

# Nature-based climate solutions for municipalities

A guide to help Québec municipalities deploy nature-based solutions to reduce greenhouse gases and mitigate climate change

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# About the En mode solutions nature project

Spearheaded by Nature Québec and the Société pour la nature et les parcs (SNAP Québec), along with a network of partners, the *En mode solutions nature* project aims to promote recognition of nature-based climate solutions as a credible tool for fighting climate change in Québec. By creating tools to build awareness and by supporting showcase initiatives at the municipal level, the *En mode solutions nature* project is designed to assess and promote understanding of the role ecosystems can play in mitigation and adaptation to climate change in Québec.

For more information, please visit www.solutions-nature.org (in French only).



## About the Société pour la nature et les parcs (SNAP Québec)

SNAP Québec is a non-profit organization dedicated to the protection of nature. It is the Québec section of the Canadian Parks and Wilderness Society (CPAWS). The organization is working to create a network of protected areas across Québec with the aim of ensuring the long-term protection of the boreal forest, the Far North, the Saint Lawrence River, and the ecosystems that support our threatened species. It also seeks to ensure the sound management of existing protected areas.

To learn more, visit www.snapquebec.org/en



## About Nature Québec

Nature Québec is a non-profit organization that has been dedicated to conserving natural environments and promoting the sustainable use of resources since 1981. With the help of a network of scientists, the Nature Québec team undertakes projects and conducts campaigns focused on four main areas: biodiversity, forests, energy and climate, and the urban environment. The organization has over 145,000 members and supporters, as well as 30 affiliated groups, and is a member of the International Union for Conservation of Nature (IUCN). It operates throughout Québec, working to build awareness, mobilize support, and take action for a more just society, with a smaller ecological and climate footprint, in solidarity with the rest of the planet.

To learn more, visit http://www.naturequebec.org/



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# The solutions are rooted in nature

The climate and biodiversity crises are often addressed separately, but it is becoming increasingly clear that the two problems are inextricably linked, as are the solutions (Pörtner *et al.*, 2021).

Québec municipalities are confronting this two-fold crisis. On the one hand, they have to deal with the impacts of a growing number of extreme weather events and absorb the costs of adaptation, which amount to \$2 billion per year in all until 2055, representing an increase in current municipal spending of approximately 12% (UMQ, 2023).

On the other hand, municipalities are increasingly expected to play a leading role in protecting biodiversity and to provide a living environment that makes it possible for local residents to have contact with nature and lead a healthy lifestyle.

In this context, **nature** can be seen as an insurance policy for climate adaptation and public health, since it provides services that are essential to municipalities, such as reducing pressure on the storm sewer system, preventing floods, and attenuating periods of drought (Adams, 2012), while promoting the general health of local residents.

# Nature-based climate solutions

According to the official definition of the International Union for Conservation of Nature (IUCN), "Nature-based Solutions address societal challenges through actions to protect, sustainably manage, and restore natural and modified ecosystems, benefiting people and nature at the same time" (IUCN, 2016).

More specifically, nature-based climate solutions are a set of actions that put ecosystems at the forefront of the fight against climate change. In other words, nature-based climate solutions address the climate crisis by simultaneously tackling greenhouse gas (GHG) emissions and the consequences of climate change; they also address the biodiversity crisis while promoting human well-being.

Nature-based climate solutions hold out great potential, since ecosystems could provide more than a third of the global mitigation efforts needed by 2030 to fight the climate crisis (Griscom et al., 2019). Whenever we use the term "nature-based solutions" in this guide, we are specifically referring to nature-based climate solutions.

Municipalities can take concrete action to combat climate change and biodiversity decline, and we hope they will recognize nature's full potential in this regard. This guide is meant to provide tools to Québec municipalities interested in implementing nature-based climate solutions within their territory.

N.B: This guide is available in print and as a digital version online. There are several references to web-based resources in the document. To take advantage of clickable links, please consult the online version.

## A toolbox for a deeper dive

- The <u>Nature-based Solutions</u> section of the IUCN website
- The <u>www.solutions-nature.org</u> website, coordinated by Nature Québec and SNAP Québec
- The "Towards local action on Nature-based Climate Solutions" <u>toolkit</u> and the "Top 10 Municipal Nature-Based Climate Solution Actions" <u>guide</u>, both from Nature Canada



# Nature-based solutions and climate plans: a promising synergy

The Québec government is inviting RCMs to devise a climate plan as part of the program to accelerate the local climate transition: Accélérer la transition climatique locale (in French only). And the RCMs are being encouraged to develop this plan for all municipalities within their territory. Drawing up a climate plan is a prime opportunity to add nature-based solutions to the array of measures employed to fulfill the two-pronged objective of climate plans: adapting to climate change and reducing GHG emissions. In developing your climate plan, we therefore suggest that you adopt the approach presented in this guide, in particular by inviting an expert in natural environments to join your team.

In Canada, nature-based solutions have the potential to capture emissions equivalent to that of 21 million vehicles per year by 2030 (78.2 megatonnes of  $CO_2$  per year) (Drever *et al.*, 2021).

# Nature-Based Solutions



# Three action areas for municipalities

According to the official IUCN definition, nature-based solutions are based on three principles:

## 1. Manage sustainably

Improve practices aimed at limiting the impact on ecosystems of using resources or ecological services, so as to cause little or no harm to the environment and avert serious adverse effects on biodiversity.

#### Examples of best management practices at the municipal level:

In the municipal sphere better management can involve:

- introducing incentives to the adoption of agroforestry practices in agricultural environments (hedgerows and agroforestry system);
- adopting legislation on tree felling and protection.

## 2. Protect

Implement a set of measures designed to maintain the current state and natural dynamic of ecosystems and to prevent or mitigate threats to biodiversity. Protection can be integral, that is, excluding all human use of an ecosystem, or it can entail other levels of protection and measures allowing for certain types of use.

#### Examples of protection at the municipal level:

Protecting natural environments at the municipal level can involve:

- zoning changes for natural environments located in residential, commercial or industrial development designed to conserve carbon sinks and the co-benefits of these environments.
- various forms of voluntary conservation of natural environments, such as natural reserves, conservation agreements, acquisition by a conservation organization, co-ownership with a conservation organization, ecological gifts, etc.

#### Lasting protection?

Not all protective measures are equivalent. The adoption of conservation zoning provides temporary protection from development in a specific area, but nothing prevents the zoning from being modified again in the future. Although zoning changes are still an excellent tool for rapid protection of a given area, it is best to follow up with steps to obtain permanent protection status, which often entails several years of work.

### 3. Restore

Implement a set of measures intended ultimately to restore the natural character, with respect to composition, structure, dynamics and ecological functions, of a degraded or artificial ecosystem.

#### Examples of restoration at the municipal level:

- Restoration of natural environments at the municipal level can involve:
- establishing ecological corridors;
- expanding the urban canopy by planting trees and shrubs.





# Natural environments

In Canada, nature-based climate solutions are mainly applicable to four types of environments that are found in many municipalities in Québec: agricultural land, grasslands, wetlands and forests.

# Wetlands

Wetlands have great potential for climate change mitigation. In fact, wetlands like peat bogs are recognized for their role in storing  $CO_2$ and can serve as major carbon sinks if they are well managed (Pörtner *et al.*, 2021). Protecting and restoring wetlands makes it possible to mitigate greenhouse gas emissions by roughly 15.5 megatonnes of  $CO_2$ -equivalent emissions per year for a cumulative total of 82.6 megatonnes in Canada by 2030 (*ibid*).

In addition to their role in fighting and adapting to climate change, nature-based solutions in wetlands can generate many co-benefits, such as flood mitigation and maintaining water quality.

Here are two examples of nature-based climate solutions in wetlands (*ibid*.):

- Avoid peatland disturbance: 10.1 megatonnes of CO<sub>2</sub>-equivalent emissions per year by 2030 in Canada.
- Restore salt marshes: 0.44 megatonne of CO<sub>2</sub>-equivalent emissions per year by 2030 in Québec.

### Forests

Forest ecosystems can play an active role in the fight against climate change by serving as natural carbon sinks, that is, by capturing and storing GHGs (Beauregard *et al.*, 2019). While the agricultural sector holds the prize for carbon sinks in the short term, if we look towards 2050, it is the forest sector that has the greatest potential for GHG reduction (as trees mature, their absorption rate accelerates) (Drever *et al.*, 2021). There are three ways in which the forest sector mitigates climate change: (1) sequestering carbon in forests; ii) storing carbon in forests and wood products; iii) substituting wood products for high intensity carbon products such as cement (Perez-Garcia *et al.*, 2015). Protecting and restoring forests and improving forestry practices in Canada would make it possible to mitigate approximately 11.9 megatonnes of  $CO_2$ -equivalent emissions per year by 2030 (Drever *et al.*, 2021) and even more by 2050.

In addition to their role in mitigating and adapting to the effects of climate change, nature-based climate solutions in forest environments can generate numerous co-benefits. In particular, they help maintain air quality and, as venues for recreational tourism activities, they can promote people's physical and mental health (*ibid*.).

Here are two examples of nature-based climate solutions in forest environments with an indication of their potential for reducing annual CO<sub>2</sub>-equivalent emissions in Québec (*ibid*.):

- Better forest management practices 2.19 megatonnes of CO<sub>2</sub>-equivalent emissions per year by 2030;
- Forest cover restoration 0.7 megatonne of  $CO_2$ -equivalent emissions per year by 2030, but 7.40 megatonnes of  $CO_2$ -equivalent emissions per year between 2030 and 2050.



# Agricultural areas

According to Québec's GHG emissions inventory, the agricultural sector accounts for 9.6% of total emissions in Quebec, or the equivalent of roughly 7.8 megatonnes of  $CO_2$ -equivalent emissions per year (MELCC, 2020). Soil, manure and livestock are the main sources of GHGs in this sector.

The following are two examples of nature-based climate solutions in the agriculture sector, with an indication of their potential for reducing annual  $CO_2$ -equivalent emissions (measured in megatonnes) in Québec (Drever et al., 2021):

- Planting trees between crops, agroforestry intercropping systems 1.76 megatonnes of  $CO_2$ -equivalent emissions per year by 2030.
- Planting cover crops: 0.57 megatonnes of CO<sub>2</sub>-equivalent emissions per year by 2030 (*ibid*.).

# Grasslands

Rich in wildlife species, grasslands can store large amounts of carbon dioxide in plant roots and soil. With respect to nature-based solutions, the term "grasslands" refers to land covered with grass, including native prairies, hayfields and pastures.

In Canada, grasslands account for 17% of the total mitigation potential of nature-based solutions, or 13.4 megatonnes of  $CO_2$ -equivalent emissions per year by 2030 (Drever et al., 2021).





Here are two examples of nature-based climate solutions in agricultural areas with an indication of their potential for reducing annual  $CO_2$ -equivalent emissions, measured in megatonnes, in Québec (ibid.):

- Avoiding conversion of grasslands to annual crops with tillage: 1.63 megatonnes of  $CO_2$ -equivalent emissions per year by 2030.
- Planting trees in pastures for silvopastoralism: 0.06 megatonnes of CO<sub>2</sub>-equivalent emissions per year by 2030.

#### Don't forget nearby nature!

Nature can sometimes be found downtown! Think about urban trees and woodlands, ponds and wetlands in local parks, and waterways that run through cities. Although they are often altered to the point of no longer being considered natural environments, better management or restoration could make them excellent nature-based solutions.



# **Co-benefits**

Adopting nature-based solutions doesn't only help fight climate change: it also generates co-benefits. There are many positive synergies, for biodiversity as well as for human health and safety.

# Benefits for biodiversity

The key to stemming the decline in biodiversity lies in protecting, sustainably managing, and restoring ecosystems. For example, planting trees in agricultural areas and adding legumes to pastures help to adapt crops to variable weather conditions, and can also support a greater abundance of native bees and other beneficial insects. By tackling ecosystem degradation AND climate change, which threaten ecosystems and their biodiversity, naturebased solutions create a virtuous circle.

# Benefits for human health

Nature-based solutions involve practices such as planting urban trees, which not only helps with adaptation to extreme heat, but also reduces concentrations of atmospheric pollutants and their effects on human health. Further, protecting and restoring natural environments gives people access to green spaces, with the associated benefits for mental and physical health. These natural environments continue to absorb carbon, while helping to combat the "nature deficit" and promoting physical activity.

## Safety benefits

In addition to the above-mentioned co-benefits, nature-based solutions are often also a less costly approach to climate change adaptation than solutions based on grey infrastructure and technology, For example, the protection and restoration of seaside wetlands not only contributes to carbon storage, but also provides a barrier to waves and storm surges, thus preventing shoreline erosion. Likewise, protecting and restoring wetlands reduces the risk of flooding by buffering the effects of high water.

Consider, for example, the Grande Plée Bleue ecological reserve project near Lévis. It provides protection for a vast peat bog, an ecological jewel spanning nearly 15 km<sup>2</sup>.

Benefit for the climate: it's a major carbon reservoir

Benefit for biodiversity: it's a habitat for more than 150 plant species, including carnivorous plants and several plants that are rare in Québec, as well as nearly 200 species of insects and more than 100 species of birds, especially waterfowl.

Human health benefit: the site is accessible to visitors via a 725-metre boardwalk.

Safety benefit: it acts as an enormous sponge, absorbing rainfall and reducing flood risk.





# Pitfalls to avoid

Like all tools, nature-based solutions come with "operating instructions." Used properly, they are highly effective allies in the fight against climate change and its impacts. Used incorrectly, however, they can be ineffective or exacerbate the problem they were intended to solve. Here are a few pitfalls to avoid:



# Using nature-based solutions to offset emissions

It is important to recognize that nature-based solutions in no way replace the need for municipalities to reduce GHG emissions, which requires a review of land-use planning, rethinking modes of transportation, and better waste management, among other things,

For example, it might be tempting for a municipality to justify cutting down mature trees on a part of its territory in order to build a road or a new development, and then try to "compensate" for it by planting young trees. However, the science doesn't support this approach, since it would result in a 30-50 year carbon deficit. It is therefore imperative to stop releasing carbon into the atmosphere by protecting existing sinks, such as mature woodlands and forests. Similarly, nature-based solutions should not be part of carbon offset mechanisms (carbon markets).



# Carbon sequestration at the expense of biodiversity

If they are conceived solely for the purposes of carbon sequestration, nature-based solutions are liable to contribute to promoting large-scale monoculture plantations at the expense of biodiversity protection. This is why they must be designed to protect local biodiversity and the ecosystems in which they are deployed.

Nature-based solutions must be implemented as part of a holistic approach which puts the priority on the conservation of local biodiversity and ecosystem integrity. The biosphere functions through interdependent elements that must be preserved to avoid aggravating existing imbalances. For example, unsuitable tree planting in locations such as grasslands or peatlands could end up adding more carbon to the atmosphere than it removes, while destroying crucial habitat for certain species.



# Implementing nature-based solutions without the consent of local communities

Governance based on justice, equity and inclusion is essential. Indigenous peoples and local communities must participate from start to finish in the implementation of nature-based solutions. In fact, a process that involves Indigenous peoples and local communities in ways that go beyond the bounds of formal consultation, striving for co-creation from the outset, will always yield better results that enhance justice and inclusion, while ensuring sustainable implementation.

To avoid these pitfalls and reduce the risk of veering off track, it is crucial to follow the IUCN Global Standard for Nature-based Solutions (see section 3. Familiarize the committee with the IUCN standard).



# Some examples of nature-based climate solutions at the municipal level



## Oasis du Bergerac/Saint-Elzéar

**Spearheaded by**: the Ville de Laval, Les Amis des milieux naturels de Laval

Action area: Protection

**Benefits for the climate and co-benefits**: Preserving a carbon sink and its ecological value

**Project overview**: Located in an area zoned for industrial and commercial development, the Saint-Elzéar boulevard sector encompasses a very ecologically valuable natural environment. Wetlands vital to several bird species make up a little more than a third of the area. They help retain runoff and floodwaters from the two streams that

run through the area. A citizens' group called *Les Amis des milieux naturels de Laval* lobbied the municipal administration to protect this natural environment. As a result, the local city council placed a renewable two-year reserve on 12-hectares (nearly 30 acres). During this period the municipal authorities will try to acquire the land that makes up this area of ecological interest.



# Redevelopment of Parc Angrignon in Montreal

Spearheaded by: the Ville de Montréal

Action area: Restoration

#### Benefits for the climate and co-benefits:

Sequestering carbon in planted trees, reducing the community's GHG emissions, maintaining biodiversity in an urban environment, and contributing to the wellbeing of local residents.

#### Project overview:

The City of Montréal is making a \$2.8 million investment in the redevelopment of Parc Angrignon. This 97-hectare park (roughly 240 acres) comprises a large forest, wetlands, clearings, a 1.1-km-long lake, children's playgrounds, and a dog park. The redevelopment project has involved planting vegetation and replacing facilities that had reached the end of their useful life. In 2021 and 2022, almost 10,000 plants were planted: 2,938 trees, 2,037 shrubs, and 4,975 herbaceous plants (A. Daniel, personal communication, November 13, 2023). This project is in line with Montréal's 2020-2030 Climate Plan, which aims to reduce the community's GHG emissions by 55% by 2030. In addition to the benefits for the climate, the project also benefits Montréal residents, who will be able to enjoy this recreational space even more.



## **Municipal subsidies for farmers**

**Spearheaded by:** The City of Granby and the Haute-Yamaska RCM

Action area: Better management

#### Benefits for the climate and co-benefits:

Sequestering carbon in the soil, reducing pollution, maintaining the soil in good condition, and using resources to enhance the well-being of local residents.

### **Project overview:**

The City of Granby and the Haute-Yamaska RCM are providing subsidies to farmers who take steps to reduce diffuse pollution of agricultural origin. Subsidized initiatives include building soil conservation structures, enhancing riparian buffer strips, and growing cover crops, among others. The RCM grants target farmers in the Lac Boivin watershed. This lake, which is at risk of eutrophication, is a spot for nature-based activities that is prized by local residents. These solutions will contribute to reducing pollution stemming from existing practices, maintaining the soil in good condition and sequestering carbon in the soil, in addition to using resources to promote the well-being of local residents.



# Steps to implement nature-based solutions in your municipality

There are six recommended steps to implement nature-based solutions at the municipal level. This is just by way of example, however. The items discussed below are meant to be adapted to your specific circumstances. The proposed framework is neither rigid nor all-encompassing.

# 1. Plan your approach

This is the first step to be taken by the municipality. Once it has finished its analysis, it will have a good idea of what the process entails and will be able to allocate sufficient resources to it.

#### a. Draw up a list of stakeholders

To ensure the social acceptability of introducing nature-based climate solutions and thus ensure their sustainability, it's essential to involve all the stakeholders throughout the entire process. In practical terms, this means creating mechanisms to encourage the full participation of all stakeholders from the start. It also means making a special effort to involve groups that have traditionally been excluded. In Québec, the process takes place on the territory of First Peoples. When the introduction of a nature-based solution concerns First Peoples or has an impact on their lands, their participation must be based on respect for their right to free, prior and informed consent (FPIC).

Ultimately, the stakeholders concerned will form a multi-stakeholder committee that will be central to the process of implementing nature-based solutions.

#### What does "free, prior and informed" consent mean, exactly?

The Declaration on the Rights of Indigenous Peoples requires states to consult and cooperate in good faith with the Indigenous peoples concerned prior to adopting and applying measures that may affect them, in order to obtain their free, prior and informed consent.

"Free" means that there is no coercion, intimidation or manipulation.

"Prior" implies that consent is sought far enough in advance of any authorization or commencement of activities, and that sufficient time is allotted for Indigenous consultation and consensus-building processes.

"Informed" means that the information provided is wide ranging, covering the nature, scale and scope, pace of implementation, and reversibility of any proposed project or activity; the project's objective and duration; the location of the areas in question; a preliminary assessment of potential economic, social, cultural and environmental impacts, including potential risks; the personnel likely to be involved in project implementation; and the procedures that the project may involve.

#### The multi-stakeholder committee

The multi-stakeholder committee is the body that is consulted in order to complete all the steps in the process. Ideally, all the stakeholders and rights-holders should be represented on the committee. At the very least, they should be informed of the process and have an opportunity to participate.

One measure of the success of the committee's work is the involvement of several municipal departments. Nature-based solutions aren't the sole preserve of the environment department; equally important are public works, public security, urban planning, etc. Close cooperation between these departments is vital.



#### Examples of relevant stakeholders:

Here is a (incomplete) list of relevant actors and rights-holders:

- Watershed organizations (Organismes de bassin versant OBV)
- Regional environmental councils (Conseils régionaux de l'environnement CRE)
- Local environmental groups
- Indigenous communities
- Forestry producers network
- Agricultural producers network
- Industry representatives
- Union of agricultural producers (Union des producteurs agricoles -UPA)
- Representatives of protected areas
- Town planning department
- Environment department
- Public works
- Citizens groups

## Toolbox Going further: stakeholder mapping

The aim of this exercise is to identify and analyze the individuals, groups and organizations that have an interest in a project. It typically involves placing stakeholders on a graph with two axes: one representing their power and influence and the other representing their interest in the project. The purpose is to develop an understanding of the perspectives and influence of stakeholders and of their potential impact on the project.

#### b. Plan the timetable, deliverables and resources

It's important to determine the specific deliverables expected from the process, to establish timetables, and to allocate resources properly. Figure 1 provides an example of deliverables, and these are discussed in greater detail under Steps 4 and 5 in this section. The process can usually be divided into two distinct phases: planning comes first and then implementing nature-based solutions.

NB: These two phases may require different kinds of human and financial resources.



Figure 1. Schematic representation of the process

The planning phase typically requires between three and six meetings of the multi-stakeholder committee, in addition to activities for citizens, such as participatory workshops or consultation activities. It's important to build in time for coordination, communications, data compilation, drafting of deliverables, and so on. These responsibilities are generally assumed by the project lead or someone they designate (see next section). The time and resources required for the implementation phase will depend on the chosen solutions.

The scope of the process and its success will depend on the human and financial resources allocated to it. Available expertise, local resources and financial resources can vary widely with the size of the municipality. Depending on local circumstances, the municipality can approach the process in different ways. For example, it can assign a municipal employee to lead or participate in the process, or it can mandate a local organization to play this role. In some cases, when the necessary expertise is not available locally, it may be advisable to enlist the services of an external consultant.



#### c. Explain the municipality's approach to local residents

When you choose to employ nature-based climate solutions in your municipality, it's important to inform people of what you're doing. And that provides a good opportunity to reiterate the municipality's commitment to fighting climate change. At this point, it's wise to clearly identify and communicate the problem you are proposing to tackle, explain nature-based solutions and discuss their co-benefits, and highlight the genuinely participatory character of the process. The public can be a valuable ally in implementing nature-based solutions. The better informed people are, and the more encouraged they are to participate in the process, the easier it will be to achieve social acceptability for nature-based solutions.

#### 2. Name a project lead

Designating someone to act as project lead is a crucial success factor. This person can be a municipal employee or a member of the multi-stakeholder committee. The project lead is the binding agent who ensures the coordination and coherence of the process.

The roles of the project lead :

#### Create the multi-stakeholder committee

Stakeholders must be contacted and invited to join the multi-stakeholder committee. Already at this stage, it's important to acknowledge the expertise of the people you approach and explain what their participation will entail (number, length and frequency of meetings, work expectations, etc.). This recognition and clarity regarding the nature of the commitment will contribute to stakeholders' long term participation.

#### Decide how the committee will function

To ensure that the work proceeds smoothly and that there is good communication among committee members, several issues should be sorted out, such as the frequency of meetings, whether they will be held virtually or in-person, who will facilitate them, how to make sure everyone can express themselves, and how decisions will be made.

#### • Clarify roles and responsibilities

Committee members usually contribute to the discussion by sharing their knowledge and data related to their field of expertise. The project lead is responsible for compiling, analyzing and synthesizing this knowledge. These syntheses usually consist of deliverables defined by the municipality, typically a description and assessment along with an action plan. However, it's also possible, depending on the size of the multi-stakeholder committee and the scope of work, for some members to form a working committee responsible for producing the deliverables.

#### • Advise the committee of the steps to be taken and the timetable

The project lead sees to it that the municipality's expectations in terms of deliverables and accomplishments are clearly communicated to the members of the multi-stakeholder committee, and that the timetable is understood.

#### • See to the coordination of the process

The project lead plans the meetings and sees to it that they run smoothly, in addition to making sure that committee members are assigned responsibilities and that action items are followed up on. The project lead also oversees communications with the committee and all the stakeholders.

• **Create conditions propitious to cooperation; recognize each member's particular expertise** The project lead should foster a positive working atmosphere marked by mutual respect and trust. Since it can be a challenge to reach a consensus when there are differences of opinion, the project lead should have a talent for getting everyone on the same page.

# 3. Familiarize the committee with the IUCN standard

Incorporating the <u>IUCN global standard for nature-based solutions</u> in the design and implementation of nature-based climate solutions is another factor in the success of your process. It is thus essential to provide training to the whole multi-stakeholder committee, or at least one resource person on the committee, to ensure that the standard is applied. If you incorporate this standard at the project design stage and use it for validation purposes, it will help you determine, first of all, whether the solution you have devised qualifies as a nature-based solution, while avoiding the pitfalls associated with its implementation (see the section on Pitfalls to avoid). Second, this will ensure the viability and social acceptability of the nature-based solutions you intend to implement. Finally, having a good grasp of the standard will give you more credibility with government and other financial backers. The IUCN standard consists of eight criteria and 28 indicators.

#### The eight IUCN criteria\* The nature-based solution should:

#### 1. Address one or more societal challenges.

In the case that concerns us here, the solution must contribute to reducing GHG emissions and facilitate adaptation to the impacts of climate change; however, nature-based solutions can also address other challenges.

#### 2. Be designed with scale in mind

It is important to recognize and respond to the interactions between the economy, society, and ecosystems. This understanding should inform the project, and the impact of the dynamic should be analyzed in a broader context as well, beyond the project's target site. Further, it is possible to plan synergies between nature-based solutions and other types of solutions, especially technological solutions.

#### 3. Obtain net gains in terms of biodiversity and ecosystem integrity.

Once the nature-based solution has been implemented, it is important to at least maintain, and ideally enhance, ecological integrity

#### 4. Be designed with a view to economic viability.

The economic dimensions of the project should be taken into consideration in order to support the long-term viability of the nature-based solution, that is, ensure that it continues beyond the implementation period. To do so, you must recognize the value of ecological services, both market-based and non-market.

#### 5. Be part of a project based on inclusive, transparent and empowering governance processes.

The chosen solution must reflect the concerns of the various stakeholders, and it is crucial for the stakeholders to be involved and willing and able to take action to unleash its full potential.

Achieve equitably balanced trade-offs between fulfilling the primary goals of nature-based solutions and preserving the other benefits of natural environments.

#### 6. Compromises must be reached in an effective and equitable way.

They must be evaluated and presented to the stakeholders. To ensure the sustainability of the nature-based solutions it is important to obtain approval from and compensate stakeholders who may be affected.

#### 7. Include mechanisms for periodic evaluation and monitoring.

This will involve adaptive management based on evidence drawing from scientific, local and traditional knowledge.

#### 8. Be designed with a view to long-term sustainability.

It is important to document the process and improve the political and legislative frameworks that undergird it. It is also vital to implement an inclusive communication and awareness-building strategy around nature-based solutions to promote the adoption of similar initiatives.

\*Adapted from the framework and the guide for using the IUCN Global Standard for Nature-based Solutions. See the bibliography for further information.

# 4. Prepare a description and assessment for your municipality

The multi-stakeholder committee, headed up by the project lead, is now ready to begin its work. The first step is producing the description and assessment, the document that will serve as the basis for drafting the action plan. As its name suggests, the description and assessment consists of two parts: a description, namely a detailed characterization of your municipality's territory, and an assessment, which includes hypotheses, root cause analyses, and conclusions that can be drawn from the data in the description.

If we compare your municipality to a patient visiting the doctor, the "description" would be the results of the set of tests carried out on the patient-blood tests, blood pressure, heart rate-while the "assessment" would be the doctor's diagnosis of the patient's state of health.

#### a. Information gathering

The aim of this step is to take stock of current knowledge of your municipality's natural environments and climate issues, and then acquire the missing information so that you can target the right solutions. This involves leveraging the multi-stakeholder committee's knowledge of the territory and the shared knowledge of the municipality's residents more generally.

#### Current knowledge

Your municipality already has data on its territory, as do the organizations that are represented on your multi-stakeholder committee. For example, your RCM, watershed organization (organisme de bassin versant), and your region's environmental centre possess important information they can share.

#### **Missing information**

Depending on the state of knowledge, it may be necessary to consult specialized firms or organizations to fill in information gaps. For example, a biology consulting firm could be enlisted to draw up an inventory of some natural environments and characterize them.

It may also be advisable to call on the services of external organizations to plan and facilitate information-gathering activities with local residents. The success of these ventures depends on the quality of the content of such activities. It is important to ensure that participants have a shared understanding of the objectives of the activity, in addition to fostering engagement, collaboration, and social interaction.



#### **Participatory mapping**

One type of activity you can engage in with residents is a participatory mapping workshop. Participatory mapping can be broadly defined as involving residents in creating or annotating maps. These maps serve as representations of public perceptions of municipal territory, infrastructure, and ecosystems, and they can also be used to collect information that traditional mapping misses. Participatory mapping workshops contribute to strengthening residents' sense of ownership of the process and facilitate public participation as well as support for the next steps.

#### Think regionally as well as locally

Don't forget that your municipality is embedded in its region. When collecting data and preparing the description of your municipality, consider both the local and regional levels. This can shed light on the key processes at work, as well as possible synergies. For example, there are regional-level climate projections indicating the strong likelihood of a rise in temperatures, but at the local level, you may need to pinpoint the urban heat islands in your municipality.

For temperature increases and anticipated climate impacts, you can actually find data for your municipality's entire region (regional level) and identify urban heat islands in your municipality (local level).

Takeaway: Gathering solid, detailed information will provide a sound basis for your municipality's assessment and will help you plan your project, while ensuring the sustainability and success of your approach.

#### b. A three-part municipal description

#### **Natural environments**

You must draw up an inventory of all the natural environments within the bounds of your municipality. There are many tools you can use, such as land use and development plans (schémas d'aménagement et de développement), development plans for agricultural zones (plans de développement de la zone agricole), and regional plans for wetlands and watercourses (plans régionaux des milieux humides et hydriques). Every type of environment should be inventoried: forests, watercourses, lakes, marshes, peatlands, woodlands, agricultural lands, fallow areas, parks, green spaces, conservation areas, areas of ecological interest, vacant land, etc. Don't forget about urban trees: they have a major impact on urban quality of life and biodiversity. For instance, knowing the canopy index of your municipality's urbanized areas can help you set greening objectives.

## Toolbox

Here is a non-exhaustive list of online data sources that may help you gather relevant information about the natural environments in your municipality. Most of these are available in French only.

- The Forêt <u>Ouverte interactive map</u> from the Ministère des Ressources naturelles et des Forêts (MRNF)
- The <u>map</u> of at-risk species from the Centre de données sur le patrimoine naturel du Québec (CDPNQ)
- Ducks Unlimited Canada's <u>Southern Quebec Wetland Inventory</u>
- The Québec potential wetlands <u>interactive map</u> from the Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP)
- The <u>Données Québec</u> website, which contains a wide range of government and municipal data (see in particular "Environnement, ressources naturelles et énergie")
- The <u>Repertoire des sites de conservation volontaire du Québec</u>, a directory maintained by the Réseau de milieux naturels protégés
- The <u>Québec Register of Protected Areas</u>
- <u>SIGAT</u> (système d'information et de gestion en aménagement du territoire), a gateway to useful public data for land-use planning
- Public environmental registers
- <u>Québec Land Register</u>
- Atlas of Territories of Conservation Interest in the St. Lawrence Lowlands (2019)



#### **Climate issues**

Climate issues and the current and future impacts of climate change on your municipality need to be identified and looked at from various angles. For example, climate issues need to be analyzed from the perspective of various sectors of activity (agriculture, forestry, tourism, etc.), and in terms of their public safety risks (heat waves, floods, violent storms, access to drinking water, etc.), as well as impacts on natural environments (more insect outbreaks, more frequent forest fires, etc.).

### Toolbox

(mainly in French only)

- Ouranos <u>regional climate change</u> <u>adaptation fact sheets</u>
- The Agriclimat project, see especially the "<u>Diagnostic</u>" section
- <u>The Small and Rural Communities</u>
   <u>Climate Action Guidebook</u> produced by
   Partners for Climate Protection
- <u>The municipal climate platform</u> of the Union des municipalités du Québec
- <u>The urban heat islands map</u> from the Institut national de santé publique du Québec (INSPQ)

#### **Regulatory and planning tools**

The political landscape is a significant factor in planning nature-based solutions.

Existing by-laws, policies, and plans may be major drivers for-or major barriers to-implementing your solutions. Analyzing the prevailing political situation can help your municipality meet the challenges of implementing and generating support for nature-based solutions and find original and effective ways forward. Fiscal tools can be very useful; it is worthwhile looking into what may be available to you (see "Sources of funding for your municipality" below).



# Toolbox

The following is a non-exhaustive list of policies, by-laws, and tools that may be relevant to any given territory:

#### RCM tools

- Schéma d'aménagement et de développement (Land use and development plan)
- Plan métropolitain d'aménagement et de développement (Metropolitan land use and development plan) for metropolitan communities
- Plan régional des milieux humides et hydriques (Plan for regional wetlands and watercourses)
- Plan de développement de la zone agricole (Development plan for agricultural areas)
- Municipal tools
- Urban master plan
- Plan particulier d'urbanisme (Special planning program)
- Plan d'agriculture urbaine (Urban agriculture plan)
- Zoning regulations
- Permits and certificate by-laws
- Sustainable development plans
- Tree felling regulations
- Plan d'adaptation aux changements climatiques (Climate change adaptation plan)
- GHG reduction plan
- Plan de conservation des milieux naturels (Plan for the conservation of natural environments)
- Tools from other organizations
- *Master plans for water* adopted by the Organisme de bassin versant (watershed organization)
- Plan de protection et de mise en valeur des forêts privées (Private forest protection and development plans) used by the Agence Régionale de mise en valeur des Forêts Privées (regional agency for private forest development)

#### c. The carbon potential of natural environments—something to think about!

Natural environments can help you become more resilient to climate change not only by serving as tools for adaptation but also by functioning as carbon sinks. Carbon sinks are processes such as tree growth that remove carbon from the atmosphere. However, it is essential to include the notion

of carbon reservoirs when determining carbon capture potential of natural environments. Carbon reservoirs store CO2; examples include tree wood or the undecomposed organic matter in peat bogs. Destruction of these environments releases stored carbon that has sometimes been held there for millennia.

Not all environments have the same carbon capture potential and capacity to act as a carbon reservoir. For example, while trees are often presented as the perfect solution to climate change, we now know that peat bogs can store up to five times more carbon than forests (Beaulne et al., 2021). Figure 2 provides a compelling illustration; it shows that the areas with the greatest carbon storage potential are basically peat bogs and marsh areas, as indicated in Figure 3.

In determining which nature-based solutions should take priority for you, it is therefore important to bear in mind that protecting wetlands is very important when it comes to carbon sinks.

You can hire a firm of experts to draw up a detailed description of the carbon potential of the natural environments within your territory.





Figure 2. Map of carbon sinks in the municipality of Preissac



Figure 3. Map of land-use types in the municipality of Preissac

#### d. Deliver the assessment

Once as much information as possible has been gathered, you are ready to compile and analyze it in order to complete the assessment. This may seem like a daunting task, but never underestimate the power of collective intelligence! The multi-stakeholder committee and the general public can be invaluable allies in completing this step.

One approach you can take is the SWOT (Strengths, Weaknesses, Opportunities, and Threats) method of strategic analysis. This group exercise makes it possible to analyze and assess the description together by filling out a grid such as the one illustrated in *Table 1*. The SWOT analysis can be carried out all at once for the entire assessment. However, if time and resources permit, it can also be done for each natural environment, allowing for an even more detailed analysis.

Internal factors (that we can act on)	Strengths: • What we do well • What we have • Examples: there are several protected areas and progressive policies	Weaknesses: • What needs improvement • What we're missing Examples: nonconforming riparian buffers, lack of regulation regarding the felling of trees in an urban area
External factors (outside our control)	Opportunities • Social context, trends • New programs • Examples: creation of a program to fund riparian buffers in agricultural areas, popularity of hiking	Threats <ul> <li>Constraints</li> <li>Factors outside our control</li> <li></li> </ul> Examples: pressure of urban <ul> <li>development on remaining wetlands</li> </ul>

Table 1. The elements of a SWOT analysis

The SWOT analysis reveals interactions, questions and, hopefully, possible solutions! It provides insight into what strengths can help overcome threats, and what opportunities are most promising for surmounting weaknesses? This analysis enables us to establish the facts and identify the issues at stake. It should be conducted initially with the multi-stakeholder committee, but it's also a good idea to go through the exercise with local residents at a participatory workshop. Ultimately, it will enrich the discussion and give the process greater legitimacy in the eyes of stakeholders and the general public.

#### e. Write up the description and assessment and have the committee validate them

At this stage, you should theoretically have all the elements needed to produce the description and assessment of your municipality. It should take the form of a report that will be submitted to your multi-stakeholder committee for review and comment, in order to confirm that it reflects their understanding of the reality of the territory.



# 5. Draw up the action plan

Like all the other steps in the process, drafting the action plan is a team effort. The multi-stakeholder committee will be called upon to participate as, ideally, will local residents.

# a. Make the applicable natural solution(s) a priority

Once the process of preparing the description and assessment is completed, it is time to choose the nature-based solutions to be implemented on a priority basis. Several criteria come into play when determining which solutions should take priority. Here are the main factors to consider:

- The potential of different environments to act as carbon sinks and reservoirs
- The issue of climate change adaptation
- The results of the SWOT analysis
- Alignment with the IUCN global standard
- The impact on biodiversity
- The impact on human health
- The impact on public safety
- The amount of work involved
- Implementation costs
- Actions in progress
- Stakeholder and public interest.

#### b. Define the SMART objectives

Each of your chosen nature-based solutions will become one of the targets of your action plan. You'll need to set clear objectives for each target. Objectives are often described as SMART - specific, measurable, achievable, realistic and timebound. For example, after completing its description and assessment, a municipality might choose forest protection as a nature-based climate solution. In its action plan, it could set the objective of increasing the surface area of protected woodland. To be SMART, this objective could be formulated as follows: increase the surface area of protected woodland by 10% by 2030.

To achieve your objectives, you need to take action. These objectives will also be presented in the action plan and specific people will be given responsibility for them. Of course, the people in charge must be well informed, know what is expected of them, and have the necessary resources at their disposal. It's also important to establish an order of priority for action items, as there are sure to be quite a few of them. When formulating your SMART objectives, take care to specify what needs to be done in the short, medium and long term.

For example, to return to the example of increasing the surface area of protected woodland, the actions could be broken down as follows:

Actions	Priority level
Identify high ecological-value private and public forests in the municipality.	2024-2025
Examine the possibility of acquiring certain strategic woodlands.	2026
For private land, enlist a private land conservation organization to approach landowners.	2026
For public land, evaluate the possibility of putting protection measures in place that are recognized by the Québec government and allow for long-term protection.	2027-2028
Introduce eco-tax measures to encourage owners to conserve and improve their forests.	2029
Raise awareness among the residents of the municipality concerning the benefits of forests and woodlands and the importance of protecting them.	Ongoing

#### Objective: Increase the surface area of protected woodland by 10% by 2030.

Finally, you will need to decide on some benchmarks that can help you determine whether you've achieved your objectives, and make some adjustments along the way, if need be. Using our example, you could calculate the surface area of protected woodland to see if it has actually increased by 10%. It's important to choose a limited number of benchmarks that your municipality and stakeholders will have the technical and financial ability to track. When pursuing long-term objectives, it can be useful to set interim targets. Taking our example of protecting woodland once again, you could aim, say, for a 5% increase by 2025, and a 10% increase by 2030.

#### **SMART Method**

#### Set goals in a way that makes them easier to attain



#### c. Measure the social acceptability of the action plan

One of the most important determining factors for social acceptability is the participation of local residents and stakeholders in decision-making. If you have organized activities involving citizens throughout the process, such as a participatory mapping workshop and a SWOT exercise, chances are your action plan already reflects the concerns and needs of the local population. You can confirm this by presenting your action plan at a consultation meeting or online. Listen to the questions and comments, and take the time to provide the necessary explanations and clarifications.

As a result of the consultation meeting, adjustments may need to be made to your action plan. If so, announce the changes and present the new version of the plan to the public to let them know that their voices have been heard.



## 6. Implement the selected nature-based solutions

At this stage, the project lead's role becomes that of coordinator. It is up to this person to align the efforts of the various players, ensuring that everyone takes ownership of their own role in order to meet their objectives. Using your action plan as a roadmap, they see to it that the benchmarks are achieved. In a way, they become the captain of the ship that they must guide safely to port.

Just as support from professionals may have been needed in the planning phase, it may also be required during the implementation phase. Depending on the field, and the scale and scope of the chosen solutions, outside expertise or advice could prove invaluable.

#### a. Establishing monitoring systems

The action plan doubles as a monitoring tool. The status of actions (completed or not completed, in progress) and key performance indicators must be updated periodically. It is up to the project lead to see to this. The members of your multi-stakeholder committee must have access to the action plan and its current progress status. Today, some cities even share the progress being made on certain action plans in real time on their websites, so that the public can also see how work is coming along.

Periodic follow-up meetings of the multi-stakeholder committee should be held to assess the progress of the action plan, to enable those responsible for implementing it to describe the constraints and obstacles they encounter, and to highlight successes. These meetings can be used to adjust the action plan, shift responsibilities and make decisions. It's also an opportunity to show how far you've come towards achieving your objectives, to make sure everyone stays on course, and to reiterate your shared vision.

#### b. Assessing impact and updating tools

Follow-up meetings serve to assess progress status and keep everyone on course, while debriefing meetings serve to measure 1) the impact of the process and 2) situational changes.

### Impacts

Some impacts will be predictable and easy to spot, others will be unexpected or more subtle. What are these impacts? How do they influence the process and the social acceptability of nature-based solutions? These questions need to be discussed with your multi-stakeholder committee, and you should also sound out the public opinion.

Once again, consider the hypothetical aim of increasing the surface area of protected woodland by 10%. Let's assume that influential landowners have chosen to opt for voluntary conservation, and that they have created a groundswell of support from other landowners. In this situation, the action plan could be adjusted to include, for instance, creating a body mandated to facilitate conservation, such as a conservation trust. On the other hand, if this enthusiasm among landowners prompts them to reforest agricultural land, you will need to readjust your approach to preserve the dynamic agriculture so essential to communities.

## Situational changes

Regulatory changes, the emergence of new players or new funding opportunities, etc., could create conditions of possibility for certain nature-based solutions that were not initially contemplated, or rule out certain solutions that were being considered. If there are obstacles to contend with, you should try to identify and analyze them and consider whether there are measures not currently included in your action plan that should be added with the aim of surmounting the obstacles in question.

To return to our example of the 10% increase in the surface area of protected woodland, let's imagine that there has been a change in ownership of some major woodlots. Perhaps they had been owned by individuals who had not used them for decades and they were suddenly sold to real estate developers. In that case, it would no longer be a priority to approach the owner to discuss voluntary conservation, but perhaps instead to take action with respect to zoning, adopting regulations regarding the percentage of trees to be retained during housing development, and so on.

To act in a deliberate and thoughtful way, you must remain aware of and sensitive to the impact of your initiative and to changes of circumstance. You will need to update the description and assessment periodically as well as the action plan to reflect the current situation. This will ensure that your approach remains relevant.



# Publicizing your achievements

The success of and support for nature-based solutions depends not only on political will, but also on rallying the forces of civil society. Clearly communicating the benefits of protecting, sustainably managing, and restoring natural environments is crucial to ensuring that people understand, support, and engage in the process. In addition to getting reports on future undertakings or completed work, people need to be made aware of the richness of their municipality's natural environments and to feel that these local projects matter to them.

# Raising public awareness of your municipality's natural environments

When a natural environment in your municipality or RCM looks like a promising site for a naturebased solution, start by promoting this natural environment. Local residents need to be aware of its existence and what makes it attractive and they should ideally know where it is located. Promotional efforts should pique people's curiosity about the natural environment and make them want to visit it and get to know it better.

In your communications about a particular natural environment, start by referring to its commonly used name, talk about what type of environment it is, and indicate its location—using a map if possible. Then explain the ecological significance of this natural environment or of the nature-based solutions being considered. Finally, if the natural environment has played a key role in your municipality's history, mention it: people respond to stories. Since your communications are aimed at a general public, it's vital that your message be accessible. Scientific content must be presented in layman's terms to be understood. Make sure the sources you draw on to describe the ecological significance of the natural environment are accurate and reliable. Refer to the description and assessment of your area if one has been produced.

#### Municipal e-newsletter

Your municipal newsletter addresses an engaged audience in your community. You can include a paragraph or two on a noteworthy natural environment, along with a photo to promote it or to inform the community of upcoming events.

#### **Municipal print newsletter**

Usually published and distributed monthly, your municipality's print newsletter is a great way to reach a wide audience. You can use a detailed, illustrated article to promote one of your municipality's natural areas. Try to include as much useful information as possible to educate citizens about the natural environment.

#### Social media

Social media are a showcase for your municipality, serving to inform the public and celebrate what makes your area unique and appealing. Put social media to good use by sharing photos of your natural environments. You can schedule several posts in advance to generate and maintain interest.

# Fostering a sense of connection to the natural environment

To cultivate the community's attachment to a natural environment, local residents must be able to have positive experiences there and be aware of everything it has to offer, both in general and specifically in terms of fighting climate change. Your municipality can contribute to fostering this bond by planning activities or initiatives that encourage and facilitate visits to this natural area, as well as by promoting its benefits and services.

A note of caution: to maintain credibility, it's imperative that the sources you use are reliable and verifiable. Regional bodies such as regional environment councils (*Conseils régionaux de l'environnement- CREs*) can help you fact-check or make suggestions. If you have the resources, you can even collaborate with these organizations to conduct a public awareness campaign.

#### **Organizing events**

When organizing an event in a natural environment, be sure to highlight the benefits of the site as well as the positive impact of the proposed nature-based solution, regardless of whether the event concerns environmental issues. If the natural environment is privately owned, organizing the event jointly can be a good way to start a discussion of the project and the public's interest in the site. Take care to ensure that visitor traffic and event facilities do not damage the environment or its vegetation.

#### Street furniture

Developing spaces where people can enjoy the natural environment can promote the use of the site. Furniture and services enhance accessibility and comfort. However, you must ensure that the choice and installation of furniture are not at odds with the aims of your nature-based solution.

#### Sharing images on social media

Don't forget to reach out to the community for photos and videos, either via comments or email. This will reflect residents' sense of belonging to their local natural environments.

# Caring for the municipality's natural environments

Finally, of course, you will need to address the nature-based solution you want to introduce. Announce your plan to take action, as well as the next steps in making the project a reality. For greater visibility, time your announcement to coincide with a meaningful date:

- World Wetlands Day: February 2
- International Day of Forests: March 21
- Earth Day: April 22
- International Day for Biological Diversity: May 22
- World Environment Day: June 5

There are countless opportunities to get people involved in your nature-based solution: give them a chance to contribute or even to take initiative by letting them know how they can participate. When people do get involved, be sure to acknowledge their contributions—for example, during a volunteer celebration or at the project's inauguration.

Make sure your publications alternate between focusing on the project's co-benefits, the ways to get involved, and the benefits of nature-based solutions. Communications are often most effective when they involve personal accounts or success stories about similar projects.



#### **Press releases**

Press releases are a tool for announcing noteworthy or topical news and events. The launch of a project or the achievement of a project milestone are both good examples of news that may warrant a press release. There is a standard format for press releases. Make sure you follow it and that you provide quality information so that it will receive widespread media coverage. Many templates and tips can be found online.

#### Websites

Your website should contain information concerning reference materials and the details of your project. The people who visit these pages will be looking for answers to their questions: explanatory content on nature-based solutions, information about the selected natural environment and the benefits of the project, the work schedule, resource people to contact, and how to get involved. This information should be suitably classified in the menu. You should include a section for frequently asked questions FAQ) and verify that the search tools yield specific results.

#### **Printed matter**

When used in the right way, print communications can be an effective tool for reaching your target audience with a standardized presentation. A campaign using print media (leaflets, posters, flyers, letters) or door-to-door canvassing to inform or rally support from local residents can be very useful in the event that people living near the natural environment in question are likely to experience significant changes as a result of the project. Faceto-face visits and personalized mailings are good ways to demonstrate that the process is consultative. Your print communication should be quick and easy to read, visually appealing, and provide clear contact information in case the reader has questions.



# Municipal by-laws for nature-based solutions

#### Disclaimer

This section of the guide does not contain legal or professional advice. It is intended to provide elected officials and municipal employees with general legal information and avenues for action applicable to Québec municipalities and current at the time of publication. The advice of qualified legal counsel should be sought before adopting any of the suggestions contained in this section.

Modifying by-laws is an effective method for municipalities to make significant changes in the area of environmental protection, including promoting sustainable development, at little cost to them. Municipalities should not hesitate to use by-laws to protect their land and natural environments. It is within their powers and jurisdiction to take action on environmental issues, as set out in section 19 of Quebec's *Municipal Powers Act*.

Nevertheless, making such changes may require a good deal of determination and political will, as the municipality must agree to "rethink and modify our organizations, behaviour, institutions, and our approach to economic development, because we cannot change the laws of physics, chemistry, or biology."<sup>1</sup> Of course, these changes may meet with some resistance from people who gain advantage from our current models of development. It is undeniable, however, that there is growing support for such changes given the urgent need to take action on climate change.

For example, at the time of this writing, the Ministère des Affaires Municipales et de l'Habitation (MAMH, department of municipal affairs and housing) is about to adopt new government land-use planning guidelines that will include ecosystem conservation and adaptation to climate change. They are important because they are the main guidelines for the land use and development plans of regional county municipalities. Ultimately, your municipality's master plan and associated by-laws will have to be consistent with your RCM's land use and development plans and its guiding principles. In other words, through these new guidelines, the government will now require municipalities to factor ecosystem conservation and climate change adaptations into their planning and by-laws. This is a big step forward!

Here are four suggested steps for using by-laws to support the implementation of nature-based solutions:

# 1. Amend your municipality's master plan

Your municipality's master plan is the key document when it comes to protecting natural environments. It outlines a municipality's vision of development for present and future generations. It is essential for this official document to spell out the municipality's plans with respect to sustainable development, protecting biodiversity and natural environments, and combatting climate change, since the master plan serves as the basis for all the various urban planning by-laws. The municipal council relies on this tool when making decisions concerning the development of its territory.

For example, a special planning program (*programme particulier d'urbanisme*) is a component of a master plan that applies to a sector requiring special attention, such as a new residential development or the downtown core. It is a detailed plan that may include land-use designations, types of infrastructure and where they are located, traffic routes, and zoning and subdivision bylaws, among other things. Special planning programs can also apply to natural environments; if construction projects are undertaken in these sites, we ensure that the protection of woodlands, wetlands, lakes, and waterways takes priority.

<sup>1.</sup> The municipality of the Canton de Lochaber-Partie-Ouest's master plan by-law *Règlement numéro 350-2020*. In this guide, we will often cite this by-law, as it is an example of how a municipality has gone above and beyond the usual urban planning regulations, making major changes to its by-laws to ensure sustainable development of its territory and preserve both the environment and the quality of life of its citizens. As the by-law has not been translated into English, all translations here are our own.



#### Example

The new master plan of the municipality of the Canton de Lochaber-Partie-Ouest, with its bylaw <u>Règlement numéro 350-2020</u>, comes out strongly in favour of sustainable development. It recognizes that quality of life is intrinsically linked to the protection of the environment and of biodiversity, as well as affirming the importance of protecting landscapes, farmlands, and forested areas. In particular, it provides for the creation of new conservation areas to establish ecological corridors.

## 2. Adopt policies, statements, and plans

A policy is a set of statements of principles, values, and intentions. It provides broad guidelines that serve as the basis for municipal decision-making and action. Policies are often accompanied by action plans to support the implementation of the vision reflected in the policy. Many municipalities have adopted environmental policies and action plans.

#### **Tree Policy**

A tree policy generally aims to rally all stakeholders and the municipality's residents around a shared vision of the benefits of trees for all. It often affirms the municipality's commitment to protecting its existing trees and increasing existing forest cover in order to mitigate and adapt to the effects of climate change. A growing number of municipalities have a tree policy, including <u>Rivière-du-Loup</u>, <u>Granby</u>, <u>Drummondville</u>, and <u>Saint-Jean-sur-Richelieu</u>, to name just a few. Most of the by-laws and municipal documents cited in this section are available in French only, although the English is linked to whenever it is available.



#### **Environmental policy**

In 2010, the City of Varennes adopted an <u>environmental policy</u>. This policy provides for mechanisms to preserve, restore, and enhance the environment, and to ensure the municipality's sustainable development. The City of Varennes has devised various action plans to support its environmental vision, including a GHG reduction plan and a climate change adaptation plan.

#### Climate change adaptation plan

The Municipality of L'Islet has adopted a <u>climate change adaptation plan</u>. The plan takes stock of the risks associated with climate change and commits the municipality to taking 32 actions to reduce those risks and promote resilience.

#### Virage Vert action plan

The City of Prévost has adopted an ambitious action plan, the <u>Virage Vert de Prévost - Plan d'action</u> <u>2019-2023</u>, which includes many measures. It provides for a conservation approach to natural environments and wetlands, beginning with mapping ecosystems, forest stands, and at-risk species, as well as defining areas for protection, including buffer zones.

#### Sustainable development policy

The municipal council of the Canton de Lochaber-Partie-Ouest has adopted a <u>sustainable</u> <u>development policy</u> clearly stating that its day-to-day decision-making process will be guided by sustainable development and the systematic application of the 16 principles of the *Sustainable Development Act*, adopted by the Québec government in 2006. This policy also stipulates that the Township will act in accordance with the principles of responsible and transparent governance, inspired by the ISO 26000 standard. The municipality has also adopted a declaration for a healthy environment, the *Déclaration municipale pour un environnement sain*, which "affirms its citizens" rights to a healthy environment and undertakes to ensure the environment is respected, protected, and promoted."

The City of Saint-Lin-Laurentides has adopted a <u>sustainable development policy</u> that identifies six priority areas: land use planning, sustainable mobility, agriculture, biodiversity, water resources, and waste management. For example, one of the priority actions is to adopt stricter regulations for riparian buffer strips in agricultural areas and to provide support and compensation to farmers who install larger strips.

## 3. By-law amendments

The next step is to adopt new by-laws or amend existing ones to reflect the master plan and the policies adopted. Section 113 of the *Loi sur l'aménagement et l'urbanisme* (Act respecting land use planning and development) specifies the provisions that can be adopted by a municipality, including zoning, subdivision, and construction by-laws.

Examples of these changes are presented below.

#### a. Land development and protection of natural environments

#### Factoring the natural environment into development

In its zoning by-law <u>Règlement de zonage 351-2020</u>, the municipality of the Canton de Lochaber-Partie-Ouest requires that a biological characterization study be carried out before any subdivision or building permit is issued. The firm chosen to conduct the study must be accredited by the municipal council. Thus, wetlands and water environments, at-risk species, and exceptional ecosystems are documented, and the urban planning advisory committee specifies how to site buildings to reduce the impact on biodiversity and adequately protect ecological corridors and other environments.

#### Protecting forest cover

The Municipality of Saint-Roch-de-Richelieu has amended its subdivision by-law <u>Règlement</u> <u>419-2022</u> to force real estate developers to preserve more wooded areas in their development projects, increasing this figure to 20% from the previous 10%.

The Municipality of Stoneham-et-Tewkesbury has amended its zoning by-law through <u>Règlement 22-926</u>, which requires a certain percentage of shrub or tree area to be preserved, depending on the size of the residential lot.

The municipality of the Canton de Lochaber-Partie-Ouest adopted a zoning by-law, <u>Règlement</u> <u>de zonage 351-2020</u>, which requires rear, lateral, and front setbacks to be maintained or implemented in order to protect forest cover and ensure ecological corridors are maintained or restored.



#### Protecting wetlands and watercourses

The municipality of the Canton de Lochaber-Partie-Ouest's zoning by-law <u>Règlement de</u> <u>zonage 351-2020</u> comprises several measures to protect wetlands and bodies of water. These include making it mandatory to respect the topography of the natural environment when siting a main or accessory building and to maintain minimum riparian buffer strips (15 - 23 metres), in addition to prohibiting excavation and backfilling in wetlands and within the 15-metre riparian buffer strip and prohibiting construction in the 0-100-year flood zone.

The Municipality of the Township of Gore's zoning by-law <u>Règlement de zonage 214</u> provides for a minimum 15-metres shoreline along wetlands and watercourses. Similarly, any new construction must be set back more than 20 metres from wetlands and water environments, in accordance with <u>siting</u> <u>regulations in the zoning grid</u>.

#### **Protecting ecological corridors**

In its land use and development plan, the Laurentians RCM uses the "biodiversity corridor" land-use designation to maintain the habitat of the white-tailed deer for the long term. The City of Mont-Tremblant (*Règlement de PIIA (2008)-106*) and the Municipalities of Lac-Supérieur (*Plan d'urbanisme Règlement 2015-558*) and La Conception (*Règlement relatif aux permis et certificats 11-2006*) have all introduced regulatory measures consistent with the land use and development plan to protect the habitat of the white-tailed deer through a network of wildlife corridors.

Lochaber-Partie-Ouest's subdivision by-law <u>Règlement de lotissement 353-2020</u> for inhabited areas sets minimum lot dimensions to maintain ecological corridors, and its zoning by-law <u>Règlement de zonage 351-2020</u> creates forest areas and non-residential areas. This maintenance of the forest cover allows for the protection of groundwater supply, water networks, and wetlands on properties by reducing housing density.

#### b. Trees and greening

#### Felling and planting standards

In its zoning by-law <u>Règlement de zonage 77-2004</u>, the City of Nicolet sets out the circumstances in which a tree may be felled and states that its replacement is mandatory. This by-law also indicates the minimum number of trees that must be maintained on any lot, whether residential or commercial. While several municipalities have such requirements, Nicolet stands out for the large number of trees required on each property. For example, a detached single-family residence must have two trees in the front yard and four trees in the back yard.

#### Protecting trees during construction work

The City of Pointe-Claire has adopted site planning and architectural integration by-law <u>Règlement sur les PIIA PC-2787</u>, which sets out provisions for protecting the best wooded areas and trees on a property when a building is sited. The same by-law requires the preservation of the natural grade around existing mature trees.

The Municipality of Saint-Bruno-de-Montarville, in its zoning by-law <u>Règlement de zonage</u> <u>URB-Z2017</u>, requires that protective measures be taken during the construction of a new building or the extension of an existing building to protect and conserve the existing trees on the lot, including the erection of a temporary fence of at least 1.2 meters in height.

The Canton de Lochaber-Partie-Ouest has also set standards for the felling and planting of trees in its zoning by-law <u>Règlement de zonage 351-2020</u>. Interestingly, the Township's by-laws clearly state that only plants, shrubs, and trees native to the Outaouais region are permitted on its land (<u>Règlement 365-2021</u>), in order to minimize the spread of invasive species.

#### **Contribution for parks**

Under Québec's Act respecting land use planning and development, municipalities can require a contribution for parks, thereby expanding green space. The owners undertake either to transfer 10% of the surface area of a lot or to pay 10% of its value on the assessment roll. Several municipalities have included this measure in their subdivision by-laws, such as Thetford Mines (*Règlement de lotissement 149*), Boucherville (*Règlement 2018-292*), Rimouski (*Règlement de lotissement 781-2013*), and the Canton de Lochaber-Partie-Ouest, to name a few. It is worth pointing out that this is a way to acquire natural spaces at no cost.

#### Is there a real risk of disguised expropriation?

Some municipalities may be reluctant to use some of these tools. In recent years, several cases have pitted municipalities that amended their by-laws in order to restrict urban development against developers and property owners who felt their property rights were being infringed.

However, Bill 39, passed in December 2023, is a game changer. It amends the Act respecting land use planning and development by adding section 245, which states that an infringement of property rights is deemed justified if the by-laws adopted are intended to protect wetlands and bodies of water or an environment of high ecological value. This section therefore makes it possible to rule out disguised expropriation when a municipality amends its zoning and its by-laws for conservation purposes, in compliance with the conditions provided for in the Act respecting land use planning and development.

What's important to retain here is that there are often ways to achieve desired results through by-laws, but care must be taken to obtain the legal advice necessary to plan them. To this end, you can make use of the Quebec Environmental Law Center's enviro hotline or the legal affairs department of the Union des municipalités du Québec, which offers a certain number of hours of free legal advice free of charge to its members.

### 4. There's more! Amending your code of ethics

Inspired by the conclusions of the Commission of Inquiry on the Awarding and Management of Public Contracts in the Construction Industry, commonly referred to as the Charbonneau Commission, the municipality of the Canton de Lochaber-Partie-Ouest has modified its code of ethics (*Règlement* <u>381-2022</u>), to ensure that real estate development projects are handled with full transparency. It now prohibits city council members from holding meetings with developers, contractors, and lobbyists. Projects must be presented at a public meeting. In addition, this amendment precludes influence peddling when by-laws are amended to address the environment or sustainable development.

#### Toolbox

(available in French only)

- Obiterre: free, plain-language legal information bank from the Québec Environmental
   Law Centre
- <u>Guide pour les municipalities: s'adapter au climat par la réglementation</u> from the Union des Municipalités du Québec
- La connectivité écologique pour les municipalités from the Québec Ecological Corridors
   Initiative
- La connectivité écologique pour les MRC from the Québec Ecological Corridors Initiative s

# Sources of funding for your municipality

On top of staffing issues and a lack of support from some groups, lack of funding is a major barrier to implementing nature-based solutions. While it's rare to find funding specifically targeting nature-based solutions, many funding sources can be used for some nature-based solutions. These include partnerships with local organizations; tools specific to municipalities, such as green taxation; government programs for mitigating and adapting to the effects of climate change; and funds established by private foundations.

# The power of partnerships

There is a wealth of funding available to address environmental issues and facilitate adaptation to the consequences of climate change, but this funding is not necessarily available to municipalities. However, it may be available to environmental organizations in your area, such as regional environmental councils and *organismes de bassin versant* (OBVs, watershed organizations). Accordingly, the working relationships you build through multi-stakeholder committees are of paramount importance. Nature-based solutions must be planned in partnership with stakeholders; for example, your municipality can act as a partner in a project spearheaded by another organization in your area.

For nature-based solutions in agricultural areas, you could work with agri-environmental advisory groups, for instance, watershed organizations, or other agronomic consultants who have access to funding programs offered by the Ministère de l'agriculture, des pêcheries et de l'alimentation (MAPAQ), such as <u>Prime-Vert</u>. The umbrella organization for watershed organizations, the Regroupement des Organismes de Bassins Versants du Québec (ROBVQ), also administers funds to support agricultural practices that improve watercourse quality. If the <u>Alternative Land Use</u> <u>Services</u> (ALUS) program exists in your area, you can include the Partnership Advisory Committee that manages the program locally. Finally, the farmers' federations of the union of agricultural producers, the Union des Producteurs Agricoles or UPA, as well as Agriculture and Agri-Food Canada sometimes have funding programs to encourage agri-environmental or biodiversity initiatives.

As for nature-based solutions involving forests and woodlands, there are many possible partnerships. You could partner with your region's *Agence Régionale de mise en valeur des Forêts Privées* (regional agency for the development of private forests), which provides funding to forest operators under various conditions, including some related to biodiversity management. You could also join forces with a private landowners' volunteer conservation organization or collaborate with your regional environmental council on greening projects and canopy enhancement projects.

Partnerships with conservation organizations are definitely worth exploring for private land protection. To find the conservation organizations in your area, check the directory of the

<u>Répertoire des sites de conservation volontaire du Québec</u> (created by the Réseau de milieux naturels protégés), which lists protected sites and conservation organizations working in most parts of Québec.

These are just a few examples of possible partnerships. Use your imagination!

# Tools specific to municipalities

#### **Green taxation**

Green taxation refers to economic or fiscal measures designed to improve environmental protection by changing the cost-benefit incentives associated with individual or corporate behaviour.

Drawing on the "polluter pays" and cost internalization principles, the most effective green taxation measures attach an additional cost (malus) to behaviours they are intended to modify, and use the revenue generated to reduce the cost of alternative solutions or to encourage beneficial behaviours (bonus).

Several municipal powers can be used for green taxation purposes (see Rates below), but two in particular hold potential for encouraging the implementation of nature-based solutions; these two powers stem from the *Loi des cités et villes* (*Cities and Towns Act*) and the *Municipal Code of Québec*.

#### General taxation power

General taxation powers allow municipalities to adopt a by-law imposing any municipal tax that complies with the limits and conditions set out in the *Cities and Towns Act*. Briefly, this tax cannot be indirect, cannot be imposed on the State or one of its mandataries, and cannot apply to an item excluded by the *Act*. Items excluded by the *Act* include, but are not limited to, the provision of goods or services, income, wealth, and natural resources. Revenues from such taxation go into general coffers, but municipalities can commit to using them to create a bonus.

#### Real life examples of green taxation

**City of Montréal**: The city has imposed a tax based on parking lot size in certain neighbourhoods, thus encouraging alternative land use (i.e., reducing the land area devoted to cars).

**City of Varennes:** The City has created a financial reserve for a green fund to finance environmental projects such as nature-based solutions. This fund is financed by allocating a portion of the profits from the sale of any building owned by the City and, since 2023, by an environmental tax levied on all taxable buildings on the territory.

**Examples of green tax applied to nature-based solutions**: Using the revenue from a tax on properties based on the canopy index to subsidize tree planting.



#### The power of regulatory dues

The regulatory dues power in Québec's municipal code allows municipal authorities to charge dues to help fund a regulatory regime and to influence citizen behaviour to achieve the objectives of the regime. The potential for green taxation is clear, given that the law allows dues to be used to influence behaviour. As the dues must be linked to a regulatory regime, the municipality must have jurisdiction over the matter in question, and the revenues must be paid into a fund exclusively for this regime. Just as for general taxation powers, dues cannot be imposed on the state or one of its mandataries and cannot apply to items excluded by the law. Although the items excluded from taxation and dues are similar, dues can apply to supplying a good or service and to the presence of an individual in the municipality's territory.

#### Real-life example of green taxation

**City of Prévost** : The City imposed dues on certain single-use products, with revenues paid into a fund for responsible consumption.

**Example of dues applied to nature-based solutions**: a water management regime that imposes dues on impervious surfaces and finances the restoration of wetlands known for their water holding capacity.

#### • Practical challenges of green taxation

To ensure the viability of by-laws that impose a tax or dues on property owners based on the natural characteristics of their lot, the municipality must have access to sufficiently accurate and reliable data. Given the limited human resources and the number of buildings potentially affected, it may be difficult to rely on site visits. In this case, geometric data is the most effective alternative, but this method incurs significant costs, especially if laser remote sensing images are required; this may be a particularly significant barrier for smaller municipalities that lack the human and financial resources to acquire and process such data.

Finally, the green taxation measure must be coherently integrated with the municipality's other policies and by-laws for it to influence behaviour and be socially acceptable. For example, if a tax on impervious surfaces is intended to reduce the ecological footprint of new constructions, is it reasonable for the municipality to impose a minimum number of parking spaces on the project? Similarly, the municipality must be exemplary in designing its own buildings when imposing a tax or dues on such behaviours. The fairness and the social acceptability of the measure depend on it.

### Rates

Rates are based on the user-pays principle. A municipality has the power to charge a fee to anyone who uses any of its goods, services, or activities. In particular, the municipality has the power to charge different rates to different users; for example, to charge non-resident users when they use certain services.

**Real-life example applied to nature-based solutions:** The municipality of Stoneham-et-Tewkesbury gives residents free access to the Mont-Wright old-growth forest park but charges a fee to non-resident visitors.

### Government programs

The provincial and federal governments regularly set up funds and programs to help achieve their objectives. As these funds and programs change over time, we won't list them here. However, keep an eye out for Environment and Climate Change Canada (ECCC) and its <u>Nature Smart Climate Solutions</u>. <u>Fund</u>. Other federal departments, such as Infrastructure Canada and Natural Resources Canada, may administer funds that could be relevant to financing nature-based solutions.

At the provincial level, keep an eye on the Ministère de l'Environnement, de la Lutte contre les Changements Climatiques, de la Faune et des Parcs and the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec to keep abreast of possible funding for nature-based solutions. Your regional county municipality (RCM) may also set up a fund to help achieve specific objectives within its territory. Don't forget to check with your RCM for opportunities!

# Foundations and programs

Many foundations provide funding for projects related to the fight against climate change and protection of biodiversity. They all have their particularities, of course, and the eligibility criteria can vary. Here are a few examples:

- <u>Green Municipal Fund</u>: This fund finances local sustainable development projects that enable municipalities to accelerate their adoption of climate solutions, in areas such as land use and water, among others. Consult its online <u>funding opportunity finder</u>.
- <u>Municipal Fund for Biodiversity</u>: This fund is intended for municipalities that commit to putting money aside to protect biodiversity. Its aims are to increase protected areas, reduce habitat degradation, enhance biodiversity and protect species-at-risk.
- <u>Fondation de la faune du Québec</u> (Québec wildlife foundation): It runs several financial assistance programs that can provide support for implementing nature-based solutions such as the Programme de mise en valeur de la biodiversité en milieu agricole (promoting biodiversity in agricultural areas) and the Programme Hydro-Québec pour la mise en valeur des milieux naturels (promoting natural environments).
- <u>Collective fund for climate and ecological transition</u>: This fund is managed by the Foundation of Greater Montréal. It is dedicated to combatting climate change, strengthening environmental resistance, and accelerating the ecological transition. One of the fund's components targets initiatives dealing with adaptation to climate change, protection of natural environments, greening and natural infrastructures.
- <u>Programme d'interactions communautaires</u> (community interaction program): This program supports the implementation of ideas for community projects aimed at conserving the biodiversity of the St. Lawrence, promoting its sustainable use, and improving its ecosystem and water quality.
- <u>Plein aire project</u>: Coordinated by the Société pour la nature et les parcs (SNAP Québec -CPAWS Québec), it seeks to support the creation of protected areas and ecological corridors on public land, working closely with local stakeholders to make the link between the protection of natural environments and access to nature.



# Conclusion

The steps and tools presented in this guide to help Québec municipalities use nature-based solutions to reduce greenhouse gas emissions and mitigate climate change are only a basic foundation. Local or regional municipalities that wish to undertake such a project must adapt those steps and tools to fit their own scale and respond to their own realities and issues.

There are many different types of nature-based solutions to choose from, but the steps and tools for implementing them are all informed by the same essential guidelines that are designed to help avoid the trap of greenwashing. By drawing on the International Union for Conservation of Nature's global standard for nature-based solutions and by creating a representative and active multi-stakeholder committee, you will be well placed to propose solid and relevant naturebased solutions, and ensure that the governance of your project is inclusive and transparent. It is admittedly a demanding process, but investing in it will help you fight climate change and adapt to its impacts, in addition to addressing cross-cutting issues such as biodiversity and health and public safety thanks to the co-benefits of nature-based solutions.

Municipalities that implement nature-based solutions will be helping to ensure a quality living environment not only for their local residents, but also for all the other inhabitants of our planet and for future generations. We hope you found this guide inspiring, and that it will support you in the process you are about to embark upon.

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