



## **FNFNES**

**First Nations Food, Nutrition and Environment Study**

## **Summary of key findings** for eight Assembly of First Nations regions **2008-2018**

University of Ottawa  
Université de Montréal  
Assembly of First Nations  
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# 1 TITLE AND METHODS

## Why was FNFNES undertaken?

This is the first comprehensive study to address gaps in knowledge about the diet, traditional food and environmental contaminants to which First Nations are exposed.

There has been a gap in our understanding of dietary patterns, nutrition and exposure to contaminants from food because of the exclusion of the First Nations population on reserve from other national studies.

Key objectives included determining:

- ▶ patterns of use of traditional and store-bought foods and nutrient intake among adults living on reserve
- ▶ food security status of households
- ▶ exposure to chemical contaminants in traditional food and tap water
- ▶ kinds and amounts of agricultural, veterinary and human pharmaceuticals present in surface water bodies on reserve

The first comprehensive study to address gaps in knowledge about diet, traditional food and environmental contaminants.

## FNFNES: a community-based participatory research project

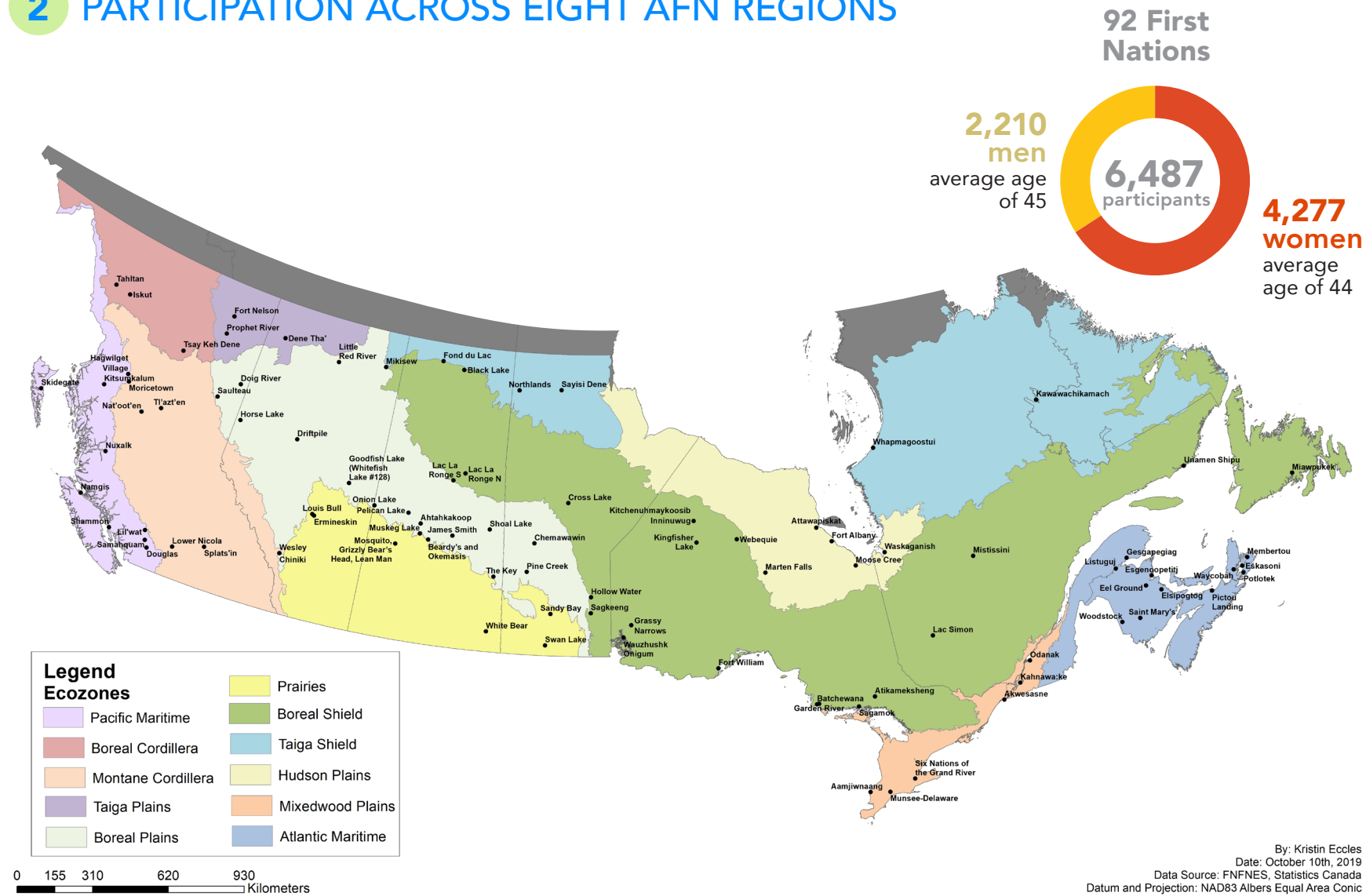
FNFNES is the largest nutrition, food security and food safety study conducted in Canada with First Nations. FNFNES used a standard approach, with identical tools and methodology to conduct a survey of First Nations adults living on reserves in each of the eight AFN regions south of the 60<sup>th</sup> parallel in Canada. To ensure the study assessed and represented the diversity of First Nations' diets, a random sampling strategy was adopted, based on an ecosystem framework that included 11 ecozones.

Participating First Nations were involved in the planning and implementation of data collection for the five principal study components:

- ▷ household interviews
- ▷ tap water sampling for metals
- ▷ surface water sampling for pharmaceuticals
- ▷ hair sampling for mercury
- ▷ traditional food sampling for contaminants

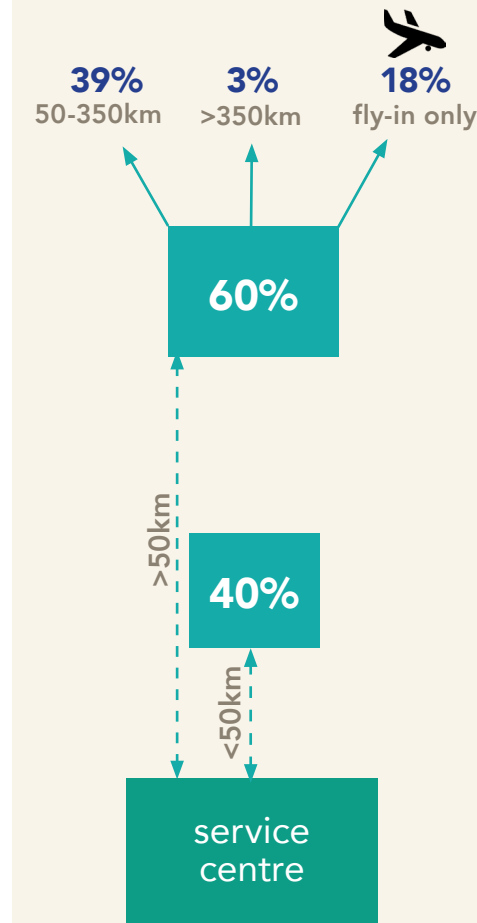


## 2 PARTICIPATION ACROSS EIGHT AFN REGIONS



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### Location of First Nations



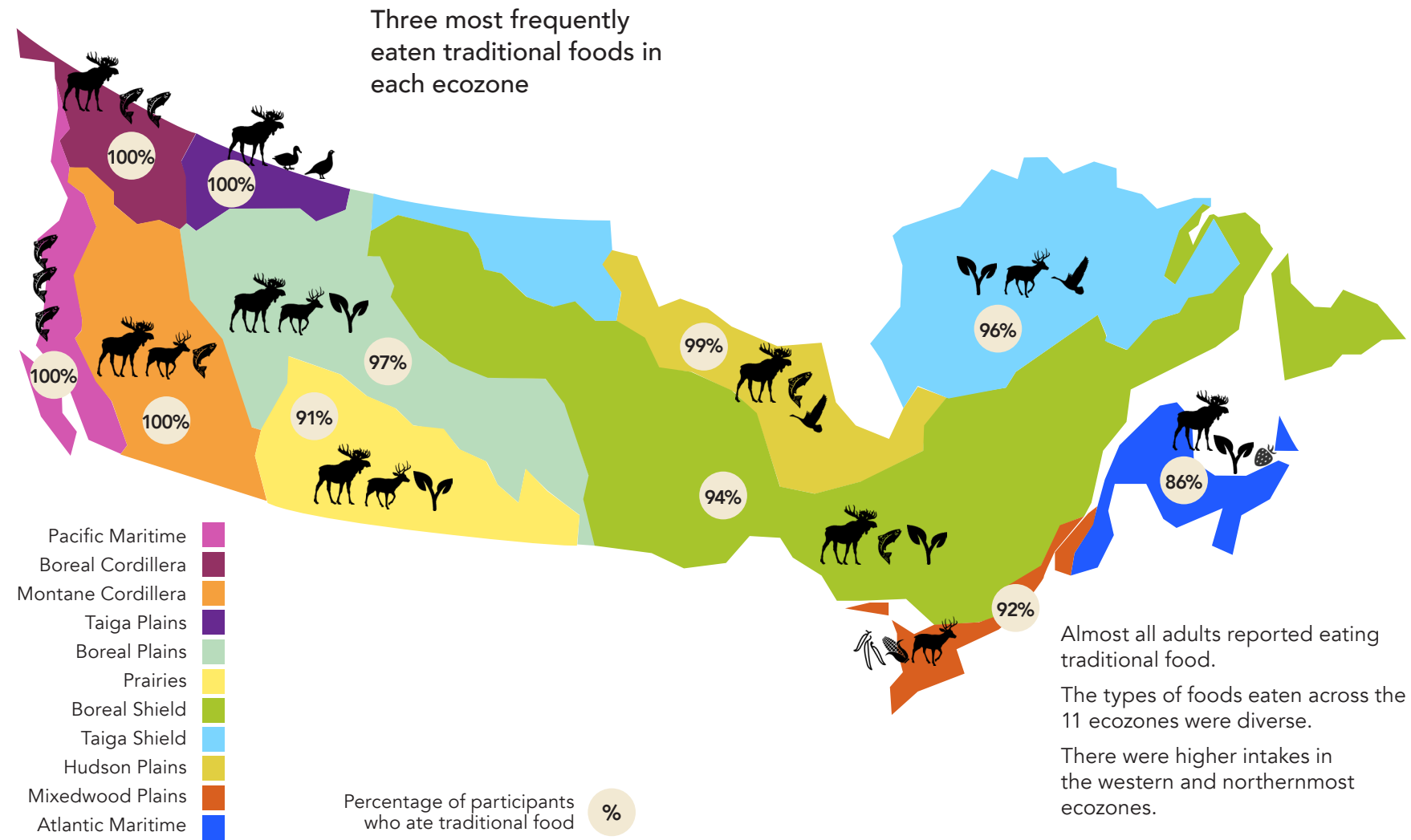
AFN regions	# of FN	# of households	data collection	community reporting back	DTW*	regional report release
BC	21	1103	2008-09	2010	2011	2011
MB	9	706	2010	2012	2012	2012
ON	18	1429	2011-12	2013	2014	2014
AB	10	609	2013	2015	2016	2016
NB NL NS PEI (Atlantic region)	11	1025	2014	2016	2017	2017
SK	13	1042	2015	2017	2018	2018
QC & LAB	10	573	2016	2018	2019	2019

\*Data training workshop

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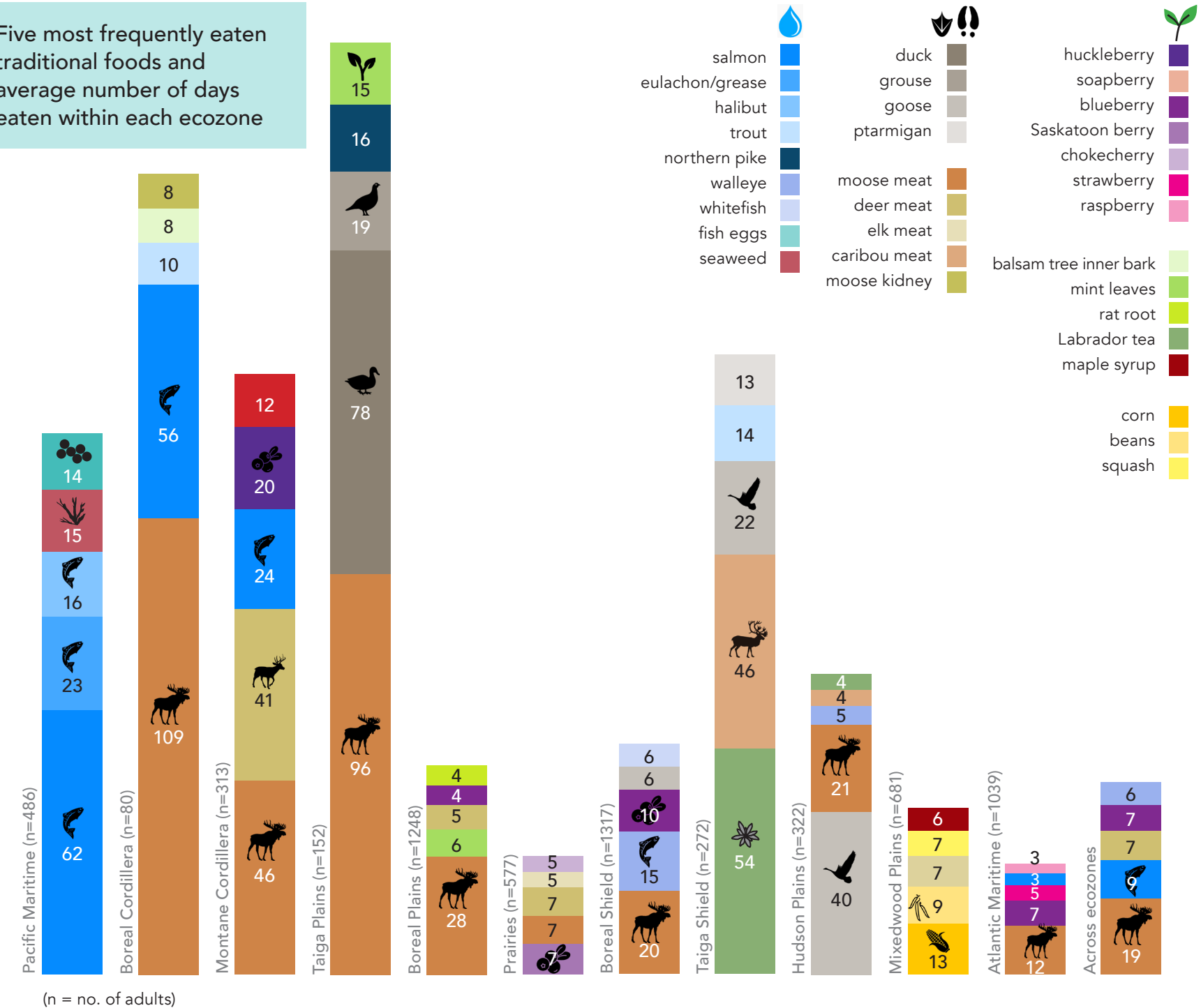


### 3 TRADITIONAL FOOD DIVERSITY AND COMMON FOODS



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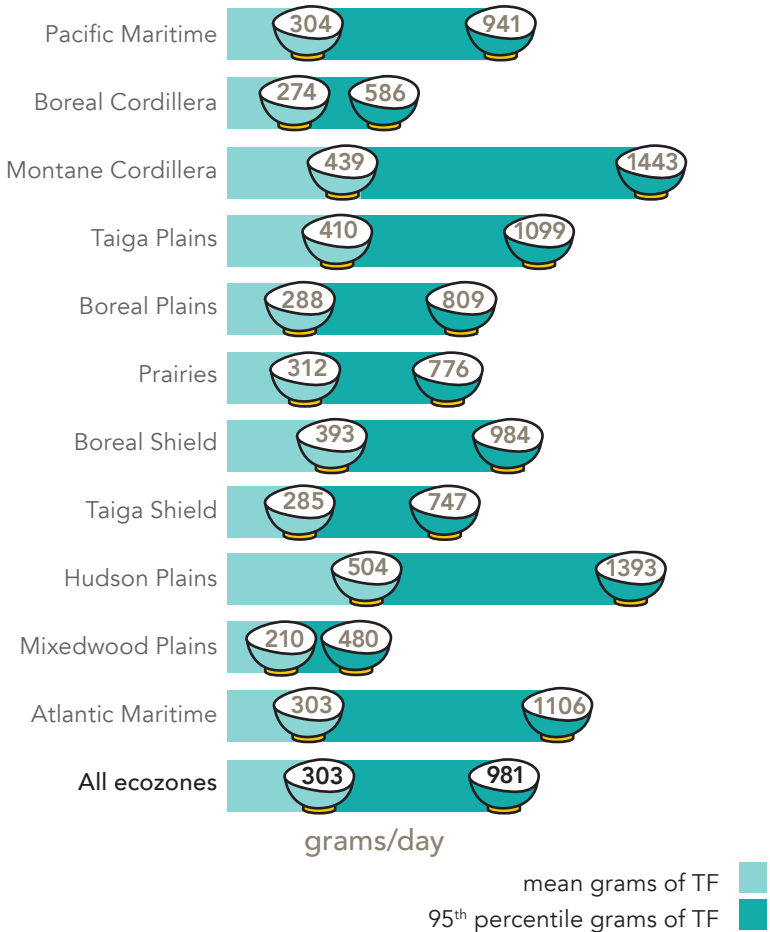
#### Five most frequently eaten traditional foods and average number of days eaten within each ecozone



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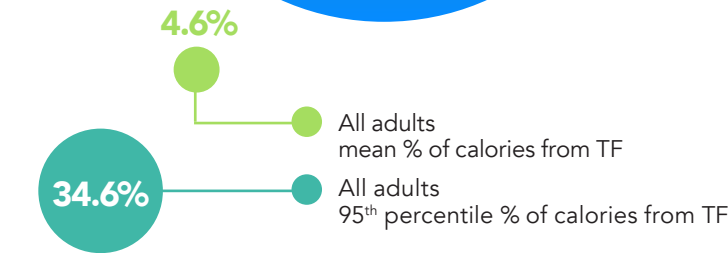
Average daily intake of traditional food was **61 grams** (¼ cup) while some adults reported eating more than **1,000 grams** (4 cups).

Daily intake of traditional food (TF)

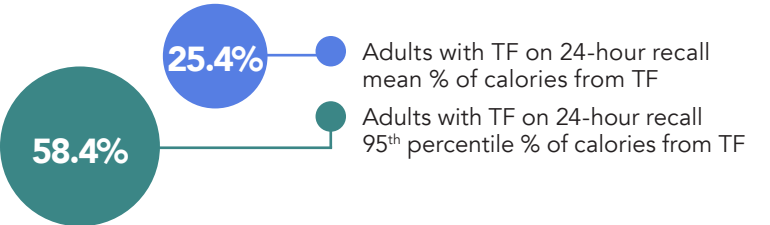


Calories from traditional food

On days traditional food (TF) was eaten, the **intake of almost all nutrients was significantly higher** while the intake of saturated fat was lower.



When we excluded those who did not eat traditional food on their dietary 24-recall interview (detailed information about all the foods and beverages eaten in the previous 24 hours), intakes of TF increased.

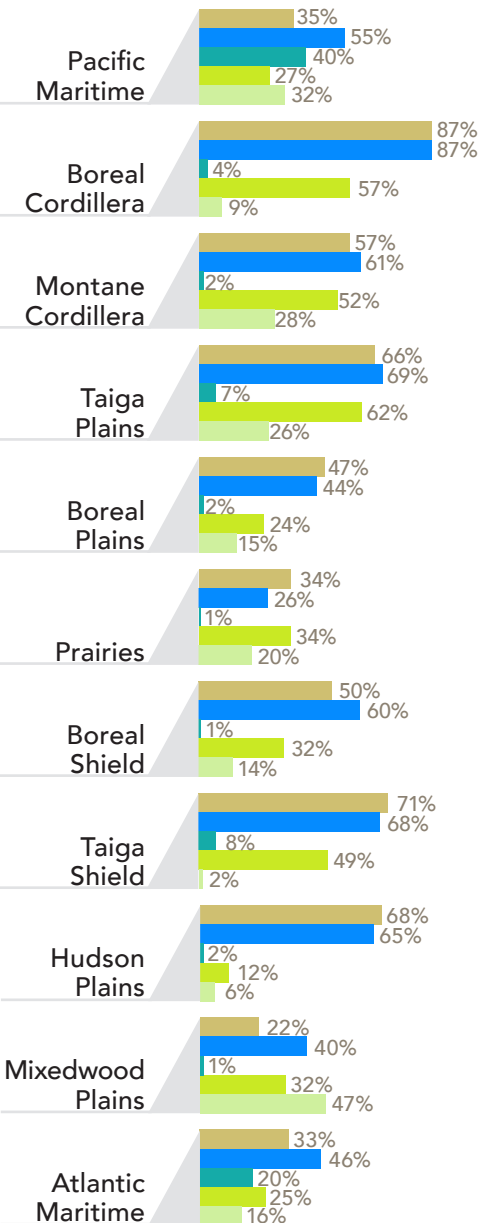


Across the regions and ecozones, most households were actively engaged in food harvesting and production.

4 HARVESTING

Food harvesting barriers

- external**
  - industrial activities (forestry, farming, mining, hydro)
  - recreational activities (non-Indigenous harvesters)
  - government regulations
  - climate change (impacting availability and lifecycle)
  - access issues
  - availability of traditional food
- household level**
  - insufficient resources to purchase/operate equipment
  - lack of a hunter
  - time



Percentage of households participating in any harvesting and production practices by ecozone



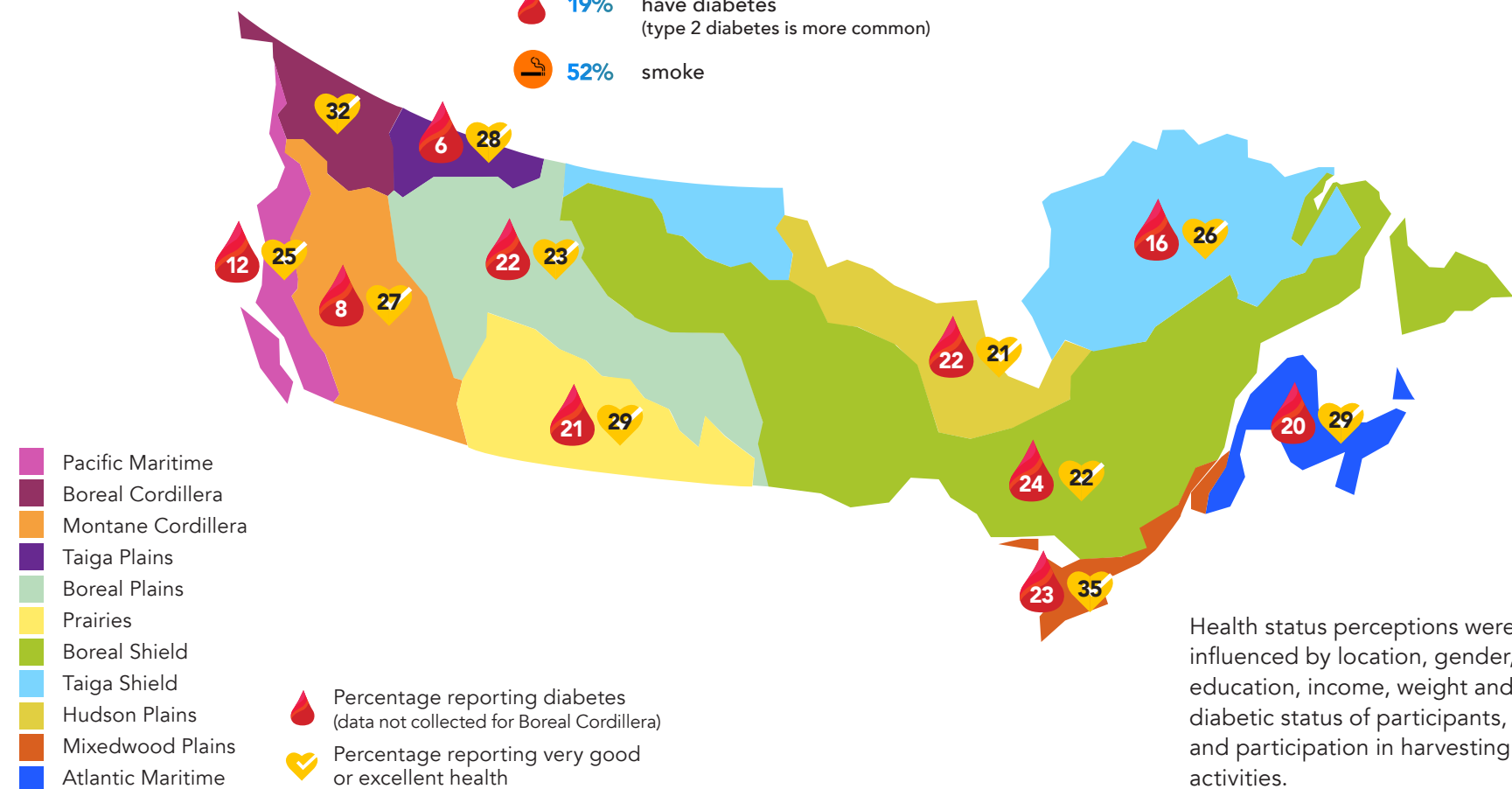
## 5 WELL-BEING, FOOD SECURITY AND DIET

### Well-being

#### Overall well-being across regions

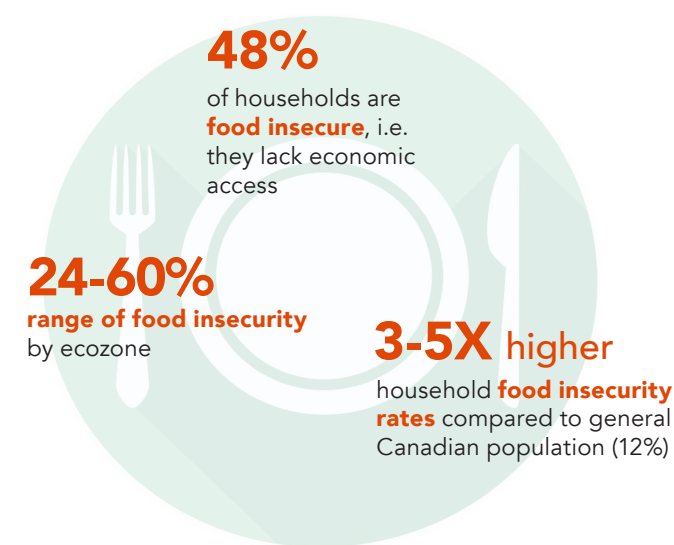
- ✓ 26% said health was very good or excellent
- 🏃 37% physically active
- ⚖️ 17% at a healthy weight
- 💧 19% have diabetes (type 2 diabetes is more common)
- 🚬 52% smoke

Measures of health continue to show that there remain large inequities in well-being between First Nations and the non-Indigenous population.



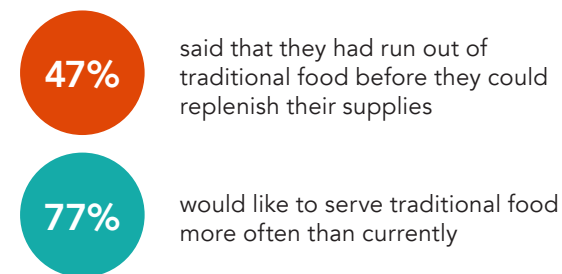
### Household food security

FNFNES measured the financial ability of households on-reserve to purchase store-bought food. Access to traditional foods was captured through questions about harvest practices, barriers to traditional food use and adequacy and availability of traditional food supplies.



Percentages of **total household food insecurity**

Foods from the traditional food system are currently also out of reach for many families.






Diet

The diet of First Nations adults does not meet nutrition recommendations. Intake of vitamins A, D and C, folate, calcium and magnesium are inadequate.

Intakes of many nutrients were significantly higher for those able to include some traditional food in their diet compared to those who only ate store-bought food.



Game meat was a key source of iron



Fish was a key source of vitamin D

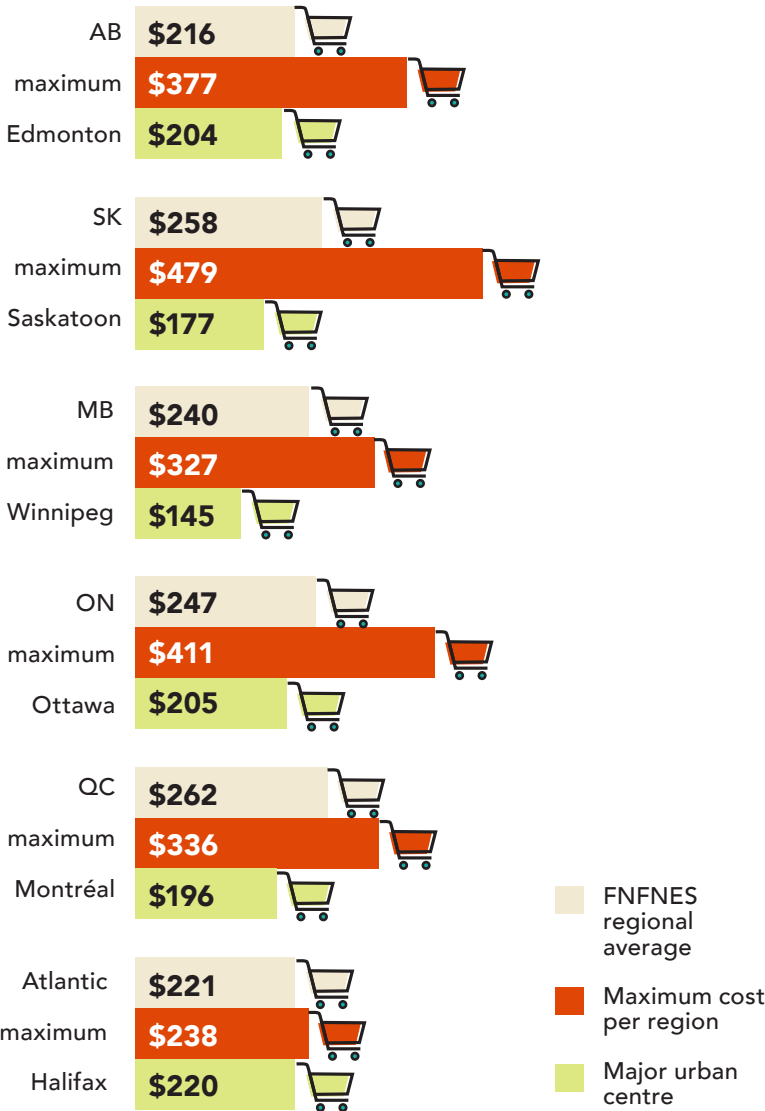
Similar to the general Canadian population, intake of sodium were **above** recommended levels. Reducing sodium intake has the potential to decrease the risk of chronic disease. Canned soup was a major source of sodium.

Food costs

In all regions, **food costs were higher** for communities outside major urban centres. A healthy food basket remains far out of reach for many communities with food costs often two to three times higher in communities more than 50 km away from a major urban centre. Costs were even higher in fly-in communities.

**Insufficient employment and wages** relative to food costs, and **insufficient availability or access** to traditional food systems are key contributors to high levels of food insecurity.

Grocery costs for a family of four

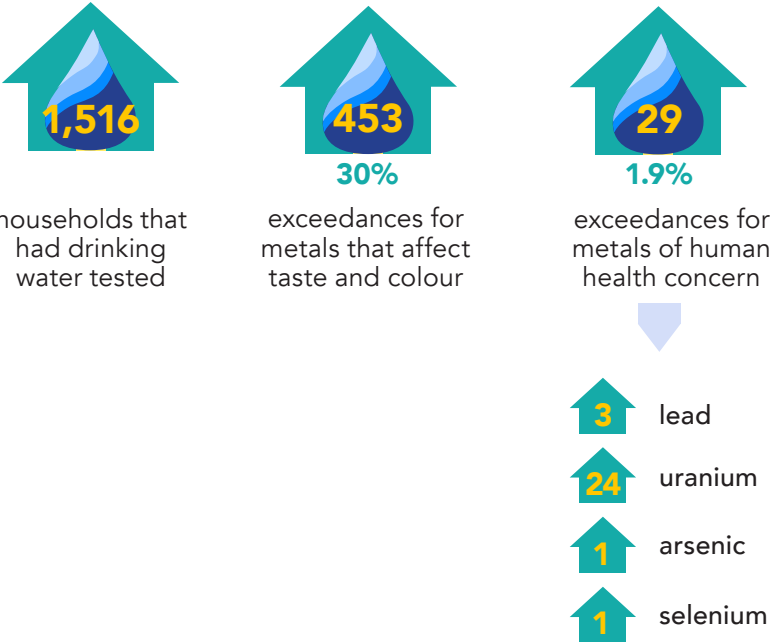


Grocery costing only undertaken after data collection in BC was completed

6 ENVIRONMENTAL CONCERNS

Drinking Water Quality and Safety

This study provides a snapshot of the levels of metals typically found in tap waters of houses in First Nation communities.



**Taste and colour** of water are two common reasons that limit the use of drinking water, despite the quality of drinking water being satisfactory for those metals that can impact human health.

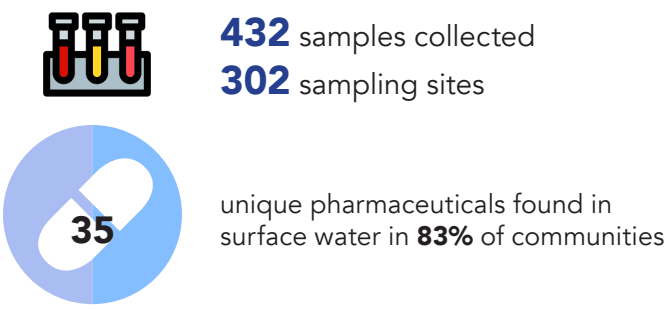


avoided using tap water for drinking because of the taste and other aesthetic values

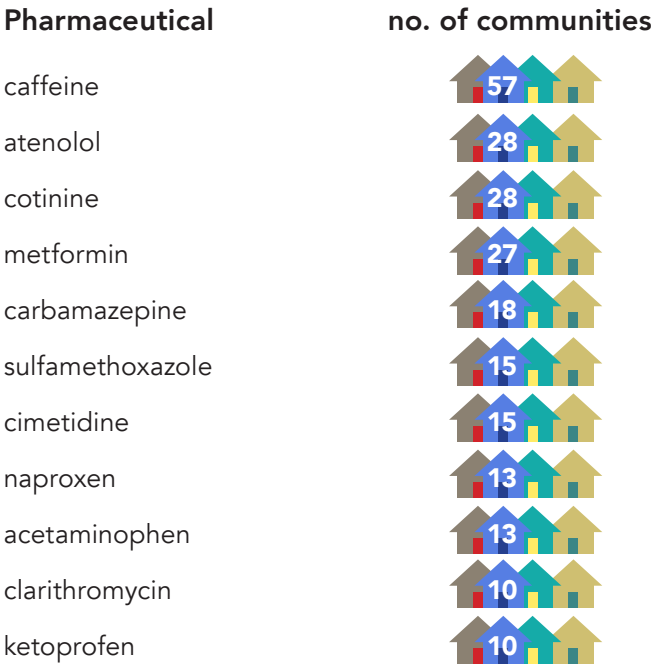
The common issues identified are usually associated with the aesthetic or taste of the water. Regular maintenance and improvement of the water treatment and/or delivery system need to be implemented to improve the quality of the drinking water supply. Some First Nation communities need to continue flushing their water before use to reduce the lead levels. Lead pipes need to be replaced in households with elevated lead levels in drinking water.



Pharmaceuticals in surface water

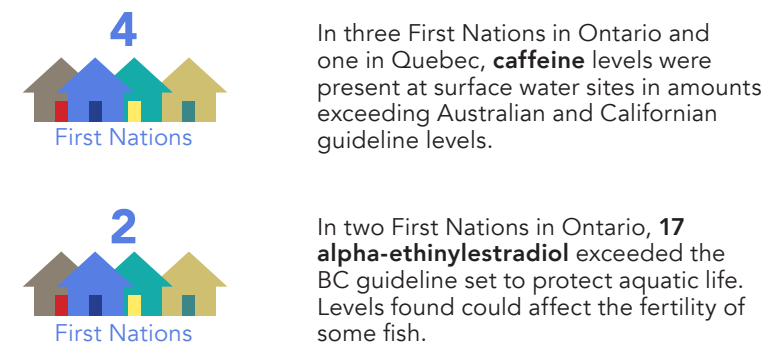


These pharmaceuticals were found in surface water in 10% or more of communities.



Pharmaceutical guidelines

Currently, there are no Canadian Drinking Water Quality Guidelines for pharmaceuticals. British Columbia has set an ambient water guideline level for 17 alpha-ethinylestradiol. Results from this study were compared to existing guidelines from British Columbia (BC), Australia, California and New York.



These pharmaceutical results point to potential sewage contamination. The concentrations of other pharmaceuticals in the FNFNES study would not pose a threat to human health or the aquatic environment. One would have to drink hundreds of glasses of water per day from these surface water sites for a prolonged period to experience health effects.

Most FNFNES results are lower than those found in other surface waters and wastewater studies in Canada, the United States, Europe, Asia and Central America.

This is the biggest dataset of contaminant levels in traditional foods across Canada and can be used to estimate the range of “typical” concentrations found in each food within each ecozone. The results are useful for other First Nations in the ecozone that had not participated in FNFNES.

Traditional food contaminant analyses

To evaluate if there was any health risk of exposure at the levels of the contaminants found in traditional food, contaminant intake was compared to Health Canada guidelines for the protection of health.

Based on current consumption patterns, the risk of exposure to contaminants through traditional food is negligible for most adults.

At the ecozone level, adults eating at the upper level of intake (95<sup>th</sup> percentile) may have an elevated risk of exposure to cadmium, lead and mercury.



each community provided up to

30

commonly consumed traditional foods (up to 5 replicates of each food)

Analysed for levels of



trace elements



metals of human health concern



persistent organic pollutants



Where some traditional samples were not collected from a community, contaminant levels in traditional food found in the same ecozone or region were used instead.

\*by local hunters or fishermen and/or obtained from household freezers and analysed.

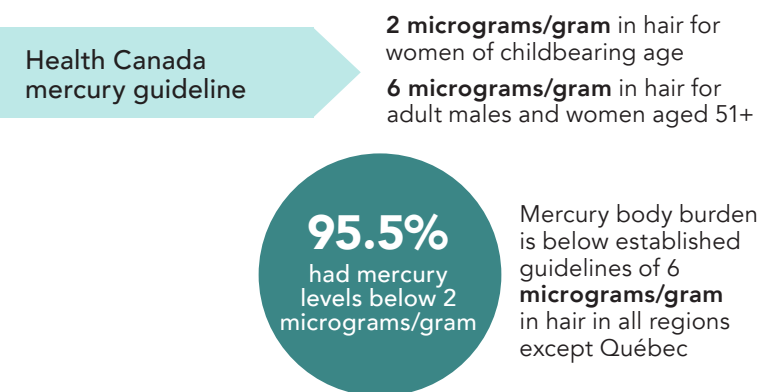
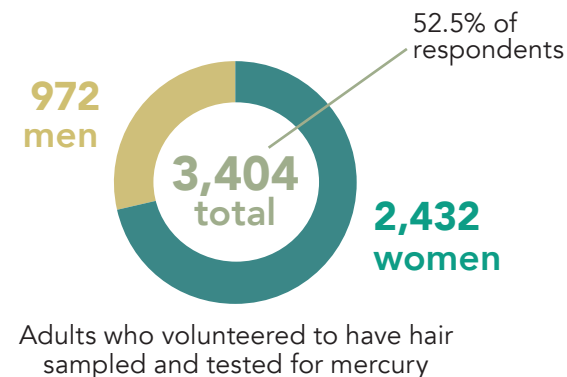


Elevated risk of exposure	Ecozones	Key traditional food high in metals
Cadmium	Boreal Cordillera Taiga Plains	Organ meats <sup>1</sup> (kidney, liver)
Lead	Boreal Plains Prairies Montane Cordillera	Animals and birds contaminated with lead- containing ammunition <sup>2</sup>
Mercury	Boreal Shield Taiga Shield	Walleye, Northern pike, trout <sup>3</sup>

1. Adults who are heavily reliant on organ meats may have an elevated risk of exposure, especially among those who are also smokers.
2. An elevated risk of exposure, due to lead-containing ammunition, was estimated for adults who are heavily reliant on traditional food.
3. An elevated risk of exposure to mercury from traditional food was seen among some women of child-bearing age.

Mercury in hair analyses

7 SUMMARY OF KEY FINDINGS



Women of childbearing age and older individuals (51+) living in northern ecozones tend to have a higher mercury exposure that exceeds Health Canada's guidelines.

Community-based/intervention studies in northern ecozones may be beneficial to investigate the prevalence of higher mercury exposures and to provide coherent risk communication and nutrition advice on the importance of traditional food and on how to reduce mercury exposure.

The findings suggest that sources of mercury include both locally harvested fish as well as commercial fish.

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- 1 This study offers for the first time a body of coherent evidence on the **human dimension of the ongoing environmental degradation** affecting First Nation citizens and communities.
- 2 Traditional food systems remain foundational to First Nations.
- 3 Traditional food has multiple core values for First Nations. These include cultural, spiritual and traditional values, along with enhanced nutrition and health, food security, ways of knowing and an ongoing connection to land and water.



- 4 **Traditional food access does not meet current needs.** Over half of all adults reported that harvesting traditional food is impacted by industry-related activities, as well as climate change.
- 5 Generally preferred to store-bought food, **traditional food is of superior nutritional quality**, and its inclusion significantly improves diet quality.

- 6 Traditional food is safe for consumption, with two primary exceptions:
  - ▷ Large predatory fish (such as walleye and northern pike) in some areas have higher levels of mercury, and some women of childbearing age have elevated levels of exposure, particularly in the northern parts of Saskatchewan, Manitoba, Ontario and Quebec.
  - ▷ The use of lead-based ammunition resulted in very high levels of lead in many harvested mammal and bird samples. As a result, there is an elevated risk of exposure to lead for some adults and women of childbearing age. **Use of other forms of ammunition can eliminate exposure to lead.**

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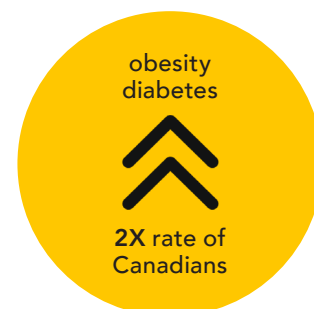
**7 Many First Nations face the challenge of extremely high rates of food insecurity.** Overall, almost half of all First Nation families have difficulty putting enough food on the table. Families with children are affected to an even greater degree.

**8** The price of healthy foods in many First Nation communities is much higher than in urban centres, and is therefore beyond the reach of many families.



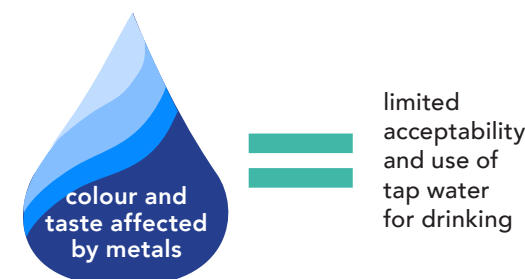
**9 The current diet of many First Nation adults is nutritionally inadequate,** which is strongly tied to food insecurity and limited access to healthy food options.

**10** The health of many First Nation adults is compromised with very high rates of smoking, obesity (double the obesity rate among Canadians), and with one-fifth of the adult population suffering from diabetes (more than double the national average).



**11** There continue to be issues with water treatment systems in many communities, particularly exceedances for metals. **Metals can affect colour and taste, which limit the acceptability and use of tap water for drinking.**

**12** Pharmaceutical residues were found in surface waters in and around many communities, indicating potential sewage contamination.



## 8 STUDY RECOMMENDATIONS

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The authors of this study urge governments and decision-makers to urgently address systemic problems relating to food, nutrition and the environment affecting First Nations, and to do so in a manner that supports First Nations-led leadership and solutions.

Beyond addressing individual and household barriers to accessing high quality foods from both market and traditional food systems, **it is imperative to reduce threats to the health of ecosystems and the quality and availability of traditional food.** Over half of all adults reported that harvesting was impacted by industry-related activities, as well as climate change. First Nations reported that they have a limited ability to affect decisions relating to natural resource management and the foods available for purchase within a community.

These findings highlight the need to **continue to build upon current efforts at the community, regional, provincial and national levels to improve food security and nutrition in First Nations** through a social determinants of health approach.

Indigenous priorities and values need to be recognized and included within relevant frameworks that affect decisions around land use, conservation, habitat protection, and access to high quality and sufficient traditional food.

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## ...STUDY RECOMMENDATIONS

New mechanisms need to be co-developed with First Nations to address weaknesses in current policy and program approaches, in order to:

### ● **Close gaps in nutrition and food (in)security**

**Improve access to the traditional food system** through a combination of subsidies that support harvesting, growing, sharing, and preservation.

**Improve local availability and access to healthier foods independent of imports** (gardens, greenhouses, hydroponic units, agricultural activity and animal husbandry when appropriate).

**Reduce food price differences between major urban centres and local First Nations** by increasing community eligibility for subsidy programs (such as Nutrition North) and providing financial support to increase First Nation operated and owned food production and distribution businesses/organizations.

**Improve families' financial ability** to purchase healthy market food and to engage in local harvesting and food production activities.

**Continue monitoring nutrition and food insecurity**, and create appropriate mechanisms to establish accountabilities in progress and reporting.

**Monitor the effectiveness of food access programs** for First Nations in curbing food insecurity.

### ● **Support sustainable and healthy lifestyles**

The high levels of smoking, obesity and diabetes reflect inequities in access to health-oriented food and built environments (e.g. walkability, recreational opportunities), and sufficient community prevention and health service delivery options. **Additional investments are needed for communities** to provide a healthier environment and culturally appropriate and safe primary prevention, acute and chronic disease management.

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## ...STUDY RECOMMENDATIONS

### ● **Support communities to increase their reliance on the traditional food system**

**Recognize and include Indigenous values and priorities in all federal, provincial and local government decisions** with respect to land use, development, conservation, habitat protection, with intention to maintain or enhance access to and availability of high quality traditional food.

**Recognize First Nations priority rights** to harvest in preferred areas to meet food needs, and minimize and compensate any potential infringements on these rights to harvest.

**Ensure support by all levels of government** to monitor, protect and ensure local ecosystems are healthy and can support First Nations ability to access sufficient traditional food.

Develop a long-term nation-wide **traditional food contaminant monitoring program**.

Develop pan-Canadian programming for the **safe and affordable replacement of lead-based ammunition and fishing weights**.

**Develop region and ecozone specific advisories and guidance for fish consumption** that would promote the importance of fish in diets, but would also inform sensitive populations such as women of childbearing age (WCBA), about decreasing exposure to mercury.

First Nations WCBA living in northern ecozones in Saskatchewan, Manitoba, Ontario and particularly Quebec would benefit from **sustained public health risk-benefit communication efforts** aiming to promote the importance of continued reliance on fish as a food source, while decreasing exposure to environmental mercury.

### ● **Ensure good drinking water quality and trust in safety of public water systems**

In order to promote the use of regular (tap) water over sugar-sweetened beverages, **concerns about the taste and/or appearance of drinking water need to be addressed**.

**Regular maintenance and inspection programs of water treatment and/or delivery systems** need to be implemented to improve the quality of the drinking water supply.

**Lead pipes need to be replaced** in communities with elevated lead levels in drinking water.

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# ...STUDY RECOMMENDATIONS



## Ensure that pharmaceuticals are not present in levels potentially harmful to humans or animals

Develop pan-Canadian guidelines and a monitoring program for **the protection of aquatic, land and human health** to avoid unnecessary exposure to pharmaceuticals and other contaminants.

Develop **detailed planning for appropriate sewage waste treatment and disposal.**

**Ensure support for the return or proper disposal of unused or expired prescription drugs and medications** as an alternative to flushing them down the toilet or throwing them into the regular garbage.

More information and  
Full Draft Comprehensive Summary Report:

**[www.fnfnes.ca](http://www.fnfnes.ca)**

If you have any questions about these results or the  
project itself, please contact:

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## FNFNES PARTICIPATING COMMUNITIES

Kitsumkalum First Nation  
Hagwilget Village  
Tahltan First Nation  
Iskut First Nation  
Witset First Nation  
Tsay Keh Dene Nation  
Tl'azt'en Nation  
Lake Babine Nation  
Fort Nelson First Nation  
Prophet River First Nation  
Doig River First Nation  
Saulteau First Nations  
Skidegate Nation  
Nuxalk Nation  
Namgis First Nation  
Tla'amin Nation  
Samahquam First Nation  
Douglas First Nation (Xa'xtsa)  
Lil'wat Nation  
Lower Nicola Indian Band  
Splatsin First Nation  
Swan Lake First Nation  
Sandy Bay Ojibway First Nation  
Pine Creek First Nation  
Chemawawin Cree Nation  
Sagkeeng First Nation  
Hollow Water First Nation  
Cross Lake Band of Indians  
Sayisi Dene First Nation  
Northlands Denesuline First Nation  
Asubpeeschoseewagong Netum  
Anishinabek (Grassy Narrows)

Wauzhushk Onigum Nation  
Kitchenuhmaykoosib Inninuwug First Nation (Big Trout Lake)  
Kingfisher Lake First Nation  
Webequie First Nation  
Fort William First Nation  
Marten Falls First Nation  
Batchewana First Nation of Ojibways  
Sagamok Anishnawbek First Nation  
Atikameksheng Anishnawbek  
Fort Albany First Nation  
Attawapiskat First Nation  
Moose Cree First Nation  
Garden River First Nation  
Aamjiwnaang First Nation  
Munsee-Delaware Nation  
Six Nations of the Grand River  
Mohawk Nation at Akwesasne  
Dene Tha' First Nation  
Little Red River Cree Nation  
Horse Lake First Nation  
Driftpile First Nation  
Mikisew First Nation  
Whitefish Lake #128 (Goodfish Lake)  
Wesley First Nation  
Chiniki First Nation  
Louis Bull First Nation  
Ermineskin Cree Nation  
Woodstock First Nation  
Saint Mary's First Nation  
Eel Ground First Nation  
Esgenoôpetitj First Nation

Elsipogtog First Nation  
Pictou Landing First Nation  
We'koqma'q First Nation  
Potlotek First Nation  
Eskasoni First Nation  
Membertou First Nation  
Miawpukek First Nation  
Fond du Lac Denesuline First Nation  
Black Lake Denesuline First Nation  
Lac La Ronge Indian Band  
Pelican Lake First Nation  
Onion Lake Cree Nation  
Ahtahkakoop Cree Nation  
Shoal Lake Cree First Nation  
James Smith Cree Nation  
The Key First Nation  
Muskeg Lake Cree Nation  
Beardy's and Okemasis First Nation  
Mosquito, Grizzly Bear's Head, Lean Man First Nation  
White Bear First Nation  
Naskapi Nation of Kawawachikamach  
Whapmagoostui First Nation  
The Crees of Waskaganish First Nation  
Montagnais de Unamen Shipu  
La Nation Anishnabe du Lac Simon  
Cree Nation of Mistissini  
Mohawks of Kahnawá:ke  
Odanak First Nation  
Micmacs of Gesgapegiag  
Listuguj Mi'gmaq First Nation