



2026

REPORT OF THE COMMISSIONER OF THE ENVIRONMENT AND
SUSTAINABLE DEVELOPMENT TO THE PARLIAMENT OF CANADA
ON BEHALF OF THE AUDITOR GENERAL OF CANADA

Flood Hazard Mapping



Office of the
Auditor General
of Canada

Bureau du
vérificateur général
du Canada

**INDEPENDENT
AUDITOR'S REPORT**

Performance audit reports

This report presents the results of a performance audit conducted by the Office of the Auditor General of Canada (OAG) under the authority of the Auditor General Act.

A performance audit is an independent, objective, and systematic assessment of how well government is managing its activities, responsibilities, and resources. Audit topics are selected on the basis of their significance. While the OAG may comment on policy implementation in a performance audit, it does not comment on the merits of a policy.

Performance audits are planned, performed, and reported in accordance with professional auditing standards and OAG policies. They are conducted by qualified auditors who

- establish audit objectives and criteria for the assessment of performance
- gather the evidence necessary to assess performance against the criteria
- report both positive and negative findings
- conclude against the established audit objectives
- make recommendations for improvement when there are significant differences between criteria and assessed performance

Performance audits contribute to a public service that is ethical and effective and a government that is accountable to Parliament and Canadians.

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At a Glance



Overall message

Overall, Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada did not ensure the timely production of effective flood hazard maps—tools necessary for climate change adaptation and for protecting communities. Many maps had not yet been completed, and most of the existing flood hazard information is not practical or actionable for users. Building resilience to flooding depends on having reliable, easy-to-use maps. Without them, public safety and infrastructure are at risk.

Public Safety Canada is working to launch a flood risk awareness portal to help people identify flood risks in their areas and take steps to prepare. However, the portal does not consider climate change. In addition, because the system and its data are proprietary to the vendor, the department cannot update or adjust the information to reflect changing conditions.

Natural Resources Canada funds flood map development and tracks which areas are being mapped, but missing performance indicators and unclear definitions make it difficult to account for program results. The department committed to mapping 200 higher-risk areas by 2028; however, it did not monitor whether the mapping projects covered the priority areas that had been preliminarily identified in a 2022 analysis. As a result, fewer than half of the maps covered the originally identified higher-risk areas.

To be best prepared for climate change, maps must be reliable and released promptly. Natural Resources Canada was not on track to have all the flood maps in production publicly available by 2028.

Flood hazard maps must integrate climate change projections; otherwise, the data are not accurate enough to guide long-term decisions, such as where to build homes or develop infrastructure. Without up-to-date information readily available to the public, people in Canada face escalating risks to public safety and higher disaster recovery costs.

Key facts and findings



- Canada's National Risk Profile noted that about 80% of highly populated areas were located, at least partially, in flood hazard zones.
- The federal government spent an average of about \$230 million annually from 2016 to 2025 in post-flood relief.
- Public Safety Canada missed its deadline to release Canada-wide flood risk ratings through a flood risk awareness portal by the end of 2025.
- As of December 31, 2025, out of 131 mapping projects underway:
 - only 64 (49%) included priority areas of higher risk as prioritized in Natural Resources Canada's 2022 analysis exercise
 - only 11 (8%) had been posted on the Canada Flood Map Inventory

See [Recommendations and Responses](#) at the end of this report.

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Introduction

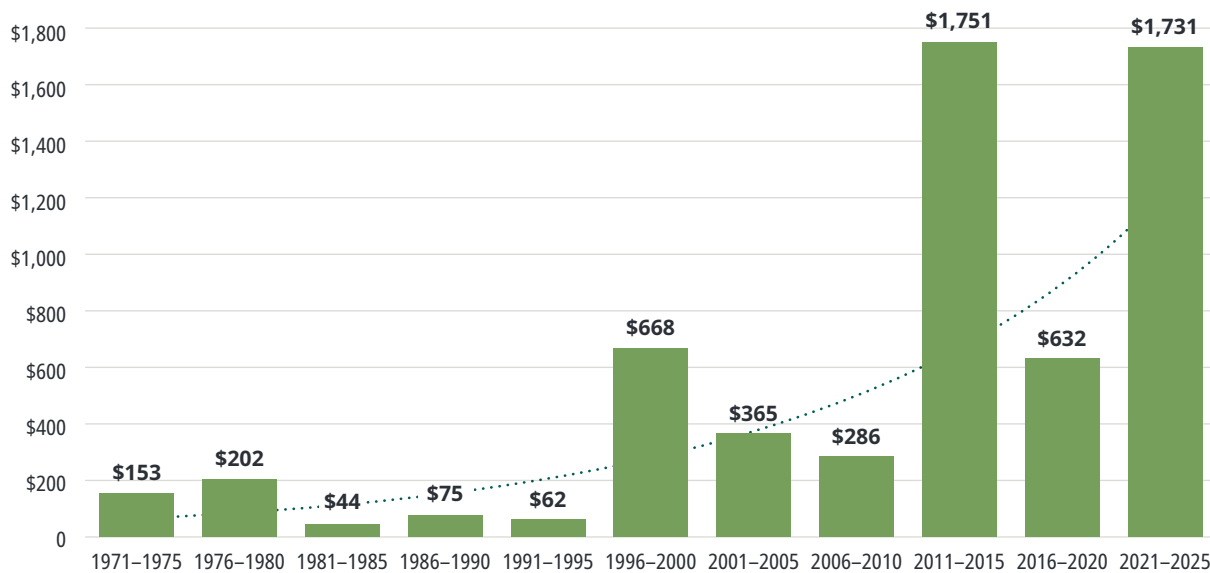
Background

Mounting cost of flooding

1. Flooding is Canada’s most costly and frequent hazard, damaging homes, vehicles, and public infrastructure. From 2016 to 2025, the federal government spent an average of about \$230 million annually in post-flood relief, and costs were rising (Exhibit 1). Flooding impacts the safety of individuals, their communities, and Canada’s economy.

Exhibit 1—The cost of the federal government’s post-flood relief is rising

Disaster Financial Assistance Arrangements payments (in millions)*



* Adjusted for inflation, 2025 dollars

Note: Adjusted using the Inflation Calculator (Bank of Canada) to November 2025. Data are based on payment year. Payments may occur many years after flood events.

Source: Based on information from Public Safety Canada



[Read the Exhibit 1 text description](#)

2. The increase in damage from floods is driven both by population growth in areas already at high risk of flooding and by climate change. Canada’s climate is warming twice as fast as the global average, although these increases are not equal across

Canada's diverse geography. Across Canada, it is expected that climate change will continue to result in more frequent and extreme precipitation events, and the ensuing costs related to flooding will keep growing unless the risk of damage is reduced.

3. Any potential source of harm or damage is a hazard. In the case of flooding, these hazards could include a river overflowing its banks or heavy rain leading to flash floods. A flood hazard map identifies where a flood might happen, how extensive it might be, and how likely it is to occur over a given time period, such as a flood event with a 1% probability of happening in any given year—sometimes referred to as a 1 in 100-year flood event.

4. In contrast, a flood risk is the potential for damage or harm because of that event. This is based on the potential social, economic, and environmental impacts of the flood, such as the cost of property damage. A flood risk rating expresses the likelihood and the estimated impact of flooding.

5. In May 2023, the federal government published the first National Risk Profile. This portrait of the disaster risks facing Canada—such as earthquakes, hurricanes, flooding, and wildfires—was meant to raise public awareness and preparedness in the case of national emergencies. The profile highlighted that flooding did not impact everyone equally and that Indigenous Peoples and northern communities could be disproportionately impacted. Furthermore, the profile noted that about 83% of people in Canada lived in urban areas. Significantly, approximately 80% of these highly populated areas were located at least partially in flood hazard zones. Despite the number of people potentially affected, the profile noted that only a patchwork of data was available to inform efforts to reduce flood risks in Canada and that few people were aware of these risks.

6. Canada's National Adaptation Strategy, published in 2023, provides direction to build resilience to more frequent and intense climate change impacts, such as heat waves, wildfires, and flooding. For example, the strategy emphasizes the principle of informed decision making as being important to make infrastructure more resilient to disasters, like flooding, to avoid damages and provide co-benefits.

7. Federal budgets have recently included significant investments, such as Budget 2025's announced 5-year funding of \$25 billion in housing and \$115 billion in infrastructure. These financial commitments highlight the need for evidence-based climate change information to effectively adapt and guide informed land-use planning and infrastructure development.



Federal flood hazard mapping initiatives

8. In 2021, the federal government launched the Flood Hazard Identification and Mapping Program ([Exhibit 2](#)). The program aimed to increase flood hazard information coverage through cost-sharing projects with provincial and territorial governments. Provincial and territorial governments are responsible for conducting flood mapping projects and addressing flood hazards. Some undertook mapping in-house, and others delegated to municipalities or conservation authorities. Originally scheduled to end in 2024, the program was extended until 2028 with new funding under Canada’s National Adaptation Strategy.

9. The Federally Identified Flood Risk Areas initiative ([Exhibit 2](#)) contributes to identifying and preparing for flood events. It is expected to provide flood risk ratings for Canadian locations, ranging from “low” to “extreme,” and considers the impacts of climate change on the likelihood and intensity of future flood events.

Exhibit 2—The 2 federal flood hazard mapping initiatives we examined contribute to Canada’s National Adaptation Strategy

Topics	Flood Hazard Identification and Mapping Program	Federally Identified Flood Risk Areas initiative
Involved departments	Lead: Natural Resources Canada Supported by: <ul style="list-style-type: none"> • Environment and Climate Change Canada • Public Safety Canada 	Public Safety Canada
Funding	Included \$64 million between 2024 and 2028 to cover 50% of the cost of maps produced by provinces and 75% of the cost of maps produced by territories under cost-sharing agreements	Received \$10 million from the Flood Hazard Identification and Mapping Program, including \$3.5 million for a Canada-wide flood hazard model to inform risk ratings
Targets (from Canada’s National Adaptation Strategy or public commitments)	By 2028, the federal government, provinces, and territories have worked collaboratively to prioritize at least 200 higher-risk flood areas for new flood hazard maps and regional-level modelling.	By the end of 2025, communicate flood risk ratings publicly through an awareness portal for all of Canada.
Scope of maps	Local and regional	National

Topics	Flood Hazard Identification and Mapping Program	Federally Identified Flood Risk Areas initiative
Scale of maps	Smaller areas are depicted in greater detail.	Larger areas are depicted in less detail.
Intended users	All levels of government, regulatory authorities, the flood mapping industry, non-government organizations, and the public	People in Canada and the federal government
United Nations' Sustainable Development Goals and the departmental sustainable development strategy	<p>Identified by Natural Resources Canada as a contribution to Goal 13 (Climate Action) and the corresponding goal of its departmental sustainable development strategy</p>  <p>Take urgent action to combat climate change and its impacts Source: United Nations</p>	<p>Identified by Public Safety Canada as a contribution to Goal 11 (Sustainable Cities and Communities) and the corresponding goal of its departmental sustainable development strategy</p>  <p>Make cities and human settlements inclusive, safe, resilient and sustainable Source: United Nations</p>

Source: Based on information from Environment and Climate Change Canada, Natural Resources Canada, and Public Safety Canada

Roles and responsibilities

10. **Natural Resources Canada.** The department is responsible for geomatics, hazard assessment, and mapping expertise. The department leads the Flood Hazard Identification and Mapping Program. Under this program, the department collaborates with provinces and territories to create and distribute **regulatory-quality flood hazard maps**.¹ It is also responsible for allocating the funding provided to provinces and territories for mapping projects. Natural Resources Canada works with other interested parties, such as Indigenous partners and local authorities, to advance regional modelling science and Traditional Knowledge science, creates tools and foundational datasets, and provides guidance and best-practice mapping references.

¹ **Regulatory-quality flood hazard maps**—High-quality engineering maps that are used for regulatory planning purposes related to land use and flood mitigation.

11. **Public Safety Canada.** The department is responsible for protecting individuals and communities from hazards, such as natural disasters. It coordinates emergency management activities with federal, provincial, territorial, and other entities. Under the Flood Hazard Identification and Mapping Program, the department is responsible for procuring a Canada-wide flood hazard model and developing flood risk ratings through the Federally Identified Flood Risk Areas initiative. The department is also responsible for publicly communicating these risk ratings.

12. **Environment and Climate Change Canada.** The department is responsible for modelling and analyzing climate change scenarios and trends, monitoring and forecasting weather, and providing water-quantity monitoring and related data to provinces and territories. Under the Flood Hazard Identification and Mapping Program, the department supports Natural Resources Canada by providing technical and scientific advice in the areas of hydrology, hydraulics, and climate change science; providing guidance on incorporating climate change; and reviewing regulatory-quality flood hazard maps.

Sustainable
development
principles in Canada

13. The Federal Sustainable Development Act and the Auditor General Act set out several principles to guide sustainable development decision making in Canada. Our office has grouped them into 14 principles and created icons to symbolize them that we consider in our environment and sustainable development audits. The subject matter of this audit relates to:

- Principle 1—integrating environmental, economic, and social factors in planning and decision making
- Principle 11—promoting openness and transparency

These principles and the list of all 14 sustainable development principles are in the following figure.

Sustainable development principles in Canada



Source: Adapted from the Federal Sustainable Development Act and the Auditor General Act

Focus of the audit

14. This audit focused on whether Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada ensured the timely production of flood hazard maps that are effective for supporting climate change adaptation and protecting people living in Canada. Effectiveness is assessed in terms of both the reliability and actionability of flood hazard maps. This audit did not assess the accuracy of flood hazard maps but rather focused on the management of organizations to support the timely

production of reliable and actionable flood hazard maps in the context of climate change. Specifically, the audit focused on the following criteria:

- whether Natural Resources Canada ensured that regulatory-quality flood hazard maps were produced in a timely manner in consideration of the expected results of the Flood Hazard Identification and Mapping Program
- whether Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada ensured that regulatory-quality local, regional, and Canada-wide flood hazard maps were reliable and actionable to support climate change adaptation and protect people living in Canada

15. This audit is important because anticipating the impacts of climate change on the likelihood and extent of flooding would enable individuals, businesses, and governments at all levels to better protect their existing assets and avoid catastrophic losses. Furthermore, investments in homes and infrastructure, including those announced in Budget 2025, could be planned and designed with climate readiness in mind by using reliable and actionable flood hazard information.

16. More details about the audit objective, scope, approach, and criteria are in [About the Audit](#) at the end of this report.

Findings and Recommendations

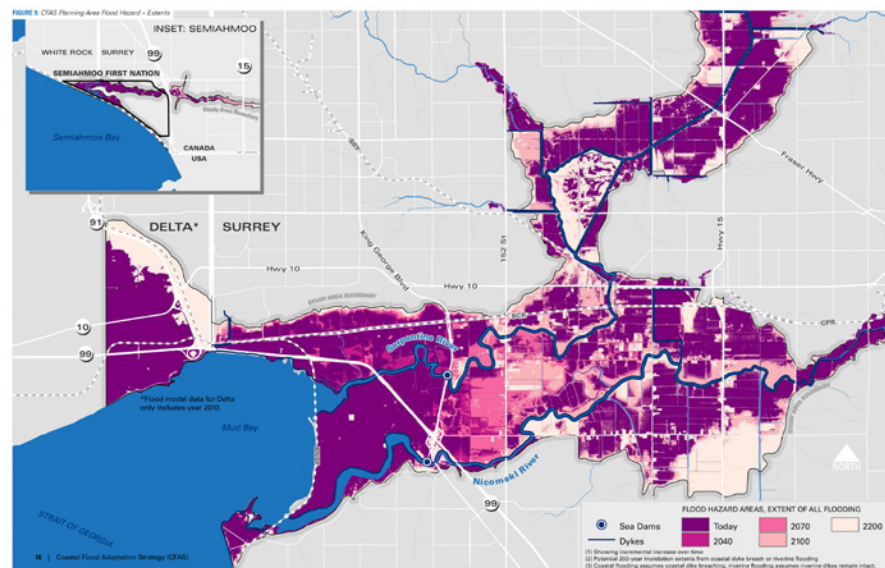
Federal departments did not ensure that flood hazard maps were effective and readily available

Why this finding matters

17. This finding matters because building resilience to future floods requires information that is effective, especially in the context of climate change. Flood hazard maps are meant to support evidence-based decision making, and therefore to be effective, they should be reliable and actionable. With effective information, people living in Canada can better protect themselves, their homes, and their assets, and the federal government can better prioritize future investments in infrastructure and implement strategies to address the impacts of flooding.

18. Integrating climate change considerations into flood hazard information allows land-use planners, other levels of government, and private sector authorities to make informed choices about strategic development and effective investment prioritization. For example, 2 municipalities used flood information that accounted for climate change to assess local impacts:

- In 2022, the Region of Durham, Ontario, conducted a flood risk assessment using existing flood hazard maps and models along with climate change scenarios. This assessment gave regional decision makers critical information to aid in reviewing and prioritizing future transportation infrastructure investments.
- In 2019, the City of Surrey, British Columbia, created a coastal flood adaptation strategy that identified the current and potential impacts of climate change on Surrey's large coastal floodplain area. Flood mapping data helped the city to develop a long-term strategy to reduce climate change-driven coastal flooding risks.



Source: From the City of Surrey's Coastal Flood Adaptation Strategy, used with permission

Context

19. Flood hazard maps are used for decisions such as where to build homes and infrastructure. These maps can be developed to reflect current and/or projected future conditions. In the context of this audit, we considered maps to be “reliable” if they were up to date and completed with the best available information, such as land-use and climate-change data. While including climate change introduces more uncertainty, there currently are science-backed tools and methodologies available that include climate change.

20. The federal government committed to prioritizing mapping areas at higher risk of flooding. It also committed to making Flood Hazard Identification and Mapping Program information easy to find and use. Anyone living in Canada should have access to flood hazard maps in formats that meet accessibility standards.

21. The federal government also planned to release flood risk ratings through a flood risk awareness portal by the end of 2025. The portal is meant to provide information, data, and maps to raise awareness and enable evidence-based decision making to build resilience to floods.

Public Safety Canada did not incorporate climate change considerations in its flood risk awareness portal

Findings

22. We found that Public Safety Canada had not incorporated climate change considerations in the Canada-wide flood risk ratings. In the department's view, there was a high level of uncertainty associated with climate-impacted flood estimation. The risk ratings to be displayed in the forthcoming flood risk awareness portal online were based on present-day assumptions related to flooding. This means that information in the portal would not be useful to help the public make long-term climate-informed decisions or investment choices that account for flood risks. The department acknowledged this fact and intended to investigate adding climate change considerations as scientific methodologies develop.

23. We found that to generate the risk ratings in a short time frame, Public Safety Canada procured a proprietary model from a private sector organization through a competitive process. The department compared the model's results to available regulatory-quality flood hazard maps to determine the model's strengths and weaknesses. The department acknowledged that procuring a proprietary model—as opposed to an open-source model—restricted full transparency regarding the model's protected inputs and outputs. Furthermore, this approach limited the department's ability to optimally reflect local conditions across the country. Promoting openness and transparency is a sustainable development principle, and disclosing assumptions, data, and methodology helps users to better understand the results and limitations of the flood hazard information and use it more effectively. The department stated that it initiated work to develop a Canada-specific open-source flood hazard model.

Recommendation

24. To provide scientifically reliable information to support climate change adaptation, Public Safety Canada should take concrete steps to:

- implement a Canada-wide flood hazard model that provides greater transparency regarding assumptions and data, and enable model adjustments
- incorporate climate change considerations in the Federally Identified Flood Risk Areas input into the flood risk awareness portal, in accordance with recognized scientific best practices

Public Safety Canada’s response. Agreed.

See [Recommendations and Responses](#) at the end of this report for detailed responses.

Natural Resources Canada and Environment and Climate Change Canada’s approach to review the alignment of flood mapping projects with technical mapping requirements had gaps

Findings

25. Natural Resources Canada, supported by Environment and Climate Change Canada, committed to reviewing flood mapping projects. This review aimed to ensure alignment with relevant flood mapping guidelines and technical requirements as incorporated in the funding agreements throughout the stages of map development. However, we found that Natural Resources Canada and Environment and Climate Change Canada’s review of funded flood mapping projects was inconsistent. While the reviews of projects in 4 provinces and 1 territory followed a detailed checklist to ensure that technical requirements, including climate change considerations, were met and documented, this process was not consistently applied in the other provinces and territories.

26. In November 2025, Natural Resources Canada enhanced the approach to review the alignment with technical mapping requirements, which addressed the gaps that we had noted. The department—with input from Environment and Climate Change Canada—implemented a detailed, standardized review checklist for all provinces and territories to document alignment with requirements and ensure the final reliability of flood hazard maps and information.

Recommendation

27. To ensure the ongoing reliability of flood hazard maps and federal guidelines to support climate change adaptation, Natural Resources Canada and Environment and Climate Change Canada should regularly review and update their approach to verify that all maps follow appropriate technical requirements, including up-to-date scientific information related to climate change impacts.

Response of each organization. Agreed.

See [Recommendations and Responses](#) at the end of this report for detailed responses.

Public Safety Canada and Natural Resources Canada made limited actionable flood hazard information publicly available

Findings

28. We found that by the end of our audit period, Public Safety Canada had not yet launched the flood risk awareness portal. However, we examined a prototype of the portal and found that its intended functionalities were designed to provide centralized, Canada-wide flood risk information in plain language and with interactive features.

29. We found that Natural Resources Canada had not ensured that regulatory-quality flood hazard maps were actionable once completed. To be actionable, flood hazard information, data, and maps should be complete and easy to find and to use; they should also be adapted to the local context and intended use, with sufficient detail on flood hazards to enable action by individuals and communities.

30. The Canada Flood Map Inventory provides a centralized listing of flood hazard maps collected by Natural Resources Canada from provinces, territories, and other organizations and was intended as a central access point for these maps. We found that the inventory did not allow for an easy and intuitive user navigation experience. During the audit period, no flood hazard map could be directly viewed or downloaded from the inventory itself. Instead, as the inventory did not host the maps, it redirected users to provincial and territorial websites. However, these maps were sometimes improperly linked, and provinces and territories had differing systems and practices to share flood mapping information.

31. We found that the department had not made all the completed maps available online through the Canada Flood Map Inventory. We found that there were 26 regulatory-quality flood hazard mapping projects completed under the current stage of the Flood Hazard Identification and Mapping Program (2024–2028). Of those, only 11 were made publicly available through the inventory. The department indicated that the publication of flood hazard maps involved many steps and that it released them only twice a year. Given the small number of mapping projects published under the current stage of the program, we also examined the publication status and actionability of the 51 mapping projects completed during the previous stage (2021–2024) for additional insight. We found that 43% of them (22 out of 51) were still not actionable at the end of 2025—that is, they were not publicly available, not listed, or not properly linked in the inventory ([Exhibit 3](#)).

Exhibit 3—The mapping projects completed under the previous stage of the Flood Hazard Identification and Mapping Program (2021–2024) were not actionable because of their limited availability



Source: Based on our analysis of information provided by Natural Resources Canada and our review of the publicly available information at the end of the audit period (December 31, 2025)

 [Read the Exhibit 3 text description](#)

Recommendation

32. To ensure that federally funded flood hazard information is actionable by the intended users, Natural Resources Canada should:
- collaborate with provinces and territories to implement concrete actions so that flood hazard maps are made available to people in Canada in a timely manner
 - use interactive features to allow the intended users to easily locate, understand, and use flood hazard information

Natural Resources Canada's response. Agreed.

See [Recommendations and Responses](#) at the end of this report for detailed responses.

Natural Resources Canada did not ensure timely production of flood hazard maps

Why this finding matters

33. This finding matters because any delays in the publication of reliable and actionable flood hazard maps expose individuals and communities to increasing risks of negative health, financial, and environmental impacts. The fact that these delays could occur could also put investments in housing, infrastructure, and other physical assets at risk, including the \$140 billion planned to be invested by the federal government as detailed in Budget 2025.

Context

34. As part of Canada's National Adaptation Strategy, the government established a 2028 target of collaborating with provinces and territories to prioritize at least 200 higher-risk flood areas for new flood hazard maps and regional-level modelling and to have taken evidence-based risk mitigation actions in accordance with scientific guidance.

35. Without pre-existing data, a regulatory-quality flood hazard map can take several years to produce. Producing a new map involves many steps, such as surveying the area, acquiring data, and creating models and projections.

Natural Resources Canada did not track whether funding was directed to maps for areas identified in the 2022 prioritization exercise

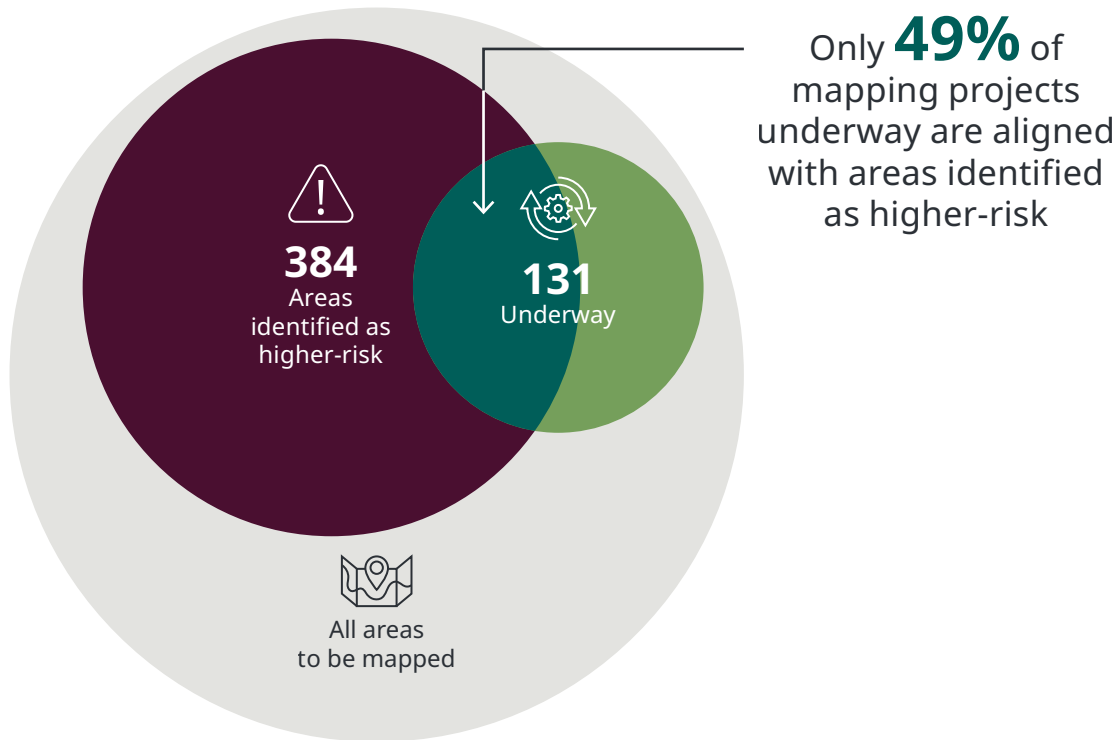
Findings

36. We found that Natural Resources Canada conducted a Canada-wide flood map prioritization exercise in 2022 to identify higher-risk areas. This analysis considered elements of gender-based analysis plus to identify the needs of populations most vulnerable to flooding, such as Indigenous people and low-income people. The department then developed an initial list of prioritized areas, which it shared with most provinces and territories to help select flood hazard mapping projects for funding.

37. We found that Natural Resources Canada did not track whether the flood hazard maps it funded covered the areas identified in the 2022 prioritization exercise. A key national adaptation strategy target and objective of the funding agreements was prioritizing higher-risk flood areas for mapping. Provinces and territories are responsible for leading flood mapping projects, and Natural Resources Canada selects the flood mapping projects that it funds through committees with the provinces and territories. Although the department was involved in project selection and although selected projects are intended to align with high-risk areas, Natural Resources Canada did not monitor whether the projects covered the areas identified in 2022. The department told us that it viewed the list of prioritized areas only as a preliminary decision-making tool. In addition, we found that the department had not updated this initial prioritization list.

38. We expected Natural Resources Canada to closely track whether the funds disbursed for higher-risk flood hazard mapping projects were benefitting populations vulnerable to flooding. This approach aligns with the principle of sustainable development of integrating environmental, economic, and social factors in planning and decision making. We compared the higher-risk areas identified in 2022 against the flood hazard mapping projects underway and found only a 49% (64 out of 131) overlap between the 2 ([Exhibit 4](#)).

Exhibit 4—Flood hazard mapping projects underway had a low overlap with the higher-risk areas identified in the 2022 prioritization exercise



Source: Based on our analysis of Natural Resources Canada’s data at the end of the audit period (December 31, 2025). The overlap was calculated using a buffer zone of 8.3 kilometres.

 [Read the Exhibit 4 text description](#)

Recommendation

39. To protect individuals most vulnerable to flooding and to help mitigate the increasing cost of flood relief in the context of climate change, Natural Resources Canada should work collaboratively with provinces and territories to update its list of higher-risk areas and monitor coverage of those areas to inform funding decisions.

Natural Resources Canada’s response. Agreed.

See [Recommendations and Responses](#) at the end of this report for detailed responses.

Natural Resources Canada was not on track to publish all funded flood mapping projects by March 2028

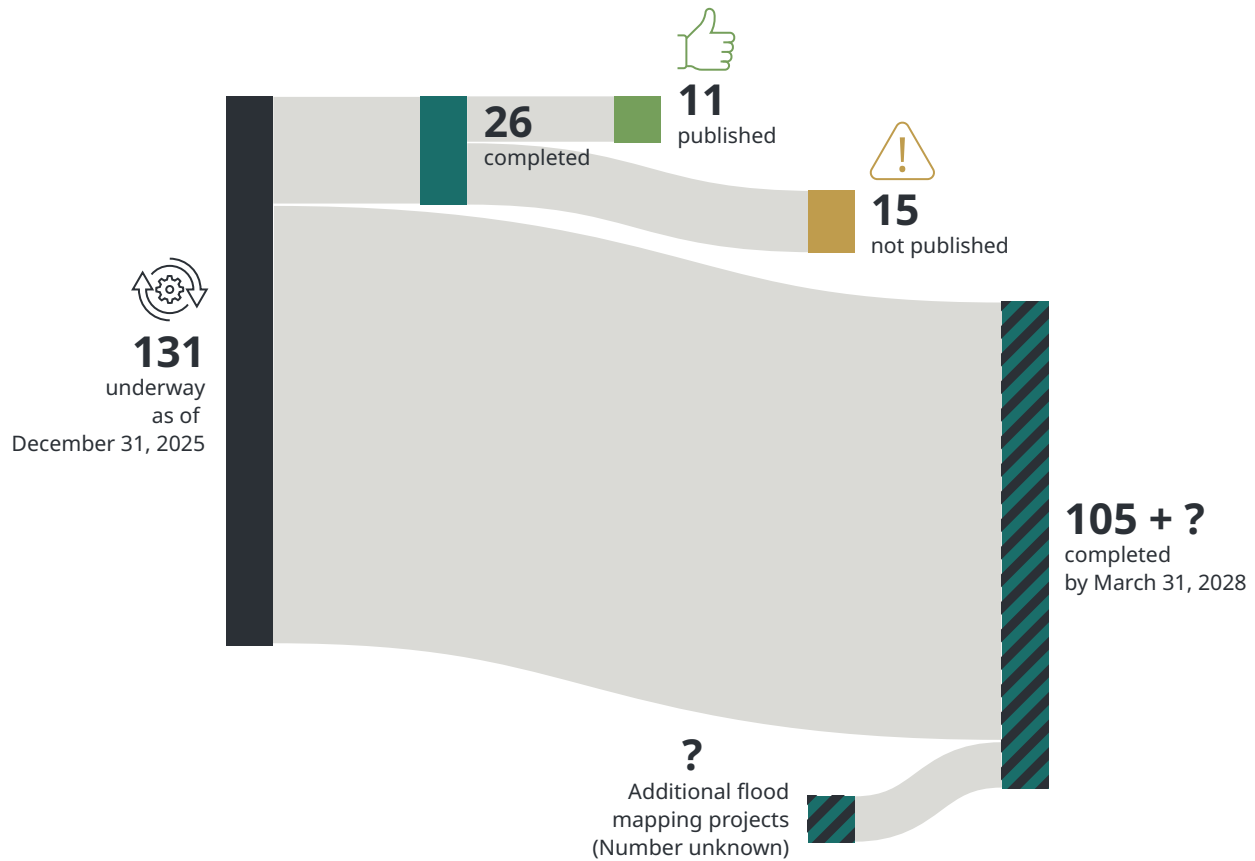
Findings

40. We found that the 2028 flood map-related target under Canada's National Adaptation Strategy was not supported by a clear definition of an "area." In other documents, instead of focusing on "high-risk areas," Natural Resources Canada aimed to cover more than 200 communities with either flood hazard mapping or regional-level modelling by 2028. There was no clear specific alignment between the higher-risk areas initially identified as priorities in 2022 and the areas or communities referred to in the loosely defined targets of the Flood Hazard Identification and Mapping Program.

41. Moreover, we found no performance indicator that addressed the second part of the 2028 target as stated in Canada's National Adaptation Strategy, which is to "have taken evidence-based risk mitigation actions in accordance with scientific guidance." In our view, the department's ability to meaningfully report on the program's success, given its intended outcome, was significantly limited by both an unclear definition of an "area" associated with the target of 200 and the absence of an indicator for the mitigation actions. This finding is consistent with the findings in our [2025 audit report on the national adaptation strategy](#), which also noted a significant deficiency in the strategy's framework for monitoring and evaluation.

42. We found that, on the basis of past program performance ([Exhibit 3](#)) and the current rate of delivery of flood mapping projects, Natural Resources Canada was not on track to publish all funded flood mapping projects by March 2028. Of the 131 projects initiated so far, only 26 had been completed ([Exhibit 5](#)).

Exhibit 5—Natural Resources Canada was not on track to publish all flood mapping projects by March 2028

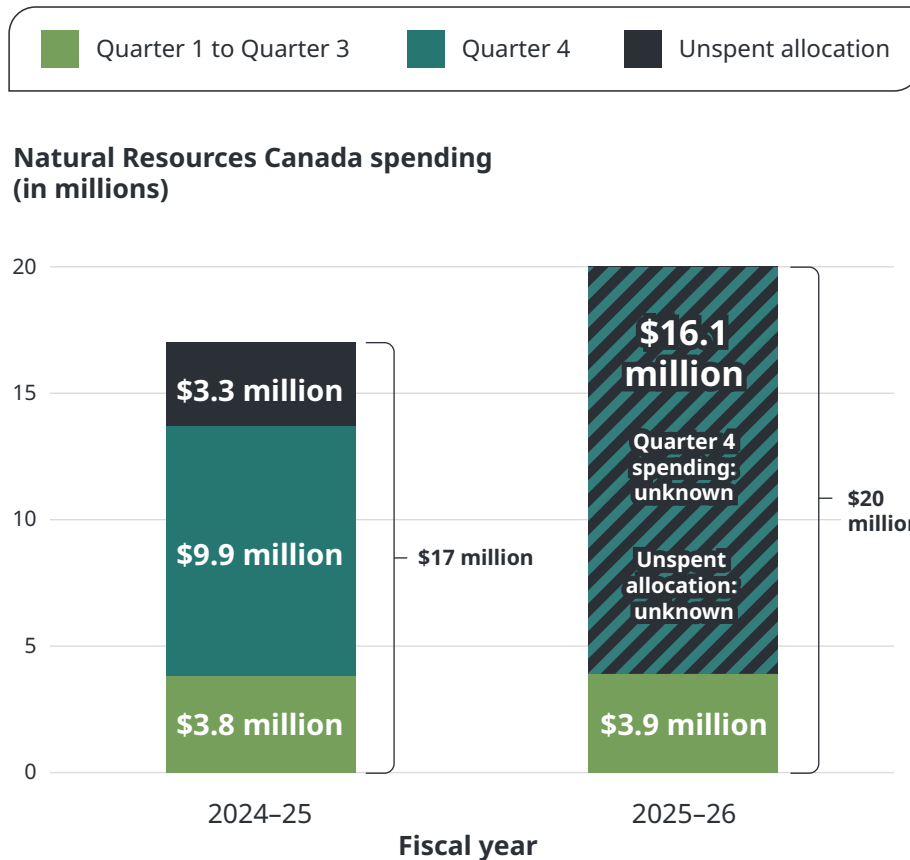


Source: Based on our analysis of information provided by Natural Resources Canada and our review of the publicly available information at the end of the audit period (December 31, 2025)

 [Read the Exhibit 5 text description](#)

43. We found that Natural Resources Canada reallocated unspent funds from one provincial or territorial jurisdiction to another so that they could spend those funds in a timely manner with the aim of increasing the number of mapping projects underway and completed. However, even with the reallocation of funds, we found that for the current fiscal year (2025–26), the department had \$16.1 million of unspent planned expenses at the end of the audit period (the end of the third quarter). Although most of the spending can take place at the end of the fiscal year (the fourth quarter), there is a considerable amount to be spent in 2025–26 ([Exhibit 6](#)). Annual spending by the department is an indicator of a consistent production of flood hazard maps. Under-expending budget allocations on flood hazard maps represents a missed opportunity to deliver additional value and achieve further program objectives.

Exhibit 6—An opportunity was missed with under-expended budget allocations



Source: Based on our analysis of information provided by Natural Resources Canada at the end of the audit period (December 31, 2025)

 [Read the Exhibit 6 text description](#)

Recommendation

44. To ensure effective program management and demonstrate value, Natural Resources Canada should improve its oversight of the Flood Hazard Identification and Mapping Program deliverables and timelines with performance management indicators that are SMART (specific, measurable, achievable, relevant, and time-bound) and aligned with the program’s various intended short- and longer-term outcomes in the context of Canada’s National Adaptation Strategy.

Natural Resources Canada’s response. Agreed.

See [Recommendations and Responses](#) at the end of this report for detailed responses.

Conclusion

45. We concluded that Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada did not ensure the timely production of flood hazard maps that are effective for supporting climate change adaptation and protecting people living in Canada.

About the Audit

This independent assurance report was prepared by the Office of the Auditor General of Canada on flood hazard mapping. Our responsibility was to provide objective information, advice, and assurance to assist Parliament in its scrutiny of the government's management of resources and programs and to conclude on whether flood hazard mapping complied in all significant respects with the applicable criteria.

All work in this audit was performed to a reasonable level of assurance in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3001—Direct Engagements, set out by the Chartered Professional Accountants of Canada (CPA Canada) in the CPA Canada Handbook—Assurance.

The Office of the Auditor General of Canada applies the Canadian Standard on Quality Management 1—Quality Management for Firms That Perform Audits or Reviews of Financial Statements, or Other Assurance or Related Services Engagements. This standard requires our office to design, implement, and operate a system of quality management, including policies or procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

In conducting the audit work, we complied with the independence and other ethical requirements of the relevant rules of professional conduct applicable to the practice of public accounting in Canada, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality, and professional behaviour.

In accordance with our regular audit process, we obtained the following from entity management:

- confirmation of management's responsibility for the subject under audit
- acknowledgement of the suitability of the criteria used in the audit
- confirmation that all known information that has been requested, or that could affect the findings or audit conclusion, has been provided
- confirmation that the audit report is factually accurate

Audit objective

The objective of this audit was to determine whether Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada ensured the timely production of flood hazard maps that are effective for supporting climate change adaptation and protecting people living in Canada.

Scope and approach

This audit was on the performance of Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada in ensuring that people living in Canada have access to flood hazard maps that are expected to be timely produced and effective. We have defined the timely production and effectiveness as follows:

- **Timely production:** A detailed regulatory-quality flood hazard map can take time to complete, sometimes up to 3 years. We expected the timely production of these maps from inception of the program on that basis, at pace and in consideration of the expected results of the program, which is scheduled to end in 2028.
- **Effective:** Local, regional, and national flood hazard maps are meant to support evidence-based decision making to support climate change adaptation, protect people living in Canada and their communities, and increase their resilience to floods. To be effective, flood hazard maps should be reliable and actionable as defined below:
 - **Reliable:** To be reliable, flood hazard maps, information, and data must meet federal, provincial, and territorial requirements. They should be completed by covering the areas at highest risk of flooding where the most vulnerable communities live and be up to date with the best available information, including land-use and climate-change information.
 - **Actionable:** To be actionable, flood hazard information, data, and maps should be complete and easy to find and use; they should also be adapted to the local context and intended use, with sufficient detail on flood hazards to enable action by individuals and communities, especially for areas where vulnerable populations at highest risk of flooding live.

To assess whether Natural Resources Canada ensured that regulatory-quality (engineering) flood hazard maps were produced in a timely manner in consideration of the expected program results, we examined the activities leading to the timely production of flood hazard maps.

We looked at the provision of support and resources by Natural Resources Canada and federal partners that may have impacted the delivery of projects. We examined current and planned expenditures against the dedicated budget and internal processes, including procurement, administration, and unanticipated delays related to information technology.

We undertook data analysis of Natural Resources Canada's database of flood mapping projects to determine the accuracy of amounts of line items that the department has been invoiced. The database included 1,167 individual line items for flood hazard mapping projects and activities. The team confirmed the accuracy of the database by using a representative sampling of 49 line items in the database sufficient for a confidence level of at least 90% that the error rate in the population was no greater than 10%. The team compared the line items with the invoices provided by the provinces and territories.

We also assessed whether Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada ensured that the local (engineering), regional, and Canada-wide flood hazard maps produced under the Flood Hazard Identification and Mapping Program and data from the Federally Identified Flood Risk Areas initiative were

effective at enabling decision making for land-use planning and resilience building in higher-risk areas and across Canada. More specifically, we assessed whether the federal departments ensured that flood hazard maps and data were reliable and actionable, in consideration of the expected timelines (see definitions above).

In terms of approach, we:

- analyzed documents, information contained in databases, and other information sources
- interviewed responsible officials and examined processes that were followed
- interviewed interested parties and industry experts
- considered international best practices

We did not examine:

- emergency preparedness and emergency management
- the development of the national flood insurance program
- flood mapping activities led by Indigenous Services Canada and Crown-Indigenous Relations and Northern Affairs Canada, as these activities are undertaken under different programs with different objectives
- the decisions for selecting mapping projects to be funded by Natural Resources Canada, as project selection is made jointly with provinces and territories

Criteria

We used the following criteria to conclude against our audit objective:

Criteria	Sources
<p>Natural Resources Canada ensured that engineering flood hazard maps were produced in a timely manner in consideration of the results expected from the Flood Hazard Identification and Mapping Program.</p>	<ul style="list-style-type: none"> • Treasury Board submissions • Resources and Technical Surveys Act • Department of Natural Resources Act • Minister of Natural Resources Mandate Letter, 2021 • Government of Canada Adaptation Action Plan, 2024 • 2024–25 Departmental Plan: Horizontal Initiatives, Environment and Climate Change Canada • Policy on Results, Treasury Board • Directive on Results, Treasury Board • Guide to Departments on the Management and Reporting of Horizontal Initiatives, Treasury Board of Canada Secretariat, 2018 • Transforming Our World: The 2030 Agenda for Sustainable Development, United Nations • Federal Sustainable Development Act • 2022 to 2026 Federal Sustainable Development Strategy, Environment and Climate Change Canada • Directive on the Management of Procurement, Treasury Board • Policy on Transfer Payments, Treasury Board • Directive on Transfer Payments, Treasury Board • Guideline on Performance Measurement Strategy Under the Policy on Transfer Payments, Treasury Board of Canada Secretariat

Criteria	Sources
<p>Natural Resources Canada, Environment and Climate Change Canada, and Public Safety Canada ensured that the engineering, regional, and Canada-wide flood hazard maps produced under the Flood Hazard Identification and Mapping Program and data from the Federally Identified Flood Risk Areas are reliable.</p> <p>Public Safety Canada, Natural Resources Canada, and Environment and Climate Change Canada ensured that the engineering, regional, and Canada-wide flood hazard maps produced under the Flood Hazard Identification and Mapping Program and data from the Federally Identified Flood Risk Areas are actionable.</p>	<ul style="list-style-type: none"> • Treasury Board submissions • Resources and Technical Surveys Act • Department of Natural Resources Act • Department of the Environment Act • Emergency Management Act • Department of Public Safety and Emergency Preparedness Act • Government of Canada Adaptation Action Plan, 2024 • 2024–25 Departmental Plan: Horizontal Initiatives, Environment and Climate Change Canada • Transforming Our World: The 2030 Agenda for Sustainable Development, United Nations • Federal Sustainable Development Act • 2022 to 2026 Federal Sustainable Development Strategy, Environment and Climate Change Canada • 2023 to 2024 Departmental Sustainable Development Strategy Report, Natural Resources Canada • 2023 to 2024 Departmental Sustainable Development Strategy Report, Public Safety Canada • Federal Flood Mapping Framework: Version 2.0, Natural Resources Canada, 2018 • Federal Hydrologic and Hydraulic Procedures for Flood Hazard Delineation: Version 2.0, Natural Resources Canada, 2023 • Case Studies on Climate Change in Floodplain Mapping, Natural Resources Canada • Policy on Results, Treasury Board • Directive on Results, Treasury Board • Policy on Transfer Payments, Treasury Board • Directive on Transfer Payments, Treasury Board • Guideline on Performance Measurement Strategy Under the Policy on Transfer Payments, Treasury Board of Canada Secretariat

Period covered by the audit

The audit covered the period from November 1, 2022, to December 31, 2025. This is the period to which the audit conclusion applies. However, to gain a more complete understanding of the subject matter of the audit, we also examined certain matters that preceded the start date of this period.

Date of the report

We obtained sufficient and appropriate audit evidence on which to base our conclusion on April 9, 2026, in Ottawa, Canada.

Audit team

This audit was completed by a multidisciplinary team from across the Office of the Auditor General of Canada led by Susie Fortier, Principal. The principal has overall responsibility for audit quality, including conducting the audit in accordance with professional standards, applicable legal and regulatory requirements, and the office's policies and system of quality management.

Recommendations and Responses

Responses appear as they were received by the Office of the Auditor General of Canada.

In the following table, the paragraph number preceding the recommendation indicates the location of the recommendation in the report.

Recommendation	Response
<p>24. To provide scientifically reliable information to support climate change adaptation, Public Safety Canada should take concrete steps to:</p> <ul style="list-style-type: none"> • implement a Canada-wide flood hazard model that provides greater transparency regarding assumptions and data, and enable model adjustments • incorporate climate change considerations in the Federally Identified Flood Risk Areas input into the flood risk awareness portal, in accordance with recognized scientific best practices 	<p>Public Safety Canada’s response. Agreed. Public Safety Canada (PS) agrees that a model that provides greater transparency and enables adjustments is needed.</p> <p>In 2024, PS initiated a multi-disciplinary, multi-year project (the Open-Source Flood Risk Analysis Network for Canada) in collaboration with an academic consortium of universities across Canada through a National Sciences and Engineering Research Council of Canada grant. The project includes government scientists and academic researchers, including postdoctoral fellows and stakeholders, with quarterly project status meetings, interim milestones, and deliverables released throughout the project. The academic consortium will complete a first-of-its-kind Canada-wide flood model, with key milestones for 2026 to include deploying local models at pilot sites and updated climate simulations. 2026 deliverables will also include addressing critical data and modeling gaps.</p> <p>This project is designed to provide strong value for money, and to align with the OAG’s recommendations by offering a transparent, reusable public asset. The project benefits from strong project management, governance, and oversight, and leverages an aggressive but realistic timeline to deliver results. When climate change information at the Canada-wide scale reaches a technical robustness, it will be integrated into the FIFRA datasets and subsequently the Portal.</p>

Recommendation	Response
<p>27. To ensure the ongoing reliability of flood hazard maps and federal guidelines to support climate change adaptation, Natural Resources Canada and Environment and Climate Change Canada should regularly review and update their approach to verify that all maps follow appropriate technical requirements, including up-to-date scientific information related to climate change impacts.</p>	<p>Natural Resources Canada’s response. Agreed. To maintain continued reliability, Natural Resources Canada (NRCan) will conduct a formal annual review of its approaches and update as required. NRCan will continue to review its rigorous deliverable review approach and maintain regular committee meetings with provincial/territorial partners to review projects outlined under agreements with partners that specify that all flood hazard maps follow appropriate technical requirements—including climate change impact considerations.</p> <p>Environment and Climate Change Canada’s response. Agreed. Environment and Climate Change Canada will continue to review and update its approaches as needed to verify that all maps produced in all phases of the Flood Hazard Identification and Mapping Program (FHIMP) follow appropriate technical requirements, including up-to-date scientific information related to climate change impacts.</p> <p>This includes review of existing templates for documentation of engineering technical reviews. Checklists on the templates will be reviewed yearly and, as needed, updated to ensure the FHIMP requirements and best practices in flood hazard mapping are captured in the documentation.</p> <p>ECCC will also continue to develop and update guidance and best practices for hydrology, hydraulics, climate change science and uncertainty.</p> <p>Expected implementation date: March 31, 2028</p>
<p>32. To ensure that federally funded flood hazard information is actionable by the intended users, Natural Resources Canada should:</p> <ul style="list-style-type: none"> • collaborate with provinces and territories to implement concrete actions so that flood hazard maps are made available to people in Canada in a timely manner • use interactive features to allow the intended users to easily locate, understand, and use flood hazard information 	<p>Natural Resources Canada’s response. Agreed. Natural Resources Canada will continue to collaborate with provinces and territories to publish flood hazard information in a timely manner, linking to respective jurisdiction’s webpages or flood hazard studies.</p> <p>Natural Resources Canada will enhance the usability of its flood mapping webpages, including upgrading the address-based search tool. In addition, Natural Resources Canada will undergo an assessment in 2026–27 to improve accessibility of its Canada Flood Map Inventory platform and revise content across flood-mapping webpages to better support users.</p>

Recommendation	Response
<p>39. To protect individuals most vulnerable to flooding and to help mitigate the increasing cost of flood relief in the context of climate change, Natural Resources Canada should work collaboratively with provinces and territories to update its list of higher-risk areas and monitor coverage of those areas to inform funding decisions.</p>	<p>Natural Resources Canada’s response. Agreed. Natural Resources Canada will collaborate with provinces and territories to update its project list quarterly and set project priorities that can increase the resiliency of Canadians in the face of the rising frequency and costs of flood events.</p>
<p>44. To ensure effective program management and demonstrate value, Natural Resources Canada should improve its oversight of the Flood Hazard Identification and Mapping Program deliverables and timelines with performance management indicators that are SMART (specific, measurable, achievable, relevant, and time-bound) and aligned with the program’s various intended short- and longer-term outcomes in the context of Canada’s National Adaptation Strategy.</p>	<p>Natural Resources Canada’s response. Agreed. Natural Resources Canada will review and improve its existing performance indicators before the end of 2026-27 to effectively report on Flood Hazard Identification and Mapping Program deliverables and outcomes in the context of the National Adaptation Strategy.</p>

Appendix—Text Descriptions of Exhibits

Here are the text descriptions of the exhibits.

Exhibit 1—The cost of the federal government’s post-flood relief is rising—Text description

This chart shows the federal government Disaster Financial Assistance Arrangements payments from 1971 to 2025. The payments were adjusted for inflation using 2025 dollars and grouped into 5-year increments.

The Disaster Financial Assistance Arrangements payments were as follows:

- Payments for 1971 to 1975 were \$153 million.
- Payments for 1976 to 1980 increased to \$202 million.
- Payments for 1981 to 1985 decreased to \$44 million.
- Payments for 1986 to 1990 increased to \$75 million.
- Payments for 1991 to 1995 decreased to \$62 million.
- Payments for 1996 to 2000 increased to \$668 million.
- Payments for 2001 to 2005 decreased to \$365 million.
- Payments for 2006 to 2010 decreased to \$286 million.
- Payments for 2011 to 2015 increased to \$1,751 million.
- Payments for 2016 to 2020 decreased to \$632 million.
- Payments for 2021 to 2025 increased to \$1,731 million.

Note: Adjusted using the Inflation Calculator (Bank of Canada) to November 2025. Data are based on the payment year. Payments may occur many years after flood events.

Source: Based on information from Public Safety Canada



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Exhibit 3—The mapping projects completed under the previous stage of the Flood Hazard Identification and Mapping Program (2021–2024) were not actionable because of their limited availability—Text description

This chart shows the number of mapping projects completed under the previous stage of the Flood Hazard Identification and Mapping Program.

In total, 51 mapping projects were completed.

Of these, 35 were publicly available, and 16 were not publicly available.

Of the ones that were publicly available, 29 were listed on the inventory and properly linked, and 6 were not listed on the inventory or improperly linked.

Source: Based on our analysis of information provided by Natural Resources Canada and our review of the publicly available information at the end of the audit period (December 31, 2025)

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Exhibit 4—Flood hazard mapping projects underway had a low overlap with the higher-risk areas identified in the 2022 prioritization exercise—Text description

This Venn diagram shows the overlap of mapping projects underway and areas identified as higher risk within the larger field of all areas to be mapped.

Of all of the areas to be mapped, 384 areas were identified as higher-risk areas in the 2022 prioritization exercise. There are 131 mapping projects underway. This means that only 49% of mapping projects are aligned with areas identified as higher-risk.

Source: Based on our analysis of Natural Resources Canada's data at the end of the audit period (December 31, 2025). The overlap was calculated using a buffer zone of 8.3 kilometres.

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Exhibit 5—Natural Resources Canada was not on track to publish all flood mapping projects by March 2028—Text description

This chart shows the completion and publication states of flood mapping projects.

As of December 31, 2025, 131 mapping projects were underway.

Of these, 26 were completed.

Of the completed projects, 11 were published, and 15 were not published.

That means that 105 projects need to be completed by March 31, 2028. An unknown number of additional flood mapping projects may be completed.

Source: Based on our analysis of information provided by Natural Resources Canada and our review of the publicly available information at the end of the audit period (December 31, 2025)

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Exhibit 6—An opportunity was missed with under-expended budget allocations—Text description

This chart shows Natural Resources Canada's budget allocations and spending in 2024–25 and 2025–26.

In the 2024–25 fiscal year, a total of \$17 million was allocated:

- \$3.8 million was spent in quarter 1 to quarter 3.
- \$9.9 million was spent in quarter 4.
- \$3.3 million was unspent.

In the 2025–26 fiscal year, a total of \$20 million was allocated:

- \$3.9 million was spent in quarter 1 to quarter 3.
- \$16.1 million remained in quarter 4. The spending in quarter 4 was unknown, and the spending allocation was unknown.

Source: Based on our analysis of information provided by Natural Resources Canada at the end of the audit period (December 31, 2025)



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