Drumheller Flood Study
About flood studies

We know you might have general questions about provincial flood studies and the different kinds of reports and maps they can include. This document provides answers to common questions about flood studies. We welcome you to read through all the questions and answers, or focus only on the specific questions you're most interested in learning more about as part of our public engagement.

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Questions and answers

What is a flood study?

Flood studies are detailed assessments of flood risk along a specific length of river. They include flood maps that identify where water will flow during a flood, and what land could be flooded for different sized floods. Flood studies can include both open water and ice jam flood maps when appropriate.

Why does the province make flood maps?

Flooding can cause damage to property, hardship to people, and loss of life. Flood studies and maps assist communities in keeping Albertans safe and protecting their properties from floods.

What information does a flood study include?

Flood studies include both detailed engineering reports and flood maps. The engineering reports are typically technical in nature and document the data, assumptions, and results of the hydrologic and hydraulic analyses needed to create flood maps. Larger studies often include more than one report in addition to separate flood map libraries, while smaller studies combine all the background information and reporting into a single report.

What is a 1:100 flood, and how does it compare to other floods?

A 1:100 flood is a flood that has a 1% chance of occurring each year. The terms 1:100 flood, 100-year flood, and 1% annual exceedance probability flood are all different ways of describing the same flood.

The same terminology is used to describe floods that have different chances of occurring. Smaller floods are statistically more likely to occur in any given year than larger floods. For example, a 1:50 flood is smaller than a 1:100 flood, and has a higher (2%) chance of occurring each year. Similarly, a 1:200 flood is larger than a 1:100 flood, and has a lower (0.5%) chance of occurring each year.

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The smallest flood we typically map is a 1:2 flood, which is considered somewhat common and has a relatively high (50%) chance of occurring each year. The largest flood map we typically map is a 1:1000 flood, which is exceeding unlikely and has a relatively low (0.1%) chance of occurring each year.

Is it true that a 1:100 flood can only happen once every 100 years?

No. A 1:100 flood is commonly referred to as a 100-year flood but this does not mean that it will only occur once every 100 years. Although it is less likely from a statistical point of view, a 1:100 flood can occur more than once over a multi-year period, in back-to-back years, or even twice in a single year.

How is the 1:100 flood determined?

Determining the magnitude of a 1:100 flood starts with an assessment of river flows or water levels, using available flow or water level records for a specific location and standard statistical calculations. The records are usually a list of highest recorded flows each year at a hydrometric gauge, but recorded lake or ice jam levels can also be used depending on the type of flooding being assessed.

Can the 1:100 flood change over time?

Yes. Because the 1:100 flood is calculated using recorded or historic flow or water level records, the calculated value can change over time when more data becomes available. Typically, the calculated value of the 1:100 flood – or floods with different chances of occurring – doesn't change dramatically year-to-year, but it can vary over time. The most significant changes usually occur after a large flood and changes our understanding of flood risk, or after long periods of low flows without any floods.

How are flood maps created?

Flood maps are created by combining hydraulic model results with high-accuracy ground information. Field surveys and LiDAR remote sensing are used to collect river and floodplain elevations, channel cross section data, bridge and culvert information, and flood berm details. A hydrology assessment using recorded and historic flow measurements is typically used to estimate river flows for a wide range of possible open water floods with different chances of occurring each year. All this information is used to build a hydraulic model of a river system, which is calibrated using highwater marks and aerial imagery from past floods to ensure that results for the different flood flows being mapped are reasonable.

We welcome you to view two short videos to learn more about river flow and flood map basics:

River Flow Basics Video | Flood Mapping Basics Video

How accurate are flood maps?

Provincial flood maps are created using the best available tools and information available when a study is conducted, and are prepared in accordance with generally accepted engineering practices.

We are confident in the work of our consultants, and that the flood maps are as representative as possible given the assumptions used to create hydraulic models and flood maps. The high-accuracy survey and base data used for flood mapping was commissioned specifically for the study, and the hydraulic modelling was calibrated using information from previous floods. All the draft reports and flood maps have undergone multiple levels of quality control and assurance, and meet or exceed minimum accuracy requirements laid out in provincial Flood Hazard Identification Program guidelines.

How accurate are the survey and base data used to create flood maps?

All topographic survey data collected for the study using standard ground-based technologies have a minimum absolute positional accuracy of ±0.05 metres, at 95% confidence. Final accuracy of bathymetric survey data collected using a combination of ground and acoustic-based technologies have a minimum accuracy of ±0.15 metres, but it is expected that most of this data maintains the ±0.05 metre minimum accuracy obtained using ground-based technologies.

In addition, the LiDAR-derived digital elevation model used to describe floodplain topography also has a minimum vertical accuracy of ±0.15 metres, at 95% confidence. In comparison, other publically-available provincial digital elevations models have stated accuracies of ±5 metres, and off-the-shelf digital elevation models available for purchase typically have accuracies no better than ±0.30 metres.

What are flood inundation maps?

Flood inundation maps show areas at risk for different sized floods, including ice jam floods in some communities. These maps also identify areas that could be flooded if local berms fail, and are typically used for emergency response planning and to inform local infrastructure design.

Older flood studies include maps for as many as three flood scenarios, including the 1:100 flood. Newer studies include maps for as many as thirteen scenarios, from the 1:2 flood to the 1:1000 flood.

Are flood inundation maps used for regulating development?

No, not usually. Unlike flood hazard maps, flood inundation maps are not typically used for regulating development, but they do provide valuable information about flood risks that can help build resilient communities. They are most often used for emergency response planning, and show areas at risk for a wide range of flood flows.

What does it mean when an area is protected by a flood berm?

We understand that flood berms reduce flood risks for those behind them. When flood waters are not higher than a flood berm, we show the area that would have been flooded as a protected area and consider it differently than directly flooded areas that are not protected. You may notice that the flood reports and our PDF flood maps use a different term for these protected areas – potential flood control structure failure areas – but we know that this is overly-technical and can be confusing. This is why our website and online flood map viewer uses the term “Protected by Flood Berm” instead.

To be very clear, we don’t think that your community’s flood berms will fail, but do want everyone to be aware that there is still some risk behind them in a worst case scenario.

What are flood hazard maps?

Flood hazard maps define floodway and flood fringe areas for the 1:100 design flood. The design flood is typically an open water flood but may also reflect 1:100 ice jam flood levels or be based on a historical flood event. The floodway is the portion of the flood hazard area where flows are deepest, fastest and most destructive. The flood fringe is the portion of the flood hazard area outside of the floodway, where flood water is generally shallower and flows more slowly than in the floodway.

The flood hazard map is usually based on the 1:100 flood inundation map but includes additional analysis to define the floodway. These maps are typically used for long range planning and to make local land use decisions, and are available to all levels of government and the public to help build resilient communities.

Are there other kinds of flood maps?

Yes. The basic science and engineering assessment used to create flood inundation maps can be used to create other kinds of flood maps. For example, flood likelihood maps illustrate cumulative flood risk over a 30 year period by combining multiple flood inundation maps. Flood range maps compare two different sized floods, and help communicate what parts of a community can become at risk as flows change during a flood event. Although these kind of flood maps are not part of flood studies, we make them available to the public though the Flood Awareness Map Application.

Are flood maps available for all rivers across Alberta?

No. Flood risks have not been identified along all rivers or through all communities, and it is important to remember that risk exists in areas without provincial flood maps.

Historically, the Flood Hazard Identification Program focused on specific communities and densely populated areas, where the risk to safety and potential for significant flood damage is typically highest. New flood studies can include longer lengths of river and less populated areas, where appropriate.

How are flood maps used by different levels of government?

Provincial flood maps are used by all levels of government, consultants, industry, non-government organizations, and the public. Flood maps can support emergency response during a flood and help build resilient communities over the long term. Flood maps can inform local land-use planning decisions, emergency management operations, and sustainable floodplain function initiatives.

Is there a connection between floods maps and insurance?

Provincial flood maps are public resources that are available to the insurance industry, but our understanding is that insurers determine flood risks using proprietary flood maps that may consider other flood mechanisms and factors. Please contact your insurer for more information about how your flood risk was assessed for insurance purposes.

Where can I learn more about provincial flood studies?

Visit www.floodhazard.alberta.ca for more information about the Flood Hazard Identification Program.

The website includes different sections for final flood studies and for draft flood studies. Final flood maps can also be viewed directly using the Flood Awareness Map Application. Please note that there are different versions of the application, one for final flood maps and one for draft flood maps.

Contact us

Email us at aep.flood@gov.ab.ca for more information about the public engagement process for the Drumheller flood study, or if you have questions about the Flood Hazard Identification Program.

https://www.alberta.ca/drumheller-flood-study-engagement.aspx

Classification: Public