

# Bow and Elbow River flood study details



This document provides answers to common questions about the Bow and Elbow River flood study.

## Flood study background information

The Bow and Elbow River flood study assesses and identifies river-related hazards along 72 km of the Bow River and 66 km of the Elbow River, as well as 1 km of Bragg Creek and 7 km of Lott Creek. The study extends along the Bow River from Bears paw Dam to the Highwood River confluence, and along the Elbow River from Bragg Creek to the Bow River confluence. The study area includes Calgary, Bragg Creek, Foothills County, Redwood Meadows, Rocky View County and Tsuut'ina Nation.

The study started in fall 2015 and technical work was completed in spring 2023. It includes multiple reports that document the collection of survey and base data, summarize the hydrology assessment, describe the hydraulic model creation and calibration process, present the modelling results used to create flood maps, illustrate the information used to define the floodway and flood fringe (including flood fringe sub-zones), include the flood hazard maps, assess and inventory flood risks, and investigate channel stability. Flood inundation maps are provided in a separate flood inundation map library.

When the draft flood study is finalized, it will replace three older flood studies and expand coverage. It will replace the Calgary flood study (which was originally completed in 1983, significantly updated in 1996, and last revised in 2012), the Bragg Creek flood study (which was completed in 1992), and the Rocky View County flood study (which was completed in 1996 and last revised in 1998). The new study will replace 99 km of older mapping and add 47 km of new mapping through areas never mapped before.



## Previous engagement and revisions

Draft reports and flood maps were provided to affected municipalities and First Nations between August 2016 and July 2022, for information and to obtain feedback as the first step of the study finalization process.

Public engagement on draft flood inundation maps, which show areas at risk for different sized floods to help with emergency response, and related reports was completed in January 2021. In response to feedback we received, revisions were made to hydraulic modelling and flood inundation mapping to incorporate and reflect the impact of new flood berms in the Bragg Creek and Calgary areas.

## This round of public engagement

This round of public engagement focuses on draft flood hazard maps, which define floodway and flood fringe areas to help with long term planning.

Most of the draft reports were shared with the public in our first round of engagement and some were revised to address feedback or correct factual errors or omissions. Reports being shared for the first time include the flood hazard mapping and the risk assessment reports. Copies of the draft flood hazard maps are also included in the "Governing Design Flood Hazard Mapping Report", but they are easier to explore using our online flood map viewer.

## Causes of flooding along rivers covered by the study

Flooding typically occurs because of high river flows driven by heavy rainfall, either alone or combined with snowmelt runoff, and are typically more of a risk in the spring and summer.

This type of flooding is often called open water flooding. We are aware that there may be other sources of flooding in your community, including groundwater flooding or flooding caused by local drainage issues, but the focus of this study is on riverine flooding caused by high river flows.

It would be unusual for a flood map to perfectly match a past flood, due to different river flows, variations in local conditions, and assumptions made for the study. Flood maps are based on theoretical floods with different chances of occurring, including the 1:100 design flood used for flood hazard mapping. Draft flood maps from the new study do not represent any specific recent or historic flood.

## Reflecting the impact of the Springbank Off-stream Reservoir

The current version of the draft study is based on naturalized flood flows that do not take into account the effect of flow regulation by the Springbank Off-stream Reservoir, which will be the first reservoir on either the Bow or Elbow Rivers with a dedicated and permanent flood mitigation purpose.

Hydraulic modelling, flood mapping, and flood risk assessment along the Elbow River downstream of the Springbank Off-stream Reservoir and along the Bow River downstream of the Elbow River confluence will be revised to account for the joint effect of Springbank Off-stream Reservoir and Glenmore Dam operations in early 2025. Until such time, draft flood hazard zones along the Elbow River between Glenmore Dam and the Bow River confluence, where the impact to landowners is expected to be most significant, are not being displayed in the online flood map viewer and information related to flood hazard zones in draft reports has been removed.

We are committed to releasing revised flood maps in the affected areas when the Springbank Off-stream Reservoir is fully operational, and already working with our provincial and Calgary partners to be ready.

## Revisions if flood berms are built or upgraded in the future

Flood studies are typically based on river conditions, floodplain topography, and flood mitigation infrastructure present at the time a study is conducted. If new community-level flood berms are constructed in the future, or existing flood berms are upgraded, we will assess the potential impact on calculated flood levels and flood maps. If impacts are significant, revisions to the flood maps will be considered, including remapping to include additional protected areas in both flood inundation and flood hazard maps.

You may notice some differences between the printed version of the maps and the online maps, specifically related to flood berms and protected areas. Our online flood maps reflect all

new or upgraded flood berms complete as of fall 2023, but we have worked with Calgary to understand the impact of the future Sunnyside Barrier. Our draft reports and printed maps are based on a future scenario that includes this flood berm, but the protection it provides will only be reflected in our online flood maps when it is completed. However, the draft floodway aligns with future flood berm plans and does not extend behind either existing or planned flood berms.

## Revisions if new dams or reservoirs are built in the future

Provincial flood studies typically use naturalized flows for flood mapping, to be cautious and help communities prepare for a worst-case scenario when a dam simply passes the flow it would naturally receive from upstream during a flood. If new dams or reservoirs with a dedicated and permanent flood mitigation component are built in the future (in addition to the Springbank Off-stream Reservoir currently under construction), and if their impact on flood flows is established to be dependable and significant, we will re-evaluate our hydrology assessment and hydraulic modelling and consider flood map revisions, if appropriate.

## Climate change considerations

The potential effects of climate change were assessed as part of the hydrology assessment. In general, the effect of climate change on the Bow and Elbow River flood flows is uncertain. Given this uncertainty, various climate change scenarios were not explicitly modelled. However, the potential impact on flood levels from increasing 1:100 flood flows by 10% and 20% was assessed, and this information can be considered by communities if desired.

## Learn more about provincial flood studies

Review our “General information about flood studies” fact sheet to learn more about provincial flood studies, including how flood maps are developed and how flood inundation and flood hazard maps are used.

Visit [www.floodhazard.alberta.ca](http://www.floodhazard.alberta.ca) for more information about the Flood Hazard Identification Program.

The website includes more details on different types of flood maps and how to view them using our online flood map viewer, as well as individual web pages for listing our draft and final flood studies.

## Contact

Email us at [epa.flood@gov.ab.ca](mailto:epa.flood@gov.ab.ca) for more information about our public engagement for draft flood studies, or if you have questions about the Flood Hazard Identification Program.