

Athabasca Flood Study

About this study

We know you might have specific questions about the Athabasca flood study and what it means for your community. This document provides answers to common questions about the study. 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 area does the flood study cover?

The new Athabasca flood study assesses and identifies flood hazards along 8 km of the Athabasca River, 8 km of Muskeg Creek, and 6 km of the Tawatinaw River through Athabasca and Athabasca County.

When was the flood study conducted?

The study started in spring 2019 and technical work on all components was completed in spring 2020.

Was the draft study shared with my local authority?

Yes. Draft reports and flood maps were provided to affected municipalities in May 2020, for information and to obtain feedback as the first step of the study finalization process.

What reports and flood maps are included in the study?

The main study components are outlined below. Draft open water and ice jam flood inundation maps are in separate flood map libraries, with details about each topic in the draft version of the main report.

Although we are not able to share the full version of the main report at this time, the excerpts we can provide include valuable background information. The report excerpts document the collection of survey and base data, summarize the hydrology assessment and flood frequency analyses, describe the hydraulic model creation and calibration process, and present the modelling results used to create flood inundation maps for both open water and ice jam flood scenarios.

Note that flood hazard maps are not included in the current scope of public engagement. Content discussing these maps, and the maps themselves, have been removed from the main report, but will be shared at a later date as part of our next stage of public engagement.

Survey and Base Data Collection: Hydraulic models and flood maps require high-accuracy base data. Field surveys and LiDAR remote sensing were used to collect river and floodplain elevations, channel cross section data, bridge and culvert information, and dedicated flood control structure details.

Open Water Hydrology Assessment: The hydrology assessment estimates flows for a wide range of possible open water floods along the Athabasca River, Muskeg Creek, and the Tawatinaw River, including the 1:2, 1:5, 1:10, 1:20, 1:35, 1:50, 1:75, 1:100, 1:200, 1:350, 1:500, 1:750, and 1:1000 floods.

Hydraulic River Modelling: A new hydraulic computer model of the river system was created using new survey data and modern tools. The model was calibrated using surveyed highwater marks from past floods to ensure that results for different floods are reasonable.

Flood Inundation Mapping: Flood maps for thirteen different sized open water floods, based on the hydraulic model results and the hydrology assessment, have been produced. Flood inundation maps can be used for emergency response planning and to inform local infrastructure design. These maps identify areas of direct flooding and areas that could be flooded if local berms fail. These draft maps are included in the separate open water flood inundation map library.

Ice Jam Assessment: Ice conditions are known to have caused significant historical flooding in Athabasca. This assessment includes an analysis of the ice jam flood history in the area and flood inundation maps for the 1:50, 1:100, and 1:200 ice jam floods. These draft maps are included in the separate ice jam flood inundation map library.

Can I view the draft flood inundation maps without reading all the reports?

Yes. The provincial [Flood Awareness Map Application](#) is the best way to view, interact with, and get more information about draft flood maps without reading through the detailed study reports.

The application can be used to view all the draft flood inundation maps from the new study, and the slider on the right side of the screen allows users to easily switch between smaller and larger floods. The slider can also be used to switch between open water and ice jam flood scenarios. Users can manually scroll or zoom to specific areas of interest, search for locations using an address, or change



the default background to satellite imagery using the layer control on the left side of the screen. Users can also find out the actual river flow being used for mapping by clicking on any part of the flooded area.

Will this new study replace our existing study and flood maps?

Yes, when the draft flood study is finalized.

What causes flooding in Athabasca?

Flooding in Athabasca typically occurs because of high river flows or ice jams. We are aware that there may be other sources of flooding in the area, 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 or ice jams.

What is the difference between open water and ice jam flooding?

Open water floods are typically caused by high flows driven by heavy rainfall, either alone or combined with snowmelt runoff, and are typically more of a risk in the spring and summer. In contrast, ice jam floods are caused by river ice breakup in the early spring season.

Does this study consider ice jam flooding?

Yes. The study assessed both open water and ice jam flood risks.

Why don't the maps match the flooding we experienced in past years?

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 as part of the flood study and its analyses. Flood inundation maps are based on theoretical floods with different chances of occurring. The draft flood inundation maps from the new study do not represent any specific recent or historic flood.

Are you confident that the flood study results and maps are accurate?

Yes. 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 that the flood maps are as representative as possible given the assumptions used to create hydraulic models and flood maps.

Why do flood maps change when a new study is completed?

New flood studies use new information and analyses. This includes high-accuracy survey and base data collected for the study, hydrology assessment that incorporates new techniques and longer flow records, and hydraulic models using modern modelling platforms. In addition to reflecting changes to the river and floodplain that have occurred since a previous study was conducted, the flood levels calculated using new information and analyses can be different than those in older studies. This means that new flood maps can also be different than older flood maps, even in the same area.

What will happen if flood berms are built or upgraded in the future?

Flood studies are 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 draft flood maps will be considered.

What will happen if the floodplain topography changes in the future?

We understand that rivers and their floodplains can change over time, whether as a result of natural processes or human development. Localized changes to topography do not typically result in significant changes to general river or flood levels, and would be captured the next time a study is formally updated. If major changes to floodplain topography were to occur and brought to our attention, we would assess whether revisions to hydraulic models and flood maps were appropriate in the interim.

Was ice jam mitigation such as ice breaking or dredging considered in the study?

No. The ice jam modelling and flood maps are based on natural processes and river conditions when survey data for the study was collected.

How has climate change been considered?

The potential effects of climate change were assessed as part of the hydrology assessment. In general, the effect of climate change on Athabasca River, Muskeg Creek, and Tawatinaw River flows is uncertain. Increased precipitation intensity may lead to higher flood peaks but this may be mitigated by reduced snowpack and drier antecedent moisture conditions due to higher temperatures. Given this uncertain conclusion, various scenarios were not explicitly modelled. However, an assessment of potential impacts on open water and ice jam flood levels was completed to characterize a freeboard that could be considered for planning purposes.

Contact us

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