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Federal geomatics guidelines for flood mapping: Manitoba Indigenous engagement case study

Acosys Consulting

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Canada

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Federal Geomatics Guidelines for Flood Mapping: Manitoba Indigenous Engagement Case Study

Natural Resources Canada (NRCan)

March 31, 2023

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Authorship

With respect and in recognition of the immense knowledge of the First Nations contributors to this report, and in acknowledgement of the sovereignty of the information that they shared with us in the production of this report, the following individuals are acknowledged as co-authors: Abdul Khan, Anita Spence, Candace Thomas, Carolyn Smelzer, Cheryl Bear, Chris Stove, Cyrus LacQuette, Dakotah Traverse, Daniel Shorting, David Gott, Dean Cochrane, Doris Latandre, Edward McLean, Fabian Sinclair, Jennifer Woodhouse, Katie Whitford, Karen Paul, Keith Castel, Kyla Stagg, Lance Cloud, Leroy Thompson, Linda Hunt, Lloyd Beardy, Lyle Leask, Marjorie Nielsen, Mark Anderton Jr., Mark Anderton Sr., Marshall Laurence, Martin Favel, Meagan Spence, Melanie Thompson, Paul Personius Jr., Rob Forbister, Ryan McCorrister, Sasha Young, Shayne Lynxleg, Theresa Bighetty and her Granddaughter, Tony Traverse, Wanda Corman, William Ferland and of course, William Sutherland.

We hope that in representing the ideas that you shared with us that Acosys Consulting is of assistance to further your goals.

Introduction

Flooding in populated (and unpopulated) areas can have devastating impacts on the human and natural environment. Accurate and appropriately detailed flood maps are important in risk management, planning, and policy development. A majority of First Nations communities in Manitoba are regularly affected by floods, and unfortunately due to climate change and development there is increased frequency and severity expected. Poor infrastructure, incomplete emergency plans, and lack of resources combine to disproportionately disadvantage First Nations communities in response and preparation for natural disasters such as flooding.

Natural Resources Canada (NRCan) leads the advancement and standardization of flood-mapping in Canada. The current project seeks to understand and document federal engagement with First Nations in Manitoba on the topic of flood mapping, and to learn how flood maps can better serve First Nations communities while respecting rights, incorporating Traditional Knowledge into federal mapping guidelines and process, namely the Federal Flood Mapping Guideline Series (FFMGS). The lessons learned in Manitoba are anticipated to be applicable to other communities, regions, and Indigenous Nations who experience similar circumstances.

Objectives

Specific objectives of the project are:

- To identify end user gaps in capacity in using/creating flood mapping for community and resource management;
- To identify gaps and opportunities for NRCan to edit or modify Federal Flood Mapping Guidelines for the inclusion of Indigenous Traditional and Ecological Knowledge;
- To conduct community engagement with First Nations communities in Manitoba in an inclusive process;
- To identify potential process (best practices) for the inclusion of traditional and ecological knowledge into the flood hazard mapping process;
- To collect, collate and produce a conference report including proposed best practices for maximizing local/ ecological and traditional knowledge in the FFMGS;

- To develop guidelines to incorporate traditional knowledge in flood maps communities in Manitoba that updates understanding of potential risk to residents, housing, business and infrastructure and traditional activities;
- To assess the applicability of the NRCan guidance material in a northern context where ice-jam flooding is prevalent and there are limited data and access to flood information;
- Production of a case study report for northern communities, based on relevant NRCan guidance material for northern communities, that will inform, or be integrated with, future iterations of the Federal Flood Mapping Guidelines Series (this report); and,
- Produce a “Glossary of Flood Impact” terms in Ojibway and Cree languages.

This report presents: background information on First Nations in Manitoba, hydroelectric and water diversion projects in Manitoba, presents an overview of flooding impacts to First Nations in Manitoba, and summarizes emergency management and First Nations. A review of engagement and gap analysis of that engagement relative to potential flood mapping need was completed. A description and summary of engagement with First Nations is provided. An integrated discussion which provides lessons learned from the review, gap analysis, and recommendations from the First Nations that were engaged.

Background Information

To improve contextual relevance for readers in the subsequent gap analysis and engagement session, background information is provided on the First Nations in Manitoba, and a summary of hydroelectric development and water diversion projects in Manitoba is provided. A compiled summary of flood impacts to First Nations in Manitoba is provided based on a review of publicly available information. A brief overview of participating federal government departments involved in emergency management practice with First Nations is provided.

First Nations in Manitoba

There are 63 First Nations in Manitoba that are recognized by Canada, and these nations represent communities from Denesuline, Swampy Cree, Plains Cree, Dakota/Nakota, and Ojibwe cultures (ISC 2021). First Nation populations range from just over 100 members to greater than 11,000 members, and there are more than 168,000 First Nations people that reside in Manitoba. There are 376 numbered reserves in Manitoba extending across all regions of the province that are the land base of the 63 First Nations in Manitoba (. Some are proximal to major urban centers while others are very remote, with access sometimes only seasonal (e.g., ice roads) and/or dependent on air support or train.

There are a number of entities that represent groups of First Nations collectively, including Tribal Councils, Assemblies, and Development Councils. Major entities (and abbreviations) are listed in Table 1.

Table 1: Tribal Councils, Assemblies, and Development Councils Representing First Nations in Manitoba

Anishinaabe Agowidiiwinan Secretariat Inc.	AAS
Assembly of Manitoba Chiefs	AMC
Dakota Ojibway Tribal Council	DOTC
Interlake Reserves Tribal Council	IRTC
Island Lake Tribal Council / Anishininew Okimawin	ILTC
Keewatin Tribal Council	KTC
Manitoba Keewatinowi Okimakanak	MKO
Southeast Resource Development Council	SRDC
Southern Chiefs Organization	SCO
Swampy Cree Tribal Council	SCTC
West Region Tribal Council	WRTC

Only one First Nation does not have an (apparent) affiliation with any of the above listed entities; Sioux Valley Dakota Nation.

The national Assembly of First Nations has three Grand Chiefs representing regions of Manitoba, Grand Chief Arlen Dumas (AMC, in Winnipeg); Grand Chief Garrison Settee (MKO, in Thompson), and Grad Chief Jerry Daniels (SCO, in Winnipeg). Additionally, the Treaty Relations Commission of Manitoba works intimately with First Nations in Manitoba.

Hydroelectric and Water Diversion Projects in Manitoba

Beginning with the Pointe du Bois dam (1911) on the Winnipeg River, there have been eight run-of-the-river (ROR) and eight reservoir-type generating stations constructed in Manitoba, including the Keeyask (Gull) that is currently being built on the lower Nelson River (Wikipedia 2023). There are an additional 15 planned generation stations. All of these units are operated by Manitoba Hydro, the provincial crown utility. Two projects were undertaken in partnership with First Nations: The Keeyask Project with Tataskweyak Cree Nation, War Lake First Nation, York Factory First Nation, and Fox Lake Cree Nation; and The Wuskwatim Project (completed in 2012) with the Nisichawayasihk Cree Nation (Manitoba Hydro 1 and 2 (nd)).

Table 2: Hydro Generating Facilities Built and Planned in Manitoba

Generating Facility	Watercourse	Built	Type
Birchtree	Burntwood River	Planned	-
Birthday	lower Nelson River	Planned	-
Bladder Rapids	Upper Nelson River	Planned	-
Bonald	Upper Churchill	Planned	-
Conawapa	Nelson River	Planned	-
Early morning	Burntwood River	Planned	-
First Rapids	Burntwood River	Planned	-
Gillam Island	Nelson River (mouth)	Planned	-
Grand Rapids Dam	Saskatchewan River	1965	Reservoir
Granville Falls	Upper Churchill	Planned	-
Great Falls Dam	Winnipeg River	1923	ROR
Jenpeg	Nelson River	1979	Reservoir
Keeyask (Gull)	lower Nelson River	In progress	Reservoir
Kelsey Generating Station	Nelson River	1960	Reservoir
Kelsey Extension	lower Nelson River	Planned	-
Kepuche	Burntwood River	Planned	-
Kettle Generating Station	Nelson River	1970	Reservoir
Laurie River 1	Laurie River	1952	Reservoir
Laurie River 2	Laurie River	1958	Reservoir
Limestone Generating Station	Nelson River	1990	ROR
Long Spruce Generating Station	Nelson River	1977	ROR
Manasan	Burntwood River	Planned	-
McArthur Falls	Winnipeg River	1954	ROR
Notigi	Nelson River	Planned	-

Pine Falls	Winnipeg River	1952	ROR
Pointe du Bois	Winnipeg River	1911	ROR
Red Rock	Upper Nelson River	Planned	-
Seven Sisters	Winnipeg River	1931	ROR
Slave Falls	Winnipeg River	1931	ROR
Whitemud	Upper Nelson River	Planned	-
Wuskwatim	Burntwood River	2012	Reservoir

In 1997, the province of Manitoba and Manitoba Hydro pursued a Northern Flood Agreement with the Northern Flood Committee, which included representatives of several First Nation communities. The Northern Flood Agreement was an attempt to settle and address historic wrongs around hydroelectric development in northern Manitoba where direct impacts, including mass relocations, flooding of traditional territory, and more had been experienced by First Nations. The agreement was not implemented with Pimicikamak (Cross Lake First Nation), but the other First Nations came to terms with Manitoba in the 1990's (Manitoba Hydro 3 (nd)).

Table 3: First Nations that Participated in the Northern Flood Agreement Negotiations

Community	Northern Flood Agreement (1997)	Northern Flood Committee
Nisichawayasihk Cree Nation	Comprehensive Implementation Agreement 1996	Nelson House Cree Nation
Norway House Cree Nation	Implementation Agreement 1997	Norway House Cree Nation
Pimicikamak (Cross Lake)	Not implemented	Cross Lake First Nation
Tataskweyak Cree Nation	Comprehensive Implementation Agreement 1992	Split Lake Cree Nation
York Factory First Nation	Implementation Agreement 1997	York Factory First Nation

A number of other settlement agreements have been made by Manitoba Hydro with impacted communities, including some First Nations and some municipal parties, between 1990 and 2010 (MB Hydro 2023).

Table 4: First Nations Participating in Agreements with Manitoba Hydro between 1990 and 2010

Community	Grand Rapids Forebay Agreements
Chemawawin Cree Nation	Agreement 2004
Easterville	Agreement 2004
Moose Lake	Agreement 2005
Mosakahiken Cree Nation	Agreement 2008

Community	Individual Agreements
Fox Lake Cree Nation	Agreement 2004
War Lake First Nation	Agreement 2004
O-Pipon-Na-Piwin Cree Nation	Agreement 2005

Community	Individual Agreements
Nelson House Community Council	Agreement 2006
Cross Lake Community Council	Agreement 2010
Cormorant Community Association	Agreement 1991

Additionally, a number of major water diversion projects have been constructed beginning in 1961 with the Fairford River Water Control Structure, which was intended to regulate water levels in Lake Manitoba (Government of Manitoba (nd), Manitoba Hydro 4 (nd). In the same vicinity, the Lake Manitoba and Lake St. Martin Outlet Channels Project is currently planned.

Table 5: Major Water Diversion Projects in Manitoba

Diversions	Location	Timeline	Purpose
Churchill River Diversion	Via South Bay Diversion Channel	1970s through 1986 & ongoing	Relocates volume of Churchill River to Nelson River at South Indian Lake.
Lake Winnipeg Regulation	Multiple locations	1970s	Intended to improve water regulation of Lake Winnipeg.
Portage Diversion	Assiniboine River west of Portage La Prairie to Lake Manitoba	1970	Prevention of flooding in Winnipeg, RMs of Portage La Prairie, Cartier, St. Francois Xavier, Headingley.
Red River Floodway	Red River to Red River	1968, 1997	Prevention of flooding in Winnipeg.
Fairford River Water Control Structure	Fairford River	1961	Regulates water levels of Lake Manitoba.
Shellmouth Dam & Reservoir	Assiniboine River upstream from Shellmouth	1972	Reservoir to reduce flood damage downstream, most particularly Winnipeg.
Lake Manitoba and Lake St. Martin Outlet Channels	Between Lake Manitoba and Lake St. Martin and Lake St. Martin and Lake Winnipeg	Planned	Intended to improve water regulation of both upstream lakes.

In addition to the above listed projects, agricultural drainage is accepted practice to control moisture in fields but is not typically subject to assessment review. The input to systems resulting from agricultural drainage is not insignificant. Increasing channelization of watercourses is concerning due to the reduced access of the water to adjacent floodplains and increased downstream output.

Given this context, it is not surprising that most First Nation communities in Manitoba have been affected by flooding.

Flooding Impacts to First Nations in Manitoba

Overall, the province of Manitoba has faced several serious challenges related to flooding in recent years, affecting many communities and infrastructure works. Coordinated effort from various levels of government and stakeholders is required to address causes and consequences.

In 2022, the Office of the Auditor General of Canada reiterated that the federal government (specifically, Indigenous Services Canada, ISC) does not meet First Nations needs in preparing for and mitigation of emergencies, ensuring response services, and has not met or implemented previously identified needs or recommendations (Office of the Auditor General of Canada 2022). Thus, First Nation communities are often still the most severely impacted during emergencies because of a lack of infrastructure, lack of or incomplete emergency management plans, lack of human capacity, and lack of resources.

However, there is a lack of basic information which may partly contribute to a diminished understanding of the issue. A search for basic statistical information on the impacts of flooding to First Nations in Manitoba (e.g., which First Nations have experienced flooding per year) yielded no results. Therefore, a survey of available news stories, videos, reports, and other similar resources was completed to compile information around flooding impacts to First Nations in Manitoba. The name of each First Nation and the word “flood” was searched using the Google search engine. Stories, videos, and other resources were reviewed to ascertain the expressed extents of impact, time periods, resources and responses, needs, associated conflict, and persistent messaging for each First Nation or group of First Nations. Any flooding at any point in the colonial history of a First Nation, including historic floods with or without management agreement(s) or modern treaty(ies) and present era (mitigated and unmitigated) floods were included as relevant to the analysis. Where available, years were noted. Note that values where no data was gleaned from the review do not necessarily indicate no impact, but rather indicate lack of available record.

The information provided in media reports was often not comprehensive and some of the impacts may not be explicitly stated as "floods". Nonetheless, the list of First Nations where floods have been experienced and/or where planning for floods has been implemented by the community is long, representing 83.3% of First Nations in Manitoba. Table 6 presents compiled information as an overview to enhance reader understanding of the impacts to First Nations in Manitoba by floods.

Table 6: First Nations in Manitoba and compiled flood impacts.

Name of Community or Nation	Year(s) of Impact	Description of Impact	Media Source
Barren Lands First Nation	Since before 2009	SaskPower infrastructure impacted community in Manitoba. Compensation deal offered resulting to flooding of reserve land by Whitesand Dam (on Churchill River). INAC settlement. Interprovincial.	MBC Radio 2009.
Berens River First Nation	2022	Provincial flood warning. Activation of Red River Floodway.	The Weather Network 2022.
Birdtail Sioux Dakota Nation	2014	Failed embankment holding back water on tributary of Birdtail Creek. Surge of water would affect downstream communities incl. Birdtail Sioux FN. Due to ice dam in culvert. Roads, bridges	Government of Manitoba 2014.
Black River First Nation	2022	Located on Lake Winnipeg. Required spring flood assistance in 2022.	Assembly of Manitoba Chiefs 2022.
Bloodvein First Nation	2010, 2022	Flood watch.	CBC News 2022a.
Brokenhead Ojibway Nation	2022	BON website provides advice for preventing basement floods, Health clinic flooded, probably more. Health centre flood/closure.	Brokenhead Ojibway 2022.
Buffalo Point First Nation	2022	Historic land issues with Ontario. Required assistance in 2022.	CBC News 2022b.
Bunibonibee Cree Nation	Historic	Flooded lands - Grand Rapids Hydro project.	CIRNAC 2020.
Canupawakpa Dakota First Nation (Oak Lake 59)	2014, 2017	Pipestone Creek. Homes cut off, culverts, drinking water, evacuations (22 ppl), safety.	CBC News 2017a.
Chemawawin Cree Nation	1960's to present day	Total loss. Relocation of entire community to Easterville as result of Grand Rapids Forebay development. Ongoing dispute as to whether MB met agreement terms, and whether that was fair in the first place. 35,000 ha of land granted to the Chemawawin CN on Cedar Lake as compensation for losses/lake damage by MB Hydro.	Wikipedia 2020.
Cross Lake First Nation / Pimicikamak	Historic	Unmitigated historic issues.	APTN 2014.
Dakota Plains Wahpeton First Nation	2004	All homes on FN mouldy, DP sues Canada. Estimated cost of rebuilding homes $18M. FN seeking compensation or re-construction. Leadership prefer to relocate to area not prone to flooding. 222 ppl evacuated. Safety.	Globe and Mail 2004.

Name of Community or Nation	Year(s) of Impact	Description of Impact	Media Source
Dakota Tipi First Nation	2014	Residents displaced. Evacuation.	Government of Treaty 2 Territory 2019.
Dauphin River First Nation	2011	One of the major impacted communities in 2011. Still affected. Will be affected by the outlet channel. Ancestral lands, hunting areas. Fish, medicines, waters, habitats.	APTN 2021.
Ebb and Flow First Nation	2011, 2014, 2022	Still (as of 2019) experiencing poor conditions, incl. condemned houses, etc. C&C not fixing. SCO not responsive. Required flood assistance in 2022. Evacuations.	APTN 2019.
Fisher River Cree Nation	2022	State of Emergency. Fisher River, upstream from Peguis. Consultation with MB gov October 2022 re: the channels incl results of environmental assessment process for project from L. Manitoba to L. St. Martin and L. St. Martin to L. Winnipeg. Impacts to rights.	Government of Manitoba 2022; Fisher River Cree Nation Facebook Page 2022.
Fox Lake Cree Nation	Historic	Impact settlement agreement between Fox Lake CN, MB Hydro, MB in 2004. Is partner on the Keeyask Hydro Partnership, though MB/MB Hydro has full control. Impacts to rights.	WA NI SKA TAN (nd).
Gamblers / Gambler First Nation	2019 onwards	Meeting to discuss water diversion from SK's Blackbird Creek which would flood lands in T2 Territory in MB	Moccasin Trail News 2019.
Garden Hill First Nations	Unknown	Unknown. Accessible only by ice road or plane in winter, water or plane in summer.	NA
God's Lake Narrows First Nation	Unknown	Water/ice road access only	Burton, KL and Smith, A. (nd).
Granville Lake First Nation	2020 flood warnings.	Located on Churchill River in NW Manitoba. Affected by SaskPower water releases especially in spring season.	Government of Manitoba 2020.
Hollow Water First Nation	Since 1960's and more since 2010	East side of Lake Winnipeg. Loss of wild rice patches and livelihoods, among other things. Erosion, water levels, etc. MB Hydro impacts since 1960s.	EcoHealth Learning Circle 2015.
Keeseekoowenin Ojibway First Nation	2014	Danger of destruction to heritage/ceremonial sites due to development such as diversion plan. Evacuations in 2014.	Government of Treaty 2 Territory 2022.
Kinonjeoshtegon First Nation	2022	Located in Interlakes region. Part of IRTC Emergency group. Flooding first time in 2022. Required flood assistance in 2022.	CBC News 2022c.

Name of Community or Nation	Year(s) of Impact	Description of Impact	Media Source
Lake Manitoba First Nation / Dog Creek	2011, 2014, 2022	Devastation after MB diverted water through the Interlake. Required flood assistance in 2022. Evacuations.	CBC News 2022c.
Lake St. Martin First Nation	2011	Devastation after MB diverted water through the Interlake. Evacuations.	CBC News 2022d.
Little Grand Rapids First Nation	Historic, 2022.	Issues related to Ontario-side land & water use. Required assistance in 2022.	AMC 2022.
Little Saskatchewan First Nation	2011, 2014	Entire generation displaced from LS FN. Nothing left. Evacuations.	EcoHealth Learning Circle 2022.
Long Plain First Nation	2017, 2022	Displaced. Required assistance in 2022. Evacuations. Long-term evacuations.	APTN 2018.
Manto Sipi Cree Nation - God's River	Unknown	Unknown	NA
Marcel Colomb First Nation	Historic and ongoing	Downstream of SP's Island Falls hydro generation station on Churchill River.	APTN 2020.
Mathias Colomb Cree Nation	Historic and ongoing	Downstream of SP's Island Falls hydro generation station on Churchill River.	CBC News 2018.
Misipawistik Cree Nation / Grand Rapids	Historic and ongoing	Community formerly located at the site of construction. 1965 Grand Rapids Dam. Drying up rapids, flooding land, debris into lake, difficult fishing.	Briarpatch 2012.
Mosakahiken Cree Nation / Moose Lake	Historic and ongoing	Traditional lands lost	Winnipeg Free Press 2012a.
Nisichawayasihk Cree Nation	Since 1974	Churchill River Diversion affected traditional lands, rights, etc.	Nisichawayasihk Cree Nation 2016.
Northlands Denésuline First Nation	Unknown	Unknown	NA
Norway House Cree Nation	Historic and ongoing	Signatory to northern flood agreement	Government of Canada 2000.
O-Chi-Chak-Ko-Sipi First Nation	2011, 2014	Evacuations from 2011 flood	Water Today 2017.
Opaskwayak Cree Nation	2017, more	Evacuations - multiple homes, multiple events	CBC News 2017b.
O-Pipon-Na-Piwin Cree Nation - South Indian Lake	Since 1974	Churchill River Diversion affected traditional lands, rights, etc.	Dam Watch International 2021.
Pauingassi First Nation	2022	Required assistance in 2022.	Brandon Sun 2022.

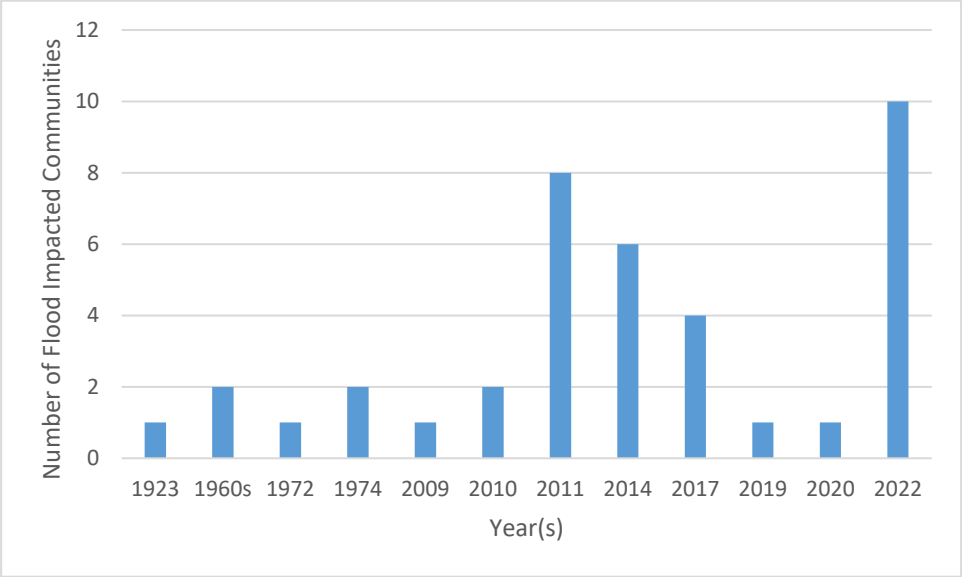
Name of Community or Nation	Year(s) of Impact	Description of Impact	Media Source
Peguis First Nation	2009, 2011, 2014, 2017, 2022	Terrible repeated floods. Roads, bridges, highway, mall, landfill, lagoon, houses. Boil water. Evacuations - repeat. Housing disruptions. Drainage improvements upstream channelize water to Peguis. Bottleneck at Peguis.	Peguis First Nation 2022; CBC News 2022e.
Pimicikamak Cree Nation	Since 1972	Jenpeg Dam. Apology offered by province of Manitoba in 2015. Community members protested at dam site in 2015 to get relationship building from MB Hydro.	CBC News 2015.
Pinaymootang First Nation	2011, 2014	Evacuations. Was sued by the government of Manitoba for negligence resulting in damage to the infrastructure and properties of PFN and 3 other FNs. That the FN built housing and infrastructure on locations that it knew or ought to have known were prone to flooding and failed to take adequate mitigation measures to protect its reserves. Canada is also accused.	Narine 2013.
Pine Creek First Nation	2014, 2022	Flooding lowlands between Duck Mtn and the southern basis of Lk Winnipegosis. Rivers: Pine, Sclater, North Duck. Inundated Hwy 20. Required flood assistance in 2022. Evacuations.	CBC News 2022f.
Poplar River First Nation	Risk identified by community members.	Relies on boat/air access.	International Institute for Sustainable Development (IISD) 2011.
Red Sucker Lake First Nation	Unknown	Accessible by air or winter road/boat.	NA
Rolling River First Nation	2022	Flood assistance required in 2022. High water threatened 3 wooden bridges. Transportation rerouted for safety. Basements flooded. Desire bridge & other infrastructure replacement.	Brandon Sun 2022.
Roseau River Anishinabe First Nation	2011, 2022	Required assistance in 2022.	CBC News 2011.
Sagkeeng Anicinabe / Sagkeeng First Nation	1923, ongoing, 2022	Great Falls Dam (1923) built right next to Sagkeeng. Required flood assistance in 2022. Bridges, schools, roads. Shoreline erosion. Evacuations. Pine Falls.	CBC News 2022g.
Sandy Bay Ojibway First Nation	2011, 2022	Upstream dike breach to protect other communities in Manitoba. Unjustly enriched province. Failed to protect FN. Required flood assistance in 2022. Homes, roads. Ancestral loss. Environmental damage.	CBC News 2017c.

Name of Community or Nation	Year(s) of Impact	Description of Impact	Media Source
Sapotaweyak Cree Nation	2010, 2022	Flooding Shoal River, evacuations, etc. Required assistance in 2022.	CBC News 2010.
Sayisi Dené First Nation	Unknown	Unknown	NA
Shamattawa First Nation	Unknown	One of Canada's top 5 flood risk locations?	Cortes Currents 2021.
Sherridon First Nation	Unknown	Unknown	NA
Sioux Valley Dakota Nation	2014, 2022	Repeat flooding - downstream of Shellmouth Dam. Note: Fishing Lake flood diversion work (SK) flows into this river system. Evacuations.	CBC News 2014.
Skownan First Nation	2011	Road closure/blockade to get attention of province re: refusal to deal with flooding due to reconstruction of bridge over west waterhen river, in 1999.	Winnipeg Free Press 2012b.
St. Theresa Point First Nation	Unknown	Plane/Boat/Winter Road/Air.	NA
Swan Lake First Nation	Unknown	Plagued with low lake levels. Environmental impacts because of this.	Pembina Valley Online 2021.
Tataskweyak Cree Nation	Historic, and 2017	High water levels - emergency declared	Flin Flon Online (nd).
Tootinaowaziibeeng Treaty Reserve	Unknown	Accessed funding (First Nation Adapt) to document flood risk baseline information.	Tootinaowaziibeeng Treaty Reserve (nd).
War Lake First Nation	2017	Regular provisioning and only transport via train service. Flooding of tracks from Thompson to Churchill closed tracks.	CBC News 2017d.
Wasagamack First Nation	Unknown	Access by winter road from St. Theresa Point.	NA
Waywayseecappo First Nation Treaty Four -1874	2014	Failed embankment holding back water on tributary of Birdtail Creek. Surge of water would affect downstream communities incl. Waywayseecappo FN. Due to ice dam in culvert. Roads, bridges. Evacuations.	CBC Video (nd).
Wuskwi Sipihk First Nation	2006, 2014	Road access has flooded in past and was predicted to flood in 2006. Evacuations.	Government of Manitoba 2006.
York Factory First Nation	Since 1960s	Northern Flood Agreement signatory. Lands flooded by hydro development.	Aboriginal Justice Implementation Commission 2001.

Here are a few summaries of examples of impacts to First Nations in Manitoba by flooding, drawn from resources indicated in Table 6:

- The SaskPower infrastructure on the Churchill River, which includes the Island Falls Hydroelectric Station and the Whitesand Dam. These facilities have been blamed for causing decades of flooding on Mathias Colomb Cree Nation around Pukatawagan, destroying habitat, disrupting traditional livelihoods and impacting the ability of the First Nation members to implement their treaty and inherent rights. The First Nation is suing for $800 million in compensation and damages (CBC News 2018).
- The Red River, which reached its sixth-largest flood on record by volume in 2022, triggered the activation of the Red River Floodway and a provincial flood warning. The flood affected downstream communities such as Peguis First Nation, which experienced a historic flood that damaged hundreds of homes and forced nearly 1,900 people to evacuate (CBC News 2022e).
- The failed embankment holding back water on a tributary of Birdtail Creek, which was due to an ice dam in a culvert. The surge of water threatened to affect several communities, including Birdtail Sioux First Nation, where roads, bridges and homes were cut off and 22 people had to be evacuated (CBC News 2014).
- Some of the communities located on Lake Winnipeg also required spring flood assistance in 2022, such as Fisher River Cree Nation, which declared a state of emergency and has consulted with the Manitoba government about the environmental impacts of the outlet channel project from Lake Manitoba to Lake St. Martin and Lake St. Martin to Lake Winnipeg (Government of Manitoba 2022; Fisher River First Nation Facebook Page 2022).
- Other communities have faced historic land issues and flooded lands due to hydroelectric projects, such as Chemawawin Cree Nation, which relocated to Easterville as a result of the Grand Rapids Forebay development and is still disputing the terms of the agreement with Manitoba Hydro (Wikipedia 2020).
- Little Saskatchewan First Nation, which suffered from mouldy homes and poor conditions due to flooding caused by the Fairford Dam sued Canada for compensation or reconstruction (Ecohealth Learning Circle 2022).
- Some communities have also experienced health issues due to flooding, such as Lake St. Martin First Nation, which had its health clinic flooded and closed in 2019 and is still affected by the outlet channel project that will impact its ancestral lands, hunting areas, fish, medicines, waters and habitats (CBC News 2022d).
- Communities attempt to be proactive and to support their members given the resources available. For instance, Brokenhead Ojibway Nation provides advice to its membership on its website for preventing basement floods (Brokenhead Ojibway 2022).

Developed from the partial information presented in Table 6, the following chart summarizes the number of communities impacted in by year:



In addition, 11 communities reported “historic” and/or “ongoing” flooding with no specific year identified, while reports for 10 communities did not specify any information regarding years of occurrence.

Information gaps, such as: years of floods, water levels, causes of floods, inundation, costs of clean up, other costs, etc. may contribute to the lack of general understanding of impacts to First Nations by floods.

Emergency Management and First Nations

In Canada, the federal, provincial, and territorial governments, as well as local communities, all have emergency management responsibilities. In assisting and supporting emergency management activities on First Nation lands, ISC is responsible for ensuring that First Nations have access to emergency management services comparable to those available to provincial residents. The federal government plays an important role in the delivery of emergency management services to First Nations communities. For some First Nations communities living on reserves, managing and recovering from emergencies is made particularly challenging by socio-economic conditions, geographic location, and the frequency with which these events occur. The federal government acknowledges it must do more to help First Nation communities both respond to natural disasters like flooding as well as prepare for them (Auditor General of Canada Report 2022).

In addition to ISC, there are several other federal departments with responsibility in emergency management and preparation, as well as infrastructure development, and management of the natural environment, including Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Infrastructure Canada (INFC), Public Safety Canada (PSC), and NRCan.

Natural Resources Canada (NRCan) plays a critical role in emergency response during flood events, working with partners across the country to increase the knowledge base about river ice break-ups and floods to

improve the ability of authorities to predict and manage flood risk. Many parts of Canada are missing up-to-date flood maps that delineate flood hazard zones, needed for flood risk planning and mitigation. NRCan's mandate includes working with the provinces and territories and Indigenous peoples to complete all flood maps in Canada. NRCan is developing the Federal Flood Mapping Guidelines Series to advance and standardize flood mapping activities across Canada. This will improve the accuracy of flood maps to support planning and emergency response. NRCan participates on and provides funding for the Indigenous Technical Working Group, which provides direction to NRCan on matters relevant to Indigenous peoples in Canada.

Gap Analysis of Existing Federal Engagement Regarding Flood Mapping

This section provides a gap analysis of the federal government's engagement with First Nations in Manitoba pertinent to flood mapping. Because little information is available on this particular topic, the focus of the analysis was expanded to include identifying spending via federal government programs on climate change adaptation and mitigation projects in Manitoba's First Nation communities, including northern and southern communities as indicated by Treaty areas.

Methods

A preliminary review of federal engagement on the topic of flood mapping revealed very few projects. It is acknowledged that flood mapping is a technical discipline that is a small segment of potential federal engagement with Manitoba First Nations. To increase potentially relevant data (including data where engagement on the topic of flood mapping would be a small component of larger projects), additional search terms were included.

Search terms included:

- Flood mapping
- Flood
- Emergency
- Emergency management
- Climate
- Climate change
- Disaster

There were several federal departments whose responsibilities intersect these parameters, including ISC, CIRNAC, INFC, PSC, NRCan, Fisheries and Oceans Canada (DFO), and Environment Climate Change Canada (ECCC). Note that DFO and ECCC were excluded from this review due to primary responsibilities with environmental and/or biotic resources.

Information on federal engagement with First Nations in Manitoba on the topic of flood mapping was gathered by searching available program websites for information on federal projects where the keywords listed above were a component. As engagement (here defined as the exchange of information without legal consultation obligations) on the specific keywords was found to be generally infrequent, projects where funding was provided to Manitoba First Nations by the above-mentioned federal departments under several programs, if the project title or provided details included one or more of the above keywords. There is an assumption that the First Nation(s) involved in each project actively engaged with one or more federal department at the time of the application process, and possibly also during and after implementation of each project. The time period of readily information examined dates from 2017-2018 to present.

The analysis examines where and how the funds were spent, what outcomes and impacts were achieved, and what challenges and opportunities exist for improving flood mitigation in Manitoba. The analysis uses a mixed-methods approach, combining quantitative and qualitative data from various sources, such as media reports, program documents, project reports, financial records, surveys, interviews, and a workshop. The analysis also incorporates Indigenous Knowledge and perspectives on flood mitigation, as well as best

practices and lessons learned from other jurisdictions. The analysis will provide recommendations for enhancing the federal funding for flood mitigation in Manitoba, and for strengthening the collaboration and coordination among different levels of government and stakeholders.

Results

This section presents results of the gap analysis completed regarding federal engagement with First Nations on the topic of flood mapping (and related topics, as described above).

Federal Programs and Engagement

Federal government programs and engagements that can be applied (directly or indirectly) to flood mapping in Manitoba are described here, along with details of implementation.

Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) Programs

First Nation Adapt Program

CIRNAC offers the First Nation Adapt Program (FNAP), created in 2017, and with an ongoing intake (CIRNAC 2021a). It provides funding to First Nation communities to assess and respond to climate change impacts on community infrastructure and disaster risk reduction. The First Nation Adapt Program supports the gathering of Indigenous Knowledge, community involvement, and the building of capacity within First Nations and First Nations organizations to conduct work and adapt to a changing climate. The floodplain mapping portion of the program provides support for communities to participate in regional watershed management processes and to collect and share regional watershed data. Through the Adapt program, First Nation communities are encouraged to develop smaller-scale floodplain maps to help identify the risks to local infrastructure and to develop best practices, tools, and adaptation options for flood management. First Nations Adapt is an ongoing program with no deadlines for application.

Indigenous Community-Based Climate Monitoring Program

Since 2018, CIRNAC also operates the Indigenous Community-Based Climate Monitoring Program (ICBCMP), which provides funding for long-term climate monitoring projects in Indigenous communities. There are $6M dollars per year in this program, and interested parties are encouraged to contact CIRNAC directly for information (CIRNAC 2021b). The program supports community-led projects to monitor climate and the environmental effects of climate change on communities and traditional territories. Indigenous peoples are uniquely positioned to provide leadership on climate change monitoring and adaptation efforts.

Indigenous Services Canada (ISC) Programs

Emergency Management Assistance Program

ISC offers the Emergency Management Assistance Program (EMAP) that reimburses response and recovery activities (including flooding) in First Nations communities, helping them recover in a timely, durable, and holistic way. There is no deadline for applications; applicants apply after an emergency (ISC 2023a).

Emergency Management Non-Structural Mitigation and Preparedness Program

ISC also provides funding to First Nations communities through its Emergency Management Non-Structural Mitigation and Preparedness Program (EMNSMPP), to prepare for natural hazards, including flooding. ISC regional officials work with First Nations at risk of flooding to ensure emergency preparedness and response plans are in place and funds eligible flood mitigation preparedness and response measures. Proposals are received to a set date till funding is exhausted (ISC 2023b).

Infrastructure Canada (INFC) Programs

Disaster Mitigation and Adaptation Fund

INFC offers the Disaster Mitigation and Adaptation Fund (DMAF) to support public infrastructure projects designed to mitigate current and future climate-related risks and disasters triggered by climate change, including floods. The program commits over 3 billion dollars to increase the resilience of communities that are impacted by natural disasters triggered by climate change. Of this amount, a minimum of 138 million dollars is allocated to Indigenous groups or communities. The Disaster Mitigation Adaptation Fund is sharing the cost of construction of the Lake Manitoba and Lake St. Martin Outlet Channel Project.

Intake is to a set date; in 2023 till July 19th (INFC 2023).

Public Safety Canada (PSC) Programs

Disaster Financial Assistance Arrangements

PSC provides financial assistance to provincial and territorial governments through the Disaster Financial Assistance Arrangements (DFAA) in the event of large-scale natural disasters, including floods. The estimated DFAA budget for 2021-22 was $445,750,000 and included an estimated payment to Province of Manitoba of $68,780,000 for a 2014 rainstorm event.

If a disaster affects only First Nations reserve lands, the province will be fully reimbursed by ISC for all response costs incurred in the preservation of life and property. ISC is fully responsible for all recovery expenses not otherwise insured or devolved under contract or agreement. The DFAA are not applicable.

If a disaster spans both off-reserve lands and First Nations reserve lands, only the off-reserve provincial expenditures or those related to provincial public works on-reserve may be considered for the purposes of determining if the DFAA threshold has been met. Once eligible off-reserve expenditures exceed the threshold, the province will be fully reimbursed (at 100 per cent of the federal share) for any on-reserve response and recovery expenses incurred that are eligible under the DFAA Guidelines.

When a natural disaster occurs, the Manitoba Government may declare the event eligible for Disaster Financial Assistance (DFA). When a DFA program is established for natural disasters, the DFA program helps Manitobans recover by providing financial assistance for uninsurable losses to basic and essential property. Assistance is generally provided for the recovery needs of local authorities (including municipalities, private residential properties, farms, small businesses, and not-for-profit organizations). It appears that disaster management on First Nations' lands and in First Nations' communities is the responsibility of ISC. More information is available on the PSC Website (PSC 2023).

Manitoba's DFA-approved projects for 2022 are listed in Appendix A (Government of Manitoba 2022); it is difficult to ascertain whether First Nations are included in any of the listed projects.

National Disaster Mitigation Program

PSC is also responsible for the National Disaster Mitigation Program (NDMP) (PSC 2021). The NDMP addresses rising flood risks and costs and builds the foundation for informed mitigation investments that could reduce, or even negate, the effects of flood events. NDMP generally has 20 to 25 million dollars available which are forwarded to provincial and territorial governments for dispersion. Provincial and territorial authorities may collaborate with, and redistribute funding to eligible entities, such as municipal or other local governments, public sector bodies, private sector bodies, band councils, international non-government organizations or any combination of these entities. Again, the government of Manitoba may choose not to distribute NDMP funding to First Nation communities, leaving the task to ISC.

Natural Resources Canada (NRCan) Programs

Flood Hazard Identification and Mapping Program

NRCan leads the federal government's flood mapping initiatives. The department published The Federal Flood Mapping Framework in 2018, outlining the roles and responsibilities of stakeholders, both within and outside of government. NRCan is investing more than 63 million dollars in the Flood Hazard Identification and Mapping Program (FHIMP) to help governments, communities and individuals understand flood hazards and take action to reduce the impacts of flooding. It hopes to develop a guideline for flood mapping that respects the Rights-based lands and water use by the First Nations peoples of Manitoba.

FHIMP program personnel at NRCan can be contacted directly for collaboration (NRCan 2022).

Federal Program Implementation

According to the data provided by the federal government, a total of $9.4 million was spent in Manitoba through four programs: the Disaster Mitigation and Adaptation Fund (DMAF), the Federal Flood Mapping Guidelines (FFMG), the Indigenous Community-Based Climate Monitoring Program (ICBCMP), and the First Nations Adapt Program (FNA). These programs aim to support communities in reducing the risks and impacts of climate change hazards, such as floods, droughts, wildfires, and extreme weather events. They also aim to enhance the capacity and knowledge of communities to monitor and report on climate change indicators and trends.

However, not all programs were equally active or accessible in Manitoba. No money was spent in this period through the Emergency Management Assistance Program (EMAP) or the Provincial Disaster Assistance Program (PDAP). These programs provide financial assistance to communities affected by natural disasters or emergencies. The reasons for this lack of funding are unclear and require further investigation.

The funds were spent in 42 out of 67 First Nation communities in Manitoba, as shown in Figure 1 and listed below.

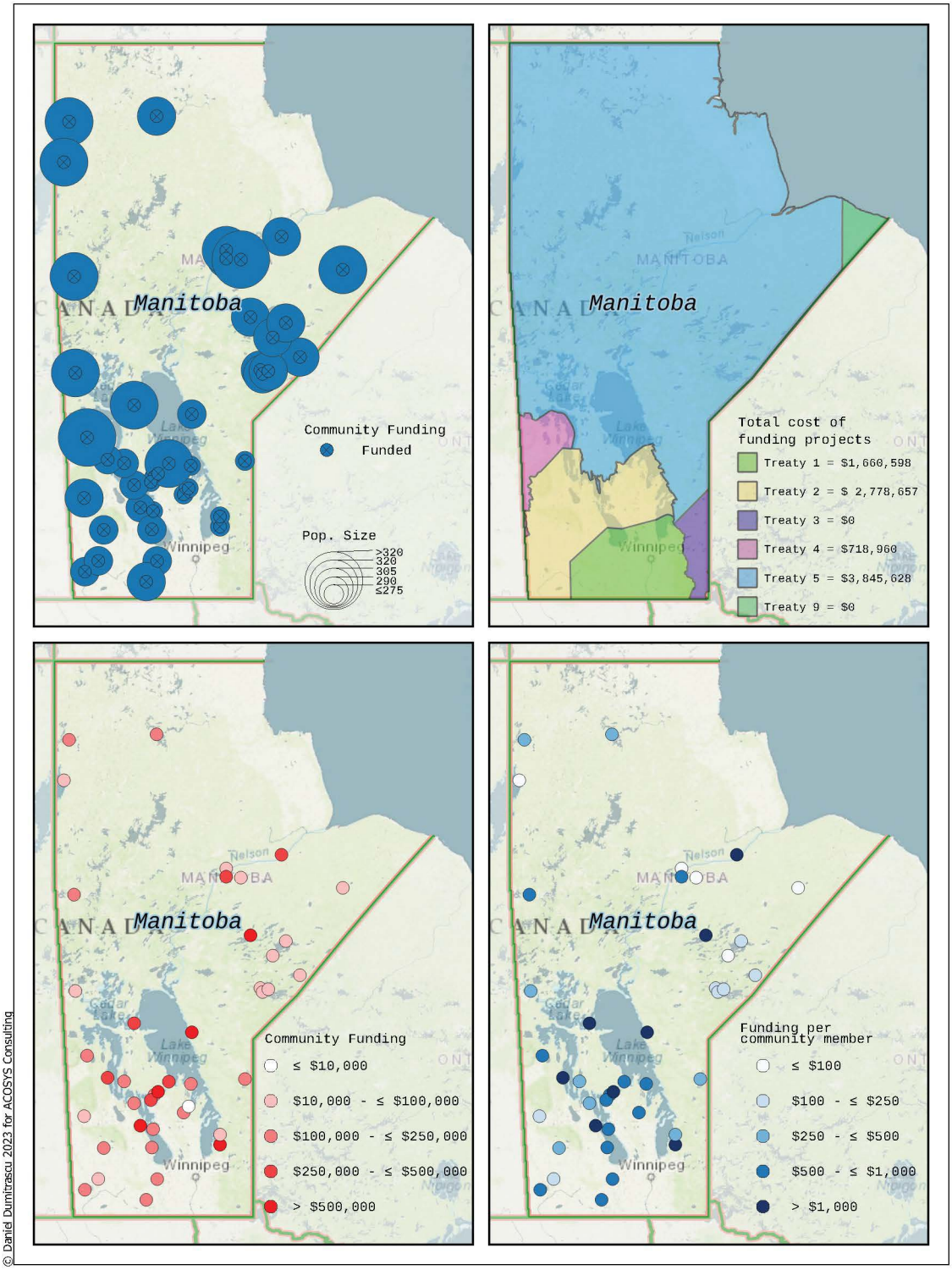
Barren Lands First Nation
Black River First Nation
Bunibonibee Cree Nation
Canupawakpa Dakota First Nation
Dauphin River First Nation
Ebb and Flow First Nation
Fisher River First Nation
Fox Lake Cree Nation
Garden Hill First Nation
God's Lake First Nation
Keeseekoowenin First Nation
Kinonjeoshtegon First Nation
Lake Manitoba First Nation
Lake St. Martin First Nation
Little Grand Rapids First Nation
Little Saskatchewan First Nation
Long Plain First Nation
Manto Sipi Cree Nation
Mathias Colomb Cree Nation
Misipawistik Cree Nation
Northlands Dene First Nation
O-Chi-Chak-Ko-Sipi First Nation
Opaskwayak Cree Nation
Peguis First Nation
Pinaymootang First Nation
Pine Creek First Nation
Poplar River First Nation
Red Sucker Lake First Nation
Sagkeeng First Nation
Sandy Bay First Nation
Sayisi Dene First Nation
Shamattawa First Nation
Sioux Valley Dakota Nation
Skownan First Nation

St. Theresa Point First Nation
Swan Lake First Nation
Tataskweyak Cree Nation
Tootinaowaziibeeng Treaty Reserve
War Lake First Nation
Wasagamack First Nation
Wuskwi Sipihk First Nation
York Factory First Nation

Outcomes of the implemented projects are not included in the summary data accessed, nor do we have information on the net benefit achieved by each community.

The locations of these communities reflect the geographic diversity and vulnerability of Manitoba's First Nations. Some communities are located in remote areas with limited access to infrastructure and services, while others are situated near urban centers or major waterways.

Figure 1: Federal Funding per Community, per Treaty Area, Value by Community, and per Community Member.



The funds were awarded through 48 separate projects, ranging from small-scale initiatives to large-scale collaborations. Most projects were one year in length, but some projects have been renewed over multiple years. The majority of projects (31) were awarded to an individual community, while the rest involved partnerships with other communities. Collaborative projects had anywhere from 2 to 11 community partners with an average of 5 community partners. In addition, 15 projects had external partners, such as tribal councils, consulting firms, treaty organizations, environmental groups, health authorities, and research institutes. External partners distributed a total of $3.4M (or 36% of total funding) of to First Nation communities. About half of the funding accessed by partners was provided through the FNA program. Table 7 summarizes the money derived from external partners and delivered to a community or communities.

Table 7: Partner organizations involved with community-based funding over the period from 2017-2018 to 2021-2022.

External Partner	Program	Allocation
Acosys Consulting Inc.	FFMG	$84,000
Anishinaabe Agowidiiwinan Secretariat Inc.	FNA	$375,402
Centre for Indigenous Environmental Resources	FNA	$79,467
Four Arrows Regional Health Authority	FNA	$215,864
Interlake Reserves Tribal Council Inc.	FNA	$1,049,964
Keewatin Tribal Council	DMAF	$234,240
Keewatin Tribal Council	ICBCMP	$388,035
Manitoba Uske Inc.	FNA	$356,046
Treaty 2 Government	DMAF	$625,918

The data for funding programs is available from 2017 to 2021 (start year of the project). Table 8 shows the spending by program and year. Overall, total spending since 2018-2019 has declined slightly from $2.3 million per year to $2.0 million in 2020-2021. The largest program is DMAF spending a total of $2 million on one project involving multiple communities.

Table 8. Summary of community funding from fiscal 2017-2018 to 2021-2022.

Program	Start Year	Number of Projects	Allocation
DMAF	2017	2	$699,931
DMAF	2018	3	$418,554
DMAF	2019	1	$625,918
DMAF	2020	2	$912,068
DMAF	2021	7	$1,914,400
FFMG	2020	1	$46,500
FFMG	2021	1	$37,500
FNA	2018	10	$1,549,837
FNA	2019	9	$1,306,823
FNA	2020	7	$1,177,687
ICBCMP	2018	2	$373,048
ICBCMP	2019	3	$314,874

Figure 2 shows the distribution of the federal funds across the 42 First Nation communities that received funding through one or more programs, by year. The figure also indicates the number of projects that each community was involved in, either individually or in partnership with other communities. A total of 48 projects were funded by the federal government in Manitoba since 2017.

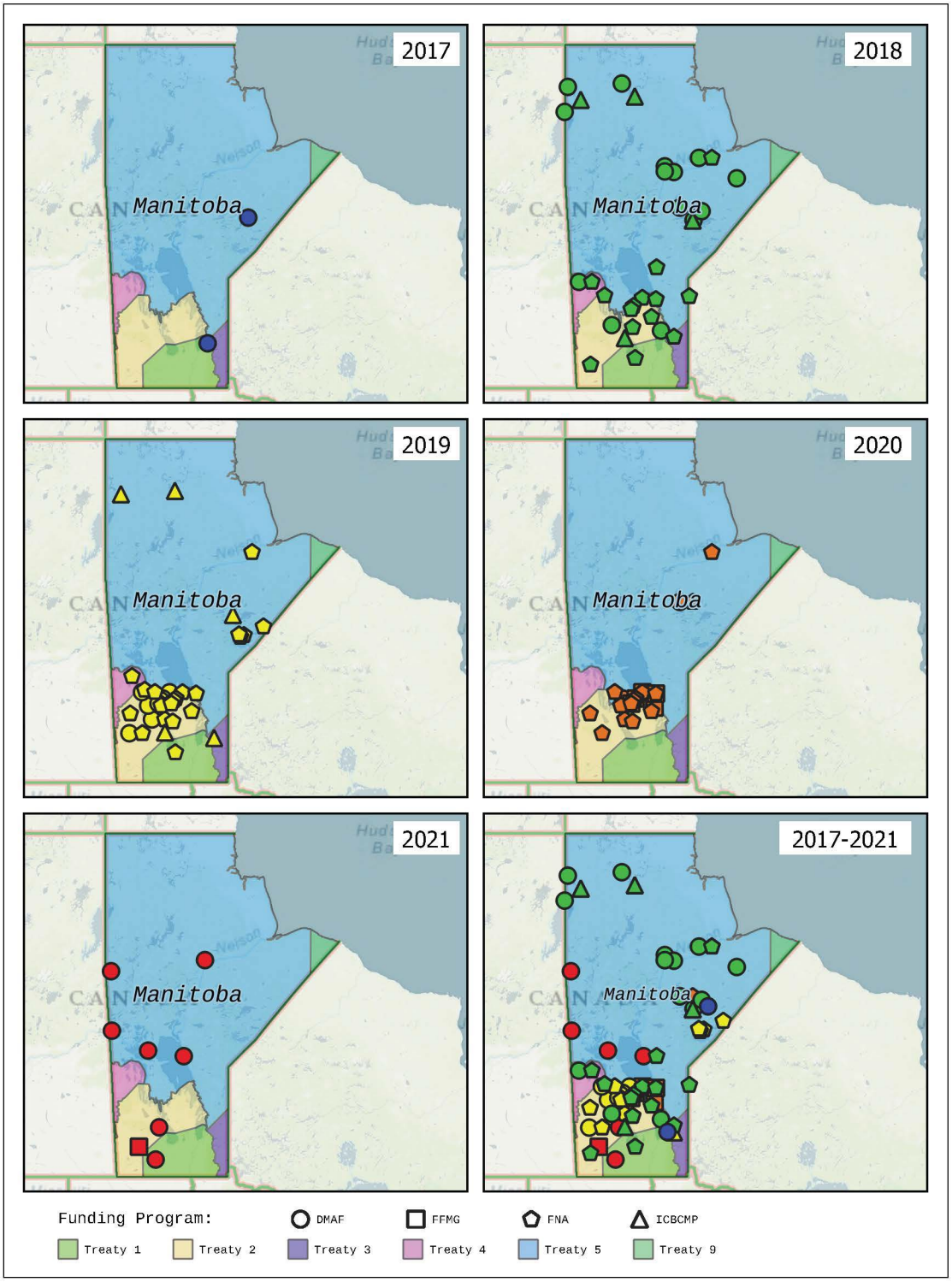


Figure 2: Communities that Accessed Federal Funds, 2017-2018 through 2021-2022.

Funding by Treaty area is given in the Table 9 and summarizes spending by geographic region (i.e., north vs. south). The table provides a useful overview of how federal funding is allocated among different Treaty areas in Manitoba and how it relates to their size, population, and needs. The table shows the distribution of federal funding for various projects related to environmental protection, economic development, social services, and cultural preservation among the different Treaty areas in Manitoba. The table also provides information on the total population of the funded communities and the cost per area and per person for each Treaty. Note that not all communities are part of a Treaty. Of these, some adhere to given Treaty while others are simply located with a Treaty boundary. As such, for summary purposes, data from these communities was grouped by Treaty as appropriate. The areal extent of Treaty 5 includes the portion of Manitoba within Treaty 5 (1875) and the area to the north that adheres to Treaty 5 (1875).

Table 9. Federal Funding per Treaty Area, including Number of Projects, Population of Communities in Treaty Area, Allocation per km^2, and Allocation per Person.

Treaty Area	Area within Manitoba (km^2)	Number of Projects	Total Population of Funded Communities	Allocation	Allocation per km^2	Allocation per Person
1	49,064	10	76,875	$1,660,598	$3.39	$21.60
2	73,503	14	90,907	$2,778,657	$177.64	$30.57
3	13,710	0	NA	$0.00	$0.00	$0.00
4	15,642	7	13,666	$718,960	$9.78	$52.61
5	489,584	23	85,039	$3,845,628	$78.38	$45.22
Unknown	NA	4	NA	$373,296	NA	NA

Note: Ten projects were shared among communities located in different Treaty areas so the project total sums to 58 and not 48.

- Treaty 3 did not receive any funding for projects (the smallest Treaty by area within Manitoba).
- Treaty 5 had the largest number of funded projects (23), the highest total amount of funding ($3.8M) and covers the largest geographic area withing Manitoba.
- Treaty 2 had the most money spent per area ($177 per km^2), despite having a smaller area compared to Treaty 1 and Treaty 5.
- Treaty 1 had the least amount of money spent per area ($3.39 per km^2).
- Treaty 4 received the most funding per community member ($52.61 per person) while Treaty 1 received the least amount of funding per community member ($21.60 per person).

Overall, the funding varied significantly across the different Treaty areas and was influenced by factors such as the number of funded projects, the size of the Treaty area, and the population of the funded communities.

Gap Analysis Summary

Although the original objective of understanding federal engagement with First Nations in Manitoba on the topic of flood mapping was not substantively addressed due to an extreme paucity of information available, the above gap analysis summarizes the amount, distribution, and nature of the funds allocated through various programs since 2017 including by First Nation and by region (Treaty). It also identifies the programs that did not fund any projects in this period.

The purpose of this analysis is to identify the strengths and weaknesses of the current funding landscape and to suggest areas for improvement and collaboration. It is also evident that federal engagement on the topic of flood mapping with First Nations in Manitoba presents a significant gap.

Engagement Session

A one-day engagement session was held on February 9th, 2023, in Winnipeg, Manitoba with representatives of First Nations in Manitoba to address the following objectives:

- To identify end user gaps in capacity in using/creating flood mapping for community and resource management;
- To identify gaps and opportunities for NRCan to edit or modify Federal Flood Mapping Guidelines for the inclusion of Indigenous Traditional and Ecological Knowledge;
- To identify potential processes (best practices) for the inclusion of Traditional and Ecological Knowledge into the mapping process;
- To develop guidelines to incorporate Traditional Knowledge in flood maps for communities in Manitoba that updates understanding of potential risk to residents, housing, business and infrastructure and traditional activities;
- To assess the applicability of NRCan guidance material in a northern context where ice-jam flooding is prevalent and there are limited data and access to flood information; and,
- To gain knowledge from First Nations in Manitoba regarding their experiences in engaging with the federal government related to floods and flood mapping.

Participant Registration

Participants were invited to register for either a session in Thompson (planned for February 7th, 2023) or in Winnipeg (February 9th, 2023). Beginning in December 2022, phone calls were made to contact, and emails and mail were sent to the Tribal Councils. A registration link (Survey Monkey) was shared with participants to gather necessary information about travel, accommodations, and more. Registration was extended to meet demand and additional participants were able to join up to the day of the meeting. Note that all participants opted to attend the session in Winnipeg and no meeting in Thompson was held.

Participation was encouraged from all sectors, including but not limited to Elders, emergency response, Land/water management or monitoring, mapping or geomatics, policing or conservation, leadership or public sector responsibility, public works management/maintenance, student, Traditional Knowledge holder, Traditional Resource User/commercial harvester, Youth representative, and more.

A communications log was maintained during participant recruitment to document outreach and interactions.

Media Release

To help spread the word and encourage participation, a media release was prepared and submitted to appropriate contacts. The content of the release was:

NEWS RELEASE:

FIRST NATIONS COMMUNITIES IN MANITOBA ARE BEING ASKED TO HELP DEVELOP FLOOD MAPS FOR THE FUTURE

Natural Resources Canada (NRCan) wants input from Manitoba's First Nations to prepare flood maps for their communities. It is sponsoring engagement workshops with First Nation communities on February 7th in Thompson, in northern Manitoba and on February 9th in Winnipeg.

A majority of Manitoba's First Nation communities are regularly hit by floods. Unfortunately, because of climate change, flooding is only getting worse. First Nation communities are often the hardest hit because of poor infrastructure, incomplete emergency management plans, and lack of resources. While First Nations are disproportionately at risk of experiencing flooding, resources to support communities in planning, mitigation, and response are still not universally accessible. The federal government acknowledges it must do more to help First Nation communities both respond to and prepare for natural disasters like flooding.

Natural Resources Canada (NRCan) plays a critical role in emergency response during flood events, to improve the ability of authorities to predict and manage flood risk. NRCan is responsible for advancing and standardizing flood mapping activities. It is looking to the Manitoba First Nations for guidance. It hopes to learn how flood maps can better serve First Nations communities while respecting rights and incorporating Traditional Knowledge into the federal mapping guidelines and process.

The engagement workshops are being facilitated by Acosys Consulting, an Indigenous-owned company. For more information, or to request an interview with David Acco, president and CEO of Acosys, contact: Erika Quiring, at 306-652-2256 or at: equiring@acosysconsulting.com.

Federal Geomatics Guidelines for Flood Mapping: Indigenous Principles, Realities, and Needs

A one-day engagement session in Winnipeg, Manitoba

- February 9th, 2023
- Fort Garry Hotel, Gateway & Tache Room
- Invited Guests from Manitoba First Nations
- Facilitated by Acosys Consulting
- Funded by Natural Resources Canada

DRAFT Agenda:

9:00 – 9:30 am	Arrival. Coffee, tea, getting settled.
9:30 – 9:45 am	Welcome. Prayer. Introductions. Theme for the day.
9:45 – 10:00 am	Presentation: Floods, flood mapping, values. *Presenter:* Stephen Bird
10:00 – 10:30 am	Guided discussion: What values are important for your community to protect from floods? How do you feel traditional knowledge should be integrated?
10:30 – 10:45 am	Morning Break – Snacks, coffee, tea, fresh air.
10:45 – 11:15 am	Guided discussion: What is your experience with the federal government and floods, preparation, prevention, management, and engagement? What have you been saying that the federal government has not heard?
11:15 – 12:00 pm	Small group exercise: Indigenous-led model of flood management.
12:00 – 1:00 pm	Lunch – soup, sandwiches, salad, beverages.
1:00 – 1:15 pm	Review of the morning. Sharing group ideas. Other ideas.
1:15 – 1:30 pm	Presentation: Technology used in flood mapping. *Presenter:* Stephen Bird
1:30 – 3:00 pm	Small group exercise: Flood scenarios. Creation of an Indigenous flood map by each group.

3:00 – 3:15 pm	Afternoon Break – Snacks, coffee, tea, fresh air.
3:15 – 3:45 pm	Sharing. Final discussion & advice from participants. Q&A.
	Thanks. Closing Prayer.

Participation

Attendees included 40 participants representing 19 distinct communities and organizations. Of the Tribal Councils, the following were directly represented by employees and/or members: Keewatin Tribal Council, Interlakes Reserves Tribal Council, West Region Tribal Council, and Swampy Cree Tribal Council. Participant roles within their communities and/or organizations included: Technical staff, operations staff, water plant operators, emergency response, housing, resource management staff, community member, Elder, Youth, and Band Councillor.

Tribal Councils that were not represented include: Dakota Ojibway Tribal Council, Southeast Resource Development Council, and Island Lake Tribal Council. To our knowledge, there were no direct representatives of the Southern Chiefs Organization, Manitoba Keewatinowi Okimakanak Inc., of the Assembly of Manitoba Chiefs, or the Sioux Valley Dakota Nation.

There were two government of Canada employees (NRCan) and three contractors (Acosys Consulting) present to facilitate the engagement session.

In Attendance	**Community/Organization, Role**
Abdul Khan	Keewatin Tribal Council
Anita Spence	Peguis First Nation
Candace Thomas	Peguis First Nation
Carolyn Smelzer	Swampy Cree Tribal Council
Cheryl Bear	Peguis First Nation
Chris Stove	Interlake Reserves Tribal Council
Cyrus LacQuette	West Region Tribal Council
Dakotah Traverse	Kinonjeoshtegon First Nation (Jackhead) - Councillor
Daniel Shorting	Little Saskatchewan - Gypsumville
David Gott	Sapotaweyak - Operations and Maintenance
Dean Cochrane	Peguis First Nation
Doris Latandre	Pinaymootang First Nation
Edward McLean	Pinaymootang First Nation
Fabian Sinclair	Chemawawin Cree Nation / Easterville
Jennifer Woodhouse	Pinaymootang First Nation
Katie Whitford	Translator, Ojibwe
Karen Paul	Lake Manitoba First Nation
Keith Castel	Pukatawagan, Mathias Colomb Cree Nation
Kyla Stagg	Pinaymootang First Nation
Lance Cloud	Waywayseecappo First Nation
Leroy Thompson	Little Saskatchewan - Gypsumville
Linda Hunt	Keewatin Tribal Council
Lloyd Beardy	Lake St. Martin
Lyle Leask	Sapotaweyak Emergency Management Operations - Pelican Rapids
Marjorie Nielsen	Peguis First Nation

Mark Anderton Jr.	Swampy Cree Tribal Council
Mark Anderton Sr.	Mosahikiken Cree Nation/Moose Lake
Marshall Laurence	Waywayseecappo First Nation
Martin Favel	Peguis First Nation - Councillor
Meagan Spence	Peguis First Nation - Housing Dept
Melanie Thompson	Pinaymootang First Nation / Fairford
Paul Personius Jr.	Opaskwayak Cree Nation
Rob Forbister	Peguis First Nation
Ryan McCorrister	Peguis First Nation
Sasha Young	Opaskwayak Cree Nation - Youth Representative
Shayne Lynxleg	Tootinaowaziibeeng Treaty Reserve
Theresa Bighetty	Pukatawagan, Mathias Colomb Cree Nation
Theresa Bighetty's Granddaughter	Pukatawagan, Mathias Colomb Cree Nation
Tony Traverse	Kinonjeoshtegon First Nation (Jackhead) - Councillor
Wanda Corman	Pinaymootang First Nation
William Ferland	Swampy Cree Tribal Council - Grand Rapids - Misipawistik
William Sutherland	Peguis First Nation - Housing Dept - Flood and Housing

Coordinating Team

Erika Quiring	Acosys Consulting
David Carriere-Acco	Acosys Consulting
Stephen Bird	Acosys Consulting
David Cook	Natural Resources Canada (NRCan)
Jocelynn Proulx	Natural Resources Canada (NRCan)

Proceedings

Introductions and Prayer

The meeting was introduced by Erika Quiring (Acosys Consulting). She welcomed the participants in attendance, talked about OCAP™, what experiences the group might have today, and that is acceptable and welcome to everyone to share their thoughts and opinions at any time. The participants each introduced themselves.

After introductions, Theresa Bighetty, an esteemed Elder from Pukatawagan, did a prayer to open the meeting.

Presentation: Floods, Flood Mapping, Values.

First, Stephen Bird (Geoscientist, Acosys Consulting) gave a PowerPoint presentation with terminology used in flood mapping by authorities, including inundation, risk, hazards, integrated flood management, data acquisition, traditional and local knowledge, modeling, values, flood mapping (and more). Briefly, the content of the presentation was:

There are three types of maps that are usually made for flood mapping:

1. Inundation maps:
    a. Show floodwater extents
    b. Used for emergency management and other rapid-production uses
2. Hazard maps:

   a. Engineering maps showing extents of different floods
   b. Can include depths and velocities
3. Risk maps:
   a. Show risks of flood hazard to socio-economic values
   b. Used to identify consequences of flooding

The community can help especially at the 3a stage...they can specify what values are important. Flood maps are mostly created to protect infrastructure and human life but maybe other values are important.

For flood mapping, Traditional and Local Knowledge:

- can be used to calibrate and validate models used to predict the extent of floodwaters across a floodplain
- can also help to fill in gaps where no local streamflow records are available
- can be used to extend the streamflow record, especially important and useful if very large historical floods can be added to the record (e.g., if someone remembers or has been told how high the flood waters were during a huge flood in 1891…engineers can use this information if the can translate the memory into a location and elevation)

Guided Discussion

Question 1: What values are important for your community to protect from floods?

The group offered a lot of insight on important values. Here is a summary:

1. The people themselves. Prioritization of Indigenous lives. Support and not racism. Unique lens of each community.
2. Land, and the land base available to First Nations.
3. Environmental quality including but not limited to:
   a. Wildlife – muskrat, fish, beavers, moose, frogs, tadpoles. Birdsong. Ptarmigan. Animals living where and in accordance with their needs. Whitefish spawning.
   b. Seneca root. Plants that bear food. Gardens, soil quality, agriculture. Medicine, teas, traditional harvesting. Forest health.
   c. Contamination of land from flooding. Winter water flow – safety. Effects from upstream. Mercury in water.
   d. Natural weather patterns, natural water flow, natural patterns. Underlying geology.
4. Traditional hunting, trapping, gathering areas. Burials and gravesites. Economic activities that are valued in day-to-day life, such as fisheries. Social activities that are valued in day-to-day life, from playgrounds to band offices to gathering places.
5. Access – damaged roads. Disruption to lives and communities. Real impacts and human costs. Damages to houses, community buildings, everything lost.

Question 2: How do you feel traditional knowledge should be integrated?

The group shared knowledge on how First Nations should be respected including integration of Traditional Knowledge. Here is a summary:

1. Resources and funds for the communities and Tribal Councils to develop their own capacity for emergency management and flood preparation.
2. Respect for Traditional Knowledge in planning and decision-making instead of mockery. Respecting the local context and knowledge. Professional engineers don't know best.

3. Listen to the First Nations people when they say what the risks are.
4. Provide support not road blocks.
5. When First Nations say environmental assessment and monitoring needs to be done, regulators should listen.
6. Resources and funds to do risk assessments for flood impacts and projects that may cause flooding or changes in water management.
    a. Assessment should include all contributing problems – from climate change (permafrost melt, changing timing of spring thaw, etc.)
    b. Upstream construction (drainage, etc.) needs to be incorporated into maps to improve predictions
    c. Pinch points (ice jams) and low-lying areas that often flood can be identified by First Nations who know the area.
    d. Effects should be considered on interconnected natural world. Including things that might not seem important, like a little snail (Aphis sp.) that only occurs at the Dauphin River outlet…
    e. Negative social impacts should be considered. Communities don't see the positive outcomes.
    f. Consultants are often biased in favour of whoever is paying them.

Question 3: What is your experience with the federal government and floods, preparation, prevention, management, and engagement?

The participants shared their experiences accessing funding and interacting with federal employees who are responsible to engage with First Nations on flood and emergency management.

1. Funding is often short term, whether it is for a program or a position. The purpose and eligibility is often not very clear. And because the timelines are so short (1 year or 2 years), everything ends just as it gets going.
2. Some funding programs (1st Nations Adapt) were very good for those communities that were able to access it and have resulting in good plans being made. But some communities missed the opportunity. And the program was not renewed.
3. Programs provide funding for only some of what is necessary. There is no funding for capacity development or equipment, only salary and travel. So you have a person with a job title but what does that title mean if they can't DO anything?
4. Eligibility for emergency funding triggered only by provincial flood forecasts, which are often wrong. The province doesn't listen when communities tell them what they know the risk is/will be. A "state of emergency" needs to be declared by the province, but they don't recognize the emergencies on First Nations lands. There is a disconnect.
5. Bureaucrats do not care if they humiliate people. They don't try to help unless you are friends with them.
6. Bureaucrats "nickel and dime" First Nations on reimbursement of eligible expenses. They do not understand the actual costs. They do not understand operational decisions that need to be made in emergency situations. Start/stops of work result in increased costs but are unavoidable with weather delays.
7. Bureaucrats don't release funding until the community completes follow up time consuming and detailed reporting. And they don't provide any support on the reporting.

8. Bureaucrats have no idea what it is like in the actual First Nation. Or what it is like in a flood. They should visit and then they would understand.

Question 4: What have you been saying that the federal government has not heard?

The participants expressed frustration with federal/colonial processes and systems, and highlighted cultural differences and the impacts on First Nations that are experienced.

1. Housing should be a priority. Permanent, safe, located in places where it will not be destroyed by the next flood. Damage control is not good enough.
2. Funded positions (jobs) should be envisioned as first responder, responsible for equipment, emergency services, helping Tribal Council reserves. Getting the ball rolling in an emergency. Expanding roles to meet needs. Prevention, preparation, and response.
3. The timing of federal programs does not align with Indigenous communities' needs or the seasons of the year. For instance, housing starts. Dikes should be built during the dry season, not during the fall and winter. The fiscal year should be moved back three months, or doing multi-year projects without paperwork.
4. Flooding and clean up don't align with the fiscal year. Release of money is at the wrong time. Delays result in poor repairs, incomplete work, and an inability to plan properly for the communities.
5. Funding for capital expenditures, long term solutions are needed. This is a systemic problem.
    a. Funding needed for infrastructure development to protect communities.
    b. Funding needed for equipment.
    c. Funding needed for capacity development.
6. Communities should be supported in flood emergencies. Safe housing in the city(ies) developed with each unique community for the times of emergency. This problem is worsening over time. People have lost hope.
7. Support in alternatives that are put forward by the First Nations – is there an alternative location for the community? Have the lands been lost or damaged beyond repair? Is compensation needed? Is remediation work possible and needed? How can things be cleaned up so the families and community can return?
8. A proactive approach would be preferred to the current reactive approach. Within communities, leadership is blamed because no prevention is in place when funding is denied. It is a no-win situation and First Nations are being set up for failure by the federal government.

Additional Question:

How can the federal government back you up with the province of Manitoba?

1. First Nations are tired of jurisdictional boundaries. First Nations shouldn't have to deal with the artificial governance model/problem of federal/provincial.

Small Group Exercise: Indigenous-Led Model of Flood Management

Note: This exercise was not completed/was removed from the agenda because it was assessed that the items were covered in the preceding guided discussion.

Instruction

In your small group, look at the example inundation, hazard, and risk maps and decide:

- What values are important to protect from flooding?
- What level of risk do you want to plan for?
- What Traditional Knowledge you would want to use to inform your planning process?
- Who do you want to work with on the mapping and emergency preparedness?
- Are these maps the sort of maps you want?
- Which of these maps are the most useful? How could they be better or adapted for your purposes?

Pick someone in your group as a spokesperson and we will share after lunch.

Presentation: Technology Used in Flood Mapping

Stephen Bird talked about technologies used in flood mapping. Some key words and concepts are:

- river bathymetry using echo sounders in deep rivers and a total station in shallow streams
- hydrometric monitoring stations to measure water height
- topographic surveys
- drone surveys
- all data feeds into a hydrodynamic model that simulates the propagation of floodwater across floodplain areas
- return periods derived from local streamflow records are used to model the return period of a given flood
- data is usually collected by professional engineers or their technicians. Community members could be trained and help collect data (i.e., work as a technician) or other roles.
- Traditional Knowledge and Ecological Knowledge can help calibrate/validate these models

Small Group Exercise: Flood Scenarios.

Creation of an Indigenous Flood Map by each group and Presentation and Discussion by each Group.

Instruction

In your small group, pick one scenario and draw the lakes, rivers, community locations, and other features on the poster board to make a map of the scenario. Use your imagination and your knowledge and work together with your group to make the best flood map possible for the community in the scenario.

Consider the following suggested topics:

- What do you need to see on your maps?
- What are the values that you need to protect?
- How large an area would you want to map?
- What type of imagery? What tools are you using? Who is doing the mapping?
- How does climate change factor into the scenario?
- Which federal department would you connect with for support?
- What support do you need to receive from the federal government?
- What sorts of projects or programs would not be useful? From your own community, are there projects or programs that have been started and then abandoned or resulted in no action?
- What so-called solutions would cause more problems? (Such as evacuation?
- Drainage? Other?)

Again, pick someone in your group as a spokesperson and we will share after the afternoon break.

Scenario #1 – The Prairie River Valley

The Prairie River flows from the west, crossing the provincial border. Your community is located in the Prairie Valley and overlooks the river. There is a lot of snow this year, and spring runoff is expected to be high.

The province to the west has a provincial emergency order to build a drainage channel from Bigfish Lake, where the water is exceptionally high, and they have dug a permanent channel that flows into the Prairie River. There are control structures to maintain water levels in the Bigfish Lake for recreational use, but when the water reaches a certain height, they release water into the Prairie River, which reaches your community around 40 to 60 hours after the release.

Buildings and roads in low-lying areas of your community sometimes flood even in ordinary high run-off years. If the water is very high, there is a potential that several community buildings can be flooded to varying degrees, including many family homes, the store and gas station, as well as the band offices. There is also a risk that flooding could damage an older bridge and block access on the road that connects the community to the outside world.

The provincial water authority has indicated that they will provide 48-hour notification of the volume of water released along with predictions of water levels at the station located at the bridge. Still, no certainty can be provided as to what the water level will be.

Here is the map that was drawn by the group presented by two of the group members. This group took the drawing home.

Figure 3: Group presenting Prairie River Valley Scenario flood map including Indigenous priorities to meeting participants. February 9, 2023. Winnipeg, MB. Photograph by David Acos. NRCan photo 2023-021

Scenario #2 – In the Shadow of a Dam

Your community is located in the boreal forest of northern Manitoba, next to an ancient river. Upstream is a dam site where the provincial crown electrical company generates electricity, and large power lines run south. The water levels are variable depending on how much water they release from the dam. They retain water for most of the year and release it to meet customers' demand during peak seasons, usually cold and hot periods (to meet the need for heating and cooling systems). When they release the water, it flows rapidly and scours the sides of the river. Many small creeks and channels are plugged up or high and dry. The increased flow is also physically dangerous and prevents access via the river to the surrounding area during peak releases.

From a municipal management perspective, in addition to the bank erosion, you are also at risk of high-water flooding infrastructure, including the only bridge into the community, the road out, and numerous homes and facilities. A landfill is located about 100 m away from the river.

Additionally, some lakes alongside the river have been drained for industrial projects or for experiments by non-profit environmental organizations. Land users report that the drained areas are dry, and the vegetation, including trees, is changing. They are concerned about wildlife, including furbearers and larger animals such as moose and caribou, as well as fish and birds.

Here is the map that was drawn by the group:

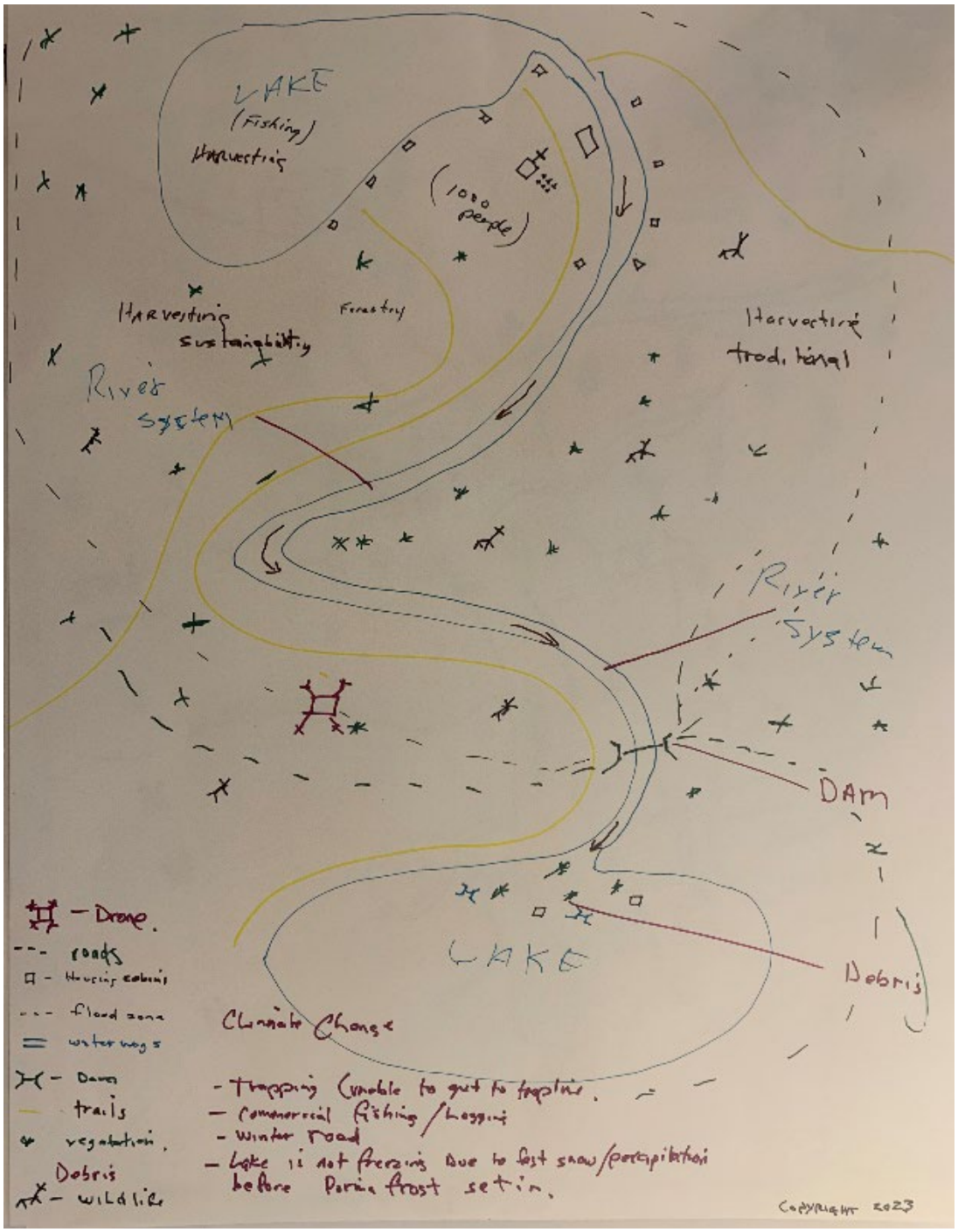
Scenario #3 – The Historic Community Flooded

You live in a community in the boreal forest of northern Manitoba. The location of your community was determined after it was decided to build a dam project for hydroelectric power generation. The original areas of your village and family homes and much of your traditional territory are now underwater, in the reservoir created by damming the river. The lakes, rivers, and forests as they had existed are gone or changed beyond recognition, as are the rapids where they built the dam. Many places in your traditional territory were lost, including land, lakes, bays, and rivers that now only exist in the memories of the Elders in your community. The ability of the people to hunt, fish, and gather has changed because the animals, the fish, and the forest have been affected by flooding and altered habitat.

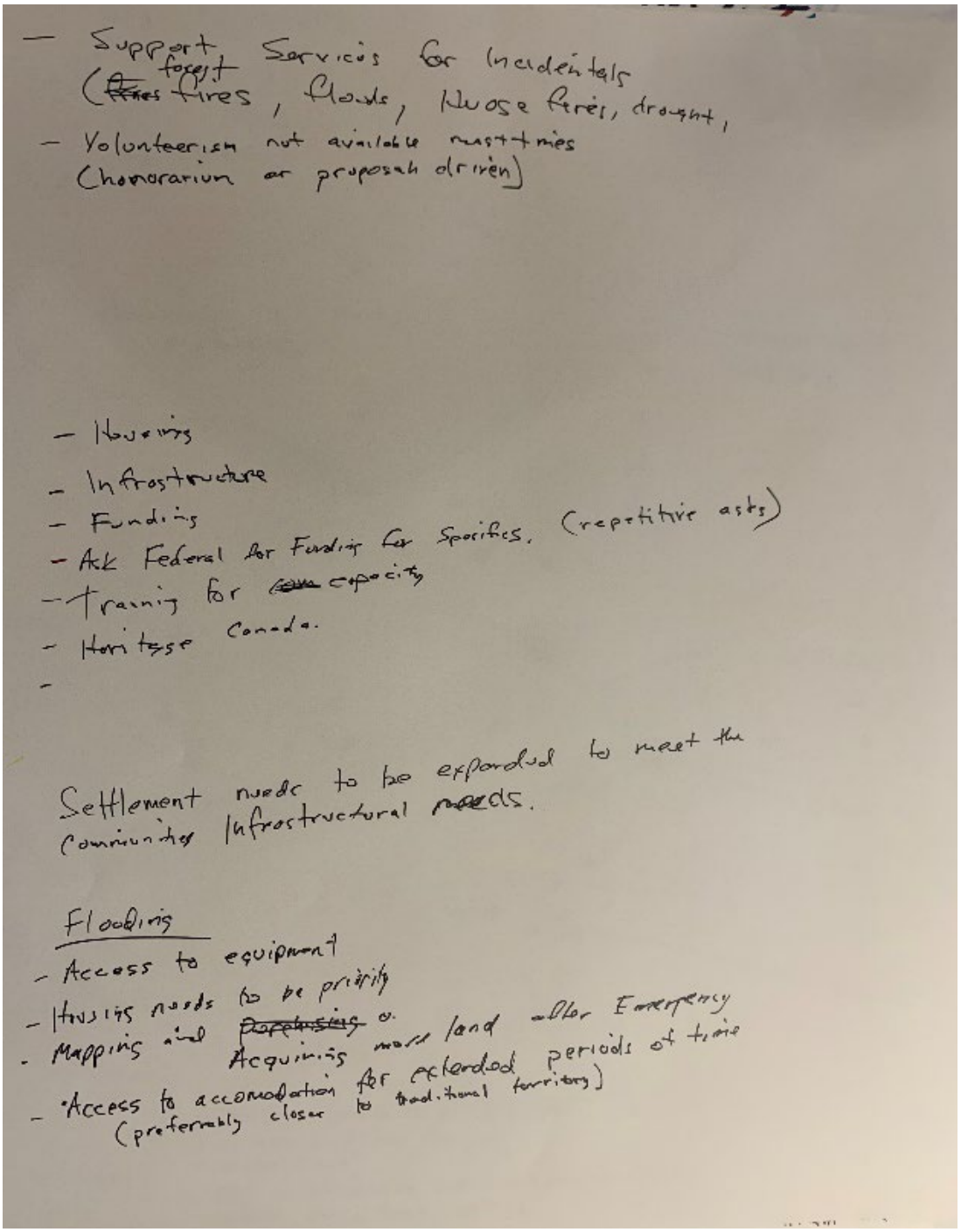
The flow of water has also changed. Lake levels differ because the hydro utility keeps water in the reservoir so it can be released during peak periods. Changes in water levels upstream and downstream do not mimic natural seasonal water level patterns. You see silt accumulating in the lakes, and this affects how the water flows. Debris, such as tree trunks, create hazards to navigation and can also destroy nets and traps set for harvesting. In your community and surrounding area, there is occasional flooding of infrastructure and community facilities, including docks, roads, and structures in low lying areas. You have an emergency management group tasked to manage flood risk.

Despite all this damage, your community continues to follow traditional lifeways, and numerous families and individuals have cabins, traplines, and other land-based commercial enterprises. Your community has worked to document some of the Traditional Knowledge and keeps the information in a secure database at the band office. From this study, you know many of the locations that active land users identified as important to them for various reasons. There is concern within your community about water quality, fisheries, lack of animals, and the ability of future generations to follow traditional lifeways.

Here is the map that was drawn by the group:



And explanatory notes:



Scenario #4 – The Flood Diversion Channels

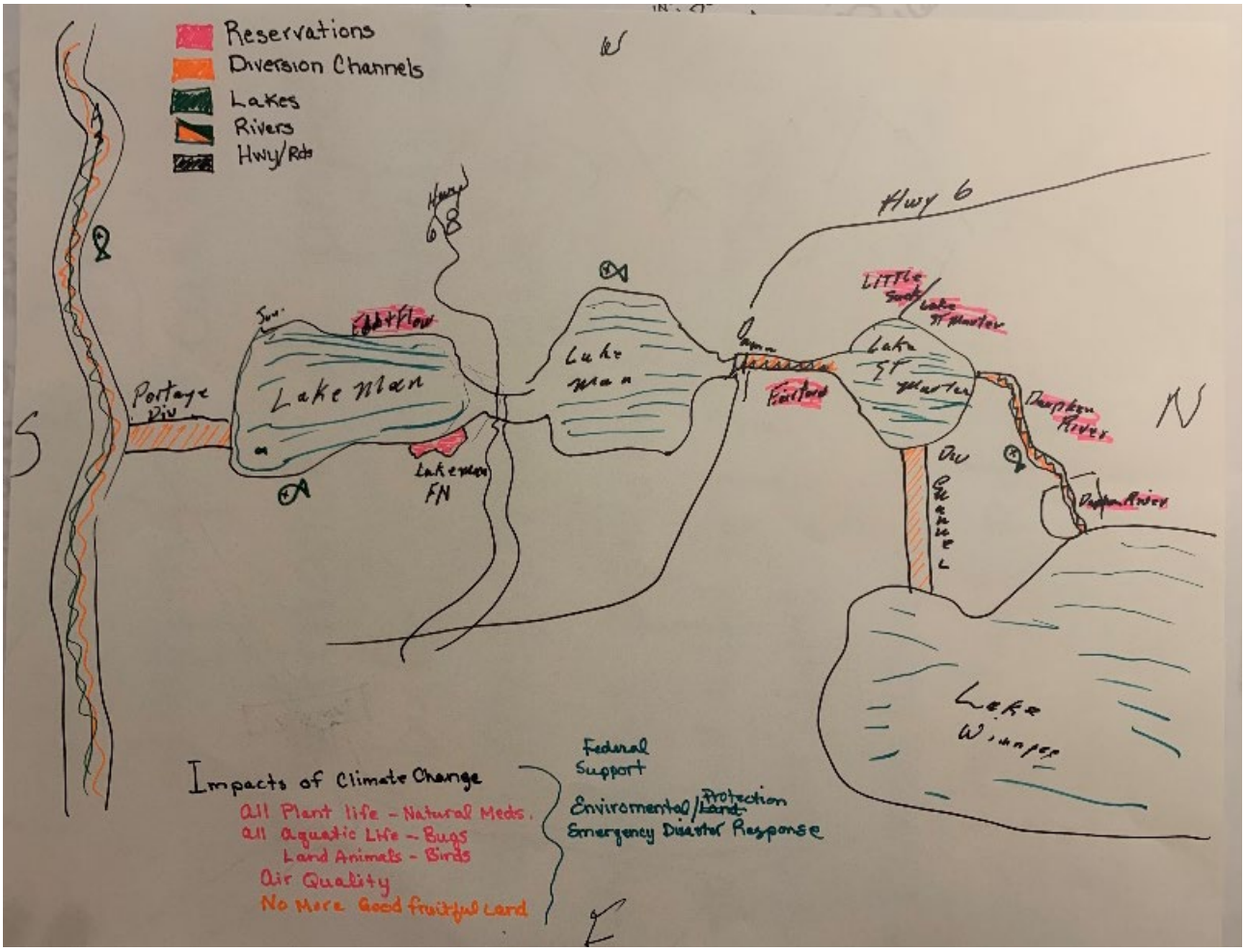
You live in a community in a low-lying region between several large lakes that are the centre of several major watersheds. Water flows to the lakes from all directions.

Upstream from you, there are several cities and towns and extensive agriculture on the floodplains of the rivers that flow towards your region. Diversion channels, dams, and diking to protect urban centres, farmland, and rural residences have resulted in increased flow to the lakes that your community is situated between.

Most of the diversion initiatives were built as emergency measures, and the downstream effects on your First Nation community were not considered. Flooding is now an annual problem that affects your ability to build, plan, and thrive. Community life has been completely disrupted. Many families have been displaced, homes and community buildings are condemned, and there has been no action to fix the problems.

A new diversion project is planned where a direct channel will be constructed between two of the large lakes near your community. This multi-year project will permanently modify the landscape and water flow in the region. It is planned to be built on provincial crown land and/or expropriated land.

Here is the map that was drawn by the group:



Final Discussion

Final advice was given by participants to Acosys and NRCan.

- Manitoba Hydro and the government of Manitoba should be here as part of the conversation.
- This should be the first meeting in an ongoing conversation. Multiple individuals would like to be part of a working group, going forward.
- Action is what matters. More talk is not the solution.

Thanks and Closing Prayer

Thanks were made. Elder Theresa Bighetty said a closing prayer. The group dispersed.

Engagement Session Summary

The one-day meeting in Winnipeg was attended by numerous individuals representing themselves, their communities/Nations, and Tribal Councils. The focus of the meeting was to obtain feedback from First Nations on federal engagement on flood mapping. The participants shared that they would like to participate actively in flood mapping as a component of proactive emergency management, and that they see opportunity for the federal government to improve practices around several aspects of emergency management (including proactive flood management):

- Respect for and inclusion of Traditional Knowledge, cultural perspectives, and Indigenous identified priorities (values);
- Environmental management and assessment should be completed to a standard relevant to Indigenous communities, in their distinctness and diversity;
- That financial resources and federal support should be put forward to meet the identified priorities, in accessible long-term programs to empower communities and acknowledge solutions identified by Indigenous expertise;
- That federal authorities should seek to understand Indigenous realities and experiences, including timelines, bureaucratic processes and procedures, reporting, and provision of appropriate support systems (e.g., applications, reporting, procurement, capacity development, more);
- That the federal government should support the development of a collaborative working group that seeks to empower Indigenous communities at the table with other partners to co-manage related challenges and to co-develop solutions. In addition to Indigenous representation, participants should include: power (hydro) authorities, provincial and municipal governments, water authorities, etc.

The meeting participants expressed loud and clear that First Nations people are tired of talking about the problem and that they are looking to the federal government to act. Some possible tools to move from words to action could be:

- Formation of a collaborative working group that seeks to address emergency management needs, including integrated flood mapping.
- Programs to sustain necessary repair and maintenance.
- Programs to develop proactive and preventive management.
- Programs that develop proactive housing strategies to meet the needs of the communities.
- Technical capacity development, including flood mapping workshops with technical expertise including Manitoba Indigenous expertise in flood mapping.
- Initiatives that support the government's commitment to 5% Indigenous procurement.
- Distinction-based approach to service provision that recognizes that each First Nation community is unique, with unique solutions, challenges, and goals.

It is acknowledged that not every element of the above is strictly related to flood mapping. However, as flood mapping is one component of preparedness that intersects with numerous other components, it is not possible to consider the other pieces without considering flood mapping. Therefore, it is difficult to separate flood mapping from other aspects of emergency management.

Integrated Discussion

The following discussion is presented relative to the objectives of the project, in consideration of the information presented above.

Objective 1

To identify end user gaps in capacity in using/creating flood mapping for community and resource management.

The FFMGs are available to First Nations communities as they are to everyone. However, capacity varies greatly between communities. Communities range in population from under 200 to greater than 10,000 individuals. Communities are reliant on Tribal Councils and other representative groups for technical elements from emergency management to financial development. Broadly, most First Nations in Manitoba lack capacity and resources for the use and creation of flood maps for their communities.

The following would be beneficial:

- Provision of training to familiarize technicians with the utility and format of the FFMGs.
- Provision of training to increase facility with necessary tools and formats (e.g., metadata).
- Technical certification could be developed.
- Provision of tools to support the work of technicians (apps, software, data storage).
- Provision of funding to support independent capacity development.
- Provision of funding to support collaborative initiatives and co-development of regional products.
- Provision of technical support on an as-needed basis.
- Provision of support for financial reporting.
- Provision of long-term, multi-year programming that will enable the First Nations communities to substantively improve programming to serve their communities and/or member nations.
- Tools/data that incorporate, in a timely manner, new upstream activities that may affect First Nations, such as agricultural drainage, dams, accurate projections for environmental impact assessments, etc.

With respect to funding and provision of resources, resources that may be provided for a narrow or limited topic or stream can severely hinder the ability to implement necessary work over time. The communities have expressed that they wish to develop their capacity, be supported towards sufficiency, and that definite action and measurable outcomes are their goals. For example, funding for flood mapping capacity development for future protective infrastructure and incorporating Traditional Knowledge of the local rivers, linked to an INFC project budget, may be better for a community than any of those projects independently.

Objective 2

To identify gaps and opportunities for NRCan to edit or modify Federal Flood Mapping Guidelines for the inclusion of Indigenous Traditional and Ecological Knowledge.

Due to the explicit lack of past federal engagement with First Nations in Manitoba, it is recommended that NRCan undertake an inclusive approach to include Traditional Knowledge and Land use into the FFMGs.

A pilot study could be undertaken with a Tribal Council or Tribal Councils to co-develop a working model or end product. Collaborative learning initiatives could be undertaken where expertise between First Nations groups could be shared in a series of modules or technical workshops. Capacity development such as is described above (Objective 1) could be implemented. Traditional Knowledge studies could be undertaken systematically as a joint NRCan and First Nations initiative. An iterative approach to development of a series of context specific approaches, checklists, decision tree, or other selection criteria would be beneficial.

Participants in the Winnipeg Engagement Session on February 9th were interested to form a Working Group for flood emergency management; flood mapping could be a key element of such a group, and a committee could provide guidance to NRCan on inclusion of Traditional Knowledge products for use in flood mapping applications.

As a government department that fulfills a technical service provision role to Canadians rather than a regulatory role, NRCan may be uniquely and beneficially positioned to facilitate relationships between government and First Nations, between government departments, and between the federal government, provinces, and First Nations.

Objective 3

To conduct community engagement with First Nations communities in Manitoba in an inclusive process.

This objective was completed via the one-day engagement session in Winnipeg on February 9th.

It is recommended that the relationships that were built on that day be developed in further engagement and/or collaborative processes.

Objective 4

To identify potential process (best practices) for the inclusion of traditional and ecological knowledge into the flood hazard mapping process.

Best practice for NRCan to incorporate Traditional and Ecological Knowledge into the flood hazard mapping process would include or consider:

- A distinction-based approach for individual communities/Nations/Councils and other entities that may represent groups. A cookie-cutter approach is unlikely to address specific needs for different communities that have different regional and flood contexts.
- Participatory processes with local experts to understand distinct needs of communities, perhaps via Tribal Councils or other representative entities that may understand local requirements, or by a nomination process from within the community (as may be relevant).
- Provision of capacity development services (training, accessible databases, data storage, data management service, collaborative app development, other).
- Provision of detailed base maps/layers to facilitate review by communities.
- Inclusion of historical data, especially in areas where land use and watercourses/ waterbodies have been modified (e.g., by hydrogeneration, diversions, etc.).
- Inclusion of locations of areas of cultural and/or environmental relevance/significance (soil maps, harvest areas, trap lines, burials, historic waterways, that may indicate values of importance to a community etc.).
- Inclusion of areas of concern to First Nations, such as locations where environmental change has been observed.

- Provision for monitoring elements that are identified as priority elements.

Objective 5

To collect, collate and produce a conference report including proposed best practices for maximizing local/ ecological and traditional knowledge in the FFMGS.

A conference report was prepared and provided to NRCan in March 2023, and is reproduced above in the section titled “Engagement Session”.

Objective 6

To develop guidelines to incorporate traditional knowledge in flood maps communities in Manitoba that updates understanding of potential risk to residents, housing, business and infrastructure and traditional activities.

Values identified by participants in the engagement session in Winnipeg on February 9th, 2023, emphasized that:

- Indigenous lives need to be prioritized in the development of all guidelines, in risk assessment, and in program planning.
- The land base available to First Nations is extremely limited (reserves, incursions into Traditional Territory) and should be ranked a high value.
- Environmental quality includes the interconnected natural world, and all of its components – wildlife, plants, medicinal plants, soil, water, habitat, the needs of each organism and system.
- Contamination should be avoided, including on land and in the aquatic environment. Protection is key.
- Safety is highly valued, including physical health, indicators of health, contributors to health, and mental health, such as is derived from a healthy natural environment.
- Natural weather patterns and water flow. Underlying geology.
- Value should be accorded to areas where First Nations people hunt, trap, and gather. Burials and gravesites. Economic activities that are valued in day-to-day life, such as fisheries. Social activities that are valued in day-to-day life, from playgrounds to band offices to gathering places. Traditional use areas.
- Value should be accorded to access, for instance the value of intact transportation systems. Real infrastructure and housing costs. Disruption to lives and communities. Real impacts and human costs. Damages to houses, community buildings, everything lost. The value of disruptions to lives and communities needs to be quantified.

If a quantification process is utilized, the value determination, or valuation, of indicators or endpoints should be determined by and further verified by First Nations. First Nations people and governments have complex and comprehensive understanding of what their communities require and of the natural environment. Their knowledge and authority respected and listened to.

We also heard that First Nations people are subject to mockery and racism in their interactions with federal bureaucrats in some of their work. It is important that practitioners within the federal government obtain an understanding of cultural uniqueness and distinctions of each community. Cultural learnings beneficial to practitioners may include training in the history of Indigenous peoples in Canada, visits to and/or billets in First Nations communities, specific anti-racist education, and other lessons that First Nations people may choose to impart on an individual or group basis.

Objective 7

To assess the applicability of the NRCan guidance material in a northern context where ice-jam flooding is prevalent and there are limited data and access to flood information.

- Guidance material could include a system or key by which users could identify specific features that may have applicability in their context.
- Guidance material could include scenario-based approaches.
- Guidance material could include up to date integration with upstream hazards and major contributors to flood risk, such as dams, that are known to have significant downstream impacts.
- Traditional knowledge around pinch points should be expressly developed and mapped by regions and communities.

Objective 8

Production of a case study report for northern communities, based on relevant NRCan guidance material for northern communities, that will inform, or be integrated with, future iterations of the Federal Flood Mapping Guidelines Series. (This report).

Objective 9

Produce a "Glossary of Flood Impact" terms in Ojibway and Cree languages.

A specific glossary was not produced for the project. However, consideration was made to concepts and phrases that do not appear to be relevant to First Nations ways of knowing. Additionally, in so much as the writers are capable of understanding, where there are important concepts that First Nations have communicated but that non-Indigenous listeners or readers have not understood, there are further gaps. For instance, there may be relational challenges between linguistic groups where direct cognates do not exist for specific terms and concepts. The following are some specific items where the writers have observed gaps in understanding or confusion from one side to the other:

- Interconnectedness is frequently emphasized by First Nations in describing systems and impacts.
- The notion of flood mapping is sometimes seen as irrelevant by First Nations people, who know perfectly well the risks and likely inundations, given a set of conditions.
- A situationally customizable "river corridor map" or "environmental river map" may better represent what First Nations communities require to communicate hazards, risks, and inundation between members and to outsiders. This is possibly reflected in the maps that the engagement participants created during the afternoon group exercise.
- Methods of ranking importance of values and variables may differ between First Nations and non-Indigenous.

This is an element that will require additional collaboration to elucidate.

Conclusion

We know from a review of the background information on flooding impacts to First Nations in Manitoba, the gap analysis of federal engagement on flood mapping (and related topics), and from the feedback offered by First Nations people in Manitoba that a/ it is a big problem, b/ the federal government could

engage more fulsomely on the topic(s), and c/ First Nations in Manitoba are frustrated with the present lack of progress.

While there are still many conversations to be held, and decisions to be made, NRCan is uniquely positioned to act to deliver and co-develop technical services to and with First Nations communities. The foundational work to understand needs, challenges, and perspectives combined with a creative approach to possible directions and solutions provides a good base for future collaborative effort.

NRCan is ideally positioned to assist provinces, including Manitoba, and other federal departments to address needs relative to First Nations citizens. Partnerships that seek to fill gaps identified in service delivery toward an acceptable standard of living for Indigenous Canadians would be beneficial.

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Appendix A – 2022 Disaster Financial Assistance Arrangements – Manitoba

Manitoba Backgrounder

APPROVED 2022 MITIGATION AND PREPAREDNESS PROGRAM PROJECTS

- Municipality of Emerson-Franklin: up to a maximum of $20,629.21 for sewer lift station generators for Dominion City and Emerson;
- Rural Municipality of Montcalm: up to a maximum of $10,818.27 for a reserve fund;
- Rural Municipality of Ritchot: up to a maximum of $63,225.09 for a reserve fund;
- Municipality of Clanwilliam-Erickson: up to a maximum of $8,566.58 to expand drainage capacity by installing additional culverts in rural areas;
- Rural Municipality of Cornwallis: up to a maximum of $38,668.12 to study high-water levels on Lake Clementi to provide options for long-term solutions;
- Municipality of Harrison Park: up to a maximum of $15,677.18 to change main lift station to a submersible pump;
- Town of Minnedosa: up to a maximum of $23,202.57 for a flood mitigation study;
- Rural Municipality of Minto-Odanah: up to a maximum of $9,489.27 for water retention structures;
- Rural Municipality of Mountain: up to a maximum of $8,295.70 for a reserve fund;
- Town of Neepawa: up to a maximum of $48,123.53 for the replacement and relocation of public infrastructure subject to flooding;
- Rural Municipality of Rosedale: up to a maximum of $12,900.66 for a sandbagging machine and safety signage;
- Rural Municipality of Whitehead: up to a maximum of $14,212.74 for larger culverts, beaver cages, and a generator for a reception centre;
- Rural Municipality of Yellowhead: up to a maximum of $15,584.07 to develop a drainage plan;
- City of Morden: up to a maximum of $84,048.99 to increase the capacity of the Parkhill Street Bridge on Dead Horse Creek;
- Rural Municipality of Alexander: up to a maximum of $32,624.00 for an engineering study to evaluate raising existing dikes/building new dikes to protect Hillside Beach area and Victoria Bay Estates;
- Rural Municipality of East St. Paul: up to a maximum of $82,322.13 for a municipal land drainage study;

- Rural Municipality of La Broquerie: up to a maximum of $56,927.13 for an emergency generator;
- Rural Municipality of Louise: up to a maximum of $17,141.63 for a drainage study near Pilot Mound;
- Rural Municipality of Morris: up to a maximum of $25,809.79 for road improvements to raise Road 2E (Riverside Road);
- Rural Municipality of Piney: up to a maximum of $15,601.00 for road improvements to raise Road 81E south of Sprague;
- Rural Municipality of Portage la Prairie: up to a maximum of $58,306.92 for a reserve fund;
- Rural Municipality of Rhineland: up to a maximum of $49,257.84 for equipment purchases to monitor Border Road during flood events;
- Village of St-Pierre-Jolys: up to a maximum of $11,046.83 for the third phase of the northwest storm sewer upgrades;
- Rural Municipality of Thompson: up to a maximum of $12,849.87 to hire a consultant to study drainage issues in Miami;
- Rural Municipality of Woodlands: up to a maximum of $32,141.61 for a drainage improvement feasibility study for the town of Warren;
- Town of Altona: up to a maximum of $36,120.16 to expand the existing northwest storm drainage ditch;
- Rural Municipality of Souris-Glenwood: up to a maximum of $21,560.36 for a reserve fund for future improvements of drainage systems;
- City of Selkirk: up to a maximum of $88,916.36 for a structural assessment of the Selkirk wharf, a land drainage study and master plan and public education supplies;
- Rural Municipality of Argyle: up to a maximum of $8,414.21 for a reserve fund;
- Rural Municipality of West Interlake: up to a maximum of $18,860.02 for a reserve fund;
- Rural Municipality of Grey: up to a maximum of $21,306.41 for a reserve fund;
- Town of Teulon: up to a maximum of $10,124.14 for emergency operations centre equipment, safety equipment, tractor pumps and hoses and training;
- Rural Municipality of Dufferin: up to a maximum of $21,526.50 to rip rap culverts;
- Rural Municipality of Grahamdale: up to a maximum of $10,818.27 for 3.5 miles of road survey for initial flood mitigation strategy development;
- Rural Municipality of Ellice-Archie: up to a maximum of $7,034.42 for a reserve fund;
- Rural Municipality of Stanley: up to a maximum of $76,024.17 for a generator for municipal offices;

- Rural Municipality of St. Francois Xavier: up to a maximum of $12,265.79 for culvert/drain upgrades in high risk areas;
- Municipality of Mossey River: up to a maximum of $12,274.25 for an enclosed trailer for a culvert steamer;
- Municipality of Norfolk Treherne: up to a maximum of $14,983.05 for the Alberni flood prevention project;
- Municipality of Glenboro-South Cypress: up to a maximum of $9,506.20 for an alarm system for the lift station and lagoon;
- Rural Municipality of Coldwell: up to a maximum of $11,114.55 for drainage upgrades;
- Rural Municipality of Gimli: up to a maximum of $55,606.59 for larger capacity pumps;
- Municipality of Gilbert Plains: up to a maximum of $12,020.30 for a reserve fund;
- Rural Municipality of Roland: up to a maximum of $9,692.43 to raise Arctic Road;
- Rural Municipality of Armstrong: up to a maximum of $16,650.66 for an enclosed trailer for a culvert steamer;
- Rural Municipality of Hanover: up to a maximum of $145,733.44 for water pumps;
- Rural Municipality of Victoria: up to a maximum of $10,056.42 to undertake drainage work with the Redboine Watershed District;
- Municipality of North Norfolk: up to a maximum of $33,140.48 for a reserve fund;
- Municipality of Rockwood: up to a maximum of $71,444.60 for the purchase of pumps, undertaking road improvements, and completing road 88N ditching project;
- Municipality of Bifrost-Riverton: up to a maximum of $28,103.80 for pumps and a pump trailer;
- Town of Powerview-Pine Falls: up to a maximum of $10,488.14 for a reserve fund;
- Rural Municipality of Riding Mountain West: up to a maximum of $12,206.53 for a reserve fund;
- Municipality of Swan Valley West: up to a maximum of $23,354.94 for a reserve fund;
- Municipality of Minitonas-Bowsman: up to a maximum of $13,433.96 for a reserve fund to increase the culvert size at NW10-35-26W1;
- Municipality of Ethelbert: up to a maximum of $5,485.32 for a culvert steamer;
- Rural Municipality of De Salaberry: up to a maximum of $33,165.87 for a reserve fund;
- Municipality of Glenella-Lansdowne: up to a maximum of $9,590.85 for a reserve fund;

- Village of Dunnottar: up to a maximum of $8,371.89 for a reserve fund;
- Rural Municipality of St. Andrews: up to a maximum of $99,235.20 for a reserve fund for future dike repair;
- Municipality of Deloraine-Winchester: up to a maximum of $12,511.27 for a reserve fund;
- Rural Municipality of Victoria Beach: up to a maximum of $5,832.39 for the purchase of a skid steer to deliver materials for dike repair and maintenance;
- Rural Municipality of Lac du Bonnet: up to a maximum of $30,160.80 for a reserve fund;
- City of Dauphin: up to a maximum of $70,835.12 for a reserve fund;
- Rural Municipality of Brokenhead: up to a maximum of $45,829.51 for rip rap at selected sites;
- Municipality of Oakland-Wawanesa: up to a maximum of $14,881.47 for a reserve fund;
- Municipality of Roblin: up to a maximum of $26,148.39 for a generator;
- Rural Municipality of Dauphin: up to a maximum of $18,081.24 for a reserve fund for future road raising;
- Rural Municipality of Lakeshore: up to a maximum of $10,039.49 for a reserve fund;
- Rural Municipality of Whitemouth: up to a maximum of $13,797.95 for culvert upgrades;
- Municipality of Prairie View: up to a maximum of $18,292.87 for a reserve fund;
- Municipality of McCreary: up to a maximum of $6,331.82 for a reserve fund to purchase generators, undertake lagoon repairs, and undertake sewer line replacement;
- Municipality of Pembina: up to a maximum of $20,366.79 for a culvert steamer with covered trailer;
- Rural Municipality of Alonsa: up to a maximum of $10,242.65 for a diesel water pump;
- Municipality of Grassland: up to a maximum of $13,400.10 for emergency response supplies;
- Municipality of Rossburn: up to a maximum of $8,236.45 for a portable generator;
- Rural Municipality of Cartier: up to a maximum of $28,306.96 for a reserve fund for a generator;
- Rural Municipality of West St. Paul: up to a maximum of $56,563.13 for upgraded culvert capacity;
- Rural Municipality of MacDonald: up to a maximum of $68,735.80 for one-in-200-year flood risk mapping on the La Salle River;

- Rural Municipality of Headingley: up to a maximum of $36,661.92 for a reserve fund for the Dodd's Road Flood Mitigation Project;
- Rural Municipality of Springfield: up to a maximum of $136,642.03 for a reserve fund;
- Municipality of Ste Rose: up to a maximum of $13,467.82 for a reserve fund;
- Municipality of Ste. Anne: up to a maximum of $47,268.56 for a drainage project with the Seine Rat Roseau Watershed District;
- Municipality of Cartwright-Roblin: up to a maximum of $11,309.24 for a reserve fund;
- Rural Municipality of Oakview: up to a maximum of $16,320.52 to purchase pumps to assist with heavy rain events;
- Rural Municipality of St. Laurent: up to a maximum of $13,053.03 for a reserve fund;
- Rural Municipality of St. Clements: up to a maximum of $98,075.49 for a reserve fund for flood mitigation equipment;
- Municipality of North Cypress-Langford: up to a maximum of $25,488.12 for a reserve fund intended for bridge enhancements;
- Town of Winnipeg Beach: up to a maximum of $12,181.14 for a reserve fund; and
- Town of Arborg: up to a maximum of $10,826.74 for the purchase of flood tubes.