



## Important Amphibian and Reptile Areas Nomination Form

# KEJIMKUJIK NATIONAL PARK AND NATIONAL HISTORIC SITE

### Part 1: IMPARA Criteria:

The Important Amphibian and Reptile Areas Program (IMPARA) Site Criteria are intended to be guidelines for identifying the importance of a site, and are somewhat flexible, depending on the specifics of the site. These criteria are intended to be the first step in a dialogue between the nominator and CHS.

Sites may be nominated based on one or more of the following criteria:

1. Sites containing species of conservation concern
2. Sites containing a high diversity of species
3. Sites that fulfill important life history function for congregations of species

#### 1. Species of Conservation Concern

A site that is nominated under this criterion must contain a significant number of individuals of a species that is of conservation concern at one or more of the following levels:

- Globally designated as Critically Endangered, Endangered or Vulnerable by the International Union for the Conservation of Nature ([IUCN](#)).
- Nationally designated as at-risk (Endangered, Threatened, and Species of Special Concern) by the Committee on the Status of Endangered Wildlife in Canada ([COSEWIC](#))
- Provincially/territorially designated as at-risk by: COSEWIC, a provincial government or other designated group that assesses the status of species within a province, or a provincial/regional Conservation Data Centre.

Defining what is meant by a "significant" number of individuals of any species is difficult given the diversity of life histories, geographic distributions and abundances of amphibians and reptiles. Here are two methods to define a significant number of individuals:

- The site holds greater than or equal to 1% of a species' Canadian population.
- The site is one of 50 or fewer sites, or is one of the 50 most important sites supporting the Canadian population of a species.

These three methods require different qualities and quantities of information. They reflect the reality that a great deal is known about some species of amphibians and reptiles, and relatively little about the majority. Therefore, we encourage nominators to include as much information as they can in their nomination. For example, when it is possible to estimate the number of individuals at a site as well as in all of Canada, then method 1 should apply. Otherwise, if the

total number of sites at which the species occurs is known, method 2 should apply. Sites from which a species has been extirpated may also be nominated if habitat restoration and/or re-introductions are underway or planned.

CHS uses the broad definition of a species used by COSEWIC, which defines species as, "Any indigenous species, subspecies, variety or geographically defined population of wild fauna and flora."

## **2. High Diversity of Species**

A site that is nominated under this criterion regularly holds a large proportion of the amphibian and/or reptile species known to be present within the nation, province/territory, region, or another spatial scale. The goal of this criterion is to identify sites that contain higher than average numbers of species. Species diversity varies significantly from region to region across Canada, and lower latitudes generally have more species than higher latitudes. This means that a significant proportion of the herpetofauna in one region may be relatively insignificant in another region, and vice versa. Therefore, it is up to the nominator to define the geographic scale (i.e. national, provincial/territorial, regional, or other) under consideration, and to demonstrate how the site's diversity is relatively high.

Nominators may also choose to make their case based on various taxonomic levels. For example, the site may hold a large proportion of the province's snake species.

## **3. Important Life History Requirements**

A site that is nominated under this criterion is used by exceptionally large numbers of amphibians and/or reptiles that congregate for the purpose of completing some life history activity such as reproduction, hibernation, or thermoregulation (e.g. communal hibernation sites, vernal breeding ponds). The nominator should define the geographic scale at which this site should be considered important. Nominators should also provide evidence supporting their claim that the congregation of a species at the site is exceptionally large.

## **Other Considerations**

Important Amphibian and Reptile Areas must have clear boundaries (geographical or political), and must be large enough to potentially support self-sustaining populations. However, they should also be small enough that they form units amenable to locally-oriented conservation and restoration. While areas that already protect amphibian and reptiles (i.e., parks and conservation areas) are obvious candidates for IMPARA designation, it is also important to nominate areas that are not currently protected.

## Part 2: Nomination Form

### Personal Information

Name: Steve Mockford, Tom Herman  
Organization/Affiliation: Acadia University  
Address: 33 Westwood Ave  
City/Town: Wolfville  
Province/Territory: Nova Scotia  
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### Location

Site names: Kejimikujik National Park and National Historic Site of Canada  
Province/Territory: County/Region/District(s): Nova Scotia, Canada  
Closest City/Town: Maitland Bridge  
UTM/Geographical Coordinates: 44° 25' N 65° 12' W

Directions to Site: Kejimikujik National Park (KNP) is accessible via Nova Scotia Route 8 – Kejimikujik Drive. Nova Scotia Route 8 can be reached by traveling approximately 160 km from Halifax via Highway 103, 190 km from Yarmouth via Highway 101, or 90 km from Digby via Highway 101.

The Seaside Adjunct is accessible from Highway 103, about 100 km south of the inland portion of the Park and 25 km southwest of Liverpool (Parks Canada, 2006).

Maps (please attach): see Figures 1 and 2.

### Physical Description

Area (please specify units): 381 sq. km.

Please describe the site, providing information of habitat type, vegetation type, presence and type of water bodies:

Kejimikujik National Park is a combination of old growth and regrown forests. The park is known as a canoe destination due its many lakes, rivers, and streams. This includes a variety of flat-water streams, shallow lakes, bogs and a few marshes. The Seaside Adjunct, a 22 sq km area on Nova Scotia's south shore, is noted for its abundant wildlife and spectacular scenery. More than 200 species of birds can be found within Kejimikujik and the park is also the most important national park for reptiles in Atlantic Canada, featuring eight species of reptiles and 13 species of amphibians.

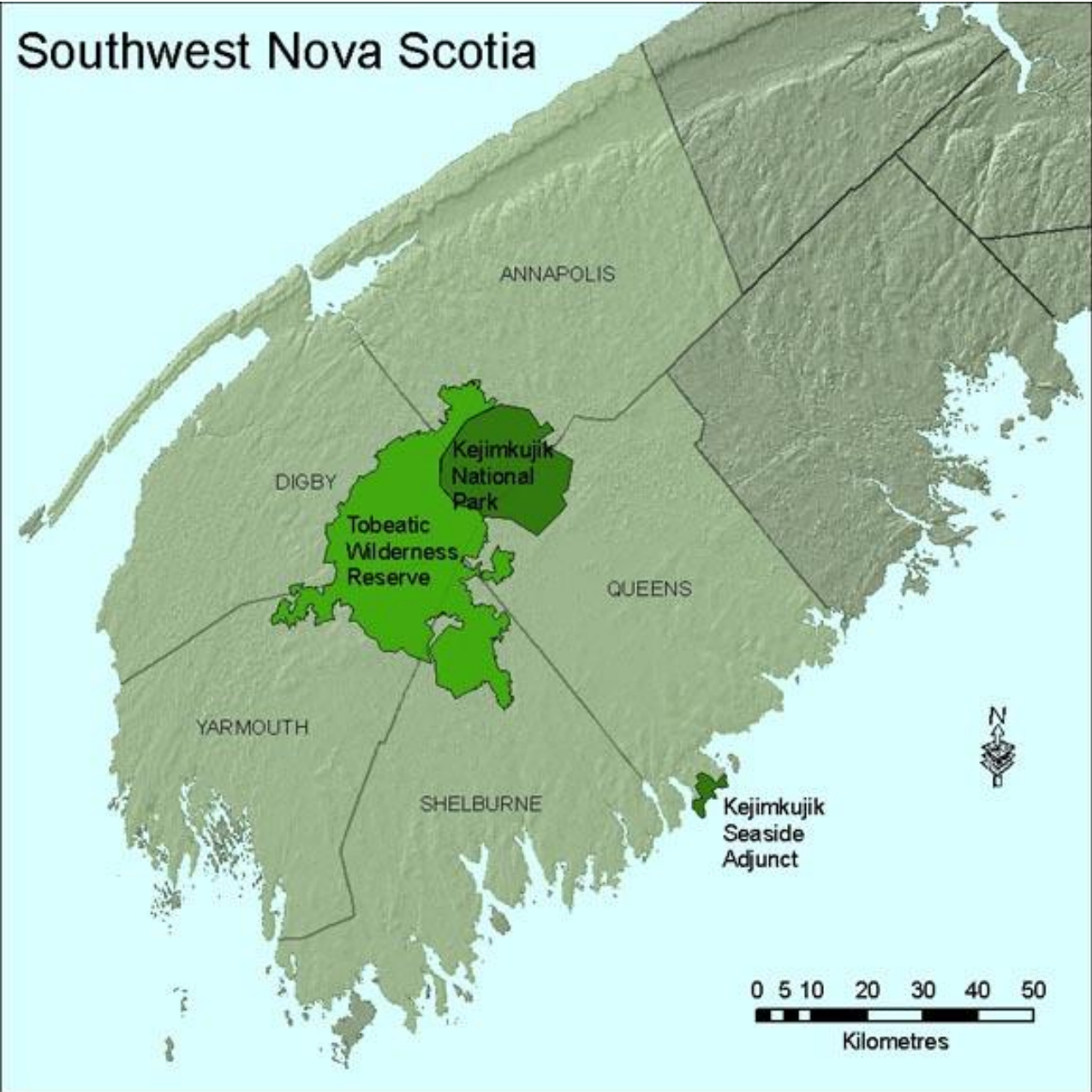


Figure 1. Location of Kejimikujik National Park and National Historic Site and the Seaside Adjunct in Southwest Nova Scotia, and within the Southwest Nova Scotia Biosphere Reserve (light green)





Figure 3. Examples of habitat types found in KNP. Hemlock forest (top left), Mersey River (top right), successional shoreline at Grafton Lake (bottom left), and cobble shoreline on Kejimikujik Lake (bottom right).

### Land Ownership

If there are five or fewer owners, please list them. Otherwise, an appropriate government representative, such as municipal council or regional district, is sufficient.

Name: Parks Canada

Organization/Affiliation: Kejimikujik National Park and National Historic Site

Address: Box 236

City/Town: Maitland Bridge

Province/Territory: Nova Scotia

Postal Code: B0T 1B0

Telephone and Fax: (902) 682-2772 (fax) (902) 682-3367

E-mail: [kejimikujik.info@pc.gc.ca](mailto:kejimikujik.info@pc.gc.ca)

Are the land owners/managers aware of the importance of the site to amphibian and reptile conservation?

YES

Are they aware of this site nomination, and if so did they participate in the process?

They are aware, but did not participate in the process

**Amphibian and Reptile Species**

In the table provided, please list all species of amphibians and reptiles recorded at the site, estimated numbers of individuals of each species (if known), and any citations from which information was obtained (include the name of an observer if information is not published). Provide a Literature Cited section at the end of the nomination.

Species	Status	No. of Individuals	References
Eastern Painted Turtle ( <i>Chrysemys picta picta</i> )	NSDNR: Green		Parks Canada, 2012
Blanding's Turtle ( <i>Emydoidea blandingii</i> )	NSDNR General: Red NSESA: Endangered COSEWIC: Endangered	350 adults estimated for the entire Nova Scotia, many live within the park. Estimated >120 adults live within the park.	Parks Canada, 2012, Nova Scotia Department of Natural Resources, 2012, Blanding's Turtle Recovery Team, 2012
Snapping Turtle ( <i>Chelydra serpentina serpentina</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Maritime garter snake ( <i>Thamnophis sirtalis pallidula</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Northern red-bellied snake ( <i>Storeria occipitomaculata occipitomaculata</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Northern ring-necked snake ( <i>Diadophis punctatus edwardsii</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Eastern smooth green snake ( <i>Liochlorophis vernalis borealis</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012

Eastern ribbon snake ( <i>Thamnophis sauritus sauritus</i> )	NSDNR General Status: Yellow NSES: threatened COSEWIC: Threatened	two primary concentrations with 4-5 additional satellite sites; total population may exceed 500 adults	Nova Scotia Department of Natural Resources, 2012, Northern Ribbon snake Recovery Team, 2012
Yellow-spotted salamander ( <i>Ambystoma maculatum</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Red-spotted newt ( <i>Notophthalmus viridescens viridescens</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Eastern redback salamander ( <i>Plethodon cinereus</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Four-toed salamander ( <i>Hemidactylium scutatum</i> )	NSDNR: Yellow		Nova Scotia Department of Natural Resources, 2012
Northern spring peeper ( <i>Pseudocaris crucifer crucifer</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Bullfrog ( <i>Lithobates catesbeiana</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Green frog ( <i>Lithobates clamitans</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Mink frog ( <i>Lithobates septentrionalis</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Northern leopard frog ( <i>Lithobates pipiens</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Wood frog ( <i>Lithobates sylvatica</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012
Pickerel frog ( <i>Lithobates palustris</i> )	NSDNR: Green		Nova Scotia Department of

			Natural Resources, 2012
American toad ( <i>Anaxyrus americanus</i> )	NSDNR: Green		Nova Scotia Department of Natural Resources, 2012

### Other Species

Please list other significant non-amphibian and non-reptile species (e.g. rare or endemic) that are present at the site and describe the importance of the site to these species.

Species	Status	Importance of Site	References
The Piping Plover <i>Charadrius melodus</i>	NSDNR: Red NSESA: Endangered COSEWIC: Endangered	Habitat: Nest above normal high water mark on sand and gravel beaches.	Nova Scotia Department of Natural Resources, 2012
Southern Flying Squirrel <i>Glaucomys volans</i>	NSDNR: Yellow COSEWIC: Special Concern	Habitat: Southern Flying Squirrels inhabit hardwood forests in eastern North America. Dead hollow trees are used as den sites. Size of population is unknown.	Nova Scotia Department of Natural Resources, 2012



Eastern Ribbonsnake (*Thamnophis s. sauritus*)

Photo by Wesley Pitts



Blandings turtle (*Emydoidea blandingii*)

Photo by Erica Newton

### Site Criteria

Under each category, please provide a description of how this site fulfills the Important Amphibian and Reptile Areas criteria (see Part 1). If a category does not apply to this site then simply leave it blank (e.g. if there are no threatened species present then leave the Threatened Species category blank).

#### 1. Species of Conservation Concern:

In regards to amphibians and reptiles under the Nova Scotia Department of Natural Resources there are:

- 1 red listed species – known to be or thought to be at risk,
- 2 yellow listed species – sensitive to human activities or natural events and
- 14 green listed species – not believed to be sensitive or at risk

In regards to amphibians and reptiles under COSEWIC there are:

- 1 endangered species
- 1 threatened species.

## 2. High Species Diversity:

Kejimikujik is the most important national park for reptiles in Atlantic Canada. With a total of eight reptile species, five snake species and three turtles. All thirteen species of amphibians known in Nova Scotia are found within the park or in adjacent areas. There are a total of five salamanders, one toad and seven frogs. Kejimikujik has a variety of flat water streams, shallow lakes, bogs and a few marshes and warm summers and mild winters; this provides a variety of amphibians with adequate habitat conditions.

At least three genetically distinguishable populations of Blanding's turtles occur in southwest Nova Scotia: Kejimikujik National Park, McGowan Lake and Pleasant River (Mockford *et al.* 2005). Despite their close proximity, there is a lack of movement among the three populations (Howes *et al.* 2008). It is unclear whether the lack of movement is due to recent anthropogenic causes or longer standing historical environmental differences.

The largest known population of Eastern Ribbonsnakes in Nova Scotia occurs in KNP at Grafton Lake. This area is of particular interest as the area most frequently occupied by ribbonsnakes was inundated from 1938 to 1996 and is now undergoing succession. There are several other known concentrations of ribbonsnakes in southwest Nova Scotia and, while it has not been assessed genetically, there does not appear to be movement among these groups.

As a result of Kejimikujik National Park's role as a core protected area in the Southwest Nova Biosphere Reserve (SNBR) conservation is approached at the greater ecosystem level. Populations of amphibian and reptile species at risk outside of the park but within SNBR benefit from collaboration with KNP. This area of southwest Nova Scotia is recognized as one of the most significant "biodiversity-at-risk hotspots" in Canada.

## 3. Important Life History Requirements:

### *Blanding's Turtles*

Blanding's turtles are concentrated in three areas of the Park and disperse within a season more than 1.5 km. Females may travel up to 3 km to their nesting sites but tend to return to the same beach every time they nest.

Stillwater brooks that are rich in sphagnum moss provide habitat for juveniles. Older juveniles (14 to 17 years) were found to move greater distances than younger turtles. They also prefer intensely coloured acidic waters with peaty soils and mats of sphagnum moss (Power *et al.* 1994)

Habitats within Kejimikujik Park provide for all life stages of the Blanding's turtle (Parks Canada, 2006).

### *Eastern Ribbonsnakes*

Habitat within KNP appears to provide for all life stages of the Eastern Ribbonsnake although overwintering sites have not been identified.

## Human Impacts

Please describe how human activities are impacting the site and the immediately surrounding areas in the following ways:

- Current site usage (if any), e.g. industrial, residential, farming, logging, camping, recreation, etc. (please indicate relative importance):

N/A National Park

- Pollution (air, water, light, noise):
- Threats to habitat (e.g. development, habitat loss or degradation, succession, fire)
- Past or current habitat conservation or restoration efforts:

## Recommended conservation actions for this area

Please describe any conservation actions that are needed/recommended for this area:

KNP administration and staff work closely with the RENEW recovery teams. As conservation needs/recommendations are recognized they are discussed and, where deemed appropriate, put into action.

### *Blanding's Turtles*

Under the direction of Park staff and guided by the RENEW recovery plan, volunteers monitor important habitats, conduct trapping for ongoing demographic assessment, track radio tagged turtles, and conduct a nest monitoring and protection program.

There is an active, ongoing research program conducted largely through Acadia University. Both beach modification and the provision of artificial nesting habitat have been carried out in response to habitat changes required.

### *Eastern Ribbonsnake*

Under the direction of Park staff and guided by the RENEW recovery plan, volunteers monitor important habitats and hand capture snakes for ongoing demographic assessment. Radio tracking has been tried in the past but current studies are being done marking individual snakes with PIT tags. For the past three years trained dogs have also used to survey for snakes.

### **Other Concerned Organizations**

Please provide contact information for organizations or individuals that are involved in protection/conservation of this site, *i.e.* World Wildlife Fund Canada, Nature Conservancy Canada, Ducks Unlimited, Federation of Nova Scotia Naturalists.

None – National Park

### **Previous Work**

Please list studies/documents/papers that have been derived from this site. If possible, include the documents with the submission or provide enough information so that the sources can be retrieved by CHS

In addition to the refereed works cited below, more than 50 theses (Hons, MSc, PhD) exploring some element of this species complex have also been published, primarily from Acadia University.

Amiel, J.J. and R.J. Wassersug. 2010. Temperature differentials between the bodies and tails of ribbon snakes (*Thamnophis sauritus*): ecological and physiological implications *Amphibia-Reptilia* 31:257-263.

Bell, S.L.M., T.B. Herman, R.J. Wassersug. 2007. Ecology of *Thamnophis sauritus* (Eastern Ribbon Snake) at the Northern Limit of its Range. *Northeastern Naturalist* 14:279-292.

Garbary, D.J., G. Bourque, T.B. Herman and J.A. McNeil. 2007. Epizoic algae from freshwater turtles in Nova Scotia. *J. Freshwater Ecology* 22: 677-685.

Herman, T.B., S. Bondrup-Nielsen and R. Smith. 2002. Globalization compromises protected areas. Pp 58-65 in Bondrup-Nielsen, S. and N.W.P. Munro (eds.). *Managing Protected Areas in a Changing World, Proceedings of the Fourth International Conference on Science and Management of Protected Areas, 14-19 May 2000*. Canada: SAMPAA.

Herman, T., I. Morrison, J. McNeil and N. McMaster. 1998. Recovery of a threatened Blanding's turtle population: linking conservation efforts in working and protected landscapes. Pp. 308-314 in Munro and Willison (eds.) *Linking Protected Areas and Working Landscapes Conserving Biodiversity*. SAMPAA.

Herman, T.B. 1997. Life on the edge: managing peripheral populations in a changing landscape. *in* van Abbema, J. (ed). *Proceedings: Conservation, Management and Restoration of Tortoises and Turtles- an International Conference*. Am. Mus. Nat.Hist., N.Y.

Herman, T.B., Power, T.D. and Eaton, B.R. 1995. Status of Blanding's Turtles, *Emydoidea blandingii*, in Nova Scotia, Canada. *Canadian Field-Naturalist* 109: 182-191.

McMaster, N. and Herman, T.B. 2000. Occurrence, habitat selection and movement patterns in juvenile Blanding's turtles (*Emydoidea blandingii*) in Kejimikujik National Park, Nova Scotia. *Chelonian Conservation and Biology* 3: 602-610.

- McNeil, J., Herman, T.B. and Standing, K.L. 2000. Movement of hatchling Blanding's turtles (*Emydoidea blandingii*) in Nova Scotia in response to proximity to open water: a manipulative experiment. *Chelonian Conservation and Biology* 3: 611-617.
- Howes, B.J., J.W. Brown, H.L. Gibbs, T.B. Herman, S.W. Mockford, K.A. Prior and P.J. Weatherhead. 2008. Directional gene flow patterns in disjunct populations of the black ratsnake (*Pantheropsis obsoletus*) and the Blanding's turtle (*Emydoidea blandingii*). *Conservation Genetics* 10: 407-417.
- Hurlburt, D.D., S. Mockford and T.B. Herman. 1999. *Chelydra serpentina* (Common snapping turtle) Aggression. *Herp. Rev.* 30(1): 39.
- Lefebvre, J., T.S. Avery and T.B. Herman. 2011. Size dimorphism and growth rate in disjunct populations of Blanding's turtles (*Emydoidea blandingii*) in Nova Scotia in relation to environment. *Herpetological Conservation and Biology* 6: 465-472.
- Mockford SW, TB Herman, M Snyder, and JM Wright. 2007. Conservation genetics of Blanding's turtle and its application in the identification of evolutionarily significant units. *Conservation Genetics* 8: 209-219.
- Mockford, S.W., L. McEachern, T.B. Herman, M. Snyder and J.M. Wright. 2005. Population genetic structure in a disjunct population of Blanding's turtle (*Emydoidea blandingii*) in Nova Scotia, Canada. *Biological Conservation* 123: 373-380.
- Mockford SW, M Snyder and TB Herman. 1999. A preliminary examination of genetic variation in a peripheral population of Blanding's turtle, *Emydoidea blandingii*. *Molecular Ecology* 1999: 323-327.
- Newton, E. and T. Herman. 2009. Habitat and movements of overwintering Blanding's turtles (*Emydoidea blandingii*) in Nova Scotia. *Can. J. Zool.* 87: 299-309.
- Power, T.D., T.B. Herman and J. Kerekes. 1994. Water colour as a predictor of Blanding's Turtle (*Emydoidea blandingii*) distribution in Nova Scotia. *Canadian Field-Naturalist* 108: 17-21.
- Standing, K.L., T.B. Herman and I.P. Morrison. 2000. Developmental abnormalities in a northeastern population of Blanding's turtle, *Emydoidea blandingii*. *Chelonian Conservation and Biology* 3: 661-664.
- Standing, K.L., T.B. Herman and I.P. Morrison. 2000. Predation of neonate Blanding's turtles (*Emydoidea blandingii*) by short-tailed shrews (*Blarina brevicauda*). *Chelonian Conservation and Biology* 3: 658-660.
- Standing, K.L., T.B. Herman, M. Shallow, T. Power, and I.P. Morrison. 2000. Results of the nest protection program for Blanding's turtles in Kejimikujik National Park, Canada: 1987-1997. *Chelonian Conservation and Biology* 3: 637-642.
- Standing, K.L., T.B. Herman and I.P. Morrison. 1999. Nesting ecology of Blanding's turtle (*Emydoidea blandingii*) in Nova Scotia, the northeastern limit of the species' range. *Can. J. Zool.* 77: 1609-1614.

Standing, K.L., T.B. Herman, D.D. Hurlburt and I.P. Morrison. 1997. Post-emergence behaviour of neonates in a northern peripheral population of Blanding's turtle, *Emydoidea blandingii*, in Nova Scotia. *Can. J. Zool.* 75: 1387-1395.

Todd J., J. Amiel and R.J. Wassersug. 2009. Factors influencing the emergence of a northern population of Eastern Ribbon Snakes (*Thamnophis sauritus*) from artificial hibernacula. *Canadian Journal of Zoology* 87:1221-1226.

### **Literature Cited**

Please list any references cited in this nomination.

Howes BJ, JW Brown, HL Gibbs, TB Herman, SW Mockford, KA Prior and PJ Weatherhead. 2008. Directional gene flow patterns in disjunct populations of the black ratsnake (*Pantheropsis obsoletus*) and the Blanding's turtle (*Emydoidea blandingii*). *Conservation Genetics* 10: 407-417.

Mockford, S.W., L. McEachern, T.B. Herman, M. Snyder and J.M. Wright. 2005. Population genetic structure in a disjunct population of Blanding's turtle (*Emydoidea blandingii*) in Nova Scotia, Canada. *Biological Conservation* 123: 373-380.

Nova Scotia Department of Natural Resources. Accessed July 2012.

<http://www.gov.ns.ca/natr/wildlife/genstatus/ranks.asp>

Power, T.D., T.B. Herman and J. Kerekes. 1994. Water colour as a predictor of Blanding's Turtle (*Emydoidea blandingii*) distribution in Nova Scotia. *Canadian Field-Naturalist* 108: 17-21.

Kejimikujik National Park and National Historic Site was designated as an IMPARA in October 2012. This account was updated in January 2018.