Drought

Occurs when there is a deficiency of precipitation over an extended period, resulting in a water shortage.

EXTENTS	CONSEQUENCE
REGIONAL	HIGH

TYPE	DURATION	SEASONALITY	WARNING TIME	LIKELIHOOD
CHRONIC	MONTHS-DECADES	MAINLY SUMMER	MONTHS-YEARS	ALMOST CERTAIN

About the Hazard

Water is essential for life and is needed for human consumption, industry and agriculture, recreation, and the environment. Preventing water shortages is linked to understanding drivers and modulators and managing drinking water systems, and supply and demand. Droughts are primarily **driven** by a persistent deficit in local precipitation and/or high air temperatures from the local hydroclimate. The likelihood and severity of these conditions are often influenced by large-scale climate patterns and persistent high atmospheric pressure systems. The progression and severity of droughts are **modulated** by watershed physical characteristics (especially soil water holding capacity and geology influencing groundwater), land use and changes (affecting evapotranspiration and infiltration), and infrastructure and extractive modifications (such as water extraction from reservoirs or groundwater).

What We Assessed

We analysed **components of the drought context in terms of water supply processes** (e.g., meteorological, soil moisture, and hydrological drought) and the **water management system** (e.g., human-environment drought). For the former, we reviewed regional drought patterns, temperature and precipitation projections under climate change, and considered the amount of available water in the watershed. For the latter, we considered future human demand and the drinking water system capacity.

Recent Past | Current | Future | Far Future

Challenges

- Drought is subject to complex physical relationships related to the water cycle, and human decisions involved with managing water supply and demand.
- Provincial drought levels recorded in the region over the last decade are not consistent.
- A much more detailed analysis would be required to more fully understand the nuances of drought (e.g., projecting the net effects of seasonal temperature and precipitation changes).

Results

While we mapped certain components of the drought hazard context (e.g. climate projections for temperature and precipitation), a map summarizing drought hazard was not deemed useful based on the available data. However, key findings from our analyses are as follows:

- The water management system is dependent on a predominantly rain-fed system in the Upper Nanaimo River watershed.
- Drought levels in the last decade have potentially shifted toward the late summer and may be increasing in duration.
- Future water supply is dependent on changes in temperature and precipitation (see Climate Change Trends).
- The drinking water system infrastructure is robust and human demand management instruments are in place.

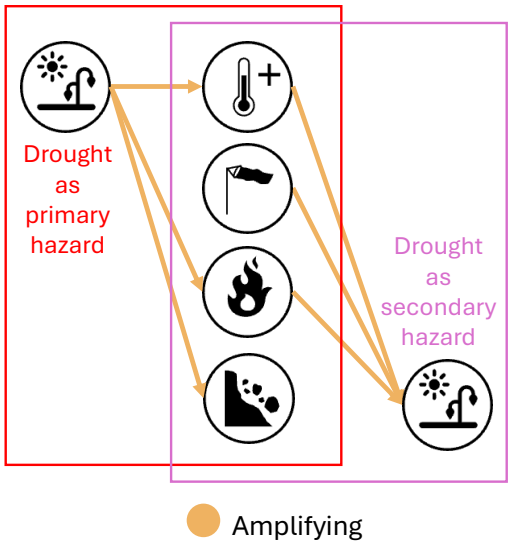
Future Trends

- The RSA is likely to experience increasing temperature, and reduced rainfall in summer in the 2050s. However, increases in rainfall during spring, fall, and winter could offset the declines in summer.
- More knowledge about impacts to the hydrologic cycle (e.g. evapotranspiration, infiltration) are required to understand the net effects of the climatic changes.
- The Jump Lake Dam (see Figure 2-1) stores the majority of the region's drinking water, and its supply and capacity is projected to meet demands to the year 2061.

In the next 5-10 years, it is difficult to determine a trend based on the uncertainties outlined above and the related human decisions that will be made. For this reason, the hazard should continue to be monitored and understood.

Interactions with Other Hazards

Drought strongly amplifies and coincides with extreme heat and wildfire hazards. It can coincide with extreme cold. Drought is often succeeded by extreme precipitation, and subsequently by associated riverine, coastal, or stormwater flooding. This has implications for reservoir management. Drought amplifies the susceptibility of future mass movement geohazards by drying soils and stressing vegetation. As a secondary hazard, drought is amplified by and coincides with extreme heat and wildfires. Windstorms can amplify drought effects (e.g., increasing evaporation) and coincide with dry conditions (creating dustbowls).



Emergency Management Considerations

- Due to its linkages with temperature and precipitation, drought hazard could potentially increase during El Niño events, whose forecasting can be used to track upcoming hazard (see Provincial resource discussed in Section 9 Recommendations)[29].
- Related to the above, track the BC drought information portal.
- Work with drinking water system personnel to periodically assess the risk of drinking water infrastructure.

29 The ENSO index is based on long-term average conditions, and it does not mean that extreme heat and extreme precipitation events cannot occur during a La Niña phase.