

Alberta Conservation Association
2018/19 Project Summary Report

Project Name: Provincial Snake Hibernaculum Survey

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Partnerships

Alberta Environment and Park

Landowners

Key Findings

- We assessed 52 hibernaculum records for potential snake activity from a list of hibernacula held in a provincial wildlife database.
- Twenty-five (48%) of the hibernacula surveyed were verified to be active based on the observation of a least one snake.
- Through conversations with landowners, we identified three undocumented hibernacula.
- The support of private landowners greatly assisted our survey effort, often making it easier to locate snake hibernacula on their properties.

Introduction

As summer transitions to winter, snakes in Alberta find their way to specific sites known as dens or hibernacula (singular: hibernaculum). Hibernacula consist of underground spaces below the

frost layer that help snakes survive through the winter months. As snakes enter hibernacula in autumn, they begin a period of dormancy that will last until spring. Generations of snakes may use specific hibernacula year-after-year and some snake species mate at hibernacula in large aggregations. Hibernacula are essential to the conservation of Alberta's snakes. As such, snake hibernacula are afforded special management and legal protections by Alberta's *Wildlife Act*.

In collaboration with Alberta Environment and Parks, we initiated the first year of a two-year provincial snake hibernaculum (den) survey in 2018/19. We assessed snake activity at known red-side garter snake (*Thamnophis sirtalis*), plains garter snake (*Thamnophis radix*), and wandering garter snake (*Thamnophis elegans*) hibernacula using simple visual encounter surveys. We focussed our work on garter snake hibernaculum records held in the Alberta Fisheries and Wildlife Information Systems (FWMIS) database.

Interaction with landowners has been a key part of this project. During conversations with them, they have shared with us their appreciation of snakes, as well as the location of new hibernacula and the history of previously known ones. In turn, we have been able to provide them with additional information on snakes and their habitat needs with the goal of conserving snakes.

Methods

We compiled a list of hibernaculum records for red-sided, plains, and wandering garter snakes from data held in the FWMIS database. From this list we created four priority categories to direct hibernaculum surveys. We assigned a lower survey priority to recent hibernaculum records and those that fell outside the time frame we expected snakes to be at their hibernacula. We assigned a higher priority to historic records that had not been visited in many years and to those with snakes observed at hibernacula in the spring and autumn.

All crews followed a set of survey guidelines and biosecurity protocols (Kendell 2018) to improve the probability of detecting garter snakes and their hibernacula, reduce potential disease transmission between sites, and to ensure consistent data collection across survey sites. Surveys were targeted to be completed during snake emergence from hibernacula in the spring and prior to their dispersal to summer habitat (April 1 to May 31), or during the autumn, prior to their

ingress into hibernacula for the winter (September 1 to October 15). Surveys were conducted during weather conditions that favoured snake activity, such as when it was sunny and calm, and when air temperature was at least 10°C. To determine the level of influence weather may have had on the survey results we recorded cloud cover, air temperature, and approximate wind speed at time of survey.

We surveyed each hibernaculum at least once. A second survey was completed if snakes were not detected during the initial survey, even though potential hibernaculum habitat features were present at the site. We recorded the time to detection of the first snake encountered during surveys. We also recorded potential disturbances within 200 m and 500 m of verified hibernacula and noted any immediate threats. Survey data and incidental snake observations were submitted to AEP for upload into FWMIS.

We sought permission from all landowners to conduct hibernacula surveys on their property. Whenever possible, we gathered information from landowners on the location and history of snakes on their land and on their opinion of snakes in general. We also provided information on the benefit of snakes, their habitat needs and offered interested landowners a copy of ACA's *Reptiles of Alberta* brochure.

Results

AEP provided ACA with 1,725 garter snake observation records from the FWMIS database. From that dataset, we isolated 131 unique records that were specifically catalogued as a hibernaculum in the database. In total, we assessed 45 of the higher priority and seven of the lower priority hibernaculum records for potential snake activity in 2018 (Table 1).

Table 1. Total number of garter snake hibernacula assessed in 2018, under each survey priority category, and their activity status.

Hibernaculum status	Total number of hibernacula assessed	Survey priority category			
		High		Low	
		1	2	3	4
Active	25	11	13	1	0
Unknown	22	13	5	2	2
Inactive	5	3	0	2	0
Total	52	27	18	5	2
		45		7	

Surveys were completed in spring (April 26 to May 29) and autumn (September 5 to October 18). A very late spring brought unsuitable weather for much of April, delaying surveys. Twenty-five (48%) of the hibernacula surveyed were verified to be active based on the observation of a least one snake. Snake presence was recorded as unknown at 22 (42%) hibernacula surveyed, despite suitable habitat being present. However, we intend to revisit seven of these sites in 2019 due to inclement weather and scheduling issues that affected efforts during the 2018 surveys. We suspected that five (10%) of the hibernacula surveyed were inactive as a result of habitat loss or other disturbance factors (Table 1).

Through conversations with landowners, we identified three undocumented hibernacula. We had in-person interactions with at least 20 landowners and shared ACA's *Reptile of Alberta* brochure with them to help keep them engaged in the maintenance of snake habitat on their properties.

Conclusions

In total, we verified snake activity at nearly half of the hibernacula we surveyed in 2018. While snakes were not detected at 42% of hibernacula with suitable habitat, this alone cannot be used to say that these hibernacula were inactive. This is because survey-specific conditions such as snake visibility in different habitat types, the time of the day, weather, and the unavailability of snakes on the surface, can impact detection. To address some of these challenges, we used a repeated-

survey approach. However, much more intense monitoring of those hibernacula we classified as being of unknown status would be needed in order to confirm that they are indeed inactive.

The support of private landowners has been crucial to the success of this project. Surveys were often made easier from the sharing of landowner knowledge about the snakes on their property. Through this work we also took the opportunity to provide information to landowners about snakes and their habitat needs, with the goal of helping to conserve these fascinating animals.

Communications

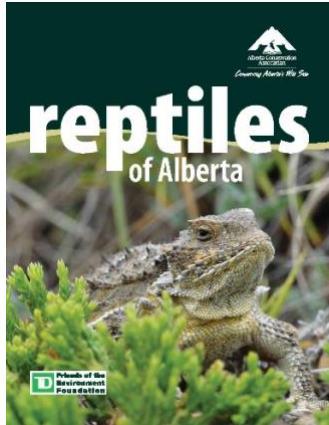
Publications

- Kendell, K. 2019. A protocol for the survey of snake hibernacula in Alberta—in preparation. Alberta Conservation Association. 21 pp.
- Alberta Conservation Association. 2019. Reptiles of Alberta [re-print], Sherwood Park, Alberta. 14 pp.

Literature Cited

Kendell, K. 2018. A protocol for the survey of snake hibernacula in Alberta—in preparation. Alberta Conservation Association. 21 pp.

Photos



ACA's *Reptiles of Alberta* brochure celebrates Alberta's reptile species with rich photographs, positive messages, and conservation information to increase awareness of this fascinating group of animals. Photo: ACA



A yellow-bellied marmot (*Marmota flaviventris*) is photographed at the entrance of a snake hibernaculum in southern Alberta. Photo: ACA



ACA Biologist, Hillary Keyes, surveys for garter snakes on an escarpment along the Sturgeon River, near Onoway. Although no snakes were located during this survey, the habitat looked favourable for a hibernaculum with many fissures reaching deep into the scarp face. Photo: Kris Kendall