

# Management Plan for the Cerulean Warbler (*Dendroica cerulea*) in Canada

## Cerulean Warbler



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**Cover illustration:** Karl Egressy

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## 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 management plans for listed Special Concern species and are required to report on progress within five years.

The Minister of the Environment and the Minister responsible for the Parks Canada Agency is the competent minister for the management of the Cerulean Warbler and has prepared this plan, as per section 65 of SARA. It has been prepared in cooperation with the Provinces of Ontario and Quebec.

Success in the management 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 plan and will not be achieved by Environment Canada and the Parks Canada Agency or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this plan for the benefit of the Cerulean Warbler and Canadian society as a whole.

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

## ACKNOWLEDGMENTS

This management plan was prepared by John Brett of Environment Canada, Canadian Wildlife Service – Ontario, based on a draft prepared by Talena Kraus of Artemis Eco-Works. Contributions from Benoît Jobin of Environment Canada, Canadian Wildlife Service – Quebec and Josh Van Wieren of Parks Canada Agency are gratefully acknowledged. The Ontario Natural Heritage Information Centre (NHIC), the Centre de données sur le patrimoine naturelle du Québec, and Josée Tardif from the Environment Canada, Canadian Wildlife Service – Quebec provided species occurrence information, while Andrew Couturier from Bird Studies Canada provided the Ontario range map. Jason Jones from Tetra Tech EC, Inc., Donald A. Sutherland from the NHIC and Jon McCracken from Bird Studies Canada provided expert opinion. Karl Egressy kindly provided the cover photograph.

## EXECUTIVE SUMMARY

Cerulean Warbler (*Dendroica cerulea*) is a small wood-warbler (family Parulidae) that breeds in a few areas in southern Ontario and southwestern Quebec. It is an area-sensitive species that is found in older or mature deciduous forests in Canada, and winters in montane forests in South America. It was listed as a species of Special Concern on Schedule 1 of the *Species at Risk Act* in January 2005.

The Canadian range for the species is concentrated mainly in two geographic breeding clusters in Ontario; i) in Carolinian forests between lower Lake Huron and Lake Ontario, and ii) in a band extending east from southeastern Georgian Bay toward a relatively dense concentration at the Frontenac Axis near the eastern end of Lake Ontario. There are a small number of breeding individuals in southwestern Quebec, along with records of individuals without breeding confirmation, and there have been sightings, but no confirmed breeding individuals, reported in Nova Scotia, New Brunswick, Newfoundland and Manitoba.

Breeding Bird Survey data indicate that the continental decline of the Cerulean Warbler may be greater than that of any other wood-warbler. This situation is reflected in Canada, where the results from the Ontario Breeding Bird Atlas suggest a population trend consistent with the continental decline.

Known and potential threats to this species include deforestation on the breeding and wintering grounds and migration routes, exotic and native forest pests and disease, nest parasitism by Brown-headed Cowbirds (*Molothrus ater*), light pollution from human-built structures along migration routes, and storms.

The objective of this management plan is to maintain the current population level and distribution of the Cerulean Warbler in Canada. This should be attainable by maintaining and improving the amount and quality of breeding and migration habitat available for current and future Canadian populations, and by promoting the conservation of suitable habitat on the migration and wintering grounds. Accomplishing the objective of this plan will also support the Partners in Flight continental population objective for this species (Rich et al. 2004).

A number of broad strategies to help achieve this objective are outlined in this plan. The most important are to mitigate the habitat-related threats that affect Canadian Cerulean Warbler populations, and to determine the relative significance of wintering, migration, and breeding range threats on Canadian populations. As this is a migratory species, working with other governments and agencies in Canada and internationally is also required to achieve the objective of this plan. Ongoing assessments of the population sizes and distribution of Cerulean Warbler in Canada will allow the continued monitoring of population trends.

A number of actions to achieve these objectives are proposed in this management plan, and are not expected to have any significant negative effects on other species.

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## 1. COSEWIC SPECIES ASSESSEMENT INFORMATION

**Date of Assessment:** May 2003

**Common Name (population):** Cerulean Warbler

**Scientific Name:** *Dendroica cerulea*

**COSEWIC Status:** Special Concern

**Reason for Designation:** This species breeds in mature deciduous forests in southern Ontario and southwestern Quebec, a habitat which has disappeared from much of its Canadian range in the last 200 years. The species has been steadily declining in numbers (three per cent per annum over the last 30 years), but most of this decline has been occurring in the core of the species' range in the U.S. and numbers may be relatively stable in eastern Ontario. Numbers in southwestern Ontario, however, have declined markedly, and overall numbers in Canada are low – less than 2000 mature individuals. The two dominant limiting factors for this species are habitat destruction on breeding, migration, and wintering grounds, and fragmentation of existing habitats.

**Canadian Occurrence:** Ontario, Quebec

**COSEWIC Status History:** Designated Special Concern in April 1993. Status re-examined and confirmed as Special Concern in May 2003.

## 2. SPECIES STATUS INFORMATION

Globally, this species is ranked G4 (Apparently Secure), with national ranks of N4B (Apparently Secure, Breeding population) in the United States and N3B (Vulnerable, Breeding population) in Canada (NatureServe 2008). Due to the continental and regional declines, Cerulean Warbler is listed as a species of “continental importance” in Bird Conservation Region 13 (BCR 13), which encompasses parts of Ontario, Quebec, Vermont, New York, Pennsylvania and Ohio (Rich et al. 2004). The Cerulean Warbler is ranked subnationally as S3B (Vulnerable, Breeding population) in Ontario, and S2 (Imperiled) in Quebec. A complete list of subnational status ranks and definitions is given in Appendix B. Based on the Canadian and global breeding pair estimates provided in the COSEWIC status report, the percent of the global population that exists in Canada is very small (i.e. between 0.17% and 1.18%).

## 3. SPECIES INFORMATION

### 3.1 Species Description

The Cerulean Warbler is a small (8 – 10 g) wood-warbler with relatively long wings and a short tail (Hamel 2000, COSEWIC 2003). The adult male is deep blue above and white below with a blue-black band across the throat, whereas the adult female is blue-green above and whitish

below with a yellow-white eyebrow (COSEWIC 2003). Both sexes have two prominent white wing-bars and white tail spots, and young individuals tend to be similarly marked to adults but not as brightly or boldly coloured (COSEWIC 2003).

### 3.2 Population and Distribution

Globally, the Cerulean Warbler breeds in eastern North America in the northeastern United States and parts of southeastern Canada (Figure 1). Its range is somewhat patchy and not contiguous throughout the areas occupied, and there have been casual sightings outside the breeding range (COSEWIC 2003). The species winters in the Andes mountains in South



Figure 1. Global range of the Cerulean Warbler (Modified from Ridgely et al. 2007).

America, including northern and western Venezuela, both slopes of the Andes in Columbia and the eastern slopes in Ecuador, Peru and Bolivia, though there have also been casual sightings outside this winter range (COSEWIC 2003). Spring and fall migrations occur mainly along the

Mississippi and Ohio River valleys and across the Gulf of Mexico, as well as along the Caribbean coast of Central America and parts of the Greater Antilles (COSEWIC 2003).

The Canadian range for the species is concentrated mainly in two geographic breeding clusters in Ontario: i) in Carolinian forests between lower Lake Huron and Lake Ontario, and ii) in a band extending east from southeastern Georgian Bay toward a relatively dense concentration at the Frontenac Axis near the eastern end of Lake Ontario (Figure 2) (COSEWIC 2003). There are a small number of confirmed breeding individuals, as well as individuals without breeding confirmation, in southwestern Quebec (Figure 3), (Bannon and Robert 1996, COSEWIC 2003, J. Tardif, pers. comm.). There have also been sightings, but no breeding individuals, reported in Nova Scotia, New Brunswick, Newfoundland and Manitoba (COSEWIC 2003). In the 2003 COSEWIC status report, it is estimated that the extent of occurrence is about 85 000 km<sup>2</sup>, and the area of occupancy is less than 100 km<sup>2</sup>.

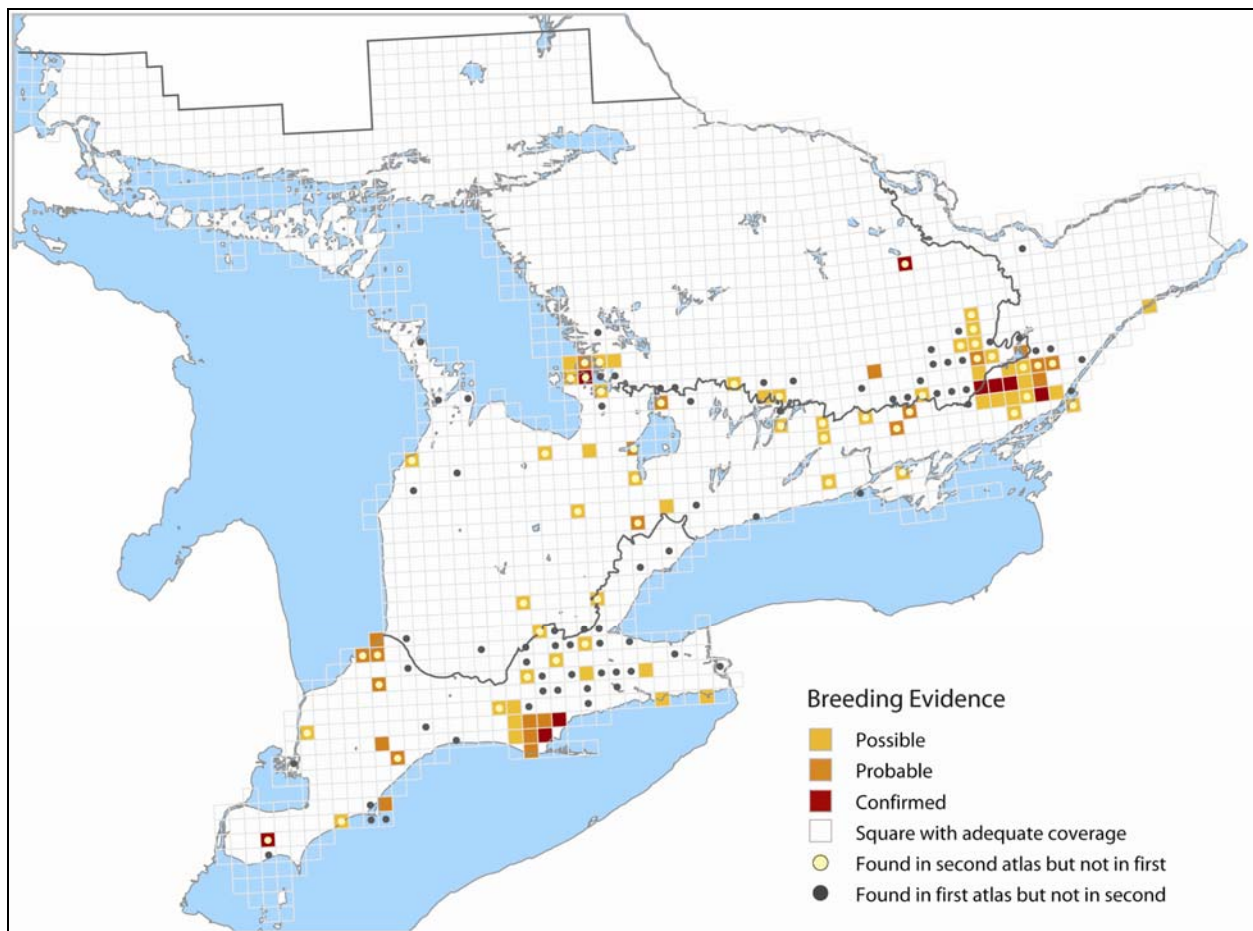


Figure 2. Distribution of the Cerulean Warbler in Ontario between 2001 and 2005 (Cadman et al. 2007). Squares are 10x10km. Data collection for the first atlas referred to in the legend was from 1981-1985.



In the 2003 COSEWIC status report it is estimated that the Canadian population of Cerulean Warbler is between 500 and 1000 pairs, based on data from the Ontario Natural Heritage Information Centre (NHIC), researchers from Queen's University, and early results from the second Ontario Breeding Bird Atlas (OBBA). However, a more recent assessment of the complete OBBA results, additional surveys, and additional NHIC data suggest that the Ontario population is closer to 500 pairs, and is possibly less than 500 (D.A. Sutherland pers. comm.).

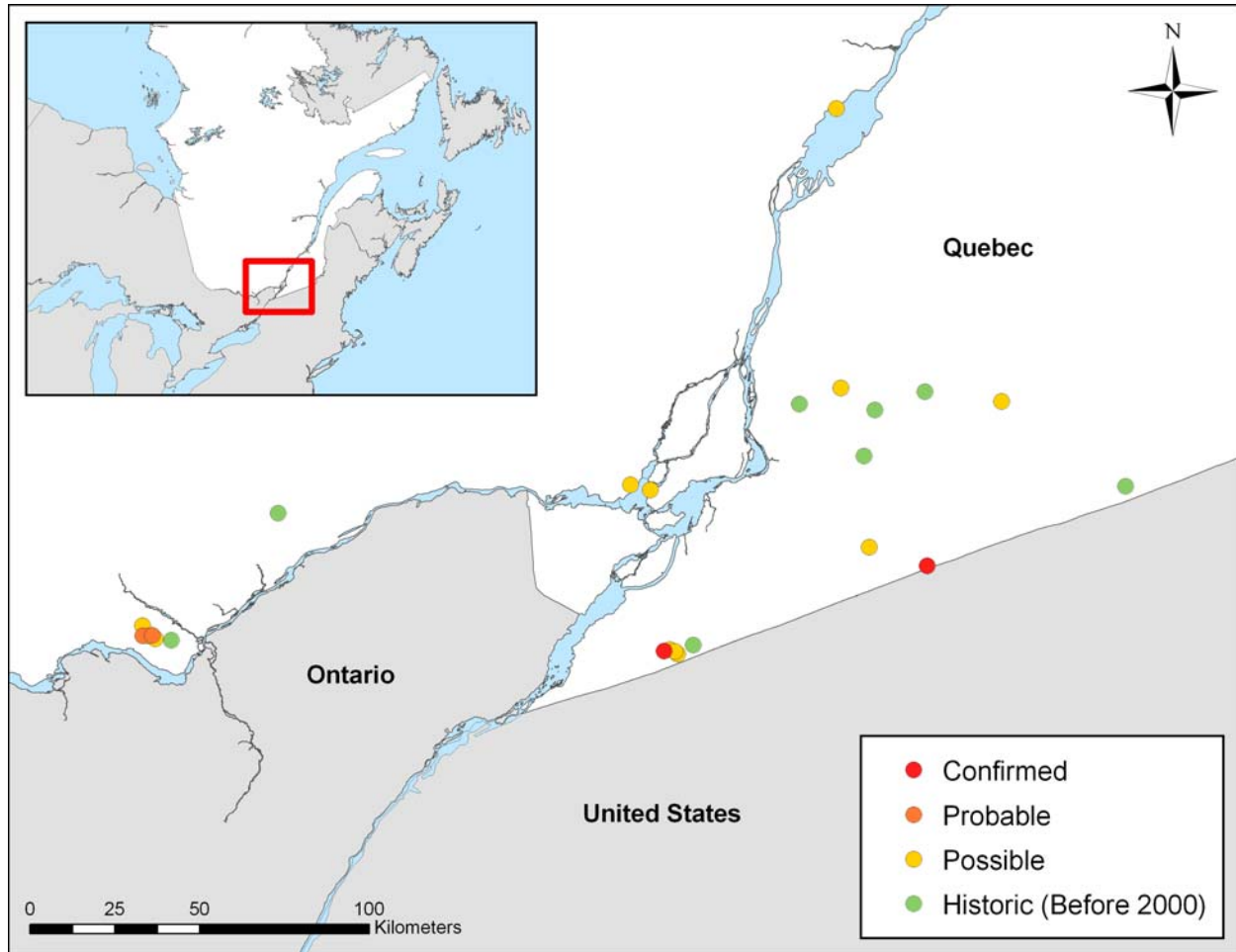


Figure 3. Breeding occurrences of Cerulean Warbler in Quebec. Data from Suivi de l'occupation des stations de nidification des populations d'oiseaux en péril du Québec (SOS-POP 2009).

Breeding Bird Survey data (Sauer et al. 2008) indicate that the continental decline of the Cerulean Warbler may be greater than that of any other wood-warbler.

The situation in Ontario is consistent with the continental decline observed in the Breeding Bird Survey (Francis 2007). The Carolinian population is experiencing a marked decline (COSEWIC 2003), with a 47% decrease in the probability of detection between the first and second Ontario breeding bird atlases (Francis 2007). Populations in eastern Ontario had been considered relatively stable (COSEWIC 2003), although more recent studies suggest that an eastern Ontario population may not be producing enough young to counter mortality and support a viable

population (Jones et al. 2004, Buehler et al. 2008). Cerulean Warbler is listed as a “priority” species in the Ontario and Quebec portion of BCR 13 (Ontario Partners in Flight 2008; V. Carignan, pers. comm.).

### 3.3 Needs of the Cerulean Warbler

#### 3.3.1 Habitat and biological needs

Cerulean Warblers typically breed in mature deciduous forests with large, tall, well-spaced trees and an open understorey (James 1984, COSEWIC 2003), but they are also found occupying older second-growth deciduous forests in Ontario. Territories usually contain high canopies with dense foliage, though some studies have found that internal canopy gaps appear to be important (COSEWIC 2003). They are usually considered to be area-sensitive (COSEWIC 2003). Cerulean Warblers demonstrate sensitivity to edge effects up to 340 m into the forest, with abundance positively correlated to the distance from the edge (Wood et al. 2006). Cerulean Warblers also exhibit habitat selection at smaller scales, and use some portions of their territories (core areas) more than others (COSEWIC 2003, Barg et al. 2006). An eastern Ontario study found that core areas had high concentrations of bitternut hickory (*Carya cordiformis*), which served as a highly preferred song-post tree (Barg et al. 2006). Other commonly-used song-post trees identified in this study include sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), and oaks (*Quercus* spp.).

On migration, Cerulean Warblers can be found in primary and mature secondary forest in a broad elevation range, along with some sightings in modified plantation forests (Welton et al. 2007).

Wintering habitat includes humid evergreen forests on the slopes of the Andes (COSEWIC 2003), although recent studies suggest a high use of modified forests such as shaded coffee and cardamom plantations (Calderon-Franco 2006, Bakermans et al. 2009).

Cerulean Warblers appear to have an entirely insectivorous diet during the breeding season, but will also consume nectar resources during the non-breeding season in South America (COSEWIC 2003).

#### 3.3.2 Limiting Factors

There are intrinsic factors that could be limiting to this species, including high site fidelity and migratory connectivity. Adults show high site fidelity (Jones et al. 2004), and may not respond to habitat degradation at a particular breeding site by moving to more suitable habitat (COSEWIC 2003), which could result in breeding in suboptimal habitat and, potentially, reduced productivity. Migratory connectivity (i.e. individuals from a given breeding area are generally connected to a specific geographic area for the winter period) has been shown to exist in Cerulean Warblers and may hinder conservation of this species, as declines in a given wintering area will likely exacerbate declines in the corresponding breeding area, and *vice versa* (Jones et al. 2008). Migration has been suggested as a potential period of mortality for this species and

other wood-warblers (Jones et al. 2004, COSEWIC 2003). A relatively long migration distance and protracted migration periods in the spring (2 months) and fall (4 months) mean that Cerulean Warblers are subjected to a long duration of high physiological stress and an increased exposure to predation (COSEWIC 2003).

## 4. THREATS

### 4.1 Threat Assessment

**Table 1. Threat Assessment Table**

Threat	Level of Concern	Extent	Occurrence	Frequency	Severity	Causal Certainty
<b>Habitat loss, fragmentation or degradation</b>						
Deforestation in breeding range	High	Widespread	Current	Continuous	Medium-High	Medium-High
Deforestation in winter range / migration route	High	Widespread	Current	Continuous	Unknown	Medium
Logging practices	High	Widespread	Current	Continuous	Medium-High	Medium-High
<b>Climate and natural disasters</b>						
Storms	Low	Local	Historic/Anticipated	Recurrent	Low-Medium	Low-Medium
<b>Exotic, Invasive, or Introduced Species/Genome</b>						
Exotic forest pests and disease	Low	Local	Anticipated	Recurrent	Low-Medium	Low
<b>Natural processes or activities</b>						
Native forest pests and disease	Low	Local	Anticipated	Recurrent	Low-Medium	Low
Nest parasitism	Low	Widespread	Current	Continuous	Unknown	Low
<b>Accidental mortality</b>						
Light pollution	Low	Unknown	Current	Continuous	Unknown	Low

### 4.2 Description of Threats

#### a) *Deforestation in breeding range*

The conversion of suitable breeding habitat for human use is a major threat to the persistence of Cerulean Warbler in Canada (COSEWIC 2003). Mature forest habitat has been and continues to be destroyed to accommodate residential, agricultural and other development, and has been described as the most serious long-term threat to the Cerulean Warbler in its breeding range

(Hamel 2000). The threat imposed by a lack of habitat is thought to be a particular concern in southwestern Ontario, where forest cover is about 14% (Ontario Partners in Flight 2008).

In addition to outright loss, fragmentation of mature forest due to development reduces the quality of the remaining habitat. Fragmentation of habitat results in an increase in forest edge, which decreases the suitability of the habitat for the area-sensitive Cerulean Warbler. The abundance of breeding Cerulean Warblers was found to be increased with an increase in patch size and a decrease in forest edge in a West Virginia population (Wood et al. 2006). Although the minimum patch size in the eastern Ontario population is reported to be smaller than those reported elsewhere (COSEWIC 2003), this population is suspected to be unstable due to low breeding success and high mortality (Jones et al. 2004, Buehler 2008).

While overall forest cover is increasing in the Canadian range of Cerulean Warbler, this does not necessarily result in an increase in habitat for this area-sensitive species. An apparent decrease in mean forest patch size in southern Ontario (Ontario Ministry of Natural Resources 2006) suggests that the overall increase may be composed of small scattered patches, which do not provide suitable habitat for breeding Cerulean Warblers.

*b) Deforestation in winter range / migration route*

The loss and fragmentation of humid montane forest on the wintering grounds are identified as threats to the Canadian populations of Cerulean Warbler (COSEWIC 2003). Montane forests in the northern Andes, where the Cerulean Warbler is known to winter, have experienced some of the highest deforestation rates in the neotropics, with 90% of the northern Andes having been deforested (Bakermans et al. 2009) to accommodate population growth and agriculture. The Cerulean Warbler spends its winters in a narrow elevational range between 620 and 1300 m (DeGraaf and Rappole 1995), so it is particularly susceptible to any habitat loss in this area (COSEWIC 2003). While traditional shade coffee plantations have been shown to provide quality habitat on the wintering grounds, the conversion of traditional plantations to more intensive sun coffee plantations may be contributing to wintering habitat loss (Bakermans et al. 2009). The availability of safe stopover habitat is potentially limiting to this species (COSEWIC 2003), although the extent of this threat is unclear (Hamel 2000). The high oversummer survival detected in one study in eastern Ontario (Jones et al. 2004) suggests that events on migration routes or wintering grounds were responsible for most adult male mortality.

*c) Logging practices*

Cerulean Warblers require mature forests with well-spaced large trees and high canopies with dense foliage for breeding habitat (Jones and Robertson 2001). Diameter-cut harvests, which remove most mature trees and reduce canopy cover, are common in Bird Conservation Region 13 (Ontario Partners in Flight 2008). The maintenance of young even-aged stands through short rotations degrades the habitat available to support populations of Cerulean Warbler (Hamel 2000), and can reduce productivity and survival.

*d) Storms*

Although not identified in the status report (COSEWIC 2003), storms have affected abundance, reproductive output, and distribution of some Cerulean Warbler populations in Canada. A decrease in canopy foliage was observed in an eastern Ontario study area following a 1998 ice storm, and a decrease in Cerulean Warbler reproductive output was subsequently detected the following spring (Jones et al. 2001). In Quebec, a 1980s ice storm damaged habitat at a site where Cerulean Warblers were regularly observed in the 1960s and 1970s. Since the 1980s storm, Cerulean Warblers have been observed at the site only on rare occasions (Bannon and Robert 1996). Likewise, thunderstorms can similarly modify habitat to make it unsuitable for Cerulean Warblers. Breeding Cerulean Warblers have not been recorded in the vicinity of Point Pelee National Park's Woodland Nature Trail since 1977, following a large thunderstorm that altered the structure of the forest in this area (Wormington and Huebert 2008). While storms are natural processes, the population-level effect of stochastic events is relatively higher for a small population like that of the Cerulean Warbler in Canada, and the effects of these events are exacerbated by the limited availability of habitat due to other threats (i.e. development).

*e) Exotic forest pests and disease*

The loss of important tree species due to disease and infestation is identified as a threat to Cerulean Warbler in the COSEWIC status report (2003), and are described as an ongoing concern in Bird Conservation Region 13 (Ontario Partners in Flight 2008). Exotic forest pests and diseases identified in Bird Conservation Region 13 that could impact Cerulean Warbler habitat include invasive insects such as emerald ash borer (*Agrilus planipennis*), Asian long-horned Beetle (*Anoplophora glabripennis*), Gypsy Moth (*Lymantria dispar*), and beech bark disease (Ontario Partners in Flight 2008, Scarr et al. 2009).

*f) Native forest pests and disease*

As with exotic pests and disease, outbreaks native insects can reduce habitat quality for Cerulean Warblers, with effects that include defoliation of a forest canopy and the outright loss of tree individuals due to disease. Moderate to severe defoliation events due to outbreaks of the forest tent caterpillar (*Malacosoma disstria*) have been documented areas within the Cerulean Warbler's Canadian range (Scarr et al. 2009), although the population-level effect of these outbreaks in Canada is not demonstrated.

*g) Nest parasitism*

Nest parasitism by Brown-headed Cowbirds (*Molothrus ater*) was identified as a threat to Cerulean Warbler in some parts of its range (COSEWIC 2003, Hamel 2000). While a study in an eastern Ontario population suggests that the extent of parasitism is low in that area (Oliarnyk and Robertson 1996), it is not known how much of an impact parasitism by cowbirds has in other parts of the range in Canada. This severity of this threat is likely exacerbated by habitat loss and fragmentation, as Brown-headed Cowbirds appear to prefer open areas and forest edges to mature forest interiors (Peck and James 1997).

#### *h) Light pollution*

Light pollution is suggested as a threat to Cerulean Warbler in the COSEWIC status report (2003), as lighted structures have been demonstrated to be responsible for Cerulean Warbler deaths while on migration. An eleven year study of a single TV tower in Florida yielded 93 dead Cerulean Warblers (Stoddard and Norris 1967 in COSEWIC 2003), although the extent and severity of this threat in Canada is unknown. One Ontario study found that adult mortality likely had a stronger effect on population growth rate than seasonal fecundity, and that events during migration or on the wintering grounds were probably responsible for most adult male mortality (Jones et al. 2004).

## **5. MANAGEMENT OBJECTIVES**

The objective of this management plan is to maintain the current population level and distribution of Cerulean Warbler in Canada. This should be attainable by maintaining and improving the amount and quality of breeding and migration habitat available for current and future Canadian populations, and by promoting the conservation of suitable habitat on the migration and wintering grounds.

Accomplishing the objective of this plan will also support the Partners in Flight continental population objective for this species (Rich et al. 2004).

As the small Canadian population of Cerulean Warbler occurs at the northern part of its continental range, and the vast majority of its continental breeding distribution and population occurs further south in the United States, it is important to note that population changes at the continental level may have a significant effect on management of this species in Canada. As the continental population of Cerulean Warbler is experiencing an ongoing downward population trend, its range may contract away from the current periphery, and individuals may immigrate towards the centre of the range. In such a case, despite best efforts described in this plan to ensure that sufficient suitable habitat is available and key threats are mitigated, the numbers of Cerulean Warbler in Canada may continue to decline.

## **6. BROAD STRATEGIES AND GENERAL APPROACHES TO MEET OBJECTIVES**

The broad strategies of this management plan are as follows:

1. Mitigate habitat-related threats to Cerulean Warbler.
2. Conduct research to determine the relative significance of wintering, migration, and breeding range threats on Canadian populations.
3. Work with governments and agencies on priority management activities within the species' breeding, migration, and wintering range.

4. Assess and monitor population sizes, trends, and distribution for all Canadian populations.

## **6.1 Actions and Performance Measures**

The actions, performance measures, and implementation schedule proposed to meet the broad strategies outlined in section 6 are presented in Table 2. The Minister of the Environment will endeavour to support implementation of this plan, given available resources and varying species at risk conservation priorities.

**Table 2. Actions and Performance Measures/Implementation Schedule**

Action	Performance Measure	Broad Strategy	Priority	Threats or concerns addressed	Responsibility <sup>1,2</sup>	Timeline
<b>1. Management</b>						
<b>1.1</b> Address Cerulean Warbler requirements in any new (or updated) management plans for public lands in Canada (Protected Areas, parks, etc.) that support populations.	Management actions/plans for public lands that address the needs of Cerulean Warbler.	1,3	H	a,b,c,e,f,g,h	EC, OMNR, MDDEP, PCA, NGOs, CAs	2015
<b>2. Conservation</b>						
<b>2.1</b> Refine and compile geographical knowledge of Canadian populations, habitat, and land tenure.	Database of Canadian populations, suitable habitat, and land tenure has been developed, key sites identified.	4	H	need for accurate baseline population information	EC, OMNR, MRNF, MDDEP, NGOs	2014
<b>2.2</b> Facilitate conservation of key sites in Canada that are not currently conserved (e.g. through acquisition, stewardship actions, partnerships with conservation organizations, etc.), where possible.	Conservation status is improved at key sites in Canada with suitable habitat.	1	M	a,b,c,d	EC, OMNR, MRNF, MDDEP, NGOs, CAs	2015
<b>3. Research</b>						
<b>3.1</b> Work with U.S. and international colleagues to determine needs of and threats facing Canadian populations on wintering grounds and migration routes.	Increased understanding of Canadian Cerulean Warbler wintering ecology and threats, and the relative importance of the threats on the breeding grounds versus wintering and migration grounds.	2,3	H	b,c,h	EC, NGOs, universities	2015
<b>3.2</b> Conduct research to determine the response of breeding populations (distribution, density, and productivity) to land management activities and silviculture practices.	Information on which management activities, including forestry practices, are appropriate to develop best practices for management of Cerulean Warbler and its habitat.	1	H	a,c,e,f,g	EC, OMNR, PCA, universities, NGOs, MRNF	2014



Action	Performance Measure	Broad Strategy	Priority	Threats or concerns addressed	Responsibility <sup>1,2</sup>	Timeline
<b>4. Monitoring and assessment</b>						
<b>4.1</b> Ensure that population size is surveyed in Ontario and Quebec at least every five years to assess and monitor national population status and distribution.	Information to assess changes in population status; updated distribution map; increasing number of occurrences input into conservation data centres' databases.	4	M	Knowledge gaps about population and distribution	EC, NGOs, PCA, OMNR, MRNF	2015
<b>5. Outreach and communication</b>						
<b>5.1</b> Promote and discuss status, conservation and management with other governments, conservation organizations, forest managers, and landowners, and promote multi-use strategies for habitat management that are compatible with needs of the Cerulean Warbler and other mature forest species.	Governments, conservation organizations, and landowners have been contacted regarding this management plan and other relevant conservation initiatives, and adopt a multi-species approach where possible; best practices have been communicated to landowners/land managers where Cerulean Warblers occur.	1,2,3	M	a,b,c,d,e,f,g,h	EC, OMNR, MRNF, MDDEP, MAPAQ, NGOs Federal agencies	2015
<b>5.2</b> Participate in Cerulean Warbler Technical Group <sup>3</sup> (CWTG) activities where feasible, including initiatives led by <i>El Grupo Cerúleo</i> (a subcommittee of the CWTG) to address threats to Cerulean Warbler on its wintering grounds.	Canadian representation in CWTG activities and initiatives.	1,2,3,4	M	a,b,c,d,e,f,g,h	EC, NGOs	Ongoing

<sup>1</sup> EC: Environment Canada; PCA: Parks Canada Agency; OMNR: Ontario Ministry of Natural Resources; MRNF: Ministère des Ressources naturelles et de la Faune; MDDEP: Ministère du Développement durable, de l'Environnement et des Parcs; MAPAQ : Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec; NGOs: non-government organizations; CAs: conservation authorities.

<sup>2</sup> Identification of government agencies and non-governmental organizations is intended to be advice and does not commit the agency or organization to implementing the listed action. Implementing actions will be contingent upon each organization's or agency's priorities and budgetary constraints.

<sup>3</sup> The Cerulean Warbler Technical Group is an international initiative to bring together researchers, conservation organizations, and governments for the purpose of Cerulean Warbler conservation.

## 6.2 Actions Already Completed or Underway

Some actions specific to the monitoring or conservation of Cerulean Warblers in Canada have been initiated:

- Habitat suitability maps have been developed and directed Cerulean Warbler surveys conducted in 2009 in the Thousand Islands Ecosystem;
- Habitat and landscape impact research initiatives (focusing on habitat quantity, habitat quality, fragmentation and matrix quality) are underway at St. Lawrence Islands National Park of Canada;
- Directed surveys of Cerulean Warblers in the Parc de la Gatineau in southwestern Quebec were conducted in 2006 and 2007 (Savignac 2006, 2007), and 2008 (National Capital Commission 2008);
- Sites with past occurrence of Cerulean Warblers in southern Quebec are visited sporadically as part of the avian species at risk yearly breeding site monitoring (SOS-POP 2009);
- In Ontario, Cerulean Warblers have been monitored as part of several bird monitoring initiatives, including the Ontario Breeding Bird Atlas (Cadman et al. 2007) and the Ontario Forest Bird Monitoring Program;
- Directed surveys by the Ontario Ministry of Natural Resources: Ontario Parks (Southeast Zone) sponsored intensive surveys of Frontenac Provincial Park in 2003, and Charleston Lake Provincial Park in 2004 and 2009; and the Ontario Natural Heritage Information Centre conducted surveys at most other known sites of occurrence in Ontario, in 2003.

## 7. MEASURING PROGRESS

Every five years, success of this management plan implementation will be measured against the following performance indicator:

- By 2015, the size and distribution of the Canadian population has been maintained.

## 8. REFERENCES

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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.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that plans 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 plan itself, but are also summarized below in this statement.

Forest landbirds are a priority guild for BCR 13 in Ontario (Ontario Partners in Flight 2008), and activities that benefit the Cerulean Warbler are likely to be beneficial to most or all of the 12 other priority species in that guild. It is recognized that management of habitat for the benefit of Cerulean Warbler populations could potentially have adverse effects on other species with differing habitat preferences (e.g. understory or canopy requirements), so any site-specific management prescriptions resulting from the actions in this plan should be assessed on a site-by-site basis given the needs of other species found in the immediate area.

It is unlikely that prevention of habitat loss, fragmentation or degradation in areas where Cerulean Warblers breed in Canada will have any significant negative effects on other species. However, for species at risk, as well as other more common species, that inhabit deciduous forests (Table 3), it is likely that increased forest conservation will have beneficial effects.

**Table 3. Species expected to benefit from conservation and management of deciduous forests in Canada.**

Common Name	Scientific Name	SARA Status
Acadian Flycatcher *	<i>Empidonax virescens</i>	Endangered
American Ginseng	<i>Panax quinquefolius</i>	Endangered
Cucumber Tree	<i>Magnolia acuminata</i>	Endangered
Gray Ratsnake, Carolinian population	<i>Pantherophis spiloides</i>	Endangered
Large-whorled Pogonia	<i>Isotria verticillata</i>	Endangered
Nodding Pogonia	<i>Triphora trianthophora</i>	Endangered
Prothonotary Warbler *	<i>Protonotaria citrea</i>	Endangered
Gray Ratsnake, Great Lakes / St. Lawrence population	<i>Pantherophis spiloides</i>	Threatened
Hooded Warbler *	<i>Wilsonia citrina</i>	Threatened
Jefferson Salamander	<i>Ambystoma jeffersonianum</i>	Threatened
Red-headed Woodpecker*	<i>Melanerpes erythrocephalus</i>	Threatened
Louisiana Waterthrush *	<i>Seiurus motacilla</i>	Special Concern
Woodland Vole	<i>Microtus pinetorum</i>	Special Concern
Red-shouldered Hawk*	<i>Buteo lineatus</i>	Special Concern (Schedule 3)
Eastern Wood-pewee*	<i>Contopus virens</i>	
Northern Flicker*	<i>Colaptes auratus</i>	
Rose-breasted Grosbeak*	<i>Pheucticus ludovicianus</i>	
Wood Thrush*	<i>Hylocichla mustelina</i>	

\*Ontario Partners in Flight forest guild priority species (Ontario Partners in Flight 2008)

## APPENDIX B: NATURESERVE RANKS AND DEFINITIONS

**Table 4. Subnational Conservation Ranks (S-Ranks) for the Cerulean Warbler in North America (NatureServe 2008).**

Country	State/Province and NatureServe status ranks
Canada	Ontario (S3B), Quebec (S2)
United States	Alabama (S1B), Arkansas (S4B), Connecticut (S3B), Delaware (S1B), District of Columbia (S2N), Florida (SNA), Georgia (S1), Illinois (S3), Indiana (S3B), Iowa (S2B,S3N), Kansas (S1B), Kentucky (S4S5B), Louisiana (S1B), Maryland (S3S4B), Massachusetts (S1B,S2M), Michigan (S3), Minnesota (S3B), Mississippi (S2B), Missouri (S2S3), Nebraska (S1), New Hampshire (S3B), New Jersey (S3B), New York (S4B), North Carolina (S2B), Ohio (S4), Oklahoma (S2B), Pennsylvania (S4B), Rhode Island (S1B,S2N), South Carolina (S1?B), South Dakota (S1B), Tennessee (S3B), Texas (SHB,S3N), Vermont (S1B), Virginia (S3S4B), West Virginia (S4B), Wisconsin (S2S3B)

The table below lists the conservation status ranks used by NatureServe and their definitions. The numbers and letters are appended to G (global rank, for the whole range), N (national rank for within a nation), or S (sub-national rank, for a province or state). A range rank (e.g. S1S2) is used to indicate a range of uncertainty about the status of the species or community.

**Table 5. NatureServe conservation status ranks and their definitions.**

Rank	Definition
1	Critically Imperiled – Critically imperiled in the jurisdiction because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation.
2	Imperiled – Imperiled in the jurisdiction because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines or other factors making it vulnerable to extirpation.
3	Vulnerable – Vulnerable in the jurisdiction due to a very restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
4	Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
5	Secure – common, widespread and abundant in the jurisdiction.
B	Breeding – breeding population of the species in the nation or state/province.
N	Non-breeding – non-breeding population of the species in the nation or state/province.
M	Migrant – occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregate transient population of the species in the nation or state/province.
NR	Unranked – status not yet assessed.
NA	Not Applicable – species is not a suitable target for conservation activities.
?	Inexact Numeric Rank—Denotes inexact numeric rank.