

The proposed Saint-Elzéar karst biodiversity reserve

PROTECTION AND MANAGEMENT FRAMEWORK
FOR THE PUBLIC CONSULTATION

July 2006



Protection and Management Framework for the Saint-Elzéar Karst Biodiversity Reserve

Public Consultation Document

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*Développement durable,
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NOTE TO READERS:

In February 2005, the Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) replaced the Ministère de l'Environnement (MENV) du Québec. For simplicity, only the current name and logo will be used in this document.

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Why protect the Saint-Elzéar karst?

- ✓ The Saint-Elzéar karst is a jewel of the natural heritage of Gaspésie and Québec, because:
 - It is possible to observe active karstic phenomena over a large area;
 - The Saint-Elzéar cave is the most important in Québec on account of the richness both in number and variety of its limestone concretions;
 - It is the oldest karst site, dating back over 230,000 years;
 - The Saint-Elzéar cave is the second largest known cave in Québec;
 - The karst territory has not been significantly disturbed by anthropic activities;
 - It is an exceptional site in Québec for education and research related to karst phenomena and cave paleontology.

- ✓ This underground natural heritage site is fragile (risk of cave-ins, sensitive to pollution, etc.), and its conservation is closely tied to activities conducted above and below ground in the watershed.

- ✓ This type of ecosystem is underrepresented in Québec's network of protected areas.

- ✓ This natural site is a regional tourist attraction, a key component of Québec's geotourism which, according to some experts of the Société québécoise de spéléologie, has considerable potential for scientific discovery and tourism development.

What will creation of the biodiversity reserve mean?

- ✓ The Saint-Elzéar karst will remain public property with the conservation status of “biodiversity reserve.” As a result, the territory will be accessible to all for the practice of environmentally responsible recreational activities.
- ✓ The territory that is currently protected covers 44.5 sq. kilometres. It is much bigger than the immediate area around the Saint-Elzéar cave, and encompasses almost all the known or potential karst phenomena of the Duval river watershed.
- ✓ The biodiversity reserve will strengthen protection of the karst by prohibiting or restricting activities likely to:
 - Disrupt the flow of groundwater or surface water;
 - Modify the vegetation cover;
 - Damage the substrate;
 - Alter the natural character of the site;
 - Have a negative impact on its biodiversity.
- ✓ The biodiversity reserve will maintain the recreational and tourism vocation of the Saint-Elzéar cave and, with certain conditions, allow the development of natural heritage projects.
- ✓ The planning of activities, the terms and conditions for managing the protected area and the conditions for practicing certain activities, particularly speleology, will be established by the MDDEP in close collaboration with the MRNF and local representatives.
- ✓ Most of the activities currently practiced will continue to be allowed in the biodiversity reserve:
 - Hunting;
 - Fishing;
 - Observation of nature and geological phenomena;
 - Hiking.

BACKGROUND

At the Rio de Janeiro Earth Summit held in 1992, the Canadian government signed the Convention on Biodiversity. In November 1992, the Québec government subscribed to the Convention's objectives and decided to implement them in its territory. In this way, the two governments made a commitment to conservation, notably by establishing a network of protected areas on their territory and developing guidelines for selecting and creating protected areas for which special measures are required to protect the biodiversity.

In view of reaching this objective, the Québec government adopted a biodiversity strategy and action plan in 1996 and 2004. It is also within the perspective of the Convention's implementation that in 1999 it drew up a profile of Québec's network of protected areas. This profile showed Québec significantly lagging behind in biodiversity conservation. In fact, in 1999, protected areas totalled less than 3% of Québec's territory. Most of them had been recently created, of small size, established on public land and concentrated in the St. Lawrence Valley. The profile also revealed the absence of a strategy for establishing a network.

This finding led the Québec government to adopt several key directions in June 2000, namely:

- Set aside 8% of the land in Québec by 2005 for the creation of protected areas¹;
- Implement a network of protected areas that are representative of Québec's biodiversity;
- Take the socioeconomic concerns of local populations into account.

A "**protected area**" means a geographically defined area that is designated or regulated and managed to reach specific conservation objectives*.

* Simplified version of the official definition given in the Natural Heritage Conservation Act (R.S.Q., c. C-61.01).

In 2002, the National Assembly adopted the Natural Heritage Conservation Act. This law marked a turning point in the history of conservation in Québec by creating new statuses for protected areas (biodiversity reserves, aquatic reserves and man-made landscapes) which enabled a different approach to be taken to protect the biodiversity of vast territories based on their ecological and social specificities, while allowing sustainable use of some of their constituent elements.

¹ In *Shine among the best*, released in March 2004, the government committed to increasing protected areas from 5% to 8% by the end of its mandate.

An “**aquatic reserve**” is an area, consisting mainly of fresh water, established to protect the biodiversity of an aquatic ecosystem and riparian environments*.

A “**biodiversity reserve**” is an area, consisting mainly of terrestrial ecosystems, established to protect biodiversity that is representative of the various natural regions of Québec*.

* Simplified version of the official definition given in the Natural Heritage Conservation Act (R.S.Q, c. C-61.01).

Since adoption of this law, the Québec government set aside 46 territories to establish aquatic and biodiversity reserves. One of these was the Saint-Elzéar karst, which was given reserve status on June 20, 2005. This decision, effective September 7, 2005, served to prohibit industrial activities (forestry, hydroelectricity and mining) likely to alter the natural character of the territory.

In parallel to the creation of the proposed Saint-Elzéar karst biodiversity reserve, the Ministère du Développement durable, de l'Environnement et des Parcs organized several information sessions and held workshops with local organizations to explain the reasons for designating the protected area and receive local concerns regarding the territory's conservation and development. At these meetings, the major

conservation, management and development issues were raised and discussed with local representatives concerned with the future of the Saint-Elzéar karst.

A certain number of steps remain before the territory in question is given permanent protection status and assigned a definitive conservation plan. Under the Natural Heritage Conservation Act (R.S.Q., c. C-61.01, s. 39), the Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) must hold a public consultation, following the procedure set up for this purpose, before attribution of the permanent protection status.

As with the consultations held for aquatic and biodiversity reserves created before the one for the Saint-Elzéar karst, public consultations on this protected area project will be conducted by the Bureau d'audiences publiques sur l'environnement (BAPE).

All interested parties will have the opportunity to learn more about the conservation project and express their opinions on the subject. Further to the consultation, adjustments will be made, if necessary, to the conservation plan for the proposed biodiversity reserve before the Ministre du Développement durable, de l'Environnement et des Parcs submits a draft decree to the government for the purpose of conferring permanent protection status to the Saint-Elzéar karst.

Drawn up by the Ministère du Développement durable, de l'Environnement et des Parcs, this document sets forth its vision for the conservation and development of the territory of this proposed biodiversity reserve.

The proposed protection and management framework also reflects the concerns of all government partners involved in the implementation of the Québec Strategy for Protected Areas.

~ CHAPTER 1 ~

TERRITORY OF THE BIODIVERSITY RESERVE



1. PROJECT JUSTIFICATION

Background on the decision

Due to the exceptional interest of its geology, the Saint-Elzéar cave has long been of special focus for the Québec government. In 1977, a year after its discovery, the government, at the request of the Société québécoise de spéléologie, exempted the cave site from wood cutting and mineral staking. It also controlled access to the cave to stop the pillaging of paleontological resources found there, particularly the bone remains it contained. In the 1980s, the Ministère du Développement durable, de l'Environnement et des Parcs envisaged the creation of an ecological reserve to protect the cave.

“Ecological reserve” means a territory that is integrally protected with access limited to scientific study or educational activities authorized by the Ministère du Développement durable, de l'Environnement et des Parcs*.

* Simplified version of the official definition given in the Natural Heritage Conservation Act (R.S.Q, c. C-61.01).

Since local representatives wished to develop the cave for recreational and tourism purposes, the Ministère du Développement durable, de l'Environnement et des Parcs put off its ecological reserve project and registered the territory as an

ecological site on maps showing land use of land in the domain of the State.

After several meetings between the various organizations involved in the territory, the Québec government, in July 2005, at the MDDEP's request, decided to protect the Saint-Elzéar karst by giving it a more flexible status that would be compatible with the site's recreational and tourism vocation, that is, the status of proposed biodiversity reserve.

The Saint-Elzéar cave site has been recognized as a potential exceptional geological site by the Ministère des Ressources naturelles et de la Faune.

Ecological reference framework

The proposed Saint-Elzéar karst biodiversity reserve is located in the Appalachians natural province, which covers the administrative regions of Estrie, Bas-Saint-Laurent and Gaspésie—Îles-de-la-Madeleine.

There are 385 protected areas within the Appalachians natural province, covering approximately 3.9% of the area.

Goals for the creation of the proposed biodiversity reserve

The proposed Saint-Elzéar karst biodiversity reserve was created for the purpose of reaching the following objectives:

- ✓ Conservation of a portion of land having a physiography characteristic of the Appalachians natural province;

- ✓ Preservation of an area of geological interest;
- ✓ Protection of the biodiversity of forest ecosystems;
- ✓ Acquisition of additional knowledge about that natural heritage, in particular karst phenomena and the evolution of the forest cover;
- ✓ Acquisition of additional knowledge about cultural heritage, in particular archeological resources.

It is worth noting that the karst ecosystems are very underrepresented in the current network of protected areas. Also, despite its small size, the proposed Saint-Elzéar karst biodiversity reserve contributes significantly in qualitative terms to the network.

In short, the network of protected areas of which the proposed Saint-Elzéar karst biodiversity reserve is a part will help protect many elements of Québec's natural heritage from anthropic disturbances resulting from the commercial exploitation of resources.

Justification of boundaries

The boundaries of the Saint-Elzéar karst biodiversity reserve were defined to include all known active or potential karst phenomena in the Duval river watershed.

They also reflect the concern to establish a minimum area that is relevant in terms of biodiversity and landscape while minimizing future socioeconomic impacts of the conservation project.

As defined, the proposed biodiversity reserve ensures the conservation of an exceptional physiographic entity, with regard to the geological phenomena occurring there, and keeps its landscape intact.

The boundaries are based on easily recognized natural markers on the site in order to facilitate surveying and land management work.

Document objectives

This document presents the territory of the Saint-Elzéar karst biodiversity reserve, its ecological and social objectives and the management terms and conditions planned by the Ministère du Développement durable, de l'Environnement et des Parcs.

It does not attempt to resolve all the problems that may arise as a result of the creation and management of a biodiversity reserve in an inhabited environment. It is nonetheless deemed worthwhile to outline them in this document in order to receive the opinions of parties interested in the conservation of the territory in question and openly debate the protection and management measures that should be applied to this type of protected area.

The ministère du Développement durable, de l'Environnement et des Parcs heartily hopes that from the public consultation on the Saint-Elzéar karst will emerge a common vision and partnership that will benefit local and regional communities and Québec society as a whole.

2. PROTECTED AREA GEOGRAPHY

Location²

The proposed Saint-Elzéar karst biodiversity reserve is located in the unorganized territory of Municipalité régionale de Bonaventure in the Gaspésie—Îles-de-la-Madeleine administrative region.

It is located roughly 15 kilometres north of Municipalité de Saint-Elzéar, between 48°13' and 48°19' north latitude and 65°17' and 65°25' west longitude.

Dimensions and boundaries

The proposed biodiversity reserve covers an area of 44.5 sq. kilometres.

Essentially, it lies within the north-eastern portion of the Duval river watershed. It also includes bluffs to the north-west that border on the left shore of Garin river.

Access

The proposed biodiversity reserve is accessible by public and forest roads from Municipalité de Saint-Elzéar.

A forest road, crossing the proposed reserve from the Garin escarpment in the south-west towards the north-east, having a 30-metre right-of-way, is excluded from the protected area.

² A detailed map of the proposed Saint-Elzéar biodiversity reserve may be consulted at the end of the document.

3. ECOLOGICAL AND SOCIAL OVERVIEW³

The proposed Saint-Elzéar karst biodiversity reserve is located in the Appalachian natural province. The general topography is characterized by an undulating plateau sloping slightly towards the south and deeply scored by a network of streams.

The elevation of the territory, bordered to the south by the Garin escarpment, ranges between 135 and 605 metres.

Climate

The proposed biodiversity reserve is characterized by a subpolar and subhumid continental climate, with an average growing season. It is located in an area that belongs to the bioclimatic domain of fir stands with yellow birch.

Geology and geomorphology

The proposed biodiversity reserve is part of the Appalachians geologic province, whose Paleozoic basement (545 to 250 million years) was severely deformed during successive orogenies.

The bedrock consists of strata of Ordovician and Silurian sedimentary rock (450-420 million years) deformed during the Acadian orogeny (between 400 and 360 million years) and which contain relatively pure limestone of La Vieille Formation. The limestone is sensitive to chemical erosion (dissolution) and the formation of karsts.

³ This section is a summary of existing key studies on the Saint-Elzéar karst (Provost, 1982; Société québécoise de spéléologie, 1984; Shroeder et al., 1995; Shroeder, 2004) and information available on the protection of karst phenomena.

There are relatively few rocky outcrops. The rock is covered with a thin layer of sedimentary rock derived till or sandy till. Sandy loams cover the valley floors. Locally, sand, gravel and peat moss border the Duval river.

The Garin escarpment extending some 450 metres above the plateau of the Saint-Elzéar region, which is at an elevation of some 250 metres, delimits the southern portion of the proposed reserve. North of the escarpment, the surface rises gradually to an elevation of some 600 metres forming the Garin plateau.

Hydrography

The major part of the proposed biodiversity reserve is in the Duval river watershed, a tributary of the Bonaventure river. The Duval Est stream drains the northern half of the proposed biodiversity reserve.

A small portion of the territory located to the north-west is drained by the Garin river. The Garin escarpment is drained to the west by the Duval river and to the east by the Hall Ouest river, a tributary of the Bonaventure river.

A lattice hydrographic network sometimes highly entrenched along the geological strata (generally limestone) cuts into the land or uses the nearly perpendicular fractures. The proposed biodiversity reserve will ensure the conservation of a representative, relatively uneven physiographic unit that is distinct from the rest of the southern part of Gaspésie.

Vegetation

The territory of the proposed biodiversity reserve is covered in forest composed mainly of mixed stands, and intolerant deciduous stands on the slopes.

The forest was almost completely burned in 1924 and so most of the forest rarely exceeds more than 80 years of age.

The oldest forests are established on well-drained clay substrate in the bottoms of the valleys, particularly Ruisseau Duval Est and the one east of the Duval lakes. This is also the case with the softwood forests, which cover approximately 7% of the territory.

The youngest forests, under 20 years, are the result of wood cutting. They are found mostly in the north-east sector of the territory drained by the Garin river.

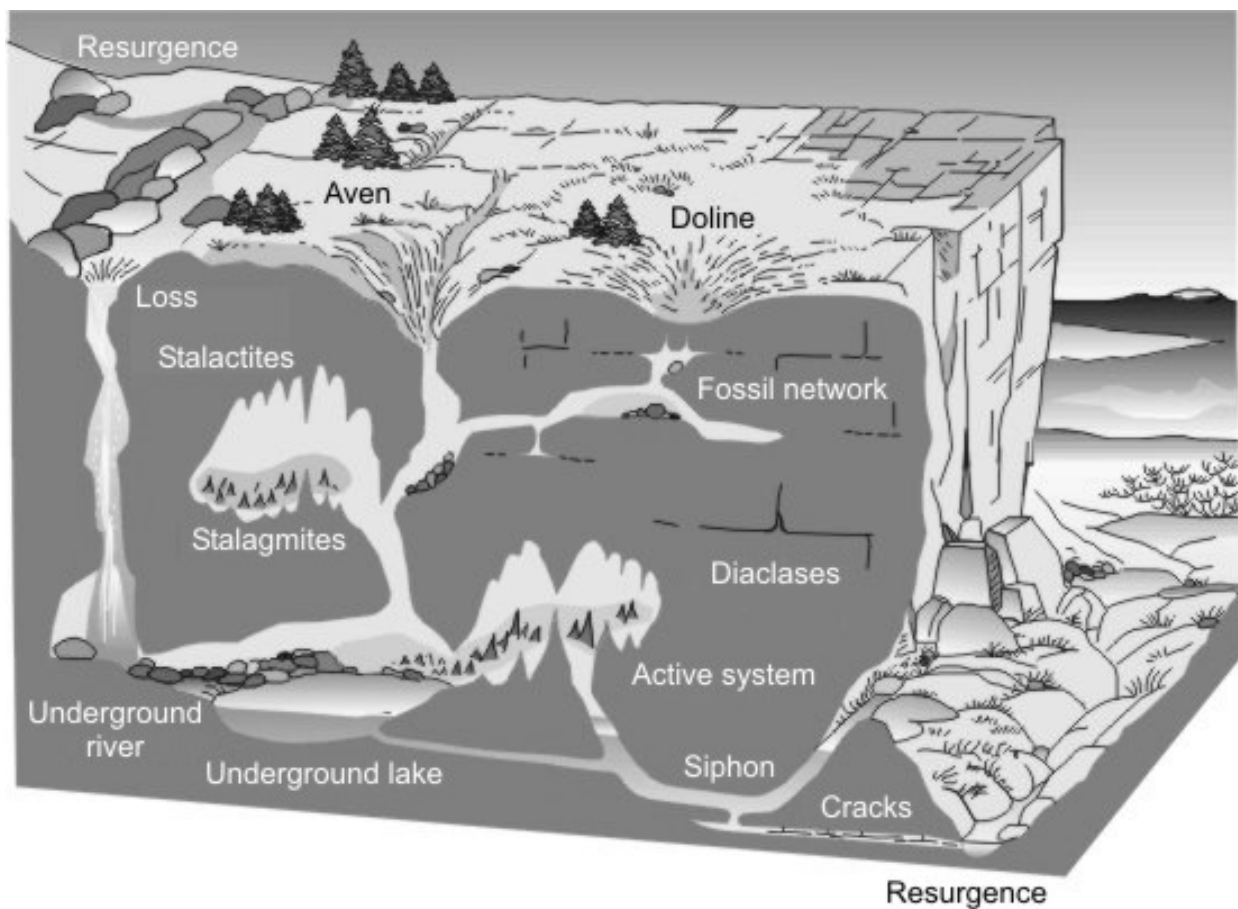
White birch and trembling aspen largely dominate the territory. Conifers are represented mostly by balsam and white spruce, as well as red spruce and black spruce.

On the well drained soils, the herbaceous and shrub flora of the forest cover include over 20 species that are typical of boreal forests. Forested areas made up of eastern cedar, balsam and white spruce are found to the north of the territory at the bottom of the valleys and along the Duval river.

What is a karst?

A karst is a type of topography in which the landscape is shaped by the dissolving action of persistent subterranean runoff on rock, usually limestone.

Karsts are characterized by an underground drainage system that has developed along fracture or stratification lines and by the creation of voids. Caves are but one of the remarkable manifestations of this phenomenon. The different features of a karstic environment are illustrated below (see glossary for definitions).



In the Saint-Elzéar area, several karst phenomena may be observed, both aboveground (dolines, blowholes, loss of Bonne Femme Café, Trou Hector, dry fossil valleys, resurgences, etc.) and belowground (de la Tour mountain cave, Gélifracis cave, Saint-Elzéar cave, fossil network, siphon, stalactites, stalagmites, etc.). Prospecting and exploration of these phenomena is difficult, however, especially in the Saint-Elzéar area where they do not seem related to the current topography and hydrography (Société québécoise de spéléologie, 1984a).

Sources: Département de Géologie, Université de Liège, <http://www.ulg.ac.be/geolsed/sedim/lexique.htm>

Yellow birch makes up 5% of the mixed stands; it grows on the slopes of the west and north-west sectors. Yellow birch-maple forests occupy only 0.2% of the area, in the valley perpendicular to the Duval river at lower altitudes.

Fauna

Black bear, moose and white-tailed deer occupy the territory. A white-tailed deer yard, legally recognized under the Regulation respecting wildlife habitats (R.S.Q., c. C-61.1, r.0.1.5), covers the north-west extremity of the proposed reserve.

Several other mammal species occupy or use the territory, including red fox, American marten, pekan, Canada lynx, North American porcupine, racoon, skunk, beaver and muskrat.

Data on threatened or vulnerable fauna species for the most part are taken from archeological digs carried out in the cave in 1977 and 1978 by the Ministère de l'Énergie et des Ressources.

In fact, the Saint-Elzéar cave, linked to the surface by a 12-metre shaft, acted as a trap for many animals over the years. As a result, on the slope located at the base of the cave's entrance, the remains of over 5,000 small animals were collected. It is therefore of historical mention.

Among the species identified from the bone remains are wolverine, rock vole, least weasel, smoky shrew, pygmy shrew, Gaspé shrew and southern bog lemming.

Underground wildlife to discover

With the exception of paleontological studies conducted on bone remains discovered in the Saint-Elzéar cave, no inventory has been done of the underground wildlife of the Saint-Elzéar karst.

It can be assumed, however, that certain animals live in or use the underground ecosystem.

In fact, many scientific studies conducted in various karst environments around the world have revealed that several species have learned to adapt to the very particular conditions of an underground environment (total darkness, excessive dampness, absence of vegetation, scarcity of food, etc.).

Globally, scientists distinguish four categories of underground animal species:

- ✓ Troglaphiles: animals that occasionally live underground;
- ✓ Troglonexes: animals that live in caves but feed outside (bats, for example);
- ✓ Troglobes: animals that live permanently in underground cavities;
- ✓ Stygophiles: animals that live exclusively in underground waters.

Gaining more knowledge on the underground wildlife of the Saint-Elzéar karst must be one of the priorities of the biodiversity reserve as these creatures have an exceptional heritage value and are excellent indicators of the state of the ecosystem.

Some identified species no longer live in Gaspésie, but are found instead at much colder latitudes. This is the case, for example, with the wolverine, Arctic hare and Ungava lemming.

According to a study conducted by Envirotel, the underground network of caves has a very high potential for bats. Although an inventory has not been done, the Saint-Elzéar karst constitutes a favourable habitat for species of Gaspésie cave bats and likely to be used by many of them in winter.

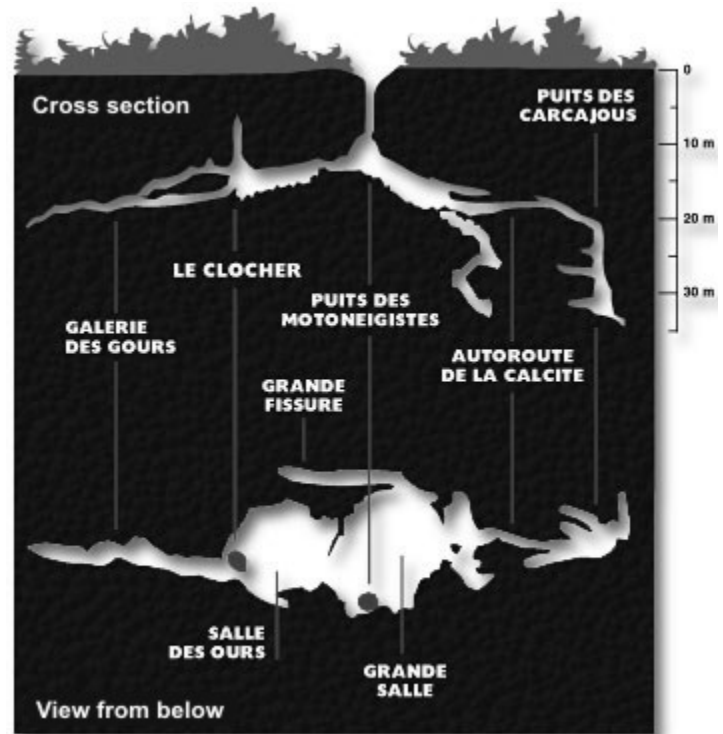
Among them are the little brown bat, a species that winters in caves where temperatures remain constant at approximately 4.5°C and relative humidity at approximately 80%. Some colonies can number in the hundreds. Until spring, they enter into a lethargic state during which time their metabolism slows. During this period, the species is particularly vulnerable to disturbance.

Exceptional geological heritage

The Saint-Elzéar cave is the oldest known cave in Québec. It was partially closed by glacial deposits at least 200,000 years ago, which suggests that it was formed before that time, over 230,000 years ago. It is thought that the last glaciation collapsed part of the chamber and formed the entrance shaft.

The underground environment is characterized by a very particular microclimate. In the deepest recesses, darkness is complete, the temperature is stable year around (about 4 °C), and air humidity is close to the saturation point (95% to 100%). On the other hand, on the surface, the microclimate may be affected by exterior climatic conditions. In fact, exterior variations in atmospheric pressure and

temperature can cause significant air currents and hygrometric changes to the karst network.



Lay-out of the Saint-Elzéar cave⁴

The access shaft, named Puits des Motoneigistes, measures three to four metres and reaches down 12 metres vertically to two chambers located side by side. In total, the network measures over 200 metres long and approximately 35 metres deep.

The first chamber, named the Grande Salle, measures 40 by 14 metres. The other chamber was named Salle des Ours because of the skulls found there. The chamber's ceiling is 10 metres high and

⁴ Sources: <http://www.lagrotte.ca/plan.html>.

forms a dome which speleologists named Le Clocher. It extends through to the Des Gours gallery, which is closed to the public because of its fragility.

Among the karst sites of interest in Québec, the one in Saint-Elzéar stands out for the size of its chambers and the quantity and variety of its concretions. In fact, it has old stalactites and stalagmites and impressive calcite needles which are for the most part well preserved.

The Garin plateau, which lies to the north of Saint-Elzéar up to the Garin river, is the only place in Québec and Eastern Canada where it is possible to observe active karst phenomena and other karst phenomena dating back over 200,000 years.

The latest studies show that karst phenomena are identified throughout the proposed biodiversity reserve. The presence of hundreds of closed depressions and numerous dolines would indicate that the cave network is larger than the network currently known.

The Saint-Elzéar karst is a jewel of Québec's natural heritage. As a whole, it is well preserved, given that the territory until now has been spared by commercial forestry and mining operations.

The proposed Saint-Elzéar karst biodiversity reserve is also of particular interest from a cultural point of view. In fact, the animal remains found at the Saint-Elzéar cave may serve to understand how Québec's territory was used and how these uses changed.

Although the territory has no recognized archeological site, it is important to point out that there is only partial knowledge of the archeological

resource and conducting an inventory is likely to reveal archeological remains.

The Saint-Elzéar Cave

The Saint-Elzéar cave was “officially” discovered by residents of Saint-Elzéar in 1976 but popular memory tells of people who discovered the entrance shaft long before.



Since then, several Québec government and university researchers, as well as the Société québécoise de spéléologie, studied the cave and the karst phenomena in the Saint-Elzéar region. Local organizations, such as the Comité de promotion des ressources naturelles de Saint-Elzéar and Habitafor, actively participated in the acquisition of knowledge of the territory’s karst phenomena.

The exceptional interest of the territory’s geology led to a proposal in 1977 to protect part of it by giving it the conservation status of ecological reserve. This project was not completed because the local population,



represented by the Comité de promotion des ressources naturelles de Saint-Elzéar Inc, preferred instead that the Saint-Elzéar cave be developed for educational, recreational and tourism purposes.

Thus, in 1980, the Comité de promotion des ressources naturelles de Saint-Elzéar Inc.



created a cave museum in Saint-Elzéar village. The museum offers visitors an exhibit of

bones found in the cave and photos of the cave. Descriptive work and a development plan were done between 1983 and 1985 in close collaboration with the MDDEP.

The cave has been open to the public since 1990. Stairs and footbridges were installed so that the caves could be visited safely. For



15 years, the Comité de promotion des ressources naturelles de Saint-Elzéar has been offering the public educational, recreational and tourism activities centred on the cave’s discovery and observation of active karst phenomena.

Photo sources: Alain Miville-Deschesnes

(Web site: <http://www.lagrotte.ca>).

The challenge of protecting the caves

Conservation of the subterranean formations depends a great deal on what occurs to their surface environment.

In fact, the vegetation established on the soil over the caves influences certain parameters, such as deep water infiltrations and runoff. In this context, water links the exterior environment with the underground environment.

It is important to know what role water plays in the equilibrium of underground environments and its course because any natural or artificial change to the environment it drains could have repercussions on the stability of the underground formations.

Human interventions could disturb the balance of the underground environment by modifying the distribution and physiochemical quality of the underground waters.

Of the activities likely to more or less seriously alter the karst network, the following need mentioning:

- ✓ Tree cutting;
- ✓ Deep plowing;
- ✓ Irrigation and draining;
- ✓ Soil compaction;

- ✓ Modification of the vegetation cover;
- ✓ Use of fertilizer;
- ✓ Disposal of waste of any kind.

As a result, protection of a karst network must occur in an upstream zone that is more or less extensive depending on the topography of the underground system, the terrestrial or aquatic fauna and distribution of species. This zone serves to control the impact of anthropic activities and future pollution.

Prospecting, development and cave visits may also cause a number of negative consequences, notably:

- ✓ Pillaging or degrading of the geological heritage and historic remains;
- ✓ Appearance of photosensitive vegetation following exposure to light;
- ✓ Modification of the cave's thermal regulation because of heat generated by visitors and lighting;
- ✓ Condensation and an increase in CO₂ levels due to excessive cave visits;
- ✓ Introduction of live germs (algae or mushroom spores, for instance);
- ✓ Degradation of the geological heritage;
- ✓ Disturbance of cave-dwelling fauna (light, noise and contact).

In short, **karst networks are highly sensitive natural environments whose state depends on the activities practiced above or below ground throughout the watershed that feeds them.**

Other uses of the territory

The Ministère des Ressources naturelles et de la Faune granted seven land rights in the perimeter of the proposed biodiversity reserve. They are as follows:

- ✓ Two leases for rough shelters;

- ✓ Two leases for personal recreational use (cottage), located near the north-west boundary of the proposed biodiversity reserve;

- ✓ Three leases for the installation of recreational facilities (access to Saint-Elzéar cave) and for the construction of a belvedere and observation tower.

A portion of the territory is served by forest roads. Authorization for access was given by the Ministère des Ressources naturelles et de la Faune to allow for the creation of over eight kilometres of hiking trails for the observation of karst phenomena.

In fall, the territory is used by the local population for moose hunting.

HIGHLIGHTS

- ✓ The Saint-Elzéar karst represents one of the jewels of the natural underground heritage of Gaspésie and Québec, because:
 - It is the only place in Canada where it is possible to observe active karst phenomena;
 - It is the most important underground formation in Québec because of its age (over 230,000 years) and the richness both in number and variety of its limestone concretions;
 - It is the second biggest underground formation in Québec;
 - It is the oldest speleological site in Québec and one of the most important today;
 - The territory has been relatively undisturbed by anthropic activities;
 - It is an exceptional site for education and research related to karst phenomena and paleontology.
- ✓ The proposed biodiversity reserve, which covers 45 sq. kilometres, encompasses almost all known active or potential karst phenomena.
- ✓ The natural underground heritage of the Saint-Elzéar karst is fragile (risk of cave-ins, pollution prone, etc.) and its conservation depends closely on the activities practiced above and below ground in the watershed.
- ✓ At the moment there is no ecosystem of this type in Québec's network of protected areas.
- ✓ This natural site is one of Gaspésie's tourist attractions, a key component of Québec's geotourism which, according to some experts, has considerable potential for scientific discovery and development.

~ CHAPTER 2 ~

ECOLOGICAL AND SOCIOECONOMIC ISSUES



ECOLOGICAL ISSUES

The primary objective of a biodiversity reserve is to preserve its aquatic and terrestrial ecosystems, maintain the biological processes that depend on it and protect its biotic and abiotic components.

Management of the proposed Saint-Elzéar karst biodiversity reserve has two major ecological objectives: maintaining the integrity of karst phenomena and learning more about them.

ISSUE 1 ~

ENSURING THE INTEGRITY OF KARST PHENOMENA

The Saint-Elzéar karst is a fragile territory. Some of the activities practiced in the biodiversity reserve could have a negative impact on the biodiversity of the territory or alter the karst phenomena if they are not strictly controlled.

Objectives

- Prohibit activities that are incompatible with the status of biodiversity reserve as defined under the Natural Heritage Conservation Act.
- Restrict the activities that can be allowed in the biodiversity reserve in order that they are carried out in keeping with the support capacity and natural character of the environments.

The **support capacity** is the threshold beyond which the functions and balance of an ecosystem are irreparably altered.

Proposals

- The MDDEP proposes to restrict activities likely to have a significant impact on karst phenomena. Special attention will be paid to activities that are likely to affect the vegetation cover or disrupt the flow of surface or underground water. As a result, unless otherwise authorized by the MDDEP, the proposed regulation prohibits:
 - Soil development work for any purpose including recreational and tourism infrastructures such as trails;
 - Forest management activities;
 - Installing or building a new structure or infrastructure works;
 - Reconstructing or demolishing an existing structure, infrastructure or works;
 - Attribution of any occupation or use;
 - Burying, abandoning or disposing of waste, snow, or other residual waste;
 - Speleology activities when they are not restricted;

- Educational or research activities if they are likely to damage or disturb the natural environment.
- Like other aquatic and biodiversity reserves, activities having a negative impact on biodiversity are prohibited, in particular:
 - Introduce non-native fauna or flora species;
 - Stock a watercourse or body of water:
 - For aquaculture, sports or commercial fishing or any other commercial purpose,
 - For any other purpose, if the fish stocked are not from a genetic strain originating from the watershed of the biodiversity reserve.
- Hunting, fishing, trapping, walking and hiking are therefore allowed without authorization from the MDDEP.
- The other activities currently practiced on the territory of the biodiversity reserve may continue to be practiced without authorization, unless they are likely to have negative repercussions on the biodiversity, but in compliance with other applicable laws.
- The MDDEP proposes that a framework be established for speleological activities.

Why protect geological sites?

- ✓ To ensure the protection and conservation of geological diversity, that is, all the variety of geological elements of Québec and that may be threatened by natural catastrophes or human interventions.
- ✓ In order to improve knowledge of the geology and geomorphology of Québec and better understand the elements that make them up.

Source: Web site of the ministère des Ressources naturelles et de la Faune.

Implications

All in all, the creation of the biodiversity reserve will have few impacts because:

- The recreational and tourism vocation of the Saint-Elzéar cave will be maintained;
- Karst development projects are possible provided they do not have a negative impact on the karst phenomena or biodiversity of the territory and that they are authorized by the MDDEP;
- Existing rights-of-way are not affected;
- There are no longer any valid wood cutting licenses for domestic purposes in the proposed biodiversity reserve and local firewood needs can be easily met by local supplies outside the protected area;

- Hunting and trapping activities may continue to be practiced in the territory, even if they are not supported by wildlife development projects;
- The protected forest cover has a very low level of productivity, and wood cutting for domestic purposes may be pursued under certain conditions if authorized by the Ministère des Ressources naturelles et de la Faune prior to the creation of the proposed biodiversity reserve;
- The practice of speleological activities already restricted by local organizations.

Finally, the permanent status of biodiversity reserve does not create new prohibitions since the prohibited activities were already prohibited under the regulation pertaining to the proposed status. It consolidates and restricts the protection measures for an exceptional karst environment.

ISSUE 2 ~

ACQUIRE KNOWLEDGE ON THE KARST PHENOMENA AND BIODIVERSITY OF THE TERRITORY

The Saint-Elzéar karst is of tremendous interest for research and education in that it provides a window onto rare and impressive geological events across Québec. Ecological knowledge of the territory, whether the functioning of karst phenomena or fauna species of the underground environment, is very fragmented and warrants developing.

Objectives

- Encourage the dissemination of existing knowledge.
- Encourage educational activities pertaining to the geological phenomena of the Saint-Elzéar karst biodiversity reserve.
- Foster scientific research to improve knowledge of the karst ecosystem (structure, functioning, fauna, flora, etc.).

Proposals

- The MDDEP suggests:
 - Setting up partnerships with educational institutions and research groups for the pursuit of studies on karst phenomena in the territory, notably in view of defining the characteristics, interest and vulnerability specific to the underground environment;
 - Establishing partnerships with local and regional naturalist associations in view of conducting an inventory and regular monitoring of the biodiversity of the biodiversity reserve;
 - Raising the awareness of users of the territory to the potential impacts of their practices on biodiversity.

Implications

The Musée des cavernes located in the Village de Saint-Elzéar could, if it wished, play a major role in the dissemination of knowledge and implementation of awareness activities.

SOCIOECONOMIC ISSUES

The protected areas are territories preserved for the benefit of current and future generations. The MDDEP wishes the local communities to be the first to benefit and, as a result, that they be involved in their management. In the same perspective, the MDDEP intends to allow recreational activities compatible with the status of conservation.

ISSUE 3 ~

INVOLVING LOCAL REPRESENTATIVES

The Natural Heritage Conservation Act, by setting up aquatic and biodiversity reserves, among other measures, aimed to encourage the active participation of local and regional representatives in the conservation and development of protected areas.

The MDDEP wishes that all representatives concerned with the territory of the Saint-Elzéar karst have the opportunity to express their opinion on the management of the biodiversity reserve and actively participate.

Objectives

- Promote a partnership approach.
- Encourage the expression of the various interest groups regarding the protection, planning of activities and management of the biodiversity reserve so that the MDDEP may define a framework on which individual projects may be built.

Proposals

- The MDDEP, through its regional branch, and in collaboration with local organizations, will develop an action plan to guide the management of the biodiversity reserve for the purpose of protecting and developing the territory and resources, in compliance with the Natural Heritage Conservation Act.
- The mechanism for the participation and coordination of local players will be proposed according to local and regional realities and the community's expectations.
- The MDDEP recommends that partnerships be established with the industrial sector, service suppliers, etc. in order to prevent future impacts generated by the activities practiced in the periphery of the biodiversity reserve or watershed upstream from the Saint-Elzéar karst.

Implications

Local organizations will be invited to participate in developing an action plan that will establish conservation, development and land management activities.

ISSUE 4 ~

MAINTAINING THE SITE'S EDUCATIONAL, RECREATIONAL AND TOURISM VOCATION

The territory has a lot of potential for recreational activities due to its rich natural heritage. On the whole, these uses remain compatible with the status of biodiversity reserve. However, any effort to develop and manage them must take into account the tremendous fragility of certain environments and obstacles to the construction of recreational installations. Certain activities that are currently practiced on the territory, notably speleology, are likely to have a negative impact on the biodiversity of the biodiversity reserve or alter its natural character.

Objectives

- Maintain the ecotourism vocation of the Saint-Elzéar karst.
- Ensure that activities practiced in the biodiversity reserve, including their development and the construction of new infrastructures, do not have a negative impact on the territory's biodiversity.

Proposals

The MDDEP proposes to:

- Unconditionally authorize recreational activities including hunting, fishing, hiking and nature observation;
- Work closely with local representatives – notably the Comité de promotion des Ressources naturelles de Saint-Elzéar, Municipalité de Saint-Elzéar and the Offre touristique intégrée de Saint-Elzéar – to:
 - Plan the development of ecotourism and recreational activities in keeping with conservation objectives,
 - Implement a program in the future to monitor activities practiced in the biodiversity reserve and surroundings in order to evaluate their possible impacts on the biodiversity of the territory;
 - Establish a framework for the practice of speleological activities with specialists, notably geologists of the ministère des Ressources naturelles et de la Faune and the Société québécoise de spéléologie,
 - Make the population aware of the fragility of the karst heritage.

Implications

In the absence of measures guaranteeing their safe and environmentally responsible practice, certain activities might be prohibited in the

biodiversity reserve (research and educational activities, speleological activities).

HIGHLIGHTS

In the projected Saint-Elzéar karst biodiversity reserve, the MDEP proposes to:

- ✓ Strengthen the protection of karst phenomena by restricting activities likely to affect their physical and ecological integrity and related biodiversity;
 - ✓ Maintain and consolidate the site's educational and ecotourism vocation;
 - ✓ Encourage research on the territory's karst phenomena and their development potential and on the biodiversity of the underground formations;
 - ✓ Authorize recreational activities that have no significant impact on the biodiversity of the territory:
 - Nature observation and geological phenomena,
 - Hunting,
 - Sport fishing,
 - Trapping,
 - Hiking;
 - ✓ With local representatives, define a framework for the practice of activities likely to have impacts on karst phenomena, notably speleology, development of the geological heritage and traffic of off-road vehicles (ATV, quad, 4 x 4, snowmobile);
- ✓ Prohibit activities that have an impact on the biodiversity or that alter the natural character of the site:
 - Introduction of non-native species into the territory for development purposes,
 - Wood cutting for domestic purposes, unless authorized prior to the creation of the biodiversity reserve,
 - Attribution of any new occupation or use or license for the harvest of firewood for domestic purposes in the biodiversity reserve;
 - ✓ Eventually implement a program to monitor activities practiced on the territory and surrounding areas to evaluate the eventual impacts on its biodiversity;
 - ✓ Develop an action plan for the biodiversity reserve with local representatives, notably Municipalité de Saint-Elzéar, the Comité de promotion des Ressources naturelles de Saint-Elzéar inc., in partnership with specialists (geologists of the ministère des Ressources naturelles et de la Faune and speleologists of the Société québécoise de spéléologie).

~ CHAPTER 3 ~

MANAGEMENT TERMS AND CONDITIONS



The objective of the biodiversity and aquatic reserves is to protect ecosystems that are representative of Québec's biodiversity. The key issue, as defined in the Natural Heritage Conservation Act, is to maintain the natural dynamic of ecosystems and therefore the biodiversity of these protected ecosystems.

This objective led the MDDEP to develop a protection and management framework specific to the Saint-Elzéar karst biodiversity reserve in order to optimally respond to the challenges of conserving this territory and its resources.

1. MANAGEMENT PRINCIPLES OF THE PROPOSED BIODIVERSITY RESERVE

The MDDEP established a number of guiding principles for the management of protected areas, including both aquatic and biodiversity reserves.

Seven principles for the management of aquatic and biodiversity reserves:

- Ecosystemic management;
- Regionalized management;
- Participatory management;
- Coherent management;
- Responsible management;
- Flexible management;
- Minimal management.

Specifically, these principles will be applied to the Saint-Elzéar karst biodiversity reserve as follows.

ECOSYSTEMIC MANAGEMENT

In the Saint-Elzéar biodiversity reserve, ecosystemic management will aim to respect the following conservation principles:

- Maintaining the natural dynamic of ecosystems;
- Restoring disturbed ecosystems, as needed and over the long term;
- Allowing activities and land development in keeping with the support capacity of the ecosystems;
- Authorizing sampling for non-commercial purposes, but without supporting the practice;
- Encouraging the acquisition and dissemination of natural and cultural heritage knowledge;
- Coordinating the management of land located around the protected area with the biodiversity reserve's conservation objectives.

REGIONALIZED MANAGEMENT

Operational management of the Saint-Elzéar karst biodiversity reserve will be the responsibility of the Direction régionale de l'analyse et de l'expertise du Bas-Saint-Laurent et de la Gaspésie—Îles-de-la-Madeleine du MDDEP.

PARTICIPATORY MANAGEMENT

The Direction régionale de l'analyse et de l'expertise du Bas-Saint-Laurent et de la Gaspésie—Îles-de-la-Madeleine du MDDEP will establish the terms and conditions for the participation of local and regional parties concerned with the management of the Saint-Elzéar karst biodiversity reserve.

Local organizations will be invited to participate in developing an action plan that will establish the priorities for short-, medium- and long-term conservation and development objectives for the Saint-Elzéar karst biodiversity reserve.

The MDDEP proposes that the terms and conditions of the collaboration be discussed with local organizations during the six months following attribution of permanent biodiversity reserve status. An action plan could be drawn up the following year and, if necessary, be revised every ten years at the same time as the conservation plan, as provided for by the Natural Heritage Conservation Act.

COHERENT MANAGEMENT

The Direction régionale de l'analyse et de l'expertise du Bas-Saint-Laurent et de la Gaspésie—Îles-de-la-Madeleine of the MDDEP is responsible for reaching the conservation objectives of the biodiversity reserve. The Direction du patrimoine écologique et des parcs of the MDDEP will provide the scientific and technical support it may need in this regard.

The other government departments responsible for different components of the biodiversity reserve will also be responsible for respecting and meeting the

conservation objectives. The responsibilities will be explained in the action plan.

RESPONSIBLE MANAGEMENT

The MDDEP is responsible for applying the Natural Heritage Conservation Act, which frames the Saint-Elzéar karst biodiversity reserve. Certain activities will also continue to be regulated by other government representatives under the legislation they administer, in collaboration with the MDDEP.

Throughout the decision-making process, the MDDEP will rely on rigorous scientific data. The principle of precaution will also be applied to ensure responsible management.

What is the principle of precaution?

When there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing the adoption of effective measures to prevent environmental degradation.

Source: Sustainable Development Act, 2006.

FLEXIBLE MANAGEMENT

A mechanism will be put in place to follow up on the conservation objectives and, if necessary, make adjustments to the strategies put in place to reach them.

This will be done by means of an assessment of the action plan's implementation and a follow-up on the state of the environment using monitoring indicators.

MINIMAL MANAGEMENT

The biodiversity reserve will be managed minimally to guarantee that the conservation plan objectives are met. This management will consist in taking action in the following areas:

- Information and communication;
- Drafting of an action plan;
- Signposting;
- Monitoring;
- Regulatory application
- Regulatory control
- Monitoring of the natural environment.

2 ACTIVITY SCHEDULE FOR THE PROPOSED BIODIVERSITY RESERVE

REGULATION

Activities practiced within the biodiversity reserve are mostly governed by the provisions of the Natural Heritage Conservation Act.

Plan provisions for activities in the Saint-Elzéar karst biodiversity reserve set forth three distinct categories:

1. Prohibited activities.
2. Activities submitted for authorization.

3. Allowed activities.

1. *Prohibited activities*

The following activities are prohibited in the Saint-Elzéar karst biodiversity reserve:

- Mining, and gas or petroleum development;
- Forest management within the meaning of section 3 of the Forest Act (R.S.Q., c. F-4.1);
- The development of hydraulic resources and any production of energy on a commercial or industrial basis;
- Stocking or introduction of non-native species into territory regardless of the purpose.

The practice of certain activities may be prohibited under other laws and regulations applicable to the territory of the biodiversity reserve.

2. *Activities requiring authorization*

Unless authorized by the Ministre du Développement durable, de l'Environnement et des Parcs and practiced in accordance with the conditions it sets, the following activities are prohibited in the Saint-Elzéar karst biodiversity reserve:

- Burial or disposal of waste, snow or any residual material;

- An activity likely to seriously degrade the integrity of the watercourses, bodies of water or wetlands;
- Any educational or research activity involving the removal of animal species, vegetation, paleontological or mineral samples;
- Erection of new structures or facilities above or below ground;
- The reconstruction or demolition of an existing structure, infrastructure or works;
- Soil development work, including any fill, burial, earthwork, removal or displacement of surface materials or vegetation cover, for any purpose including recreational and tourism purposes such as the development of trails;
- Use of a pesticide;
- Speleological activities not restricted or involving samples of any type (soil, rock, bone, etc.).

The practice of certain activities may also be limited under other laws or regulations that apply to the territory of the biodiversity reserve.

3. Permitted activities

All other activities not mentioned previously are allowed in the Saint-Elzéar karst biodiversity reserve. The following activities are allowed provided they

comply with the applicable legislative and regulatory provisions, including those requiring a permit, authorization or payment of certain fees.

Accordingly, the following are authorized:

- Hunting;
- Trapping;
- Sport fishing;
- Excursions on foot, horseback, skis or snowshoes.
- Nature observation;
- Educational activities that do not involve sample taking;
- Maintenance of existing trails.

The circulation of off-road vehicles (ATV, 4 x 4, etc.), given the impacts they may have on the karst environment, must be restricted in the biodiversity reserve. The MDDEP will define a framework for these practices with local representatives.

ZONING

Generally, the MDDEP proposes zoning of aquatic and biodiversity reserves in order to provide guidelines for developing the territory according to the support capacity (that is, the fragility) of the environments they make up.

The MDDEP has not established zoning for the Saint-Elzéar karst biodiversity reserve, because:

- The entire territory has karst potential;
- Knowledge of karst is very fragmented.

If need be, the MDDEP may define zoning for the biodiversity reserve with local representatives when drawing up the action plan for the purpose of providing a framework for future development of activities and their practice in the protected area.

CONCLUSION...

The Saint-Elzéar karst biodiversity reserve protects one of the most remarkable geological sites in Québec. The Saint-Elzéar cave is certainly one of the most remarkable elements given its age, size and paleontological interest. The entire territory, however, is of key interest for knowledge of karst phenomena and related biodiversity. It therefore made sense to guarantee the perennity of this geological jewel, while allowing for the development of its riches for the benefit of everyone.

At this stage, it is worth mentioning the efforts made by local representatives, particularly the Comité de promotion des ressources naturelles de Saint-Elzéar Inc. since 1976, to preserve this heritage and make it known.

Protection of this site crowns their efforts. In fact, the Saint-Elzéar karst biodiversity reserve will benefit above all the local and regional communities who will enjoy and fully benefit from its attractions. It is in this perspective that the Ministère du Développement durable, de l'Environnement et des Parcs proposes to implement a management approach that is based on partnership.

In an effort to rely on local organizations, the MDDEP proposes that the Comité de promotion des ressources naturelles de Saint-Elzéar Inc.

become its preferred partner for all matters pertaining to matters pertaining to the planning of management interventions of the Saint-Elzéar karst biodiversity reserve.

Conservation of this environment, which will be devoted to light recreation, natural and cultural heritage discovery activities, education and scientific research, contribute significantly to consolidating the local tourist offer.

With its natural character, cultural richness and accessibility, the territory offers a very appropriate framework for the development of recreational and tourism activities, including ecotourism, nature observation and hiking, and complementary to the existing products, such as the biopark of Gaspésie, the Musée acadien du Québec de Bonaventure and the Banc-de-pêche-de-Pasbébiac historic site.

The management terms planned for the Saint-Elzéar karst biodiversity reserve will serve to bring together the various interest groups by inviting them to combine their efforts, means and skills to come up with a development project that is in harmony with and respectful of the environment.

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GLOSSARY

Aven (or pit): A vertically inclined shaft extending upward from a cave, generally to the surface. (Fr. gouffre or aven)

Calcite: mineral material formed by the dissolution of limestone by acidic waters. On contact with air from underground cavities, the calcite solidifies and forms concretions resembling candles (stalactites, columns) or draperies (flow, stalagmitic floor). (Fr. calcite)

Canyon: chasm cut by running water in sedimentary rock. (Fr. gorge)

Cave: natural underground hole that is relatively shallow and with at least one access. A grotto is said to be active if it is still being transformed by water infiltration (hollowing, concretions, sediment deposits). (Fr. grotte)

Chasm: a very deep crack with steep, rocky sides. (Fr. gorge)

Column: formation produced by the union of a stalactite and a stalagmite. (Fr. colonne)

Doline: closed depression formed by erosion from underground waters. (Fr. doline)

Dry valley: a fossil valley that lacks a permanent surface stream, normally on carbonate rocks, drained by an underground source. Water flows only during periods of strong runoff or flood. The formation of dry valleys dates back to the ice age. (Fr. vallée sèche)

Gour: small overflowing pool of water with calcite built up along the edges. (Fr. gour)

Karst: landscape formed in soluble carbonate rock. Karst formations are characterized by surface erosion but also caves created by underground water movement. Dissolution, and therefore the formation of the karst model, is aided by abundant water, CO₂ in water (which increases pressure), water temperature (the colder the water the higher the CO₂ levels and therefore more prone to karsification), vegetation (which releases CO₂ and therefore reinforces the water's

effect), rock type (fractures, etc.), the period of contact between the water and rock. (Fr. karst)

Limestone pavement (or grike): geological formation in limestone or dolomitic rock, created by runoff from rainwater, which dissolves the rock, and by gelifraction (frost action). This type of soil is criss-crossed with bumps, cracks and crevices of varying size of up to several metres. (Fr. lapiaz)

Loam: mixture of sand, alluvium and clay. (Fr. loam)

Resurgence: point at which an underground stream reaches the surface. Resurgences together with springs are very common on limestone plateaus. (Fr. resurgence)

Sink: a point where a stream or river disappears underground. (Fr. loss)

Speleology: scientific, recreational or technical activity that consists in locating, exploring, studying and mapping underground cavities. (Fr. spéléologie)

Stalactite: generally of calcite, formed by dripping water and hanging from a cave roof. They form where percolation water seeps from a cave ceiling and becomes saturated with respect to calcite due to loss of carbon dioxide into the cave air. Calcite is precipitated round the rim of the water droplet and continued deposition creates a hollow tubular straw stalactite (soda straw). Additional deposition of calcite on the outside of the initial cylinder creates an ordinary tapering stalactite.

Stalagmite: formed on the floor of caves by the slow and continuous dripping of calcite water. (Fr. stalagmite)

Till: unassorted mixture of rocky debris (clay to large rocks) deposited directly on the ice without major intervention from ice melt nor settling. (Fr. till)

Well: large, generally round, hole in the ground reaching an underground aquifer. (Fr. puits)

Proposed Saint-Elzéar karst biodiversity reserve

Legend

- = Cottages
- X Caves
- Proposed biodiversity reserve



Metadata

Geodetic reference system: NAD 83 compatible with global system WG5 84

Mapping projection: Modified Tranverse Mercator (MTM), zone 5

Sources

Data: Organizations: Ministère des Ressources naturelles et de la Faune

Base de données topographiques (BDTO) 1/20,000

Protected areas: Ministère du Développement durable, de l'Environnement et des Parcs

Production

Production : Direction du patrimoine écologique et des Parcs
 Service des aires protégées
 Division de la géomatique et de l'infographie

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