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# ECOLOGICAL INTEGRITY OF NATIONAL PARKS

## CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS



Canada 

**Suggested citation for this document:** Environment and Climate Change Canada (2021) Canadian Environmental Sustainability Indicators: Ecological integrity of national parks. Consulted on *Month day, year*. Available at: [www.canada.ca/en/environment-climate-change/services/environmental-indicators/ecological-integrity-national-parks.html](http://www.canada.ca/en/environment-climate-change/services/environmental-indicators/ecological-integrity-national-parks.html).

Cat. No.: 978-0-660-39763-4  
ISBN: En4-144/21-2021E-PDF  
Project Code: EC21032.108

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Environment and Climate Change Canada  
Public Inquiries Centre  
12th Floor Fontaine Building  
200 Sacré-Coeur Blvd  
Gatineau QC K1A 0H3  
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860  
Fax: 819-938-3318  
Email: [enviroinfo@ec.gc.ca](mailto:enviroinfo@ec.gc.ca)

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# CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS

# ECOLOGICAL INTEGRITY OF NATIONAL PARKS

October 2021

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# Ecological integrity of national parks

According to the *Canada National Parks Act*, “ecological integrity” is

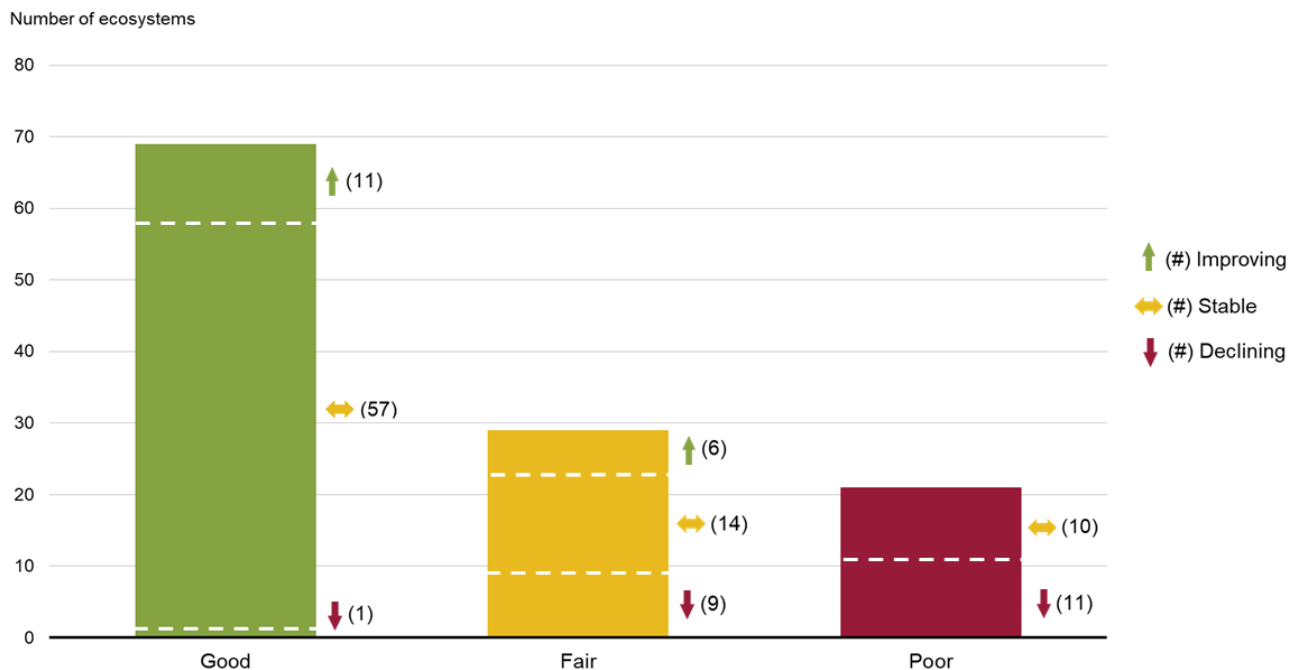
*with respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes.*

In other words, ecosystems have integrity when their native components, such as native species and biological communities, natural landscapes and functions, are intact and are likely to persist. The ecological integrity of national parks is assessed by monitoring representative components of major park ecosystems, such as forest, freshwater and wetlands. It is a key measure of the condition of our national parks.

## Key results

- Of the 119 ecosystems in 43 national parks that were assessed in 2020:
  - 58% are in good condition
  - 24% are in fair condition
  - 18% are in poor condition
- Most park ecosystems are stable (68%), while 14% are improving, and 18% are declining
- Overall, the ecological integrity of 82% of park ecosystems were maintained or improved

**Figure 1. Ecological integrity conditions and trends of ecosystems in 43 national parks, Canada, 2020**



[Data for Figure 1](#)

**Note:** Monitored ecosystems may include forests, freshwater, wetlands, grasslands, shrublands, tundra, coastal/marine and glaciers, depending on what is present in each park. Akami-Uapishk<sup>U</sup>-KakKasuak-Mealy Mountains National Park Reserve, Nááts'ihch'oh National Park Reserve, Thaidene Néné National Park Reserve, Rouge National Urban Park and Qausuittuq National Park did not report on ecological integrity in 2020.

**Source:** Parks Canada (2021) Protected Areas Establishment and Conservation Directorate.

The conditions and trends of ecosystems within national parks are evaluated regularly using a series of monitoring measures (for example, plant and animal populations and soil properties) which are designed to track changes in biodiversity and natural processes within those ecosystems. The condition of an ecosystem is determined by comparing these measures to threshold values, and each measure is assigned a score. The

scores are then averaged together to rate the condition of the ecosystem (good, fair or poor). The trend of an ecosystem (improving, stable, declining) reflects a change in condition over a 5 year period.

Condition and trend must always be interpreted with caution. Because the condition represents an average of several monitoring measures, the condition may show no change over time, even if individual measures are improving or declining.

An ecosystem that is rated as good and stable is secure and likely to persist, and no major management actions like ecosystem restoration are required. Fair or declining ecological integrity indicates that the ecosystem is vulnerable and management actions may be required. Poor ecological integrity indicates that the ecosystem is impaired, and significant management actions may be required. Improving ecological integrity results may indicate that restoration actions are working.

**Table 1. Ecological integrity trends by ecosystem type, Canada, 2020**

<b>Ecosystem</b>	<b>Improving (number of ecosystems)</b>	<b>Stable (number of ecosystems)</b>	<b>Declining (number of ecosystems)</b>	<b>Total (number of ecosystems)</b>
Forests	7	18	6	31
Shrublands	0	1	0	1
Grasslands	1	3	1	5
Tundra	3	11	5	19
Freshwater	0	28	6	34
Glaciers	0	2	0	2
Wetlands	1	11	0	12
Coastal/marine	5	7	3	15

**Source:** Parks Canada (2021) Protected Areas Establishment and Conservation Directorate.

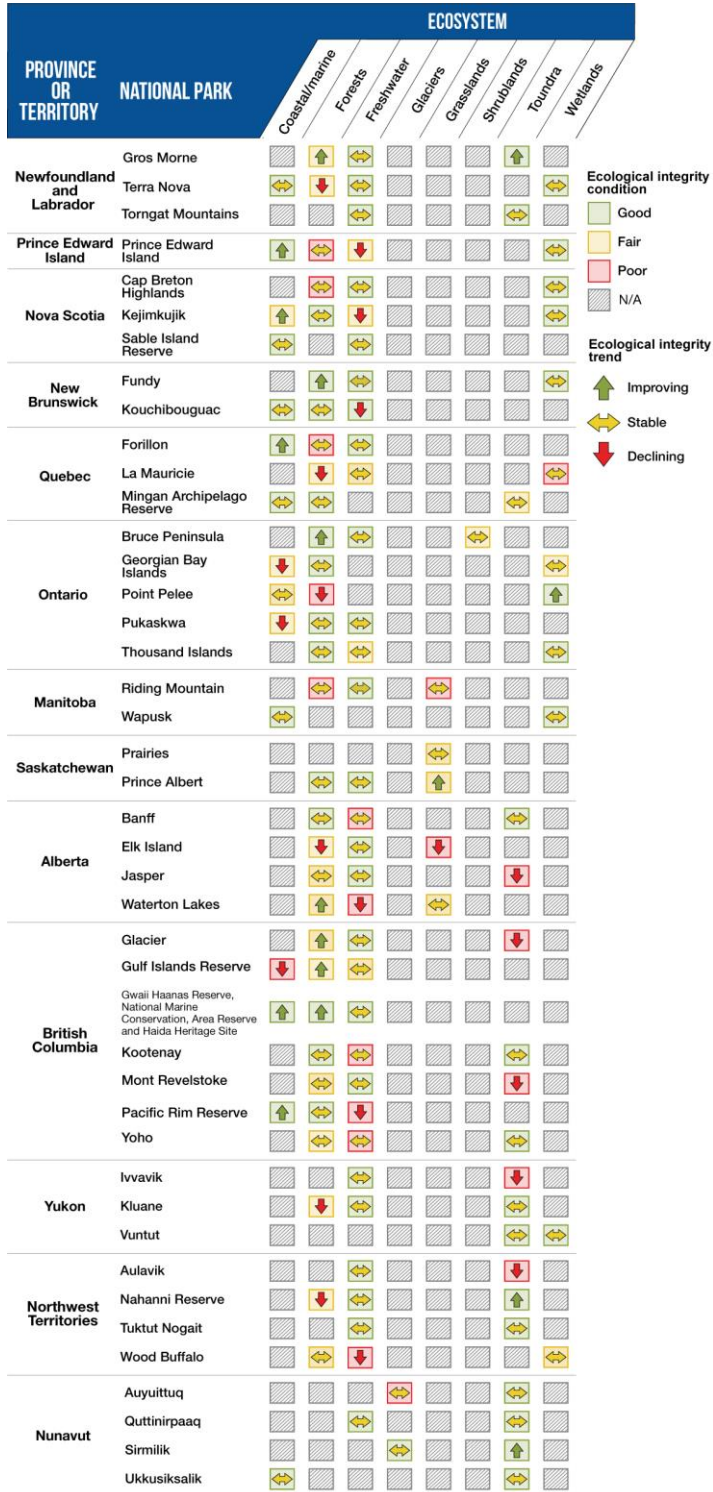
National parks are interlinked with their surrounding ecosystems and are affected by many of the same pressures on the environment. Some of the stressors affecting ecosystems in Canada’s national parks include:

- habitat loss and degradation
- reduction of landscape connectivity (for example, building of roads and trails)
- climate change impacts (for example, increasing temperatures) and climate-mediated ecological changes and cumulative effects (for example, diseases and natural disturbances)
- loss of keystone species (for example, wolves or bison)
- pollution and contaminants
- invasive species

Parks Canada implements management actions (for example, ecosystem restoration) when issues are identified. Each ecosystem responds differently to stressors and to management actions. It may take many years to make measurable improvements to ecological integrity and to demonstrate the ecological benefits of management actions.

# Data for individual parks

Figure 2. Ecological integrity conditions and trends of ecosystems in 43 national parks by province and territory, Canada, 2020



www.canada.ca/indicateurs-environnementaux

Data for Figure 2

Source: Parks Canada (2021) Protected Areas Establishment and Conservation Directorate.

## About the indicator

### What the indicator measures

The Ecological integrity of national parks indicator summarizes the condition (good, fair, poor) and trend (improving, stable, declining) of ecosystems within 43 national parks.

### Why this indicator is important

The Ecological integrity of national parks indicator provides an indication of the condition of Canada's national parks. National parks help to protect biodiversity, preserve ecosystem services, connect landscapes, and provide a natural solution for climate change by capturing and storing carbon. National parks also help to build knowledge and understanding of ecosystems, and connect Canadians with nature.

Parks Canada regularly monitors and assesses the condition of the main ecosystems in national parks (for example, forests, tundra, wetlands or freshwater). Ecosystems are managed to improve or maintain ecological integrity. Management plans systematically address opportunities for improving the ecological integrity of park ecosystems.



### Sustainably managed lands and forests

This indicator tracks progress on the [2019 to 2022 Federal Sustainable Development Strategy](#), supporting the target: By March 31, 2023, ecological integrity will be maintained or improved in 92% of national park ecosystems. The most recent data available show that, of the 119 national park ecosystems assessed in 2020, 82% were maintained or improved.

In addition, the indicator contributes to the [Sustainable Development Goals of the 2030 Agenda for Sustainable Development](#). It is linked to Goal 15: Life on land.

The indicator also contributes towards the [Pathway to Canada Target 1](#) initiative. It is linked to Priority 3: Maximize conservation outcomes.

It also contributes to the [Aichi Biodiversity Targets](#). It is linked to Target 11: "By 2020, at least 17 percent of terrestrial and inland water, and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes."

### Related indicators

[Canada's conserved areas](#) indicators report the amount and proportion of Canada's terrestrial and marine area that is conserved.

The [Global trends in conserved areas](#) indicator compares Canada's protected area to a peer group of countries.



## Data sources and methods

### Data sources

The indicator summarizes the condition and trend of ecosystems in National Parks. Parks Canada regularly monitors the condition of ecosystems using a set of representative measures. Selected measures in each major park ecosystem are combined and the ecosystem is scored as good, fair or poor. Parks Canada monitoring for ecological integrity formally began in 2008 and is ongoing.

#### More information

Ecological integrity is reported for major ecosystems in 43 of Canada's national parks. Data are not yet available for Akami-Uapishk<sup>u</sup>-KakKasuak-Mealy Mountains National Park Reserve, Nááts'ihch'oh National Park Reserve, Thaidene Néné National Park Reserve, Qausuittuq National Park, and Rouge National Urban Park.

Between 1 and 4 ecosystems are assessed in each park. Examples of ecosystems include forests, wetlands, and glaciers. The selected ecosystems form most of the area of a park and are important to its biological functioning. For each ecosystem, a scientifically sound set of environmental measures is developed, based on appropriateness, representativeness, monitoring needs and cost-effectiveness. Some examples of ecological integrity measures include wildlife population size, estimates of plant productivity, water quality, and extent of invasive species. Data for these measures are gathered from a variety of sources, including on-the-ground field sampling, satellite imagery, academic and government partners, and traditional knowledge. Measured values are compared to thresholds, such as whether a wildlife population is near desirable size or whether water meets a water quality standard threshold. When such thresholds are not available, interim thresholds based on available information of historical variability are used. The frequency of monitoring varies from annually to once a decade, depending on the specific measures.

Data are collated and stored in Parks Canada's Information Centre for Ecosystems database to support management and reporting.

Data sets for individual measures are published in the [Government of Canada Open Data Portal](#).

### Methods

Ecological integrity monitoring is adapted to the ecology of each park. Information is gathered for each selected ecosystem, and a determination is made as to whether the ecosystem is in good, fair or poor condition and whether that condition is improving, declining, or stable. Complete methods information is available in Parks Canada's 2011 Consolidated Guidelines for Ecological Integrity Monitoring in Canada's National Parks, available from the Protected Areas Establishment and Conservation Directorate, Parks Canada.

#### More information

Ecosystem condition is determined from the monitoring results as follows: each measure is assigned a score based on its condition compared to its threshold (good = 2, fair = 1, poor = 0). If one-third or more of the measures are scored poor, the ecosystem-level indicator is also scored poor. If less than one-third of the measures are scored poor, the average score of the measures (weighted equally) determines the ecosystem score.

The assessment of the overall trend for each ecosystem is based on a change in its overall condition over 5 years, or in the trend of monitoring measures. If the condition of the ecosystem has not changed, it is considered stable unless a strong majority of the monitoring measures shows the same trend.

The national indicator (% of ecosystems maintained or improved) is an overall assessment of the trend of ecological integrity across national parks. It is generated by dividing the number of ecosystem that are stable or improving by the total number of ecosystems monitored.

### Caveats and limitations

The monitoring measures used to determine the condition and trend of ecosystems are chosen to represent the most important elements of the ecosystem and thus provide an indication, rather than a complete assessment, of

ecological integrity. Monitoring takes place against a background of natural variability, and because many locations are remote and some measurements are time-consuming or expensive to conduct, the frequency of monitoring may be low. This leads to unavoidable uncertainty in assigning conditions and trends to ecosystems.

Ecosystems are not of equal area or of equal importance in parks; comparisons between systems or between parks must be made with caution.

Some parks have not yet reported results, while others are basing their reporting on incomplete suites of measures that reflect current data availability. Monitoring methods are selected using objective techniques to provide credible overall assessments. Where information is incomplete, expert opinion, literature review, preliminary data and statistical principles are used to support the definition of thresholds.

The equal weighting of measures may not always reflect their relative ecological importance.

The data do not include provincial or other parks or other types of protected areas.

## Resources

### References

Government of Canada (2000) [Canada National Parks Act](#). Retrieved July 14, 2021.

Parks Canada (2011) Consolidated Guidelines for Ecological Integrity Monitoring in Canada's National Parks. Protected Areas Establishment and Conservation Branch, Parks Canada.

Parks Canada (2017) [State of Canada's Natural and Cultural Heritage Places 2016](#). Retrieved on July 14, 2021.

### Related information

[Parks Canada](#)

## Annex

### Annex A. Data tables for the figures presented in this document

**Table A.1. Data for Figure 1. Ecological integrity conditions and trends of ecosystems in 43 national parks, Canada, 2020**

Ecological integrity condition	Improving (number of ecosystems)	Stable (number of ecosystems)	Declining (number of ecosystems)	Total (number of ecosystems)
Good	11	57	1	69
Fair	6	14	9	29
Poor	0	10	11	21
<b>Total</b>	<b>17</b>	<b>81</b>	<b>21</b>	<b>119</b>

**Note:** Monitored ecosystems may include forests, freshwater, wetlands, grasslands, shrublands, tundra, coastal/marine and glaciers, depending on what is present in each park. Akami-Uapishk<sup>u</sup>-KakKasuak-Mealy Mountains National Park Reserve, Nááts'ihch'oh National Park Reserve, Thaidene Néné National Park Reserve, Rouge National Urban Park and Qausuittuq National Park did not report on ecological integrity in 2020.

**Source:** Parks Canada (2021) Protected Areas Establishment and Conservation Directorate.

**Table A.2. Data for Figure 2. Ecological integrity conditions and trends of ecosystems in 43 national parks by province and territory, Canada, 2020**

Province or territory	National park	Ecosystem type	Ecological integrity condition	Ecological integrity trend
Newfoundland and Labrador (NL)	Gros Morne	Forests	Fair	Improving
Newfoundland and Labrador (NL)	Gros Morne	Freshwater	Good	Stable
Newfoundland and Labrador (NL)	Gros Morne	Tundra	Good	Improving
Newfoundland and Labrador (NL)	Terra Nova	Coastal/marine	Good	Stable
Newfoundland and Labrador (NL)	Terra Nova	Forests	Fair	Declining
Newfoundland and Labrador (NL)	Terra Nova	Freshwater	Good	Stable
Newfoundland and Labrador (NL)	Terra Nova	Wetlands	Good	Stable
Newfoundland and Labrador (NL)	Torngat Mountains	Freshwater	Good	Stable
Newfoundland and Labrador (NL)	Torngat Mountains	Tundra	Good	Stable
Prince Edward Island (PE)	Prince Edward Island	Coastal/marine	Good	Improving
Prince Edward Island (PE)	Prince Edward Island	Forests	Poor	Stable
Prince Edward Island (PE)	Prince Edward Island	Freshwater	Fair	Declining

Province or territory	National park	Ecosystem type	Ecological integrity condition	Ecological integrity trend
Prince Edward Island (PE)	Prince Edward Island	Wetlands	Good	Stable
Nova Scotia (NS)	Cape Breton Highlands	Forests	Poor	Stable
Nova Scotia (NS)	Cape Breton Highlands	Freshwater	Good	Stable
Nova Scotia (NS)	Cape Breton Highlands	Wetlands	Good	Stable
Nova Scotia (NS)	Kejimikujik	Coastal/marine	Fair	Improving
Nova Scotia (NS)	Kejimikujik	Forests	Good	Stable
Nova Scotia (NS)	Kejimikujik	Freshwater	Fair	Declining
Nova Scotia (NS)	Kejimikujik	Wetlands	Good	Stable
Nova Scotia (NS)	Sable Island Reserve	Coastal/Marine	Good	Stable
Nova Scotia (NS)	Sable Island Reserve	Freshwater	Good	Stable
New Brunswick (NB)	Fundy	Forests	Good	Improving
New Brunswick (NB)	Fundy	Freshwater	Good	Stable
New Brunswick (NB)	Fundy	Wetlands	Good	Stable
New Brunswick (NB)	Kouchibouguac	Coastal/marine	Good	Stable
New Brunswick (NB)	Kouchibouguac	Forests	Good	Stable
New Brunswick (NB)	Kouchibouguac	Freshwater	Good	Declining
Quebec (QC)	Forillon	Coastal/marine	Good	Improving
Quebec (QC)	Forillon	Forests	Poor	Stable
Quebec (QC)	Forillon	Freshwater	Good	Stable
Quebec (QC)	La Mauricie	Forests	Fair	Declining
Quebec (QC)	La Mauricie	Freshwater	Fair	Stable
Quebec (QC)	La Mauricie	Wetlands	Poor	Stable
Quebec (QC)	Mingan Archipelago Reserve	Coastal/marine	Good	Stable
Quebec (QC)	Mingan Archipelago Reserve	Forests	Good	Stable
Quebec (QC)	Mingan Archipelago Reserve	Tundra	Fair	Stable
Ontario (ON)	Bruce Peninsula	Forests	Good	Improving
Ontario (ON)	Bruce Peninsula	Freshwater	Good	Stable
Ontario (ON)	Bruce Peninsula	Shrublands	Fair	Stable
Ontario (ON)	Georgian Bay Islands	Coastal/marine	Fair	Declining
Ontario (ON)	Georgian Bay Islands	Forests	Good	Stable
Ontario (ON)	Georgian Bay Islands	Wetlands	Fair	Stable
Ontario (ON)	Point Pelee	Coastal/marine	Fair	Stable
Ontario (ON)	Point Pelee	Forests	Poor	Declining

Province or territory	National park	Ecosystem type	Ecological integrity condition	Ecological integrity trend
Ontario (ON)	Point Pelee	Wetlands	Good	Improving
Ontario (ON)	Pukaskwa	Coastal/marine	Fair	Declining
Ontario (ON)	Pukaskwa	Forests	Good	Stable
Ontario (ON)	Pukaskwa	Freshwater	Good	Stable
Ontario (ON)	Thousand Islands	Forests	Good	Stable
Ontario (ON)	Thousand Islands	Freshwater	Fair	Stable
Ontario (ON)	Thousand Islands	Wetlands	Good	Stable
Manitoba (MB)	Riding Mountain	Forests	Poor	Stable
Manitoba (MB)	Riding Mountain	Freshwater	Good	Stable
Manitoba (MB)	Riding Mountain	Grasslands	Poor	Stable
Manitoba (MB)	Wapusk	Coastal/marine	Good	Stable
Manitoba (MB)	Wapusk	Wetlands	Good	Stable
Saskatchewan (SK)	Grasslands	Grasslands	Fair	Stable
Saskatchewan (SK)	Prince Albert	Forests	Good	Stable
Saskatchewan (SK)	Prince Albert	Freshwater	Good	Stable
Saskatchewan (SK)	Prince Albert	Grasslands	Fair	Improving
Alberta (AB)	Banff	Forests	Good	Stable
Alberta (AB)	Banff	Freshwater	Poor	Stable
Alberta (AB)	Banff	Tundra	Good	Stable
Alberta (AB)	Elk Island	Forests	Fair	Declining
Alberta (AB)	Elk Island	Freshwater	Good	Stable
Alberta (AB)	Elk Island	Grasslands	Poor	Declining
Alberta (AB)	Jasper	Forests	Fair	Stable
Alberta (AB)	Jasper	Freshwater	Good	Stable
Alberta (AB)	Jasper	Tundra	Poor	Declining
Alberta (AB)	Waterton Lakes	Forests	Fair	Improving
Alberta (AB)	Waterton Lakes	Freshwater	Poor	Declining
Alberta (AB)	Waterton Lakes	Grasslands	Fair	Stable
British Columbia (BC)	Glacier	Forests	Fair	Improving
British Columbia (BC)	Glacier	Freshwater	Good	Stable
British Columbia (BC)	Glacier	Tundra	Poor	Declining
British Columbia (BC)	Gulf Islands Reserve	Coastal/marine	Poor	Declining

Province or territory	National park	Ecosystem type	Ecological integrity condition	Ecological integrity trend
British Columbia (BC)	Gulf Islands Reserve	Forests	Fair	Improving
British Columbia (BC)	Gulf Islands Reserve	Freshwater	Fair	Stable
British Columbia (BC)	Gwaii Haanas Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site	Coastal/marine	Good	Improving
British Columbia (BC)	Gwaii Haanas Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site	Forests	Good	Improving
British Columbia (BC)	Gwaii Haanas Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site	Freshwater	Good	Stable
British Columbia (BC)	Kootenay	Forests	Good	Stable
British Columbia (BC)	Kootenay	Freshwater	Poor	Stable
British Columbia (BC)	Kootenay	Tundra	Good	Stable
British Columbia (BC)	Mount Revelstoke	Forests	Fair	Stable
British Columbia (BC)	Mount Revelstoke	Freshwater	Good	Stable
British Columbia (BC)	Mount Revelstoke	Tundra	Poor	Declining
British Columbia (BC)	Pacific Rim Reserve	Coastal/marine	Good	Improving
British Columbia (BC)	Pacific Rim Reserve	Forests	Good	Stable
British Columbia (BC)	Pacific Rim Reserve	Freshwater	Poor	Declining
British Columbia (BC)	Yoho	Forests	Fair	Stable
British Columbia (BC)	Yoho	Freshwater	Poor	Stable
British Columbia (BC)	Yoho	Tundra	Good	Stable
Yukon (YT)	Ivvavik	Freshwater	Good	Stable
Yukon (YT)	Ivvavik	Tundra	Poor	Declining
Yukon (YT)	Kluane	Forests	Fair	Declining
Yukon (YT)	Kluane	Freshwater	Good	Stable

Province or territory	National park	Ecosystem type	Ecological integrity condition	Ecological integrity trend
Yukon (YT)	Kluane	Tundra	Good	Stable
Yukon (YT)	Vuntut	Tundra	Good	Stable
Yukon (YT)	Vuntut	Wetlands	Good	Stable
Northwest Territories (NT)	Aulavik	Freshwater	Good	Stable
Northwest Territories (NT)	Aulavik	Tundra	Poor	Declining
Northwest Territories (NT)	Nahanni Reserve	Forests	Fair	Declining
Northwest Territories (NT)	Nahanni Reserve	Freshwater	Good	Stable
Northwest Territories (NT)	Nahanni Reserve	Tundra	Good	Improving
Northwest Territories (NT)	Tuktut Nogait	Freshwater	Good	Stable
Northwest Territories (NT)	Tuktut Nogait	Tundra	Good	Stable
Northwest Territories (NT)	Wood Buffalo	Forests	Fair	Stable
Northwest Territories (NT)	Wood Buffalo	Freshwater	Poor	Declining
Northwest Territories (NT)	Wood Buffalo	Wetlands	Fair	Stable
Nunavut (NU)	Auyuittuq	Glaciers	Poor	Stable
Nunavut (NU)	Auyuittuq	Tundra	Good	Stable
Nunavut (NU)	Quttinirpaaq	Freshwater	Good	Stable
Nunavut (NU)	Quttinirpaaq	Tundra	Good	Stable
Nunavut (NU)	Sirmilik	Glaciers	Good	Stable
Nunavut (NU)	Sirmilik	Tundra	Good	Improving
Nunavut (NU)	Ukkusiksalik	Coastal/marine	Good	Stable
Nunavut (NU)	Ukkusiksalik	Tundra	Good	Stable

Source: Parks Canada (2021) Protected Areas Establishment and Conservation Directorate.

Additional information can be obtained at:

Environment and Climate Change Canada  
Public Inquiries Centre  
12th Floor Fontaine Building  
200 Sacré-Cœur Blvd  
Gatineau QC K1A 0H3  
Telephone: 1-800-668-6767 (in Canada only) or 819-938-3860  
Fax: 819-938-3318  
Email: [enviroinfo@ec.gc.ca](mailto:enviroinfo@ec.gc.ca)