Friends of Blackfoot: Snake Activity Project

Road-kill Survey 2023

AMENDED: February 2026

EINP provided data collected on RR 210 between TR 530 and EINP/PRA boundary fence from June 15 to Sep 23 2023.

A total of 35 garter snakes were counted and removed from RR 210.

	2023
Jun	4
Jul	9
Aug	12
Sep	7
Oct	3
Grand Total	**35**

May 2024

Friends of Blackfoot Society
52365 Range Road 210
c/o Cooking Lake - Blackfoot Provincial Recreation Area
Sherwood Park AB T8G 1A6

Friends of Blackfoot
COOKING LAKE – BLACKFOOT PROVINCIAL RECREATION AREA

Executive Summary

As part of the ongoing citizen science activities of the Friends of Blackfoot Society (FoB), our snake monitoring project emphasizes spring and fall observations of plains garter snake (*Thamnophis radix*) in the vicinity of the two Waskehegan hibernacula and incidental public sightings associated with the Cooking Lake Blackfoot Provincial Recreation Area. In 2023, the program expanded to include documentation of garter snake mortality on roads adjacent to Waskehegan staging area, primarily Range Road 210 from Baseline Road Wye Road.

Standardized surveys began on May 2 2023 (41 dead snakes) and continued through to mid October when repeated surveys did not detect any dead snakes. A cumulative total of 443 dead and 6 live snakes were seen during the surveys. Temporal distribution of mortality was bimodal: May 2 to ~May 12 and then August 26 to September 25. These dates are consistent with the period when garter snakes migrate from hibernacula to their summer use areas in May and then move back towards their winter den sites in the fall. Spatial distribution indicates mortality is not equally distributed along the surveyed area but is clustered around three local sites in the vicinity of nearby hibernacula.

FoB continues to build on this project as an opportunity to provide snake-friendly information to public audiences and as a basis to support future collaborative mitigation to reduce the excessive road-related mortality of garter snakes throughout the Cooking Lake moraine.

Background

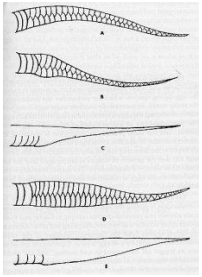
Plains garter snakes (*Thamnophis radix*) are relatively common in east central Alberta south of Cold Lake (Russell and Bauer 2000). Their preferred habitats contain ponds, lakes, sloughs or marshes in aspen parkland and short-grass prairie natural regions. These areas provide an abundance of preferred foods, including amphibians, small mammals, worms, invertebrates, and even small fishes. Garter snakes use hibernation as a critical overwinter survival strategy and thus require suitable winter den sites in rock piles, sink holes, mammal burrows, or among tree roots. Garter snakes also will hibernate under buildings or in cellars when suitable conditions are present to sustain their period of dormancy. Extensive migration can occur between winter and summer use areas.

All key factors for garter snake survival are abundant on the Cooking Lake Moraine and throughout the Beaverhills Biosphere. These snakes are adapted naturally to maintain successful populations on the moraine and are an essential component of local ecosystems. In particular, the rock rubble base of the moraine (glacial till) provides abundant winter den sites for hibernating snakes (Kendell 2020). An active plains garter snake den at the Waskehegan Staging Area of the Cooking Lake Blackfoot Provincial Recreation Area (CLPRA) east of Ardrossan, Alberta was registered with provincial Parks, and Fish and Wildlife, databases in 2020 (Pybus 2020).

As an add-on to ongoing local citizen science interest in snakes, a concerted effort was made in 2023 to document vehicle-related garter snake mortality along Range Road 210 along the west boundary of the Cooking Lake Blackfoot Provincial Recreation Area (PRA) and Elk Island National Park (EINP) between Wye Road (Hwy 630) and Highway 16. Snake mortality in this area was known locally for many years, most often in spring and fall (approx. Apr/May, Aug/Sept). Dr Gordon Court (wildlife biologist, Fish and Wildlife) spent many hours in this area in his early years. The snakes he saw were largely red-sided garter snakes (*Thamnophis sirtalis parietalis*). In 2023, they are exclusively plains garter snakes (*Thamnophis radix*). However, this report simply provides this as background and will not delve into reasons for this change in biodiversity.

Methods

Road Kill Efforts: Intermittent standardized surveys to document garter snakes were conducted by one observer throughout the summer. Total distance covered each survey was ~9 km. (7 of which were on RR 210) and generally took 60-90 min. The route was east on Baseline Road (Twp 530) from Range Road (RR) 211 to RR 210, south on RR 210 to Wye Rd (Hwy 630), deadhead north on RR 210 to Twp Rd 524 then west on 524 from RR 210 to 211 (occasionally west of 211 approximately 0.5 km). Surveys were conducted from a slow-moving vehicle (10-20 km/hr) in late afternoon/early evening during daylight. On two occasions in September, due to the sheer number of dead snakes and waning daylight, the survey route was completed the following day.



All live or dead snakes were counted and mapped with GPS. General observation of size category (small <25 cm, medium 25-50 cm, large 51-70 cm) and, with dead snakes, gender based on reproductive conformation (male - expanded cloacal profile or direct evidence of extruded hemipenes; female – tapered cloacal region with straight-line profile & thicker tail) were recorded. Occasionally dead snakes and associated habitat pictures were taken. All observations were recorded on a paper map and also uploaded in real-time to the Alberta provincial road mortality app (511 Alberta Highway Watch, Govt of AB). Topographic descriptors were used to identify specific portions of the route to help assess potential foci of mortality. All dead snakes were disposed in the adjacent roadside ditch.

Care and attention was taken at all times in light of traffic safety and attention to oncoming or passing vehicles. This included use of 4-way flashing lights throughout the survey, avoidance of stopping on hills, vehicle displaced well over to right shoulder for any stops, and avoidance of busy times of day in terms of traffic use on RR 210 (i.e. avoid commuter times, generally conducted late afternoon/early evening).

For DNA purposes, five snake tails (2-3 cm) were collected, fixed in 95% ethanol, and allowed to infuse with fixative prior to freezing at -80C. These samples were provided to the provincial Amphibian and Reptile BioBank effort via Kris Kendell (Alberta Conservation Association).

Local education efforts to highlight and perhaps reduce the mortality included posting notices near community mailboxes and community halls, information disseminated via local social media contacts, posters at trailheads in the PRA, selected agency social media postings. On September 10/11, the County of Strathcona placed two large flashing traffic signs on RR 210, one at the intersection with Twp Rd 530 and one just north of Wye Road. These were active 24 hrs/day and were removed approx. October 12.

Results

Surveys

Snake records began with an observation of 41 dead garter snakes along RR 210 on May 2 2023 (Figure 1&2). Subsequent early surveys were bi-weekly until mortality diminished. Surveys in June and /July were intermittent and some negative surveys were not recorded. From mid August to mid October, surveys were conducted at least twice weekly, often on Fridays (prior to a weekend) and Mondays (after a weekend). Surveys were discontinued in the fall following multiple surveys in which no dead or live snakes were seen, in conjunction with weather conditions consistent with known reduction in snake activity.

A total of 449 snakes (443 dead, 6 live) was seen on 37 surveys along RR 210 between Baseline and Voyageur 1 between May 2 and October 17 (Table 1). Dead snakes were seen on 27 of the 37 surveys, live snakes were seen on 3. No snakes were seen on 9 surveys, 5 of which occurred in October.

Figure 1. Snake observation survey dates, May to October 2023.

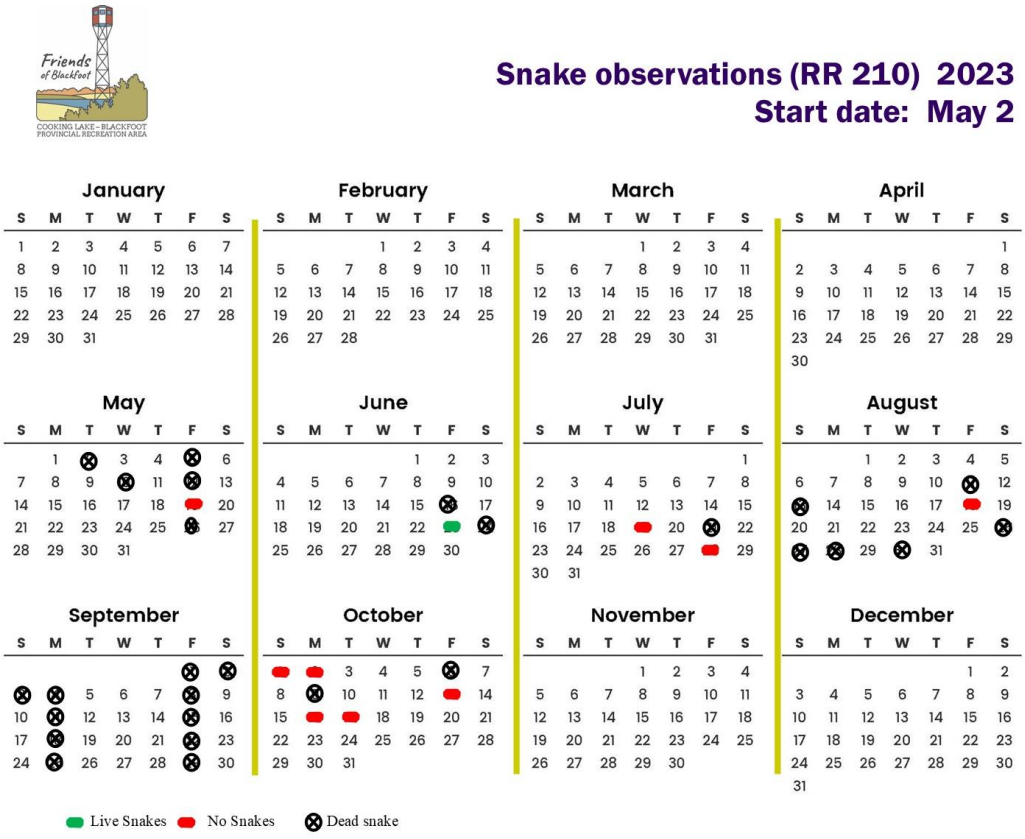


Figure 2. Garter snakes observed along a 7km section of Range Road 210, May to October 2023.

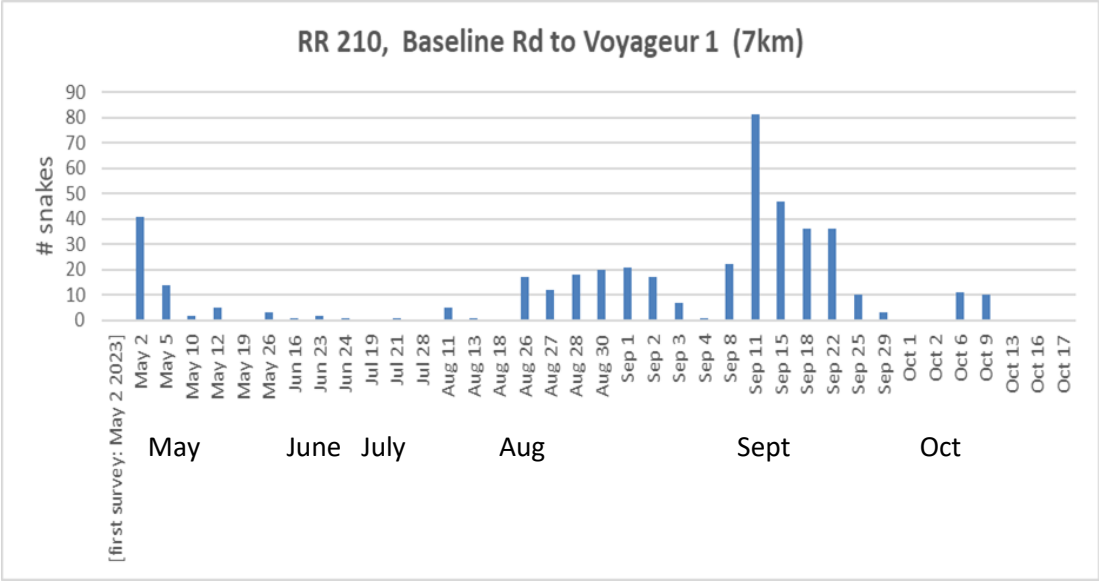


Table 1. Raw observations of garter snakes on RR 210 from Baseline to Wye Rd, 2023

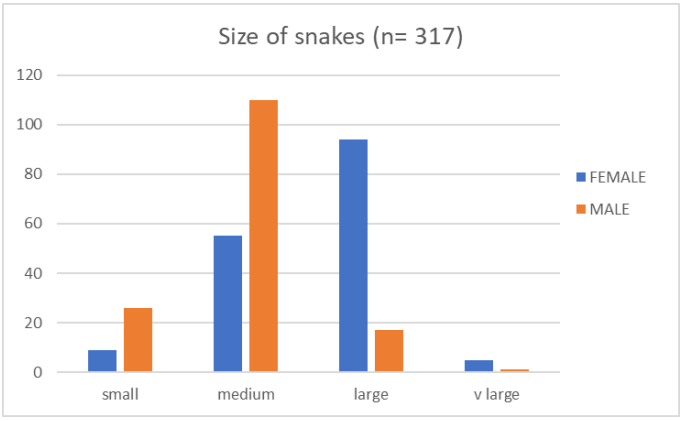
Date	Snakes Y/N	Dead Live	# seen	Highland	dry pond	524/ 210	210/ Wask	Voy 1	Voy 2/3	Voy 3	Voy 4	other
02-May	Y	dead	**41**	8		3	4		2	12	2	10
05-May	y	dead	**14**				1	2	3	4		4
	Y	live	**2**			1						1
10-May	y	dead	**2**				1		1			
12-May	Y	dead	**5**	1			1		1			2
19-May	N		**0**									
26-May	y	dead	**3**	1				1				1
16-Jun	Y	dead	**1**			1						
23-Jun	y	live	**2**	1								1
24-Jun	Y	dead	**1**									1
19-Jul	N		**0**									
21-Jul	y	dead	**1**									1
28-Jul	N		**0**									
11-Aug	Y	dead	**5**	3			1					1
13-Aug	y	dead	**1**									1
18-Aug	N		**0**									
26-Aug	Y	dead	**17**	3	5		5		2			2
27-Aug	y	dead	**12**	5	4		2		1			
28-Aug	y	dead	**18**	2	1		5	1	5			4
30-Aug	y	dead	**20**	1	1	1		5	10	1		1
01-Sep	y	dead	**21**	7	2		4	1	6			1
02-Sep	y	dead	**17**		1		4	1	6		1	4
		live	**2**	1	1							
03-Sep	y	dead	**7**	1			2		2			2
04-Sep	y	dead	**1**					1				
08-Sep	y	dead	**22**	1	2	1	3			5	1	9
11-Sep	Y	dead	**81**	4	5	2	13	1	24	1	3	28
15-Sep	Y	dead	**47**		2	1	11		18			15
18-Sep	Y	dead	**36**	2	4		9	3	8	4		6
22-Sep	y	dead	**36**	3	1	3	2		10			17
25-Sep	y	dead	**10**	3	1			1	3			2
29-Sep	y	dead	**3**		1				1			1
01-Oct	N		**0**	no snakes	Cold damp days, near zero night temps							
02-Oct	N		**0**									
06-Oct	Y	dead	**11**		2				4			5
09-Oct	Y	dead	**10**	1	3		3		3			
13-Oct	N		**0**									
16-Oct	N		**0**									
17-Oct	N		**0**									
TOTAL			**449**	**48**	36	13	71	17	110	27	7	120

Although snakes were detected along much of the survey course, significant clusters of dead snakes occurred on RR 210 at 3 primary sites: Highlands (south of TR 530) (48, 11%), Waskehegan entrance (71, 16%), and Voyageur Estates entrance 2/3 (110, 25%) (Table 2). This pattern was particularly evident during the fall period when of the 369 dead snakes seen between Aug 26 and Oct 17 these three sites accounted for 54% of the total mortality: Highland (34, 9%) Waskehegan (63, 17%) Voy 2/3 (103, 28%). The remaining snakes were scattered as individual records along the areas between these cluster points.

Proportion of dead snakes at:	Overall (n=443)	Fall (n=369)
Highland	11%	9%
Waskehegan	16%	17%
Voyageur 2/3	25%	28%

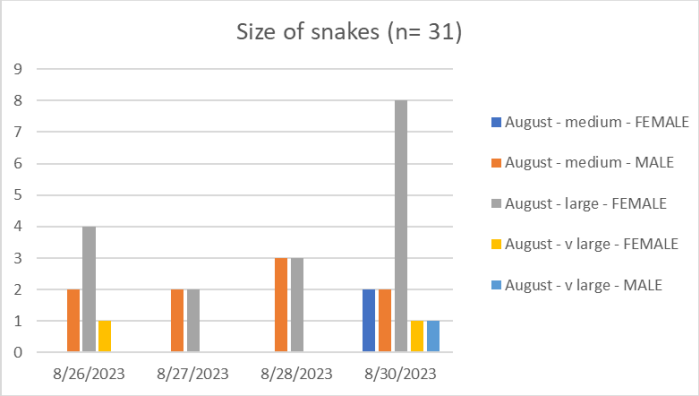
Number, size, and gender of dead snakes [Pybus data from 511 Alberta Traffic Watch]

A total of 441 dead snakes was entered into the data tracking app. Size category of snakes observed [small <25cm, med 25-50cm, large 51-70cm, v large >70 cm] was recorded from August 26 to late September.



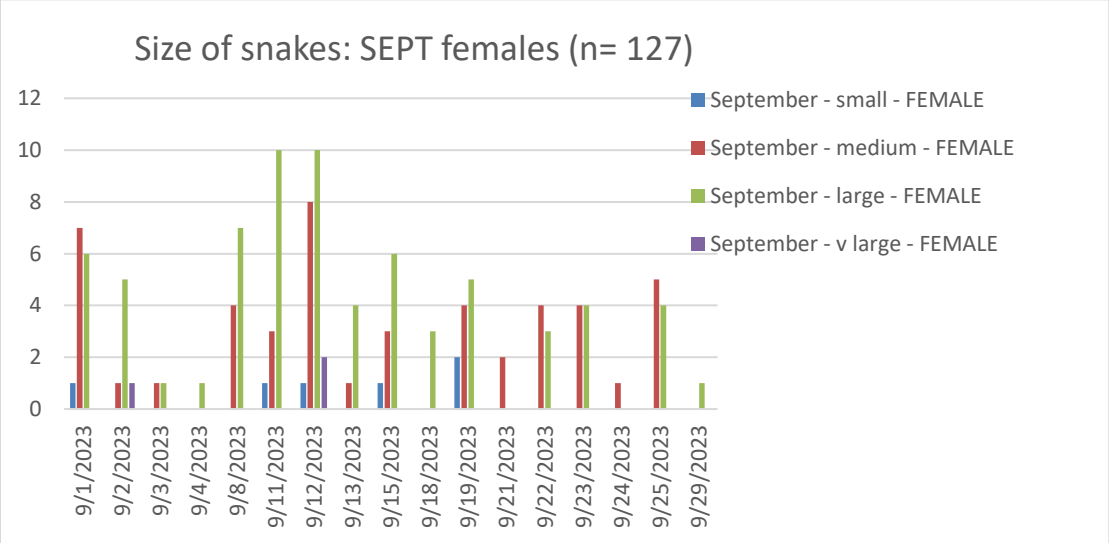
Of the 317 snakes for which size and gender was recorded, 163 (51%) were females, 154 (49%) were males.

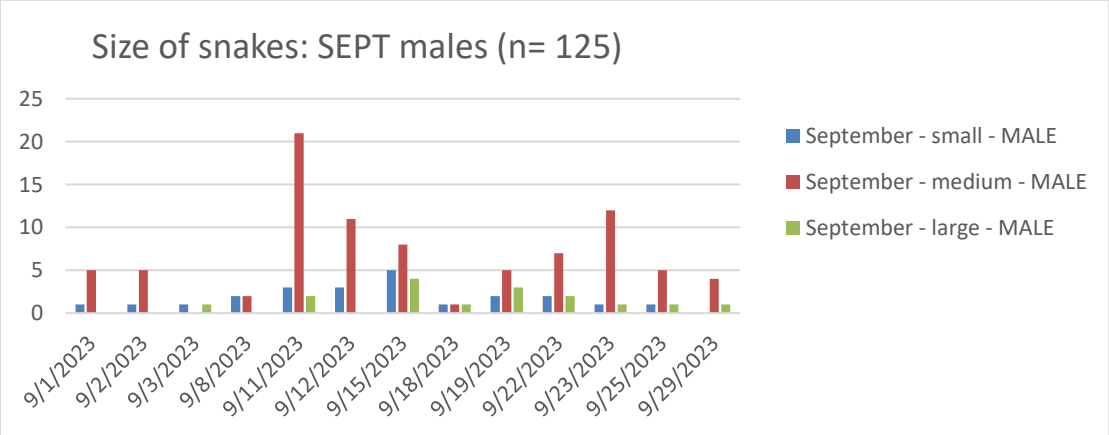
Of the 163 females, the majority were large (58%), yet of 154 males, most were medium (110, 71.4%).



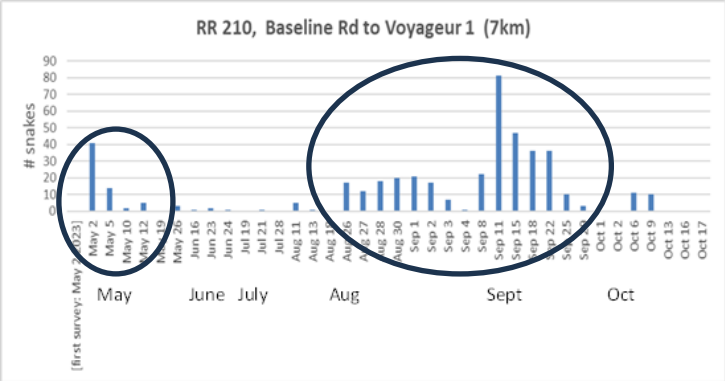
Size data are insufficient to assess monthly patterns. Of the 4 days assessed in August, most of the snakes were large females and med males.

However, within the month of September, large females predominated in mid September but medium males predominated through the month.





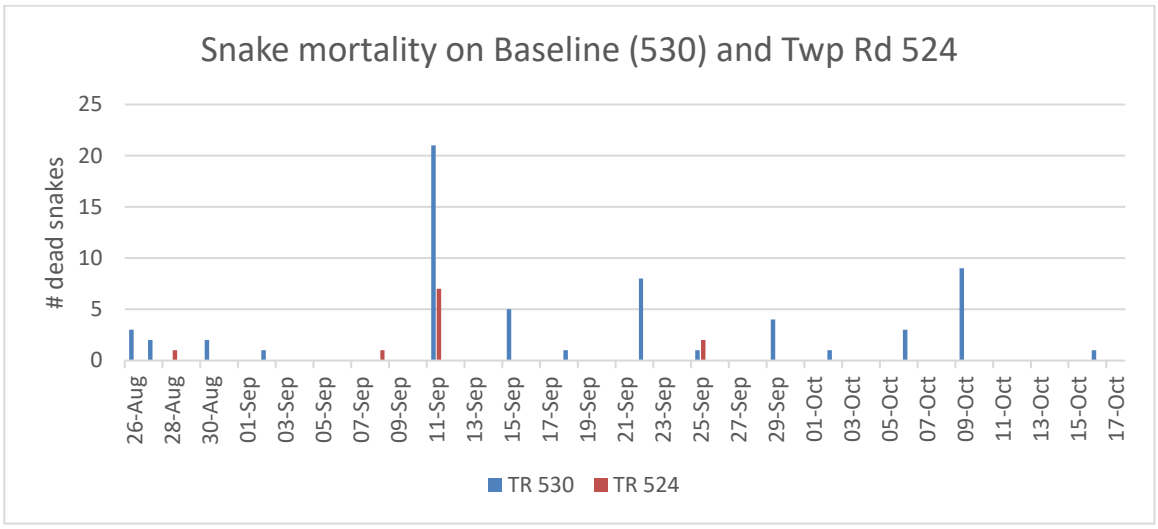
Temporal pattern of dead snakes (see Figure 2)



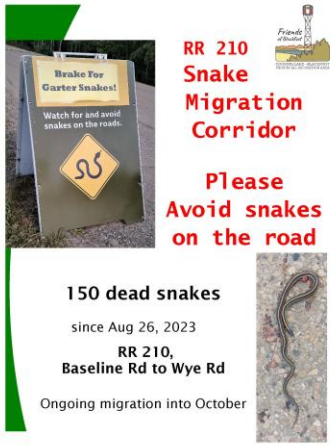
Of the 443 dead snakes documented from May to October, mortality was concentrated in early May (n=62, 14% of total) and from Aug 26 to Sep 25 (345, 77%), with a noticeable increase Sep 11 to 22 (210 dead snakes). Reduced mortality in early September, coincided with a cold weather front (cool, overcast, smoky all day, daytime high 10-15C). Similarly, daytime temperatures dipped below 10C after September 29 but a period of warm weather was associated with dead snakes on the Oct 6 and 9 surveys (daytime highs 20-25C).

Baseline Road (Twp Rd 530) and Twp Rd 524

As an add-on, road surveys were conducted along Twp Rd 530 and Twp Rd 524 between RR 210 and RR 211 starting on Aug 26 2023. Methods were the same methods as used on RR 210.



These results reinforce the patterns seen on RR 210: increased mortality of snakes through mid September and during the relatively warm spell in early October.



Communications

Information regarding the mortality of snakes on local roads was posted and highlighted at the Heritage Interpretive Centre at Waskehegan staging area. During the fall, laminated posters were displayed near local community mailboxes, on public notice boards at community halls and local vendor sites, and at notice boards at the 4 staging areas within the PRA. The poster file also was provided to a few individuals to share on local social media networks. In addition, the Beaverhills Biosphere and Alberta Conservation Association (ACA) posted awareness information on their social media accounts.

Collaboration

To further raise awareness of the situation, a working group was established under the umbrella of the Beaverhills Biosphere. This included individuals from the Biosphere, ACA, Alberta Parks, Parks Canada (Elk Island), County of Strathcona, AB Environment & Protected Areas, and Friends of Elk Island. The intent was to muster experience, expertise, and knowledge to review road-related mortality of garter snakes across the Cooking Lake moraine and work towards effective mitigation to reduce the mortality.

The most substantial result to date was 2 flashing road signs that the Co of Strathcona placed on RR 210 at the intersection with Baseline Road and Wye Road.

Each sign flashed 24 hrs a day with

WATCH FOR ….. GARTER SNAKES

The signs were installed on September 11 and removed on October 13.

In support of the provincial Amphibian & Reptile BioBank project, the tails of 5 dead snakes were collected on RR 210 on May 5 and turned over to Kris Kendal (ACA) for accession into the provincial plains garter snake DNA collection. This is a collaborative project developed by the AB Amphibian and Reptile Specialist Group and the Royal Alberta Museum to create a repository of DNA from snakes, toads, frogs and turtles in the province.

Discussion

Vehicle-related mortality of garter snakes is not new. Nor is it a new occurrence along the section of RR 210 used for the surveys reported herein. In fact, quite the opposite. The mortality has been known, and ongoing, for many years. But this is 2024 and things are different now. The scale of human activity along this section of road has steadily increased… more visitors, more residents, more vehicles, higher speeds,

extended use each day and throughout the year. What was once a quiet country road is now a well-used connector and commuter corridor. Interactions with wildlife were bound to increase also. Slow-moving animals, that soak up heat from warm dark surfaces, were bound to get in the way. A trip along RR 210 on May 2 2023 and the finding of 41 snake carcasses kicked off the surveys that form the basis of this report.

Data herein are limited by the methodology. While the standardized approach can document temporal, seasonal, and geographic patterns, it cannot be used to assess snake abundance or population estimates. The live and dead snakes counted are only the ones available to see during each survey. Scavengers and predators readily make use of roadkill wildlife. On occasion, ravens (*Corus corax*) and crows (*Corvus brachyrhynchos*) were seen during a survey eating or flying away with dead snakes. And according to some sources, crows and ravens particularly enjoy snake liver as a treat. The number of coyote (*Canis latrans*) scats on the roadside noticeably increased in August, suggesting they too were taking advantage of the abundance of food. In addition, some motorists hit and removed an unknown number of snakes – and at least one reptophile provided records of 4 dead garter snakes documented in *iNaturalis*t and removed from this section of RR 210 on August 2 2024 (A Metro, pers comm). However, these drawbacks do not detract from the scale of the mortality and the patterns revealed in the current data.

Current data reinforce the general patterns in the natural history of garter snakes, with particular focus on increased activity associated with spring and fall migrations away from and going towards known wintering sites. While current data are lacking for spring 2023 (1st survey was on May 2), there is enough data to show spring mortality through early May which diminished after mid May. Some surveys in June and July were not documented if there were no dead or live snakes seen, although there is evidence of very little mortality on this road during summer months. A pattern of increased mortality after mid August and sustained through to late September is readily apparent in current data, and the three primary clusters of mortality are in the vicinity of known hibernacula.

A relatively large number of garter snake hibernacula are documented on the moraine (Kendell 2020), some of which occur adjacent to this strip of deadly road (Pybus, 2020, Friends of Blackfoot 2021,2022, S Fyfe pers comm). The abundance of small lakes and sloughs with adjacent wetlands and grassy uplands in the moraine landscape, all relatively undisturbed with human activity provide optimal summer habitat for garter snakes. However, it also comes with increasing vehicle traffic as recreational and rural residential activities increased in recent years. The surveyed section of range road 210 also is a key connector route between Highway 16 to the north and 14 to the south, and receives significant traffic associated with a busy equine centre and a popular provincial park staging area. A secondary spinoff from such surveys and data is the potential to identify previously undocumented winter den sites.

The population size or local abundance of garter snakes cannot be addressed with road-related mortality data. Similarly, it is not known how mortality data may reflect the true demographics of the local population. However, the high proportion of large females dead on the road, suggests potential for a serious loss of reproductive capacity for the local population.

Communication and collaboration are key to success in any project of the scale of road-related wildlife mortality, even if limited to a relatively small area like the Cooking Lake moraine. Our hope is that documenting the amount and patterns of mortality on one small portion of one busy road can be used to launch a higher profile, broader awareness, and increased concern for both snakes and snake mortality that will lead to effective actions to reduce the extent of the mortality. The umbrella effect of the Biosphere connecting various agencies, stakeholders, residents, and concerned citizens seems a good fit for generating a closer look and perhaps a new approach to reducing traffic-related wildlife mortality in

general, and specifically that of garter snakes. The rapid deployment of the flashing traffic signs by the County of Strathcona was a good first step on this path. They were perhaps the single best communication tool that registered with the public, as reflected in reported conversations among school children at Uncas, local residents at Antler Lake and Deville/N Cooking halls, folks gathered around kitchen tables, and comments provided in local social media posts. Though, that is not to detract from the signs and posters that also raised the profile of the issue among users of the PRA and folks who drove the road, dropped in at local businesses, or visited other sites where the posters were hung or information was read on web pages and social media.

Overall highlights:

- Spring activity was detected in early May; however, this was the first day of the survey. The initial observations may not reflect the actual activity period as snakes moved away from the winter dens.
- Survey route was truncated to 7 km along RR 210 as no dead snakes were seen north of Baseline (TWP Rd 530) or south of the southern most entrance to Voyageur Estates.
- Surveys along Baseline and Twp Rd 524 between RR 210 and 211 serve as additional mortality data, but also perhaps as control areas for which no mitigations were deployed.
- Results are an absolute minimum # of dead snakes. There was evidence of ravens, crows, and probably coyotes removing dead snakes. Similarly some people apparently removed individual snakes after inadvertently running them over. And at least one other person removed a few snakes from this section of RR 210.
- These data provide systematic evidence of the scale of mortality rather than the specific number of dead snakes nor abundance of local garter snake populations.
- Such survey data can
    - highlight the mortality
    - identify cluster points or mortality hotspots
    - identify key time periods of significant mortality
    - inform future mitigations
    - raise awareness of garter snakes and the ecological services they provide in the Beaverhills Biosphere

Recommendations:

- continue standardized observations in coming years.

Start earlier - April 1 2024.

Document negative surveys consistently

Consistently include sections of Twp rds 530 and 524 between RR 210 and 211

- work with newly established Working Group under banner of BHI to mitigate future mortality
- promote further communication and collaboration locally and throughout the Biosphere regarding
    - the value of garter snakes to local ecosystems
    - the excessive mortality on roads adjacent to hibernacula

Acknowledgements

This ad hoc project is fuelled by the efforts of a few FoB members and interested local residents.

Prepared by Margo Pybus, on behalf of FoB

Associated Literature

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Russell, A.P., and A.M. Bauer. 2000. The amphibians and reptiles of Alberta. University of Calgary Press, Calgary, AB. 279 pp.

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Working towards this:

NOT this: