

# Partners in Climate Action:

## How Beardy's and Okemasis' Cree Nation is addressing flood-related risks through knowledge sharing and collaboration

### CASE STUDY

The following case study looks at how Beardy's and Okemasis' Cree Nation (BOCN) engaged in adaptation planning due to concerns related to frequent flooding and associated impacts on community health and infrastructure. In 2013, BOCN responded by enhancing their adaptation knowledge, skills and tools through funding provided by the Climate Change Adaptation Program of [then] Aboriginal Affairs and Northern Development Canada.

This case study presents how adaptation planning has increased the community's adaptive capacity by building climate change considerations into land-use and emergency planning and by expanding its network of partners, which enabled research on community concerns and access to additional funding. The case study also highlights key insights for other communities.

### BEARDY'S AND OKEMASIS' CREE NATION

Beardy's and Okemasis' Cree Nation (BOCN) is located between the North and South Saskatchewan Rivers to the north of Saskatoon where the boreal forest meets

the plains. The First Nation covers about 20,500 hectares, which includes just over 9,100 hectares of land acquired through Treaty Land Entitlement<sup>1</sup> (BOCN, 2017b). BOCN has nearly 3,425 registered members, of whom approximately 40 per cent live on reserve. The community generates revenue through

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<sup>1</sup> BOCN is one of 25 First Nations in Saskatchewan that signed a Treaty Land Entitlement Framework Agreement on September 22, 1992: "Under this agreement, the provincial and federal governments committed to providing the signatory First Nations with \$440 million over 12 years to buy land, mineral rights and improvements, which include buildings and structures affixed to the land" (Indigenous and Northern Affairs Canada [INAC], 2017, para 3).



land leases, operation of Blackhawks Gas and a skills training centre in Duck Lake.<sup>2</sup> BOCN also established the Willow Cree Development Corporation to partner with companies interested in conducting business with the community (BOCN, 2017a).

BOCN initiated an adaptation planning process due to severe spring flooding over multiple years including 2005, 2007 and 2011. Repeat flooding caused extensive damage to infrastructure and created safety concerns. For example, road washouts led to accidents and drowning deaths, and heightened concerns over community access to emergency response. Flooding also led to black mould growth in houses, as well as contamination of drinking water, contributing to health problems for community members. Lost revenue from about 360 hectares of flooded agriculture leases led to decreased funding for important youth and elder programming. It is estimated that inadequate water management coordination and planning on and off reserve in the past led to an additional loss of just over 3,600 hectares of suitable farm land over time (Clark's Crossing Gazette, 2017) and millions of dollars in estimated lost economic opportunities (Personal communication, Alfred Gamble, January 24, 2018). These cumulative impacts revealed that existing infrastructure was inadequate to withstand current climate variability, therefore leaving the community more vulnerable to climate change.

In response to some of these challenges, a representative from BOCN joined the Prince Albert Model Forest Network (PAMF) in 2007 (and became an official member of the board in 2008) to help build community capacity (Welter, 2016). As a result, BOCN was actively involved in 18 direct and indirect projects and programs with the PAMF between 2007 and 2014. One of these programs that PAMF was directly involved in was the Saskatchewan Rangers Program for youth from Beardy's and Okemasis' and surrounding First Nations communities to gain skills in the resource sector, including first aid, chainsaw safety and Traditional Knowledge gathering (Welter, 2016). A project that PAMF was indirectly involved in was related to climate change and adaptation planning, described in the following sections.

### Adaptation Planning Process

BOCN started its adaptation planning process through funding provided by the [then] Aboriginal Affairs and Northern Development Canada's Climate Change Adaptation Program in 2013 in partnership with PAMF and the Saskatchewan Research Council (SRC) (Welter, 2016).<sup>3</sup> The community piloted a handbook created specifically for adaptation in rural communities called "Pathways to Climate Change Resilience: A Guidebook for Canadian Forest Communities," as described in Box 1 (Pearce & Callihoo, 2011).

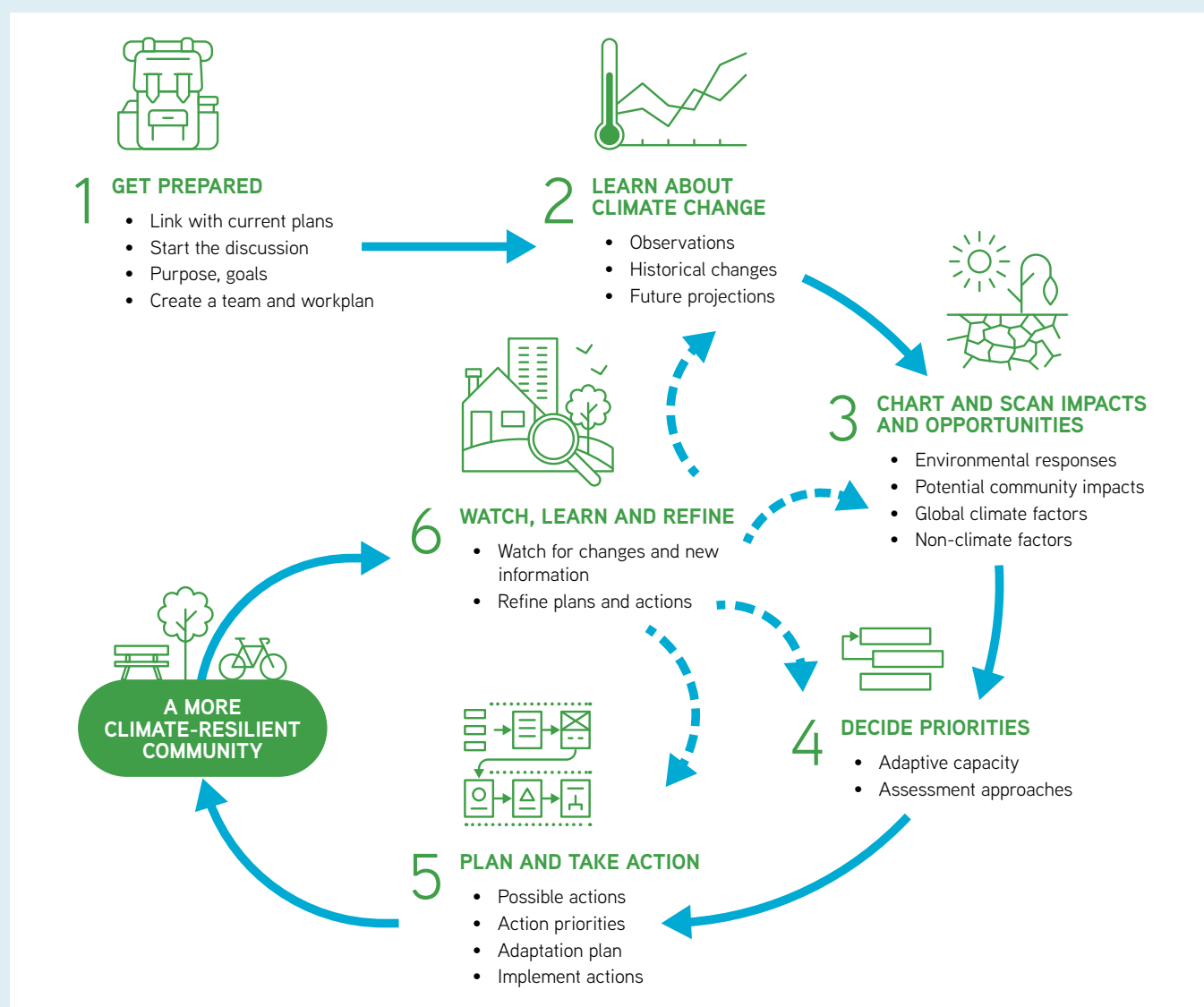
<sup>2</sup> There were 38 active leases/permits on the First Nation's land leases as of December 31, 2016 (including cottage, residential and commercial leases) (BOCN, 2016).

<sup>3</sup> The project's formal title was Climate Change Vulnerability Assessment, Adaptation Planning and Knowledge Transfer for Beardy's and Okemasis First Nation, Saskatchewan.

## BOX 1: PATHWAYS TO CLIMATE CHANGE RESILIENCE GUIDEBOOK

The *Pathways to Climate Change Resilience Guidebook* is a resource designed to help rural Canadian forest-based communities undertake climate change adaptation planning. It is a trail map of how small communities can learn more about climate change, identify what its impacts might be in their unique geographic, social, cultural and economic situation, and help them identify priorities for moving forward.

The trail map includes a series of six steps for communities to follow as summarized in Figure 1 below (Pearce & Callihoo, 2011, p. 5)



**Figure 1. Trail Map from the Pathways to Climate Change Resilience Guidebook**

Source: Pearce & Callihoo, 2011.

The chapters correspond with each step of the trail map and emphasize the need to learn, monitor, and adjust plans and decisions based on observed changes and new information. A *Community Resource Collection* document acts as a supplement to the guidebook. It includes examples of other community planning approaches, references and sample materials.



The adaptation process was facilitated by Cindy Pearce, a professional forester and Principal of Mountain Labyrinths Inc., a consulting company based in Revelstoke, British Columbia that specializes in rural natural resource development and community planning. The process started with a community meeting in 2013 where community members shared observed changes in climate over the past 30 years, including impacts these changes had on their community and traditional area. These observations were consistent with climate data and the knowledge of specialists from the SRC and University of Saskatchewan researchers present at the meeting. Band staff also met with these climate specialists following the meeting in early 2014 to explore how to incorporate climate resilience into planning (BOCN, 2014).

Changes in climate observed by the community and in historical climate records were linked to five main risks and associated impacts for BOCN:

- **Greater variability in precipitation from year to year**, which has led to extended drought and flooding periods. Larger extremes and unpredictability create challenges in determining how to adapt at the community level.
- **Warmer, shorter winters**, which have led to changes in plant, wildlife and insect distributions. New species have been observed in the traditional area, including pronghorn, cougar and wood ticks, some of which are invasive species. Traditional food sources such as deer and berries have also declined in quality and quantity.
- **Higher winds and more frequent windstorms**, which have led to power outages, damage to buildings and downed trees.
- **Greater amounts of rainfall and increased intensity of rainfall events**, which have led to flooding of essential roads and homes that threatens the health and safety of community members. Flooding also leads to contamination of drinking water, loss of revenue from agriculture leases, and increased risk of West Nile virus and Lyme disease.
- **Longer periods with very hot temperatures**, which have led to health impacts for community members, especially elders and young children. Higher temperatures alongside drought increase wildfire risk and levels of wildfire smoke in the community (BOCN, 2014).

## Key Actions

In early 2014, the top six priorities for strengthening the community's resilience were set by the chief, a councillor, several band staff members and other community members based on the recommendations from the 2013 community meetings (BOCN, 2014). These priorities (ranked from highest to lowest) were:

1. **Healthy Band members** – Reduce risks to drinking water quality through improved monitoring and addressing cistern contamination, relocation of the water treatment plant for easier access during flooding, preparation of a Health Plan that includes health impacts from climate change, and communication of health risks to community members related to climate change.
2. **Emergency preparedness** – Update emergency response plan to include extensive flooding, tornadoes, power outages lasting longer than one day (especially in winter), a pandemic and an evacuation plan. They also planned to provide household information and practice emergency scenarios.
3. **Community revenue** – Diversify agricultural crops, increase land rental rates and encourage more tourism.
4. **Road access** – Secure funding to enhance road structure to increase resilience to flooding and water.
5. **Housing** – Relocate and build new houses outside of flood prone areas and incorporate climate resilient design into houses.
6. **Watershed planning and land use** – Monitor surface and groundwater, forest pest outbreaks and complete watershed scale land-use plans incorporating climate projections (BOCN, 2014).

## Initial Results

Adaptation planning by BOCN helped to establish a wide network of partners. This network helped the community access the tools, resources and information required to demonstrate the shortcomings of existing infrastructure and resulting impacts on community members, leading to funding and support for longer-term solutions.

To address risks to drinking water quality, BOCN partnered with the Department of Geography and the Schools of Environment and Sustainability and Public Health at the University of Saskatchewan, as well as the SRC to conduct research on climate change, water and health. For example, graduate students from the Schools of Public Health and Environment and Sustainability along with researchers from the SRC designed and conducted studies looking at connectivity between surface water and groundwater, abandoned wells

and risk of contamination of groundwater from surface water flooding, and sources of contamination for cistern drinking water. One of these projects was undertaken in partnership with Yellow Quill First Nation. This research has provided more information around risk and ways to mitigate it, such as increasing monitoring of groundwater after flood events, decommissioning abandoned wells, and creating guidelines for cistern water supply maintenance and monitoring. This research also built capacity by providing funding to hire community research assistants from BOCN and training in research and technical skills such as water sample collection and conducting interviews with community members. As a result of these initiatives, community members from BOCN are developing a higher level of preparedness for future risks related to drinking water and flooding.

To secure community road access and reclaim flooded agricultural land, remote sensing and predictive GIS mapping was used to demonstrate how previous planning in the community had contributed significantly to flooding issues. In the 1950s a secondary road was built through the community and new culverts were installed at an existing drainage ditch. GIS mapping revealed that these culverts were built one foot higher than the original water level, which caused water to accumulate from the surrounding area. Using this information, funding was secured from [then] Indigenous and Northern Affairs Canada to design and build an expanded drainage ditch with larger culverts in the spring of 2018 (Clark's Crossing Gazette, 2017). This project should mitigate flooding and related problems caused by past planning and design flaws while building resilience to climate variability and change.

## Lessons for Other Communities and First Nations

The following points highlight lessons learned by BOCN through its adaptation process that may apply to other communities and First Nations:

- **Establish a community champion.** This can help coordinate adaptation efforts and ensure adaptation is integrated in all aspects of community planning and development. BOCN had a project champion that developed network connections, applied for funding, conducted GIS mapping and analysis to inform planning, and engaged the community to move adaptation planning forward.
- **Develop a wide network of partners.** This can help communities access resources for research and projects to support adaptation. BOCN found that connecting with the PAMF prior to the adaptation planning process provided opportunities for partnerships with organizations, governments and universities. These collaborations led to

research projects that generated data that gave credibility and proof for adaptation needs, as well as funding for projects to build resilience.

- **Build community capacity.** Adaptation planning can be an opportunity to leverage existing community capacity and to bring in resources and expertise that will further develop this capacity. For BOCN, using adaptation project funding to pilot the *Pathways to Climate Change Resilience Guidebook* gave participants the opportunity to share observations and learn more about how climate change may impact their community. Research partnerships with the University of Saskatchewan enabled community research assistants to learn valuable research and technical skills.
- **Include the community in planning.** Community buy-in and participation in developing adaptation strategies is key to ensuring long-term success. BOCN found that validating past climate and current changes using Traditional Knowledge was a powerful way to engage community members in adaptation initiatives and ongoing monitoring.
- **Collaborate with other communities.** Collaborating with other communities undergoing research or adaptation planning can help secure project funding and leverage resources. For example, BOCN was able to secure funding for a project to study drinking water quality by partnering with Yellow Quill First Nation.

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