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Fonds de Fiducie de la Faune
du Nouveau-Brunswick



News Release
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Five Years of Study on Fish Populations Since Opening of the Causeway Gates Show Signs Petitcodiac River Ecosystem Health Improving

MONCTON, NEW BRUNSWICK – MONDAY JUNE 15, 2015 – With spring well underway, many sea-run fish species are entering the Petitcodiac River for spawning or rearing purposes. The Petitcodiac Fish Recovery Coalition has set up its live fish trap and is ready to collect another season of data in order to monitor how well different fish species are faring. The coalition says it is pleased with the data its trapping efforts have generated for the past 5 years since the opening of the causeway gates in 2010. The data indicate that the health of the river's ecosystem is improving.



Photos: (Left) Picket trap viewed from the Westmorland County bank, near Salisbury, in June 2014.
(Right): Fyke nets, facing downstream, viewed from Westmorland County bank, near Salisbury, in September 2014.
Photo credit: Edmund Redfield - Petitcodiac Fish Recovery Coalition.

“Many fish populations continue to be headed in desired directions following the opening of the causeway gates,” explains Edmund Redfield, who oversees the coalition’s fish trap operations and research. **“Many native species populations that we hoped would increase are indeed doing so, some far more than expected, while the numbers of non-native invasive species are declining.”**

The results of the latest monitoring suggest that, **after decades of absence or reduced numbers, increases in quantities of striped bass, American eel, rainbow smelt and Atlantic tomcod are evidence that many native fish populations in the Petitcodiac River are rebounding.** These native species seem to have benefited from the return of free tidal flow to the river, since their catch rates were influenced by tidal magnitude, and have been increasing over time along with the size of the tides.



Striped bass



American eel



Tomcod

Indeed, as many local citizens have noticed, **the Petitcodiac River’s tidal bore is now bigger and stronger.** The growth in the size of the tides arriving at the trap site has been well documented. As the river channel continues to widen, there is less friction and a more efficient conduit for the bore to express itself. *(See additional information on page 4 – “The Petitcodiac River’s Tidal Bore”.)*

“Just how much the return of stronger tides has been beneficial to the river’s native fish populations is clear when we look at, for example, American eels,” says Redfield. “Eels were among the very few species thought to have done well in the causeway headpond and there had been concerns the opening of the gates would be detrimental to this species. However, five years later, there is no evidence of a decline in the numbers of eels. In fact, their numbers may actually be increasing as a result of the changes taking place in the river: in 2014, we caught four times the number caught in either 2010 or 2011. Eels migrate upstream and downstream for feeding and overwintering, and they move out to sea for spawning, so the tides help facilitate their movement.”

Meanwhile, Redfield says signs that **invasive species are disappearing from the river** are quite encouraging. “The number of invasive smallmouth bass has fallen and remains below the ability to detect them at our fish trap site,” he explains. Popular with sports fisherman, smallmouth bass had originally been introduced in the ecosystem by anglers. Aggressive predators, they out-compete native fish for territory and prey, and eat any bite-sized native fish they encounter.



Smallmouth bass

Redfield also notes that, **predictably, beloved native species Atlantic salmon and American shad have not yet permanently returned to the Petitcodiac River.** Shad gave initial signs of recovery in 2013, with spawning adults straying into the river for the first time in decades, but there was no repetition detected in 2014. Atlantic salmon still require ongoing intervention to reverse their extirpation from the river’s ecosystem, with numbers once again showing little change at the trap site in 2014.



Atlantic salmon



American shad

Atlantic salmon is listed as endangered everywhere in the inner Bay of Fundy. Historically, the Petitcodiac River produced about 20% of the inner Bay of Fundy’s Atlantic salmon population. The Petitcodiac Fish Recovery Coalition is working with many partners (federal government, provincial agencies, non-governmental organizations and academia) to re-establish inner Bay of Fundy Atlantic salmon in the Petitcodiac River. While no returning adult salmon have been caught at the fish trap yet, the coalition has documented salmon nests (redds) upstream of the trap in several of the river’s tributaries.

“As for American shad, which had completely vanished from the upland reaches of the Petitcodiac River after construction of the causeway, our occasional captures are not enough to indicate that they are present in the river,” says Redfield. “Shad show a high degree of fidelity to their natal streams, so it is to be expected that a river lacking a resident population will require quite some time to be recolonized by strays coming in from other rivers.”

Finally, 2013 and 2014 saw **fewer gaspereau at the fish trap site**, compared to 2010 to 2012 - the first three years following the opening of the causeway gates. Gaspereau are native and desirable in the river’s ecosystem. “But this could be a natural consequence of a disturbance in their habitat,” reassures Redfield. “When the causeway was constructed in 1968, the population initially crashed, but eventually came back again in large numbers by the late ‘90s. The same pattern could be repeating itself. The river’s estuary is currently evolving towards a new equilibrium. Its channel continues to widen as it displaces the silt that built up during the years the gates were closed. With this theory, once the river reaches a more natural equilibrium, we should see the gaspereau numbers rebound again.” Redfield and his team will thus be closely monitoring the gaspereau run this spring.



Gaspereau

The Petitcodiac Fish Recovery Coalition’s monitoring of fish species provides useful insights into fish populations in the Petitcodiac River that allow decision makers to be better equipped to manage the future of the river and its species.

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The Petitcodiac River's Tidal Bore



©Charles LeGresley

Photo: Charles LeGresley - Petitcodiac Riverkeeper.

What is the Tidal Bore?

The Petitcodiac River's tidal bore is a wavefront of water that makes its way upstream against the natural flow of the river, as the tide comes in. The bore's passage in Moncton immediately increases the Petitcodiac River's depth by approximately 1 metre. The tide continues to rise afterwards for more than two hours, and this increases the depth of the river by about 10 metres. The tidal amplitude is much lower upstream, where the Petitcodiac Fish Recovery Coalition's fish trap is located.

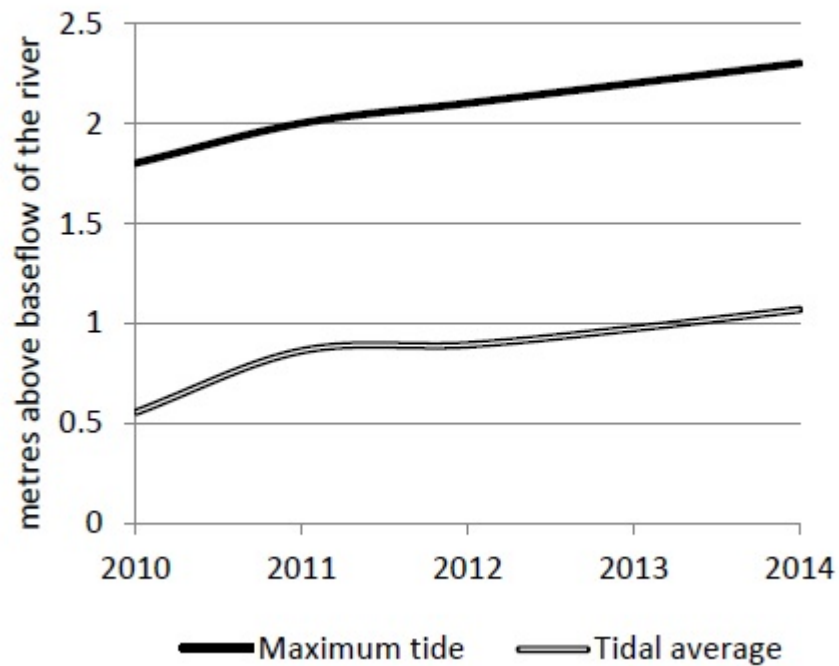
Since the tidal bore has to move such a long distance upstream, and this takes a lot of time, the tide is still rising upstream in Salisbury when the water level at mouth of the river starts to recede again with the tide going back out into the bay. When the tidal bore moves upstream, it must counteract the river's natural current by moving much faster. This friction drains the bore's energy. If the speed of the bore becomes less than the speed of the river's current, the bore is swept back downstream.

How Bigger and Stronger Has the Tidal Bore Become Since the Opening of the Causeway Gates?

The river narrowed down by 92% from a width of 1 km down to 80 m after the causeway was constructed in 1968, thanks to massive sedimentation. The tidal bore's amplitude declined to a small fraction of a metre. Prior to the causeway being built, the bore used to be between 1 and 1.5 metres in height.

Now that the causeway gates are open, the Petitcodiac River has been able to start to flush out its sediments. In November 2012, at approximately 1 km downstream from the causeway, data showed that the river channel had widened by 20 metres. At 10 km downstream, the channel had widened by about 350 metres. With a wider channel, there is less friction. The bore can thus express itself more strongly.

Changes in tides reaching the PFRC fish trap site
between 2010 and 2014



Tides are recorded by a river gauge close to the trap site near the old railroad bridge in Salisbury. Data are archived online. Tidal average is calculated based on the bigger of the two daily tides.

The maximum tide recorded at the fish trap site has increased from 1.8 metres in 2010, to 2.3 metres in 2014. This means that the depth of the tides has increased by approximately half a metre over 5 years. The average size of tide has also increased by approximately one half metre (0.55 metres in 2010 to 1.06 metres in 2014). This data shows that most tides, not just the bigger ones, are much higher now than they were before the opening of the causeway gates.

Source: Petitcodiac Fish Recovery Coalition.