Species at Risk Act
Action Plan Series

Action Plan for Blanding's Turtle (*Emydoidea blandingii),* Nova Scotia Population, in Canada

Blanding's Turtle

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For copies of the action plan, or for additional information on species at risk, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, recovery strategies, and other related recovery documents, please visit the Species at Risk (SAR) Public Registry[1].

Cover illustration: Blanding's Turtle (Jeffie McNeil)

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[1] www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996)[2] 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 action plans for species listed as Extirpated, Endangered, and Threatened for which recovery has been deemed feasible. They are also required to report on progress within five years after the publication of the final document on the SAR Public Registry.

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

The Minister of Environment and Climate Change and Minister responsible for the Parks Canada Agency is the competent minister under SARA for the Blanding's Turtle, Nova Scotia population, and has prepared this action plan to implement the recovery strategy, as per section 47 of SARA. To the extent possible, it has been prepared in cooperation with the Nova Scotia Department of Natural Resources, species experts, Indigenous groups, and environmental non-government organizations, as per section 48(1) of SARA.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this action plan and will not be achieved by Environment and Climate Change Canada, the Parks Canada Agency, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this action plan for the benefit of the Blanding's Turtle and Canadian society as a whole.

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

The recovery strategy sets the strategic direction to arrest or reverse the decline of the species, including identification of critical habitat to the extent possible. It provides all Canadians with information to help take action on species conservation. When critical

[2] www.canada.ca/en/environment-climate-change/services/species-risk-act-accord-funding/accord-protection-backgrounder.html

habitat is identified, either in a recovery strategy or an action plan, SARA requires that critical habitat then be protected.

In the case of critical habitat identified for terrestrial species including migratory birds SARA requires that critical habitat identified in a federally protected area[3] be described in the *Canada Gazette* within 90 days after the recovery strategy or action plan that identified the critical habitat is included in the public registry. A prohibition against destruction of critical habitat under ss. 58(1) will apply 90 days after the description of the critical habitat is published in the *Canada Gazette*.

For critical habitat located on other federal lands, the competent minister must either make a statement on existing legal protection or make an order so that the prohibition against destruction of critical habitat applies.

If the critical habitat for a migratory bird is not within a federal protected area and is not on federal land, within the exclusive economic zone or on the continental shelf of Canada, the prohibition against destruction can only apply to those portions of the critical habitat that are habitat to which the *Migratory Birds Convention Act, 1994* applies as per SARA ss. 58(5.1) and ss. 58(5.2).

For any part of critical habitat located on non-federal lands, if the competent minister forms the opinion that any portion of critical habitat is not protected by provisions in or measures under SARA or other Acts of Parliament, or the laws of the province or territory, SARA requires that the Minister recommend that the Governor in Council make an order to prohibit destruction of critical habitat. The discretion to protect critical habitat on non-federal lands that is not otherwise protected rests with the Governor in Council.

[3] These federally protected areas are: a national park of Canada named and described in Schedule 1 to the *Canada National Parks Act*, The Rouge National Park established by the *Rouge National Urban Park Act*, a marine protected area under the *Oceans Act*, a migratory bird sanctuary under the *Migratory Birds Convention Act, 1994* or a national wildlife area under the *Canada Wildlife Act* see ss. 58(2) of SARA.

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This document was prepared by Megan Crowley (Parks Canada Agency) and Jeffie McNeil (Mersey Tobeatic Research Institute) in collaboration with species experts and with extensive input from Julie McKnight (Environment and Climate Change Canada). Advice and guidance were provided by staff at Parks Canada, Environment and Climate Change Canada and the Nova Scotia Department of Natural Resources.

Academics, species experts and volunteers have contributed to the science and communications for the recovery of the species and they have provided advice for the development of this action plan. We acknowledge the contributions of the many volunteers, landowners, students, field assistants and interns who have helped with recovery actions over the years.

Executive Summary

This action plan complements the recovery strategy for the Blanding's Turtle, *Emydoidea blandingii* (Nova Scotia population) (Parks Canada Agency 2012). It addresses each of the seven broad strategies identified in the Blanding’s Turtle recovery strategy and builds on existing recovery programs with a focus on fostering stewardship and partnerships with a variety of stakeholders.

Critical habitat for the Nova Scotia population of Blanding’s Turtles was identified to the extent possible in the recovery strategy (Parks Canada Agency 2012), and this action plan identifies new critical habitat for the Blanding’s Turtle (Nova Scotia population) to take into account new population information. Proposed measures to protect critical habitat are presented in section 1.4.

This action plan was developed in collaboration with, and is closely tied to, the action plan for Eastern Ribbonsnake, *Thamnophis sauritus* (Atlantic population). Both of these species are wetland reptiles with isolated populations occurring in southwest Nova Scotia. Due to their similar distributions and wetland habitat requirements, there are many common stakeholders for both species and they face some similar threats. This action plan is also closely tied to the Multi-Species Action Plan for Kejimkujik National Park and National Historic Site of Canada, which includes measures for Blanding’s Turtle within park boundaries (Parks Canada Agency 2016).

The recovery measures included in this plan build on the recommended approaches outlined in the recovery strategy for the Blanding’s Turtle (Nova Scotia population). An implementation schedule is included and prioritizes each recovery measure and delineates timelines.

Proposed recovery measures in this action plan will have limited socio-economic impact and constraints to human land use. Indirect costs are expected to be minimal and the benefits relate to the value of biodiversity to Canadians, positive impacts on cultural values, and conservation of other species.

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1. Recovery Actions

1.1. Context and Scope of the Action Plan

Blanding's Turtles are medium sized freshwater turtles with a semi-hinged shell. They are very long lived (80+ years) and slow to mature (approx. 20 years in Nova Scotia) (Congdon et al. 1993, Herman et al. 2003, McNeil 2002). One of their most distinctive features is the bright yellow chin and throat. Their high-domed top shell (carapace) is grey to black with yellow flecks (Caverhill and Crowley 2008). The flecks are typically brighter in younger turtles and most visible when the shell is wet. The lower shell (plastron) is orange-yellow with irregular black patches.

The Nova Scotia population of Blanding's Turtle was listed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 1993 and uplisted to Endangered on re-assessment in 2005 due to its small size and the projected decline of one of its populations (COSEWIC 2005). Its status remained Endangered on re-assessment by COSEWIC in 2016. It is listed as Endangered under the Nova Scotia Endangered Species Act (2000) and federal *Species at Risk Act* (2006). The majority of threats occur in three broad categories, 'habitat loss or degradation', 'accidental mortality' and 'changes in ecological dynamics or natural processes'. Specifically, the high priority threats are mortality from on and off road vehicles and machinery, cottage and residential development, road development, and increased predation pressure resulting from human activities.

In Nova Scotia, the Blanding's Turtle (Nova Scotia population, hereafter referred to as Blanding's Turtle), is concentrated in the southwest interior of the province. This includes Kejimkujik National Park and National Historic Site of Canada (KNPNHS) as well as the surrounding areas, particularly along the Mersey and Medway river watersheds. Within this range, Blanding's Turtles occur in at least three distinct populations, as well as several smaller concentrations, as described in the Recovery Strategy (Parks Canada Agency 2012). Since the publication of the recovery strategy, two new sites have been discovered, both on the Medway watershed: one likely represents a new distinct population and the other appears to be an extension of a previously known population.

The short-term population and distribution objectives established by the recovery strategy are to maintain or increase adult survivorship sufficient to sustain the three recognized populations; maintain or enhance recruitment into the three recognized populations; maintain extent of occurrence in the province; maintain area of occupancy in the province; and reduce threats facing all life stages. The long term objectives are to achieve a self-sustaining population of Blanding's Turtles in Nova Scotia, over the current range (as measured by 95% probability of persistence in each recognized population when projected over 10 generations (400 years)), and to maintain sufficient gene flow to prevent any single population from becoming genetically isolated.

The recovery strategy for the Blanding's Turtle (Nova Scotia population) was posted on the Species at Risk Registry in 2012 (Parks Canada Agency 2012). All broad strategies and general approaches to meet objectives detailed in the recovery strategy for the Blanding's Turtle are addressed in this document. This action plan will be implemented only within Nova Scotia, which is the only province in Canada where the Blanding's Turtle (Nova Scotia population) occurs. Critical habitat is partially identified in the recovery strategy for Blanding's Turtle and new critical habitat is identified in this document (Section 1.3).

The recovery strategy provides more details on the strategic direction and approaches for recovery of listed relevant species, critical habitat information, and background information on the species and its threats. A multi-species action plan was developed specifically for Kejimkujik National Park and National Historic Site of Canada and includes recovery measures for all species at risk that occur within the park (Parks Canada Agency 2016), including the Blanding's Turtle. The KNPNHS multi-species action plan is consistent with the recovery measures outlined in this action plan.

1.2. Measures to be Taken and Implementation Schedule

The recovery measures outlined below are arranged according to the broad strategies identified in the recovery strategy for Blanding's Turtle (Nova Scotia population). This implementation schedule (Table 1) is for all recovery measures and includes the level of priority (high, medium or low) assigned to each recovery measure, the threats or concerns addressed, and the timeline. Measures that will be conducted within Kejimkujik National Park and National Historic site are outlined in the park's multi-species action plan (2016).

In Table 1, "Priority" reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the recovery objective for the species. Medium priority measures may have a less immediate or less direct influence on reaching the recovery population and distribution objectives, but are still important for recovery of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the recovery objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of species.

Table 1. Implementation schedule for recovery measures for the Blanding's Turtle.

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
Broad Strategy 1: Continue to support, inform, recommend and, where possible, build on the significant public participation and partner involvement in meaningful recovery actions.				
1.1	**Approach:** Continue to invite and involve volunteers directly in meaningful recovery actions and priority research and monitoring activities and provide feedback.			
1.1.1	Invite and involve volunteers in recovery efforts, and provide support, training, feedback, and recognition.	M	Public perception, lack of information	Ongoing
1.1.2	Provide equipment, support, and training to environmental, non-governmental and community organizations that engage volunteers.	M	Public perception, lack of information	Ongoing
1.1.3	Engage and mentor youth in recovery.	M	Public perception, lack of information	Ongoing
1.2	**Approach:** Continue to work with Mi'kmaw communities supporting Blanding's Turtle recovery.			
1.2.1	Detailed in Broad Strategy 2.	-	-	-
1.3	**Approach:** Facilitate stewardship by building relationships and providing guidance to achieve habitat conservation and restoration and evaluate effectiveness of approaches to stewardship.			
1.3.1	Contact landowners and distribute educational materials and exchange knowledge, as necessary, to encourage people to engage in conservation and stewardship activities. Update public websites and other information sources as required.	H	Habitat loss or degradation, accidental mortality, disturbance	Ongoing
1.3.2	Create opportunities for affected landowners and community members to express their opinions and seek creative solutions (e.g., sandbar and rail bed nesting sites).	H	Habitat loss or degradation, accidental mortality, disturbance	As required
1.3.3	Collaborate with social scientists to develop and conduct surveys to evaluate the success of educational initiatives in affecting knowledge and behaviour.	L	Habitat loss or degradation, accidental mortality, disturbance	2021
1.4	**Approach:** Collaborate with other recovery teams and partners to coordinate and deliver ecosystem-based recovery activities and minimize overlap in landowner contact.			
1.4.1	Liaise with species' teams/ working groups and partners to coordinate activities and deliver consistent messaging at the ecosystem level.	M	Foster partnerships	Ongoing

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
1.5	**Approach:** Work closely with local forestry, hydroelectricity and tourism industries to protect and restore habitat and to foster involvement in recovery.			
1.5.1	Continue to work with Nova Scotia Power to reduce risk of turtle nest flooding.	H	Changes in ecological dynamics or natural processes	Ongoing
1.5.2	Work with stakeholders to foster the conservation of this species (habitat, education, involvement).	H	Habitat loss or degradation	Ongoing
1.5.3	Work with stakeholders (NS DNR, forestry companies, private landowners) in the newly discovered population in the Lower Medway to develop a management plan for this area	H	Habitat loss or degradation, accidental mortality, changes in ecological dynamics or natural processes	2020
Broad Strategy 2: Invite, encourage, and include Mi'kmaw involvement in the recovery process to explore opportunities for different approaches and knowledge.				
2.1	**Approach:** Seek out and integrate Mi'kmaw knowledge and worldviews into decision making and long term planning.			
2.1.1	Hold co-organized and hosted species' team/ working group meetings in local Mi'kmaw communities to integrate Mi'kmaw philosophy, knowledge and worldviews (e.g. sharing circles, ceremony).	M	Foster partnerships	At least once every 2 years
2.1.2	Support outreach and recovery actions on Mi'kmaw lands and communities (e.g. community meetings, events, monitoring, research, conservation planning, and ceremonies).	H	Habitat loss or degradation, accidental mortality, disturbance	Ongoing
2.1.3	Support Mi'kmaw-led projects to learn cultural stories, names, and teachings about Blanding's Turtle, their habitat and our relationship to their habitat and communicate appropriate information back to communities, jurisdictions and species experts.	M	Foster partnerships	As required
2.2	**Approach:** Explore opportunities to establish regular communications between Mi'kmaw organizations and communities and species at risk jurisdictions, academics and volunteers. Explore opportunities for ceremony to be a regular part of recovery action.			
2.2.1	Engage interested local Mi'kmaw community members (including youth) in recovery.	M	Foster partnerships	Ongoing

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
2.2.2	Regularly communicate with Mi'kmaw organizations, Mi'kmaw communities, species at risk jurisdictions, academics and volunteers.	M	Foster partnerships	Ongoing
Broad Strategy 3: Determine the extent of the range in Nova Scotia and identify population status, structure, habitat use and threats in known and any new concentrations found.				
3.1	**Approach:** Continue to solicit sighting reports from members of the public.			
3.1.1	Maintain toll free reporting hotline and online species at risk reporting form and develop mobile reporting app.	H	Lack of information, maintain extent of occurrence	Ongoing (app developed 2017)
3.1.2	Solicit sighting reports through outreach (talks, booths at community events, websites), citizen science, and the distribution of outreach materials.	H	Lack of information, maintain extent of occurrence	Ongoing
3.2	**Approach:** Continue targeted trapping and visual surveys in new areas, based on reported sightings, single confirmed sightings, aerial photographs and threats.			
3.2.1	Conduct targeted surveys to search for new populations, following established protocols and guidelines.	H	Lack of information, maintain extent of occurrence	Ongoing (report every 5 years)
3.3	**Approach:** Assess the size and extent of known and new concentrations.			
3.3.1	Conduct surveys and tracking in the Lower Medway and any other newly discovered concentrations to identify habitat use and distribution	H	Habitat loss or degradation	Lower Medway 2020; other as required
3.3.2	Conduct tracking studies of hatchlings and young juveniles to better understand their seasonal movements.	M	Habitat loss or degradation	Ongoing
3.3.3	Conduct studies to better understand use of vernal pools, seasonally flooded areas, terrestrial habitats and seasonal connections between sites.	H	Habitat loss or degradation	Ongoing
3.3.4	Determine connectivity between new populations/concentrations and known populations.	M	Habitat loss or degradation	As required
3.3.5	Locate new nesting sites (through tracking, visual surveys, etc.) and evaluate the need for nest protection efforts.	H	Habitat loss or degradation; accidental mortality, changes in ecological dynamics or natural processes	Ongoing

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
3.4	**Approach:** Continue to provide training for volunteers and support volunteer-led efforts that contribute to research and monitoring goals.			
3.4.1	Detailed in Approach 1.1	-	-	-
Broad Strategy 4: Ensure conservation of currently known habitats and new habitats as they are identified.				
4.1	**Approach:** Employ a variety of approaches to conserve habitat: legal, policy and stewardship.			
4.1.1	Support land trusts that contribute towards Blanding's Turtle recovery through formal protection of habitat.	H	Habitat loss or degradation, accidental mortality, changes in ecological dynamics or processes	Ongoing
4.1.2	Engage forest certification systems to implement private standards and codes governing private sector practice that are beneficial for the species.	M	Habitat loss or degradation, accidental mortality, changes in ecological dynamics or processes	As required
4.1.3	Provide recommendations on land planning for existing, new and proposed protected areas.	H	Habitat loss or degradation, accidental mortality, changes in ecological dynamics or processes	As required
4.1.4	Work with the province to develop Special Management Practices (SMPs).	M	Habitat loss or degradation, accidental mortality, changes in ecological dynamics or processes	As required
4.1.5	Work with municipalities, developers, landowners and other stakeholders on land planning to minimize the impacts of roads, cottage development, agriculture and other activities.	H	Habitat loss or degradation, accidental mortality, changes in ecological dynamics or processes	As required

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
4.2	**Approach:** Coordinate recovery actions on high priority ecosystems that may contain multiple species at risk, with other recovery teams and partners.			
4.2.1	Detailed in 1.4	-	-	-
4.3	**Approach:** Explore with landowners, NGO's, industry and the academic community ways to effectively use stewardship to identify and maintain habitat.			
4.3.1	Work with stakeholders to minimize impacts on the species and its habitat, and to develop site specific management plans as required.	H	Habitat loss or degradation, accidental mortality	Ongoing; management plans as required
4.4	**Approach:** Facilitate recovery planning by providing updated information to partners through the Blanding's Turtle database and species at risk resource website.			
4.4.1	Annually update the central online databases that are part of the species at risk resource website and provide to the Atlantic Canada Conservation Data Centre. Ensure up-to-date information and maps are available to partners.	M	Lack of information, habitat loss or degradation, accidental mortality	Ongoing – annual
4.5	**Approach:** Monitor habitats to identify threats and take actions to remove or reduce any threats which arise.			
4.5.1	Detailed in 7.3.3	-	-	-
Broad Strategy 5: Undertake recovery actions to increase recruitment or decrease mortality in areas that have been identified and evaluate the effectiveness of these actions				
5.1	**Approach:** Continue the annual nest protection program in all known populations and conduct an initial evaluation of the program.			
5.1.1	Protect turtle nests from predation by covering with a protective cage and, where possible, protect nesting females from accidental mortality.	H	Accidental mortality, changes in ecological dynamics or processes, maintain or enhance recruitment, maintain or increase adult survivorship	Annual
5.1.2	Evaluate nest protection program using trapping, tracking and visual survey data to determine survivorship from protected nests.	M	Maintain or enhance recruitment	Ongoing – report every 5 years

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
5.2	**Approach:** Assess short-term effectiveness of the incubation and headstarting program. Following the assessment, discuss optional and/or required next steps with the recovery team.			
5.2.1	Conduct systematic tracking, trapping and visual surveys to identify previously released headstarts to assess survivorship. Use this data to assess the effectiveness of the turtle headstarting program.	M	Maintain or enhance recruitment	Ongoing
5.3	**Approach:** Take additional steps to reduce vehicular and boat mortality through signs, speed bumps, and public education.			
5.3.1	Mitigate threats to Blanding's Turtles from vehicle mortality (e.g., through speed reduction, wildlife passage corridors, gates, signage, education)	H	Accidental mortality	Ongoing
5.3.2	Work with NS Department of Transportation and other authorities to sign priority sites on provincial roads and ATV trails.	H	Accidental mortality	2020 at known sites; other sites as required
5.3.3	Reduce the threat of motor boat collisions through signage, education and regulation.	L	Accidental mortality	Where applicable
5.4	**Approach:** Conduct research and take actions where there is imminent risk of mortality by moving vulnerable adults, hatchlings and nests. Take other recovery actions that are identified as necessary by recovery experts and document all decisions, goals and evaluations of success.			
5.4.1	Move nests and turtles that are in imminent danger (e.g., from flooding or vehicular impacts). Undertake additional recovery actions as required.	H	Accidental mortality	Ongoing
5.5	**Approach:** Reduce the risk of poaching and collection for pets though public education.			
5.5.1	Ensure outreach includes messaging on the importance of keeping wild turtles in their natural habitat.	H	Disturbance or persecution, accidental mortality	Ongoing
5.5.2	Inform enforcement agencies when poaching is suspected.	H	Disturbance or persecution, accidental mortality	As required

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
5.6	**Approach:** Take other recovery actions that are identified as necessary by recovery experts and document all decisions, goals and evaluations of success.			
5.6.1	Develop a food and garbage awareness program, where applicable, to reduce impacts of hyperabundant predator populations (racoons, red squirrels) on wildlife, including turtle nest predation.	H	Changes in ecological dynamics or processes	2020
5.6.2	Monitor for alien invasive fish (Smallmouth Bass, Chain Pickerel) and develop a response plan, as required.	M	Changes in ecological dynamics or processes	2023
5.6.3	Explore mechanisms for preventing the introduction and spread of invasive fish.	M	Changes in ecological dynamics or processes	2020
Broad Strategy 6: Examine male fecundity in the population complex to determine if there is a conservation concern and continue studies to assess and maintain genetic variation that will sustain a viable population.				
6.1	**Approach:** Determine the effective population size by conducting an assessment of paternity within the population complex to identify the number of males successfully reproducing and the proportion of clutches with multiple sires. Undertake studies to determine if there is a conservation concern such as male fertility, as required.			
6.1.1	Determine the effective population size by conducting an assessment of paternity within the population complex to identify the number of males successfully reproducing and the proportion of clutches with multiple sires. Undertake studies to determine if there is a conservation concern such as male fertility, as required.	M	Maintain or enhance recruitment, small population effects	2020
6.2	**Approach**: Assess genetic relationships of known and any new concentrations (when sample sizes allow) with the three known populations through DNA collection.			
6.2.1	Facilitate genetic analysis by collecting scute clipping and blood samples during ongoing monitoring and research.	L	Small population effects	Ongoing
6.2.2	Assess the genetic relationships of newly discovered groups of turtles with the previously known populations.	M	Connectivity, small population effects	2020 Lower Medway; others as required

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
Broad Strategy 7: Conduct strategic monitoring of the population complex and continue to reassess and update population models.				
7.1	**Approach:** Develop a strategic monitoring plan and conduct standardized monitoring at a level necessary to refine assessment of survivorship, abundance and fecundity and identify new threats. Collect data necessary to assess the effectiveness of recovery actions.			
7.1.1	Develop and implement a long-term monitoring strategy with clearly identified goals and methods.	H	Monitor populations, habitats, and threats	2020, revise as necessary
7.1.2	Identify priority sites and the roles of partners involved, and conduct monitoring as laid out in the monitoring strategy.	M	Monitor populations, habitats, and threats	Ongoing
7.1.3	Investigate other factors affecting nest success (e.g., humidity and temperature).	L	Monitor populations, habitats, and threats	As required
7.2	**Approach:** Construct initial population models for two of the four known populations and refine the models for the other two to reflect the most current demographic data, literature on models, and recovery actions underway.			
7.2.1	Review population viability analysis (PVA) assumptions and calculations to determine confidence in model outputs.	M	All	Every five years
7.2.2	Review and update population existing models as required.	M	All	Every five years
7.2.3	Assess turtle data in other populations to determine if a population viability analysis (PVA) is possible and either construct initial PVA or collect additional data.	M	All	2020
7.3	**Approach:** Monitor the effect of human activities and habitat change on long term viability.			
7.3.1	Continue to photo document nesting site habitat over time to ensure that existing and emerging threats to nesting habitat are being identified and adequately mitigated.	M	Habitat loss or degradation, changes in ecological dynamics or processes, climate change	Ongoing
7.3.2	Develop and implement monitoring protocol for nesting habitats that are prone to change.	M	Habitat loss or degradation, changes in ecological dynamics or processes, climate change	2020

#	Recovery Measures	Priority[a]	Threats or objectives addressed	Timeline
7.3.3	Document and monitor development in and around habitats to identify new threats and allow for long term evaluation the effects of development on the species.	M	Habitat loss or degradation, changes in ecological dynamics or processes, climate change	2020
7.3.4	Track turtles to monitor response to changing environments.	M	Habitat loss or degradation, changes in ecological dynamics or processes	Where applicable

[a] "Priority" reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the population and distribution objectives for the species. Medium priority measures may have a less immediate or less direct influence on reaching the population and distribution objectives, but are still important for the recovery of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the population and distribution objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of the species.

1.3. Critical Habitat

Critical habitat is defined in the *Species at Risk Act* (2002) section 2(1) as "the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species."

Critical habitat for the Blanding's Turtle in Canada was partially identified in the federal recovery strategy (Parks Canada Agency 2012). It was recognized that the information available at the time was insufficient to fully identify critical habitat because it was not known if critical habitat identified was sufficient to support a self-sustaining population of Blanding's turtles in Nova Scotia over the long term. A schedule of studies was included to obtain the information required. Additional critical habitat at two sites is identified in this action plan, based on recent survey work, using the approach described in section 7.1 of the recovery strategy (Parks Canada Agency 2012). Nevertheless, critical habitat remains partially identified. The completion of the schedule studies identified in the recovery strategy will allow for the full identification of critical habitat.

1.3.1. Identification of the species' critical habitat

Critical habitat characteristics and description

Critical habitat for Blanding's Turtle is presented in Figures 1-5. These maps distinguish between the critical habitat identified in the recovery strategy (2012) and the critical habitat being identified in this action plan. The biophysical attributes of critical habitat are described in section 7.1.3 of the recovery strategy (Parks Canada Agency 2012) and included as Appendix B of this document.

In this action plan, critical habitat is identified in the two new areas discovered since the publication of the recovery strategy. Both areas are found on non-federal lands in the Medway watershed: one forms an extension to the critical habitat polygon at a previously identified population, while the other is a new critical habitat polygon representing a newly discovered population. As this latter area was just discovered in 2016, it is expected that critical habitat for this population is incomplete and will need to be revised as further information becomes available.

Critical habitat for Blanding's Turtle, Nova Scotia population, occurs within the identified polygons (Figures 1-5) where the critical habitat criteria and methodology described in section 7.1 of the recovery strategy are met.

Figure 1. Overview of critical habitat for *Blanding's Turtle (Nova Scotia population).* Critical habitat is represented by the yellow and orange shaded polygons where the criteria and methodology set out in section 7.1 of the recovery strategy are met.

Figure 2. Critical habitat for *Blanding's Turtle (Nova Scotia population) identified in block A of Figure 1.* Critical habitat is represented by the orange shaded polygons where the criteria and methodology set out in section 7.1 of the recovery strategy are met.

Figure 3. Critical habitat for *Blanding's Turtle (Nova Scotia population) identified in block B of Figure 1.* Critical habitat is represented by the orange shaded polygons where the criteria and methodology set out in section 7.1 of the recovery strategy are met.

Figure 4. Critical habitat for *Blanding's Turtle (Nova Scotia population) identified in block C of Figure 1.* Critical habitat is represented by the yellow and orange shaded polygons where the criteria and methodology set out in section 7.1 of the recovery strategy are met.

Figure 5. Critical habitat for *Blanding's Turtle (Nova Scotia population) identified in block D of Figure 1.* Critical habitat is represented by the yellow shaded polygons where the criteria and methodology set out in section 7.1 of the recovery strategy are met.

1.3.2. Examples of activities likely to result in destruction of critical habitat

Examples of activities likely to result in the destruction of critical habitat are described in the recovery strategy (Parks Canada 2012).

1.4. Proposed Measures to Protect Critical Habitat

The information below outlines the measures proposed to be taken to protect critical habitat for Blanding's Turtle, Nova Scotia population.

1.4.1 Measures proposed to protect critical habitat on federal lands

Critical habitat for Blanding's Turtle occurs in KNPNHS of Canada, a federal protected area. KNPNHS was described on Schedule 1 of the *Canada National Parks Act* on February 19, 2001. As required under SARA, a description of the portion of previously identified critical habitat for Blanding's Turtle found in this area was published in the Canada Gazette by Parks Canada on April 9, 2014. This critical habitat was protected under s.58(1) of SARA. No new critical habitat identified in this action plan occurs on federal lands.

1.4.2 Proposed protection measures on non-federal lands

With regard to the portions of critical habitat on non-federal lands, Environment and Climate Change Canada will assess the protection currently in place. This involves first working with the Government of Nova Scotia to determine which Nova Scotia laws and legal instruments are in place to prevent destruction of critical habitat. If there are gaps in the protection of critical habitat, provisions or measures in place under SARA or other federal legislation will be reviewed to determine whether they prevent destruction of critical habitat. The laws and legal agreements in place that protect critical habitat will be monitored for efficacy at least every five years. Conservation measures, including stewardship initiatives, that contribute to preventing critical habitat destruction will also be considered and monitored.

If it is determined that any portions of critical habitat are not protected, and steps are being taken to protect those portions, those steps will be communicated via the Species at Risk Public Registry through the reports referred to in section 63 of SARA.

2. Evaluation of Socio-Economic Costs and of Benefits

The *Species At Risk Act* requires that an action plan include an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation (SARA 49(1)(e), 2002). This evaluation addresses only the incremental socio-economic costs of implementing this action plan from a national perspective as well as the social and environmental benefits that would occur if the action plan were

implemented in its entirety, recognizing that not all aspects of its implementation are under the jurisdiction of the federal government. It does not address cumulative costs of species recovery in general nor does it attempt a cost-benefit analysis. Its intent is to inform the public and to guide decision making on implementation of the action plan by partners.

The protection and recovery of species at risk can result in both benefits and costs. The Act recognizes that "*wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons*" (SARA 2002). Self-sustaining and healthy ecosystems with their various elements in place, including species at risk, contribute positively to the livelihoods and the quality of life of all Canadians. A review of the literature confirms that Canadians value the preservation and conservation of species in and of themselves. Actions taken to preserve a species, such as habitat protection and restoration, are also valued. In addition, the more an action contributes to the recovery of a species, the higher the value the public places on such actions (Loomis and White, 1996; Fisheries and Oceans Canada, 2008). Furthermore, the conservation of species at risk is an important component of the Government of Canada's commitment to conserving biological diversity under the *International Convention on Biological Diversity*. The Government of Canada has also made a commitment to protect and recover species at risk through the Accord for the Protection of Species at Risk. The specific costs and benefits associated with this action plan are described below.

2.1. Policy Baseline

The province of Nova Scotia has access to many legislative, regulatory, and management tools for the conservation and stewardship of the Blanding's Turtle (Nova Scotia population). This includes the *Endangered Species Act*, *Parks Act*, *Crown Lands Act*, *Wildlife Act*, *Environment Act*, *Forests Act*, *Special Places Protection Act*, *Conservation Easements Act*, Nova Scotia Wetland Conservation Policy, *Wilderness Areas Protection Act*, and Special Management Practices. Additionally, many recovery measures can be carried out by federal or provincial species at risk funding programs, in-kind contributions by recovery biologists, or research by universities.

2.2. Socio-economic Costs of Implementing this Action Plan

The implementation of the recovery measures identified in Table 1 may generate direct costs as well as societal costs. These costs are reported in this section only if they result in incremental expenditures or constraints in land uses (including foregoing or modifying current and future activities), compared to measures already in place (see ongoing measures in Table 1).

For the Blanding's Turtle, the direct and reasonably expected societal costs are expected to be low (i.e., between $0 and $5 million) over the short term (2018-2027). These anticipated costs include salary, volunteer time, travel, materials, equipment, and

other related costs. Indirect costs are those resulting from implementing the action plan, which may have an impact on various stakeholders. Impacts to stakeholders include foregoing or modifying current and future activities.

Costs would only be incurred locally as the species occupies a limited geographic area in Nova Scotia. Costs at the regional or provincial scale are expected to be minimal.

2.3. Benefits of Implementing this Action Plan

Biodiversity is essential for healthy ecosystems, human health, prosperity, security and wellbeing. Canadians derive many benefits from biodiversity including recreational, aesthetic, educational, cultural benefits as well as ecological goods and services essential to human survival. Care for the environment is consistently ranked as one of Canada's top priorities in public opinion polls (Canada's Fourth National Report to the United Nations Convention on Biological Diversity , 2010). An opinion poll found that three quarters of Canadian respondents feel that preserving natural areas and the variety of native plant and animal life in Canada is important to them (Ipsos Reid Opinion Poll, 2011).

The total value of endangered species consists of non-consumptive use values (such as recreation, spiritual/cultural, research and education), indirect use values (value of the ecological role of a species in an ecosystem) and non-use values (i.e., preserving the benefits of nature for future generations)[4]. Achieving the objectives of this action plan will have a positive impact on society.

In the recovery strategy, lakeshore and wetland habitats are identified as critical habitat. Wetland ecosystems provide a number of goods and services that can be categorized as provisional goods, regulating services, habitat/support, cultural services, and supporting services (Millennium Ecosystem Assessment, 2003; TEEB, 2010). Important ecological services may be neglected in policy analysis because there are few suitable empirical studies from which benefits may be transferred.

Wetlands provide a wide range of socio-economic benefits including flood control, filtering contaminants, carbon sequestration, coastal protection, regulating drinking water supply, supporting plant life, and supporting recreational activities. According to a Genuine Progress Index (GPI) Atlantic study on the province's water resource values, Nova Scotia's wetlands provide an estimated $7.9 billion worth of benefits in ecosystem services to Nova Scotians annually and wetland loss to development in Nova Scotia equates to an estimated $2 billion annually in lost ecological services like water purification, recharging drinking waters and enhancing fishery productivity (Nova Scotia Wetland Conservation Policy, 2011).

[4] Non-use values include bequest value (satisfaction of knowing that future generations will have access to nature's benefits), altruist value (satisfaction of knowing that other people have access to nature's benefits) and existence value (satisfaction of knowing that a species or ecosystem exists).

The actions outlined in this plan cover the entire range of the Nova Scotia population of Blanding's Turtles and are expected to contribute significantly to the recovery of this species. Other species at risk that will benefit from the protection of Blanding's Turtles include the Eastern Ribbonsnake and Atlantic Coastal Plain Flora suite. The measures outlined in the recovery action plan offer a cost effective way of maximizing conservation. It is expected that the recovery approaches outlined in the action plan will benefit the larger ecological community, including other species at risk.

2.4. Distributional Impacts

Although the Blanding's Turtle occurs on provincial, federal, and private properties, private landowners are not expected to bear the brunt of the costs for the species' recovery. Non-governmental organizations are active in Nova Scotia where the species occur and measures within this action plan include building on current stewardship and landowner initiatives.

3. Measuring Progress

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

Reporting on implementation of the action plan (under s. 55 of SARA) will be done by assessing progress towards implementing the broad strategies.

Reporting on the ecological and socio-economic impacts of the action plan (under s. 55 of SARA) will be done by assessing the results of monitoring the recovery of the species and its long term viability, and by assessing the implementation of the action plan.

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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*[5]. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the Federal Sustainable Development Strategy's[6] (FSDS) goals and targets.

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

Overall, it is anticipated that the approaches outlined in this Action Plan will have a beneficial impact on non-target species (other species at risk and those not at risk), ecological processes, and the environment. Management is likely to include protection of wetland habitat. This has the potential to benefit many wetland species, including some that are at risk. In Nova Scotia, the distribution and habitat of Blanding's Turtles occasionally overlaps with that of other species at risk, including Eastern Ribbonsnake, species of Atlantic Coastal Plain Flora and wetland bird species. Where other species at risk coexist with Blanding's Turtles, recovery and conservation initiatives outlined in this strategy will be coordinated with other groups implementing recovery measures for species at risk; this is particularly the case with Eastern Ribbonsnake, where the recovery programs for the two species are closely integrated. It will ensure that actions are mutually beneficial and not detrimental to other species at risk.

Stewardship actions, educational programs and awareness initiatives with landowners, Indigenous organizations, and the general public; all levels of government; industry; and other audiences; will lead to increased understanding, appreciation of, and concrete action towards the conservation of wetlands and the recovery of species at risk in general. A Landowner Stewardship Guide (titled "Healthy Lakes and Wetlands: A Landowner Stewardship Guide for Species at Risk in Nova Scotia") was developed to help encourage stewardship of all wetland species at risk on private lands and inform landowners of ways to minimize their impacts on these species (Crowley 2014).

[5] www.canada.ca/en/environmental-assessment-agency/programs/strategic-environmental-assessment/cabinet-directive-environmental-assessment-policy-plan-program-proposals.html
[6] www.fsds-sfdd.ca/index.html#/en/goals/

Appendix B: Identification of the Species' Critical Habitat

*This section is reproduced in its entirety from the Recovery Strategy for the Blanding's turtle (*Emydoidea blandingii*), Nova Scotia Population, in Canada – 2012*

Biophysical attributes

Critical habitat includes all areas within the identified polygons. This encompasses seasonal habitats required for all life stages and the aquatic and terrestrial travel routes between these habitats. Biophysical attributes of habitats used varies considerably with site, season and age-class, and not all are currently identified. Typical biophysical attributes are listed below, although it should be noted that specific attributes for certain life stages (e.g., hatchings) are still unclear. Hence, section 7.2 identifies activities to help better define these attributes and determine the geographic locations of any additional critical habitat.

Biophysical attributes of aquatic habitats used during the active season typically include, but are not limited to, the following (Bourque 2006, Caverhill 2003, Gilhen 1984, McMaster and Herman 2000, Power 1989):

- Wetlands including fens, bogs, ponds, vernal pools, lake coves, streams
- Slow moving water
- Abundant aquatic vegetation
- Overhanging vegetation (e.g. sedges or sweetgale)
- Mid-range water color (100-250 TCU)
- Muddy, organic substrate, not dominated by rocks

Biophysical of overwintering habitats typically include, but are not limited to, the following (Caverhill 2006, McNeil 2002, Newton and Herman 2009, Power 1989):

- Wooded pools or channels, railway trenches, and specific sections of streams or wetlands
- Deep organic substrate
- Undercut banks

Biophysical attributes of nesting habitats include, but are not limited to, the following (Caverhill 2006, McNeil 2002, Power 1989, Standing 1997):

- Natural or human-modified sites such as lakeshore beaches, woodland outcrops, gravel pits and roadsides
- Areas exposed to sunlight
- Areas with exposed substrate such as gravel, soil or sand, in which a turtle can dig a nest

Biophysical attributes of travel routes, include but are not limited to, the following (Camaclang 2007, Kydd 2010, Lefebvre 2010, McNeil 2002, Power 1989):

- A variety of terrestrial habitats including woodland, trails, meadows

- A variety of aquatic habitats including along streams, along lake shores or across lakes, through wetlands, vernal pools