

Environment and

ECOLOGICAL **INTEGRITY OF NATIONAL PARKS CANADIAN ENVIRONMENTAL** SUSTAINABILITY INDICATORS



Suggested citation for this document: Environment and Climate Change Canada (2019) Canadian Environmental Sustainability Indicators: Ecological integrity of national parks. Consulted on *Month day, year.* Available at: <u>www.canada.ca/en/environment-climate-change/services/environmental-indicators/ecological-integrity-national-parks.html</u>.

Cat. No.: En4-144/21-2019E-PDF ISBN: 978-0-660-31303-0

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CANADIAN ENVIRONMENTAL SUSTAINABILITY INDICATORS ECOLOGICAL INTEGRITY OF NATIONAL PARKS

July 2019

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Ecological integrity of national parks

Ecosystems have integrity when their native species, landscapes and functions are intact.¹ 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

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- Of the 119 ecosystems in 43 national parks that were assessed:
 - 60% are in good condition
 - o 24% are in fair condition
 - o 16% are in poor condition
 - As of 2018, the ecological integrity of 82% of park ecosystems is maintained or improved
- Most park ecosystems are stable (72 of 119 or 61%), 26 have improving trends, and 21 have declining trends

Figure 1. Ecological integrity status and trends of ecosystems in 43 national parks, Canada, 2018



Data for Figure 1

Note: Park ecosystems may include forest, freshwater, wetlands, grasslands, shrublands, tundra, coastal/marine and glaciers, depending on what is present in each park. Akami-Uapishk¹-KakKasuak-Mealy Mountains, Nááts'ihch'oh National Park Reserves and Qausuittuq National Parks did not report on ecological integrity in 2018. Rouge National Urban Park has not yet reported. Source: Parks Canada (2019).

¹ Parks Canada (2018) <u>Ecological integrity</u>. Retrieved on May 13, 2019.

Canadian Environmental Sustainability Indicators

The condition of ecosystems within national parks is evaluated regularly using a series of monitoring measures (for example plant and animal populations and soil properties) that are designed to track biodiversity and natural processes within those ecosystems. Each of these measures is compared to threshold values and assigned a score. The scores within each ecosystem are then averaged together to give the state of the ecosystem (good, fair or poor).

Most of the ecosystems that improved were forests or freshwater ecosystems (14 ecosystems). These 2 types of ecosystems also had the most ecosystems in decline (13 ecosystems).

Ecosystem	Improving (number of ecosystems)	Stable (number of ecosystems)	Declining (number of ecosystems)	Total (number of ecosystems)
Forests	9	17	5	31
Shrublands	0	1	0	1
Grasslands	2	1	2	5
Tundra	4	12	3	19
Freshwater	5	21	8	34
Glaciers	0	2	0	2
Wetlands	2	8	2	12
Coastal/marine	4	10	1	15

 Table 1. Ecological integrity trends by ecosystem type, Canada, 2018

Source: Parks Canada (2019).

Parks Canada identifies the major stressors of national parks as being the following:

- habitat loss
- habitat fragmentation (for example, building of roads and trails)
- losses of large carnivores, such as wolves
- air pollution
- pesticides
- invading non-native species
- over-use of national parks by humans

Parks are interlinked with their surrounding ecosystems and, despite their protected status, they are affected by many of the same pressures we place on the environment in general. Climate change affects species and ecosystems inside and outside parks. It is a stressor and changes the natural regions that parks are meant to represent. The ecosystems respond differently to stressors, and they also respond differently to management actions. Some management actions may take many years to show results, particularly for slow-growing vegetation.

Figure 2. Ecological integrity status and trends of ecosystems in 43 national parks by province and territory, Canada, 2018

Province or territory	National park	/3	100	Ores	0 2 2 2 2 3 2 3 3 3 3 3 3 3 3 3 3 3 3 3	ale s	Ecc	osy:		n Star
	Gros Morne		₽	\$				☆		Ecological integrity
NL	Terra Nova	\Leftrightarrow	¥	⇔					4	status
	Torngat Mountains			\$				\Leftrightarrow		Good
PE	Prince Edward Island	∲		4					¥	E Fair
	Cape Breton Highlands		☆	⇔					4	Poor
NS	Kejimkujik	∲	⇔	4					☆	
	Sable Island Reserve	⇔		4						4
	Fundy		⇔	₽					4	Ecological integrity
NB	Kouchibouguac	\Leftrightarrow	<	¥						trend
	Forillon	₽	<⇔	~						f Improving
QC	La Mauricie		♦	₽					⇔	Stable
	Mingan Archipelago Reserve	⇔	⇔					�		Declining
	Bruce Peninsula		((⇔			
	Georgian Bay Islands	\Leftrightarrow	\						∲	
ON	Point Pelee	⇔	☆						♦	
	Pukaskwa	\$	\	ŧ						
	Thousand Islands		<	♦					<	
	Riding Mountain		4	∲		∲				
MB	Wapusk	\Leftrightarrow							4	
01/	Grasslands					♦				
SK	Prince Albert		<	4		\Leftrightarrow				
	Banff		☆	¥				4		
	Elk Island		<	⇔		¥				
AB	Jasper		⇔	∲				<⇔		
	Waterton Lakes		∲	♦		₽				
	Glacier		☆	⇔				₽		
	Gulf Islands Reserve	♦	♦	∲						
BC	Gwaii Haanas Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site	€	♠	\$						
	Kootenay		€	ŧ				₽		
	Mount Revelstoke		₽	4>				♦		
	Pacific Rim Reserve	₽	<	¥						
	Yoho		�	¥				♠		
	lvvavik			\				4		
YT	Kluane		\$	¥				4		
	Vuntut							4>	\	
	Aulavik			\				♥		
	Nahanni Reserve		₽	\$				₽]
	Tuktut Nogait			4>				<⇒		
	Wood Buffalo		¥	4>					⇔	
	Auyuittuq				⇔			4>		
	Quttinirpaaq			4>				4>		1
	Sirmilik				<			4>		
	Ukkusiksalik	\Leftrightarrow						\Leftrightarrow		

Data for Figure 2

Source: Parks Canada (2019).

About the indicator

What the indicator measures

The Ecological integrity of national parks indicator summarizes the state (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 clean air and water and mitigate climate change while providing enjoyment to Canadians.

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 integrity of park ecosystem.



Sustainably managed lands and forests

This indicator supports the measurement of progress towards the following <u>2019 to 2022 Federal Sustainable</u> <u>Development Strategy</u> long-term goal: Lands and forests support biodiversity and provide a variety of ecosystem services for generations to come.

It is used to assess progress towards the target: By March 31, 2023, ecological integrity will be maintained or improved in 92% of national park ecosystems.

In addition, the indicator contributes to the <u>Sustainable Development Goals of the 2030 Agenda for Sustainable</u> <u>Development</u>. It is linked to the 2030 Agenda's Goal 15: Life on land.

Related indicators

<u>Canada's conserved areas</u> indicators report the amount and proportion of Canada's terrestrial and marine area that is conserved.

The <u>Global trends in protected areas</u> indicator compares Canada's protected area to a peer group of countries.

Data sources and methods

Data sources

The indicator summarizes the state and trend of ecosystems in National Parks. Parks Canada regularly monitors the state of ecosystems using a set of measures specific to the ecosystems. 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^U-KakKasuak-Mealy Mountains National Park Reserve, Nááts'įhch'oh National Park Reserve, Qausuittuq National Park, and Rouge National Urban Park.

Between 1 and 4 main ecosystems in each park, have their ecological integrity assessed. Examples of ecosystems include forests, wetlands, and glaciers. The main ecosystems form most of the area of a park and are important to its biological functioning. For each main 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 surveys, estimates of plant productivity, water quality measurements, and invasive species surveys. Data for these underlying measures are gathered from a variety of sources, including on-the-ground field sampling, satellite imagery, academic and government partners, and traditional knowledge. Measured levels are compared to thresholds, such as whether a wildlife population is near desirable levels or whether water meets a water quality standard. Interim thresholds based on significant changes in desired traits are used when more biologically based assessments are not available. The frequency of monitoring varies from annually to once a decade, depending on the specific measurement.

Data are collated and stored in a database, the Information Centre for Ecosystems, 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 individual park. Information is gathered for each of the main ecosystems, and a determination is made as to whether the ecosystem is in good, fair or poor condition and whether it 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 status 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 main ecosystem is based on a change in its status from 5 previous years. If the condition of the ecosystem indicator has not changed, it is considered stable unless a strong majority of the measures selected for that ecosystem have the same trend.

The national-level indicator is an overall assessment of ecological integrity across national parks. It is generated by summing the ecosystem-level indicator scores in each combination of status and trend for each park.

Recent changes

Glacier and tundra ecosystems in Auyuittuq National Park, Nunavut and the freshwater ecosystem in Sable Island were added to the indicator. Changes to Grasslands National Park in Saskatchewan were the exclusion of the freshwater ecosystem as it is not within the park boundary and combining the grassland and scrubland ecosystems into 1 grassland ecosystem.

Caveats and limitations

The measurements used to determine the status and trend of main 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 some 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 status 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 reports on incomplete suites of measures that reflect current data availability. Ecological integrity measures are selected using objective techniques to provide credible overall assessments. Where information is incomplete, preliminary data and statistical principles are used to support the selection of measures and 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

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) <u>State of Canada's Natural and Cultural Heritage Places 2016</u>. Retrieved on May 13, 2019. Parks Canada (2018) <u>Ecological integrity</u>. Retrieved on May 13, 2019.

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 status and trends of ecosystems in 43 national parks, Canada, 2018

Ecological integrity status	Improving (number of ecosystems)	Stable (number of ecosystems)	Declining (number of ecosystems)	Total (number of ecosystems)
Good	15	55	2	72
Fair	10	10	8	28
Poor	1	7	11	19
Total	26	72	21	119

Note: Park ecosystems may include forest, freshwater, wetlands, grasslands, shrublands, tundra, coastal/marine and glaciers, depending on what is present in each park. Akami-Uapishk¹-KakKasuak-Mealy Mountains, Nááts'ihch'oh National Park Reserves and Qausuittuq National Parks did not report on ecological integrity in 2018. Rouge National Urban Parkhas not yet reported. Source: Parks Canada (2019).

Table A.2. Data for Figure 2. Ecological integrity status and trends of ecosystems in 43 national parks by province and territory, Canada, 2018

Province or territory	National park	Ecosystem type	Ecological integrity status	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	Good	Stable

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

Province or territory	National park	Ecosystem type	Ecological integrity status	Ecological integrity trend
Ontario (ON)	Georgian Bay Islands	Wetlands	Fair	Improving
Ontario (ON)	Point Pelee	Coastal/marine	Fair	Stable
Ontario (ON)	Point Pelee	Forests	Good	Improving
Ontario (ON)	Point Pelee	Wetlands	Poor	Declining
Ontario (ON)	Pukaskwa	Coastal/marine	Good	Stable
Ontario (ON)	Pukaskwa	Forests	Good	Stable
Ontario (ON)	Pukaskwa	Freshwater	Fair	Declining
Ontario (ON)	Thousand Islands	Forests	Good	Stable
Ontario (ON)	Thousand Islands	Freshwater	Fair	Declining
Ontario (ON)	Thousand Islands	Wetlands	Good	Stable
Manitoba (MB)	Riding Mountain	Forests	Poor	Stable
Manitoba (MB)	Riding Mountain	Freshwater	Good	Improving
Manitoba (MB)	Riding Mountain	Grasslands	Poor	Improving
Manitoba (MB)	Wapusk	Coastal/marine	Good	Stable
Manitoba (MB)	Wapusk	Wetlands	Good	Stable
Saskatchewan (SK)	Grasslands	Grasslands	Poor	Declining
Saskatchewan (SK)	Prince Albert	Forests	Good	Stable
Saskatchewan (SK)	Prince Albert	Freshwater	Good	Stable
Saskatchewan (SK)	Prince Albert	Grasslands	Poor	Stable
Alberta (AB)	Banff	Forests	Good	Improving
Alberta (AB)	Banff	Freshwater	Poor	Declining
Alberta (AB)	Banff	Tundra	Good	Stable
Alberta (AB)	Elk Island	Forests	Good	Stable
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	Improving
Alberta (AB)	Jasper	Tundra	Poor	Stable
Alberta (AB)	Waterton Lakes	Forests	Fair	Improving
Alberta (AB)	Waterton Lakes	Freshwater	Poor	Stable
Alberta (AB)	Waterton Lakes	Grasslands	Fair	Improving
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 status	Ecological integrity trend
British Columbia (BC)	Gulf Islands Reserve	Forests	Poor	Declining
British Columbia (BC)	Gulf Islands Reserve	Freshwater	Fair	Improving
British Columbia (BC)	Gwaii Haanas Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site	Coastal/marine	Good	Stable
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	Improving
British Columbia (BC)	Kootenay	Freshwater	Poor	Declining
British Columbia (BC)	Kootenay	Tundra	Good	Improving
British Columbia (BC)	Mount Revelstoke	Forests	Fair	Improving
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	Fair	Declining
British Columbia (BC)	Yoho	Forests	Fair	Stable
British Columbia (BC)	Yoho	Freshwater	Poor	Declining
British Columbia (BC)	Yoho	Tundra	Good	Improving
Yukon (YT)	lwavik	Freshwater	Good	Stable
Yukon (YT)	lwavik	Tundra	Good	Stable
Yukon (YT)	Kluane	Forests	Fair	Stable
Yukon (YT)	Kluane	Freshwater	Fair	Declining
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

Province or territory	National park	Ecosystem type	Ecological integrity status	Ecological integrity trend
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	Declining
Northwest Territories (NT)	Wood Buffalo	Freshwater	Good	Stable
Northwest Territories (NT)	Wood Buffalo	Wetlands	Fair	Stable
Nunavut (NU)	Auyuittuq	Glaciers	Fair	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	Stable
Nunavut (NU)	Ukkusiksalik	Coastal/marine	Good	Stable
Nunavut (NU)	Ukkusiksalik	Tundra	Good	Stable

Source: Parks Canada (2019).

Additional information can be obtained at:

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