Environment Fact Sheets

Nature: A driver of economic activity

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Note to readers

This article integrates experimental gridded gross domestic product (GDP) data with environmental geographies to allow an understanding of the relationship between the environment and human activity. The article focuses on goods-producing industries and selected service industries that depend on natural resources or natural assets. It emphasizes the industries' reliance on natural capital assets and the flow of ecosystem provisioning, regulating and cultural services.

The analysis focuses on the sub-drainage area (SDA) level of the Standard Drainage Area Classification (SDAC). The share of GDP attributed to industries within each SDA was calculated as the industry estimated GDP divided by estimated total SDA GDP, excluding education (elementary and secondary schools, colleges and CEGEPs, and universities), health (ambulatory services and hospitals), and public administration (federal, provincial, municipal and Indigenous public administration). The calculated shares of GDP for the industries under analysis were then ranked within each SDA to support a comparative analysis of the importance of those industries.

Note that some industry GDP could not be accurately allocated to the grid, specifically hunting and trapping, fishing, aquaculture, and offshore activities. These activities are therefore not included in the SDA-level analysis.

Total GDP and industry GDP at the SDA level are not currently available. Statistics Canada is working to establish methods to accommodate customized tabulation requests using the grid squares to provide users with more localized data, such as total GDP by SDA.

Standard Drainage Area Classification

The SDAC was developed to enable the production of integrated statistics by relevant environmental geographies, aligning data with how water flows and how ecosystems function (Statistics Canada, 2003). The classification includes a hierarchical system of drainage areas that are useful for spatial analysis of environmental, economic and social statistics. The largest of these hydrological regions are called major drainage areas (MDAs), and they are defined by the primary river system that drains them. The 11 MDAs in Canada can be disaggregated into 164 SDAs, which are the unit of analysis used in this paper. SDAs can be disaggregated into 974 sub-sub-drainage areas (SSDAs). Some SSDAs had no GDP data and were dropped from the analysis.

Methodology

The gridded 2021 GDP data used in this article were produced at a 1 square kilometre resolution using a fixed grid and were aggregated into geographic units based on the SDAC. It is assumed that each grid square constitutes a separate economy and that the productive activity of institutional units (e.g., firms and governments) can be measured or allocated by grid square (Bemrose et al., 2023; Brown et al., 2025). There are four methods for determining GDP by grid square: direct measurement of business activity, imputations for remote workplaces and natural resources activity, imputations for production networks, and imputations for public sector activity (Bemrose et al., 2023). For more information on the methods used, see *Mapping Production Activity in Yukon: Experimental Indexes of Grid Square-based Gross Domestic Product*.

Ecosystem services definitions

The United Nations System of Environmental Economic Accounting Ecosystem Accounting (United Nations, 2023) provides the following definitions:

An **ecosystem service** is the contribution of ecosystems to the benefits that are used in economic and other human activity.

A **provisioning ecosystem service** represents the contribution to benefits that are extracted or harvested from ecosystems.

A **cultural ecosystem service** represents the experiences and intangible services related to perceived or actual qualities of ecosystems.

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Acknowledgments

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Introduction

Canada's gross domestic product (GDP) is often reported at the national, provincial and territorial levels. While these data give Canadians a broad picture of the economy, they do not tell the story of how the natural landscape in Canada contributes to the economy. Examining economic activity in Canada through the lens of regional ecosystems and watersheds can provide a more nuanced understanding of how industries interact with the abundant natural resources located throughout the country.

By mapping GDP at the sub-drainage area (SDA) level, this analysis demonstrates that the unique mix of industries and economic activity in different areas of the country is in part shaped by natural resources and the biophysical features of the landscape. This localized perspective highlights both the opportunities and the vulnerabilities present in different regions. Ultimately, this approach offers policy makers and stakeholders valuable information to support decision making that respects both community needs and environmental stewardship across Canada.

The St. Lawrence major drainage area: An industrial engine

Canada's economy generates a greater share of its GDP from the services sectors compared with the goods-producing sectors. In 2021, Canada's total GDP was $2.1 trillion, with service-based industries accounting for two-thirds of the total and goods-producing industries accounting for one-third.[1] More than half (57%) of Canada's GDP and almost two-thirds of the service industry's GDP was estimated to have been generated in the St. Lawrence major drainage area (MDA) (Map 1), which includes 25 SDAs across Ontario, Quebec, and Newfoundland and Labrador. Almost one-quarter of national GDP was estimated to have been produced in the Lake Ontario Niagara Peninsula SDA—home to Toronto—with the finance and insurance sector representing the highest share of GDP in the SDA. This illustrates how the activities of service industries are often enabled by—and interconnected with—the goods-producing sector.

Goods-producing industries often rely heavily on natural capital assets to enable production. For example, agriculture needs fertile soils, forestry depends on valuable tree stands, mining relies on the presence of economically viable metal and mineral deposits, and hydroelectric power generation requires strong water flows and sufficient elevation changes. While other factors are important—such as the availability of skilled labour and transportation infrastructure—industry activity is often situated near natural assets, which can often be in more rural and remote areas of the country.

As a result, the types of environmental impacts and landscape disturbances in these regions can differ significantly from those in more urban centres. For example, where goods-producing industries operate, freshwater resources can be impacted—through water use, discharge of mining effluents, agricultural runoff containing fertilizers and pesticides, changes in timing of water flow, increased sedimentation, and the introduction of invasive species (Webster et al., 2015).

Examining gridded GDP data for selected goods-producing industries enables an analysis of the ties between economic activity and location of natural resource assets, while also illuminating the potential local impacts of these activities on people and the environment.

Service sectors tend to have fewer direct impacts on surrounding ecosystems compared with goods-producing sectors, such as agriculture, forestry, fishing and hunting; mining, quarrying, and oil and gas extraction; electric power generation, transmission and distribution; construction; and manufacturing.

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1. Goods-producing industries are defined as industries within North American Industry Classification System codes 11 to 33. All other industries are considered service industries.

However, it is important to recognize that the service sector can have significant indirect environmental impacts. For example, globally, industries such as tourism, health and finance services have seen an increase in carbon dioxide emissions from 1995 to 2021, when considering the emissions associated with energy consumption (Liang et al., 2025).

Map 1
Gross domestic product by major drainage area, 2021
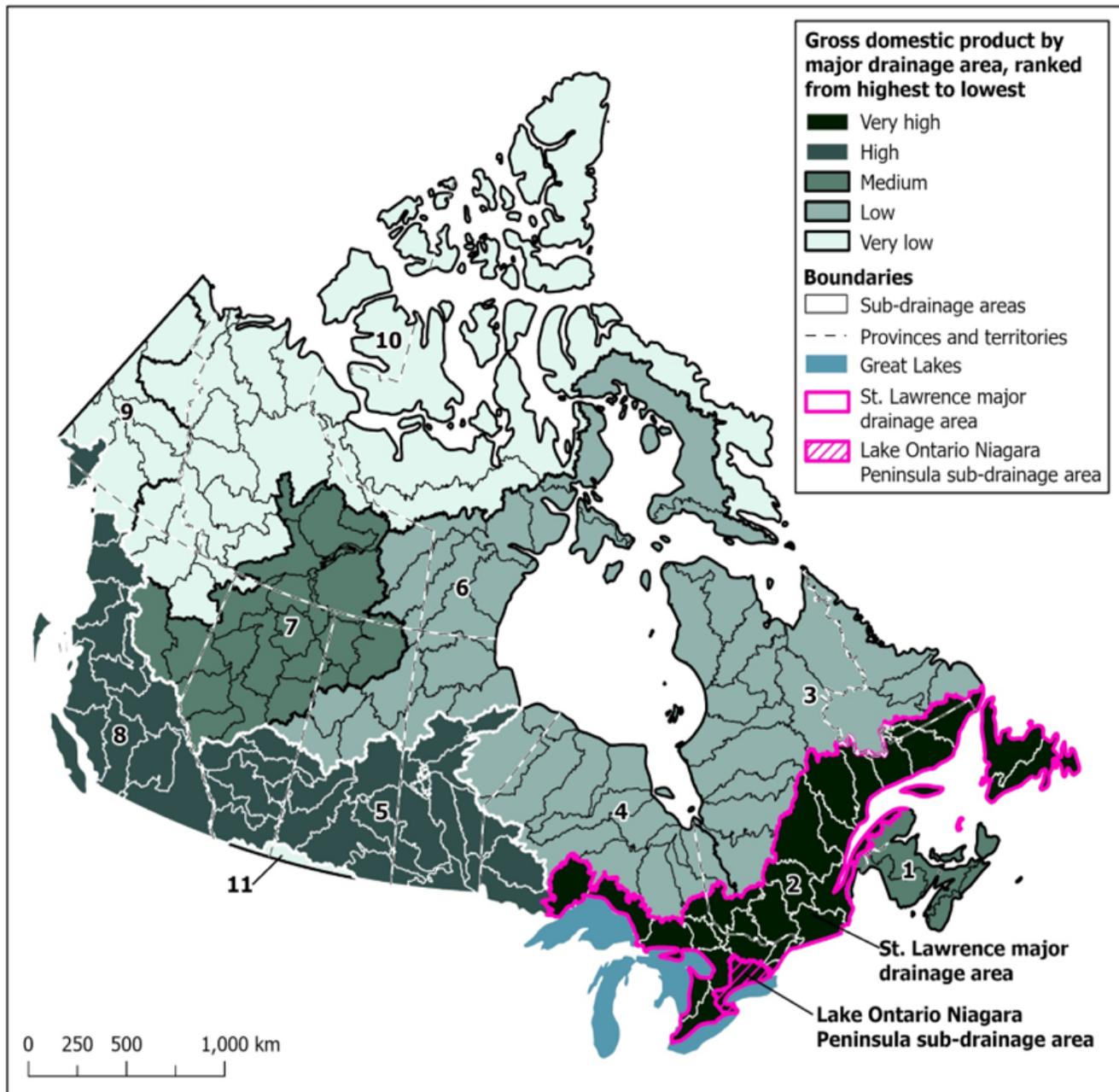
Code	Major drainage area	Code	Major drainage area	Code	Major drainage area
1	Maritime Provinces	5	Nelson River	9	Yukon River
2	St. Lawrence	6	Western and Northern Hudson Bay	10	Arctic
3	Northern Quebec and Labrador	7	Great Slave Lake	11	Mississippi River
4	Southwestern Hudson Bay	8	Pacific		

Source: Statistics Canada, calculations by author.

Goods-producing industries rely on and impact natural capital assets

Oil and gas extraction, mining and quarrying, and electric power generation, transmission and distribution are key goods-producing industries that rely specifically on the location of natural capital assets.

These activities also have distinct environmental impacts on the landscape, such as land disturbance and fragmentation caused by drilling sites and access roads, contamination of soil and water, and emissions of pollutants and greenhouse gases, among other effects. In 2021, the oil and gas extraction and the mining and quarrying subsectors accounted for 34% of industry greenhouse gas emissions (Statistics Canada, 2024a) and 3% of industry water use (Statistics Canada, 2024b).

Oil and gas extraction

The oil and gas extraction industry plays a critical economic role in the SDAs where it operates. In Canada, regional economies supported by this subsector are concentrated in Alberta's oil sands region. However, this activity also occurs in other areas of the country, including northern British Columbia (British Columbia Energy Regulator, 2024), off the coast of Newfoundland and Labrador (Natural Resources Canada, n.d.) and in the Northwest Territories (Government of Northwest Territories, 2025)—an area with significant natural gas resources and ongoing interest in development.

The five SDAs (Map 2) estimated to have the highest share of their GDP from this subsector accounted for about 44% of the total GDP for the oil and gas extraction subsector in Canada. Three of the top five SDAs were located in northeastern Alberta, stretching into northwestern Saskatchewan. The subsector was also estimated to have accounted for a large majority of the GDP for the Central Liard and Petitot SDA (Map 2), a region that overlaps the borders of northern British Columbia and Alberta.
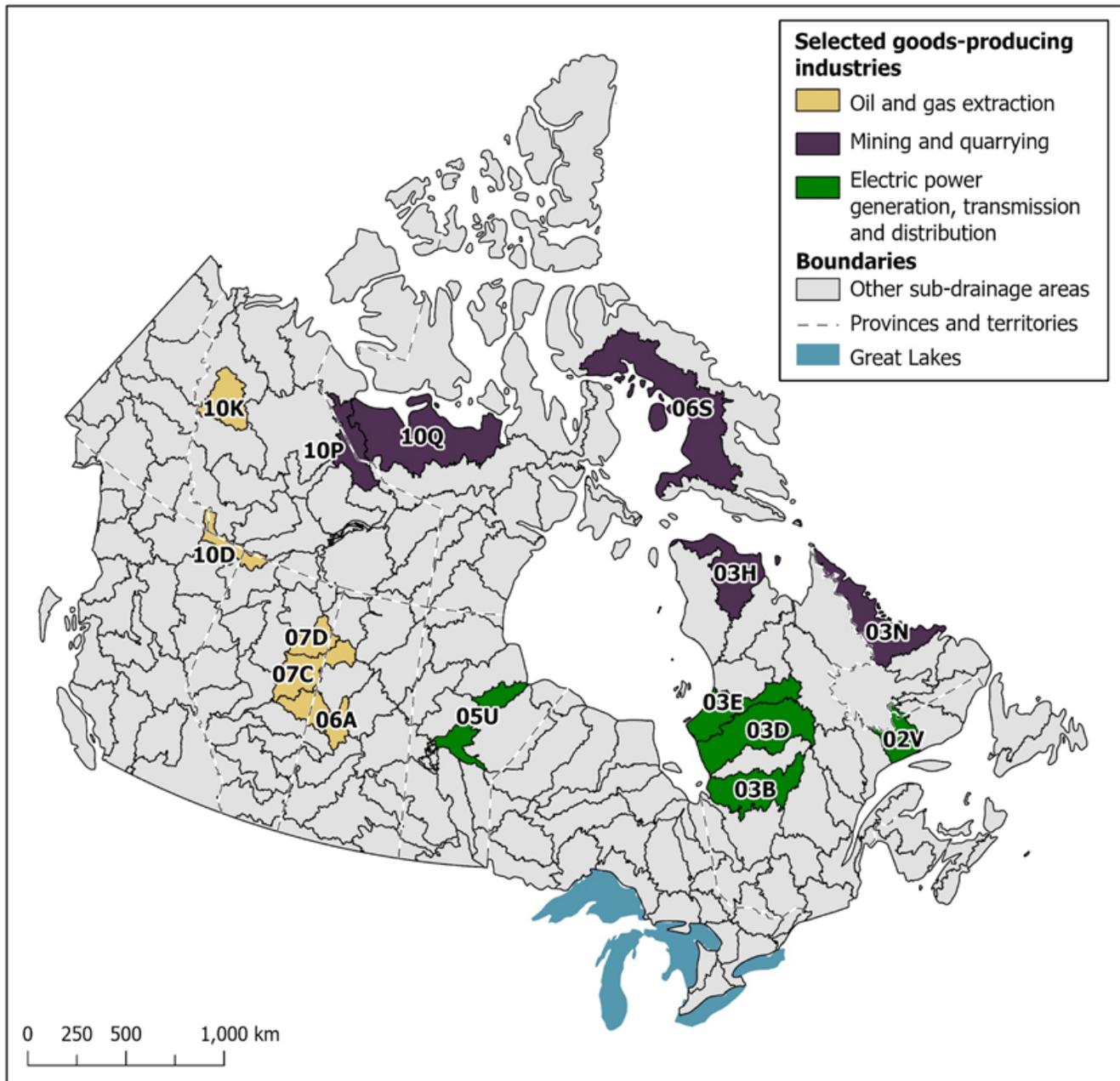
Mining and quarrying

The Western Ungava Bay SDA in northern Quebec was estimated to have the highest share of GDP from mining and quarrying, compared with all other SDAs. With a population of about 3,800 in 2021 (Statistics Canada, 2023a), this remote area is experiencing mining and exploration for critical minerals (Investing News Network, 2023).

Much of the mining activity in remote northern areas operates on a fly-in, fly-out basis, with workers staying in temporary camps and having limited direct economic interaction with nearby communities (Deacon et al., 2017). As a result, while mining drives economic output in these SDAs, its influence on local community development may be more limited.

The five SDAs that were estimated to have the highest share of GDP from mining and quarrying were in Nunavut, the Northwest Territories, northern Quebec and northern Labrador (Map 2). However, when considering the total GDP produced by the subsector, SDAs around Regina, Saskatchewan (potash mines), and Fernie, British Columbia (coal mines) were estimated to have accounted for the largest total GDP in the subsector.

Map 2
Sub-drainage areas with the highest share of gross domestic product from selected goods-producing industries, 2021

Industry:	**Oil and gas extraction**		Industry:	**Mining and quarrying**		Industry:	**Electric power generation, transmission and distribution**	
Rank	**Code**	**Sub-drainage area**	**Code**	**Sub-drainage area**		**Code**	**Sub-drainage area**	
1	10D	Central Liard and Petitot	03H	Western Ungava Bay		03D	La Grande, coast	
2	07D	Lower Athabasca	10P	Coppermine		02V	Gulf of St. Lawrence, Romaine	
3	07C	Central Athabasca, lower	10Q	Coronation Gulf and Queen Maud Gulf		03B	Broadback and Rupert	
4	10K	Central Mackenzie, The Ramparts	03N	Northern Labrador		03E	Grande rivière de la Baleine, coast	
5	06A	Beaver, Alberta and Saskatchewan	06S	Foxe Basin, Baffin Island		05U	Nelson	

Source: Statistics Canada, calculations by author.

Electric power generation

In 2021, 60% of electric power generation was from hydroelectric sources (Statistics Canada, 2024c). In the same year, the proportion of power generation from wind and solar were about 6% and 0.5% respectively. Though small contributors, the combined share of total electricity generation from wind and solar has grown from about 1.5% to just over 8% between 2014 and 2024 (Statistics Canada, 2024c). These activities are dependent on the biophysical characteristics of the landscape—renewable water assets, energy flows, and incoming solar radiation.

Four of the five SDAs that earned the highest estimated share of their GDP from the electric power generation, transmission and distribution industries in 2021 were located either off the James Bay Coast of Quebec or north of the Gulf of St. Lawrence (Map 2). In the La Grande (coast) SDA, a region that was home to fewer than 7,000 people in 2021, an overwhelming majority of economic activity was estimated to be traced to these industries.

Agriculture

The agriculture industry depends on fertile soils, productive cropland and rangeland, and abundant water assets to support crop and animal production.

In 2021, agroecosystems extended across 569,705 square kilometres of Canada's landscape (Statistics Canada, 2023b), and the agriculture industry was responsible for 11% of industrial water use in Canada (Statistics Canada, 2024b). It also relies on the flows of ecosystem services such as crop production, pollination, and soil and sediment retention provided by these ecosystems.

Three-quarters of Canada's cropland is concentrated in the Nelson River MDA (Statistics Canada, 2025). This MDA was estimated to have accounted for more than one-third of the national GDP generated by the crop and animal production industry.[2]

The Lake Winnipegosis and Lake Manitoba SDA, situated to the west of Lake Winnipeg and extending into parts of Saskatchewan, was estimated to have had the greatest share of GDP from crop and animal production compared to all other SDAs with crop and animal production activity. Three of the five SDAs estimated to have the highest share of GDP generated from crop and animal production compared to all other SDAs, were located in the Nelson River MDA (Map 3), highlighting the importance of the industry to this area of the Prairies.

Despite the importance of the industry in this region, agricultural activities occur across much of southern Canada, with five SDAs in southern Ontario, Quebec, British Columbia and Alberta accounting for nearly half of the industry's total estimated GDP in 2021.

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2. The North American Industry Classification System codes included in the crop and animal production industry are 111, 1121, 1122, 1123, 1124 and 1129.

Map 3
Sub-drainage areas with the highest share of gross domestic product from the crop and animal production, and forestry and logging industries, 2021
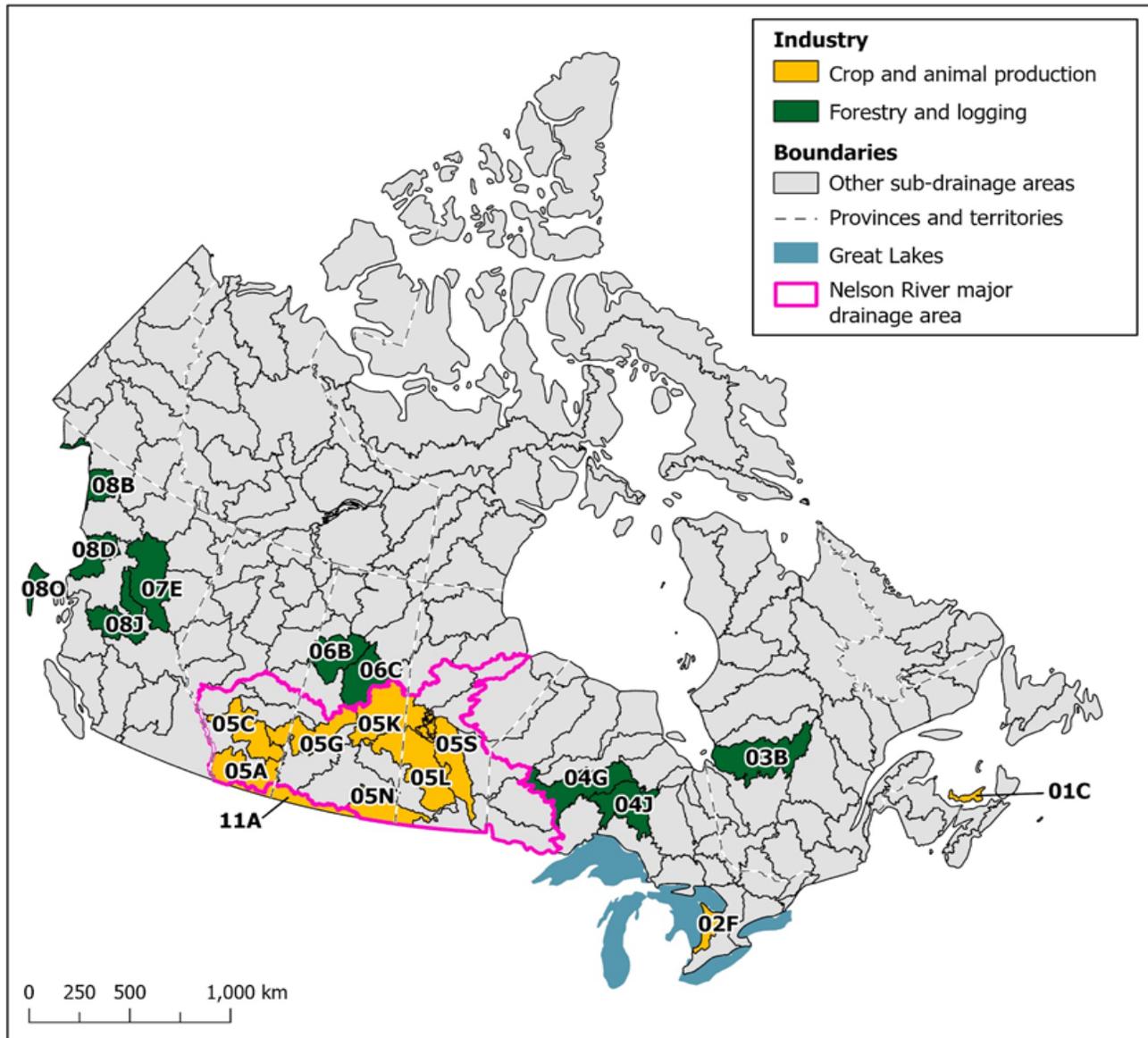
Industry: Crop and animal production			Industry: Forestry and logging		
Rank	Code	Sub-drainage area	Rank	Code	Sub-drainage area
1	05L	Lake Winnipegosis and Lake Manitoba	1	04G	Upper Albany
2	11A	Missouri	2	03B	Broadback and Rupert
3	05S	Western Lake Winnipeg	3	07E	Williston Lake
4	02F	Eastern Lake Huron	4	04J	Kenogami
5	05A	Upper South Saskatchewan	5	08J	Nechako
6	05G	Lower North Saskatchewan	6	08O	Queen Charlotte Islands
7	05K	Saskatchewan	7	06B	Upper Churchill, Manitoba
8	05N	Souris	8	08B	Northern coastal waters, British Columbia
9	05C	Red Deer	9	06C	Central Churchill, upper, Manitoba
10	01C	Prince Edward Island	10	08D	Nass, coast

Source: Statistics Canada, calculations by author.

Forestry and logging

The forestry and logging subsector depends on forests as a natural capital asset and on flows of ecosystem services, such as ecosystem contributions to the growth of trees, which support timber production, as well as regulating services such as biological control and nursery population services. Over one-third of the country is covered by forest or areas with significant tree cover (Statistics Canada, 2025).[3]

In 2021, five SDAs in British Columbia accounted for about one-third of the total estimated GDP for the forestry and logging subsector. However, the subsector's importance was estimated to have been less regionally concentrated—SDAs where forestry and logging activity contributed the highest share of GDP compared to other SDAs, were located in British Columbia, Saskatchewan, Ontario and Quebec (Map 3). The Upper Albany SDA in Ontario was estimated to have had the highest share of its GDP derived from the forestry and logging subsector compared to all other SDAs.

Cultural ecosystem services and link to industry activity

Cultural ecosystem services include recreation-related services that rely on nature's contributions—specifically, the biophysical characteristics and their quality that enable people to use and enjoy the environment through experiential interactions (United Nations, 2021).

The industries profiled below—the scenic and sightseeing transportation subsector, as well as the accommodation and food services sector—rely in part on the recreational services provided by ecosystems. These industries can be of particular importance in SDAs that are less populated and that are located near natural landscapes sought out by tourists.

The scenic and sightseeing transportation subsector[4] provides services for recreational activities such as dinner cruises, hot air balloon rides and steam train excursions. These services rely on access to natural landscapes, waterbodies and waterways. This subsector was estimated to have represented only a small share of GDP in SDAs across Canada.

The Wanapitei and French SDA in Ontario, which includes the city of North Bay, offers tourists experiences such as helicopter tours and boat cruises on Lake Nipissing. These types of sightseeing activities contributed to the region having the highest estimated share of GDP from the scenic and sightseeing transportation subsector compared to all other SDAs with scenic and sightseeing transportation activity. Other SDAs where the subsector was estimated to have represented among the highest share of GDP included Upper Fraser in British Columbia, Northern Gaspé Peninsula in Quebec and Upper St. Lawrence in Ontario, which contains the Thousand Islands region (Map 4).

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3. This total includes treed area (including treed wetlands) and treed area disturbance (areas in varying stages of regeneration after experiencing forest harvest or forest fire from 1990 to 2020).
4. This subsector falls under North American Industry Classification System code 487.

Map 4

Sub-drainage areas with the highest share of gross domestic product from the scenic and sightseeing transportation, and accommodations and food services industries in Canada, 2021
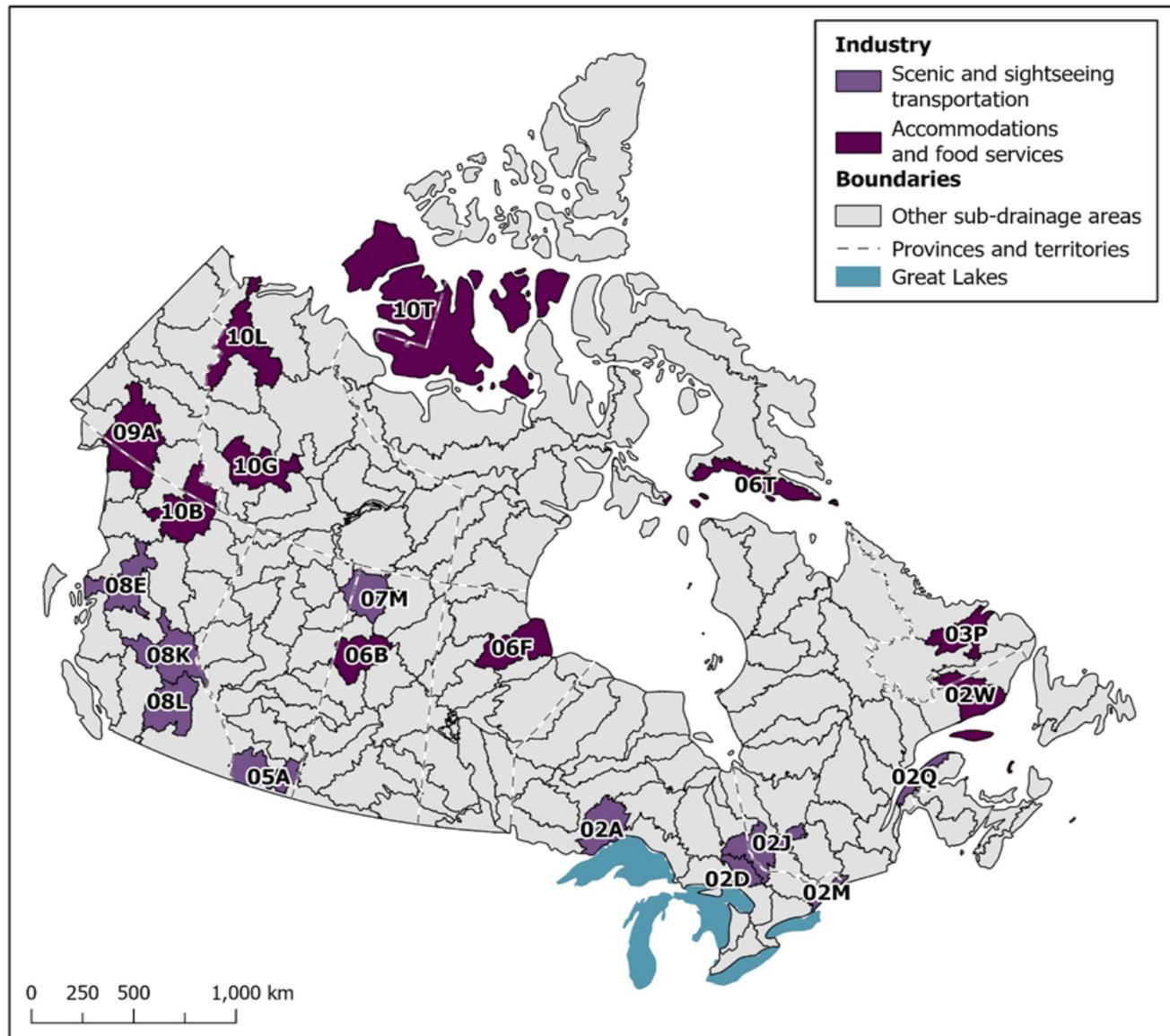
Industry: Scenic and sightseeing transportation

Rank	Code	Sub-drainage area
1	02D	Wanapitei and French, Ontario
2	08K	Upper Fraser
3	02J	Upper Ottawa
4	02Q	Northern Gaspé Peninsula
5	02A	Northwestern Lake Superior
6	08E	Skeena, coast
7	02M	Upper St. Lawrence
8	07M	Lake Athabasca, shores
9	05A	Upper South Saskatchewan
10	08L	Thompson

Industry: Accommodations and food services

Rank	Code	Sub-drainage area
1	06T	Hudson Strait, Baffin and Southampton Islands
2	10B	Central Liard
3	06B	Upper Churchill, Manitoba
4	10T	Southern Arctic Islands
5	10G	Upper Mackenzie, Camsell Bend
6	10L	Lower Mackenzie
7	02W	Gulf of St. Lawrence, Natashquan
8	03P	Central Labrador
9	09A	Headwaters Yukon
10	06F	Lower Churchill, Manitoba

Source: Statistics Canada, calculations by author.

The accommodation and food services sector[5] also draws benefits from activities associated with tourist experiences and enjoyment of Canada's natural scenery, as well as activities associated with exploration and development activities related to resource extraction. In 2021, as travel gradually began to recover from the impacts of the COVID-19 pandemic, the presence of employees involved in construction and development projects helped offset the economic losses in this sector caused by reduced tourism (Northern Development Initiative Trust, 2021).

In 2021, the Hudson Strait, Baffin and Southampton Islands SDA had the highest estimated share of GDP from the accommodation and food services sector compared to other SDAs. Other regions where the sector was estimated to have represented among the highest share of GDP were in the north (Map 4), including in the Central Liard SDA in northern British Columbia and the Gulf of St. Lawrence, Natashquan SDA in Quebec (includes Anticosti Island and the Mingan Archipelago National Park Reserve).

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5. This sector falls under North American Industry Classification System code 72.

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