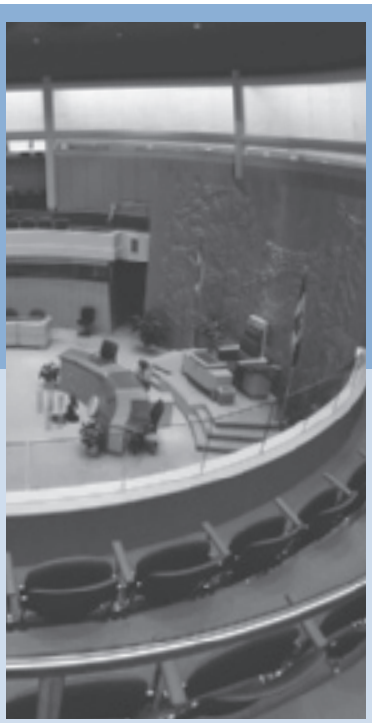

Report of the Auditor General of Canada to the Northwest Territories Legislative Assembly—2017

Independent Auditor's Report

Climate Change in the Northwest Territories

Office of the Auditor General of Canada

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Office of the
Auditor General
of Canada

Bureau du
vérificateur général
du Canada

To the Honourable Speaker of the Northwest Territories Legislative Assembly:

I have the honour to transmit herewith to the Northwest Territories Legislative Assembly my report on Climate Change in the Northwest Territories, in accordance with the provisions of section 41 of the *Northwest Territories Act*.

Yours sincerely,

Michael Ferguson, CPA, CA
FCPA, FCA (New Brunswick)

OTTAWA, 18 October 2017

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Introduction

Background

Climate change in the Northwest Territories

1. According to the Northwest Territories Department of Environment and Natural Resources, the impact of climate change on the Northwest Territories is significant and widespread. The Department has reported that the average surface temperature in the Northwest Territories has risen by about 2 degrees Celsius since the 1940s, compared with a 0.74 degree Celsius increase worldwide. In one area of the Northwest Territories, this increase has reached 3 degrees Celsius.

2. Exhibit 1 lists some of the impacts of climate change on the Northwest Territories, according to various sources, including the Department of Environment and Natural Resources. While not all impacts can be attributed entirely to climate change, these sources state that it is a major factor.

Exhibit 1 Examples of recent impacts of climate change on the Northwest Territories

Type of change	Impact	Examples
Warming	Sea ice has been reduced.	Sea levels have risen as sea ice has been reduced, causing significant coastal erosion in some Northwest Territories communities, such as Tuktoyaktuk. Coastal erosion has affected community infrastructure and damaged or destroyed cultural and heritage sites. This has resulted in the relocation of buildings and the spending of millions of dollars to protect the shoreline.
	Permafrost is thawing.	Most Northwest Territories communities are built on varying types of permafrost. Thawing permafrost has caused shifting, foundational cracks, and structural problems in buildings. There have been increased shifting, slumping, and sinkholes for roads. This has increased maintenance costs and disrupted transport for communities and industry.
	Ice forms later in the fall and melts earlier in the spring. The ice is also thinner.	The Government of the Northwest Territories has had to intensify efforts to maintain winter roads. Many communities and mining operations depend on ice roads for seasonal travel outside of communities, as well as for transporting crucial supplies such as food, fuel, and construction materials. Despite these efforts, there have been increasing incidents of winter road closures and reduced load weight limits. This has resulted in both higher costs for delivering supplies to communities and concerns about safety. The shortened and less reliable ice season has also affected those living traditional lifestyles, including trappers, who have a shorter period to travel over ice to reach their traplines, and for whom safety is also a concern.

Exhibit 1 Examples of recent impacts of climate change on the Northwest Territories (continued)

Type of change	Impact	Examples
Increased variation in precipitation	Precipitation levels in the Northwest Territories are becoming highly variable between seasons and across the territory.	Increased precipitation (including snowfalls that are wetter and heavier) pose risks and have affected infrastructure, including building foundations and roofs. Increased precipitation in some instances has led to road flooding or washouts. Low water levels in other instances have affected remote communities that rely on barges to supply essential goods such as food and fuel, as well as those communities relying on hydroelectric power.
Extreme weather events	Extreme weather events, such as storms, floods, and droughts, have been occurring more often.	While forest fires in the boreal forest are a natural phenomenon, the frequency and intensity have increased. In 2014, one of the years with the highest number of fires, there were a record 385 fires in the territory, which burned about 3.4 million hectares and cost the Government of the Northwest Territories just over $56 million. Forest fires have affected residents' health and safety, wildlife, and lands used by residents for traditional lifestyles and subsistence living.

Sources: Based on information from NWT Climate Change Impacts and Adaptation Report, Department of Environment and Natural Resources, 2008; True North: Adapting Infrastructure to Climate Change in Northern Canada, National Round Table on the Environment and the Economy, 2009; "Change and Challenge": Climate Change Adaptation Plan for the GNWT Department of Transportation, Department of Transportation, 2013; NWT State of the Environment Report, Department of Environment and Natural Resources, 2016; NWT State of the Environment Report online, "13: Permafrost" web page, Department of Environment and Natural Resources, 2014; Risk Management Framework, Department of Public Works and Services, 2014; Good Building Practice for Northern Facilities, Department of Public Works and Services, 2013; Risk Assessment & Analysis Report: Building Roof Snow Overload, PW&S/GNWT Managed Facilities/ Buildings, Department of Public Works and Services, 2004; Northwest Territories Wildland Fire Operations 2005–2014, Department of Environment and Natural Resources; Species Status Report: Porcupine Caribou and Barren-Ground Caribou in the Northwest Territories, Northwest Territories Species at Risk Committee, 2017; and interviews between the Office of the Auditor General of Canada and selected Government of the Northwest Territories officials.

3. According to the Intergovernmental Panel on Climate Change, one of the leading causes of climate change is fossil fuel combustion and industrial processes that emit greenhouse gases (GHGs), such as carbon dioxide, into the atmosphere. The Northwest Territories is a small emitter of GHGs. In 2013, it was responsible for about 0.2 percent of Canada's total GHG emissions, according to Environment and Climate Change Canada.

4. While the Northwest Territories is a small emitter of GHGs, it is particularly vulnerable to the impacts of climate change. These impacts threaten the livelihoods of residents and way of life of communities, in particular Indigenous communities, many of which are remote. The Northwest Territories' efforts to adapt to climate change cover 33 communities that are spread over 1 million square kilometres.

5. Responding to the impacts of climate change is a shared responsibility. It requires partnerships within and across governments; with non-governmental organizations, including industry; and with the public.

Roles and responsibilities

6. **Department of Environment and Natural Resources.** The Department of Environment and Natural Resources is the lead department for climate change in the territory and is responsible for

- leading the development of strategies for the Northwest Territories to address greenhouse gas emissions and to **adapt** to climate change impacts;
- leading the sharing of climate change information to support territorial government departments and the public in their adaptation efforts;
- promoting the use of scientific research, traditional knowledge, and public education to understand climate change in the Northwest Territories; and
- representing the territorial government in national climate change initiatives.

7. The Department of Environment and Natural Resources must also maintain, conserve, and protect the condition, quality, diversity, and abundance of the environment, including water, air, wildlife, habitat, and forests in the Northwest Territories.

8. **Department of Infrastructure.** On 1 April 2017, the Department of Public Works and Services and the Department of Transportation were merged into the new Department of Infrastructure. The Department of Infrastructure is responsible for

- promoting energy efficiency in its management of the Government of the Northwest Territories' assets and adapting these assets to the impacts of climate change, and
- adapting the transportation network throughout the Northwest Territories to the impacts of climate change.

Focus of the audit

9. This audit focused on whether the Department of Environment and Natural Resources and the Department of Infrastructure took adequate steps to meet their commitments to reduce territorial greenhouse gas emissions and to adapt to climate change impacts in the Northwest Territories.

10. This audit is important because climate change significantly affects the Northwest Territories and the government needs to know what it has to do to adapt. Climate change is affecting wildlife, landscape, and critical infrastructure, as well as residents' food and fuel security, their traditional economy, and their ability to get in and out of their communities.

Adaptation—Actions to try to prevent or reduce the negative impacts of climate change and/or build on the positive impacts.

11. We did not examine the role of other Government of the Northwest Territories departments, community governments, associations, the federal government, or the private sector in managing greenhouse gas emissions or in adapting to climate change impacts.

12. In 2016, many legislative audit offices across Canada decided to look at the issue of climate change and developed similar audit approaches and questions to examine climate change action within their governments. As part of this initiative, the Office of the Auditor General of Canada decided to do federal and territorial climate change audits.

13. More details about the audit objective, scope, approach, and criteria are in **About the Audit** at the end of this report (see pages 24–28).

Findings, Recommendations, and Responses

Leadership on climate change

Overall message ➔

14. Overall, we found that the Department of Environment and Natural Resources did not fulfill its leadership role and meet its commitments on climate change. The Department did not identify the risks to the Northwest Territories posed by climate change, establish a territorial strategy to adapt to climate change, or provide departments and communities with easy access to the information needed to take action to address climate change impacts.

15. Instead, Government of the Northwest Territories departments and communities pursued their own adaptation efforts. This resulted in a piecemeal approach to adaptation. Consequently, the government did not know whether the territory was doing enough to adapt to climate change impacts, whether the areas of greatest risk were being addressed, and whether the adaptation actions of one department or community had negatively affected another.

16. While the Department of Environment and Natural Resources focused its climate change efforts on developing greenhouse gas strategies, it did not set meaningful emission targets or focus on major emitters.

17. This is important because without a territory-wide focus on adaptation, clear leadership, strategic direction, and access to relevant climate change information, departments and communities will continue to face the severe and costly impacts of climate change on their own.

The Department of Environment and Natural Resources did not develop a territorial strategy to adapt to climate change

What we found

18. We found that the Department of Environment and Natural Resources did not develop a climate change adaptation strategy for the Northwest Territories, despite its commitment to do so almost 10 years ago. Consequently, the Department had not identified the significant climate change risks the territory faced, what needed to be done to adapt to the impacts of climate change, and the supports that departments and communities needed to adapt.

19. Our analysis supporting this finding presents what we examined and discusses the following topic:

- Strategy for adapting to climate change

Why this finding matters

20. This finding matters because a territorial adaptation strategy can increase the territory's resilience to the impacts of climate change and help position government departments and communities to respond to risks as they emerge. Other territorial departments and residents rely on the Department of Environment and Natural Resources for direction on how to adapt to the impacts of climate change, and to connect them with the information and people they need to support their efforts.

Recommendation

21. Our recommendation in this area of examination appears at paragraph 27.

Analysis to support this finding

22. **What we examined.** We examined whether the Department of Environment and Natural Resources developed a territorial adaptation strategy that assessed the climate change risks across the territory and identified clear and specific adaptation priorities. We also examined whether the Department implemented the strategy, monitored its implementation, and collected information on results achieved.

23. **Strategy for adapting to climate change.** One of the Department of Environment and Natural Resources' key commitments, made in 2007, was to develop a territorial adaptation strategy. This commitment was reaffirmed in 2008 and 2011. We found that the Department did not develop an adaptation strategy for the territory and focused more of its climate change efforts on developing strategies to control greenhouse gas (GHG) emissions. While emission control is important, the need to adapt to climate change impacts in the territory is critical.

24. In the absence of a territorial adaptation strategy with clear and specific adaptation priorities, we looked at what other adaptation steps the Department of Environment and Natural Resources had taken. We found

that the Department's adaptation work was ad hoc and reactive. This work consisted mostly of allocating federal adaptation funds to various Government of the Northwest Territories' climate change projects, providing advice on territorial adaptation projects, and participating in various forums and projects on climate change (at the territorial, national, and international levels). This participation included representing the Government of the Northwest Territories in discussions as part of the Pan-Canadian Framework on Clean Growth and Climate Change.

25. We also found that the Department of Environment and Natural Resources had not worked with other territorial departments, communities, industry, and residents to identify the most important climate change risks the territory faces and the supports needed for adaptation. Further, the Department had not assessed the costs of not adapting to the impacts of climate change, both in the short term and the long term.

26. The Department of Environment and Natural Resources had started working on a climate change strategic framework, which it plans to issue in February 2018. According to the Department, this framework will include strategies for both adaptation and greenhouse gas emissions. As part of this work, it also sought the views of stakeholders, including departments and residents, on what should be included in the framework. We also noted that in January 2017, the Department began working on an initiative to help determine the potential costs of inaction and of adaptation to climate change impacts on the Northwest Territories. In our view, these steps are important if the Department is to fulfill its commitments to lead the territory's adaptation efforts.

27. **Recommendation.** The Department of Environment and Natural Resources should develop and implement a strategy outlining how the Northwest Territories will adapt to climate change. The strategy should

- include a territory-wide assessment of climate change risks;
- be developed with input from other territorial departments and residents;
- take into account regional diversity, current adaptation efforts, and existing knowledge of climate change impacts in the territory; and
- include indicators to facilitate tracking of climate change adaptation progress, a clear implementation plan, and provision for ongoing assessments and updates as adaptation needs evolve.

The Department's response. *Agreed. The Department of Environment and Natural Resources is currently developing a Northwest Territories Climate Change Strategic Framework (CCSF), and it will address both climate change mitigation and adaptation. The CCSF is being developed as a document for the whole of the Northwest Territories. Regional diversity and current adaptation needs and efforts will be highlighted in this document.*

Extensive public engagement was carried out through regional engagement sessions, an online survey, and acceptance of written submissions to gather views on climate change issues. This input has been incorporated into the draft document, and a Summary of Joint Engagement Activities was published on the Department's website during the summer of 2017.

The draft CCSF will be available for public review during the fall of 2017. Residents and communities will have one month to review and comment on the draft CCSF, and this feedback will be used to finalize the CCSF.

The implementation of the CCSF will require an action plan. This action plan will include a performance measurement framework with specific indicators to help track the progress and commitments made in the CCSF. Ongoing assessment of adaptation efforts in the Northwest Territories will be assessed as part of the action plan. The CCSF action plan will be developed over the 2017–18 fiscal year.

The Department of Environment and Natural Resources did not fulfill its commitment to provide departments and communities with information needed to take action on climate change

What we found

28. We found that the Department of Environment and Natural Resources did not fulfill its commitment to collect and share climate change information needed to make decisions on adaptation. The Department did not identify the information that other departments and communities needed to take action on climate change, or do enough to facilitate their access to existing climate change information.

29. Our analysis supporting this finding presents what we examined and discusses the following topic:

- Information to support climate change decisions

Why this finding matters

30. This finding matters because territorial departments and communities have identified the need for information that will help them better adapt to the impacts of climate change, and they have stated that they do not have what they need. This includes both scientific research and traditional knowledge. The Department of Environment and Natural Resources is responsible for sharing and promoting scientific and traditional knowledge to support decisions on climate change. As such, the Department needs to ensure that this information is identified, collected, and made available in an accessible format.

Recommendation

31. Our recommendation in this area of examination appears at paragraph 39.

Analysis to support this finding

32. **What we examined.** We examined whether the Department of Environment and Natural Resources had identified and shared the information departments and communities needed to address climate change risks and respond to its impacts.

33. **Information to support climate change decisions.** The Department of Environment and Natural Resources made a commitment to provide government departments and others with relevant and accessible climate change information to help them make adaptation decisions.

34. We found that the Department had not identified the climate change information that territorial departments and communities required to make effective adaptation decisions. This was despite the fact that officials from the departments we audited, as well as stakeholders, told us of information they needed to make climate change adaptation decisions.

35. We also found that the Department did not do enough to help departments and communities access the significant amount of information on climate change that already existed for the Northwest Territories to help them in making adaptation decisions. For example, we found that every regional consultation held by the Department when developing its climate change strategic framework raised the concern that existing climate change information and analysis was not shared, and that this was a barrier to adaptation.

36. While the Department partnered with post-secondary and other research institutions, as well as with federal and territorial governments, to obtain climate change information and discuss climate change issues, we found that this was not enough to meet its commitment and ensure that departments and stakeholders had the right information to make adaptation decisions.

37. Officials informed us of occasions where the Department did not take advantage of opportunities to acquire climate change information specific to the Northwest Territories. An example is the Inuvik Satellite Station Facility, which is overseen by Natural Resources Canada and hosts both federal and international satellites. These earth observation satellites generate data about the entire Northwest Territories. This data can be used to monitor ice conditions and track landscape changes, and therefore to better understand the impacts of climate change and how to adapt.

38. The Department of Environment and Natural Resources recently started identifying opportunities to share climate change information. In May 2017, it released the Knowledge Agenda: Northern Research for Northern Priorities, which identified Government of the Northwest Territories' research priorities, many of which were linked to gaining a better understanding of climate change impacts. We were told by departmental officials that the Knowledge Agenda should help facilitate access to climate change information in the future.

39. **Recommendation.** To better support climate change information needs and adaptation decisions, the Department of Environment and Natural Resources should do the following:

- Identify the climate change information needs of Government of the Northwest Territories departments as well as those of communities.
- Provide departments and others with access to relevant climate change information to make informed adaptation decisions. This would include collecting new information, accessing information already available, and establishing mechanisms to house and share this information. The Department should work with other government departments, agencies, communities, and research institutions to identify existing climate change–related information.
- Monitor implementation of the Knowledge Agenda: Northern Research for Northern Priorities.

The Department's response. *Agreed. Information management is an area of focus in the Northwest Territories Climate Change Strategic Framework (CCSF), and the CCSF action plan will have information management as a key area of focus. The action plan will be developed during the 2017–18 fiscal year.*

In the development of the CCSF and the Knowledge Agenda, information needs have been identified.

As part of the CCSF action plan, information-sharing mechanisms will be examined to determine the most effective process for collecting information and the available platforms for housing information.

The Department will continue to work with other governments through the Pan-Territorial Adaptation Partnership, Canada's Climate Change Adaptation Platform, the Canadian Council of Ministers of the Environment, the Canadian Council of Forest Ministers, and the Pan-Territorial Adaptation Strategy to identify the latest information on climate change.

The Knowledge Agenda will develop an action plan in 2017–18, which will assist with monitoring its implementation.

The territorial greenhouse gas strategy did not have a significant impact on reducing emission levels

What we found

40. We found that the 2011–2015 territorial greenhouse gas (GHG) strategy developed by the Department of Environment and Natural Resources lacked meaningful emission targets, did not have targets for major emitters, and did not have a significant impact on emission levels. We also found that the Department did not develop implementation plans for the strategy, did not track progress against commitments, and did not report on results.

41. Our analysis supporting this finding presents what we examined and discusses the following topics:

- Developing and monitoring territory-wide greenhouse gas strategies
- Steps taken to reduce greenhouse gas emissions from infrastructure operations

Why this finding matters

42. This finding matters because greenhouse gas emissions are one of the leading causes of climate change. The Northwest Territories is host to a number of industries that produce significant GHG emissions, such as mining, transportation, and oil and gas. There is a need for clear targets for GHG emissions from all sectors to help ensure that everyone does their part to contribute to the Northwest Territories' efforts to address climate change.

Recommendations

43. Our recommendations in these areas of examination appear at paragraphs 50 and 51.

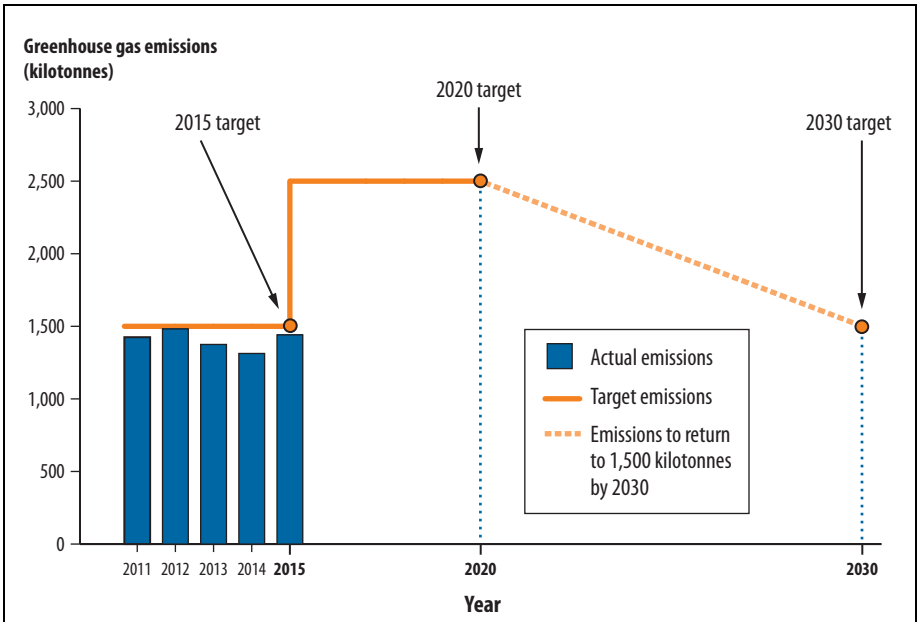
Analysis to support this finding

44. **What we examined.** We examined whether the Department of Environment and Natural Resources had developed territorial greenhouse gas strategies, monitored their implementation, and collected information on results achieved. We also examined whether the Department of Infrastructure established departmental plans and implemented identified actions to help meet GHG emission targets for the Northwest Territories.

45. **Developing and monitoring territory-wide greenhouse gas strategies.** We found that since 2001, the Department of Environment and Natural Resources had developed three successive territorial GHG strategies, the last of which expired in 2015. That last strategy's goal was not to reduce the territory's GHG emissions. Rather, its territorial targets allowed emissions to increase to meet the anticipated demand for energy for new mining and oil and gas projects. These targets extend to 2030. According to annual GHG data reported by Environment and Climate Change Canada, the strategy's first territorial target—to stabilize GHG emissions to 1,500 kilotonnes by 2015—was met (Exhibit 2).

46. While the Department of Environment and Natural Resources had developed a 2011–2015 GHG strategy, we found that the strategy did not focus on major emitters. For example, the transportation sector was responsible for about 50 percent of the territory's emissions, but the only target for this sector was to reduce emissions from passenger vehicles, which represented about 4 percent of total emissions. Where the strategy had goals to address GHG emissions in specific areas, such as industry and communities, these were vague and unmeasurable. Officials told us that setting GHG emission targets is challenging because the Northwest Territories has a resource-based economy, and the government must also ensure that essential services, such as fuel, food, and medical services, are provided to the territory's many remote communities.

Exhibit 2 The Northwest Territories' greenhouse gas strategy allows for increases in emissions



Source: National Inventory Report 1990–2015: Greenhouse Gas Sources and Sinks in Canada, Environment and Climate Change Canada; and A Greenhouse Gas Strategy for the Northwest Territories 2011–2015, Northwest Territories Department of Environment and Natural Resources

47. The Department committed to track progress on the 2011–2015 GHG strategy annually. However, we found that the Department did not monitor whether the strategy's commitments were being met and how they were contributing to meeting GHG emission targets. We also found that even though the strategy expired in 2015, the Department had not issued a report on the progress made or the results achieved, including whether GHG emission targets were met. At the time of our audit, the Department also had not issued a new GHG strategy, but indicated that the climate change strategic framework currently in development would include a new GHG strategy for the territory.

48. The Department of Environment and Natural Resources, in consultation with various stakeholders, conducted two reviews of its GHG strategies: one in 2005 and another in 2011. Both reviews identified a number of elements that were missing from these early strategies, such as specific emission targets, an implementation plan, and accountability for results. We found that these issues persisted in the 2011–2015 strategy.

49. **Steps taken to reduce greenhouse gas emissions from infrastructure operations.** We found that the Department of Infrastructure took steps to reduce GHG emissions from its own operations to help meet GHG emission targets for the Northwest Territories, such as the following examples.

- In 2007, it established a retrofit program to upgrade government buildings to improve energy efficiency and reduce GHGs. Since that time, 59 projects have been completed, which the Department estimated had reduced GHGs by just under 54,000 tonnes.
- It converted its ferries to more fuel-efficient engines and pilot-tested hydraulic mooring winches to reduce idling time, which it stated helped reduce emissions.

50. **Recommendation.** The Department of Environment and Natural Resources should

- develop a new greenhouse gas (GHG) strategy for the Northwest Territories that includes concrete actions for addressing GHG emissions, how the actions will address emissions, and the specific steps for their implementation; and
- actively monitor the commitments in its new GHG strategy and publicly report on progress made and results achieved on an ongoing basis.

The Department's response. *Agreed. The Northwest Territories Climate Change Strategic Framework (CCSF) includes mitigation of greenhouse gas (GHG) emissions in the Northwest Territories.*

Through a CCSF action plan, the Department of Environment and Natural Resources will identify concrete actions for addressing GHG emissions in the Northwest Territories and identify specific steps for implementation. Detailed actions related to energy supply, demand, and policy are included in the 2030 Energy Strategy being developed.

The performance measurement framework, as part of the action plan, will monitor how actions are addressing emissions and monitor commitments made in the CCSF and the 2030 Energy Strategy. The Department of Environment and Natural Resources commits to reporting annually to the public.

51. **Recommendation.** In developing and implementing its greenhouse gas (GHG) strategy, the Department of Environment and Natural Resources should engage with stakeholders, including industry, to clearly identify commitments to address GHG emissions in each sector across the Northwest Territories.

The Department's response. *Agreed. Regional engagement workshops, an online survey, and written submissions have informed requirements for addressing greenhouse gas emissions in the Northwest Territories in the Northwest Territories Climate Change Strategic Framework (CCSF).*

In the development of the CCSF action plan, the Department of Environment and Natural Resources will continue to engage with stakeholders and Aboriginal governments to develop sector commitments.

The Department of Environment and Natural Resources did not address long-standing deficiencies affecting its leadership on climate change

What we found

52. We found that the Department of Environment and Natural Resources did not address long-standing identified deficiencies that affected its ability to lead on climate change. For example, it did not assess what authorities and resources it required to fulfill its leadership role.

53. Our analysis supporting this finding presents what we examined and discusses the following topic:

- The Department of Environment and Natural Resources' efforts to address deficiencies affecting its leadership on climate change

Why this finding matters

54. This finding matters because if the Department of Environment and Natural Resources does not have ways to coordinate people and information, and does not have an adequate number of people to do the job, it will not be able to effectively lead the Government of the Northwest Territories on climate change.

Recommendation

55. Our recommendation in this area of examination appears at paragraph 60.

Analysis to support this finding

56. **What we examined.** We examined whether the Department of Environment and Natural Resources had addressed identified deficiencies that affect its leadership role for climate change.

57. **The Department of Environment and Natural Resources' efforts to address deficiencies affecting its leadership on climate change.** More than 10 years ago, the Department of Environment and Natural Resources identified deficiencies that affected its climate change leadership. These included insufficient funding, insufficient authority to hold other territorial departments accountable for their climate change and greenhouse gas emission commitments, and no formal way to communicate and coordinate with groups involved in climate change. We found that the Department still had not addressed these deficiencies.

58. In 2007, the Department committed to put in place the Climate Change Network to share information, connect people, and promote climate change action in the Northwest Territories. We found that the Department did not establish this network, despite two attempts, and was unable to explain why.

59. We also found that the Department had not conducted an analysis of the resources or authority it needed to carry out its responsibility and mandate as climate change lead for the Government of the Northwest Territories. Officials told us that the Department's responsibilities as the lead on climate change had increased while its resources had not.

60. **Recommendation.** The Department of Environment and Natural Resources should consider options for how best to fulfill its responsibilities as the lead for climate change in the Government of the Northwest Territories. This could include

- considering what authority is needed, and
- identifying the resources needed to fulfill its responsibilities.

Some of these options could be considered as part of the Department's development and implementation of a territorial climate change strategic framework.

The Department's response. *Agreed. The implementation of the Northwest Territories Climate Change Strategic Framework (CCSF) will be enabled through a CCSF action plan to be developed in the 2017–18 fiscal year.*

As part of this exercise, the Department of Environment and Natural Resources will look at its authority, roles, and responsibilities, and the resources required to effectively carry out the CCSF.

Adapting to climate change impacts

Departments did not take enough action to address climate change risks

Overall message ➔

61. Overall, we found that the departments we examined were not doing enough to address climate change risks and adapt to the many diverse impacts on wildlife and buildings. While the Department of Environment and Natural Resources had set out protections for some vulnerable species, such as selected caribou species, it had no overall adaptation plan to better protect wildlife and help ensure that the areas of greatest risk were being addressed.

62. On the other hand, the Department of Infrastructure identified specific adaptation actions to protect public roads and buildings from the risks posed by climate change, but these were only routinely carried out for roads.

63. This finding matters because the impacts of climate change can be significant in many areas. For example, many residents of the Northwest Territories depend on wildlife for food and income, and wildlife has a high cultural value. The territory's roads are critical to the economy and security, bringing in needed supplies to communities and businesses, and helping to manage the high costs of living in the north. Public buildings such as schools, hospitals, and health clinics provide critical services.

64. Our analysis supporting this finding presents what we examined and discusses the following topics:

- Our summary assessment of the departments' measures to adapt to climate change impacts
- Plan for wildlife management in response to climate change
- Implementing adaptation measures for wildlife management
- Climate change adaptation plan for public buildings
- Implementing adaptation measures for public buildings
- Climate change adaptation plan for roads
- Implementing adaptation measures for roads

Context

65. Many factors can affect wildlife, including harvesting, habitat loss, and alien species. According to the Department of Environment and Natural Resources, while there are natural fluctuations in wildlife populations, climate change increases the impacts. Warmer temperatures, higher snowfalls, and extreme weather events have affected the ecosystem in the Northwest Territories, which has been a factor in declining populations of various species, most notably caribou. This has also been a factor in the decreased country food supply and increased reliance on store-bought food in a number of communities in the Northwest Territories, affecting residents' food security and costs, health, and culture.

66. Climate change information indicates that buildings and roads are exposed to greater risk due to climate change impacts from increased temperatures, precipitation, and permafrost degradation. Winter roads are particularly at risk because they rely on cold temperatures. Permafrost degradation compromises the foundations of all-weather roads and buildings, and presents challenges for construction designs to keep pace with increasing climate change impacts.

Recommendations

67. Our recommendations in these areas of examination appear at paragraphs 73, 81, and 87.

Analysis to support this finding

68. **What we examined.** We examined whether the Department of Environment and Natural Resources had assessed risks to wildlife from climate change, as well as developed an adaptation plan to address these risks and taken actions to implement the plan. We also examined whether the Department of Infrastructure had assessed the risks to roads and buildings posed by climate change, as well as developed and taken actions to implement adaptation plans to address these risks.

69. **Our summary assessment of the departments' measures to adapt to climate change impacts.** We found that the Department of Environment and Natural Resources and the Department of Infrastructure did not take adequate steps to adapt to climate change impacts on wildlife and buildings. However, for the most part, the Department of Infrastructure took adequate steps to adapt to climate change impacts on roads (Exhibit 3). The following paragraphs present detailed findings for each of the three areas we examined.

Exhibit 3 The Department of Environment and Natural Resources and the Department of Infrastructure made adaptation commitments but did not always follow through on their implementation

	Department of Environment and Natural Resources	Department of Infrastructure	
	Wildlife	**Buildings**	**Roads**
Did the responsible department have an adaptation plan that identified high-risk areas?	No. There was no overall adaptation plan or overall assessment of wildlife risks. However, there were some individual species plans and initiatives to manage wildlife, including for specific species identified as vulnerable.	Yes. There have been a series of plans guiding adaptation for public buildings since 2001. Permafrost degradation and increasing snow loads were identified as the areas of greatest risk for public buildings.	Yes. There has been an adaptation plan for transportation since 2013. All-weather and winter roads were identified as the areas of greatest risk in the transportation network.
Did the responsible department meet selected commitments for high-risk areas in its adaptation plan?	No. In the individual species plans, there were large gaps in the Department's data collection and monitoring for some vulnerable species. Some other identified climate change risk areas, such as alien species, were also not addressed.	No. In the files we examined, monitoring and operations and maintenance to address risks were inconsistently carried out and often did not follow the guidance set out in plans.	Yes. In most cases, monitoring and operations and maintenance to address risks were carried out in the files we examined.

70. **Plan for wildlife management in response to climate change.** We found that the Department of Environment and Natural Resources did not have an overall adaptation plan covering all wildlife. As a result, it had not adequately assessed the overall risks affecting wildlife or established adaptation priorities. Instead, the Department had a number of individual wildlife initiatives, some of which identified climate change risks in specific areas, including for selected vulnerable species. Consequently, the Department did not know whether the areas of greatest risk for wildlife had been identified and were being addressed. This was despite the fact that departmental officials informed us that climate change impacts on wildlife had been rapid and unpredictable.

71. **Implementing adaptation measures in wildlife management.** In the absence of an overall adaptation plan, we asked the Department to identify commitments that it made to help address the impacts of climate change on wildlife. We examined the actions the Department took to meet these commitments. We found that it did not do enough to fulfill the commitments it identified as important to addressing climate change impacts on wildlife (Exhibit 4).

Exhibit 4 The Department of Environment and Natural Resources did not fulfill all the commitments it identified as important to address climate change impacts on wildlife

Area	Department's commitment	Actions taken by the Department
Managing alien species	Develop a strategy to manage the spread of alien species, which are an increasing area of concern and upset ecosystems by outcompeting native species for limited resources.	No strategy had been developed.
Developing environmental indicators	Develop indicators to monitor the changing state of the environment to help identify wildlife changes or issues.	The indicators were developed and reported on the Department's website (last reported in 2015).
Collecting biological samples of wildlife	Collect wildlife biological samples from harvesters to understand wildlife health and track climate change impacts.	Samples were collected, but in some cases, there were delays of up to two to three years in their analysis, or they were not analyzed at all.
Monitoring vulnerable species	Manage and monitor the 24 species that have been identified by the federal or territorial government as being vulnerable and where the Department has jurisdiction (such as those listed in the federal and the territorial *Species at Risk Act* dating as far back as 2003).	The Department did monitor some species that were typically of value to Northwest Territories communities, such as barren-ground and boreal caribou, through species management plans. However, it did little or no monitoring of some other vulnerable species or species at risk, such as the Peary caribou, collared pika, muskox, and western toad.

72. Officials told us that while the number of vulnerable species that require monitoring continues to increase, the Department's resources have not.

73. **Recommendation.** The Department of Environment and Natural Resources should identify and implement wildlife management actions to adequately adapt to climate change. This should include

- conducting an assessment of risk for its overall wildlife management strategy to ensure that all climate change risks to wildlife have been identified;
- collecting the information required to understand climate change impacts on wildlife, including the status of species in the territory;
- taking action to address the risks identified; and
- working to fulfill those commitments it had already identified as important to addressing climate change impacts on wildlife.

The Department's response. *Agreed. Wildlife monitoring, assessment, and management are done primarily on a species-specific basis. As part of this approach, all factors that affect a species are considered in order to assess their cumulative impact on species/population health and resilience. Based on these assessments, management actions are identified that can be taken to maintain or enhance the overall status and resilience of populations.*

Species-specific management plans are an important tool to identify species-specific threats (including climate change), recommend actions to address the cumulative impacts of these threats, and track changes in population size, trend, and overall health.

The Department of Environment and Natural Resources will continue to consider climate change in this wildlife monitoring, assessment, and management approach. This will include efforts to identify and better understand climate change impacts on individual species, its contribution to cumulative effects, and species-specific options to mitigate cumulative effects and enhance population health and resilience.

74. **Climate change adaptation plan for public buildings.** The Department of Infrastructure assessed climate change risks for public buildings, such as hospitals, health centres, and government offices. It identified the two highest risks for public buildings as permafrost degradation affecting foundations and snow loads affecting roof stability.

75. We found that although the Department did not develop a formal climate change adaptation plan for public buildings, it undertook a number of steps to help manage the risks of climate change impacts, such as

- contributing to five new national standards for buildings under the Northern Infrastructure Standardization Initiative (NISI) that were rolled out between 2014 and 2017;

- developing and adopting Good Building Practice for Northern Facilities in 2001 to guide the design and construction of public buildings in a unique northern climate; and
- changing its operations and maintenance practices and procedures to help manage risks and protect public buildings from climate change impacts, such as removing snow from roofs identified as vulnerable to excessive snow loads.

76. **Implementing adaptation measures for public buildings.** We examined whether the Department of Infrastructure followed its operations and maintenance practices to manage risks and protect public buildings from climate change impacts. These practices were significant because about 80 percent of public buildings are significantly aged and both current and future climate change impacts pose risks.

77. We reviewed a selection of public buildings, such as schools, hospitals and health clinics, and daycare centres in regions with permafrost degradation and heavier snow loads. We examined the Department's operations and maintenance from the 2013–14 fiscal year to the 2016–17 fiscal year. For inspections required every five years, we examined from the 2004–05 fiscal year to the 2016–17 fiscal year.

78. We found that the Department did not consistently follow its own operations and maintenance practices to manage risks and protect buildings from climate change impacts for these facilities (Exhibit 5).

79. The Good Building Practice for Northern Facilities and NISI standards outline options to use specific technologies in building foundations to address permafrost degradation, such as thermosiphons, a system to keep a foundation and surrounding permafrost cold. When these options are used, the Good Building Practice, standards, and departmental procedures recommend specific inspections and ongoing monitoring to protect the technology and ensure that it is working.

80. We looked at all nine public buildings in the Northwest Territories that used thermosiphons. We found that the Department regularly inspected and monitored only four out of nine buildings (44 percent). These activities are particularly important because the Department has made significant investments in this technology to help keep permafrost in a frozen state in order to support building foundations.

Exhibit 5 The Department of Infrastructure often did not follow its own practices for operations and maintenance of public buildings where permafrost and snow loads were prevalent

Operations and maintenance practices to adapt to climate change impacts*	Actions taken by the Department in the facilities we reviewed
Conduct roof inspections every year Assess roof snow overload risk every five years	The Department did not undertake the annual roof inspections or the five-year roof snow overload risk assessments as committed. • 10 of 16 buildings (63%) we reviewed did not undergo annual roof inspections. Of these 10 buildings, half were not inspected at all during the period we reviewed. • Only one region had repeated the roof snow overload risk assessment since its inception in 2004, and this was not within the required five-year cycle.
Clear snow accumulations to help reduce the risk of roof structural damage on buildings	The Department did not remove snow from roofs as required. • Snow had not been removed from roofs for 8 of 16 buildings (50%) we examined. This included a health centre and school that the Department had identified as having a higher risk of heavy snow accumulation. We found that these two facilities also did not undergo annual roof inspections during the period we reviewed.
Remove snow from building foundations to prevent the snow's insulation from degrading permafrost that is susceptible to thaw	The Department did not routinely perform operations and maintenance activities to prevent permafrost degradation. • 10 of 12 facilities (83%) we examined did not have snow removed from foundations. For some of the assets where snow removal did not occur, we found that there were documented problems with the foundations.
Inspect facilities with wooden foundations affected by permafrost melt and snow loads every year	The Department did routinely inspect buildings with wooden foundations. • 10 of 11 facilities (91%) we examined were inspected annually.

* Based on guidance in the Department's Maintenance Management Standards and other departmental procedures, or the Northern Infrastructure Standardization Initiative standards.

81. **Recommendation.** The Department of Infrastructure should consistently carry out those operational practices that it committed to in order to manage the impacts of climate change on public buildings.

The Department's response. *Agreed. All infrastructure should be under a constant review and inspection cycle as part of its life cycle. Assessing risk with respect to climate change or other factors, and documenting the risks along with the action taken, should form part of the overall record.*

As public buildings are designed and built under a strict national building code, the Government of the Northwest Territories should continue to work with other Canadian jurisdictions, including the federal government, to ensure the building codes adequately address the issues.

82. **Climate change adaptation plan for roads.** In 2013, the Department of Infrastructure developed a climate change adaptation plan for transportation infrastructure that identified all-weather and winter roads as the greatest areas of risk. In its adaptation plan, the Department committed to a range of adaptive actions to manage these risks for all-weather roads and winter roads. These actions included

- testing and using new technologies to help manage the impacts of permafrost degradation and changes in ice conditions,
- conducting research on the viability of winter roads, and
- changing selected operations and maintenance practices to better protect roads from impacts such as melting ice.

The adaptation plan also included a long-term strategy to convert publicly constructed winter roads to all-weather roads.

83. **Implementing adaptation measures for roads.** We examined the Department of Infrastructure's implementation of selected adaptation actions that it committed to in its adaptation plan (listed in paragraph 82).

84. We found that the Department of Infrastructure had worked with various partners to test some new technologies to help prevent permafrost degradation on all-weather roads. For example, it piloted a number of technologies on the Inuvik to Tuktoyaktuk highway project, such as alternative drainage structures. It also adopted a new technology to better determine winter road ice thickness.

85. We also found that the Department had worked with partners to undertake research to help better understand how to manage challenges in winter road operations.

86. We examined whether the Department followed the critical operations and maintenance practices it identified to manage climate change impacts on roads. These critical practices were to protect permafrost, prevent road washouts and hazardous conditions, and ensure that winter roads were safe for travel. We focused on two areas: culverts and ice roads, which are winter roads constructed on bodies of water. For culverts, we examined a selection of both large and small culverts from across the Northwest Territories. For ice roads, we examined a selection of roads from three regions that were identified by the Department as high risk or frequently used. For the culverts and ice roads we examined, we found that the Department followed its key practices most of the time, except for small culverts, where its inspections were not consistent (Exhibit 6).

Exhibit 6 The Department of Infrastructure followed its own operations and maintenance practices to protect roads from climate change impacts most of the time

Operations and maintenance practices to adapt to climate change impacts	Actions taken by the Department for the roads we reviewed
Conduct regular inspections of large and small culverts on all-weather roads to identify required maintenance and rehabilitation	The Department did conduct regular inspections of large culverts in most cases: • 37 of 41 (90%) large culverts we reviewed were inspected. The Department did not conduct regular inspections of small culverts: • 25 of 50 (50%) small culverts we reviewed were not inspected.
Use ground-penetrating radar to measure ice thickness of ice roads to determine weight-bearing capacity for safe use	The Department did measure ice thickness in most cases when required by its Guidelines for Safe Ice Construction: • The Department measured ice thickness 51 of 63 times (81%) when it was required in the roads we reviewed. We found one instance where the Department did not test the ice road thickness before increasing the amount of weight allowed to travel over the road.
Conduct regular inspections of ice roads to detect hazards and cracks that pose risks to ice road integrity	The Department did conduct inspections to detect hazards and cracks that pose risks to ice road integrity: • The Department conducted inspections 148 of 164 times (90%) when its guidelines required them.

87. **Recommendation.** The Department of Infrastructure should consistently carry out those operational practices that it committed to in order to manage the impacts of climate change on roads, in particular for the management of small culverts and ice roads.

The Department's response. *Agreed. The Department of Infrastructure has a number of cornerstone manuals, plans, and aids to assist our workforce and our contractors in achieving success. The Department will continue to refine these documents, along with the necessary training and education, to ensure that operational needs are met, the workforce remains safe, and the network remains safe, secure, and effective.*

Conclusion

88. We concluded that the measures taken by selected Government of the Northwest Territories departments were not adequate to fulfill the government's climate change commitments to reduce territorial greenhouse gas emissions and to adapt to climate change impacts in the Northwest Territories.

About the Audit

This independent assurance report was prepared by the Office of the Auditor General of Canada on the Department of Environment and Natural Resources' and Department of Infrastructure's management of climate change in the Northwest Territories. Our responsibility was to provide objective information, advice, and assurance to assist the Legislative Assembly in its scrutiny of the government's management of resources and programs, and to conclude on whether the selected departments' implementation of climate change measures 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 for 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 applies Canadian Standard on Quality Control 1 and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

In conducting the audit work, we have complied with the independence and other ethical requirements of the Rules of Professional Conduct of Chartered Professional Accountants of Ontario and the Code of Values, Ethics, and Professional Conduct of the Office of the Auditor General of Canada. Both the Rules of Professional Conduct and the Code 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 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; and
- confirmation that the findings in this report are factually based.

Audit objective

The objective of this audit was to determine whether selected Government of the Northwest Territories departments had taken adequate measures to fulfill the government's climate change commitments to reduce greenhouse gas emissions and to adapt to climate change impacts.

We defined "adequate measures" to mean that progress had been made in meeting commitments outlined in climate change strategies, frameworks, plans, and other associated sources to mitigate and adapt to climate change.

Scope and approach

In 2016, many legislative audit offices across Canada decided to look at the issue of climate change and developed similar audit approaches and questions to examine climate change action within their governments. As part of this initiative, the Office of the Auditor General of Canada decided to do federal and territorial climate change audits.

The Northwest Territories audit focused on selected Government of the Northwest Territories departments that play a key role in the government's climate change efforts. Specifically, we examined the Department of Environment and Natural Resources and the Department of Infrastructure (created by the merger of the former Department of Public Works and Services and the Department of Transportation on 1 April 2017).

We focused on efforts by both departments to meet climate change commitments to reduce territorial greenhouse gas (GHG) emissions and to adapt to climate change impacts. This work included assessing whether the Department of Environment and Natural Resources, as the designated lead department for climate change in the Northwest Territories, had taken adequate measures to fulfill its leadership role and meet specific commitments it made, such as the development, implementation, and monitoring of GHG and adaptation plans for the Northwest Territories. We also examined whether the Department had established and implemented other mechanisms, as committed, to support implementation of the Northwest Territories' GHG and adaptation strategies, in order to monitor implementation, collect and use data to help support climate change decisions, and measure and report on progress.

We also examined whether both departments had taken adequate actions and met key commitments specific to their responsibility areas, to help meet the Government of the Northwest Territories' broader commitments to contribute to GHG emission reductions.

Finally, we examined whether both departments had taken adequate measures to adapt to climate change impacts in their areas of responsibility, in order to contribute to the Government of the Northwest Territories' broader commitments to adapt to climate change. Within the Department of Environment and Natural Resources, this work focused on adaptation measures in the area of wildlife. Wildlife was chosen given both its cultural significance and its critical links to food security. For the Department of Infrastructure, we focused on those areas the Department identified as posing the highest climate change risks. (For public buildings, the highest risk identified was permafrost degradation and snow loads, and for transportation, this was all-weather and winter roads.)

Our examination of the Department of Infrastructure's adaptation efforts for public buildings and roads included an examination of files on the operations and maintenance activities performed for a selection of buildings and roads (including culverts) chosen on the basis of geographic region and risk level (see the following table). Both for public buildings and roads, we examined whether the Department followed the operations and maintenance practices it identified as critical to managing climate change impacts. We examined the Department's operations and maintenance from the 2013–14 fiscal year to the 2016–17 fiscal year. For inspections required every five years, we examined from the 2004–05 fiscal year to the 2016–17 fiscal year.

Buildings		
Type	**Population***	**Sample**
Buildings prone to snow overloading	180	16
Buildings in regions known to have permafrost issues	152	12
Wood-pile foundations	33	11
Thermosiphons	9	9

Culverts (all-weather roads)		
Type	**Population***	**Sample**
Large culverts	226	41
Small culverts	1,632	50
Ice roads (winter roads constructed on bodies of water)		
Type	**Population***	**Sample**
Ice roads on lakes	2	2
Ice crossings on rivers and lakes	7	1
Ice roads on a river	1	1

* Population refers to the size of the set of items considered for selection. Population may have been filtered by region, risk level, and type of item.

We did not examine the role of other Government of the Northwest Territories departments, community governments, associations, or the private sector (including industry) in managing greenhouse gas emissions or adaptation to climate change impacts. We also did not audit any federal climate change efforts in the Northwest Territories.

Criteria

Criteria	Sources
To determine whether selected Government of the Northwest Territories departments had taken adequate measures to fulfill the government's climate change commitments to reduce greenhouse gas (GHG) emissions and to adapt to climate change impacts, we used the following criteria:	
The Department of Environment and Natural Resources, in coordination with selected departments, has a climate change mitigation and climate change adaptation strategy for the Northwest Territories, including specific targets, plans, and activities for reducing GHG emissions and for adapting to climate change impacts.	• Environment and Natural Resources Establishment Policy, Government of the Northwest Territories • GNWT Official Statement on Climate Change—2004 and GNWT Official Statement on Climate—1998 • A Greenhouse Gas Strategy for the Northwest Territories 2011–2015, Department of Environment and Natural Resources • NWT Greenhouse Gas Strategy 2007–2011, Department of Environment and Natural Resources • NWT Climate Change Impacts and Adaptation Report, Department of Environment and Natural Resources, 2008

Criteria	Sources
To determine whether selected Government of the Northwest Territories departments had taken adequate measures to fulfill the government's climate change commitments to reduce greenhouse gas (GHG) emissions and to adapt to climate change impacts, we used the following criteria: (continued)	
The Department of Environment and Natural Resources, in coordination with selected departments, is monitoring and reporting on the implementation of these strategies, including whether GHG targets are being met.	• Environment and Natural Resources Establishment Policy, Government of the Northwest Territories • Financial Management Board Handbook, Government of the Northwest Territories • A Greenhouse Gas Strategy for the Northwest Territories 2011–2015, Department of Environment and Natural Resources • NWT Greenhouse Gas Strategy 2007–2011, Department of Environment and Natural Resources
The Department of Environment and Natural Resources is playing a leadership role in the implementation and coordination of the Government of the Northwest Territories' mitigation and adaptation efforts.	• Environment and Natural Resources Establishment Policy, Government of the Northwest Territories • Financial Management Board Handbook, Government of the Northwest Territories • A Greenhouse Gas Strategy for the Northwest Territories 2011–2015, Department of Environment and Natural Resources • NWT Greenhouse Gas Strategy 2007–2011, Department of Environment and Natural Resources
Selected Government of the Northwest Territories departments establish and take actions to implement a plan to help meet the Northwest Territories' GHG reduction commitments.	• A Greenhouse Gas Strategy for the Northwest Territories 2011–2015, Department of Environment and Natural Resources • Public Works and Services Establishment Policy, Government of the Northwest Territories • Northwest Territories Energy Action Plan, Government of the Northwest Territories, 2013 • Green Light: Signalling the Department of Transportation's Commitment to the Environment, Department of Transportation, 2009
Selected departments have plans for adapting to climate change impacts relating to their areas of responsibility, and take actions to implement these adaptation plans, in particular for those areas identified as the highest priority risks.	• A Greenhouse Gas Strategy for the Northwest Territories 2011–2015, Department of Environment and Natural Resources • NWT Greenhouse Gas Strategy 2007–2011, Department of Environment and Natural Resources • Financial Management Board Handbook, Government of the Northwest Territories • Pan-Territorial Adaptation Strategy, governments of the Northwest Territories, Nunavut, and Yukon, 2011 • NWT Climate Change Impacts and Adaptation Report, Department of Environment and Natural Resources, 2008

Criteria	Sources
To determine whether selected Government of the Northwest Territories departments had taken adequate measures to fulfill the government's climate change commitments to reduce greenhouse gas (GHG) emissions and to adapt to climate change impacts, we used the following criteria: (continued)	
	• Environment and Natural Resources Establishment Policy, Government of the Northwest Territories • Public Works and Services Establishment Policy, Government of the Northwest Territories • Transportation Establishment Policy, Government of the Northwest Territories • Green Light: Signalling the Department of Transportation's Commitment to the Environment, Department of Transportation, 2009 • Connecting Us: Northwest Territories Transportation Strategy 2015–2040, Department of Transportation • "Change and Challenge": Climate Change Adaptation Plan for the GNWT Department of Transportation, Department of Transportation, 2013

Period covered by the audit

The audit covered the period between 1 April 2013 and 30 June 2017. 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 audit period, most notably in our examination of the Department of Environment and Natural Resources' leadership role for climate change, which dated back to 2001.

Date of the report

We obtained sufficient and appropriate audit evidence on which to base our conclusion on 14 September 2017, in Ottawa, Ontario.

Audit team

Principal: Glenn Wheeler
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List of Recommendations

The following table lists the recommendations and responses found in this report. The paragraph number preceding the recommendation indicates the location of the recommendation in the report, and the numbers in parentheses indicate the location of the related discussion.

Recommendation	Response
Leadership on climate change	
27. The Department of Environment and Natural Resources should develop and implement a strategy outlining how the Northwest Territories will adapt to climate change. The strategy should • include a territory-wide assessment of climate change risks; • be developed with input from other territorial departments and residents; • take into account regional diversity, current adaptation efforts, and existing knowledge of climate change impacts in the territory; and • include indicators to facilitate tracking of climate change adaptation progress, a clear implementation plan, and provision for ongoing assessments and updates as adaptation needs evolve. **(18–26)**	**The Department's response.** Agreed. The Department of Environment and Natural Resources is currently developing a Northwest Territories Climate Change Strategic Framework (CCSF), and it will address both climate change mitigation and adaptation. The CCSF is being developed as a document for the whole of the Northwest Territories. Regional diversity and current adaptation needs and efforts will be highlighted in this document. Extensive public engagement was carried out through regional engagement sessions, an online survey, and acceptance of written submissions to gather views on climate change issues. This input has been incorporated into the draft document, and a Summary of Joint Engagement Activities was published on the Department's website during the summer of 2017. The draft CCSF will be available for public review during the fall of 2017. Residents and communities will have one month to review and comment on the draft CCSF, and this feedback will be used to finalize the CCSF. The implementation of the CCSF will require an action plan. This action plan will include a performance measurement framework with specific indicators to help track the progress and commitments made in the CCSF. Ongoing assessment of adaptation efforts in the Northwest Territories will be assessed as part of the action plan. The CCSF action plan will be developed over the 2017–18 fiscal year.

Recommendation	Response
39. To better support climate change information needs and adaptation decisions, the Department of Environment and Natural Resources should do the following: • Identify the climate change information needs of Government of the Northwest Territories departments as well as those of communities. • Provide departments and others with access to relevant climate change information to make informed adaptation decisions. This would include collecting new information, accessing information already available, and establishing mechanisms to house and share this information. The Department should work with other government departments, agencies, communities, and research institutions to identify existing climate change–related information. • Monitor implementation of the Knowledge Agenda: Northern Research for Northern Priorities. **(28–38)**	**The Department's response.** Agreed. Information management is an area of focus in the Northwest Territories Climate Change Strategic Framework (CCSF), and the CCSF action plan will have information management as a key area of focus. The action plan will be developed during the 2017–18 fiscal year. In the development of the CCSF and the Knowledge Agenda, information needs have been identified. As part of the CCSF action plan, information-sharing mechanisms will be examined to determine the most effective process for collecting information and the available platforms for housing information. The Department will continue to work with other governments through the Pan-Territorial Adaptation Partnership, Canada's Climate Change Adaptation Platform, the Canadian Council of Ministers of the Environment, the Canadian Council of Forest Ministers, and the Pan-Territorial Adaptation Strategy to identify the latest information on climate change. The Knowledge Agenda will develop an action plan in 2017–18, which will assist with monitoring its implementation.
50. The Department of Environment and Natural Resources should • develop a new greenhouse gas (GHG) strategy for the Northwest Territories that includes concrete actions for addressing GHG emissions, how the actions will address emissions, and the specific steps for their implementation; and • actively monitor the commitments in its new GHG strategy and publicly report on progress made and results achieved on an ongoing basis. **(40–49)**	**The Department's response.** Agreed. The Northwest Territories Climate Change Strategic Framework (CCSF) includes mitigation of greenhouse gas (GHG) emissions in the Northwest Territories. Through a CCSF action plan, the Department of Environment and Natural Resources will identify concrete actions for addressing GHG emissions in the Northwest Territories and identify specific steps for implementation. Detailed actions related to energy supply, demand, and policy are included in the 2030 Energy Strategy being developed. The performance measurement framework, as part of the action plan, will monitor how actions are addressing emissions and monitor commitments made in the CCSF and the 2030 Energy Strategy. The Department of Environment and Natural Resources commits to reporting annually to the public.

Recommendation	Response
51. In developing and implementing its greenhouse gas (GHG) strategy, the Department of Environment and Natural Resources should engage with stakeholders, including industry, to clearly identify commitments to address GHG emissions in each sector across the Northwest Territories. **(40–49)**	**The Department's response.** Agreed. Regional engagement workshops, an online survey, and written submissions have informed requirements for addressing greenhouse gas emissions in the Northwest Territories in the Northwest Territories Climate Change Strategic Framework (CCSF). In the development of the CCSF action plan, the Department of Environment and Natural Resources will continue to engage with stakeholders and Aboriginal governments to develop sector commitments.
60. The Department of Environment and Natural Resources should consider options for how best to fulfill its responsibilities as the lead for climate change in the Government of the Northwest Territories. This could include • considering what authority is needed, and • identifying the resources needed to fulfill its responsibilities. Some of these options could be considered as part of the Department's development and implementation of a territorial climate change strategic framework. **(52–59)**	**The Department's response.** Agreed. The implementation of the Northwest Territories Climate Change Strategic Framework (CCSF) will be enabled through a CCSF action plan to be developed in the 2017–18 fiscal year. As part of this exercise, the Department of Environment and Natural Resources will look at its authority, roles, and responsibilities, and the resources required to effectively carry out the CCSF.
Adapting to climate change impacts	
73. The Department of Environment and Natural Resources should identify and implement wildlife management actions to adequately adapt to climate change. This should include • conducting an assessment of risk for its overall wildlife management strategy to ensure that all climate change risks to wildlife have been identified; • collecting the information required to understand climate change impacts on wildlife, including the status of species in the territory; • taking action to address the risks identified; and • working to fulfill those commitments it had already identified as important to addressing climate change impacts on wildlife. **(68–72)**	**The Department's response.** Agreed. Wildlife monitoring, assessment, and management are done primarily on a species-specific basis. As part of this approach, all factors that affect a species are considered in order to assess their cumulative impact on species/population health and resilience. Based on these assessments, management actions are identified that can be taken to maintain or enhance the overall status and resilience of populations. Species-specific management plans are an important tool to identify species-specific threats (including climate change), recommend actions to address the cumulative impacts of these threats, and track changes in population size, trend, and overall health. The Department of Environment and Natural Resources will continue to consider climate change in this wildlife monitoring, assessment, and management approach. This will include efforts to identify and better understand climate change impacts on individual species, its contribution to cumulative effects, and species-specific options to mitigate cumulative effects and enhance population health and resilience.

Recommendation	Response
81. The Department of Infrastructure should consistently carry out those operational practices that it committed to in order to manage the impacts of climate change on public buildings. **(68–69, 74–80)**	**The Department's response.** Agreed. All infrastructure should be under a constant review and inspection cycle as part of its life cycle. Assessing risk with respect to climate change or other factors, and documenting the risks along with the action taken, should form part of the overall record. As public buildings are designed and built under a strict national building code, the Government of the Northwest Territories should continue to work with other Canadian jurisdictions, including the federal government, to ensure the building codes adequately address the issues.
87. The Department of Infrastructure should consistently carry out those operational practices that it committed to in order to manage the impacts of climate change on roads, in particular for the management of small culverts and ice roads. **(68–69, 82–86)**	**The Department's response.** Agreed. The Department of Infrastructure has a number of cornerstone manuals, plans, and aids to assist our workforce and our contractors in achieving success. The Department will continue to refine these documents, along with the necessary training and education, to ensure that operational needs are met, the workforce remains safe, and the network remains safe, secure, and effective.