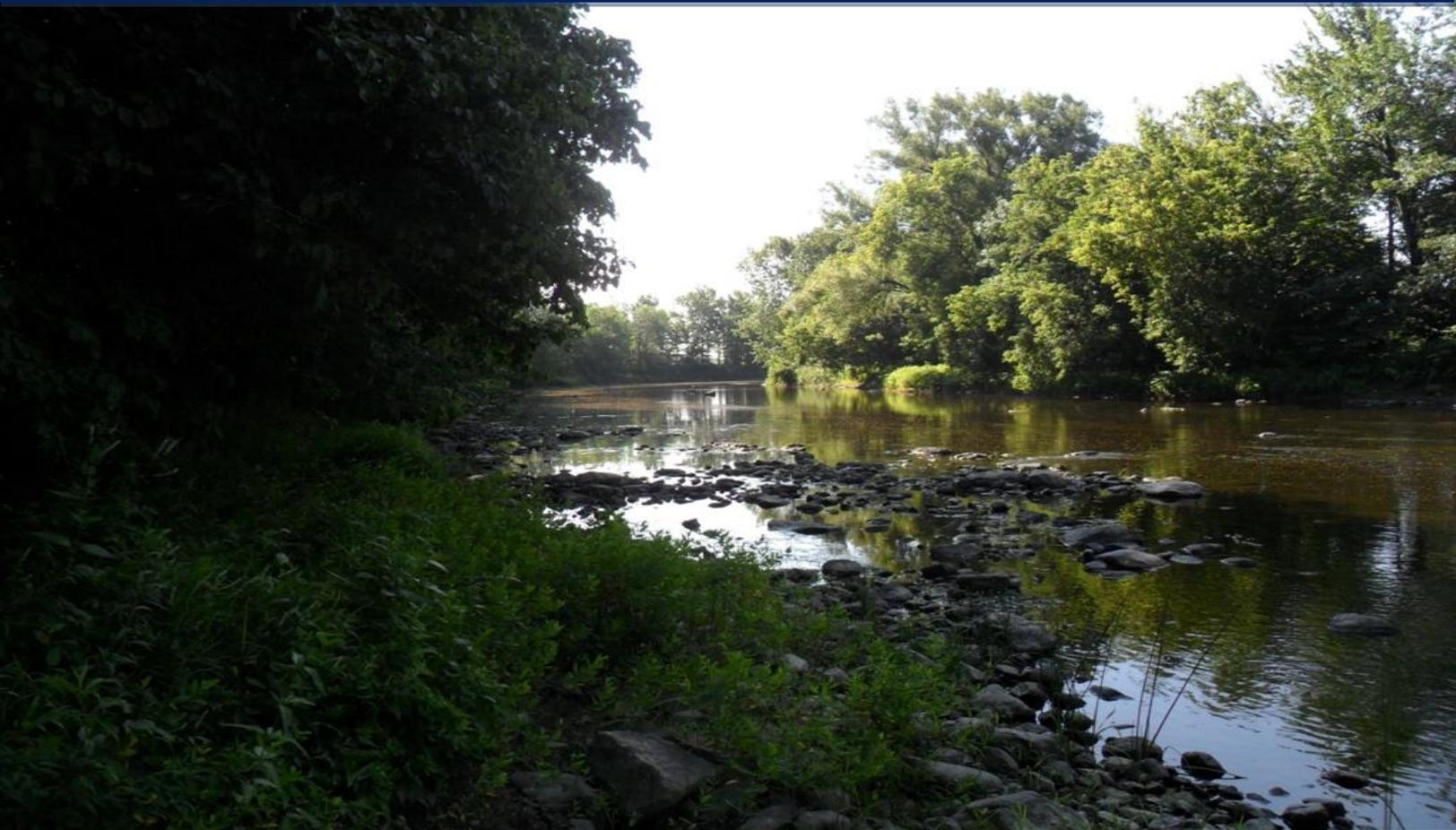


VOLUNTARY CONSERVATION OF THE HABITATS AND BIODIVERSITY OF THE PIKE RIVER

NOTRE-DAME-DE-STANBRIDGE / PIKE RIVER SECTOR



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The Organisme de bassin versant de la baie Missisquoi (www.obvbm.org) receives its power from the Government of Québec under the *Act to affirm the collective nature of water resources and provide for increased water resource protection*. In concert with stakeholders in the field, the OBVBM is mandated to develop and regularly update a water management plan that identifies local issues related to the protection of this resource, with a view to promoting environmental conservation and sustainable development of the region.

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Cover photo: Pike River woodland, OBVBM, 2013

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1 PROJECT CONTEXT

The Organisme de bassin versant de la baie Missisquoi (OBVBM) first launched the **Voluntary conservation of the habitats and biodiversity of the Pike River** project in 2008. It is now in its third phase, covering the final section (downstream and mouth) of the Pike River (*Rivière aux Brochets*)¹: the Notre-Dame-de-Stanbridge – Pike River sector.

Inventories carried out in 2008 and 2010 by the OBVBM covered the sections of the Pike River extending from Frelighsburg (USA border), through Stanbridge East and Bedford (city and township), up to the Notre-Dame-de-Stanbridge municipal limit.

The current document contains data from woodlands along the river, characterized in 2013, in the municipalities of Notre-Dame-de-Stanbridge and Pike River. It includes a portrait of the river and its biodiversity, a survey of the forest communities and vascular plants, amphibians, reptiles and birds located in 2013, descriptions of the species at risk, and recommendations for protecting their habitats.

1.1 PROJECT OBJECTIVES

Protecting river ecosystems is one of the objectives of the OBVBM's water management plan for the Missisquoi Bay watershed.

The voluntary conservation project aims to:

Encourage the preservation of river habitats by providing property owners with a portrait of their riparian woodland and information on how they can preserve and increase their woodland's biodiversity as well as the ecological services it provides.

Raise awareness among citizens of Notre-Dame-de-Stanbridge and Pike River about the importance of conserving the natural aquatic and riparian areas in the downstream sector of the Pike River.

Survey the critical habitats for species at risk in the Pike River watershed in order to protect the richness and biodiversity of this sector.

1.2 SPINY SOFTSHELL TURTLE

In this third phase of the characterization of riparian habitats along the Pike River, particular attention was paid to the spiny softshell turtle, a threatened species that is found notably in the downstream portion and mouth of the river. In fact, this is the only place in Quebec where it is found. The spiny softshell turtle is a unique species in Quebec, and its protection and development should be among the top priorities for Notre-Dame-de-Stanbridge and Pike River inhabitants. A more detailed description of the spiny softshell turtle is provided in section 5.1.2 of this document.

¹ Although the official name of the river is in French only (*Rivière aux Brochets*), for ease of reading, this document uses the informal English name, Pike River.

2 RIPARIAN WOODLANDS OF THE PIKE RIVER

2.1 HYDROGRAPHY

The Pike River begins its course at the Quebec–Vermont border (Frelighsburg), and empties into the Missisquoi Bay (Lake Champlain) in Quebec. The Quebec portion of its watershed covers an area of 555 km² (85%), while the Vermont portion covers an area of 102 km², or 15% of the total. Its 62 km course (56 km in Quebec) begins in the Appalachian hills (Eastern section) and meanders through the lowlands plain (Western section). In Quebec, it then goes through the municipalities of, in order, Frelighsburg, Stanbridge East, Bedford Township, City of Bedford, Notre-Dame-de-Stanbridge and Pike River.

Along the way, it collects the waters from at least twenty-three (23) sub-watersheds (level 3 watercourses). Its main tributaries are the Morpions and Groat streams, and Rivière aux Brochets Nord. It also collects the waters of Lake Selby and the Walbridge, Meigs, Ewing and Au Castor streams.

2.2 LAND USE

In the Pike River watershed, 56% of the territory is used for agriculture, 38% is covered by forest, while urbanized areas occupy only about 2% of the territory. In the western section of the watershed, however, agriculture covers a much greater percentage (see map 1). In fact, in Stanbridge East, this project's study area, more than 60% of the land is used for agriculture, primarily annual, wide-row crop crops such as corn and soy, which account for 62% of vegetable production.

The OBVBM characterized the riverbanks of properties along the Pike River in the municipalities of Frelighsburg, Stanbridge East, Bedford, Notre-Dame-de-Stanbridge and Pike River. According to the assessment carried out in 2011 and 2012, less than 40% of the banks of shoreline properties were vegetated. In Pike River, the percentage of vegetated banks was less than 20%, while in Notre-Dame-de-Stanbridge, 50% of riverbanks had vegetated riparian strips.

2.3 WATER QUALITY

At the sampling station located in the municipality of Pike River, the quality of the river has deteriorated due to excessive concentrations of various pollutants. For example, from 2010 to 2012, the average concentration of phosphorous was 54.5 ug/L, while the quality guideline for preventing eutrophication in watercourses is 30 ug/L. High concentrations of phosphorous are the primary cause of blue-green algae in Lake Champlain. In addition, samples show high concentrations of fecal coliforms, nitrates and suspended solids. The generally questionable quality of the Pike River water affects the health of its aquatic fauna (fish) and is harmful to certain usages such as fishing, swimming, and other water-related recreational activities (canoeing, cottage life).

Soil left bare from agricultural activities is the primary source of phosphorous deposition in the Pike River. This soil, which is rich in fertilizer, is eroded by melting snow and rainfall. This surface run-off transports large amounts of sediments into the water, carrying with it all the chemical and animal fertilizers (manure) and pesticides contained therein.

2.4 BIODIVERSITY

The western section of the Pike River watershed, located in the very south of Quebec, is recognized as an area dominated by agriculture and having undergone intense deforestation. Although the area is highly fragmented and weakened, it still contains a remarkable biodiversity. This sector is home to many species of interest, fauna and flora alike, including several species at risk.

The inventories carried out during phases 1 and 2 of the project confirmed the presence of a number of species at risk, including the wood turtle, designated “vulnerable” in Quebec, and the common snapping turtle, designated “of special concern” at the federal level. In addition, these inventories found a number of plant species at risk, such as butternut, black maple, swamp white oak, false hop sedge and Massachusetts fern (bog fern). Several bird species designated “threatened” in Canada, such as the Canada warbler and the chimney swift, as well as one species designated “vulnerable” in Quebec, the bald eagle, were also found. In total, during phases 1 and 2, more than forty (40) species at risk were identified in the riparian habitats of the Pike River.

Canada warbler (*Cardellina canadensis*)



© Alain Hogue, www.oiseaux.ca

Eastern red-backed salamander (*Plethodon cinereus*)



Painted turtle (*Chrysemys picta marginata*)



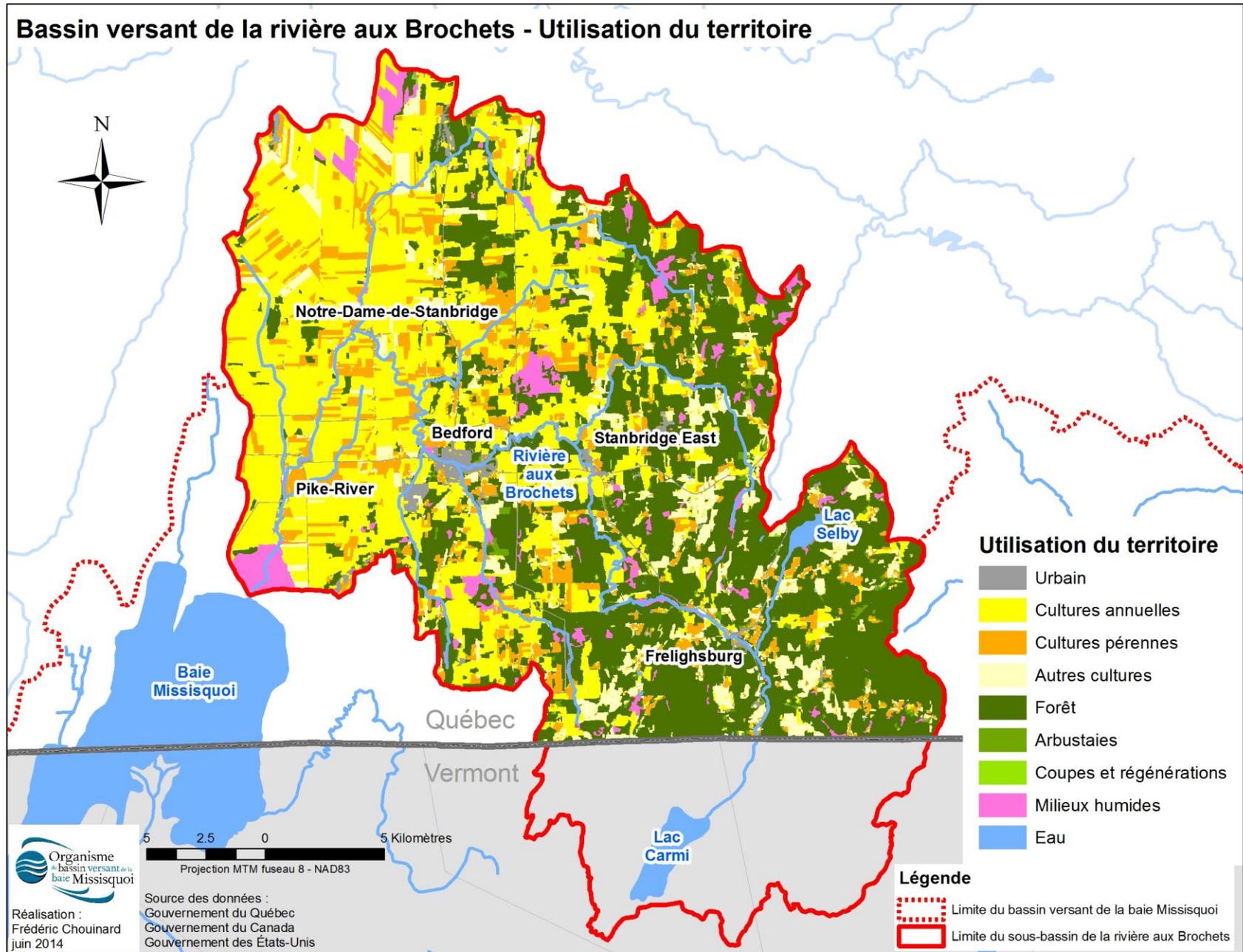
© Patrick Galois / Amphibia-Nature

American toad (*Anaxyrus americanus*)



© Martin Ouellet / Amphibia-Nature

Map 1 – Pike River – Land Use



3 GENERAL DESCRIPTION OF THE SECTOR CHARACTERIZED

In 2013, the Pike River was covered by canoe and on foot over a distance of about 30 km, from the river's eastern junction with Chemin Saint-Charles in Notre-Dame-de-Stanbridge, to the end of Chemin Molleur in Pike River, a few kilometres upstream from the river mouth, and to the northern end of its ecological reserve (see map 2). The banks were observed to determine occurrences of amphibian and reptile species, potential turtle nesting sites and, especially, presence of the spiny softshell turtle.

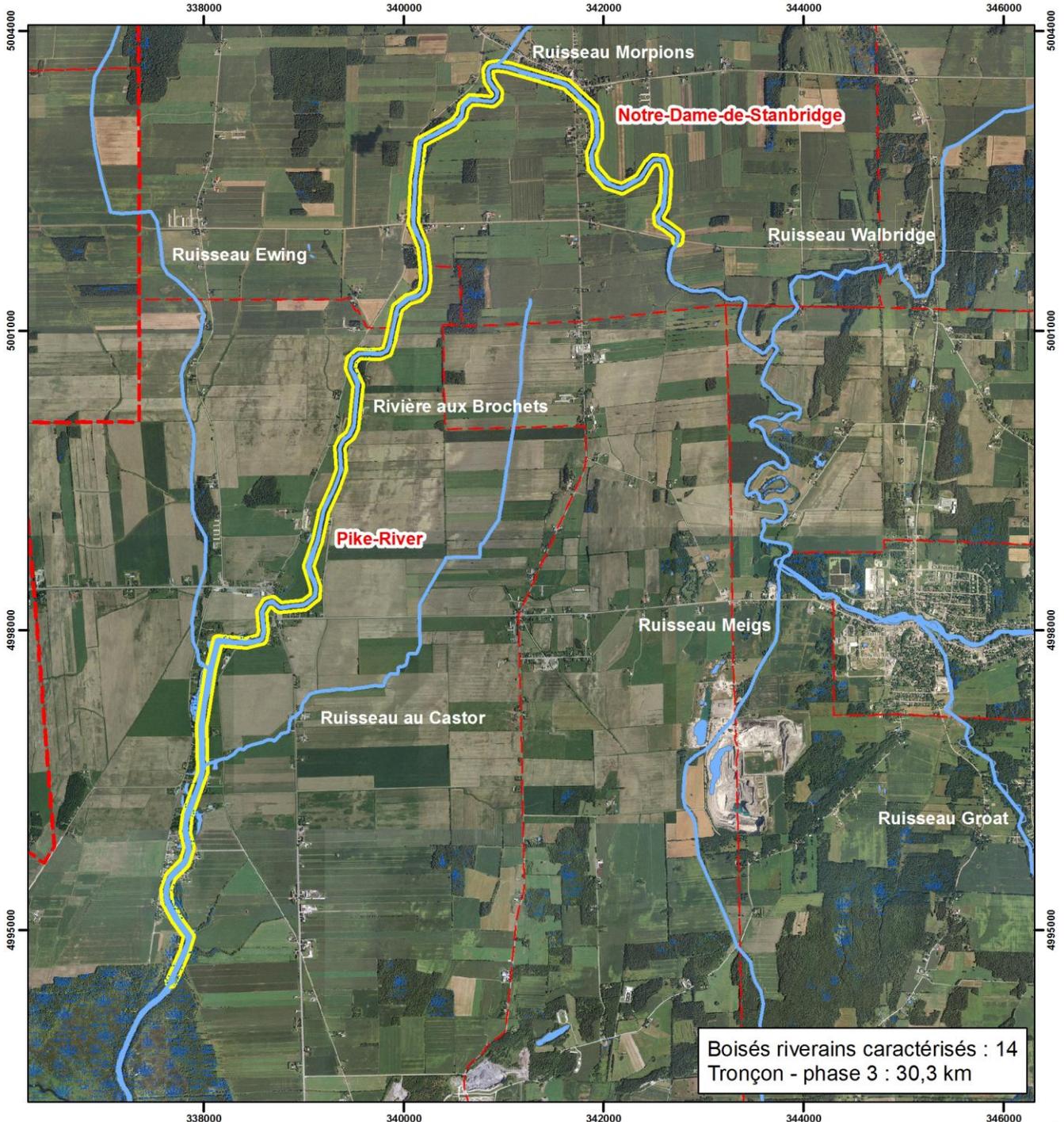
Because the two municipalities covered are dominated by agricultural activities, rather than characterizing the biodiversity of species on cultivated lands, where potential habitats are rather rare, priority was given to the riparian woodlands. The woodlands targeted had to have an area of at least 2 hectares, considered the minimal area for accommodating a certain biodiversity. Of the 30 kilometres of riverbank covered, only 14 woodlands of such size were identified, including two (2) that were more than one hundred metres from the bank but which were deemed of interest for ecological characterization given their size. The smallest woodland had an area of just 0.7 hectare but was included because it was a peninsula with a wetland. The largest woodland had an area of 22 hectares and was located inland. Six (6) of the woodlands characterized were in Notre-Dame-de-Stanbridge and eight (8) were in Pike River.

Thirteen (13) of the fourteen (14) woodlands visited were on properties zoned for agricultural use (green) and belonged to twelve (12) distinct owners, the last being an unowned peninsula. Of these properties, eight were used for large-scale farming, three were used for raising livestock and farming, and three were used mostly for residential or vacation purposes.

Several tributaries of the Pike River run through the properties or woodlands characterized. These include Au Castor, Granger, Pelletier, Charon, Larochelle and Bellefroid-Dandurand streams.

Map 2 – General map of the sector covered in 2013

Inventaires herpétofaune, avifaune et flore riveraine Rivière aux Brochets - Notre-Dame-de-Stanbridge à Pike-River



Tronçon - phase 3	Limite MRC Limite municipale	Cours d'eau Plans d'eau	Milieux humides
<p>Système de projection Mercator transverse modifiée - fuseau 8 (MTM8), North American Datum 1983 (NAD83)</p> <p>Source des données Gouvernement du Québec Gouvernement du Canada MRC Biome-Missisquoi</p>		<p>ÉCHELLE 1:50 000 MÈTRES</p>	
<p>Organisation Organisme de bassin versant de la baie Missisquoi Frédéric Chouinard 2013</p>			

4 DESCRIPTION OF THE WOODLANDS CHARACTERIZED

The riparian woodlands characterized as part of this project are primarily what are called “residual” woods, hemmed in between the river and the road or with relatively marginal agricultural potential. In fact, of the 30 km of riverbanks surveyed in the project, only about fifteen (15) woodlands of more than 2 hectares were found, almost all surrounded by large tracts of farmland (see maps 1 and 2). Their conservation is therefore all the more important because they are genuine refuges for many wildlife and plant species. They also play an important role in water quality and in the quality of aquatic habitats of the Pike River by performing certain ecological functions. For example, the preservation of riparian woodlands helps to limit soil and riverbank erosion, fosters the reproduction of certain species, and keeps the water cool for the river’s fish by providing shade. In addition, shrubs and trees on the riverbanks mitigate the damage caused by muskrats and by agricultural drainage systems, maintaining the riverbank’s stability.

4.1 ECOLOGICAL ASSESSMENT OF WOODLANDS

Fourteen (14) woodlands were characterized by a botanical expert and assessed according to thirteen (13) criteria to determine their “ecological quality.”

Criteria for assessing plant rarity

- 1. The number of rare or at-risk species**, whether designated threatened, vulnerable, or likely to be designated as such in Quebec, according to the Centre de données sur le patrimoine naturel du Québec (MDDEP, 2012; MDDEFP, 2013).
- 2. The number of rare species designated threatened or vulnerable**, according to the MDDEP (2012).
- 3. The number of species ranked S1 critically imperiled or S2 imperiled in Quebec**, according to the CDPNQ (2008) or NatureServe (2013).
- 4. The number of rare species at risk across their entire range or in Canada**, that is, species with a G1, G2 or G3 global conservation status rank, or an N1, N2 or N3 national conservation status rank, according to the CDPNQ (2008) or NatureServe (2013).
- 5. The number of rare species in the Montérégie** (administrative region), for rare species with less than five recent occurrences (i.e. within the last 20 years) according to the CDPNQ (2008) or FloraQuebeca’s Comité Flore québécoise (2009).
- 6. The number of species of interest**, that is, species that were on one of the first four lists of rare plants in Quebec (Bouchard et al., 1983; Lavoie, 1992; Labrecque and Lavoie, 2002; CDPNQ, 2008), or species (not rare) designated as vulnerable to frequent or occasional commercial harvesting (CDPNQ, 2008), or species that may be included in the next list of rare plants, given their relative rarity in Quebec, or species that are very rare in the Montérégie.
- 7. The number of species with excellent or very good quality occurrences**, containing a large number of individuals for the species in a relatively intact habitat, based on scientific documents or the expert’s personal knowledge of a species in Quebec.

Criteria for ecological assessment

- 8. Area:** a relatively large woodland, measured in hectares, is granted more points than a woodland with a smaller total area.
- 9. Regional uniqueness,** that is, the degree to which a woodland's type of forest ecosystem is found within the Montérégie administrative region (common, occasional or rare).
- 10. Floristic diversity:** the estimated number of species of vascular plants in a woodland.
- 11. The integrity** or the degree to which a woodland has been disturbed by human activities, such as recent or intensive logging, invasive plants, roads and paths, buildings, dumping, ditches, agriculture, plantings, etc.
- 12. Maturity:** the estimated age of a woodland's forest communities, or according to the age of the oldest forest community if there are more than one.
- 13. Importance of wetlands** according to their estimated area in relation to the woodland's total area, whether it is a swamp, marsh, bog, pond, lake, stream or riverbank; this criterion can be an indicator of the site's quality as a home for wildlife.

According to this assessment, woodlands **11, 14, 10, 7, 1 and 12** are the richest and of the most interest for flora. Of these, sites **11, 14 and 10** stand out clearly for their very high quality, while sites **7, 1 and 12** are of high quality.

Woodland **11** should be declared an *Exceptional Forest Ecosystem (EFE)*, because it is home to an extremely rare species in Quebec (the 2nd occurrence of *Carex trichocarpa*) and a rare and declining type of forest community (forest of silver maple and swamp white oak).

However, this does not mean that the other woodlands do not have any ecological value or floristic quality. For example, woodland 9 obtained the lowest score in all categories. Yet the fact that a wetland covers most of its area makes it of definite importance.

**Preservation of all these woodlands is important because
the Montérégie is the administrative region with the
lowest rate of forest cover in all of Quebec.**

4.2 WOODLANDS CHARACTERIZED – NOTRE-DAME-DE-STANBRIDGE

4.2.1 Description of woodland #1

Located on the right bank of the Pike River, woodland #1 has an area of 1.6 hectares. It has 340 m of shoreline along the river and its maximum depth from the bank is about 106 m. The shoreline of this site is a wetland. In addition, a temporary spring pond (vernal pool) was found in the woodland. The woodland is hemmed in between the river and large areas of farmland where mostly corn and hay are grown. The next closest woodland is about 345 m away.

The forest community is composed of sugar maple, red oak and basswood, and is estimated to be between 90 and 120 years old. Its regional uniqueness, that is the degree to which this woodland's type of forest ecosystem is found within the Montérégie administrative region, is considered occasional. The woodland's floristic diversity is considered average and it has not undergone very much disturbance. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is deemed high.

Table 1: Summary of woodland #1

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environment (Pike River)
Forest community:	Sugar maple, red oak and basswood Maturity: 90–120 years Regional uniqueness: occasional
Vascular plants at risk:	Butternut
Birds at risk:	Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013 Wood turtle (recorded in 1991)

Other floristic species of interest:

- Hairy sedge (*Carex hirtifolia*), once considered rare (Bouchard et al., 1983; Lavoie, 1992; Labrecque and Lavoie (2002)
- Deer-tongue grass (*Panicum clandestinum*), considered rare in 1992 (Lavoie, 1992)
- Witch-hazel (*Hamamelis virginiana*), considered rare in 1983 (Bouchard et al., 1983)

4.2.2 Description of woodland #2

Situated 350 m from the Pike River, woodland #2 is not a riparian woodland. It was characterized because of its relative proximity to woodland #1 (345 m). With an area of 1.9 hectares, woodland #2 contains a few small, temporary wetlands (vernal pools). Its understory is relatively bare. The woodland is surrounded by large areas of farmland where mostly corn and hay are grown.

There are two forest communities in the woodland: Eastern hemlock, estimated to be 120 years old, and red maple, estimated to be 50 years old. Its regional uniqueness, that is the degree to which this woodland’s type of forest ecosystem is found within the Montérégie administrative region, is considered occasional. The woodland’s floristic diversity is considered low although it has not undergone very much disturbance. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is deemed low.

Table 2: Summary of woodland #2

Habitats:	Forest (residual, fragmented), edge (edge effect), small temporary wetlands (vernal pool)
Forest community:	Eastern hemlock and red maple Regional uniqueness: occasional Maturity: hemlock = 120 years; red maple = 50 years
Vascular plants at risk:	No species recorded
Birds at risk:	No species recorded
Amphibians and reptiles at risk:	No species recorded

Other floristic species of interest:

- Witch-hazel, considered rare in 1983 (Bouchard et al., 1983)

4.2.3 Description of woodland #3

Located on the right bank of the Pike River, this woodland has an area of 2.8 hectares, 380 m of shoreline along the river, and a maximum depth from the bank of about 120 m. The shoreline of this site is classified as a “shallow water” wetland. The woodland is hemmed in between the river and a road (Chemin des Rivières). On the other side of the road are large tracts of farmland where mostly soy, corn and hay are grown. The next closest woodland is about 56 m away, on the other side of the river. On the same side of the river, the next closest woodland is about 200 m away. Ruisseau Pelletier (stream) runs through the centre of the woodland and was probably straightened for drainage. The woodland’s forest community is a moist deciduous forest estimated to be 50 years old. Its degree of regional uniqueness is occasional. The floristic diversity and its integrity are considered average. The understory is densely populated with herbaceous plants. Overall, the woodland is deemed of average quality.

Table 3: Summary of woodland #3

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environment (Pike River)
Forest community:	Moist deciduous forest Maturity: 50 years Regional uniqueness: occasional
Vascular plants at risk:	Ostrich fern

Birds at risk:	Barn swallow Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013

4.2.4 Description of woodland #4

Located on the left bank of the Pike River, this woodland spans three adjacent evaluation units that all belong to the same owner. About 3.3 hectares, it has 445 m of shoreline along the river and its maximum depth from the bank is about 115 m. The western sector of the woodland is a treed swamp classified as a wetland. The woodland is enclosed between the river and large areas of farmland where mostly corn and hay are grown. The next closest woodland is about 345 m away. The forest community is dominated by sugar maple and basswood, about 90 years old, and it is common in the region. The floristic diversity and its integrity are considered average. Overall, the woodland is deemed of average quality.

Table 4: Summary of woodland #4

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environment (Pike River); wetland (treed swamp)
Forest community:	Sugar maple and basswood Maturity: 90 years Regional uniqueness: common
Vascular plants at risk:	Virginia bugleweed Ostrich fern
Birds at risk:	Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013

Other floristic species of interest:

- Riverbank wildrye (*Elymus Riparius*) was recorded in 1994. This species was removed from the list of floristic species likely to be designated threatened or vulnerable in June 2013.
- A huge red oak was found with a 1.5 metre diameter at breast height.

4.2.5 Description of woodland #5

Located on the right bank of the Pike River, this woodland has an area of 2.3 hectares, with 135 m of shoreline along the river and a maximum depth from the bank of about 165 m. The woodland is hemmed in between the river and the road, and is surrounded by large areas of farmland where mostly wheat and corn are grown. It is relatively isolated, the next closest woodland being about 900 m away by land.

The woodland is composed of a sugar maple–white pine forest, about 90 years old. This type of forest community is common in the region. The woodland’s floristic diversity and its integrity are considered low, as it is disturbed by partial cutting, roads, and a proliferation of non-native herbaceous plants. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is deemed low.

Table 5: Summary of woodland #5

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environment (Pike River)
Forest community:	Sugar maple and white pine Maturity: 90 years Regional uniqueness: common
Vascular plants at risk:	Butternut Ostrich fern
Birds at risk:	Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013

4.2.6 Description of woodland #6

Located about 325 m from the left bank of the Pike River, this woodland has a total area of 22.2 hectares (distributed across seven properties). The woodland is 750 m long and varies between 230 and 350 m wide. It contains a wetland classified as a “treed swamp” covering an area of about 6 hectares. The woodland is surrounded by large areas of farmland where mostly corn and hay are grown. The next closest woodland is about 350 m to the south.

The forest is dominated by red maple, judged to be between 50 and 70 years old. Its regional uniqueness, that is the degree to which this woodland’s type of forest ecosystem is found within the Montérégie administrative region, is considered common. Its floristic diversity is considered poor and it is of average integrity, with logging present. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is deemed low.

According to the botanical expert who characterized the site, the flora is remarkably undiversified for such a relatively large woodland (the biggest of all 14 studied). This is probably a result of intensive browsing by white-tailed deer.

Table 6: Summary of woodland #6

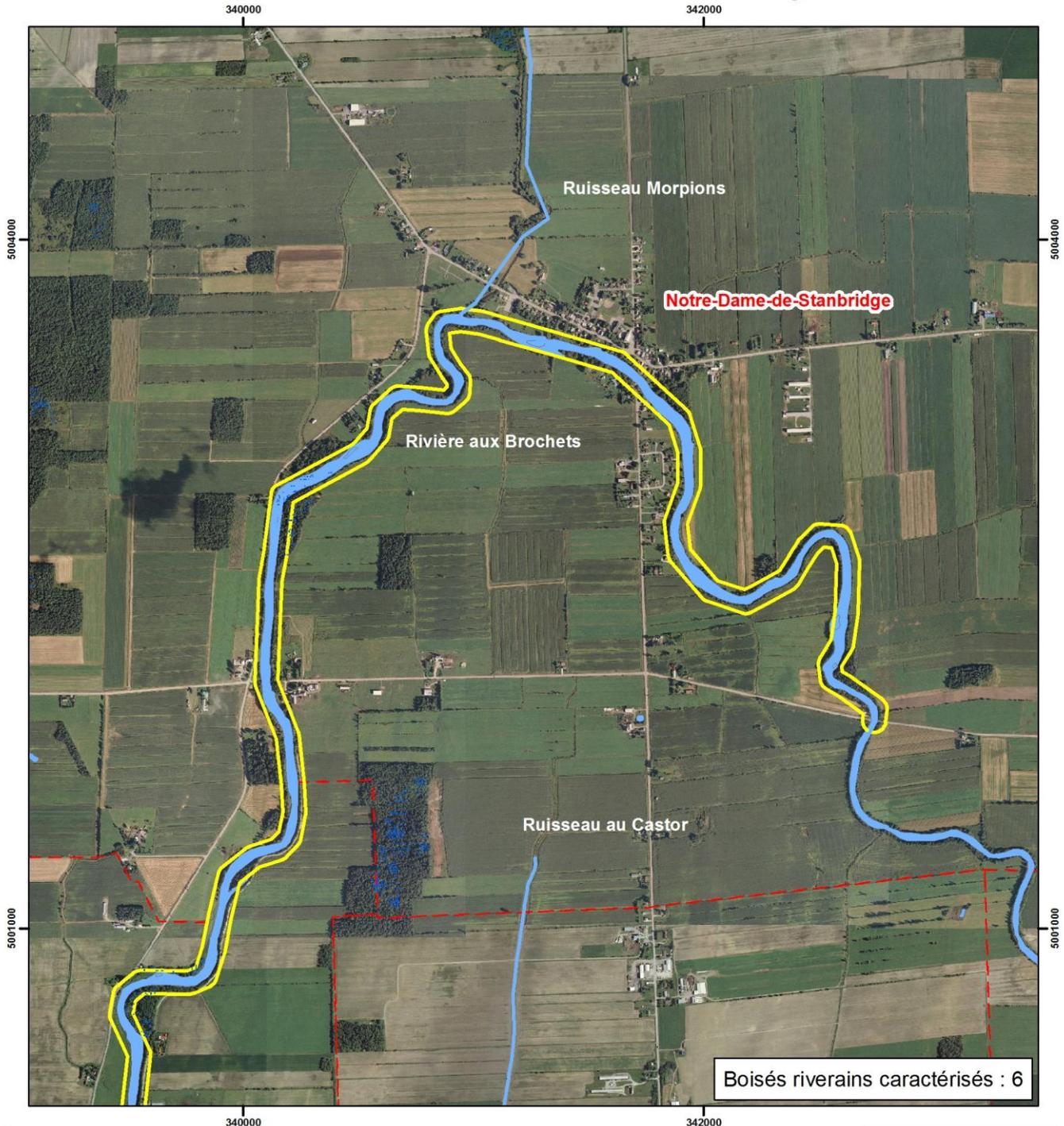
Habitats:	Forest (residual, fragmented), edge (edge effect), wetlands (swamp)
Forest community:	Red maple Maturity: 50–70 years Regional uniqueness: common
Vascular plants at risk:	No species recorded in 2013
Birds at risk:	No species recorded in 2013
Amphibians and reptiles at risk:	No species recorded in 2013

Other floristic species of interest:

- Roundleaf yellow violet (*Viola rotundifolia*), considered rare in 1983 (Bouchard et al., 1983) and in 1992 (Lavoie, 1992)

Map 3 – Sector covered: Notre-Dame-de-Stanbridge

Inventaires herpétofaune, avifaune et flore riveraine
Rivière aux Brochets - Notre-Dame-de-Stanbridge à Pike-River



Tronçon - phase 3	Limite MRC Limite municipale	Cours d'eau Plans d'eau	Milieux humides
<p>Système de projection Mercator transverse modifiée - fuseau 8 (MTM8), North American Datum 1983 (NAD83)</p> <p>Source des données Gouvernement du Québec Gouvernement du Canada MRC Biome-Missisquoi</p>			
<p>Réalisation</p> <p>Frédéric Chouinard 2013</p>			

Woodland #1: Vernal (spring) pool



Woodland #1



Woodland #1: Riparian flora



Woodlands #1 and #2: Corn growing in between



Woodland #3: Moist deciduous forest



Woodland #3: Mouth of Pelletier stream



Woodland #4: Treed swamp



Woodland #4: Agricultural drainage into the woodland



View upstream from woodland #5



Woodland #6



Woodland #7



Woodland #7: River arm that floods



4.3 WOODLANDS CHARACTERIZED – PIKE RIVER

4.3.1 Description of woodland #7

Woodland #7 is a peninsula separated from the mainland by a forgotten and more or less flooded arm. With a total area of about 0.7 hectares, this woodland has 205 m of shoreline along the river and is about 55 m wide. The next closest woodland is about 430 m to the east. This woodland/island is not part of a lot and therefore has no owner.

The woodland is composed of a moist mixed deciduous forest, estimated to be about 90 years old. This type of forest community is occasional in the region. The floristic diversity is considered average, and its integrity has undergone little disturbance. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is deemed high.

Table 7: Summary of woodland #7

Habitats:	Forest (residual, fragmented), edge (edge effect), moist, riparian and aquatic environments (river and pond)
Forest community:	Moist mixed deciduous forest Maturity: 90 years Regional uniqueness: occasional
Vascular plants at risk:	Ostrich fern Great St. John’s-Wort
Birds at risk:	No species recorded in 2013
Amphibians and reptiles at risk:	No species recorded in 2013

4.3.2 Description of woodland #8

Located on the left bank of the Pike River on the convex part of a meander, this riparian woodland has an area of 3.0 hectares, nearly 600 m of shoreline along the river, and a maximum depth from the bank of about 140 m. The bank of the woodland is classified as a “swamp” wetland. It also contains a “marsh” wetland, as well as a small pond. The woodland is hemmed in between the river and the road and surrounded by large tracts of agricultural land used to grow hay, corn and grain crops. The next closest woodland is about 630 m by land.

The forest community is made up of red ash, with a semi-open canopy, and is estimated to be about 50 years old. It is common in the region. The woodland’s floristic diversity and its integrity are considered average, as it is somewhat disturbed by the presence of roads and logging. Overall, the quality of the woodland is deemed average.

Table 8: Summary of woodland #8

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environments (Pike River), wetlands (swamp, marsh, pond)
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Forest community:	Red ash, semi-open canopy Maturity: 50 years Regional uniqueness: common
Vascular plants at risk:	Canada lily Ostrich fern
Birds at risk:	Barn swallow Eastern wood pewee
Amphibians and reptiles at risk:	Snapping turtle

4.3.3 Description of woodland #9

Located on the left bank of the Pike River, woodland #9 is a residual woods hemmed in between the road and the river. With a total area of 1.2 hectares, the woodland is divided between two owners. The entire woodland has about 360 m of shoreline on the river and its maximum depth from the bank is about 65 m. The next closest woodland is about 650 m by land. The woodland is disturbed by several developments. Electrical lines run through it and there is an old abandoned barn.

The forest ecosystem is a moist deciduous forest, estimated to be about 50 years old. This type of forest community is common in the region. The woodland’s floristic diversity and its integrity are considered low. Human-introduced plants are dominant. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is considered low.

Table 9: Summary of woodland #9

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environments (Pike River)
Forest community:	Moist deciduous forest Maturity: 50 years Regional uniqueness: common
Vascular plants at risk:	No species recorded in 2013
Birds at risk:	No species recorded in 2013
Amphibians and reptiles at risk:	Snapping turtle

4.3.4 Description of woodland #10

Located on the left bank of the Pike River, woodland #10 is one of the forest communities of greatest floristic interest in the study sector. With an area of 3.8 hectares, it has 435 m of shoreline along the river and its maximum depth from the bank is about 140 m. It is in fact classified as a “treed swamp” wetland. It also contains a “marsh” type wetland. The woodland is hemmed in between the river and large tracts of agricultural land where mostly corn and hay are grown. The next closest woodland is about 65 m away on the other side of the river, or about 430 m by land. The woodland is located in the Pike River’s 0-20 year floodplain.

The forest community is composed of silver maple with a semi-open canopy and a reedy canary grass marsh. It is estimated to be over 120 years old. This type of forest ecosystem is considered rare in the Montérégie region. The woodland’s floristic diversity is considered low but its integrity is mostly undisturbed. Overall, the quality of the woodland is deemed very high.

Table 10: Summary of woodland #10

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environments (Pike River), wetlands (swamp and marsh)
Forest community:	Semi-open silver maple forest and reedy canary grass marsh Maturity: more than 120 years Regional uniqueness: rare
Vascular plants at risk:	Butternut Virginia Water-horehound
Birds at risk:	Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013

4.3.5 Description of woodland #11

Located on the left bank of the Pike River, woodland #11 is one of the forest communities of greatest floristic interest in the study sector. With an area of 4.5 hectares, this woodland has 480 m of shoreline along the river and its maximum depth from the bank is about 140 m. It is in fact classified as a “treed swamp” wetland. It also contains a “marsh” type wetland. The woodland is hemmed in between the river and large tracts of agricultural land where mostly corn and hay are grown. The next closest woodland is about 430 m away by land. The woodland is located in the Pike River’s 0-20 year floodplain.

The forest community is composed of silver maple and swamp white oak. It is estimated to be between 90 and 120 years old. This type of forest ecosystem is rare in the Montérégie region. The floristic diversity is considered average and its integrity mostly undisturbed. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is deemed very high.

According to the botanical expert who characterized the site’s flora, this woodland can be considered an Exceptional Forest Ecosystem (EFE) because it is home to three rare species (Villeneuve, 1994), two of which have excellent quality occurrences, and one of them being extremely rare in Quebec (*Carex trichocarpa*).

Table 11: Summary of woodland #11

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environments (Pike River), wetlands (swamp and marsh)
Forest community:	Silver maple and swamp white oak Maturity: 90–120 years Regional uniqueness: rare
Vascular plants at risk:	Hairy-fruited sedge

	Swamp white oak Virginia Water-horehound Canada lily Ostrich fern
Birds at risk:	Eastern wood pewee Barn swallow
Amphibians and reptiles at risk:	No species recorded in 2013

4.3.6 Description of woodland #12

Located on the right bank of the Pike River, woodland #12 has an area of 2.8 hectares, 375 m of shoreline along the river, and a maximum depth from the bank of about 100 m. It is a residual woods, hemmed in between the river and the road, at the foot of a slope in a low-lying floodplain. In fact, the woodland is located in the 0-20 year floodplain of the Pike River. According to data from the Ministère de la Faune, when this riparian woodland floods in the spring it becomes a spawning and rearing site for several species of fish, including northern pike, silver redhorse, golden shiner, brown bullhead, black crappie and yellow perch.

This woodland is very isolated, surrounded by vast tracts of agricultural land where mainly corn and hay are grown; the next closed woodland is about 1.2 km away by land. It is also classified as a “swamp” wetland.

The forest community is composed of silver maple and a reedy canary grass and cattail marsh. It is estimated to be between 70 and 90 years old. This type of forest ecosystem is considered rare in the Montérégie region. The woodland’s floristic diversity is considered low and its integrity average, disturbed by the presence of housing, lawns and waste. Overall, the quality of the woodland, that is, its conservation value based on the floristic rarity and ecological significance of the site, is considered high.

Table 12: Summary of woodland #12

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environments (Pike River), wetlands (swamp and marsh)
Forest community:	Silver maple and reedy canary grass and cattail marsh Maturity: 70–90 years Regional uniqueness: rare
Vascular plants at risk:	Swamp white oak
Birds at risk:	Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013

4.3.7 Description of woodland #13

Located on the right bank of the Pike River, this woodland has an area of 1.8 hectares, with 300 m of shoreline along the river and a maximum depth from the bank of about 90 m. The woodland is hemmed in between the river and the road, surrounded by large tracts of agricultural land where mostly corn and soy

are grown. The next closest woodland is about 1000 m to the west. A large portion of the woodland is classified as a “swamp” wetland.

The forest community is composed of an open red oak–silver maple forest and a reedy canary grass meadow, with a maturity of about 70 years. Its degree of regional uniqueness is considered occasional. The woodland’s floristic diversity and its integrity are considered low, being disturbed by the presence of buildings, a canal and a mowed understory. Overall, the quality of the woodland is considered poor.

Table 13: Summary of woodland #13

Habitats:	Forest (residual, fragmented), edge (edge effect), riparian and aquatic environments (Pike River), wetlands (swamp)
Forest community:	Open red oak–silver maple forest and reedy canary grass meadow Maturity: 70 years Regional uniqueness: occasional
Vascular plants at risk:	Butternut Ostrich fern
Birds at risk:	Eastern wood pewee
Amphibians and reptiles at risk:	No species recorded in 2013

4.3.8 Description of woodland #14

Located at the mouth of the Pike River, woodland #14 is in fact a huge wetland in the shape of a delta that overlaps the territories of Pike River and Saint-Armand. In its portion located in Pike River, this vast floodplain (0–20 years) covers roughly 400 hectares with fen bogs, wooded bogs, swamps and treed swamps, located on either side of the Pike River over a distance of about 2.25 km and extending over more than 1.5 km of land. It is a spawning site for several species, including northern pike, during spring floods. This exceptional natural environment is already partially protected, with 78.3 hectares protected by the Nature Conservancy of Canada, Quebec Region, and 29.3 hectares belonging to the Pike River Ecological Reserve (Ministère de l’Environnement du Québec). It also contains a protected area designated as a “wildlife habitat” for muskrat. The future Highway 35 will cut through the eastern section (about 37 hectares of woodland are included in the route). The remaining 255 hectares, for the portion located in Pike River, are shared among some twenty property owners.

Several tributaries run through this exceptional woodland, flowing into the Pike River. Among these are the Bellefroid-Dandurand stream, which runs through the western portion, and the Edwin and Louis-Rochelleau streams in the eastern portion.

The northern portion of this woodland, which is almost inaccessible except by boat, can be reached by just one road, Chemin Molleur. This road leads to the woodland’s only buildings, a few cottages along the river.

Only about five hectares of the woodland were surveyed, by way of indication. The forest community of the portion characterized is a silver maple and red oak forest with a maturity of about 90 years. This type of forest ecosystem is considered rare in the Montérégie region. Its floristic diversity is considered low but its integrity is mostly undisturbed. Overall, the quality of the woodland, that is, its conservation value based on

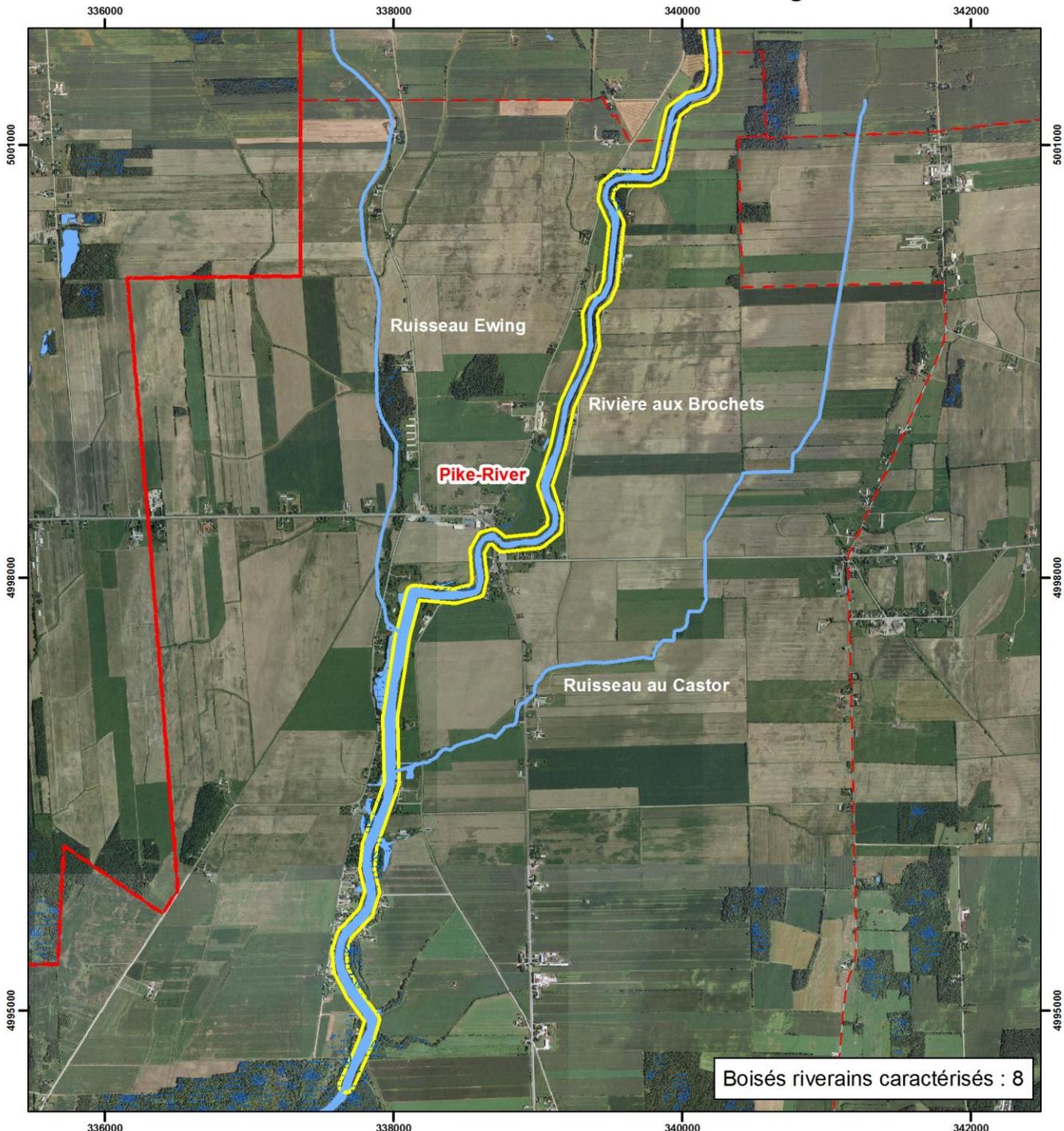
the floristic rarity and ecological significance of the site, is deemed very high. In particular, the woodland contains Exceptional Forest Ecosystems.

Table 14: Summary of woodland #14 – portion Pike River

Habitats:	Forest, edge (edge effect), riparian and aquatic environments (streams, Pike River), wetlands (bogs, swamps)
Forest community (portion characterized):	Silver maple and red oak Maturity: 90 years Regional uniqueness: rare
Vascular plants at risk:	Shag-bark hickory Virginia Water-horehound Swamp white oak White oak (recorded in 1984)
Birds at risk:	No species recorded in 2013 Least bittern (recorded by CDPNQ) Loggerhead strike (recorded by CDPNQ)
Amphibians and reptiles at risk:	No species recorded in 2013

Map 4 – Sector covered – Pike River

Inventaires herpétofaune, avifaune et flore riveraine
Rivière aux Brochets - Notre-Dame-de-Stanbridge à Pike-River



Tronçon - phase 3	Limite MRC	Cours d'eau	Milieux humides
	Limite municipale	Plans d'eau	

Système de projection
Mercator transverse modifiée - fuseau 8 (MTM8), North American Datum 1983 (NAD83)

Source des données
Gouvernement du Québec
Gouvernement du Canada
MRC Brome-Missisquoi

MÈTRES
750 375 0 750

Réalisation

Organisme de bassin versant de la baie Missisquoi
Frédéric Chouinard
2013

Woodland #8: Treed swamp



Woodland #8: Pond



Woodland #10: Marsh



Woodland #10: Marsh



Woodland #11



Woodland #11



Woodland #12: Swamp white oak



Woodland #12: Swamp



Woodland #13: Shag-bark hickory



Woodland #14: Swamp



Table 15: Summary of woodlands characterized

Site	Hectares	Flora inventory	Bird inventory	Herpetofauna inventory	Forest community	Species at risk	Species of interest*	Regional uniqueness	Diversity	Integrity	Quality	Conservation value ranking
Notre-Dame-de-Stanbridge												
1	1,6	yes	yes	bank	sugar maple, red oak and basswood	3	3	occasional	average	high	high	5
2	1,9	yes	no	no	Eastern hemlock and red maple	0	1	occasional	low	high	low	10
3	2,8	yes	yes	yes	moist deciduous forest	3	0	occasional	average	average	average	7
4	3,3	yes	yes	yes	sugar maple and basswood	3	2	common	average	average	average	7
5	2,3	yes	no	yes	sugar maple and white pine	3	0	common	low	low	low	13
6	22,2	yes	no	yes	red maple forest	0	1	common	low	average	low	12
Pike-River												
7	0,7	yes	no	yes	moist mixed deciduous forest	2	0	occasional	average	high	high	4
8	3,0	yes	yes	yes	semi-open red oak forest	5	0	common	average	average	average	7
9	1,2	yes	no	yes	moist deciduous forest	1	0	common	low	low	low	14
10	3,8	yes	yes	yes	semi-open silver maple forest and reedy canary grass marsh	3	0	rare	low	high	very high	3
11	4,5	yes	yes	yes	silver maple and swamp white oak (Exceptional Forest Ecosystem)	7	0	rare	average	high	very high	1
12	2,8	yes	yes	bank	silver maple forest and reedy canary grass and cattail marsh	2	0	rare	low	average	high	6
13	1,8	yes	no	bank	open red oak forest and reedy canary grass marsh	3	0	occasional	low	low	low	10
14	5,1	yes	no	yes	silver maple and red oak	7	0	rare	low	high	very high	2

*Species that were once considered rare (Bouchard et al., 1983; Lavoie, 1992; Labrecque and Lavoie, 2002; CDPNQ, 2008) but which are not on the latest list (MDDEFP, 2013)

5 SPECIES AT RISK

Every plant or animal species has its own specific characteristics and is important, whether for its ecological, scientific, dietary, economic, medicinal or cultural value.

In Quebec, species at risk are identified in the *Act respecting threatened or vulnerable species*. With this Act, the Ministère du Développement durable, de l'Environnement et de la Lutte contre les Changements Climatiques (MDDELCC) has committed to guaranteeing the preservation of all of Quebec's genetic diversity.

Article 16 of the *Act respecting threatened or vulnerable species* outlines the general prohibitions that apply to threatened or vulnerable species. An inventory of these species is required before analyzing any land use planning or development plan. Allowing for exceptions, precautionary and mitigation measures must be put in place to protect these species or their habitats.

At the federal level, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is made up of experts who assess the situation of wild species. The committee then determines whether a species or a population is extinct (no longer exists on the planet), extirpated (no longer exists in the wild in Canada, but exists elsewhere), endangered, threatened, of special concern, or not at risk.

Official COSEWIC and MDDELCC categories

Endangered (E): a wildlife species facing imminent extirpation or extinction.

Threatened (T): a species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

Vulnerable (V): any species whose survival is at risk even though it is not likely to become extinct.

Special Concern (SC): a species is of special concern when it is particularly sensitive to human activities or natural events but is not threatened or at risk.

Vulnerable to harvesting (VH): plants vulnerable to harvesting are not rare plants, but plants that have commercial value on the market.

Likely to be designated threatened or vulnerable (L): a species is likely to be designated threatened or vulnerable when the information available suggests it is at risk and that it requires special attention.

5.1 AT RISK SPECIES FOUND

Fourteen (14) riparian woodlands were surveyed for their biodiversity in 2013.

The inventory of vascular plants was carried out by botanist André Sabourin. Patrick Galois, a biologist and herpetofauna specialist with Amphibia-Nature, conducted the inventory of amphibians and reptiles, and Jean-Guy Papineau, ornithologist, surveyed the avifauna (birds). They surveyed the woodlands in order to provide the most complete picture possible of the habitats and biodiversity, particularly for species with special status. In addition, about thirty kilometres of the Pike River were covered by canoe in order to observe amphibians and reptiles along the river and banks.

Species of “special concern” in Canada

- Eastern wood pewee (*Contopus virens*) – in Canada (COSEWIC)
- Snapping turtle (*Chelydra serpentina*) – in Canada (COSEWIC)

Species designated “threatened”

- Barn swallow (*Hirundo rustica*) – in Canada (COSEWIC)
- Spiny softshell turtle (*Apalone spiniferà*)

Species likely to be designated threatened or vulnerable

- Shag-bark hickory (*Carya ovata*)
- Hairy-fruited sedge (*Carex trichocarpa*)
- Swamp white oak (*Quercus bicolor*)
- Virginia bugleweed (*Lycopus virginicus*)
- Great St. John’s-Wort (*Hypericum ascyron* subsp. *pyramidatum*)
- Butternut (*Juglans cinerea*) – designated endangered in Canada (COSEWIC)
- Four-toed salamander (*Hemidactylium scutatum*) – occurrence presumed

Species designated “vulnerable”

- Wood turtle (*Glyptemys insculpta*) – designated threatened in Canada (COSEWIC) – (recorded in 1991, CDPNQ)

Species designated “vulnerable to harvesting”

- Ostrich fern (*Mattencia struthiopteris*)
- Canada lily (*Lilium canadense*)

The complete list of species identified is provided in the appendix along with their status in Quebec and in Canada.

5.1.1 Flora (vascular plants) at risk

The different stages of forest aging are intrinsically linked to the various habitats and species they contain. Generally, the more mature and intact the forest, the greater its biological diversity.

**In Quebec, 78 plant species have been designated threatened or vulnerable:
57 threatened, 12 vulnerable, and 9 vulnerable to harvesting.**

**In addition, 314 vascular plant species are considered likely to be
designated threatened or vulnerable.**

**Six (6) species “likely to be designated threatened or vulnerable” in Quebec and two (2)
species designated “vulnerable to harvesting” were found in 2013.**

Species “likely to be designated threatened or vulnerable”

Shag-bark hickory (*Carya ovata*)



André Sabourin, 2013

Shag-bark hickory (*Carya ovata*): Belonging to the family Juglandaceae (also known as the walnut family), shag-bark hickory has been a species likely to be designated threatened or vulnerable in Quebec since 2008. This tree can grow up to 25 m tall and produces very large leaves with five leaflets as well as edible nuts. It can be distinguished by its bark made up of long strips that peel away from the trunk at the ends (hence its name).

Habitat: In southern Quebec, shag-bark hickory is at its northern peripheral limit. It is found primarily in rich, cool or humid woodlands, in maple sugar forests and other deciduous forests on clayey or rocky ground, and sometimes in open areas along ditches.

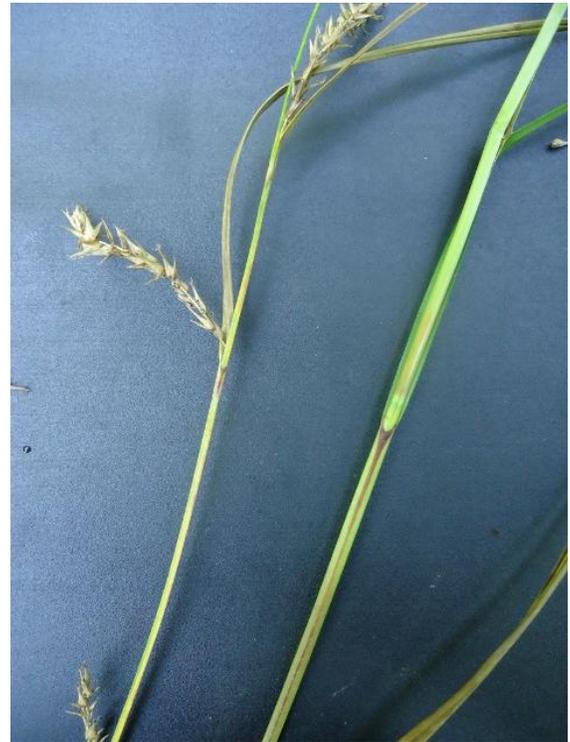
Conservation issues: Shag-bark hickory has become rare since wooded zones were cleared to make way for agricultural lands in the tree’s natural habitat in Quebec, that is, in the Montérégie and greater Montreal areas.

Hairy-fruited sedge (*Carex trichocarpa*): A rhizome perennial in the sedge family (Cyperaceae), hairy-fruited sedge has thick tufts and stems that are 60 to 150 cm long. It produces very long leaves that are 4 to 8 mm wide. Its purple seeds help distinguish it from other sedges.

Habitat: In Quebec, this sedge is at the northern peripheral limit of its distribution. This type of sedge is found in wetlands, especially marshes, swamps, wet meadows and shorelines.

Conservation issues: The identification of this rare plant is only the second known occurrence in Quebec. Habitat loss is the primary cause of its rarity, particularly the loss of wetlands and riparian habitats.

Hairy-fruited sedge (*Carex trichocarpa*)



André Sabourin, 2013

Swamp white oak (*Quercus bicolor*)



André Sabourin, 2013

Swamp white oak (*Quercus bicolor*): Of the family Fagaceae, or beech family, swamp white oak has shiny dark green leaves up to 17 cm long, with fuzzy pale green undersides. The leaves have rounded lobes, not pointed tips. The acorns have a long stalk and the scales on the acorn cap are recurved and pointed. As the name suggests, this species is closely related to our native white oak, except its preference is

for wetter and heavier soils. It does not like drought.

Habitat: In Quebec, swamp white oak is at the northern limit of its natural range. It grows in wet lowlands such as floodplains and silver maple forests.

Conservation issues: Swamp white oak is rare. Its decline can be attributed to the loss of wetlands and the development of floodplains.

Virginia bugleweed (*Lycopus virginicus*): This species is on the list of species “likely to be designated threatened or vulnerable” in Quebec because it has less than ten populations in Quebec and because of its peripheral distribution in the south of the province.

Habitat: Wetlands, swamps and shorelines.

Conservation issues: Loss of habitat is its primary threat.

Virginia bugleweed(*Lycopus virginicus*)



© Patrick Galois / Amphibia-

Butternut (*Juglans cinerea*)



© OBVBM

Butternut (*Juglans cinerea*): Butternut is a tree indigenous to North America. Its range in Canada is limited to parts of southern Ontario, Quebec and New Brunswick. Of the

family Juglandaceae, this tree can be distinguished by its leaves with many leaflets (11 to 17) and its sticky and highly pubescent nuts. Its bark is grey. Since 2003, butternut has been listed as “endangered” in Canada and “likely to be designated threatened or vulnerable” in Quebec.

Habitat: Butternut is the only indigenous walnut tree found in Quebec, but its range is limited to the extreme south of the province, in the Outaouais valley, the St. Lawrence Lowlands, and Estrie. Butternut’s distribution in Quebec corresponds more or less to the sugar maple–bitternut hickory forest and sugar maple–basswood forest bioclimatic zones.

Conservation issues: Its significant decline has been caused largely by butternut canker, a fungus that infects and kills healthy butternut trees.

Great St. John's-Wort (*Hypericum ascyron* subsp. *pyramidatum*): This giant St. John's Wort plant grows up to 1.5 m tall. It blooms in summer.

Habitat: It usually grows along high shorelines, in open and moist areas, as is the case along the Pike River. This is the second observation along this river, the closest known occurrence being near Farnham.

Conservation issues: The species is considered in decline. Habitat loss, in particular the degradation of riparian environments, is the main threat.

Great St. John's-Wort
(*Hypericum ascyron* subsp. *pyramidatum*)



© OBVBM, 2013

Species designated “vulnerable to harvesting”

Ostrich fern
(*Mattencia struthiopteris*)



© OBVBM, 2013

Ostrich fern (*Mattencia struthiopteris*): Also known as “fiddlehead,” this perennial herbaceous plant in the family Dryopteridaceae is designated “vulnerable to harvesting” in Quebec.

Habitat: These ferns grow in rich deciduous forests that are shady and moist, with more than 60% coverage. Also found in floodplains and ditches subject to seepage from high water tables and flooding in the spring.

Conservation issues: Although it is not considered at risk for the moment, excessive harvesting and the collection of large quantities of plants for sale on the food

market is putting pressure on this species and is likely to have an impact in the long term.

Canada lily (*Lilium canadense*): The Canada Lily belongs to the Liliaceae family. It has hanging orangey yellow flowers spotted with brown, and lanceolate leaves, in whorls.

Designated a vulnerable species in Quebec in 2005, the species is not rare, but its harvesting is now prohibited because of its ornamental value.

Conservation issues: Several factors are making it increasingly rare: grazing by white-tailed deer, logging, certain inappropriate forest development practices, and the destruction of its habitat for urban and agricultural development. Harvesting of whole specimens for horticultural purposes also places pressure on the species' wild populations. Given that it takes three to five years for the plants to produce flowers attractive to consumers, suppliers are tempted to pick them directly from the natural environment.

Since 2005, the Canada lily is protected under the *Act respecting threatened or vulnerable species*. However, prohibitions for this species are limited to the annual harvesting of no more than 5 whole specimens or underground parts or the trading of any whole specimen or any underground part harvested from a wild population.

Canada lily (*Lilium canadense*)



© OBVBM

The complete list of vascular plants identified is provided in the appendix along with their status in Quebec and in Canada.

5.1.2 Herpetofauna (amphibians and reptiles) at risk

Amphibians and reptiles (herpetofauna) are an important component of ecosystems. They are an integral part of the food chain both as prey and as predators. The decline in their populations is of even greater concern in light of the impact on several other animal species. A large number of species of amphibians and reptiles are affected by habitat loss, disturbances and fragmentation. Urbanization, industry and intensive agriculture are the primary threats. Because of their permeable skin, which makes them vulnerable to contaminants present in the aquatic environment, and the fact that they live both in water and on land during their biological cycle, amphibians are considered strong indicators of the quality of their environment.

**Southern Quebec is home to 11 species of Anura (toads and frogs),
10 species of salamanders, 8 species of freshwater turtles
and 8 species of snakes.**

**One (1) species designated “of special concern” in Canada and one (1) designated
“threatened” both in Quebec and in Canada were found in 2013.**

**In addition, according to the CDPNQ, one (1) species designated “vulnerable” in Quebec
and “threatened” in Canada was found in 1991.**

**According to Patrick Galois from Amphibia-Nature, there is a high likelihood for
the presence of the four-toed salamander, a species that is “likely to be designated
threatened or vulnerable” in Quebec.**

Species designated “vulnerable”

Wood turtle (*Glyptemys insculpta*): The wood turtle is one of eight species of freshwater turtles in Quebec. It is being closely monitored in Quebec, and observations are available in the *Atlas des amphibiens et des reptiles du Québec* (AARQ) and from the Centre de données sur le patrimoine naturel du Québec (CDPNQ). A recovery plan for five species of turtles in Quebec, including the wood turtle, was published in 2005. The species is designated “threatened” in Canada.

Habitat: The most terrestrial of our turtles, the wood turtle spends summers in open forests and logged areas, near bodies of water, where it returns as needed to regulate its body temperature. It may

Wood turtle (*Glyptemys insculpta*)



© Patrick Galois / Amphibia- Nature

travel 300 m or more from the water, preferring woods and alder groves bordering aquatic environments. It spends the winter at the bottom of sandy and rocky rivers, lakes and beaver ponds.

Conservation issues: The main threats to the wood turtle's survival are the degradation and destruction of its habitat, the increase in human activity (disturbance), accidental death (roads, agricultural machinery), the destruction of its nests by predators, and the capture of individuals for collection and commercial purposes.

Species “likely to be designated threatened or vulnerable”

Four-toed salamander (*Hemidactylium scutatum*): This salamander can be distinguished by its white belly dotted with black spots. Its hind feet each have four toes. It is only 10 cm long.

Four-toed salamander (*Hemidactylium scutatum*)



© Martin Ouellet / Amphibia-Nature

Habitat: This species lives in peat bogs and swamps where it lays its eggs in sphagnum moss.

Conservation issues: The small area of habitat left makes its situation precarious: urbanization, intensive agricultural development and the draining of peat bogs are the main causes of its population decline.

Species designated “of special concern” in Canada

Snapping turtle (*Chelydra serpentina*): This turtle is discreet, spending most of its time hidden in the water and aquatic vegetation. It is quite large (carapace up to 50 cm long) and has a long tail. It is the biggest freshwater turtle in Quebec. It is basically carnivorous, with a diet of tadpoles, fish and dead animals. In fact, as a carrion eater, it is considered an aquatic environment cleaner.

Snapping turtle (*Chelydra serpentina*)



© Patrick Galois / Amphibia-Nature

Species designated “threatened”

Spiny softshell turtle (*Apalone spinifera*)



Spiny softshell turtle (*Apalone spinifera*):

The spiny softshell turtle is what’s called a softshell turtle, i.e. without scutes, and has a leathery upper shell. It is the only member of the family Trionychidae in Quebec. Females reach a carapace length of up to 40 cm (21.3 in), whereas males are about half that size.

A strictly aquatic turtle, the spiny softshell can be seen basking on rocks or tree trunks, or laying its eggs at the edge of bodies of water. It is found in a wide variety of habitats, including rivers, streams, lakes, ponds near rivers, and swampy, sandy or silty shallow bays. It loves crayfish and also eats worms, insects, tadpoles and fish.

The spiny softshell turtle mates between May and September and usually lays its eggs in June. The eggs begin to develop in the fall and continue in May after hibernation. A female usually lays eggs once a year, and the nest contains about twenty eggs. The incubation period lasts 60 to 70 days, aided by the sun, and the hatchlings emerge in August and September. Nests are usually excavated within a few metres of the water in sand or gravel substrate and where there is little to no vegetation growing. Below our latitudes, spiny softshell turtles do not nest before they are 15 years old, when they have become big enough (space for the eggs).

A large percentage of the individuals that were monitored in Quebec hibernate in Vermont (U.S.) near the Quebec border. One known hibernation site is the Alburg-Swanton Bridge. From October to April, all turtles are in hibernation, at the bottom of the water, without eating and breathing through their skin. The Vermont Agency of Natural Resources has not authorized the complete removal of the old bridge because it is an important site for the spiny softshell turtle (basking and hibernation). The spiny softshell requires well-oxygenated water in winter, which it finds near this bridge and on the Missisquoi River, in particular downstream from the Swanton damn.

Baby spiny softshell (*Apalone spinifera*)



This species is rare in Canada because it is found in only a few places in Quebec and in Ontario. Its current distribution in Quebec is limited to the Missisquoi Bay in Lake Champlain in the south of the province. This is the only known population remaining. This aquatic turtle is designated “threatened” and there are probably only a few hundred individuals left in the north of Lake Champlain.

The Pike River is therefore an important site for the spiny softshell turtle in Quebec.

Conservation issues: The Spiny Softshell Recovery Team considers that the female population living in the Pike River is very small and subject to a number of threats.

Nesting sites, located a few metres from the water in sand or gravel substrate, have declined following the increase in housing density around the bay and in the Pike River. In fact, the spiny softshell turtle habitat is threatened by the degradation of riparian zones caused in particular by residential development, agriculture, campgrounds, recreational beaches and municipal water maintenance activities. The females are very fearful when on land and human activities can therefore be a source of disturbance for the nesting sites. This species will also undergo significant pressure during work related to the completion of Highway 35 which crosses the Pike River.

The water regime has been altered by deforestation, the destruction of wetlands, and intensive agricultural drainage, removing water-absorbing buffer zones. The nests are therefore increasingly subject to flooding during heavy rains, which reduces their hatching rate.

The eggs are also exposed to more predators, due to the overabundance of some predators, such as raccoons, which has resulted from increased human presence and activities that provide them with shelter (buildings) and new food sources such as corn.

Spiny softshell turtles are also exposed to risks of collision and injury from motorized boats in the river and when travelling between their summer and hibernation areas in the lake. An active carnivorous species, it is also sometimes attracted by lures and caught in fishing lines.

Rehabilitated bank in the Missisquoi Bay natural refuge



© Patrick Galois / Amphibia-Nature

It feeds and basks in the wetlands and dense grasses surrounding Lake Champlain and its tributaries. These habitats still exist in the Missisquoi Bay but are increasingly subject to disturbances, disrupting the turtles’ basking activities.

It is clear that the needs of the spiny softshell turtle are varied and may easily be compromised. To some degree it is possible to provide artificial nesting sites to replace its natural nesting sites, but it is impossible to relocate its hibernation site.

The spiny softshell turtle is also found in the western part of the Missisquoi Bay. Yet this sector, which has favourable natural

conditions, is surrounded by heavily used vacation sites (cottages and campgrounds). The already advanced development of the Missisquoi Bay shoreline threatens the integrity of its habitat, and by extension, the very survival of these turtles in Quebec.

Action taken: A number of measures have been implemented, including the use of radio-telemetry to document the spiny softshell turtle's home ranges and habitat use. The results of this monitoring were used to intervene to protect the spiny softshell turtle in the Alburg-Swanton Bridge project and to verify its essential needs in Quebec and in Vermont. For some of these measures, the State of Vermont works in close cooperation with Quebec government agencies. Measures applied since 2005 have included monitoring the impact of the construction of a new Alburg-Swanton bridge (Vermont) on the site of a hibernaculum, conservation agreements with shoreline property owners, the protection of nests and public information campaigns.

Another example is the Missisquoi Bay Natural Refuge, next to the Philipsburg campground. Created in 2003, this refuge is dedicated to the spiny softshell turtle. After the bank was returned to its natural state (removal of the fill and the dyke), a natural beach formed and could be used as a nesting site by turtles in this sector. Managed by the Nature Conservancy of Canada in collaboration with volunteers from the Missisquoi Bay conservation group SOS Turtles, this refuge offers turtles a place where they can live undisturbed since public access is restricted during critical times of year.

Other actions have included creating nesting sites and installing floating basking platforms.

The Spiny Softshell Recovery Team has been monitoring nesting sites along the Pike River every year since 2003. In 2009, an egg collection program was implemented. The eggs are placed in artificial incubation at the Granby Zoo and the Ecomuseum Zoo. The project has been an undeniable success. From 2010 to 2013, the eggs collected from 31 nests and placed in artificial incubation had a hatching rate of over 80%. The program allowed for the release of close to 480 juveniles into the wild, in the nesting areas where the eggs came from.

Basking platform for turtles



© Patrick Galois / Amphibia-Nature

In 2012, in light of the artificial incubation program's success and the low hatching rate of nests left *in situ*, the Recovery Team decided to collect as many eggs as possible and to continue this program until 2020.

The complete list of amphibians and reptiles found is provided in the appendix along with their status in Quebec and in Canada.

5.1.3 Avifauna (birds) at risk

Birds are vital for biodiversity. Several bird species are at the top of the food pyramid, helping to maintain the ecosystem's natural equilibrium as predators of other animal species (insects, amphibians, fish, etc.). The slightest change in this close relationship can have consequences on our environment. Thus, habitat fragmentation, urbanization and forest destruction are radically influencing population dynamics. Birds are good indicators of the state of an ecosystem's biodiversity.

All birds were identified either by their song or cry, or visually.

One (1) species designated of “special concern” in Canada and one (1) species designated “threatened” in Canada were found.

Species designated of “special concern”

Eastern wood pewee (*Contopus virens*): This species of passerine belongs to the Tyrannidae family. The Eastern wood pewee nests in the eastern U.S. and in southern Canada, from southwestern Saskatchewan, through southern Ontario and Quebec, up to the Maritimes (except for Newfoundland). It winters mostly

Eastern wood pewee (*Contopus virens*)



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in the north of South America, but it may also sometimes spend winter in Central America. The species is designated of “special concern” in Canada.

Habitat: Forest clearings in deciduous, coniferous and mixed forests. They are also found along forest edges and tree-lined edges of bodies of water.

Conservation issues: The causes of the decline are not understood, but might be linked to habitat loss or degradation on its wintering grounds in South America or changes in availability of insect prey. If the population declines continue to persist, the species may become “threatened” in the foreseeable future.

Species designated “threatened”

Barn swallow (*Hirundo rustica*): Designated “threatened” in Canada in 2011, the barn swallow is a metallic blue-black songbird that feeds on flying insects. It is the most widespread species of swallow in the world. In Canada, its nests and eggs are protected under the *Migratory Birds Convention Act, 1994*.

Habitat: The species tends to nest in man-made structures such as barns and bridges. A long-distance migrant, it nests and reproduces in North America and then migrates to Central and South America for the winter.

Conservation issues: Its decline in Canada started in the late 1980s. While the specific causes are unclear, the scope and extent of the decline are alarming. A decrease in the number of open barns and food sources in some agricultural areas may be partly responsible.

Barn swallow (*Hirundo rustica*)



Malene, I., via Wikimedia Commons

Rare or noteworthy bird species observed

- Eastern screech owl (*Megascops asio*)
- Lincoln’s sparrow (*Melospiza lincolni*)
- Wilson’s snipe (*Gallinago delicata*)

The complete list of birds found is provided in the appendix along with their status in Quebec and in Canada.

6 RECOMMENDATIONS

All the woodlands surveyed are important to preserve. While some forest communities have more diversity and greater floristic integrity than others, these riparian and inland woodlands are vital habitats for the species identified, especially considering that woodlands in this agricultural region tend to be fragmented, very small, and generally rare.

6.1 PROTECTION OF FLORA AND FOREST ECOSYSTEMS

A forest's health depends on the biodiversity of its understory. The understory provides shelter and nourishment for all members of the food chain, from insects to mammals.

- Preserve the understory's natural plants, as they are essential components of wildlife habitats in the forest and riparian ecosystem.
- Preserve wetlands (e.g. spring pools).
- Harvest forest resources in a sustainable way, whether collecting tree essences, mushrooms or medicinal plants.
- Practise selective cutting so as to keep the forest canopy as closed as possible.
- When clearing trees, keep clearings small so as to ensure forest continuity and avoid creating long edges; this will help reduce drying from wind as well as the risk of windfall (trees blown over by the wind).
- Avoid forest draining because it can cause the ground and temporary forest wetlands to dry up and the water table level to drop.

6.2 PROTECTION OF AMPHIBIANS AND REPTILES

Riparian woodlands are environments that foster a rich biodiversity and may also serve as travel corridors for some species, helping to keep populations connected. It is therefore important to foster their preservation, restoration, and even expansion.

- Leave wood debris (branches and dead trees) on the ground because it provides shelter for terrestrial and burrowing salamanders, helping them to stay moist and to avoid predators.
- Vegetated riverbanks also serve as travel corridors for some species, helping to keep riparian populations connected. It is recommended that a vegetated strip be maintained along watercourses next to riparian woodlands. For agricultural areas, provincial legislation requires that a strip of vegetation at least 3 metres wide be preserved between the crop and the watercourse.
- Ideally, in order to foster the movement of species, a forest corridor at least 3 metres wide should be maintained between woodlands.

Additional recommendations specific to turtles

When building or landscaping, it should be remembered that although turtles stay mostly at the edge of the water, they also go on land, especially the females during nesting season.

- For painted turtles and snapping turtles, it is mostly the females that travel on land, during nesting season. The wood turtle, however, spends long periods of summer on land, venturing 300 m or more

from the water. It is therefore exposed to a number of human-related threats, not just in the water, but also over a large area of land.

- The wood turtle is especially fond of alder groves and young, open forests in the riparian zone. It also uses more open areas such as meadows or fields, where it risks danger from agricultural machinery and livestock. For example, it may be injured by hay-cutting equipment. Raising the blade by a few centimetres (minimum 15 cm from the ground) can help reduce this risk
- As much as possible, avoid circulating in ATVs and keep livestock from venturing onto the sand and gravel beds that are created by the natural erosion of the shoreline, especially beginning at the end of May (start of nesting season). Sand and gravel beds are nesting sites. The female digs a hole in the substrate, lays her eggs and then covers them up again. The closest eggs are just a few centimetres from the surface and therefore highly vulnerable to being crushed
- Avoid removing fallen trees and immersed trunks along the edges of watercourses. Partially submerged dead trees are ideal spots for sun basking, an essential activity for various species of turtles. Turtles also take shelter beneath trees and immersed branches for protection and to hibernate.

6.3 PROTECTION OF BIRDS

Preservation of riparian woodlands along the Pike River is important because there are not many places in the region where sparrows, woodpeckers and birds of prey can build their nests. These moist areas are full of birds because food is plentiful.

- Observe birds from a distance and without making any noise, so as to protect nesting sites and feeding areas.
- Maintain shrubs along the riverbank, as they are essential for feeding and nesting.
- Preserve dead tree stumps, often used as feeders, nesting holes and perches.
- Plant forage crops.
- Preserve wetlands (e.g. spring pools).

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APPENDIX 1 – FLORA

List of vascular plants at risk found

Designation in Canada (Ca) and in Quebec (Qc):

Endangered (E), special concern in Canada (SC), threatened (T), likely to be designated threatened or vulnerable (L), vulnerable (V), vulnerable to harvesting (VH).

Species – Vascular plants				
French name	Latin name	English name	Status	
			Ca	Qc
CYPERACEAE				
Carex à fruits velus	<i>Carex trichocarpa</i>	Hairy-fruited Sedge	-	L
DRYOPTERIDACEAE				
Matteuccie fougère-à-l'autruche	<i>Matteuccia struthiopteris</i>	Ostrich Fern	-	VH
FAGACEAE				
Chêne bicolore	<i>Quercus bicolor</i>	Swamp White Oak	-	L
HYPERICACEAE				
Millepertuis à grandes fleurs	(<i>Hypericum ascyron</i> subsp. <i>pyramidatum</i>)	Great St. John's-Wort	-	L
JUGLANDACEAE				
Noyer cendré	<i>Juglans cinerea</i>	Butternut	E	L
Caryer ovale	<i>Carya ovata</i>	Shag-Bark Hickory	-	L
LAMIACEAE				
Lycophe de Virginie	<i>Lycopus virginicus</i>	Virginia Water-horehound	-	L
LILIACEAE				
Lis du Canada	<i>Lilium canadense</i>	Canada Lily	-	VH

Other floristic species of interest:

- Hairy sedge (*Carex hirtifolia*), once considered rare (Bouchard et al., 1983; Lavoie, 1992; Labrecque and Lavoie, 2002)
- Deer-tongue grass (*Panicum clandestinum*), considered rare in 1992 (Lavoie, 1992)
- Witch-hazel (*Hamamelis virginiana*), considered rare in 1983 (Bouchard et al., 1983)
- Riverbank wildrye (*Elymus Riparius*) was recorded in 1994. The species was removed from the list of plants likely to be designated threatened or vulnerable in June 2013.
- A huge red oak was found with a 1.5 metre diameter at breast height
- Roundleaf yellow violet (*Viola rotundifolia*), considered rare in 1983 (Bouchard et al., 1983) and in 1992 (Lavoie, 1992)

APPENDIX 2 – HERPETOFAUNA

List of amphibians and reptiles found

Designation in Canada (Ca) and in Quebec (Qc):

Endangered (E), special concern in Canada (SC), threatened (T), likely to be designated threatened or vulnerable (L), vulnerable (V), vulnerable to harvesting (VH).

Species – Amphibians and Reptiles				
French name	Latin name	English name	Status	
			Ca	Qc
ANURAN AMPHIBIANS				
Crapaud d'Amérique	<i>Anaxyrus americanus americanus</i>	American Toad	-	-
Grenouille des bois	<i>Lithobates sylvaticus</i>	Wood Frog	-	-
Grenouille léopard	<i>Lithobates pipiens</i>	Northern Leopard Frog	-	-
Grenouille verte	<i>Lithobates clamitans</i>	Green Frog	-	-
Rainette versicolore	<i>Hyla versicolor</i>	Gray Treefrog	-	-
Ouaouaron	<i>Lithobates catesbeianus</i>	American Bullfrog	-	-
URODELA				
Salamandre à quatre orteils*	<i>Hemidactylum scutatum</i>	Four-toed Salamander	-	L
Salamandre cendrée	<i>Plethodon cinereus</i>	Eastern Red-backed Salamander	-	-
TESTUDINE REPTILES				
Tortue des bois**	<i>Glyptemys insculpta</i>	Wood Turtle	T	V
Tortue molle à épines	<i>Apalone spinifera</i>	Spiny Softshell Turtle	T	T
Tortue peinte	<i>Chrysemys picta</i>	Painted Turtle	-	-
Tortue serpentine	<i>Chelydra serpentina</i>	Snapping Turtle	SC	-

*Occurrence presumed by an amphibian and reptile expert.

**Recorded in 1991 (source: CDPNQ)

APPENDIX 3 – AVIFAUNA

List of birds found

Designation in Canada (Ca) and in Quebec (Qc):

Endangered (E), special concern in Canada (SC), threatened (T), likely to be designated threatened or vulnerable (L), vulnerable (V), vulnerable to harvesting (VH).

Species – Birds				
French name	Latin name	English name	Status	
			Ca	Qc
ALCEDINIDAE				
Martin-pêcheur d'Amérique	<i>Megaceryle alcyon</i>	Belted Kingfisher	-	-
ANATIDAE				
Bernache du Canada	<i>Branta canadensis</i>	Canada Goose	-	-
Canard colvert	<i>Anas platyrhynchos</i>	Mallard	-	-
ARDEIDAE				
Grand héron	<i>Ardea herodias</i>	Great Blue Heron	-	-
BOMBYCILLIDAE				
Jaseur d'Amérique	<i>Bombycilla cedrorum</i>	Cedar Waxwing	-	-
CAPRIMULGIDAE				
Étourneau sansonnet	<i>Sturnus vulgaris</i>	Common Starling	-	-
CARDINALIDAE				
Cardinal à poitrine rose	<i>Peucaea ludoviciana</i>	Rose-breasted Grosbeak	-	-
Cardinal rouge	<i>Cardinalis cardinalis</i>	Northern Cardinal	-	-
Passerin indigo	<i>Passerina cyanea</i>	Indigo Bunting	-	-
CATHARTIDAE				
Urubu à tête rouge	<i>Cathartes aura</i>	Turkey Vulture	-	-
CHARADRIIDAE				
Pluvier kildir	<i>Charadrius vociferus</i>	Killdeer	-	-
COLUMBIDAE				
Tourterelle triste	<i>Zenaidura macroura</i>	Mourning Dove	-	-
CORVIDAE				
Corneille d'Amérique	<i>Corvus brachyrhynchos</i>	American Crow	-	-
Geai bleu	<i>Cyanocitta cristata</i>	Blue Jay	-	-
Grand corbeau	<i>Corvus corax</i>	Common Raven	-	-

Species – Birds				
French name	Latin name	English name	Status	
			Ca	Qc
EMBERIZIDAE				
Bruant chanteur	<i>Melospiza melodia</i>	Song Sparrow	-	-
Bruant familier	<i>Spizella passerina</i>	Chipping Sparrow	-	-
Bruant à gorge blanche	<i>Zonotrichia albicollis</i>	White-throated Sparrow	-	-
Bruant de Lincoln	<i>Melospiza lincolni</i>	Lincoln's Sparrow	-	-
Bruant des marais	<i>Melospiza georgiana</i>	Swamp Sparrow	-	-
Bruant des prés	<i>Passerculus sandwichensis</i>	Savannah Sparrow	-	-
Junco ardoisé	<i>Junco hyemalis</i>	Dark-eyed Junco	-	-
FALCONIDAE				
Crécerelle d'Amérique	<i>Falco sparverius</i>	American Kestrel	-	-
FRINGILLIDAE				
Chardonneret jaune	<i>Carduelis tristis</i>	American Goldfinch	-	-
Roselin familier	<i>Haemorbous</i>	House Finch	-	-
HIRUNDINIDAE				
Hirondelle rustique	<i>Hirundo rustica</i>	Barn Swallow	T	-
Hirondelle à front blanc	<i>Petrochelidon pyrrhonota</i>	American Cliff Swallow	-	-
Hirondelle bicolore	<i>Tachycineta bicolor</i>	Tree Swallow	-	-
ICTERIDAE				
Carouge à épaulettes	<i>Agelaius phoeniceus</i>	Red-winged Blackbird	-	-
Oriole de Baltimore	<i>Icterus galbula</i>	Baltimore Oriole	-	-
Quiscale bronzé	<i>Quiscalus quiscalu</i>	Common Grackle	-	-
LARIDAE				
Goéland à bec cerclé	<i>Larus delawarensis</i>	Ring-billed Gull	-	-
MIMIDAE				
Moqueur chat	<i>Dumtella carolinensis</i>	Gray Catbird	-	-
PARIDAE				
Mésange à tête noire	<i>Poecile atricapillus</i>	Black-capped Chickadee	-	-
PARULIDAE				
Paruline à croupion jaune	<i>Setophaga coronata</i>	Myrtle Warbler	-	-
Paruline à tête cendrée	<i>Setophaga magnolia</i>	Magnolia Warbler	-	-

Species – Birds				
French name	Latin name	English name	Status	
			Ca	Qc
Paruline bleue	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	-	-
Paruline flamboyante	<i>Setophaga ruticilla</i>	American Redstart	-	-
Paruline jaune	<i>Dendroica petechia</i>	Yellow Warbler	-	-
Paruline masquée	<i>Geothlypis trichas</i>	Common Yellowthroat	-	-
Paruline noir et blanc	<i>Mniotilta varia</i>	Black-and-white Warbler	-	-
PASSERIDAE				
Moineau domestique	<i>Passer domesticus</i>	House Sparrow	-	-
PICIDAE				
Grand pic	<i>Dryocopus pileatus</i>	Pileated Woodpecker	-	-
Pic chevelu	<i>Picoides villosus</i>	Hairy Woodpecker	-	-
Pic flamboyant	<i>Colaptes auratus</i>	Northern Flicker	-	-
Pic maculé	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	-	-
Pic mineur	<i>Picoides pubescens</i>	Downy Woodpecker	-	-
REGULIDAE				
Roitelet à couronne dorée	<i>Regulus satrapa</i>	Golden-crowned Kinglet	-	-
Roitelet à couronne rubis	<i>Regulus calendula</i>	Ruby-crowned Kinglet	-	-
SCOLOPACIDAE				
Chevalier grivelé	<i>Actitis macularius</i>	Spotted Sandpiper	-	-
Bécassine de Wilson	<i>Gallinago delicata</i>	Wilson's Snipe	-	-
SITTIDAE				
Sittelle à poitrine blanche	<i>Sitta carolinensis</i>	White-breasted Nuthatch	-	-
STRIGIDAE				
Petit-duc maculé	<i>Megascops asio</i>	Eastern Screech Owl	-	-
TROCHILIDAE				
Colibri à gorge rubis	<i>Archilochus colubris</i>	Ruby-throated Hummingbird	-	-
TROGLODYTIDAE				
Troglodyte familier	<i>Troglodytes aaron</i>	House Wren	-	-
TURDIDAE				
Grive fauve	<i>Catharus fuscescens</i>	Veery	-	-

Species – Birds				
French name	Latin name	English name	Status	
			Ca	Qc
Merle d'Amérique	<i>Turdus migratorius</i>	American Robin	-	-
TYRANNIDAE				
Moucherolle phébi	<i>Sayornis phoebe</i>	Eastern Phoebe	-	-
Pioui de l'Est	<i>Contopus virens</i>	Eastern Wood Pewee	SC	-
Tyran huppé	<i>Myiarchus crinitus</i>	Great-crested Flycatcher	-	-
Tyran tritri	<i>Tyrannus tyrannus</i>	Eastern Kingbird	-	-
VIREONIDAE				
Viréo à œil rouge	<i>Vireo olivaceus</i>	Red-eyed Vireo	-	-
Viréo à tête bleue	<i>Vireo solitarius</i>	Blue-headed Vireo	-	-
Viréo mélodieux	<i>Vireo gilvus</i>	Eastern Warbling Vireo	-	-

Rare or noteworthy bird species observed

- Eastern screech owl (*Megascops asio*)
- Lincoln's sparrow (*Melospiza lincolni*)
- Wilson's snipe (*Gallinago delicata*)

OBSERVATIONS TO REPORT?

If you spot a plant or bird of interest, please contact the Organisme de bassin versant de la baie Missisquoi (OBVBM).

Elements to note: species, date, place, photo if possible

For information or to send photos: obvbm@bellnet.ca

Telephone: 450-248-0100

For observations of amphibians or reptiles (including road deaths of turtles), please contact Amphibia-Nature.

Elements to note: species, date, place, photo if possible

For information or to send photos: info@amphibia-nature.org

Telephone: 514-521-6121

Thank you for sharing your observations!

Juvenile spiny softshell (*Apalone spinifera*) hatched in incubation



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Adult male spiny softshell (*Apalone spinifera*)



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