available on short notice, including for livestock. Connect with Health Authority and Drinking Water Officers as required	FN/LG/WS, AF
Coordinate support to local authorities and First Nations, as required, to address community specific requirements	EMCR
Ensure water bailiffs are actively regulating and controlling the diversion and use of water from the streams they are appointed to and are accurately communicating drought conditions, watering restrictions and targets	WLRS (Regional Operations)
Provide water suppliers with advice on water conservation	MUNI, WLRS, Health Authorities
Provide technical assistance and expertise to water suppliers experiencing problems due to water shortages	WLRS, Health Authorities
Monitoring	
Monitor and enforce compliance with restrictions and allocations through bylaws; intensify enforcement efforts as appropriate	FN/LG/WS
Continue reporting on status of water supplies and forecasted future scenarios to WLRS	FN/LG/WS
Monitor and enforce compliance with orders issued under provincial legislation	WLRS
Intensify monitoring of prioritized stream conditions and aquatic ecosystems, examining the efficacy of water conservation measures	WLRS, WLRS (Regional Operations)
Documentation and Preparation for Next Level	
Prepare for emergency response where risk of loss or failure of supply exists	FN/LG/WS
Coordinate support to local authorities and First Nations, as required, to address community specific requirements	EMCR
Inform Deputy Minister's Committee on Natural Resources and Minister of WLRS of possible loss or failure of supply where the risk exists	EMCR, WLRS, WLRS (Executive)
Estimate impacts to the agricultural sector from Temporary Protection Orders	AF

Document conservation actions taken to date; maintain registry of groups and individuals contacted; record potential social, environmental (for example, fish population and habitat loss) and economic impacts	WLRS, WLRS (Regional Operations)

Appendix 3.A: Legislation Potentially Applicable Under Drought

Legislation	Primary Administering Agency	General Scope
Water Sustainability Act	Ministry of Water, Land and Resource Stewardship	• Provides for the allocation and management of groundwater and stream water. • Sets out protective measures for wells and groundwater and identifies offences and penalties. • Regulates groundwater, protects stream health, protects fish and fish habitat, and addresses water use during times of scarcity with declarations of SWS, critical environmental flow protection orders and fish population protection orders.
Fisheries Act	Fisheries and Oceans Canada Environment and Climate Change Canada Ministry of Water, Land and Resource Stewardship	• The purpose of this Act is to provide a framework for the proper management and control of fisheries; and the conservation and protection of fish and fish habitat, including by preventing pollution and issuing angling closures to protect fish. • WLRS has delegated authority to issue a variation order for all freshwater fish species other than salmon. • Environment and Climate Change Canada are responsible for administering the pollution prevention provisions within the *Fisheries Act*.
Species at Risk Act	Fisheries and Oceans Canada Environment and Climate Change Canada Parks Canada	• The purposes of the *Species at Risk Act* (SARA) are to prevent wildlife species in Canada from disappearing, to provide for the recovery of wildlife species that are extirpated (no longer exist in the wild in Canada), endangered, or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened. • Though overall coordination of SARA falls to the Minister of Environment and Climate Change, the Minister of Fisheries and Oceans is responsible for the protection and recovery of aquatic species at risk under federal jurisdiction (other than individuals found on National Wildlife Areas, and lands administered by Parks Canada).
Drinking Water Protection Act	Ministry of Health	• Requires water supply systems to provide potable water with appropriate construction and operating permits. It also establishes qualification standards for operators; requirements for emergency response, water source and system

	Provincial Health Officer Regional Health Authorities	assessments; a process for preparing a drinking water protection plan; and other protective measures for drinking water supplies. • HLTH provides policy support and guidance relating to the act. Regional Health Authorities administer and enforce the act. The Provincial Health Officer provides oversight and provides reports related to the Act and drinking water supplies.
Emergency and Disaster Management Act	Ministry of Emergency Management and Climate Readiness	• Provides enabling legislation that authorizes the minister to declare and designate any area of the province a disaster area (i.e. State of Emergency), and during an emergency, to obtain reserve powers. • Enables local authorities and First Nations—for example, a mayor and council or chief and council--to declare a State of Local Emergency, which provides similar wide-ranging emergency powers.
Environmental Management Act	Ministry of Environment and Climate Change Strategy	• Regulates industrial and municipal waste discharge, pollution, hazardous waste and contaminated site remediation. This act also requires preparation of environmental plans for flood control, drainage, soil conservation, water resource management, waste management and air quality management.
Local Government Act and Community Charter	Ministry of Municipal Affairs	• Sets out the corporate authority of various types of local governments (municipalities, regional districts, improvement districts etc.). From the perspective of water management, of greatest significance are powers and responsibilities relating to land use, growth, infrastructure (for example, stormwater management), works and similar matters.
Water Utility Act	Ministry of Water, Land and Resource Stewardship	• Provides for regulating privately operated water systems servicing five or more persons or a corporation. Operators are subject to the same duties, responsibilities and restraints that are imposed on a public utility under the Utilities Commission Act.
Farm Practices Protection Act	Ministry of Agriculture and Food	• Only applicable if drought conditions result in a change from normal farm practices. For instance, irrigation practices or dust control practices may change as a result of lower water availability.
Milk Industry Act	Ministry of Agriculture and Food	• This act describes general farm requirements. If the producer were not able to have an adequate supply of water (for example, they could not run their dairy farm), then the industry and marketing board would work with the producer to relocate those animals.

Appendix 3.B: Drought Relevant Programs for Agriculture

Program	Primary Administering Agency	General Scope
Production Insurance Program	Ministry of Agriculture/Business Risk Management	• Helps producers manage their risk of crop losses caused by drought and other perils (hail, spring frost, excessive rain, flooding etc.). • Each crop has different coverage options, and insurance must be purchased in advance of crop season. Only harvested crops are insured, not the regrowth feed for grazing. • Producers need to inform program they are experiencing impacts due to water shortages, whether voluntary or as a result of regulatory situations.
AgriStability Program	Ministry of Agriculture/Business Risk Management	• Helps stabilize farm income by managing the risk of large income declines. It protects agricultural producers against declines in their net farming income due to market conditions, production loss or increased costs of production. Payments are made if a producer's current year margin falls more than 30% below their reference margin.
Western Livestock Price Insurance Program	Cross-provincial program	• A risk management tool available in B.C., Alberta, Saskatchewan, and Manitoba. • The program provides producers with protection against an unexpected drop in prices on cattle and hogs over a defined period.
AgriRecovery Framework	Ministry of Agriculture and Food/ Agriculture and Agri-Food Canada	• AgriRecovery is a framework that forms the basis by which federal, provincial and territorial governments can work together, when natural disasters occur, to assess the impacts and determine whether there is need for an AgriRecovery initiative. • AgriRecovery is for extraordinary expenses unrelated to production and is not offered on a consistent basis. It does not cover production or revenue declines which could be insured, including those resulting from disasters.
Livestock Tax Deferral Program	Agriculture and Agri-Food Canada (AAFC)	• A provision designed to help defer the tax burden for livestock producers who sell all or part of their breeding herd due to drought or flooding in regions designated by AAFC.
Beneficial Management	Ministry of Agriculture and Food/Investment	• The Beneficial Management Practices (BMP) program provides funding for eligible farm businesses to purchase equipment (for example, irrigation systems and

Practices Program	Agriculture Foundation	weather stations), develop water capture and storage systems, and fund assessments, plans, and technical designs. • Applicants must first complete an Environmental Farm Plan (EFP), a free, confidential and voluntary assessment that identifies opportunities to adapt and respond to environmental and climate challenges.
Agricultural Water Infrastructure Program	Ministry of Agriculture and Food/Investment Agriculture Foundation	• A funding program that supports more efficient infrastructure or storage to maximize available water for agricultural uses, particularly irrigation and livestock watering.
Extreme Weather Preparedness for Agriculture Program	Ministry of Emergency Management and Climate Readiness/Investment Agriculture Foundation	• A funding program that supports producers with projects that help prepare farms for wildfires, flooding and extreme heat.

Appendix 4: Provincial and Federal Agency's Responsibilities Related to Drought

Agency	Drought Related Responsibilities
Provincial Agencies	
Ministry of Water, Land and Resource Stewardship (WLRS)	• Leads development of legislation and policy related to drought management in B.C. • Lead provincial agency for drought coordination, planning and response • Administers the *Water Sustainability Act* • Communicates directly with water users, under the *Water Sustainability Act,* about actions commenced under this plan • Operates the River Forecast Centre; collects and interprets snow, meteorological and streamflow data to provide warnings and forecasts of stream and lake runoff conditions • Operates the Provincial Groundwater Observation Well Network • Responsible for regulatory action under the WSA, including Orders of the Minister, Comptroller, Engineer and Lieutenant Governor in Council (LGIC) under the WSA (s. 22, 86, 87, 88 and 93) • Responsible for updating the B.C. Drought and Water Scarcity Response Plan • Provides internal-to-government guidance on drought • Protects and restores fish habitat and aquatic ecosystems • Oversees and coordinates the science required to assess impacts and monitor water before, during and after droughts
Ministry of Transportation and Infrastructure (MOTI)	• Administers WSA s. 10 use approvals for maintenance contracts and projects related to MOTI activities and infrastructure and follows advice and instructions from the Comptroller related to drought
Ministry of Environment and Climate Change Strategy (ENV)	• Administers the *Environmental Management Act* • Manages and coordinates the Provincial Groundwater Observation Well Network • Operates hydrometric, climate and water quality networks • Supports drought strategy, governance and planning initiatives
Ministry of Forests, (FOR)	• Manages and protects water as a forest resource under the *Forest and Range Practices Act* • Lead agency for managing wildfire threats
Ministry of Agriculture and Food (AF)	• Supports agricultural industry water requirements used in the production of food and other agricultural products • Communicates with the broad agricultural community about actions commenced under this plan

	• Collects and disseminates information on irrigation, crop, soil and livestock management during times of drought • Coordinates roles of AF staff within provincial and regional drought working groups • Provides timely information on drought conditions; WLRS drought response actions; and drought-related programs, initiatives and supports to producers though multiple channels (for example, e-bulletins, social media posts, webpages, community meetings, liaising with industry associations) • Collects intelligence about drought impacts and drought response needs from producers and industry associations • Informs Temporary Protection Order decisions on the needs of agricultural water users and estimated impacts to the sector • Reports drought impacts on dryland farming and livestock range areas to provincial and regional working groups • Leads drought response in non-irrigated areas and assesses livestock needs in drought impacted areas • Liaises with other AF branches (for example, Emergency Management Branch, Business Risk Management Branch) to support producers as needed
Ministry of Municipal Affairs (MUNI)	• Oversees local government activities under the *Local Government Act* • Provides water conservation resources and advice to local government water suppliers • Communicates with local government about actions commenced under this plan
Ministry of Health (HLTH)	• Provides policy support and guidance relating to the *Public Health Act* and *Drinking Water Protection Act*
Office of the Provincial Health Officer (OPHO)	• The Provincial Health Officer (PHO) provides oversight and provides reports related to drinking water under the Drinking Water Protection Act. • The PHO is the senior public health official for BC and is responsible for monitoring the health of the population of BC and providing independent advice on public health issues to Ministers and public officials. • The responsibilities and powers of the PHO are outlined in the *Public Health Act* and *Drinking Water Protection Act*.
Regional Health Authorities (RHA)	• Implements the *Public Health Act* and *Drinking Water Protection Act* • Drinking Water Officers provide guidance to water suppliers and local governments on emergency coordination, preparedness and response planning related to loss of water supply
First Nations Health Authority (FNHA)	• Plans, designs, manages and funds the delivery of First Nations health programs and services, including the Drinking Water Safety Program • Collaborates, coordinates and integrates with HLTH and the RHAs

Ministry of Emergency Management and Climate Readiness (EMCR)	• Coordinates emergency support to local authorities and First Nations during emergency response activities • Operates provincial regional emergency operations centres and provincial emergency coordination centres • Provides mitigation, preparedness and planning services • Provides advice and the historic context of response activities in regions related to loss of supply (potable water and firefighting) • Chairs the Disaster Risk Management Committee (DRMC), to collaborate with partner ministries to support disaster risk management across government, in accordance with the United Nations' Sendai Framework for Disaster Risk Reduction
BC Energy Regulator (BCER)	• Monitors streamflow conditions in areas where BCER has authorizations • Provides regular communication to industry regarding flow conditions and potential for suspensions • Issues suspensions to WSA s. 10 diversions as needed • Provides regulatory oversight to ensure compliance with WSA s. 10 suspensions and streamflow thresholds in WSA ss. 9 and 10.
Federal Agencies	
Agriculture and Agri-Food Canada (AAFC)	• Delivers the federal Drought Watch program to provide timely information regarding the impacts of climatic variability on water supply and agriculture • Provides information on agricultural practices that reduce drought vulnerability and improve management during a drought
Environment and Climate Change Canada (ECCC) [Water Survey of Canada]	• Responsible for the collection, interpretation and dissemination of standardized water resource information • Operates hydrometric, climate and water quality networks in partnership with the B.C. Ministry of Environment and Climate Change Strategy
Fisheries and Oceans Canada (DFO)	• Administers the federal *Fisheries Act*, except for the pollution prevention provisions therein that are administered by Environment and Climate Change Canada • Administers the federal *Species at Risk Act* as it applies to aquatic species at risk (other than those found on National Wildlife Areas and Parks Canada lands)
Indigenous Services Canada (ISC)	• Supports Indigenous Peoples (First Nations, Inuit and Métis) and Northerners in their efforts to develop healthier, more sustainable communities • Provides guidance for First Nations communities to develop emergency response plans for drinking water systems

Appendix 5: Chronology of Key Government Actions in a Model Drought Year

This table highlights key initiatives regarding the different roles and responsibilities of organisations within the B.C. provincial government on drought management issues.

Key Actions	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Coordination												
B.C. Water Committee Water Hazards Sub-Committee	■	■	■	■	■	■	■	■	■	■	■	■
Provincial Technical Drought Working Group				■	■	■	■	■	■	■		
Regional Technical Drought Working Groups		■	■	■	■	■	■	■	■	■	■	
Drought Advisory Tables				■	■	■	■	■	■	■		
Conduct pre-drought preparedness meetings			■	■								
Conduct post-drought debrief meetings											■	■
Communication												
Implement water conservation communication		■	■	■	■	■	■	■	■	■		
Provincial natural hazard weekly briefings	■	■	■	■	■	■	■	■	■	■	■	■
Drought Information Portal				■	■	■	■	■	■	■	■	
Seasonal preparedness briefings			■	■								
Issue first province-wide news release for season			■	■								
Issue monthly snow conditions and water supply bulletins	■	■	■	■	■	■						
Issue weekly or bi-weekly drought level updates					■	■	■	■	■	■	■	
Issue drought preparation communications to water suppliers		■	■									
Recommend early water conservation activities to agricultural producers				■	■	■						
Escalate conservation messaging as appropriate							■	■	■	■		
Contact water licensees directly via mail							■	■	■			

Data and Monitoring												
Review and update Watershed Watch Lists												
Determine flow thresholds for streams identified on Watershed Watch Lists												
Complete snow surveys and assess Basin Snow Indices												
Produce Seasonal Volume Runoff Forecasts												
Produce 30-Day Percentage of Average Precipitation conditions												
Produce 7-Day Average Streamflow conditions												
Augment streamflow and aquifer level monitoring as required												
Monitor community and licensee water use												
Assess drought vulnerability of communities/water suppliers												
Prioritize water supply status data from local governments for input into Water Supply Dashboard												
Policy												
Elevate drought level ratings as appropriate												
Request water licensees voluntarily conserve and share water												
Communicate with local authorities and First Nations to recommend updates to watering restrictions												
Undertake regulatory actions as appropriate												
Undertake enforcement actions as appropriate												
Prepare emergency response where loss or failure of supply risk exists												
Issue State of Local Emergency or State of Provincial Emergency as necessary												

Appendix 6: Drought Response Communications Summary Table**

Drought Level(s)	Province-Wide Communications		Region Wide Communications		Targeted Regional Communications*		Direct Communication with Water Licensees	
Level 1 (Yellow)	**Task**	**Who**	**Task**	**Who**	**Task**	**Who**	**Task**	**Who**
	Issue province-wide news release	GCPE	Issue targeted news releases in impacted geographic regions	GCPE	Provide updates via email to key stakeholder groups and major licensees	WLRS	Use direct and indirect communications to request water licensees voluntarily conserve and share water	WLRS
	Regularly issue updated online water supply and snow bulletins	WLRS	Issue Low Streamflow Advisories in impacted geographic regions	WLRS	Attend public meetings	WLRS, AF, DFO	Where appropriate, work with BCAC and other industry organizations to encourage agricultural producers to take early actions	AF
			Designate local media spokesperson(s) for local level issues	GCPE				
Level 2/3 (Peach/ Orange)	**Task**	**Who**	**Task**	**Who**	**Task**	**Who**	**Task**	**Who**
	Issue updated province-wide news release	GCPE	Intensify local communication efforts, as appropriate, based on current	GCPE, WLRS	Intensify frequency of updates via email, as appropriate, to key stakeholder	WLRS, BCER	Advise high-volume water licensees directly, via mail; request voluntary conservation	WLRS

Drought Level(s)	Province-Wide Communications		Region Wide Communications		Targeted Regional Communications*		Direct Communication with Water Licensees	
			streamflow conditions		groups and major licensees			
	Potentially hold media news conference to announce activation of additional drought measures and to provide updated information	GCPE, WLRS	Issue updated targeted news releases in impacted geographic regions	GCPE	Commence utilization of additional communication channels (for example, print, social media, associations etc.)	GCPE, WLRS	Use direct and indirect communications to request water licensees voluntarily conserve and share water	WLRS
	Continue to regularly issue updated online water supply and snow bulletins	WLRS			Attend public meetings	WLRS, AF, DFO	Where appropriate, work with BCAC and other industry organizations to encourage agricultural producers to take early actions	AF

Drought Level(s)	Province-Wide Communications		Region Wide Communications		Targeted Regional Communications*		Direct Communication with Water Licensees	
Level 4/5 (Red/ Maroon)	**Task**	**Who**	**Task**	**Who**	**Task**	**Who**	**Task**	**Who**
	Increase frequency and intensity of province-wide communication through media, advertising, internet, email updates and other forums	GCPE	Increase frequency and intensity of targeted local communication through media, advertising, internet, email updates and other forums	GCPE, WLRS	Continue to issue frequent updates via email, as appropriate, to key stakeholder groups and major licensees	WLRS, BCER	Advise high-volume water licensees directly of conditions via mail or other direct means	WLRS
	Continue to regularly issue updated online water supply and snow bulletins	WLRS					Continue to request voluntary conservation; undertake regulatory action as required	WLRS
							Contact producers that may be required to reduce water use	AF, BCER

* Targeted regional communications may include direct communication with community groups, user groups, local governments, Indigenous governments and others as well as participation in community events, response to local media inquiries and other local level activities.
** A provincial drought communication plan will be prepared each year. Action items will differ from year to year based on the nature of the drought and communication priorities.

Appendix 7: Additional Resources

All emergency situations that affect the health and safety of the public should be reported to EMCR at 1-800-663-3456.

Provincial Government Resources

- B.C. Drought Landing Page: This site is the central webpage for provincial drought preparedness and response information. It provides links to cross-agency drought resources for communities, water licensees and farmers.
- B.C. Drought Information Portal: This site is a single source for geographic drought level information for B.C. It uses multiple embedded maps to provide information on provincial drought levels, watershed conditions and information, historical drought time-lapse information and other information related to drought monitoring.
- General Drought Information B.C. webpage: Links to provincial government drought information, including information on water conservation and water management during drought.
- River Forecast Centre (RFC): The RFC collects and interprets snow, meteorological and streamflow data to provide warnings and forecasts of stream and lake runoff conditions around the province.
- Drought in Agriculture webpage: Information on drought management in agriculture, including information on irrigation, crops, soil, livestock, pasture and range management as well as links to resources on feed and pasture availability and financial programs. The Quick Guide to Drought Resources provides a summary of key drought resources and can be provided as a hard copy to producers.
- Emergency Management in BC: This site provides an overview of emergency management in B.C. and provides links to training and resources for use before, during and after emergencies.
- Emergency Info BC: This site provides up-to-date emergency alerts.
- Dealing With Drought: A Handbook for Water Suppliers in British Columbia*:* Updated in 2022, this document provides local government water suppliers with tools to help with drought planning, example bylaws and links to other resources.
- Resources for water system operators webpage: Links to tools and resources to help water suppliers fulfill their responsibilities under the *Drinking Water Protection Act* and Drinking Water Protection Regulation.
- Water Laws and Rules in B.C.: Information on provincial acts and regulations, including the *Water sustainability Act, Water Protection Act and Environmental Management Act*.
- Fire Danger Rating Reports: Maps on fire danger ratings across B.C., produced annually during fire season from April 15th to October 15th.

- Provincial Fisheries Management: Drought Response Plan: Provides provincial direction for fisheries management and guides the implementation of regional management actions during drought conditions in B.C.

Federal Government Resources

- Drought Watch (Agriculture and Agri-Food Canada): This is Agriculture and Agri-Food Canada's web hub for national and regional information targeted at the agricultural sector. It links to information on current conditions and access to federal assistance programs.
- The Weather (Government of Canada): Current and forecasted weather, air quality, alerts, analyses and modelling.

Technical Resources

- Irrigation Industry Association of BC (IIABC): The IIABC provides access to tools and irrigation manuals that can assist in improving the operation of irrigation systems, including: Irrigation Management Guide, B.C. Sprinkler Irrigation Manual, B.C. Trickle Irrigation Manual, and Irrigation Scheduling Calculators.
    - B.C. Sprinkler Irrigation Manual
    - B.C. Trickle Irrigation Manual
- BC Agriculture Council: The BC Agriculture Council has produced the Environmental Farm Planning documents that can provide information on conducting an irrigation system assessment. These documents assist in evaluating irrigation system operation.
    - Environmental Farm Plan Reference Guide
    - Irrigation Assessment Guide

Other Resources

- National Drought Mitigation Centre (NDMC) (University of Nebraska): The NDMC is dedicated to helping "people and institutions develop and implement measures to reduce societal vulnerability to drought, stressing preparedness and risk management rather than crisis management." While focused on the USA, the NDMC website has a wealth of information on drought planning, monitoring, impacts and mitigation.
- U.S. Drought Portal: National Integrated Drought Information System (NIDIS): The U.S. National Oceanic and Atmospheric Administration leads implementation of the NIDIS. The U.S. Drought Portal is part of this interactive system to provide early warning about emerging and anticipated droughts, assimilate and quality control data, and provide information about risk and impact to different agencies and stakeholders.
- North America WaterWatch: Map of real-time streamflow compared to historical streamflow for B.C. and adjoining provinces and states using percentile flows.

- First Nations' Emergency Services Society (FNESS): The First Nations' Emergency Services Society of British Columbia (FNESS) is a not-for-profit organization and registered charity governed by a First Nation Board of Directors. FNESS supports B.C. First Nations in building safer, healthier, thriving communities through programs focused on Awareness, Preparedness, Mitigation, and Recovery.