

VIC 2023 Spring Seasonal Readiness Workshop Agenda – Day 2

Wednesday, May 10, 2023

8:30-8:50 Opening Prayer

Buffy Sue David – Stz’uminus First Nation

Opening Comments & VIC Updates and Introductions

8:50-9:10 Emergency Program Act (EPA) Update

EMCR Policy and Legislation Team

9:10-9:45 BC Heat Alert and Response System (BCHARS)

Emergency Management Unit (Ministry of Health)

Vancouver Island Health Authority

9:45-10:00 Drought Planning

KPMG

10:00-10:20 Break

10:20-10:40 BC Emergency Alerting Update

EMCR

10:40-11:40 Major Marine Disaster Training & Response

Joint Rescue Coordination Centre (JRCC)

11:40-12:00 Pacific Climate Impacts Consortium

Pacific Climate Impacts Consortium

12:00-12:30 Ask EMCR – An open forum to ask EMCR questions

EMCR Regional Team

Update: Modernized Emergency Management Legislation

VIC Spring
Seasonal
Readiness
May 10



Update: Legislation

- EMCR has finalized draft legislation
- The draft legislation will be approved in the coming weeks
- The legislation will be tabled in fall 2023



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and Climate Readiness

Helping communities prepare for the legislation over summer/fall 2023

- Tabling in fall 2023 provides an opportunity to work with communities to ensure a common understanding of the legislation, how it will be implemented, and the supports needed for implementation
- Key activities:
 - Technical paper detailing key policy shifts in the legislation
 - Short explainer videos on key policy shifts
 - Guidance documents and webinars on how to implement key policy shifts



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Shifts in New Legislation

- Inclusion of Indigenous peoples
- Well rounded four phase framework
- Clear hazard-focused risk assessment and planning requirements
- Embedded “all of society approach”
- Increased opportunities for collaboration
- Enhanced response and recovery powers



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New Powers and Tools

Available upon
Royal Assent

- **Multi-jurisdictional Emergency Management Organizations (MJEMOs)**
 - Local authorities will now be able to choose to establish or join a multijurisdictional emergency management organization. These can include local authorities, First Nations, and the province.
- **States of Local Emergency (SOLE)**
 - SOLE declarations will last 14 days and can be extended for periods of 14 days each with approval of the Minister or LGIC
- **Recovery Powers**
 - Local authorities will now be able to declare a Recovery Period and use recovery powers, if required, following a SOLE.
 - Recovery Periods will last 90 days



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New Responsibilities

**Phased
Implementation**

Emergency Management Planning

- Prepare/maintain a Risk Assessment with respect to the hazards within a local authority's jurisdiction, which consider climate change, equity denied populations, and available Indigenous knowledge
- Local authorities will be required to have business continuity plans
- Emergency Management plans will be required to include actions for all four phases of emergency management, all available Indigenous knowledge, and action to address risks to equity denied populations

Consultation and Collaboration

- Local governments will need to engage with other relevant parties when preparing emergency management plans
- When developing risk assessments and emergency management plans, local authorities must also make reasonable efforts to consult and co-operate with Indigenous governing bodies and coordinate emergency management plans
- Local governments will be responsible for consulting and cooperating with Indigenous Governing Bodies in all phases of emergency management



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Regulations

There are **three main regulations** under the existing Emergency Program Act, which will be **modernized**:

1. Emergency Program Management Regulation
2. Local Authority Emergency Management Regulation
3. Compensation and Disaster Financial Assistance Regulation

In addition to the modernization of existing regulations, **three new regulatory areas** are proposed:

1. General
2. Compliance and Enforcement
3. Critical Infrastructure



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Timeline and Phasing

- Final draft legislation is complete
- Spring/Summer 2023: Help communities prepare to implement the legislation
- Fall 2023: Legislation to be tabled and come into force
 - New tools and powers are available to local governments
- 2023/2024: Target for regulations to be deposited



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Questions

- Questions?
- Please always feel free to reach out to EMCR to discuss further.

ModernizeEM@gov.bc.ca



BC Heat Alert Response System (BC HARS): 2023

BC HARS Briefing for the VIC 2023
Spring Seasonal Readiness
Workshop

10 May 2023



Territorial Acknowledgement



Image: Crossing Cultures and Healing totem pole designed to further reconciliation, placed next to the provincial Ministry of Health building in Victoria, BC. Master carvers and brothers Perry and Tom LaFortune of the Tsawout First Nation carved the pole (2018).

Agenda

1. Background

- Extreme heat impacts
- What we heard from 2022

2. BC Heat Alert Response System (BC HARS)

- BC HARS Criteria/Trigger
- BC HARS Activation
- BC HARS Messaging / Action Examples

3. Heat Resources and Tools

BC Provincial Heat Alert
and Response System
(BC HARS): 2023



Background – Extreme Heat Impacts

- In greater Vancouver there were 110 excess deaths during an extreme heat event (EHE) in the summer of 2009 (Kosatsky et al)
- During the 2021 heat dome, there were an estimated 740 excess deaths across all British Columbia (Henderson et al). The BC Coroners Service has directly attributed 619 deaths in British Columbia to the 2021 EHE (BC Coroners Service, June 2022).
- Suspected heat related deaths July 23 to Aug 03, 2022 Extended heat event: 16 (BC Coroners Service, Aug 2022).

Original Research Article

ENVIRONMENTAL
EPIDEMIOLOGY

OPEN

Analysis of community deaths during the catastrophic 2021 heat dome

Early evidence to inform the public health response during subsequent events in greater Vancouver, Canada

Sarah B. Henderson*, Kathleen E. McLean, Michael J. Lee, Tom Kosatsky

Background: British Columbia, Canada, was impacted by a record-setting heat dome in early summer 2021. Most households in greater Vancouver do not have air conditioning, and there was a 440% increase in community deaths during the event. Heat-related data were analyzed to inform modifications to the public health response during subsequent events in summer 2021 to guide further research.

Methods: The 434 community deaths from 27 June through 02 July 2021 (heat dome deaths) were compared with all 1,367 community deaths that occurred in the same region from 19 June through 09 July of 2013–2020 (typical weather deaths). Conditional logistic regression was used to examine the effects of age, sex, neighborhood deprivation, and the surrounding environment. Data available from homes with and without air conditioning were also used to illustrate the indoor temperatures differences.

Results: A combined index of material and social deprivation was most predictive of heat dome risk, with an adjusted odds ratio of 2.98 (1.95, 4.49) for the most deprived category. Heat dome deaths also had lower greenness within 100 m than typical weather deaths. Indoor temperatures in one illustrative home without air conditioning ranged between 30°C and 40°C.

Conclusions: Risk of death during the heat dome was associated with deprivation, lower neighborhood greenness, older age, sex, high indoor temperature with low air conditioning per changes.

Keywords: Heat dome; All-cause mortality; Deprivation; Greenness

Introduction

In early summer 2021, the province of British Columbia, Canada, experienced an unprecedented heat dome event. Hundreds of local temperature records were broken on consecutive days at the same time. In the Fraser Valley, temperatures reached 46°C on June 27 (46.1°C).

Environmental Health Services, British Columbia, Canada

Funding for publication of this study was provided by the British Columbia Government.

Data availability: The vital statistics data are publicly available, but access can be restricted. Other data are available from the Health Research Consortium upon request.

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Environmental Epidemiology (2022) 6, 1–10. Received: 7 September 2021; Accepted: 10 January 2022
DOI: 10.1002/epi.1000000000000000

BC CORONERS SERVICE

Suspected Heat-Related Deaths in B.C. Knowledge Update

Suspected Heat-Related Deaths, July 26 to August 3, 2022

The following summarizes the number of heat-related deaths reported to the BC Coroners Service between July 26, 2022 (the first reported death) and August 3, 2022.

Caveats: The data are considered preliminary and subject to change as coroners' investigations conclude. These data were compiled by Coroner Notification Date, which may differ from the date of injury.

Methodology: The data presented in this report are based on the aggregated results of coroners' investigations into the circumstances of a death where cause of death is suspected to be "Effects of Heat".

Definition: A heat-related death is defined as a death where:

- The localized environment or body temperature is keeping with hyperthermia (ICD10 T670); or
- There is no direct temperature at the time of death but there is evidence (circumstantial, scene environment, medical history) to support that heat played a significant causal effect on the death (ICD10 T679).

Heat-Related Deaths by Notification Date

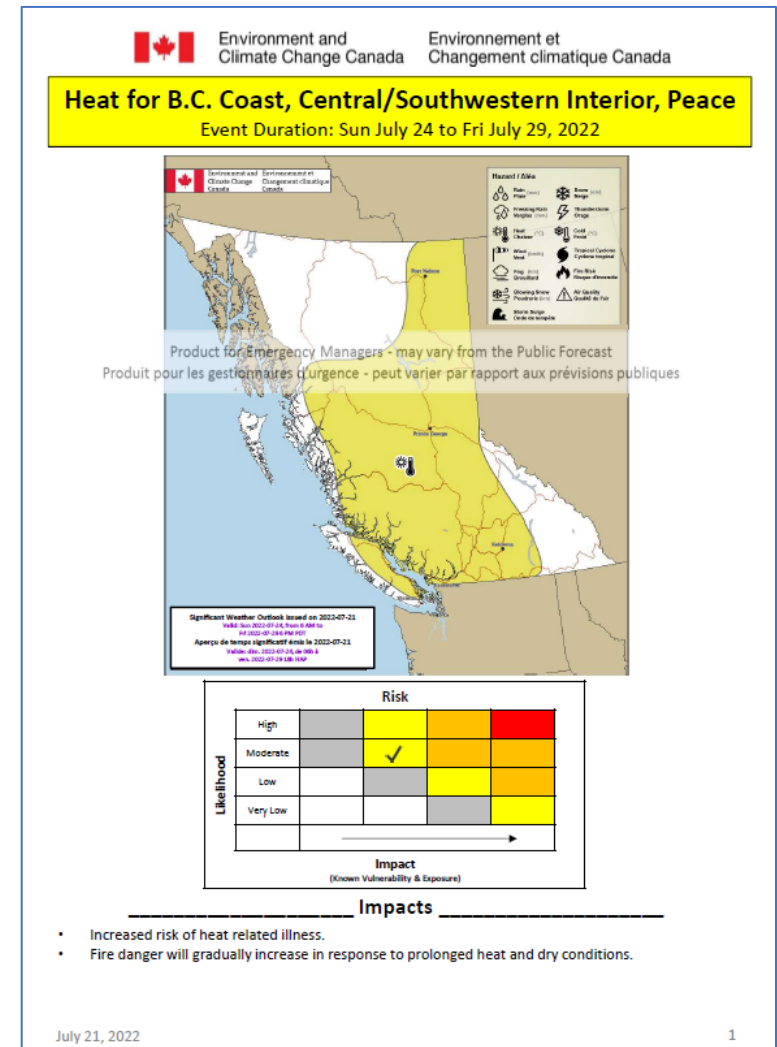
Notification Date	# of Deaths
July 26	1
July 27	2
July 28	1
July 29	5
July 30	3
July 31	1
August 1	0
August 2	2
August 3	1
Total	16

Extreme Heat and Human Mortality:
A Review of Heat-Related Deaths in B.C.
in Summer 2021

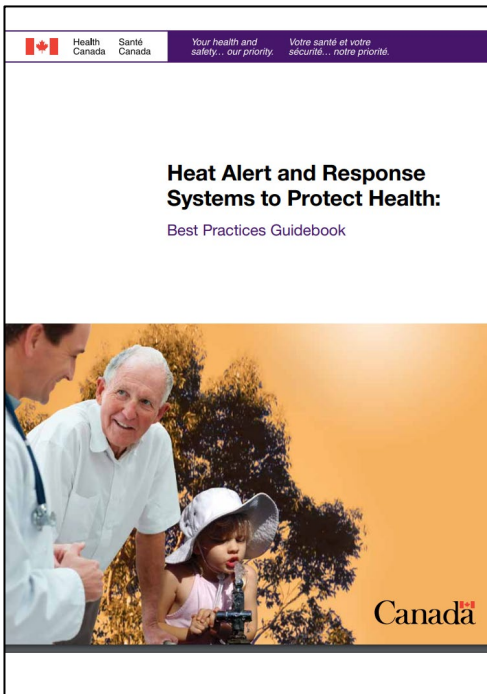
Chief Coroner of British Columbia
July 27, 2022

Background – Extreme Heat Impacts 2022

- Summer 2022 was the first year with the BC HARS in place.
- From June to September 2022 there were six Heat Warnings issued
- The extended heat event from July 25–Aug 01, was very closely monitored, both for the length of the event and particularly that the overnight temperatures were not markedly decreasing.
- 40 regions in the province were impacted by this protracted heat wave where July 26th saw 14 maximum temperature records either tied or broken across the province.

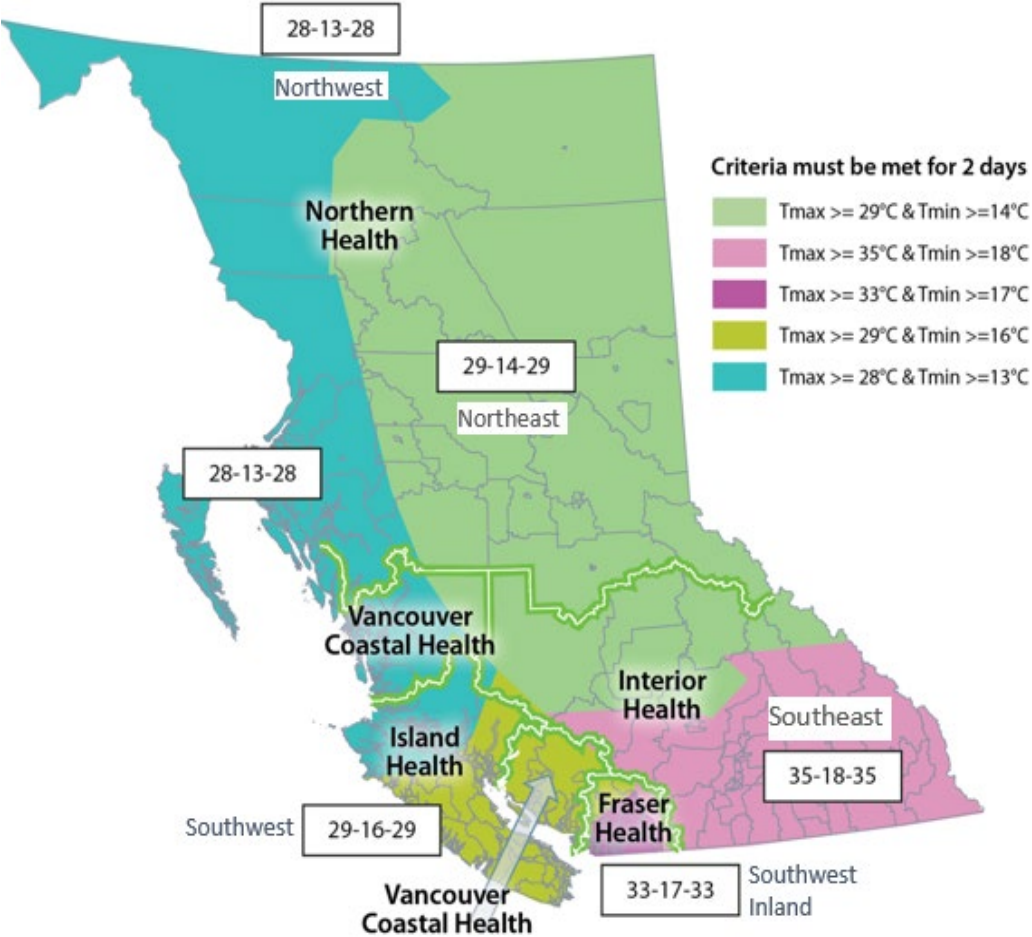


Background: Why BC HARS?



BC Heat Alert and Response System: 2023

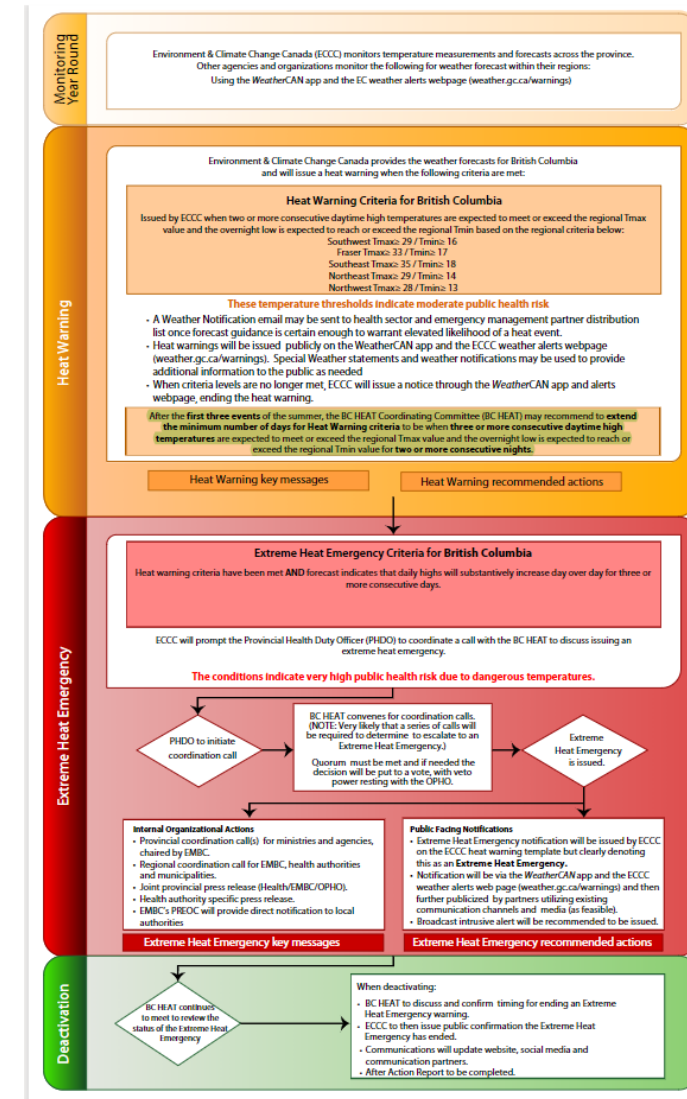
BC Heat and HA Regions



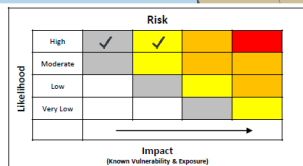
Alert	Heat Warning **	Extreme Heat Emergency
Public health risk	Moderate (5% increase in mortality)	Very high (20% or more increase in mortality)
Descriptor	Very hot	Dangerously hot
Historic frequency	1-3 per summer season	1-2 per decade
Criteria	Southwest = 29-16-29* Fraser = 33-17-33* Southeast = 35-18-35* Northeast = 29-14-29* Northwest = 28-13-28* *(Daytime high, nighttime low, daytime high)	Heat warning criteria have been met and forecast indicates that daily highs will substantively increase day-over-day for 3 or more consecutive days

BC HARS Escalation Process

- Developed in partnership with Environment Climate Change Canada (ECCC) / BC HEAT Coordinating Committee
- Leverages EMCR regional communication structures to support coordination calls with partners
- Includes revised language for third heat event of the season



 Environment and
Climate Change Canada Environnement et
Changement climatique Canada

[illegible]

- June 22, 2021

[illegible]

Extreme Heat Emergency

10:17 AM 94%
Alert for Soukris DC
10:06 AM - 10:18 AM

Rouffin's morning

Issued at: 10:12 AM on PC1 Saturday 2nd April 2022

Time of first report: 10:06pm

Heavy rain from Ayrshire and into Inverclyde this weekend

We were brought to Rouffin's morning by a strong wind from W. Ministry meeting

Revised HCC terms etc.

Forecastable Area of weather overnight will bring heavy rain to the West of Scotland. Stronger winds may also be experienced. Heavy rain likely to benefit the rainfall totals of 100-150mm over the last 24 hours. The weather will improve after midnight.

Air temperature: High chance of rain in the forecast area this morning, on Sunday before it must reach maximum intensity. Rainfall totals are expected to be between 100-150mm over the next 24 hours.

The heaviest rain is expected to hit the West of Scotland and Fife in the early part of 10:00am in Inverclyde as Glasgow morning.

Heavy convective rain across Highlands and some power cuts in the north.

Winds will possibly weaken towards evening, but calm and overcast.

Please advise us to monitor rain and forecast later in the day.

If you have any comments or queries please email us on info@routins.co.uk or tweet them using #RoutinsDC

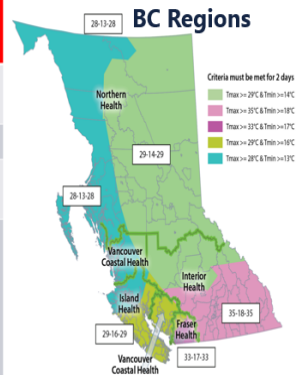
In effect for:
West Coast Community

Regional Coordination call organized by EMCR may be recommended by Health Authority/MHO

Level 2 Extreme Heat Emergency
Coordination calls coordinated by EMCR for all impacted regions

BC HARS: Messaging and Recommended Actions

Alert level	Heat Warning	Extreme Heat Emergency
Public health risk	Moderate (5% increase in mortality)	Very high (20% or more increase in mortality)
Descriptor	Very hot	Dangerously hot
Historic frequency	1-3 per summer season	1-2 per decade
Criteria	Southwest = 29-16-29* Fraser = 33-17-33* Southeast = 35-18-35* Northeast = 29-14-29* Northwest = 28-13-28* *(Daytime high, nighttime high, daytime high)	Heat Warning criteria have been met and forecast indicates that daily highs will substantively increase day-over-day for 3 or more consecutive days



Recommended Messaging

1. Pre-season
2. Heat Warning
3. Extreme Heat Emergency

Recommended Actions

1. Pre-season
2. Heat Warning
3. Extreme Heat Emergency
4. Post-season / post event

Ministries

(General, EMCR, HLTH)

Health Sector

(Health Authorities, Health Service Delivery, Public Health, BCEHS)

First Nations and Local Authorities

Partner Organizations
(Community Organizations, NGOs)

Messaging Examples

	Pre-season Key Messages	Heat Warning Key Messages	Extreme Heat Emergency Key Messages	Air Quality, Heat Warning and Extreme Heat Emergency Messaging
Key Messages	<ul style="list-style-type: none"> As of June 2022 B.C. has a two-tier Heat Alert and Response System (HARS). The first HARS level, a Heat Warning, means that temperatures are very hot and there is a moderate public health risk. A Heat Warning will usually be issued one to three times in a typical summer. The second HARS level, an Extreme Heat Emergency, means that temperatures are dangerous and there is a very high public health risk. An Extreme Heat Emergency may only be issued one to two times per decade. It is important to have a plan for Heat Warnings and extreme heat emergencies – see Prepared BC Emergency Guides. It is important to evaluate whether you can safely stay in your home during an Extreme Heat Emergency (prolonged exposure to temperatures over 31°C are dangerous for susceptible people) - see the indoor temperature guide in Extreme Heat Emergency. 	<ul style="list-style-type: none"> (ONLY if/when indicated by ECCC) The Heat Warning could evolve into an Extreme Heat Emergency. Be prepared to activate heat plans. Drink plenty of water and other liquids to stay hydrated. Take it easy, especially during the hottest hours of the day. Seek cooler indoor and outdoor spaces. If you have air conditioning, be sure to turn it on. It does not need to be on as high as it can go to help keep you safe. Take a cool shower or put part of your body into a tepid bath. Wear a wet shirt or apply damp towels to your skin to cool down. It is important to remember that overheating can lead to heat exhaustion and heat stroke. Signs of heat exhaustion include heavy sweating, headache, muscle cramps, feeling unwell, extreme thirst, and dark urine. If you are experiencing these symptoms, you should seek a cooler environment, drink plenty of water, rest, and use water to cool 	<ul style="list-style-type: none"> All Heat Warning messages apply. Indoor environments without effective air conditioning may become dangerously hot as the temperatures increase over the coming days. Top floors of buildings and rooms with windows that face west, and south will be particularly hot. Monitor indoor temperatures for yourself and those you are checking on. It is important to know the indoor temperature guide: <ol style="list-style-type: none"> Sustained exposure to temperatures of 26°C or less are generally safe. Sustained exposure to temperatures from 26°C to 31°C may pose a risk to the most susceptible people. Sustained exposure to temperatures over 31°C should be avoided for susceptible populations, whenever possible. If they cannot be avoided, monitoring of the environment (using thermometers) and the individual (using heart rate) should be considered. 	<ul style="list-style-type: none"> Air quality during a Heat Warning / Extreme Heat Emergency may be affected by high concentrations of ozone or particulate matter, especially if there are wildfires burning nearby. Heat and air pollution affect your body in different ways, and some people are susceptible to the effects of both. Cooler, cleaner indoor air is the best way to protect yourself from heat and air pollution. Heat poses a bigger risk than smoke for most people, so prioritize staying cool.

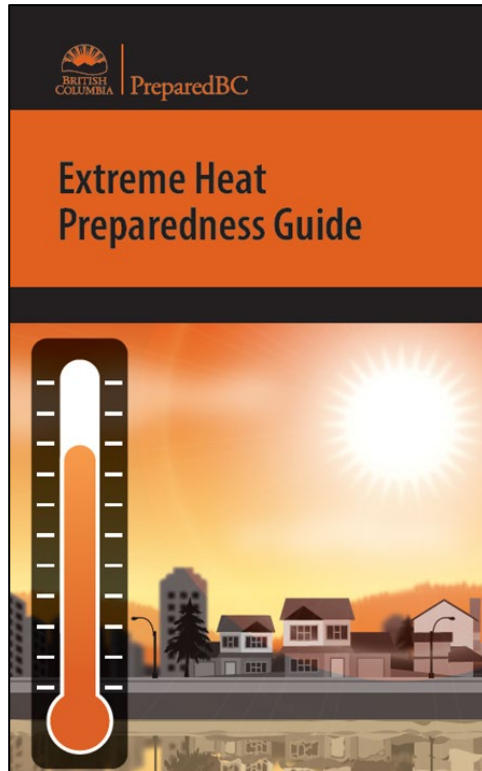
Example of Recommended Actions – Ministry of Health and Emergency Management and Climate Readiness

MoH and EMCR	<p>All bullets general to all ministries and:</p> <ul style="list-style-type: none"> • Create pre-season social media updates and press releases on heat and health for initial event, Heat Warnings and extreme heat emergencies. • Support pre-season briefings with Emergency Management BC and RHA partners. • Ensure that consistent and up-to-date public messaging is available on public communication channels including Beat the Heat (HeatLinkBC) and Prepared BC Emergency Guides. • Provide local government, health, and community service providers and community organizations with access to heat health communication resources. • Participate in heat health and emergency preparedness forums to promote heat health planning, preparedness, and response. • Provide emergency management preparedness and response guidance to health care providers. 	<p>All bullets general to all ministries and:</p> <ul style="list-style-type: none"> • BC Heat Data Sub-committee to monitor and inform BC HEAT Committee of demands on the health system as available through the BC HEAT Data portal. • Convene the BC HEAT operations Sub-committee if, as determined by ECCC and SMEs, the event looks likely to evolve into an Extreme Heat Emergency. • Upon recommendation of the health authority, consider if there is need for EMCR regional offices to schedule a coordination call with First Nation, local authority, and other emergency management partners. • EMCR to support communities through EPA/Task number processes • MoH and EMCR issue heat messaging through digital platforms and if possible, radio or print, in line with the BC HARS document Heat Warning key messages. • Amplify Heat Warnings as appropriate. • Direct all to key resources. <p>And all pre-season recommended actions not already considered</p>	<p>All bullets general to all ministries, recommended actions noted in the Heat Warning and:</p> <ul style="list-style-type: none"> • Consider declaring a Provincial State of Emergency under the <i>Emergency Program Act</i>. • Consider issuing Emergency Orders under the <i>Emergency Program Act</i> and/or the <i>Public Health Act</i>. • Convene the BC HEAT Coordinating Committee (if not already convened during the Heat Warning). • EMCR regional offices to schedule a coordination call with First Nation, local authority, and other emergency management partners. With RHAs and Environment and Climate Change Canada invited to attend. • Issue bulletins, as necessary, to ensure that all relevant ministries/agencies are aware of the Extreme Heat Emergency and are prompted to enact Extreme Heat Emergency plans where they exist. • Consider PHO/MHO/EMCR press release. • BC HEAT Committee to recommend EMCR to employ the use of provincial broadcast intrusive alerting • Conduct emergency advertising including geo-targeted radio live-reads, as feasible. • Issue heat health messages through digital platforms and if possible, radio or 	<p>All bullets general to all ministries and:</p> <ul style="list-style-type: none"> • Conduct hot wash, AAR, and implement lessons learned/observed.
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What we heard for revision to BC HARS: 2023

• Guidance needed detailing a base level of response	June 2023
• Additions needed for BC HARS appendix <ul style="list-style-type: none">• Communications templates• Glossary	May and June 2023
• Need for creation and inclusion of 'quick start guides' or checklists per table of recommendations	June 2023
• Trigger and escalation process to be clarified	May 2023
• Recommendation of when to start and closeout a response need to be explicit	May 2023
• Recommendations should be clearly parsed out (e.g., EMCR/MoH)	May 2023

Tool and Resources



Health checks during extreme heat events

A guide for doing in-person or remote health checks

Extreme heat events can lead to dangerous indoor temperatures in homes without functioning air conditioning. Health checks are used to assess how people at high risk of heat-related illness are doing during extreme events. In-person health checks are best, but a remote health check is better than no health check.

This guide has five pages with important information for doing health checks during extreme heat events.

- PAGE 1: Rapid risk assessment checklist
- PAGE 2: Recognizing and responding to heat-related illness
- PAGE 3: In-person health checks
- PAGE 4: Remote health checks
- PAGE 5: Measuring body and room temperature

Rapid risk assessment checklist

To assess whether someone is at risk, check all the personal factors that apply on the following list. The more boxes checked, the higher the potential risk.

☐ Older adult (60 years+)	The body's ability to cool itself is impaired as people age.
☐ Mental illness or cognitive impairment	Conditions such as schizophrenia, depression, anxiety, and dementia can reduce awareness of heat-related risks.
☐ Chronic disease	Chronic diseases such as diabetes, heart disease, respiratory disease, and cancer can limit the body's ability to cool.
☐ Living alone or socially isolated	People who live alone or do not have strong social connections are at higher risk because they have fewer people looking out for them.
☐ Substance dependency or use	The ability to sense and respond to heat can be affected by use of drugs or alcohol, especially for those who are dependent.
☐ Impaired or decreased mobility	People with impaired or reduced mobility might be less able to take protective measures during extreme heat events.
☐ Medication use	Some prescription medications, for common conditions can cause dehydration and affect the body's ability to cool itself.
☐ Poor physical fitness	People who are not engaged in regular physical activity are less able to keep cool in the heat.

www.ncceh.ca

HEAT WARNING VERSUS EXTREME HEAT EMERGENCY

HEAT WARNING

Daytime and overnight Heat Warning criteria have been met for the region.

DAY 1 DAY 2 DAY ...

HEAT WARNING TYPICAL SUMMER TEMPERATURE

Public Health Risk: MODERATE

Temperatures are VERY HOT

Keep cool and take it easy, especially during the hottest hours of the day.

Drink plenty of water and other fluids to stay hydrated, even if you do not feel thirsty.

Use air conditioning if you have it. If you do not have effective air conditioning, keep your home cooler by shading the windows from the outside using cardboard, awnings or shutters, or from the inside using curtains or blinds.

Indoor temperatures peak at around 9 p.m. and indoor environments may be most dangerous overnight. If the outside temperature is cooler than inside, open windows and doors and use fans to draw cooler air into the home. Fans alone cannot effectively lower internal body temperature, especially for older adults.

EXTREME HEAT EMERGENCY

Heat Warning criteria have been met and forecast shows that daily highs will substantially increase day-over-day for three or more days in a row.

DAY 1 DAY 2 DAY 3 DAY ...

EXTREME HEAT EMERGENCY TYPICAL SUMMER TEMPERATURE

Public Health Risk: VERY HIGH

Temperatures are DANGEROUSLY HOT

There is a significantly increased risk of severe injury and death for susceptible individuals living in dangerously hot indoor environments over 31°C.

Check in on others multiple times a day, especially in the evening.

Highest health risk is due to hot indoor temperatures building up day over day. Indoor temperatures can remain hot for days after a heat event.

Do You Know Who Are MOST SUSCEPTIBLE During Extreme Heat?

A susceptible individual with no way to cool the inside of their home should relocate to another cooler location or outside. Consider staying with friends or family that have air conditioning or cooler spaces. Alternatively, identify places in your community you can visit for a few hours to get cool.

Know the indoor temperature guide and keep a thermometer beside you so you know when your home is getting too hot.

OVER 31°C should be avoided for susceptible populations

FROM 26°C to 31°C may pose a risk to the most susceptible people

26°C or LESS is generally safe

If you have family or friends susceptible to extreme heat, help them plan ahead with the Extreme Heat Preparedness Guide and check in regularly with them during a heatwave. Learn how to do a health check in during a heatwave here.

- SENIORS
- People who LIVE ALONE
- People with PRE-EXISTING HEALTH CONDITIONS such as diabetes, heart disease or respiratory disease
- People with MENTAL ILLNESS such as schizophrenia, depression, or anxiety
- People with SUBSTANCE USE DISORDERS
- People with LIMITED MOBILITY
- People who are MARGINALLY HOUSED
- People who WORK IN HOT ENVIRONMENTS
- People who are PREGNANT
- INFANTS and YOUNG CHILDREN

Questions?

Thank you!

Shannon Waters, Medical Health Officer, Island Health
Shannon.Waters@islandhealth.ca

Nancy Clements, Nancy.Clements@islandhealth.ca

Feedback or comments on the HARS:
Heat.Response@gov.bc.ca

Drought and Water Scarcity Planning

VIC Region Spring Readiness Meeting

May 10, 2023

What is drought?

Drought is a recurrent feature of climate involving a shortfall in precipitation over an extended period, resulting in a water shortage. In BC, drought typically results from combinations of **insufficient snow accumulation**, **hot and dry weather** or a **delay in rainfall**.

Drought can lead to reduced water availability for:

-  **Community use** (e.g., household needs)
-  **Responder use** (e.g., fire suppression)
-  **Environmental needs** (e.g., aquatic species)
-  **Agricultural use** (e.g., crops and livestock)
-  **Economic use** (e.g., business and industry)



Why does drought matter in BC?

Most basins across the province were exposed to drought conditions in 2022.

85% of basins reached **Drought Level 3**
(Adverse Impacts Possible)

50% of basins reached **Drought Level 4**
(Adverse Impacts Likely)

26% of basins reached **Drought Level 5**
(Adverse Impacts Almost Certain)

2022 DROUGHT LEVELS AT A GLANCE																			
Drought Levels:	0	1	2	3	4	5													
BASINS	30-Jun	14-Jul	21-Jul	28-Jul	04-Aug	11-Aug	25-Aug	01-Sep	08-Sep	15-Sep	22-Sep	06-Oct	13-Oct	20-Oct	27-Oct	03-Nov	10-Nov	24-Nov	01-Dec
Fort Nelson	0	0	0	0	0	0	1	2	3	3	4	4	5	5	5	5	5	5	4
East Peace	0	0	0	1	1	1	1	2	3	3	3	4	5	5	5	5	5	5	5
North Peace	0	0	0	0	0	0	1	1	2	2	3	4	5	5	5	5	5	5	5
South Peace	0	0	0	0	0	0	1	2	3	3	3	4	5	5	5	5	5	5	5
Northwest	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Stikine	0	0	0	1	1	1	1	0	0	0	1	1	1	2	1	1	1	1	1
Skeena-Nass	0	0	0	1	1	1	1	0	0	0	1	2	2	2	2	1	1	1	1
Bulkley-Lakes	0	0	0	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3
Finlay	0	0	0	1	1	1	2	2	2	2	2	3	3	4	4	4	4	4	4
Parsnip	0	0	0	1	1	1	1	1	1	1	2	3	3	4	4	4	4	4	4
Upper Fraser West	0	0	0	1	1	1	1	1	1	1	1	2	2	3	2	2	2	2	2
Upper Fraser East	0	0	0	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3
Upper Columbia	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
Lower Columbia	0	0	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	2	2
West Kootenay	0	0	1	1	1	1	1	1	1	1	1	2	2	3	3	3	2	2	2
East Kootenay	0	0	0	0	0	1	1	1	1	1	1	2	2	3	3	3	2	2	2
Kettle	0	0	0	1	1	1	3	3	3	3	3	4	4	5	5	5	3	3	3
Middle Fraser	0	0	0	1	1	1	1	1	1	1	1	2	2	3	3	3	3	3	3
Lower Thompson	0	0	0	0	0	1	1	1	1	1	1	2	2	3	3	3	3	3	3
North Thompson	0	0	0	0	0	1	1	1	1	1	1	2	2	3	3	3	3	3	3
South Thompson	0	0	0	0	0	1	1	1	1	1	1	2	2	3	3	3	3	3	3
-Salmon River	0	0	0	0	0	1	2	2	2	2	2	2	2	3	3	3	2	2	2
Nicola	0	0	0	0	0	1	1	1	2	2	2	3	3	4	4	4	3	3	3
-Coldwater River	0	0	0	0	0	1	2	2	3	3	3	3	3	4	4	4	3	3	3
Okanagan	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2
Similkameen	0	0	0	0	0	1	1	1	2	2	2	2	2	3	3	3	3	3	3
Central Pacific Range	0	0	0	1	1	1	1	2	2	2	2	3	3	3	3	3	3	4	3
Eastern Pacific Range	0	0	0	1	1	1	1	2	2	2	3	4	4	5	5	3	3	4	4
Sunshine Coast	0	0	0	1	1	1	2	2	3	3	4	4	5	5	5	4	4	4	3
Lower Mainland	0	0	0	1	1	1	2	2	3	4	4	5	5	5	5	4	3	3	4
Central Coast	0	0	0	0	1	1	2	1	1	2	2	3	4	4	4	3	3	3	1
West Vancouver Island	0	0	0	1	2	2	3	3	3	3	4	5	5	5	4	2	2	4	3
East Vancouver Island	0	0	0	1	2	2	3	3	3	3	4	4	5	5	5	3	3	4	3
Haida Gwaii	0	0	0	0	1	2	3	1	0	0	1	3	4	4	2	0	0	1	0
Renowned B.C. Water Management Branch - Ministry of Forests																			

Prepared By: Water Management Branch - Ministry of Forests

How do you plan for drought?

Provincial Products

Local Products

Water Supplier Products

All-Hazards

The All-Hazard Plan

BRITISH COLUMBIA Emergency Management System 2016

LOCAL EMERGENCY MANAGEMENT PLAN TEMPLATE FOR LOCAL AUTHORITIES AND FIRST NATIONS

HAZARD, RISK AND VULNERABILITY ANALYSIS (HRVA) FOR LOCAL AUTHORITIES AND FIRST NATIONS

Emergency ManagementBC

Drought & Water Scarcity

British Columbia Drought and Water Scarcity Response Plan

FIRST NATIONS AND LOCAL AUTHORITY EMERGENCY MANAGEMENT PLAN FOR WATER SCARCITY TEMPLATE

Dealing with Drought A Handbook for Water Suppliers in British Columbia

EMERGENCY RESPONSE AND CONTINGENCY PLANNING FOR SMALL WATER SYSTEMS

JUNE 2016

HEALTH PROTECTION BRANCH
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1st Edition, March 2021

Ministry of Emergency Management and Disaster Response

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Updated August 2022



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2nd Edition, Fall 2008



Emergency ManagementBC

Drought & Water Scarcity

British Columbia Drought and Water Scarcity Response Plan



Updated August 2022

Prepared by the Ministry of Land, Water and Resource Stewardship
on behalf of the Inter-agency Drought Working Group

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LOCAL EMERGENCY MANAGEMENT PLAN TEMPLATE FOR LOCAL AUTHORITIES AND FIRST NATIONS A template intended for the development of an all hazard, local emergency management plan. 2nd Edition, January 2021

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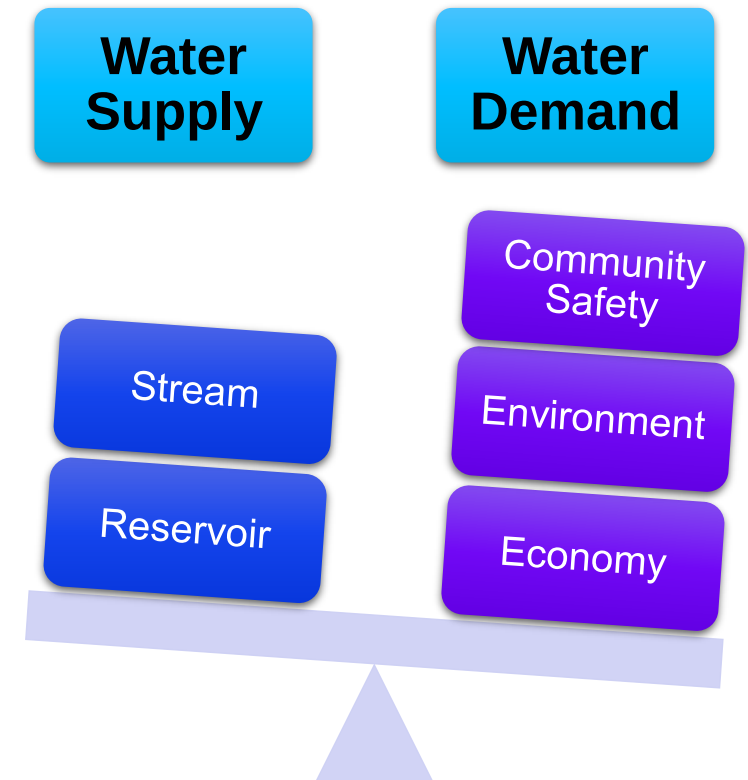
BRITISH
COLUMBIA

What is a Water Scarcity Event?

A water scarcity event occurs when the combined need from all community uses (**water demand**) exceeds or is at risk of exceeding the supply available under normal operations (**water supply**).

Water scarcity events can be caused by:

- Droughts
- Infrastructure capacity, condition, or failure
- Contamination of supply
- Limitations on available storage



Water Scarcity Template Overview

FIRST NATIONS AND LOCAL AUTHORITY EMERGENCY MANAGEMENT PLAN FOR WATER SCARCITY TEMPLATE

An emergency management plan template for water scarcity
intended to supplement a local emergency management plan.

1st Edition, March 2023

How?

Emergency Management and Climate Readiness (EMCR) engaged KPMG in February to develop a template that could support First Nations and local authorities in their respective efforts to plan responses to local water scarcity emergencies.

Why?

The primary objective of the template is to support communities in **reducing risk related to water scarcity** events in the province and **support coordinated and effective response activities**.

Water scarcity is a growing risk in the Province, driven by:

- Increasing demands for water;
- Declining water supplies; and
- The impacts of climate change.

Water Scarcity Template Overview

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1st Edition, March 2023

Draft for Discussion

Developed for First Nations and Local Authorities

Key Contents Include...

“How to Use This Template” and Introductory Text

Scope (Supply, Demand, and Community Overview)

Water Scarcity Response Structure

Local Response Measures:

- Situational Awareness and Assessment of Response Measures
- Community Actions and Policy Options
- Logistics Options

17 Supporting Appendices

Water Scarcity Template Overview

FIRST NATIONS AND LOCAL AUTHORITY EMERGENCY MANAGEMENT PLAN FOR WATER SCARCITY TEMPLATE

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1st Edition, March 2023

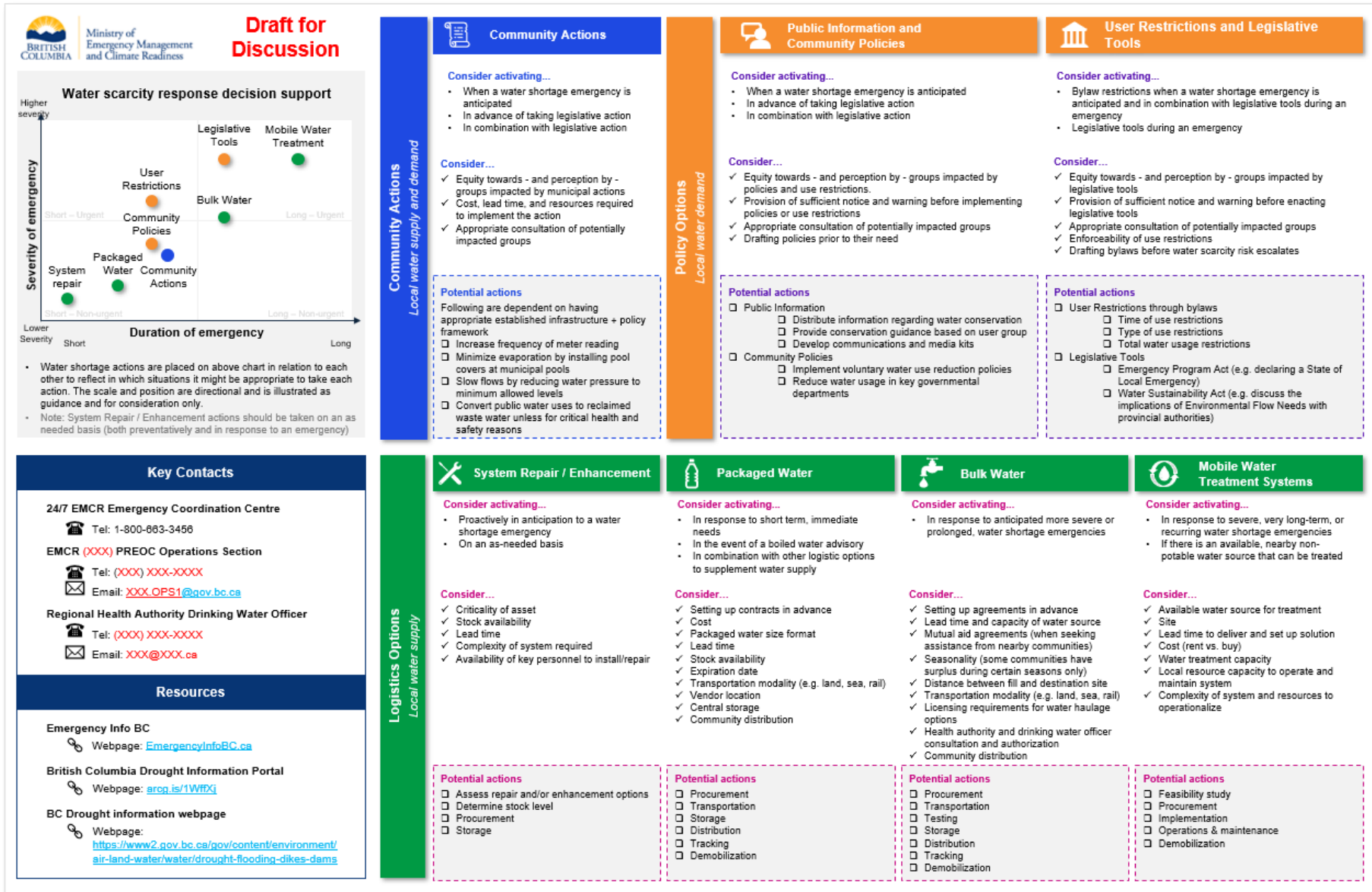
In Scope

- Preparedness and response considerations
- First Nations considerations
- Local water supply, system, and critical assets
- Local water demand, critical users, and water usage requirements
- Logistics options to increase water supply

Out of Scope

- Mitigation and recovery considerations
- Water infrastructure or system improvements outside of events
- Catastrophic event preparedness and response
- Taking the place of community policies, bylaws, etc.

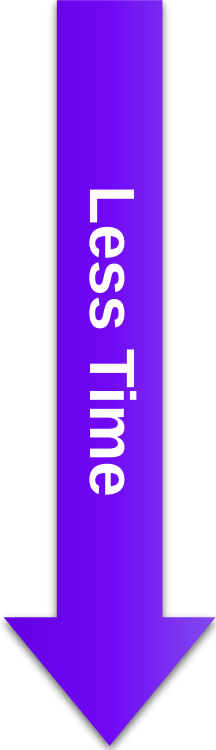
Water Scarcity Response Placemat



Drafting Your Plan

Time-Limited Planning Approach

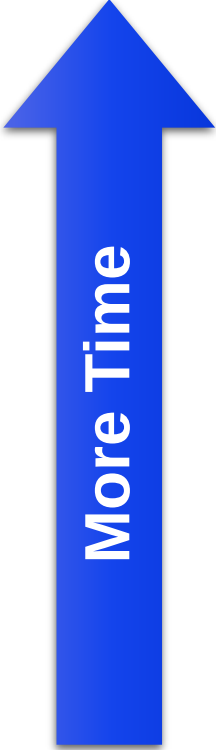
Thorough Planning Approach



Less Time

- **Timeline:** Hours/Days
- **Contributors:** Bring together key responding personnel and agencies
- **Content:** Focus on critical sections
 - Consider the Scope of the Plan
 - Understand Water Demand
 - Understand Water Supply
 - Review Response Options
 - Prioritize Response Options

- **Timeline:** Weeks/Months
- **Contributors:** Bring together all relevant responding personnel and agencies
- **Content:** Consider all sections and appendices relevant to your community; validate content with key personnel



More Time

Plan Overview

Scope of the Plan	Context
Community or regional scope	Community or region that the plan applies to, noting nearby First Nations and local authorities that are not in scope for clarity.
Geographic scope	Jurisdictional and geographic boundaries covered by the plan.
Types of events	Types of water scarcity events considered under the plan (such as drought, main line failure, chemical infiltration), as well as the types of events that are specifically excluded.
Organizations involved	Organizations that are considered under the plan such as local, regional and/or provincial authorities, local water purveyors, and other entities, as well as any that are specifically excluded.

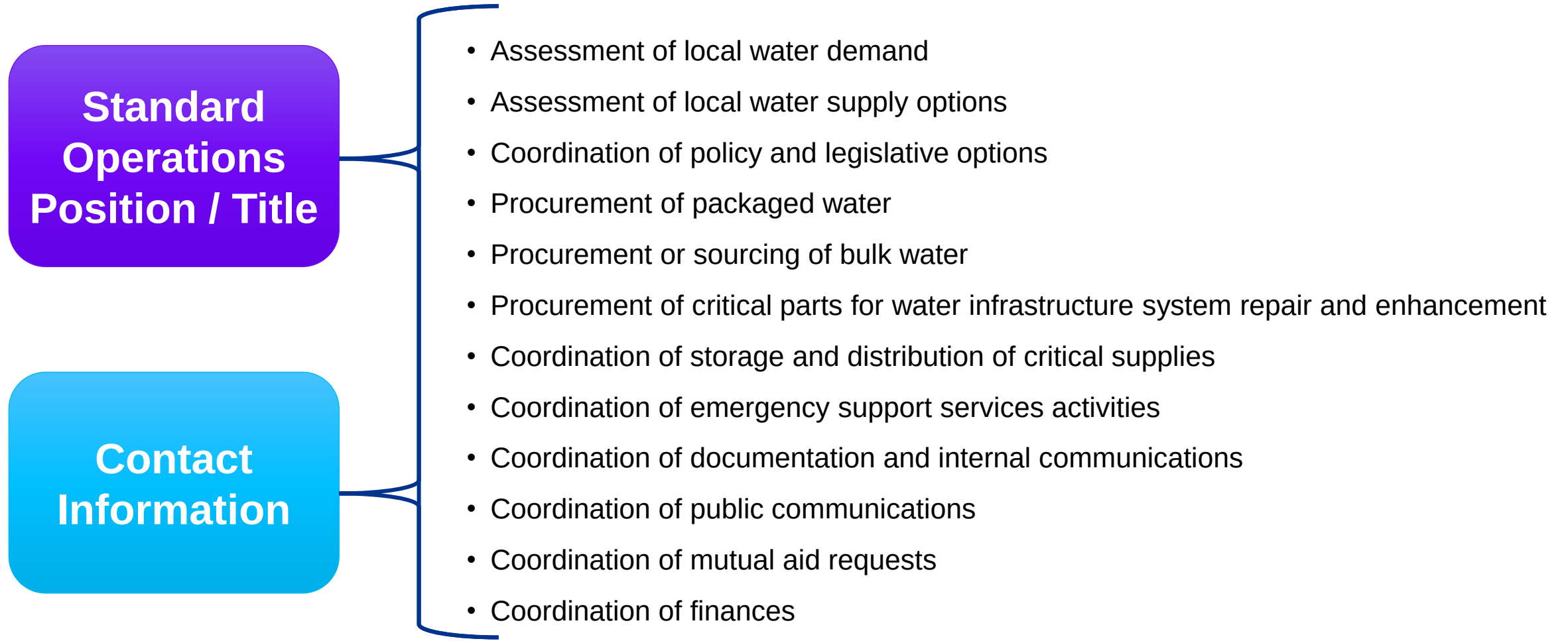
Local Water Supply

- **Local Water Sources**
- **Minimum Flow Rates (L/s) or Levels (m)**
- **High Risk Seasons or Periods**

Local Water Demand

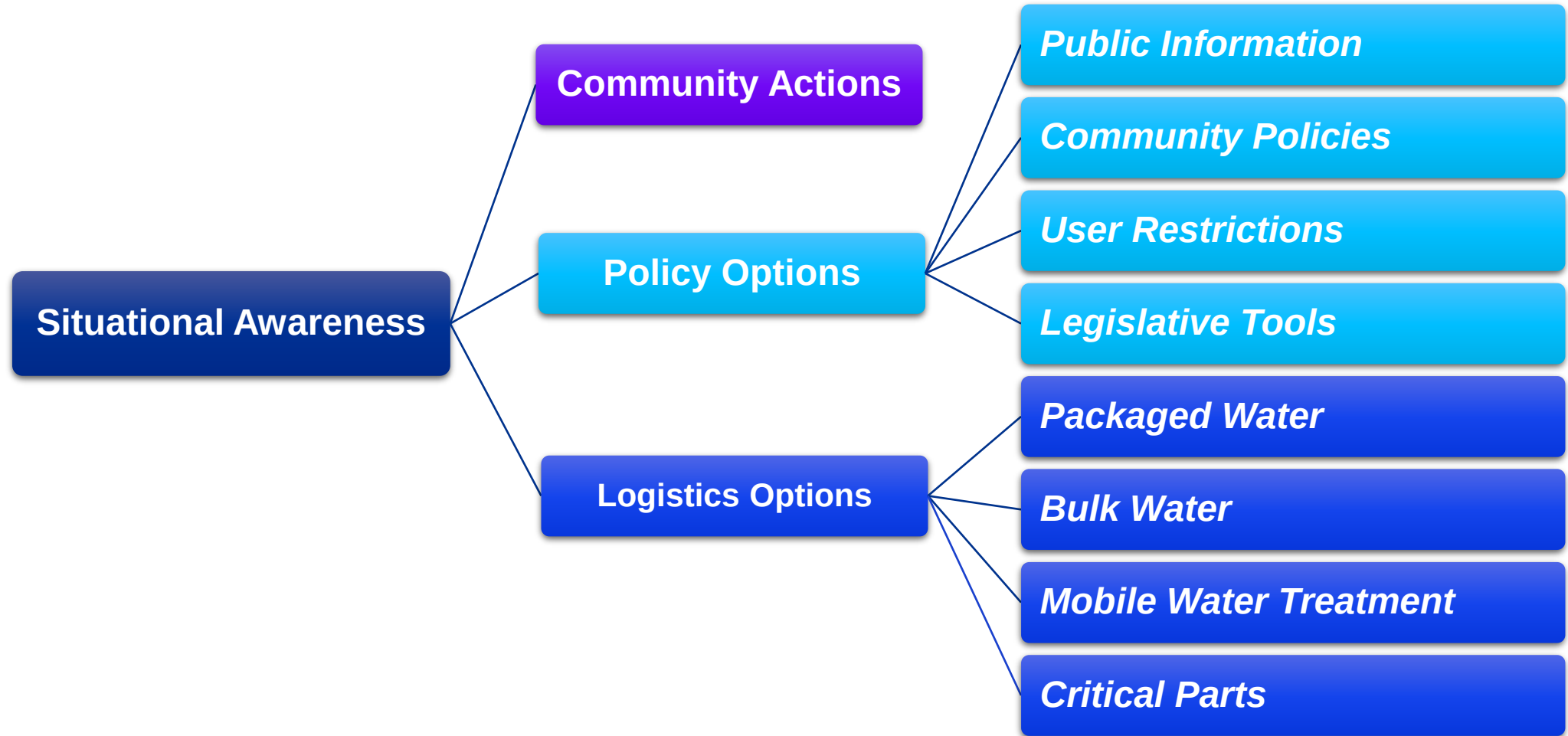
- **Key Water Demand Categories**
- **Water Demand Flow Rate (L/s)**

Response Structure



Response Measures

For each response option, communities should consider local capacity and resources needed, cost, and lead time to implement the option.



Community Actions

Communities can consider additional actions and steps to respond to water scarcity that are outside of formal policies and logistics activities. “Incident Levels” are to be defined by the community.

Incident Level	Response Options
[Low]	<ul style="list-style-type: none">• Plan for increases in frequency of meter reading.• Ensure meters are working effectively.• Collaborate with water purveyors and major water users (including license holders) to identify water-saving measures.
[Medium]	<ul style="list-style-type: none">• Increase frequency of meter reading.• Track and fix any leaks based on metering usage.• Prepare conservation retrofit kits, such as low-flow taps.• Modify municipal water features into a closed-loop system using recycled water only.
[High]	<ul style="list-style-type: none">• Distribute retrofit kits.• Minimize evaporation by installing pool covers at municipal pools.• Slow flows by reducing water pressure to minimum allowed levels.• Convert public water uses to reclaimed wastewater unless for critical health and safety reasons.

Public Information

Consider aligning public information efforts with local water purveyors, neighboring communities, and provincial and regional authorities.

Incident Level	Response Options
[Low]	<ul style="list-style-type: none">• Provide suggestions on conservation efforts and raise awareness of possible restrictions by potential stages.• Provide public information on the causes of water scarcity.
[Medium]	<ul style="list-style-type: none">• Prepare and distribute water conservation materials.• Provide possible conservation actions by specific customer types.• Coordinate the development of communications and media kits – products that help explain key information about your community that can be used for future public information efforts.
[High]	<ul style="list-style-type: none">• Continue or increase exposure to general outreach and awareness program.

Community Policies

Consider equity towards, and perception by, groups impacted by community policies introduced.

Incident Level	Response Options
[Low]	<ul style="list-style-type: none">• Draft community policies to prepare for increases in incident levels.• Introduce water supply conservation policies.• Issue permits to identify exceptions to the conservation policies.• Notify planned reduction in water quality for critical water users (e.g. healthcare providers, major industries/agricultural organizations).
[Medium]	<ul style="list-style-type: none">• Enforce hydrant opening.• Implement voluntary water use reduction in line with public information and communication (e.g. taking shorter showers, ensure tap is shut when brushing etc.).
[High]	<ul style="list-style-type: none">• Implement policies to reduce water usage in key government departments (e.g. parks, street cleaning, toilet facilities in municipal properties) in alignment with current/anticipated user restrictions.

User Restrictions and Penalties

Consider: drafting bylaws before water scarcity risk escalates; the enforceability of use restrictions; and policy equity towards all groups within your community.

Incident Level	Response Options
[Low]	<ul style="list-style-type: none">• Draft potential bylaws that will be considered for use at higher incident levels. Consider thresholds for penalties for various user groups.• Initiate planning efforts to consider critical vs non-critical water users. Engage sector and agency representatives as appropriate.• Provide internal and external notifications for anticipated user restrictions.
[Medium]	<ul style="list-style-type: none">• Implement user restrictions authorized under local policies or bylaws (e.g., ban filling pools).• Limit water usage up to a widely communicated volume.
[High]	<ul style="list-style-type: none">• Consider further restrictions based on:<ul style="list-style-type: none">◦ Time of day;◦ Designated days;◦ Type of use (e.g., residential, agricultural, commercial); and/or◦ Total water usage (up to a widely communicated volume).• Impose fines, potentially at graduated levels depending on severity/recurrence of offense.• Revoke licenses for commercial organizations where appropriate.

Legislative Tools

Communities can consider provincial and federal legislation options to decrease the demand for water or manage the supply of water.

Emergency Program Act

Declaration of a State of Local Emergency and use of Local Powers

Communities considering this options should coordinate with their local Ministry of Emergency Management and Climate Readiness Regional Office.

Water Sustainability Act

Discussion with the Ministry of Forests regarding the implications of pre-established Environmental Flow Needs

Communities considering this option should consider reaching out to the Ministry of Forests well in advance of drought events.

Logistics: Packaged Water

Packaged water logistics focuses on water in pre-packaged bottles and jugs. It is generally considered to be a short-term option, and largely based on vendor location, availability, and accessibility to the community.

Key Considerations	Modifiable Steps
<ul style="list-style-type: none">• Cost• Lead time• Size format• Vendor location• Stock availability• Central storage• Community distribution	<ol style="list-style-type: none">1. Procurement2. Transportation3. Storage4. Distribution5. Tracking6. Demobilization

Logistics: Bulk Water

The bulk water option considers potable water and/or non-potable water being sourced locally/regionally, typically from a watershed or reservoir, and is transported through a licensed water haulage vendor to the destination. It is generally considered to be a short-term option, and largely based on supplier location.

Key Considerations	Modifiable Steps
<ul style="list-style-type: none">• Health authority and Drinking Water Officer consultation and authorization• Lead time• Mutual aid agreements• Transportation modality and distance between source and destination• Seasonality• Community distribution• Licensing requirements for water haulage vendors	<ol style="list-style-type: none">1. Procurement2. Transportation3. Testing4. Storage5. Distribution6. Tracking7. Demobilization

Logistics: Mobile Water Treatment Systems

Mobile water treatment systems rely on non-potable water from an available water source to be treated using a mobile treatment system (i.e. not a water treatment plant). This option is considered long-term, and is largely based on stock availability and the complexity of system required.

Key Considerations	Modifiable Steps
<ul style="list-style-type: none">• Available water source for treatment• Site applicability• Lead time• Cost (rent vs. buy)• Water treatment capacity• Local resource capacity to operate and maintain system• Complexity of system and resources to operationalize	<ol style="list-style-type: none">1. Feasibility study2. Procurement3. Implementation4. Operations & maintenance5. Demobilization

Logistics: Critical Parts (System Enhancement/Repair)

Critical parts and other resources can be procured to repair or enhance existing potable and drinking water systems. This is generally considered a long-term option, and is based on stock availability, complexity of system required.

Key Considerations	Modifiable Steps
<ul style="list-style-type: none">• Criticality of asset• Stock availability• Lead time• Complexity of system required	<ol style="list-style-type: none">1. Assessment of options2. Determine stock level3. Procurement4. Storage

Appendices 1-9

Appendices 1-9 provide additional details, information, and key resources that are referenced in the body of the plan. Appendices and their contents should be adjusted to include local resources and reflect the context of the community it is serving.

1. Related Documents Map
2. Key Resources and Links
3. Acronyms
4. Glossary
5. Distribution Lists
6. Call-Out and Contact Lists
7. Local Water Supply Information
8. Local Water Demand Information
9. Local Water Scarcity Risk Assessment

Examples:

Flow Rate Table

The following table outlines the seasonal range of stream flows in litres per second (L/s) for the [insert scope: primary and/or regional water source(s)].

Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average												
High												
Low												
Minimum												

Definitions

Average: monthly average based on historical data (L/s)

High: seasonal high flows based on historical data (L/s)

Low: seasonal low flows based on historical data (L/s)

Minimum: threshold indicating that the water supply has reached a critical point and is no longer able to serve the community's demand. This value can be determined with consideration of the following:

- Local water demand;
- Environmental Flow Needs (EFN); d
- functioning of the aquatic system; an
- Commitment and obligations under e
- [Other considerations]

Potable Water

Category	Sub-Category	Delivery Location and Address	Demand (L/s)	Special Requirements	Primary Contact Name	Primary Phone Number / Email Address
Education	School	[ABC Elementary School; XX 1 st Street, City].	[L/s]	[Delivery in 5-gal jugs]	[John Doe]	[Cell: 555-555-5555]
Neighboring Communities	First Nation					
Neighboring Communities	Local Authority					
Agriculture	Animal Husbandry					

Risk Profile

✓ Consider mapping key hazards relevant to water scarcity incidents within a risk mapping table. A sample format is provided below, and a more in-depth process is provided within the "Companion Guide for the HRVA Tool" (p. 61-66).

[Community] Risk Profile for Water Scarcity Incidents		Consequence				
		None	Low	Medium	High	Extreme
Likelihood	Almost Certain					
	Likely				Drought (Stage 4)	
	Possible					
	Unlikely					
	Rare					

High Risk: Higher Consequence, Higher Likelihood

Moderate Risk: Lower Consequence, Higher Likelihood OR Higher Consequence, Lower Likelihood

Low Risk: Lower Consequence, Lower Likelihood

Appendices 10-17

Appendices 10-17 provide additional details, information, and key resources that are referenced in the body of the plan. Appendices and their contents should be adjusted to include local resources and reflect the context of the community it is serving.

10. Response Options Prioritization Table

11. Logistics Planning Considerations – Packaged Water

12. Logistics Planning Considerations – Bulk Water

13. Logistics Planning Considerations – Water Treatment

14. Mutual Aid and Supply Agreements

15. Logistics Tracking Template

16. Logistics Considerations – Water System Repair / Enhancement

17. Engagement and Communications Materials

Examples:

This appendix provides a tool for analyzing and documenting the community's response options.

Hazard	Impact	Likelihood	Primary Response Options	Reference/Section
[Drought (Stage 4)]	[High]	[Likely]	1) [Primary Option]	[Plan Section XX]
			2) [Secondary Option]	[Plan Section XX]
			3) [Tertiary Option]	[Plan Section XX]
			4) [Tertiary Option]	[Plan Section XX]
[Moderate/High Risk Hazard]	[Ranking]	[Ranking]	1) [Option Description]	[Plan Section XX]
			2) [Option Description]	[Plan Section XX]
			3) [Option Description]	[Plan Section XX]

Delivery Tracking Template

Address	First Name	Last Name	Date of Delivery	Delivery Confirmation [Y/N]	Additional Information
[E.g., 123 Smith St]	[John]	[Smith]	[8/16/2023]	[Y]	

Pick-Up Tracking Template

Address	First Name	Last Name	Date of Pick-up	Pick-up Confirmation [Y/N]	Additional Information
[E.g., 123 Smith St]	[John]	[Smith]	[8/16/2023]	[Y]	

The communication channels identified here are specifically relevant to [local government's] priority impacted and interested parties.

Channel	Reach	Timing/Lead Time	Contact
Local Government website	Parties actively seeking information about water scarcity situation and/or local government response	24 hours or less	[Contact Name / Title]
Local Radio Station news	[geographic area; audience profile]	Daily/ 24 hours or less	[Contact Name / Title]
Local Newspaper	[geographic area; audience profile]	Weekly/24 hours or less	[Contact Name / Title]
Alert App or similar local apps	[geographic area; audience profile]	Daily/	[Contact Name / Title]
Provincial radio news	[geographic area; audience profile]	Daily/ 24 hours or less	[Contact Name / Title]
Provincial television news	[geographic area; audience profile]	Daily/ 24 hours or less	[Contact Name / Title]
Posted bulletins	[geographic area; audience profile]	Daily	[Contact Name / Title]
BC Ferries Announcements	[geographic area; audience profile]	Daily	[Contact Name / Title]
Highway electronic signboards	[geographic area; audience profile]	Daily	[Contact Name / Title]
Sandwich boards	[geographic area; audience profile]	Daily	[Contact Name / Title]

Next Steps

Engagement and Feedback

March – May 2023

- Spring Readiness Workshops
- First Nations Health Authority
- First Nations' Emergency Services Society
- Indigenous Services Canada
- Inter-Agency Drought Working Group

Update Template and Placemat

May 2023

- Capturing and considering all feedback received
- Revising products as required

Release Template and Placement

May/June 2023

- Providing template to Ministry of Emergency Management and Climate Readiness for release
- Continuing support as requested

Thank you! We want to hear from you!

Local Authority Feedback

Spring Readiness Meeting:
Questions for Local Authorities -
VIC Region



First Nations Feedback

Spring Readiness Meeting:
Questions for First Nations - VIC
Region



Agency Feedback

Spring Readiness Meeting:
Questions for Agency
Representatives - VIC Region



David Hewson, Manager
Critical Infrastructure Resilience & Emergency Management Practice
KPMG LLP
204-955-5425 | dhewson@kpmg.ca

BC Emergency Alert

Seasonal Readiness Update 2023



Ministry of
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and Climate Readiness

What are BC Emergency Alerts?

BC Emergency Alerts



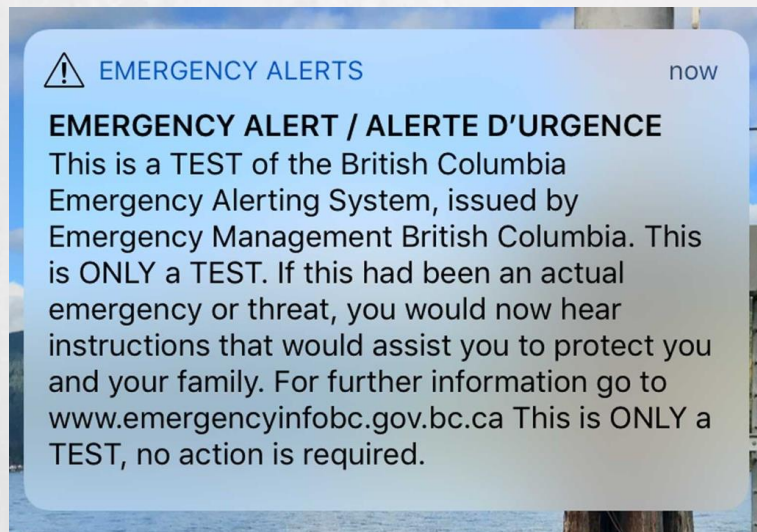
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- BC Emergency Alerts are broadcast urgent messages to radios, tv, and/or cellphones in targeted areas
- BC Emergency Alerts are faster, and can reach more people instantly, compared to other methods of information sharing

BC Emergency Alerts



Ministry of
Emergency Management
and Climate Readiness



- On cellphones: one way push message (not a text) with summary info & clickable hyperlink
- On radio & TV: interrupts regular programming
- These alerts are “intrusive”—they force their way onto media channels—so no need to sign up or download an app
- People cannot opt-out
- Emergency Alerts are issued using a national software system called Alert Ready

How to have an alert issued



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1. Complete the Emergency Alert Submission form and send to EMCR (unless there is no time or ability)
2. Call the ECC @ 1-888 backline or 1-800-663-3456
3. Work with EMCR to confirm alert message and area



Ministry of
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and Climate Readiness

What's new for 2023?

Enhancements to BC Emergency Alerting



Ministry of
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and Climate Readiness

1. Future support for more types of hazards
2. Streamlined criteria for when an alert can be issued
3. Updated Emergency Alert Submission (EAS) form
4. Alert process refinements
5. New recommendations for preparing your community to alert



Ministry of
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and Climate Readiness

How can you learn more?

Upcoming Learning Opportunities



Ministry of
Emergency Management
and Climate Readiness

1. Video-based training
 - Short (~15 minutes) videos will be distributed to communities this spring
 - If more information is needed, it can be requested from Regional Managers
2. New alerting guidelines for First Nations and Local Governments requesting alerts
3. Public information about alerting is available on the EMCR website



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Emergency Management
and Climate Readiness

Questions?



Fisheries and Oceans
Canada

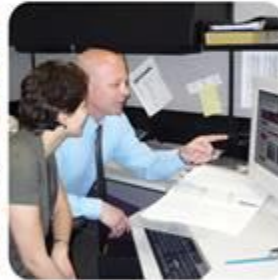
Pêches et Océans
Canada

Canadian
Coast Guard

Garde côtière
canadienne



Safety First, Service Always



Maritime Mass Rescue Operations Mass Casualty Incident

Mass Rescue Operation (MRO)



MRO

“an incident occurring on the water that is so severe that the regulated and standing federal SAR system is not sufficient to respond to all aspects of the search and rescue of survivors and/or the preservation of life.”

Passenger Ships



**Increases in Passenger Ship
size & numbers**

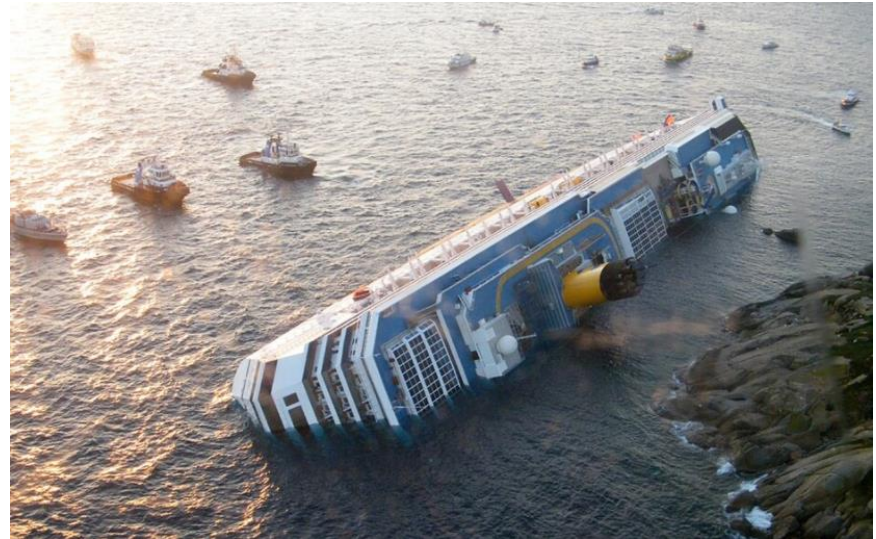


A size comparison between the Titanic and a modern cruise ship.

Recent Passenger Ship Disasters



Passenger Ship Disaster “Costa Concordia” 2012



Passenger Ship Disaster “Viking Sky” 2019



Maritime Disaster Evacuation



- Mass Rescue Operations are low frequency, high consequence events
- e.g. groundings, collisions, sinking, fire, Aircraft emergency



The Cruise Line Industry



- Typical 2700 passenger cruise ship





Victoria Clipper

Operates an international ferry service between Seattle Washington State USA and Victoria BC Canada on a year round service.

LOA - 52 m

Beam – 12 m

Capacity - 525 pass

Black Ball Ferry Line

Operates MV Coho an international ferry service between Port Angeles Washington State USA and Victoria BC Canada on a year round service.

LOA – 104 m

Beam – 21.95

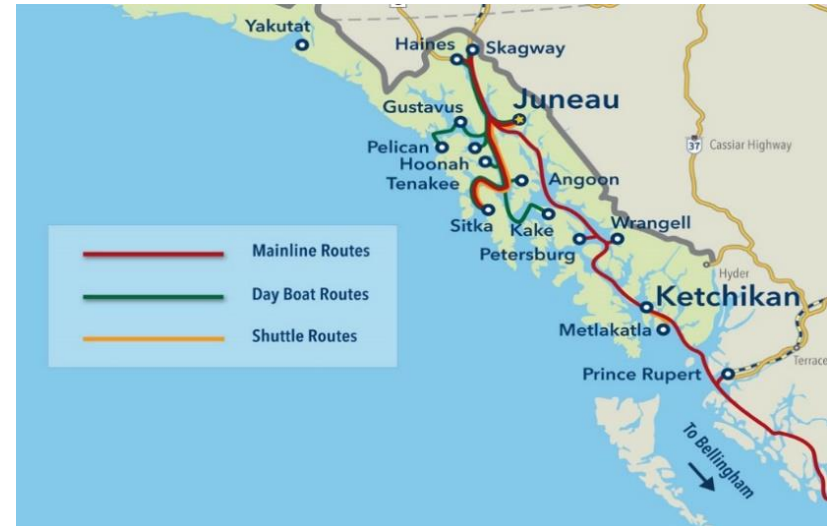
Capacity – 1000 pass + 110 cars



Alaska Marine Highway System



- **Alaska State Ferries operate a regular ferry service between Bellingham, Prince Rupert and Ketchikan, Alaska**



Victoria MRO/MCI Framework



The Victoria MRO/MCI Framework will provide for the local coordinated deployment of federal, provincial, and municipal agencies during a Marine Mass Rescue Operation or large-scale humanitarian mission in the vicinity of The City of Victoria.

MRO Response Partners



Federal Agencies

Canadian Coast Guard
Canadian Armed Forces
Canada Border Services Agency
Transport Canada
RCMP
Public Safety Canada
Public Health Agency of Canada

Municipal Agencies

City of Victoria
Victoria Fire Rescue Dept
Victoria Police Dept
Victoria Emergency Support
Services

Provincial Agencies

Emergency Management & Climate
Readiness BC(EMCR)
Health Emergency Management
BC(HEMBC)
BC EHS(BC Ambulance)
BC Transit
BC Ministry of Health (BC MOH)

United States Coast Guard

USCG: D 13 Seattle

Volunteer Organizations

Royal Canadian Marine SAR
Emergency Support Services

Industry

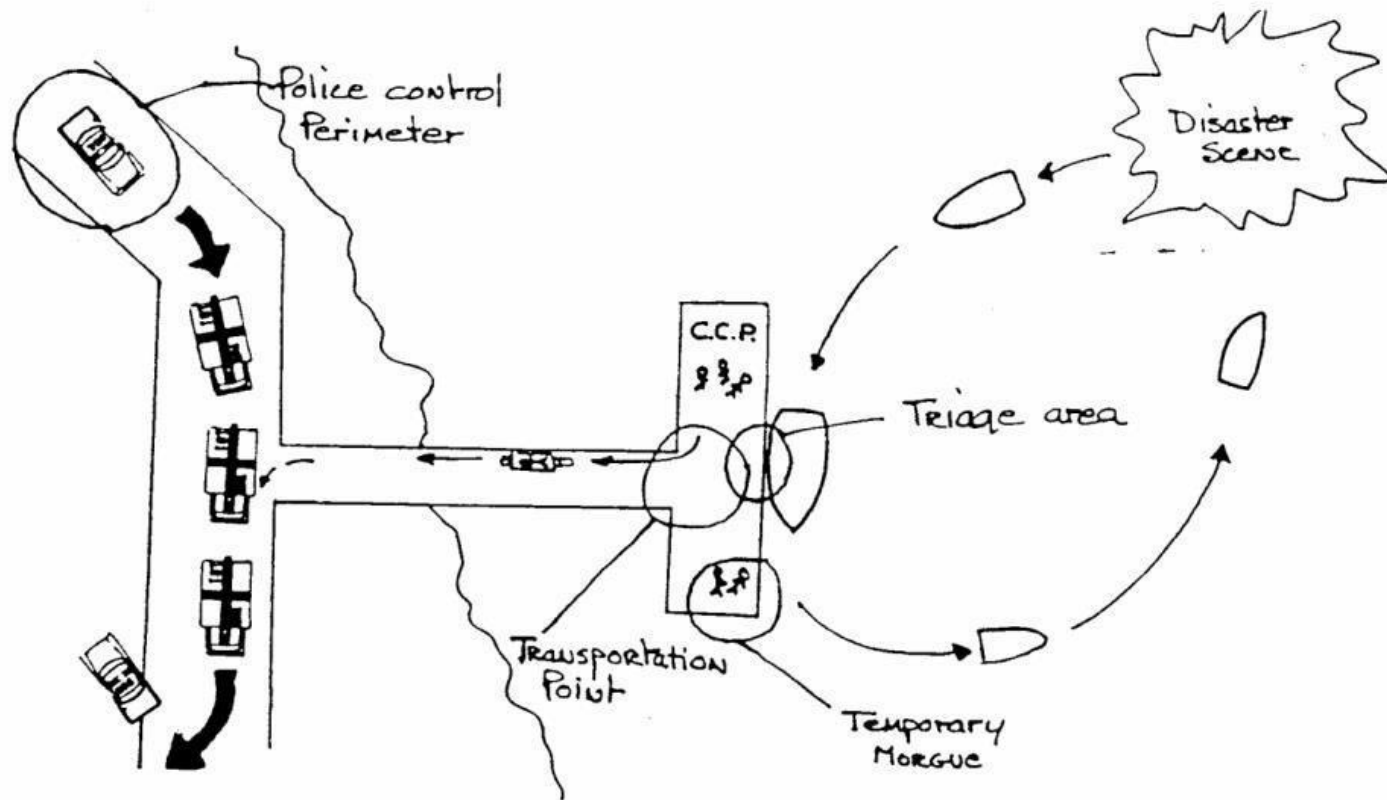
Cruise Line Rep
Commercial Towing

A Place of Safety

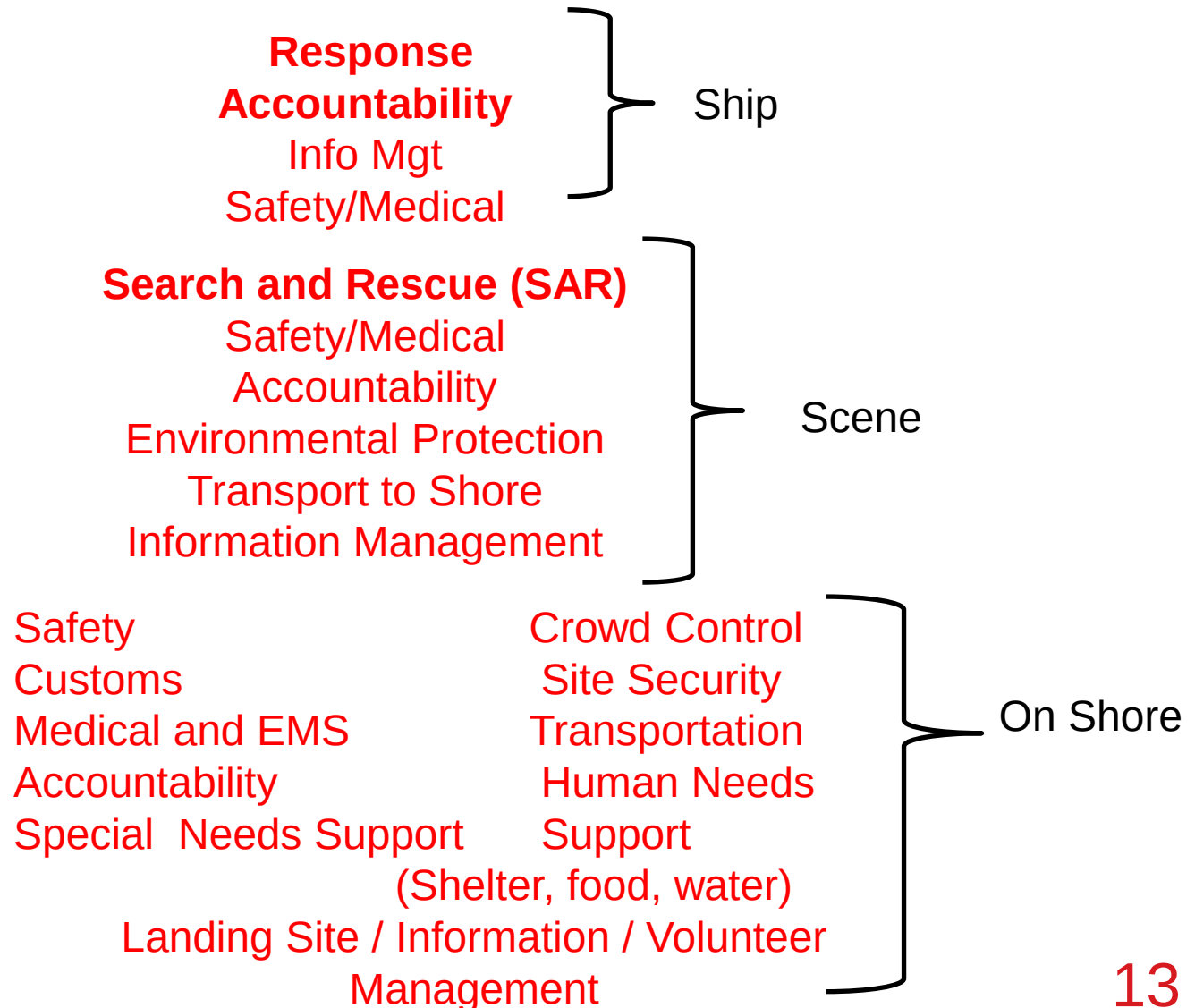


- *A location where rescue operations are considered to terminate; where the survivors' safety of life is no longer threatened*
- *Where their basic human needs (such as food, shelter and medical needs) can be met*
- *A place from which transportation arrangements can be made for the survivors' next or final destination*

Disaster Scene Layout



Response Locations during an MRO



Shore side Response



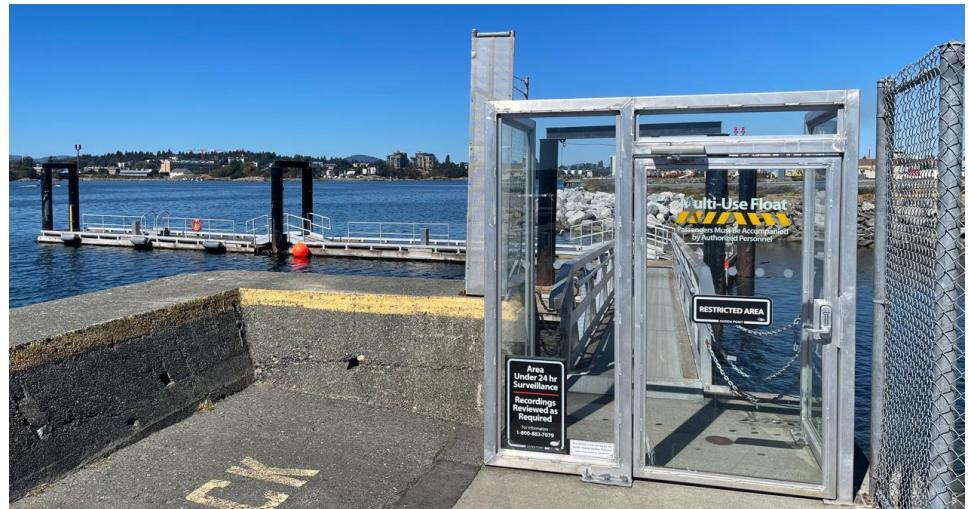
- A Shore side Response Framework defines roles and Responsibilities for each agency/organization



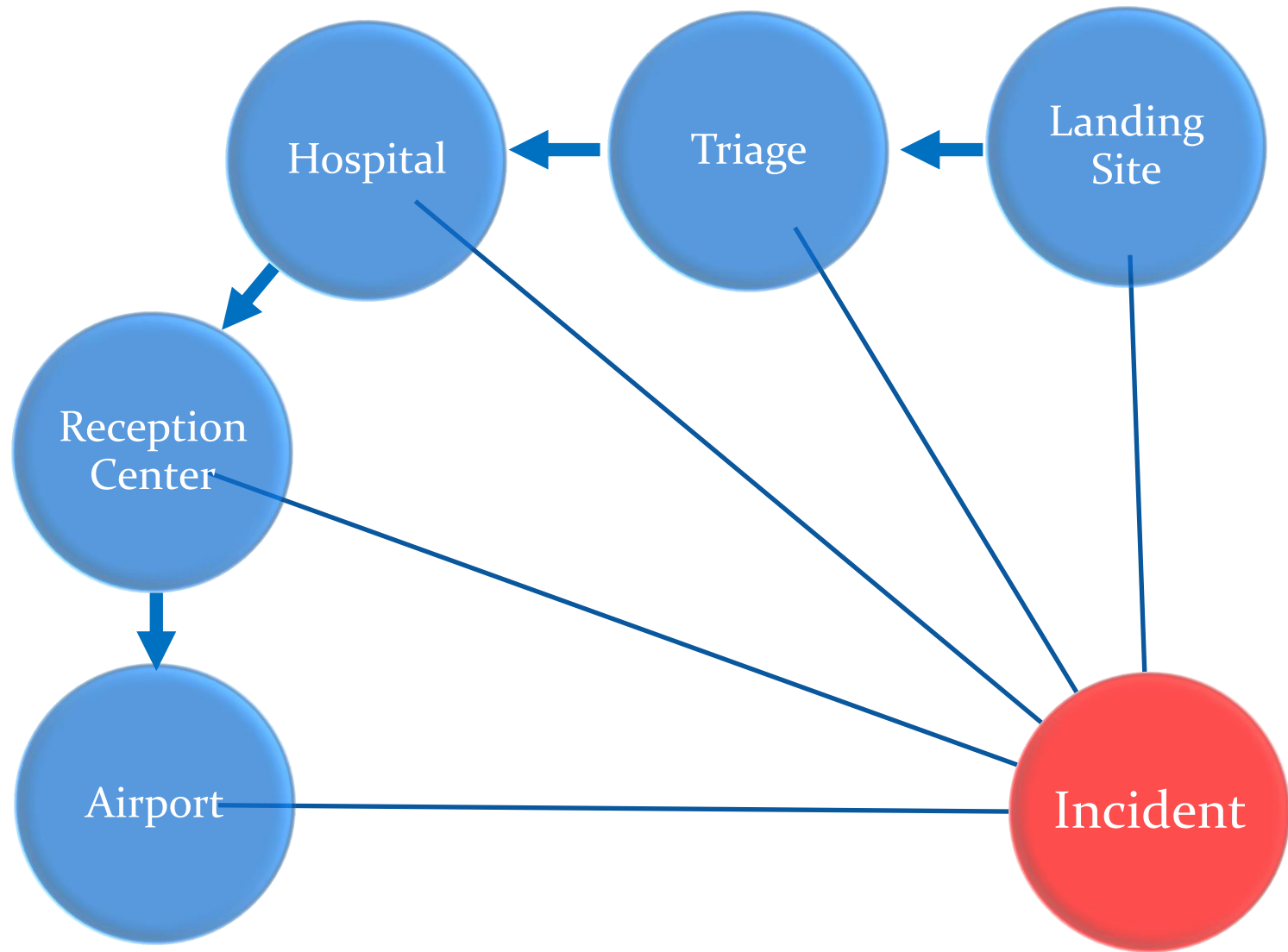
Ogden Point Cruise terminal Landing Site



- The purpose of the MRO Framework is to provide for a rapid, organized, and coordinated shore-side response to a mass rescue operation
- The Landing Site, Casualty Collection Area is where passengers are received by first responders such as Fire and BC Ambulance



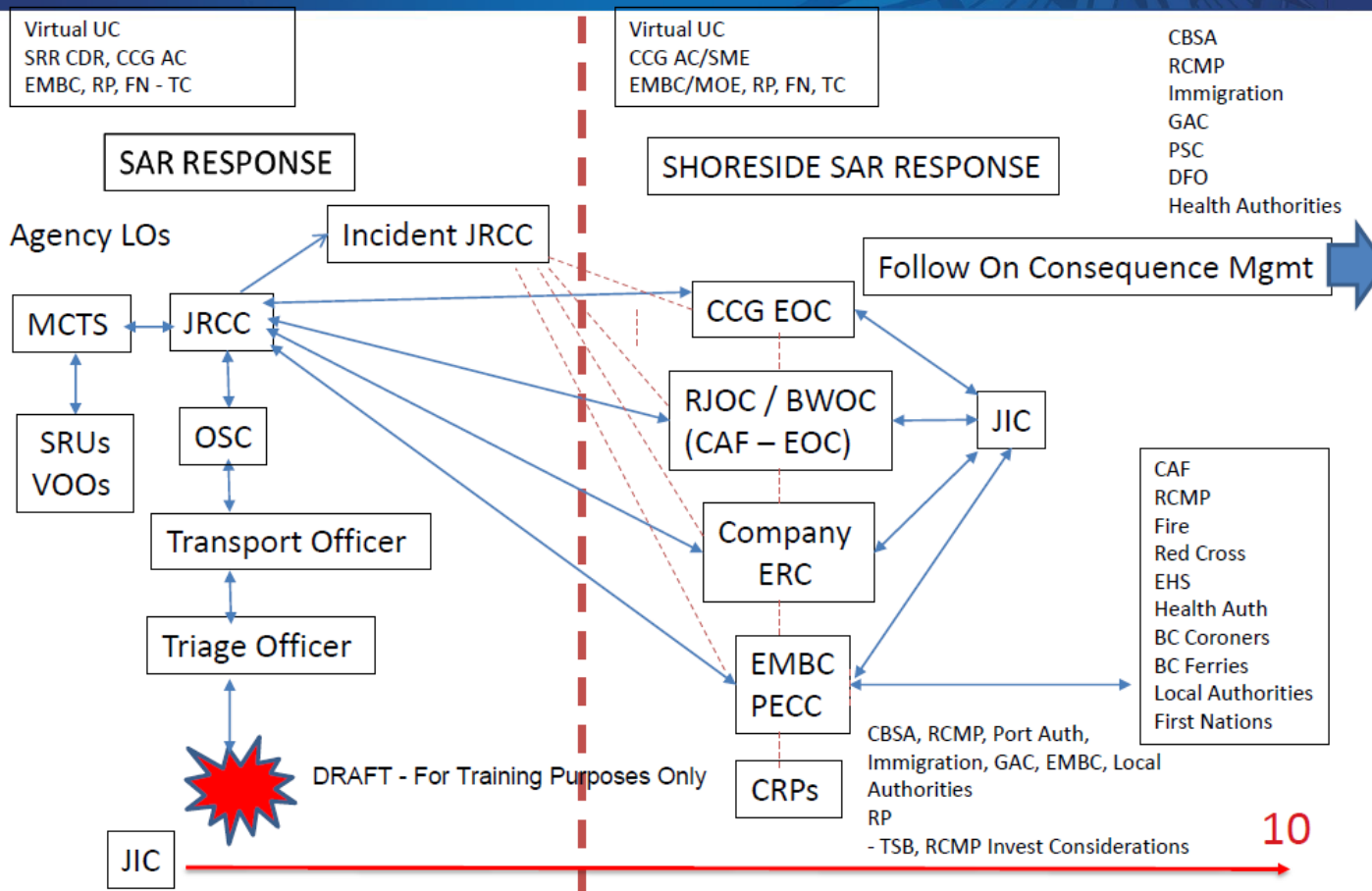
Shoreside Response Flow of Passengers



Communications and Alerting



Recommended MRO C2



Reception Center



- **Uninjured Passengers are transported from the Landing Site to the Reception Center**
- **Responsibilities include:**
- **Activation of Emergency Support Services Center (ESS)**

Emergency Operation Center



**Victoria Emergency Operation
Center location:
Fire Hall # 1 Hall – 1025 Johnson St**



Victoria Area Hospitals



BC EHS will transport injured passengers from the landing site to hospital for medical care Royal Jubilee or Victoria General Hospitals Victoria BC,



Passenger Transportation



- Passenger transportation from the Reception Center home will be the responsibility of the cruise line.



QUESTIONS



Climate Change Projections and Planning

EMCR – Spring Seasonal Readiness
May 10, 2023



Introductions



Nina Nichols
Indigenous Communities Climate
Adaptation Coordinator
ninanichols@uvic.ca



Stacey O'Sullivan
User Engagement Assistant
sosullivan@uvic.ca

Living and calling from the territories of the ləkʷəŋən Peoples of the Esquimalt and Songhees Nations, and of the W̱SÁNEĆ Peoples.

Our Organization

- Regional climate service provider
- Launched 2005; sister organization to Pacific Institute for Climate Solutions (PICS)
- Partner with researchers and users of climate information



Regional Climate Impacts

- developing, providing, and interpreting future projections of regional climate change



Hydrologic Impacts

- quantifying the hydrologic impacts of climate change and variability



Climate Analysis and Monitoring

- serving the need for past climate information and its interpretation



Computational Support Group

- enabling high speed computing on large datasets, developing online tools, and maintaining open-source code

CLIMATE DATA



WHAT IS CLIMATE DATA

- Projections of average future climate conditions (over 30-year periods) for a variety of temperature and precipitation-based climate variables.

ONE PIECE OF THE RESILIENCE PUZZLE

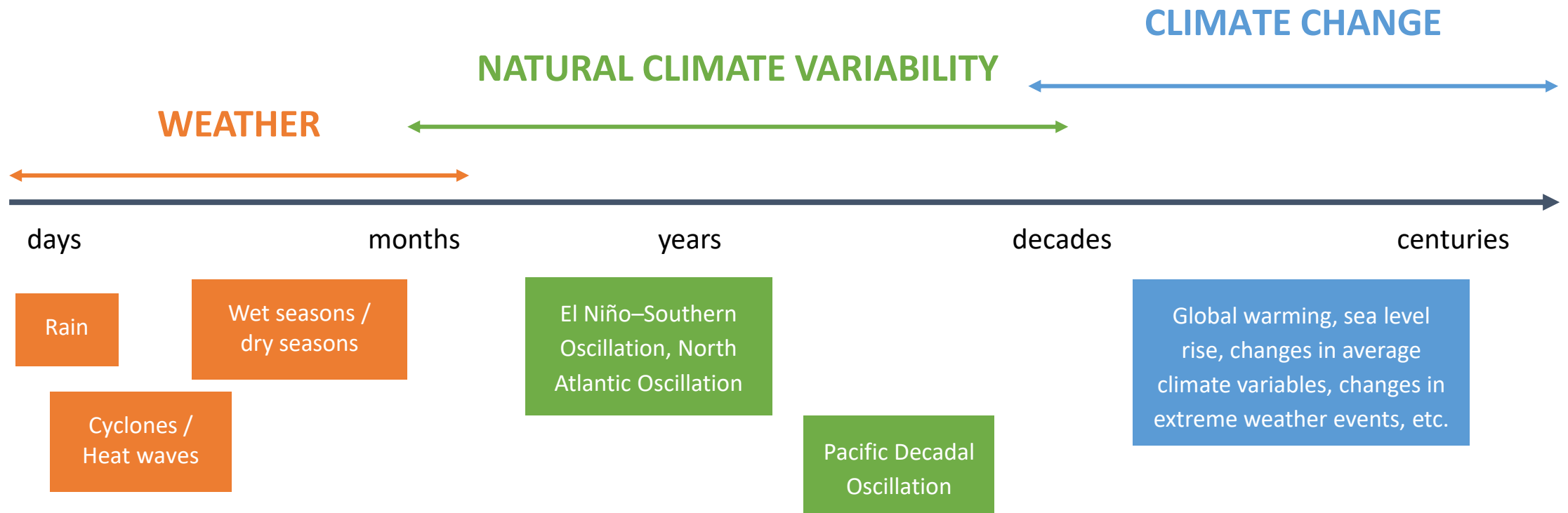
- Climate data can be used alongside other forms of knowledge to inform decision making, planning and resilience.
- Only one piece of a larger planning or assessment process.



**ANOTHER TOOL IN THE
TOOLBOX**

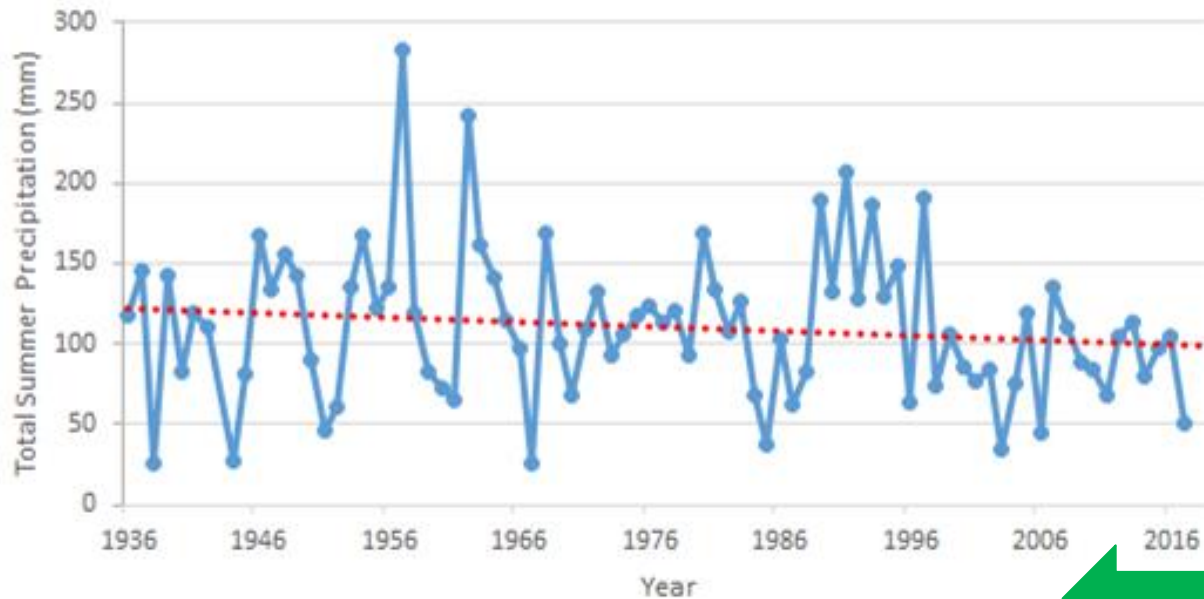
Weather, natural variability and climate change

- Decisions often need to consider many different time scales



Climate change is both:

1. The change in **average conditions over long time periods.**
 - For example, changes in average precipitation or in sea levels.
2. The change in extreme events with **different intensity and frequency.**
 - For example, changes in the number of droughts or heavy precipitation.

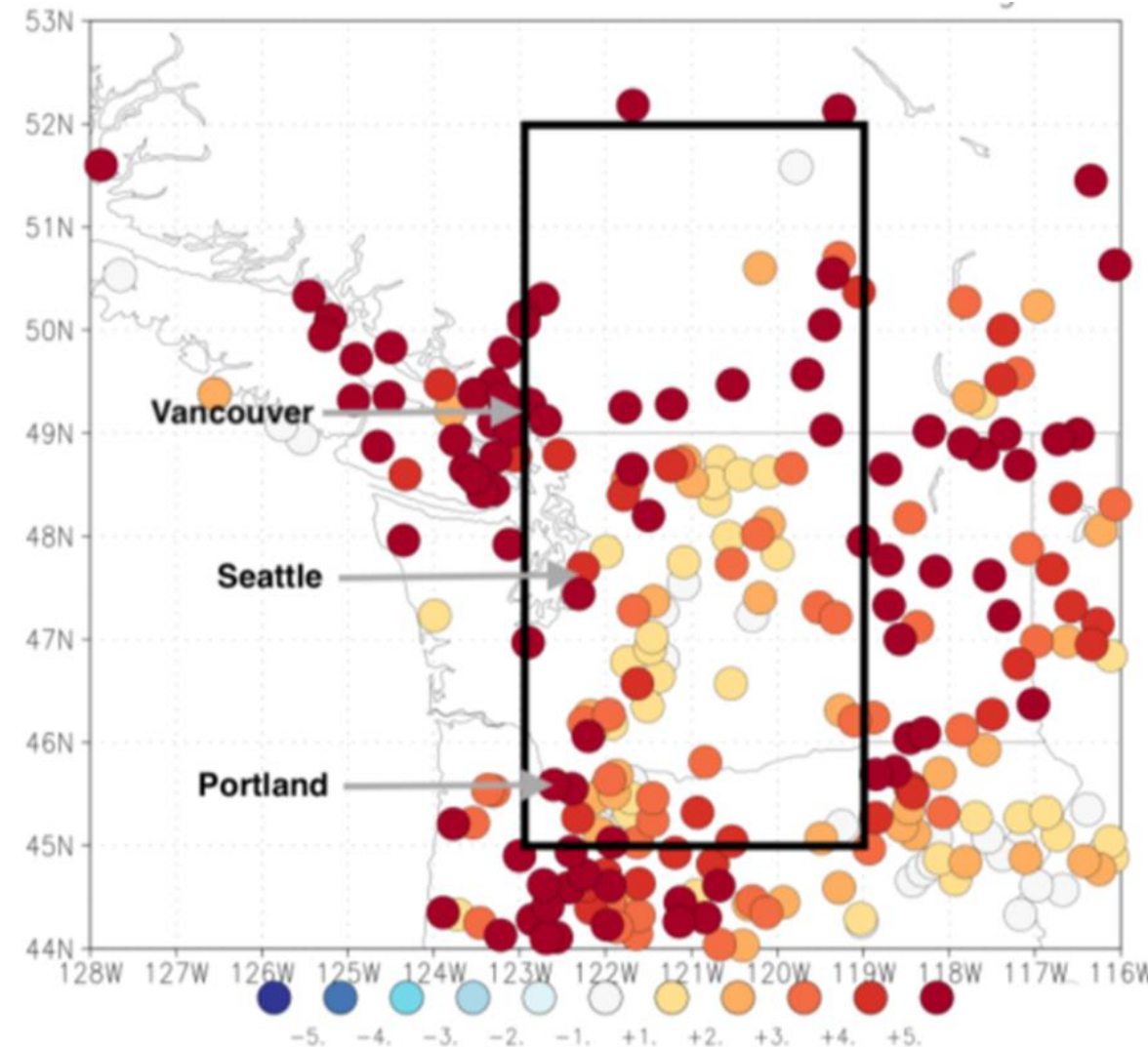


Both types of changes are linked



June 2021- Heat Dome

- 1-in-1000 year event in today's climate
- $\sim 2^{\circ}\text{C}$ hotter with climate change
 - Many records were broken by as much as 5°C
- Under a global 2°C climate, it's likely similar events could become 1-in-10 year or 1-in-5 year events.



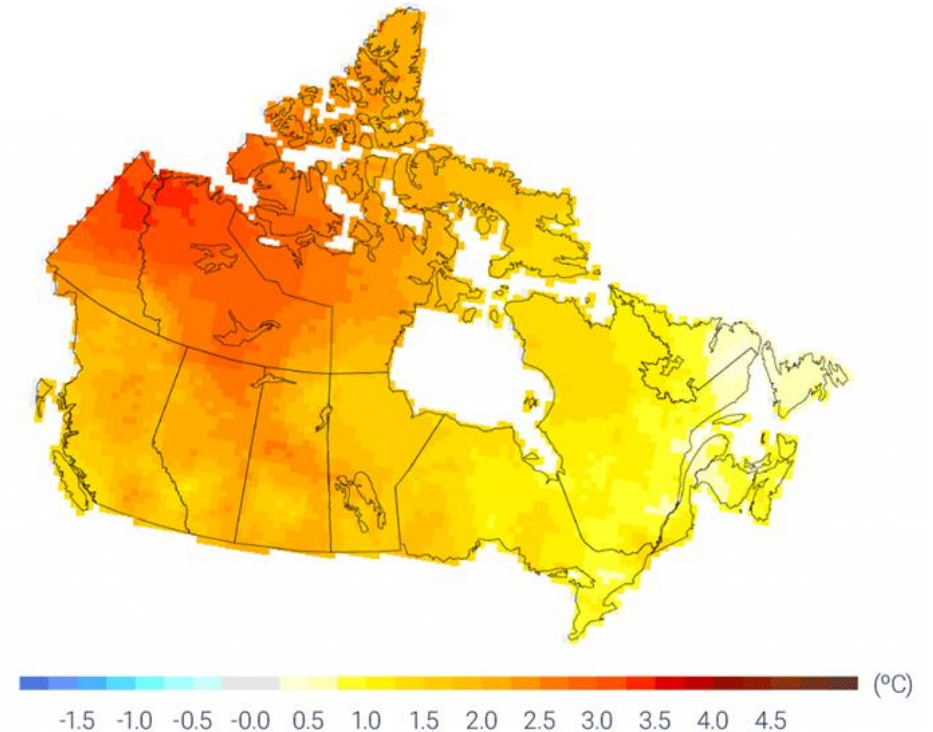
November 2021- Atmospheric River

- A one in 50-to-100 year event
- A compound extreme event;
 - Intense precipitation
 - Existing wet conditions
 - Snowmelt at higher elevations.
- Maximum values of extreme streamflow exceeded 1-in-100 year values at several basins
- Probability of such events has increased by about 50% due to climate change
- With about 3°C warming, the event will be 2.5 to 4 times as likely.



The Climate is Changing

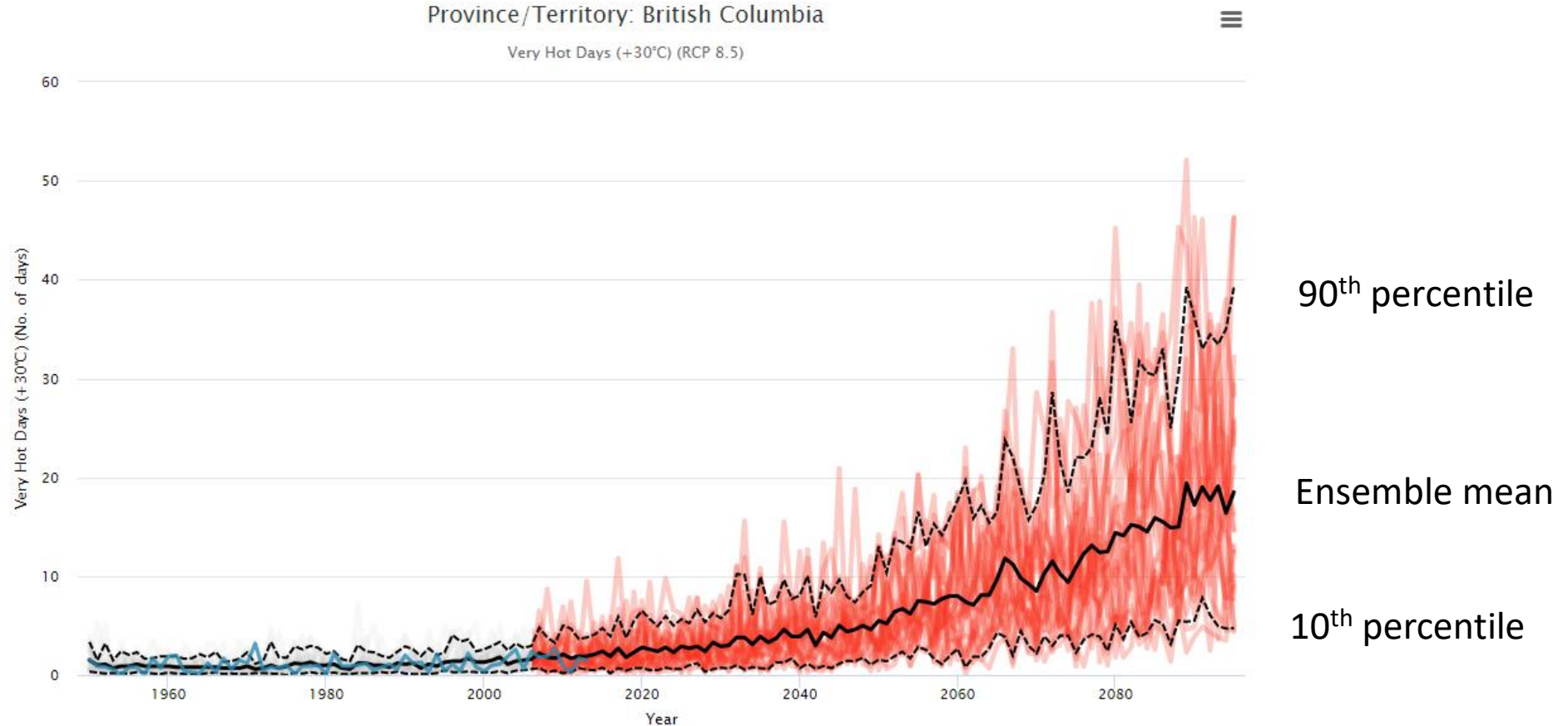
- Effects of widespread warming are evident in many parts of Canada and are projected to intensify in the future
 - **Global temperature** has increased by over 1°C in past 150 years
 - **Canada** has warmed at 2X the global rate, 3X in the North
 - Changes by only a couple of degrees can bring significant impacts and risks
 - Climate data and information helps to understand and plan for these changes



Warming in Canada between 1948-2018

Source: Zurich University of Applied Sciences, NASA images

Climate Models



Individual model data

MIROC-ESM-CHEM
IPSL-CM5A-MR
NorESM1-M
MIROC-ESM
CESM1-CAM5

NorESM1-ME
MRI-CGCM3
BNU-ESM
bcc-csm1-1
bcc-csm1-1-m

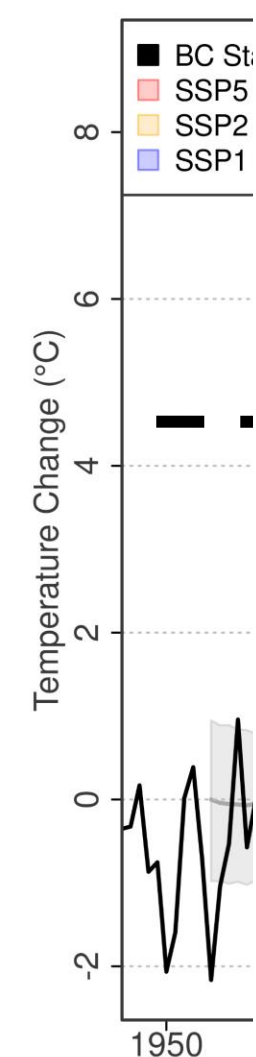
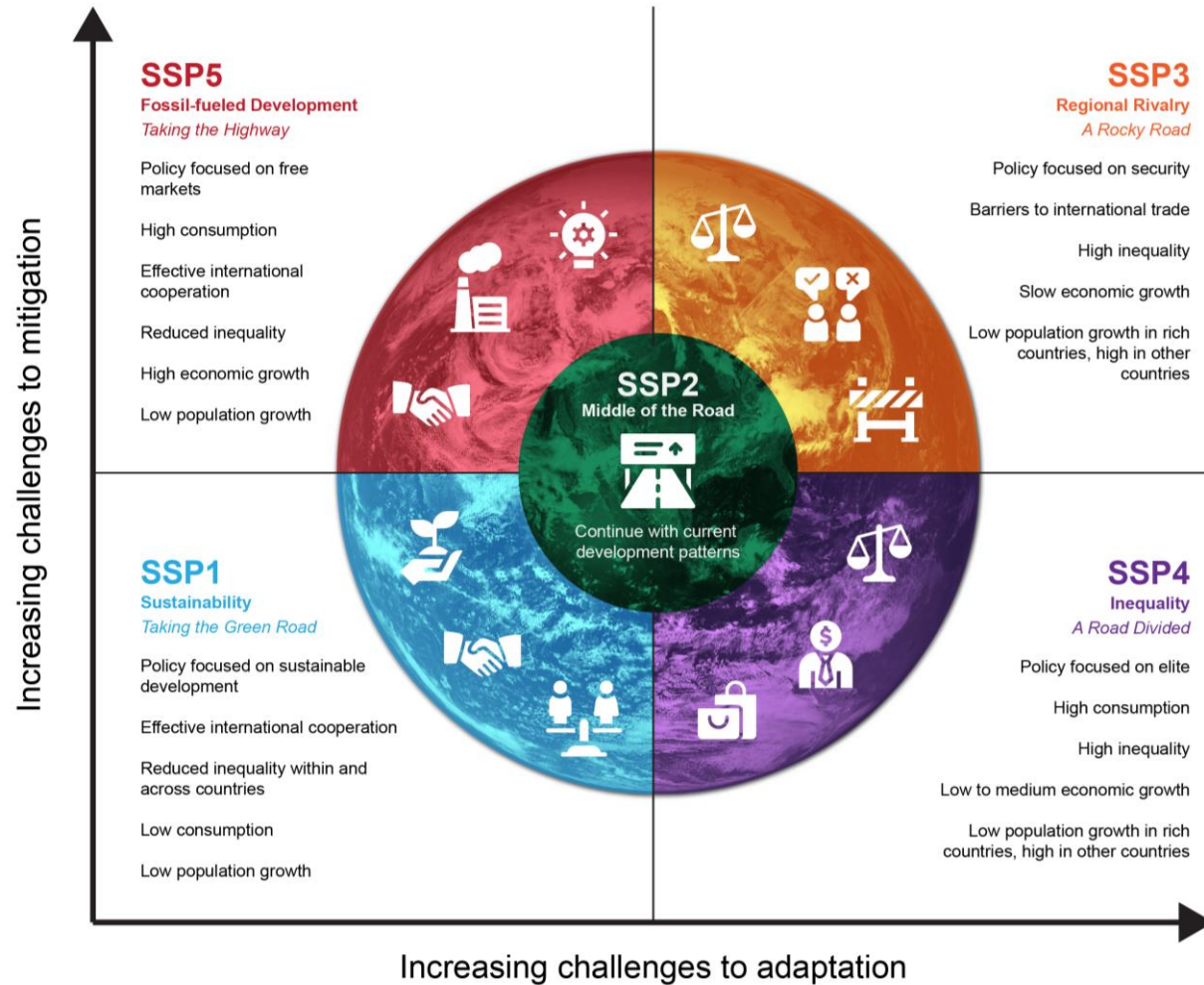
HadGEM2-ES
HadGEM2-AO
GFDL-ESM2G
CNRM-CM5
IPSL-CM5A-LR

FGOALS-g2
CSIRO-Mk3-6-0
MIROC5
CCSM4
MPI-ESM-MR

GFDL-ESM2M
MPI-ESM-LR
GFDL-CM3
CanESM2

Ensemble mean
Historical Values
10th percentile
90th percentile

Future Warming



Summary:

1. Past conditions not a good guide for future, and don't represent today
2. Conditions keep changing with time in all but best case
3. Must accommodate wider range of conditions in all cases
4. 2050s cautious (high emissions scenario) roughly equals 2070s optimistic (mid emissions scenario)

Climate Projection Trends in BC



Warmer winters,
fewer days below freezing



More hot summer days,
longer dry spells in summer



More precipitation in the fall,
winter, and spring



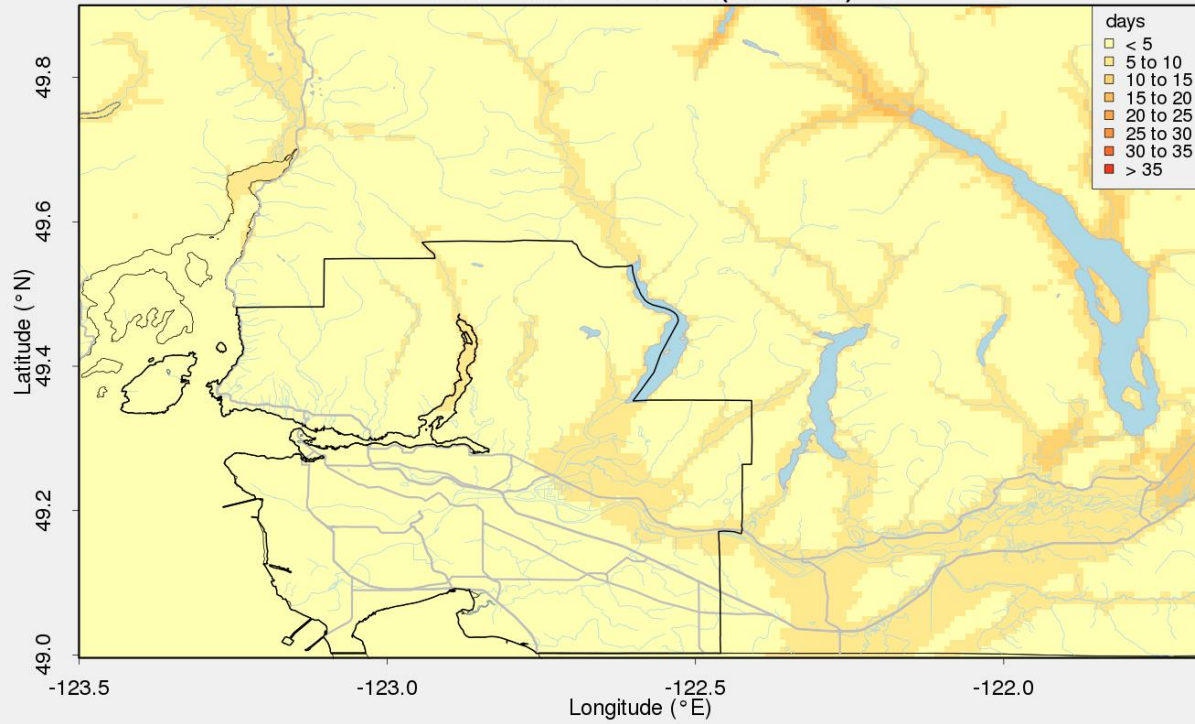
Increased frequency and intensity
of precipitation and storm events

Climate Projections

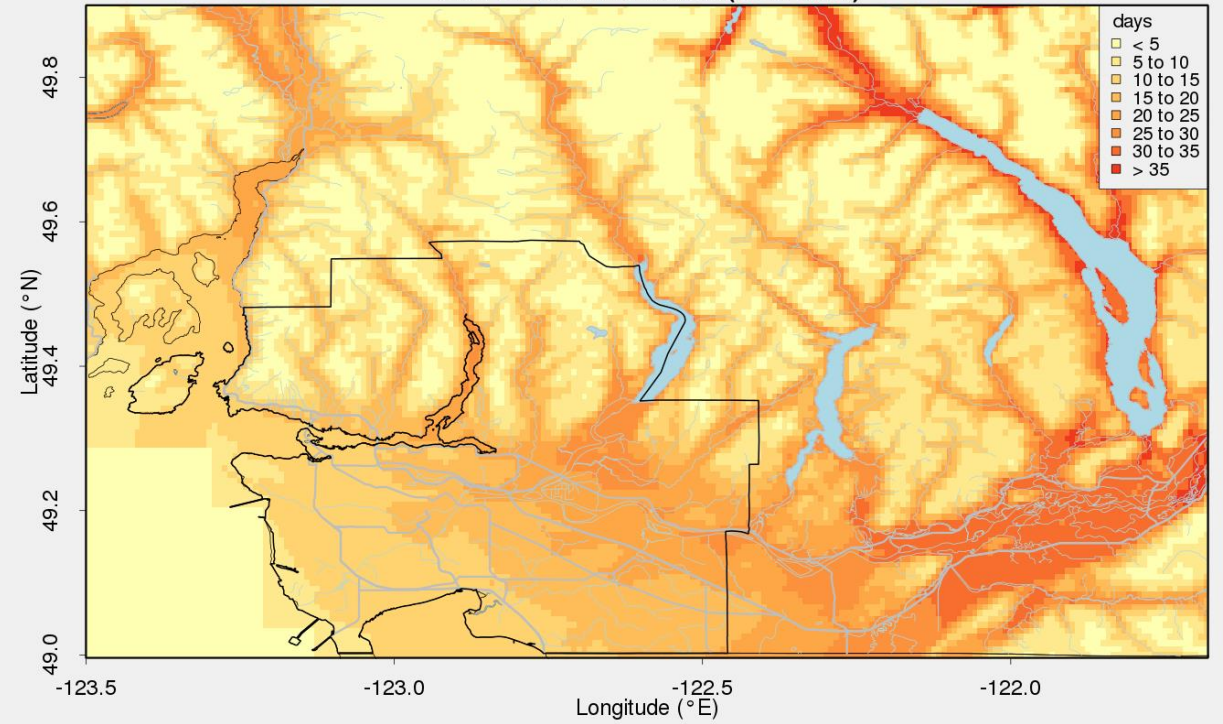
Hot Days – Lower Mainland

Hot Days: # of days over 30°C

Annual Summer Hot Days Past
CMIP5 Ensemble RCP85 (1971-2000)



Annual Summer Hot Days Projections
CMIP5 Ensemble RCP85 (2041-2070)



Climate Projections – Metro Vancouver

- Wetter winters, particularly fall
- Drier summers
- Reduced snowpack

TABLE 3: TOTAL PRECIPITATION OVER SEASONS AND YEAR

	Past (mm)	2050s (mm)	2080s (mm)	2050s Percent Change (%)		2080s Percent Change (%)	
				Average	(Range)	Average	(Range)
Fall	580	642	693	11	(-1 to 24)	20	(10 to 38)
Winter	683	714	780	5	(-3 to 12)	14	(2 to 27)
Spring	400	430	447	8	(-4 to 15)	12	(3 to 25)
Summer	206	168	147	-19	(-41 to 1)	-29	(-53 to -6)
Annual	1869	1953	2068	5	(-1 to 9)	11	(2 to 17)

Climate Projections

Ice Days and Snow– Terrace Region

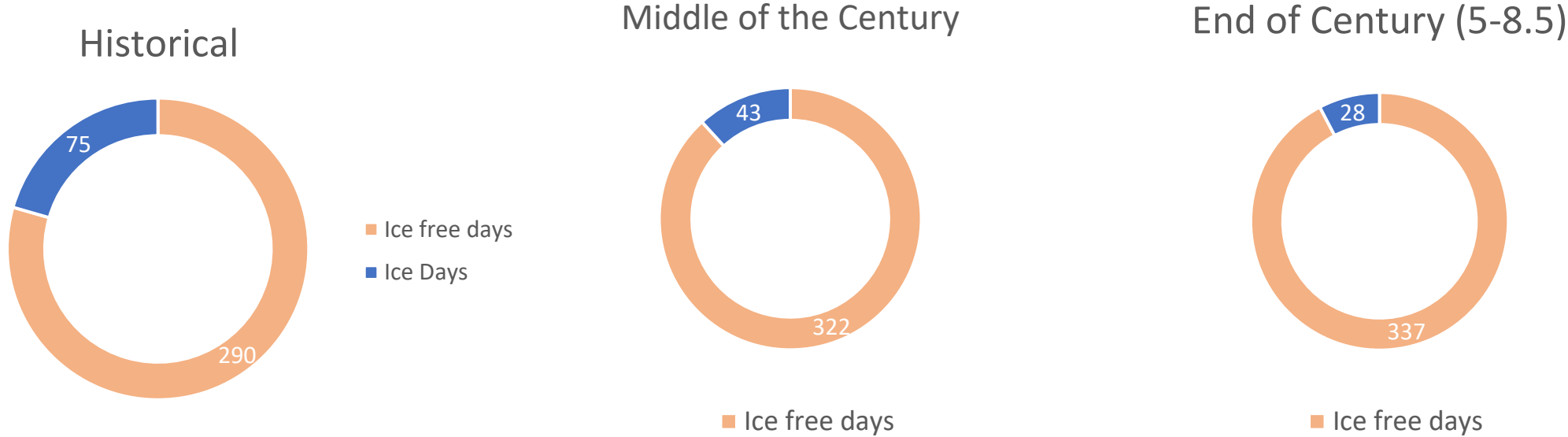


TABLE 4: PRECIPITATION AS SNOW

	Past (mm)	2050s (mm)	2050s Change (mm)		2080s (mm)	2080s Change (mm)	
			Average	(Range)		Average	(Range)
Terrace Region	429mm	227mm	-202mm	(-222 to -169mm)	147mm	-282mm	(-329 to -234mm)
			-47%	(-59 to -41%)		-66%	(-81 to -54%)



Where does climate data come in?



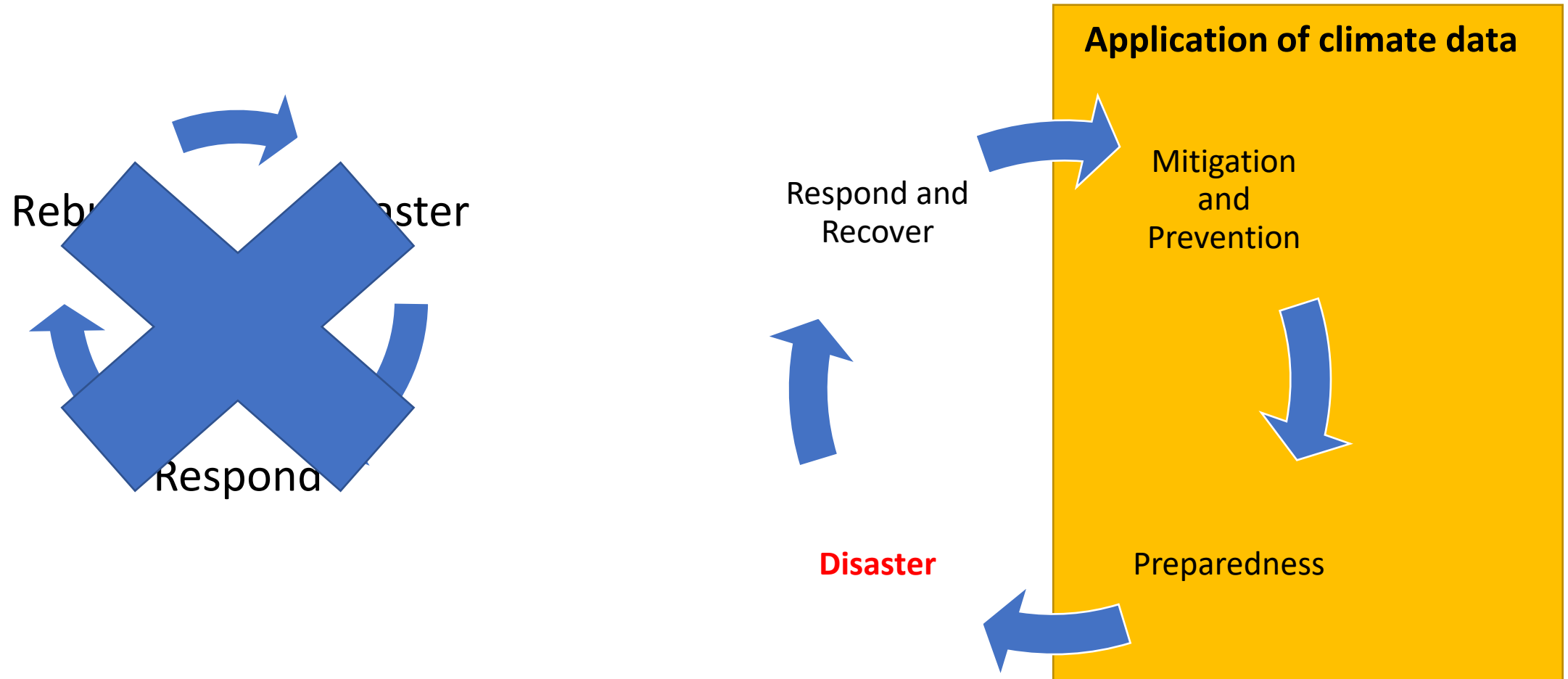
Climate data can support process discussions about

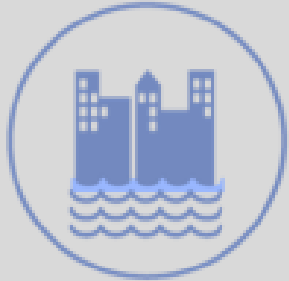
- Hazards, impacts, risks
- Values and priorities
- Actions and preparedness

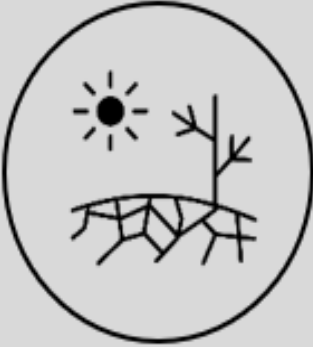
Climate data supports understanding long term changes in the climate in order to improve preparedness and resilience.

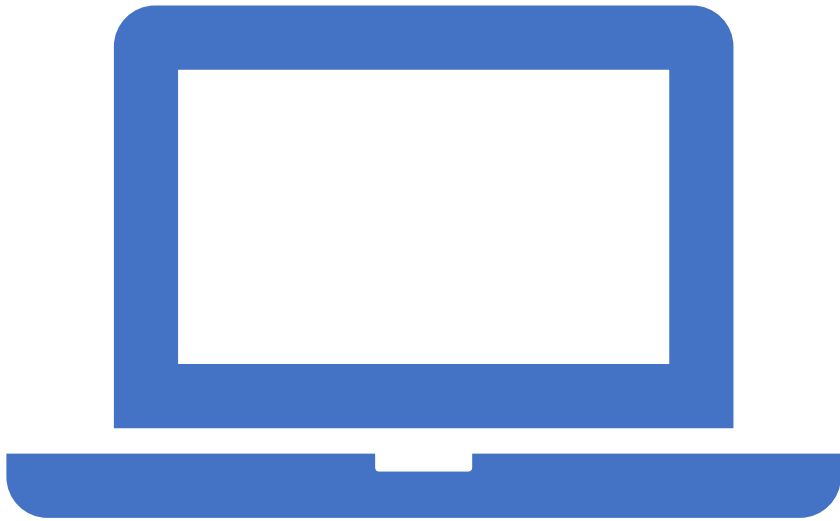
Emergency response cycle

- Climate data can support preparedness and prevention in the emergency response cycle.



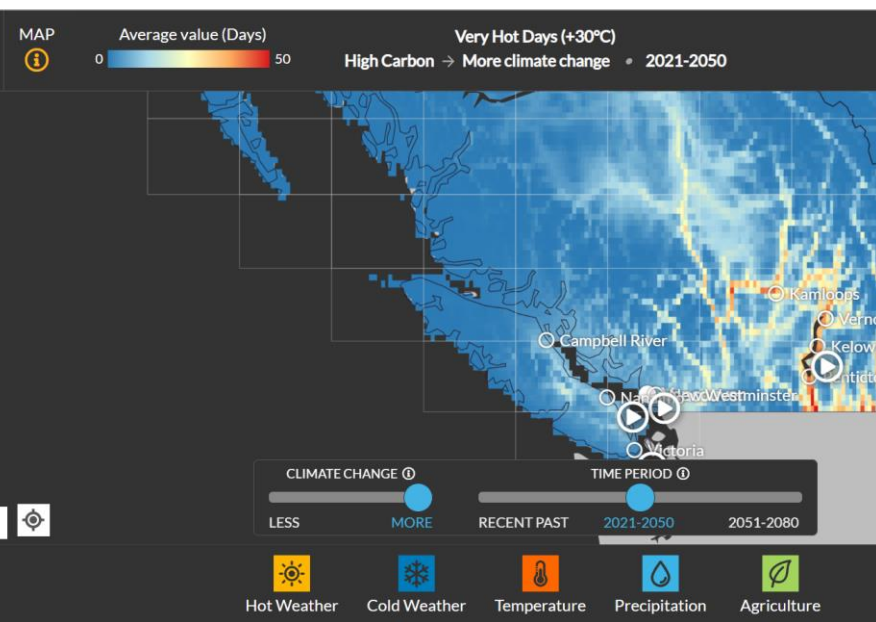
Climate Hazard	Description	Relevant Variables	Climate Data source
<p>Extreme heat events and increasing temperature</p> 	<ul style="list-style-type: none"> Increased frequency and severity of heatwaves Increased average temperatures Increased average relative humidity 	<ul style="list-style-type: none"> Days with Tmax > 25°, 27°, 29°, 30°, 32°, or 37°C Cooling degree days: A measure used to estimate cooling demand, the number of degree days above 18°C Tropical Nights: Night temps above, 18°, 20° or 22°C Hottest Day: Warmest daytime temperature in selected time period 	ClimateData.ca
<p>Flooding</p> 	<ul style="list-style-type: none"> <u>Riverine Flooding:</u> accumulation of extreme water levels from rivers <u>Pluvial Flooding:</u> accumulation of extreme water levels from rainfall <u>Coastal flooding:</u> from sea level rise, storm surge and wave effects 	<ul style="list-style-type: none"> Max 1 day total Precipitation Wet Days > 10mm or 20mm Short duration rainfall - IDF curves (<i>only available for certain locations</i>) 	Climatedata.ca
		<ul style="list-style-type: none"> 20-year annual max one day precipitation 50-year annual max one day precipitation Extreme Streamflow (only available for Upper Fraser) 	PCIC Climate Explorer

 <p>Wildfires</p>	<ul style="list-style-type: none"> Increased frequency and severity of wildfires Reduced air quality 	<p><i>No direct wildfire variables. Information can be extrapolated from variables around temperature and precipitation, such as:</i></p> <ul style="list-style-type: none"> Summer precipitation Summer max temperature 	PCIC Plan2Adapt
		<ul style="list-style-type: none"> Maximum number of consecutive dry days: longest spell of days where less than 1mm of precipitation falls daily 	Climatedata.ca
<p>Drought</p> 	<ul style="list-style-type: none"> Increased frequency and severity of droughts 	<ul style="list-style-type: none"> Precipitation as Snow Spring/Fall/Summer average precipitation Summer average temperature 	PCIC Plan2Adapt
		<ul style="list-style-type: none"> Maximum number of consecutive dry days: describes the longest spell of days where less than 1mm precipitation falls daily. Number of periods with more than 5 consecutive dry days Total precipitation Standardized precipitation evapotranspiration index (3-months or 12-months): index based on 	Climatedata.ca



Online Climate Tools

- Free
- Downloadable data
- Easy to use (mostly!)



RCP 8.5: High Carbon climate future

GHG emissions continue to increase at current rates

Variable	Period	Mean	2021-2050			2051-2080		
			Low	Mean	High	Low	Mean	High
Precipitation (mm)	annual	515	437	540	660	450	570	699
Precipitation (mm)	spring	99	69	107	150	75	114	157
Precipitation (mm)	summer	158	93	161	237	84	158	242
Precipitation (mm)	fall	124	83	130	185	87	143	206
Precipitation (mm)	winter	134	91	143	199	99	155	215
Mean Temperature (°C)	annual	3.5	4	5.4	6.8	5.6	7.4	9
Mean Temperature (°C)	spring	3.4	3.2	5.5	8	4.8	7.4	10.1
Mean Temperature (°C)	summer	13.5	14	15.7	17.4	15.7	17.9	20.1
Mean Temperature (°C)	fall	3.6	3.4	5.3	7	5.1	7.2	9.3
Mean Temperature (°C)	winter	-7	-8.4	-5.1	-2.2	-6.5	-3.2	-0.1
Tropical Nights	annual	0	0	0	0	0	0	1
Very hot days (+30°C)	annual	4	3	11	23	8	23	42
Very cold days (-30°C)	annual	3	0	2	5	0	1	3
Date of Last Spring Frost	annual	May 29	April 17	May 9	May 28	March 26	April 22	May 13
Date of First Fall Frost	annual	Sep. 10	Sep. 7	Sep. 22	Oct. 8	Sep. 15	Oct. 3	Oct. 22
Frost-Free Season (days)	annual	101	108	133	161	131	162	198



High-resolution, searchable climate data:

- Observed daily station data, gridded historical data
- Downscaled climate change projections
- Visualisation, including comparison of emissions scenarios
- Summaries by location
- **Variables:** national maps, zoom in on region
- **Analyze page:** customized indices
- **Sector modules:** tailored information

Canadian Centre for Climate Services

Climate Services Support Desk

Web: Canada.ca/climate-services

Email: ccsc-cccs@ec.gc.ca

Phone: 1-833-517-0376

- Helps users find the **right datasets** and **information**
- Provides **guidance** for understanding and using data
- Draws on a **network of experts** to respond to inquiries



Feedback

Your feedback is welcome.
Leave us your comments and
suggestions.

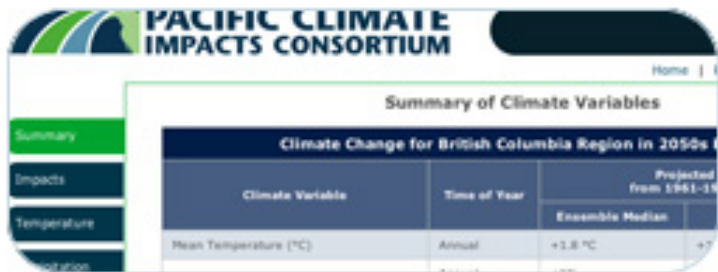


Inquiry

Get help from our climate
experts to find, understand, and
use climate information.

PCIC: Analysis Tools

Plan2Adapt



PLAN2ADAPT

Use PCIC’s Plan2Adapt online tool if you’re only familiar with climate modelling but still interested understanding the impacts that climate variability may have on specific regions of British Columbia

Climate Variable	Season	Projected Change from 1961-1990 Baseline	
		Ensemble Median	Range (10th to 90th percentile)
Temperature (°C)	Annual	+3.2 °C	+2.3 °C to +4.2 °C
Precipitation (%)	Annual	+7.0%	+2.0% to +11%
	Summer	+3.9%	-11% to +13%
	Winter	+6.1%	-0.23% to +8.9%
Precipitation as Snow* (%) <i>CAUTION: This variable may have a low baseline. See note 2 below.</i>	Annual	-29%	-33% to -24%
	Winter	-23%	-25% to -16%
	Spring	-38%	-51% to -34%
Growing Degree-Days* (degree-days)	Annual	+534 degree-days	+324 to +781 degree-days
Frost-Free Days* (days)	Annual	+43 days	+34 to +58 days
Heating Degree-Days* (degree-days)	Annual	-1130 degree-days	-1500 to -835 degree-days
Cooling Degree-Days* (degree-days)	Annual	+48.6 degree-days	+19.9 to +110 degree-days

PCIC: Climate Explorer



Model ⓘ

PCIC12

Emissions Scenario ⓘ

Historical, then RCP 8.5

Variable ⓘ

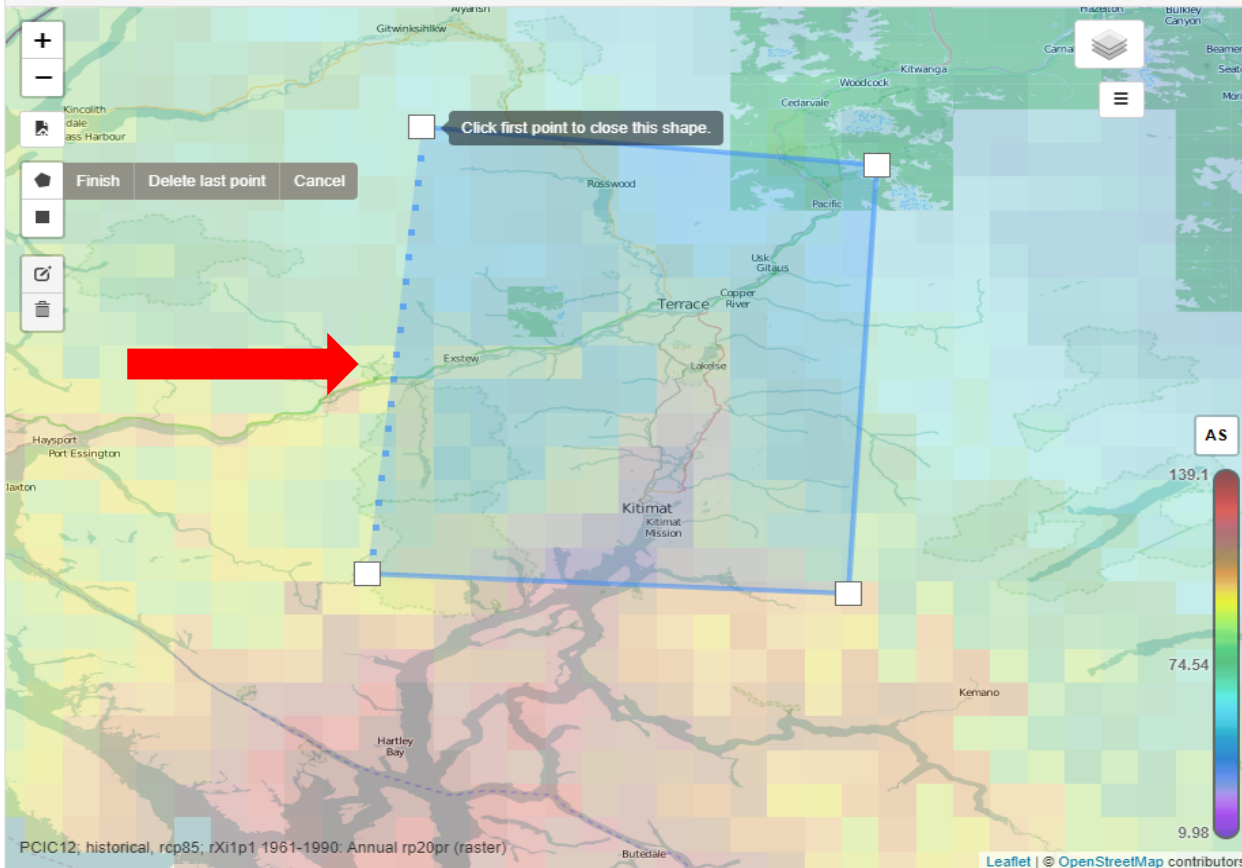
rp20pr - 20-year annual maximum one day precipitation amount

Filtered Datasets Summary ⓘ

PCIC12 historical, rcp85: rp20pr → 6 datasets

Data Map ⓘ

PCIC12; historical, rcp85; rXi1p1 1961-1990: Annual rp20pr (raster)



Data Graphs ⓘ

PCIC12 historical, rcp85: rp20pr

Annual Cycle ⓘ

Long Term Average ⓘ

Model Context ⓘ

Change from Baseline ⓘ

Snapshot ⓘ

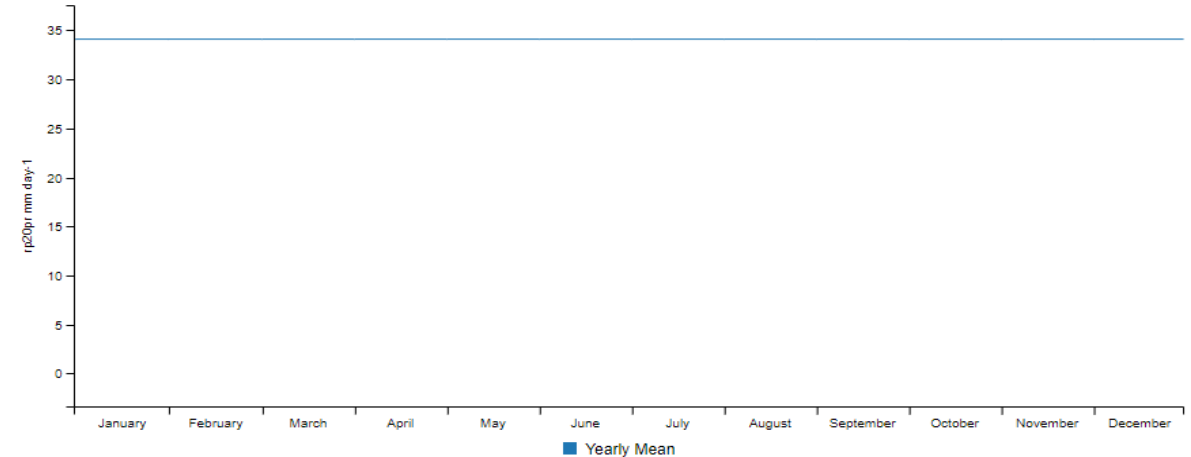
Dataset ⓘ

Run 1 (rXi1p1), 1961-1990

Export Data ⓘ

XSLX

CSV



filtered datasets ↓

Statistical Summary ⓘ

PCIC12 historical, rcp85: rp20pr

Time of Year ⓘ

Annual

Export Data ⓘ

XSLX

CSV

Run ▾

Averaging Peri... ▾

Min ▾

Max ▾

Mean ▾

Median ▾

Std.Dev ▾

Units

PCIC: Building Design Tools

[Home](#) / [Data Portal](#)

DATA PORTAL



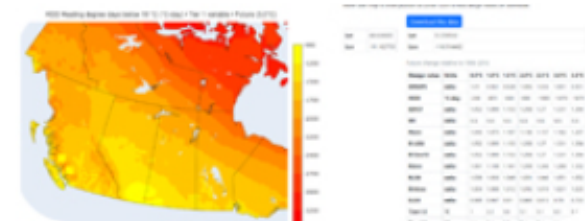
WEATHER FILES

Future-shifted weather files have been produced at each of the locations in Canada in the CWEC 2016 dataset.

[READ MORE](#)

[Home](#) / [Analysis Tools](#)

ANALYSIS TOOLS



DESIGN VALUE EXPLORER

Use the Design Value Explorer to access historical climatic design variables across Canada, in either map or table form, examine projected future change in design variables, and download maps and tables.

[READ MORE](#)

National Building Code of Canada:

“...many buildings will need to be designed, maintained and operated to adequately withstand ever changing climatic loads.”

PCIC Dataset: Weather Files

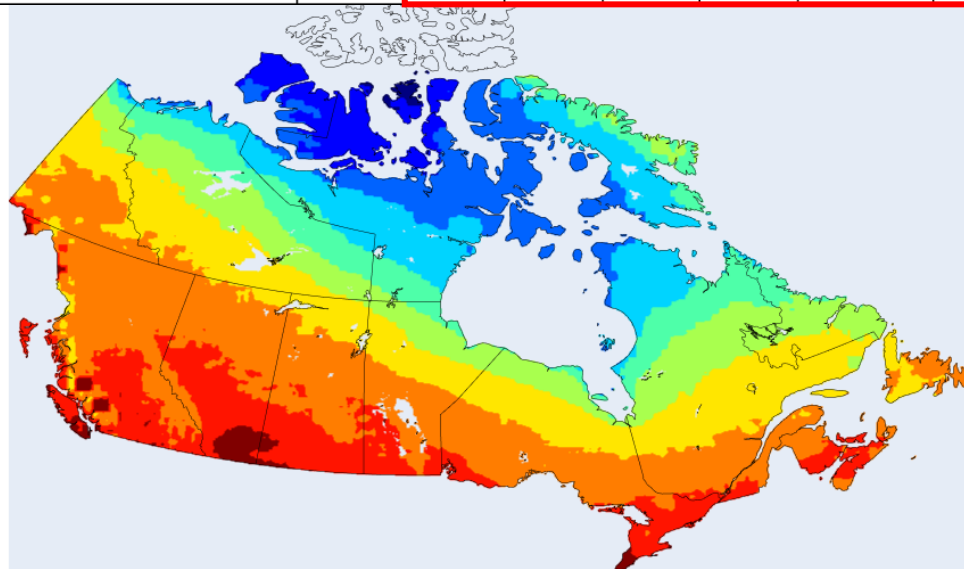
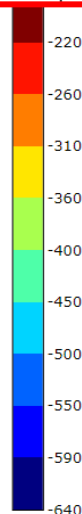
- Weather files are critical inputs for building performance simulation (i.e., energy modelling).
- In Canada, historical weather files known as [Canadian Weather Year for Energy Calculation \(CWEC\)](#) are the primary climate data used by building professionals in simulation and design.
- **These files are based on historical climate data.**
- **Historical files generally:**
 - Underestimate cooling loads
 - Overestimate heating loads
 - Inaccurately predict occupant comfort under future climate conditions

Hide	☆	Victoria-Univ of Victoria	BC	717830	↑ 48.457, -123.3046	↑ 60.1	2020s, 2050s, 2080s
Type	Scenario	Time Period	Ensemble Statistic	Variables	Download	<p>PCIC's future-shifted weather files adjust historical CWEC 2016 weather files, using the results from climate model projections from a high emissions scenario.</p> <p>www.pacificclimate.org/data/weather-files</p>	
Weather	RCP8.5	2020s	Average	All thermodynamic	Download		
Weather	RCP8.5	2050s	Average	All thermodynamic	Download		
Weather	RCP8.5	2080s	Average	All thermodynamic	Download		
Summary	RCP8.5	All	Multiple	All thermodynamic	Download		

PCIC Analysis Tool: Design Value Explorer

Table C-2
Climatic Design Data for Selected Locations in Canada

Province and Location	Elev., m	Design Temperature				De- gree- Days Below 18°C	15 Min. Rain, mm	One Day Rain, 1/50, mm	Ann. Rain, mm	Moist. Index	Ann. Tot. Ppn., mm	Driv- ing Rain Wind Pres- sures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa	
		January		July 2.5%									S _s	S _r	1/10	1/50
		2.5% °C	1% °C	Dry °C	Wet °C											



Future change relative to 1986-2016

Design value	Units	0.5°C	1.0°C	1.5°C	2.0°C	2.5°C	3.0°C	3.5°C
DRWP5	ratio	1.008	1.02	1.046	1.066	1.093	1.115	1.128
HDD	°C-day	-230	-430	-630	-810	-990	-1300	-1300
IDFCF	ratio	1.051	1.096	1.146	1.197	1.254	1.31	1.368
MI	ratio	n/a	n/a	n/a	n/a	n/a	n/a	n/a
PAnn	ratio	1.021	1.034	1.054	1.069	1.086	1.101	1.115
R1d50	ratio	1.051	1.096	1.146	1.197	1.254	1.31	1.368
R15m10	ratio	1.051	1.096	1.146	1.197	1.254	1.31	1.368
RAnn	ratio	1.052	1.091	1.131	1.164	1.195	1.222	1.245
RL50	ratio	0.968	0.897	0.844	0.762	0.68	0.593	0.506
RHAnn	ratio	1.002	1.003	1.004	1.004	1.004	1.003	1.003
SL50	ratio	0.715	0.554	0.429	0.329	0.25	0.194	0.152
TJan1.0	°C	1.3	2.8	4.3	6	6	7.9	7.9
TJan2.5	°C	1.4	2.9	4.1	5.8	5.8	7.6	7.6
TJul97.5	°C	1.2	2.2	3.3	4.4	4.4	7.1	7.1
TwJul97.5	°C	1	1.9	2.7	3.7	3.7	5.7	5.7
Tmax	°C	1	1.9	2.9	3.9	5.1	6.1	7.1
Tmin	°C	1.5	2.7	3.8	4.9	5.9	6.8	7.6

PCIC Analysis Tool: Design Value Explorer

Learn more! Please join us on June 8th from
10:30am - 12:00pm PT for an in-depth
training on this tool!

<https://www.pacificclimate.org/news-and-events/seminars/introducing-design-value-explorer-%E2%80%93-integrating-future-climate-data-built-environment>

Follow up with us

Want to use projections in your work, need support accessing tools or have questions?

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Stacey O'Sullivan- sosullivan@uvic.ca

Sign up for our newsletter @ pacificclimate.org

Another great resource: Climate Services Support Desk - Canada.ca/climate-services

Thank You

Questions?

