

Recovery Strategy for the Blanchard's Cricket Frog (*Acris blanchardi*) in Canada

Blanchard's Cricket Frog



2010

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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 Blanchard's Cricket Frog. Environment Canada led the development of this strategy, working in cooperation with Parks Canada Agency under SARA. It has also been prepared in cooperation with the Ontario Ministry of Natural Resources.

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 and 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 Blanchard's Cricket Frog and Canadian society as a whole.

If an extant population of Blanchard's Cricket Frog is found or reintroduction is determined to be feasible, this recovery strategy will be followed by one or more action plans that will provide information on recovery measures to be taken by Environment Canada and 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

The Recovery Strategy for the Blanchard's Cricket Frog, formerly Northern Cricket Frog, was prepared on behalf of the Recovery Team by James Kamstra and Barbara Slezak with contributions from Bob Johnson, Kaela Beauclerc, Vicki McKay, Angela McConnell, Allen Woodliffe, Edythe Sonntag, Mike Oldham, Andrew Lentini, and John Brett.

This strategy was prepared using the original National Recovery Plan for Blanchard's Cricket Frog (Kellar et al. 1997). Greg Lipps, Edythe Sonntag and Paul Pratt provided information and insight related to Blanchard's Cricket Frogs. Rick Lehtinen shared information on Blanchard's Cricket Frog from his research paper, prior to it being published.

EXECUTIVE SUMMARY

Formerly recognized as a subspecies of the Northern Cricket Frog (*Acris crepitans*), the Blanchard's Cricket Frog (*A. blanchardi*) is listed as Endangered on Schedule 1 of the *Species at Risk Act*. It is also listed as Endangered under Ontario's *Endangered Species Act, 2007*¹. It is a tiny member of the treefrog family (Hylidae), with moist warty skin that is usually gray, brown or olive coloured but may also be partly green or reddish brown.

The Blanchard's Cricket Frog has a wide range in the U.S. extending from Michigan, west to South Dakota, and south to Texas and extreme northeastern Mexico. Historically, the Blanchard's Cricket Frog extended into extreme Southern Ontario with confirmed historic sightings from Point Pelee National Park and Pelee Island. Although there have been unconfirmed reports of Blanchard's Cricket Frog as recently as 1997, there have not been confirmed sightings since the early 1970s and it is suspected that the species may not be present in Ontario and, therefore, Canada.

The reasons for the decline of the Blanchard's Cricket Frog in Ontario are unknown, however numerous threats exist that have likely been contributing factors. These threats include: dyked and drained wetlands; cottage development; flooding; dredging of drainage canals; invasive species (common reed and carp); use of fertilizers and pesticides, particularly the historic use of DDT and other pesticides; predation by bullfrogs; and road mortality. This species is also limited by its specific habitat needs and climatic changes.

There are unknowns regarding the feasibility of recovery of the Blanchard's Cricket Frog, as many questions remain regarding whether it continues to exist in Canada and whether enough suitable habitat exists in Ontario to support a viable population. In keeping with the precautionary principle, this recovery strategy has been prepared as would be done when recovery is determined to be feasible.

The population and distribution objectives are to determine if the Blanchard's Cricket Frog is still present in its Canadian range and whether suitable habitat for reintroduction² still exists. Broad strategies have been developed to help meet this objective, and are presented in the Strategic Direction for Recovery (Section 6.2).

Critical habitat is not identified in this recovery strategy due to the uncertainty surrounding the Blanchard's Cricket Frog's presence in Canada and the lack of key information regarding the species' habitat requirements and threats in its Canadian range. Critical habitat will be identified in an updated version of this recovery strategy or in an action plan, if an extant population of the species is found or sufficient habitat is available in its Canadian range for reintroduction, provided reintroduction is determined to be feasible.

If an extant population is found or reintroduction is determined to be feasible, an action plan will be posted on the SARA Public Registry by 2016.

¹ The species is currently listed as Northern Cricket Frog (*Acris crepitans*) on the Species at Risk in Ontario (SARO) List

² Reintroduction is used throughout the text to indicate putting a species back into its former habitat as defined by Oxford Dictionary

RECOVERY FEASIBILITY SUMMARY

Based on the following four criteria outlined by Environment Canada (2009), there are unknowns regarding the feasibility of recovery of the Blanchard's Cricket Frog. Therefore, in keeping with the precautionary principle, a full recovery strategy has been prepared as would be done when recovery is determined to be feasible. It may not be possible to mitigate various threats to the species, and availability of habitat of sufficient quality requires further investigation.

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.

Unknown. At present there are individuals capable of reproduction available in the U.S., however it is not known if individuals are present in Canada. It may be possible to use donor populations from the nearby portions of the U.S. if: i) genetic characterization of these populations indicates that the U.S. populations are similar enough in genetic composition, ii) there are sufficient populations available at donor sites given Blanchard's Cricket Frogs are also in decline in the U.S., and iii) reintroduction is feasible.

Any decision on the feasibility of reintroduction of the Blanchard's Cricket Frog to Canada will be made in accordance with policies and guidelines from the Ontario Ministry of Natural Resources, Environment Canada and other responsible jurisdictions after careful examination of all available information.

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

Unknown. Suitable habitat may exist within the former Canadian range of the species that could be managed, restored or enhanced for the benefit of Blanchard's Cricket Frogs. Sites with suitable habitat or restoration potential could also serve as possible reintroduction sites.

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

Unknown. The threats which contributed to the species' decline in Ontario are poorly understood; however, it is suspected that some threats such as predation, habitat loss or degradation and pesticide use were contributing factors. While some of these threats (e.g. habitat loss or degradation) may be avoided or mitigated, the impacts and effects of other threats (e.g. predators, invasive species, contamination) on the Blanchard's Cricket Frog possibly may not be avoided or mitigated. Additionally, some intrinsic characteristics of the Blanchard's Cricket Frog, such as freeze intolerance, are unable to be mitigated and may limit recovery of this species in Canada.

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

Unknown. Recovery techniques exist, but it is not known if they will be effective. There are a few examples of reintroduction initiatives in the U.S., some of which have demonstrated success, including efforts to translocate Blanchard's Cricket Frogs in Michigan and Ohio. These initiatives can serve as test cases and learning opportunities for Canada.

It is unknown whether it will be feasible to reintroduce this species in Canada given declines in populations at possible U.S. donor sites, uncertainty regarding availability of suitable habitat at Canadian sites, and uncertainty as to whether threats can be mitigated. In addition, several questions remain with respect to the possible reintroduction to formerly known sites of the Blanchard's Cricket Frog in Ontario. It is uncertain whether or not these sites could be used for reintroduction due to contamination, loss of habitat and possibility of failure due to stochastic events, predation, etc.

As the small Canadian population of Blanchard's Cricket Frog occurs at the northern part of its continental range, and the vast majority of its continental 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 recovery feasibility in Canada.

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1. COSEWIC SPECIES ASSESSMENT INFORMATION

Date of Assessment: May 2001

Common Name: Blanchard's Cricket Frog

Scientific Name: *Acris blanchardi*

COSEWIC Status: Endangered

Reason for designation: Due to continuing declines in the extent of the species' occurrence, area of occupancy, extent of habitat and number of individuals, any remaining individuals of this frog species would exist in a single small population on Pelee Island.

Canadian Occurrence: Ontario

COSEWIC Status history: Designated Endangered in April 1990. Status re-examined and confirmed in May 2001. Last assessment based on an update status report.

***Other Names:** Northern Cricket Frog, *Acris crepitans*, *Acris crepitans blanchardi*, *Acris crepitans paludicola*, *Acris gryllus blanchardi*, *Acris gryllus paludicola*, *Hyla ocularis blanchardi*

2. SPECIES STATUS INFORMATION

Although the species is ranked as globally secure (G5), the Blanchard's Cricket Frog has been ranked by NatureServe (2009) as possibly extirpated in Canada (NH) and in Ontario (SH). This species has been considered Endangered within Canada by COSEWIC, and is listed as Endangered on Schedule 1 of the *Species at Risk Act*. It is also listed as Endangered under Ontario's *Endangered Species Act, 2007*. Historically, the Canadian population made up less than 1% of the global population of this species.

The Blanchard's Cricket Frog is ranked as nationally secure (N5) in the U.S. while it ranges from being unranked (SNR) to critically imperiled (S1) in some states (NatureServe 2009; Appendix B). Rankings in the states at the northern part of this species' range reflect a higher risk of extinction, with South Dakota, Minnesota, and Wisconsin ranked as critically imperiled (S1), and Michigan ranked as imperiled (S2).

3. SPECIES INFORMATION

3.1 Species Background

Based on the results of recent phylogenetic work (Gamble et al. 2008), the species formerly identified as Northern Cricket Frog is now recognized as three distinct species within the genus *Acris*: *A. blanchardi*, *A. crepitans*, and *A. gryllus*. These changes are reflected on Schedule 1 of the *Species at Risk Act* and the Species at Risk Public Registry, with “Northern Cricket Frog” (*A. crepitans*) replaced by “Blanchard’s Cricket Frog” (*A. blanchardi*).

3.2 Species Description

The Blanchard’s Cricket Frog is a tiny member of the treefrog family attaining lengths of 1.8 to 3.5 cm with females being somewhat larger (Conant and Collins 1991). As an adult, the species has moist warty skin that is usually gray, brown or olive coloured but may also be partly green or reddish brown. The overall skin pattern is often quite uniform but can be variable with indistinct blotches, spots or an irregular dorsal stripe. A dark brown triangular patch is usually present between the eyes. The belly is light and the thigh has dark barring. The species’ call is cricket-like and often described as sounding like pebbles tapped together rapidly. Unlike most other members of the treefrog family, Blanchard’s Cricket Frogs do not have toe pads, and hence do not climb. Tadpoles of this species are mostly mottled brown with a pale belly and a characteristic black-tipped tail (Vogt 1981).

Blanchard’s Cricket Frog may be confused with two other frog species of similar size that occur within the species’ range in Ontario: Western Chorus Frog (*Pseudacris triseriata*) and Spring Peeper (*Pseudacris crucifer*). The Blanchard’s Cricket Frog is distinguished from these other tree frogs by the dark triangle between its eyes while, the western chorus frog has three dark lines on its back and the spring peeper has a dark X on its back (NatureWatch 2006).

In the northern parts of their range, Blanchard’s Cricket Frogs call in early June to late July, both during the day and at night. Females attach 200 to 400 eggs in small clusters to vegetation near the surface. These hatch in three or four days. The tadpole period lasts for 5 to 10 weeks (Vogt 1981) during which time the tadpoles attain a maximum size of about 3.5 cm before transforming into adults. Juveniles grow rapidly and breed the next summer after overwintering in cracks and depressions away from surface water (Oldham and Campbell 1990).

The Blanchard’s Cricket Frog is limited by its short life cycle, with individuals surviving generally for two years and in most cases only breeding once (Johnson and Christiansen 1976, Burkett 1984). The population turnover rate is believed to be almost 100% in two years (Britton 2000, Gray and Brown 2005). However, adults have lived up to four years in captivity at the Toronto Zoo (Johnson pers. comm. 2006). At some U.S. locations, typically a large number of frogs can be seen at a given site early in spring and these numbers decline steadily as the season progresses. It has been observed that following the breeding season, virtually no adults can be found at the breeding site (Lipps pers. comm. 2006), which could be attributed to their short life span, cryptic behaviour or micro habitat selection. The Blanchard’s Cricket Frog, like many amphibians, lays a large number of eggs and, therefore, has the potential for rapid population

growth if conditions are optimal. However, its very short life span makes it highly vulnerable to local extirpation if a breeding season fails and to stochastic events that may impact various portions of their range. The likelihood of local extirpation increases in the event of two consecutive failed breeding seasons.

3.3 Population and Distribution

The Blanchard's Cricket Frog has a wide range in the U.S. extending from Michigan, west to South Dakota, and south to Texas and extreme northeastern Mexico (Figure 1). Historically the Blanchard's Cricket Frog extended into extreme southwestern Ontario with the only confirmed (i.e. substantiated with a photograph, audio recording, or a voucher specimen) sightings coming from Point Pelee National Park and Pelee Island (Oldham and Campbell 1990; Figure 2). A few other unconfirmed reports exist from elsewhere in southwestern Ontario (Britton 2000).

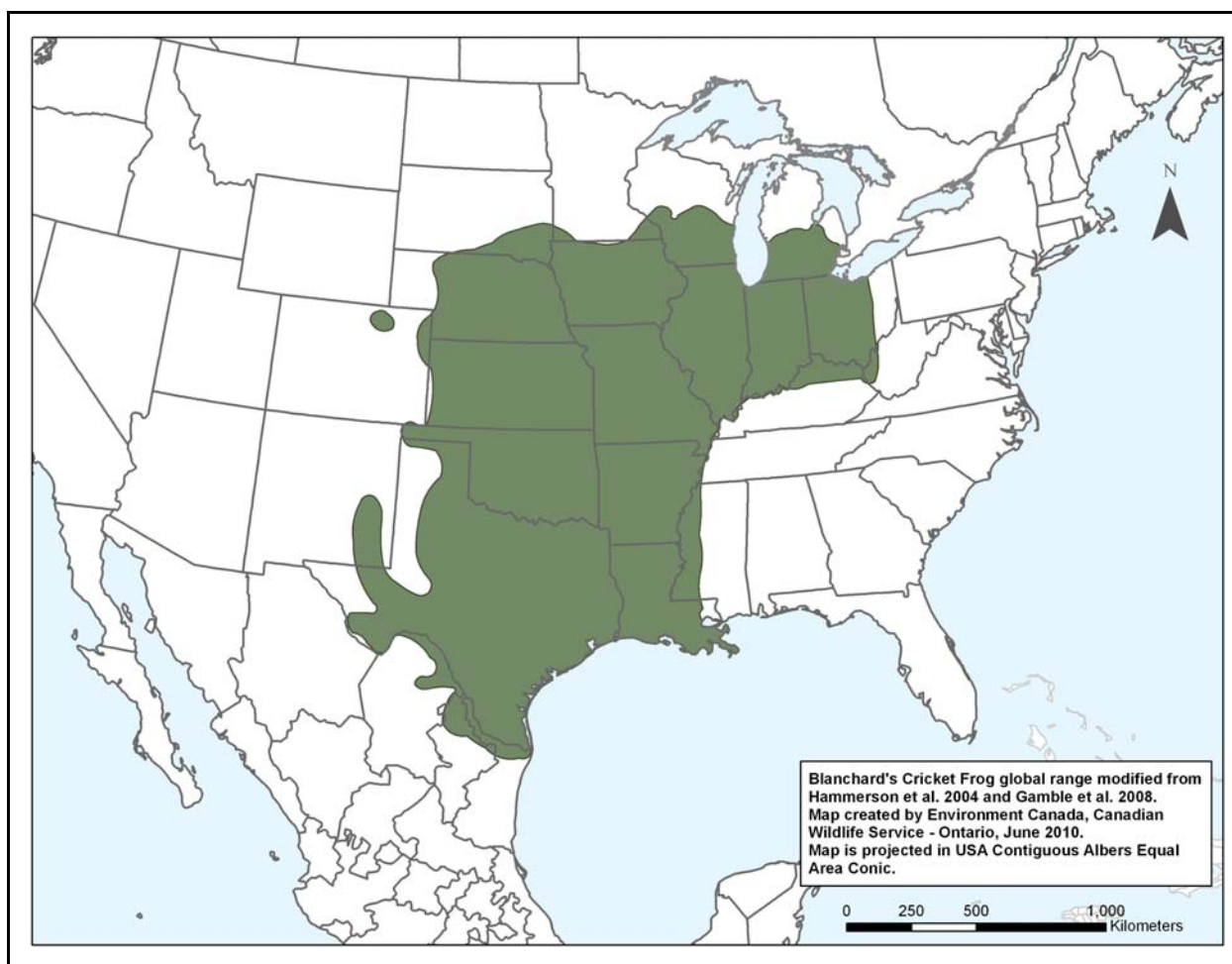


Figure 1: Global Range of the Blanchard's Cricket Frog.

Point Pelee National Park

The Blanchard's Cricket Frog has not been confirmed at Point Pelee National Park and vicinity since 1920 and is considered to be extirpated from this location. However, a 1961 specimen appears to have been collected west of Point Pelee, and there was an unconfirmed record of

calling at Point Pelee National Park marsh in 1972 (Table 1). Hillman Marsh, historically an integral part of the Point Pelee marsh system, could also represent former habitat for Blanchard's Cricket Frog, although there are no records to substantiate this.

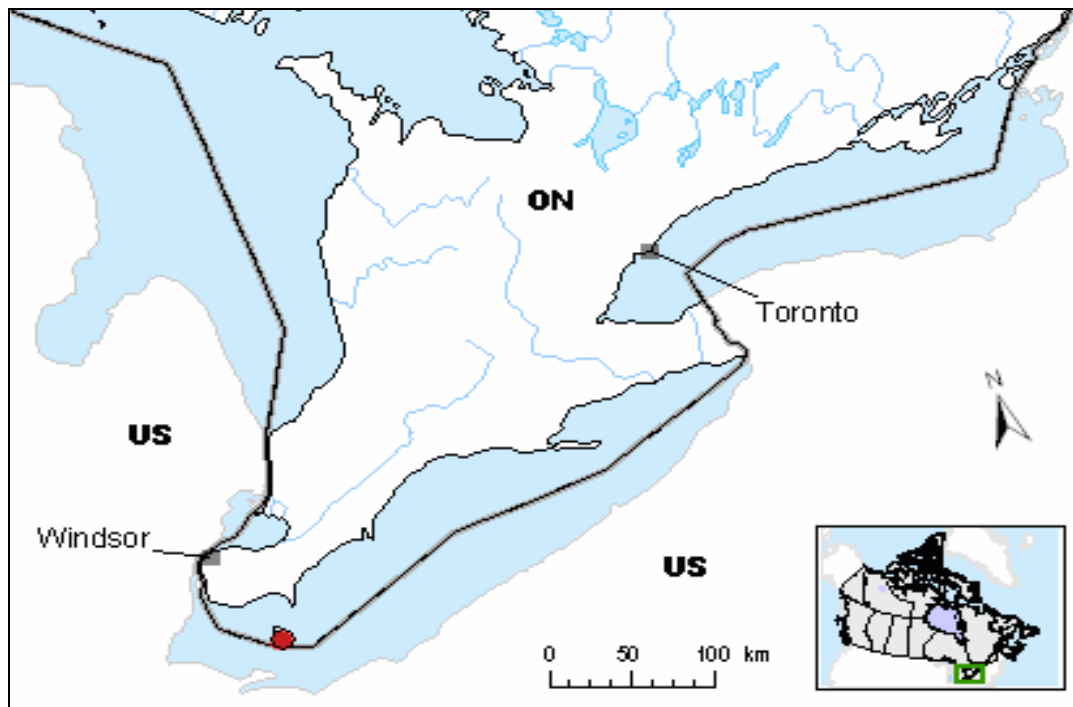


Figure 2: Canadian Range of Blanchard's Cricket Frog (confirmed 1970s). Map from the Species at Risk Public Registry (www.sararegistry.gc.ca).

Pelee Island

On Pelee Island, Blanchard's Cricket Frogs were reported and confirmed from 20 locations in the early 1970s but the species declined precipitously through that decade and from 1977 on, there have only been unconfirmed reports from Fox Pond in Fish Point Provincial Nature Reserve, Pelee Island (Oldham and Campbell 1990). During 1997 and 1998, the Toronto Zoo funded a two year study on Pelee Island, focused on Fox Pond. During the breeding season, "frogloggers" (a device used to remotely monitor frog populations by recording any vocalizations over a period of time) were used to record sound and analyzed for frog calls. No calling Blanchard's Cricket Frogs or visual observations were noted during this study (Johnson pers. comm. 2006).

Table 1: Summary of Blanchard's Cricket Frog Sightings in Ontario

Location	Year	Confirmed	Un-confirmed	Comment	Author (year)/ Source
Point Pelee National Park					
Point Pelee National Park	1920	X		Single calling male	Oldham and Campbell (1990)
West of Point Pelee National Park	1961	X		Location unconfirmed	Canadian Museum of Nature Catalogue #CMNAR 30088, F.R. Cook and M.G. Foster .
Point Pelee National Park Marsh	1972		X	Single individual heard calling by Don Rivard	Rivard and Smith (1973)
Pelee Island					
Pelee Island	1970s	X		Reported from 20 locations by Craig Campbell	Oldham and Campbell (1990)
Fox Pond in Fish Point Provincial Nature Reserve	1984		X	30 calling males	Oldham and Campbell (1990)
Fox Pond	1987		X	Two calling adults	Oldham and Campbell (1990)
Fox Pond	1990		X	Single individual heard calling	Kamstra et al. (1995)
Pelee Island	1992			None found in extensive survey	Kraus (1992)
Fox Pond	1993		X	Calling males	Kellar et al. (1997)
Fox Pond	1997		X	Adult frog found under a piece of wood	Britton (2000)
Fox Pond and adjacent area	1997-1998			Toronto Zoo study, no observations of Blanchard's Cricket Frog	Johnson pers. comm. (2006)

United States

Blanchard's Cricket Frog is still common in much of its range but has shown significant declines over the last two decades across the northern portions of its range (Gray and Brown 2005). In Michigan, Blanchard's Cricket Frogs have declined by 75% in the past 20 years (Lehtinen 2002, Sonntag pers. comm. 2006). A recent study by Lehtinen and Skinner (2006) found that the eastern range limit in Ohio has contracted by 50%. Blanchard's Cricket Frogs formerly occurred on Kelly's Island and the Bass Islands of Ohio, which lie less than 15 km from Pelee Island, however Blanchard's Cricket Frogs from these areas in Ohio are now extirpated as well (Lipps pers. comm. 2006).

3.4 Needs of the Blanchard's Cricket Frog

The Blanchard's Cricket Frog has specific habitat requirements that limit its ability to inhabit all portions of its range. The specific habitat requirements of permanent open wetlands with few fish, sparse emergent vegetation and gently sloping muddy or sandy shores are now more difficult to locate within the fragmented habitats of southern Ontario. The Blanchard's Cricket Frog requires a habitat mosaic of suitable sites for hibernation, breeding, foraging, and movement. Natural linkages are important so that movement can occur between locations allowing for recolonization opportunities as well as genetic mixing.

Unlike many other frogs, Blanchard's Cricket Frogs remain in the vicinity of permanent water throughout the active season. In Ontario, Blanchard's Cricket Frogs have been heard calling in June, while individuals, recently transformed from tadpoles, have been observed in September (Britton 2000). All individuals recorded occurred close to the shoreline, suggesting that they use similar habitats for breeding and foraging. They typically inhabit gently sloping muddy or sandy shores of ponds, ditches, or marshes and open wetlands where there is abundant emergent vegetation (Vogt 1981). They can occur in a wide variety of water bodies throughout their range, which may include lakes, ponds, marshes, rivers and streams (Conant and Collins 1991), and can also occur in constructed ponds such as those used for fish hatcheries (Johnson pers. comm. 2009). They show a strong preference for open wetlands with minimal tree canopy as opposed to shaded or partially shaded wetlands (Lehtinen and Skinner 2006). Although Vogt's findings indicate that this species often inhabits open wetlands with abundant emergent vegetation, Lipps (pers. comm. 2006) has found that some Blanchard's Cricket Frogs avoid cattail marshes, preferring lower or even sparse emergent vegetation, including ponds where the edges are heavily grazed. On Pelee Island, Blanchard's Cricket Frogs formerly occurred in drainage canals, marshes, beach pools, flooded fields, and a flooded abandoned quarry (Oldham and Campbell 1990).

Specific hibernation sites are not well known or documented. Blanchard's Cricket Frogs frequently hibernate in upland sites near wetlands (Irwin et al. 1999). Sonntag (pers. comm. 2006) found that in Michigan, Blanchard's Cricket Frogs usually hibernate in crayfish burrows if the crayfish are absent. Presumably the frogs hibernate in close proximity to the wetlands where they breed and forage.

Habitat corridors and wetland complexes may be important to allow for dispersal, to ensure genetic mixing between nearby subpopulations and for recolonization opportunities. Corridors and wetland complexes may be particularly critical for Blanchard's Cricket Frogs because factors such as their short life span may contribute to a high probability of local extirpation if conditions become unfavourable for even a single breeding season. Habitat fragmentation eliminates recolonization opportunities; this may be one of the chief reasons for the disappearance of some populations (Lipps pers. comm. 2006).

Because of these habitat requirements, in combination with the small size of the organism, it is expected that the home range is small and that a population can persist in a relatively small area given suitable habitat conditions. Burkett (1984) found Blanchard's Cricket Frogs dispersed up to 100 m on rainy nights, which is considerably less than most frogs.

Since southwestern Ontario is at the extreme limit of the species' range, it is possible that climatic conditions (length of Ontario winters, length of growing season, depth of frost penetration, minimum winter temperatures, and possible effects of climate change) may be a limiting factor to the species in Canada. A study by Irwin et al (1999) suggests that Blanchard's Cricket Frogs are intolerant of extensive freezing, with only 2 of their 15 study individuals surviving a 24 to 96 hour experimental temperature treatment of -0.8° to -2.6°C.

4. THREATS

4.1 Threat Assessment

Table 2. Threat Assessment Table

Threat	Level of Concern	Extent	Occurrence	Frequency	Severity	Causal Certainty
Habitat Loss and Degradation						
Dyking and draining of wetlands	High	Widespread	Historic	Unknown	High	Medium
Dredging of drainage canals	High	Widespread	Historic/Current	Recurrent	High	Medium
Cottage development	High	Widespread	Historic/Current	Continuous	High	Medium
Pollution						
Pesticides	Medium	Widespread	Historic/Current	Recurrent	Medium	Medium
Exotic, Invasive, or Introduced Species						
Invasive Species	Medium	Widespread	Historic/Current	Continuous	Medium	Medium
Natural Processes or Activities						
Predation	Medium	Widespread	Historic	Unknown	Medium	Low
Disease	Low	Unknown	Unknown	Unknown	Low	Low
Accidental Mortality						
Road Mortality	Low	Widespread	Historic	Unknown	Low	Medium
Climate and Natural Disasters						
Northern Climate	Low	Widespread	Historic/Current	Continuous	Unknown	Low
Flooding	Low	Widespread	Historic	Recurrent	Medium	Low
Storms	Low	Widespread	Historic	Recurrent	Medium	Low

4.2 Description of Threats

While the exact cause for the decline of the Blanchard's Cricket Frog in Canada is not fully understood, it is believed that a combination of factors contributed to their decline. Suggested reasons for the dramatic decline on Pelee Island in the 1970s include natural flooding from unusually high lake levels, redredging of canals and filling of wetlands, pesticides and heavy predation by bullfrogs and herons (Oldham and Campbell 1990, Kellar et al. 1997). The general decline that has affected the northern portion of the species' range suggests that the suspected absence from Pelee Island may not be an isolated incident but part of a wider geographic trend in combination with an inherent characteristic of the species which makes them so susceptible to extirpation over such a broad area.

4.2.1 Habitat Loss and Degradation

Pelee Island

Historically, a large wetland occupied about 2 800 ha of Pelee Island and likely supported a potentially large population of Blanchard's Cricket Frogs. The wetland was dyked and drained in the 1880s (Britton 2000).

Blanchard's Cricket Frog populations were likely in the many drainage canals that line Pelee Island's roads and fields. These canals are periodically dredged for maintenance, which degrades the habitat that develops over time and probably kills many inhabitants of the canal. During periods of flooding, these canals were pumped, and the resulting currents likely flushed adults and tadpoles out into the lake. These canals also receive agricultural runoff of fertilizers and pesticides, as most of the island is under cultivation. There was no indication that any amphibians were breeding in the canals during extensive searches in 1992 (Kraus 1992).

Cottage development has intensified along parts of the Pelee Island shoreline, so beach pools no longer form in places that they historically did. This has further eliminated habitat for the species.

Point Pelee National Park

Historically, the wetlands to the north of Point Pelee National Park were also much more extensive. Formerly, the marsh on the Point Pelee peninsula was approximately 3 633 ha in size. Drainage of this wetland started in the late 1800s, prior to the formation of Point Pelee National Park in 1918. The result was a 58% loss of the original wetland area, alterations in the local hydrology, and deforestation of surrounding upland habitats (McKay pers. comm. 2006). Today, less than 5% natural habitat remains in Essex County (the county which includes Point Pelee National Park) due to intensive agriculture, settlement and supporting infrastructure development (Snell 1987). These factors have likely contributed to local extirpations of Blanchard's Cricket Frog and other species at risk.

United States

In Michigan, Sonntag (pers. comm. 2006) believes that loss, fragmentation and degradation of wetlands are the main reasons for Blanchard's Cricket Frog declines. The stronghold in that state is in the southwest where suitable habitat patches are better linked with corridors. However, in a statewide survey of Ohio, Lehtinen and Skinner (2006) found the highest populations of Blanchard's Cricket Frog in the most intensively cultivated part of the state.

4.2.2 Pollution

Amphibians, with their aquatic larval stage and permeable skin, are believed to be particularly sensitive to contamination of water. Most of Pelee Island is intensively cultivated and subject to use of chemical fertilizers and pesticides.

Campbell (1978) reported high levels of DDE and PCBs in seven Blanchard's Cricket Frogs analyzed from Pelee Island (cited in Oldham and Campbell 1990). Historically, a portion of Point Pelee National Park's dry land was used for agriculture (crops, orchards and livestock) and some of this land was subject to the application of pesticides. In addition, a mosquito control program of the past included pesticide treatment of the marsh (McKay pers. comm. 2010). Several wildlife species there have been found to contain high levels of DDT in their tissues even though DDT has not been used there since the 1960s (Russell et al. 1994). However, the last confirmed Blanchard's Cricket Frog record from within Park boundaries dates from 1920 and pesticide use did not become widespread until the 1940s (McKay pers. comm. 2006).

Blanchard's Cricket Frogs sampled in Ohio also showed high levels of organic pollutants (Russell et al. 2002). However, Lehtinen and Skinner (2006) found large populations of Blanchard's Cricket Frog in the most intensively cultivated part of the state suggesting that Blanchard's Cricket Frog may not be particularly sensitive to pesticides; however there is little information on the effects of pesticides on Blanchard's Cricket Frogs.

4.2.3 Exotic, Invasive, or Introduced Species

Some invasive species have become an increasing issue with respect to their impacts on native species. Although protected in the Fish Point Provincial Nature Reserve, Fox Pond may no longer be suitable as habitat for the Blanchard's Cricket Frog. In the 1970s and 1980s, Fox Pond was an open water pond with about 80% coverage by Spatterdock (*Nuphar lutea advena*) (Kamstra et al. 1995), which presumably was suitable for the frogs. By 1994 the eastern portion of the pond was totally covered by dense Spatterdock but open water and an emergent sedge flat remained along the west shoreline. This shallow zone would provide good summer habitat (Johnson pers. comm. 2006). More recently, the water levels have dropped and vegetation has become very dense. In particular, the highly invasive non-native European common reed (*Phragmites australis australis*) has increased in Fox Pond. The eastern barrier beach was breached by Lake Erie in 2002 allowing Common Carp (*Cyprinus carpio*) and other fish to enter (Woodliffe pers. comm. 2006). The impacts of invasive species can range from altering habitat to predation on existing species and competition for resources (food, shelter, etc).

4.2.4 Natural Processes or Activities

Blanchard's Cricket Frogs are potentially preyed upon by a wide variety of predators. While predation is a natural phenomenon and small frogs are an important link in the food chain, in combination with other stressors, a high rate of predation could tip the balance and lead to a population decline or extirpation. In the 1970s, the largest Black-crowned Night-Heron (*Nycticorax nycticorax*) nesting colony in Ontario, containing approximately 900 active pairs, occurred along the north side of Fox Pond at Fish Point Provincial Nature Reserve (Campbell 1976). These birds would have foraged widely in the area but likely exerted a high predation pressure on the amphibians at Fox Pond, including Blanchard's Cricket Frogs. The colony abandoned the site and moved to nearby Middle Island in 1981 (Kamstra et al. 1995). Britton (2000) hypothesizes that with fewer herons around, the Bullfrog (*Rana catesbiana*) population exploded, becoming an even more effective predator on the Blanchard's Cricket Frogs. Hundreds of Bullfrogs were observed in Fox Pond during an evening in June 1988 (Kamstra pers. obs.) and again in June of 1994 (Johnson pers. obs.).

Sonntag (pers. comm. 2006) believes that many small wetlands in Michigan no longer support Blanchard's Cricket Frogs because of the introduction of sport fish into them. The introduction of sport fish into Blanchard's Cricket Frog habitat, for example due to a natural breach in Fox Pond, may add another form of predation to an extant population or to a reintroduced population.

There are no reports of diseases afflicting Blanchard's Cricket Frogs (Oldham and Campbell 1990). However, diseases can be hard to detect without targeted investigation. Recently, chytridiomycosis caused by the fungus *Batrachochytrium dendrobatidis* has been implicated in many amphibian declines and extinctions (Daszak et al. 2003). It is possible that chytridiomycosis or some other disease has also affected Blanchard's Cricket Frogs. Lipps (pers. comm. 2006) noted that captive Blanchard's Cricket Frogs at the Toledo Zoo were less susceptible to chytridiomycosis than some other amphibian species.

4.2.5 Accidental Mortality

Roads are a significant cause of mortality to virtually all wildlife species. Frogs can experience very high levels of road mortality, particularly when roads are in close proximity to wetlands, and on rainy nights when frogs are migrating or dispersing. This was not known to be a particular threat to Blanchard's Cricket Frogs on Pelee Island or Point Pelee. When the species was widespread on Pelee Island most of the roads were gravel and traffic was light, so road mortality was less of an issue there than it would be now. Nevertheless, since many of the historic breeding areas were around the fringes of the island, and there is a road around nearly the entire shoreline, individual Blanchard's Cricket Frogs were undoubtedly run over by vehicles.

4.2.6 Climate and Natural Disasters

Since southwestern Ontario is at the extreme northern limit of the species' range, it is possible that the limitations imposed by climatic conditions have posed, and continue to pose a threat to this species in Canada, and make the species susceptible to stochastic events. The recent decline of Blanchard's Cricket Frogs in the northern part of their range but not further south supports the idea that climatic limitations could have played a role.

Several sites at Lighthouse Point Provincial Nature Reserve on Pelee Island were flooded during high lake levels and storms in 1972 and 1973, and have not supported Blanchard's Cricket Frogs since that time (Oldham and Campbell 1990). Beach pools and marshes elsewhere around the island periphery were breached and scoured by lake storms. Following the 1972 and 1973 storms, parts of the shoreline on Pelee Island were fortified with armour stone.

5. POPULATION AND DISTRIBUTION OBJECTIVES

The population and distribution objectives of this recovery strategy are to determine if the Blanchard's Cricket Frog is still present in its Canadian range and to assess the feasibility of reintroduction.

As discussed in the Recovery Feasibility Summary, there are many unknowns that need to be addressed regarding recovery. It is important to confirm whether the species is still present and assess the feasibility of reintroduction before further steps are taken. There is a considerable lack of knowledge surrounding this species in Canada. Even if reintroduction were to be considered, information is needed about the species and the availability of sites with suitable habitat to determine if reintroduction is feasible, and if habitat restoration would first be required.

This recovery strategy will be updated if an extant population of Blanchard's Cricket Frog is found in Ontario or as warranted in response to changing conditions and/or knowledge.

6. BROAD STRATEGIES AND GENERAL APPROACHES TO MEET OBJECTIVES

6.1 Actions Already Completed or Currently Underway

The Toronto Zoo acquired a number of Blanchard's Cricket Frogs from Ohio in 1999, to attempt captive breeding for possible reintroduction to Canadian sites. Frogs successfully overwintered in artificial hibernation sites and bred the following spring. Eggs hatched and tadpoles developed, however, the tadpoles all died before transforming. Although some of the frogs lived for up to four years, they did not breed in subsequent years (Johnson pers. comm. 2006).

Recent work was undertaken to better understand the spatial genetic structure of the Blanchard's Cricket Frog across its range (Beaucherc et al. 2010).

There are currently several researchers studying Blanchard's Cricket Frog in nearby parts of the U.S. because of concern over declining populations. Some reintroduction efforts have been attempted or are being proposed in the U.S. Although not part of the Canadian program, much of their research can potentially benefit the Ontario recovery program. Some of this research includes: monitoring the establishment of translocated frogs, state-wide surveys of remaining populations in Michigan and monitoring the immigration rate and establishment of the Ypsilanti population in a created wetland (Sonntag, pers. comm. 2006).

Staff at the Detroit Zoo transplanted both tadpoles and recently metamorphosed frogs to three created wetlands in southeastern Michigan in 2004. Calling individuals were heard at all three locations the following spring indicating that at least some individuals had successfully overwintered (Sonntag pers. comm. 2006). Blanchard's Cricket Frogs were discovered in a created wetland in Minnesota that was north of their known range; it is unknown whether the frogs were released or arrived on their own, as they were previously believed to be extirpated in the state (Berendzen 2003). This example suggests the possibility that the species can be successfully reintroduced in the northern part of its range.

In 2006, Blanchard's Cricket Frogs were relocated to the Kuehnle State Wildlife Area on Middle Bass Island, Ohio, which is less than 15 km from Pelee Island. Although feeding and vocalization behaviour was observed following the release, no Blanchard's Cricket Frogs were observed on subsequent visits to the site (Lipps 2007).

6.2 Strategic Direction for Recovery

The short-term (5 year) broad strategy to meet the population and distribution objective is to:

1. Complete surveys at sites known to formerly have Blanchard's Cricket Frogs to determine: i) if the species is still present in its Canadian range, and ii) whether there is sufficient habitat available in Canada, if it is suitable for recovery efforts, and whether restoration is needed.

If it is determined that the species is still present in its Canadian range and that sufficient habitat is available in Canada, the following additional strategy is recommended:

2. Determine the threats to the current population and the threats that caused the rapid decline of the species in Canada, and investigate ways to mitigate these threats.

If the threats that caused the rapid decline and suspected extirpation of the species are identified and can be mitigated, or if an extant population is discovered and the threats to the current population can be mitigated, the following strategy is recommended:

3. Mitigate threats, where feasible.
4. Complete research to fill information gaps on species biology and habitat needs to determine feasibility of, and appropriate techniques for, reintroduction³ or population augmentation.

³ Any decision on the feasibility of reintroduction of the Blanchard's Cricket Frog to Canada will be made in accordance with policies and guidelines from the Ontario Ministry of Natural Resources, Environment Canada and other responsible jurisdictions after careful examination of all available information.

Table 3. Recovery Planning Table

Threat or Limitation	Priority	Broad Strategy to Recovery	General Description of Research and Management Approaches
Lack of confirmation of presence/absence in Canada	High	Species surveys and habitat assessment	<ul style="list-style-type: none"> • Survey Pelee Island locations for potential presence of the species. • Investigate any observations of Blanchard's Cricket Frogs reported in Ontario. • Verify historic records for authenticity • Investigate current habitat conditions at all historical locations.

If it is determined that the species is still present in its Canadian range and that sufficient habitat is available in Canada, the following additional approaches are recommended:

Threat or Limitation	Priority	Broad Strategy to Recovery	General Description of Research and Management Approaches
All threats	Medium	Research and assess threats, and identify mitigation options	<ul style="list-style-type: none"> • Coordinate with individuals or agencies researching declines and threat mitigation options for Blanchard's Cricket Frog in the northern U.S. • Investigate causes of Blanchard's Cricket Frog declines. • Identify real and potential current threats at potential reintroduction site(s). • Assess which threats may have led to extirpations where extant populations occur, or where they might be reintroduced. • Investigate threat mitigation options

If the threats that caused the rapid decline and suspected extirpation of the species are identified and can be mitigated, or if an extant population is discovered and the threats to the current population can be mitigated, the following approaches are recommended:

Threat or Limitation	Priority	Broad Strategy to Recovery	General Description of Research and Management Approaches
Habitat loss, pesticide use, invasive species, predation, disease, road mortality, flooding, and storms	Medium	Mitigate threats	<ul style="list-style-type: none"> • Develop a mitigation strategy and mitigate threats where extant populations occur, or where they might be reintroduced.
Unknowns regarding feasibility of reintroduction	Medium	Assess feasibility of reintroduction	<ul style="list-style-type: none"> • Review and evaluate approaches to reintroduction including success of other amphibian reintroduction / translocation projects. • Investigate legal aspects of reintroduction at international, national, provincial, and municipal levels. • Identify details of habitat conditions in nearby U.S. locations that still have apparently viable Blanchard's Cricket Frog populations. • Conduct research to compare genetics of historic and extant Ontario populations with nearby extant U.S. populations. • Identify and investigate gaps in knowledge of Blanchard's Cricket Frog ecology that may be important for maintenance/recovery of any extant populations located or successful reintroduction.
Habitat availability	Medium	Assess need for habitat restoration	<p>If reintroduction is determined to be feasible:</p> <ul style="list-style-type: none"> • Where wetland restoration is deemed necessary, review and evaluate wetland restoration approaches and techniques. • Develop a habitat restoration program, including site specific plans for high priority candidate reintroduction sites. • If habitat restoration is necessary, implement appropriate restoration program to reintroduction site(s)

7. CRITICAL HABITAT

7.1 Identification of the Species' Critical Habitat

Critical habitat is not identified in this recovery strategy due to the uncertainty surrounding the Blanchard's Cricket Frog's presence in Canada and the lack of key information regarding the species' habitat requirements and threats in its Canadian range. Critical habitat will be identified in an updated version of this recovery strategy or in an action plan, if an extant population of the species is found or sufficient habitat is available in its Canadian range for reintroduction, provided reintroduction is determined to be feasible.

7.2 Schedule of Studies to Identify Critical Habitat

Acquiring habitat information will largely depend on collaboration with U.S. researchers and land managers experienced with the species and its habitat. The schedule of studies includes:

Table 4: Schedule of Studies

Description of Activity	Rationale	Timeline
Assess site/habitat conditions at all historic and candidate sites in Canada.	Determine if conditions at the site (contamination, predators, invasive species etc.) may require mitigation prior to any possible reintroduction.	2016
Review literature and collaborate with U.S. experts to document what is known about habitat and compare to what is known about former Canadian sites	Assist in the determination of habitat requirements of the species and possible Canadian sites with suitable habitat.	2016

8. MEASURING PROGRESS

The performance indicators presented below provide a way to define and measure progress toward achieving the population and distribution objectives. Specific progress towards implementing the recovery strategy will be measured against indicators outlined in any subsequent action plans.

Table 5. Performance Measures

Broad Strategy	Performance Measures
1. Complete surveys at former sites known to have Blanchard's Cricket Frogs to determine: i) if the species is still present in its Canadian range, and ii) whether there is sufficient habitat available in Canada, if it is suitable for recovery efforts, whether restoration is needed.	<ul style="list-style-type: none"> • Determination of presence/absence of species in Canadian range. • List of Canadian sites with suitable habitat for Blanchard's Cricket Frog. • Completion of a list of candidate reintroduction sites (if feasible).

If it is determined that the species is still present in its Canadian range and that sufficient habitat is available in Canada, the following additional strategy will be addressed:

2. Determine the current threats and the threats that caused the rapid decline of the species in Canada and whether these will negatively impact recovery efforts.	<ul style="list-style-type: none"> • Ranked list of threats to Blanchard's Cricket Frog in Canada and identification of possible mitigation measures.
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If the threats that caused the rapid decline and suspected extirpation of the species are identified and can be mitigated, or if an extant population is discovered and the threats to the current population can be mitigated, the following strategy will be addressed:

3. Mitigate threats, where feasible 4. Complete research to fill information gaps on species biology and habitat needs to determine feasibility of, and appropriate techniques for, reintroduction or population augmentation.	<ul style="list-style-type: none"> • Development of a mitigation strategy and implementation of all feasible threat mitigation measures. • Determination of reintroduction feasibility and appropriate techniques for reintroduction or population augmentation.
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9. STATEMENT ON ACTION PLANS

If an extant population is found or reintroduction is determined to be feasible, an action plan will be posted on the SARA Public Registry by 2016.

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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 an 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 on non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below.

This Recovery Strategy will clearly benefit the environment by promoting the recovery of the Blanchard's Cricket Frog. The potential for the Strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this Strategy will clearly benefit the environment and will not entail any significant adverse effects. Refer to the following sections of the document in particular: Description of the species' needs – ecological role, biological needs, and limiting factors; effects on other species; and recommended approach for recovery.

The historic range of Blanchard's Cricket Frog is within one of the most biologically diverse areas of Canada and is occupied by many other species at risk including Smallmouth Salamander (*Ambystoma texanum*), Blue Racer (*Coluber constrictor foxii*), Lake Erie Watersnake (*Nerodia sipedon insularum*), Eastern Foxsnake (*Elaphe gloydi*), Spotted Turtle (*Clemmys guttata*) and a number of plant species. As little is known about the specific habitat needs of the Blanchard's Cricket Frog in Canada it is difficult to determine what impacts its recovery will have on other species. However, in general the creation, restoration or management of habitats for Blanchard's Cricket Frogs could positively affect other species including wetland species at risk by creating habitat and reducing the impact of some threats. If habitat management and restoration or species reintroduction is undertaken, impacts on non-target species will be assessed and mitigation measures addressed.

APPENDIX B: NATURESERVE RANKS AND DEFINITIONS

Table 6. Subnational Conservation Ranks (S-Ranks) for the Blanchard's Cricket Frog in North America (NatureServe 2009).

S-Rank	Province/State
Canada	Ontario (SH)
United States	Arkansas (S5), Colorado (SH), Illinois (S5), Indiana (S4), Iowa (S3?), Kansas (S5), Kentucky (S5), Louisiana (SNR), Michigan (S2S3), Minnesota (S1), Mississippi (SNR), Missouri (S5), Nebraska (S5), New Mexico (S4), Ohio (SNR), Oklahoma (S5), South Dakota (S1), Texas (S5), West Virginia (SH), Wisconsin (S1)

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 7. 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