PROPOSED

Species at Risk Act
Recovery Strategy Series

Recovery Strategy for the Green-scaled Willow (*Salix chlorolepis*) in Canada

Green-scaled Willow

2010

Canada

Recommended citation :

Environment Canada. 2010. Recovery Strategy for the Green-scaled Willow (*Salix chlorolepis*)) in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Environment Canada. Ottawa. v + 14 p.

For copies of the recovery strategy or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the Species at Risk Public Registry (www.sararegistry.gc.ca).

Cover illustration: Frédéric Coursol

Également disponible en français sous le titre
“ Programme de rétablissement du saule à bractées vertes (*Salix chlorolepis*) au Canada [Proposition] ”

ISBN
Catalogue No.

PREFACE

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996) agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c. 29) (SARA), the federal competent ministers are responsible for the preparation of recovery strategies for listed Extirpated, Endangered, and Threatened species and are required to report on progress within five years.

The Minister of the Environment is the competent minister for the recovery of the Green-scaled Willow and has prepared this strategy, as per section 37 of SARA. It has been prepared in cooperation with the Government of Quebec. The administrators of Quebec's Gaspésie Provincial Park were consulted during the development of this document.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Environment Canada or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing the strategy for the benefit of the Green-scaled Willow and Canadian society as a whole.

This recovery strategy will be followed by one or more action plans that will provide information on recovery measures to be taken by Environment Canada and other jurisdictions and/or organizations involved in the conservation of the species. Implementation of this strategy is subject to appropriations, priorities and budgetary constraints of the participating jurisdictions and organizations.

ACKNOWLEDGEMENTS

Appreciation and thanks are extended to Jacques Labrecque of Quebec's Ministère du Développement durable, de l'Environnement et des Parcs (Department of sustainable development, environment and parks) for providing the most recent data on the Green-scaled Willow. Thanks also go to Claude Isabel of Quebec's Gaspésie Provincial Park for the update on threats to the Green-scaled Willow, and to Guy Jolicoeur of the Ministère du Développement durable, de l'Environnement et des Parcs for his input. Special thanks are extended to Frédéric Coursol for drafting the first version of this document and to all members of the recovery team for their constructive comments on this recovery strategy. Thanks to François Shaffer (Canadian Wildlife Service, Quebec Region, Environment Canada) for the final editing of the document.

SUMMARY

Green-scaled Willow is a branched dwarf shrub, typically less than 30 cm tall, with erect branchlets. It was designated threatened in Canada by the Committee on the Status of Endangered Wildlife in Canada in April 2006 and was added to Schedule 1 of the *Species at Risk Act* in December 2007. The species was also designated threatened in Quebec in 1995 under the Quebec *Act Respecting Threatened or Vulnerable Species*. It is endemic to Quebec and is restricted to Mount Albert in Quebec's Gaspésie Provincial Park. The total population is estimated at 300 plants.

The known habitat of Green-scaled Willow is characterized by low vegetation cover on rocky, stabilized slopes of alpine serpentine. The species grows between pebbles and gravel or on thin dry or moderately moist soils exposed to full sunlight, at elevations of between 825 and 1050 m, with a large concentration of plants surveyed at elevations of between 925 and 950 m.

The greatest threat to the Green-scaled Willow is trampling. Natural or human-triggered avalanches also pose a threat to some sub-populations. The species can also be attacked by Rusty Tussock Moths or by mites or aphids.

There are still gaps in the knowledge about this species. For instance, there are no data on its demographic characteristics, such as the size, nature and viability of the soil seed bank, reproduction and mortality rates, or population viability. The demographic trends of a species are a determining factor in effective management, but they have not yet been described for this species.

The long-term population and distribution objectives for Green-scaled Willow are to maintain its population and distribution in Canada at current levels. To this end, the preferred strategies are to raise the awareness and encourage the involvement of affected stakeholders, to carry out the necessary surveys and monitoring, and to conduct relevant research to obtain missing information, which is essential to the recovery of the species.

The critical habitat of the Green-scaled Willow is identified in this recovery strategy as being the serpentine rock outcrop of Mount Albert in Quebec's Gaspésie Provincial Park.

An action plan for the Green-scaled Willow will be posted on the Species at Risk Public Registry within five years of the publication of the recovery strategy.

SUMMARY OF RECOVERY FEASIBILITY

Under section 40 of the *Species at Risk Act*, the competent minister must determine whether recovery of the listed wildlife species is technically and biologically feasible. On the basis of the following criteria established by the Government of Canada (2009), recovery of Green-scaled Willow is considered biologically and technically feasible.

1. **Individuals of the wildlife species that are capable of reproduction are available now, or in the foreseable future, to sustain the population or improve its abundance.**
   Yes. In all known subpopulations, individuals capable of reproduction are available to maintain or increase populations.

2. **Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.**
   Yes. However, there is little potential Green-scaled Willow habitat other than that on Mount Albert in Quebec's Gaspésie Provincial Park.

3. **The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.**
   Yes. None of the threats to the species and its habitat are unavoidable or prevent the recovery of the species.

4. **Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.**
   Yes. The Green-scaled Willow can be protected through the management of trails by Gaspésie Provincial Park and through avalanche awareness programs.

TABLE OF CONTENTS

1. SPECIES ASSESSMENT INFORMATION FROM COSEWIC

Date of Assessment: April 2006

Common Name (population): Green-scaled Willow

Scientific Name: *Salix chlorolepis*

COSEWIC Status: Threatened

Reasons for Designation: An endemic shrub restricted to the serpentine outcrops of Mount Albert in Gaspésie Provincial Park, Quebec. The low numbers of the shrub located on a single mountain top are at risk from stochastic events, potential impact of the exotic tussock moth, and limited impacts from hikers along the Appalachian Trail.

Canadian Occurrence: Quebec

COSEWIC Status History: Designated threatened in April 2006. Assessment based on a new status report.

2. SPECIES STATUS INFORMATION

The Green-scaled Willow is designated threatened and has been protected since 1995 under the Quebec *Act Respecting Threatened or Vulnerable Species*. It has been has assigned a conservation status rank of critically imperiled at the global (G1), national (N1) and provincial (S1) levels (NatureServe 2009). The Green-scaled Willow is endemic to Quebec, which means that 100% of the occurrences are located in that province.

3. SPECIES INFORMATION

3.1 Description of the Species

The Green-scaled Willow is a branched dwarf shrub with erect branchlets, and is typically less than 30 cm tall. The simple leaves are short-stalked and are initially covered with a whitish waxy coating on both surfaces, with the upper surface subsequently turning green. They are up to 25 mm long. The catkin bracts are hairless, olive green in colour and persist through to the maturation of the capsule. The catkins are short-stalked and measure 5 to 13 mm in length. The fruit is a short-stalked, hairless capsule 4 mm long (COSEWIC 2006). The seeds have a tuft of silky hairs that facilitates wind dispersal.

3.2 Population and Distribution

The Green-scaled Willow is endemic to Quebec and occurs only on Mount Albert in Gaspésie Provincial Park (Figure 1) (COSEWIC 2006; Labrecque and Lavoie 2002; Centre de données sur le patrimoine naturel du Québec 2008). The species has been recorded to date on the slopes of 10 glacial cirques at the top of Mount Albert (COSEWIC 2006).

The species' population is estimated at about 300 plants. However, a comprehensive survey of all potential habitats has never been conducted, and the size of the population and its range are therefore not precisely known. Individuals are grouped into four sub-populations (COSEWIC 2006). The Green-scaled Willow does not appear to have been affected by changes in population size or density (COSEWIC 2006). However, it should be noted that very little monitoring of this species has been carried out, such that the actual population trend is uncertain.

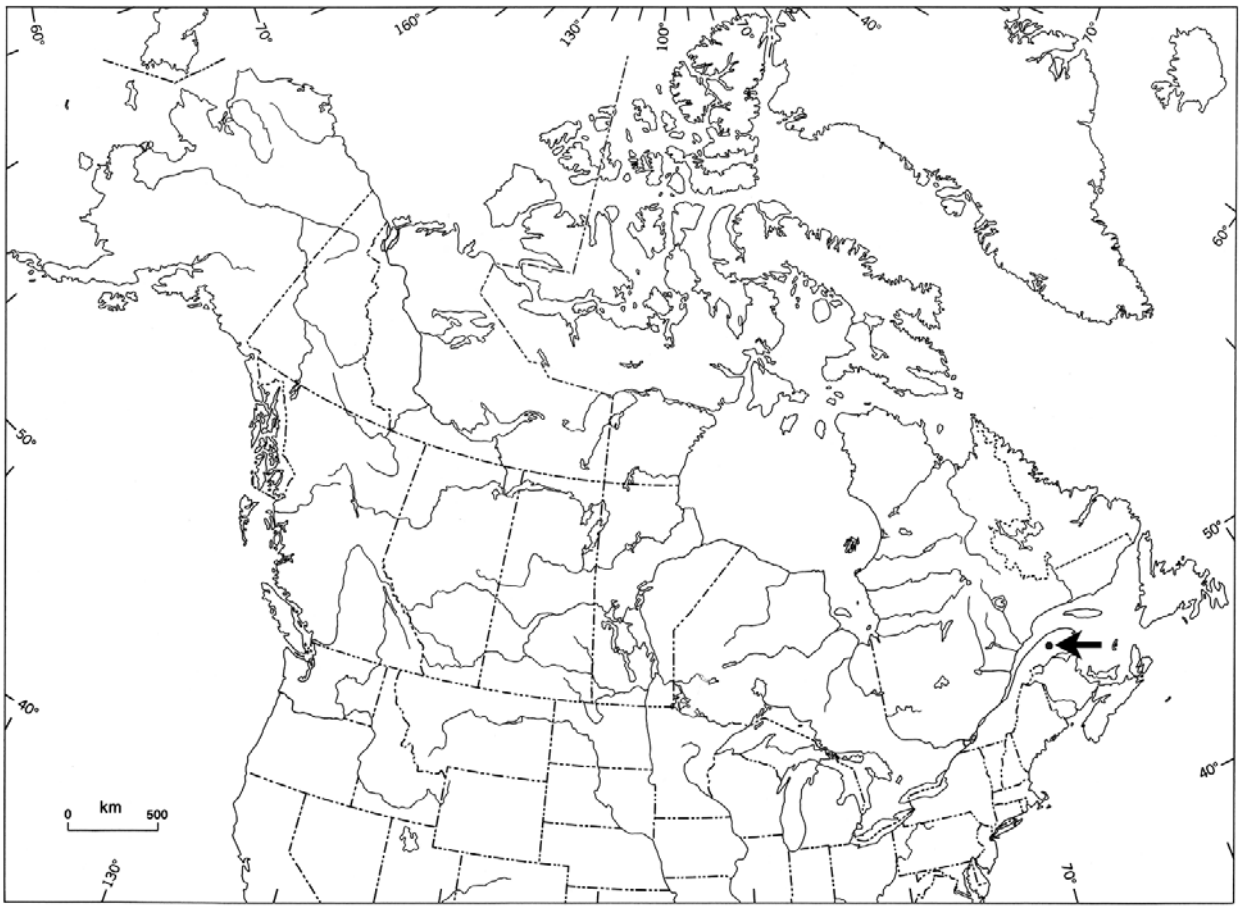

Figure 1. Global range of Green-scaled Willow (Source: COSEWIC 2006)

3.3 Needs of Green-scaled Willow

The Green-scaled Willow is a dioecious species, which means there are separate male and female plants. It flowers from early July to mid-August, following leaf development. Fruiting begins in the last week of July and continues until the first frosts (early September). The species is typically entomophilous[1] and anemophilous[2], which would explain the relatively high frequency of the hybrid (*Salix* x *gaspensis*), the result of a cross between the Green-scaled Willow and Short-fruit Willow (*S. brachycarpa*).

The habitat of the Green-scaled Willow is located in the alpine belt and is characterized by low vegetation cover on stabilized rocky serpentine slopes. The species grows between pebbles and gravel on thin dry or moderately moist soils exposed to full sunlight (Lavoie and Fleurbec 1995; Coursol 2001). The species' habitat is strongly associated with elevations ranging from 825 to 1050 m, with a high concentration of plants at elevations of 925 to 950 m.

[1] Pollinated by insects.
[2] Pollinated by the wind.

4. THREATS

4.1 Threat Assessment

Table 1. Threat Assessment Table

Threat	Level of concern[1]	Extent	Occurrence	Frequency	Severity[2]	Causal certainty[3]
Disturbance or damage						
Human trampling	Moderate	Localized	Current	Seasonal	Low	High
Climate and natural disasters						
Avalanche	Low	Localized	Anticipated	Unknown	Unknown	Low
Natural activities or processes						
Herbivory by Rusty Tussock Moth	Low	Localized	Current	Seasonal	Low	Low
Attack by mites and aphids	Low	Localized	Unknown	Seasonal	Unknown	Low

[1] *Level of concern: means that managing the threat is a concern (high, moderate or low) for recovery of the species, taking into account the population and distribution objectives. This criterion takes into account the assessment of all information appearing in the table).*

[2] *Severity: indicates the population-level effect (High: very large population-level effect, moderate, low or unknown).*

[3] *Causal certainty: indicates the level of information available on the threat (High: the available evidence establishes a strong link between the threat and the pressures on population viability; Moderate: a correlation exists between the threat and population viability, e.g., an expert opinion; Low: assumed or plausible threat).*

4.2 Description of Threats

Disturbance or damage

Human trampling

Most sub-populations of Green-scaled Willow are generally inaccessible and no human-related threats are anticipated, except in the case of the sub-population located near hiking trails in the Vallée du Diable (La Grande Cuve). The sub-population located at the western edge of La Grande Cuve, which has been estimated at 200 plants by the Centre de données sur le patrimoine naturel du Québec (CDPNQ), is adjacent to the International Appalachian Trail on Mount Albert, and is highly exposed to human trampling. Hikers take shortcuts to get around obstacles in the trail and, in the long term, such off-trail use can result in trail widening and can damage or destroy plants in the surrounding area. In the worst-case scenario, between 10 and 20 plants could be affected by hikers.

Climate and natural disasters

Avalanches

Avalanches, whether natural or human-triggered (skiers), are likely to harm the species, either by breaking the plants or altering the upper layer of soil, where the plants have their roots. Off-trail downhill skiing is an activity that is gaining popularity. Skiers currently have access to only a few sectors, but may eventually wish to use other sectors of Mount Albert. This could result in an increased number of avalanches, which would require an assessment of the severity of disturbances to Green-scaled Willow habitat due to avalanches. However, this threat appears to be low.

Natural activities or processes

Herbivory by Rusty Tussock Moth

Herbivory by Rusty Tussock Moth (*Orgyia antiqua*), a member of the family Lymantriidae (Lepidoptera), on the Green-scaled Willow has been observed a number of times, resulting in serious damage to the foliage. At this time, it is impossible to determine the impact of herbivory by these moths on the Green-scaled Willow population, but it appears to be relatively low (McIntosh 2006). McIntosh, an insect and disease specialist, has indicated that, given the known behaviour of this moth and the capacity of willows to sucker and to survive even severe herbivory, the moth would be unlikely to kill willow plants. In addition, this moth is prone to population crashes after hatching due to the rapid development of fatal viruses (McIntosh 2006).

Attack by mites and aphids

An unidentified gall has been observed a number of times on the Green-scaled Willow. The galls are irregular and are likely caused by mites or aphids (Goulet 2005). Their impact on Green-scaled Willow is unknown, but Sacchi et al. (1988) report that flower bud production is reduced by 43% compared to intact stems and that seed production per individual is reduced by between 10% and 50% in the case of *Salix lasiolepis*.

5. POPULATION AND DISTRIBUTION OBJECTIVES

The long-term objectives are to maintain the Canadian population and distribution of Green-scaled Willow at their current levels.

There is not sufficient information to quantify specific long-term population and distribution targets. The studies that are planned in order to address the major knowledge gaps will help to specify the population and distribution targets and objectives.

6. BROAD STRATEGIES AND APPROACHES FOR MEETING RECOVERY OBJECTIVES

6.1 Actions Already Completed or Underway

To reduce human trampling, the portion of the International Appalachian Trail in La Grande Cuve has been modified to direct hikers towards boulder fields rather than to areas with low vegetation cover. Additional trail markings have also been added to facilitate the identification of the trail. It is not known at this time how successful these measures will be. The park managers estimate that approximately 450 hikers use the trail in summer (Isabel 2009).

An information session and discovery activities have been organized and presented by the Gaspésie Provincial Park to raise public awareness of the Green-scaled Willow. In addition, to reduce the risk of avalanches, information is regularly provided to park users through the Centre d'avalanche de La Haute-Gaspésie and an information bulletin is issued three times a week in winter by park authorities (Isabel 2009).

To evaluate the ecological integrity of Gaspésie Provincial Park, an indicator of the status of species at risk has been developed and is used to conduct monitoring at two locations near the sub-populations. Several dozen individuals are surveyed every five years. The first survey was conducted in 2005 and the second one during the summer of 2010 (Isabel 2010).

In 2004, cuttings taken from a male plant and female plant were successfully cultivated at the Montréal Botanical Garden as part of the Urgence Conservation project, which is aimed at developing a proper reproduction method. Since then, additional plants have been grown from cuttings in order to increase the population in cultivation at the Montréal Botanical Garden. Some of these plants have even flowered just two years after cutting propagation (Coursol 2009).

6.2 Strategic Direction for Recovery

The following table presents the recommended broad strategies and approaches for meeting the population and distribution objectives for the Green-scaled Willow in Canada.

Table 2. Recovery Planning Table

Threat or limiting elements	Priority	Broad strategy for recovery	General description of the broad research and management approaches
Trampling and avalanches	Urgent	Reduce the two main threats to the species and its habitat	• Develop the necessary strategies to reduce the two threats, including a communication and awareness strategy aimed at park users. • Integrate these strategies into the management plans and administrative documents of Gaspésie Provincial Park.
Knowledge gap related to abundance and distribution	Urgent	Identify the species' distribution and population size and trend	• Establish monitoring protocols and perform counts of known sub-populations. • Conduct research to locate new sub-populations. • Delineate the spatial distribution of the various sub-populations.
Knowledge gap related to demographic characteristics	Medium	Identify the demographic characteristics of the species	•Identify, design and conduct studies required for specifying the demographic characteristics of the species (existence of seed banks, germination rates, reproduction and mortality rates, viability of sub-populations, interannual variation in seed production).
Herbivory by Rusty Tussock Moth and attack by mites and aphids	Low	Acquire the necessary knowledge on threats by insects and mites	•Identify, design and conduct the necessary studies to identify vulnerability to herbivory by moths and attack by mites and aphids.

6.3 Narrative to Support the Recovery Planning Table

Reduce the two main threats to the species and its habitat

To ensure effective action, it would be advisable to begin by developing the necessary strategies to reduce the two main threats to the species and its habitat, namely avalanches—both natural and human-triggered—and trampling. The areas used by hikers and skiers may be periodically examined in terms of the species' needs and changes in hiking and skiing. If the activities pose a threat to the species, a decision will have to be made to relocate or prohibit these activities. The strategies should include a communications and awareness component aimed at park users. A stewardship component could be developed that would involve skiers and hikers in discussions on the protection of the species. Once completed, the strategies will have to be taken into account in the drafting or updating of the management plan or master plan of Gaspésie Provincial Park, and in all administrative documents relating to protected areas associated with the species' critical habitat.

Identify the species' distribution and population size and trend

A comprehensive study to identify the abundance and distribution of the Green-scaled Willow on all parts of Mount Albert will provide a better picture of the species' status and ensure more effective protection of sensitive areas. To this end, a method for assessing the species' abundance will have to be developed. Judging from counts conducted in 2004 (COSEWIC 2006), which indicate a small number of individuals in most sub-populations, it is possible that the La Grande Cuve sub-population is overestimated. The assessment of the abundance of this sub-population would give a better estimate of the size of the species' population. In addition, a number of potential habitats on the south and west slopes of Mount Albert, or on Mount Olivine, which is also in Gaspésie Provincial Park, have not yet been visited. The spatial extent of each sub-population should also be determined in order to produce a precise map of the species' distribution. All of the above work is essential in order to determine the main causes of the variations in the size of the populations and to assess whether recovery efforts are effective. Criteria for identifying a decline in the population will also have to be established. The population trend will have to be precisely determined in order to know with certainty whether the population is actually stable. The data collected will be entered into the Centre de données sur le patrimoine naturel du Québec (CDPNQ).

Identify the demographic characteristics of the species

It will be important to design and conduct the studies required to improve our understanding of the demographic characteristics of the population, particularly with respect to the existence of seed banks, germination rates, the frequency of reproduction by seeds, the importance of vegetative reproduction, reproduction and mortality rates, and viability of sub-populations. To this end, field work or in situ or ex situ trials may have to be carried out.

Acquire the necessary knowledge on threats by insects and mites.

We must increase our knowledge of the vulnerability of the species to herbivory by Rusty Tussock Moth and of attack by mites and aphids.

7. CRITICAL HABITAT

7.1 Critical Habitat Identification

The habitat of the Green-scaled Willow is located in the alpine belt and is characterized by low vegetation cover on stabilized rocky serpentine slopes. The species grows between pebbles and gravel or on thin dry or moderately moist soil exposed to full sunlight (Lavoie and Fleurbec 1995; Coursol 2001). Historical collections mention the presence of Green-scaled Willow in bog areas on the summit plateau of Mount Albert (Lavoie and Fleurbec 1995). The habitat of the Green-scaled Willow is strongly associated with elevations ranging from 825 to 1050 m, with a high concentration of individuals at elevations of 925 to 950 m.

The critical habitat of the Green-scaled Willow is identified in this document as the rocky serpentine rock outcrop of Mount Albert (Figure 2). The total area of this outcrop is roughly 2730 ha. The entire known population of the species is included within the boundaries of this outcrop. New sub-populations that may eventually be discovered will be added to the identification of critical habitat, if they are located outside the critical habitat identified above.

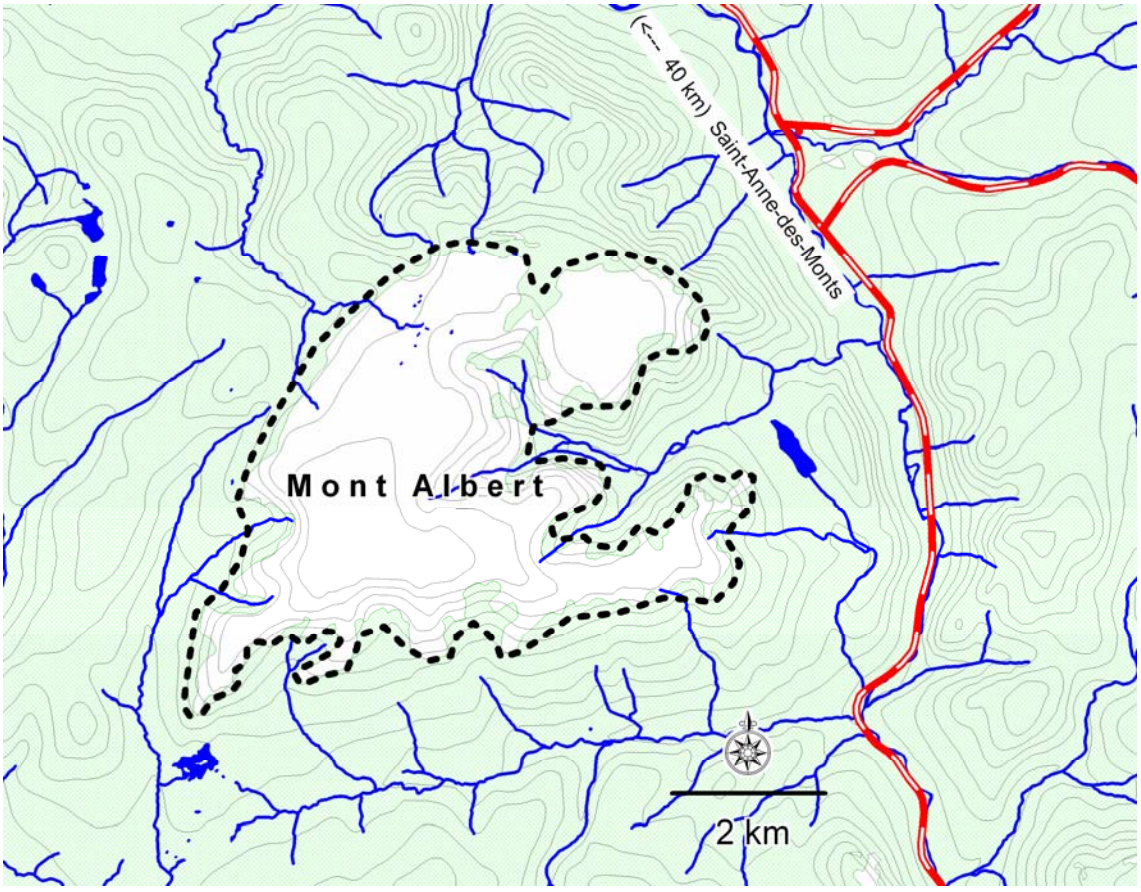

Figure 2. Extent of Critical Habitat for the Green-scaled Willow in Quebec (Source: adapted from COSEWIC 2006).

7.2 Activities Likely to Result in Destruction of Critical Habitat

There are very few activities that are likely to destroy the critical habitat of the Green-scaled Willow, since it is located in the Gaspésie Provincial Park in an area of identified as of « high conservation priority» as well as in an area identified as of « extremely high conservation priority » (Ministère du Loisir, de la Chasse et de la Pêche 1987). In addition, most individuals are generally inaccessible. Nonetheless, certain human activities could potentially contribute to destroying the species' critical habitat, such as activities that result in soil compaction or alteration of the upper soil layer.

Activities that could result in the destruction of the species' critical habitat include, but are not limited to

1) Off-trail hiking: the most important sub-population of Green-scaled Willow is located at the western edge of Vallée du Diable. This sub-population, which the CDPNQ estimates at 200 plants, is adjacent to the International Appalachian Trail on Mount Albert, and is partially exposed to trampling by hikers. Moreover, it appears that some users take shortcuts to get around obstacles in the trail. In the long term, such off-trail use can result in trail widening and can damage or destroy surrounding individuals. Trampling can also lead to soil compaction.

2) Off-trail downhill skiing: Off-trail downhill skiing is an activity that is gaining popularity. It is carried out primarily at the Mur des Patrouilleurs and, to a lesser extent, at La Grande Cuve. The Green-scaled Willow is known to occur at the latter site, but use of the site by skiers is very limited. Skiers may eventually wish to use other sectors of Mount Albert, which could increase the number and frequency of avalanches. Avalanches can modify the upper soil layer, where the plants have their roots.

8. MEASURING PROGRESS

The performance indicators presented below propose a means of determining and measuring the progress towards the population and distribution objectives. The specific progress made towards the implementation of the recovery strategy will be measured against indicators set out in the subsequent action plans.

The success of the recovery strategy will be evaluated every five years on the basis of the following performance indicators:

- Maintenance of the Green-scaled Willow population at its current level of approximately 300 individuals;
- Maintenance of the current distribution of Green-scaled Willow.

9. STATEMENT ON ACTION PLANS

An action plan for the Green-scaled Willow will be posted on the Species at Risk Public Registry within five years of the publication of the recovery strategy. It will describe the actions to be taken to meet the objectives set out in this recovery strategy.

10. REFERENCES

Centre de données sur le patrimoine naturel du Québec. 2008. Les plantes vasculaires menacées ou vulnérables du Québec. 3rd edition. Gouvernement du Québec, ministère du Développement durable, de l'Environnement et des Parcs, Direction du patrimoine écologique et des parcs, Quebec. 180 p.

Coursol, F. 2001. Fiche d'information sur le saule à bractées vertes. Government of Quebec. Website: http://www.mddep.gouv.qc.ca/biodiversite/especes/saule/saule.htm [accessed December 2009].

Coursol, F. 2009. Pers. comm. Assistant botanist, Research and Scientific Development Division, Montréal Botanical Garden, Montréal, Quebec.

[COSEWIC] Committee on the Status of Endangered Wildlife in Canada. 2006. COSEWIC Assessment and Status Report on the Green-scaled Willow (*Salix chlorolepsis*) in Canada. Ottawa (ON): Committee on the Status of Endangered Wildlife in Canada. 22 + vii p. (http://www.sararegistry.gc.ca/status/status_e.cfm).

Goulet, H. 2005. Pers. comm. Research scientist, Insect and Arachnid Systematics, Eastern Cereal and Oilseed Research Centre, Agriculture and Agri-Food Canada, Government of Canada, Ottawa. E-mail correspondence to André Payette, February 2005.

Government of Canada. 2009. *Species at Risk Act* Policies, Overarching Policy Framework [Draft]. *Species at Risk Act* Policies and Guidelines Series. Ottawa (ON): Environment Canada. 38 p.

Isabel, C. 2010. Pers. comm. Head of the Conservation and Education Service of Gaspésie Provincial Park. Sainte-Anne-des-Monts, Quebec. Email correspondence to François Shaffer, September 2010.

Labrecque, J. and G. Lavoie. 2002. Les plantes vasculaires menacées ou vulnérables du Québec. Québec (QC): Gouvernement du Québec, ministère de l'Environnement, Direction du patrimoine écologique et du développement durable. 200 p.

Lavoie, G. and Fleurbec / G. Lamoureux, S. Lamoureux. 1995. Le saule à bractées vertes, espèce menacée au Québec. Québec (QC): Gouvernement du Québec, ministère de l'Environnement et de la Faune, Direction de la conservation et du patrimoine écologique. 7 p.

McIntosh, R. 2006. Pers. comm. Insect and disease specialist for the Saskatchewan Forest Service, Saskatchewan Ministry of the Environment. Assessment of the impacts of herbivory on *Salix chlorolepis* by Rusty Tussock Moth, presented to Rob Wright, PhD (member of COSEWIC, Saskatchewan), at the April 2006 COSEWIC Species Assessment Meeting.

Ministère du Loisir, de la Chasse et de la Pêche. 1987. Parc de la Gaspésie : le Plan directeur. Ministère du Loisir, de la Chasse et de la Pêche, Direction de l'aménagement, Service des plans directeurs. 173 p.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [Web application], version 4.0. Arlington (VA): NatureServe. Website: http://www.natureserve.org/explorer [accessed December 2009].

Sacchi, C.F., P.W. Price, T.P. Craig and J.K. Itami. 1988. Impact of shoot gall attack on sexual reproduction in the arroyo willow. Ecology 69(6): 2021-2030.

Tardif, B., G. Lavoie and Y. Lachance. 2005. Atlas de la biodiversité du Québec. Les espèces menacées ou vulnérables. Québec (QC): Gouvernement du Québec, ministère du Développement durable, de l'Environnement et des Parcs, Direction du développement durable, du patrimoine écologique et des parcs. 60 p.

APPENDIX A: EFFECTS ON THE ENVIRONMENT AND OTHER SPECIES

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans and program proposals to support environmentally sound decision-making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below.

The potential for this recovery strategy to inadvertently lead to adverse effects on the environment and other species was considered. Given that the recommended activities are limited to non-intrusive activities, such as population surveys and monitoring, it may be concluded that this strategy will not entail any significant adverse effects.

The recommended activities may also help the species noted below since the main threats to the Green-scaled Willow are much the same as those affecting other species. Mountain Holly Fern (*Polystichum scopulinum*) is designated threatened by COSEWIC and is listed in Schedule 1 of SARA. It is also designated threatened in Quebec (*Act Respecting Threatened or Designated Species*), along with Indian's Dream (*Aspidotis densa*), Serpentine Stitchwort (*Minuartia marcescens*) and Dwarf Arctic Groundsel (*Solidago simplex* subsp. *simplex* var. *chlorolepis*). These four species share the same habitat as the Green-scaled Willow on Mount Albert. A number of species likely to be designated threatened or vulnerable in Quebec also occur on Mount Albert (Tardif et al. 2005), including Aleutian Maidenhair (*Adiantum aleuticum*), Swamp Thistle (*Cirsium muticum* var. *monticolum*) and Rough Fescue (*Festuca altaica*).

APPENDIX B: RECORD OF COLLABORATION AND CONSULTATION

The following stakeholders and organizations participated in the development of the recovery strategy for Green-scaled Willow, either in the preparation of the documents or in consultations held by Environment Canada:

Frédéric Coursol
Scientific Research and Development Division
Montréal Botanical Garden

Claude Isabel
Head, Conservation and Education
Gaspésie Provincial Park

Patricia Desilets and Guy Jolicoeur
Ecosystems and Biodiversity
Habitat Heritage and Parks Sector
Ministère du Développement durable, de l'Environnement et des Parcs

François Shaffer
Canadian Wildlife Service – Quebec Region
Environment Canada

A draft of the recovery strategy for Green-scaled Willow was sent to the following Aboriginal communities and organizations to obtain their feedback prior to its posting on the SARA Public Registry:

Listuguj Mi'gmaq Government

Micmacs of Gesgapegiag

Mi'gmawei Mawiomi Secretariat