

# FIRST NATIONS-LED CLIMATE ACTION AND THE LINKS TO HEALTH

Denise Webb<sup>1</sup> and Rebecca Zalaski<sup>2</sup>

<sup>1</sup> National Collaborating Centre for Indigenous Health (NCCIH)

<sup>2</sup> Mother Earth Environmental Services (MEES) - Goodfish Lake Business Corporation (GLBC) - Whitefish Lake First Nation #128 (WFL #128)

## Background:

- Climate change and Indigenous public health are interconnected, yet there is little evidence on the specifics of this relationship, such as through the links between community-based climate action and human health and well-being.
- MEES is 100% owned and operated by WFL #128. WFL #128 community members, Elders, and Indigenous Knowledge (IK) Holders/Keepers identify environmental issues and climate change concerns to WFL #128 Leadership, which are then communicated by Leadership to MEES.
- MEES undertakes various projects within and on behalf of the Nation, such as comprehensive and continual projects and assessments within our lands and waters. MEES safeguards and protects WFL #128's environment and IK to ensure sustainability for future generations.
- The NCCIH and MEES collaborated in a project partnership to address this gap, by drawing links between WFL #128's environmental projects and human health and highlighting related research to inform potential next steps in a climate and health focused journey.

## Objectives:

- Create user-friendly resources connecting environmental science and public health.
- Demonstrate the vast linkages between climate action and protecting and promoting the health and well-being of Indigenous Peoples and communities.

## Methods:

- Extracted information from two of WFL #128's environmental projects and their technical reports to categorize potential linkages to human health and well-being, forming categories of:
  - "hunting and plant gathering,"
  - "land types," and
  - "carbon capture and storage."
- Reviewed academic peer-reviewed literature focused on health outcomes within each category, as well as climate change adaptation solutions relevant to the two projects.
- Summarized findings into plain language resources, physically drawing connections to health as identified in the literature review.

## PROJECT 1

### ASSESSING LAND CHANGES AND THE LINKS TO HEALTH

- Analyzed how land cover changed over time, finding 38.21% changed from 1984-2022, primarily attributed to urbanization, agriculture, and climate change. WFL #128 community members identified local plant and wildlife species of significance.
- Cropland demonstrated the greatest significant increase of over 32% gain in total land cover change, yet provides no habitat for plant species of significance. Barren land also demonstrated a consistent and upward increase of over 17% in rapid gain, and was ranked low and very low for plant and wildlife species of significance, respectively.
- Shrubland and grassland rapidly declined at approximately 61% and 40% losses in total land cover change, respectively. Shrubland was ranked low significance for local plant species and moderate for wildlife, while grassland was ranked moderate for wildlife and very high for plants.
- Yarrow, sage, prairie onion, creeping juniper, red willow, dandelion, red clover, and northern valerian root/little root were identified local plant species at greatest risk of local extinction due to habitat loss, while duck and beaver were identified as wildlife species at greatest risk.

#### LINKS TO HEALTH

- Literature supports the **nutritional and medicinal value** of the plant and wildlife species WFL #128 community members classified as significant.<sup>1</sup>
- The act of gathering plants and hunting and trapping may contribute to **mental and spiritual well-being** as well as **physical health**, such as through **recreation** and **food security**.<sup>2</sup>

- Literature suggests land cover classes of significance identified in the WFL #128 area offer unique effects on **immune system function** and **mental and emotional health**, such as improved cognitive function, energy level, and mood, and reduced stress, anxiety, and depression.<sup>3,4</sup>
- Some land covers may also affect **food production** and **water and air quality**.<sup>5</sup>

#### SOLUTION INSIGHTS

- Literature cautions Etuaptmuk (two-eyed seeing) climate change adaptation strategies are needed to protect wildlife and plant habitats.<sup>6</sup>
- Example:** Relational approaches to beaver habitat restoration may see beavers as teachers and collaborative partners to whom climate scientists are accountable.<sup>7</sup>

#### WANT TO LEARN MORE?

Zalaski, R., & Webb, D. (2025). *Indigenous-led climate action: Assessing land changes and the links to health*. National Collaborating Centre for Indigenous Health.

[nccih.ca/495/Indigenous-led-climate-action-land-changes.nccih?id=10524](https://nccih.ca/495/Indigenous-led-climate-action-land-changes.nccih?id=10524)



## PROJECT 2

### LINKS BETWEEN CARBON CAPTURE AND STORAGE (CCS) AND HEALTH

- Planned baseline assessment to forecast potential effects of a proposed CCS project within the WFL #128 territory.
- CCS is concerning to WFL #128 community members, Elders, IK Holders/Keepers, and especially youth as future inhabitants of our land. Indigenous peoples alike commonly follow the Seventh Generation Principle: that current inhabitants only borrow land from future inhabitants.
- Our lands and waters know no arbitrary, anthropogenic boundaries. If contamination occurs, the entire collective region of biotic and abiotic components will be affected, perhaps permanently.
- Even small leaks from CCS pipelines and storage hubs may travel several kilometres. Water readily uptakes carbon dioxide, risking groundwater contamination, which can spread to wildlife, vegetation, and humans via surface water bodies and tributaries, wells, and aquifers.
- Plans include drilling baseline groundwater monitoring wells 15-20 metres below ground surface to continuously monitor and detect any contamination.
- Will monitor: abnormally elevated concentrations of metals (e.g., arsenic, lead, and uranium), dissolved inorganic carbon, total dissolved solids, electrical conductivity, alkalinity, and low levels of pH. Each parameter can be a preliminary indicator of carbon dioxide leaks.

#### LINKS TO HEALTH

- Research identifies risks of CCS pipeline leaks or ruptures to ground-level **air quality**, potentially affecting **respiratory and cardiovascular health**.<sup>8</sup>
- CCS pipeline leaks or ruptures may cause heavy metals to contaminate groundwater, impacting **food security** and **drinking water quality**, posing risks to **impaired bodily functions, weakened growth and cognitive development, illnesses, cancers, and mortality**.<sup>8-9</sup>
- Children, persons with pre-existing health conditions, pregnant and lactating women, and men are all uniquely vulnerable to the potential effects of heavy metal water contamination on their **physical health**.<sup>10-11</sup>

#### SOLUTION INSIGHTS

- Literature points to deliberate community consultation and reactive, more responsive processes to address potential effects of CCS and to protect groundwater quality.<sup>12-13</sup>
- Community engagement must be built from partnerships grounded in the United Declaration on the Rights of Indigenous Peoples (UNDRIP) and First Nations peoples' Treaty rights, land governance, and land sovereignty.

#### WANT TO LEARN MORE?

Zalaski, R., & Webb, D. (2025). *Indigenous-led climate action: Links between carbon capture and storage and health*. National Collaborating Centre for Indigenous Health.

[nccih.ca/495/Indigenous-led-climate-action-carbon-capture.nccih?id=10523](https://nccih.ca/495/Indigenous-led-climate-action-carbon-capture.nccih?id=10523)



## Implications:

- This project partnership identifies links between environmental management and risk assessments to public health.

**Framed by Project #1**, land conservation – such as conserving grasslands – may also mean protecting habitats for plants and wildlife that provide nutritious and medicinal subsistence, as well as conserving the beneficial mental health effects connected to the land.

**Framed by Project #2**, baseline assessments – such as risks to soil, air, and water – may also provide guiding frameworks to protect the health and well-being of whole communities, on which industry projects are accountable to as supported by UNDRIP and Treaty rights.

- Details of the relationship between environmental and climate action and human health and well-being may effectively support policies, practices, and funding applications in both environmental and public health sectors.

## Conclusion:

This study promotes the extended reach Indigenous-led climate action can have beyond environmental realms to influence preventative public health and health promotion fields of practice.

1. Marles, R. J., Clavelle, C., Monette, L., Tays, N., & Burns, D. (2000). *Aboriginal plant use in Canada's northwest boreal forest*. Natural Resources Canada, Canadian Forest Service, UBC Press.

2. Paul, S., Haynes, E., Rush, K., Te Hwi, B., Jakobi, J., & Robbins, F. (2024). Hunting can increase physical activity of Indigenous peoples in Canada: Picoem te yecwem'instut. *Applied Physiology, Nutrition, and Metabolism*, 49(6), 818-823.

3. Karjalainen, E., Sarjala, T., & Raitio, H. (2010). Promoting human health through forests: Overview and major challenges. *Environmental Health and Preventive Medicine*, 15, 1-8.

4. Wu, L., Luo, S., Li, D., Chen, Q., Li, J., & Wen, J. (2023). Effects of deciduous forests on adolescent emotional health in urban areas: An example from the Autumn Ginkgo Forest in Chengdu. *Forests*, 14, 1099.

5. Lyons, K. G., Török, P., Hermand, J.-M., Kiehl, K., Kirman, A., Kollmann, J., Overbeck, G. E., et al. (2023). Challenges and opportunities for grassland restoration: A global perspective of best practices in the era of climate change. *Global Ecology and Conservation*, 4(6), e026512.

6. M'ish Ne'k'mag, Marshall, A., Beasley, K. E., Hum, J., Joudry, S., Papadopoulos, A., Picou, S., et al. (2021). "Awakening the sleeping giant": Re-Indigenization principles for transforming biodiversity conservation in Canada and beyond. *Facets*, 6(1), 839-869.

7. Druschke, C. G., Booth, E. G., Demuth, B., Halgen, J. M., Lave, R., Lundberg, E. R., Myhal, N., et al. (2024). Re-centering relations: The trouble with quick fix approaches to beaver-based restoration. *Geoforum*, 156, 104121.

8. Mahjour, S. K., & Faroughi, S. A. (2023). Risks and uncertainties in carbon capture, transport, and storage projects: A comprehensive review. *Gas Science and Engineering*, 119, 205117.

9. Fagorite, V. I., Chijoke, C. E., Opara, A. I., Onyekuru, S. O., & Oguezie, E. E. (2022). Environmental and safety issues associated with geological carbon storage: A review. *Euro-Mediterranean Journal for Environmental Integration*, 7, 445-461.

10. Brown, J. E. (2017). *Nutrition through the life cycle* (6th ed.). Cengage Learning.

11. Whitney, E., Rolles, S. R., Hammond, G., & Piché L. A. (2016). *Understanding nutrition* (2nd Canadian ed.). Nelson Education.

12. Steinhorsdottir, K., Pete, S., Dipple, G. M., Truman, R., & Snaebjörnsdóttir, S. O. (2024). Early engagement with First Nations in British Columbia, Canada: A case study for assessing the feasibility of geological carbon storage. *EGUphere*, [preprint], 1-20.

13. Esposito, A., & Benson, S. M. (2012). Evaluation and development of options for remediation of CO<sub>2</sub> leakage into groundwater aquifers from geologic carbon storage. *International Journal of Greenhouse Gas Control*, 7, 62-73.