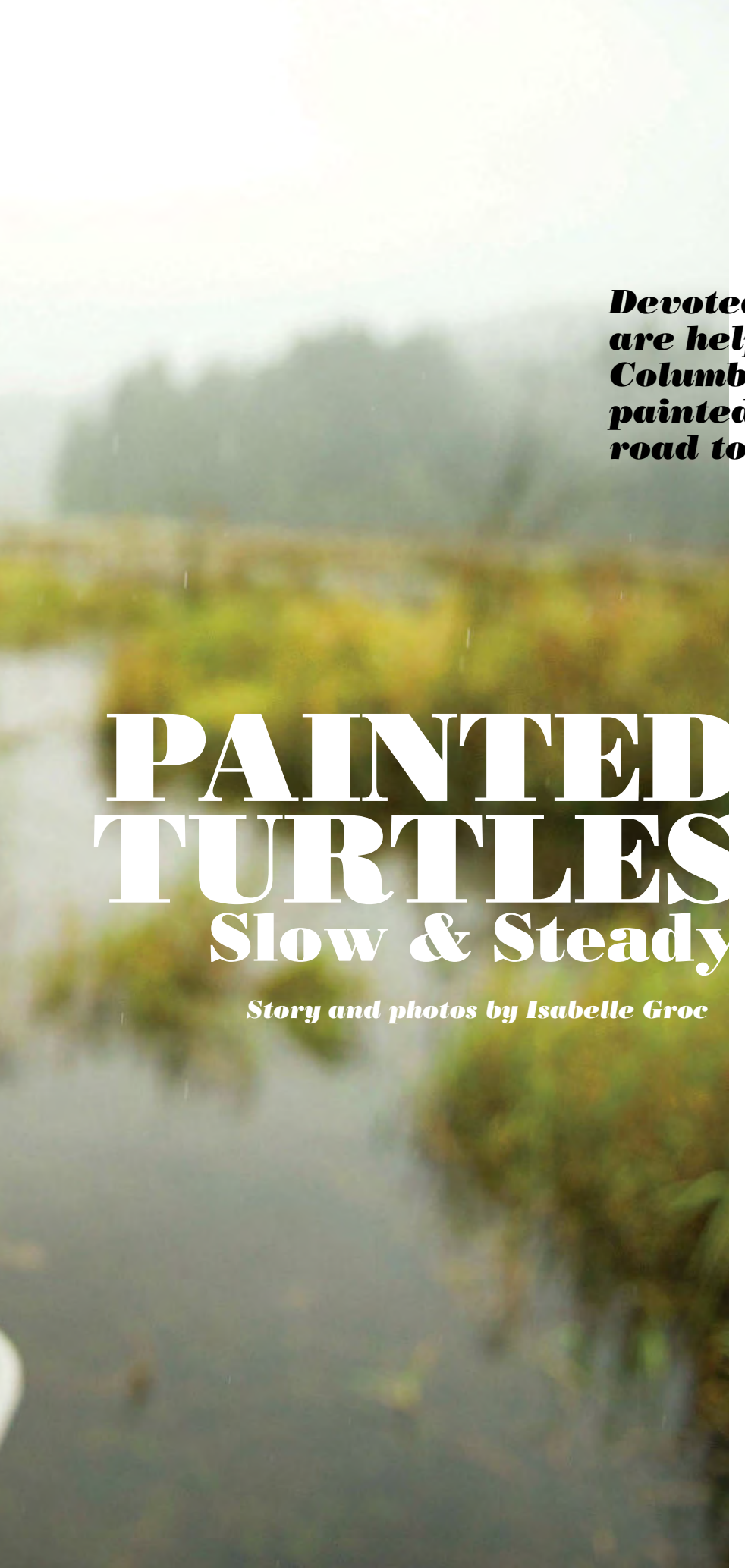
Cindy Hulst releases a baby western painted turtle into the wilds of the Lower Mainland.



PAINTED TURTLES
Slow & Steady

Devoted conservationists are helping British Columbia's rare western painted turtles along the road to recovery

Story and photos by Isabelle Groc

EVERY YEAR, ON A LATE SPRING evening, three female western painted turtles leave the waters of Case Lake, on Texada Island, come ashore to dig shallow nests and carefully lay their eggs, one at a time. After laying, the females pull the soil back in place with their hind feet, camouflaging the nests, and return to the lake where they have lived for several decades. Since 2009, Aimee Mitchell, a species at risk biologist with the Coastal Painted Turtle Project has been watching this ancient ritual, waiting for hatchlings to emerge from these eggs come fall.

But year after year, the eggs have failed to produce a single baby turtle. Since the turtles were nesting in lawns and gardens of nearby private landowners, Mitchell first suspected that the soil was not high enough quality for the eggs to properly develop. She diligently built two south-facing nesting beaches and installed basking logs the turtles need to stay warm. The next year, the females came back, laid eggs in the new nesting habitat, but once again, no turtles were born. Finally, after surveying the lake, Mitchell realized the problem. There was not a single male turtle present in Case Lake; as a result, the eggs remained unfertilized. "These females have been religiously nesting every year but never had any young," she explained.

THERE WAS ONCE more turtles in this small lake, but after a road was built through the wetland, the turtles gradually lost their nesting habitat to urban development and were often killed when crossing the road. Eventually, only three older females were left.

Mitchell and her colleagues decided to take action before the lake lost all remaining turtles. In the fall of 2014, she captured a young male from a nearby lake and moved the animal to Case Lake, with the

An adult western painted turtle, with the distinctive yellow lines on its head.

hope to give the population a fresh start.

"I was excited for the females to finally be able to contribute to the population rather than wasting their energy every year," she said.

The fate of those isolated, "living dead" western painted turtles, unable to reproduce, is not unique. These animals belong to the Pacific Coast population of western painted turtles, which are found on the south coast of British Columbia, including the Fraser Lowlands, the Sunshine Coast, southeast Vancouver Island and in urban areas throughout the Lower Mainland. This population is federally listed as "endangered" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and provincially redlisted because of major declines, primarily due to habitat loss and fragmentation, road mortality, human disturbance, poaching, predation and invasive species. The western painted turtle is one of four recognized subspecies of painted turtles in North America, and it is B.C.'s only remaining native freshwater turtle, as another species, the western pond turtle was extirpated decades ago.

On warm, sunny days, western painted turtles can be spotted swimming in shallow water or basking on logs along a lakeshore. They are easily recognizable with yellow stripes on the head, neck, tail and legs, and their uniquely shaped bright red-orange abstract markings on the plastron (belly-side of the shell). But because they live around the shallow waters of ponds, lakes and wetlands that are also highly valued by humans, much of their habitat has been appropriated for urban development. In many areas of B.C.'s south coast, wetlands and ponds that the turtles thrive in were drained, filled or modified to meet human needs.

ON THE FAST-GROWING lower Sunshine Coast, Michelle Evelyn, leader of the Sunshine Coast Wildlife Project, has counted 17 different waterbodies occupied by western painted turtles, but most of them have small populations of 30 individuals or fewer.

"One of the biggest threats the turtles face here is road mortality," she says. Roads run along the lakes where the animals live, and very little nesting habitat remains, forcing turtles to seek nesting opportunities in unsuitable sites.

As females venture on land every year to nest, they cross roads and have fatal encounters with cars, which has negative long-term impacts on the overall population. "The turtle life history is set up so that very few babies survive to adulthood, but once they make it to adulthood, they are supposed to live for decades and reproduce year after year," explains Evelyn. "Every time you lose a breeding adult from the population, that is really devastating."

Known for their resilience, turtles have features that biologists still do not completely understand. In the first few years of a turtle's life, the number of growth rings on the plastron gives away its age, but then it becomes impossible to tell how old a turtle is, and no biologist has been monitoring turtles long enough to know exactly how long they live. It is generally thought that these animals can live for more than 50 years. Unlike humans, turtles don't seem to age, and the liver, lungs and kidneys of an old turtle cannot be distinguished from a young turtle. In fact, the older the turtles get, the more eggs they produce and the more successful they are at reproducing.

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Western painted turtles are true masters of survival and have unique adaptations that help them withstand the harshest conditions. For example, in September, baby turtles break out of their eggs but will stay in their shallow nest despite freezing winter temperatures. The tiny hatchlings possess a natural anti-freeze and produce special proteins that cause ice crystals to form outside of cells, preventing damage to tissue. When the weather warms up in the spring, they emerge intact.

In the winter, turtles bury themselves in the mud at the bottom of ponds and lakes and lie dormant, often in groups. They slow down their metabolism and heart rate and absorb oxygen from the water through their skin and cloaca (the opening of the reproductive tract).

But today, even with their exceptional ability to survive, western painted ▸

turtles are struggling in the modern world. "They can't stand up to a car," says Evelyn. "Even species with good adaptations need habitat—so when their habitat disappears because humans take over a lot of it, there is only so much they can do."

Evelyn and other biologists work hard to help western painted turtles, and since 2008 her team has taken many actions to give the Sunshine Coast populations a new boost, building 11 nesting beaches strategically located between the lakes and the roads to reduce road mortality. Since a nesting beach was built at Ruby Lake, the number of turtles killed every year has decreased from 20 animals to one or two.

Turtles may also choose nesting sites where their eggs are not able to survive. When set in campsites, on swimming beaches, near boat launches or in agricultural fields, the shallow nests are often accidentally dug up by people and dogs or destroyed by boats and trucks.

EACH YEAR, STARTING in May, Evelyn patiently watches the turtles come ashore. She protects the nests and if the females pick an unsafe site, she relocates the eggs to a more secure location. In 2012, eggs that were laid in two unsafe nests were collected for the first time to test whether it was possible to raise western painted turtles in captivity. A year later, 12 baby turtles were released at the same lakes where they were first gathered. "They seemed very at home in the lake once they were released," recalls Evelyn.

Since then, more turtles are raised in captivity every year as part of a collaborative effort between Wildlife Preservation Canada and the Greater Vancouver Zoo. After a year in captivity, baby turtles are released in various sites around Metro Vancouver and the Fraser Valley where South Coast turtle populations are too small and isolated to breed on their own. In the summer of 2014, 120 turtles were released, and this year, 130 more animals will be released to help regrow the wild populations.

"We know there are more than 120 turtles in the South Coast population and those turtles would not be around if we didn't help them out, so we are having an impact already," says Andrea Gielens, recovery biologist for Wildlife Preservation Canada.

Captive breeding is a complex process, and some of the survival adaptations that the turtles possess can become a challenge in captivity. For example, after mating, females can store sperm for up to three years, and as a result a clutch of eggs can have more than one father. "A female does not have to run into a male every year in order to lay successful eggs, which is great for the turtles in an area where there is a low concentration of animals," Gielens explains.

Western painted turtle habitat in British Columbia.

But in Burnaby Lake, one of the main breeding sites in the Lower Mainland, western painted turtles often mate with non-native midland painted turtles, and when Gielens catches those females for captive breeding, the offspring she raises may be from an unwanted non-native species. "It is a good survival strategy but it is one thing the turtles do that works against us in captivity," she says.

In the wild, western painted turtles also face competition from introduced red-eared sliders, which are often released in lakes by owners who no longer want them as pets. These larger turtles compete for space and resources, and they will eat painted turtle hatchlings. Gielens is increasingly worried about red-eared sliders. Last year, she witnessed these turtles successfully reproduce for the first time, which had never happened before for a species adapted to warmer climates. With climate change, the invasive turtles gain a new advantage in B.C. "We now have a released pet that is breeding, which adds a whole new level to controlling this invasive species," Gielens notes.

Over the long term, climate change may also impact western painted turtles in a deeper way. The temperature in the nest determines the sex of the hatchlings. Cooler nests produce male offspring, and warmer ones produces female offspring. A continued warming climate could result in an unequal sex ratio. "We may have to produce males artificially by keeping them cooler in captivity," says Gielens.

In the meantime, Aimee Mitchell hopes that the new male she placed in Case Lake will successfully produce hatchlings in the fall.

"Hopefully he likes his new ladies," she says. "The needs of the turtles are fairly simple, like providing them with a safe nesting location. This is the one species that I feel we can make a tangible difference for."

Public education and outreach is an important component of western painted turtle recovery.