



HOUSE OF COMMONS  
CHAMBRE DES COMMUNES  
CANADA

# **SCIENCE AND RESEARCH IN CANADA'S ARCTIC IN RELATION TO CLIMATE CHANGE**

**Report of the Standing Committee on Science  
and Research**

**Valerie Bradford, Chair**

**DECEMBER 2024  
44th PARLIAMENT, 1st SESSION**

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Chair**

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## **NOTICE TO READER**

### **Reports from committees presented to the House of Commons**

Presenting a report to the House is the way a committee makes public its findings and recommendations on a particular topic. Substantive reports on a subject-matter study usually contain a synopsis of the testimony heard, the recommendations made by the committee, as well as the reasons for those recommendations.

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# **THE STANDING COMMITTEE ON SCIENCE AND RESEARCH**

has the honour to present its

## **THIRTEENTH REPORT**

Pursuant to its mandate under Standing Order 108(3)(i), the committee has studied science and research in Canada's Arctic in relation to climate change and has agreed to report the following:





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## SUMMARY

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On 31 January 2023, the House of Commons Standing Committee on Science and Research (the Committee) decided to undertake a study on the science and research needs in Canada's Arctic in relation to climate change. During its study, the Committee held seven meetings between 9 May 2024 and 11 June 2024. It heard from 34 witnesses and received five briefs.

While Canada's Arctic is a broad area with many different types of natural environments and communities, the Committee heard about common impacts of climate change across the region, such as melting sea ice, thawing permafrost, the increased frequency of extreme weather events, and changing ecosystems, with consequential impacts on the lives of Arctic residents.

Witnesses spoke to a variety of existing Arctic research programs, such as the Canadian High Arctic Research Station and the Polar Continental Shelf Program, but highlighted ongoing gaps and challenges related to:

- the high costs of conducting research in the Arctic;
- limited research infrastructure;
- supporting the development of Arctic researchers;
- increasing research coordination;
- building collaborative relationships with communities;
- supporting Indigenous leadership in research initiatives;
- increasing capacity in environmental monitoring; and
- limited support for areas of Arctic study beyond the environment.

Beyond research, the Committee also heard about other supports that would strengthen Arctic communities and Canada's international reputation as an Arctic state.

The evidence compiled by the Committee led to 20 recommendations for the Government of Canada to strengthen science and research capacity in Canada's Arctic, especially in order to address climate change and its impacts. In particular,

the Committee recommends the development of a comprehensive Arctic research strategy to identify priorities and long-term goals for Arctic research in Canada.

# LIST OF RECOMMENDATIONS

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*As a result of their deliberations committees may make recommendations which they include in their reports for the consideration of the House of Commons or the Government. Recommendations related to this study are listed below.*

## **Recommendation 1**

**That the Government of Canada undertake reviews of the Polar Continental Shelf Program and the Northern Research Supplement to increase funding to cover the current and expected future costs they were designed to offset. .... 18**

## **Recommendation 2**

**That the Government of Canada undertake a review of Arctic research programs, such as Polar Knowledge Canada, the Arctic and Northern Challenge Program and ArcticNet, to ensure they are meeting the long-term needs of Arctic researchers..... 18**

## **Recommendation 3**

**That the Government of Canada, through the Canadian High Arctic Research Station, in collaboration with Northern communities and Arctic researchers, explore ways in which to develop and support additional research centres and infrastructure across the Arctic..... 20**

## **Recommendation 4**

**That the Government of Canada support the development of Arctic researchers, such as through the Canada Students Grants and Loans program and programs administered by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research. .... 21**

**Recommendation 5**

**That the Government of Canada review Arctic research funding programs provided by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other Arctic research programs such as those at Polar Knowledge Canada, Natural Resources Canada and the National Research Council of Canada, in order to identify and address any redundancies, increase coordination between programs, and reduce administrative barriers for researchers. .... 23**

**Recommendation 6**

**That the Government of Canada review funding criteria used by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other funding programs for Arctic research, in order to ensure proper collaboration between researchers and local communities when appropriate..... 24**

**Recommendation 7**

**That the Government of Canada, in collaboration with Indigenous organizations, review the funding criteria used by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other funding programs for Arctic research, in order to ensure proper collaboration between researchers and Northern communities when appropriate, and the accessibility of funding programs for Indigenous organizations..... 26**

**Recommendation 8**

**That the Government of Canada review current Arctic environmental monitoring programs in consultation with Arctic communities, Indigenous organizations, and Arctic researchers to identify areas where data and knowledge are insufficient and take steps to address them. .... 27**

**Recommendation 9**

**That the Government of Canada review Arctic funding programs delivered by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other funding programs for Arctic research, in order to promote better representation of the many diverse fields of study relevant to Arctic research. .... 29**

**Recommendation 10**

**That the Government of Canada plan to replace its only Arctic research vessel, the *Amundsen*, which is nearing the end of its useful life, and ensure that it can be fully used for scientific research moving forward. .... 31**

**Recommendation 11**

**That the Government of Canada continue to support Arctic housing initiatives, such as the Urban, Rural and Northern Indigenous Housing Strategy. .... 31**

**Recommendation 12**

**That the Government of Canada review the results to date of Canada’s Connectivity Strategy, particularly as it relates to Arctic connectivity, and address any ongoing gaps identified as a result..... 31**

**Recommendation 13**

**That the Government of Canada continue to support Arctic energy initiatives in collaboration with provinces and territories, Indigenous governments and organizations, and communities to promote reliable, sustainable, and appropriate energy solutions for communities..... 32**

**Recommendation 14**

**That the Government of Canada explore opportunities to support economic development in Arctic communities, including in resource extraction, construction, manufacturing, and shipping. .... 33**

**Recommendation 15**

**That the Government of Canada explore opportunities to strengthen Canada’s international reputation as an Arctic leader, such as through the creation of an ambassador for the Arctic or increased leadership in international Arctic organizations such as the Arctic Council and the International Maritime Organization. .... 34**

**Recommendation 16**

**That the Government of Canada, in consultation and cooperation with Indigenous groups and Northern governments, review shipping legislation or regulations and international agreements to which it is a party in order to identify any concerns or opportunities for revision and to take appropriate measures. .... 35**

**Recommendation 17**

**That the Government of Canada continue to support community-driven climate change adaptation initiatives in the Arctic. .... 36**

**Recommendation 18**

**That the Government of Canada, through Nutrition North Canada, and in consultation and cooperation with Indigenous groups, review food security and food sovereignty programs in the Arctic to identify areas for improvement and then take appropriate measures..... 37**

**Recommendation 19**

**That the Government of Canada, in collaboration with provincial, territorial and Indigenous governments, work to conduct research on the impacts of climate change on health care delivery capacity in Canada’s Arctic. .... 38**

**Recommendation 20**

**That the Government of Canada, in a cross-departmental fashion and in collaboration with provincial, territorial, and Indigenous governments, Northern communities, and the research community, develop a comprehensive Arctic research strategy to identify priorities and long-term goals..... 40**





# SCIENCE AND RESEARCH IN CANADA'S ARCTIC IN RELATION TO CLIMATE CHANGE

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## INTRODUCTION

On 31 January 2023, the House of Commons Standing Committee on Science and Research (the Committee) adopted a motion to:

[U]ndertake a study on the science and research needs in Canada's Arctic in relation to the troubling effects of climate change and assess

- i. the consequences and impacts of melting glaciers, rising oceans, thawing permafrost and unpredictable water levels, and other environmental phenomena throughout the ecosphere;
- ii. whether Arctic and northern populations have the research infrastructure, tools and funds to participate in research; and
- iii. if Arctic science and research collaboration is meaningfully conducted with local and Indigenous communities.<sup>1</sup>

During its study, the Committee held seven meetings between 9 May 2024 and 11 June 2024. It heard from 34 witnesses and received five briefs. The Committee would like to thank all the individuals and organizations that took the time to participate in this study by appearing or submitting a brief.

The evidence compiled by the Committee led to 20 recommendations for the Government of Canada to strengthen science and research capacity in Canada's Arctic, especially in order to address climate change and its impacts. These recommendations aim to address ongoing gaps and challenges in Arctic research, such as the high costs associated with conducting research in the Arctic, building collaborative relationships with communities, and supporting Indigenous leadership in Arctic research. In particular, the Committee recommends the development of a comprehensive Arctic research strategy to identify priorities and long-term goals for Arctic research in Canada.

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1 House of Commons, Standing Committee on Science and Research (SRSR), *Minutes of Proceedings*, 31 September 2023.



## DEFINING CANADA'S ARCTIC

In the *National Inuit Strategy on Research*, Inuit Tapiriit Kanatami (ITK), the national representational organization for Inuit in Canada, outlines the various definitions that are used to identify Canada's Arctic region, including:

- the discontinuous permafrost<sup>2</sup> zone, which includes areas where any permafrost is present but where some sections of the land may be free of permafrost, and covers the territories and northern portions of British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec and Labrador;
- North of 60°, which includes everything north of the 60th parallel north, and includes the territories and parts of northern Quebec and Labrador;
- a territorial definition that includes Yukon, the Northwest Territories, and Nunavut;
- Inuit Nunangat, the Inuit homeland in Canada, comprised of the Inuvialuit Settlement Region in the Northwest Territories, Nunavut, Nunavik in Northern Quebec, and Nunatsiavut in Northern Labrador; and
- the Arctic Circle, which occurs at approximately 66°33' N and marks the border of the Arctic climate zone and includes portions of Yukon, the Northwest Territories, and Nunavut.<sup>3</sup>

For the purposes of this report, a broad definition of the Arctic was used, consistent with the discontinuous permafrost zone. Certain witnesses and testimony referred to more specific regions, such as Inuit Nunangat, and are identified as such where relevant.

## CLIMATE CHANGE IN CANADA'S ARCTIC

In their testimony before the Committee, witnesses emphasized the powerful impact of climate change in Canada's Arctic. Many witnesses testified to the fact that the Arctic is

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2 Permafrost is ground that remains frozen for two or more years.

3 Inuit Tapiriit Kanatami, *National Inuit Strategy on Research*, 2018.

warming at a rate of two to six times faster than the global average.<sup>4</sup> The specific impacts of this warming are discussed below.

## Melting Sea Ice

Witnesses discussed the impacts of melting sea ice in Canada's Arctic. As explained by Andrew Arreak, Regional Operations Lead for the Qikiqtaaluk Region – Mittimatalik of SmartICE, in a statement read to the committee on his behalf, "[t]he ice is not only melting from the top from the heat of the sun, but from the bottom due to warm ocean currents."<sup>5</sup> As a result of melting sea ice, the Committee heard from several witnesses that Canada's Arctic is experiencing increasingly unpredictable and unsafe travel conditions on the ice, which is often used by people in the Arctic for travel, hunting, and camping.<sup>6</sup>

## Thawing Permafrost

Permafrost covers 40% to 50% of Canada, with a thickness ranging between a few meters deep to hundreds of meters deep.<sup>7</sup>

Witnesses noted that permafrost is thawing across the Arctic.<sup>8</sup> In natural environments, this is leading to disturbances in tundra and forests, changing the living environments of plants and animals, which can subsequently impact the ability of Indigenous peoples to

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4 SRSR, [Evidence](#), 11 June 2024, 1110 (Natan Obed, President, Inuit Tapiriit Kanatami); SRSR, [Evidence](#), 21 May 2024, 1105 (Richard Boudreault, Adjunct Professor, University of Waterloo, Polytechnique Montréal and CSMC, As an individual); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard, Executive Director, ArcticNet); SRSR, [Evidence](#), 9 May 2024, 1240 (Normand Voyer, Professor, Center for Northern Studies); Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023; and Warwick F. Vincent, "Background document," Written submission to the House of Commons Standing Committee on Science and Research, June 2024.

5 SRSR, [Evidence](#), 11 June 2024, 1215 (Katherine Wilson, Director of Knowledge Co-Production, SmartICE).

6 Ibid., 1215; SRSR, [Evidence](#), 11 June 2024, 1110 (Natan Obed); and SRSR, [Evidence](#), 9 May 2024, 1135 (Michel Allard, Professor Emeritus, Center for Northern Studies, Laval University, As an individual).

7 SRSR, [Evidence](#), 9 May 2024, 1105 (Michel Allard).

8 SRSR, [Evidence](#), 4 June 2024, 1100 (Lisa Koperqualuk, President, Inuit Circumpolar Council (Canada)); SRSR, [Evidence](#), 21 May 2024, 1115 (William Quinton, Professor, Wilfrid Laurier University, As an individual); SRSR, [Evidence](#), 30 May 2024, 1110 (Isla Myers-Smith, Professor, Faculty of Forestry, University of British Columbia, As an individual); Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023; and SRSR, [Evidence](#), 9 May 2024, 1105 (Michel Allard).



hunt and harvest traditional foods.<sup>9</sup> Permafrost thaw also causes increased instability in Arctic infrastructure, such as buildings, pipelines and airstrips.<sup>10</sup> Lisa Koperqualuk, President of the Inuit Circumpolar Council (Canada), testified that “50% of Arctic infrastructure may be at risk of damage by 2050.”<sup>11</sup>

## Extreme Weather Events

Witnesses also noted the increased frequency of extreme weather events, such as flooding and wildfires, in Canada’s Arctic.<sup>12</sup> William Quinton, a Professor at Wilfrid Laurier University, appearing as an individual, illustrated the devastating impacts of extreme weather events through the following anecdote:

To put a human face on this, I think of a colleague and friend of ours who is also a former grand chief of the Dehcho First Nations in the Northwest Territories. In 2021, she and all of her community of Jean Marie River, on the banks of the Mackenzie River, lost their homes to the flooding of that year, as did many other communities nearby. She and many of her community members had to build their new homes elsewhere, and she did, in the community of Enterprise, not too far away. Two years later, that community burned to the ground. Ninety per cent of it burned, including her house. She lost two homes to extreme events within two years. I just don’t see its equivalent in southern Canada, and she’s by no means the only person with these types of experiences in the north.<sup>13</sup>

Angus Cockney, Community Engagement and Northern Specialist at the Arctic Research Foundation, also shared the impact of extreme weather events and their impact on coastal erosion, testifying that “[m]y cousin Noella Cockney is a retired RCMP officer. Her house’s foundation was being pounded by waves last summer. You’d think she’d want to move south or to a safer place, but she said, ‘This is my homeland. I’m not moving.’”<sup>14</sup>

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9 SRSR, [Evidence](#), 9 May 2024, 1105 (Michel Allard).

10 SRSR, [Evidence](#), 4 June 2024, 1100 (Lisa Koperqualuk); SRSR, [Evidence](#), 9 May 2024, 1135 (Michel Allard); Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024; SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer, Chief Executive Officer, Arctic Research Foundation); and Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023.

11 SRSR, [Evidence](#), 4 June 2024, 1100 (Lisa Koperqualuk).

12 SRSR, [Evidence](#), 21 May 2024, 1115 (William Quinton); SRSR, [Evidence](#), 30 May 2024, 1110 (Isla Myers-Smith); and Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024.

13 SRSR, [Evidence](#), 21 May 2024, 1115 (William Quinton).

14 SRSR, [Evidence](#), 9 May 2024, 1115 (Angus Cockney, Community Engagement and Northern Specialist, Arctic Research Foundation).

## Changing Ecosystems

Warming temperatures in the Arctic and elsewhere have also led to changing ecosystems, with changes to what plants are able to grow in the Arctic and where different animal species make their homes.<sup>15</sup> This includes the introduction of new species of plants and animals to Arctic ecosystems, and the loss of other species. As explained in a brief submitted to the Committee by Joël Bêty and Dominique Berteaux, “[b]oreal species are moving northwards, which is beginning to wipe out species and ecosystems in the High Arctic.”<sup>16</sup> Changing ecosystems can also lead to the acceleration of other climate change effects. For example, as Michel Allard, Professor Emeritus at the Center for Northern Studies at Laval University, appearing as an individual, explained, newly abundant shrub growth on the tundra can increase snow accumulation and cause permafrost degradation.<sup>17</sup>

Changes in ecosystems, such as the type of flora and fauna present and their growing seasons and migratory patterns, are also having an impact on the ability of Indigenous peoples in the Arctic to hunt and harvest traditional foods, thus contributing to food insecurity in the region.<sup>18</sup>

Warming in the Arctic was also linked to emerging infectious diseases. Susan Kutz, Professor and Tier 1 Canada Research Chair in Arctic One Health, appearing as an individual, testified that many diseases are influenced by environmental temperature and a warming Arctic has led to new parasites and pathogens emerging in the Arctic as their range, and the range of the animals that carry them, expands.<sup>19</sup>

The loss of Arctic plant biodiversity was also linked to losses in chemodiversity and potential negative impacts on pharmaceutical innovation, given that, as testified by Normand Voyer, a Professor at the Center for Northern Studies, “40% of the drugs in

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15 Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023; SRSR, [Evidence](#), 30 May 2024, 1145 (Joël Bêty, Professor, Canada Research Chair in Northern Biodiversity, Université du Québec à Rimouski); SRSR, [Evidence](#), 30 May 2024, 1145 (Isla Myers-Smith); and SRSR, [Evidence](#), 4 June 2024, 1245 (Susan Kutz, Professor and Tier I Canada Research Chair in Arctic One Health, As an individual).

16 Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024.

17 SRSR, [Evidence](#), 9 May 2024, 1140 (Michel Allard).

18 Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024; Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023; SRSR, [Evidence](#), 9 May 2024, 1140 (Michel Allard); and SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty).

19 SRSR, [Evidence](#), 4 June 2024, 1255 (Susan Kutz).



our medicine cabinet come from plants. With global warming, plants are adapting their metabolism. Some will go extinct. For example, we may lose the first medication developed to treat Alzheimer’s disease.”<sup>20</sup>

## Beyond the Arctic

Changes in the Arctic environment are expected to have cascading effects on the rest of the planet.<sup>21</sup> For example, Jackie Dawson, Canada Research Chair in Human and Policy Dimensions of Climate Change at the University of Ottawa and ArcticNet, appearing as an individual, testified that, “altered freshwater fluxes in the Arctic Ocean from melting ice will lead to variations in the Gulf Stream, which we expect will then lead to changes in the climate, not only locally but all the way to the mid latitudes.”<sup>22</sup>

Jackie Dawson also underscored the fact that the prime drivers of anthropogenic, or human-caused, climate change are not in the Arctic. In other words, the main causes of the challenges the Arctic environment is facing are located in industrial areas to the South.

## CURRENT STATE OF RESEARCH IN CANADA’S ARCTIC

Witnesses noted several important Arctic research programs currently in place in Canada. The Polar Continental Shelf Program, which provides logistical support to researchers in Canada’s Arctic, was recognized as “the glue that holds Canadian Arctic research together,” by Andrew Derocher, Professor of Biological Sciences at the University of Alberta, appearing as an individual.<sup>23</sup> However, witnesses did note that the amount provided by the Polar Continental Shelf Program has not kept pace with the rising costs associated with doing research in the Arctic.<sup>24</sup>

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20 SRSR, [Evidence](#), 9 May 2024, 1245 (Normand Voyer).

21 SRSR, [Evidence](#), 9 May 2024, 1215 (Jackie Dawson, Canada Research Chair in Human and Policy Dimensions of Climate Change, University of Ottawa and ArcticNet, As an individual); SRSR, [Evidence](#), 9 May 2024, 1240 (Normand Voyer); SRSR, [Evidence](#), 28 May 2024, 1240 (David Hik, Chief Scientist, Polar Knowledge Canada); Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024; and SRSR, [Evidence](#), 30 May 2024, 1140 (Isla Myers-Smith).

22 SRSR, [Evidence](#), 9 May 2024, 1215 (Jackie Dawson).

23 SRSR, [Evidence](#), 21 May 2024, 1110 (Andrew Derocher, Professor of Biological Sciences, University of Alberta, As an individual); and Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024.

24 SRSR, [Evidence](#), 21 May 2024, 1140 (Andrew Derocher); and SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty).

The Canadian High Arctic Research Station (CHARS), which opened in Cambridge Bay in 2019, was also highlighted. David Hik, Chief Scientist at Polar Knowledge Canada (POLAR), which is headquartered within CHARS, testified that the mandate of CHARS is “to undertake and support locally relevant and globally significant knowledge creation” with a focus on ecosystem science, understanding the connections between northern community wellness and environmental health, and advancing clean energy and cold climate infrastructure solutions.<sup>25</sup> Natan Obed, President of ITK, testified that while investment in POLAR and CHARS “is a very positive development”, he did hope for more Inuit involvement in governance and priority setting.<sup>26</sup> Meanwhile, other witnesses said they would like to see more involvement from northern communities in setting research agendas and conducting research.<sup>27</sup>

Anne Barker, the Director of the Arctic and Northern Challenge Program at the National Research Council of Canada, also highlighted that program, which was developed through engagement with northern residents to improve the daily lives of Arctic and northern people through applied technology and innovation in the areas of housing, health, food and water.<sup>28</sup>

Representatives from the Social Sciences and Humanities Research Council (SSHRC), including President Ted Hewitt and Vice-President of Research Sylvie Lamoureux, noted their work with ArcticNet and Sentinel North, which bring together researchers from multiple disciplines with community partners, government agencies and the private sector.<sup>29</sup> They also mentioned Canada’s involvement in NordForsk, an international research initiative on sustainable Arctic development.<sup>30</sup> ArcticNet was also mentioned by Natan Obed as having a “true partnership approach from start to finish” with Inuit

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25 SRSR, [Evidence](#), 28 May 2024, 1240 (David Hik).

26 SRSR, [Evidence](#), 11 June 2024, 1115 (Natan Obed).

27 SRSR, [Evidence](#), 9 May 2024, 1150 (Michel Allard); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard); SRSR, [Evidence](#), 9 May 2024, 1220 (Normand Voyer); SRSR, [Evidence](#), 4 June 2024, 1205 (Susan Kutz); SRSR, [Evidence](#), 6 June 2024, 1225 (Nicolas Brunet, Associate Professor, As an individual); SRSR, [Evidence](#), 6 June 2024, 1240 (Jessica M. Shadian, President and Chief Executive Officer, Arctic360); and SRSR, [Evidence](#), 11 June 2024, 1220 (Pippa Seccombe-Hett, Vice President, Research, Aurora College).

28 SRSR, [Evidence](#), 28 May 2024, 1140 (Anne Barker, Director, Arctic and Northern Challenge Program, National Research Council of Canada).

29 SRSR, [Evidence](#), 28 May 2024, 1140 (Ted Hewitt, President, Social Sciences and Humanities Research Council); SRSR, [Evidence](#), 28 May 2024, 1225 (Sylvie Lamoureux, Vice-President, Research, Social Sciences and Humanities Research Council); and Social Sciences and Humanities Research Council of Canada, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, June 2024.

30 Ibid.



people, both through ITK and through the Inuit Circumpolar Council (Canada).<sup>31</sup> In a supplemental document submitted to the Committee, SSHRC noted that “[b]etween January 2018 and June 2023, SSHRC awarded over \$158 million through SSHRC-specific and tri-agency funding opportunities to support northern research, including on Arctic-related topics.”<sup>32</sup>

Carrie Grable, Director of Inuit Qaujisarvingat at ITK also spoke of an announcement in the 2024 federal budget of \$10 million over three years for Inuit research governance as a welcome first step to improve coordination between the Government of Canada and Inuit research agencies.<sup>33</sup>

Henry Burgess, the Head of the Natural Environment Research Council Arctic Office in the United Kingdom, also highlighted the Canada-Inuit Nunangat-United Kingdom Arctic Research Program (CINUK), which is conducting research related to climate-driven changes to the Inuit Nunangat environment and the impacts on Inuit community health and wellbeing.<sup>34</sup> The program is a partnership between United Kingdom Research and Innovation, POLAR, the National Research Council, Fonds de recherche du Québec, Parks Canada and ITK.<sup>35</sup> Natan Obed noted the CINUK program as an example of “good work that’s happening.”<sup>36</sup>

ITK’s own work in this area was also highlighted, with Natan Obed testifying about their National Inuit Health Strategy, which is currently being developed, the Inuit Climate Change Strategy, released in 2019, and the National Inuit Strategy on Research, launched in 2018.<sup>37</sup>

In the Northwest Territories, Pippa Seccombe-Hett, Vice-President of Research at Aurora College, also discussed the work of her institution, including its Western Arctic Research

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31 SRSR, [Evidence](#), 11 June 2024, 1130 (Natan Obed).

32 Social Sciences and Humanities Research Council of Canada, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, June 2024.

33 SRSR, [Evidence](#), 11 June 2024, 1135 (Carrie Grable, Director, Inuit Qaujisarvingat, Inuit Tapiriit Kanatami).

34 SRSR, [Evidence](#), 4 June 2024, 1105 (Henry Burgess, Head, Natural Environment Research Council Arctic Office).

35 Ibid.

36 SRSR, [Evidence](#), 11 June 2024, 1130 (Natan Obed).

37 Ibid., 1110.



Centre, its ongoing transformation into a polytechnic university, and its work in the development of shared research infrastructure across the Northwest Territories.<sup>38</sup>

In Quebec, Joël Bêty, a Professor and Canada Research Chair in Northern Biodiversity at the Université du Québec à Rimouski, spoke of a number of provincial interuniversity and multidisciplinary groups that support northern research, including the Centre for Northern Studies, Québec Océan, the Centre for Biodiversity Science, the Centre interuniversitaire d'études et de recherches autochtones, the Société du Plan Nord, and the Institut nordique du Québec.<sup>39</sup>

SmartICE, a community-based social enterprise, was also highlighted as an exemplar of Canadian Arctic climate change research, through their work on the effects of climate change on hunting routes over sea ice.<sup>40</sup> Speaking on its behalf, Katherine Wilson, the Director of Knowledge Co-Production, testified in particular to the role that SmartICE plays in training young people in local communities in research, geographic information systems and other monitoring technology.<sup>41</sup> As she said before the Committee, “[b]eing able to provide the training in the communities, without their having to come south, means they can stay with their families.”<sup>42</sup>

The Committee also heard from Kimberly Strong, a Professor of Physics at the University of Toronto, who testified on behalf of the Polar Environment Atmospheric Research Laboratory (PEARL), an observatory in Eureka, Nunavut that tracks changes in the Arctic atmosphere.<sup>43</sup> PEARL is accessible only by charter aircraft and an annual summer shipping route. Kimberly Strong shared with the Committee that PEARL’s ongoing operations are at risk due to a lack of stable funding.<sup>44</sup>

Witnesses who appeared before the Committee in the context of this study spoke to a variety of specific research projects in Canada’s Arctic, such as capturing carbon dioxide from generators, extracting water from the atmosphere, small-scale renewable energy

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38 SRSR, [Evidence](#), 11 June 2024, 1210 (Pippa Seccombe-Hett).

39 SRSR, [Evidence](#), 30 May 2024, 1155 (Joël Bêty).

40 SRSR, [Evidence](#), 28 May 2024, 1150 (Anne Barker); SRSR, [Evidence](#), 11 June 2024, 1155 (Natan Obed); and SRSR, [Evidence](#), 11 June 2024, 1215 (Katherine Wilson).

41 SRSR, [Evidence](#), 11 June 2024, 1240 (Katherine Wilson).

42 Ibid.

43 SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong, Professor of Physics, University of Toronto, Polar Environment Atmospheric Research Laboratory).

44 Ibid.



technologies, climate-resilient infrastructure, and oil spill response strategies.<sup>45</sup> They also highlighted other projects related to changing animal behaviour and vegetation patterns, and public health research projects.<sup>46</sup> Many witnesses also spoke of Canada's role in promoting Indigenous collaboration in Arctic research as a strength.<sup>47</sup>

## RESEARCH NEEDS IN CANADA'S ARCTIC

While witnesses shared the above examples of research projects and infrastructure currently in place in Canada's Arctic, they also testified to various areas in which Canada could strengthen its research capacity in the region.

### Increased Funding

Many witnesses recommended to the Committee that the federal government increase funding for Arctic research, particularly due to the higher cost of conducting research in the Arctic in comparison to more southern locations in Canada.<sup>48</sup> Higher costs associated with Arctic research include operational costs, transportation costs to access remote areas, and the higher cost of goods, such as food and other supplies. As explained by Christine Barnard, the Executive Director of ArcticNet:

One of the most important lessons we have learned at ArcticNet is that research in the north is completely different from research in the south. It requires more time to build and nurture relationships, to co-develop projects and to exchange throughout a project's lifespan. It requires more travel and therefore more funds, as work in the north

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45 SRSR, [Evidence](#), 21 May 2024, 1125 (Richard Boudreault); SRSR, [Evidence](#), 28 May 2024, 1150 (Anne Barker); SRSR, [Evidence](#), 28 May 2024, 1310 (Andrew Applejohn, Executive Director, Programs, Polar Knowledge Canada); SRSR, [Evidence](#), 30 May 2024, 1110 (Isla Myers-Smith); SRSR, [Evidence](#), 30 May 2024, 1125 (Bing Chen, UArctic Chair, Professor and Associate Dean, Memorial University of Newfoundland, As an individual); SRSR, [Evidence](#), 4 June 2024, 1205 (Susan Kutz); and SRSR, [Evidence](#), 11 June 2024, 1135 (Natan Obed).

46 Ibid.

47 SRSR, [Evidence](#), 21 May 2024, 1125 (William Quinton); Susan Kutz, "Additional notes," Written submission to the House of Commons Standing Committee on Science and Research, 4 June 2024; and SRSR, [Evidence](#), 28 May 2024, 1145 (Ted Hewitt).

48 SRSR, [Evidence](#), 21 May 2024, 1110 (Andrew Derocher); SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard); SRSR, [Evidence](#), 9 May 2024, 1220 (Normand Voyer); SRSR, [Evidence](#), 21 May 2024, 1135 (Richard Boudreault); SRSR, [Evidence](#), 30 May 2024, 1110 (Isla Myers-Smith); SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty); Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023; and Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024.

is tremendously expensive and can be dangerous, with people needing the right safety and cultural training to ethically work with communities.<sup>49</sup>

For example, Isla Myers-Smith, a Professor in the Faculty of Forestry at the University of British Columbia, appearing as an individual, noted that a few years ago, it cost her \$7,000 to charter a one-way plane from Inuvik to Qikiqtaruk-Herschel Island, and she expected the trip to cost \$10,000 in summer 2024.<sup>50</sup> Meanwhile, Andrew Derocher noted that the Northern Research Supplement, which was set up to off-set the higher cost of doing research in northern Canada, has not adjusted its value in many years.<sup>51</sup>

Witnesses also discussed the need for more long-term funding projects, particularly for climate change research, which often requires long timelines for data collection, analysis, and the development and deployment of adaptation and mitigation strategies.<sup>52</sup> Climate change adaptation involves adjusting to the current and future effects of climate change, such as changing building methods to account for melting permafrost, whereas mitigation involves preventing or reducing the emission of greenhouse gases in order to reduce the severity of climate change impacts, such as through the adoption of renewable energy solutions.

Michel Allard used the difference between his work in Quebec—largely funded by the provincial government—and his work in Nunavut—largely funded by the federal government—as an example. He testified that his work in Nunavut is “a bit more challenging because the funding is less consistent. Federal programs are intermittent.”<sup>53</sup>

Less consistent funding programs require researchers to submit proposals more often, taking up resources and creating administrative burdens, while also leaving teams and

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49 SRSR, *Evidence*, 9 May 2024, 1210 (Christine Barnard).

50 SRSR, *Evidence*, 30 May 2024, 1140 (Isla Myers-Smith).

51 SRSR, *Evidence*, 21 May 2024, 1110 (Andrew Derocher).

52 Ibid.; SRSR, *Evidence*, 9 May 2024, 1135 (Michel Allard); SRSR, *Evidence*, 9 May 2024, 1210 (Christine Barnard); SRSR, *Evidence*, 9 May 2024, 1235 (Normand Voyer); SRSR, *Evidence*, 28 May 2024, 1225 (Kimberly Strong); SRSR, *Evidence*, 30 May 2024, 1135 (Joël Bêty); SRSR, *Evidence*, 4 June 2024, 1235 (Warwick Vincent, Professor, Centre for Northern Studies (CEN), Université Laval, As an individual); SRSR, *Evidence*, 11 June 2024, 1250 (Katherine Wilson); Jackie Dawson et al., “ArcticNet Science Priorities Report,” Written submission to the House of Commons Standing Committee on Science and Research, July 2022; Polar Environment Atmospheric Research Laboratory (PEARL), “Written Submission for the Pre-Budget Consultations in Advance of the Upcoming (2024) Federal Budget,” Written submission to the House of Commons Standing Committee on Science and Research, 2024; Joël Bêty and Dominique Berteaux, *Brief*, Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024; and Susan Kutz, “Additional notes,” Written submission to the House of Commons Standing Committee on Science and Research, 4 June 2024.

53 SRSR, *Evidence*, 9 May 2024, 1135 (Michel Allard).



communities with uncertainty regarding the longevity of research programs.<sup>54</sup> This can make it challenging for researchers to recruit staff and researchers, or to commit to community infrastructure development.

Therefore, the Committee recommends:

### **Recommendation 1**

**That the Government of Canada undertake reviews of the Polar Continental Shelf Program and the Northern Research Supplement to increase funding to cover the current and expected future costs they were designed to offset.**

### **Recommendation 2**

**That the Government of Canada undertake a review of Arctic research programs, such as Polar Knowledge Canada, the Arctic and Northern Challenge Program and ArcticNet, to ensure they are meeting the long-term needs of Arctic researchers.**

## **Research Infrastructure**

Witnesses discussed the challenges inherent in the development and maintenance of research infrastructure in Canada's Arctic. Arctic research institutions include post-secondary institutions, such as Nunavut Arctic College, Aurora College and Yukon University; federal and territorial government institutions, such as CHARS; and private and non-profit organizations, such as SmartICE.

Witnesses spoke of the important role that these Arctic research institutions play in building capacity, infrastructure and logistical support for research projects in Canada's Arctic.<sup>55</sup>

In light of the challenges identified by witnesses that arise when applying solutions developed in the south that do not necessarily work in the north, Arctic research

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54 SRSR, [Evidence](#), 4 June 2024, 1245 (Warwick Vincent); and SRSR, [Evidence](#), 6 June 2024, 1130 (Heather Exner-Pirot, Director, Energy, Natural Resources and Environment, Macdonald-Laurier Institute, As an individual).

55 SRSR, [Evidence](#), 9 May 2024, 1150 (Michel Allard); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard); SRSR, [Evidence](#), 6 June 2024, 1225 (Nicolas Brunet); and SRSR, [Evidence](#), 11 June 2024, 1210 (Pippa Seccombe-Hett).

institutions are also key for finding solutions developed in the Arctic by Arctic residents.<sup>56</sup>

Witnesses also testified about how many of these institutions are under-funded, under-resourced, and under-staffed, and there are not enough of them to cover the vast geography of Canada's Arctic.<sup>57</sup> Andrew Derocher also commented on the loss of important research stations due to limited funding, such as a base in Tuktoyaktuk.<sup>58</sup>

Witnesses also noted that the location of CHARS in the western Canadian Arctic poses challenges, given the size of Canada's Arctic. Richard Boudreault, an Adjunct Professor at the University of Waterloo, Polytechnique Montréal and the Canadian Space Mining Corporation, appearing as an individual, and Andrew Derocher added that additional locations would be valuable, particularly in the eastern Arctic.<sup>59</sup> Alternatively, they suggested an infrastructure model in which there is one large research centre that is able to support smaller research centres through a hub-and-spoke model.<sup>60</sup>

Richard Boudreault also testified that a merger of CHARS, operated by POLAR, and the Polar Continental Shelf Program, operated by Natural Resources Canada, could help reduce administrative burdens and make it easier for researchers who access funds from both sources.<sup>61</sup> However, centralizing support in federal government institutions, such as CHARS, was also identified as something that can limit access for Indigenous communities.<sup>62</sup>

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56 SRSR, [Evidence](#), 6 June 2024, 1225 (Nicolas Brunet); SRSR, [Evidence](#), 4 June 2024, 1205 (Susan Kutz); SRSR, [Evidence](#), 11 June 2024, 1250 (Katherine Wilson); Warwick F. Vincent, "Background document," Written submission to the House of Commons Standing Committee on Science and Research, June 2024; and SRSR, [Evidence](#), 21 May 2024, 1130 (Richard Boudreault).

57 SRSR, [Evidence](#), 9 May 2024, 1220 (Normand Voyer); SRSR, [Evidence](#), 6 June 2024, 1240 (Jessica M. Shadian); SRSR, [Evidence](#), 11 June 2024, 1245 (Pippa Seccombe-Hett); SRSR, [Evidence](#), 11 June 2024, 1250 (Katherine Wilson); SRSR, [Evidence](#), 21 May 2024, 1125 (Richard Boudreault); SRSR, [Evidence](#), 21 May 2024, 1155 (Andrew Derocher); SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong); SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty); and SRSR, [Evidence](#), 4 June 2024, 1300 (Maribeth Murray, Executive Director, Arctic Institute of North America).

58 SRSR, [Evidence](#), 21 May 2024, 1140 (Andrew Derocher).

59 SRSR, [Evidence](#), 21 May 2024, 1155 (Richard Boudreault); and SRSR, [Evidence](#), 21 May 2024, 1140 (Andrew Derocher).

60 SRSR, [Evidence](#), 21 May 2024, 1155 (Richard Boudreault); and SRSR, [Evidence](#), 21 May 2024, 1110 (Andrew Derocher).

61 SRSR, [Evidence](#), 21 May 2024, 1155 (Richard Boudreault).

62 SRSR, [Evidence](#), 4 June 2024, 1205 (Susan Kutz); and SRSR, [Evidence](#), 11 June 2024, 1115 (Natan Obed).



Richard Boudreault further recommended that there are many small research centres operated by universities that could be brought together into a more cohesive network.<sup>63</sup> While those smaller research centres were noted, several witnesses also spoke to the fact that there is still limited research infrastructure in the Arctic, including for:

- maritime research, such as with regard to ports and ships;
- office space, resulting in researchers working from home while also facing housing shortages and overcrowding;
- storage space for equipment; and
- data infrastructure to support greater coordination and interoperability.<sup>64</sup>

Therefore, the Committee recommends:

### **Recommendation 3**

**That the Government of Canada, through the Canadian High Arctic Research Station, in collaboration with Northern communities and Arctic researchers, explore ways in which to develop and support additional research centres and infrastructure across the Arctic.**

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63 SRSR, [Evidence](#), 21 May 2024, 1155 (Richard Boudreault).

64 SRSR, [Evidence](#), 21 May 2024, 1110 (Andrew Derocher); SRSR, [Evidence](#), 6 June 2024, 1125 (Aldo Chircop, Professor of Maritime Law and Policy, As an individual); SRSR, [Evidence](#), 6 June 2024, 1200 (Nicolas Brunet); SRSR, [Evidence](#), 11 June 2024, 1215 (Katherine Wilson); Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023; Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024; SRSR, [Evidence](#), 28 May 2024, 1210 (Anne Barker); and Susan Kutz, "Additional notes," Written submission to the House of Commons Standing Committee on Science and Research, 4 June 2024.

## Support for Arctic Researchers

Witnesses also discussed the need to support the hiring and training of more Arctic researchers, and particularly to support Arctic residents who are interested in pursuing research careers.<sup>65</sup> As Anne Barker testified:

We need people. We need people doing that research. We need to enable our northerners to also be recognized as experts in their knowledge systems as well as ... typical western science.<sup>66</sup>

Heather Exner-Pirot, Director of Energy, Natural Resources and Environment at the Macdonald-Laurier Institute, appearing as an individual, further discussed the need to encourage a diverse group of individuals to pursue Arctic research, including diversity in their fields of study and backgrounds.<sup>67</sup>

Speaking to the SmartICE model, Andrew Arreak discussed the value of co-developing training programs with Inuit, and conducting training in communities, so people don't have to leave their families. As he wrote, "[w]e don't need to go south to get a western degree to do research."<sup>68</sup> Kirk Anderson, a Professor and University of the Arctic Chair for School Effectiveness at Memorial University of Newfoundland and the University of the Arctic, appearing as an individual, also spoke to the importance of "indigenizing our approach to teaching" when training and educating people in Canada's Arctic.<sup>69</sup>

Therefore, the Committee recommends:

### Recommendation 4

**That the Government of Canada support the development of Arctic researchers, such as through the Canada Students Grants and Loans program and programs administered by**

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65 SRSR, [Evidence](#), 21 May 2024, 1105 (Richard Boudreault); SRSR, [Evidence](#), 28 May 2024, 1225 (Anne Barker); SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty); SRSR, [Evidence](#), 30 May 2024, 1155 (Isla Myers-Smith); SRSR, [Evidence](#), 6 June 2024, 1220 (Nicolas Brunet); Jackie Dawson et al., "ArcticNet Science Priorities Report," Written submission to the House of Commons Standing Committee on Science and Research, July 2022; Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024; Warwick F. Vincent, "Background document," Written submission to the House of Commons Standing Committee on Science and Research, June 2024; SRSR, [Evidence](#), 9 May 2024, 1150 (Tom Henheffer); and SRSR, [Evidence](#), 9 May 2024, 1220 (Normand Voyer).

66 SRSR, [Evidence](#), 28 May 2024, 1225 (Anne Barker).

67 SRSR, [Evidence](#), 6 June 2024, 1115 (Heather Exner-Pirot).

68 SRSR, [Evidence](#), 11 June 2024, 1215 (Katherine Wilson).

69 SRSR, [Evidence](#), 30 May 2024, 1100 (Kirk Anderson, Professor and UArctic Chair for School Effectiveness, Memorial University of Newfoundland and the University of the Arctic, As an individual).



**the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research.**

## Greater Research Coordination

Witnesses noted a need for greater coordination among levels of government, researchers, research funding programs, research institutions, communities and businesses across Canada's Arctic.<sup>70</sup> Maribeth Murray, Executive Director of the Arctic Institute of North America, noted that the Canadian Network of Northern Research Operators, which provides technical services and access to support facilities for Arctic researchers, could fill this role and contribute to common infrastructure and resource planning, if it had more resources.<sup>71</sup> Meanwhile, Anne Barker spoke to the potential of funding programs and research licensing organizations in supporting coordination.<sup>72</sup>

Better coordination can help address challenges related to high administrative burdens associated with research. Witnesses noted that Arctic research institutions and communities often have limited administrative capacity and staff, but are still expected to complete similar administrative tasks as large southern universities.<sup>73</sup> As an example, Kimberly Strong spoke of how PEARL does not fit easily into any of Canada's major recurring funding programs, and has relied in the past on a variety of funding programs, some of which no longer exist, and all of which have their own proposal and funding requirements.<sup>74</sup> Describing the history of PEARL's federal funding, Kimberly Strong noted that, since 2003, PEARL has been supported through:

- three years of funding from the Canada Foundation for Innovation, which allowed them to install equipment and set up facilities during their onset;

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70 SRSR, [Evidence](#), 4 June 2024, 1240 (Maribeth Murray); SRSR, [Evidence](#), 28 May 2024, 1150 (Anne Barker); and SRSR, [Evidence](#), 30 May 2024, 1130 (Isla Myers-Smith).

71 SRSR, [Evidence](#), 4 June 2024, 1240 (Maribeth Murray).

72 SRSR, [Evidence](#), 28 May 2024, 1150 (Anne Barker).

73 SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer); SRSR, [Evidence](#), 6 June 2024, 1200 (Nicolas Brunet); Jackie Dawson et al., "ArcticNet Science Priorities Report," Written submission to the House of Commons Standing Committee on Science and Research, July 2022; and SRSR, [Evidence](#), 9 May 2024, 1215 (Jackie Dawson).

74 SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong); and *Ibid.*, 1255.



- six years of funding from the Canadian Foundation for Climate and Atmospheric Sciences, which no longer exists;
- one time funding from the Natural Sciences and Engineering Research Council of Canada's Climate Change and Atmospheric Research Program;
- two years of funding from the International Polar Year;
- some funding from the Arctic Research Infrastructure Fund;
- regular funding from the Canadian Space Agency; and,
- support from Environment and Climate Change Canada, which shares facilities with PEARL.<sup>75</sup>

A centralized administrative body could assist smaller organizations in coordinating and completing tasks such as funding applications, and with sharing large resources, such as specialized equipment.

Therefore, the Committee recommends:

#### **Recommendation 5**

**That the Government of Canada review Arctic research funding programs provided by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other Arctic research programs such as those at Polar Knowledge Canada, Natural Resources Canada and the National Research Council of Canada, in order to identify and address any redundancies, increase coordination between programs, and reduce administrative barriers for researchers.**

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75      *Ibid.*, 1255.



## Community Collaboration

Witnesses noted the value of having close collaborative relationships between researchers and communities in Arctic research.<sup>76</sup> This can help combat what Andrew Derocher called a “fly in-fly out style” of research, where researchers and the results they produce are not tied to community needs and solutions.<sup>77</sup> One example of positive community collaboration presented to the Committee by Warwick Vincent, a Professor at the Centre for Northern Studies at Université Laval, appearing as an individual, was the work of Michel Allard applying CT scans to permafrost in a theoretical manner, who was then approached by the mayor of Salluit to use that method to create “a risk map for future climate change such that the community can now build for the future knowing that, in the decades ahead, they are on the most stable ground in that particular area.”<sup>78</sup>

Katherine Wilson also discussed how close collaboration between researchers and communities can also help researchers interpret data they collect to ensure that results are grounded in the community’s context and history.<sup>79</sup>

Therefore, the Committee recommends:

### Recommendation 6

**That the Government of Canada review funding criteria used by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research,**

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76 SRSR, [Evidence](#), 21 May 2024, 1110 (Andrew Derocher); SRSR, [Evidence](#), 9 May 2024, 1125 (Tom Henheffer); SRSR, [Evidence](#), 9 May 2024, 1130 (Angus Cockney); SRSR, [Evidence](#), 9 May 2024, 1130 (Michel Allard); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard); SRSR, [Evidence](#), 9 May 2024, 1220 (Normand Voyer); SRSR, [Evidence](#), 28 May 2024, 1145 (Anne Barker); SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong); SRSR, [Evidence](#), 28 May 2024, 1315 (David Hik); SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty); SRSR, [Evidence](#), 4 June 2024, 1155 (Henry Burgess); SRSR, [Evidence](#), 4 June 2024, 1230 (Warwick Vincent); SRSR, [Evidence](#), 4 June 2024, 1255 (Susan Kutz); SRSR, [Evidence](#), 11 June 2024, 1210 (Pippa Seccombe-Hett); SRSR, [Evidence](#), 11 June 2024, 1215 (Katherine Wilson); Jackie Dawson et al., “ArcticNet Science Priorities Report,” Written submission to the House of Commons Standing Committee on Science and Research, July 2022; Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023; Heather Exner-Pirot, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 9 June 2024; Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024; and SRSR, [Evidence](#), 6 June 2024, 1235 (Nicolas Brunet).

77 SRSR, [Evidence](#), 21 May 2024, 1110 (Andrew Derocher).

78 SRSR, [Evidence](#), 4 June 2024, 1230 (Warwick Vincent).

79 SRSR, [Evidence](#), 11 June 2024, 1235 (Katherine Wilson).

**and other funding programs for Arctic research, in order to ensure proper collaboration between researchers and local communities when appropriate.**

## Driven by Indigenous Peoples

Witnesses noted that, in many cases in Canada's Arctic, scientific research is taking place on Indigenous land, and therefore must be driven by Indigenous rights-holders and support reconciliation and self-determination.<sup>80</sup> This includes funding Indigenous governments, organizations and researchers directly, as well as ensuring Indigenous participation and direction in non-Indigenous led research projects, such as agenda setting, selecting research teams, determining research methodology, data analysis, and reporting. Witnesses also spoke of a need to integrate Indigenous knowledge more comprehensively into government policy, science and research.<sup>81</sup> Natan Obed also noted the important role of supporting Indigenous governance in their traditional territories, both in terms of research, as well as the general management of their own lands and peoples.<sup>82</sup>

In Inuit Nunangat, Natan Obed discussed how its four regions each apply different approaches to research, such as through their regional governance organizations and ethics boards, driven by jurisdictional needs and territorial/provincial relationships, and brought together through ITK.<sup>83</sup> Pippa Seccombe-Hett spoke of how other provinces and

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80 SRSR, [Evidence](#), 9 May 2024, 1125 (Tom Henheffer); SRSR, [Evidence](#), 9 May 2024, 1150 (Michel Allard); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard); SRSR, [Evidence](#), 9 May 2024, 1220 (Normand Voyer); SRSR, [Evidence](#), 30 May 2024, 1110 (Isla Myers-Smith); SRSR, [Evidence](#), 4 June 2024, 1145 (Lisa Koperqualuk); SRSR, [Evidence](#), 6 June 2024, 1100 (Heather Exner-Pirot); SRSR, [Evidence](#), 6 June 2024, 1155 (Aldo Chircop); SRSR, [Evidence](#), 6 June 2024, 1200 (Nicolas Brunet); SRSR, [Evidence](#), 11 June 2024, 1115 (Natan Obed); Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023; SRSR, [Evidence](#), 4 June 2024, 1240 (Warwick Vincent); SRSR, [Evidence](#), 9 May 2024, 1230 (Jackie Dawson); SRSR, [Evidence](#), 21 May 2024, 1120 (Richard Boudreault); and Council of Canadian Academies, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 2024.

81 SRSR, [Evidence](#), 9 May 2024, 1130 (Angus Cockney); SRSR, [Evidence](#), 9 May 2024, 1210 (Christine Barnard); SRSR, [Evidence](#), 9 May 2024, 1230 (Jackie Dawson); SRSR, [Evidence](#), 21 May 2024, 1130 (Richard Boudreault); SRSR, [Evidence](#), 30 May 2024, 1150 (Kirk Anderson); SRSR, [Evidence](#), 4 June 2024, 1100 (Lisa Koperqualuk); SRSR, [Evidence](#), 4 June 2024, 1125 (Henry Burgess); SRSR, [Evidence](#), 4 June 2024, 1210 (Warwick Vincent); SRSR, [Evidence](#), 11 June 2024, 1155 (Natan Obed); and Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023.

82 SRSR, [Evidence](#), 11 June 2024, 1110 (Natan Obed).

83 Ibid., 1200.



territories have their own methods of ensuring proper Indigenous collaboration and research licensing.<sup>84</sup>

Lisa Koperqualuk noted in her testimony that a particular challenge facing Inuit in Canada is a lack of access to international climate financing, such as through the United Nations Framework Convention on Climate Change.<sup>85</sup> The United Nations Framework Convention on Climate Change aims to prevent human interference with the climate system, and includes a system of grants and loans for developing countries to fund climate change mitigation and adaptation activities.<sup>86</sup> As Canada is classified as a developed or industrialized country, Inuit in Canada do not have access to those grants and loans.

Therefore, the Committee recommends:

#### **Recommendation 7**

**That the Government of Canada, in collaboration with Indigenous organizations, review the funding criteria used by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other funding programs for Arctic research, in order to ensure proper collaboration between researchers and Northern communities when appropriate, and the accessibility of funding programs for Indigenous organizations.**

### **Increased Environmental Monitoring**

Witnesses noted gaps in the ability of researchers to comprehensively monitor changes in terrestrial, marine and atmospheric areas of the Arctic, such as through the

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84 SRSR, [Evidence](#), 11 June 2024, 1245 (Pippa Seccombe-Hett).

85 SRSR, [Evidence](#), 4 June 2024, 1125 (Lisa Koperqualuk).

86 United Nations Climate Change, [What is the United Nations Framework Convention on Climate Change?](#)

measurement of methane and carbon dioxide emissions from melting permafrost, and from compiling accurate counts of wildlife populations.<sup>87</sup>

The importance of thorough and long-term monitoring of northern ecosystems was explained by David Hik, who said that “at the heart of being able to develop adaptation and mitigation responses is knowing what’s changing and how quickly it is changing.”<sup>88</sup>

It was noted by the Arctic Research Foundation (ARF) in their *Arctic National Strategy* that “[o]nly approximately 20% of the Arctic ocean floor has been mapped to modern standards.”<sup>89</sup> Inland Arctic lakes and large marine basins are also under-mapped, making it hard for researchers to understand changes in lakebeds and the ocean floor caused by climate change, such as through permafrost erosion.<sup>90</sup> Increased and improved monitoring of Arctic waters can help researchers and policy-makers better understand what is happening in them and the potential impacts on community, as well as provide a better picture of marine animal populations.<sup>91</sup>

Therefore, the Committee recommends:

### **Recommendation 8**

**That the Government of Canada review current Arctic environmental monitoring programs in consultation with Arctic communities, Indigenous organizations, and Arctic researchers to identify areas where data and knowledge are insufficient and take steps to address them.**

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87 SRSR, [Evidence](#), 21 May 2024, 1200 (Richard Boudreault); SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer); SRSR, [Evidence](#), 9 May 2024, 1155 (Michel Allard); SRSR, [Evidence](#), 9 May 2024, 1225 (Jackie Dawson); SRSR, [Evidence](#), 9 May 2024, 1235 (Normand Voyer); SRSR, [Evidence](#), 28 May 2024, 1250 (David Hik); SRSR, [Evidence](#), 28 May 2024, 1310 (Kimberly Strong); SRSR, [Evidence](#), 30 May 2024, 1115 (Joël Bêty); SRSR, [Evidence](#), 6 June 2024, 1215 (Jessica M. Shadian); Joël Bêty and Dominique Berteaux, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 30 May 2024; Susan Kutz, “Additional notes,” Written submission to the House of Commons Standing Committee on Science and Research, 4 June 2024; and SRSR, [Evidence](#), 4 June 2024, 1230 (Warwick Vincent).

88 SRSR, [Evidence](#), 28 May 2024, 1310 (David Hik).

89 Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023.

90 Ibid.

91 Ibid.



## Expanding Areas of Study for Arctic Research

Witnesses noted several areas outside of environmental and natural resource topics for which they would recommend the expansion of Arctic research.

Several witnesses noted that there is a lack of economists and business specialists working in the Canadian Arctic and helping to inform economic development.<sup>92</sup> An example of the importance of economic research in the Arctic was presented by Heather Exner-Pirot in relation to shipping:

Looking only at sea ice changes—which is well funded and studied—one might expect shipping in the Canadian Arctic to grow dramatically. In fact, this is often taken for granted and repeated in speeches and op-eds. In my own research, however, I have come to understand that other factors are much more important than sea ice changes with respect to whether shipping increases in the Canadian Arctic, namely the economics of resource development. Investment decisions are tied to commodity cycles, not sea ice melt.<sup>93</sup>

Heather Exner-Pirot also testified to the value of research programs and funding that adopt multidisciplinary approaches and recognize the ways in which different fields of research interact.<sup>94</sup> For example, she highlighted the overlap between political science, social science, defence and Indigenous peoples in her work.<sup>95</sup> She recommended “funding outcomes instead of processes” to help encourage a more holistic approach to research.<sup>96</sup>

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92 SRSR, [Evidence](#), 6 June 2024, 1100 (Heather Exner-Pirot); SRSR, [Evidence](#), 6 June 2024, 1155 (Aldo Chircop); and SRSR, [Evidence](#), 6 June 2024, 1250 (Jessica M. Shadian).

93 SRSR, [Evidence](#), 6 June 2024, 1100 (Heather Exner-Pirot).

94 *Ibid.*, 1125.

95 *Ibid.*

96 *Ibid.*

Therefore, the Committee recommends:

### Recommendation 9

**That the Government of Canada review Arctic funding programs delivered by the granting agencies, namely the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council of Canada, and the Canadian Institutes of Health Research, and other funding programs for Arctic research, in order to promote better representation of the many diverse fields of study relevant to Arctic research.**

## OTHER SUPPORTS NEEDED IN CANADA'S ARCTIC

Beyond research needs, witnesses discussed a number of other supports that would be helpful in building a stronger and more climate-resilient Arctic.

### General Infrastructure Needs

Beyond the specific research infrastructure needs discussed previously, witnesses also noted more general infrastructure needs in the Arctic that would also improve Canada's capacity to conduct meaningful research in the region.

Transport infrastructure in the Arctic faces increasing challenges as a result of climate change. Michel Allard discussed, for example, the common use of gravel runways in Canada's Arctic, which is not sufficient for many different types of aircraft. This necessitates an increasing shift towards paved runways, which require additional consideration related to melting permafrost and the need for different maintenance machinery.<sup>97</sup>

Meanwhile, Tom Henheffer, Chief Executive Officer of the ARF, discussed shipping infrastructure, noting that the vessel that the ARF uses for most of their research work is based out of Halifax, requiring 10 to 14 days just to reach the Arctic, because the infrastructure needed to maintain it is not available in the north.<sup>98</sup> Other witnesses spoke to the fact that Canada's icebreakers are nearing the end of their life, and as Jackie Dawson testified, "it's taken us 18 years to build a new icebreaker."<sup>99</sup> Warwick Vincent

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97 SRSR, [Evidence](#), 9 May 2024, 1135 (Michel Allard).

98 SRSR, [Evidence](#), 9 May 2024, 1125 (Tom Henheffer).

99 SRSR, [Evidence](#), 9 May 2024, 1245 (Jackie Dawson); SRSR, [Evidence](#), 4 June 2024, 1240 (Maribeth Murray); and SRSR, [Evidence](#), 4 June 2024, 1235 (Warwick Vincent).



illustrated this using the *Amundsen* as an example, a Canadian Arctic research vessel and icebreaker that is 45 years old, whereas as “a typical lifetime for a ship is between 30 and 50 years.”<sup>100</sup> The *Amundsen* “is Canada’s only icebreaker equipped with state-of-the-art research facilities in support of national and international multidisciplinary research programs,” following a scientific retrofit in 2002.<sup>101</sup> Owned by the Canadian Coast Guard, the *Amundsen*’s scientific activities are regulated through a cost sharing agreement with Amundsen Science—a not-for-profit corporation hosted at Université Laval—that sets a minimum number of dedicated science days per year.<sup>102</sup>

Several witnesses also noted that housing availability in Canada’s Arctic is limited, and many residents are faced with insufficient and overcrowded living conditions.<sup>103</sup> The *Arctic National Strategy* released by the ARF reported overcrowding rates of approximately 55%.<sup>104</sup> Likewise, there are limited short-term housing options, such as hotels, which hinders the ability of non-resident researchers to visit Arctic communities.<sup>105</sup>

Jessica M. Shadian, President and Chief Executive Officer of Arctic360, a not-for-profit think tank dedicated to the Arctic, noted that new physical infrastructure should incorporate best practices for climate change adaptation, such as consideration for melting permafrost and changing temperature ranges in the Arctic.<sup>106</sup>

Witnesses also discussed shortfalls in communications infrastructure in the Arctic.<sup>107</sup> Nicolas Brunet, an Associate Professor appearing as an individual, testified, for example,

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100 SRSR, [Evidence](#), 4 June 2024, 1235 (Warwick Vincent).

101 Amundsen Science, [Explore the Icebreaker](#).

102 Amundsen Science, [Strategic Plan 2021/2025](#).

103 Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023; SRSR, [Evidence](#), 9 May 2024, 1145 (Angus Cockney); Jessica Shadian, [Arctic360: Innovation out of the Arctic](#), Brief submitted to the House of Commons Standing Committee on Science and Research, 2024; SRSR, [Evidence](#), 6 June 2024, 1255 (Jessica M. Shadian); and SRSR, [Evidence](#), 11 June 2024, 1240 (Katherine Wilson).

104 Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023.

105 SRSR, [Evidence](#), 11 June 2024, 1120 (Natan Obed).

106 Jessica Shadian, [Arctic360: Innovation out of the Arctic](#), Brief submitted to the House of Commons Standing Committee on Science and Research, 2024.

107 SRSR, [Evidence](#), 6 June 2024, 1220 (Nicolas Brunet); SRSR, [Evidence](#), 6 June 2024, 1240 (Jessica M. Shadian); Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023; and SRSR, [Evidence](#), 4 June 2024, 1145 (Lisa Koperqualuk).



that while enormous progress has been made over the past five years in Internet connectivity, connections are still not reliable and affordable, and much of his work has to include budgets to enhance community connectivity, such as establishing Starlink connections.<sup>108</sup> Jessica M. Shadian contrasted this with communities at a similar latitude in Norway, where connectivity is well established and reliable.<sup>109</sup>

Other witnesses discussed the need to increase satellite infrastructure in Canada's Arctic, such as through satellite ground stations.<sup>110</sup>

Therefore, the Committee recommends:

#### **Recommendation 10**

**That the Government of Canada plan to replace its only Arctic research vessel, the *Amundsen*, which is nearing the end of its useful life, and ensure that it can be fully used for scientific research moving forward.**

#### **Recommendation 11**

**That the Government of Canada continue to support Arctic housing initiatives, such as the Urban, Rural and Northern Indigenous Housing Strategy.**

#### **Recommendation 12**

**That the Government of Canada review the results to date of Canada's Connectivity Strategy, particularly as it relates to Arctic connectivity, and address any ongoing gaps identified as a result.**

### **Energy Needs**

Witnesses also noted that many Arctic communities in Canada still rely on diesel to meet their energy needs.<sup>111</sup> Numerous potential solutions were presented to the Committee

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108 SRSR, [Evidence](#), 6 June 2024, 1220 (Nicolas Brunet).

109 SRSR, [Evidence](#), 6 June 2024, 1240 (Jessica M. Shadian).

110 Warwick F. Vincent, "Background document," Written submission to the House of Commons Standing Committee on Science and Research, June 2024; SRSR, [Evidence](#), 4 June 2024, 1210 (Warwick Vincent); and SRSR, [Evidence](#), 9 May 2024, 1225 (Jackie Dawson).

111 SRSR, [Evidence](#), 11 June 2024, 1155 (Natan Obed); SRSR, [Evidence](#), 21 May 2024, 112. (Richard Boudreault); and Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023.



regarding transitioning to a more sustainable energy system in the Arctic, including small- and medium-sized nuclear reactors, wind farms and solar panels.<sup>112</sup>

Witnesses discussed how energy solutions are likely to vary depending on feasibility and interest in specific communities.<sup>113</sup> Natan Obed also noted that the cost of transitioning away from diesel was a major barrier to doing so.<sup>114</sup>

Therefore, the Committee recommends:

### Recommendation 13

**That the Government of Canada continue to support Arctic energy initiatives in collaboration with provinces and territories, Indigenous governments and organizations, and communities to promote reliable, sustainable, and appropriate energy solutions for communities.**

## Economic Development

Tom Henheffer noted that economic investment to support industry, resource, and infrastructure development can play an important role in protecting Canada's sovereignty and combatting attempts by the Chinese government to make economic inroads in Arctic communities.<sup>115</sup> In his testimony, he said, "Canada needs to be a good partner there and invest in resources and infrastructure, because if we don't, other people are going to, and China is already showing that."<sup>116</sup>

Other witnesses noted the potential to support Arctic economic development in areas such as resource extraction, construction, manufacturing, and shipping.<sup>117</sup> Jessica M.

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112 SRSR, [Evidence](#), 9 May 2024, 1125 (Tom Henheffer); SRSR, [Evidence](#), 21 May 2024, 1120 (Richard Boudreault); SRSR, [Evidence](#), 6 June 2024, 1110 (Heather Exner-Pirot); SRSR, [Evidence](#), 11 June 2024, 1225 (Pippa Seccombe-Hett); and Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023.

113 SRSR, [Evidence](#), 9 May 2024, 1125 (Tom Henheffer); and SRSR, [Evidence](#), 6 June 2024, 1215 (Jessica M. Shadian).

114 SRSR, [Evidence](#), 11 June 2024, 1155 (Natan Obed).

115 SRSR, [Evidence](#), 9 May 2024, 1200 (Tom Henheffer).

116 Ibid.

117 SRSR, [Evidence](#), 9 May 2024, 1245 (Jackie Dawson); SRSR, [Evidence](#), 6 June 2024, 1140 (Heather Exner-Pirot); SRSR, [Evidence](#), 11 June 2024, 1250 (Katherine Wilson); and Arctic Research Foundation, "[Arctic National Strategy](#)," Written submission to the House of Commons Standing Committee on Science and Research, October 2023.

Shadian described an example of the lack of construction capacity in the Arctic in Iqaluit's hotel and conference centre, which was fabricated in and imported from China.<sup>118</sup>

Therefore, the Committee recommends:

#### **Recommendation 14**

**That the Government of Canada explore opportunities to support economic development in Arctic communities, including in resource extraction, construction, manufacturing, and shipping.**

### **International Relations in the Arctic**

Witnesses noted several areas where Canada could strengthen international relations in the Arctic to address concerns around climate change, sovereignty, and global conflict.<sup>119</sup> As examples, Tom Henheffer noted that China is attempting to purchase and invest in property, financial assets and businesses in Canada's Arctic, the United States denies Canada's claim over the Northwest Passage, and Russian submarines are testing the boundaries of Canada's Arctic waters.<sup>120</sup>

Jackie Dawson also noted that "Russia's invasion of Ukraine has meant that large portions of the global Arctic is now off-line for research activities."<sup>121</sup> While acknowledging the loss of a substantial amount of Russian Arctic research and data as a result, witnesses also noted the opportunities for increased international research in the Canadian Arctic.<sup>122</sup> Jackie Dawson cautioned that, as a result, Canada needs to "have proper measures in place to support this shift."<sup>123</sup> This point was also made by Richard Boudreault who testified that "we can invite people to work with us because we have an expanse of land

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118 Jessica Shadian, *Arctic360: Innovation out of the Arctic*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2024.

119 SRSR, *Evidence*, 9 May 2024, 1110 (Tom Henheffer), SRSR, *Evidence*, 9 May 2024, 1215 (Jackie Dawson); SRSR, *Evidence*, 21 May 2024, 1140 (Richard Boudreault); SRSR, *Evidence*, 30 May 2024, 1110 (Isla Myers-Smith); and SRSR, *Evidence*, 4 June 2024, 1120 (Henry Burgess).

120 SRSR, *Evidence*, 9 May 2024, 1110 (Tom Henheffer).

121 SRSR, *Evidence*, 9 May 2024, 1215 (Jackie Dawson).

122 Ibid.; SRSR, *Evidence*, 4 June 2024, 1120 (Henry Burgess); SRSR, *Evidence*, 30 May 2024, 1110 (Isla Myers-Smith); and SRSR, *Evidence*, 4 June 2024, 1225 (Maribeth Murray).

123 SRSR, *Evidence*, 9 May 2024, 1215 (Jackie Dawson).



that’s immense and that’s going to be able to be used to build relationships with foreign countries.”<sup>124</sup>

Jackie Dawson ultimately recommended to the Committee that Canada establish an ambassador for the Arctic to strengthen international relations in this area.<sup>125</sup>

Therefore, the Committee recommends:

### **Recommendation 15**

**That the Government of Canada explore opportunities to strengthen Canada’s international reputation as an Arctic leader, such as through the creation of an ambassador for the Arctic or increased leadership in international Arctic organizations such as the Arctic Council and the International Maritime Organization.**

## **Shipping Regulation**

Several witnesses testified to the importance of regulating shipping in the Arctic, particularly due to its impacts on climate change.<sup>126</sup> As sea ice continues to melt at an accelerated rate, there is an expectation that shipping interest in the Arctic will increase. Aldo Chircop, a Professor of Maritime Law and Policy, appearing as an individual, spoke specifically to the International Maritime Organization’s (IMO) Polar Code, which regulates shipping in international Arctic waters. He described it as a “first generation solution” that focused only on liquid waste, and did not address broader environmental concerns, including air pollution and underwater noise.<sup>127</sup>

In a document submitted to the Committee following his appearance, Warwick Vincent identified three broad categories of environmental impact that derive from shipping: physical, such as undersea noise pollution and the disruption of migratory patterns; chemical, including fuel spills and air pollution; and biological, such as invasive microbes

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124 SRSR, [Evidence](#), 21 May 2024, 1140 (Richard Boudreault).

125 SRSR, [Evidence](#), 9 May 2024, 1235 (Jackie Dawson).

126 SRSR, [Evidence](#), 6 June 2024, 1105 (Aldo Chircop); SRSR, [Evidence](#), 30 May 2024, 1125 (Bing Chen); Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024; and SRSR, [Evidence](#), 30 May 2024, 1150 (Kirk Anderson).

127 SRSR, [Evidence](#), 6 June 2024, 1105 (Aldo Chircop).

and species transported into the Arctic by ships.<sup>128</sup> Aldo Chircop also identified insufficient regulation surrounding safety for maritime accidents in Arctic waters.<sup>129</sup>

Aldo Chircop added that Canada recently worked with the IMO to designate Canadian Arctic waters as a controlled area for certain emissions through an update to the *International Convention for the Prevention of Pollution from Ships*.<sup>130</sup> He also explained that the IMO has banned the use and transport of heavy fuel in Arctic waters, effective July 2024, although this ban may not come into effect for some ships until 2029.<sup>131</sup> He recommended further work to “integrate and update international standards,” and that this should be undertaken with the involvement of Inuit organizations to ensure their interests are reflected.<sup>132</sup>

Further to international regulation, Aldo Chircop also shared his perspective that the *United Nations Declaration on the Rights of Indigenous Peoples Act* also requires the review of federal legislation such as the *Canada Shipping Act, 2001*, the *Arctic Waters Pollution Prevention Act* and other statutes to ensure they comply with that Act.<sup>133</sup>

Therefore, the Committee recommends:

#### **Recommendation 16**

**That the Government of Canada, in consultation and cooperation with Indigenous groups and Northern governments, review shipping legislation or regulations and international agreements to which it is a party in order to identify any concerns or opportunities for revision and to take appropriate measures.**

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128 Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024.

129 SRSR, *Evidence*, 6 June 2024, 1120 (Aldo Chircop).

130 Ibid.; and International Maritime Organization, *International Convention for the Prevention of Pollution from Ships (MARPOL)*.

131 SRSR, *Evidence*, 6 June 2024, 1120 (Aldo Chircop).

132 Ibid.

133 Ibid.; *United Nations Declaration on the Rights of Indigenous Peoples Act*, S.C. 2021, c. 14, s. 5; *Canada Shipping Act, 2001*, S.C. 2001, c. 26; and *Arctic Waters Pollution Prevention Act*, R.S.C. 1985, c. A-12.



## Climate Change Adaptation

Several witnesses spoke to the importance of developing climate change adaptation strategies and implementing them in collaboration with Arctic communities.<sup>134</sup> Isla Myers-Smith described it as such: “[w]hen we think about climate change in the north, the adaptation issues are local, and the mitigation issues are global, beyond the scope of Canada.”<sup>135</sup>

An example presented by Anne Barker was the manufacturing and installation of heat recovery ventilators in northern homes that are adapted for the cold weather climate.<sup>136</sup> Kimberly Strong also spoke of testing the performance of solar panels at PEARL for a Canadian solar panel company to see how they perform in that climate before deploying them elsewhere in the north.<sup>137</sup> Other examples included adapting building foundations and paved runways to ensure they can withstand changes to the permafrost.<sup>138</sup>

Therefore, the Committee recommends:

### Recommendation 17

**That the Government of Canada continue to support community-driven climate change adaptation initiatives in the Arctic.**

## Food Security and Food Sovereignty

David Hik noted challenges faced by Arctic residents around food security, with the ARF’s *Arctic National Strategy* writing that food insecurity rates in the north are “upwards of 70% for moderate and severe food insecurity.”<sup>139</sup> Tom Henheffer illustrated this challenge

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134 SRSR, [Evidence](#), 21 May 2024, 1150 (William Quinton); SRSR, [Evidence](#), 28 May 2024, 1250 (David Hik); SRSR, [Evidence](#), 30 May 2024, 1120 (Isla Myers-Smith); SRSR, [Evidence](#), 30 May 2024, 1120 (Bing Chen); SRSR, [Evidence](#), 4 June 2024, 1220 (Warwick Vincent); SRSR, [Evidence](#), 11 June 2024, 1115 (Natan Obed); SRSR, [Evidence](#), 9 May 2024, 1140 (Michel Allard); and SRSR, [Evidence](#), 9 May 2024, 1145 (Angus Cockney).

135 SRSR, [Evidence](#), 30 May 2024, 1120 (Isla Myers-Smith).

136 SRSR, [Evidence](#), 28 May 2024, 1215 (Anne Barker).

137 SRSR, [Evidence](#), 28 May 2024, 1320 (Kimberly Strong).

138 SRSR, [Evidence](#), 9 May 2024, 1110 (Michel Allard); *Ibid.*, 1135; and Jessica Shadian, [Arctic360: Innovation out of the Arctic](#), Brief submitted to the House of Commons Standing Committee on Science and Research, 2024.

139 Arctic Research Foundation, “[Arctic National Strategy](#),” Written submission to the House of Commons Standing Committee on Science and Research, October 2023; and SRSR, [Evidence](#), 28 May 2024, 1315 (David Hik).

through an example of the high cost of groceries in the Arctic, testifying that “[y]ou can pay \$14 for a head of lettuce in some of these communities.”<sup>140</sup>

In addition to food insecurity, or not having access to sufficient food, witnesses also spoke to the issue of food sovereignty, or the ability of Northern communities to hunt, harvest and consume traditional foods.<sup>141</sup> The impacts of climate change discussed earlier in this report, such as melting sea ice and changing ecosystems, are affecting the ability of Indigenous peoples to hunt and harvest, including changing the availability and behaviour of certain species and increasing the danger of hunting and harvesting as previously safe travel routes become dangerous or weather events become more extreme.

Therefore, the Committee recommends:

### **Recommendation 18**

**That the Government of Canada, through Nutrition North Canada, and in consultation and cooperation with Indigenous groups, review food security and food sovereignty programs in the Arctic to identify areas for improvement and then take appropriate measures.**

## **Health**

Natan Obed also noted health challenges faced by Arctic residents, including a life expectancy more than 10 years lower than the average Canadian life expectancy, and a high mortality rate for cancer.<sup>142</sup> He linked these health challenges to a lack of access to appropriate health care, as individuals with more complex health issues have to be referred to providers outside of their communities.<sup>143</sup>

He also made a connection between reduced access to hunting, fishing and traditional foods associated with climate change and changes in Arctic diets and social structures that can lead to physical and mental health challenges.<sup>144</sup>

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140 SRSR, *Evidence*, 9 May 2024, 1120 (Tom Henheffer).

141 SRSR, *Evidence*, 28 May 2024, 1315 (David Hik); and SRSR, *Evidence*, 4 June 2024, 1230 (Susan Kutz).

142 SRSR, *Evidence*, 11 June 2024, 1120 (Natan Obed).

143 Ibid.

144 Ibid.



Therefore, the Committee recommends:

### Recommendation 19

**That the Government of Canada, in collaboration with provincial, territorial and Indigenous governments, work to conduct research on the impacts of climate change on health care delivery capacity in Canada’s Arctic.**

## TOWARDS A COMPREHENSIVE ARCTIC RESEARCH STRATEGY

Many witnesses spoke to the need for Canada to develop a comprehensive Arctic research strategy.<sup>145</sup> Several witnesses were concerned that Canada was not showing adequate leadership among Arctic nations regarding science and climate change.<sup>146</sup>

Tom Henheffer testified to a document prepared in this area by ARF, an Arctic National Strategy for Canada—referenced previously in this report—built around four pillars: “reconciliation and the co-production of knowledge; protecting the environment while understanding and adapting to climate change; capacity building and economic development; and Arctic data governance and management.”<sup>147</sup>

In addition to the testimony presented in previous sections, witnesses recommended the development of an Arctic research strategy that should aim to improve long-term

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145 SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer); SRSR, [Evidence](#), 9 May 2024, 1215 (Jackie Dawson); SRSR, [Evidence](#), 9 May 2024, 1235 (Normand Voyer); SRSR, [Evidence](#), 28 May 2024, 1305 (David Hik); SRSR, [Evidence](#), 30 May 2024, 1130 (Isla Myers-Smith); SRSR, [Evidence](#), 4 June 2024, 1210 (Warwick Vincent); SRSR, [Evidence](#), 4 June 2024, 1220 (Maribeth Murray); SRSR, [Evidence](#), 6 June 2024, 1205 (Jessica M. Shadian); SRSR, [Evidence](#), 11 June 2024, 1245 (Katherine Wilson); Heather Exner-Pirot, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 9 June 2024; and Susan Kutz, “Additional notes,” Written submission to the House of Commons Standing Committee on Science and Research, 4 June 2024.

146 SRSR, [Evidence](#), 9 May 2024, 1230 (Jackie Dawson); SRSR, [Evidence](#), 28 May 2024, 1305 (David Hik); SRSR, [Evidence](#), 4 June 2024, 1210 (Warwick Vincent); and SRSR, [Evidence](#), 6 June 2024, 1205 (Jessica M. Shadian).

147 SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer).



planning and priority-setting, and take a multi-disciplinary, cross-departmental approach.<sup>148</sup>

Normand Voyer testified to the importance of an Arctic Research Strategy for setting and committing to long-term goals, explaining that “[w]e can’t conduct research on climate change and its impact in Canada’s far north if we establish a three-year program and then replace it with another program so we have to change everything.”<sup>149</sup> This point was also raised by Kimberley Strong, given PEARL’s experiences with funding instability throughout its operation.<sup>150</sup>

Witnesses testified that a comprehensive Arctic Research Strategy for Canada could help harmonize the work of diverse political, scientific, and local communities and allow the federal government, Northern communities, and scientific stakeholders to collaborate together in setting research priorities.<sup>151</sup> Jackie Dawson noted that Canadian researchers are “disjointed”.<sup>152</sup> It can be hard to know what projects and programs exist, so working together can help Canadians better understand what is being done in the Arctic and why.

Several witnesses noted that a National Arctic Research Strategy should be cross-departmental and multi-disciplinary, including both science and research, as well as issues related to sovereignty and security, for example.<sup>153</sup> This cross-departmental

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148 Jessica Shadian, *Arctic360: Innovation out of the Arctic*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2024; SRSR, [Evidence](#), 28 May 2024, 1225 (Anne Barker); SRSR, [Evidence](#), 28 May 2024, 1240 (David Hik); Heather Exner-Pirot, [Brief](#), Submitted to the House of Commons Standing Committee on Science and Research, 9 June 2024; SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer); SRSR, [Evidence](#), 9 May 2024, 1215 (Jackie Dawson); SRSR, [Evidence](#), 9 May 2024, 1235 (Normand Voyer); SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong); SRSR, [Evidence](#), 30 May 2024, 1130 (Isla Myers-Smith); SRSR, [Evidence](#), 4 June 2024, 1210 (Warwick Vincent); SRSR, [Evidence](#), 4 June 2024, 1220 (Maribeth Murray); SRSR, [Evidence](#), 6 June 2024, 1205 (Jessica M. Shadian); SRSR, [Evidence](#), 11 June 2024, 1140 (Natan Obed); SRSR, [Evidence](#), 11 June 2024, 1245 (Katherine Wilson); Warwick F. Vincent, “Background document,” Written submission to the House of Commons Standing Committee on Science and Research, June 2024; and Susan Kutz, “Additional notes,” Written submission to the House of Commons Standing Committee on Science and Research, 4 June 2024.

149 SRSR, [Evidence](#), 9 May 2024, 1235 (Normand Voyer).

150 SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong).

151 SRSR, [Evidence](#), 9 May 2024, 1225 (Jackie Dawson); SRSR, [Evidence](#), 28 May 2024, 1305 (David Hik); SRSR, [Evidence](#), 4 June 2024, 1210 (Warwick Vincent); SRSR, [Evidence](#), 4 June 2024, 1240 (Maribeth Murray); SRSR, [Evidence](#), 6 June 2024, 1250 (Jessica M. Shadian); SRSR, [Evidence](#), 11 June 2024, 1140 (Natan Obed); and SRSR, [Evidence](#), 11 June 2024, 1245 (Katherine Wilson).

152 SRSR, [Evidence](#), 9 May 2024, 1255 (Jackie Dawson).

153 SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer); SRSR, [Evidence](#), 28 May 2024, 1235 (Kimberly Strong); SRSR, [Evidence](#), 28 May 2024, 1305 (David Hik); and Jessica Shadian, *Arctic360: Innovation out of the Arctic*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2024.



approach could help avoid, in the words of Tom Henheffer, “duplicated effort, wasted time and wasted taxpayer money.”<sup>154</sup>

Therefore, the Committee recommends:

### **Recommendation 20**

**That the Government of Canada, in a cross-departmental fashion and in collaboration with provincial, territorial, and Indigenous governments, Northern communities, and the research community, develop a comprehensive Arctic research strategy to identify priorities and long-term goals.**

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154 SRSR, [Evidence](#), 9 May 2024, 1110 (Tom Henheffer).

## APPENDIX A: LIST OF WITNESSES

The following table lists the witnesses who appeared before the committee at its meetings related to this report. Transcripts of all public meetings related to this report are available on the committee’s [webpage for this study](#).

Organizations and Individuals	Date	Meeting
<b>Arctic Research Foundation</b> Angus Cockney, Community Engagement and Northern Specialist Tom Henheffer, Chief Executive Officer Jackie Jacobson, Board Member	2024/05/09	86
<b>ArcticNet</b> Christine Barnard, Executive Director	2024/05/09	86
<b>As an individual</b> Michel Allard, Professor Emeritus, Centre for Northern Studies, Laval University Jackie Dawson, Canada Research Chair in Human and Policy Dimensions of Climate Change, University of Ottawa and ArcticNet	2024/05/09	86
<b>Centre for Northern Studies</b> Normand Voyer, Professor	2024/05/09	86
<b>As an individual</b> Richard Boudreault, Adjunct Professor, University of Waterloo, Polytechnique Montréal and CSMC Andrew Derocher, Professor of Biological Sciences, University of Alberta William Quinton, Professor, Wilfrid Laurier University	2024/05/21	87
<b>National Research Council of Canada</b> Anne Barker, Director, Arctic and Northern Challenge Program Shannon Quinn, Secretary General	2024/05/28	88

<b>Organizations and Individuals</b>	<b>Date</b>	<b>Meeting</b>
<b>Polar Environment Atmospheric Research Laboratory</b> Kimberly Strong, Professor of Physics, University of Toronto	2024/05/28	88
<b>Polar Knowledge Canada</b> Andrew Applejohn, Executive Director, Programs David Hik, Chief Scientist	2024/05/28	88
<b>Social Sciences and Humanities Research Council</b> Ted Hewitt, President Sylvie Lamoureux, Vice-President, Research	2024/05/28	88
<b>As an individual</b> Kirk Anderson, Professor and UArctic Chair for School Effectiveness, Memorial University of Newfoundland and the University of the Arctic Bing Chen, UArctic Chair, Professor and Associate Dean, Memorial University of Newfoundland Isla Myers-Smith, Professor, Faculty of Forestry, University of British Columbia	2024/05/30	89
<b>Université du Québec à Rimouski</b> Joël Bêty, Professor, Canada Research Chair in Northern Biodiversity	2024/05/30	89
<b>Arctic Institute of North America</b> Maribeth Murray, Executive Director	2024/06/04	90
<b>As an individual</b> Susan Kutz, Professor and Tier I Canada Research Chair in Arctic One Health Warwick Vincent, Professor, Centre for Northern Studies (CEN), Laval University	2024/06/04	90
<b>Inuit Circumpolar Council (Canada)</b> Lisa Koperqualuk, President	2024/06/04	90
<b>Natural Environment Research Council Arctic Office</b> Henry Burgess, Head	2024/06/04	90
<b>Arctic360</b> Jessica M. Shadian, President and Chief Executive Officer	2024/06/06	91

<b>Organizations and Individuals</b>	<b>Date</b>	<b>Meeting</b>
<b>As an individual</b>	2024/06/06	91
Nicolas Brunet, Associate Professor		
Aldo Chircop, Professor of Maritime Law and Policy		
Heather Exner-Pirot, Director, Energy, Natural Resources and Environment, Macdonald-Laurier Institute		
<b>Aurora College</b>	2024/06/11	92
Pippa Seccombe-Hett, Vice President, Research		
<b>Inuit Tapiriit Kanatami</b>	2024/06/11	92
Carrie Grable, Director, Inuit Qaujisarvingat		
Natan Obed, President		
<b>SmartICE</b>	2024/06/11	92
Katherine Wilson, Director of Knowledge Co-Production		



## **APPENDIX B: LIST OF BRIEFS**

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The following is an alphabetical list of organizations and individuals who submitted briefs to the committee related to this report. For more information, please consult the committee's [webpage for this study](#).

**Arctic360**

**Council of Canadian Academies**

**Exner-Pirot, Heather**

**Social Sciences and Humanities Research Council**

**Université du Québec à Rimouski**





## REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the committee requests that the government table a comprehensive response to this report.

A copy of the relevant *Minutes of Proceedings* (Meetings Nos. [86](#), [87](#), [88](#), [89](#), [90](#), [91](#), [92](#), [93](#), [102](#), [106](#) and [109](#)) is tabled.

Respectfully submitted,

Valerie Bradford  
Chair



## **Dissenting Opinion of His Majesty's Official Opposition**

### **Regarding the Science and Research in Canada's Arctic in Relation to Climate Change**

The Conservative Party of Canada disagrees with the recommendations in this report that call for unfunded spending. The Arctic is an important and key part of Canada that has been suffering from the damaging effects of Liberal mismanagement, particularly the Liberal carbon tax. It is vital for everyone to remember that for every additional dollar spent the government must first find a dollar that it will save rather than imposing debts upon future generations through reckless spending. Reckless spending leads to runaway inflation which leads to life becoming increasingly unaffordable for more and more Canadians.

