

# Flood Mitigation Systems

Environment and Protected  
Areas and Municipal Affairs

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Report of the Auditor General  
December 2025

**Assessment of  
Implementation Report**

**Auditor  
General**  
OF ALBERTA

Brandon Lundy, MLA  
Chair  
Standing Committee on Legislative Offices

On behalf of my office, I am transmitting the *Flood Mitigation Systems Assessment of Implementation* to the Members of the Legislative Assembly of Alberta, under the *Auditor General Act*.



W. Doug Wylie FCPA, FCMA, ICD  
Auditor General of Alberta

Edmonton, Alberta  
December 2025

# Assessment of Implementation Report

## Flood Mitigation Systems

### *Environment and Protected Areas and Municipal Affairs*

(March 2015)

#### Summary of Recommendations

We assessed the implementation of four recommendations from our March 2015 audit of *Flood Mitigation Systems* to improve processes for managing financial and public safety risks from floods. Three of the recommendations have been implemented. The departments stated that the fourth recommendation—to designate flood hazard areas and regulate development within them—will not be implemented.

#### Environment and Protected Areas and Municipal Affairs

**NOT IMPLEMENTED** Recommendation:  
Designate flood hazard areas and complete floodway development regulation

#### Environment and Protected Areas (Environment)

**IMPLEMENTED** Recommendation:  
Update flood hazard maps and mapping guidelines

**IMPLEMENTED** Recommendation:  
Assess flood risks<sup>1</sup>

**IMPLEMENTED** Recommendation:  
Enhance flood mitigation project assessments<sup>2</sup>

<sup>1</sup> This recommendation title has been updated from our March 2015 report to clarify and better reflect the substance of the recommendation.

<sup>2</sup> Ibid.

## Introduction

In 2013, Alberta experienced devastating floods that claimed five lives, displaced over 100,000 people, damaged 14,500 homes, and resulted in rebuilding costs of over \$5 billion. The burden of these costs fell almost exclusively on the federal and Alberta governments. In response, the Alberta government initiated significant actions to improve preparedness and mitigate future flood risks.

Our 2015 audit of flood mitigation processes found:

- weaknesses in Environment's processes for flood hazard mapping, flood risk assessments, and flood mitigation project assessments
- inconsistent approaches to managing development in flood hazard areas. Some municipalities restricted development while others did not.
- Municipal Affairs had not finalized regulations or enforcement processes for land use in floodways

We recommended that Environment strengthen its flood mitigation processes by:

- improving flood hazard mapping
- conducting risk assessments to support flood mitigation decisions
- considering both previously funded and proposed flood mitigation projects when making approval decisions

Additionally, to reduce public safety risks and prevent unnecessary expenses, we recommended that:

- Environment designate flood hazard areas
- Municipal Affairs establish processes to control or prohibit future development in these areas and enforce regulatory requirements

We assessed whether the four recommendations were implemented. However, Municipal Affairs did not provide all the information requested by the Office of the Auditor General. The implications of this are discussed below.

## Access to information challenges by the Auditor General

In accordance with the *Auditor General Act*, I am informing the Assembly, that in carrying out the work of my office, I was denied certain information requested to assess the implementation of a flood mitigation systems recommendation to the Department of Municipal Affairs.

Municipal Affairs asserts they completed analysis of controlling development in floodways, which was provided to the Minister and Cabinet. My office sought evidence of the analysis as part of our assessment of implementation, from both Environment and Municipal Affairs.

We asked Municipal Affairs to provide the analyses they said they had prepared related to risks and to controlling and regulating development in flood hazard areas. The Department did not provide any information to us in this regard. Municipal Affairs told us their analysis is privileged, and they could not provide it. Our report remains incomplete without this information, which we believe is important to the public. Examining analysis, prepared by a department, as it relates to risks and risk management is a normal part of our assessment of implementation work.

Our findings may not reflect pertinent and significant information and our work is incomplete in this regard. We received all other information necessary to complete the remainder of our assessment of implementation.

# Environment and Protected Areas and Municipal Affairs

Recommendation:

**Designate flood hazard areas and complete floodway development regulation**

**NOT IMPLEMENTED**

Effectiveness of measures to mitigate financial and public safety risk in flood hazard areas unknown and no plan for monitoring

## Context

Environment's flood mitigation plans stress the importance of keeping people away from the water rather than keeping the water away from people. Residents and businesses in flood hazard areas, particularly floodways,<sup>3</sup> pose public safety and financial risks. Governments can manage these risks by restricting development in such areas, when necessary.

Under the *Water Act*, the Environment Minister can, subject to regulations, designate (that is, mark or point out) land as a flood hazard area if there is a threat to life or property from flooding. The Minister can specify acceptable land uses in these areas, in consultation with local authorities, before making the designation. This designation formally acknowledges the flood risk, and local authorities are expected to consider this risk when planning future development. Designated areas carry restrictions like limits on development and government financial assistance, except for specified uses.

The *Municipal Government Act* empowers the Lieutenant Governor in Council to regulate land use by controlling or prohibiting development in floodways, with exemptions for municipalities that already have significant development in these areas.

In 2015, both the departments of Environment and Municipal Affairs accepted our recommendation to designate flood hazard areas and complete floodway development regulations. The purpose of our recommendation was to address the financial and public safety risks from ongoing development in flood hazard areas. At that time, Environment and Municipal Affairs, respectively, were advancing designating flood hazard areas and developing regulations for these areas. As such, our recommendation aligned with the approach being taken to deal with the risks.

## Environment stopped designating flood hazard areas

In 2020, Environment's plan to designate flood hazard areas was put on hold, awaiting clarity on a floodway development regulation from Municipal Affairs.

By 2022, Environment decided to stop designating flood hazard areas. An assistant deputy minister approved this decision, citing ongoing development of flood maps for use by municipalities, Disaster Recovery Program (DRP) changes, and the possibility of a national flood insurance program as sufficient measures to mitigate risks from future floods.

The only issue Environment identified in not designating was potential misalignment with Municipal Affairs if they proceed with a floodway development regulation.

<sup>3</sup> The flood hazard area refers to land impacted by the flood and is typically divided into two zones: the floodway and the flood fringe. The floodway includes the river channel and adjacent overbank areas, where water flows are deepest, fastest, and most destructive.

Environment stated that the government has never regulated development in designated flood hazard areas under the *Water Act*, and only two maps have been designated—from 2002 and 2003—but neither were used to regulate land use decisions. With Municipal Affairs deciding not to implement a floodway regulation, Environment confirmed it will not pursue flood hazard designations, leaving section 96 of the *Water Act* unused.

## Municipal Affairs stopped developing regulations for flood hazard areas

Municipal Affairs stated that, since the 2013 floods and our 2015 audit, the government has focused on other measures to mitigate safety and financial risks from development in flood hazard areas. These measures include Disaster Recovery Program (DRP) changes, a new risk assessment tool managed by the Alberta Emergency Management Agency, and flood hazard maps from Environment. Municipal Affairs stated that development decisions in flood hazard areas rest with municipal governments.

## What we assessed

Given the significant risks to public safety and provincial finances from development in flood hazard areas, and the reliance on other measures to mitigate these risks, we sought evidence to determine whether Environment and Municipal Affairs:

- analyzed the risks and effectiveness of these other measures
- have plans to monitor and evaluate the impact of these measures on limiting development in flood hazard areas

## Our current findings

### Key findings

- Environment's risk analysis was incomplete and inadequate
- Municipal Affairs did not provide their analysis to us, claiming it is privileged
- No evidence current measures will effectively mitigate risks and no plan to monitor impact on flood hazard area development

## Environment's risk analysis incomplete and inadequate

Environment's risk analysis for stopping flood hazard area designations failed to show how existing and planned processes would effectively mitigate public safety and financial risks. Key items that are missing or not adequately analyzed include:

- **Financial risks from flooding not considered**

Environment's analysis did not include an assessment of financial risks associated with floods.

When development is allowed in flood hazard areas and damaged by floods, the government bears the financial risks. Alberta covers up to 100 per cent of flood damages to residential properties (up to DRP limits),<sup>4</sup> jointly with the federal government, while municipalities are responsible for only 10 per cent of municipal infrastructure damages.<sup>5</sup> In other provinces, municipalities cover more if they allow development in flood zones.<sup>6</sup>

<sup>4</sup> The Alberta Disaster Recovery Program provides financial assistance for uninsurable loss and damage caused by emergencies and disasters. There is \$500,000 funding cap per homeowner application, and a one-time limit on disaster financial assistance per property address.

<sup>5</sup> Municipal cost sharing was implemented as part of the DRP changes.

<sup>6</sup> For example, British Columbia provides financial assistance covering 80 per cent of eligible municipal flood recovery costs, Saskatchewan municipal claims are subject to a deductible, and Manitoba utilizes a cost-sharing formula.

The province also funds flood mitigation tools such as flood mapping, risk assessments, and infrastructure, but municipalities don't have to use them in development decisions. Flood mitigation infrastructure, like new and planned berms and dams, may reduce the flood hazard areas, but development in these areas still poses safety and financial risks. Increased development in flood hazard areas creates greater need for mitigation infrastructure.

The 2013 floods cost Alberta \$2 billion.<sup>7</sup> Calgary alone incurred \$409 million in infrastructure damages, \$55 million in emergency response costs, and \$323 million in recovery.<sup>8</sup>

- **Conclusion on limited value of flood hazard area designation lacked supporting analysis**

Environment concluded that designating flood hazard areas under section 96 of the *Water Act* would only prevent provincial projects or funding in these areas. However, the analysis did not evaluate the extent of provincially funded projects in flood hazard areas or the additional costs required for flood mitigation infrastructure in these developments. For example, we did not find any evidence of Environment's involvement in evaluating the risks associated with projects such as the Willow Square health facility in Fort McMurray and infrastructure near the planned Calgary Arena.

Further, the analysis did not consider another key aspect of section 96: designation could limit government financial assistance for flood damages unless specific uses are allowed. This gap relates to the lack of analysis of financial risks noted above.

- **Claim that municipalities restrict development in flood hazard not supported by actual data on development**

The analysis claimed that many municipalities restrict development in flood hazard areas with bylaws. This claim was based on Environment examining bylaws of 130 flood-prone communities. But we found that while some bylaws restrict development, others allow it, and the analysis lacked data on actual development in these areas.

Between 2013–2017, data from Municipal Affairs showed that new developments and improvements in flood hazard areas increased the total assessed value at risk of future flooding by \$1.38 billion. Municipal Affairs said that it has no plans to update or use this data, as it does not monitor municipal land use bylaws or development approvals because it lacks authority to intervene in municipal decision-making.<sup>9</sup>

- **Uncertainty regarding national flood insurance coverage and impact**

Environment's analysis indicates a potential transfer of flood financial risk to homeowners due to proposed federal changes such as national flood insurance. While the federal government has announced its intent to establish an entity for flood reinsurance, the program details, nature, and extent of coverage (for example, for new developments in flood hazard areas), and actual implementation remain unclear based on publicly available information.

- **Impact of Disaster Recovery Program (DRP) changes unknown**

The 2021 DRP changes introduced a discretionary \$500,000 limit on residential claims and a one-time allowance for claiming flood recovery funding. However, the analysis did not assess how these changes would reduce financial risks from floods. For example, it didn't estimate the financial impact if such limit existed during the 2013 floods. Also, no floods have occurred since the changes, and it is unclear if the limit would be enforced, so the impact of these changes is unknown.

<sup>7</sup> The 2013 floods incurred a cost of \$5 billion for the provincial and federal governments. [Flooding in Calgary - Flood of 2013](#).

<sup>8</sup> [Flooding in Calgary - Flood of 2013](#)

<sup>9</sup> Municipal Affairs stated that municipalities have primary authority over land use planning and development decisions, aligning with the principles of local autonomy and accountability outlined in the *Municipal Government Act*. Acknowledging the local governments' firsthand knowledge and experience with the consequences, Municipal Affairs believes that it has no role in that decision making process.

## **Municipal Affairs did not provide their analysis, claiming it is privileged**

We asked Municipal Affairs to provide the analyses they said they had prepared related to risks and to controlling and regulating development in flood hazard areas. The Department did not provide any information to us in this regard. Municipal Affairs told us their analysis is privileged, and they could not provide it. Our report remains incomplete without this information, which we believe is important to the public. Examining analysis, prepared by a department, as it relates to risks and risk management is a normal part of our assessment of implementation work.

## **No evidence current measures will effectively mitigate risks and no plan to monitor impact on flood hazard area development**

Both Environment and Municipal Affairs cited reliance on current measures to mitigate risk, but did not provide evidence of analysis of the effectiveness of these measures. Additionally, neither department has a process or plans to assess if the current and planned risk-mitigation measures are working as intended. Reasons provided by the departments include:

- both departments lack the mandate, responsibility, and capacity to assess the effectiveness of the current risk mitigation measures
- both departments do not consider themselves “risk owners” for flood hazard area development
- Environment stated that monitoring the effectiveness of risk mitigation is unfeasible, especially without a flood event to analyze

The risks that prompted our recommendation remain.



# Environment and Protected Areas

Recommendation:

## Update flood hazard maps and mapping guidelines

**IMPLEMENTED**

### Context

Environment conducts river and flood hazard studies to identify and map flood hazard areas throughout the province. The goal is to improve public awareness of existing flood hazards, promote appropriate development in flood hazard areas, and reduce future flood damages and associated financial costs.

In 2015, Environment lacked comprehensive and up-to-date flood hazard maps.<sup>10</sup> Although maps for 63 of the 66 most flood prone communities, covering 960 kms of rivers, were either drafted or finalized, one third of them were over 20 years old. This outdated information made it hard to accurately identify and mitigate flood risks across the province. As well, Environment's mapping guidelines had not been revised to cover all categories of flood hazards, making it even harder to mitigate flood risks.

### Our current findings

#### Flood hazard mapping

In 2017, Environment developed a 25-year flood mapping plan (2017–2042). The plan entails updating existing maps to current standards and expanding mapping coverage to include more communities. Implementing this plan should increase the total distance of mapped rivers from about 1,200 km to 2,500 km. The plan highlights the need for annual average funding of \$2.6 million to meet current and future mapping commitments.

Each year, Environment identifies mapping projects to complete based on the long-term plan, while also considering changing priorities, new information, and available funding. It decides on new areas for mapping and prioritizes those in the long-term plan based on factors such as population growth, vulnerable populations, infrastructure in flood prone areas, proposed new development areas, and recent floods. Draft maps are reviewed by Environment, communities, and municipalities to ensure accuracy. Then, Environment publicly posts the final maps.<sup>11</sup>

Environment is making good progress in fulfilling its mapping commitments in the long-term plan. As of June 2022, 21 new maps had been completed, replacing 31 outdated ones, and six more were in progress for previously unmapped areas. To ensure efficient project management, Environment has established monitoring processes to track the progress of each mapping project, as well as the annual and long-term plans. Environment regularly reviews and updates the long-term plan, most recently in 2022.

#### Mapping guidelines

Environment updated its technical guidelines for flood hazard identification in 2022 and developed additional guidelines in 2024. The department has also implemented a new process to review all flood hazard identification guidelines annually and update them as needed.

<sup>10</sup> A flood hazard map is a specialized map that delineates the area that would be flooded in an event that has a one per cent chance of occurring in any given year.

<sup>11</sup> Alberta flood hazard maps are at [Alberta Floods Portal](https://alberta.ca/alberta-floods-portal/).

# Environment and Protected Areas

## Recommendation: **Assess flood risks** **IMPLEMENTED**

### Context

In 2015, Environment lacked the capacity and information to conduct flood risk assessments. Such assessments are crucial for evaluating a community's potential financial risks from flooding. They play a central role in guiding municipal planning and decision-making.

### Our current findings

To ensure consistency in evaluating flood mitigation alternatives, Environment adopted a standardized methodology for the flood damage assessments. The Provincial Flood Damage Assessment Tool<sup>12</sup> enables the calculation of flood damages at different levels of inundation in a community, using a standardized approach. This tool helps in assessing the priority of proposed flood mitigation projects by comparing them against the potential cost of a particular flood in a community. By using this tool, Environment shows potential economic risks. It lets them compare the cost-effectiveness of different flood mitigation projects and select the best.

Environment has developed a long-range plan (2021–2029) for completing risk assessments, and it also prepares annual plans based on availability of flood hazard mapping plans and community-specific property data.<sup>13</sup> To prioritize risk assessments, Environment uses criteria like those used for mapping to identify the communities most vulnerable to flooding.

Once Environment completes draft risk-assessment reports, it gives them to municipalities for their input and feedback. Environment's management, with third party consultants, reviews feedback and approves the reports before making them public.

Environment, in partnership with Public Safety Canada through the National Disaster Mitigation Program, has completed 21 flood damage risk assessments for communities, including Red Deer, Peace River, and Fort McMurray. Environment's internal documents indicate that the cost of completing a flood risk assessment typically ranges from \$10,000 to \$75,000, depending on the extent of community infrastructure in the flood hazard area.

The most recent update to the 2022 plan indicated that all projects planned for 2021–2022 were completed on schedule and within budget.

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<sup>12</sup> In 2019, Environment implemented a new tool called CanFlood.

<sup>13</sup> The prerequisites for conducting a risk assessment include the completion of inundation damage maps, which highlight areas susceptible to flooding, and the availability of community-specific property data, which identifies the inventory of exposed properties.

# Environment and Protected Areas

Recommendation:

**Enhance flood mitigation project assessments**

**IMPLEMENTED**

## Context

Environment plays a central role in identifying, selecting, funding, and tracking flood mitigation projects throughout the province.

In 2015, Environment needed to improve its processes to assess the overall effect of flood mitigation projects. Projects were approved without assessing if existing mitigation efforts already provided sufficient community protection.

Environment managed two grant programs focused on flood resilience and mitigation: the Alberta Community Resilience Program (ACRP) and the Watershed Resiliency and Restoration Program. ACRP ran from 2014 to 2020 and is currently in an administrative phase pending the finalizing of grants for long-term projects.<sup>14</sup>

Our assessment focused on Environment's processes for administering ACRP, including project selection, funding allocation, and monitoring of project implementation.

## Our current findings

Environment has improved its process for reviewing applications for flood resilience and mitigation grants. A grant committee evaluated applications from municipalities using specific criteria to determine eligibility for funding, considering previous and applied-for funding, plus existing and planned mitigation measures. Approved projects were ranked for ministerial approval and subject to financial and project reporting obligations. Environment also reviewed municipality project reporting for compliance purposes.

Environment has also implemented a system to track flood mitigation structures developed with provincial funding, helping identify and locate the structures.

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<sup>14</sup> ACRP funded the design and construction of projects that aimed to protect critical infrastructure from flooding.

# About our Assessment of Implementation Report

Management is responsible for implementing our recommendations. We examine implementation plans and perform procedures to determine whether management has implemented our recommendations when management asserts that they have been implemented. We repeat our recommendations if we do not find evidence they have been implemented. We may also issue new recommendations for matters that come to our attention during our assessment.

We conduct our assessments of implementation under the *Auditor General Act*. We apply Canadian Standard on Quality Management 1. Accordingly, we have maintained a comprehensive system of quality management, including documented policies and procedures regarding compliance with applicable professional standards and applicable ethical, legal, and regulatory requirements. We comply with the independence and other ethical requirements of the Chartered Professional Accountants of Alberta Rules of Professional Conduct, which are founded on fundamental principles of integrity and due care, objectivity, professional competence, confidentiality, and professional behaviour.





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