

Upper Red Deer River Flood Study

About this study

We know you might have specific questions about the Upper Red Deer River 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 Upper Red Deer River flood study assesses and identifies river-related hazards along 85 km of the Red Deer River and 17 km of Bearberry Creek, through Red Deer County, Clearwater County, and Mountain View County, including Sundre.

When was the flood study conducted?

The study started in fall 2017 and technical work on all components was completed in fall 2019.

Was the draft study shared with my local authority?

Yes. Draft reports and flood maps were provided to affected municipalities between May 2018 and December 2019, 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. Individual draft reports document the collection of survey and base data, summarize the hydrology assessment and flood frequency analyses, describe the hydraulic model creation and calibration process, present the modelling results used to create flood inundation maps, and investigate channel stability at a high level. Draft open water flood inundation maps are in a separate flood map library.

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 some reporting, but will be shared at a later date as part of our next stage of public engagement.

Survey and Base Data Collection Report: Hydraulic models and flood maps require high-accuracy survey and base data. Field surveys and LiDAR

2013



remote sensing were used to collect river and floodplain elevations, channel cross section data, bridge and culvert information, and dedicated flood berm details. This report documents the collection of all foundational survey and base data for the study.

Open Water Hydrology Assessment Report:

This report presents the results of the open water hydrologic assessment and flood frequency analysis at several locations along the Red Deer River and Bearberry Creek. It presents flow estimates for a wide range of open water floods, 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 Modelling and Open Water Flood

Inundation Mapping Report: This report documents the creation of hydraulic models that simulate open water flood levels along the Red Deer River and Bearberry Creek within the study area. The report also includes flood history documentation, details about how the models were calibrated to previous floods and surveyed highwater marks, and flood profiles for thirteen different sized open water floods, from the 1:2 to the 1:1000 flood.

Open Water Flood Inundation Map Library: These maps show what would be flooded for thirteen different sized open water floods, from the 1:2 to the 1:1000 flood. Flood inundation maps can be used for emergency response planning and to inform local infrastructure design. These maps also show areas that would be flooded if local flood berms fail.

Channel Stability Investigation Report: This report provides insight into general channel stability along the Red Deer River and Bearberry Creek within the study area, by using aerial photos and channel cross sections to compare current and historic riverbank locations.

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. 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 along the Red Deer River and Bearberry Creek?

Flooding along the Red Deer River and Bearberry Creek occurs because of high river flows. 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.

2013



Does the study include information from the 2013 flood?

Yes, the study does include the 2013 flood! The survey and base data used for hydraulic modelling and flood mapping were all collected after the 2013 flood, and estimated peak 2013 flood flows were included in the hydrology assessment. We also collected 2013 flood highwater mark data throughout the study area, and used this information for hydraulic model calibration to ensure our study was as accurate as possible.

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.

Does this study consider groundwater flooding?

No, provincial flood studies focus on riverine flood hazards – the situation when high water escapes the river and inundates the floodplain. This is true for both the Red Deer River and Bearberry Creek. Although your community may also face other flood hazards, the study doesn't assess groundwater, local drainage issues, or overland flooding caused by excessive rain or snowmelt runoff.

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

2013



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.

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 Red Deer River and Bearberry Creek 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 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 Upper Red Deer River flood study, or if you have questions about the Flood Hazard Identification Program.