PRIORITIZED ISSUES FOR 2024-2034

Competing water uses

ORGANISME
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de la rivière du Nord



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1. Factual description

1.1 Several types of water resource use recorded in the ZGIE

The total population of the Integrated Water Management Zone (ZGIE) is estimated at 206,680 inhabitants (Statistics Canada, 2016). The permanent and secondary (vacationers) populations are estimated at 180,331 inhabitants and over 26,000 inhabitants, respectively. At times, the vacation population represents over 50% of the total population in certain municipalities in the ZGIE. Vacation residences are most often located along watercourses and bodies of water. Light urbanization can be found on the shores of some lakes (e.g., Lac Saint-Joseph, Lac Masson, Lac Raymond, etc.): density is increased, lots are often small, impermeable surfaces (roofs, asphalted surfaces, etc.) are numerous, and sanitary facilities are located near bodies of water (Abrinord, 2023). Many buildings do not meet standards related to riparian buffers and septic systems, as they predate current regulations.

The total population growth rate of the municipalities in the ZGIE was 8.8% over 2011-2016 — well above the provincial average (MEI, 2020; Statistics Canada, 2018). This population is supplemented by tourists and workers who do not reside in the region but may also play a key role in the use of water resources.

1.2 Quantity

Withdrawers

Water supply is the main use of the resource in the ZGIE. Several industries are supplied by ground and surface water. A total of 18 municipalities have a water distribution network located within the ZGIE. Over 150,000 people are estimated to be supplied with potable water from a municipal ground or surface source. In addition to municipalities, there are some one hundred active water withdrawal sites for commercial, industrial, and agricultural businesses (MELCCFP, 2022b). A number of recreational and tourism businesses are also known to be major water withdrawers, such as golf courses, wellness centres, and ski/tubing parks. Unfortunately, the total volume of water withdrawn by the agricultural sector is unknown. Water withdrawals can be used for crop irrigation as well as animal watering. Around twenty human-made dams in the ZGIE were built to supply a water withdrawal site.

1.3 Quality

Naturally, water use has an impact on its quality. After having used water, therefore, different sectors return it into the environment, often at a lesser quality level than that at which it was withdrawn. Wastewater discharge standards of municipalities, industries, and certain businesses unfortunately allow the discharge of contaminants into the environment. It is important to highlight the role of upstream-downstream dynamics in the use of this resource. The uses of upstream water resources impact those located downstream. Indeed, water quality results for the Rivière du Nord show a gradual degradation of water quality from upstream to downstream (diagnostic report – Poor Water Quality). Bacteriological contaminants may have an impact on health. Water quality results in the ZGIE show concentrations of fecal coliforms which may compromise, at times in certain sectors, recreational uses involving direct or indirect contact. Some public beaches in the region had to be closed due to elevated bacteriological contamination. The Lac Raymond beach was closed again for a few days in 2023 (Peers, 2023).

Sport fish communities can also be affected by emerging contaminants such as organochlorine compounds and polybromodiphenylethers (PBDEs). These products originate from human activities like agriculture and industrial waste. Indeed, PBDEs are more abundant in fish flesh downstream than upstream of urban centres in analyses carried out in the Laurentides and Lanaudière regions (MELCC, 2018a). Mercury levels of natural or anthropogenic origin measured in fish flesh exceed the recommended threshold in 100% of medium and large walleye (MELCC, n.d.).

Some contamination events in water environments may even require municipalities to completely stop water withdrawal and potable water production. For example, in 2022, a hydrocarbon spill into the Rivière du Nord in Val-David caused the closure of municipal wells. The municipality was forced to ask the population to reduce their water consumption to essential uses only for 24 hours (Journal Accès, 2022).

1.4 Accessibility

Several recreation and tourism activities make in situ use of water resources. Activities on lakes and watercourses include swimming, motorized and non-motorized pleasure boating (canoes, kayaks, paddleboards), fishing, outdoor recreation, and aquatic ecosystem observation. In the winter, snowshoeing and/or cross-country skiing as well as mountain biking over frozen bodies of water are also common. Moreover, many recreation and tourism businesses such as wellness centres and golf courses are set up strategically close to bodies of water to offer a pleasant and relaxing setting for their customers. Wellness centres often even include river swimming in their bathing cycle.

Over 370 human-made dams were built to accommodate recreational activities and vacationers in the ZGIE. Arising from massive residential construction along bodies of water, shoreline privatization is a more common issue. Accessibility to lakes and rivers is increasingly difficult for non-shoreline residents. According to a survey carried out by Abrinord in 2016 concerning accessibility in the region, nearly 70% of respondents enjoyed swimming, and the absence of public access to water is a major source of complaints to municipalities. In 2016, 24 public water access points (municipal beaches, campgrounds, resort areas) were listed in the ZGIE (Abrinord, 2016). The number of private beaches offering access to members of a shoreline association or those with notarized access to the lake remains unknown.

The large diversity of activities on bodies of water in the ZGIE may also be problematic (Colpron, 2020). While some want to promote accessibility for all, others fear that they will lose their peace and that water quality and/or ecosystems will be affected by increased traffic. The portrait of accessibility to bodies of water in Abrinord shows that this dichotomy largely opposes shoreline and non-shoreline residents (Abrinord, 2016). In order not to prohibit access but rather reduce traffic at certain water access points, several municipalities have instated rather high daily fees for non-residents (Ville de Sainte-Marguerite-du-Lac-Masson, 2022).

2. Hypothesis of its presence

2.1 Quantity

Withdrawers

Over 160,000 people in the ZGIE are supplied with drinking water from a municipal ground or surface source. An estimated 50,000 people are therefore supplied by individual water sources, most of which are groundwater (wells).

Overall, the zone studied by the Laurentides-Les Moulins PACES (groundwater knowledge project) does not show a water deficit, as precipitation is largely in surplus and evapotranspiration is limited. Actual groundwater withdrawals in the Laurentides represent 1 mm/year – 0.5% of the annual refill (Gagné et al., 2022). The study showed that withdrawal volumes by major withdrawers (+ 75 m³/day) from groundwater in the ZGIE increased from 2016 to 2019, rising from around 11 M m3/year to 17 M m3/year (Gagné et al., 2022).

The availability of surface water is currently high across the watershed (MELCCFP, 2022a). Studies on groundwater in the Laurentides have shown that the potential exchange between ground and surface water is average to high. This indicates either that surface water has mixed into groundwater or that groundwater provides the base flow of watercourses (Gagné et al., 2022). Surface water inflow into groundwater may be permanent or temporary (seasonal). In 2022, a Polytechnique de Montréal report indicated that four municipal groundwater wells in the ZGIE have potential permanent and/or seasonal inflows from Rivière du Nord (Baudron, Labelle, and Masse-Dufresne, 2022).

The fractured rock of the Canadian Shield, which forms a low-productivity aquifer, and the limited coverage of granular aquifers located in valleys cause some areas of the ZGIE to experience water supply difficulties or even be forced to limit their operating flow rates.

Residence times show that, despite the presence of relatively young groundwater (a few decades old), a certain proportion of groundwater may also remain in the aquifer for several millennia, which must inspire prudent resource exploitation.
A CIME FM article published in June 2023 showed that the biggest challenge for the Ville de Mirabel is currently water supply. Indeed, it seems that at the current growing rate of water consumption, water tables will not be able to meet demand in 10 years (CIME, 2023).

Variation in water levels

An adequate water level maintains habitats and biodiversity, in addition to conserving related goods and services, such as water supply for the population and the practice of certain recreational activities.

Certain aspects related to health and public safety may be influenced by fluctuations in water levels (floods, potable water supply, etc.). A major reduction in the water level may hinder water supply. It may also have a considerable impact on the dilution of contaminants and their concentrations in water.

A major rise in the water level may have significant impacts on raw water withdrawal infrastructure in addition to a possible inflow of contaminants.

In 2020, 465 dams measuring at least one metre in the ZGIE were listed in the dam directory of the Centre d'expertise hydrique du Québec (CEHQ) (MELCC, 2021). When the advantages and disadvantages associated with a human-made dam are compared as a function of the upstream-downstream gradient, we find that they benefit upstream populations much more than downstream ones. Close to thirty human-made dams were constructed to regulate variations in water levels, while a dozen was constructed to control floods.

Advantages	Disadvantages
Upstream from the dam	
• Property value associated with water access • Water leisure activities • Potable water reserve or protection against fires	• Ecological impacts
Locally	
• Control flow rates and flood risk • Hydroelectricity generation (in some cases)	• Dam management costs
Downstream from the dam	
• Predictable flow rates	• Ecological impacts • Geomorphological impacts (shoreline erosion) • Impacts on the quality of potable water sources • Risks Associated with Equipment Breakdowns

Figure 1 : Advantages and disadvantages associated with human-made dams (Godin, 2022; Abrinord and RPNS, 2022).

2.2 Quality

Poor water quality may have major implications for health and public safety.

Cyanobacteria

According to a 2019 report from the Institut national de la santé publique du Québec (INSPQ) on health risks associated with recreational water activities, six outbreaks associated with the presence of biological and chemical contaminants in recreational waters took place in the Laurentides between 2005 and 2016 (Huppé, Gauvin, Lévesque, and INSPQ, 2019). Among the biological contaminants, cyanobacteria were detected. Ingestion or dermal contact with the toxins produced by certain species of cyanobacteria may induce health problems (Huppé et al., 2019; INSPQ, 2017). In total, 47 different lakes in the ZGIE were affected at least once between 2004 and 2017 (MELCC, 2018b).

Bacteriological contamination

Raw, ground, or surface water with high microorganism concentrations may pose a significant threat to raw water withdrawal sites for drinking water supply. Drinking water treatment may also become more costly, if not impossible, in cases of elevated concentrations of fecal coliforms.

Emerging and other contaminants

Due to the many human activities in the region, several types of contaminants may be introduced intentionally or accidentally into the environment and end up in water. Unfortunately, although monitored, not all contaminants can be treated in the potable water facilities in place (emerging contaminants, fertilizing matter, inorganic substances, heavy metals, hydrocarbons, etc.). As with biological contamination, drinking water treatment may become more costly when these contaminants are present. For certain contaminants, current technologies are simply unable to treat them.

2.3 Accessibility

Boating

Shoreline erosion from waves or even the speed and number of watercrafts on bodies of water are certainly issues of concern for shoreline residents of the ZGIE. Some municipality and/or lake associations are attempting to regulate certain activities related to boating. Examples of framework attempts include the limitation of wakeboarding to designated zones, speed limits at a certain distance from shorelines, motor size limitations, etc. (Government of Canada, 2023). However, pleasure boating falls under federal jurisdiction and is governed by the Canada Shipping Act. One of the regulations of this Act – the Boating Restriction Regulations – allows various restrictions to be imposed on a river or body of water located in a municipality. In order to benefit from the application of this by-law in one or more bodies of water within its territory, a municipality must clearly identify the problem and attempt to resolve it before applying to Transport Canada (COBALI, n.d.). As the process is very complex, few steps are ever taken and finalized. The lakes in the ZGIE with restrictions are unfortunately unknown. Municipalities and lake associations mostly establish nautical codes of ethics to regulate motorized boating, to which users are encouraged to conform on a voluntary basis, as they are not legally binding (MAMH, 2010).

2.4 Natural environment conservation

The destruction or degradation of wetlands and aquatic environments (WAEs) contributes to the reduction or disappearance of some species in favour of other better adapted species, if not invasive alien species (IAS). In the long term, these biodiversity disruptions may significantly compromise the ecosystem services offered by WAEs. The conservation of natural environments seems to be becoming increasingly important to the population of the ZGIE, as opposed to other uses of the region. Indeed, the destruction and degradation of natural environments have become areas of great concern to the populations of ZGIE municipalities. During a citizen consultation, Ville de Saint-Sauveur citizens raised their concern over intensive development (Goudreau, 2023). Beyond constituting ecological damage, IAS may interfere with recreational fishing and nautical activities and have a negative impact on shoreline property values (Gouvernement du Québec, 2022).

3. General location

Usage conflicts are not recorded exhaustively in the ZGIE. However, the absence of usage conflict location data does not signal an absence of conflict. The multitude of uses across the ZGIE and its diverse group of users may lead to several cases of competing uses. In addition, usage conflicts may be current or potential, i.e., a conflict may arise if a formerly sustainable situation deteriorates (especially in the context of climate change) (Groupe Ageco, 2019).

Usage conflicts may be perceived in two ways: at the local level (body of water, residence, municipality) or at the watershed level. In the Rivière du Nord watershed, which accounts for 97% of the surface area of the ZGIE, upstream-downstream water quality degradation can be observed, and usage conflicts are clearly evident throughout.

4. Causes of the issue

Water is a collective resource. Different uses of water are not prioritized within a legal framework (Marcotte-Latulippe and Trudelle, 2012).

4.1 Agricultural, municipal, commercial, and industrial sectors

Major withdrawers

Major withdrawers of water resources. Use may become competitive due to the variation in the quantities available at certain periods of the year.

Water supply

An essential resource: large quantities of water are withdrawn for human consumption by municipalities and private and autonomous networks. Use may become competitive due to the variation in the quantities available at certain periods of the year.

Shoreline privatization

The urbanization of lake and watercourse shorelines reduces their accessibility. Shoreline development and some recreational activities may contribute to the degradation of water environments (poor water quality, appearance of IAS, eutrophication, etc.). To protect them, certain measures are put in place and may have an impact on accessibility according to individual status (shoreline resident or not, non-residents, etc.) and/or according to the intended use (e.g., boat ramp exclusively for non-motorized boats, private beaches, etc.).

Uses contributing to poor water quality:

All causes of poor water quality in the various sectors are presented in the Poor Water Quality diagnostic report. The deterioration of water quality can impact a large number of uses. Poor-quality water poses a major threat to potable water supply and public health. It can also hinder direct- and indirect-contact recreational activities, also due to public health risks.

Uses that contribute to the degradation/destruction of wetlands and water environments

All causes of the degradation/destruction of WWEs in the various sectors are presented in the Degradation/Destruction of Wetlands and Water Environments diagnostic report. The degradation or destruction of WWEs can have major impacts on several ecosystem services, not to mention usage (e.g., water supply, pollutant regulation, climate regulation, soil morphology, natural habitats, landscape aesthetics). Directly or indirectly, all water stakeholders in the ZGIE can be affected by this issue, which thereby creates a range of usage conflicts.

4.2 Recreation and tourism

Attractiveness of the region

Proximity to Montréal, nature, mountainous backdrops, and recreation and tourism facilities are important attractions that draw a considerable number of vacationers and tourists to the Laurentides each season. In the recreation and tourism sectors of the ZGIE, WAEs are often at the heart of development. Whether for leisure activities or their aesthetic appeal, their uses are numerous.

Multiple uses

In situ uses in lakes and watercourses (swimming, motorized or unmotorized pleasure boats [canoes, kayaks, paddleboards, etc.], fishing, outdoor recreation, aquatic ecosystem observation, etc.). Strategic placement for a pleasant and relaxing environment for businesses (wellness centres, inns, golf courses, etc.). Beyond in situ uses, many businesses are also major water consumers (artificial snow for ski resorts, golf course irrigation, pond filling, etc.).

Human-made dams

A lack of scientific information often prevents stakeholders from understanding the behaviours of watercourses in relation to dam management methods. The lack of communication between dam managers and other stakeholders, the lack of management support, and comprehension difficulties may be sources of conflict affecting the parties.

4.3 Climate change

Climate change could be the cause of many future usage conflicts related to water resources in the ZGIE.

Attractiveness of the region

With the rising frequency of heatwaves and extreme heat events, accessing bodies of water to cool off could also become more common across the ZGIE.

Major water supply withdrawers

The evolution of hydroclimatic conditions is expected to lead to longer low flow periods. Longer dry episodes may strongly affect surface flow rates and the available flow for withdrawal (Ouranos, 2020). Major withdrawers may create additional stress on the quality of the available water – surface and ground – during these periods (Ouranos, 2020). Dry spells may also impact the volumes of water available to dilute wastewater effluent in receiving bodies of water.

Increases in surface runoff (extreme rainfall) and reductions in watercourse base runoff (low flow) may lead to reduced recharge and therefore a reduction in the volumes of groundwater available for withdrawers, including municipalities (Gagné et al., 2022).

Degradation/destruction of wetlands and water environments

Increasing precipitation, extreme climate events, and higher temperatures may promote eutrophication by increasing nutrient inputs and heating surface water. The eutrophication of bodies of water is a phenomenon with an enormous influence on recreational uses such as swimming and fishing (MDDELCC, 2014).

5. Main consequences

5.1 Environmental

The competing uses of water resources can have several environmental consequences:

- Noncompliance with ecological controlled flows
- Deterioration of water quality
- Deterioration of wildlife habitats
- Reduced water transparency
- Rise in water temperatures
- Reduced dissolved oxygen concentrations
- Reduced aquatic biodiversity
- Accelerated aging of bodies of waterNon-respect des débits réservés écologiques

5.2 Economic

- Loss of development opportunities for certain uses
- Significant human and financial resources to ensure continued use

5.3 Social

- Degradation of social cohesion due to non-equitable water access
- High pressure on certain water management stakeholders (e.g., municipalities, governments)
- Lack of trust in authorities that do not support conflict resolution
- Lack of collaboration of certain parties who may feel bullied or without solutions
- Demobilization of certain stakeholder
- Water privatization for some users to the detriment of others
- Loss of uses
- Loss of quality of life
- Risk to health and safety

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