

## = Petitcodiac River =

The Petitcodiac River / p?ti?ko?di.æk / , known informally as the Chocolate River , is a Canadian river in south @-@ eastern New Brunswick . The river has a meander length of 79 kilometres ( 49 miles ) and is located in Westmorland , Albert , and Kings counties , draining a watershed area of about 2 @,@ 071 square kilometres ( 800 sq mi ) . The watershed features valleys , ridges , and rolling hills , and is home to a diverse population of terrestrial and aquatic species . Ten named tributaries join the river in its course toward its mouth in Shepody Bay . Before the construction of a causeway in 1968 , the river had one of the world 's largest tidal bores , which ranged from 1 to 2 metres ( 3 @.@ 3 ? 6 @.@ 6 ft ) in height and moved at 5 to 13 kilometres per hour ( 3 @.@ 1 ? 8 @.@ 1 mph ) . With the opening of the causeway gates in April 2010 , the river is flushing itself of ocean silts , and the Bore is returning to its former glory .

The Mi 'kmaq were the first to settle near the river , and used it as part of a portage route between Shubenacadie and the village of Petitcodiac , where they had a winter camp . Acadians from Port Royal , Nova Scotia colonised the region in 1698 , but were expelled in 1755 during the Seven Years ' War . Acadian resistance fighters in Village @-@ des @-@ Blanchard ( now Hillsborough ) fought under the command of French leader Charles Deschamps de Boishébert in the Battle of Petitcodiac to fend off British troops and suffered the destruction of most of their settlement . The British troops revisited the river three years later and conducted the Petitcodiac River Campaign . In the 1840s , the Greater Moncton area saw a shipbuilding boom , but this was halted following the arrival of the steam train , and forced the town to unincorporate . These changes eventually marginalised the Petitcodiac River .

In 1968 , a controversial rock @-@ and @-@ earth fill causeway was built between Moncton and Riverview to prevent agricultural flooding and to carry a crossing between the two communities . The causeway caused many problems for the river and its surrounding ecosystem . An estimated 10 million cubic metres ( 13 million cubic yards ) of silt was deposited in the 4 @.@ 7 km ( 2 @.@ 9 mi ) of river downstream from the causeway in the first three years following construction . The causeway restricted the movement of fish and reduced the region 's salmon catches by 82 percent . Water quality has also dropped thanks to industrial expansion around the area . In 2003 , Earthwild International designated the Petitcodiac River as the most endangered river in Canada because of these problems . On 14 April 2010 , the causeway 's gates were opened permanently as part of a \$ 68 million three @-@ phase project designed to restore the river , to be completed by 2015 .

## = = Etymology = =

A popular belief suggests that the name derives from the French term " petit coude " , meaning " little elbow " . In fact , the name derives from an indigenous word , probably Maliseet or , possibly Mi 'kmaq . According to Maliseet Elder and linguist Dr. Peter Paul of Woodstock Reserve , the name refers to a wall of water rushing in : " now they call that petakuyak . [ It ] means ' sound of thunder , ' well , the rush of water coming in like a thunderstorm . " If the term has a Mi 'kmaq origin , it could have been derived from the word Petkootkwe?k , meaning " the river that bends like a bow " , a reference to the right angle bend near Moncton . Acadians transformed this to Petcoudiac or Petitcoudiac , which was modified to Petitcodiac by British settlers . The river 's heavy sedimentation led to the nickname " Chocolate River " , due to the resulting brown tint . When the Petitcodiac River Causeway was built , an additional 10 million cubic metres ( 13 million cubic yards ) of this sediment began to accumulate in the 4 @.@ 7 km ( 2 @.@ 9 mi ) of river downstream from it .

## = = Geography = =

## = = = Course = = =

The river measures about 79 km ( 49 mi ) from its source near Petitcodiac to its mouth at Shepody

Bay ; its source derives from the confluence of the Anagance and North rivers in western Westmorland County . The Anagance River arises from its tributaries , Hayward Brook and Holmes Brook , and drains 81 km<sup>2</sup> ( 31 sq mi ) from the south @-@ east of the Petitcodiac River , while the North River drains 264 km<sup>2</sup> ( 102 sq mi ) from the north . From the confluence , the river passes under the bridge on Route 106 in Petitcodiac , The road then follows the river to Moncton on the left side of the river . Route 1 crosses the river a few kilometres downstream to join Trans @-@ Canada Highway 2 . The community of River Glade precedes Petitcodiac River 's right tributary , Pollett River , with a watershed of 314 km<sup>2</sup> ( 121 sq mi ) . As the waterway runs past Salisbury , its final major right tributary , Little River ( formerly known as Coverdale River ) , joins it . Little River 's watershed is 275 km<sup>2</sup> ( 106 sq mi ) . The river passes Coverdale and is joined by Turtle Creek before widening as it approaches Moncton .

The causeway , built in 1968 , formed a wall blocking all but 100 m ( 330 ft ) of water as the river flowed downstream toward the Gunningsville Bridge . Before the causeway 's construction , the river 's area would expand through Moncton , attaining a width of 1 @.@ 6 km ( one mile ) . A series of banks to both sides precede the 90 @-@ degree turn to the south , a feature that gave Moncton its original name , Le Coude ( The Elbow ) . The river passes Dieppe on its eastern side and Hillsborough on its western side before it approaches its mouth .

The Memramcook River , which has a watershed area of 412 km<sup>2</sup> ( 159 sq mi ) joins the Petitcodiac River near its mouth . The Petitcodiac River then widens and drains into Shepody Bay , where there is a 122 km<sup>2</sup> ( 47 sq mi ) wetland . Once past the Hopewell Rocks , Shepody Bay merges with the Cumberland Basin , which runs south @-@ west toward Chignecto Bay . Chignecto Bay drains into the Bay of Fundy , which flows into the Gulf of Maine , which proceeds south @-@ east into the Atlantic Ocean through the Northeast Channel .

= = = Watershed = = =

The Petitcodiac River watershed is about 2 @,@ 071 km<sup>2</sup> ( 800 sq mi ) . The average yearly precipitation in the watershed is 1 @,@ 100 millimetres ( 43 in ) , with average temperatures of 17 @.@ 5 ° C ( 63 @.@ 5 ° F ) in the summer and ? 7 @.@ 5 ° C ( 18 @.@ 5 ° F ) in the winter . The watershed is located in the Kings , Westmorland , and Albert counties in south @-@ east New Brunswick , with some of it crossing into the Caledonian Highlands to the south @-@ east . It borders the Bay of Fundy and three other designated watersheds in the province : the lower Saint John River to the north @-@ west , the Shediac Bay to the north @-@ east , and the Kennebecasis River to the south . Although the Petitcodiac River 's watershed is geographically distinct from that of the nearby Memramcook River , some groups merge the two for categorisational purposes .

The area has been occupied by Europeans since the late 17th century . 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 . In spite of this growth , most of the area remains relatively undisturbed : 80 percent of the watershed is covered with 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 . Nevertheless , the Petitcodiac Watershed Monitoring Group noted in 2001 that this growth is one of the main factors for the ongoing " environmental degradation " of the river .

= = Hydrology = =

= = = Water quality = = =

The Petitcodiac River was listed in 2003 as the most endangered river in Canada by Earthwild International , and was listed second , behind Quebec 's Rupert River , in 2002 . The causeway was cited as one of the major factors behind the river 's degraded health . The Canadian Council of Ministers of the Environment 's Water Quality Index gave two study sites an " excellent " rating , 20

sites a " good " rating , 27 sites a " fair " rating , and five sites a " marginal " rating .

Since 1999 , the Petitcodiac Watershed Alliance ( known as the Petitcodiac Watershed Monitoring Group at the time ) has collected water samples from May to October to study bacteria , nutrient , pH , dissolved oxygen ( DO ) , and sediment levels . Two sampling sites , one upstream from the causeway and one downstream , were used during the 2009 study . The river had an average temperature of 27 ° C ( 81 ° F ) in August at the upstream location , in contrast to the average of 20 @. @ 1 ° C ( 68 @. @ 2 ° F ) at the same site over the total period of the study . E. coli levels were high upstream , and above recreationally safe levels downstream in June , July , and August . 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 ; in contrast , the river was always within safe nitrate levels .

During their 2001 study , the Petitcodiac Watershed Alliance noted the effects of agriculture on the river 's water quality , and recommended to work with local farmers to install cattle fencing around streams which run through their properties , and " eventually phase out " cosmetic pesticide usage . The Petitcodiac Riverkeeper holds a stronger position on the issue : the organisation notes that pesticides " find their way into the surface and ground water by leaching into the soil or as part of stormwater runoff . " They request that , while measures have been taken in 2009 by the provincial government to regulate cosmetic pesticide usage , the province must forbid its usage altogether and require chemical manufacturers to disclose health warnings and all ingredients on labels . The New Brunswick Department of Environment also warned of the erosion caused by the removal of the river 's riparian zones , which is a common " land use practice " .

Although mining around the area essentially stopped with the closure of the gypsum mines in 1982 , uranium mining has surfaced as a potential problem for the river . The province was the subject of a controversy in 2007 when it gave Vale Limited ( formerly known as CVRD Inco ) the right to mine for uranium at Turtle Creek , where the Greater Moncton water reservoir is maintained . Environmentalists warned of the dangers related to the move , fearing that contaminants could be pushed into the surrounding water . The Petitcodiac Riverkeeper also noted uranium mining 's " irreversible effects to the health of ecosystems , watersheds , wildlife , agriculture , recreation , and public health " , and joined 30 other environmental groups in asking the provincial government to establish a ban on the act . The province would later restrict uranium mining to 300 m ( 980 ft ) from residential areas and ban it from protected drinking water areas . Another controversy in 2006 involved exploration for oil and gas deposits in the same area , but access was blocked by the municipal government .

Shortly after the building of the causeway , a 35 ha ( 86 @-@ acre ) 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 . While the landfill was shut down in 1992 , samples by the Environmental Bureau of Investigation and the Petitcodiac Riverkeeper showed that ammonium levels around the leachate exceeded Canadian quality guidelines by as much as 15 times , and contained heavy metals , petroleum hydrocarbons , and PCBs . A mortality rate of 100 percent was found for test trout and daphnia when exposed to water samples . Gemtec Limited , the company responsible for planning and closing the landfill , and the City of Moncton were charged on 12 March 2002 , for offences relating to the Canadian Environmental Protection Act ( 1999 ) and the Fisheries Act . The city pleaded guilty on 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 .

= = = Discharge = = =

The river aids in the drainage of ten significant bodies of water : Weldon Creek , Fox Creek , Mill Creek , Halls Creek , Jonathan Creek , Turtle Creek , Little River , Pollett River , Anagance River , and North River . A report in 2000 showed that it handles an average discharge of 27 @. @ 3 m<sup>3</sup> / s

( 960 cu ft / s ) into its mouth yearly , with a recorded high of 730 m<sup>3</sup> / s ( 26 @, @ 000 cu ft / s ) in 1962 and a low of 0 @. @ 36 m<sup>3</sup> / s ( 13 cu ft / s ) in 1966 . The same report estimated mean values for the minimum and maximum discharges for every two @-@ year , 10 @-@ year , and 100 @-@ year flood events , and minimum discharges for every two @-@ year , five @-@ year , and 100 @-@ year " drought " events :

= = = Tidal bore = = =

The Petitcodiac River tidal bores ? retrograde waves moving upstream over downstream waves ? occur twice a day and come from the world 's highest tides in the Bay of Fundy . The first European mention of the bore was by British Lieutenant Colonel George Scott on 17 November 1758 , during a downstream voyage from Moncton to Fort Frederick , near Saint John . The Admiralty referred to the tidal bore in a hydrographic chart published in 1861 , observing that " [ after ] its passage the rise of the tide is very rapid until high water is attained " , and that " [ during the lowest tides ] the Bore still appears but its broken front usually is only a few inches high . "

The bores ranged from 1 to 2 m ( 3 @. @ 3 ? 6 @. @ 6 ft ) in height , with speeds from 5 to 13 km / h ( 3 @. @ 1 ? 8 @. @ 1 mph ) . In 1825 , Peter Fisher noted that the " noise of the Bore is heard a great distance , and animals immediately take to the highland , and manifest visible signs of terror if near it . " Before the causeway ( 1968 ) , values were compared with the tidal bores of the Qiantang , Hooghly and Amazon rivers . After the causeway was built , the bores reached heights from about 5 to 75 cm ( 2 @. @ 0 ? 29 @. @ 5 in ) .

= = Wildlife = =

Before the construction of the causeway , the Petitcodiac River was home to many aquatic species . Fish originally included hundreds of thousands of Atlantic tomcod and rainbow smelt , tens of thousands of gaspereau and American shad , thousands of American eel , Atlantic salmon , brook trout , lamprey , and striped bass and hundreds of Atlantic sturgeon . Other fish include the blueback herring , the brown bullhead , the chain pickerel , the smallmouth bass , the white perch , and the white sucker . Marine mammals were uncommon , but normally consisted of pilot whales , Atlantic white @-@ sided dolphins , harbour porpoise , harbour seals , and porbeagles . Freshwater mollusc species included the brook floater , the dwarf wedgemussel , the eastern ellipto , the eastern floater , the eastern pearlshell , and the triangle floater . 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 , and was later isolated to just nine American watersheds after its elimination from the Petitcodiac . The Atlantic salmon is no longer present in the watershed , and has since been listed as an endangered species in Canada . The American shad was a favourite with fishermen , and represented two @-@ thirds of the entire Canadian shad landings from 1870 to 1900 ; catches peaked at 0 @. @ 91 to 2 @. @ 72 million kilograms ( two to six million pounds ) per year . Three other species have been eliminated from the river : the striped bass , the Atlantic sturgeon , and the Atlantic tomcod . However , a project of the Petitcodiac Riverkeeper , funded by the Government of Canada 's Environmental Damage Fund in 2005 , noted that the removal of the causeway would result in a " good " chance of bringing back the eliminated species , and an " excellent " chance of increasing the numbers of species deemed to have been reduced in numbers . No data has been released for the Atlantic salmon or the striped bass .

Various insects and arachnids reside around the Petitcodiac River . Among them is the stonefly , the mayfly , the caddisfly , the simulium , the subfamily of tanypodinae , and the Hydracarina . Non @-@ native species , such as the black @-@ footed spider , the beech scale , the white @-@ marked tussock moth , and the mountain ash sawfly have also made their home in the Petitcodiac River watershed . At the southern extremities of the watershed , 50 to 90 percent of the world 's semipalmated sandpipers feed on the mud shrimp at Shepody Bay . Around 269 @, @ 445 stop

there before migrating to South America , a number which accounts for at least 7 @. @ 7 percent of the total population . Among others , the semipalmated plover ( around 2 percent of the North American population ) , the short @- @ billed dowitcher , the red knot , the sanderling , and the least sandpiper are also known for migrating through the Important Bird Area .

A diverse number of plant species reside in the watershed as well . Red , white , and black spruce , red maple , white birch , and trembling aspen are the most common . Jack pine is commonly found in regions that fires have repeatedly ravished , while cedar is found in bogs and areas where gypsum and limestone are present . Higher altitude slopes and ridgetops house sugar maple , beech , and yellow birch trees . Zelazny et al. note that " [ the ] high frequency of disturbed sites dominated by aspen stands reveals the degree of historical and recent human disturbance along the Petitcodiac River . " The Petitcodiac River 's riparian zone houses a number of trees , including willows , white spruce , white pine , and speckled alder . Other trees , such as the tamarack and white pine , can also be found in the watershed . Plants such as the rufous bulrush tend to grow near calcareous areas , and hemlock can be found in small , pure stands . Alien plant species include the mother @- @ of @- @ thyme , the Japanese barberry , the Scotch broom , the yellow flag , and Canada bluegrass .

In 1937 , the 37 @, @ 000 @- @ year @- @ old skeleton of a mastodon was discovered by workers near Hillsborough . It was in near perfect condition and was transported to the New Brunswick Museum in Saint John , where it has been displayed ever since .

= = Geology = =

The Petitcodiac River watershed covers an area north and east of the Caledonian Highlands ; a low @- @ elevation ( on average 67 m ; 220 ft ) region with rolling hills , valleys , and ridges . In fact , most of the region was below sea level , beneath the former DeGeer and Goldthwait seas , during the quaternary period . Non @- @ calcareous Pennsylvanian ( and younger ) sandstones , conglomerates , silt , and red- to grey @- @ tinted mudstone now compose the majority of the bedrock . The northern shore of the Petitcodiac River , including the Anagance and North rivers , is primarily made up of shale with volcanic rocks , mixed igneous rocks , and felsic pebble conglomerates . The southern shore , including the Little and Pollett rivers , is composed of Precambrian or Lower @- @ Palaeozoic sedimentary , igneous , and volcanic rocks , and limestone . Both shores include red to grey Mississippian sandstone . Red beds , or red @- @ tinted sedimentary rocks , have a higher occurrence around Port Elgin . Other significant Mississippian @- @ era rock patches appear in two areas around the watershed . The first is located near the north @- @ western border of the watershed , near Lutes Mountain and Cornhill . The second ranges from the east of the Memramcook River to the west of Hillsborough , in Beech Hill . The Petitcodiac River watershed also features karst topography , where gypsum and limestone around Mississippian rocks dilute into the circulating groundwater . This creates sinkholes , depressions , and caves . Examples of rare karst occurrences appear west of the village of Petitcodiac , where large sinkholes alternate between small ridges to form honeycomb @- @ shaped patterns . Hillsborough is the home of one of the longest gypsum cave networks in eastern Canada , and is a key habitat for bats in hibernation .

The majority of the watershed 's topsoil is composed of sand , clay , and silt , under which normally lies a layer of ablation moraines . Fairly rich soils made of alluvium and tidal deposits are found along the Petitcodiac and Memramcook rivers , and have often been exploited for agricultural purposes . A publication by the New Brunswick Department of Natural Resources notes that the soils in Salisbury , made from calcareous sandstone and mudstone , are fine @- @ textured and , when properly drained , " are the most fertile glacial tills " in the watershed . In contrast , they note , soils deriving from local conglomerates are more coarse and sandy , and are less fertile .

Albertite , a type of asphalt , was first found in Albert County in 1849 by the Canadian physicist Abraham Gesner , inventor of kerosene . Over 200 @, @ 000 tonnes of the mineral were shipped to Boston within 30 years . Large deposits of gypsum found eight kilometres ( five miles ) from the mining site were shipped around the globe as well . The Petitcodiac River was used as the primary

means for transporting the minerals at the time .

= = History = =

= = = Colonisation ( 1604 ? 1698 ) = = =

The Petitcodiac River region was first settled by the Mi 'kmaq , who used the river 's upstream current as part of a portage route between Shubenacadie and a winter camp at the confluence of the Anagance and North rivers . The first Europeans arrived in early 1604 , when a French expedition to Acadia ( now Nova Scotia and New Brunswick ) , led by the explorer Pierre Dugua de Mons and accompanied by cartographer Samuel de Champlain and future Acadian governor Jean de Biencourt , sailed into the Bay of Fundy . Hoping to find an ideal site for a settlement , they passed Advocate Harbour and the Saint John River before Dugua chose to settle on Saint Croix Island in present @-@ day Maine . Although they did not explore the Petitcodiac region , they returned to the coasts of eastern Nova Scotia , where they founded Port Royal . In 1676 , Jacques Bourgeois , a colonist from the Nova Scotian settlement , settled in the area of Beaubassin ( now the Tantramar Marshes ) . By 1685 , its population had grown to 129 , with 19 out of the 22 families living permanently in the region . Pierre Thibodeau , also from Port Royal , founded Chipody ( now Shepody , New Brunswick ) near Shepody Bay in 1698 . At this time , the inhabitants often referred to the Petitcodiac , Memramcook , and Shepody River area as " Trois @-@ Rivières " ( Three Rivers ) ( not to be confused with Trois @-@ Rivières , Quebec ) .

= = = Acadian history ( 1698 ? 1763 ) = = =

The French and Indian War erupted in 1754 amid tensions between the British and the French over control of the Ohio Valley . Initially , the inhabitants of Acadia were uninvolved in the conflict because the French had already ceded the land to Britain under the Treaty of Utrecht ( 1713 ) . The Acadians were asked to take an oath declaring complete fidelity toward the British monarch on several occasions , but they refused . At first , they were not punished for doing so . A declaration of neutrality was signed in 1730 and was accepted by Nova Scotia governor Richard Philipps . This earned the Acadians the nickname the " neutral French " . At the outbreak of war in 1754 , the British again demanded unconditional oaths of fealty , perceiving the Acadians as a possible threat . In spite of resistance led by Jean @-@ Louis Le Loutre , representatives eventually agreed to sign , but their reluctance persuaded Governor Charles Lawrence to order the Acadian population expelled from British territory .

About 1 @, @ 100 Acadians living around the Petitcodiac River were affected by this decision . Two hundred British troops led by Major Joseph Frye were sent to destroy the settlements of the Three Rivers , beginning with Shepody and Village @-@ des @-@ Blanchard ( now Hillsborough ) . French resistance commander Charles Deschamps de Boishébert , hoping to evacuate as many Acadians as possible , was unable to march the distance between Nerepis and the Shepody settlement in time , but fought at the second threatened village on 28 August 1755 . Boishébert 's troops , composed of inhabitants from the area and from Shepody , counter @-@ attacked , suffering only one loss to twenty @-@ three British casualties . This defeat is thought to have been the reason for the British abandonment of the campaign at the Three Rivers . The commander and the evacuated Acadians , whom Edward Larracey estimated to total around 700 , suffered a massive famine from 1756 to 1758 , largely caused by the scarce resources following the battle .

In 1758 , Joseph Broussard , also known as Beausoleil by the locals , led raids against British vessels sailing in the Bay of Fundy and the Cumberland Basin . This provoked the British into initiating two raids of their own . The first took place in February in Shediac , where Lieutenant Colonel George Scott tried to find Boishébert . When they were returning , Boishébert ambushed them , killing two of Scott 's gunmen . The second raid took place at the settlement of Shepody in March , where the British were shocked to find that the Acadians had already begun rebuilding their

homes . On 28 June , Scott learned of reports that cattle were stolen outside of Fort Beausejour ; the British issued an order for Captain Beloni Danks to send 75 men up the Petitcodiac River . They arrived in Moncton the following night , and about 30 Acadians began firing at their vessel . However , Danks held his offensive position , and the British killed 19 Acadians , taking nine others prisoner . He and his troops continued to sail up the river the next day ; they sent 60 men to burn a settlement 9 @. @ 7 km ( 6 mi ) west of Moncton . Historians presume that the area had already been deserted .

Acadians continued to survive in the region , overcoming the results of the raids . Scott sailed back to the region to search for Beausoleil and to weaken the Acadians before the winter . He arrived in Moncton near midnight on 12 November , but the tide of the Petitcodiac River prevented him from sending more than twelve men . They came back the next morning with 16 prisoners . Scott was told that the area was virtually defenceless , so he sent three parties to La Chapelle ( now Bore Park in Moncton ) , Silvabro ( now Lewisville ) , and Jagersome ( now Dieppe ) . Scott recorded no deaths or prisoners , but all buildings in sight were burned , and cattle were brought back onto the vessel . Additional raids by Scott between 14 and 17 November captured a dozen Acadian prisoners , burned settlements , and uncovered Beausoleil 's own schooner . The crew sent an Acadian prisoner on the 17th to request the surrender of the remaining residents , but when he returned , he reported that they had all begun to flee to Cocagne , Shediac , and the settlements around the Miramichi River . This prompted Scott to return to Fort Frederick in Saint John .

A few of the Acadians migrating to the Miramichi River probably died of hypothermia during the trip due to the 1758 ? 59 winter . Those who survived joined the refugees already present , who had been persuaded by Boishébert to seek refuge there . Inadequate housing and supplies , among other reasons , led to the deterioration of the reputation of the French commander , and only 700 Acadians remained there by late 1759 . Meanwhile , the raiding rapidly took its toll on the residents who stayed around the Three Rivers , as food supplies became scarce and reconstruction became impossible . The fall of Quebec City in September 1759 also eliminated the possibility of assistance from that area . On 16 November 1759 , the 190 Acadians in the region sent a delegate to Fort Beauséjour ( which had been renamed Fort Cumberland ) to announce their surrender to the newly promoted Colonel Frye . The settlements of Miramichi , Richibucto , and Bouctouche surrendered the next day , with a delegate sent to the fort to represent their 700 refugees . Frye requested and received permission from Governor Lawrence to take them in for the winter . The Acadian refugees were offered land on the Isthmus of Chignecto in early 1760 , but most requested their original lands around the Three Rivers , which the governor granted .

= = = Resettlement and modern history ( 1763 ? present ) = = =

After the Treaty of Paris ( 1763 ) , exiled Acadians began to return to the area , but their numbers around the Three Rivers remained under 200 by 1769 . Settlers from Philadelphia began to migrate to the Petitcodiac River area in 1766 : the Trites , Jones and Stieff families moved to present @- @ day Moncton , but the Stieff family ( now Steeves ) , later moved south @- @ east to Hillsborough . Nine families bought land up to 21 km ( 13 mi ) west from the bend of the river , ranging from 1 @, @ 718 to 2 @, @ 193 acres ( 695 ? 887 ha ) per grant . In 1829 , the population of Moncton reached 100 , composed mainly of descendants of these settlers .

Moncton 's shipbuilding era began in 1840 with the arrival of Stewart Russell , 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 . The ship and its crew sank in a storm on 24 December 1850 , during a trip to Boston for Christmas . A ferry service on the Petitcodiac River was launched around 1841 , thanks to a license obtained by Simon Outhouse . The Larch , built by Stephen Binney in 1845 , was another important vessel , becoming the largest to sail on the river . But it was not until the arrival of Joseph Salter in 1846 that the shipbuilding boom began : a shipyard founded by Binney and Salter produced 24 vessels from 1847 to 1859 , and employed almost 500 of the 1 @, @ 000 inhabitants in Moncton . Salter would become the first mayor of Moncton in April 1855 , the year the town was incorporated .

The European and North American Railway was extended to link Pointe du Chene to Moncton in 1857 , with an eventual goal of reaching Saint John in 1860 . The move , according to Larracey , caused the town to become " but a station stop along a railway line " . This coincided with the failure of Moncton 's shipbuilding industry and a population drop from a peak of 2 ,000 to about 500 . The town declared bankruptcy and was unincorporated in 1862 , but it later regained its status in 1875 , after it became the Intercolonial Railway 's headquarters for its shops in 1871 . While the Petitcodiac River continued to aid in the shipping of goods into the 20th century , shipbuilding essentially ended in the 1890s . The final vessel built in Moncton was the Woolastook II on 14 May 1980 , while the final ship to sail up the Petitcodiac River was the Inox from France , which arrived on 12 July 1986 , ( and was , ironically , stranded in Moncton until 3 November due to the river 's tidal fluctuations ) .

In 1924 , the Petitcodiac Tidal Power Company proposed a tidal power project . This called for a dam to be built between Hopewell Cape and Fort Folly Point . The company sold shares to raise funds for the project and a series of on - site and airborne studies were conducted by the federal government , but the project fell through by 1928 . As rail transport became more common , it displaced river transportation around the Great Depression . In addition , the Greater Moncton International Airport offered an airmail service from Moncton to Montreal by 29 December 1929 . These factors further marginalised the Petitcodiac .

The Gunningsville Bridge , which crosses the Petitcodiac River to link Moncton and Riverview , was built in 1867 . It was damaged and rebuilt on four different occasions . The first was following the Saxby Gale of 1869 , which forced the town to rebuild the bridge in 1872 . It went under " extensive repairs " mid - 1892 , but ice build - up from the Petitcodiac continued to pose a threat for the wooden structure , leading to the construction of a new steel version from 1915 to 1919 . This fourth bridge would suffer through many collisions , including one with the Mayflower in September 1929 , which caused the ship to capsize and drown two men . The Gunningsville Bridge would last 86 years before it would be demolished a final time , making way for a 425 - metre - long ( 1 ,394 ft ) four - lane bridge crossing . Covered bridges were also built over the Petitcodiac River , the final extant one being " Hasty " , built in 1929 .

= = = Causeway controversy ( 1968 ? present ) = = =

In 1968 , the provincial and federal governments completed the construction of a causeway between the communities of Moncton and Riverview to provide a crossing over the river , and to keep water levels from impeding agricultural production . This was a benefit for the federal government at the time , which had constantly maintained the dykes in the area . It also benefited the provincial government , as the federal government was willing to fund the \$ 3 million project , but not a bridge . Although the causeway was equipped with a fishway , problems arose when fish were unable to cross it freely due to sedimentation build - up ; some 82 percent of the salmon were prevented from travelling upstream by the structure . The sediment accumulated in the 4 - 7 km ( 2 - 9 mi ) of river downstream from the causeway , with over 10 million cubic metres ( 13 million cubic yards ) of silt deposited in the first three years following construction . Several reports from 1969 to 1971 described its impact on the aquatic ecosystem , and proposals for amendments to the causeway gates were released , but no action was taken . In 1976 and 1977 , reports pointed out several problems related to the gates ' function due to erosion , winter ice jams , and " unsatisfactory fishway operation " .

It was not until 1978 that New Brunswick 's Department of Transportation commissioned a study of the problems . The final report recommended three alternatives for action : to continue operation " as - is " , to continue operation without the gates , or to eliminate gate leakage and amend the operation protocol . The third alternative was chosen two years later , but did not substantially improve fish migration as expected . The provincial government decided to open the gates between 15 April and 7 July 1988 , to allow fish to migrate up the stream . This was repeated from 26 September to 31 October 1988 , and in the spring of 1989 and 1990 during low tides . In 1991 , New Brunswick 's Department of Oceans and Fisheries recommended opening the gates from April to



December each year . A provincial government committee report recommended an additional seven options for the modification of the causeway in May 1992 , but the government did not act upon any of these options due to the low " cost @-@ benefit " factor . More reports documented problems related to the passage of fish in the river until 1995 , when the Department of Transportation agreed to open one gate from April to December , as suggested four years earlier . A project was then organized in December 1996 to begin a trial for the systematic opening of the gates during the year , but conditions could not be physically met , and it was terminated on 1 June 1999 .

In February 2001 , the Niles Report proposed an additional four modifications to the causeway project : to either replace the fishway , open the gates during peak fish migration , open the gates permanently , or replace the entire causeway with a bridge . An Environmental Impact Assessment study was commissioned in 2003 to develop and summarise these options , and on its completion in 2005 , it announced the recognition of " Option 3 " and " Option 4 " as possible solutions . The first option had been ruled out following the evaluation of other fish passage models , which were deemed inapplicable to the river . The second , suggesting systematic gate @-@ opening periods , was ruled out because of the inability to cater to every marine species ' migration periods . Option 4 was split into three sub @-@ options , mainly to list possible bridge lengths : 170 , 280 , and 315 metres ( 190 , 310 , and 344 yards ) . The provincial government later accepted the proposal on 6 December 2006 , and selected " Option 4B " on 7 August 2007 , which called for a 280 m ( 310 yd ) bridge in the place of the causeway .

The project was divided into three phases , expected to cost a total of \$ 68 million . Phase 1 consisted of the prevention of erosion along the shorelines , improvements to the nearby drainage system , and the construction of dikes and aboiteaux ; the work was carried out from 7 July 2008 , to 14 April 2010 . Phase 2 consists of opening the gates to monitor river flow , both upstream and downstream , for two years . Phase 3 , commenced in 2012 , consisted of the bridge 's development and the removal of the causeway , and is anticipated to be completed in 2015 . Confusion arose as to whether or not the project would be funded by the federal government . They refused , in spite of an earlier comment from the Department of Fisheries and Oceans , which had hinted at a possible negotiation . Unwilling to wait , the provincial government came forward with an initial \$ 20 million on 7 July 2008 , to begin the first phase .

The approach of Phase 2 was met with various complaints . A biology professor at the Université de Moncton noted that \$ 200 @,@ 000 ? \$ 250 @,@ 000 worth of pesticide would be required to keep the mosquito population around the city of Moncton from doubling once the gates open . Flood warnings were issued by the provincial Department of Supply and Services for the town of Riverview , warning that high river tides could lead to the flooding of over 3 hectares ( 7 @.@ 4 acres ) of sport fields and structures built in low @-@ lying areas ; however , they added that the causeway 's flood gates were able to descend if required , eliminating the chances of such repercussions from a possible inundation . Residents near the headpond west of the causeway criticized the project , citing the decrease in property values of about 480 homes ( by approximately 30 percent , according to the EIA report ) , the \$ 68 million price tag , unstable ice conditions , and a lower water quality . In spite of legal threats by the Lake Petitcodiac Preservation Association ( LAPPA ) and various residents , the causeway opened its gates on 14 April 2010 , coinciding with the beginning of various studies .

Since the opening , the river improved significantly , surpassing original expectations for the project . An AMEC engineer participating in the firm 's studies , Jacques Paynter , said that the banks of the river had begun widening " at a noticeable pace " , with the tidal bore growing closer to its pre @-@ 1968 levels : " We were actually anticipating a fairly modest increase in height . It seems to be already exceeding what we might have expected . " He noted that an estimated 40 @,@ 000 gaspereau had returned to the river , and called for more studies to determine the impact of the causeway 's opening .

= = Recreation = =

Residents around the Petitcodiac have used the river for various recreational purposes . Trips were

made annually via the river from Moncton to Beaumont for Feast of Saint Anne celebrations with the locals . The Blakeson , a towboat owned by Blakeny and Sons , offered " moonlight cruises " in the early 1930s for 50 cents ( approximately \$ 6 @. @ 50 in 2010 values ) . The service was popular until the towboat capsized in front of embarking passengers , causing them to lose interest . During their Environmental Impact Assessment in September 2005 , AMEC cited recreational fishing and birdwatching as major pre @-@ causeway activities . A fishery for Atlantic salmon existed downstream from the causeway for several years post @-@ 1968 . The Moncton Naturalists ' Club also publishes their Birding in the Moncton Area , a birdwatching guide covering sites from Sackville to Mary 's Point . Other activities downstream from the causeway include boating , canoeing , kayaking , seal and harbour @-@ porpoise viewing , and tour boating . On 24 July 2013 , the North American record for surfing a single river wave was set by Wessels and Whitbread of California , who rode the Petitcodiac River 's tidal bore 29 km ( 18 mi ) .

Before the opening of the causeway gates on 14 April 2010 , the Petitcodiac River 's 21 km ( 13 mi ) headpond ( west of the causeway ) , colloquially known as Lake Petitcodiac , was promoted by LAPPA as a recreational haven for residents in the area . According to the association , over 10 @, @ 000 estimated hours of boating took place on the lake , in addition to canoeing , kayaking , motor boating , water skiing , jet skiing , sailing , and swimming . Fishing tournaments , dragon boat regattas , dog sledding , and snowmobiling were popular at the time as well . However , a study by the PWMG showed that fecal coliform levels in the headpond from June , July , and September 2009 exceeded 2 @, @ 419 parts per 100 millilitres ; more than 12 times the 200 / 100 ml recommended by the Canadian Water Quality Guidelines for recreational purposes .

Bore Park , located in the area formerly known as La Chapelle , became a popular tourist location by 1907 for watching the Petitcodiac 's tidal bore move up the river twice a day . The area features information about the wave , as well as a clock indicating the time of its next appearance . Bore Park is a part of Riverfront Park , Greater Moncton 's 5 km ( 3 @. @ 1 mi ) section of the Trans Canada Trail , where tourists may walk , bike , or skate along the riverfront . The trail continues west to Hillsborough and Fundy National Park , and east to Sackville , Nova Scotia , and Prince Edward Island . Jonathan Creek , Fox Creek , Halls Creek , and Mills Creek also offer trails that run along their streams .

= = Lists = =

The following lists are ordered from the mouth of the river to its source .

= = = Crossings = = =

The river runs under ten bridges , excluding the causeway .

= = = Tributaries = = =

The Petitcodiac River features ten named tributaries , which drain a total of 28 additional streams .