

## FACT SHEET

# Climate Change and Drought

September 2024

Climate change will [increase the risk and severity of droughts in parts of Canada](#) that already struggle with water shortages, like the southern Prairies and the interior of British Columbia (Bonsal et al. 2019). A drought is a period of abnormally dry weather that lasts long enough to cause serious water shortages for natural ecosystems, agriculture, and people.

## Climate change is making droughts more frequent and more severe

- Climate change has made [droughts more frequent and severe around the world](#), and the trend is expected to continue to worsen (IPCC 2023, p. 67; Chiang et al. 2023).
- Climate change exacerbates drought, both because it shifts rainfall patterns and because it increases temperatures, leaving ecosystems increasingly vulnerable to dry conditions. Rising temperatures strain water supplies by increasing both evaporation rates and [water consumption by plants](#) (Walker and Van Loon 2023), resulting in [drier soil conditions and water scarcity](#) (Overpeck and Udall 2020).
- Rising global temperatures [alter precipitation patterns](#) (United Nations n.d.; Zhang et al. 2019), reduce snowpack levels, and threaten glacial run-off as glaciers recede.
- Climate change is also causing droughts to develop faster, making “[flash droughts](#)” more common (Yuan et al. 2023). This new reality makes forecasting and monitoring droughts more difficult.
- Over the 21st century, the total land area subject to drought is [expected to increase](#), with over 40 per cent of global land area expected to experience year-round drying by the end of the century, [even under low-emissions scenarios](#) (IPCC 2023, p. 1119; Cook et al. 2020).

## Droughts are costly disasters

- Droughts were an important factor in the recent dramatic increase in crop insurance payments in Canada, which surged from \$890 million in 2018 to [\\$4.897 billion in 2022](#) (Arnason 2024).

- Drought insurance payouts to Alberta’s farmers and agribusinesses reached a record [\\$326.5 million in 2023](#) , more than tripling the payouts from the 2021 drought, according to the Agriculture Financial Services Corporation (Smith 2024).
- Due to severe drought, crop production in Saskatchewan fell by a record-high 47 per cent in 2021. That year, Saskatchewan was the only province to see its economy contract (-0.3 per cent). [Statistics Canada reported](#) that while “activity was up in most sectors of the economy, those gains were entirely negated by the worst drought in nearly two decades” (Statistics Canada 2022).
- In the Abitibi region of Québec, hay producers received a record [\\$6.8 million in compensation](#) for the 2023 drought, more than triple the annual average (Cameron 2024).
- Droughts [limit hydroelectricity generation](#), cutting revenue for utilities, increasing reliance on fossil-fuelled generation (Statistics Canada 2024), and making electricity [more expensive for consumers](#) (CBC News 2023).
- In January 2024, drought conditions in both B.C. and Manitoba meant lower reservoir levels at the hydroelectric facility, forcing the two provinces to [import power](#) from other jurisdictions (Canadian Press 2024).
- In 2021, a drought in Manitoba limited power production, resulting in a [\\$248-million loss](#) for Manitoba Hydro (Manitoba Hydro 2022).

### **Droughts threaten the health of Canadians**

- Droughts can [degrade drinking water quality and increase the risk of waterborne diseases](#), as sluggish flows and more evaporation concentrate contaminants in water bodies and promote toxic algal blooms (Yusa et al. 2015).
- Droughts can contribute to [respiratory issues](#) (Yusa et al. 2015), because of windblown dust from dried-out soils.
- Droughts in northwest British Columbia, particularly during July and August when [salmon are migrating](#) (Curran and Marsden 2021) to their upstream spawning areas, can cause severe and lasting damage to their populations, and to the ecosystems and Peoples that rely on them (Curran and Marsden 2021).

### **Droughts worsen the risk of floods and wildfires**

- During droughts, trees and plants are weakened or killed. Dry conditions also [prevent new buds from growing](#) (Natural Resources Canada 2024) and forests from regenerating. Weakened trees and plants have a harder time defending

themselves against insects and diseases, making them more likely to die and become fuel for wildfire.

- [Drought can increase the risk of flooding](#). Dry conditions hurt soil quality and kill off vegetation, making soil less able to absorb water. If heavy rainfall follows a drought, water can run off more easily, which increases the risk of flooding (Bonsal et al. 2019).
- Droughts in northwest British Columbia, particularly during July and August when [salmon are migrating](#) to their upstream spawning areas, can cause severe and lasting damage to their populations, and to the ecosystems and Peoples that rely on them (Curran and Marsden 2021).

### **Governments can do a lot to protect Canadians from the worsening risk of droughts**

- Scientists have warned that the consequences of climate change will only get worse as the concentration of heat-trapping gases in the atmosphere increases (IPCC 2022). Governments around the world, including Canada's, must act immediately to reduce greenhouse gas emissions and limit global warming.
- Because the impacts of climate change are already here and getting worse, communities and governments must work together to adapt and prepare for increased risk of drought today. Here are a few specific measures governments can take:
  - **Strengthening agricultural resilience:** Canada can adapt to drought by improving early warning systems, such as the [Canadian Drought Monitor](#) (Agriculture and Agri Food Canada 2024), to help producers make informed decisions. Investing in irrigation systems and water storage and offering incentives for planting drought-tolerant crop varieties can [further strengthen resilience](#) in the agricultural sector. It is also important to enhance crop insurance and disaster relief programs to better support farmers during droughts (Bonsal et al. 2011).
  - **Proactive planning:** All orders of governments should proactively plan for drought by developing and implementing drought response plans, such as [Alberta's comprehensive Drought Response Plan](#). These plans can include strategies for managing water resources and coordinating efforts across affected sectors and communities (Government of Alberta 2024).
  - **Investing in structural measures for hydroelectricity:** The hydroelectricity sector could adapt to drought by continuing to invest in [water management infrastructure](#), such as reservoirs, to ensure that

energy production can continue during low water levels (B.C. Hydro 2024).

## Resources

- [Canadian Drought Monitor](#) (Agriculture and Agri Food Canada 2024)
- [Reporting Extreme Weather and Climate Change: A Guide for Journalists](#) (World Weather Attribution 2024)

## Experts available for comment and background information on this topic:

- **Ryan Ness** is Director of Adaptation Research at the Canadian Climate Institute and the lead researcher on the Institute's [Costs of Climate Change series](#) (Eastern Time, English and French).
- **Sarah Miller** is Research Lead in Adaptation at the Canadian Climate Institute (Pacific Time, English).

## For more information or to interview an expert, please contact:

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## References

Agriculture and Agri Food Canada. 2024. Canadian Drought Monitor.  
<https://agriculture.canada.ca/en/agricultural-production/weather/canadian-drought-monitor>

Arnason, Robert. 2024. "Crop Insurance Costs Explode." *The Western Producer*, February 29.  
<https://www.producer.com/news/crop-insurance-costs-explode/>

BC Hydro. 2024. "How we manage drought conditions."  
<https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/drought-management.html>

Bonsal, B.R., D.L. Peters, et al.. 2019. "Changes in freshwater availability across Canada; Chapter 6 in Canada's Changing Climate Report." Government of Canada.  
<https://changingclimate.ca/CCCR2019/chapter/6-0/>

Cameron, Daphné. 2024. "Compensations pour Pertes Agricoles: Un Milliard pour les Agriculteurs après une Année Désastreuse." *La Presse*, March 21.

<https://www.lapresse.ca/actualites/2024-03-21/compensations-pour-pertes-agricoles/un-milliard-pour-les-agriculteurs-apres-une-annee-desastreuse.php>.

Canadian Press. 2024. "Drought in Western Canada Impacting Hydropower Production as Reservoirs Run Low." *Business in Vancouver*, January 29.

<https://www.biv.com/news/resources-agriculture/drought-western-canada-impacting-hydropower-production-reservoirs-run-low-8295183>

CBC News. 2023. "Drought is causing B.C. utilities to import more power — and that will affect your bills in 2024." December 21.

<https://www.cbc.ca/news/canada/british-columbia/bc-electric-rate-changes-as-province-imports-power-1.7065802>

Chiang, Felicia, Omid Mazdiyasn, and Amir AghaKouchak. 2021. "Evidence of Anthropogenic Impacts on Global Drought Frequency, Duration, and Intensity." *Nature Communications* 12(1). <https://doi.org/10.1038/s41467-021-22314-w>

Cook, Benjamin I., Justin S. Mankin, Kate Marvel, A. Park Williams, Jason E. Smerdon, and Kevin J. Anchukaitis. 2020. "Twenty-First Century Drought Projections in the CMIP6 Forcing Scenarios". *Earth Future* 8 (6).

<https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019EF001461>

Curran, Deborah, and Tara Marsden. 2021. *Ayookxw responding to climate change*. Canadian Climate Institute. June 21.

<https://climateinstitute.ca/publications/ayookxw-responding-to-climate-change/>

Government of Alberta. 2024. *Alberta Drought Response Plan*. Environment and Protected Areas. August 14. <https://www.alberta.ca/system/files/epa-alberta-drought-response-plan.pdf>

IPCC (Intergovernmental Panel on Climate Change). 2023. *Climate Change 2021 – The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

Manitoba Hydro. 2022. "Manitoba Hydro posts \$248 million consolidated net loss due to drought: 2021-22 annual report." September 29.

[https://www.hydro.mb.ca/articles/2022/09/manitoba\\_hydro\\_posts\\_248\\_million\\_consolidated\\_net\\_loss\\_due\\_to\\_drought\\_2021\\_22\\_annual\\_report/](https://www.hydro.mb.ca/articles/2022/09/manitoba_hydro_posts_248_million_consolidated_net_loss_due_to_drought_2021_22_annual_report/)

Natural Resources Canada. 2024. "Drought." *Natural Resources Canada*, April 12.

<https://natural-resources.canada.ca/climate-change/climate-change-impacts-forests/forest-change-indicators/drought/17772>.

Overpeck, Jonathan T., and Bradley Udall. 2020. "Climate Change and the Aridification of North America." *Proceedings of the National Academy of Sciences* 117(22): 11856–11858.

<https://doi.org/10.1073/pnas.2006323117>

Smith, Madeline. 2024. "Farmers, Ranchers Worry About Coming Season Amid Drought, High Pasture Insurance Payouts." *CBC*, February 26.

<https://www.cbc.ca/news/canada/edmonton/alberta-farmer-rancher-drought-insurance-1.7124671>.

Statistics Canada. 2022. "Drought drags down Saskatchewan Economy in 2021". *Statistics Canada*. September 23.

<https://www.statcan.gc.ca/o1/en/plus/1852-drought-drags-down-saskatchewan-economy-2021>

Statistics Canada. 2024. *An energy snapshot: First quarter of 2024 review*.

<https://www.statcan.gc.ca/o1/en/plus/6447-energy-snapshot-first-quarter-2024-review>

United Nations. n.d. "Water – At the Center of the Climate Crisis." *United Nations*.

<https://www.un.org/en/climatechange/science/climate-issues/water>

Walker, David, and Anne F. Van Loon. 2023. "Droughts Are Coming on Faster." *Science* 380(6641): 130–132. <https://doi.org/10.1126/science.adh3097>

World Weather Attribution. 2023. "Climate change more than doubled the likelihood of extreme fire weather conditions in Eastern Canada." August 22.

<https://www.worldweatherattribution.org/climate-change-more-than-doubled-the-likelihood-of-extreme-fire-weather-conditions-in-eastern-canada/>

Yuan, Xing, Yumiao Wang, Peng Ji, Peili Wu, Justin Sheffield, and Jason A. Otkin. 2023. "A Global Transition to Flash Droughts under Climate Change." *Science*, 380(6641), 187–191.

<https://doi.org/10.1126/science.abn6301>

Yusa, Anna, Peter Berry, June J. Cheng, Nicholas Ogden, Barrie Bonsal, Ronald Stewart, and Ruth Waldick. 2015. "Climate Change, Drought and Human Health in Canada." *International Journal of Environmental Research and Public Health* 12(7): 8359–8412.

<https://doi.org/10.3390/ijerph120708359>

Zhang, Xuebin, Greg Flato, Megan Kirchmeier-Young, Lucie Vincent, Hui Wan, Xiaolan L. Wang, Robin Rong, John Fyfe, Guilong Li, and Viatcheslav V. Kharin. 2019. "Changes in Temperature and Precipitation Across Canada." In *Canada's Changing Climate Report*, edited by E. Bush and D. S. Lemmen, 112–193. Government of Canada.

<https://changingclimate.ca/CCCR2019/chapter/4-0/4-3/summary/>