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NORTHWEST WILDLIFE PRESERVATION SOCIETY

Common Garter Snake

Thamnophis sirtalis



Photo Credit: Kristiina Ovaska - www.bcreptiles.ca

By Erika Dort

The common garter snake (*Thamnophis sirtalis*) is an important British Columbian reptile, and is the most widespread snake species in North America. British Columbia is home to three different subspecies: the Puget Sound Garter Snake (*T. s. pickeringi*), the Valley Garter Snake (*T. s. fitchi*), and the Red-sided Garter Snake (*T. s. parietalis*).

The common garter snakes in Canada are special as they are one of the most northern groups of reptiles in the world: there are populations as far north as the Northwest Territories! For this reason, biologists love to study them in order to learn more about how their environmental adaptations differ from those of their more southern relatives.

Afraid of snakes? Not to worry – garter snakes are completely harmless so there is no need to panic if you see one when you are out and about. They are not aggressive and are probably more afraid of you than you are of them. In fact, seeing these snakes in your garden is a good sign as one of their favourite snacks is slugs – the bane of many a gardener's existence. So if you glimpse a common garter snake lurking in your flower beds just sit back, relax, and let them do some work for you!

Characteristics

The three subspecies of the common garter snake present in British Columbia can be distinguished from one another by subtle differences in their colour and patterning, but all have a black/green body with a distinct head and three light stripes (white, yellow, greenish-yellow, blue, or brown) running down their

NWPS Headquarters
720-1190 Melville Street
Vancouver, BC V6E 3W1

NWPS Vancouver Island
PO Box 39058
RPO James Bay
Victoria, BC V8V 4X8

t Vancouver 604.568.9160
t Victoria 778.967.3379
e info@northwestwildlife.com
w www.northwestwildlife.com

back and sides. Some individuals also have red side stripes or spots that mix with their other markings to form a variety of patterns. Adults can be anywhere from 46 cm to 130 cm (18 to 51 in) in length. Their size as adults can vary greatly depending on geographic location: northern populations tend to display larger average lengths than those in the south.

The common garter snake is sexually dimorphic (males and females differ in appearance), with females having larger heads and bodies than their male counterparts. The young snakes have the same appearance as the adults, except that they are much smaller (usually between 14 and 20 cm (5.5 and 8 in) when they are born).



Photo Credit: Darren Colello

Though there are two other species of garter snake in British Columbia (the Northwestern and the Western Terrestrial Garter Snake), the colouring and patterning of each is unique, so it is fairly straightforward to distinguish between the three species within BC. In other areas of their range there are different species of garter snake that can be often be confused with the common garter snake.

Life Cycle

Common garter snakes begin to reproduce between the ages of one and three, and females can have broods every one to three years depending on the availability of resources from year to year. Mating starts in the spring (April to May) after the snakes emerge from their overwintering dens (hibernacula). Males emerge first and wait for the females to arrive. Courtship consists of males rubbing against the sides of the female – in fact, it is common for multiple males to court a single female at the same time, forming what is called a mating ball. However, after a male has mated with a female he will insert what is known as a copulatory plug into her cloaca, preventing the other males from successfully mating with her. Interestingly, it seems that the other males somehow recognize the presence of the copulatory plug and cease their attempts to mate with that female.

Garter snakes are ovoviviparous, which means that the embryos develop in eggs inside of the female. However, instead of the female laying the eggs to hatch, they hatch inside of her and she gives birth to live young. After mating, the snakes migrate to their summer hunting grounds to start finding food; females also start to look for a good location to birth their young. Gestation is 12-16 weeks, and offspring are born between July and September. While pregnant, the females are less active than usual and focus on keeping their bodies at the optimum temperature for their eggs. The average brood size is between 10 and 40 young, but some as large as 80 have been recorded!

The baby snakes are independent as soon as they are born, and do not need mom or dad to teach them any skills. They will hang around their mother for a few hours, but she does not provide them with any care or protection – they are left on their own to find food. Unfortunately, the mortality rate of young garter snakes is quite high, and very few of them will survive the one to two years it takes to mature into adults and start reproducing.

In the wild, common garter snakes live for an average of two years. In captivity, their average lifespan increases to between six and ten years. There is even one known case of an individual living twenty years! Unfortunately, the stresses inherent in their natural habitat (predators, cold winter temperatures, etc.) prevent garter snakes in the wild from enjoying such longevity.

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t Vancouver 604.568.9160
t Victoria 778.967.3379
e info@northwestwildlife.com
w www.northwestwildlife.com

Habitat

Common garter snakes are habitat generalists, living in a wide range of environments from shorelines, wetlands and valleys, to grasslands, forests, and rocky high-elevation habitats. Generally, they stay near aquatic environments in order to keep close to their favourite prey: amphibians. Although these snakes are terrestrial, like all garter snakes, they can also swim if they need be! Their ability to adapt to such a large variety of habitats and environmental conditions is what makes these snakes so successful and widespread.

The common garter snake is the most wide-ranging snake in North America with populations as far south as Mexico and as far north as the Northwest Territories in Canada. It is most abundant throughout the United States and Canada, but there are isolated populations in northern Mexico. Within British Columbia geographical distribution differs among the three subspecies. The Puget Sound subspecies (*T. s. pickeringi*) is found on Vancouver Island and the Lower Mainland, the Valley subspecies (*T. s. fitchi*) is in southern BC and the northern coast, and the red-sided subspecies (*T. s. parietalis*) clusters on the eastern edge of BC near the prairie provinces.



Image Credit: www.bcreptiles.ca

Common garter snakes inhabit different environments depending on the time of the year. During the period of late autumn to winter, when temperatures drop too low for them and their prey, they take refuge in underground dens known as hibernacula (sing. hibernaculum). Hibernacula must be located below the frost line, which for the Canadian populations means going quite far underground. Depending on the size of the hibernaculum there can be upwards of thousands of snakes in a single den, with multiple species sharing space at times. In the spring, the snakes emerge from their hibernacula to mate. This can be quite a sight as thousands of garter snakes emerge at the same time and take over the area near their dens. The Narcisse snake dens in Manitoba, have an annual spring emergence of thousands of garter

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720-1190 Melville Street
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RPO James Bay
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t Victoria 778.967.3379
e info@northwestwildlife.com
w www.northwestwildlife.com

snakes has become a visitor hot spot that attracts tourists from all over the world. After this mating spectacle finishes, the common garter snakes disperse to their summer hunting grounds to hunt, feed, and in the case of the females, find a suitable spot for giving birth to their young. Finally, as autumn progresses, the snakes stop hunting and eating, and they start their migration back to the hibernaculum for another winter nap.

Behaviour

The common garter snake is diurnal, preferring to be active and hunt during the day and rest at night. Generally, these snakes are solitary, preferring to hunt solo and fend for themselves. The exception to this behaviour is during the winter and spring when they are dormant and mating, respectively. Common garter snakes are not picky eaters. They prey on a wide variety of amphibians including frogs, toads and salamanders, but they have also been known to snack on small mammals, birds, fish, slugs and snails, as well as other reptiles. Earthworms are also a favourite food, especially for young garter snakes. Common garter snakes primarily use smell to track down their prey, and once they have the location of prey they approach stealthily and ambush the animal using both their smell and vision. The saliva of common garter snakes is slightly toxic so they are able to immobilize smaller prey animals to make them easier to deal with as they swallow their prey whole.

Like other reptiles, common garter snakes are ectotherms ("cold-blooded"). This means they rely on external sources, such as the sun, to regulate their internal body temperature. Therefore, the body temperatures of snakes rise and fall with their external environment. This is why you may observe garter snakes (as well as other reptile species) basking themselves in the morning sunlight on a well-placed rock. This is also why snakes are able to go dormant and successfully survive the cold winter months without needing to hunt and eat.

As mentioned above, common garter snakes overwinter in underground dens called hibernacula. Some populations will migrate up to 15 km from their summer hunting grounds to find an adequate hibernaculum for the winter. During the winter months the snakes go through a process called brumation, which is a form of hibernation used by cold-blooded animals. During brumation, their body temperature naturally lowers which in turn lowers their metabolism. Consequently, the snakes require little to no energy to survive and do not need to eat. They are still alert, but they do not move a lot, unless it is to grab a drink of water.

In the presence of predators common garter snakes rely on their ability to camouflage with their environment, and their first response to predation is to hide or flee into water (this is where their swimming prowess comes in handy). However, if captured they will try to bite, and will also release a foul-smelling liquid secretion that will spread all over their captor as the snake writhes around. Make note of this before trying to handle one of these snakes!

Threats

The common garter snake is listed by the IUCN (International Union for Conservation of Nature) as a species of Least Concern because as a species it is so widely distributed, and overall its populations do not seem to be in decline. Similarly, it is yellow-listed in the province of British Columbia, meaning that the species as a whole is not seen to be threatened at risk of extinction. However, common garter snakes are not without threats. Unfortunately, fear of snakes can often drive people to attempt to rid themselves of these animals, despite the fact that they are harmless. Additionally, the use of garden pesticides can adversely affect their health, and water pollution is an issue as so many of the animals they eat are aquatic species. Garter snake populations are also often raided for the commercial pet trade, as they are a relatively harmless species.

Common garter snakes have a number of natural predators including large fish, bullfrogs, raccoons, skunk, foxes, and birds such as crows, hawks and herons. Young garter snakes are particularly

NWPS Headquarters
720-1190 Melville Street
Vancouver, BC V6E 3W1

NWPS Vancouver Island
PO Box 39058
RPO James Bay
Victoria, BC V8V 4X8

t Vancouver 604.568.9160
t Victoria 778.967.3379
e info@northwestwildlife.com
w www.northwestwildlife.com

vulnerable because of their small size, and they have a hard time surviving the first few years to adulthood.

Common garter snakes are common in British Columbia's cities, especially gardens, because there are ample prey species as well as plenty of shelter to hide from predators. In fact, they play an important role in garden ecosystems as they eat quite a few pest species and are also a source of food for many birds and mammals. As a result, many gardeners delight in the appearance of garter Snakes in and around their gardens!

The most important factor for ensuring the health of common garter snakes, as well as other snake species, is the presence of appropriate hibernacula for overwintering. The colder the climate, the more important it is for the snakes to have a den that is deep underground. It is important that these habitats are conserved, especially in Canada where long, cold winters abound and hibernacula are often full of hundreds or even thousands of snakes. The destruction of one of these hibernacula could result in the loss of an overwintering den for an entire snake population.

What We Can Do To Help

- As with all wildlife, it is always best to observe from afar. Snakes view humans as predators so chasing and/or trying to handle them can cause undue stress for the animal that can lead to various health issues.
- Spread the love for snakes! These highly misunderstood animals can benefit from some more positive PR. Let your friends and family know how important the common garter snake is to the ecosystems it lives in and share a fun fact from this report!
- If you are a gardener, take steps to ensure that your garden is 'snake-friendly' including limiting the use of pesticides, or creating a rock pile in a sunny area to give them a place to soak up some heat in the morning.

Other Interesting Facts

- Common garter snakes have a unique ability to deal with toxic prey. Both the rough-skinned newt (*Taricha granulosa*) and the Western toad (*Bufo boreas*) are toxic to other predators, but common garter snakes seem to have no problem eating these species. This means that they do not have to compete with any other predators to snack on these toxic amphibians.
- It has been shown that in female garter snakes with a larger body size results in an increase in reproductive output.
- Garter snakes, like all snakes have a forked tongue to give them a sense of direction of the chemical particles they are picking up. Snakes both taste and smell with their tongues.
- Garter snakes have no eyelids, and therefore can never close their eyes. They do have a transparent eye-cap scale that covers each eye, and is shed with the rest of their skin.
- Contrary to popular belief, snakes are not slimy, but like all reptiles, possess dry-scales covering their bodies.
- Snakes have hundreds of ribs, even more depending on their length.

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Where & When to View Common Garter Snakes

As you might have guessed spring and summer are the best times to see common garter snakes. If you happen to be in Manitoba, make sure to visit the Narcisse snake dens in the spring! Unfortunately, British Columbia does not have a similar tourist attraction, but if you are hoping to catch a glimpse of these snakes keep a sharp eye out starting in April and May.

Bibliography

Journal Resources:

Devine, M.C. 1977. Copulatory plugs, restricted mating opportunities and reproductive competition among male garter snakes. *Nature* **267**: 345-346.

Zhang, R., and Gray, P.M. 2017. The evolution arms race of garter snakes and newts. *Western Undergraduate Research Journal: Health & Natural Sciences* **8**(1): 1-3.

Web Resources:

<http://www.bcreptiles.ca/default.htm>

The Reptiles of British Columbia – A website devoted to getting reptiles some much needed attention through sharing information on British Columbia's reptile species.

<http://www.hat.bc.ca>

Habitat Acquisition Trust – A regional land trust that seeks to conserve nature on south Vancouver Island through purchasing land and helping local landowners establish legal restrictions to protect natural habitats.

<http://www.canadianherpetology.ca>

Canadian Herpetological Society – A registered Canadian charity made up of researchers, conservationists, naturalists, and educators who contribute to reptile and amphibian research in Canada with the goal of increasing conservation of these species.

<http://ibis.geog.ubc.ca/biodiversity/efauna/>

E-Fauna BC: Electronic Atlas of the Wildlife of British Columbia – This online atlas of British Columbia wildlife is part of a larger volunteer-driven project showcasing the biodiversity in our province. There is also an E-Flora website documenting the plant diversity of BC.

<http://www.psu.edu/dept/nkbiology/naturetrail/speciespages/gartersnake.htm>

Penn State University: The Virtual Nature Trail – This website is an education resource developed by Penn State University to educate the campus community and local schools on the native ecosystems and their inhabitants.

http://www.biokids.umich.edu/critters/Thamnophis_sirtalis/

University of Michigan: BioKIDS – A research group from the University of Michigan dedicated to science education in elementary and middle school classrooms in America, and particularly in Detroit Public Schools.

<http://cwf-fcf.org/en/resources/encyclopedias/fauna/amphibians-and-reptiles/common-garter-snake.html>

Canadian Wildlife Federation – A charitable organization that works to connect Canadians to nature and

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w www.northwestwildlife.com

educate on the large diversity of wildlife in the country. They also work to conserve wildlife populations and habitat in Canada.

http://animaldiversity.org/accounts/Thamnophis_sirtalis/

University of Michigan: Animal Diversity Web – An online encyclopedia run by the University of Michigan with thousands of species accounts that document the natural history, distribution, classification, and conservation of individual animals.

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