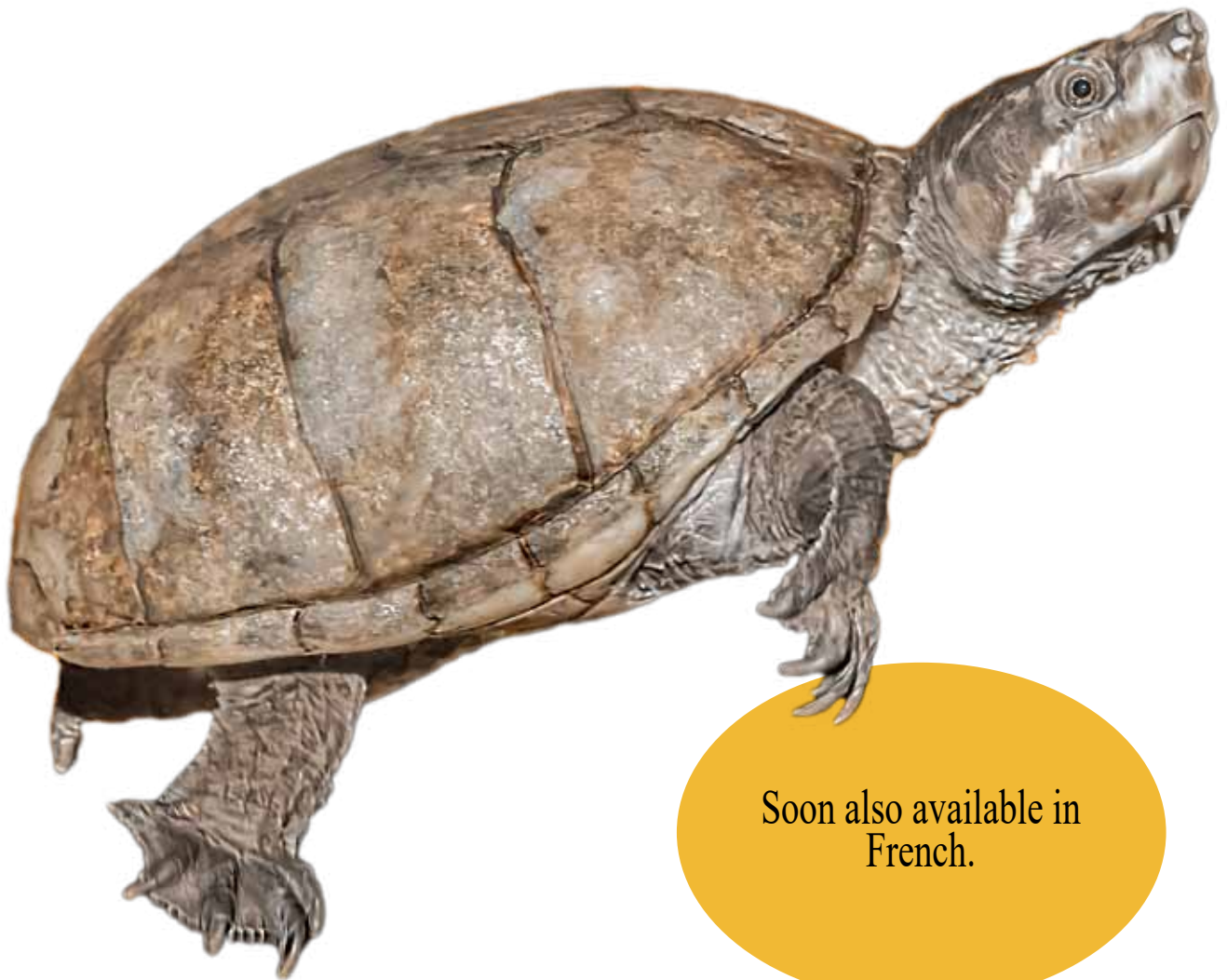


FRESHWATER TURTLES OF CANADA



Soon also available in
French.

For a better world.



It took many years to make this book. Guillaume has changed during this time. Here he is with his mother in 2022.

Unless otherwise indicated, all photos in this book were taken by Marc DeBlois, Julie Boudreault, Guillaume DeBlois and Grégoire DeBlois.

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THE AUTHORS

GUILLAUME AND HIS MOTHER

One day, Guillaume learned that the turtles in Québec were in danger and not many people even knew of their existence. With this knowledge, he decided to write a book to raise awareness and educate others about their precarious situation.

Guillaume was only six years old when he had this idea! You can imagine that his writing skills were not perfect at that age. However, it did not discourage him. Guillaume turned to Julie, his mother, to ask for help in carrying out his project. This partnership resulted in publishing their first book, entitled *Les tortues du Québec* (*Québec's Turtle*) in French.



Guillaume and his mother in 2015.

THE SUCCESS OF THE FIRST BOOK

Guillaume sent his manuscript to Dr David Suzuki, a famous environmentalist. Dr Suzuki decided to help him by writing the back cover of *Les tortues du Québec*. He also invited Guillaume to speak in front of 1200 young people during the Blue Dot Tour to motivate the audience to do their part for the environment.

A few months later, Julie Grignon, Acting Assistant Deputy Minister at Québec's Forests, Wildlife and Parks, discussed the book *Les tortues du Québec* during the 55th Science Environment Forum. Guillaume was invited to this forum which celebrated the 25th anniversary of Québec's Act respecting threatened or vulnerable species. Five hundred professionals were present. Awesome, don't you think?



Guillaume and David Suzuki in 2014.

Rafale, an online youth spokesperson for the Government of Quebec, encourages children and adults to read *Les tortues de Québec*.



© Martin Lipman/Canadian Museum of Nature

Guillaume, circled in red, among other finalists and winners of the 2015 Nature Inspiration Awards.

NATURE INSPIRATION AWARDS

Guillaume was a youth category finalist at the Nature Inspiration Awards in 2015. This national award is presented by the Canadian Museum of Nature in Ottawa. Guillaume did not win the award; however, he came back proud of his participation in the Gala event. He met many accomplished environmentalists who encouraged him

to continue writing. They spoke to him of the importance of his awareness and education work.

With all of this support and encouragement, Guillaume chose to start working on a new book, this time on all of the freshwater turtles in Canada. Since he loved his work experience with his mother, he decided to take on this new fantastic adventure with her.



Guillaume Daigle presenting Guillaume with the Wetland Hero Award.

WETLAND HERO

Guillaume was named a Wetland Hero by Ducks Unlimited Canada in 2016 and received a grant to continue his research.



Guillaume at work.



SECTION ONE: GENERAL INFORMATION

BASIC CONCEPTS

This section provides some basic terminology on freshwater turtle biology. It will give you a better understanding of the words used in the book, and increase your knowledge.

-Freshwater turtles are REPTILES just like snakes, crocodiles and lizards. What distinguishes them from the other reptiles is their SHELL which serves as a protective shield. A turtle's shell is made of two parts: a CARAPACE (top) and a PLASTRON (bottom).

-Freshwater turtles are OVIPAROUS meaning that they lay eggs. However, they do not incubate them as chickens do. Instead, turtles dig their nest in appropriate substrate (typically a mixture of sand, soil, and/or gravel), lay their eggs in the



© Suzanne Fisette, MELCC

Freshwater turtles are oviparous.

hole, and cover them up. The sun incubates the eggs until the end of the summer or into the fall, depending on the species of turtle. Adult turtles in Canada do not return to the nest to protect the eggs nor do they protect the hatchlings when they emerge.

-Turtles often return to the same nesting site each year, though not always. Depending on nest site conditions and other environmental factors, turtles may choose a different site to nest in a given year.

-Freshwater turtles are ECTOTHERMIC, meaning that they warm up or cool down based on their surrounding environment (i.e., they need an external heat source such as the sun to regulate their internal temperature). You will have a better chance of finding turtles in the spring and summer when they bask in the sunlight on rocks or tree stumps that emerge from the water.

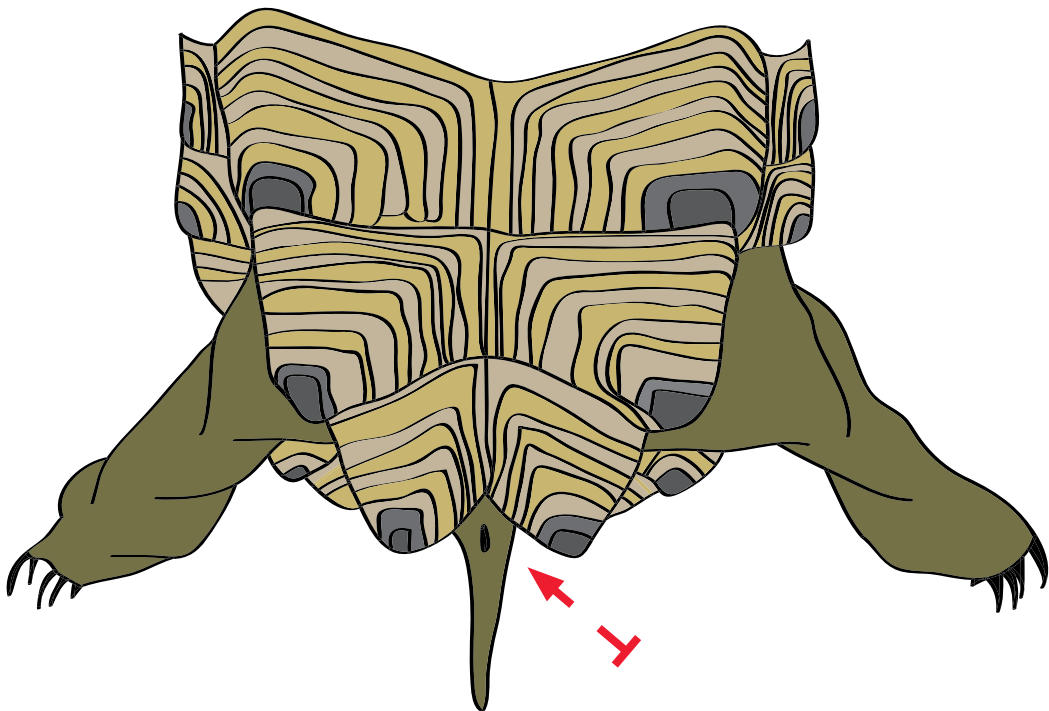


Painted turtle sunbathing in the parc national de Plaisance.



-Freshwater turtles HIBERNATE (though the word BRUMATE is a more appropriate word) in the winter. As temperatures decrease, turtles move to appropriate areas in order to survive the winter. Some will burrow into the mud in wetlands, while others do not burrow at all, staying on top of the substrate while still submerged under water. During the winter, a turtle's metabolism is much slower and the animal must significantly reduce its movements. During that cold period, they can obtain oxygen from the water by breathing through their skin, mouth or cloaca without surfacing for air. Cloaca is their butt! Aha!

Only very rarely have Canada's freshwater turtles been found to hibernate on land. There is one turtle, however, that will spend its winter on land: the Eastern Box Turtle. Unfortunately, native box turtles are now extirpated from Canada, with the exception of a few released/escaped pets.



During the winter, turtles can breathe out of their butt! How cool! Talk about bad breath...

-Most freshwater turtles are OMNIVOROUS meaning that they eat both meat and plants, although species such as Spiny Softshell and Northern Map Turtle are primarily CARNIVOROUS (meat-eaters). Here is an example of a typical diet.

Freshwater turtle menu		
Mushrooms	Leaves	Aquatic plants
Insects	Tadpoles	Worms
Dead animals	Fish and crawfish	Flowers
Molluscs	Snails	Berries



GETTING TO KNOW THE ANATOMY OF A TURTLE

You will not see their ears. They are internal, i.e., underneath the skin.



Plastron

The turtle's shell has two parts: the carapace (upper shell) to protect the back of the turtle and the plastron (lower shell) to protect its belly.



Turtles do not have teeth. However, they have powerful bony jaws. Watch out!

Clawed feet.

The male turtle's tail is larger and longer than the female turtle's. It is one of the ways to distinguish the sexes.



Eastern Painted Turtle in its natural habitat.



WHERE TO SEE TURTLES?

Freshwater turtles are found in the southern parts of provinces from British Columbia to Nova Scotia. Their natural habitat includes water bodies such as lakes, rivers, bogs, fens, ponds, and swamps. They may also use riparian zones (areas along streams and rivers) and even clearings, such as fields, which allow turtles to move from one area to another during the active season.



If you go looking for turtles, look particularly in calm bays, ponds, slow flowing rivers or in marsh habitat. Sunny days in May are the best times to see turtles basking, though some species will bask throughout the

entire active season, using logs, open shorelines and rocks to haul up on.

Did you know that 25% of all the wetlands on the planet are found in Canada?



Guillaume searches for Musk Turtles in Thousand Islands National Park.



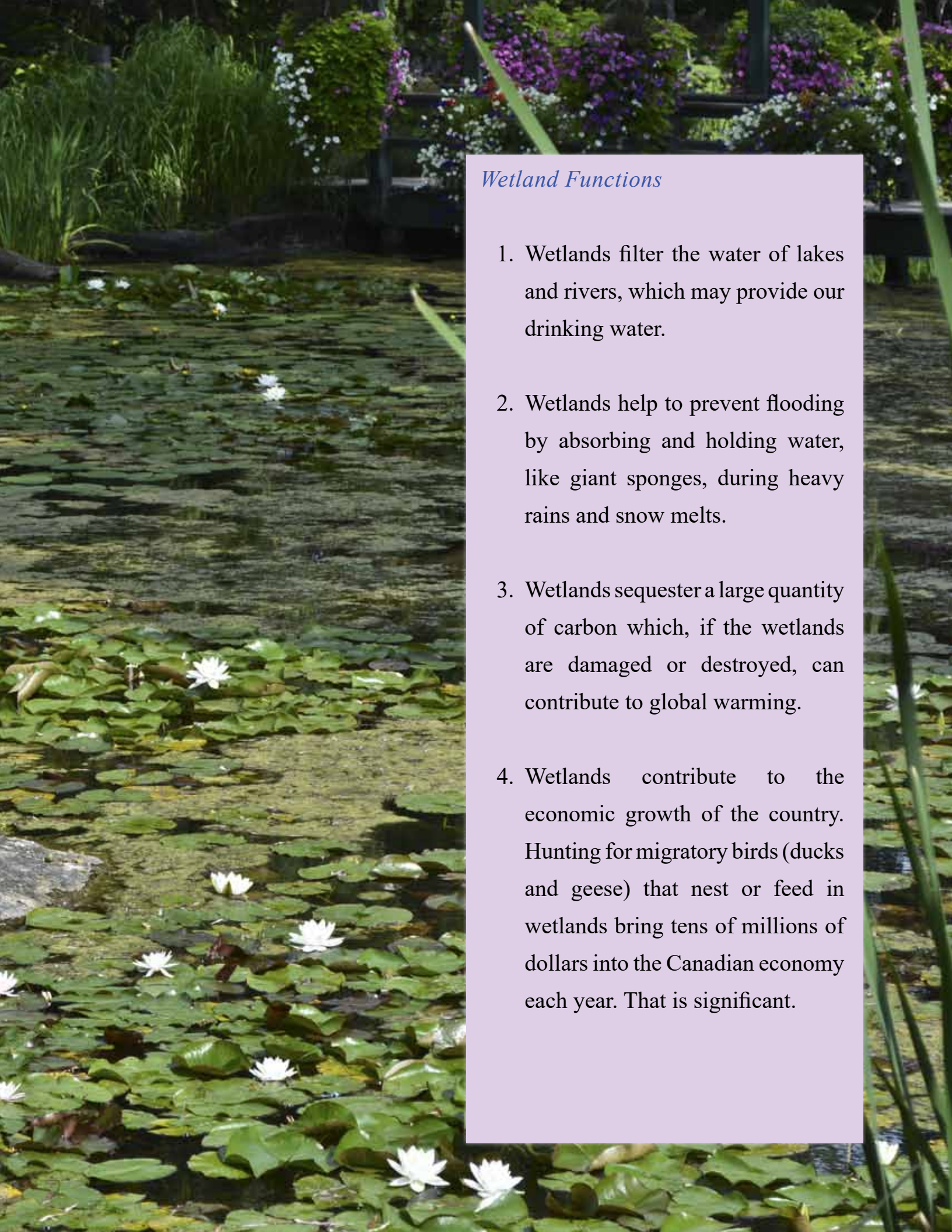
A photograph of a wetland area. In the foreground, there are several tall, green grasses. The middle ground is dominated by a pond or stream filled with water lilies, including large green leaves and several white flowers. The background is filled with dense green vegetation and trees, creating a lush, natural setting.

Praise for wetlands

Unfortunately, it is estimated that 75% of Canadian wetlands have disappeared, become degraded, or have been fragmented as a result of human activities since European Settlement. Human beings, usually without being malicious, have destroyed wetlands to create agricultural land, or build houses, industries, shops and roads.

Many people mistakenly think that wetlands have no value. Guillaume's mother even admits that she long thought that wetlands were only mud reservoirs or incubators for bloodthirsty mosquitoes!

It's really sad because wetlands are crucial for the survival of a third of the endangered species in Canada. We must protect them for the future of those species but also for us, human beings.



Wetland Functions

1. Wetlands filter the water of lakes and rivers, which may provide our drinking water.
2. Wetlands help to prevent flooding by absorbing and holding water, like giant sponges, during heavy rains and snow melts.
3. Wetlands sequester a large quantity of carbon which, if the wetlands are damaged or destroyed, can contribute to global warming.
4. Wetlands contribute to the economic growth of the country. Hunting for migratory birds (ducks and geese) that nest or feed in wetlands bring tens of millions of dollars into the Canadian economy each year. That is significant.

ZOOS, AQUARIUMS AND PARKS

In Canada, you can observe turtles in zoos, aquariums and in municipal, provincial and national parks. You will likely find a place to see them near your home, whether they are in their natural environment, or at an educational facility.

Above all, don't be discouraged when looking for them in their natural habitat. Turtles are rare and precious. They do not occur everywhere and can be hard to find. To help you in your search, you will find on the next page a table of parks and historic sites managed by Parks Canada, along with a list of the turtle species that have been observed there. The table is not exhaustive but it provides a good overview of where you can find the turtles in the different Canadian provinces.

Parks Canada is one of many government and private organizations responsible for the protection and recovery of endangered species, including turtles, living within their properties. Do not hesitate to talk to the biologists working in the parks. They will be able to tell you about the turtles that live there and may give you hints on where you might be able to see them.

Observers must be respectful of the animals since too much **DISTURBANCE** can cause the turtles to abandon an area or prevent them from feeding. If you find a Threatened or Endangered species, do not post the location publicly, since there are some people that collect these animals from the wild to sell as pets.



Turtle species in some sites managed by Parks Canada

Province	Turtle species	Snapping	Spiny Softshell	Spotted	Musk	Blanding's	Painted	Map	Western Pond	Wood	Eastern Box		
	Areas administered by Parks Canada												
N.S.	Kejimikujik National Park	X		Due to their rarity, and collection for the pet trade, we are not providing location information for Spotted Turtles.		X	X			Due to their rarity, and collection for the pet trade, we are not providing location information for Wood Turtles.			
N.B.	Kouchibouguac National Park	X											
Qc.	Fort Lennox National Historic Site	X	X					X					
	La Mauricie National Park	X						X					
	Lachine Canal National Historic Site							X					
	Chambly Canal National Site	X						X					
	Carillon Canal National Historic Site	X						X					
	Sainte-Anne-de-Bellevue Canal National Historic Site								X				
	Saint-Ours Canal Historic Site	X							X				
Ont.	Fathom Five National Marine Park						X						
	Bruce Peninsula National Park	X											
	Fort George National Historic Site	X						X					
	Fort St. Joseph National Historic Site							X					
	Georgian Bay Islands National Park	X				X	X	X	X				
	Point Pelee National Park	X	X			X	X	X	X				
	Pukaskwa National Park	X				X	X	X	X				
	Thousand Islands National Park	X				X	X	X	X				
	Trent-Severn Waterway National Historic Site	X				X	X	X	X				
	Rideau Canal National Historic Site	X				X	X	X	X				
Rouge National Urban Park	X				X	X	X	X					
Man.	Linear Mounds National Historic Site						X						
	Riding Mountain National Park	X					X						
Sask.	Grasslands National Park						X						
B.C.	Gulf Islands National Park Reserve						X						



WHAT THREATENS CANADA'S TURTLES?

Freshwater turtles in Canada face a lot of dangers. Here are some of them:

1. Urbanization

Urbanization poses a great threat to freshwater turtles as humans have destroyed and eliminated wetlands by building infrastructure over them.

Streets and highways have been developed to get us from one place to another. For turtles, this maze of lanes is a real challenge. Turtles are often unable to bypass roads and they don't understand waiting for a light to turn green! Imagine the risks that they encounter when they cross a road to move from one stream to the other or travel to a nesting site.

Year after year, adult females usually nest in the same general location as previous years. If they cannot find their usual nesting site, they sometimes lay their eggs on the side of the road. Other threats to turtles during the nesting period include vehicles hitting adult females, vehicles driving over and crushing nests, and road mortality and predation of hatchlings. A turtle's life is not easy!

2. Pollution

Turtles need good water quality. They may have difficulty surviving where there is pollution. They sometimes fall gravely ill. Some scientists have found plastic debris in the stomach of dead turtles. Think about the impact of your garbage, please don't litter. Thanks.



3. *Illegal capture*

Do not try to capture our indigenous turtles and bring them home. All Canadian turtle species are now listed in the Species at Risk Public Registry. The collection of any animal on this list is prohibited.

4. *Recreational activities*

When people participate in recreational water activities, they sometimes harm the turtles. For example, boat propellers can inflict injuries to the turtles. Fishermen can also catch turtles by accident. Fish hooks, even those that dissolve, must carefully be removed before the turtle can be released.

5. *Natural predators*

The natural predators of the freshwater turtles in Canada include racoons, black bears, coyotes, red foxes, bald eagles, herons, gulls, skunks, muskrats, river otters, bullfrogs, American mink, Virginia opossum, and even dogs and cats. These predators mainly eat the eggs and the young.

6. *Illnesses*

Some illnesses come from pollution. For example, after being exposed to chemicals, shell rot sometimes develops on the carapace of turtles.

Some natural predators



Raccoon



Muskrat



Black Bear



Bald Eagle



Dog



THE SPECIES AT RISK ACT

Many Acts protect freshwater turtles in Canada. For example, the federal Species at Risk Act prohibits the killing of animals listed as an EXTIRPATED, ENDANGERED or THREATENED. It is also illegal to harm, harass, possess, sell or buy them, and even to just take them in your hands. Many provinces have their own legislation as well.

Did you notice in the book that Guillaume sometimes holds a turtle in his hands? Guillaume learned proper handling techniques and received permission from the biologists and specialists with proper permits. Handling was done only in the context of awareness and education that this book provides. Do not handle turtles without a very good reason, such as helping them cross the road. It is the right thing to do.



WHY PROTECT TURTLES?

It is important to understand that, depending on the species, turtles take eight to 20 years to reach their SEXUAL MATURITY and that only a small number of the young turtles will reach that age. A small increase in the mortality rate of the adults can bring a species to EXTINCTION.

All the species have a role to play in nature. Every time one of them disappears, the ecosystem's BALANCE is weakened.

The protection of turtles is INSEPARABLE from the preservation of wetlands and riparian buffers where a wide variety of plants and animals live and DEPEND on one another. So, we must be careful.

WHAT CAN YOU DO TO HELP?

1. Keep your distance

Because turtles are shy, using binoculars or a camera with a good zoom will allow you to observe them for longer.

2. Pick up your trash

Do not throw anything away, wherever you are. It is a good habit to have. Plastic waste has been found in the stomachs of turtles who mistook it for food.

3. Respect the signs

If you decide to start searching for turtles, you will likely see road signs indicating their presence in some areas. Make sure the driver of your vehicle sees the signs to prevent road mortality.

4. Report your observations

There are organizations in each province that collect information on turtles for research purposes. You can help by sharing your observations with them. Information that is most



helpful includes: the date, location (GPS coordinate, address, or map), photograph if possible, and the name of the species you identified. If you are able to share even more data such as the weather, their behaviour, type of wetland, and anything unique to the location, the better. You can never have too much data.

Here are some web sites or email addresses of organisations that collect the data.

British Columbia	Electronic Atlas of the Wildlife of British Columbia ibis.geog.ubc.ca/biodiversity/efauna/
Alberta	Alberta Volunteer Amphibian Monitoring Program www.ab-conservation.com/avamp
Saskatchewan	Saskatchewan Conservation Data Centre www.biodiversity.sk.ca/OnlineRep.htm
Manitoba	The Manitoba Herps Atlas www.naturenorth.com/Herps/Manitoba_Herps_Atlas.html
Ontario	Ontario Reptile and Amphibian Atlas Program www.ontarionature.org/programs/community-science/reptile-amphibian-atlas/ Government of Ontario www.ontario.ca/page/report-rare-species-animals-and-plants
Québec	Atlas des Amphibiens et des Reptiles du Québec www.atlasamphibiensreptiles.qc.ca/wp/ Carapace Project www.carapace.ca
New Brunswick	New Brunswick Museum nbm-mnb@nbm-mnb.ca
Nova Scotia	Nova Scotia's Species at Risk www.new.speciesatrisk.ca/?q=node/add/sighting
Canada	Canadian Wildlife Federation www.inaturalist.ca



SECTION TWO:
CANADA'S TURTLE SPECIES





WOOD TURTLE



The Wood Turtle is found in Ontario, New Brunswick, Nova Scotia and Québec. Once widespread in Canada, it is now listed as a **THREATENED** species in Canada. Denis Masse, a biologist in La Mauricie National Park, invited Guillaume to visit one of their most important nesting

sites. Very generous with his time and information, Mr Masse took the opportunity to talk to Guillaume about the **MEASURES** being undertaken to protect this species. Here is a short photo report from their discussion.

A TOP SECRET SITE

In La Mauricie, a region in Québec, people are very concerned about the fate of Wood Turtles. There is a simple reason for that: a precious nesting site is the subject of very special protection measures. Its exact location is kept TOP SECRET because of the threat of illegal collection. It is not a laughing matter. Fences have been put up to prevent people from approaching and walking across the site.



The nest site is only known and accessible to those monitoring the turtles. Guillaume was a very fortunate guest and will never tell where this site is located.



REPRODUCTION

Female Wood Turtles reach their adult size around the age of 14. It is only at that age that she becomes able to reproduce. She may travel up to five kilometers to lay her eggs, in late May or early June, on a sandy or gravelly site.

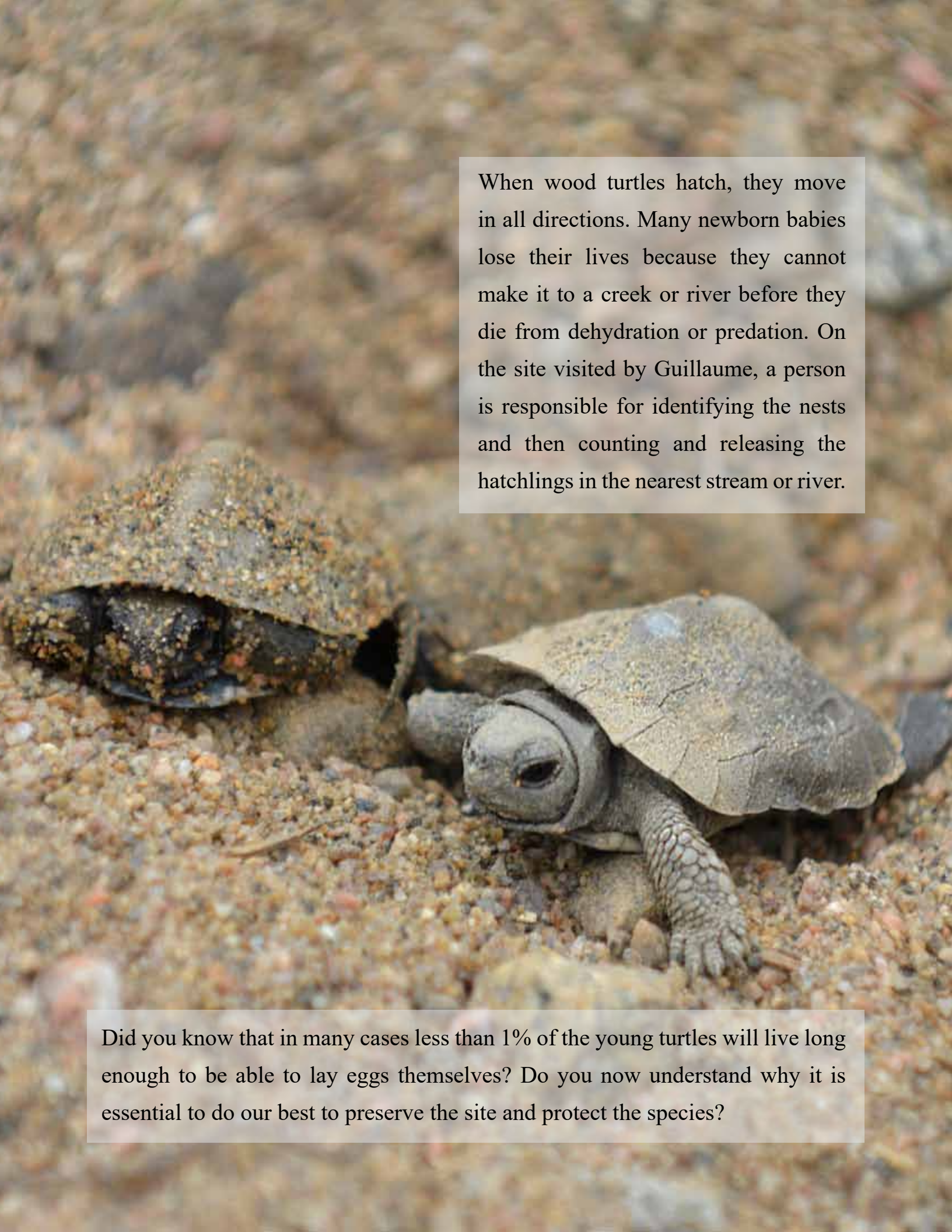
She may come back to the same site many times to dig test holes. She seems to be searching for the ideal conditions for the incubation of her

eggs. This exploration can take many days.

When she is ready, the female will lay one to 18 eggs. After laying her clutch of eggs, she may come back again to the site to dig other holes; however, she will not lay a second clutch of eggs. Biologists are trying to understand this unusual behavior. Would she do that to fool the predators who seek to plunder the nest?



The incubation period for Wood Turtle eggs is approximately 60 to 90 days depending on environmental conditions. This could mean that they may hatch a couple weeks sooner or later. To protect nests from predators, Guillaume installed a cage with a metal mesh over a nest that was previously IDENTIFIED with an orange ribbon.

A close-up photograph of two young wood turtles on a sandy beach. The turtle in the foreground is facing left, with its head and front legs visible. Its shell is a mottled brown and grey color, covered in sand. The turtle in the background is partially obscured and also facing left. The background is a blurred expanse of sand and small pebbles.

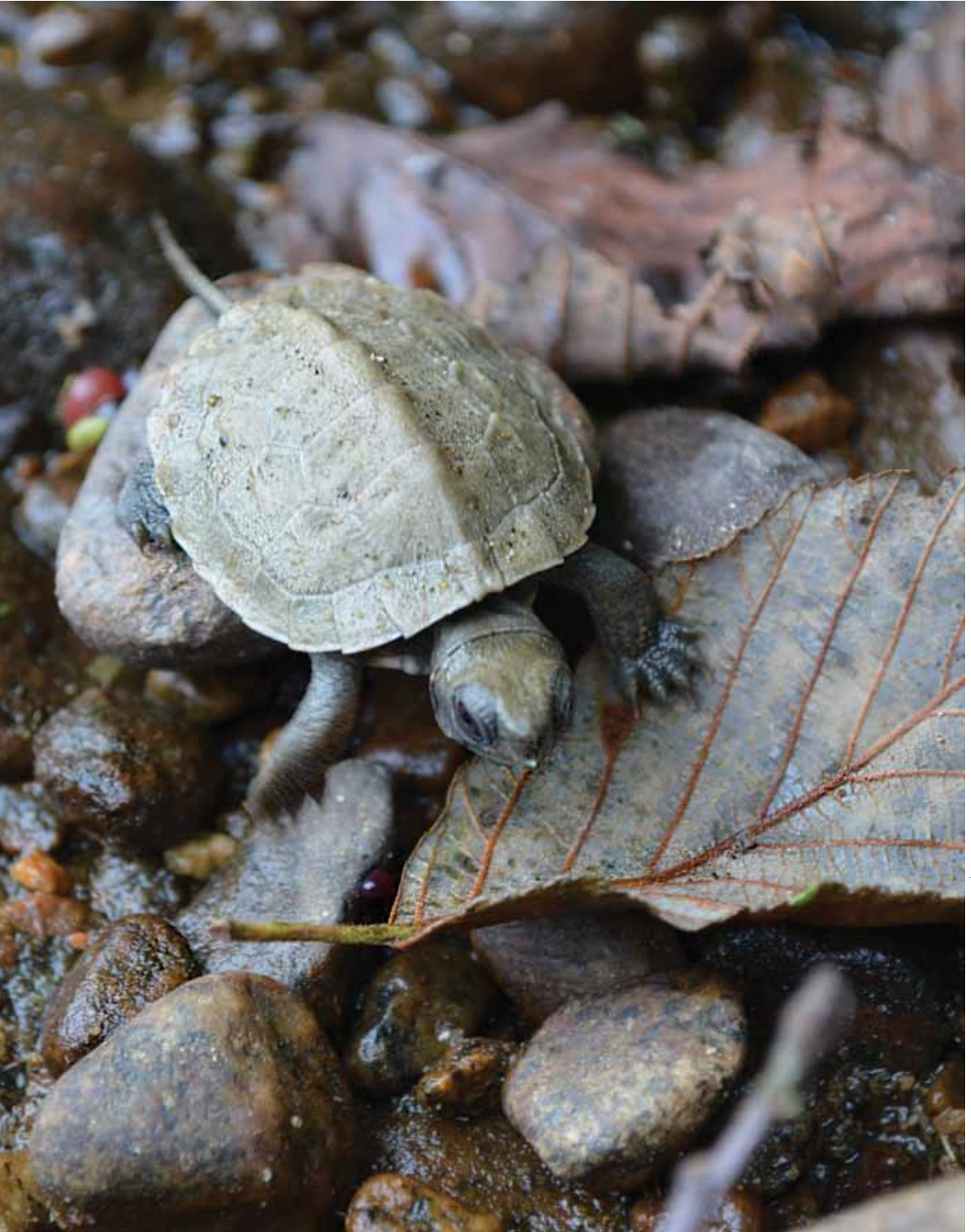
When wood turtles hatch, they move in all directions. Many newborn babies lose their lives because they cannot make it to a creek or river before they die from dehydration or predation. On the site visited by Guillaume, a person is responsible for identifying the nests and then counting and releasing the hatchlings in the nearest stream or river.

Did you know that in many cases less than 1% of the young turtles will live long enough to be able to lay eggs themselves? Do you now understand why it is essential to do our best to preserve the site and protect the species?



When they hatch, baby Wood Turtles measure between three and four centimetres in shell length and have a tail almost as long as their body.







Wood Turtles are not easy to find in the wild because they spend a lot of time in the woodlands, particularly in alder stands, during the summer. You can see leaves of alders in the photo to the left.

When biologists find Wood Turtles, they put transmitters on some of them as shown in the photo below.



Using an antenna to pick up different frequencies for each transmitter, the biologists follow the movements of the turtles and gather data. The information collected gives them a better understanding of the extent and nature of the territory they use throughout the year.

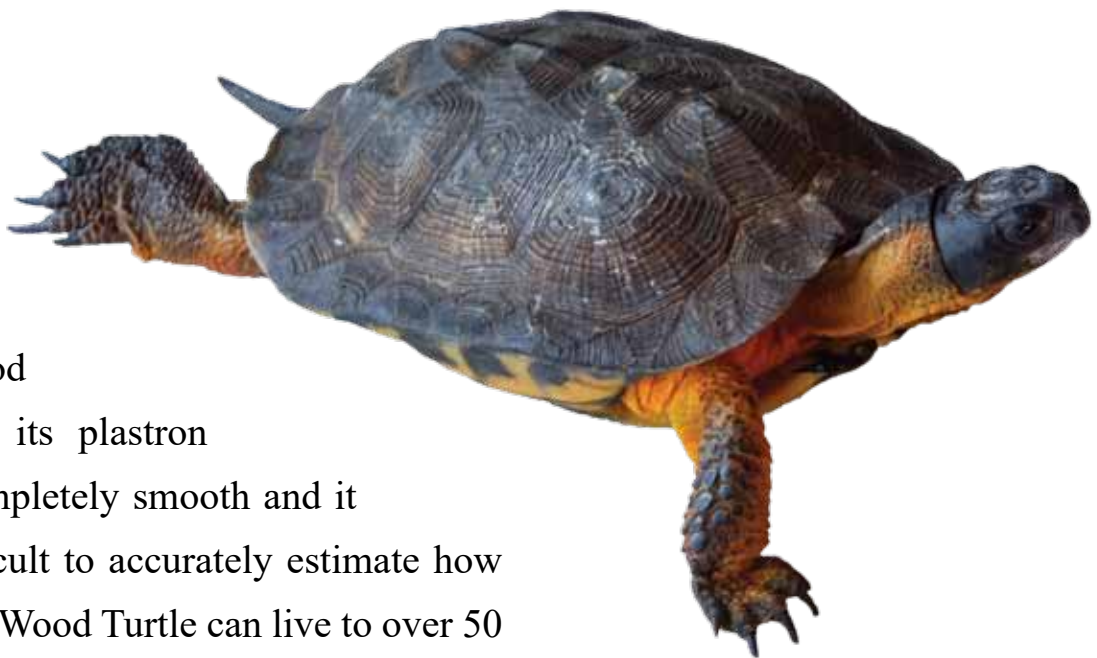


Some of the data collected when biologists capture the turtles include their weight and many different shell measurements. The brownish carapace of the Wood Turtle can reach up to 23 centimetres in length.





Denis Masse teaches Guillaume and his brother how to estimate the age of a Wood Turtle using the growth rings on its plastron. It's similar to counting the growth rings on a tree!

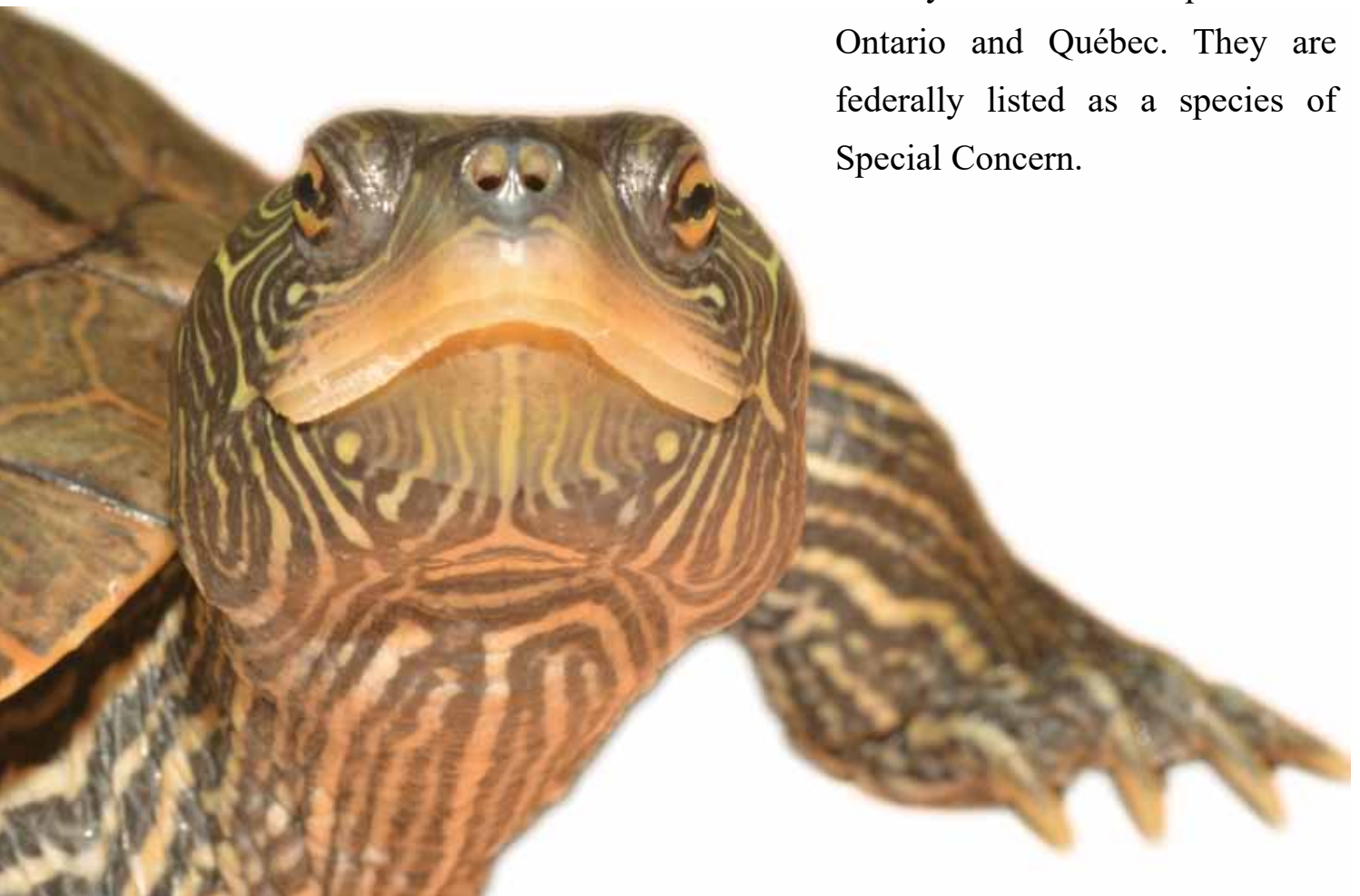


As the Wood Turtle ages, its plastron becomes completely smooth and it is more difficult to accurately estimate how old it is. The Wood Turtle can live to over 50 years old.



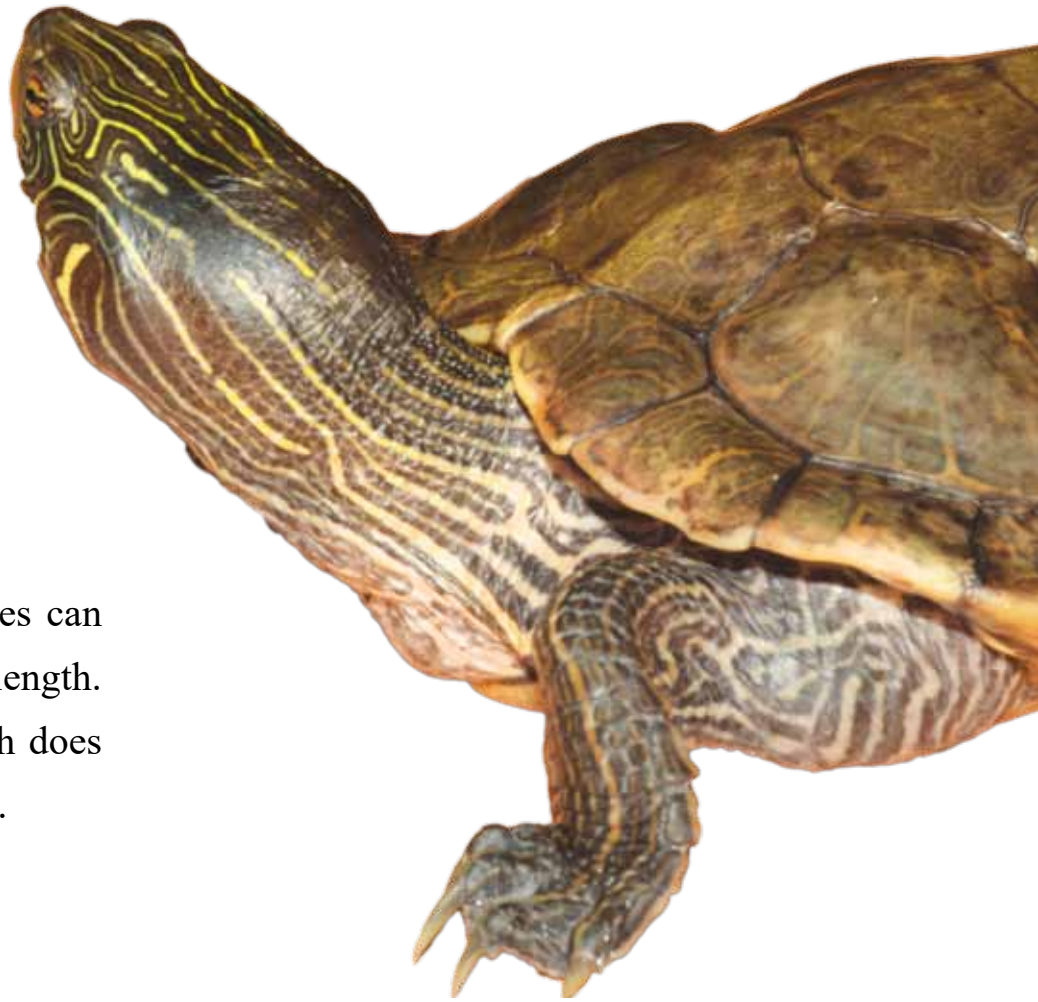
NORTHERN MAP TURTLE

Northern Map Turtles are found in only two Canadian provinces: Ontario and Québec. They are federally listed as a species of Special Concern.



Scientists estimate that they can live up to 50 years.

The SHELL of the females can reach 27 centimetres in length. For the males, their length does not exceed 16 centimetres.



← 16 to 27 cm →





WHERE DOES THEIR NAME COME FROM?

The sinuous lines on the Map Turtle's skin and shell look like the contour lines on TOPOGRAPHIC MAPS produced by geographers.



Females start to reproduce when they are between 12 to 14 years old and lay up to 23 eggs. The males may start to mate at four years old.



AT LAC DES DEUX-MONTAGNES

One of the most important populations of the Northern Map Turtle in Canada is located at Lac des Deux-Montagnes where human activity levels are very high. This is why the map turtles living there are the subject of SPECIAL CARE.

A group of experts has established a RECOVERY PLAN to preserve and improve the turtles' habitat, protect their nests, and provide areas for basking in the sun. The plan also includes awareness for boaters and the installation of buoys to inform motor boat owners of the presence of the turtles.

Several hundred Northern Map Turtles were captured, marked and released in Lac des Deux-Montagnes during a two year study undertaken by the Ecomuseum biologists. Fifty-two of the turtles were equipped with

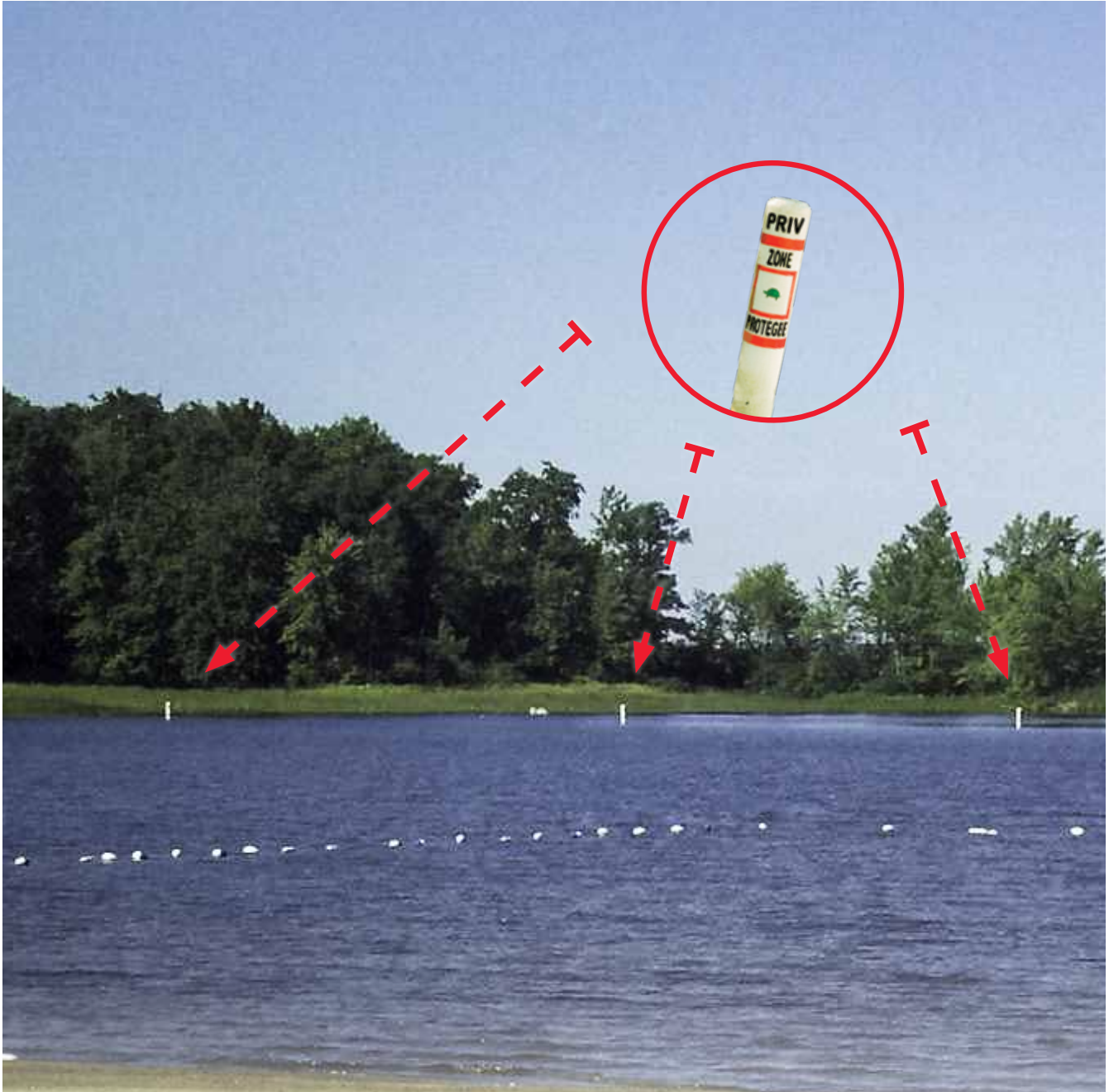
TRANSMITTERS similar to those used in the Wood Turtle research previously discussed.

When a health assessment was completed on the turtles, biologists noticed that some of them had injuries distinctive to motor boat propellers. One of them had even lost a front leg and part of its shell.



Turtle harmed by a propeller.

©Marie-Andrée Carrière



To reduce the risks of future accidents in Lac des Deux-Montagnes, BUOYS now advise boaters to keep their distance from locations with high turtle activity. In the photo, you can see the bathing zone of the beach in the parc-nature du Cap-Saint-Jacques (Pierrefonds). In the background, you can see the buoys outlining the protection zone for the Northern Map Turtles.

© Denis Fournier/City of Montreal





DID YOU KNOW?

The sex of freshwater turtles is either genetically determined or influenced by incubation temperature. Northern Map Turtle eggs that are incubated at temperatures of 25°C or less produce mostly males, while those incubated at 30°C or more produce mostly females. Between 25°C and 30°C, there is an even distribution between males and females.



BLANDING'S TURTLE



Blanding's Turtles reside in three Canadian provinces. In Québec and in Ontario, they are found in the Great Lakes region. In Nova Scotia, they are found in and around Kejimikujik National Park and National Historic Site.



SOME OBSERVATIONS MADE BY GUILLAUME:

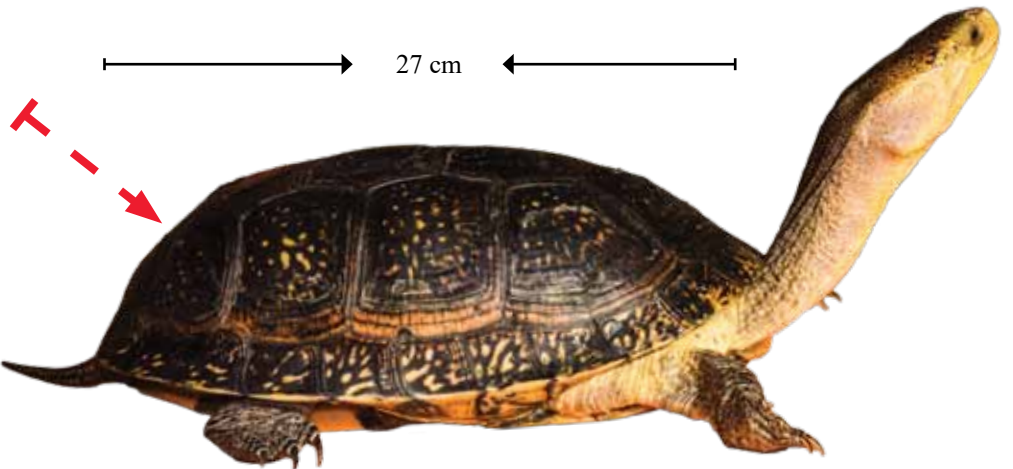


The shell is brown or black with yellowish dots or lines.

The underside of its shell is bright yellow with dark patches along the sides.



Its carapace is highly domed and can reach 27 cm in length.



THE BLANDING'S TURTLE IN KEJIMKUJIK NATIONAL PARK

The Kejimikujik National Park region is where it is possible to find the greatest diversity of reptiles and amphibians in Nova Scotia. The three species of turtles that have been recorded there include: Eastern Painted Turtle, Snapping Turtle, and Blanding's Turtle. Jeffie McNeil, a biologist you can see with Guillaume in the photo on the next page, works very hard to protect them.



During our visit, a Blanding's Turtle that had never been recorded before was captured. It was marked using a unique notch code system to identify it. The turtle was named Guillaume in honour of such a memorable day. You can see Guillaume and the Blanding's Turtle named Guillaume together in the photo above. From now on, each time the turtle is recaptured biologists will be able to share updates with us.



Guillaume with Jeffie McNeil.



LOTS OF WORK

FEMALE Blanding's Turtles lay a clutch of eggs almost every year in June. Their nests typically have six to 13 eggs that hatch from the end of August to mid-October. Researchers are responsible for COUNTING, MEASURING and MARKING hatchlings before releasing them. Thus, when they are captured again, biologists are able to know which turtle they found, assess its general health, and record the changes in weight and growth.



Turtle nest protected against predators.



Lauren Lawrence from Parks Canada measures a turtle.



The GPS can provide precise locations of the turtles.



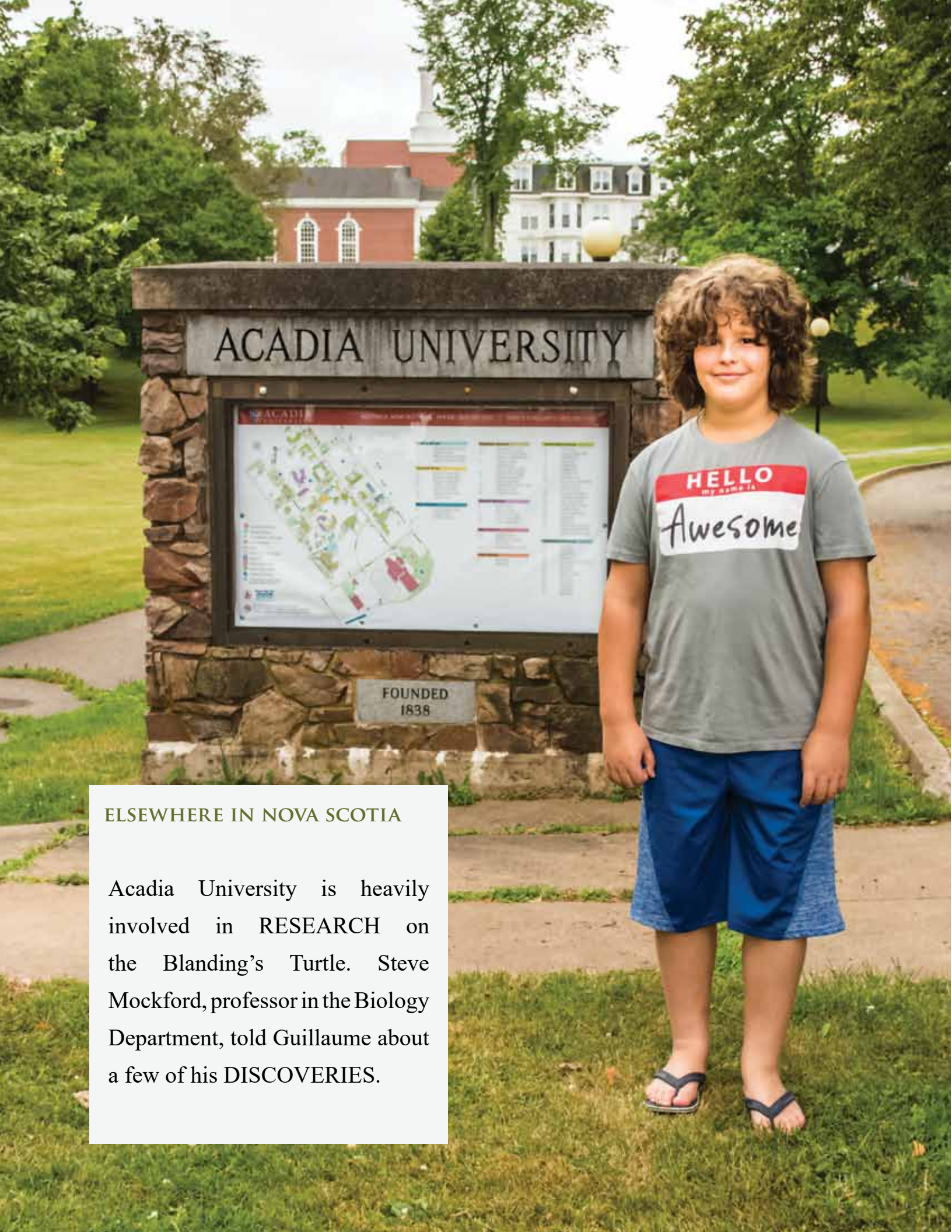
The turtles are marked with a file. This does not hurt them or affect their survival.



VERY USEFUL SIGNS

Biologists equip turtles with transmitters to gain information about their MOVEMENTS, the extent of their HABITAT, and the sites they prefer to NEST and HIBERNATE. Once these sites are brought to light, it is possible to INSTALL signs to ask people to be careful in these critical habitats.





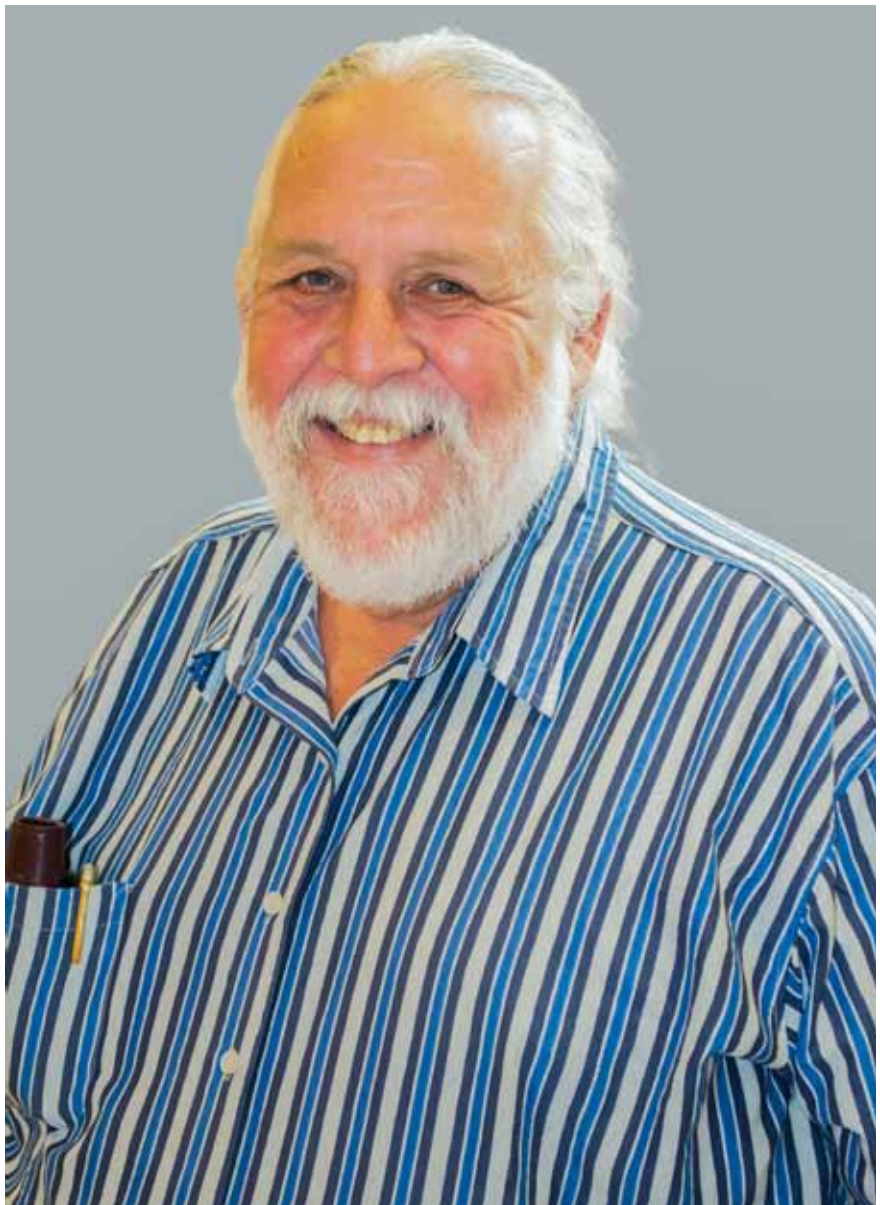
ELSEWHERE IN NOVA SCOTIA

Acadia University is heavily involved in RESEARCH on the Blanding's Turtle. Steve Mockford, professor in the Biology Department, told Guillaume about a few of his DISCOVERIES.

Interview between Guillaume and Steve Mockford

What were you able to discover with your research?

Dr Mockford: I will give you an example: When we compared our studies with others done in other Canadian provinces, we noticed that the turtles in Nova Scotia reached sexual maturity later. In the Southern parts of its distribution range in Canada, they begin to breed at 14 years. In Nova Scotia, it is not before 18 years. The fertility rate of the Blanding's Turtle in Nova Scotia is also lower than elsewhere in Canada. Their future here is, therefore, particularly uncertain. The species is listed as Threatened in Ontario and Québec, but Endangered in Nova Scotia.



Steve Mockford.



How can we distinguish between the male and female?

Dr Mockford: There are a few usual tricks to differentiate both sexes for ADULT turtles. First, the plastron of the males is concave to facilitate mating while the plastron of the female is flat. Second, the tail of the male is longer and larger than the one of the female. Finally, for the Blanding's Turtle only, when the upper part of the beak is dark, it is a male. For the females, it has yellowish stripes.



José Lefebvre, researcher at Acadia University, developed a method to identify the sex of BABY turtles using the ratio of oestrogen and testosterone, both hormones which are present in their blood.

Why are Blanding's Turtles sometimes called half-box turtles?

Dr Mockford: Box turtles are equipped with a hinge on their plastron which allows them to completely hide in their carapace. Blanding's Turtles also have a hinged plastron but they sometimes lack the musculature to completely close it. That is why they are called half-box.



Can you determine if this is a female or a male?





In Canada, the Blanding's Turtle can live up to and likely over, 80 years of age! In the photo on the previous page, you can see a young male of 25 years named PIERRE. It swam near our canoe. The biologist Jeffie McNeil used the opportunity to assess its health. What luck!



CONCRETE ACTIONS

Parks Canada, Acadia University, the Atlantic Veterinary College and the Oaklawn Farm Zoo combined forces with many volunteers to recover Blanding's Turtle eggs from Kejimikujik National Park and incubate them in laboratories. They raise the hatchlings for two years before releasing them

in the WILD. This work was done to INCREASE THE SURVIVAL RATE of the young and the Blanding's Turtle population in Nova Scotia. The larger the turtles are when released, the fewer predators will be able to eat them. Guillaume has his fingers crossed in the hope that it works.



SPINY SOFTSHELL TURTLE

The Spiny Softshell Turtle is only found in two Canadian provinces, Ontario and Québec. It is federally listed as Endangered.

In Canada, the northern part of its distribution range, males reach sexual maturity around seven years old whereas females reach sexual maturity between 12 to 15 years old.

The females lay between two and 43 eggs. Normally, the eggs must be kept warm, UNDERGROUND, for approximately 60 to over 90 days, depending on environmental temperatures. Unfortunately, during this incubation period, the eggs are sometimes found by predators or POACHERS.

Moreover, the nests can be flooded. You might think that the water should not bother the turtles. Think again. The Spiny Softshell Turtle lives the majority of its life in water but its eggs, even though they require some humidity, cannot be submerged for long periods of time.

To maximize the chances of successful HATCHING and SURVIVAL of the young, the Granby Zoo, in Quebec, takes part in a recovery program of the species in association with other partners.





THE GRANBY ZOO

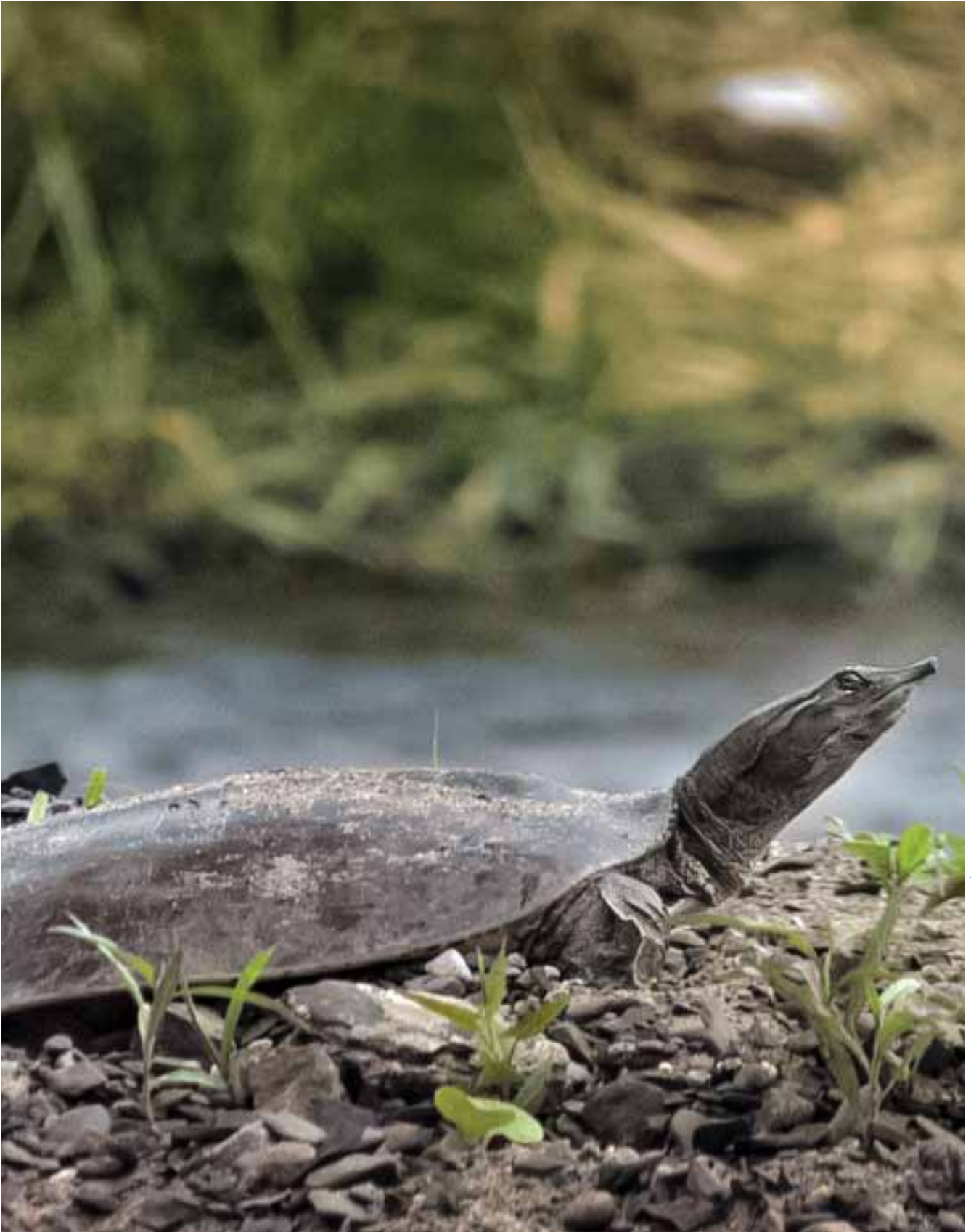
The Granby Zoo is a partner in the recovery program for the Spiny Softshell Turtle. Their responsibilities include:

- RAISING awareness on the protection of critical habitat such as wetlands, riparian zones, nesting sites, nursery areas, and basking sites;
- CONDUCTING ecological surveys of nesting sites;
- MONITORING population growth of the Spiny Softshell Turtle.

One of the main responsibilities of the Granby Zoo is to incubate the eggs of the Spiny Softshell Turtle and release the young in the wild.



During the first eight years of the recovery program, the Granby Zoo released close to 1000 young Spiny Softshell Turtles that hatched in the laboratory. Guillaume sincerely thanked them for all of their hard work.



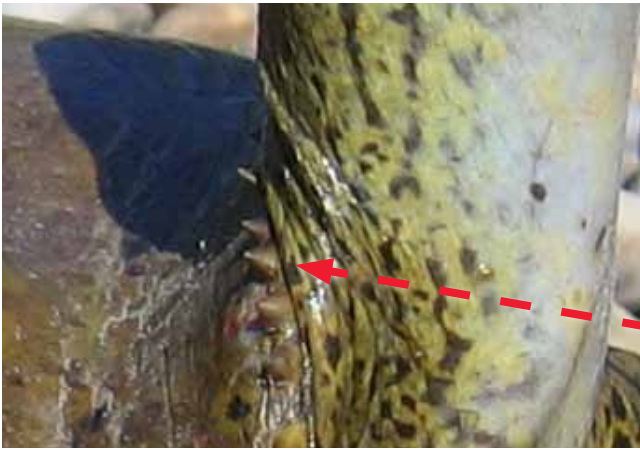
INTERVIEW WITH BIOLOGIST PATRICK PARÉ

Patrick Paré is a biologist and Director of Conservation and Research at the Granby Zoo. He answered some of Guillaume's questions.



Why can't I see spines on the Spiny Softshell Turtles?

Mr. Paré: Sometimes, there are spines on either side of the head, on the edge of the shell as you can see in the picture on this page. Most of the time, however, only small, rounded protuberances are observed.



© Scott Gillingwater

© Scott Gillingwater



Is their shell really soft?

Mr. Paré: Yes. The Spiny Softshell Turtle is the only freshwater turtle in Canada that does not have a hard shell made of scales. Its carapace is rather made of thick skin that covers its skeleton. This makes it more vulnerable to attacks by predators.



Does it have other means to defend itself?

Mr. Paré: Fortunately, it can move swiftly underwater and its reaction time is very quick. Its carapace blends in with the sandy bottom and helps it to hide. Due to its hydrodynamic shell and head, along with large webbed feet, what this turtle loses in protection from a hard shell, it makes up for in speed and agility. Finally, its nose is in the shape of a tube allowing it to breathe while keeping its body submerged, hence protected out of sight.



How much time can the Spiny Softshell Turtle remain underwater?

Mr. Paré: Similar to other reptiles, the Spiny Softshell Turtle has a pulmonary respiration. During the summer, it can stay underwater for several minutes. In the winter, in Canada, since it hibernates underwater for more than six months, it reduces its vital functions. Gas exchange is done through its skin which is on average four times more permeable to gases (oxygen and carbon dioxide) than the other turtle species!





How long can it live?

Mr. Paré: Specialists believe that they can live more than 50 years in the wild.



Do you have news of the young turtles you released since the beginning of the recovery program?

Mr. Paré: In 2016, we began a monitoring program of the juvenile Spiny Softshell Turtles using telemetry techniques. It is now possible to fix a very small non permanent transmitter on the carapace of young turtles that weigh more than 25 grams. At birth, softshells weigh six to seven grams and reach the required weight of 25 grams after one year. With this project, we have a better understanding of their movement, their favorite areas in the river and their hibernation sites. However, few individuals have been monitored up to now.



What do you give to eat to the young turtles that hatch in Labo 1?

Mr. Paré: A wide range of food is offered to the young Spiny Softshell Turtles to give them a better chance of survival. Sometimes we give them dry food containing all the nutrients essential for their survival. On the other hand, we prefer to give them a kind of pudding made from trout or salmon, dry food, zucchinis and chicory, vitamins and gelatin. Before releasing them into the wild, we provide them with live worms and insects. They are very voracious and retain their hunting instinct throughout the process.







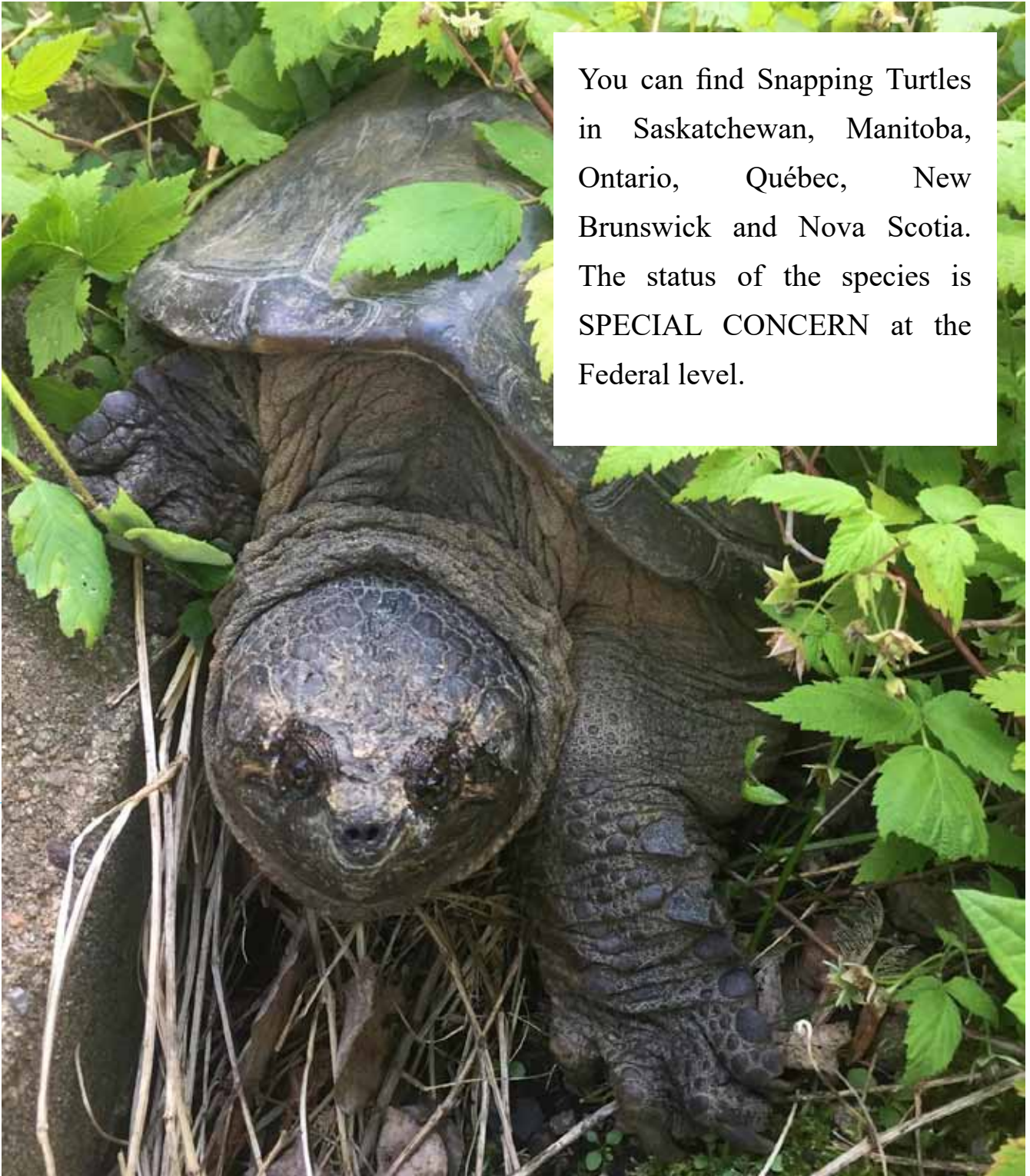


What is the biggest Spiny Softshell Turtle you ever saw?

The size of the spiny softshell does not exceed 54 centimetres. The female weighs up to 11.7 kg, but rarely reaches this weight, and is twice as large as the male.

SNAPPING TURTLE

You can find Snapping Turtles in Saskatchewan, Manitoba, Ontario, Québec, New Brunswick and Nova Scotia. The status of the species is **SPECIAL CONCERN** at the Federal level.



In Ontario, female Snapping turtles begin to breed around the age of 15 to 20 years. In general, they lay from 6 to 100 round eggs. The incubation period lasts from 55 to well over 95 days depending on environmental conditions.

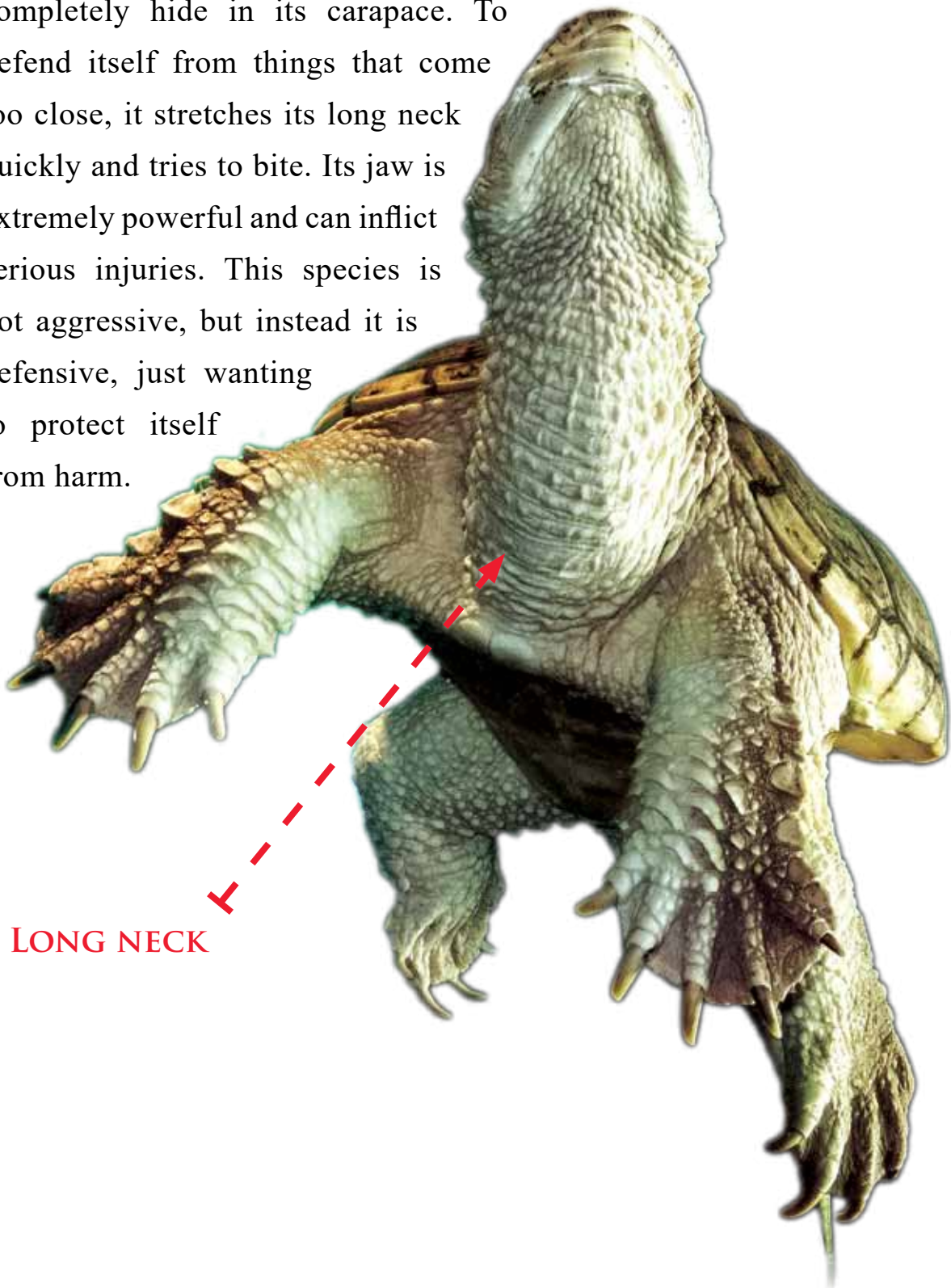
Snapping turtles are the **LARGEST** of our freshwater turtles. Its maximum length is 50 cm and it can weigh up to 18 kilograms.

The **LIFE SPAN** of the Snapping Turtle could be well over 80 years.

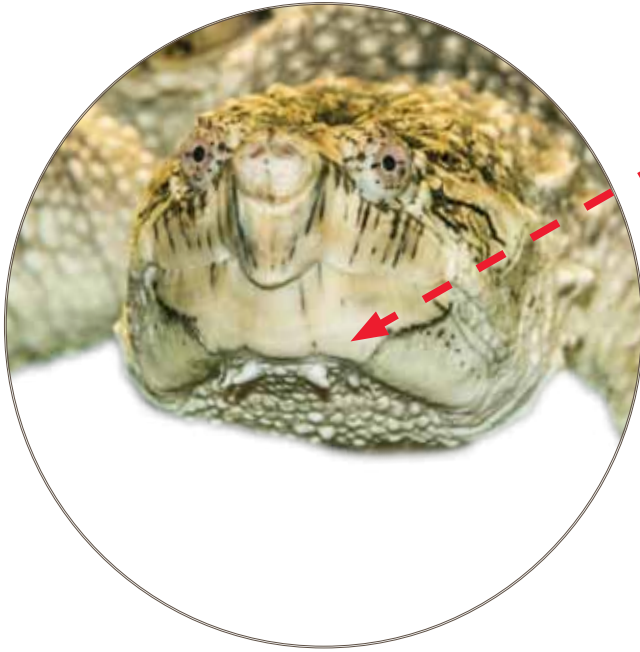


SOME OBSERVATIONS MADE BY GUILLAUME

The Snapping Turtle is unable to completely hide in its carapace. To defend itself from things that come too close, it stretches its long neck quickly and tries to bite. Its jaw is extremely powerful and can inflict serious injuries. This species is not aggressive, but instead it is defensive, just wanting to protect itself from harm.



LONG NECK



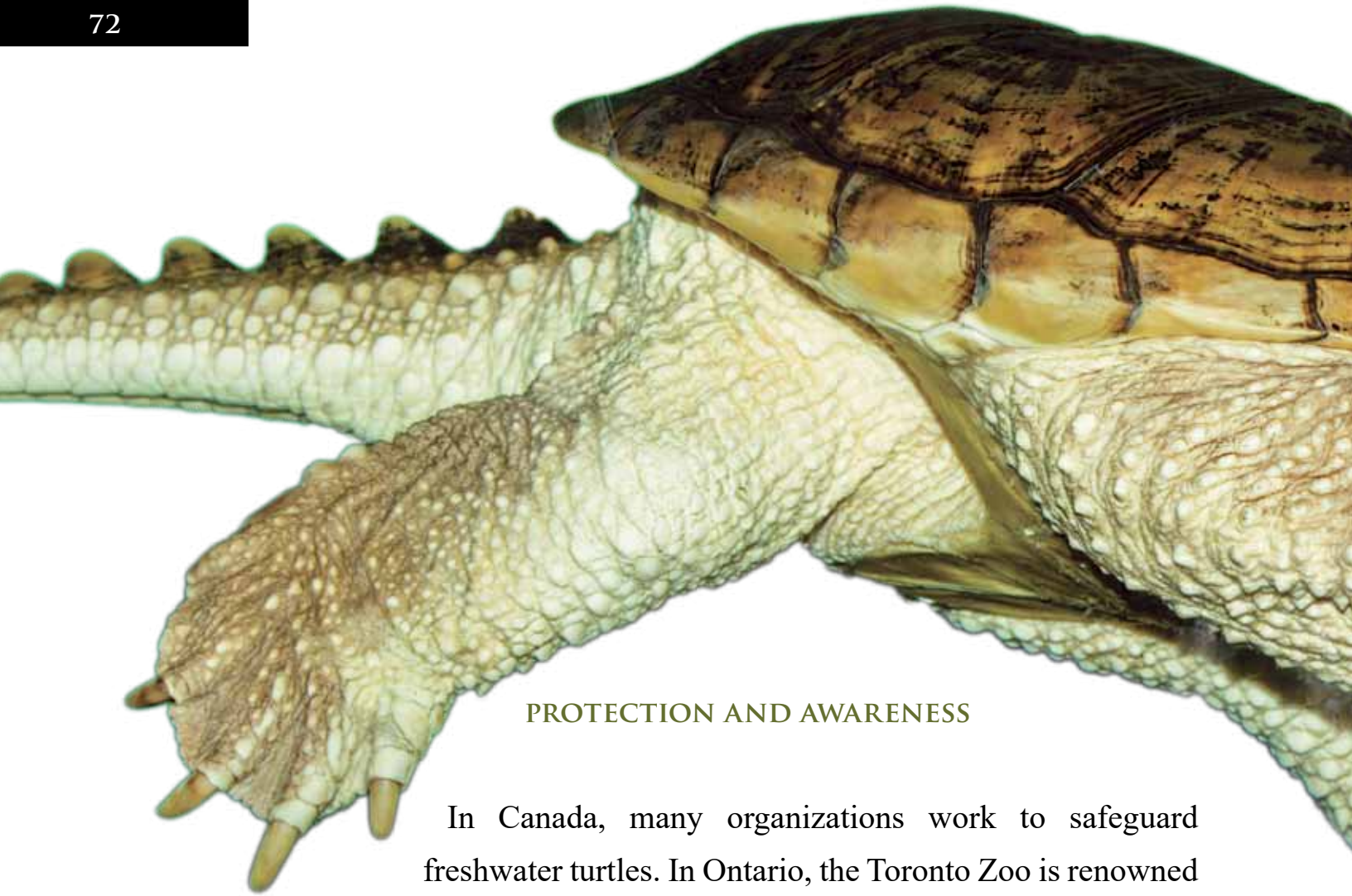
BARBELS

Massive head, hooked and sturdy beak, and chin with barbels.

Its tail looks similar to that of a Stegosaurus. It is long and decorated with bony plates aligned like the teeth of a saw.

TAIL

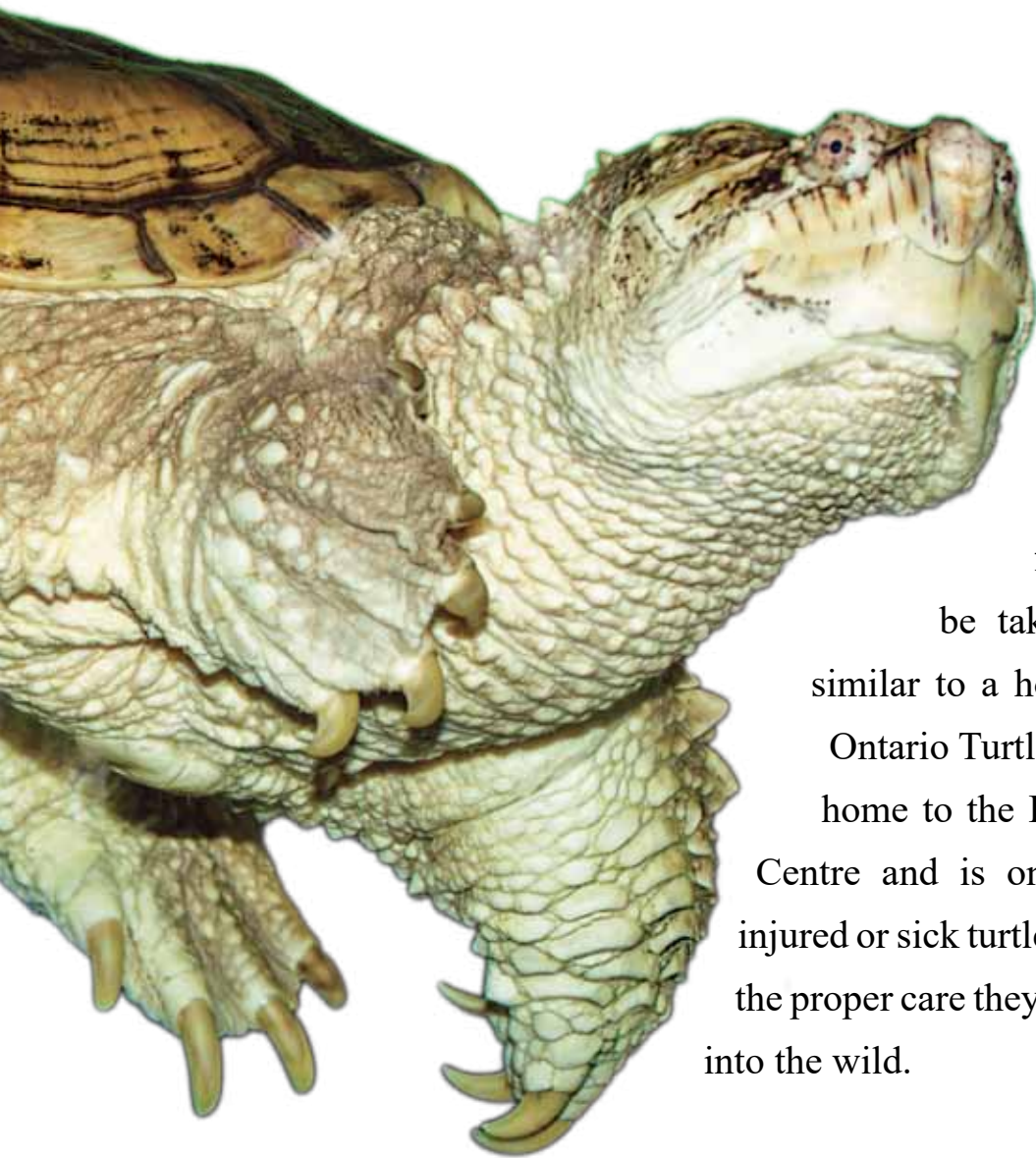




PROTECTION AND AWARENESS

In Canada, many organizations work to safeguard freshwater turtles. In Ontario, the Toronto Zoo is renowned for its PROGRAMS Adopt a Pond, Ontario Turtle Tally and Turtle Island Conservation that aim to protect turtles and their habitat while raising AWARENESS and through EDUCATION.





HEALING

Each year, many Snapping Turtles are **WOUNDED** or **KILLED**. When a wounded turtle is found on the road it can be taken to a turtle hospital similar to a hospital for humans. The Ontario Turtle Conservation Centre is home to the Kawartha Turtle Trauma Centre and is one of the places where injured or sick turtles can be taken to receive the proper care they need to be released back into the wild.

HUNT PROHIBITED

As recently as 2017, it was still permitted to **HUNT** Snapping Turtles in Ontario. People who care about them and not-for-profit organizations like Ontario Nature put pressure on the government to stop the annual hunt. Even Guillaume wrote a letter and signed a **PETITION** to stop the hunt from happening. In 2018, the legislation was changed to ban the hunting of Snapping Turtles in Ontario. Now, all provinces except for Saskatchewan, have banned the hunting of Snapping Turtles. Guillaume was very proud he acted and changes were made.



EASTERN MUSK TURTLE



The Musk Turtle is found in Ontario and Québec. In Canada, the status of the species is considered ‘SPECIAL CONCERN’ by COSEWIC (Committee on the Status of Endangered Wildlife in Canada).



WHERE DOES THE EASTERN MUSK TURTLE LIVE?

Musk Turtles spend most of their time in the water and are most ACTIVE in the early mornings and evenings. During the warmest part of the year they may be more active at night. It is not easy to find them in the wild. The best time to see a Musk Turtle is during the NESTING period in June and in July. However, we advise you to not disturb them during that CRUCIAL PERIOD. Instead go to the zoo to observe this species – like Guillaume does.



Guillaume had to learn to handle a Musk Turtle under SUPERVISION and permission of the biologist of the Little Ray's Reptile Zoo for this photo. In the wild, you must not handle turtles, unless you have the appropriate permits. Do not forget about the laws that protect our turtles.

At maturity, the Musk Turtle does not exceed 15 centimetres in carapace length and weighs a mere 250 grams. Despite its harmless appearance, it can be very defensive. It tries to bite at the slightest suspicious movement. It can also give off a strong smell (musk) to discourage anything that disturbs it.





BIOLOGICAL CLOCK

The **LIFESPAN** of Musk Turtles is about 30 years.

REPRODUCTION

Females generally lay from three to seven eggs and nest incubation lasts from 60 to over 90 days. The eggs hatch during the months of August and September.



TOO COOL!

The Musk Turtle is able to climb trees!

The Musk Turtle has a hinge on its plastron that is almost not visible. It allows it to hide better in its shell.

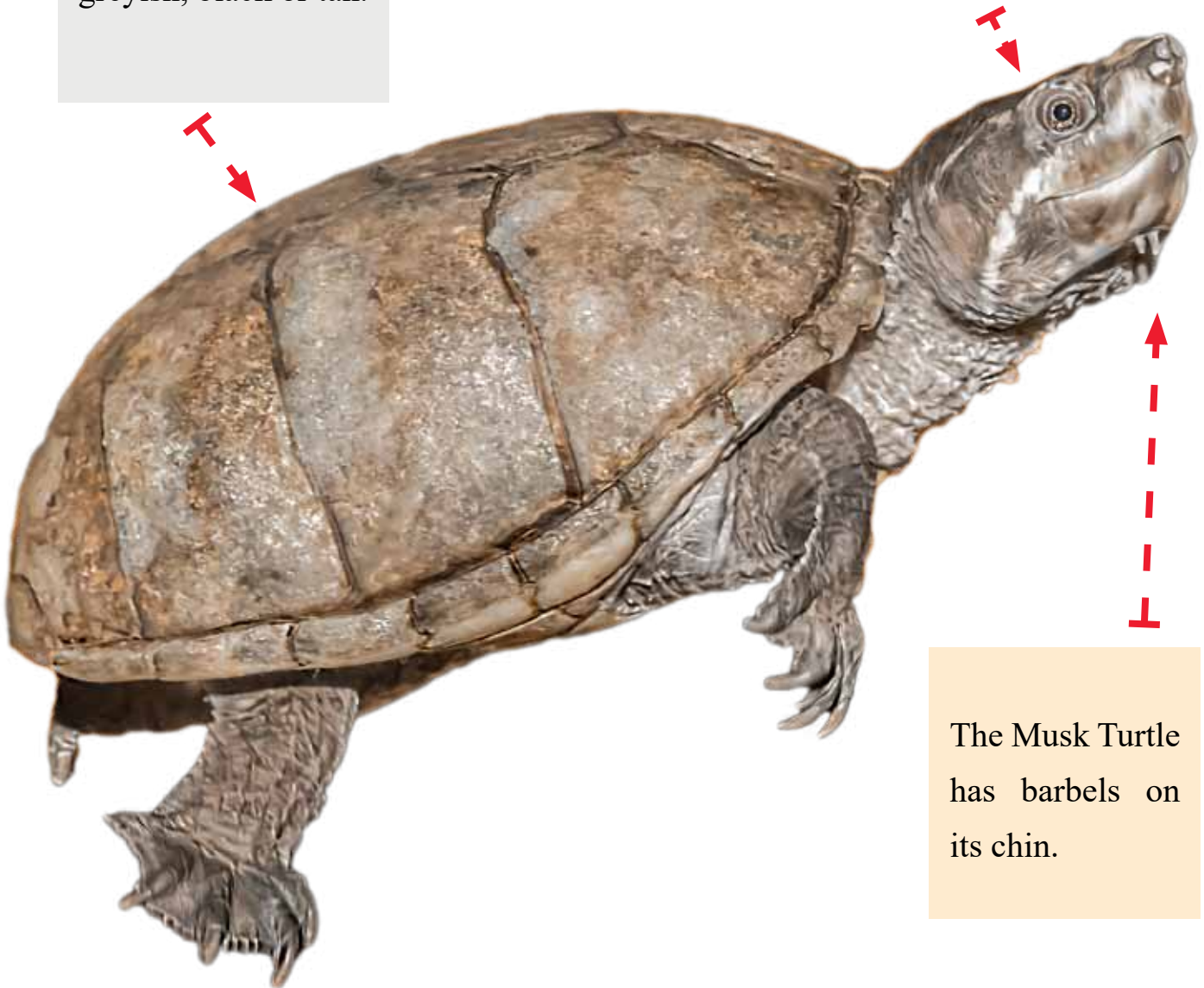




SOME OBSERVATIONS MADE BY GUILLAUME:

Its carapace is highly domed, smooth and greyish, black or tan.

There are two white lines on either side of the head of the Musk Turtle: one above the eye and the other below. These white lines become less visible with age.



The Musk Turtle has barbels on its chin.

SPOTTED TURTLE

The Spotted Turtle is found in Ontario and Québec. Specialists don't currently know if any remain in Québec, since only one or two records exist. They believe there is a chance to find specimens somewhere between the Ottawa River, Île Perrot and Hull. Keep an eye out and report your sightings because Spotted Turtles are endangered!

The species is threatened largely because of illegal collection. All location information must be kept secret.









Spotted Turtles are able to reproduce from about 11 years old. The few eggs that they lay (from two to eight) take 55 to over 90 days to hatch. They can live to be over 40 years old. THE LONGEVITY of some specimens in the Georgian Bay area of Ontario was estimated to be 110 years!

Spotted Turtles sometimes hibernate in beaver burrows.

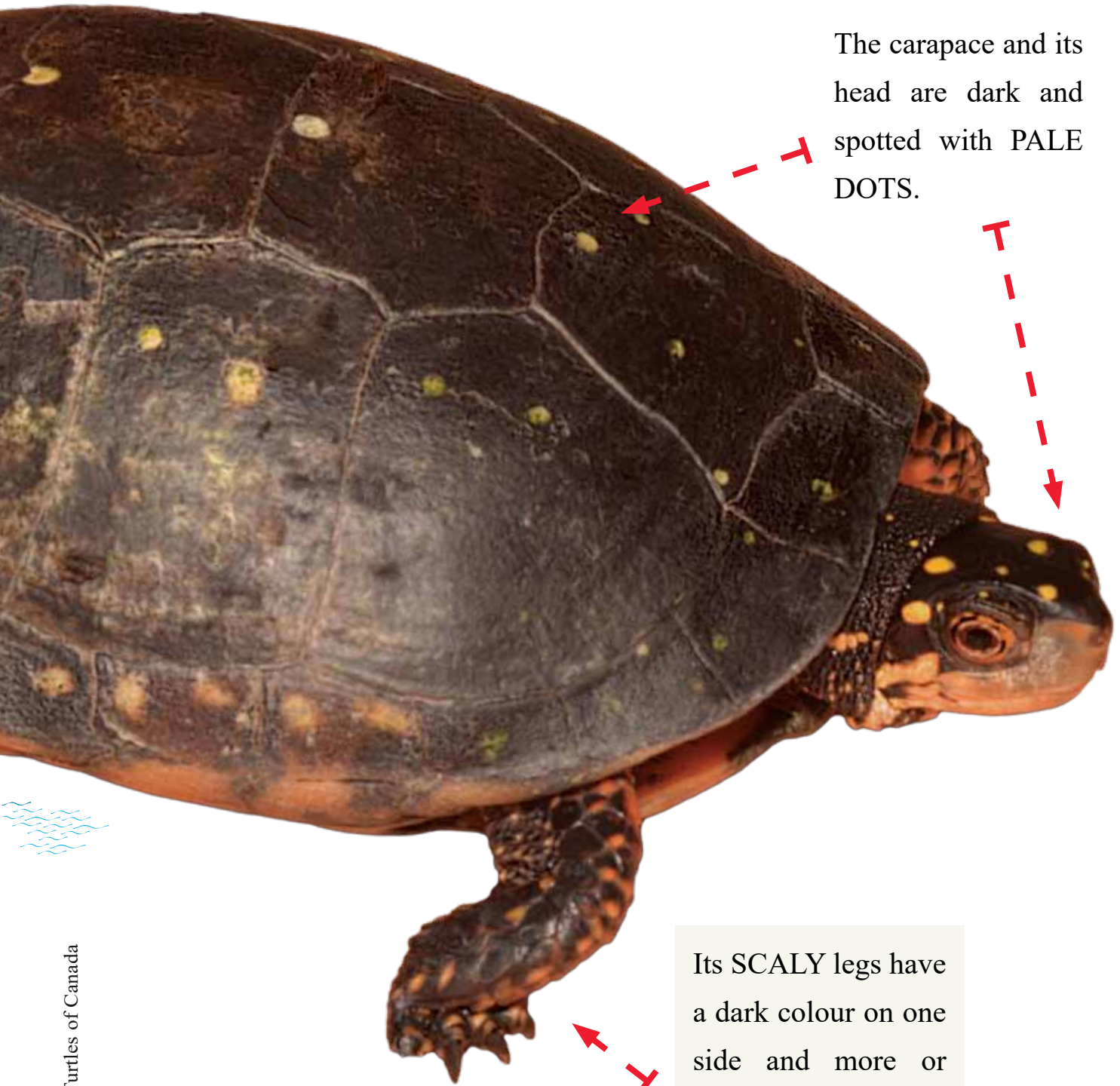
Spotted Turtles are federally listed as Endangered due in part to illegal collection for the pet trade.



SOME OBSERVATIONS MADE BY GUILLAUME:

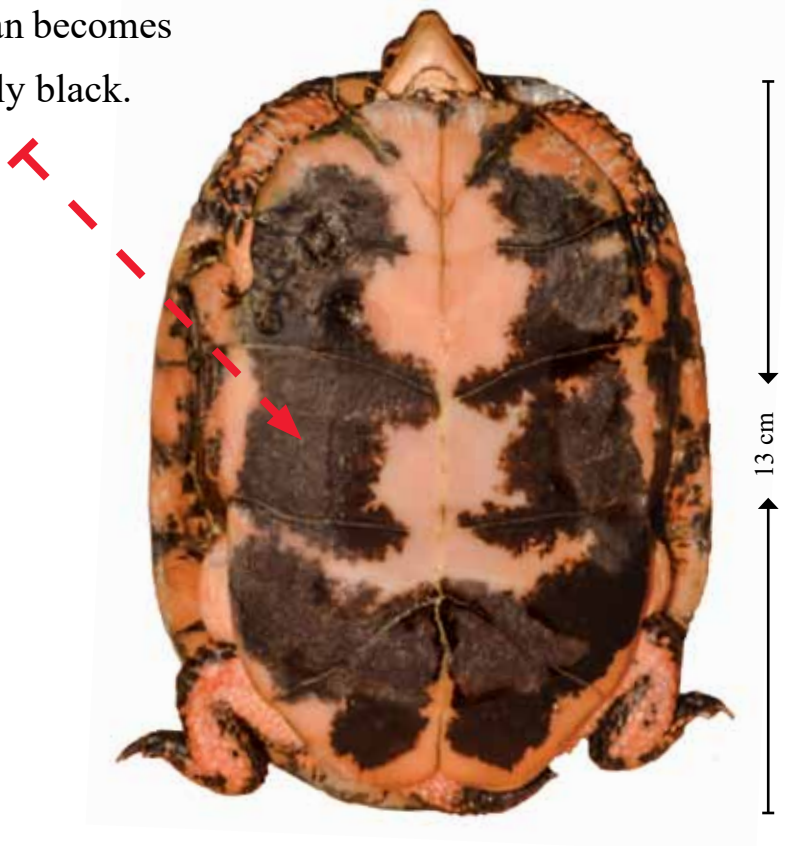
The carapace and its head are dark and spotted with PALE DOTS.

Its SCALY legs have a dark colour on one side and more or less orangey or coral colour on the other.





The plastron of the Spotted Turtle is black and orange. However as they age, it can become almost entirely black.



Its length does not exceed 13 centimetres.



PAINTED TURTLE

There are THREE SUBSPECIES of Painted Turtle in Canada. The WESTERN Painted Turtle can be found in British Columbia, Alberta, Saskatchewan, Manitoba and Northern Ontario. The MIDLAND Painted Turtle lives in Central, Eastern and Southern Ontario and Québec. As for the EASTERN Painted Turtle, it can be observed in New Brunswick and Nova Scotia. In general, the nests of Painted Turtles have from two to 23 eggs.



The status of the Painted Turtles varies from one subspecies to the other and between regions. We created this table to help you out.

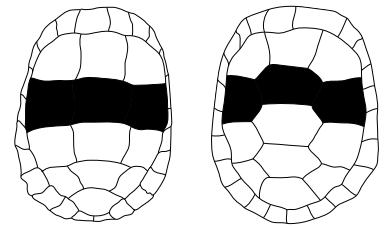
Status of the Painted Turtles according to COSEWIC*		
*Committee on the Status of Endangered Wildlife in Canada		
Subspecies	Provinces	Status
Eastern Painted Turtle	New Brunswick Nova Scotia	Special Concern
Midland Painted Turtle	Québec Ontario	Special Concern
Western Painted Turtle	British Columbia (Pacific Coast population)	Endangered
	British Columbia (Intermountain and Rocky Mountain population)	Special concern
	Alberta Manitoba Ontario Saskatchewan	Not at risk



Ways to distinguish the three subspecies

The three subspecies have an OVAL, GREEN, SMOOTH, slightly DOMED carapace. The dark green skin of the head is embellished with a network of YELLOW LINES that sometimes change to RED at the neck, legs and tail. Here are a few characteristics that can help you identify what subspecies of Painted Turtle you are observing. Keep in mind that not all individuals fall into this guideline.

1. Generally, the Eastern Painted Turtle's scutes on the carapace are more ALIGNED in rows, and the Midland and the Western are more OFF SET.



2. The Eastern Painted Turtle usually has a COMPLETELY yellow plastron; however, they sometimes have blotches. The Midland usually has a grey central blotch on the plastron.
3. Eastern Painted Turtles mostly have LIGHT COLOURED BANDS on the anterior (front) edges of some of the scutes on the carapace.
4. The Western Painted Turtles are the only Painted Turtles that have a large BLACK and RED or ORANGE pattern on the plastron as adults.

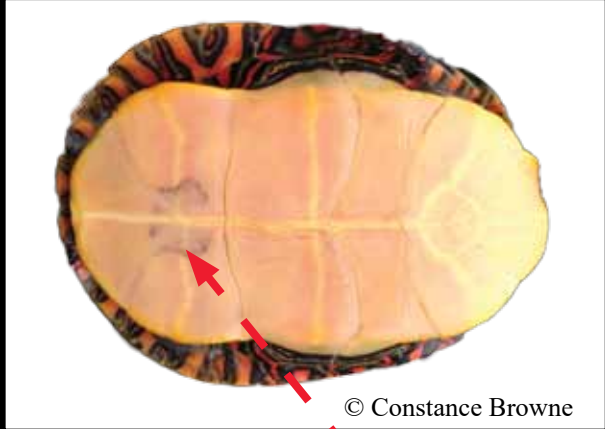
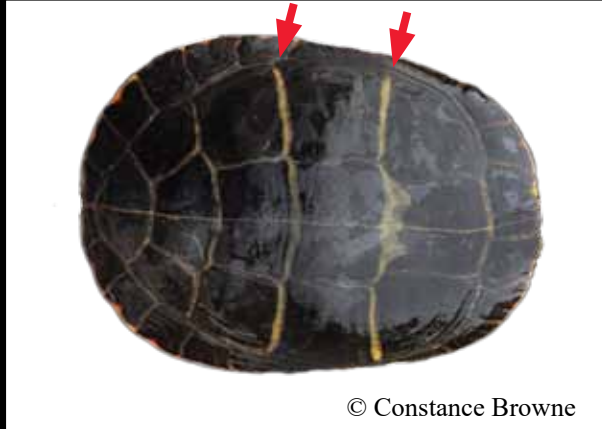


Light coloured bands

CARAPACE

PLASTRON

Eastern Painted Turtle



Midland Painted Turtle

Blotches



Western Painted Turtle





ANECDOTE

In June 2015, researchers with the Wascana Turtle Program in Saskatchewan found one Western Painted Turtle that was particularly interesting. Its LENGTH was 26.6 cm - the largest on RECORD in Canada.



© Kelsey A. Marchand



FUN FACT

Male Painted Turtles have very LONG CLAWS on their front feet (see image above). He uses these long claws during the COURTSHIP DISPLAY in the spring. He places himself in front of the female and gently caresses her face and neck with his clawed feet.



THE GREATER VANCOUVER ZOO

The Greater Vancouver Zoo is working to re-establish the Western Painted Turtle. Since 2012, staff has COLLECTED turtle eggs from nesting sites and incubated them in their laboratory. Between 2013 and 2016, the zoo had released around 310 turtles. Guillaume asked a few questions to Menita Prasad who takes care of the animals.

Why do you incubate the eggs in the zoo?

Ms. Prasad: The only eggs that are COLLECTED and INCUBATED in captivity are those that are laid in AREAS OF HIGH RISKS such as parking lots, where it is impossible to protect them with a simple fence for example.

However, I must add that part of the re-establishment program of the Painted Turtles also includes the creation of protected sites in areas of high human activities.

How long do you keep the young?

Ms. Prasad: The newborns weigh around five grams. We keep them in captivity until they multiply their weight by ten to reach 50 grams before we release them in the wild.

By doing that, we make sure that they are less vulnerable to predators.

Do you control the temperature to get only males or females?

Ms. Prasad: We always incubate at a MEAN temperature which theoretically would produce as many MALES as FEMALES.

When the turtles hatch, they have a white dot on the tip of its beak. Why?

Ms. Prasad: This white dot is an eggtooth that will soon fall off. It's only use is to help the young turtles break the shell of their eggs.



© Greater Vancouver Zoo

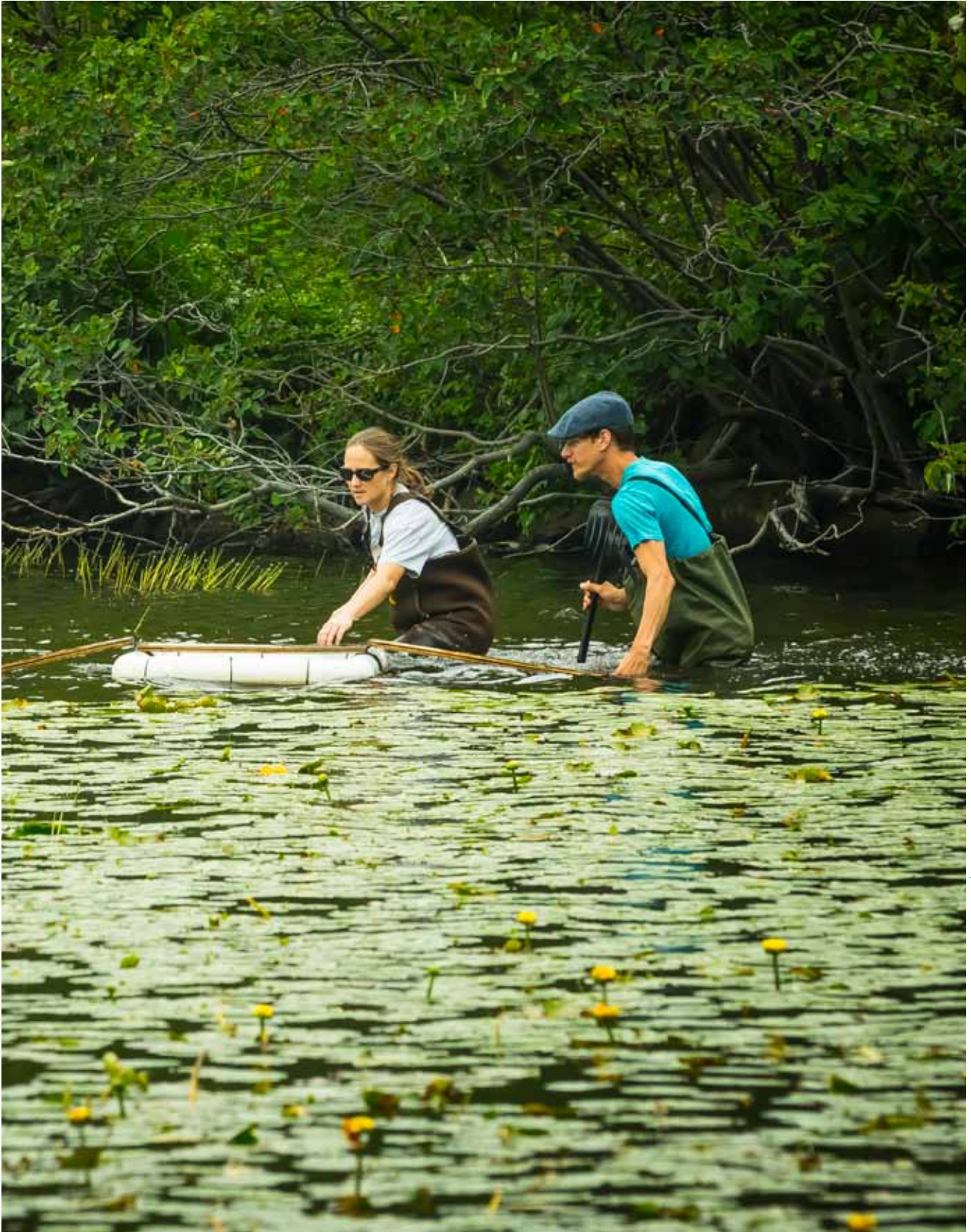
Biologists who work hard to protect our turtles

In New Brunswick, Dr. Constance Browne and Andrew Sullivan survey lakes in Rockwood Park to determine which species of turtles are there and their population densities. They have set up different kinds of traps to capture Eastern Painted Turtles and Snapping Turtles.

Sometimes they catch Red-eared Sliders in their nets. Red-eared Sliders are NON-NATIVE turtles to Canada. When that happens, the researchers FIND HOMES for these released pets to make sure they do not compete with NATIVE species. It is a lot of work.



Submerged trap.



Dr. Constance Browne and Andrew Sullivan checking if turtles have been caught in a floating trap.



IDENTIFYING A RED-EARED SLIDER



© Scott Gillingwater
Baby Red-eared Slider

This species usually has a red patch behind each eye. Since our native turtles do not have this red marking, it is easy to identify. Unfortunately, in some older animals, the red markings fade to a grey or black colour, making identification more tricky.

The Red-eared Slider is native to the United States and Mexico. It is sold in pet stores. Kids love this species because it's cute and requires little care at first.

While the turtles are often very small when initially purchased from pet stores, they grow much bigger as they age. An adult's carapace can reach

30 cm long. At this size it will require a larger enclosure and more attention. This species can live up to well over 40 years!

With such a long lifespan, people sometimes lose interest in keeping them as pets. With the best intentions in mind, these pet owners may release their childhood pet into their local pond or stream without understanding the consequences of their actions. These turtles could transmit disease and illness to our native species. Additionally, in some circumstances, sliders may compete for resources with native turtles.

If you buy a Red-eared Slider in a pet shop and do not want it anymore, give it to someone else. Choose a person who will take GREAT CARE of it. Your gesture will help save Canadian species.



© Scott Gillingwater

The skin of the head, neck and legs is streaked with green and yellow lines.



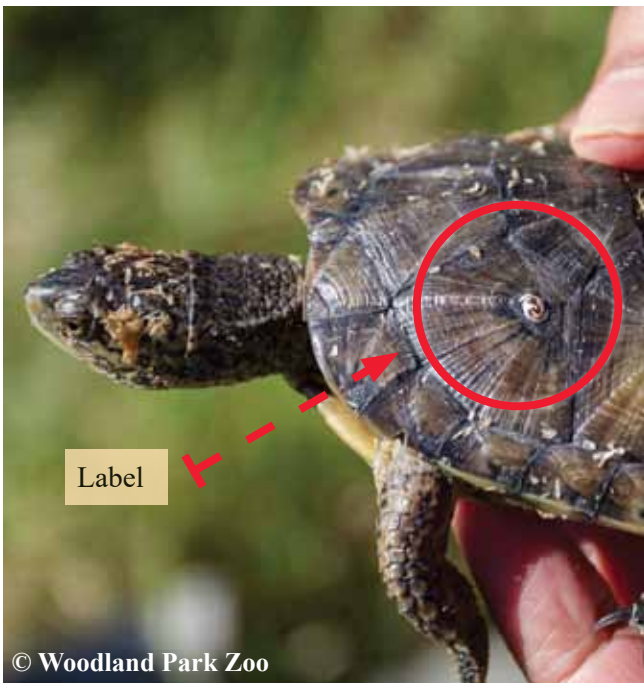
PACIFIC POND TURTLE



The Pacific Pond Turtle was listed as Extirpated from Canada in 2002, although no specimens have been located in the country since 1959. British Columbia was the only province where it was found and researchers are still looking for individuals in hopes to re-establish their population. If some INDIVIDUALS are found and are able to reproduce, it is possible to create a RECOVERY plan for the species. Since there are still some Pacific Pond Turtles in neighbouring American states, it could still be possible to eventually REINTRODUCE the species.



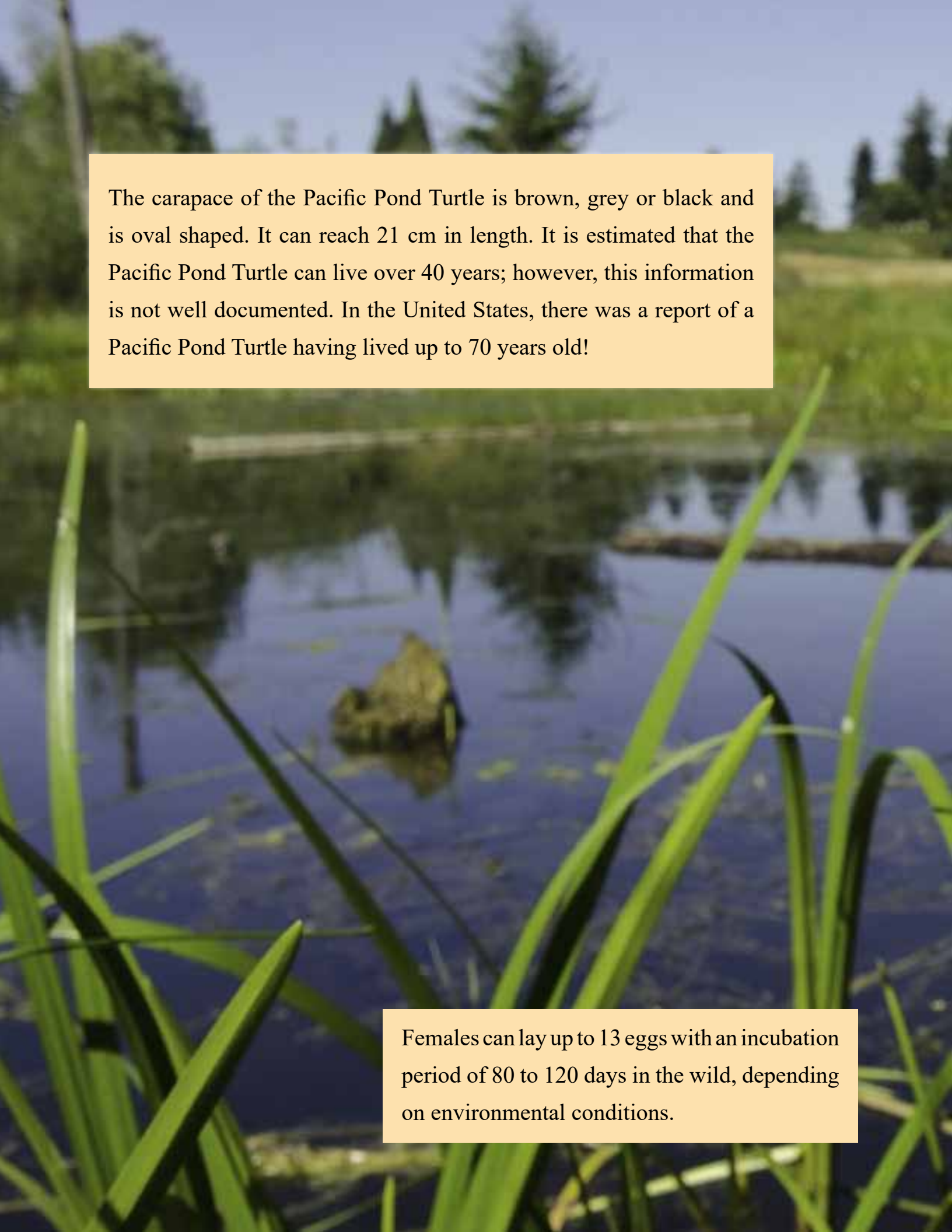
© Woodland Park Zoo



© Woodland Park Zoo

Pacific Pond Turtles are also AT RISK in the United States. In Washington State, eggs are collected in the wild and transported to Woodland Park Zoo where they are hatched and released in the wild once they are big and strong enough to avoid predators. The zoo puts a LABEL on the carapace in order to FOLLOW their growth development.





The carapace of the Pacific Pond Turtle is brown, grey or black and is oval shaped. It can reach 21 cm in length. It is estimated that the Pacific Pond Turtle can live over 40 years; however, this information is not well documented. In the United States, there was a report of a Pacific Pond Turtle having lived up to 70 years old!

Females can lay up to 13 eggs with an incubation period of 80 to 120 days in the wild, depending on environmental conditions.



EASTERN BOX TURTLE



The Eastern Box Turtle is considered EXTIRPATED in Canada. Prior to its extirpation, it was only found in southern Ontario.

Archaeological digs have confirmed that the Eastern Box Turtle is an indigenous species in Canada. Some specialists think that the RARE living specimens observed over the past few decades were probably IMPORTED from the United States and released in southern Ontario. It is only a hypothesis at this time and still needs to be validated.

In Canada, there are two species of turtles that spend a significant amount of time out of the water: the Wood Turtle and the Eastern Box Turtle. These two species are considered to be more TERRESTRIAL than the others.

The Eastern Box Turtle may be able to breed as young as five to seven years of age, though in northern parts of its range, maturity is likely reached at 10 years or more. Sexually mature females lay between one to eight eggs that hatch after 60 to over 95 days, depending on the location. This species of turtle can live over 100 years of age.



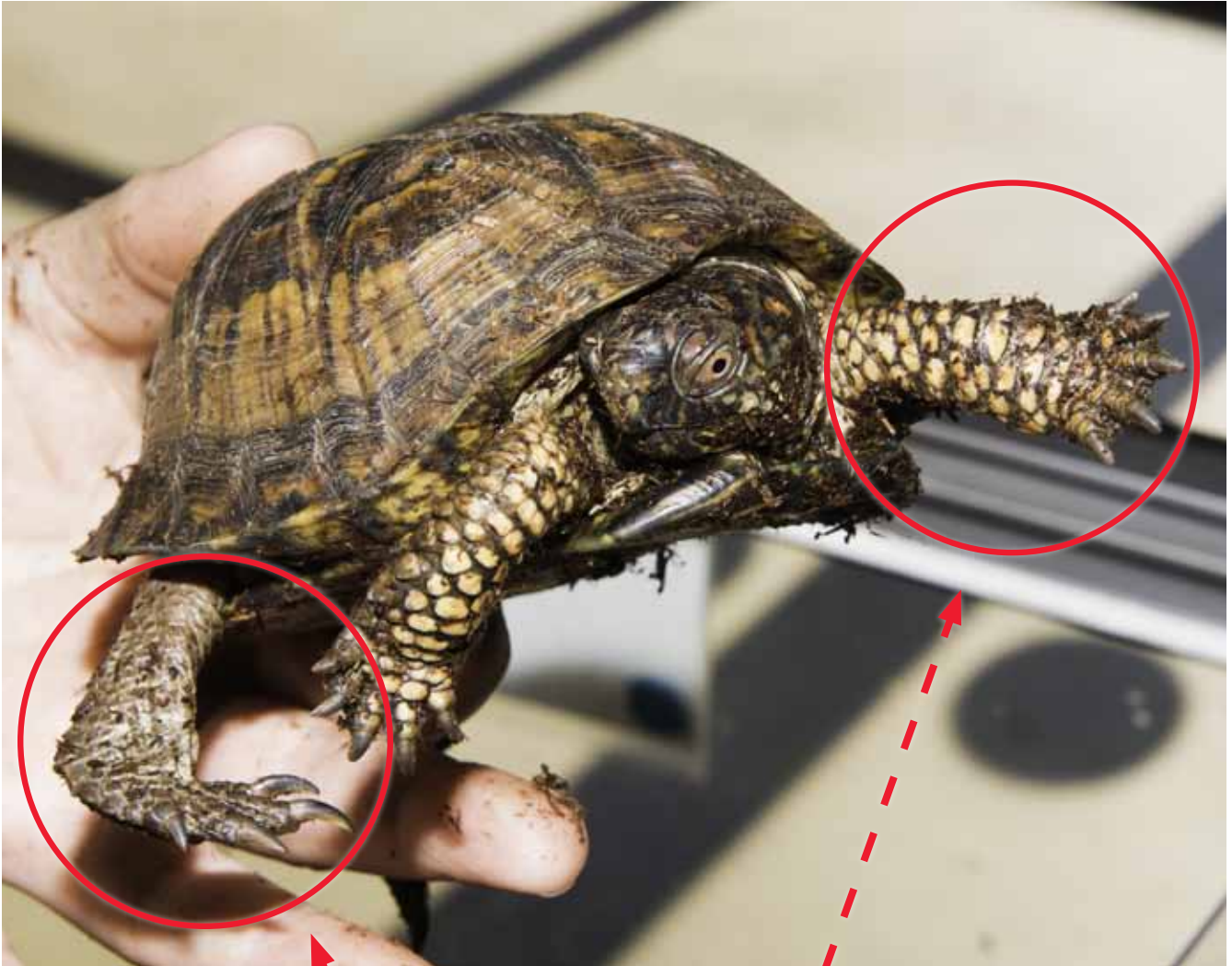
SOME OBSERVATIONS MADE BY GUILLAUME

The carapace of the Eastern Box Turtle is highly domed. It can REACH up to 20 centimetres in length.



Its carapace is covered with BLACK, BROWN, YELLOW and/or ORANGE patterns. All these photos show the same turtle. However, be advised that the patterns vary considerably from one turtle to the next.

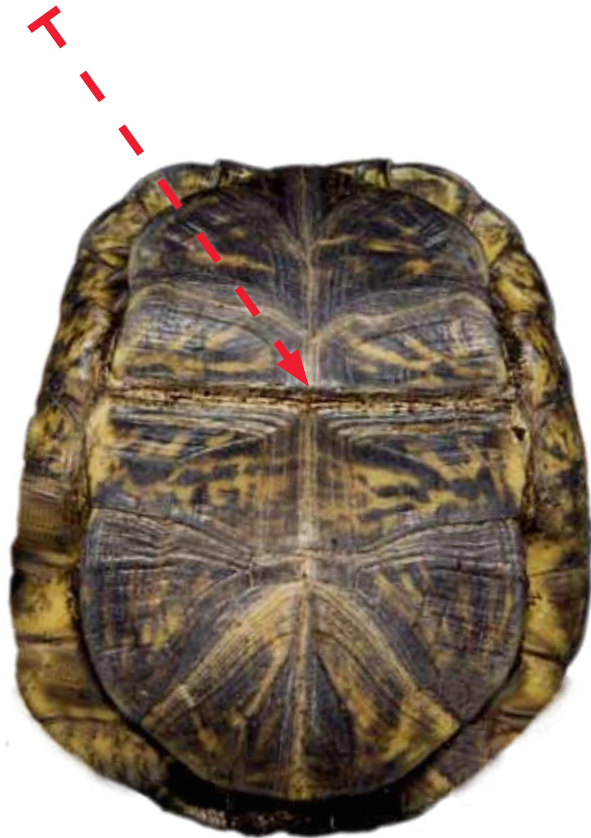




The Eastern Box Turtle has four claws on its hind feet and five on its front feet.



HINGE



DID YOU KNOW?

The plastron of the Eastern Box Turtle, Musk Turtle and Blanding's Turtle is SPECIAL. It is equipped with a hinge which gives these turtles the ability to hide better in their carapace when threatened. The Eastern Box Turtle is well named because it is the only species in Canada that is able to entirely hide itself in its carapace, as if it were hiding in a box.

FUN FACT

In Canada, all turtles prepare themselves to spend the winter underwater. Their metabolism progressively slows down during hibernation at the bottom of various water bodies. An exception to this hibernation strategy is the Eastern Box Turtle, who instead burrows underground during the winter months.



CONCLUSION

IT WAS FUN!

In your hands, you have the work of many years of research and hard work. Even if GUILLAUME was sometimes tempted to give up, he persevered. For that, he deserves admiration.

Guillaume is not a genius. He is a boy like all the others. He had to read, think, prepare questions, interview people, travel, and many other things to make this book. Congratulations, Guillaume.

Fortunately, he was not alone in achieving this feat. Congratulations also to his mother (Julie), father (Marc), and brother (Grégoire), who were there for this colossal project. They were all convinced of its importance by Guillaume.



Grégoire helping his little brother Guillaume and Scott Gillingwater to release baby Spiny Softshell Turtles that hatched in incubators.

ACKNOWLEDGMENTS

Many people have helped Guillaume in his research for this book. Here are some individuals he would like to thank from the bottom of his heart:

Carole Bellerose from Centre de la biodiversité du Québec; Constance Browne and Andrew Sullivan from University of New Brunswick and Rockwood Park; Cynthia Paszkowski from University of Alberta; David Suzuki from David Suzuki Foundation; Denis Fournier from City of Montreal; Daniel Featherstone, Denis Masse, Elisabeth Caron, Hillary Knack, Jacques Brunet, Lauren Lawrence, Mary Beth Lynch and Noah Johnson from Parks Canada; Donald McAlpine from New Brunswick Museum; Étienne Plasse; Geneviève Leblanc from ministère de l'Éducation et de l'Enseignement supérieur; Gigi Allianic from Woodland Park Zoo; Guillaume Daigle et Katie Scott from Ducks Unlimited Canada; Jean-Marc Vallières from parc national de Plaisance; Jeffie McNeil from Mersey Tobeatic Research Institute; Kelsey A. Marchand from University of Regina; Marie-Andrée Carrière from Environment and Climate Change Canada; Menita Prasad from Greater Vancouver Zoo; Patrick Paré from the Granby Zoo; Paul Goulet, Sheri Goulet and Brian Oehring from Little Ray's Reptile Zoo; Paul Yannuzzi and Katherine Wright from Toronto Zoo; Samantha Hughes from Wood; Scott Gillingwater, Kaela Orton, Samantha Arevalo and Eleanor Heagy from Upper Thames River Conservation Authority; Sébastien Rouleau from Zoo Ecomuseum; Stéphanie Tessier from Canadian Museum of Nature; Steve Mockford et José Lefebvre from Acadia University; Suzanne Fisette from ministère de l'Environnement et de la Lutte contre les changements climatiques; Yohann Dubois from ministère des Forêts, de la Faune et des Parcs.



SCIENTIFIC REVIEWER: SCOTT GILLINGWATER

Scott Gillingwater provided the scientific revisions for this book. Guillaume admires him immensely. You'll understand why by reading his impressive biography.

Scott Gillingwater is a reptile specialist who has worked with all eight species of native Canadian turtles.

He is currently the Species at Risk Biologist for the Upper Thames River Conservation Authority as well as a freelance Herpetologist.

Since 1994, he has initiated and conducted many field surveys on different turtle populations, worked on the rehabilitation of habitats, and currently manages one of the largest turtle egg incubation and hatchling release programs in Canada. With his team, he has released tens of thousands of hatchlings back into Ontario's rivers, lakes and wetlands.



Scott Gillingwater in action in the field.

Mr. Gillingwater is also a member of several groups, teams and committees, and a past president of the Canadian Herpetological Society.

Thanks for sharing.



“These days, when most Canadians live in cities, few of us get to see turtles. These fascinating creatures evolved long before humans were on this Earth, but today, people have become very numerous and we are taking over habitat where turtles once flourished. I believe it is important for us to love all parts of Nature so we will be more careful in how we treat her.

This book is a labour of love by a child, Guillaume DeBlois, and his mother, Julie, expanding a survey of turtles in Quebec to look at the reptiles across Canada. Read it with delight. I guarantee you will learn things you didn’t know about this fascinating group of animals.”

- David Suzuki