

# Action Plan for the Victorin's Gentian (*Gentianopsis virgata* ssp. *victorinii*) in Canada

## Victorin's gentian



2014

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For copies of the action plan, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, recovery strategies, plans and other related recovery documents, please visit the [Species at Risk Public Registry](#).

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## Preface

The federal, provincial, and territorial government signatories under the [Accord for the Protection of Species at Risk \(1996\)](#)<sup>1</sup> agreed to establish complementary legislation and programs that provide for the 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 action plans for species listed as Extirpated, Endangered, and Threatened for which recovery has been deemed feasible. They are also required to report on progress five years after the publication of the final document on the SAR Public Registry.

Under SARA, one or more action plan(s) provides the detailed recovery planning that supports the strategic direction set out in the recovery strategy for the species. The plan outlines what needs to be done to achieve the population and distribution objectives (previously referred to as recovery goals and objectives) identified in the recovery strategy, including the measures to be taken to address the threats and monitor the recovery of the species, as well as the proposed measures to protect critical habitat that has been identified for the species. The action plan also includes an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation. The action plan is considered one in a series of documents that are linked and should be taken into consideration together. Those being the COSEWIC status report, the recovery strategy, and one or more action plans.

The Minister of the Environment and the Minister responsible for Parks Canada Agency are the competent ministers under SARA for the Victorin's Gentian and have prepared this action plan to implement the recovery strategy, as per section 47 of SARA. To this extent possible, it has been prepared in cooperation with the Government of Quebec (Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (MDDEFP)).

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 and actions set out in this action plan and will not be achieved by Environment Canada, Parks Canada Agency, or any other jurisdiction, alone. All Canadians are invited to join in supporting and implementing this action plan for the benefit of the Victorin's Gentian and Canadian society as a whole.

Implementation of this action plan is subject to the appropriations, priorities and budgetary constraints of the participating jurisdictions and organizations.

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<sup>1</sup>[http://www.sararegistry.gc.ca/approach/strategy/accord\\_text\\_e.cfm](http://www.sararegistry.gc.ca/approach/strategy/accord_text_e.cfm)

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## Executive Summary

This action plan complements the Recovery Strategy for Victorin's Gentian (*Gentianopsis virgata* ssp. *victorinii*) in Canada (Environment Canada 2012). The proposed recovery measures aim to implement all the general strategies and approaches to recovery set out in the recovery strategy for all the populations and suitable habitat for the species in Canada.

The critical habitat for Victorin's Gentian is identified in the recovery strategy. It consists of all suitable habitat in the mid-littoral zone up to the adjacent shore, thereby including the upper littoral zone of the 14 priority target occurrences. Because we still do not know to what extent these parts of the critical habitat contribute to meeting the long-term population and distribution objectives, a schedule of studies has been proposed to fill the knowledge gaps on population viability and dynamics. This action plan considers this aspect in the development of necessary recovery measures and therefore does not identify any additional critical habitat for the time being.

Critical habitat identified to date is located on both federal and non-federal land. Proposed measures to protect critical habitat are presented in section 1.4.

The recovery measures proposed for Victorin's Gentian include four strategies: 1) conservation of the species, its suitable habitat and the adjacent riparian area; 2) surveys and monitoring; 3) research; and 4) communication and outreach. A schedule outlining the priorities for the implementation of these measures has been developed and a socio-economic evaluation has been conducted. Low-to-medium environmental, social and economic impacts (positive for the most part) are expected at the regional level in the areas targeted by the action plan. They should generate few additional land use constraints beyond those stipulated under the current legislative and regulatory framework. The direct cost of implementing this action plan is estimated at \$962,000 for 2014–2019.

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# 1. Recovery Actions

## 1.1 Context and Scope of the Action Plan

Victorin's Gentian (*Gentianopsis virgata* ssp. *victorinii*) is an herbaceous species endemic to Quebec and grows mainly along the upper shoreline of the freshwater or slightly brackish marshes of the St. Lawrence River. The species was assessed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2004, and has been listed as such in Schedule 1 of the *Species at Risk Act* (SARA) since 2005. In Quebec, the species has been listed as threatened under the *Act respecting threatened or vulnerable species* since 2001.

The population of Victorin's Gentian is estimated at between 1700 and 6000 individuals. To date, 45 occurrences of the species have been documented along the St. Lawrence River between Deschambault and Lotbinière to the west and Saint-Roch-des-Aulnaies and Île-aux-Oies to the east. The Centre de données sur le patrimoine naturel du Québec (CDPNQ) contains up-to-date population data.

Habitat loss, through shoreline filling and infrastructure development for example, is the greatest threat facing Victorin's Gentian. Human trampling, invasive plants, mowing and flower picking, as well as overabundant animal populations also threaten its occurrences.

The population and distribution objectives listed in the Recovery Strategy for the Victorin's Gentian (*Gentianopsis virgata* ssp. *victorinii*) in Canada (Environment Canada 2012) are twofold. The short-term objectives are to maintain and, if possible, increase the population size and area of occupancy of Victorin's Gentian within each of the 14 occurrences identified as priority targets. The long-term objectives are to maintain and, if possible, increase the population size and area of occupancy of Victorin's Gentian throughout its range in Canada.

This action plan seeks to fully implement the general recovery strategies and approaches proposed in the recovery strategy for all populations and suitable habitat for the species in Canada. It complements the *Plan de conservation du gentianopsis élané variété de Victorin* (*Gentianopsis procera* subsp. *macounii* var. *victorinii*) (Jolicoeur and Couillard 2007; currently under revision) published by the Government of Quebec. The conservation plan includes 17<sup>2</sup> occurrences identified as priority targets for conservation of the species.

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<sup>2</sup> In the revision of the provincial conservation plan, some occurrences were merged due to their proximity. The 14 occurrences of the federal recovery strategy correspond exactly to the 17 provincial occurrences.

## 1.2 Measures to be taken and Implementation Schedule

**Table 1. Implementation Schedule**

| #  | Recovery Measures  | Priority <sup>3</sup> | Threats or concerns addressed | Schedule  |
|--|--|-----------------------|-------------------------------|-----------|
| <b>General strategy: Conservation of the species, its suitable habitat as well as the adjacent riparian zone</b>   |  |                       |                               |           |
| <b>Approach: Apply legal and stewardship measures within the occurrences as well as in the adjacent shoreline in order to reduce the effects of the main threats</b> |  |                       |                               |           |
| 1  | Continue efforts to acquire, provide legal protection for and/or reach conservation agreements on priority occurrences and adjacent areas  | High                  | All except 5 – 6 – 7          | 2014-2019 |
| 2  | Eliminate practices inconsistent with maintaining the species and its habitat  | High                  | All except 5 – 6 – 7          | 2014-2019 |
| 3  | Take into account the presence of the species and its suitable habitat when conducting environmental assessments of projects (including repairing retaining walls), or before adopting mitigation or compensatory measures | High                  | All except 5 – 6 – 7          | 2014-2019 |
| 4  | Assess the forests adjacent to priority occurrences in order to conserve them as buffer zones for shoreline conservation   | Medium                | 1.9                           | 2014-2019 |
| 5  | Assess the quality indices of riparian strips for all priority occurrences to target priority intervention sites   | Medium                | 12                            | 2014-2019 |
| 6  | Improve mapping and signage (e.g., placards) at occurrences with conservation/protection status  | Medium                | 2, 4                          | 2014-2019 |
| <b>Approach: Maintain or implement management approaches aiming at increasing the abundance of the species and the area of occupancy of its suitable habitat</b>     |  |                       |                               |           |
| 7  | Determine whether the 14 priority occurrences can be managed to make them sufficiently productive to maintain or increase the species' overall population and area of occupancy  | Medium                | 12                            | 2014-2019 |
| 8  | Explore approaches for increasing populations  | Medium                | 12                            | 2014-2019 |
| 9  | Restore habitat where technically feasible   | Low                   | All except 6                  | 2014-2019 |
| <b>General strategy: Surveys and monitoring</b>  |  |                       |                               |           |
| <b>Approach: Establish a monitoring program for this species with highly fluctuating local populations</b>   |  |                       |                               |           |
| 10   | Develop a quick method for estimating the number of individuals in an occurrence   | High                  | 12                            | 2014      |
| 11   | Determine how often surveys have to be conducted to understand the population dynamics of the species (interannual variations in abundance, trends and hardiness)  | Medium                | 12                            | 2014      |

<sup>3</sup> "Priority" reflects the extent to which the action contributes directly to recovery of the species or is an essential precursor to an action that contributes to the recovery of the species.



|   |  |        |     |           |
|---|--|--------|-----|-----------|
| 12  | Expand the monitoring of occurrences initiated in 2008 to other occurrences  | Medium | 12  | 2014-2019 |
| 13  | Clarify the status of the population in Boischatel   | Medium | 12  | 2014      |
| 14  | Regularly check whether the species is present or absent in suitable habitat that is not currently colonized   | Low    | 12  | 2014-2019 |
| <b>General strategy: Research</b>   |  |        |     |           |
| <b>Approach:</b> Clarify certain demographic parameters of Victorin's Gentian (vitality, viability of occurrences and threat responses)                 |  |        |     |           |
| 15  | Develop and implement a research program to provide a better understanding of the impact of major threats to the survival of the species   | Medium | All | 2014-2019 |
| 16  | Determine the minimum size for a viable population   | Medium | 12  | 2014-2015 |
| 17  | Determine whether the species is a seed bank and, if so, determine its longevity   | Medium | 12  | 2014-2019 |
| <b>General strategy: Communication and outreach</b>   |  |        |     |           |
| <b>Approach:</b> Develop and implement a communications strategy with partner organizations, special interest groups, landowners and the general public |  |        |     |           |
| 18  | Encourage exchanges between stakeholders (scientists, recovery groups and implementation groups, NGOs, levels of government, the general public, and private landowners) through yearly meetings, presentations to partners, information sessions for citizens, etc.   | High   | All | 2014-2019 |
| 19  | Encourage support from the general public and land-management decision-makers (municipalities, regional county municipalities (RCMs), regional conferences of elected officials, etc.) through various initiatives such as conducting project pre-feasibility studies and focusing on promoting compliance with laws, regulations and policies | High   | All | 2014-2019 |
| 20  | Continue outreach to shoreline property owners using tools such as brochures, non-technical articles, websites, conservation maps, shoreline quality indices, landowners' notebooks, annual information sessions, etc.   | Medium | All | 2014-2019 |

Threats and limiting factors: 1) shoreline filling and infrastructure development; 2) human trampling; 3) invasive plants; 4) mowing and flower picking; 5) overabundant animal populations; 6) changes in salinity due to climate change; 7) ice scour; 8) pollution; 9) erosion; 10) oil spills; 11) accumulation of debris on the shoreline; and 12) gaps in knowledge.

## 1.3 Critical habitat

### 1.3.1 Identification of the species' critical habitat

The critical habitat for Victorin's Gentian is identified in the recovery strategy for this species (Environment Canada 2012). It corresponds to all suitable habitat with each of the 14 priority occurrences; it consists of all the suitable habitat within the boundaries of

the occurrence delineated on one side by the shore (high-water mark) and on the other side by the upper limit of the lower littoral zone. We still do not know to what extent these portions of the critical habitat contribute to attaining the long-term population and distribution objectives. It may be difficult to increase the population of Victorin's Gentian and its area of occupancy within the 14 priority occurrences sufficiently to maintain them at these levels, notably because of the availability of the habitat. The schedule of studies in the recovery strategy outlines the activities required to fill this knowledge gap and determine whether additional portions of critical habitat are required to meet the long-term population and distribution objectives. This action plan considers this aspect in the development of necessary recovery measures and therefore will not identify any additional critical habitat for the time being.

## **1.4 Proposed Measures to Protect Critical Habitat**

Critical habitat for Victorin's Gentian has been identified on federal and non-federal lands.

### **1.4.1 Proposed protection measures on federal land**

Critical habitat for one occurrence of Victorin's Gentian is on land owned by Parks Canada at Grosse Île and the Irish Memorial National Historic Site. Under the provisions of subsection 58(5) of SARA, the competent minister shall, within 180 days following the posting of the final version of the recovery strategy that identifies critical habitat on the Species at Risk Public Registry, and after consulting with every other competent minister, make an order for any portion of critical habitat that is not legally protected by provisions in or measures under SARA or any other Act of Parliament. If the minister does not make the order, the minister shall include in the Species at Risk Public Registry a statement setting out how the critical habitat or portions of it are legally protected.

### **1.4.2 Proposed protection measures on non-federal land**

With regard to those portions of critical habitat on non-federal lands, Environment Canada intends to collaborate with the Government of Quebec to determine if provincial legislation and regulations will be considered to provide protection for critical habitat for this species under SARA.

Being respectful of jurisdictional role, Environment Canada's approach is to first look to the laws of the province and, where necessary, move on to assess if provisions in or measures under SARA or any other Act of Parliament can protect those portions of critical habitat.

If it is deemed that the critical habitat is not protected in whole or in part, the progress towards achieving its protection will be included in the Species at Risk Public Registry by way of reports as per section 63 of SARA.

The implementation of stewardship measures is an important complementary strategy for preserving this species' critical habitat. Environment Canada will collaborate with the Government of Quebec, non-governmental organizations and individuals to facilitate the implementation of conservation measures.

## 2. Socio-economic Evaluation

SARA requires that an action plan include an assessment of the socio-economic costs and benefits resulting from its implementation (*Species at Risk Act* 2003). There may be costs and benefits associated with the protection and recovery of species at risk. The Act recognizes that "*wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons.*" Healthy, self-sustaining ecosystems whose various elements are intact, including species at risk, make a positive contribution to the livelihood and quality of life of all Canadians. A review of the literature confirms that Canadians value the preservation and conservation of species for their own sake. Measures taken to preserve a species, such as habitat protection and restoration, are also important. In addition, the value the public attaches to a protective measure increases in tandem with the measure's ability to contribute to the recovery of a species (Loomis and White 1996; Fisheries and Oceans Canada 2008). Moreover, the conservation of species at risk is an important element of the Government of Canada's commitment to conserve biodiversity in accordance with the international *Convention on Biological Diversity*. The Government of Canada is also committed to protecting and providing for the recovery of species at risk under the [National Accord for the Protection of Species at Risk](#).

This section assesses the potential socio-economic costs associated with implementing the action plan, as well as the benefits it could provide.

### 2.1 Costs

#### 2.1.1 Direct costs

The Action Plan for Victorin's Gentian in Canada describes the recovery measures that must be implemented to meet the population and distribution objectives set out in the recovery strategy for this species. Table 2 presents the breakdown of anticipated direct costs based on the four general recovery strategies; it is a compilation of the estimated costs for each activity in Table 1. These costs were determined by consulting with the main stakeholders involved in species conservation. Given that stakeholders often focus their work on several species or, more generally, on the habitat, the costs presented may not be fully attributable to Victorin's Gentian. The direct costs are estimated for the period from 2014 to 2019<sup>4</sup> and include acquisitions, salaries, volunteer time, travel and equipment.

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<sup>4</sup> Section 55 of SARA requires that the progress toward achieving the action plan objectives be assessed and that a report on the action plan's implementation and ecological and socio-economic impacts be prepared five years after the plan comes into effect.

Table 2. Estimate of the direct costs related to implementing the 2014–2019 recovery plan for Victorin's Gentian

| General strategy   | Priority | Governments<br>(federal and<br>provincial) | Other stakeholders |
|--|----------|--|--------------------|
| Conservation of the species, its suitable habitat and the adjacent riparian area | High     | \$427,000<br>(56%)                         | \$335,000<br>(44%) |
| Surveys and monitoring   | High     | \$47,500<br>(54%)                          | \$40,000<br>(46%)  |
| Research   | High     | \$20,000<br>(53%)                          | \$17,500<br>(47%)  |
| Communication and outreach   | High     | \$40,000<br>(53%)                          | \$35,000<br>(47%)  |

The subtotal for the government (federal and provincial) costs is estimated at \$534,500, which represents 56% of the total estimated direct costs.

The subtotal for the other stakeholders costs is estimated at \$427,500, which represents 44% of the total estimated direct costs.

The total estimated direct cost is \$962,000.

### 2.1.2 Indirect costs

The indirect costs are the potential costs associated with the action plan's implementation that could have an impact on the various stakeholders affected by the management of Victorin's Gentian in Canada, particularly private landowners.

Critical habitat is largely on non-federal land, which could affect the landowners' behaviour. For example, in order to limit the threat connected with filling and infrastructure development, governments, municipalities and landowners must restrict shoreline development or any other activities in the critical habitat of Victorin's Gentian. Outdoor enthusiasts and all-terrain vehicle users will have to change their hiking and riding routes in the intertidal zone so as not to disturb the habitat of Victorin's Gentian. Finally, citizens must stop picking this plant.

## 2.2 Benefits

To maintain biodiversity, the ecosystems where the species live must be healthy and intact. These conditions are important in providing various ecological services. While these values are difficult to quantify, studies conducted throughout the world have demonstrated their important economic contribution (Barbier and Heal 2006; Almack and Wilson 2010). A meta-analysis by Balmford et al. (2002) shows that the cost-benefits ratio of effective conservation programs in wild natural environments is 100:1.

As for the individual importance of a species, it depends on several factors, including the year, location and services taken into consideration (Isbell et al. 2011). The great contribution of biodiversity to ecological services that guarantee the current and future economic and ecological health of Canada would therefore justify applying the precautionary principle in order to maintain and reestablish species at risk.

Victorin's Gentian is not considered to have any direct economic value (in terms of marketing). However, Victorin's Gentian has intrinsic value and is an important part of Canada's natural heritage. According to the *Canada Gazette* (2007), Canadians want to conserve species for future generations even if they will never personally see or use these species. Furthermore, the aesthetic appeal of Victorin's Gentian makes it a symbol of estuarine conservation and protection of threatened or vulnerable species (COSEWIC 2004). The species is also of scientific interest to botanists because it raises the entire range of issues relating to the origin and diversification of the endemic flora of the estuarine shores of the St. Lawrence River (COSEWIC 2004).

The ecosystem in which Victorin's Gentian lives provides many ecosystem services<sup>5</sup>. Wetlands are recognized as important in the life cycle of many species of insects, fish, amphibians, molluscs, reptiles, small furbearing mammals, and birds (Environment Canada 2010). In addition, these areas play a role in nutrient cycling and water purification, and can reduce erosion by slowing the current (Environment Canada 2010). Considering that the St. Lawrence River is the main water source for a large number of municipalities in Quebec, the water treatment role played by marshes along the river becomes even more critical. Also, the marshes provide spawning grounds for many species of fish and habitat for waterfowl. They therefore promote recreational activities such as hunting, fishing and wildlife and plant observation (Environment Canada 2010).

## 2.3 Conclusion

The implementation of all recovery measures proposed in this action plan would result in direct costs of almost \$962,000 for the 2014–2019 period. Low-to-medium environmental and socio-economic impacts (positive for the most part) are expected at the regional level in the areas targeted by the action plan. They should generate few additional land use constraints beyond those stipulated under the current legislative and regulatory framework. Implementing this action plan would also contribute specifically to the Federal Sustainable Development Strategy (Environment Canada 2010). Finally, the plan contributes to the efforts of organizations involved in sustainable land management in the upper estuary of the St. Lawrence River.

## 3. Measuring Progress

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<sup>5</sup> The internationally accepted definition of ecosystem services is that of the Millennium Ecosystem Assessment (MEA) from the Secretariat of the Convention on Biological Diversity (SCBD). Ecosystem services are the benefits people obtain from ecosystems. These services are the result of ecological functions. The MEA identifies the four main types of ecosystem services as provisional, regulative, supporting and cultural (MEA 2005).

The performance indicators presented in the associated recovery strategy provide a way to define and measure progress in achieving the population and distribution objectives.

Pursuant to section 55 of SARA, a report on the *implementation* of the action plan will be produced by assessing progress in implementing the general strategies.

Pursuant to section 55 of SARA, a report on the ecological and socio-economic impacts of the action plan will be produced by assessing the results of monitoring the species' recovery and its long-term viability and by evaluating the action plan's implementation.

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## 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 and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or achievement of any of the [Federal Sustainable Development Strategy](#)'s<sup>6</sup> (FSDS) goals and targets.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that implementation of action plans may inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all the 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 action plan itself, but are also summarized below in this statement.

This action plan contributes directly to achieving the goals and targets of the Federal Sustainable Development Strategy for Canada. More specifically, it will help restore populations of wildlife to healthy levels and maintain productive and resilient ecosystems with the capacity to recover and adapt (goals 5 and 6 of the strategy).

The possibility that the action plan might inadvertently produce negative effects for the environment and other species was considered. However, since the recommended recovery measures are limited to non-intrusive activities such as monitoring occurrences and public outreach, we concluded that this plan will not produce any significant adverse effects.

Victorin's Gentian is dependent on the upper and middle shoreline. Protection of critical Victorin's Gentian habitat will have beneficial effects on many wildlife species that occupy this habitat, including nesting waterfowl and other plant species endemic to the freshwater estuary of the St. Lawrence River that live in association with Victorin's Gentian, many of which are in precarious situations, such as Provancher's Fleabane (*Erigeron philadelphicus* ssp. *provancheri*) (threatened species under the LEMV), Victorin's Water Hemlock (species of concern listed in Schedule 1 of SARA and a threatened species under the *Act respecting threatened or vulnerable species*) and the Pipewort Parker (threatened species under the *Act respecting threatened or vulnerable species*). In addition, a dozen or so other species likely to be designated as threatened or vulnerable in Quebec live in association with Victorin's Gentian. Actions for the protection of priority Victorin's Gentian occurrences and outreach initiatives targeting the public and shoreline communities will directly contribute to the conservation of populations of these other rare species that occupy the St. Lawrence River freshwater estuary.

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<sup>6</sup> [www.ec.gc.ca/dd-sd/default.asp?lang=En&n=F93CD795-1](http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=F93CD795-1)