The Importance of Country Foods Studies in Environmental Baselines and Risk Assessments

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CanNorth

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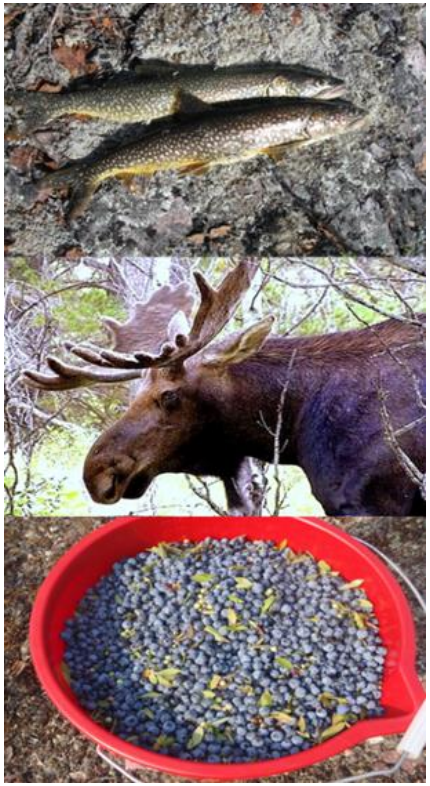
ISO 9001, ISO 14001 and OHSAS 18001 REGISTERED

Presentation Overview

- What is a country foods study?
- Benefits of incorporating country foods studies in environmental baseline studies and risk assessments
- Case study
- Challenges
- Take home message

What are Country Foods?

"Traditional native foods that are obtained from the land by local residents during subsistence hunting and gathering, such as wild game, birds, fish, and berries."



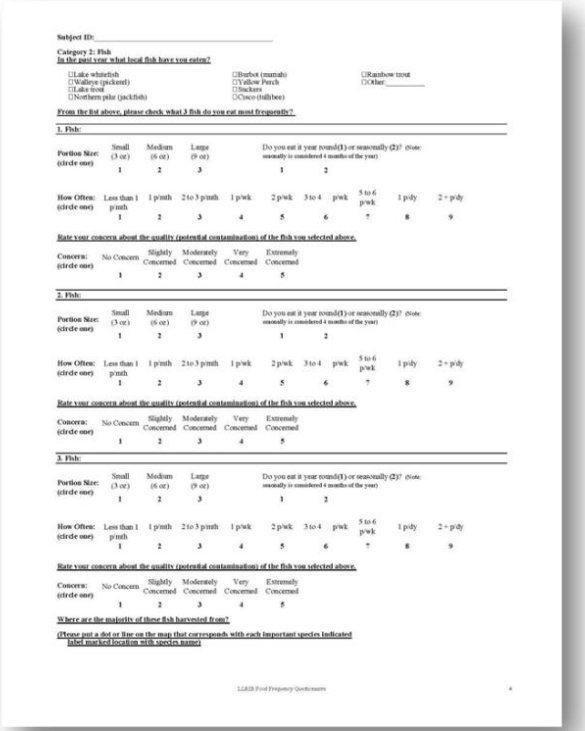
What is a Country Foods Study?

- Components:
  - gather information on type, quantity, and location of country foods consumed by community members
  - obtain chemical information from country foods samples
  - HHRA or other reporting/use of data

Maximize community involvement in the study design, project, and follow-up communication

Methods - Dietary Studies and Interviews

- Complete interviews to document consumption patterns and harvest locations of country foods in study communities
- Train local community members to complete interviews
- Community specific Food Frequency Questionnaires (FFQ) are an important tool to determine consumption rates



Subject ID:_____

Category 2: Fish
In the past year what local fish have you eaten?

☐Lake whitefish
☐Walleye (pickerel)
☐Lake trout
☐Northern pike (jackfish)
☐Burbot (mamah)
☐Yellow Perch
☐Suckers
☐Cisco (tullibee)
☐Rainbow trout
☐Other_____

From the list above, please check what 3 fish do you eat most frequently?.

1. Fish:

Portion Size: (circle one)	Small (3 oz)	Medium (6 oz)	Large (9 oz)			Do you eat it year round(1) or seasonally (2)? (Note: seasonally is considered 4 months of the year)				
	1	2	3			1	2			
How Often: (circle one)	Less than 1 p/mth	1 p/mth	2 to 3 p/mth	1 p/wk	2 p/wk	3 to 4 p/wk	5 to 6 p/wk	1 p/dy	2 + p/dy	
	1	2	3	4	5	6	7	8	9	

Rate your concern about the quality (potential contamination) of the fish you selected above.

Concern: (circle one)	No Concern	Slightly Concerned	Moderately Concerned	Very Concerned	Extremely Concerned
	1	2	3	4	5

2. Fish:

Portion Size: (circle one)	Small (3 oz)	Medium (6 oz)	Large (9 oz)			Do you eat it year round(1) or seasonally (2)? (Note: seasonally is considered 4 months of the year)				
	1	2	3			1	2			
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Where are the majority of these fish harvested from?

(Please put a dot or line on the map that corresponds with each important species indicated label marked location with species name)

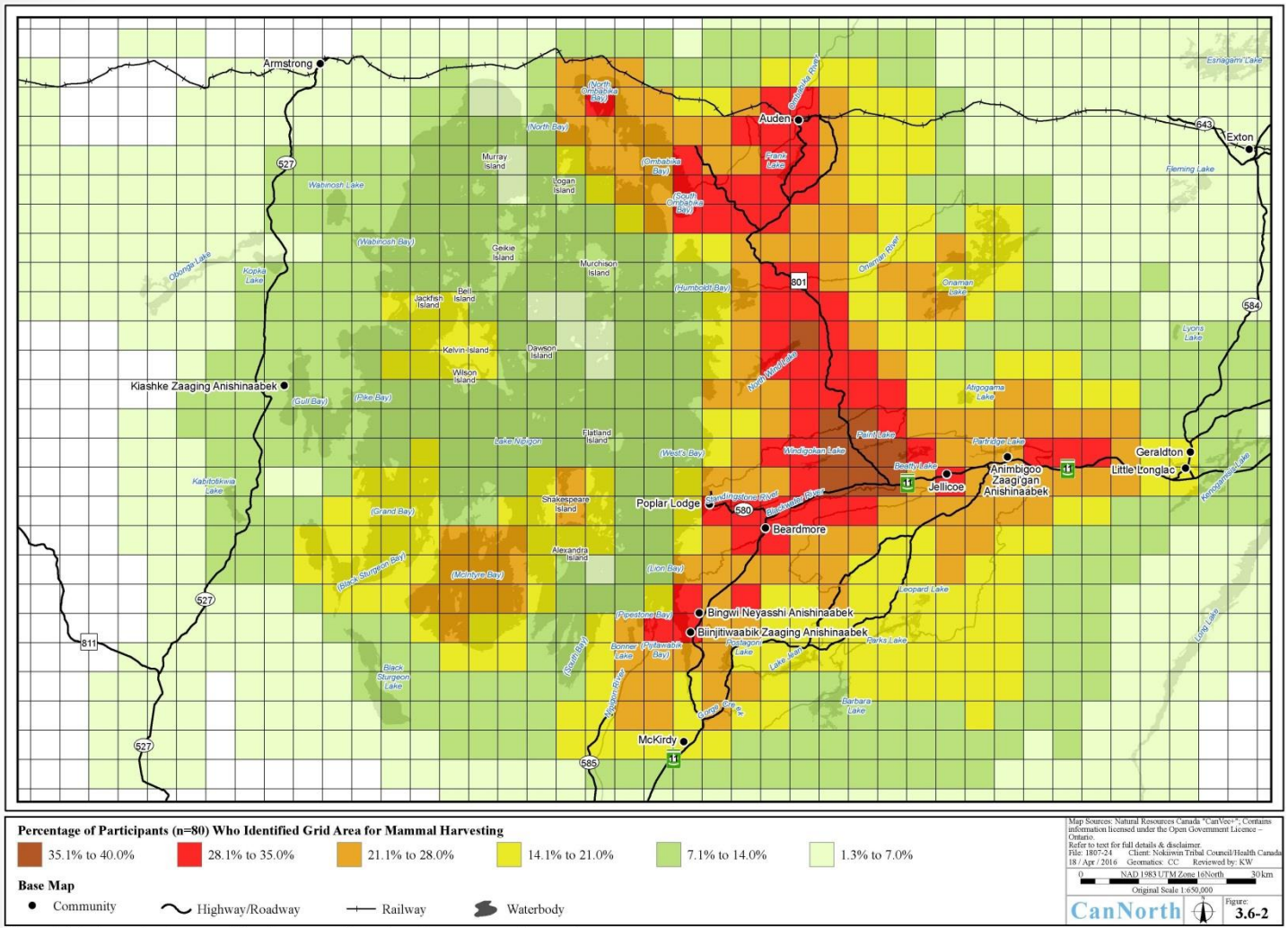


Figure 3.6-2. Approximate mammal hunting areas of interviewed community members.

Country Foods Chemistry

- Collect and submit country food samples to a certified laboratory for chemical analyses

- Common examples:
  - Moose, beaver, snowshoe hare
  - Spruce grouse, mallard duck
  - Walleye, lake whitefish, northern pike
  - Blueberry, bog cranberry
  - Medicinal and edible plants

Environmental Baseline Studies

- Includes components such as:
  - Defining the Local Study Area (LSA) and Regional Study Area (RSA)
  - Characterizing aquatic environment in waterbodies located near the project and in the LSA
  - Characterizing terrestrial environment in the LSA and RSA
  - Chemical analyses usually limited to water, sediment, soil, lichen, berries, benthic invertebrates, fish, small mammals
- Data used in risk assessment and Environmental Assessment (EA)

Benefits of Conducting Country Foods Studies Alongside Baseline Studies

1. Establish/build community relations at an early stage
2. Overlap and cost savings
3. Establish baseline chemical concentrations
4. Manage environmental risk and project planning
5. Ability to gather additional community information to include in the EA
6. Collect site specific information for risk assessments

Community Involvement

- Important for people who use the land to have a voice from the start
- Develop a partnership on the project
- Temporary employment and capacity building
- Recognizes the importance of Traditional Knowledge in the EA process

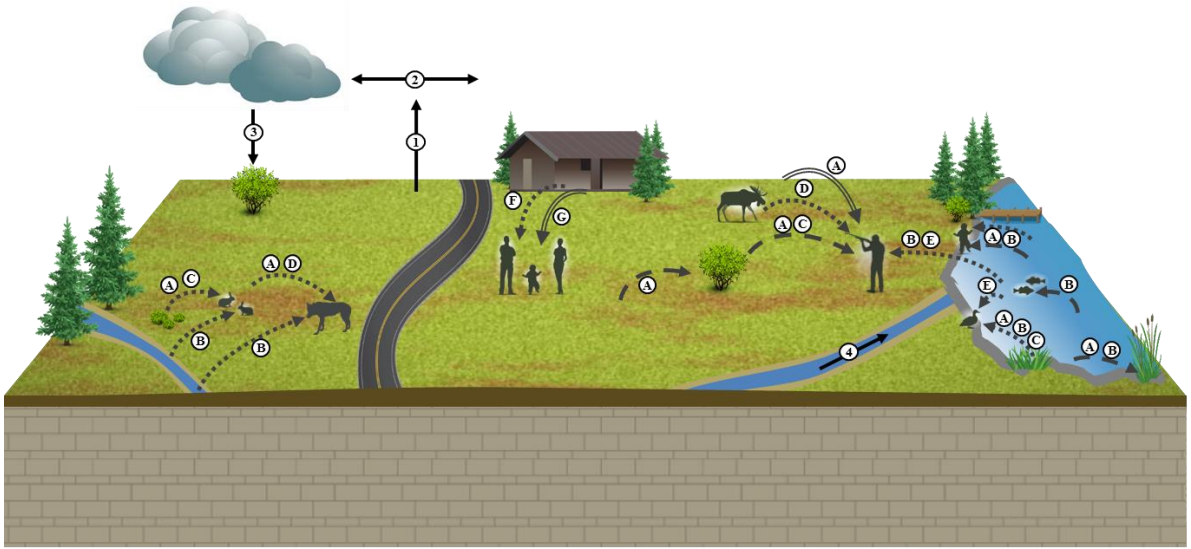
Capacity Building

- Establish a community project manager or liaison
- Train and employ community members as interviewers
- Community members and elders engaged during interview process
- Community members are highly involved in sample collections
- Results are communicated to the community

Benefits Continued

- Costs are generally low and can overlap with baseline
- Target species of most interest to community
- Obtain baseline country foods chemistry data to use for comparative purposes during future monitoring
- Adjust project plans to avoid sensitive locations early in the planning stage
- Obtain additional information to strengthen multiple sections of the EA

Risk Assessment Pathways

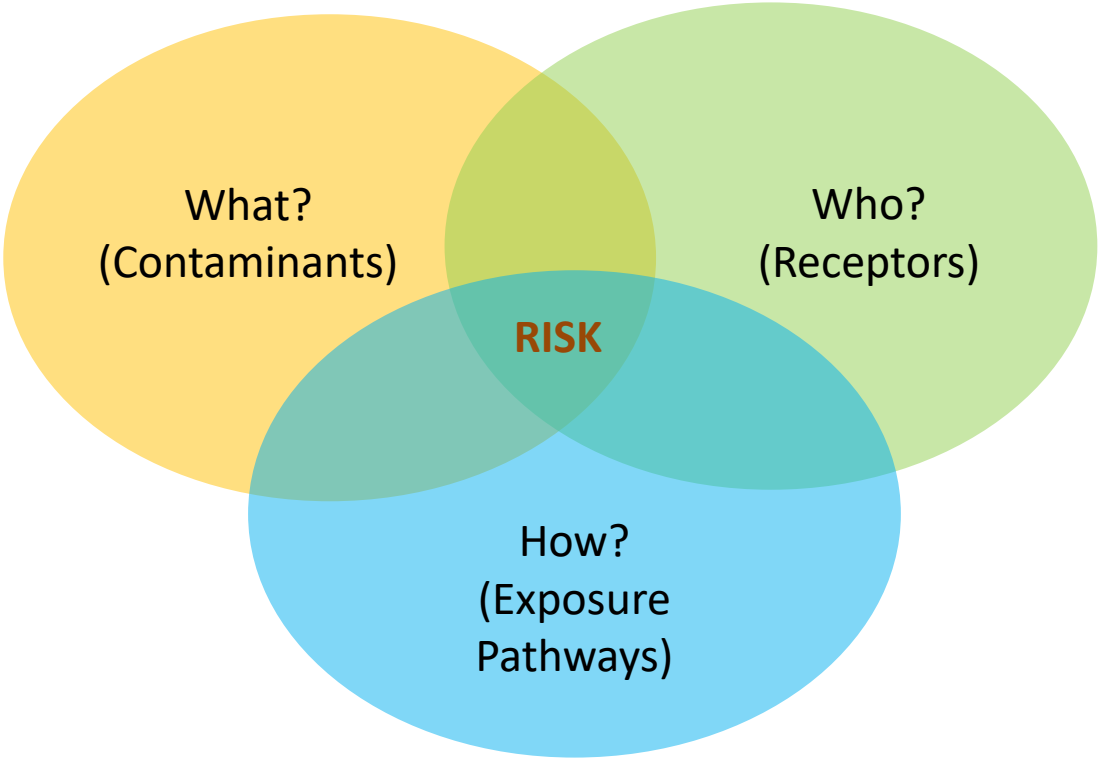


Environmental Fate Processes
1. Wind erosion
2. Atmospheric dispersion
3. Wet and dry deposition
4. Overland Flow

Exposure Media
- (A) Soil or sediment
- (B) Surface water
- (C) Vegetation
- (D) Prey/game
- (E) Fish
- (F) Indoor dust
- (G) Indoor air

Exposure Pathways
- Uptake/direct contact
- Ingestion
- Inhalation

Determining the Problem Formulation

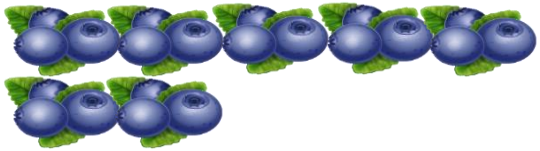
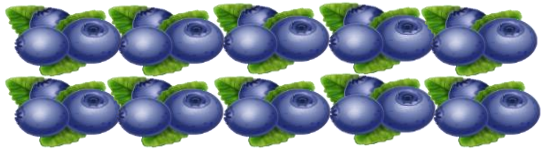


Benefits of Using Country Foods Study Data in Risk Assessments

- Increase community confidence
- Site specific consumption values are far superior to generic values
- Increase breadth of site specific chemistry data



Variation in Country Foods Intake

Food Group	Indigenous Adult – N.W.T	Canadian Adult - Yellowknife
Meat		
Fish		
Fruit/Berries		

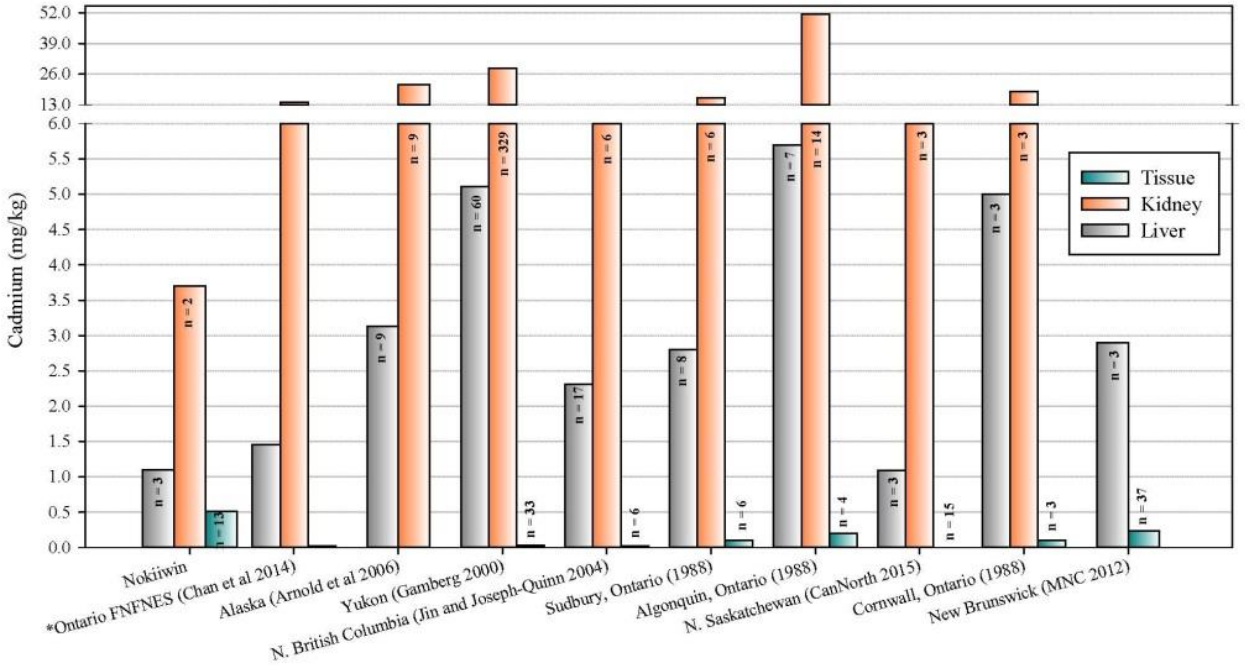
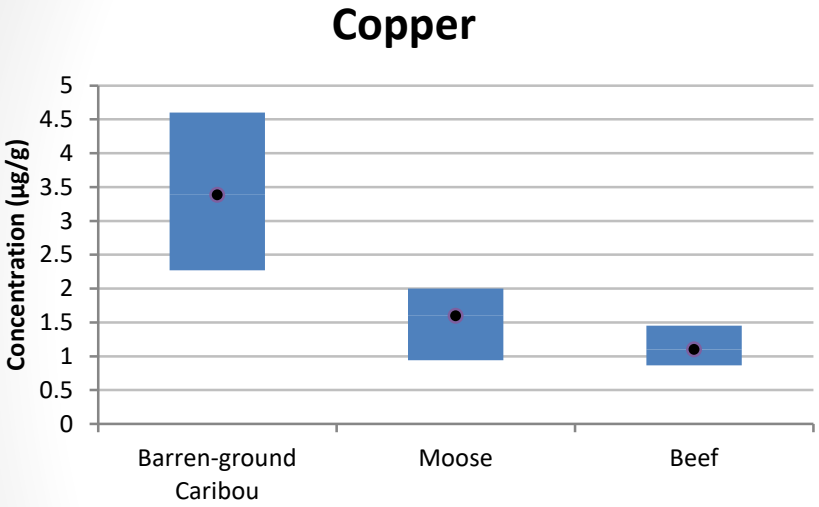
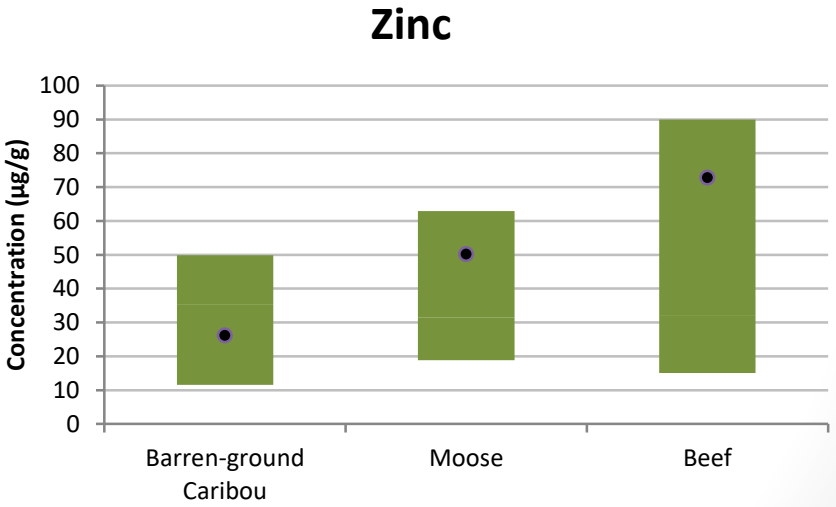


Figure 6.7-1
Mean cadmium concentrations in moose kidney, liver, and tissue samples collected in the NTC study area.
*First Nations Food, Nutrition and Environmental Study, Ontarion 2011-2012 (Chan et al. 2014). Sample size not available.

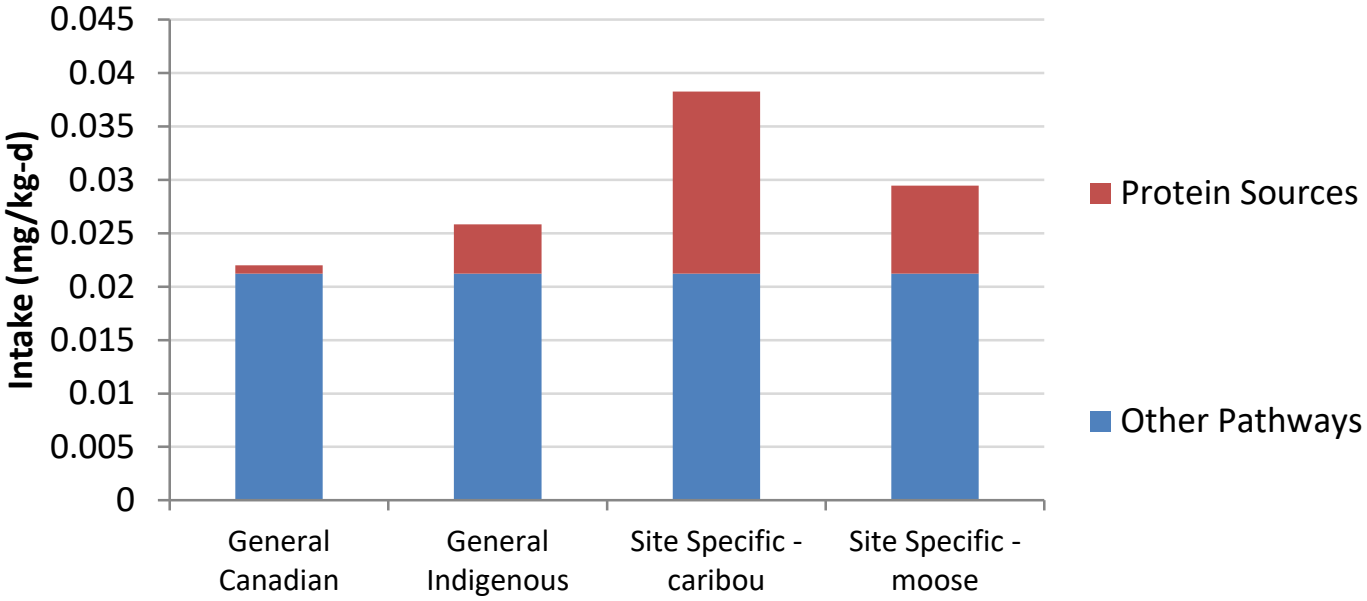

Copper
Concentration (µg/g)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Barren-ground Caribou
Moose
Beef


Zinc
Concentration (µg/g)
100
90
80
70
60
50
40
30
20
10
0
Barren-ground Caribou
Moose
Beef

Risk Assessment Case Study

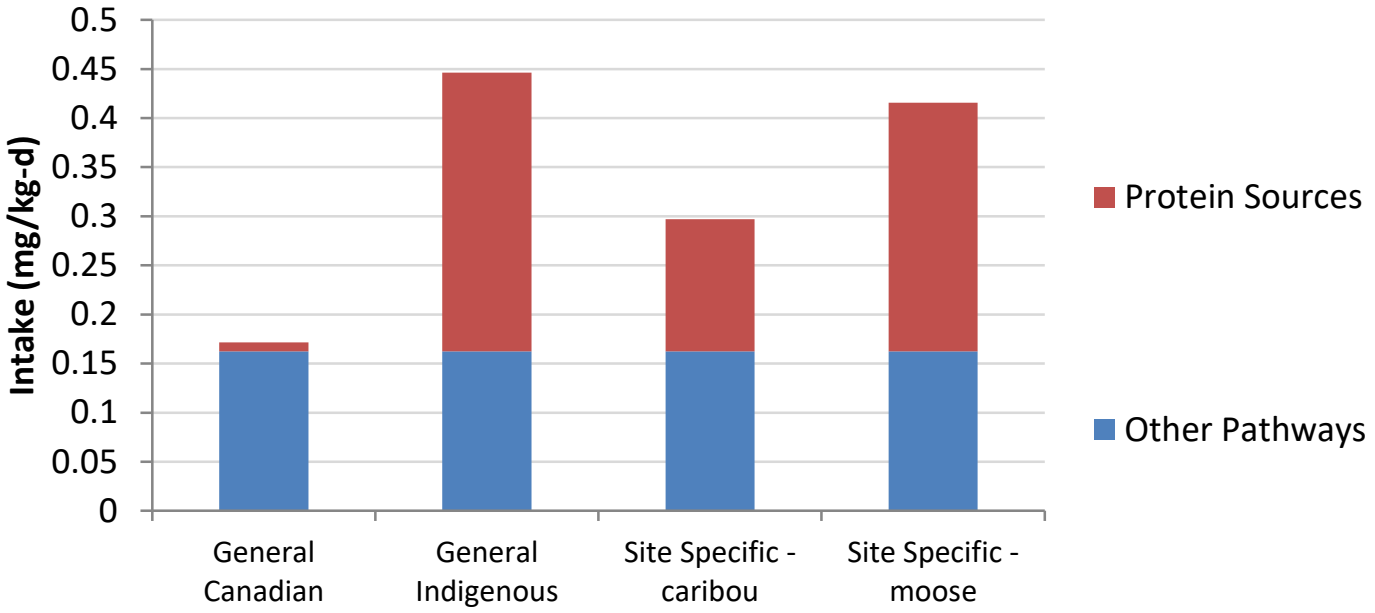
- Example for the copper and zinc data
- Examined different diets:
  - General Canadian (supermarket foods)
  - General Indigenous diet (supermarket foods)
  - Site-specific Indigenous diet high in caribou
  - Site-specific Indigenous diet high in moose
- Other pathways considered in a generic fashion
- Can compare intake to toxicity value

Risk Assessment Case Study - Copper



Toxicity reference value = 0.091 to 0.141 mg/kg-d (depending on lifestage)

Risk Assessment Case Study - Zinc



Toxicity reference value = 0.49 to 0.57 mg/kg-d (depending on lifestage)

Difficulties and Challenges

- Obtaining enough samples for chemical analyses
- Lack/loss of interest by community
- Cultural differences in language, timelines, etc.
- Concerns about data accuracy
- Communication of results
- The community may also be located near an existing operational site

Take Home Message

- Northern Saskatchewan is home to mining and milling operations and communities illustrating why industry and communities must work together
- Conducting a country foods study alongside environmental baseline studies will lead to:
  - Increased community involvement/training/employment/engagement
  - A more robust risk assessment and EA

QUESTIONS???

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