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The Petitcodiac River

The Petitcodiac river, often nicknamed by the locals as the chocolate river due to its heavy sedimentation, is located in South Eastern, New Brunswick. It is a popular belief that the name derives from the French term “petit coude” meaning “little elbow”. The real etymology of the word comes from an indigenous word. According to Maliseet Elder and linguist Dr. Peter Paul of the Woodstock Reserve, the name refers to a wall of water rushing in and means “sound of thunder”. The name could also derive from the Mi’kmaq word Epetkutogoyek *which* means “the river that bends like a bow”. This is a reference to the right-angle bend near Moncton. Acadians transformed the spelling to Petcoudiac or Petitcoudiac which was modified to Petitcodiac by British settlers.

Ten named tributaries join the river in its course toward its mouth in Shepody Bay. Its tributaries to the left are North River, Mill Creek, Jonathan Creek, Halls Creek, and Fox Creek. Its tributaries on the right are Anagance River, Little River, Pollett River, Turtle Creek, and Weldon Creek. The Memramcook River joins the Petitcodiac River near its mouth. The Petitcodiac then drains into Shepody Bay. Once the bay passes Hopewell Rocks, it merges with the Cumberland Basin, which flows South-West towards Chignecto Bay. Chignecto Bay drains into the Bay of Fundy, which flows into the Gulf of Maine, which continues South-East into the Atlantic Ocean via the Northeast Channel.

The river has a meander length of 79 kilometers. It runs through Westmorland, Albert, and Kings counties. An array of banks on both sides precede the 90-degree turn to the south, a characteristic that gave Moncton its original name, Le Coude (The Elbow). Its watershed includes valleys, ridges, rolling hills and is home to a varied population of terrestrial and aquatic species. The area of its watershed is 2,071 square kilometers. The average yearly precipitation in the watershed is 1,100 millimetres.

In 1968, the famous causeway was built between Moncton and Riverview in lieu of a bridge to travel between the two communities. Its purpose was also to prevent agricultural flooding. It formed a wall which blocked all but 100 meters of water as the river flowed downstream toward the Gunningsville Bridge. This caused major issues for the river and its surrounding ecosystem. An estimated ten million cubic meters of silt was deposited in the 4.7 kilometers of river downstream from the causeway in the first three years following construction. The causeway limited the movement of fish and reduced the region’s salmon catches by 82 percent. The causeway also benefited the provincial government’s budget, as the federal government was willing to fund the $3 million project, but not a bridge. Several proposals for amendments were given, but no action was pursued.

Before the construction of a causeway in 1968, the river had one of the world's largest tidal bores. They occurred twice a day and came from the world's highest tides in the Bay of Fundy. Their height ranged from 1 to 2 metres and they moved at 5 to 13 kilometres per hour. During the causeway's time, the height diminished to a few centimetres. Water quality also dropped due to industrial expansion around the area. In 2003, Earthwild International classified the Petitcodiac River as the most endangered river in Canada. The causeway was blamed as one of the major factors behind the river's depleted health.

The Petitcodiac River was home to many aquatic species. Fish originally included Atlantic tomcod, rainbow smelt, gaspereau, American shad, American eel, Atlantic salmon, brook trout, lamprey, striped bass, and Atlantic sturgeon. A lot of diverse species, right? Well, it's not over yet! Other fish included the blueback herring, brown bullhead, chain pickerel, smallmouth bass, white perch, and the white sucker. Marine mammals were uncommon, but still existed in the region. Pilot whales, Atlantic white-sided dolphins, harbour porpoise, harbour seals, and porbeagles have all been sighted in the Petitcodiac river. Now, we mustn't forget about our freshwater mollusc species! The brook floater, dwarf wedgemussel, eastern ellipto, eastern floater, eastern pearlshell, and the triangle floater all made a home in the Petitcodiac. That's a diverse community of organisms. In fact, many other aquatic organisms are thought to have once entered the watershed due to the low salinity of the water.

Six species have disappeared from the river since the mid-1980s.The Petitcodiac River was the only known Canadian habitat of the dwarf wedgemussel. This species is now extirpated across Canada and endangered in the United States. The Atlantic salmon is no longer present in the watershed, and has been listed as an endangered species in Canada. Four other species have been eliminated from the river: the striped bass, the American shad, the Atlantic sturgeon, and the Atlantic tomcod. There are also many plant and insect species diminishing due to the effects of the causeway.

Shortly after the building of the causeway, a 35-hectare landfill was built near the river. Various materials were disposed of in the area, including petroleum waste oil, pipe and foam insulation, sewage sludge, and medical waste. Although the landfill was shut down in 1992, samples by the Environmental Bureau of Investigation and the Petitcodiac Riverkeeper indicated that ammonium levels around the leachate exceeded Canadian quality guidelines by as much as fifteen times, and contained heavy metals, petroleum hydrocarbons, and PCBs. Daphnia and trout that were exposed to water samples had a 100 percent mortality rate. Gemtec Limited, the company responsible for planning and closing the landfill, and the City of Moncton were charged on the 12 March 2002, for offences relating to the Canadian Environmental Protection Act (1999). The city admitted to their crimes against the environment on the 23 September 2003, paid a $35,000 fine, and was ordered to help reduce the leachate flow from the landfill. Three years later, Gemtec Limited was fined a total of $6,000 and was ordered to contribute a total of $22,000 to the federal Environmental Damages Fund and the Jonathan Creek Committee.

Moncton's population has grown rapidly since the 19th century, rising from fewer than 100 people in 1825, to over 15,000 people in 1917, and to 126,000 people in 2006. Despite this growth, most of the

area remains relatively undisturbed: 80 percent of the watershed is forest, a tenth is used for agriculture and three percent is occupied by wetlands. Only four percent of the area is used for commercial, residential, or private usage. Even so, the Petitcodiac Watershed Monitoring Group indicated in 2001 that this growth of the city is one of the main factors for the ongoing "environmental degradation" of the river. We must remember that although the population has grown, without the river it wouldn't have.

The Petitcodiac is the reason the shipbuilding era began in 1840. Without this breakthrough, Moncton would have been a ghost town. Stewart Russell was a shipbuilder from Hopewell. Russell built the Aginora, which sailed down the Petitcodiac River to trade at the ports in Saint John and New England. A ferry service on the Petitcodiac River was launched in 1841, thanks to a license owned by Simon Outhouse. Stephan Binney built the Lark in 1845. It was another important vessel as it was the largest to sail on the river. When Joseph Salter arrived in 1846 was when things really got cracking. A shipyard founded by Binney and Salter produced 24 vessels from 1847 to 1859, and employed nearly 500 of the 1,000 inhabitants in Moncton at the time. Salter then became the first mayor of Moncton in April 1855, the year the town was incorporated.

After years of planning and bickering, the causeway gates were opened in 2010. Since the opening, the river improved significantly, surpassing original expectations for the project. The tidal bore's height is increasing more than predicted. An estimated 40,000 gaspereau have returned to the river.

This is a great start for solving the problems the river faces, but more needs to be done. It is important that we take regular samples of the water in the river to ensure maximum quality. How can we improve the quality if we don't know the fluctuations and patterns it experiences? Since 1999, the Petitcodiac Watershed Alliance has collected water samples to study bacteria, nutrient, pH, dissolved oxygen, and sediment levels. E. coli levels were high upstream, and above recreationally safe levels downstream in June, July, and August of 2009. Nitrates and phosphates failed to meet the safe quality threshold on occasion. A publication by the New Brunswick Department of Environment in 2007 showed that the watershed did not meet the quality guidelines for E. coli in 10 percent of samples, for dissolved oxygen in 5 percent of samples, and pH in 3 percent of samples.

During their 2001 study, the Petitcodiac Watershed Alliance noted the effects of pesticides on water quality, and recommended working with farmers to install fencing around streams which run through their properties, and "eventually phase out" cosmetic pesticide usage. Pesticides contaminating our watersheds is also an issue we need to attack. A good idea would be to ban or restrict harmful activities near bodies of water. For example: in 1982, the province allowed uranium mining near Turtle Creek which is where the tri-community of Moncton, Dieppe and Riverview's drinking water comes from. They later restricted the mining to 300 meters from residential areas and banned it completely from protected drinking water areas.

Education is half the battle. If we educate the youth of today, we can protect the youth of tomorrow. We need to teach them how to separate their waste, why our watersheds are vital to our lives, more

importantly what a watershed is. Here's a hint: it's not a shed filled with water like an alarming number of people think. Their lack of knowledge isn't always their fault though, older generations need to care enough to teach us what is going on around us. Do you want a world without worries that will only last for the next thirty years, or do you want to leave something for the next generation?

Let the youth get involved, show them that they matter and are important. You never know who could be doubting themselves or be thinking that they don't matter because they're "just a kid". There could be someone who decides not to pursue a career in science because they don't think they're good enough, or someone who doesn't speak up or research matters important to them because they think their opinion "doesn't matter". That person could be the person that would have discovered or invented a revolutionary watershed care technique. The Petitcodiac Watershed Alliance has done a great job of starting this movement. Members of their group are often guest speakers at local high schools and they welcome student volunteers to assist in field work. This is the best way to educate and show youth that their input matters.

Educating everyone and making changes to school curriculums is difficult. Making those changes will be tedious and take an immense amount of time. We need action NOW. Why not just provide more funding to The Petitcodiac Watershed Alliance? They have helped New Brunswick's ecosystems and bodies of water more than anyone else. They have had some part in everything mentioned above for solutions. A petition should be started to direct the provincial government to increase their funds. Passionate environmentalists could even hold fundraisers! This is a group of extraordinary people who deserve more credit and more opportunities. This is the solution that would make all the other solutions possible. New Brunswick is the province that is often dismissed, this agitates our youth, a lot of us plan to move out West because of it. If it was shown that their voices could be heard and they could make a difference, they would be inspired to. N.B youth are dying to make a change. We are passionate, if given the opportunity, we will do anything it takes for the water quality we deserve.

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