Species at Risk Act
Recovery Strategy Series

Recovery Strategy for the Maritime Ringlet (*Coenonympha nipisiquit*) in Canada

Maritime Ringlet

2012

Canada

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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 (SAR) Public Registry (www.sararegistry.gc.ca).

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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 recovery strategies for listed Extirpated, Endangered, and Threatened 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 are the competent ministers for the recovery of the Maritime Ringlet, a species designated as Endangered is Schedule 1 of SARA, and have prepared this strategy, as per section 37 of SARA. It has been prepared in cooperation with the Governments of Québec and New Brunswick.

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, the Parks Canada Agency, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this strategy for the benefit of the Maritime Ringlet 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, the Parks Canada Agency, 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.

ACKNOWLEDGMENTS

Vincent Carignan and Benoit Jobin (Environment Canada, Canadian Wildlife Service – Quebec Region) led the development of this recovery strategy based on a draft written by Reginald P. Webster (consultant, entomologist). The Maritime Ringlet Recovery Team and the following people contributed to this document: Sylvain Paradis (Parks Canada Agency), Pascal Giasson, Mark McGarrigle, Gilles Godin and Maureen Toner (New Brunswick Department of Natural Resources, Fish and Wildlife Branch), Marie-José Ribeyron (Environment Canada, Canadian Wildlife Service – National Capital Region), Alain Branchaud, Karine Picard, Matthew Wild and Martine Benoit (Environment Canada, Canadian Wildlife Service – Quebec Region), Alain Gouge (Société de conservation des milieux humides du Québec) and Diane Amirault-Langlais (formerly with Environment Canada, Atlantic Region).

EXECUTIVE SUMMARY

The Maritime Ringlet (*Coenonympha nipisiquit*) is a small (wing span 32-36 mm) tan to orange brown-coloured butterfly that is one of only two butterflies in Canada with a life cycle entirely limited to a salt marsh habitat. . The species was assessed as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2000 and has been listed as endangered in Schedule 1 of the *Species at Risk Act* since 2003.

The population of the Maritime Ringlet is estimated at 56 000 to 66 000 individuals. It is endemic to Canada, with an extremely restricted distribution within a small area near Chaleur Bay in northern New Brunswick (six sites, two of which are the result of introductions) and the southern coast of the Gaspé Peninsula in Québec (four sites).

The main threats to the species are waterfront development, marsh infilling, the effects of climate change (water levels and erosion), residential pesticides and sewage as well as industrial effluents. The limited distribution and the isolation of populations also results in an inherently high probability of extirpation for all sites.

The recovery of the Maritime Ringlet is deemed technically and biologically feasible. The population and distribution objectives are to maintain the Maritime Ringlet populations at all permanently occupied salt marshes. Broad strategies and approaches to achieve these objectives are presented in the Strategic direction for recovery section.

Critical habitat for the Maritime Ringlet is identified in this recovery strategy at the nine saltwater marches where permanent populations of the species are currently located (three sites in Quebec, six in New Brunswick), including the two salt marshes in New Brunswick where introduction efforts have been performed.

One or more action plans detailing activities for the implementation of this recovery strategy will be developed within five years of posting the recovery strategy to the SAR Public Registry.

RECOVERY FEASIBILITY SUMMARY

The recovery of the Maritime Ringlet is deemed technically and biologically feasible based on SARA policies that establish four criteria on which to base the assessment (Government of Canada 2009). Correspondingly, when the responses to the four criteria listed below are either "yes" or "unknown", the competent ministers develop a recovery strategy, in accordance with section 41 (1) of SARA:

1. *Individuals of the wildlife species that are capable of reproduction are available now or in the foreseeable future to sustain the population or improve its abundance.*

   Yes. Individuals capable of reproduction are currently found in nine populations (including two introduced populations) in New Brunswick and Québec.

2. *Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.*

   Yes. Sufficient habitat is available to support the nine known permanent populations. Other sites with apparently suitable habitat are also available that could potentially be used by the species.

3. *The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.*

   Yes. Significant threats to the species can be mitigated through recovery actions (primarily through management and protection of salt marshes, stewardship and education).

4. *Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.*

   Yes. Recovery techniques exist and have been demonstrated to be effective, especially when introducing new populations to New Brunswick.

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1. COSEWIC* SPECIES ASSESSMENT INFORMATION

Date of Assessment: April 2009

Common Name (population): Maritime Ringlet

Scientific Name: *Coenonympha nipisiquit*

COSEWIC Status: Endangered

Reason for Designation: Globally, this species of Satyr butterfly is confined to 10 salt marshes in the small region of Chaleur Bay and Gaspésie. Only three populations are large enough for long term survival to be probable. All populations are expected to experience habitat loss due to both sea level rise and increased storm frequency. The New Brunswick populations are also subject to threats associated with increased urban development and the collection of host plants.

Canadian Occurrence: QC, NB

COSEWIC Status History: Designated Endangered in April 1997. Status re-examined and confirmed in May 2000 and in April 2009.

*Committee on the status of endangered wildlife in Canada

2. SPECIES STATUS INFORMATION

The Maritime Ringlet is only found in Canada where it is listed as Endangered under Schedule 1 of the *Species at Risk Act* (SARA) (L.C. 2002, ch. 29) since 2003. It is also listed as Endangered under the *New Brunswick Endangered Species Act* (S.N.B. 1996, c. E-9.101) and as Threatened under the *Québec Act respecting threatened or vulnerable species* (L.R.Q. c. E-12.01).

NatureServe (2010) attributed the global conservation rank of G1 (Critically Imperiled) for this species, the national rank of N1 (Critically Imperiled) in Canada as well as a subnational rank of S1 (Critically Imperiled) in New Brunswick and Québec. The species has not been evaluated by the International Union for the Conservation of Nature (IUCN).

3. SPECIES INFORMATION

3.1 Species Description

The Maritime Ringlet is a small (wing span 32-36 mm) tan to orange brown-coloured butterfly with an eye-spot on the underside of the forewing of most females and about 30% of the males (COSEWIC, 2009). This insect is a member of the Family Nymphalidae (Brush-footed butterflies) and Subfamily Satyrinae (Satyrs). This species is one of only two butterflies in Canada with a life cycle almost entirely limited to a salt marsh habitat.

3.2 Population and Distribution

The Maritime Ringlet has an extremely restricted global distribution within a small area of Chaleur Bay in northern New Brunswick and the southern coast of the Gaspé Peninsula in Québec (Figure 1).

In Québec, the species has been reported at four sites: 1) the estuary of the Rivière Nouvelle near Nouvelle (Dion, 1995; Gouge, 2002, 2003); 2) Forillon National Park (Penouille) (Handfield, 1999; Gouge, 2003; Gilbert, 2005); 3) Saint-Omer; and 4) Saint-Siméon-de-Bonaventure. However, the species permanently occupies only the first three sites, given that no adults have been observed at Saint-Simeon since 2002. According to COSEWIC (2009), the three adult butterflies observed there were likely strays from Nouvelle or Saint-Omer.

In New Brunswick, the Maritime Ringlet is known from six locations: four natural sites within Nepisiguit Bay at Peters River (Beresford), Daly Point, Carron Point, and Bass River (Webster, 1997; New Brunswick Maritime Ringlet Recovery Team, 2005); and two introduced populations at Bas Caraquet and Rivière du Nord, about 45 km northeast of Bathurst (Webster, 2002).

The populations of the Maritime Ringlet in New Brunswick and Québec are separated by 70 to 160 km over the open waters of the Chaleur Bay and gene flow between them is unlikely (COSEWIC 2009). However, within each province the populations are generally clustered (Figure 1). This distribution results in a reduced probability of long-term persistence due to reduced genetic variability as a result of limited or lack of exchange of individuals and low potential for recolonization of sites that may be lost.

The Maritime Ringlet generally occurs in relatively dense populations at each site. The population size in New Brunswick is probably between 30,000 and 40,000 adults (Webster, 1995, 1996, 1999, 2001) with the largest population occurring in the estuary of the Peters River in Beresford and Bathurst (estimate of 27,000 adults in a 156.4 ha marsh complex). Population estimates are available for three sites in Québec with the population near Nouvelle estimated at 26,000 adults within a 101 ha marsh complex. Only a few adults have been observed at each of the three other known sites in the province. No information is available on the former distribution of this species nor on its population trends.

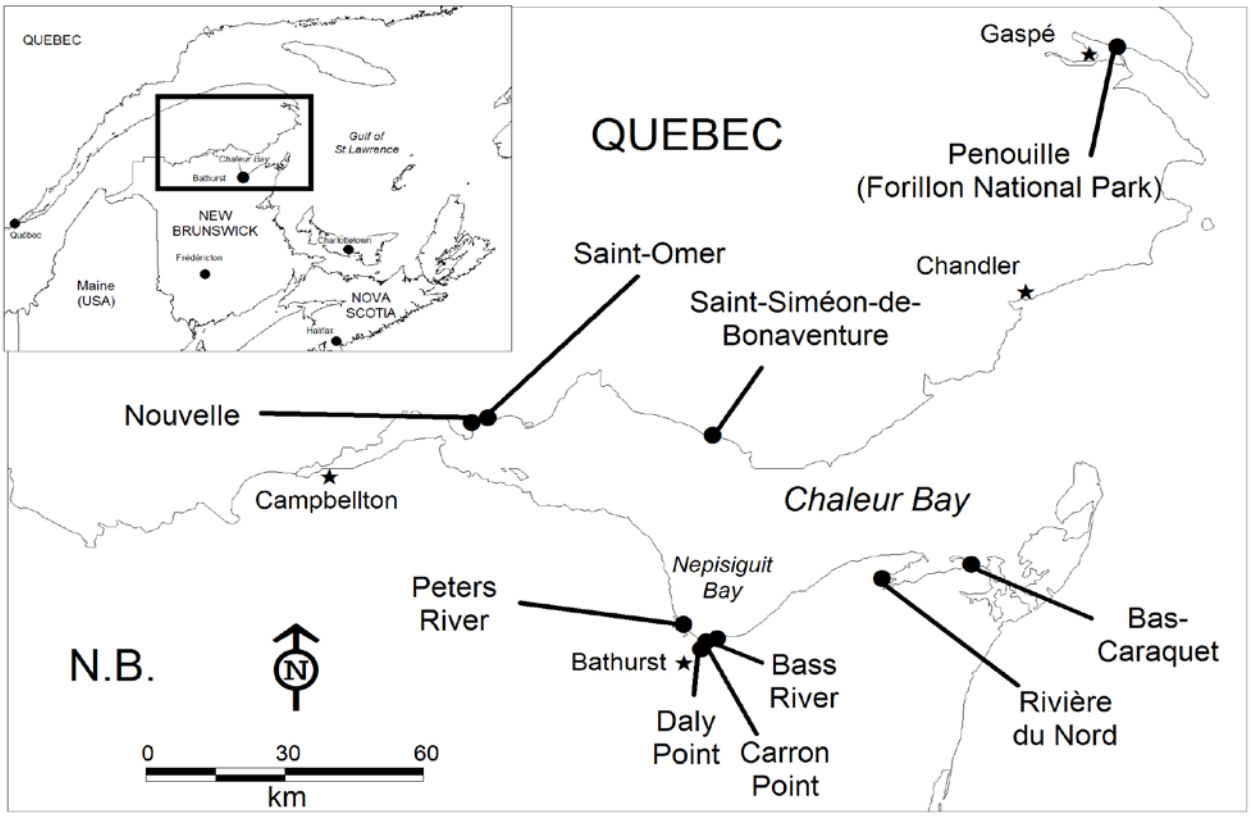

Figure 1. Location of Maritime Ringlet populations (black dots).

3.3 Needs of the Maritime Ringlet

The entire life cycle takes place within salt marshes with occasional use of neighbouring habitats, mainly for flower visitation (Webster, 1995, 1998; Sei and Porter, 2003). The primary host plant for the caterpillars is Salt-meadow Grass (*Spartina patens*) and much of the life-cycle of this insect is dependent on this common salt marsh plant. Sea Lavender (*Limonium carolinianum*) is also very important because 96% of this species' flower visitation is to that plant (Webster 1995, 1996, 1998). Adult densities and survivorship show a direct relationship with the abundance of these two species in all the salt marshes where this species occurs (Sei and Porter 2003). Other common plants in sections of the salt marsh inhabited by this butterfly are Salt-water Cord Grass (*Spartina alterniflora*), Seaside Plantain (*Plantago maritima*), Sea Milkwort (*Glaux maritima*), Sea Lavender (*Limonium carolinianum*), Seaside Goldenrod (*Solidago sempervirens*), and Eged's Silverweed (*Argentina egedii).* Adult densities and survivorship show a strong positive association with the abundance of their two principal resources, Salt-meadow Grass and Sea Lavender in all the salt marshes where this species occurs (Sei and Porter, 2003).

The salt marsh community is usually bordered either by sand dunes of varying sizes, fresh water marshes or forest communities with an adjacent and often narrow zone of marsh edge vegetation that consists of plant species more typical of drier (non-saline inundated) upland habitats. Tidal streams and ponds surrounded by dense stands of Salt-water Cord Grass are common throughout most of these salt marshes (COSEWIC 2009).

The Maritime Ringlet is dependent on the natural tidal regime for maintaining the salt marsh ecosystem where it occurs. Nearly all the salt marshes inhabited by the Maritime Ringlet are in estuaries or are associated with river systems flowing into harbours.

4. THREATS

4.1 Threat Assessment

Table 1. Treat Assessment Table.

Threat	Level of Concern[1]	Extent	Occurrence	Frequency	Severity[2]	Causal Certainty[3]
Habitat loss and degradation						
Waterfront development	High	Generalized	Common	Recurrent	High	High
Marsh infilling	High	Generalized	Common	Recurrent	High	High
All terrain vehicules	Medium	Generalized	Common	Recurrent	Low	Low
Pollution						
Residential pesticides	High	Generalized	Common	Recurrent	High	Medium
Residential sewage	High	Generalized	Common	Recurrent	High	Medium
Industrial effluent	High	Generalized	Common	Recurrent	High	Medium
Oil Spills	Medium	Localized	Historic/ Unknown	Recurrent	Medium	Medium
Insect control programs	Low	Localized	Unknown	Unknown	Medium	Medium
Change in the ecological dynamic or natural processes						
Picking of Sea Lavender	Low	Localized	Unknown	Unknown	Low	Low
Specimen collection	Low	Unknown	Anticipated	Unknown	Medium	Low
Climate and meteorological events						
Climate change (water levels and erosion)	High	Generalized	Common	Recurrent	High	Medium
Exotic, invasive or introduced genome or species						
Invasive plants	Low	Localized	Common	Recurrent	Medium	Medium

[1] Level of Concern: signifies that managing the threat is of (high, medium or low) concern for the recovery of the species, consistent with the population and distribution objectives. This criterion considers the assessment of all the information in the table).
[2] Severity: reflects the population-level effect (High: very large population-level effect, Moderate, Low, Unknown).

[3] Causal certainty: reflects the degree of evidence that is known for the threat (High: available evidence strongly links the threat to stresses on population viability; Medium: there is a correlation between the threat and population viability e.g. expert opinion; Low: the threat is assumed or plausible).
[4] Each threat is evaluated at the local level (each site) and at the rangewide level. When two items are present in a box, this means that the threat level if not the same for both scales (Local scale / Rangewide scale).

4.2 Description of Threats

Threats are listed in order of decreasing level of concern.

Waterfront Development

The natural environments adjacent to salt marshes are prime sites for cottages, houses and other types of construction. The loss of these habitats can have a detrimental impact on associated salt marshes as it could affect nutrient cycling between these habitats (COSEWIC, 2009). Intensive waterfront development also increases habitat fragmentation. Continued development may eliminate corridors for dispersal amplifying the natural levels of fragmentation and the isolation of populations through the fragmentation of suitable habitat. In Quebec, many infrastructures cut through or encircle suitable habit (Torresan 2011), including in Forillon National Park (e.g. roads on Penouille Point); Tremblay 2002). This threat is greatest for populations near Bathurst Harbour and the estuary of the Peters River in New Brunswick. Currently, there is little development in or near salt marshes occupied by the Maritime Ringlet in Québec and thus this threat is minimal in this region.

Marsh Infilling

The largest populations in New Brunswick are located within urban areas. The site in the estuary of the Peters River is owned by numerous landowners and is under constant pressure as a result of developments resulting in infilling (COSEWIC, 2009).Small-scale infilling has occurred within this marsh complex resulting in the direct loss of Maritime Ringlet habitat. This threat is more limited in Quebec, although it is present at sites in Nouvelle and Saint-Omer (Torresan 2011).

Climate change (water levels and erosion)

Studies of the effects of climate change indicate that the sea level has increased in the past 100 years and predict an increase in the incidence of catastrophic natural events (Forbes et al., 2004; COSEWIC, 2009). Higher sea level and increased incidence of severe storms may induce shoreline erosion which may alter the ecological dynamics of salt marshes and lead to severe degradation as well as increase the mortality of all life stages of the Maritime Ringlet (New Brunswick Maritime Ringlet Recovery Team, 2005). Ice scouring of the substrate can also occur during winter storms in salt marshes that are not protected by barrier beaches. The presence of ice blocks in salt marshes crushes caterpillars during the diapause phase. This threat mostly concerns the Daly Point and Carron Point populations in New Brunswick.

Residential Pesticides

Pesticide run-off into the estuary from adjacent private properties may impact the species or its habitat by altering plant communities and available food sources (COSEWIC, 2009). This threat is largely related to urban development and affects all salt marshes except the one in Penouille, located in Forillon National Park. The ban on lawn care pesticides introduced in New Brunswick and Quebec in the 2000s should reduce the impact of this threat.

Residential Sewage

The potential threat of sewage pollution is directly related to urban development (COSEWIC, 2009). The greatest threats will be for populations near Bathurst Harbour and the estuary of the Peters River in New Brunswick. Surfactants (wetting agents), such as detergents or oils and increased nutrient levels entering the estuaries from faulty septic systems or sewage treatment system failures may have negative impacts on the Maritime Ringlet or its habitat. Surfactants in the water flooding the marshes during the tide cycle may increase mortality rates of all life stages of the Maritime Ringlet, especially adults which become wet and incapable of flight. Around the barachois on the Nouvelle River, 70 houses are not yet connected to the municipal sewer system (Torresan 2011). According to PESCA Environnement (2000), 528 residences in Saint-Omer do not have their wastewater treated by the municipality. Of those residences, 212 have non-compliant septic systems.

Industrial Effluents

A number of industries are located in Bathurst Harbour where two populations of the Maritime Ringlet exist. Industrial effluents containing surfactants or toxic chemicals entering Bathurst Harbour may have a negative impact on the Maritime Ringlet or its habitat (COSEWIC, 2009). Pollution from incoming streams and residual contamination from past industrial activities may affect the Maritime Ringlet or its habitat. This threat has been reduced following the closing of the Smurfit-Stone mill in Bathurst. At the barachois at Nouvelle, the wastewater from a fish farm with only primary treatment is also released into the barachois (PESCA Environnement 2000). Pollution from residual contamination from past industrial activities may affect the Maritime Ringlet or its habitat.

All Terrain Vehicles

Use of all terrain vehicles (ATV) on salt marshes can cause significant habitat degradation (erosion and changes in plant communities) and could cause direct mortality of immature stages and adults (COSEWIC, 2009). Signs of the repeated passage of recreational vehicles are present at most of the Quebec and New Brunswick sites (Gouge, 2003; New Brunswick Maritime Ringlet Recovery Team 2005; Gouge 2003; Torresan 2011)

Oil Spills

An oil spill (or other toxic chemicals) would directly impact a Maritime Ringlet population by causing high mortality of all life stages exposed to the spill and would likely, at least temporarily, destroy the plant community of the salt marsh, should the spill enter the estuary or harbour adjacent to a population (COSEWIC, 2009).

In 1999, there was such an (oil) spill in the Ruisseau Savoy leading to the Saint-Omer barachois. Non-chemical decontamination treatments were applied until 2004 (Josianne Torresan, personal communication). Furthermore, according to the MDDEP (http://www.mddep.gouv.qc.ca/eau/regions/region11/11-gaspesie(suite).htm [French only], certain commercial and industrial activities have affected the quality of groundwater in the Gaspé Peninsula area, especially contamination due to the storage of petroleum products.

Picking of Sea Lavender

Commercial picking of Sea Lavender for use in dried flower arrangements is a possible but minor potential threat to the Maritime Ringlet (COSEWIC, 2009). However, no commercial operations are currently under way. Picking of Sea Lavender has been observed in the marsh at Saint-Omer, Québec (S. Paradis, pers. obs.), although removal of small quantities of material for personal use should have little impact on the species.

Insect Control Programs

Insecticide use to control mosquitoes or other insects in salt marshes adjacent to developed areas is a potential threat to the Maritime Ringlet (COSEWIC, 2009). The biological control agent *Bacillus thuringiensis* var. *israelensis* is currently in use by some municipalities in New Brunswick (New Brunswick Maritime Ringlet Recovery Team 2005) (and in Quebec (http://www.mddep.gouv.qc.ca/eau/regions/region11/11-gaspesie(suite).htm) . At present, little data is available on the impact that any of the current mosquito control agents might have on the life stages of the Maritime Ringlet, but lepidopterans in general show a sensitivity to this product (Hall 2009).

Specimen Collection

Small populations like that at Forillon National Park could be negatively impacted by illegal specimen collection (COSEWIC, 2009). However, this threat has not been quantified.

Invasive plants

Invasive plants such as the Common Water Reed (*Phragmites australis)* are real, significant threats because they can replace every other species in the upper littoral zone once they become established. There are also few known effective strategies for fighting these species or controlling their spread. In 2009, the Common Water Reed already occupied a significant area of the Nouvelle and Saint-Omer barachoises (Gilbert 2008).

5. POPULATION AND DISTRIBUTION OBJECTIVES

The population and distribution objectives are to maintain the Maritime Ringlet populations at all permanently occupied salt marshes.[1] The primary factor for listing the Maritime Ringlet as endangered was its very limited and fragmented geographic distribution. Since most salt marshes occupied by this species are relatively unfragmented and undeveloped and individuals reproduce successfully without any clear downward trends, these objectives should allow for the long-term survival of the species.

6. BROAD STRATEGIES AND GENERAL APPROACHES TO MEET OBJECTIVES

6.1 Actions Already Completed or Currently Underway

The New Brunswick Maritime Ringlet Recovery Strategy and Action Plan have been completed (New Brunswick Maritime Ringlet Recovery Team, 2005). This document was used as a baseline to develop general strategies and approaches to meet recovery objectives outlined in the current recovery strategy.

Surveys and population monitoring

Surveys have been completed in most of the known salt marshes occupied by the butterfly in New Brunswick and Québec. A monitoring protocol for known New Brunswick sites has been developed (New Brunswick Department of Natural Resources, 2007) and monitoring efforts have been ongoing since 2002.

Habitat mapping

Detailed vegetation maps have been completed for most occupied sites in New Brunswick and Québec (Webster, 1995, 1996, 2001; Gilbert, 2005, 2008).

Identification of pollution sources

Potential sources of pollutants have been identified in New Brunswick. Preliminary testing for surfactants (wetting agents), sewage and pesticides was done in the Peters River marsh in 2005.

[1]The Saint-Siméon-de-Bonaventure site in Quebec is not included in these objectives, as the site is not considered to be permanently occupied (see section 3.2).

Protection

Stewardship programs have been initiated in New Brunswick and Québec. A total of 86 ha of habitat (coastal and salt marsh) have been acquired at the Nouvelle site in Québec by the Société de conservation des milieux humides du Québec (see http://www.scmhq.ca/reserve.htm).

Research

Considerable research on the biology and ecology of the Maritime Ringlet has been done in New Brunswick. Preliminary genetic studies have been conducted to characterize the genetic makeup of the native populations of the Maritime Ringlet in New Brunswick and Québec (Sei and Porter, 2007).

6.2 Strategic Direction for Recovery

Table 2. Recovery Planning Table

Threat or Limitation	Broad Strategy to Recovery	Priority	General Description of Research and Management Approaches
All	Conservation and stewardship of the species and its habitat	High	• Generate support for recovery actions, including habitat protection and binding stewardship agreements. • Promote consistent enforcement and implementation of existing protection measures and regulations. • Identify and mitigate the impact of threats to populations and habitats at all sites.
Knowledge gaps	Survey and monitoring	High	• Conduct regular monitoring of populations at all known sites. • Assess population numbers and habitat changes at all known sites. • Survey potential sites.
Knowledge gaps	Research	Medium	• Clarify the population dynamics of each of the known populations of the Maritime Ringlet, including genetic make-up.
All	Communication and outreach	Medium	• Support and expand existing communication and outreach strategies.

6.3 Narrative to Support the Recovery Planning Table

Stewardship programs involving landowners, municipalities, federal and provincial governments, local conservation groups and industry are an essential element for recovering this species. Several stewardship and education initiatives already exist and should be supported. Education regarding the negative impacts of infilling, the use of pesticides on residential lawns, and the use of all-terrain vehicles (ATVs) in salt marshes, should help to reduce these threats.

A comprehensive assessment of Maritime Ringlet populations and its habitat is necessary to detect changes (abundance, sex-ratios, genetic make-up, plant structure and composition, etc.) over time and assess if recovery efforts are working. Additional salt marshes in New Brunswick and Québec, and possibly in Prince Edward Island, should be assessed and surveys initiated to determine their suitability for supporting other undocumented Maritime Ringlet populations.

7. CRITICAL HABITAT

7.1 Identification of the Species' Critical Habitat

The Maritime Ringlet is a species associated with salt marshes. The biological and physical attributes of a salt marsh suitable for this species are as follows:

- the habitat is located within estuaries or harbours fed by one or more river and stream systems;
- the habitat contains a mosaic of plants used as hosts for oviposition and larval development (Salt-meadow Grass) as well as nectar sources for adults (Salt-water Cord Grass, Seaside Plantain, Sea Milkwort, Sea Lavender, Seaside Goldenrod, and Eged's Silverweed);
- the habitat is separated from adjacent sand dunes, fresh water marshes or forests by a narrow zone of marsh edge vegetation more typical of drier upland habitats, including Common Yarrow (*Achillea millefolium*), Sow-thistle (*Sonchus* sp.), Glasswort (*Salicornia* spp.) and Sweet Gale (*Myrica gale*).

The Maritime Ringlet's critical habitat is fully identified in this recovery strategy and is considered sufficient to meet the population and distribution objectives. The Maritime Ringlet's critical habitat is identified as salt marshes such as those at the nine permanently occupied sites, including the two salt marshes in New Brunswick where introduction efforts have been carried out.

In Quebec, critical habitat was delineated by tracing a polygon around plant communities to which Maritime Ringlets are associated and within which they have been surveyed (Gouge 2002; Gilbert 2005, 2008; Webster 1995, 1996, 1998, 1999, 2001). In New Brunswick, only one coordinate is provided to indicate the approximate centre of each marsh containing critical habitat as detailed maps outlining the location of the suitable habitat are presented in the Recovery Strategy and Action Plan for the Maritime Ringlet in New Brunswick (New Brunswick Maritime Ringlet Recovery Team, 2005). In both provinces, plant communities were identified based on air photo interpretation and ground truthing. Critical habitat ends beyond the transition between the salt marshes and dry areas or the freshwater marshes next to a suitable salt marsh (based on plant species composition). Tables and figures indicating the boundaries of polygons containing Maritime Ringlet critical habitat can be found in Appendix A. Any anthropogenic structure found within these polygons (e.g. roads, rights-of-way, piers) and that does not possess the biophysical attributes of a suitable salt marsh is not identified as critical habitat for the Maritime Ringlet.

7.2 Activities Likely to Result in the Destruction of Critical Habitat

Habitat destruction is determined on a case-by-case basis. There is destruction if part of the critical habitat has permanently or temporarily deteriorated to the extent that the habitat can no longer serve its purpose when the species needs it. Destruction can result from one or many activities occurring at a given point in time or from the cumulative effects of one or more activities over a period of time (Government of Canada 2009). Anthropogenic activities that are likely to result in the destruction of critical habitat of the Maritime Ringlet include, but are not limited to, the following activities:

1) Changes in the flooding regime could cause changes in the plant community of the salt marshes with a decrease or elimination of important adult and larval resources:

- construction of dams or other water control structures on river and stream systems associated with the estuaries or harbours of occupied salt marshes.

2) Chemical input could cause changes in the plant communities of the salt marshes with a decrease or elimination of important adult and larval resources:

- application of residential pesticides or fertilizers resulting in surface or subsurface run-off into salt marsh habitat;
- poorly-maintained or ineffective septic systems in nearby coastal zones resulting in influx of nutrients from residential sewage into salt marsh habitat.

3) Activities causing permanent physical loss of habitat may lead to extirpation of some populations and prevent potential dispersal among site (increased fragmentation and isolation of populations):

- infilling of marsh habitat for waterfront development (residential, recreational, docks, etc.);
- draining salt marsh for conversion to pasture;
- dyking or installing water control structures to create a permanently flooded wetland.

4) Soil compaction can affect normal root function, seedling recruitment, and natural hydrologic patterns. This may prevent plant establishment therefore causing permanent physical loss of habitat.

- ATV or other vehicule use
- Trampling by repeated passage by foot

5) Disturbance or modification of vegetation can reduce availability of resources important to the species.

- Commercial picking or large-scale removal of Sea Lavender for dried flower arrangements would eliminate or reduce availability of the preferred plant species as a nectar resource.

8. MEASURING PROGRESS

The performance indicators presented below provide a way to define and measure progress toward achieving the population and distribution objectives. Every five years, the success of this recovery strategy with be measured against indicators outlined in subsequent action plans.

This recovery strategy will be considered to be successful if:

- the distribution of the Maritime Ringlet is maintained (individuals are observed at all permanently occupied salt marshes);
- the population size of the Maritime Ringlet is maintained at each permanently occupied salt marsh.

9. STATEMENT ON ACTION PLANS

One or more action plans will be completed for Maritime Ringlet within 5 years of the posting of the recovery strategy on the Species at Risk Public Registry.

10. REFERENCES

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APPENDIX A : MARITIME RINGLET CRITICAL HABITAT

1. Critical habitat in Québec

Table A-1. Polygons containing critical habitat for the Maritime Ringlet in Quebec.

Marsh name	Land tenure	Population estimate and year	National Topographic System (NTS) Map (1: 50 000)	Latitude and longitude of polygon nodes* within which critical habitat is located and area (ha)	Marsh description
Nouvelle Barachois	Non-federal	26000 (2002)	22B/01	A : 48.1168 N; –66.3053 W B : 48.1157 N; –66.2742 W C : 48.1089 N; –66.2576 W D : 48.0885 N; –66.2684 W E : 48.0883 N; –66.2744 W Area: 1632.58 ha	Salt marsh located at the mouth of the Nouvelle river east of the Miguasha Road and west of Pointe Labillois
Saint-Omer Barachois	Non-federal	25-28 (2003)	22B/01	A : 48.1085 N; -66.2520 W B : 48.1086 N; -66.2514 W C : 48.1077 N; -66.2494 W D : 48.1073 N; -66.2494 W E : 48.1071 N; -66.2512 W F : 48.1073 N; -66.2512 W G : 48.1075 N; -66.2507 W Area: 3.28 ha	Salt marsh located at the mouth of the Ruisseau Savoy (Saint-Omer Barachois), near the village of Robitaille, South of highway 132
Penouille (Forillon National Park)	Federal	Probably <100 (2007) (no solid population estimate)	22A/16	A : 48.8586 N; -64.4382 W B : 48.8601 N; -64.4327 W C : 48.8559 N; -64.4126 W D : 48.8531 N; -64.4199 W E : 48.8546 N; -64.4377 W Area: 97.88 ha	Salt marsh located in the Baie de Penouille, south of highway 132 and north of the road located on Presqu'île de Penouille

* A single polygon with multiple nodes was drawn around the outer boundaries of each suitable salt marsh. The position of the nodes was determined to ensure that all suitable salt marsh habitat was included in the polygon.

Figure A-1. Polygon containing critical habitat at the Nouvelle barachois.

Figure A-2. Polygon containing critical habitat at the Saint-Omer barachois.

Figure A-3. Polygon containing critical habitat at Penouille.

2. Critical habitat in New Brunswick

Table A-2. Polygons containing critical habitat for the Maritime Ringlet in New Brunswick.

Marsh name	Land tenure	Population estimate and year	National Topographic System (NTS) Map (1: 50,000)	New Brunswick Atlas block reference(s)*	Centre of polygon	Marsh description
Peters River (Beresford)	Non-federal	27,000 (early 2000s)	21P/12	16D2	47.700 N; -65.685 W	Salt marsh located at the mouth of Peters River and landward of Youghall and Beresford Beaches.
Daly Point	Non-federal	9,500 (1994)	21P/12	16D3	47.636 N; -65.625 W	Salt marsh located on Daly Point, the point of land extending into Bathurst Harbour west of Sand Hill.
Carron Point	Non-federal	Hundreds ? (1996)	21P/12	16D2-16D3	47.650 N: -65.615 W	Salt marsh located west of Carron Point and extending into Bathurst Harbour, north of Ronalds Cove.
Bass River	Non-federal	Hundreds ? (2002)	21P/12	16E2	47.657 N: -65.582 W	Salt marsh located at the mouth of Bass River, near the area where the river meets Nepisiguit Bay.
Bas Caraquet**	Non-federal	635 (1999)	21P/15	10B4	47.804 N: -64.831 W	Salt marsh located north of highway 145, near the village of Bas-Caraquet.
Rivière du Nord**	Non-federal	2000 (2000)	21P/14	9D5-9E4-9E5	47.793 N: -65.083 W	Salt marsh located adjacent to the Rivière du Nord, from the Village Historique Acadien to the Village-des-Poirier.

* Reference number consists of the page number and block(s) where the suitable habitat is located as identified in the 2002 edition of the New Brunswick Atlas (Province of New Brunswick, 2002). For all sites, a center point is provided to identify the approximate centre of each marsh and the NB map book square and topographic map references are provided to help locate the marsh on a map. Note that the marsh locations may not all appear in the New Brunswick Atlas, but represent location names as identified on topographic maps. Coordinates indicate the approximate centre of each marsh containing critical habitat. Detailed maps outlining the location of the suitable habitat are presented in the Recovery Strategy and Action Plan for the Maritime Ringlet in New Brunswick (New Brunswick Maritime Ringlet Recovery Team, 2005).

** Introduced population

Figure A-4. Approximate centre of polygon containing critical habitat at Peters River (red dot).

Figure A-5. Approximate centre of polygon containing critical habitat at Daly Point (red dot).

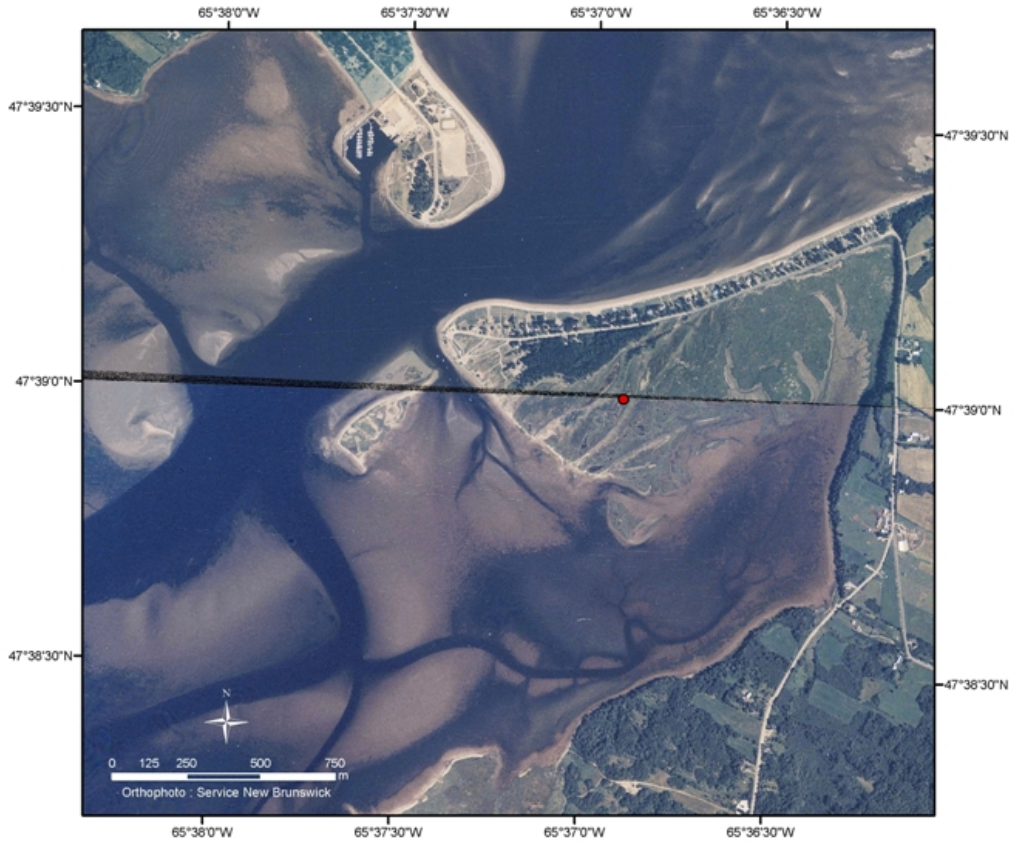

Figure A-6. Approximate centre of polygon containing critical habitat at Carron Point (red dot).

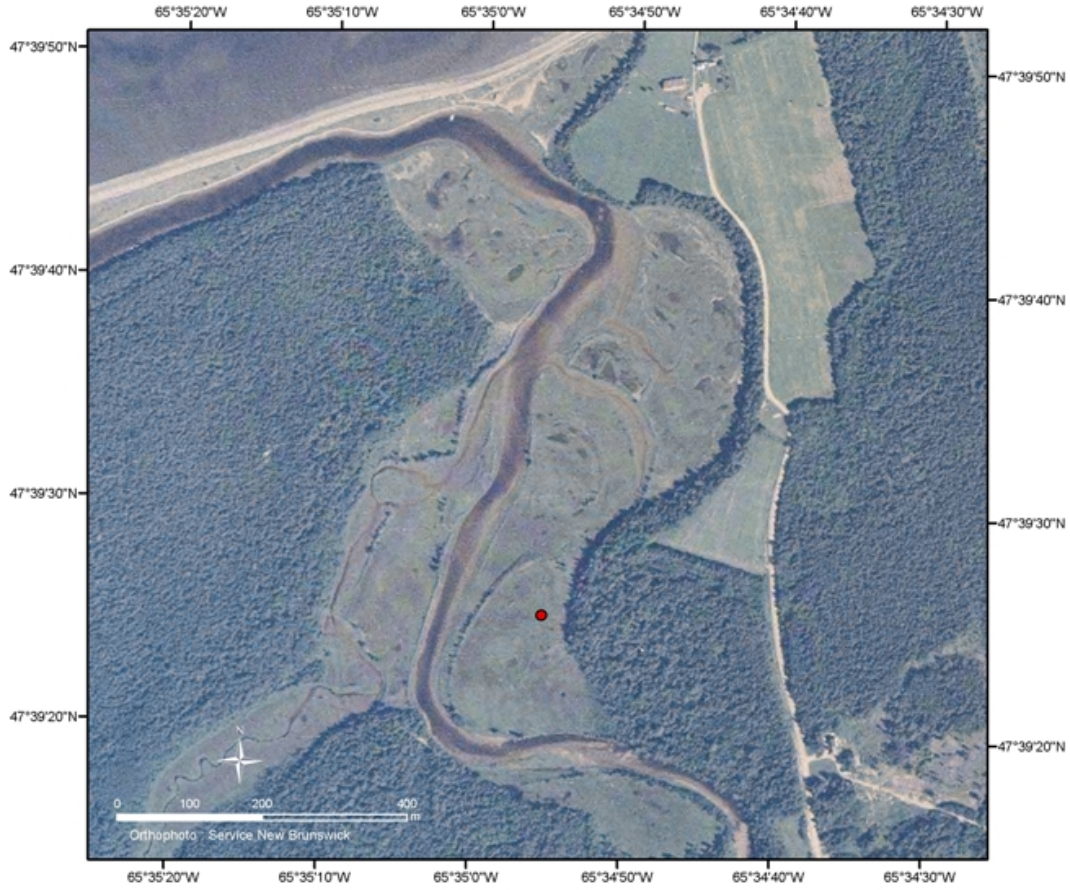

Figure A-7. Approximate centre of polygon containing critical habitat at Bass River (red dot).

Figure A-8. Approximate centre of polygon containing critical habitat at Bas Caraquet (red dot).

Figure A-9. Approximate centre of polygon containing critical habitat at Rivière-du-Nord (red dot).

APPENDIX B: 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 in this statement.

The implementation of this recovery strategy is unlikely to result in any negative effects on other species within the habitat occupied by the Maritime Ringlet. The primary methods utilized accomplish the objectives of the recovery strategy involve mitigating or eliminating threats to the Maritime Ringlet and protection of occupied salt marshes. This will benefit all other species living in and near salt marshes occupied by this insect, including the Yellow Rail (*Coturnicops noveboracensis*), a species listed as “special concern” under SARA which is known to occur in the salt marsh at Nouvelle, and the Nelson’s Sharp-tailed Sparrow (*Ammodramus nelsoni*) and the Maritime Copper (*Lycaena dospassosi*), a butterfly species strictly associated with salt marshes, which are both listed as "species likely to be designated as threatened or vulnerable" in Québec.

The possibility that the present recovery strategy inadvertently generates negative effects on the environment and on other species was considered. The majority of recommended actions are non-intrusive in nature, including surveys and outreach. We conclude that the present recovery strategy is unlikely to produce significant negative effects.