



**SPECIES
AT RISK**

The Gray Ratsnake

A Landowner's
Guide to Helping
It Recover





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Wildlife has a right to exist.

This might seem obvious, but many species are threatened by the encroachment of human settlement. They disappear slowly. And the problem is getting worse as land development accelerates. For many species it's already too late. For those under threat, we must make a conscious effort to preserve their habitats and lives.

This booklet is about one species at risk: the Gray Ratsnake (*Pantherophis spiloides*).

Big, black and beautiful

Gray Ratsnake basics

A native of Ontario, the Gray Ratsnake is nationally and provincially designated as a species at risk. The Great Lakes/St. Lawrence population (all Gray Ratsnakes in The Frontenac Axis) is listed as “Threatened” under the provincial and federal endangered species acts, while the Carolinian population (southwestern Ontario) is listed as “Endangered.”

A non-venomous constrictor that poses no threat to humans, it is one of the largest snake species in Canada, commonly about 1.2 m (4 feet) long. Although one of the few Canadian snakes that spends any appreciable time in trees, it is found most commonly on the ground or underground. Shy, it prefers not to meet up with humans. If you do meet a Gray Ratsnake, perhaps basking in the sun, you can't help but be impressed with its size and beauty.

About this booklet

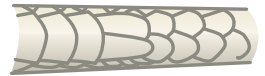
This booklet is a how-to for landowners and community groups. We explain how to identify a Gray Ratsnake, recognize its habitat and help contribute to its recovery.

You'll also learn how to:

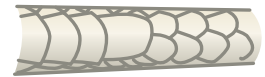
- Report observations
- Improve habitat
- Experiment with managing habitat
- Create and install snake crossing signs
- Assist with population monitoring
- Prevent traffic mortality

What does a Gray Ratsnake look like?

- **Length:** 1–1.5 m (3–5 feet); can exceed 1.8 m (6 feet)
- **Girth:** slender compared to other species of its length
- **Shape:** a flattened belly and sides; sometimes described as loaf-shaped in cross-section



Gray Ratsnake – anal plate divided



Not Gray Ratsnake – anal plate single

- **Scales:** faintly ridged; the anal scale, where the tail attaches to body on the underside, is divided
- **Colouring:** black or dark brown, often with a faint, blotched pattern or distinct diamond pattern with yellow-orange skin visible between the scales; the belly is light grey or brown, sometimes with a checkerboard pattern; the throat, chin, and upper lip are creamy white; juveniles are distinctively blotched.

What other snakes could be mistaken for the Gray Ratsnake?

Frontenac Axis Area:



Northern Watersnake



Eastern Milksnake

Carolinian Area – includes the above plus:



Melanistic (All-Black) Gartersnake



Eastern Hog-Nosed Snake



Eastern Foxsnake



Gray Ratsnakes are slender compared to other species of its length.

Although Gray Ratsnakes can swim, a large snake in the water in Ontario is more likely to be a Northern Watersnake. Watersnakes can also be found in trees, but usually only those at the edge of a body of water. Gray Ratsnakes are more likely to climb trees and enter tree cavities.



Where do Gray Ratsnakes live?

Gray Ratsnakes are widespread in the United States but found in only two areas of Ontario: the Frontenac Axis of eastern Ontario (the largest populations) and the Carolinian forests of south-western Ontario (smaller, more isolated populations).

Are Gray Ratsnakes poisonous?

No. Gray Ratsnakes have no venom. In fact, the only venomous snake in Ontario is the Eastern Massasauga Rattlesnake, another protected species, which inhabits two relatively small areas of southwestern Ontario on Lake Huron and Lake Erie. There is nowhere in Ontario that the Gray Ratsnake is known to overlap with the Eastern Massasauga Rattlesnake, however, this mimicry often leads to Gray Ratsnakes being mistaken for rattlesnakes.

Why is the Gray Ratsnake a species at risk?

Loss of habitat, traffic mortality and persecution have taken their toll on the Gray Ratsnake. Because they don't reach maturity until they are about eight years old, and females only reproduce every two to three years, even healthy populations are hard hit by the death of a few individual adult snakes. Repeated disturbance can result in the loss of an entire local population.

Gray Ratsnakes are protected by law from being hunted, captured, possessed, killed, bought or sold. The habitat of the Gray Ratsnake is protected from development and site alteration. (Refer to the back page of this pamphlet for additional sources of information.)



Gray Ratsnakes are not venomous.

The most common threats to Gray Ratsnakes on private land

- Destruction and fragmentation of habitat
- Traffic mortality
- Persecution and harassment by humans
- Harassment and predation by household pets

Living peacefully with snakes



Please do not move snakes more than 100 metres. Move them further and you risk killing them.

How do you move a snake?

It is best to let snakes move on their own time, but if a snake must be moved to keep it safe, it should never be moved more than 100 m.

If you decide it's best for the snake, you'll need a container at least three feet deep, preferably with a lid, and a long-handled broom. Tip the bin on its side and position it near the snake. Gently guide the snake into the bin with the broom, without pushing the snake, and put the lid on. At the release site let the snake slither into its new surroundings. Do not leave the snake in a covered bin.

Gray Ratsnakes can be useful

Snakes play an important role in their ecosystems by acting as both predators and prey. Many people are pleased to have Gray Ratsnakes under their porches or in trees near their home because they eat rodents. They in turn provide food for larger predators such as ospreys, foxes, and coyotes.

If you don't want the snakes near your home, you can still have the advantages if you provide alternative habitat.

Once you seal holes in your home, snakes living there will look for another place to live. Consider helping them move. The key is not to move the snakes further than 100 metres (325 feet), because their established home ranges and hibernation places are critical to survival. Release them at a safe place away from people, pets and buildings.

They are creatures of habit. They survive best in familiar areas where they know hiding places, where to hunt, where to lay their eggs and where to overwinter. Move them further and you risk killing them.

Not everyone likes snakes. If you want to discourage their presence near your home or children's play area, here are a few effective strategies:

- **Close openings around your house.** Openings under porches and walkways are prime spots. Check for openings around the top of your house because Gray Ratsnakes can climb. Points of entry can include eaves and soffits, roof vents and chimneys. By identifying and sealing openings into buildings you will also exclude rodents and bats, which can cause damage and health



Nylon garden netting entangles and kills snakes. Please avoid using it.

Five ways to reduce threats to snakes on your property

- 1. Know they won't hurt you.** Fear of snakes is common but no reason to harm them. If you know they won't hurt you, you might start looking out for their welfare.
- 2. Leave them alone and encourage others to do the same.** If you have a positive opinion about Gray Ratsnakes – and pass it along to others – the snakes are less likely to be killed through fear or ignorance.
- 3. Keep pets away.** Large dogs can kill an adult Gray Ratsnake, and both dogs and cats are capable of killing hatchlings or juveniles.
- 4. Check before mowing the lawn.** If you see snakes on your lawn, gently encourage them to leave before cutting grass. Nudge the snake with a broom while offering a clear path of escape.
- 5. Use alternatives to nylon mesh in the garden.** Nylon garden netting and silt fencing entangles and kills snakes. 2.5 cm (one-inch) mesh is the most hazardous. Rolls of netting stored in sheds can trap snakes, so store them in a sealed plastic bag. Some people use mesh fencing to deter deer. An alternative is a simple fence made of one or two strands of nylon fishing line strung about four feet off the ground. Deer become confused when they encounter the line and do not cross it.

problems. The best time to close openings is in mid- to late October, when snakes have left for the winter. Gray Ratsnakes will not stay in an attic over winter in Ontario.

- **Keep the area clear of debris.** Snakes use wood piles, compost, or leaf piles as a refuge.
- **Keep grass short.**
- **Relocate bird feeders and bird houses.** They can attract rodents that snakes feed on.



An ideal location for a nesting box – a deciduous forest edge, protected from the wind by a rock outcrop.

Interesting facts: As the forest grows and decays, ideal nesting habitat changes. A stump or log that serves as an egg-laying site might only provide the right conditions for a few years, until it decomposes too much. Even in that short time, it might be used by several females to successfully incubate hundreds of eggs – a major contribution to the local population.

Helping the Gray Ratsnake survive

Now that you know Gray Ratsnakes are harmless, beneficial and in need of protection, we hope you'll consider helping them survive. It begins by knowing more about their habits and habitats.

Gray Ratsnakes prefer mature, deciduous forest and forest edges. An individual snake might use different parts of its home range at different times of year based on stages of its life cycle.

Nesting sites: moist and crumbly

Females lay their eggs in moist and crumbly places that provide an even heat for incubation. They like rotting logs, stumps and living trees with decomposing sections. They also use piles of compost, leaves, hay, grass clippings, woodchips or woody debris. Eggs are laid in July and hatch in mid-to-late September.

Basking and shedding: sunny and dry

Like other reptiles, snakes bask in the sun in order to keep their body temperature warm. Gray Ratsnakes are especially fond of sun-exposed trees at the edge of forests. They will also use other trees (standing or fallen; living or dead), large flat rocks or rock outcrops, wood piles, open paths and roof-tops or ledges on buildings.

Hibernation sites: deep and safe

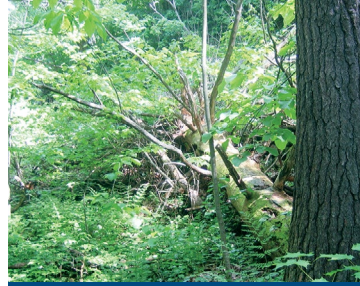
Little is known about where Gray Ratsnakes hibernate in Ontario except that they are deep within rock outcrops. The only clue that there may be a hibernaculum nearby is the presence of several snakes over a period of time in spring and fall. Please report observations of any Species at Risk, including Gray Ratsnake, to the Natural Heritage Information Center (contact info found on back page of this pamphlet). Be sure to include clear pictures with your report so that species identification can be confirmed by specialists. Hibernation sites are sensitive habitats. Their location should be kept confidential to minimize destruction or exploitation.

Thinking like a snake

If you are keen to help the Gray Ratsnake, it is useful to spend time walking around your property thinking like one.

For example, if you identify a tree used as a basking site, you might want to think about how long that tree is likely to last, and whether there is a younger tree large enough to replace it when it falls or degrades. Likewise, large, flat rocks can be kept free of debris and overgrowth.

You can assess how well you are doing by monitoring the habitat over time. Map out the potential basking, nesting and retreat sites, then do so again every five years to see if the number has increased, decreased or remained the same.



Allow unused parts of your property to revert to a natural state.

Snake-assistance tips

- Keep brush piles rather than burning them.
- Do not remove large hollow snags, stumps or rotting logs, especially if they are near the edge of a forest, clearing or wetland.
- Avoid removing trees with cavities (these are used by a variety of wildlife).
- If you must move a fallen log or cut down a tree which is in danger of falling, move the log to a nearby edge area away from human activity. If necessary, wait until late fall or winter to remove fallen logs or hollow trees.
- If you suspect your compost pile may be being used as a nesting site, avoid disturbing the pile between July and October to keep eggs safe. If possible, avoid adding new material that could attract predators, such as food scraps, and only add material to the sides of the pile (not the top).



As they die, large trees can become basking or retreat sites.

Prime snake real estate

Rock piles: good for basking and shelter.

Brush piles: provide cover for snakes and small rodents they eat.

Large limbs, stumps and logs: good for basking, shelter or even to lay eggs.

Flat boards: reptiles and amphibians like to hide under flat boards close to natural areas and food sources.

Compost piles: garden compost piles of the right consistency and temperature might attract nesting snakes if not turned between mid-June and late September.

How to create and restore habitat

Natural Forests

The forest usually takes care of itself. Most of the habitat elements required by Gray Ratsnakes will be naturally restored or created over time by natural processes. Clearings can be caused by beaver activity or wind storms. As forests age, large mature trees provide habitat for both Gray Ratsnakes and prey species. As they die, these large trees can become basking or retreat sites. Later still, rotting logs and stumps provide ideal nesting sites. You can contribute simply by allowing your forested areas to remain undisturbed.

Rural Gardens

If you live close to a forest in Gray Ratsnake country, making your garden or yard “snake-friendly” is easy. You can create shelter, cover, or try to attract other wildlife to your garden that will be a reliable food source for snakes, including the Gray Ratsnake.

How to build a nesting box

Since 2005, the Leeds-Grenville Stewardship Council has been designing, building and installing Gray Ratsnake nesting boxes. The goal is to increase nesting sites, while collecting information on nesting materials and temperatures required for successful hatching of eggs.

Habitat creation methods change as we learn more. **Before building a nest box, we recommend you contact a member of the Leeds-Grenville Stewardship Council to ensure that you have the most recent instructions (see back cover).**

Boxes should be placed where snakes have been seen. Inside each box, a mix of leaves, woodchips and hay is used to imitate the natural conditions.

The boxes are cubes constructed from white cedar, 4 x 4 ft. on each side, completely covered by heavy gauge wire mesh with openings between 1 x 2 in. and 2 x 4 in. Openings of this size keep out larger predators of Gray Ratsnake eggs (skunks and raccoons). Two sides of the box (the front and lid) are removable, so nesting materials can be added easily then removed at the end of the season.

Assemble two sections four feet square. Fastened together with 2x2s to form a cube. Pre-drill holes and fasten all parts with 3-inch deck screws.

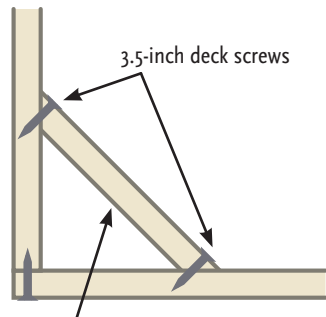


Erecting a nest box behind a barn.

Materials list:

24 feet	4-foot-wide welded 16-gauge wire with small openings (see above)
10	2 x 2 in. by 8 feet white cedar lumber (or 2 x 4 in. ripped into 2 x 2s)
1–2 lbs	3½ in. deck screws and screwdriver
1–2 lbs	7⁄8 to 1 in. fence staples and a hammer or appropriate staples and an air-powered stapler

Corner of box



2 x 2 x 10-inch brace. Ends cut on 45° angles.



Carefully checking a nest box for eggs.

Brace corners with 10-inch pieces cut on 45° angles (see diagram at right). The back, bottom and two sides are covered with the 14- to 18-gauge wire.

Two more sections four feet square are needed to form the removable front and top. It is not necessary to brace the inside corners of these two sections. They are also covered with heavy gauge wire.

Once the box is in place and is filled with nest material, the front and top are pre-drilled and fastened with deck screws.

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Location: follow the food

Set up the box in May or June. An ideal location is somewhat sheltered, either in the forest or near a forest edge. If possible, boxes should be placed where Gray Ratsnakes have been observed or are likely to be found. Gray Ratsnakes feed on rodents, so nesting locations near barns, sheds and cottages are most likely to be successful. Also consider the accessibility of the site. You'll want to monitor the box occasionally.

Fill: not too tight

You will need a well-mixed blend of leaves, woodchips and hay (but no food scraps that might attract predators) – enough to fill the box to at least three-quarter level. The fill should be loose enough for female Gray Ratsnakes to enter, and the hatchlings to exit. Secure the top of the box. The contents will settle over the summer. Avoid adding more fill. Be observant for activity of adult snakes around your box.

Season's end: egg evidence

The following spring (late May to June), well after the eggs will have hatched, empty the box to look for eggshells. Carefully sift through the contents with gloved hands (pitchforks and shovels can damage eggs from other snakes), and refill the box after inspection.

Gray Ratsnake eggshells are soft and

pliable, not hard like a chicken egg. They are oval and elongated – about 5 cm by 2.5 cm (2 inches by 1 inch). If you find evidence of eggshells, count how many eggs hatched and report this information to your local stewardship group or MECP contact.

If you find unhatched eggs, contact your local MECP office. It may be possible for a specialist to incubate the eggs, but permits are required.

You might not find eggs in your nest box. Nesting success in Gray Ratsnake nest boxes is lower than for other wildlife structures such as Osprey platforms. The Leeds Grenville Stewardship nesting box project has had relatively good success over time. Monitoring results show that between 2009 and 2017 our nest boxes successfully hatched 1,250 Gray Ratsnake hatchlings.



Potential breeding success will increase as more landowners participate.

Potential breeding success will increase as more landowners participate. We also learn through reports of successful and unsuccessful attempts. Furthermore, other at-risk snakes could use the nests, including Eastern Hog-Nosed Snakes and Eastern Foxsnakes (see page 4 for photos).

Doing it right is important

Artificial snake habitats are experimental. There is still some risk to the snakes if the habitat does not have all the necessary characteristics. For example, an artificial nesting site that gets too hot can kill eggs. Likewise, one that doesn't produce sufficient heat will result in unhatched eggs that waste the precious reproduction potential of adult females that may not nest every year. A site that floods or is not sufficiently protected from cold could also kill the snakes that use it.



Gray Ratsnake eggshells are soft and pliable, not hard like a chicken egg.

Long-term protection



Children benefit from seeing a snake close up.

Spreading the word

It takes only one or two motivated people to start local stewardship activities. If you like the idea of helping Gray Ratsnakes in your community, begin by educating yourself and then talking to neighbours. Contact the Stewardship Council, conservation authority, or naturalist club in your county. There might be existing programs.

It's also helpful if there are other people in the neighbourhood who are comfortable with snakes and willing to help with stewardship

activities and promoting learning about snakes. Children in particular often benefit from seeing a snake close up, while learning about snakes and the reasons we want to protect them. Visitor centers at National and Provincial Parks, and zoos accredited by the Canadian Association of Zoos and Aquariums (CAZA) are examples of places where it may be possible to observe live snakes.

When talking with friends and neighbours about snakes, it is important to respect people's fear. It is possible to dislike or be afraid of snakes yet respect their right to live and reproduce. Go reptile watching with friends on a sunny day. Take pictures on your phone and report your sightings with citizen science apps such as iNaturalist and Ontario Nature's Ontario Reptile & Amphibian Atlas.



You may wish to specify that a certain number of trees of a certain size be maintained.

More information

In addition to this booklet, the MNRF has developed a pamphlet titled *Live and Let Slither*, various classroom materials and a slide presentation that can be delivered to landowner groups in a workshop.

The Friends of Murphy's Point Provincial Park have produced a 20-minute DVD titled *Gray Ratsnake Conservation in Ontario*. It is available in many libraries within the Gray Ratsnake range, or can be borrowed free of charge by contacting the park directly (613-267-5060). Copies can also be purchased.

Refer to the back page of this booklet for additional sources of information.

A snake tale

"When we moved to this house on 2½ acres, we became aware of the astounding amount of deer that were very interested in our start-up garden. They decimated many plants. I shielded these plants against their voracious appetites with black netting, with ¼-inch holes – almost invisible. That first summer I smelled death and found two huge black snakes in a deadly embrace, entangled in the netting (see page 7). We had no idea what they were, but I felt very bad about the way they died. We try to convince the new neighbours that all the snakes here are harmless and useful."

– Anneke Berkman

Snakes on the road: reducing traffic mortality

Removing snakes from the road

Always remember, safety first! Stop only if it is safe to do so. Take pictures, record the location and report your findings to the Ontario Natural Heritage Information Centre, iNaturalist or the Ontario Reptile and Amphibian Atlas.

“It is surprising the number of snakes that can be saved on the roads in rural areas. The best method is to stop safely and approach the snake from behind. Walking behind it will generally move it along. If not, a stick (end rounded) can be used to gently lift it to the side of the road in the direction it is traveling. Or you may just pick it up very gently and remove to the roadside. I have been using this method for many years and have encouraged all the residents in my community to do the same.”

– Perth, Ontario resident

Traffic mortality is a serious problem for many species, particularly amphibians and reptiles. Adult females with eggs are frequent victims, potentially leading to local population declines. The mortality of only three females per year may raise the probability of local population extinction above 90 percent within 500 years.

Snakes seem to be attracted to paved roads but are also seen on dirt and gravel roads. Gray Ratsnakes can be seen on roads any time from early May to the end of September, but are most commonly seen in June and July.

How to reduce traffic mortality

Slow down in snake country. Adult Gray Ratsnakes are easy to mistake for branches or cracks in the road but can usually be avoided.

Note where you see snakes. Gray Ratsnakes may be more common on some stretches of road than others, particularly if there is a hibernation site nearby. Mention to friends and neighbours if you see snakes frequently along a certain stretch of road. You could also consider asking your township or county if a snake crossing sign can be erected (see opposite).

Avoid paving roads in snake country. Roads in Gray Ratsnake habitat should be left as dirt or gravel where possible rather than being “upgraded” to pavement. This reduces their attractiveness as basking sites for snakes and results in slower traffic.

Move snakes off the road. Only move snakes if it is safe to do so. See sidebar.

Erecting snake- crossing signs



Above is the recommended sign to alert drivers to snakes.

Snake crossing signs are an excellent way to alert drivers to the presence of Gray Ratsnakes. Several Ontario provincial parks have them.

Pick a location where snakes have been seen (or run over) repeatedly for several years. Do not install signs on four-lane highways. It is too dangerous.

- Determine who is responsible for the road. On public roads, you will need to prepare a proposal and receive permission from the county or municipal authority. It is a good idea to prepare a budget to cover the expense of signs, tabs, posts, installation and extra signs in case of loss or vandalism.
- Once permission is granted, check with the county or municipality to determine the type of post they prefer for installation. Some require a 12-foot post, while others may request a 10-foot post slid into a 5-foot, in-ground post for easier maintenance. Ask if the county or municipality will install it for you. Otherwise, hire a company that is insured for such work.
- The sign should be installed 150 metres (495 feet) in advance of the crossing area. Before finalizing the location, check with local hydro, phone, gas and cable companies to ensure you will not damage anything below ground.
- Use a standard diamond-shaped, 24 x 24-inch highway sign in yellow and black with a fluorescent background. Decide whether a tab indicating the length of the crossing area (next 2, 3 or 4 km) is necessary.
- Once the sign is installed, you may want to hold an unveiling ceremony and invite relevant officials and the press. This will help to publicize the issue and ensure that local motorists understand why the sign is there.

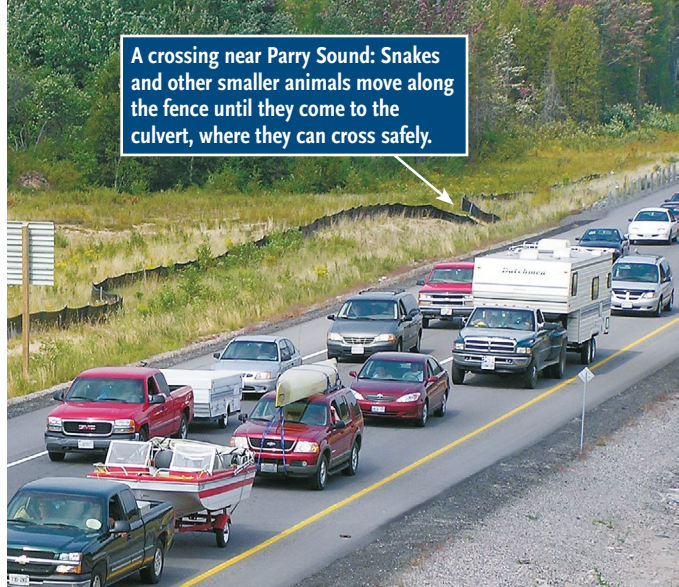


A Gray Ratsnake after a deadly encounter with an automobile.

Mitigating road mortality

If you are concerned about road mortality, you can learn more about potential mitigation measures and petition local decision makers to implement them.

For more information regarding methods for mitigating road mortality, the Government of Ontario has developed the Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario, available online at bit.do/roadmortality.



A crossing near Parry Sound: Snakes and other smaller animals move along the fence until they come to the culvert, where they can cross safely.

One step better: structural changes

Although posting snake crossing signs helps to educate drivers, it is unclear whether it actually reduces mortality of snakes on roads. More direct methods such as fencing and structural changes to roads are likely to be more successful, although they are significantly more expensive.

These techniques are still experimental and need to be engineered specifically to a location and species. But if there are very high numbers of snakes being killed in a particular area, it is worth discussing the problem with the county or municipality and your local Ontario Ministry of Environment, Conservation and Parks office.

Techniques that have been tried with other species include:

- Fencing to keep snakes off the road in combination with providing new habitat on one side of the road.
- Using fences to channel snakes into a culvert or underpass.
- Posting reduced speed limits in the area.



Clear photos are helpful in confirming observations of rare species.

Reporting what you see

Landowners and others can help the Recovery Team determine the distribution of Gray Ratsnakes by reporting sightings to their local Ministry of Natural Resources and Forestry office. Please document exactly where and when you saw the snake, and if possible submit clear digital photos, which are very helpful in confirming observations of rare species.

Helping scientists monitor the Gray Ratsnake

You may be able to help scientists monitor the Gray Ratsnake and other reptiles and amphibians. In some areas of the province, there may also be opportunities to support and assist scientists and Park and Ministry staff with more intensive monitoring. Volunteers and student staff with the Friends of Murphy's Point Park raise funds for PIT tagging (inserting an electronic chip in snakes to identify them) and educational programming through an adopt-a-snake program.



Researchers measure a Gray Ratsnake

For further information, please contact:

- **Leeds-Grenville Stewardship Council**
lgstewardship.ca
lgstewardship@gmail.com
- **Ministry of Environment, Conservation and Parks**
1-800-461-6290
ontario.ca/page/
ministry-environment-conservation-parks
- **Thousand Islands National Park**
613-923-5261 · Toll-free: 1-888-773-8888
ont-ti@pc.gc.ca
- **Conservation Authorities**
905-895-0716
conservation-ontario.on.ca
- **Land Trusts**
416-588-6582
ontariolandtrustalliance.org
- **Nature Conservancy of Canada**
416-932-3202
natureconservancy.ca

The Governments of Canada and Ontario post recovery documents, assessments, and information on recovery actions for species at risk online.

- **Government of Canada**
canada.ca/en/services/
environment/wildlife-plants-species/
species-risk.html
- **Government of Ontario**
ontario.ca/page/species-risk

Reporting Observations

- **Ontario Natural Heritage Information Centre**
ontario.ca/page/report-rare-species-animals-and-plants#section-1
- **iNaturalist**
inaturalist.ca and inaturalist.ca/projects/
nhic-rare-species-of-ontario
- **Ontario Reptile and Amphibian Atlas**
ontarionature.org/oraa/app/

Project supervisors:

Martin Streit and Glenn Desy, Ontario Ministry of Natural Resources and Forestry

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Text compilation and editing:

Jane Devlin, Paula Norlock, Holly Bickerton and Tony Leighton

Graphic design: Gareth Lind, linddesign.ca

Scientific editors:

Members of the former Gray Ratsnake Recovery Team, in particular Gabriel Blouin-Demers, Shaun Thompson and Anne Yagi

Parks Canada Editors:

Josh Van Wieren, Noah Johnson and Mary Beth Lynch

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Parks
Canada

Parcs
Canada



Ontario