

**Title:** Wetland as Natural Solutions: Baselines and projections for Wetlands on Agricultural Land

**ECCC Project Number:** GCXE23C446

## Background

The climate and nature crises are inextricably linked, and natural climate solutions are uniquely suited to address both of these challenges. Natural climate solutions help to remove greenhouse gases (GHG) from the atmosphere, preserve the adaptive potential of our earth reducing risk from natural disasters, and enhance the resilience of communities. Canada is committed to natural climate solutions to build resilience and help Canada meet its 2030 and 2050 climate change objectives. The Nature Smart Climate Solutions Fund (NSCSF), administered by Environment and Climate Change Canada (ECCC), supports partner-led projects—focused on either place-based actions or sector-based policy—that result in the reduction of GHG and increased carbon sequestration on Canadian soil using activities that also have biodiversity benefits. NSCSF activities during 2021-22 to 2030-31 will seek to reduce 2-4 megatonnes of GHGs per year from 2030 to 2050 and onwards. Several hundred million dollars will be invested in these projects across the country, and rigorous accounting and reporting of the actual and projected mitigation outcomes of the program as well as individual projects will be essential. Initially, what is needed is ongoing support to account and report on how different funded activities will affect that carbon pool by 2030 or 2050.

Canada does not have GHG projections for all categories in the LULUCF sector, particularly for the activities under the NSCSF related to wetlands. GHG projections rely on natural and social science to assess future activities under different scenarios and quantifying the GHG emissions or removals associated with each scenario. ECCC aims to develop scenarios and activity projections for wetlands to 2050 and estimate the associated emissions or removals from the funded projects.

## Request for Research Proposal

One of the objectives of the ECCC NSCSF is the development of freshwater mineral wetland baselines nationally and for focused geographic regions. This objective will be accomplished through two baselines: the wetland national inventory and will be determined by looking at the historical rates of land use change and conversion of wetlands in Canada, which will be conducted by the research laboratory of Irena Creed. Another baseline is for designing successful nature smart climate solution projects and assessing the success of the NSCSF program moving forward.

Two additional socioeconomic components have been requested by ECCC to complement the existing work:

***Objective 1. Identify the main drivers of wetland conversion and projecting how these drivers might change the rates of wetland conversion, and the resulting GHG emissions, over time.***

This objective will result in future wetland scenarios that explicitly incorporate socioeconomic considerations. For example, changes in agricultural commodity prices and input costs can affect wetland drainage decisions on agricultural lands in the Prairies. If commodity prices are projected to increase by 2030 and even further by 2050, the rate of wetland conversion may increase over time compared to a constant price scenario. Including these socioeconomic impacts and associated behavioural feedbacks is important to producing credible wetland conversion projections. The goal is ultimately to produce wetland future scenarios to assess the outcome of the NSCSF using the best available natural and social science information.

***Objective 2. Analysis of how activities might shift to a different location or ecosystem (leakage) if activities are undertaken to reduce the draining of wetlands on agricultural lands in a given region.***

One unintended impact of conservation programs is to bring non-cropland into agricultural production, offsetting some of the direct benefits. These leakage impacts can arise due to increased output prices and substitution effects. For example, in the United States Conservation Reserve Program, it is estimated that for every 100 acres of cropland retired through the program, around 20 acres of non-cropland were converted to agricultural production. The aim of this objective is to identify the potential regional rates of leakage for activities aimed at avoided conversion of freshwater mineral wetlands. This analysis would assess the potential for activities to move to other areas, whether this would lead to draining other wetlands or shift to impacting another ecosystem in a given region.

## Proposed Approach

We propose the following approach to achieve these objectives:

1. Initial analysis of the Lake Winnipeg watershed, with the assumption that this model and approach could then be applied in Ontario/Quebec and the rest of Canada
2. Collect data on historical, current, and future wetland extent from natural science teams
3. Identify and describe the main drivers of wetland conversion (e.g. literature review and/or quantitative assessment)
4. Design and implement a survey instrument to explore the economic behavioural perspectives of stakeholders towards wetland management and drainage (e.g. wetlands as natural, perceived drivers of loss, risk of leakage).
5. Using the data from the national inventory and historical rates of wetland conversion in Canada along with relevant economic data and insights from the stakeholder survey, develop a model that incorporates behaviour to project wetland conversation rates under different scenarios based on economic conditions (e.g. input costs, commodity prices), technology changes (e.g. drainage costs, yields) and policy instruments (e.g. regulations, payment for ecosystem service schemes).
6. Use the developed model and projections to assess the efficiency of various policy instruments

7. Assess the potential role of 'leakage' of wetland associated emissions (i.e., displacement of emissions from avoiding an activity to another location) in the analysis at the sub-provincial level
8. We propose a timeline of 3 years to allow time for recruitment and initial data collection.