PSIE

Programme de suivi de l'intégrité écologique

EIMP - Ecological integrity monitoring program

2003-2012 REPORT

Summary

ECOLOGICAL INTEGRITY MONITORING PROGRAM - EIMP

Parcs Québec Network – Sépaq

2003-2012 Report | Summary

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A word from the CEO and the Vice-President

The first priority of a national park is to ensure the permenant protection and conservation of its habitats while at the same time making them accessible to the public for educational or recreational use. In this, the park administrators are challenged every day with ensuring that a good balance is struck between conservation and accessibility in order to ensure that this main objective is reached.

It is with this in mind that the Ecological Integrity Monitoring Program was created. The EIMP has become invaluable to the park management teams as it is the main tool used for verifying changes in the ecological integrity of the regions under their care.

Born from an idea that was originally proposed over ten years ago, this report brings together the data from over 370 studies produced between 2003 and 2012 by the entire system of national parks managed by the Sepaq. The results show that, overall, the ecological integrity throughout the system of parks has remained constant or improved. Throughout this period, great efforts were made to promote the parks and facilitate accessibility. We are extremely pleased by these results for they show that the park administrators were able to maintain the delicate balance between the conservation of our natural heritage and keeping the parks accessible to the population.

The publication of our first EIMP report is an event that will stand out in the history of Quebec's national parks. We wish to thank all the park management teams who, year in and year out, have worked to accomplish the noble mission with which we have been entrusted. We would also like to underscore the hard work of all the people who helped in creating the EIMP, as much the employees of the Sépaq as our partners, researchers, and specialists, whose contributions considerably improved the quality of the program.

And so we invite you to read the findings reported in your favorite parks!

Raymond Desjardins
Chief Executive Officer
Société des établissements de plein air du Québec

Martin Soucy
Vice President exploitation
Parcs Québec

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Introduction

Following the example set out by so many other large national park systems across the globe, the Société des établissements de plein air du Québec (Sépaq) undertook in 2002 to implement a monitoring program for our natural heritage in the parks under its administration. Following up on the ideas proposed by Parks Canada on ecological integrity, the Service des parcs and the Société de la faune et des parcs du Québec (now headed under the MDDEFP) had prepared in 2000 the first measures for what would eventually become that monitoring program. With these foundations laid, the Services des parcs collaborated with the Sepaq to produce the framework for the program that would be implemented within their parks. It was in 2003 that the first surveys began.

The results of these physical and biological investigations have allowed us to produce an outline of the changes in ecological integrity in the National Parks of Quebec. Being that ecosystems are extremely complex, it would be unrealistic to imagine measuring the evolution of each and every composing element. Nevertheless, through a judicious selection of indicators combining feasibility and pertinence, it has been possible to create a monitoring program which allows park administrators to direct their decisions and actions so as to fulfill the park's mission of conservation adequately.

The last ten years have seen major investments (around 140 million dollars between 1999 and 2012) aimed at improving park accessibility to the population. These efforts have paid off! The number of park visits went from 2.6 million day-visits in 2003 to over 4 million in 2012. It is therefore normal to question what impact these developments have had on the protected natural habitats. The EIMP findings are reassuring: the overall survey results indicate that ecological integrity has been maintained throughout the parks system. Furthermore, in spite of increases in investment and visitation, the overall ecological integrity has not been altered. The parks have become more accessible without compromising the main reason for their existence, the protection of our natural heritage for future generations.

This document is a summary of the results of ten years of information gathering, from 2003 to 2012. To see the full results, consult the EIMP website at: www.parcsquebec.com/ecologicalintegrity

Understanding the EIMP – Objectives and Basic Principles

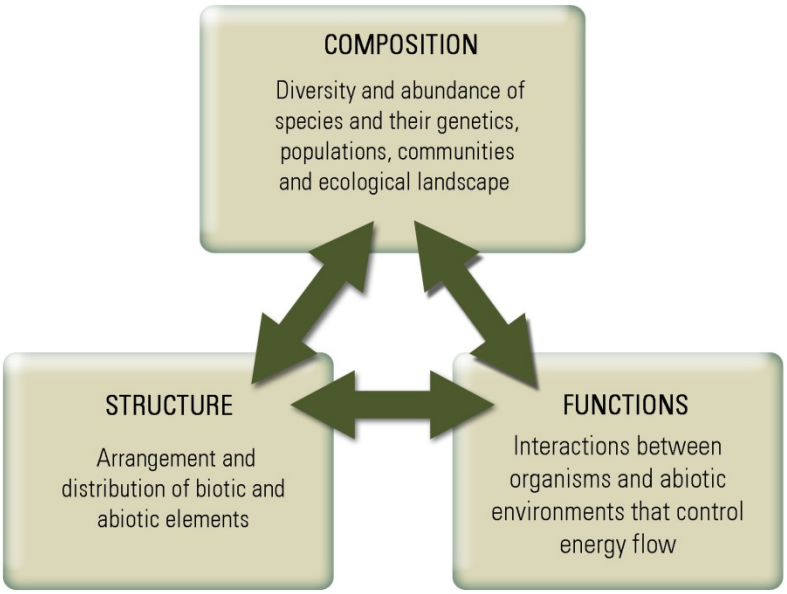
The goal of the EIMP is the following:

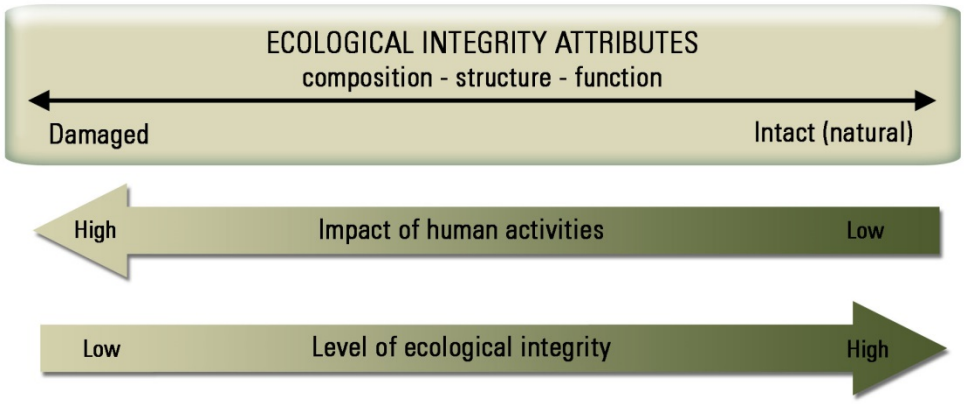
> **To monitor changes in ecological integrity levels in Quebec's national parks.**

This goal raises three specific objectives:

- *Evaluate overall efficiency of the conservation mission's management principles.*
- *Detect the onset or presence of undesirable situations and, where applicable, implement corrective actions or mitigation measures.*
- *Communicate information on changes in the health of these parks to government authorities, partners, park visitors and the general public.*

But what exactly is ecological integrity? Three attributes are used to describe the integrity of an ecosystem: the composition, the structure, and the functions. The less these attributes in an ecosystem are altered by human activity, the greater the ecological integrity. Furthermore, the state of what is measured is not declared "good" or "bad", since this state does not refer to a quality threshold. Rather, it is how the ecosystem is evolving in relation to the influences of human activity that is assessed and judged as positive or negative.





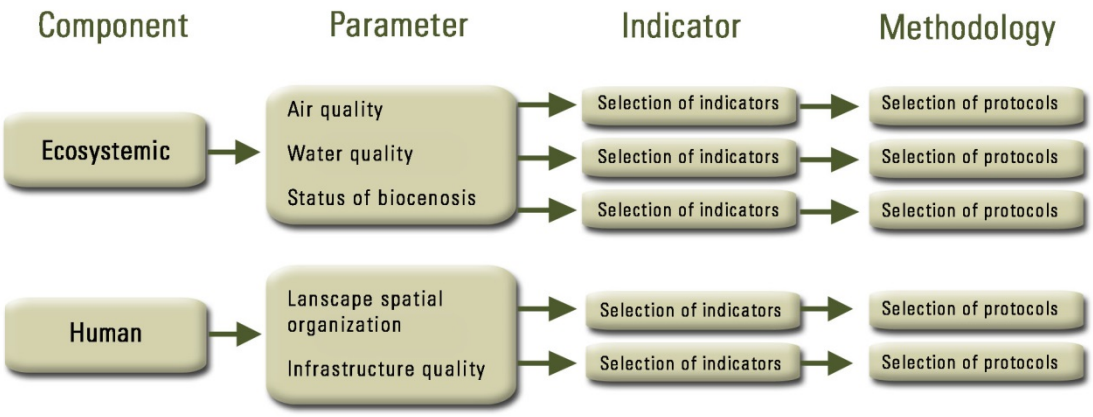
To achieve this, the EIMP relies on indicators. By definition, an indicator is a tool for the analysis and evaluation of select parameters which allows the information describing complex phenomena to be simplified and easily understood. Taken as a whole, these indicators produce a portrait of a park's ecological integrity. There are various different types of indicators. For example, they may examine the physical or chemical charactistics of an habitat or follow the changes of a species, a group of species, or even the extent of stress factors related to infrastructures. All that is required is a selection of indicators that are practical and relevant to sample the parameters that best represent the condition of the ecosystems as a whole.

Understanding the EIMP – Parameters Evaluated

An ecosystem is made up of an infinite number of links and processes between its component elements. To succeed in synthesizing such complexity from a relatively small number of indicators is a significant challenge. Carefully chosing the indicators for this is extremely important. The EIMP found inspiration in this within the *Ecological Monitoring Framework* from the National Park Service (NPS) of the United States, who modeled different ecosystems within the American national parks by establishing the nature of the interactions between the species, the physical environments and the stress factors that were present.

Five parameters were selected for the EIMP :

1- Air quality
2- Water quality
3- Status of biocenosis (living organisms)
4- Landscape spacial organization
5- Infrastructure quality



Understanding the EIMP – Rating, symbols, and ecological power

Rating and Symbols: To keep the findings of the EIMP simple to communicate, a rating system for the indicators has been created. According to the degree of change measured by an indicator, a positive or negative rating was assigned to it. The rating obtained was then represented by a symbol which allows for easy comprehension as to whether ecological integrity has improved or not. The symbols in question can apply to an individual indicator, to a parameter (in this case, the symbol represents the total sum of the ratings for the individual indicators that measure a parameter), and to the entire parks (the symbol represents the total sum of all indicators reported upon in a park).

Change in ecological integrity level	Symbol
Significant increase	
Increase	
Stability	
Decrease	
Significant decrease	

Ecological power : Not all indicators are equal in their capacity to express the actual changes in ecological integrity or the magnitude of said changes. A system of evaluation for what has been termed "ecological power" has been developed to determine the relative importance of what is measured by the indicators. (See the article, *L'expertise de 72 scientifiques permet de bonifier le Programme de suivi de l'intégrité écologique -french only* [1]). Through this process, the inidicators are classed into three orders of ecological power. The most influential being the first order of power and the least influential being the third order.

The rating system and the symbols are adapted to the ecological power. For example, according to this system, an indicator of the first order where the measurements indicate a significant positive change would get a +4 rating and would be evaluated as more important in the overall context of a park than an indicator of the third order which would only be rated +1.

[1] Gingras, J. et P. Graillon (2012), L'expertise de 72 scientifiques permet de bonifier le Programme de suivi de l'intégrité écologique, Bulletin de conservation 2012-2013 – Les parcs nous ont dévoilé…, Parcs Québec, p. 15-17. (http://www.sepaq.com/dotAsset/c8200865-83f6-416b-8906-ad08f5b29267.pdf)

Understanding the EIMP – Global Results and Management Results

Global results : Starting from the points given to the individual results of each indicator, it is possible to attribute a global result to a park. This results translates the combined impact of various indicators tracked in the park into the ecological integrity of the park in question. Thus, a overall stable result means that the indicators that contributed to decreasing the ecological integrity were balanced by the indicators which contributed to increasing it, and not that all the indicators were stable. Likewise, an overall decrease means that the number of indicators that decreased the ecological integrity of the park outnumbered the indicators that increased it, and not that all the indicators in the park are decreasing.

Management results: The indicators measure elements over which the park managers control is quite variable. If the results from certain indicators depend completely on the administrators decisions (for example, infrastructure density), others vary in relation to factors that the administrators have no control over (for example, the acidity of precipitation). For many other indicators, the managers have a mixed level of control. For example, rare plants may be put under pressure as much from natural sources as from anthropic sources. However, the administrators may take special measures to protect these species.

The management results are therefore a way of analyzing the results that takes this into account. It consists of applying a correction factor to the ratings produced by a given indicator which is based on the level of control possible for a said indicator. As with the overall results, the ratings of all indicators are totaled to obtain the management result of a park. The table below presents the correction factors that are used.

Level of control	Correction factor	Interpretation
Complete	1	The original ratings are not modified. The results for the indicator is therefore applied at 100% for calculating management results.
Partial	0,5	The original score is divided by two. The results for the indicator are therefore applied at 50% for calculating management results.
None	0	The original score is dropped to zero. The results from the indicator are therefore in no way considered when calculating management results.

The Results – Results for the Entire Network

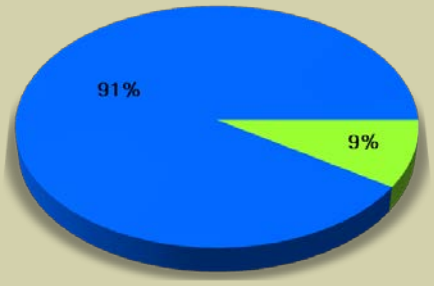
To obtain the complete and details results from each measure, consult the EIMP website:

www.parcsquebec.com/ecologicalintegrity

Global results: The table below compiles the results for all the parks surveyed. All of the 22 parks have maintained their overall ecological integrity and two even showed improvement. No park showed an overall decrease in their ecological integrity. These results are particularly satisfying considering that Quebec's national parks underwent a period of development and a major rise in the numbers of visitors over the last decade. The impact to the natural environment of the parks from these potential stressors was therefore well managed.

GLOBAL RESULTS

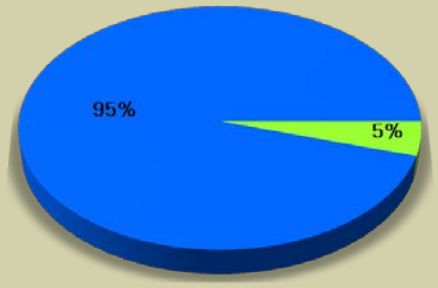
Number of parks classed by changes in ecological integrity level
(of 22 parks)

Symbol	Degree of change	Number of parks	Parks by percentage
	Significant increase	0	
	Increase	2	
	Stability	20	
	Decrease	0	
	Significant decrease	0	

Management results: The table below paints a picture similar to that of the global results. The level of ecological integrity that is shown by these findings from indicators are that much more satisfying in that it is based on analysis of indicators that are adjusted to reflect the level of influence that park management has over them. It shows that, in spite of the inevitable expansion of infrastructures aimed at increasing accessibility to the parks, the precautions taken and the overall methods used have counterbalanced the negative effects of this intrusion and preserved the overall ecological integrity of the parks.

RESULTS FOR INDICATORS RELATED TO PARK MANAGEMENT

Number of parks classed by changes in ecological integrity level
(of 22 parks)

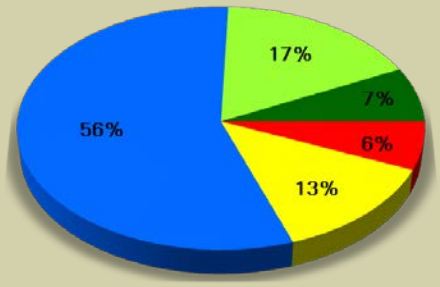
Symbol	Degree of change	Number of parks	Parks by percentage
	Significant increase	0	
	Increase	1	
	Stability	21	
	Decrease	0	
	Significant decrease	0	

The Results – Highlights

Of the 373 investigations carried out for this report, 209 (56%) showed a stable level of ecological integrity in the parks. However, as shown in the table below, other investigations showed changes, both positive (25% of indicators) and negative (19%). Among the indicators which testify of a significant decrease, more than two thirds are the consequence of external activities outside the parks for which we have no control. For the other cases, corrective actions are under evaluation or integrated into the conservation plans of the parks.

All Indicators

Number of indicators organized by degree of change in ecological integrity level
(of 373 indicators)

Symbol	Degree of change	Number of indicators	Indicators by percentage
↑	Significant increase	27	
↗	Increase	64	
↔	Stability	209	
↘	Decrease	49	
↓	Significant decrease	24	

The following pages show the indicators that underwent the most notable changes throughout the system of parks, either by their general trend, or by their magnitude.

Amphibians and Reptiles Improvement	Quality habitats : Of the 20 reports related to amphibians or reptiles, 11 show an improvement in the situation and five show stability. While everywhere the situation has shown an overall deterioration due to quality loss in their habitats (RECCAR 2013, Deroches 2004, Gibbons 2000) and the fact that amphibians and reptiles are animals that generally pass their entire life-cycle in fairly localized territories, these encouraging results show the high quality of the park habitats and the importance of these protected areas for these animals. RÉCARR (Réseau Canadien de Conservation des Amphibiens et Reptiles), Factors contributing to declines in amphibian population sizes and occurrences, http://www.carcnet.ca/english/amphibians/amphissues.php, [Visited on December 15, 2013.] Desroches, J.-F., et al. Picard (2004), Pour la conservation des amphibiens : la conservation et non la relocalisation, Le naturaliste canadien, 128-2, p. 29-34. Gibbons, J.W., *et al.* (2000), The global decline of reptiles, *Déjà Vu* amphibians, Bioscience, vol. 50-8, p. 653-666.
Arctic Alpine Vegetation Improvement	Positive actions of management : Four parks contain apline habitats. The vegetation in these habitats is very sensitive to trampling by hikers, and is a common indicator used for these parks. In three of the parks, the indicator shows an improvement in these plants (a significant improvement in two of the cases), while in the fourth park the situation is stable. This improvement is the result of specific interventions aimed at increasing the awareness of park visitors and more clearly guiding them in these fragile habitats.
Habitat Fragmentation Improvement	Nature reclaims her rights : Of the 19 parks that used this indicator, four showed a significant improvement in their state. This is the indicator that showed the greatest number of indicators with significant increase. As well, none of the parks showed deterioration in this area. This improvement is principally due to progressive revegetation of old forest trails which existed prior to the creation of certain parks and are no longer used today.
Invasive Alien Species Deterioration	A generalized problem in North America : This indicator currently shows a drop in the ecological integrity in five parks. No park is showing improvement. The problem of invasive alien species is widespread in southern Quebec and remains a priority for the park administrators. Global warming is a factor that may exacerbate this problem in the future (Auzel 2012). Several parks participate in research projects to find effective methods for controlling these species. Auzel, P., *et al.* (2012), Impacts des changements climatiques sur la biodiversité du Québec : Résumé de la revue de littérature, CSBQ, MDDEP, Ouranos. 29 p.
Bird surveys Deterioration	A continental concern : Of 12 surveys done on the groups of birds nesting within the parks, nine showed a widespread decrease in their population and biodiversity, four of which showed a significant decrease. While troubling, these results are consistent with reports from across the continent. *L'initiative de conservation des oiseaux de l'Amérique du Nord* (2012) proposes that decrease in insect population, change and loss of habitat, pesticide use, and climate change as various possible causes of the decline in Canadian bird populations. Cheskey *et al.* (2011) states that many species of birds depends on the boreal forest to survive but that said forest is undergoing major transformations: pressures from industrial and hydroelectric development,

	logging, mining, climate change. In spite of these troubling conclusions, the problem does not appear to stem from a degradation in park habitats. Initiative de conservation des oiseaux de l'Amérique du Nord (2012), État des populations d'oiseaux du Canada, Environnement Canada, Ottawa, Canada, 36 p. Cheskey *et al.* (2011), Oiseaux en péril : L'importance des milieux humides et des cours d'eau de la région boréale du Canada, Nature canada, Boreal Songbird Initiative, Natural Resources Defense Council, 27 p.
Survey of bats ↘ Deterioration	**A disease now present in Québec :** Of five parks that studied their bats population over several years, four showed a significant decrease in population and biodiversity. It is now well known that white-nose syndrome, a fungal infection, is responsible for a major decrease in the bat populations of North America. The fungus disturbs the hibernation cycle by forcing the bats to consume their fat reserves too rapidly during the winter. The first infections were discovered in the United States in 2006 and have spread across North America, arriving in Quebec in 2010 (Tremblay et Jutras, 2010; U.S. Fish & Wildlife Service, 2013). Like the breeding birds, this problem does not appear to stem from a deterioration in park habitat. Tremblay, J.A., et J. Jutras (2010), Les chauves-souris arboricoles en situation précaire au Québec : Synthèse et perspectives, Le naturaliste canadien, 134-1, p. 29-40. U.S. Fish & Wildlife Service, White-nose syndrome.org : A coordinated response to the devastating bat disease, http://www.fws.gov/WhiteNoseSyndrome, [Visited on December 15, 2013.]
Infrastructure density ↘ Deterioration	**Facilitating park access** : In nine of the 21 parks where this indicator was tracked, infrastructure density had increased, which translate to a potential stress factor for park habitats, and in four cases quite significantly so. Major investments in improving accessibility are the unsurprising explanation of this densification. The decision of where to place these new installations still plays a major role in species preservation and maintenance of habitat connectivity. Thus, in spite of the increase in infrastructures, overall habitat fragmentation has not gone up. It even improved for many parks. This is because, in general, the new infrastructures were built on already occupied or disturbed sites, thereby limiting their negative impact on animal species and their habitats.

The Results – By park

The following pages contain the results of each park as a summary sheet.

Summary Sheet	National Park	Summary Sheet	National Park
A	Aiguebelle	M	Mont-Mégantic
B	Anticosti	N	Mont-Orford
C	Bic	O	Mont-Saint-Bruno
D	Fjord-du-Saguenay	P	Monts-Valin
E	Frontenac	Q	Mont-Tremblant
F	Gaspésie	R	Oka
G	Grands-Jardins	S	Plaisance
H	Hautes-Gorges-de-la-Rivière-Malbaie	T	Pointe-Taillon
I	Île-Bonaventure-et-du-Rocher-Percé	U	Yamaska
J	Îles-de-Boucherville	V	Parc marin du Saguenay-Saint-Laurent
K	Jacques-Cartier		Lac-Témiscouata*
L	Miguasha		

*Note : The parc national du Lac-Témiscouata, officially established in November 2009 and opened to the public in June 2013, is not included in the present report. The EIMP is in place there, but the period for data collection was too short to be able to collect conclusive results. The findings for this park will be published in the next five-year report.

The following elements are presented in sheet form for each park:

1- The global result and the park management result (see page 8 to understand the meaning of these results)
2- Some highlights from the surveyed indicators.
3- A synthesis diagram which displays at a glance the overview of the changes measured by the indicators in the park.
4- A summary table listing all the indicators that were surveyed in the park and showing the changes in ecological integrity level monitored for each.

To obtain the complete and detailed results for each measure visit the EIMP website:

www.parcsquebec.com/ecologicalintegrity

AIGUEBELLE National Park

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

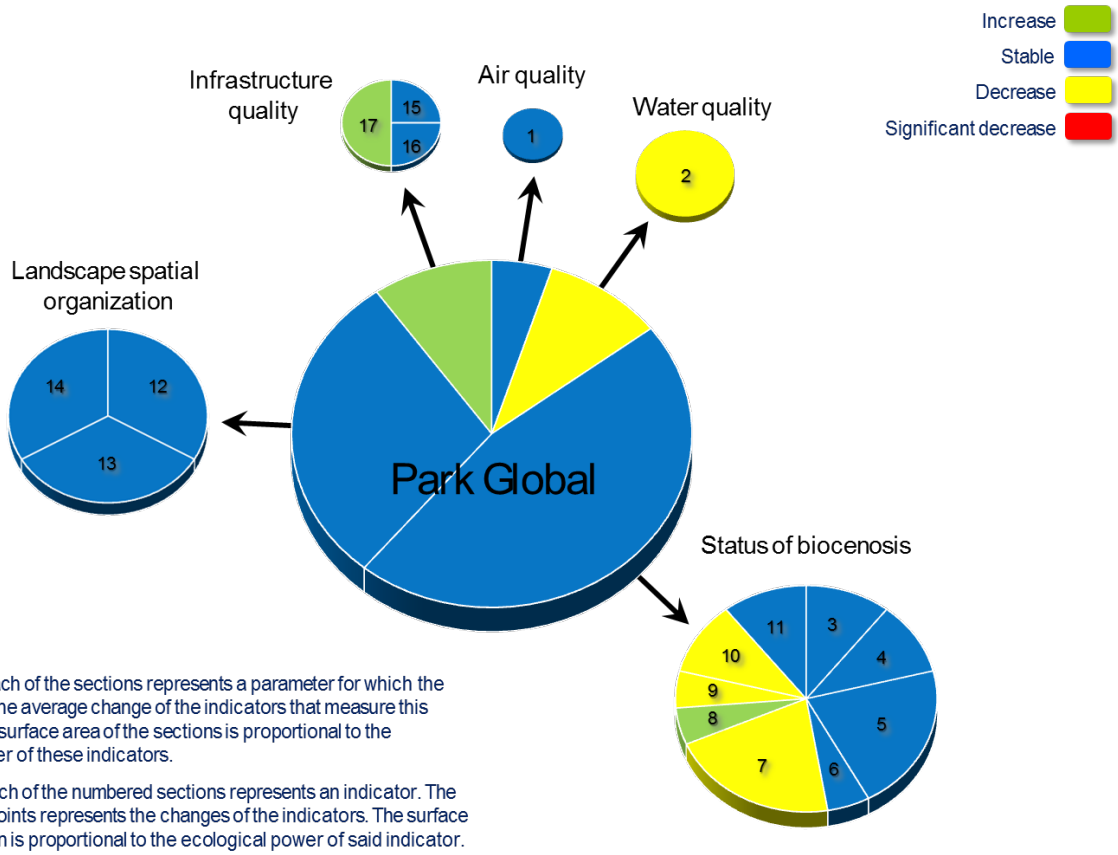
Management result

STABLE

Highlights

- Asian oak fern stalks (*Gymnocarpium jessoense*) appear to have increased in number.
- Bank denaturalization index has diminished.
- The state of benthic fauna has slightly deteriorated (unknown reason(s)).

Synthesis diagram



Park Global: Each of the sections represents a parameter for which the color signifies the average change of the indicators that measure this parameter. The surface area of the sections is proportional to the ecological power of these indicators.

Parameters: Each of the numbered sections represents an indicator. The color of these points represents the changes of the indicators. The surface area of a section is proportional to the ecological power of said indicator.

Sheet A

AIGUEBELLE National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Benthic fauna quality	2- Standardized global biological index	1	
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	7- Monitoring breeding birds	1	
		Monitoring Small mammals	2	Lack of data
		Monitoring the Pine Marten	3	Lack of data
	Rare and endangered species situation	8- Monitoring the Northern Oak Fern	3	
	Exceptional or fragile habitat quality	9- Monitoring heron nesting sites	3	
		10- Monitoring cliff vegetation	2	
	Fish resource quality	11- Fishing quality index	2	
Landscape spatial organization	Infrastructure density	12- Infrastructure density index	1	
	Fragmentation	13- Landscape dissection index	1	
	Periphery land use	14- Land use index	1	
Infrastructure quality	Hiking trail quality	15- Hiking trail width	3	
	Campsite quality	16- Degradation index	3	
	Water bank infrastructure quality	17- External impact degradation index	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

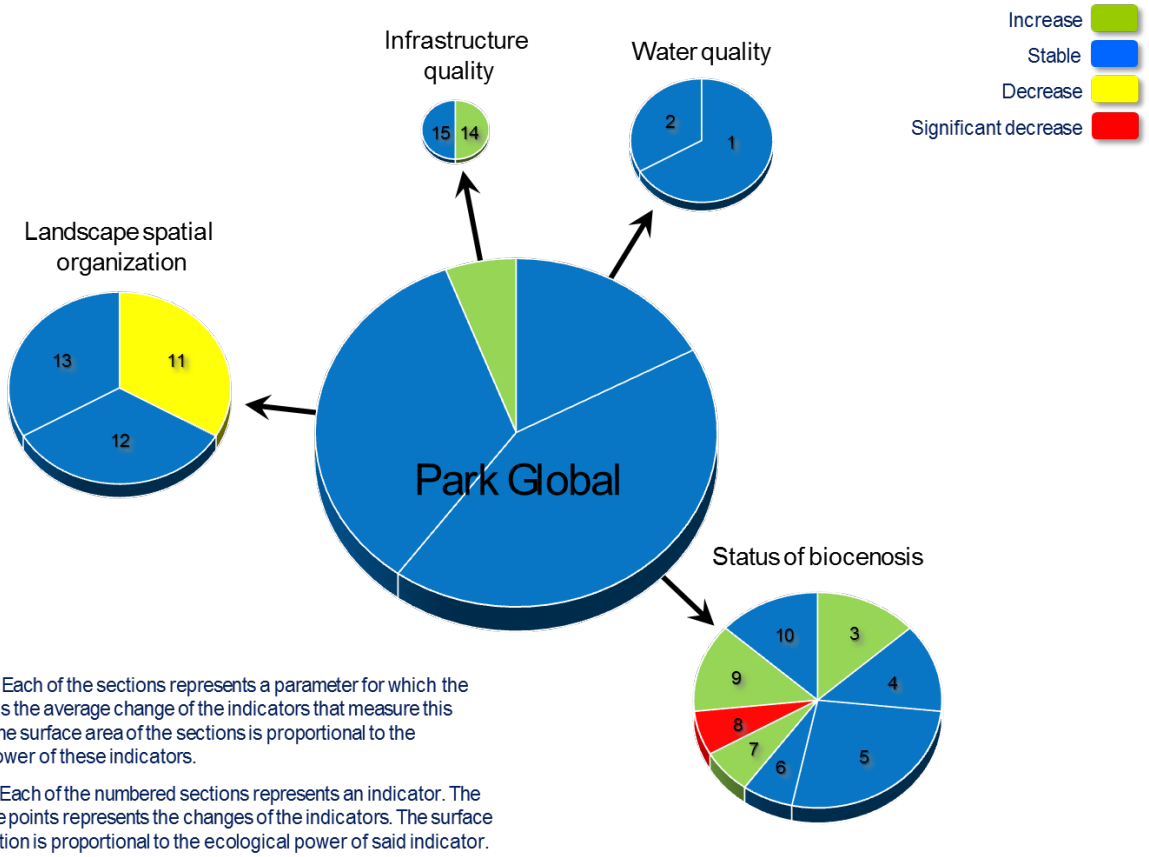
Management result

STABLE

Highlights

- Atlantic salmon appear to have increased in number in the Vauréal River.
- The width of the hiking trails is gradually diminishing.
- Calypso orchids (*Calypso bulbosa*) appear to have decreased in number (unknown reason(s)).

Synthesis diagram



Park Global: Each of the sections represents a parameter for which the color signifies the average change of the indicators that measure this parameter. The surface area of the sections is proportional to the ecological power of these indicators.

Parameters: Each of the numbered sections represents an indicator. The color of these points represents the changes of the indicators. The surface area of a section is proportional to the ecological power of said indicator.

Sheet B

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Water quality	Benthic fauna quality	1- Standardized global biological index	1	
	Lake acidity level	2- PH of selected lakes	2	
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		Monitoring bats	2	Lack of data
	Rare and endangered species situation	Monitoring the Bald Eagle	3	Lack of data
		7- Monitoring Atlantic Salmon	3	
		8- Monitoring the Fairy Slipper	3	
	Exceptional or fragile habitat quality	9- Monitoring EFEs – Fir forest, White Spruce and White Pine	2	
		10- Monitoring EFEs lac Wickenden old growth forest	2	
Landscape spatial organization	Infrastructure density	11- Infrastructure density index	1	
	Fragmentation	12- Landscape dissection index	1	
	Periphery land use	13- Land use index	1	
Infrastructure quality	Hiking trail quality	14- Hiking trail width	3	
	Campsite quality	15- Degradation index	3	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

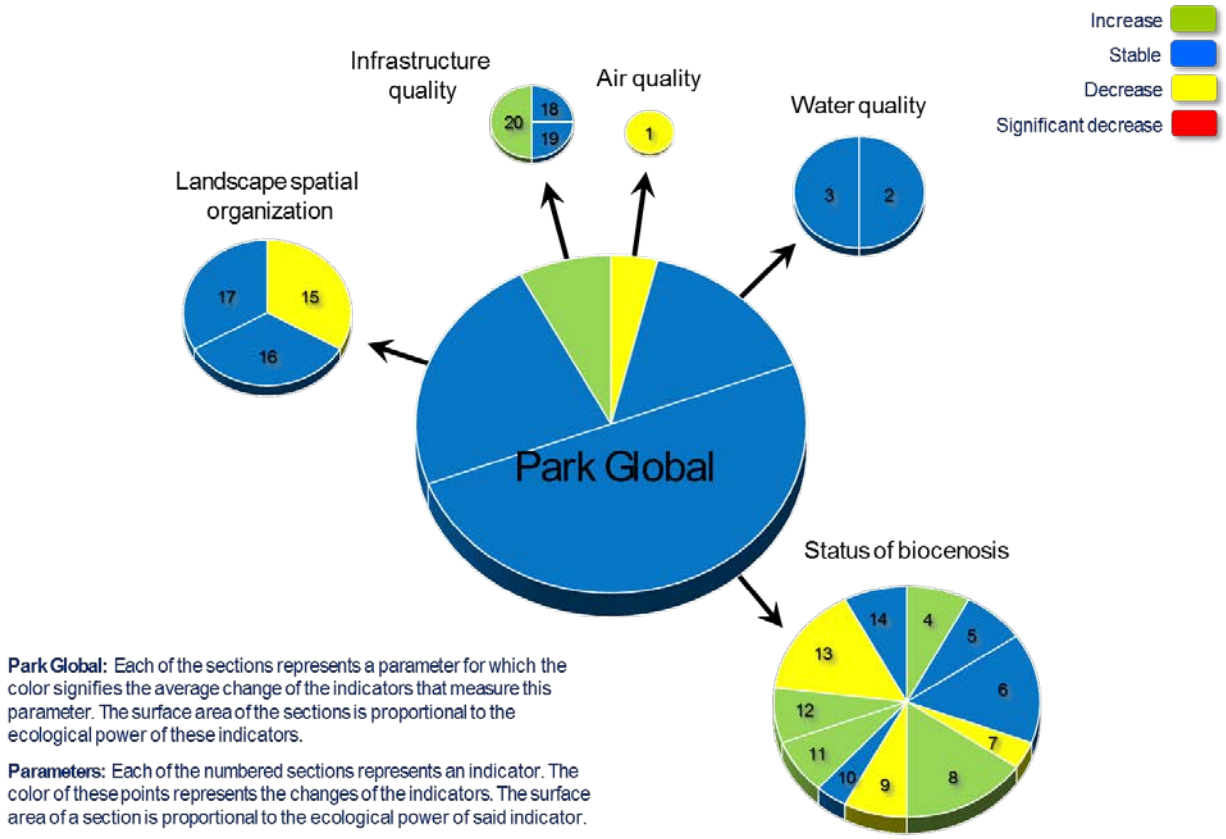
Management result

STABLE

Highlights

- The biodiversity index for breeding birds has increased.
- The percentage of denaturalized banks has diminished.
- Precipitations are slightly more acidic (element out of our control).

Synthesis diagram



Park Global: Each of the sections represents a parameter for which the color signifies the average change of the indicators that measure this parameter. The surface area of the sections is proportional to the ecological power of these indicators.

Parameters: Each of the numbered sections represents an indicator. The color of these points represents the changes of the indicators. The surface area of a section is proportional to the ecological power of said indicator.

Sheet C

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Benthic fauna quality	2- Standardized global biological index	1	
	Bacterial and physicochemical stream water quality	3- Bacterial and physicochemical water quality index	1	
Status of biocenosis	Non-indigenous plant propagation	4- Quadra sampling	2	
	Invasive exotic species	5- Species list	2	
	Influence of anthropogenic events on natural processes	6- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	7- Depredation index	3	
	Situation of selected fauna species	8- Monitoring breeding birds	1	
		Monitoring bats	2	Lack of data
		9- Anuran listening route	2	
	Rare and endangered species situation	10- Monitoring the Cutleaf Fleabane	3	
	Exceptional or fragile habitat quality	11- Monitoring EFEs – White Spruce forest, lichen and Arctostaphylos	2	
		12- Monitoring EFEs – Red Pine forest	2	
		13- Marsh monitoring program	1	
	Fish resource quality	14- Quahog harvest	2	
Landscape spatial organization	Infrastructure density	15- Infrastructure density index	1	
	Fragmentation	16- Landscape dissection index	1	
	Periphery land use	17- Land use index	1	
Infrastructure quality	Hiking trail quality	18- Hiking trail width	3	
	Campsite quality	19- Degradation index	3	
	Water bank infrastructure quality	20- External impact degradation percentage	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

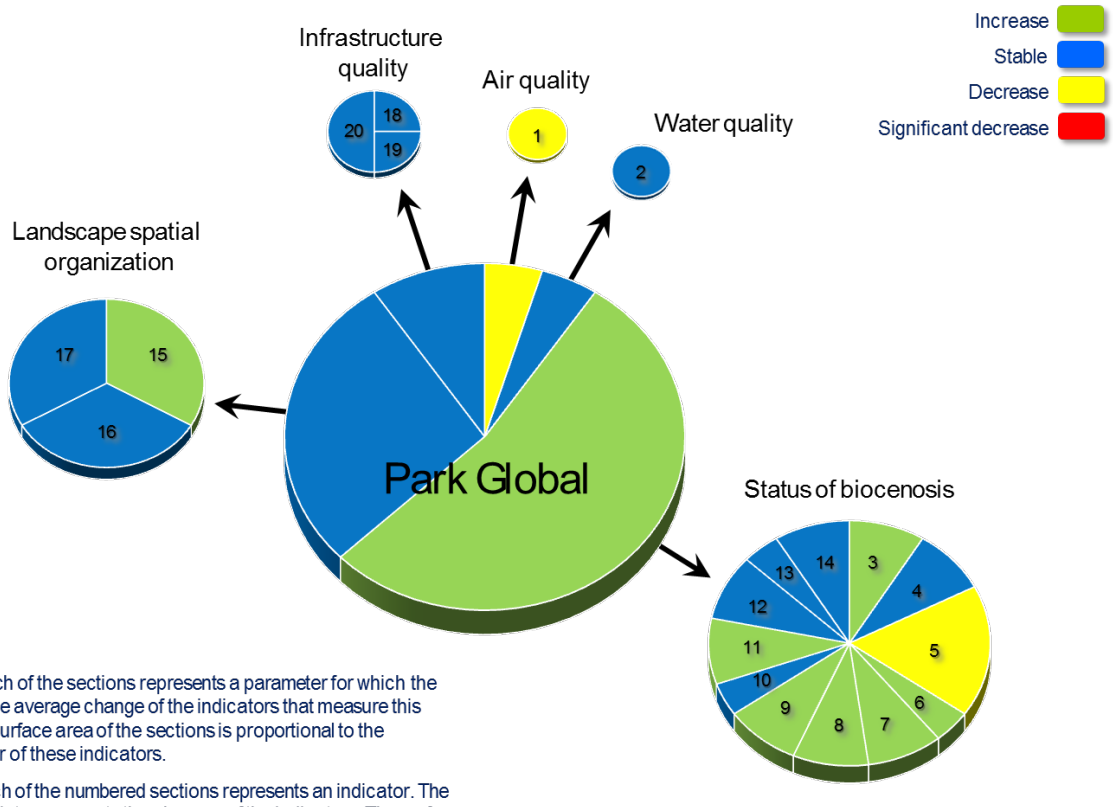
Management result

STABLE

Highlights

- The biodiversity index for ground beetles (*Carabidae*) and weevils (*Curculionoidea*) has increased.
- Striped coralroot (*Corallorhiza striata*) appear to have increased in number.
- Precipitations are more acidic (element out of our control).

Synthesis diagram



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Sheet D

FJORD-DU-SAGUENAY National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Benthic fauna quality	Standardized global biological index	1	Lack of data
	Lake trophic level	2- Trophic rating measurement	2	
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		7- Anuran listening route	2	
		8- Monitoring stream salamanders	2	
		9- Monitoring ground beetles and snout beetles	2	
	Rare and endangered species situation	10- Monitoring the Peregrine Falcon	3	
		11- Monitoring the Striated Coral-root	3	
	Exceptional or fragile habitat quality	12- Monitoring EFEs – Red Pine and White Pine forest	2	
		13- Monitoring marine terraces	3	
	Fish resource quality	14- Fishing quality index	2	
Landscape spatial organization	Infrastructure density	15- Infrastructure density index	1	
	Fragmentation	16- Landscape dissection index	1	
	Periphery land use	17- Land use index	1	
Infrastructure quality	Hiking trail quality	18- Hiking trail width	3	
	Campsite quality	19- Degradation index	3	
	Water bank infrastructure quality	20- External impact degradation index	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

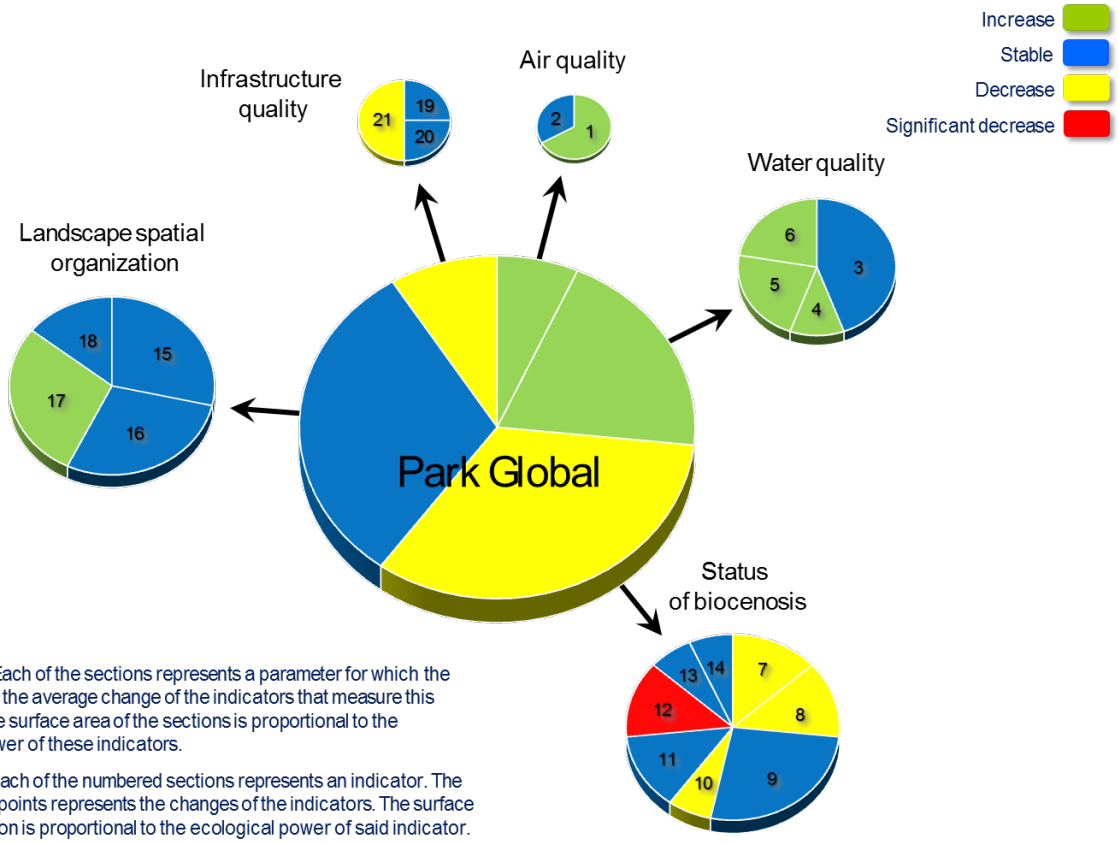
Management result

STABLE

Highlights

- Precipitations are less acidic.
- Phosphor and fecal coliform concentrations have diminished.
- Fish populations in the Grand lac Saint- François are not doing well (ongoing studies).
- The percentage of bank denaturalization is gradually increasing (corrective action(s) planned under conservation plan).

Synthesis diagram



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FRONTENAC National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	
Water quality	Benthic fauna quality	3- Standardized global biological index	1	
	Lake trophic level	4- Water clarity	3	
	Bacterial and physicochemical stream water quality	5- Phosphorus concentration	2	
		6- Fecal coliform concentration	2	
Status of biocenosis	Non-indigenous plant propagation	7- Quadra sampling	2	
	Invasive exotic species	8- Species list	2	
		Monitoring Common Reed	3	Lack of data
	Influence of anthropogenic events on natural processes	9- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	10- Depredation index	3	
	Situation of selected fauna species	Avian monitoring	1	Lack of data
		11- Anuran listening route	2	
		12- Ichthyological quality index	2	
	Rare and endangered species situation	13- Monitoring the Bald Eagle	3	
		14- Monitoring Peatland Orchids	3	
	Exceptional or fragile habitat quality	Monitoring a lacustrine habitat	2	Lack of data
Landscape spatial organization	Infrastructure density	15- Infrastructure density index	1	
	Fragmentation	16- Landscape dissection index	1	
	Periphery land use	17- Land use index	1	
	Periphery activities	18- Pressures of adjacent activities	2	
Infrastructure quality	Hiking trail quality	19- Hiking trail width	3	
	Campsite quality	20- Degradation index	3	
	Water bank infrastructure quality	21- External impact degradation percentage	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

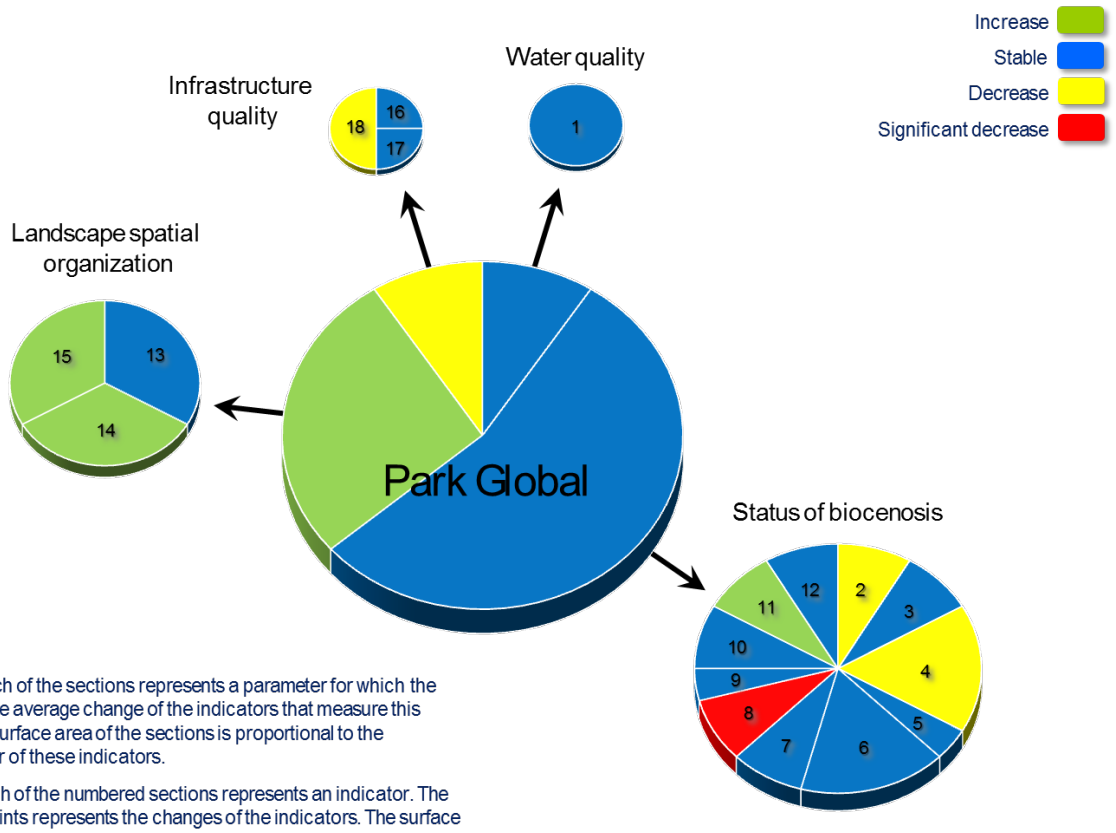
Management result

STABLE

Highlights

- The state of the arctic alpine vegetation has improved.
- Habitat fragmentation has diminished.
- The total caribou population has diminished (corrective action(s) planned under conservation plan).

Synthesis diagram



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Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	Precipitation pH – MDDEFP stations	2	Lack of data
Water quality	Benthic fauna quality	1- Standardized global biological index	1	↔
Status of biocenosis	Non-indigenous plant propagation	2- Quadra sampling	2	↘
	Invasive exotic species	3- Species list	2	↔
	Influence of anthropogenic events on natural processes	4- Disturbance/restoration index	1	↘
	Significance of human and wildlife interactions	5- Depredation index	3	↔
	Situation of selected fauna species	6- Monitoring breeding birds	1	↔
		Winter monitoring – Mustelidae	2	Lack of data
		7- Anuran listening route	2	↔
	Rare and endangered species situation	8- Monitoring Caribou	2	↓
		9- Monitoring the Greenscale Willow	3	↔
	Exceptional or fragile habitat quality	10- Monitoring EFEs – old-growth fir forest	2	↔
		11- Monitoring arctic-alpine vegetation	2	↑
	Fish resource quality	12- Fishing quality	2	↔
Landscape spatial organization	Infrastructure density	13- Infrastructure density index	1	↔
	Fragmentation	14- Landscape dissection index	1	↑
	Periphery land use	15- Land use index	1	↗
Infrastructure quality	Hiking trail quality	16- Hiking trail width	3	↔
	Campsite quality	17- Degradation index	3	↔
	Water bank infrastructure quality	18- External impact degradation index	2	↘

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

IMPROVEMENT

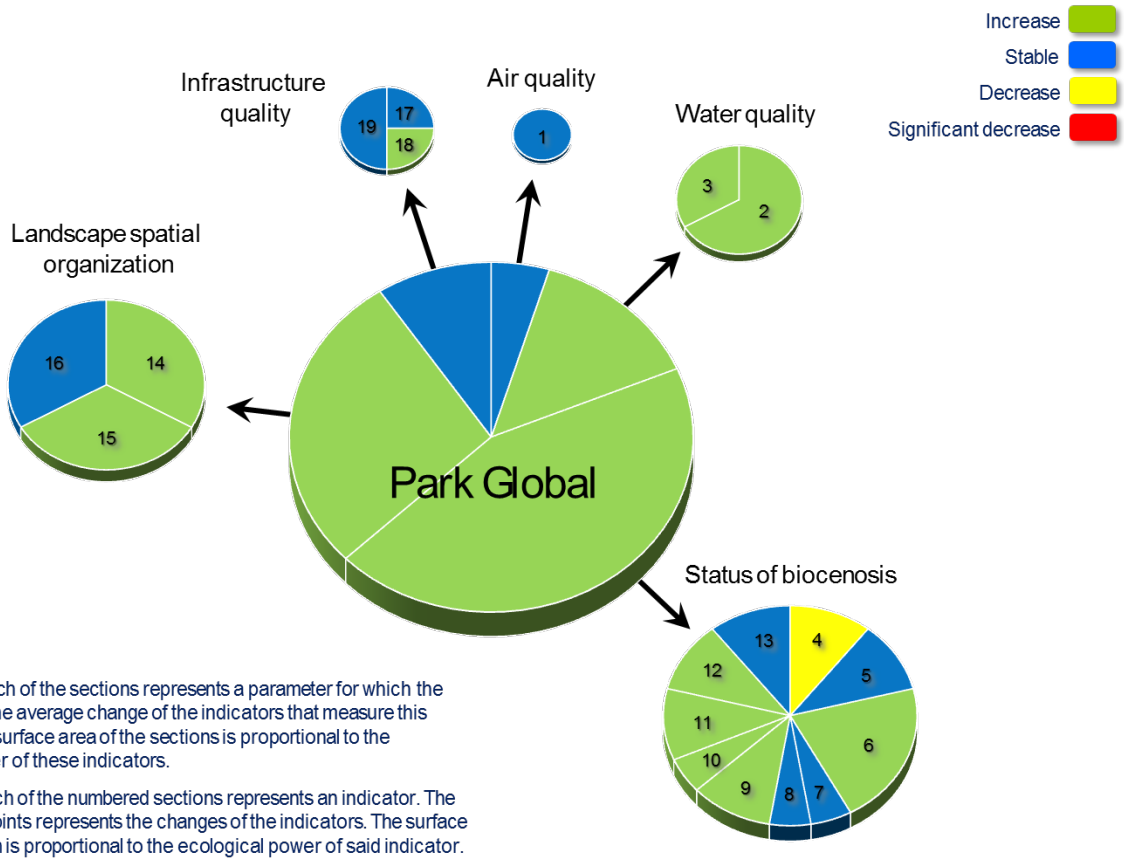
Management result

IMPROVEMENT

Highlights

- The state of the benthic fauna appears to be gradually improving.
- The population of Common nighthawks (*Chordeiles minor*) appears to have increased in numbers.
- The fragmentation of the habitat has diminished.

Synthesis diagram



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Sheet G

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Benthic fauna quality	2- Standardized global biological index	1	
	Lake acidity level	3- pH of selected lakes	2	
	Lake trophic level	Voluntary lake surveillance network	2	Lack of data
Status of biocenosis	Non-indigenous plant propagation	4- Quadra sampling	2	
	Invasive exotic species	5- Species list	2	
	Influence of anthropogenic events on natural processes	6- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	7- Depredation index	3	
	Situation of selected fauna species	8- Monitoring the Common Loon	3	
		Monitoring birds in a lacustrian environment	2	Lack of data
		9- Anuran listening route	2	
		Monitoring Brook Trout habitat	2	Lack of data
	Rare and endangered species situation	10- Monitoring Common Nighthawk	3	
		Monitoring Arctic Char	3	Lack of data
	Exceptional or fragile habitat quality	11- Monitoring EFEs – boreal forest	2	
		12- Monitoring arctic-alpine vegetation	2	
	Fish resource quality	13- Fishing quality index	2	
Landscape spatial organization	Infrastructure density	14- Infrastructure density index	1	
	Fragmentation	15- Landscape dissection index	1	
	Periphery land use	16- Land use index	1	
Infrastructure quality	Hiking trail quality	17- Hiking trail width	3	
	Campsite quality	18- Degradation index	3	
	Water bank infrastructure quality	19- External impact degradation index	2	

HAUTES-GORGES-DE-LA-RIVIÈRE-MALBAIE National Park

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

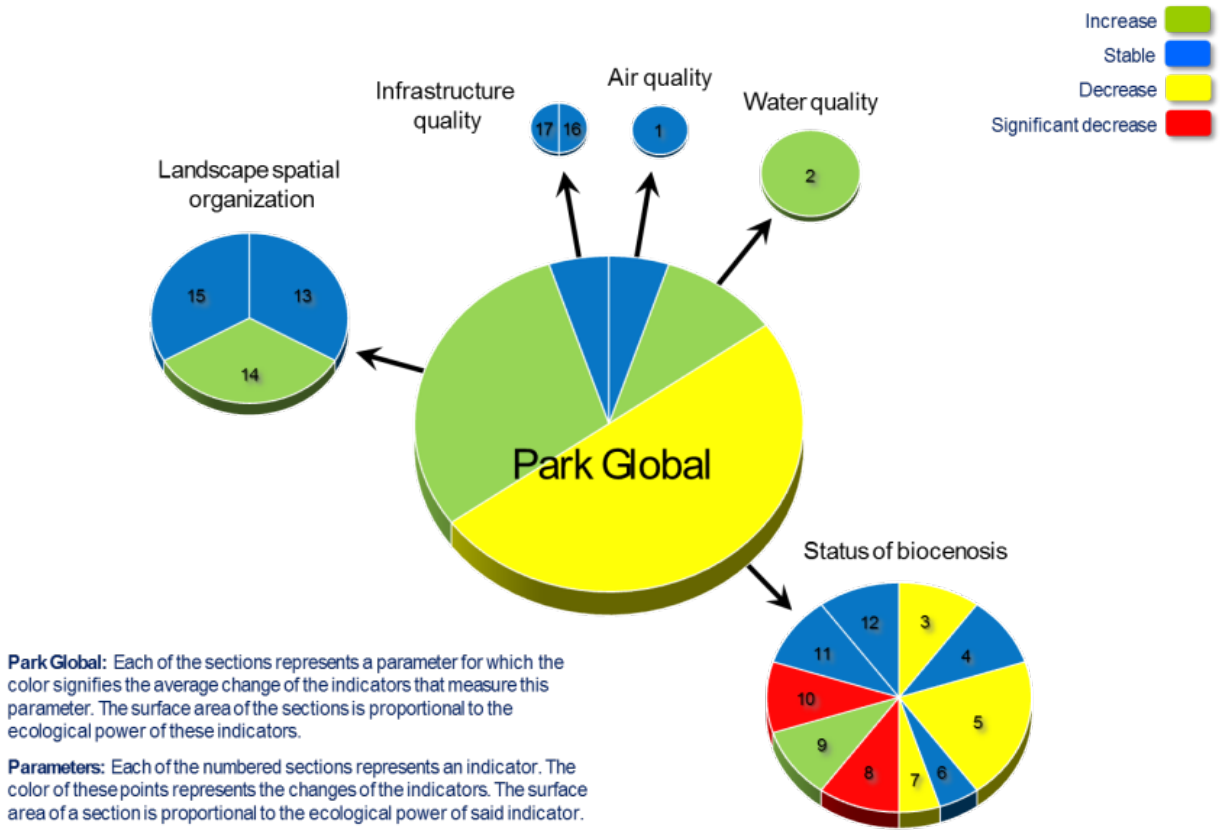
Management result

STABLE

Highlights

- The state of the benthic fauna is gradually improving.
- The biodiversity index for river salamanders has increased.
- Habitat fragmentation has diminished.
- The biodiversity index for frogs (*Anura*) has diminished (variability of spring weather).
- The evolution index of the maple forest, elm and ash has diminished (unknown reason(s)).

Synthesis diagram



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Sheet H

HAUTES-GORGES-DE-LA-RIVIÈRE-MALBAIE National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Benthic fauna quality	2- Standardized global biological index	1	
	Lake trophic level	Voluntary lake surveillance network	2	Lack of data
	Bacterial and physicochemical stream water quality	Bacterial and physicochemical water quality index	1	Lack of data
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		7- Monitoring the Pine Marten	3	
		8- Anuran listening route	2	
		9- Monitoring Stream Salamanders	2	
	Rare and endangered species situation	Monitoring Bicknell's Thrush	3	Lack of data
		Monitoring Arctic Char	3	Lack of data
	Exceptional or fragile habitat quality	10- Monitoring EFEs – Maple forest, Elm and Ash	2	
		11- Monitoring arctic-alpine vegetation	2	
	Fish resource quality	12- Fishing quality index	2	
Landscape spatial organization	Infrastructure density	13- Infrastructure density index	1	
	Fragmentation	14- Landscape dissection index	1	
	Periphery land use	15- Land use index	1	
Infrastructure quality	Hiking trail quality	16- Hiking trail width	3	
	Campsite quality	17- Degradation index	3	
	Water bank infrastructure quality	External impact degradation index	2	Lack of data

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

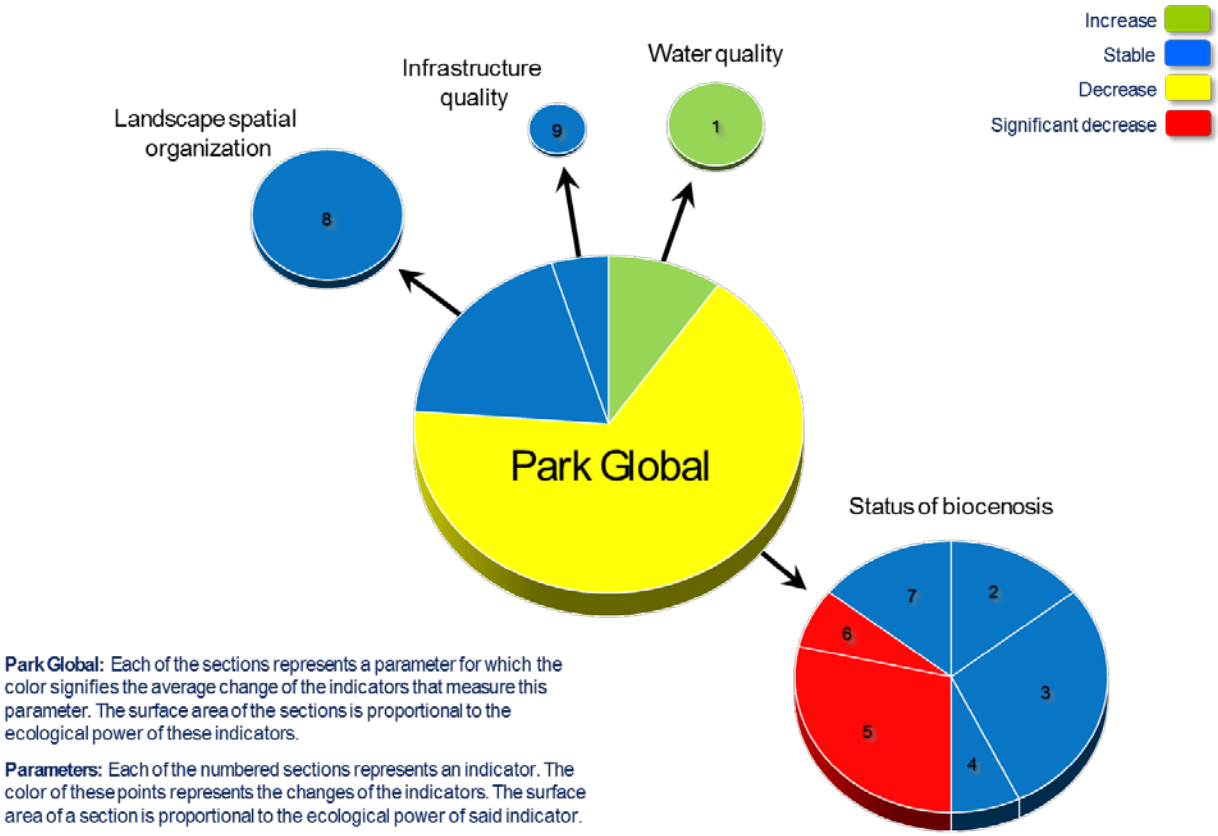
Management result

STABLE

Highlights

- Toxicological analyses show an improvement in the water quality of the gulf.
- Mated sea bird pairs have diminished in number (external environmental reasons).
- The Northern gannet (*Morus bassanus*) colony has decreased in net productivity (external environmental reasons).

Synthesis diagram



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ÎLE-BONAVENTURE-ET-DU-ROCHER-PERCÉ National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Water quality	Bacterial and physicochemical stream water quality	1- Mercury content in Northern gannet eggs	2	
Status of biocenosis	Non-indigenous plant propagation	Quadra sampling	2	Lack of data
	Invasive exotic species	2- Species list	2	
	Influence of anthropogenic events on natural processes	3- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	4- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		5- Monitoring seabirds	1	
		Monitoring bats	2	Lack of data
		Monitoring ground beetles and snout beetles	2	Lack of data
	Rare and endangered species situation	Monitoring the Dense Whitlowgrass	3	Lack of data
	Exceptional or fragile habitat quality	6- Monitoring net productivity in Northern Gannet colony	3	
	Fish resource quality	7- Status of lobster stocks	2	
Landscape spatial organization	Infrastructure density	8- Infrastructure density index	1	
Infrastructure quality	Hiking trail quality	9- Hiking trail width	3	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

Management result

STABLE

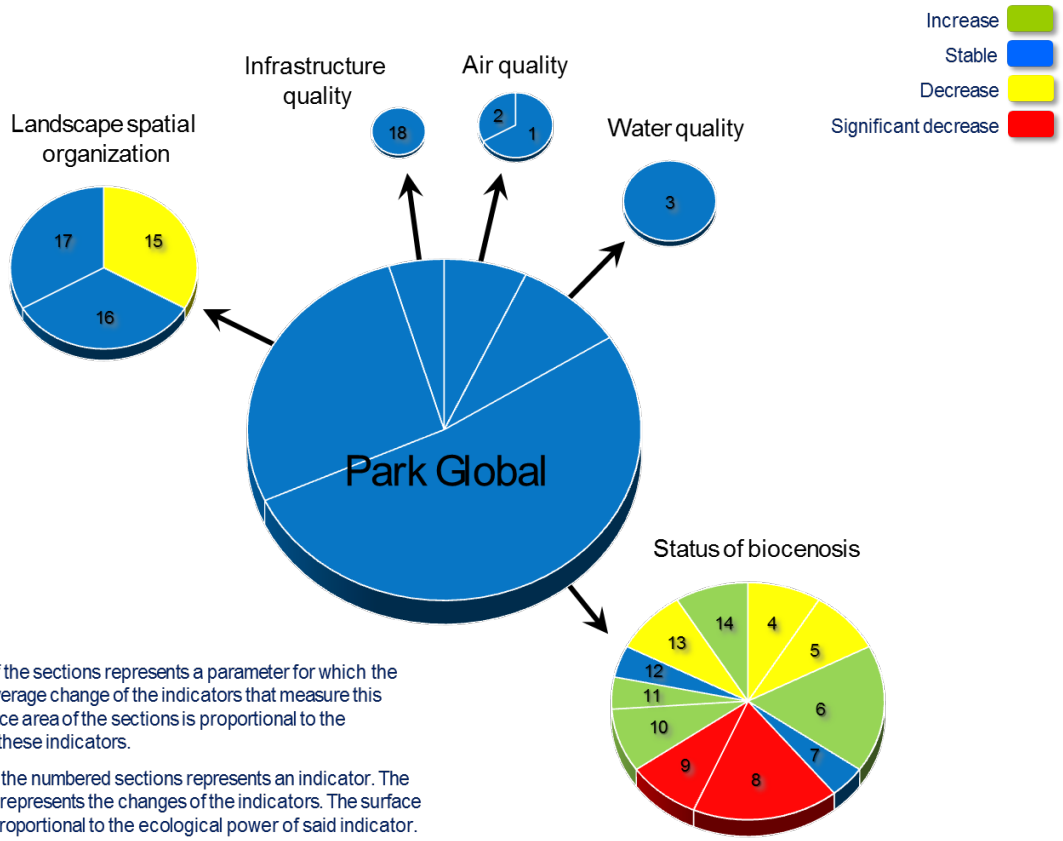
Highlights

The observed number of brown snakes (*Storeria dekayi*) has increased.

Bats appear to be widely affected by the white-nose syndrome (general trend in North America).

The biodiversity index for breeding birds has diminished (general trend in North America).

Synthesis diagram



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Sheet J

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	↔
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	↔
Water quality	Bacterial and physicochemical stream water quality	3- Bacterial and physicochemical water quality index	1	↔
Status of biocenosis	Non-indigenous plant propagation	4- Quadra sampling	2	↘
	Invasive exotic species	5- Species list	2	↘
	Influence of anthropogenic events on natural processes	6- Disturbance/restoration index	1	↗
	Significance of human and wildlife interactions	7- Depredation index	3	↔
	Situation of selected fauna species	8- Monitoring breeding birds	1	↓
		9- Monitoring bats	2	↓
		10- Anuran listening route	2	↗
	Rare and endangered species situation	11- Monitoring the Brown Snake	3	↑
		12- Monitoring the Eastern Spring Beauty	3	↔
	Exceptional or fragile habitat quality	13- Monitoring EFEs – Basswood, Red Ash	2	↘
		14- Monitoring EFEs – Red Oak, SIlver Maple	2	↗
Landscape spatial organization	Infrastructure density	15- Infrastructure density index	1	↘
	Fragmentation	16- Landscape dissection index	1	↔
	Periphery land use	17- Land use index	1	↔
Infrastructure quality	Water bank infrastructure quality	18- External impact degradation index	2	↔

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

IMPROVEMENT

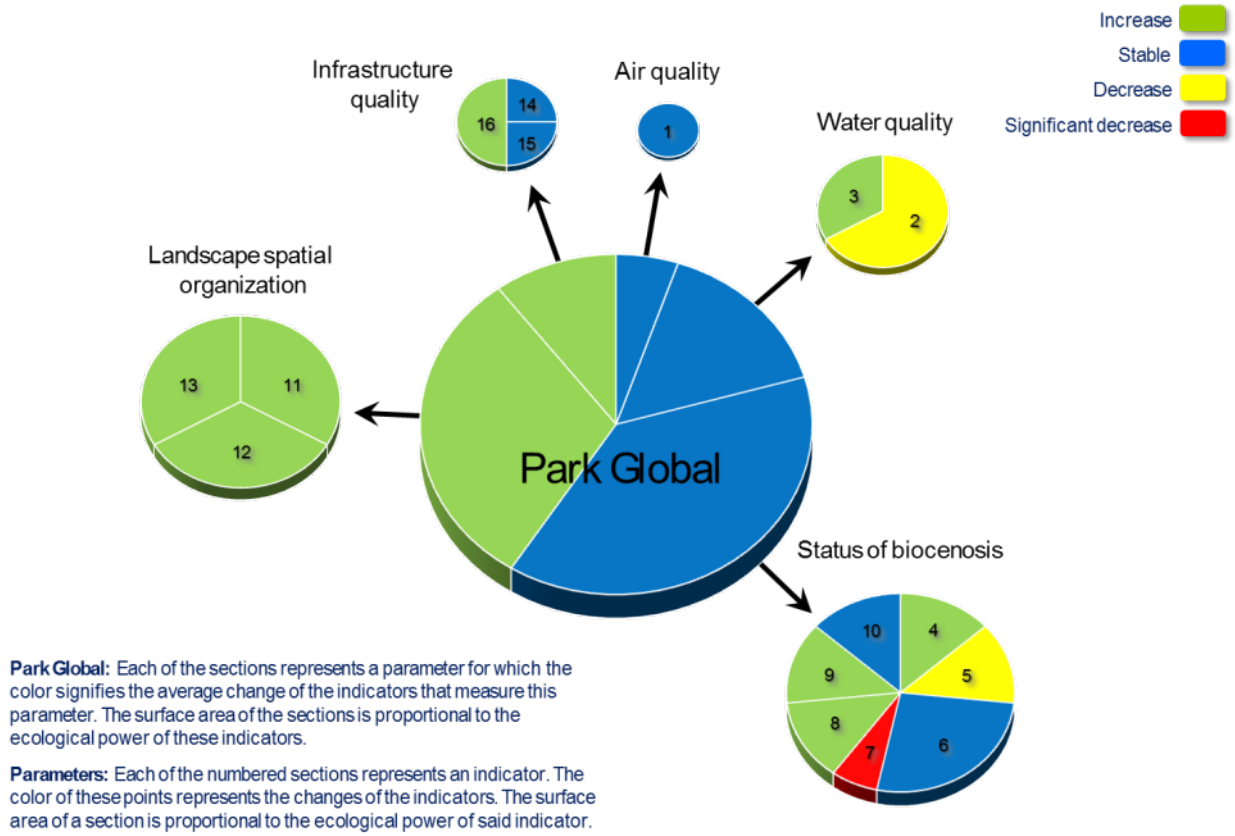
Management result

STABLE

Highlights

- Bank denaturalization index has diminished.
- Habitat fragmentation has diminished.
- Problems of depredation have intensified (actions to increase awareness among visitors started in 2013).

Synthesis diagram



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Sheet K

JACQUES-CARTIER National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Benthic fauna quality	2- Standardized global biological index	1	
	Lake acidity level	3- PH of selected lakes	2	
Status of biocenosis	Non-indigenous plant propagation	4- Quadra sampling	2	
	Invasive exotic species	5- Species list	2	
	Influence of anthropogenic events on natural processes	6- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	7- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		Monitoring bats	2	Lack of data
		Habitat suitability index of moose	3	Lack of data
		8- Anuran listening route	2	
	Rare and endangered species situation	Monitoring Arctic Char	3	Lack of data
	Exceptional or fragile habitat quality	9- Monitoring EFEs – Yellow Birch, Fir, Elm, Ash	2	
	Fish resource quality	10- Fishing quality index	2	
Landscape spatial organization	Infrastructure density	11- Infrastructure density index	1	
	Fragmentation	12- Landscape dissection index	1	
	Periphery land use	13- Land use index	1	
Infrastructure quality	Hiking trail quality	14- Hiking trail width	3	
	Campsite quality	15- Degradation index	3	
	Water bank infrastructure quality	16- External impact degradation index	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

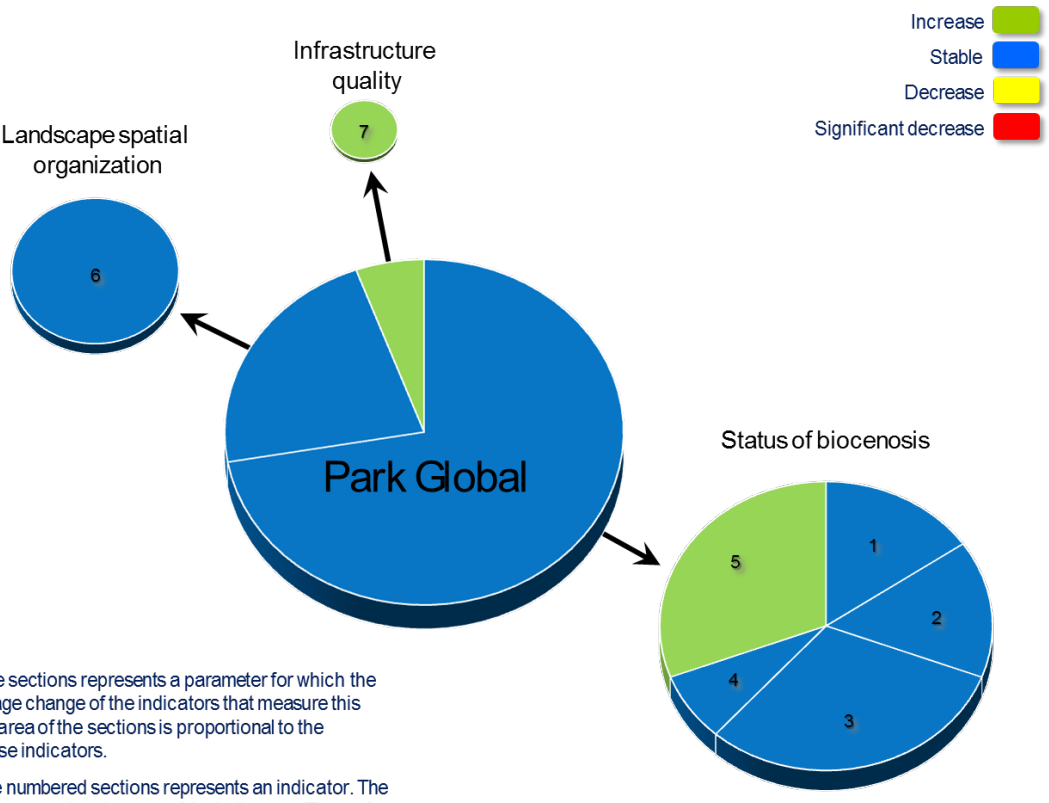
Management result

STABLE

Highlights

- Two new species of breeding birds have been identified.
- The width of the hiking trails has diminished.

Synthesis diagram



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Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Status of biocenosis	Non-indigenous plant propagation	1- Quadra sampling	2	
	Invasive exotic species	2- Species list	2	
	Influence of anthropogenic events on natural processes	3- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	4- Depredation index	3	
	Situation of selected fauna species	5- Monitoring breeding birds	1	
		Monitoring bats	2	Lack of data
		Monitoring stream salamanders	2	Lack of data
	Rare and endangered species situation	Monitoring orchids	3	Lack of data
	Exceptional or fragile habitat quality	Monitoring cliff retreat	1	Lack of data
Landscape spatial organization	Infrastructure density	6- Infrastructure density index	1	
Infrastructure quality	Hiking trail quality	7- Hiking trail width	3	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

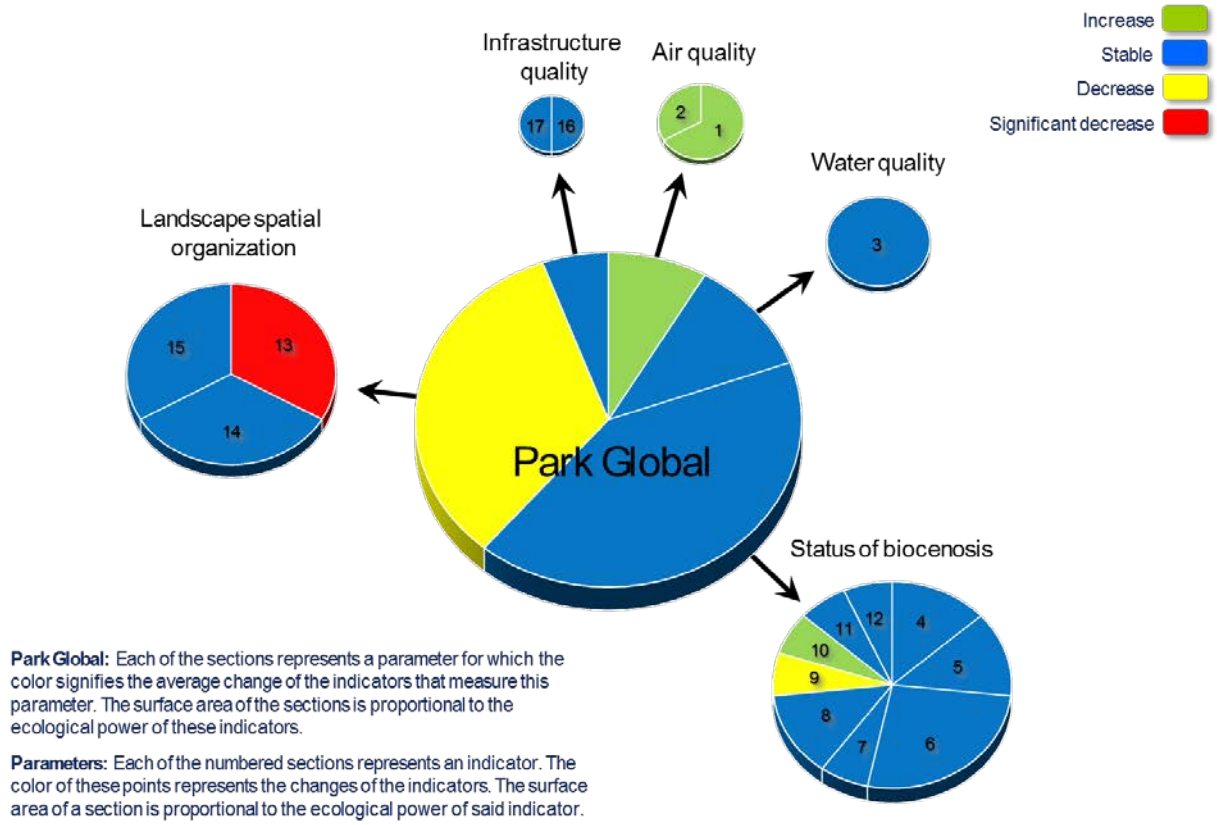
Management result

STABLE

Highlights

- Precipitations are less acidic.
- The number of Bicknell's thrushes heard has increased.
- The infrastructure density has increased (park's accessibility improvement).

Synthesis diagram



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MONT-MÉGANTIC National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	
	Light pollution	Celestial spectrophotometry	3	Lack of data
Water quality	Benthic fauna quality	3- Standardized global biological index	1	
	Bacterial and physicochemical stream water quality	Bacterial and physicochemical water quality index	1	Lack of data
Status of biocenosis	Non-indigenous plant propagation	4- Quadra sampling	2	
	Invasive exotic species	5- Species list	2	
	Influence of anthropogenic events on natural processes	6- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	7- Depredation index	3	
	Situation of selected fauna species	8- Monitoring bats	2	
		9- Monitoring Moose yarding areas	3	
		Anuran listening route	2	Lack of data
	Rare and endangered species situation	10- Monitoring Bicknell's Thrush	3	
		11- Monitoring Wild Leek	3	
	Exceptional or fragile habitat quality	Monitoring EFEs – Fir forest, Mountain Woodsorrel	2	Lack of data
		Monitoring arctic-alpine plants – Northern Gentian	3	Lack of data
		12- Monitoring arctic-alpine plants – Highland Rush	3	
Landscape spatial organization	Infrastructure density	13- Infrastructure density index	1	
	Fragmentation	14- Landscape dissection index	1	
	Periphery land use	15- Land use index	1	
Infrastructure quality	Hiking trail quality	16- Hiking trail width	3	
	Campsite quality	17- Degradation index	3	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

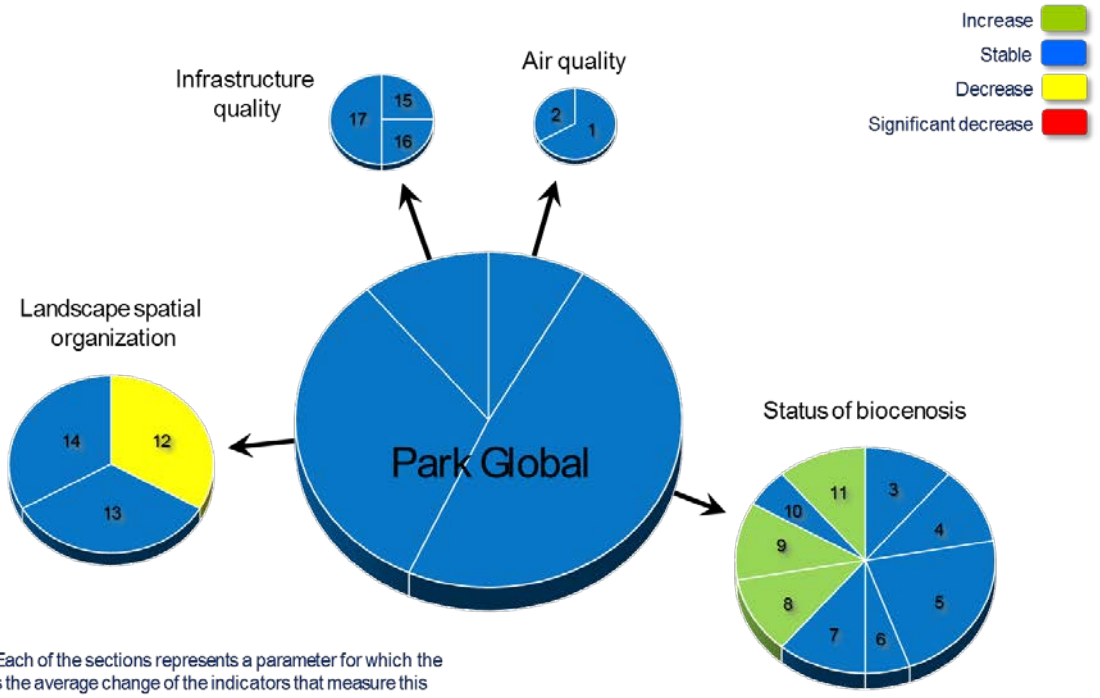
Management result

STABLE

Highlights

- The biodiversity index for frogs (*Anura*) has increased.
- The evolution index of the red oak stand has slightly improved.
- The infrastructure density is slowly increasing (park's accessibility improvement).

Synthesis diagram



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Sheet N

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	↔
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	↔
Water quality	Benthic fauna quality	Standardized global biological index	1	Lack of data
	Lake trophic level	Voluntary lake surveillance network	2	Lack of data
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	↔
	Invasive exotic species	4- Species list	2	↔
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	↔
	Significance of human and wildlife interactions	6- Depredation index	3	↔
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		7- Monitoring the Common Loon	3	↔
		Monitoring Moose yarding areas	3	Lack of data
		8- Anuran listening route	2	↗
		9- Monitoring stream salamanders	2	↗
	Rare and endangered species situation	10- Monitoring Wild Leek	3	↔
		Monitoring a threatened plant	3	Lack of data
	Exceptional or fragile habitat quality	11- Monitoring EFEs – Red Oak	2	↗
Landscape spatial organization	Infrastructure density	12- Infrastructure density index	1	↘
	Fragmentation	13- Landscape dissection index	1	↔
	Periphery land use	14- Land use index	1	↔
Infrastructure quality	Hiking trail quality	15- Hiking trail width	3	↔
	Campsite quality	16- Degradation index	3	↔
	Water bank infrastructure quality	17- Degradation index	2	↔

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

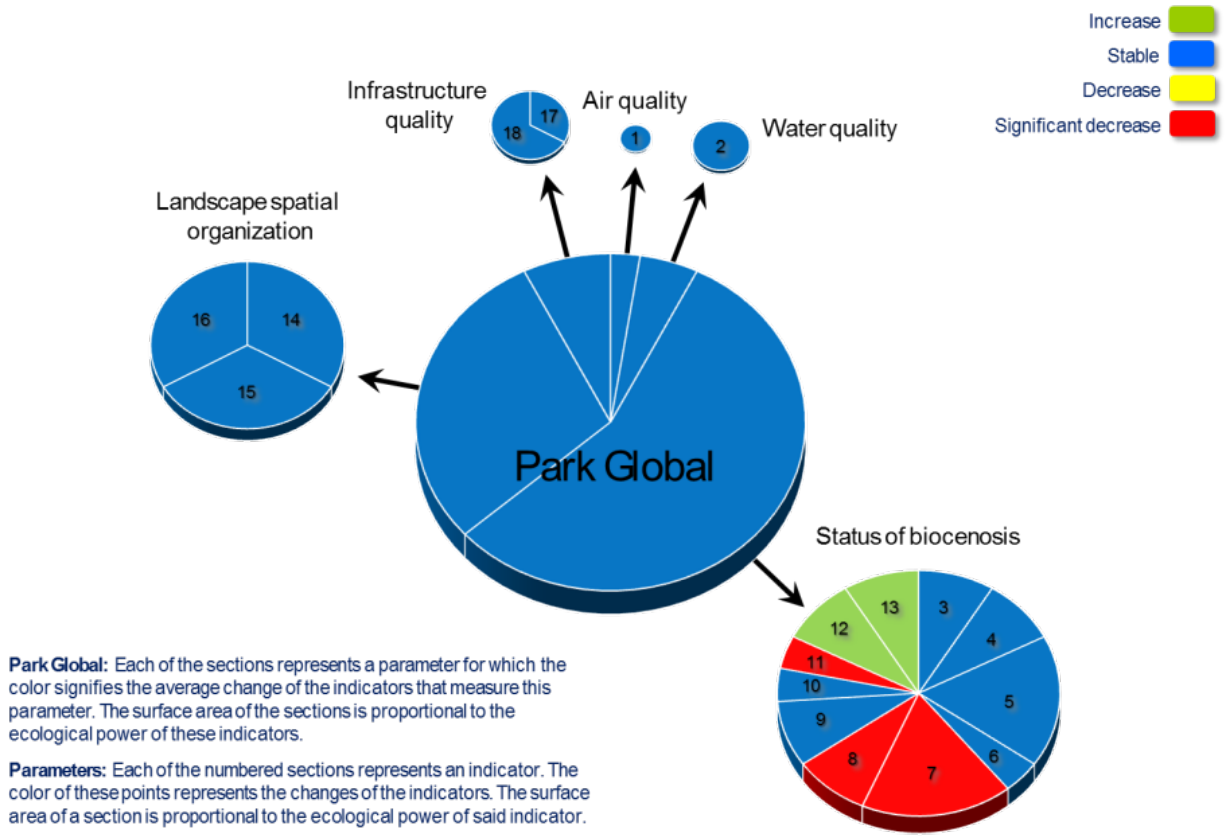
Management result

STABLE

Highlights

- The evolution index for the exceptional forest ecosystems has improved.
- Bats appear to be widely affected by white-nose syndrome (general trend in North America).
- Broad beech-ferns (*Phegopteris hexagonoptera*) have decreased in number (unfavorable meteorological conditions).
- The biodiversity index of breeding birds has diminished (general trend in North America).

Synthesis diagram



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MONT-SAINT-BRUNO National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Atmospheric pollutants	1- Air quality index – MDDEFP station	3	
Water quality	Lake acidity level	2- PH of selected lakes	2	
	Lake trophic level	Voluntary lake surveillance network	2	Lack of data
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	7- Monitoring breeding birds	1	
		8- Monitoring bats	2	
		9- Anuran listening route	2	
	Rare and endangered species situation	10- Monitoring Showy Orchis	3	
		11- Monitoring Broad Beech-fern	3	
	Exceptional or fragile habitat quality	12- Monitoring EFEs – Sugar Maple-Hickory Stand	2	
		13- Suivi des ÉFE – Monitoring EFEs – Red Oak, Sugar Maple	2	
Landscape spatial organization	Infrastructure density	14- Infrastructure density index	1	
	Fragmentation	15- Landscape dissection index	1	
	Periphery land use	16- Land use index	1	
Infrastructure quality	Hiking trail quality	17- Hiking trail width	3	
	Water bank infrastructure quality	18- Degradation index	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

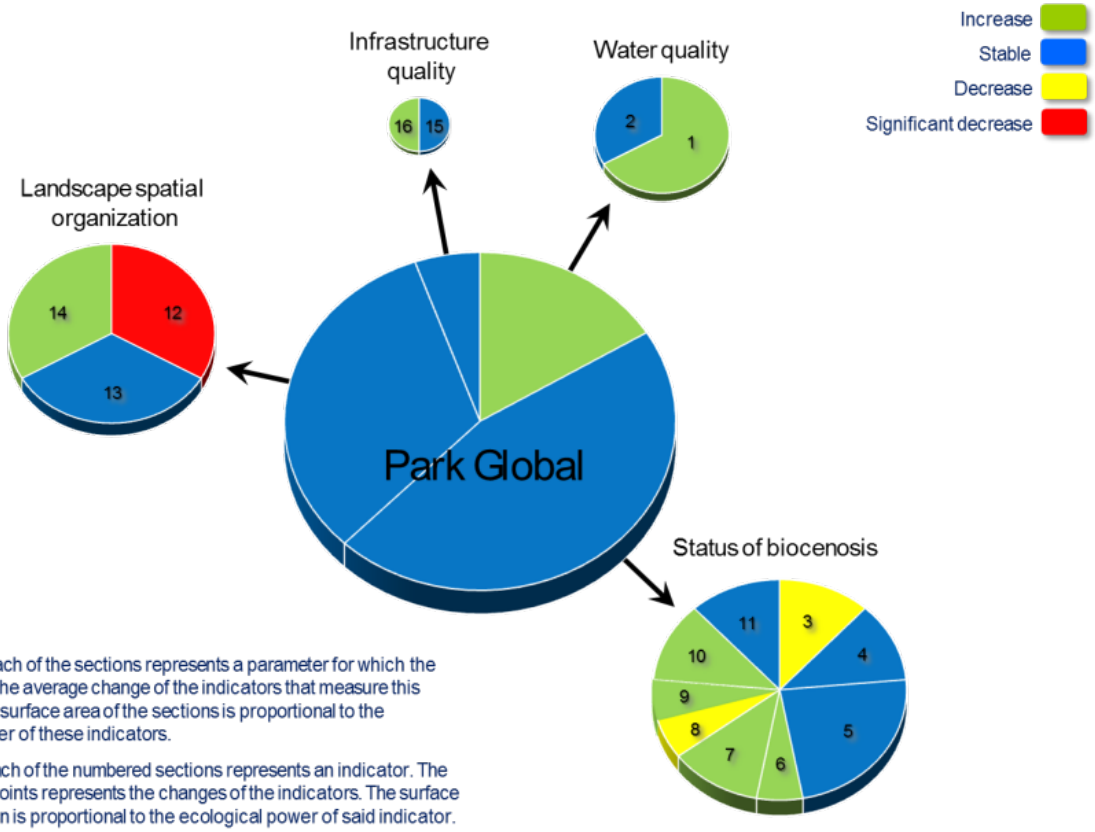
Management result

STABLE

Highlights

- The state of the benthic fauna appears to be gradually improving.
- The state of arctic alpine vegetation has improved.
- The biodiversity index for frogs (*Anura*) has increased.
- The infrastructure density has increased (park's accessibility improvement).

Synthesis diagram



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Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Water quality	Benthic fauna quality	1- Standardized global biological index	1	
	Lake acidity level	2- PH of selected lakes	2	
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		Monitoring bats	2	Lack of data
		7- Anuran listening route	2	
	Rare and endangered species situation	8- Monitoring Bicknell's Thrush	3	
		9- Monitoring Robinson's Hawkweed	3	
	Exceptional or fragile habitat quality	10- Monitoring arctic-alpine vegetation	2	
	Fish resource quality	11- Fishing quality index	2	
Landscape spatial organization	Infrastructure density	12- Infrastructure density index	1	
	Fragmentation	13- Landscape dissection index	1	
	Periphery land use	14- Land use index	1	
Infrastructure quality	Hiking trail quality	15- Hiking trail width	3	
	Campsite quality	16- Degradation index	3	
	Water bank infrastructure quality	External impact degradation percentage	2	Lack of data

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

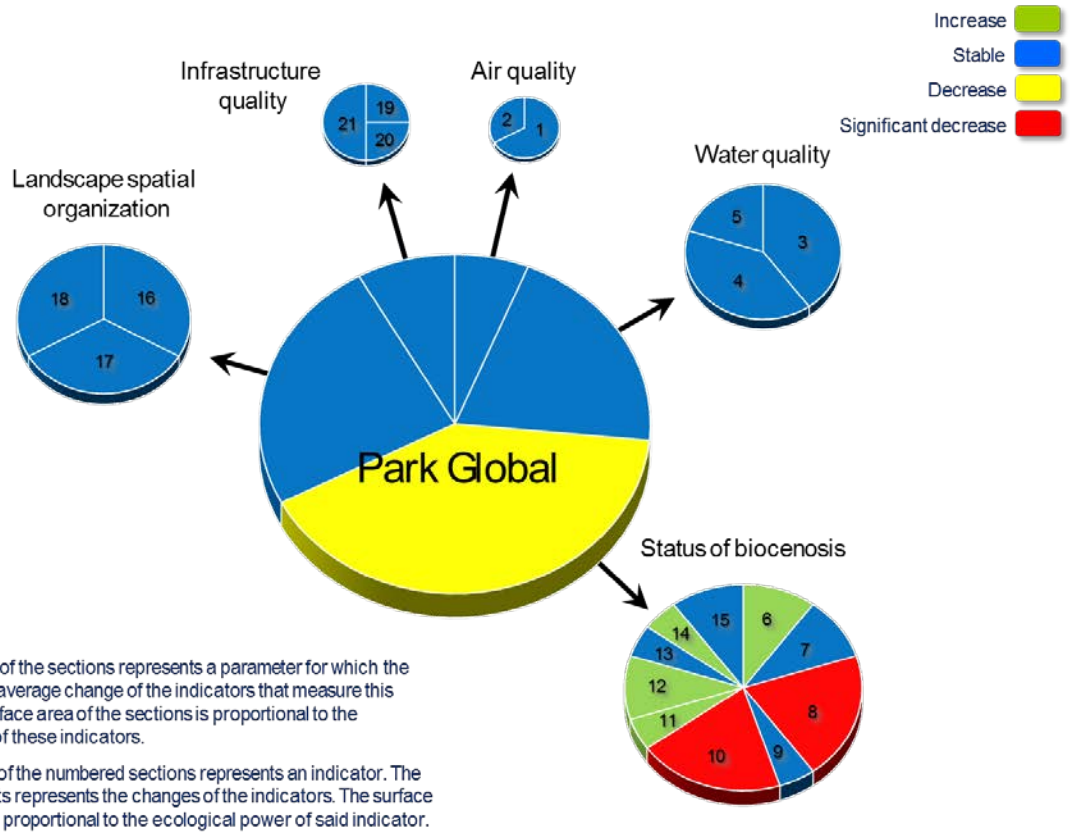
Management result

STABLE

Highlights

- The common loon presence index is gradually increasing.
- The biodiversity index of breeding birds has diminished (general trend in North America).
- Illegal plantations were discovered within the park (corrective action(s) planned under conservation plan).

Synthesis diagram



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Sheet Q

MONT-TREMBLANT National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	↔
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	↔
Water quality	Benthic fauna quality	3- Standardized global biological index	1	↔
	Bacterial and physicochemical stream water quality	4- Bacterial and physicochemical water quality index	1	↔
		5- MDDEFP bathing water monitoring	2	↔
Status of biocenosis	Non-indigenous plant propagation	6- Quadra sampling	2	↗
	Invasive exotic species	7- Species list	2	↔
	Influence of anthropogenic events on natural processes	8- Disturbance/restoration index	1	↓
	Significance of human and wildlife interactions	9- Depredation index	3	↔
	Situation of selected fauna species	10- Monitoring breeding birds	1	↓
		11- Monitoring the Common Loon	3	↗
		Monitoring bats	2	Lack of data
		12- Anuran listening route	2	↗
	Rare and endangered species situation	13- Monitoring Bicknell's Thrush	3	↔
		14- Monitoring Robinson's Hawkweed	3	↗
	Exceptional or fragile habitat quality	Monitoring EFEs – Red Oak	2	Lack of data
	Fish resource quality	15- Fishing quality index	2	↔
Landscape spatial organization	Infrastructure density	16- Infrastructure density index	1	↔
	Fragmentation	17- Landscape dissection index	1	↔
	Periphery land use	18- Land use index	1	↔
Infrastructure quality	Hiking trail quality	19- Hiking trail width	3	↔
	Campsite quality	20- Degradation index	3	↔
	Water bank infrastructure quality	21- External impact degradation index	2	↔

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

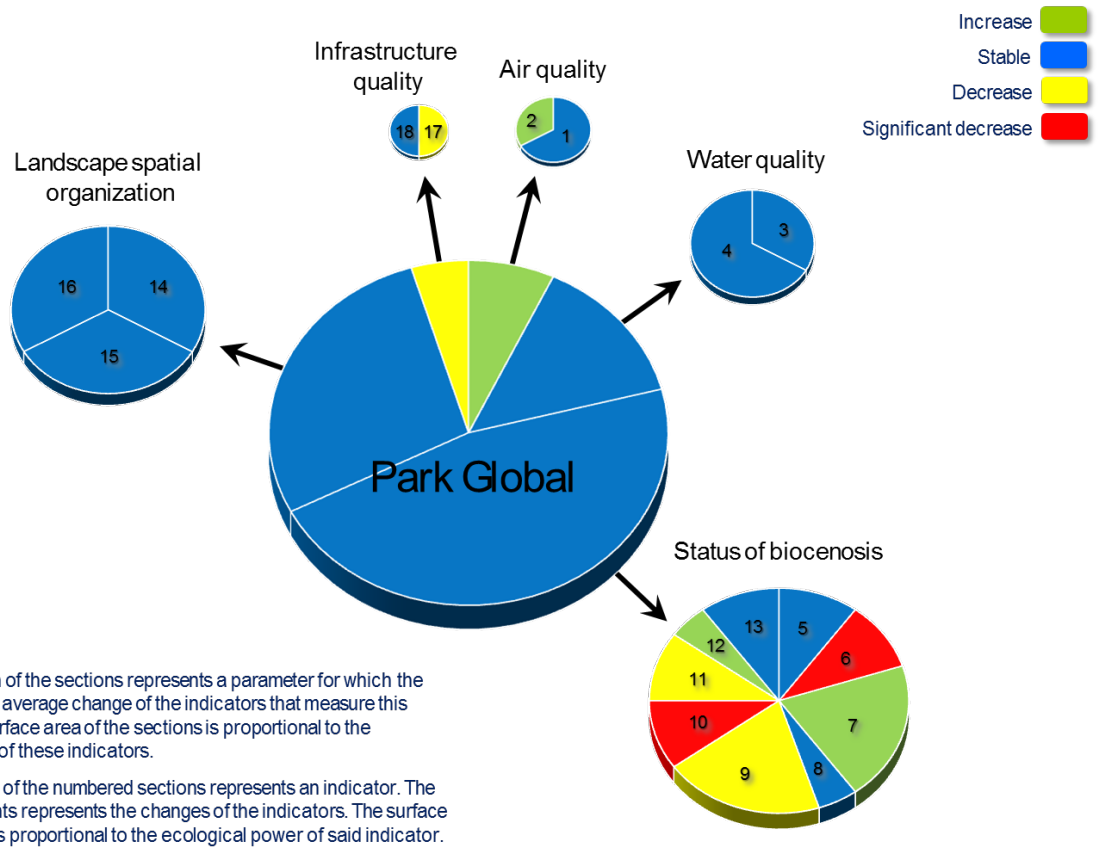
Management result

STABLE

Highlights

- The air quality indicator has improved.
- The population of a threatened plant species has increased.
- Numerous invasive exotic species have been spotted (widespread problem in southern Quebec).
- Bats appear to be widely affected by the white-nose syndrome (general trend in North America).

Synthesis diagram



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Sheet R

OKA National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	
Water quality	Benthic fauna quality	Standardized global biological index	1	Lack of data
	Lake acidity level	3- PH of selected lakes	2	
	Bacterial and physicochemical stream water quality	4- MDDEFP bathing water monitoring	1	
Status of biocenosis	Non-indigenous plant propagation	5- Quadra sampling	2	
	Invasive exotic species	6- Species list	2	
	Influence of anthropogenic events on natural processes	7- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	8- Depredation index	3	
	Situation of selected fauna species	9- Monitoring breeding birds	1	
		10- Monitoring bats	2	
		11- Anuran listening route	2	
	Rare and endangered species situation	Situation of rare and endangered plant species	3	Lack of data
		12- Monitoring a threatened plant	3	
	Exceptional or fragile habitat quality	Monitoring EFEs – Sugar Maple-Hickory Stand	2	Lack of data
		13- Monitoring EFEs – White Oak	2	
Landscape spatial organization	Infrastructure density	14- Infrastructure density index	1	
	Fragmentation	15- Landscape dissection index	1	
	Periphery land use	16- Land use index	1	
Infrastructure quality	Hiking trail quality	17- Hiking trail width	3	
	Campsite quality	18- Degradation index	3	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

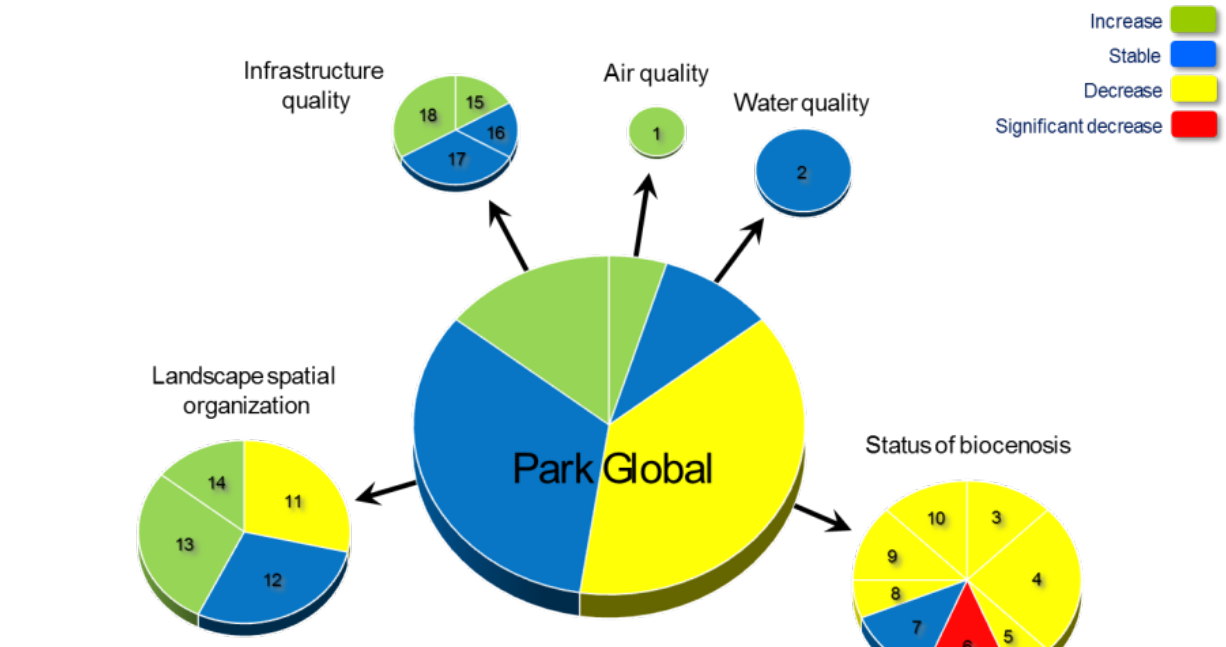
Management result

STABLE

Highlights

- Precipitations are less acidic.
- The width of the hiking trails is slowly diminishing.
- The pressure on waterfowl from hunting at the outskirts of the park has diminished.
- Bats appear to be widely affected by the white-nose syndrome (general trend in North America).

Synthesis diagram



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Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
Water quality	Bacterial and physicochemical stream water quality	2- Bacterial and physicochemical water quality index	1	
Status of biocenosis	Non-indigenous plant propagation	Quadra sampling	2	Lack of data
	Invasive exotic species	3- Species list	2	
	Influence of anthropogenic events on natural processes	4- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	5- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		6- Monitoring bats	2	
		7- Anuran listening route	2	
	Rare and endangered species situation	Monitoring the Four-toed Salamander	3	Lack of data
		8- Monitoring the Common Hackberry	3	
	Exceptional or fragile habitat quality	9- Monitoring EFEs – Maple Grove, Red Oak	2	
		10- Monitoring EFEs – Silver Maple, Black Ash	2	
Landscape spatial organization	Infrastructure density	11- Infrastructure density index	1	
	Fragmentation	12- Landscape dissection index	1	
	Periphery land use	13- Land use index	1	
	Periphery activities	14- Pressure - water game hunt	2	
Infrastructure quality	Hiking trail quality	15- Hiking trail width	3	
	Campsite quality	16- Degradation index	3	
	Water bank infrastructure quality	17- External impact degradation index	2	
		18- External impact degradation percentage	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

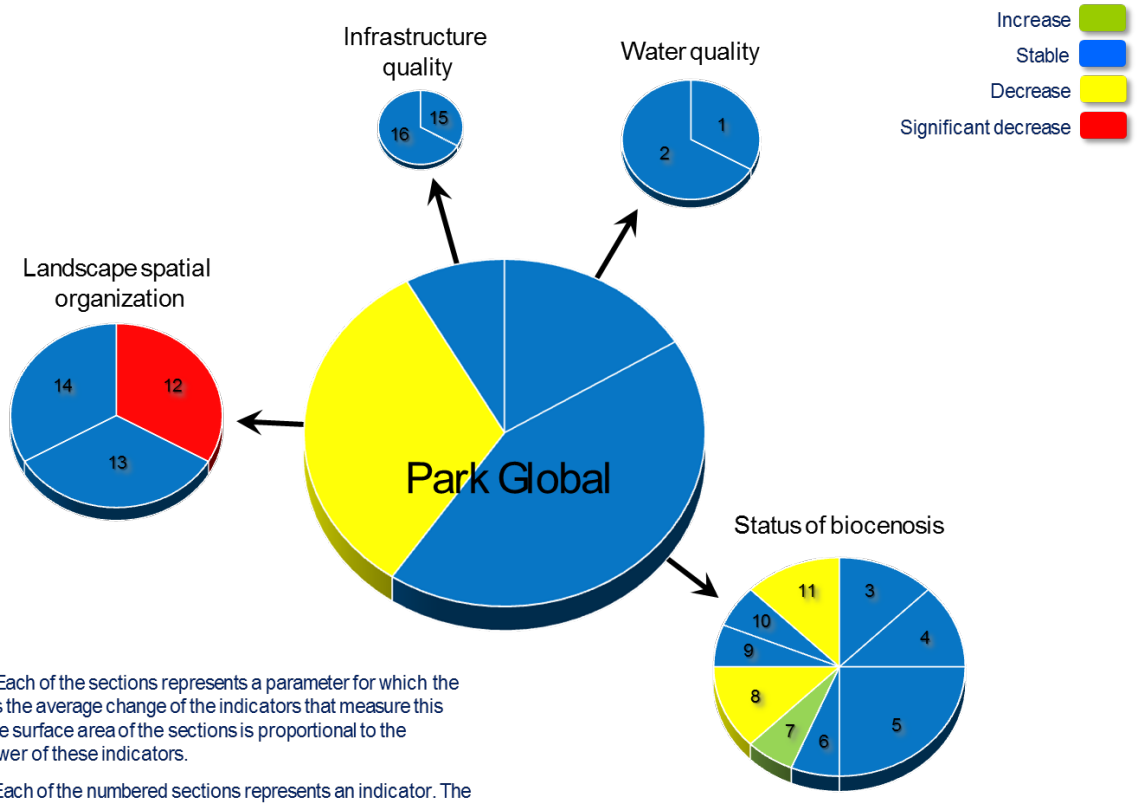
Management result

STABLE

Highlights

- Active moose yards have increased in number.
- The banks of the peninsula continue to erode (element out of our control, ongoing studies).
- The infrastructure density has increased (park's accessibility improvement).

Synthesis diagram



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Sheet T

POINTE-TAILLON National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Water quality	Lake acidity level	1- pH of selected lakes	2	
	Bacterial and physicochemical stream water quality	2- MDDEFP bathing water monitoring	1	
Status of biocenosis	Non-indigenous plant propagation	3- Quadra sampling	2	
	Invasive exotic species	4- Species list	2	
	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	6- Depredation index	3	
	Situation of selected fauna species	Monitoring breeding birds	1	Lack of data
		7- Monitoring moose	3	
		8- Anuran listening route	2	
	Rare and endangered species situation	9- Monitoring relict plants	3	
		Monitoring Dragon's Mouth	3	Lack of data
	Exceptional or fragile habitat quality	10- Monitoring coastal dune	3	
		11- Monitoring shoreline erosion	2	
Landscape spatial organization	Infrastructure density	12- Infrastructure density index	1	
	Fragmentation	13- Landscape dissection index	1	
	Periphery land use	14- Land use index	1	
Infrastructure quality	Campsite quality	15- Degradation index	3	
	Water bank infrastructure quality	16- External impact degradation percentage	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

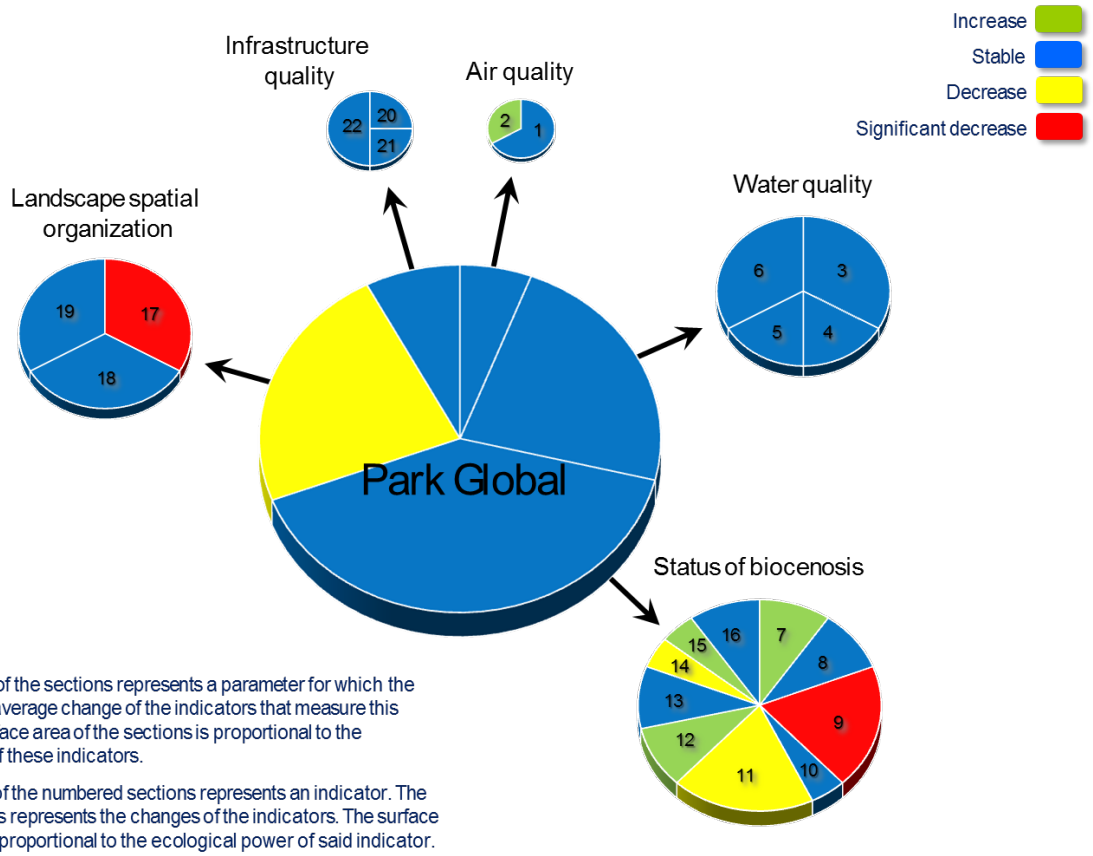
Management result

STABLE

Highlights

- Wild garlic (*Allium tricoccum*) appear to have increased in number.
- The biodiversity index of micromammals has increased.
- Multiple cyanobacteria events were reported (external environmental reasons).
- The infrastructure density has increased (park's accessibility improvement).

Synthesis diagram



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Sheet U

YAMASKA National Park

Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Air quality	Precipitation acidity	1- Precipitation pH – MDDEFP stations	2	
	Atmospheric pollutants	2- Air quality index – MDDEFP stations	3	
Water quality	Benthic fauna quality	3- Standardized global biological index	1	
	Lake acidity level	4- pH of selected lakes	2	
	Lake trophic level	5- Voluntary lake surveillance network	2	
	Bacterial and physicochemical stream water quality	6- Bacterial and physicochemical water quality index	1	
Status of biocenosis	Non-indigenous plant propagation	7- Quadra sampling	2	
	Invasive exotic species	8- Species list	2	
	Influence of anthropogenic events on natural processes	9- Disturbance/restoration index	1	
	Significance of human and wildlife interactions	10- Depredation index	3	
	Situation of selected fauna species	11- Monitoring breeding birds	1	
		Monitoring bats	2	Lack of data
		12- Monitoring small mammals	2	
		13- Anuran listening route	2	
	Rare and endangered species situation	14- Monitoring the Red-shouldered Hawk	3	
		15- Monitoring Wild Leek	3	
	Fish resource quality	16- Monitoring – ice fishing	2	
Landscape spatial organization	Infrastructure density	17- Infrastructure density index	1	
	Fragmentation	18- Landscape dissection index	1	
	Periphery land use	19- Land use index	1	
Infrastructure quality	Hiking trail quality	20- Hiking trail width	3	
	Campsite quality	21- Degradation index	3	
	Water bank infrastructure quality	22- External impact degradation index	2	

Complete results: www.parcsquebec.com/ecologicalintegrity

Global result for park

STABLE

Management result

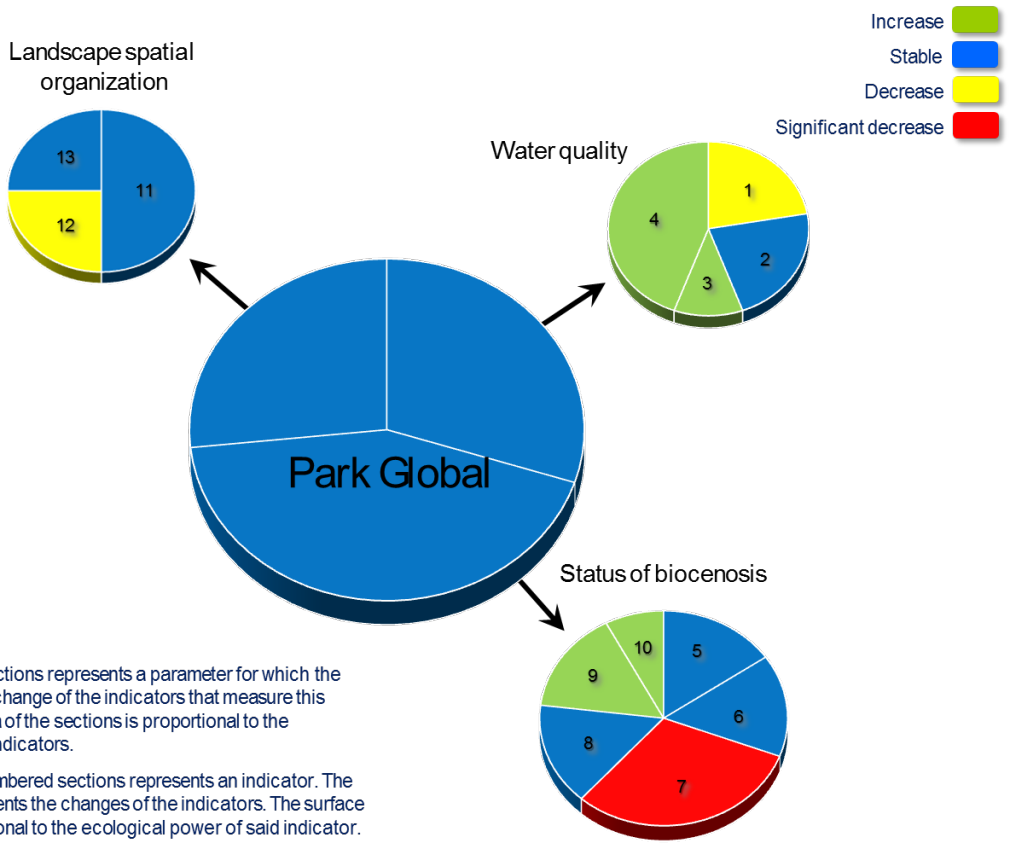
STABLE

Highlights

The quality of water purification systems appears to have improved.

The estimated beluga population has diminished over the years (external environmental reasons out of our control).

Synthesis diagram



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Parameter	Indicator	Methodology	Ecological power	Change of ecological integrity level
Water quality	Eutrophication survey	1- Toxic algae monitoring	2	
		2- Primary production monitoring	2	
		Quantity of fertilizer used in agricultural areas	2	Lack of data
	Bacterial and physicochemical stream water quality	3- Quality of water treatment systems	3	
		Chemical contamination of soft shell clams	2	Lack of data
	Contamination by hydrocarbons and other toxic substances	4- Accidental spill survey	1	
Status of biocenosis	Influence of anthropogenic events on natural processes	5- Disturbance/restoration index	2	
	Situation of selected fauna species	6- Sea bird monitoring	2	
		Harbour seal monitoring	3	Lack of data
	Rare and endangered species situation	Barrow's goldeneye monitoring	3	Lack of data
		7- Beluga monitoring	1	
		Large rorquals monitoring	3	Lack of data
	Exceptional or fragile habitat quality	Marine prey monitoring	1	Lack of data
		Herbaceous littoral zone monitoring	2	Lack of data
	Fish resource quality	8- Ice fishing monitoring	2	
		9- Rainbow smelt monitoring	2	
		Sea-run brook trout monitoring	3	Lack of data
		10- Green sea urchin monitoring	3	
Landscape spatial organization	Periphery land use	11- Land use index	1	
	Disturbance due to human activity	12- Number of vessels at observation points	2	
		Number of recreational vessel passages	2	Lack of data
		13- Number of commercial vessel passages	2	

ECOLOGICAL INTEGRITY MONITORING PROGRAM – EIMP

Parcs Québec Network – Sépaq

2003-2012 Report | Summary

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www.parcsquebec.com/ecologicalintegrity

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