Project Report

The NWT Climate Change Inventory: A Compilation of Research conducted Under NWT Scientific Research Licences, 2017-2022.

**June 2024**

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# Project Summary

In 2023 and 2024, an inventory of climate change research (the NWT Climate Change Inventory) that contains 144 journal articles (primary research and review/synthesis articles) published between 2017 and 2022 was constructed following a replicable methodology. The articles cover a wide range of topics related to climate change in the Northwest Territories (see Appendix A) that were judged to be relevant to the goals and objectives of the territorial government.

This report was created to:

* provide context for the inventory,
* document the steps that were followed to identify relevant research products for inclusion in the Climate Change Inventory, and
* to make recommendations for adjustments to the project criteria and methods that may be used to create future versions of the inventory (e.g., to perform annual updates).

# Project Background

The objective of this project was to create an inventory of climate change research for the Northwest Territories (NWT) through the identification of relevant research products that were produced under the authority of an NWT Scientific Research Licence issued between 2017 and 2022. The resulting NWT Climate Change Inventory will provide summaries of the latest research related to climate change impacts in the NWT to support decision-making by governments, IGOs, industry, co-management boards, the NWT public, and others.

The project was initiated by the Government of the Northwest Territories (GNWT) Department of Environment and Climate Change (formerly the Department of Environment and Natural Resources) in 2022 via a contribution agreement with Aurora College. Until 1 April 2023, Aurora College was responsible for issuing NWT Scientific Research Licences under the authority of the [Scientists Act](https://www.justice.gov.nt.ca/en/files/legislation/scientists/scientists.a.pdf). To facilitate public awareness of research taking place within the territory, the College maintained an online resource, [the NWT Research Database](https://data.researchlicensing.ece.gov.nt.ca/), that contained information about all issued licences.

As of 1 April 2023, responsibility for issuing NWT Scientific Research Licences and maintaining the NWT Research Database have been transferred to the GNWT Department of Education, Culture, and Employment.

# Methods

In this section, the methods that were used to construct the NWT Climate Change Inventory are outlined in sufficient detail for the project and its outcomes to be replicated by a third party.

Whenever possible, links to online tools and resources have been provided; please note that these may change without warning and require updating in future.

## Stage 1 (2023)

### NWT Research Database Review

1. Relevant data was pulled from the [NWT Research Database](https://data.researchlicensing.ece.gov.nt.ca/) for every NWT Scientific Research Licence issued between 1 January 2017 and 31 December 2022. Relevant data included:
2. Project Title
3. PI First Name
4. PI Last Name
5. Licence Number
6. Affiliation
7. Year
8. Issued Flag
9. Team Members
10. Objectives
11. Summary
12. Location
13. Region Name
14. Tag Name
15. For each licence, the project description (Summary) was reviewed to determine whether the project met the criteria for inclusion in the NWT Climate Change Inventory (see Appendix A). If necessary, the project summary in the [annual compendia of NWT research](https://nwtresearch.com/research/publications-and-reports/compendia-research) was also reviewed.
16. All licences that were excluded from the inventory were categorized by the reason for their exclusion. Excluded categories included:
17. Baseline contaminants
18. Discovery (i.e., projects focused on exploration rather than research)
19. Engineering
20. Health
21. Mapping
22. Mining/industry
23. Mining/industry – energy sector
24. Seismic/geological
25. Seismic/geological – climate change in the geological past
26. Social sciences
27. Space
28. Stock management (i.e., of fish and wildlife)
29. Traditional knowledge

**Table 1. Results of the review of the NWT Research Database for NWT Scientific Research Licences issued from 2017 to 2022.**

|  |  |
| --- | --- |
| **Description of Action Taken** | **No. Licences Identified** |
| 1a. Pulled relevant data from NWT Research Database for all NWT Scientific Research Licences issued from 2017 through 2022. | 1144 |
| 1b. Reviewed project descriptions in the NWT Research Database to determine whether the project met the criteria for inclusion in the NWT Climate Change Inventory. | 544 |
| 1c. Excluded licences were categorized by the reason for their exclusion. | 600 |

### Web of Science Database Search

1. Each NWT Scientific Research Licence that met the criteria for inclusion in the NWT Climate Change Inventory (identified in Step 1b above) was used to search for hits (journal articles, proceedings papers, reviews, etc.) in the [Web of Science (WoS) Database](https://clarivate.com/webofsciencegroup/solutions/web-of-science/) using the following parameters:
   1. Author: A search was performed for all researchers listed on the licence. This included the Principal Investigator (PI), as well as any team members listed on the licence, linked by the Boolean operator “or”. If necessary, the search results were refined using the researcher’s full name, institution, or both.
   2. Topic: *((climat\* or environment\*) and change\*) or (thaw\*) or (climate) or (glob\* and warm\*) or (warm\*) or (vegetat\* and change\*) or (cumulat\* and impact\*)*
   3. Custom publication date range: *2017-01-01 to 2023-02-28*

Graphical user interface, application

Description automatically generated

**Figure 1. Example of the search criteria used to perform a search in the Web of Science Database.**

1. The resulting hits were reviewed for both topic (i.e., does the article deal with an aspect of climate change?) and location (i.e., did the study take place, in whole or in part, in the NWT?) Those journal articles where the response to both questions was yes were added to a marked list.
2. Hits that addressed the following were not included in a marked list:
   1. Research that took place entirely outside of the NWT.
   2. Development of field methods, computer models, etc., unless the data that was collected in the NWT was included and explicitly shown.
   3. Editorials, unless climate change in the NWT was the explicit topic.
   4. Conference papers.
3. The marked list was exported once for each licence (selecting the option to export full records; see Appendix B).
4. All exported WoS marked lists were merged into one spreadsheet that contained all identified journal articles.
5. Duplicate journal articles were deleted from the spreadsheet.

**Table 2. Results from the Web of Science Database search for journal articles related to relevant NWT Scientific Research Licences issued from 2017 to 2022.**

|  |  |
| --- | --- |
| **Description of Action Taken** | **No. Journal Articles** |
| 2e. Merged all WoS marked lists into one spreadsheet. | 1240 |
| 2f. Duplicates removed. | 830 |

### Categorization of Journal Articles

* 1. The spreadsheet of journal articles (created in Step 2f above) contains 72 categories of information for each article (see the details on the full record export from WoS provided in Appendix B).
  2. Each journal article was further categorized to meet the project objectives:
     1. Paywall?
* Yes/No
  + 1. Category
       - Data paper (presents a dataset or a product, with little or no interpretation)
       - Journal article (presents the results of climate change research)
       - Methodological (presents a method – e.g., a climate model, spatial model, or stable isotope framework – with any presented results a secondary purpose of the paper)
       - Out-of-range (presents climate change research, but with a geographic scope too broad for inclusion – e.g., global or northern hemisphere scope)
       - Removed (did not meet the criteria for inclusion – e.g., not climate change research, not a research paper, or no research conducted in the NWT)
       - Review/synthesis (presents a meta-analysis of multiple other papers; a secondary research product)
    2. Scope
       - Within NWT/north (contains research conducted in the NWT; scope may also include research done at other northern sites, such as northern Canada, the circumpolar arctic, or the Arctic Ocean)
       - Beyond NWT (research scope is global, northern hemisphere, North America, Canada, etc.)
    3. Scope – refined
       - Arctic Ocean
       - Canada
       - Circumpolar
       - Circumpolar, Tibetan Plateau
       - Global
       - Global – oceans
       - North America
       - Northern Canada
       - Northern Hemisphere
       - Nunavut
       - NWT
       - Polar oceans
       - Polar region
       - Western Canada
    4. NWT region
       - Beaufort Delta
       - Sahtu
       - Dehcho
       - North Slave
       - South Slave
       - All, or
       - Any combination of the above
    5. NWT area
       - Text description of the nearest town, community, landmark, park, feature, etc.
    6. Indigenous Knowledge?
       - Yes/No
    7. Lead author type
       - Academic
       - Government – federal
       - Government – territorial
       - Indigenous knowledge holder
       - Non-governmental organization
    8. GNWT author?
* Yes (chosen if the lead author, or any coauthor, was a GNWT employee at the time of publication or became one following publication; included employees of a main-line government department, Aurora College/Aurora Research Institute, Prince of Wales Northern Heritage Centre, or the Northwest Territories Geological Survey)
  + - * No
    1. DOI link
       - A standardized DOI address that can be used to view the article online

c. The category (3bii) and scope (3biii) classifications were used to reduce the NWT Climate Change Inventory to the most relevant categories of research product (see Table 3).

**Table 3. Categorization of journal articles identified during a WoS database search. The most relevant research products (n = 476, highlighted in red) were selected by filtering for category and scope.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **No. Journal Articles** | | |
| **Total** | **Within NWT/north** | **Beyond NWT** |
| Data Paper | 22 | 16 | 6 |
| Journal Articles | 415 | **408** | **7** |
| Methodological | 124 | 92 | 32 |
| Out-of-Range | 58 | n/a | 58 |
| Removed | 130 | Not categorized | Not categorized |
| Review/synthesis | 81 | **61** | 20 |

### Google Search for Other Research Products

1. A web search was performed using the Google search engine to look for non-peer-reviewed research products that were associated with relevant NWT Scientific Research Licences (identified in Step 1b).
2. A web search for government reports and other grey literature was conducted using the string *“PI-first-name PI-last-name Northwest Territories climate change”.*
3. Theses written by graduate students studying under each PI were searched in one of two ways:
   1. Using the Google search engine and the string *“PI-first-name PI-last-name PI-institution thesis”.*
   2. Using the institution’s online thesis/dissertation repository and the string *“PI-first-name PI-last-name”.*
4. All non-peer reviewed research products were downloaded in .pdf format and saved to a dedicated folder on the contractor’s remote computer.
5. The Google search for other research products was halted on 27 March 2023, as per an email from F. Griffith (see Appendix C).

**Table 4. Summary of the results of the Google search for other research products related to relevant NWT Scientific Research Licences issued from 2017 to 2022.**

|  |  |
| --- | --- |
| **Description of Action Taken** | **No. Products** |
| 4d. Saved all non-peer reviewed research products in pdf format. | 292 (incomplete) |

## Stage 2 (2024)

### Determining Inventory Content

The most relevant journal articles were chosen for inclusion in the final version of the NWT Climate Change Inventory via the following process (summarized in Table 5):

1. Papers that did not meet the criteria for inclusion (e.g., not climate change research, not a research paper, or no research conducted in the NWT) were removed.
2. Data papers, methodological papers, and out-of-range papers were removed.
3. Review/synthesis papers with a geographic focus beyond the NWT were removed.
4. The remaining journal articles were compiled into one spreadsheet that contained:
   1. Journal articles on climate change with a geographic focus on the NWT or the north.
   2. Journal articles on climate change with a geographic focus beyond the NWT, but with a particular relevance to the NWT.
   3. Review/synthesis papers with a geographic focus on the NWT or the north.
5. The contents of the spreadsheet were compared to three existing climate change databases used by GNWT-Environment and Climate Change (see Appendix D). Entries in the NWT Climate Change Inventory that were already in one or more of the three existing databases were deleted.
6. The following groups of spreadsheet entries were removed:
   1. Journal articles published in 2023; deleted because the annual record is incomplete.
   2. Journal articles in press; deleted because a final published version was not available.
   3. Journal articles published between 2017 and 2022, but with 0 citations.
7. The remaining papers were sorted by two columns of data in the inventory spreadsheet:
   1. Publication year.
   2. Times Cited, All Databases.
8. The most frequently cited papers in each year were included in the final version of the NWT Climate Change Inventory (see Table 6), using a reasonable cutoff threshold for each year.

**Table 5. Summary of the process to determine the final content of the NWT Climate Change Inventory.**

|  |  |
| --- | --- |
| **Description of Action Taken** | **No. Journal Articles** |
| End of Step 2: Collate all journal articles related to relevant NWT Scientific Research Licences. | 830 |
| 5a. Remove 130 papers that do not meet the criteria for inclusion. | 700 |
| 5b. Remove 204 data papers, methodological papers, and out-of-range papers. | 496 |
| 5c. Remove 20 review/synthesis papers with scope beyond the NWT. | 476 |
| 5e. Remove 84 papers already captured in three other databases. | 392 |
| 5fi. Remove 13 papers published in 2023. | 379 |
| 5fii. Remove 12 papers in press. | 367 |
| 5fiii. Remove 37 papers published between 2017 and 2022 but with 0 citations. | 330 |
| **TOTAL REMAINING JOURNAL ARTICLES** | **330** |

**Table 6. Summary of the number of journal articles included in each year of the NWT Climate Change Inventory.**

|  |  |  |
| --- | --- | --- |
| **Publication Year** | **No. Journal Articles** | |
| **With 1+ citation** | **To include in final version of inventory** |
| 2017 | 44 | 21 |
| 2018 | 40 | 20 |
| 2019 | 44 | 21 |
| 2020 | 75 | 31 |
| 2021 | 76 | 30 |
| 2022 | 51 | 21 |
| **TOTAL** | **330** | **144** |

### Summaries of the Significance of the Research to the NWT

1. A short (approximately 100 word) statement was written for each journal article in the NWT Climate Change Inventory. This statement summarized the most important outcomes of the research and highlighted the importance of the research and/or its outcomes to the NWT. The statement was written in plain language using the information in the article abstract as a starting point, as well as information from the text of the body of the article (if needed).

### Final Assembly of the NWT Climate Change Inventory Spreadsheet

1. The spreadsheet of information about the 144 journal articles in the NWT Climate Change Inventory was formatted in the following ways:
   1. Citation information in multiple columns was merged and properly formatted.
   2. Keywords in two columns were merged and properly formatted.
   3. Columns of relevant information were organized following the description in the project scope-of-work agreement.
   4. Extra columns of information were deleted.
2. Summaries of the significance of the research to the NWT (developed in Step 6) were added to the spreadsheet.

# Recommendations

Should this project be replicated in future years to capture emerging research products and journal articles, the following recommendations may help streamline the project and reduce the resource and time investments.

1. Better define project boundaries.

For many reasons, the work required to create an NWT Climate Change Inventory will always have fuzzy boundaries:

* There are lags between when an NWT Scientific Research Licence is issued, when the research is conducted, and when the results are published. Often, the journal articles related to a licence are published five or more years after the licence is issued.
* Projects can change in scope or focus after a licence is issued, resulting in unanticipated outcomes or publications. For example, some licences excluded during Step 1c may have evolved to include an aspect of climate change, which was not captured using this project’s methodology.
* Researchers often share data and/or collaborate with other researchers on larger projects, resulting in publications with a scope far different than what can be anticipated from the NWT Scientific Research Licence.
* Team members may change over time, and as a result, some publications may be published by people who are not named on the NWT Scientific Research Licence.
* Some researchers are more likely to publish their research in alternate formats that are harder to locate than journal articles. For example, government researchers are more likely to publish non-peer reviewed reports and grey literature, while academic researchers are more likely to have portions of their research published in the theses and dissertations of their graduate students.

Because of these fuzzy boundaries, a strongly defined project scope is needed to minimize the time required to identify relevant journal articles. Some actions that could help limit the scope of future project iterations include:

1. Identifying NWT Scientific Research Licences related to climate change as they are issued, which would remove the need for licences to be reviewed a second time (i.e., this would remove Step 1 entirely).
2. Streamlining the terms used in the Web of Science Database search (i.e., the terms used in Step 2aii could be re-written or reduced to reduce the number of hits for each search).

Regardless of whether either of the above actions are taken, there will still be a significant amount of review and “hand-sorting” that will need to be done to identify and select relevant journal articles for inclusion in the inventory.

1. Prioritize open access journal articles.

The objective of developing the NWT Climate Change Inventory is to provide summaries of the latest research related to climate change impacts in the NWT to support decision-making by governments, IGOs, industry, co-management boards, the NWT public, and others. Since many members of these target groups do not have access to journal articles behind paywalls (e.g., via an affiliation with a post-secondary institution), and since purchasing an individual journal article can cost upwards of $30, future iterations of the NWT Climate Change Inventory should prioritize open access journal articles.

Open access articles are available and reusable, free of charge and without restrictions, and remain free in perpetuity. Prioritizing open access journal articles will provide more equitable access to the contents of the NWT Climate Change Inventory, which is important for communities, organizations, and members of the public that are less well-resourced than employees of mainline GNWT departments.

1. Select journal articles that are most relevant to the NWT for inclusion in the inventory.

In the current 2017-2022 iteration of the NWT Climate Change Inventory, the most highly cited journal articles in each year were selected for inclusion. While this criterion seemed to work well for earlier years of the inventory, it did not work as well for more recent years, when review/synthesis articles and articles on certain topics became overrepresented. For example, ten of the 21 articles published in 2022 that were included in the inventory were review/synthesis articles, which tend to be more highly cited immediately following publication because other researchers use their broad conclusions and descriptions of research systems/processes to bolster their own journal articles. In 2021 and 2022, several of the most highly cited articles were on freshwater species and ecosystems due to the publication of multiple articles by the Circumpolar Biodiversity Monitoring Program’s Freshwater division, which had recently completed a multi-year adaptive monitoring program run by the Conservation of Arctic Flora and Fauna working group of the Arctic Council.

The overrepresentation of certain types of article and research topic is problematic because important and relevant research is excluded from the inventory. Some actions that could help ensure that more representative articles are included in future project iterations include:

* 1. Prioritizing papers with a scope within the NWT over articles with a broader scope.
  2. Prioritizing papers with an NWT-based co-author (e.g., employees of Indigenous organizations/governments, GNWT mainline departments, the Northwest Territories Geological Survey, Prince of Wales Northern Heritage Centre, Aurora College, etc.)
  3. Limiting the number of review/synthesis articles included in the inventory to a certain number per year.
  4. Excluding any review/synthesis articles from the final version of the NWT Climate Change Inventory.

1. Explore the use of AI to summarize the importance of each journal article to the NWT.

One of the most time-consuming steps in this project was writing summaries on the relevance of each journal article to the NWT. It may be a better use of time to develop a robust prompt that can be entered into an AI platform, along with the abstract of the journal article, to prompt AI to write a first draft of the summary. The draft can then be tweaked and adjusted to better address the relevance of the research project and journal article to climate change research in the NWT.

# Appendix A: Guidelines for Inclusion in the NWT Climate Change Inventory

The following is an excerpt from the 2022 GNWT-ENR contribution agreement with ARI. These guidelines were used to determine what research should be included in the NWT Climate Change Inventory:

-----------------------

Applicable research will include any and all climate change-related research stored in the ARI NWT Research Database, that identifies a specific climate change impact to the natural or human environment. Research that should NOT be included in the Inventory includes any research that does not include a climate change impact as a primary component of the research, such as research dealing exclusively with adaptation policy or greenhouse gas reduction measures. However, any research dealing with an adaptation measure in response to a climate change impact \*should\* be included. Additionally, any research dealing primarily with governance should not be included in the Inventory. Research dealing with governance or policy may be included only if that research also includes climate change impacts as a primary component. Finally, any research that is not tied to field studies done in the NWT and included in the ARI NWT Research Database should not be included in the Inventory.

The following list of climate change keywords can be used as a reference for searching through the ARI NWT Research Database (optional):

*permafrost, active layer, thaw slumps, landslides, storm surge, invasive species,*

*wildlife/fish/salmon/trout/insects/caribou/moose/deer/bison/wolves/muskox/fur bearers/birds, lakes, rivers, watersheds, river erosion, parasites, diseases/viruses, lightening, storms, coastal erosion, lake/river levels, river ice extent, wildfire and fire severity, wildfire smoke/air quality, human health/impacts, wind, tornadoes, air temperature, heat waves, ground/soil temperatures, hydrology, stream/river flow, water quality, heavy metals, contaminants, turbidity, groundwater, aufeis (frozen winter overland flow), changes in lakes/rivers, limnology, precipitation, drought, flooding, snow and snow loading, sea level, lake ice extent, sea ice extent, ocean acidification,*

*carbon/methane storage, carbon/methane emissions, peat/wetlands/forests, change in species distributions, tree line, boreal forest, forest health/defoliators/bark beetles, winter roads, contaminated sites/sumps, cultural/heritage sites, roads, runways, buildings, housing, ports, piles, infrastructure, phenology, pollutants, archaeology, indicators, glaciers, soils, extreme events, acid rock drainage, paleoclimatology, habitat, agriculture, tourism, mining, oil/gas, culture, food security, cumulative effects, transportation, renewable energy*

Overall climate change themes that should be covered in the Inventory include climatology, fresh water/ice, marine water/ice, animals, vegetation, humans, ecosystems, landscape processes, archaeology/paleonotology, and infrastructure/energy. These themes should be used as a guide to ensure the relevance of research included in the Inventory; however, it is not necessary to organize research by these themes in the spreadsheet.

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# Appendix B: Web of Science Full Record Results

When a full record is exported from the Web of Science Database, it contains 72 categories of information on each hit (i.e., a journal article, conference paper, book, or other research product identified during a search).

The 72 categories of information are as follows, with more information on each category available on the [Web of Science Core Collection Help page](https://images.webofknowledge.com/images/help/WOS/hp_full_record.html) (note that those categories that were used to sort and create the NWT Climate Change Inventory are italicized).

|  |  |  |
| --- | --- | --- |
| *Publication Type* | Reprint Addresses | *Issue* |
| *Authors* | Email Addresses | Part Number |
| Book Authors | Researcher IDs | Supplement |
| Book Editors | ORCIDs | Special Issue |
| Book Group Authors | Funding Orgs | Meeting Abstract |
| *Author Full Names* | Funding Name Preferred | *Start Page* |
| Book Author Full Names | Funding Text | *End Page* |
| *Group Authors* | Cited References | *Article Number* |
| *Article Title* | Cited Reference Count | *DOI* |
| *Source Title* | Times Cited, WoS Core | *DOI Link* |
| Book Series Title | *Times Cited, All Databases* | Book DOI |
| Book Series Subtitle | 180 Day Usage Count | Early Access Date |
| Language | Since 2013 Usage Count | Number of Pages |
| Document Type | Publisher | WoS Categories |
| Conference Title | Publisher City | Web of Science Index |
| Conference Date | Publisher Address | Research Areas |
| Conference Location | ISSN | IDS Number |
| Conference Sponsor | eISSN | Pubmed Id |
| Conference Host | ISBN | Open Access Designations |
| *Author Keywords* | Journal Abbreviation | Highly Cited Status |
| *Keywords Plus* | Journal ISO Abbreviation | Hot Paper Status |
| *Abstract* | Publication Date | Date of Export |
| Addresses | *Publication Year* | UT (Unique WOS ID) |
| Affiliations | *Volume* | Web of Science Record |

# Appendix C: Email from F. Griffith to Halt Step 4

The following email from Fritz Griffith, received on 27 March 2023, confirmed that the Google search for other research products (identified using information from relevant NWT Scientific Research Licences) should be halted.

**jolie.gareis@outlook.com**

|  |  |
| --- | --- |
| **From:** | Fritz Griffith <Fritz\_Griffith@gov.nt.ca> |
| **Sent:** | Monday, March 27, 2023 6:26 PM |
| **To:** | Jolie Gareis; Brian Sieben |
| **Subject:** | RE: update - ENR Climate Change Inventory |
| **Follow Up Flag:** | Follow up |
| **Flag Status:** | Completed |

Hi Jolie,

Thanks for sending this over. I’ve browsed through the spreadsheet and discussed briefly with Brian.

As a first step, I think that papers without a focus on the NWT or at least the north in general (Arctic/subarctic) should not be included. This would mean any papers with a Canada-wide or global focus should be filtered out (even if they include some data from the north or the NWT). I think this might actually take care of quite a few papers.

I also agree that any papers that deal with methods/model development and testing, with NWT-based results as a secondary purpose, can be deemed lower priority and filtered out – with the exception being papers whose primary author is a GNWT employee. An example would be the paper ‘A New Protocol to Map Permafrost Geomorphic Features and Advance Thaw- Susceptibility Modelling’ by Rudy et al. This paper deals primarily with novel methodologies, so it should get filtered out (even though there are some results in the paper, but that’s not its main focus). \***However**\*, this particular paper is actually an exception because the primary author, Ashley Rudy, is a GNWT employee (works with the Northwest Territories Geological Survey – the fact that she’s listed as working with the Geological Survey of Canada appears to be a typo, as she is definitely with NTGS). Based on this exception, the paper should not be filtered out.

Can you let me know how many papers are left after filtering in these methods? If the number is still too high, then I think that some of your other suggested methods would work well. In particular, your idea of comparing the number of citations each year is a good one.

My initial thoughts on grey literature is, perhaps it would be easiest just to not include grey literature. It sounds like its own complicated process dealing with that, and I imagine that most valuable climate change research can be found in the published literature anyway. But I will double check what Brian’s thoughts are on that and let you know.

Thanks again for all your hard work. You’ve clearly put a lot of time and effort into this project and it’s very

appreciated. On that topic – I know you were mentioning that this project is taking more hours than anticipated. Please let us know how many additional hours you will require so that we can complete an amendment agreement, if necessary.

Thank you,

Fritz

# Appendix D: Existing Climate Change Databases

The three databases currently in use by the GNWT Department of Environment and Climate Change include the following:

1. CIMP Database Climate Change Inventory
2. Wilfrid Laurier NWT Climate Change Research Inventory
3. Climate Change Compendium Spreadsheet

Note that any journal articles that were identified during the Web of Science search that were also included in one of the above databases were excluded from the NWT Climate Change Inventory in Step 5e. This was done to reduce duplicate entries and duplication of effort.

# Appendix E: Files Included in the Final Project Package

The files included in the final project package include:

1. The NWT Climate Change Inventory: this is the final version of the inventory containing 144 journal articles. The inventory is organized in a spreadsheet, with each article listed alongside its bibliographic information and a summary of the significance of the research to the NWT.
2. The full inventory of all identified journal articles: this is a spreadsheet containing the information for the 700 articles that were compiled in Step 5a.
   1. Note that this spreadsheet has not been properly formatted, and many articles that had a scope beyond the NWT were not fully characterized using all categories listed in Step 3b; nevertheless, it contains a lot of journal articles that are relevant to climate change research/impacts in the NWT.
   2. Note that all 144 journal articles in the NWT Climate Change Inventory are also present in the full inventory (i.e., they haven’t been removed from the full version).
3. The Project Report (this document).

Also available, although not sorted or categorized at this time, is a collection of 292 other research products related to relevant NWT Scientific Research Licences. Currently, these products are stored (in pdf format) on the contractor’s computer, and will be kept until **31 December 2024** before being deleted.