

Atlantic Canada Marine Biodiversity Essay Contest

“Proactive Planning for Marine Biodiversity”

Submitted by Allison MacKay

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Often in the past, economical decisions were made with little, if any, regard to the effects they may have on marine biodiversity. These decisions and the issues they result in are still negatively affecting marine ecosystems across Canada and around the world. By negatively affecting marine ecosystems, these problems have endangered marine biodiversity and in essence the future prosperity and evolution of man.

Marine biodiversity is a name given to the variety of life in the ocean, sea and coastal environments. This variety of life includes all animals, plants, fungi and micro organisms and their genetic makeup. It also refers to the ecosystems in which these organisms live. Because the Earth is interdependent it is important to maintain biological diversity among its organisms to ensure a self sustaining future environment. The more diverse the variety of organisms found on Earth is, the less of an affect the disappearance of one organism would have on the overall balance, and the more likely it is that one species will be able to adapt to environmental changes.

The responsibility of monitoring and preserving biodiversity has been divided, by the International Convention of Biological Diversity, among 150 countries. In 1992 at the Rio Earth Summit, these countries signed an agreement committing them to monitor and assess biodiversity within their borders. It also appoints them responsible for taking measures in conservation or enhancement of biodiversity in their country. Canada signed with the Convention in the mid 1990's and therefore has assumed such responsibility over its environment and any issues regarding it.

One such issue where human action has upset marine biodiversity is the Petitcodiac River. Located at the end of the Bay of Fundy, the Petitcodiac travels North West from Shepody Bay and divides the city of Moncton from the town of Riverview.

Daniel LeBlanc is the Petitcodiac River keeper, his comment that the Petitcodiac is “one of the most documented cases of a declining ecosystem in Canada” (June 29, 2002) express the severity issue. There are numerous sources contributing to the decline of this ecosystem. They are referred to as pollution sources and are listed according to the severity of their impact on the river. In “The Petitcodiac River keeper’s 2004 list of the “10 Worst Pollution Sources in the Petitcodiac River”(Times & Transcript), The Greater Moncton Sewage Treatment Plant and the Moncton riverside landfill ranked second and third on the list, respectively while the Petitcodiac causeway was considered the number one pollution source with the most negative influence on the river.

Located on the west bank of the river in the Town of Riverview is the Greater Moncton Sewage Treatment Plant. This treatment plant collects, partially treats, and then expels 50 million liters of sewage into the river each day. This partially treated sewage poses potential threats to organisms living in the river. What is more, during periods of heavy rainfall, when the plant reaches its full containment capacity, the overflow is discharged directly into the river. This means that in accompaniment to the partially treated effluents entering the river system daily is an occasional dose of completely untreated sewage. Currently there is no procedure to disinfect the sewage before discharging it into the water system. Encouragingly, a Screening Assessment Report preformed prior to the trial causeway gate opening in 1998 states that although it did not then warrant the installation of a disinfection process, that “this would probably be a consideration in a long term river restoration plan.”(LeBlanc, Daniel). Although this may not appear to be beneficial to the current condition of the river, it is a step in the right

direction. The construction of a sewage treatment plant with the option of a disinfection process demonstrates awareness and concern for the surrounding environment.

A little ways up the river on the east bank is the site of a former landfill. This city landfill was in use until 1992 when its capacity was exhausted. It is hazardous to the Petitcodiac River as it is situated along the waterfront on sediment deposited after the installation of the causeway. The location of this dump site is another example of ignorance towards the effect of our actions on marine biodiversity. The landfill leaches between 100,000 to 300,000 liters of toxic effluents into the water on a daily basis. It is not known exactly what toxins are seeping into the river because the landfill was available to the public and so unsupervised dumping occurred. Although the levels are deemed acceptable by the government, samples of the liquids seeping into the Petitcodiac reveal traces of PBC and other heavy metals. The accumulation of hazardous toxins in the river is amplified by the decreased tidal flow. Due to a causeway barrier spanning the full width of the river and obstructing the natural water flow, the toxins are not being dispersed by the tide.

The construction of the Petitcodiac causeway is another example of an economical decision made without properly considering the impacts it would have on the marine biodiversity of the Petitcodiac River. As mentioned earlier it is the number one pollutant source of the river. The construction of the causeway was approved on June 3rd, 1964, under the Navigable Waters Protection Act, and was completed in 1968. It was the most economical option for a river crossing. The causeway disrupts the natural tidal flow of the water and obstructs fish passage. During the original construction of the causeway in 1968, the water gates were designed to allow fish to pass through. It is necessary to

allow fish access to the upper part of the river in order for them to spawn. However, environmental studies from as early as 1969, one year following the construction of the causeway, report “fish passage problems” (Reports). After three consecutive reports all stating that the gates were not providing adequate fish passage, modifications were made. But to no avail, as fish passage through the causeway remains inadequate. This inadequacy has contributed to the elimination of four out of ten indigenous species of fish. The six species of indigenous fish remaining in the river are all classified as rare.

Among the eliminated species is the Inner Bay of Fundy Salmon. These salmon are genetically unique and not found anywhere else in the world. The remaining few hundred are being held in captivity as breeding stock with aspirations of reintroducing the fish back into the river when conditions are more favorable.

Likewise, the American Shad, once abundant to the waters of the Petitcodiac is considered extinct in the river’s current environment. More important to the Shad, however, is the estuary of Shepody Bay. The entire East Coast American Shad fish population migrates annually from Florida to the rich feeding grounds of Shepody Bay. The current declining conditions of the Petitcodiac River negatively affect the American Shad when it is considered that “the Petitcodiac River and its tributaries significantly contribute to the estuarine nutrient supply of (Shepody Bay).”(Leblanc, Daniel)

Besides fish, other organisms have been negatively affected by the changes in the Petitcodiac River. For instance, the Dwarf Wedge mussel, once found in the river is now extinct. Also affected is the Mud Shrimp (or *Corophium volutator*). This tiny creature, measuring 5mm long, could be found in abundances of up to 60,000 shrimp per square meter of mud along the Petitcodiac River banks and in the estuary. The Mud Shrimp is

extremely rare to North America and is found only here in the Bay of Fundy and in the Gulf of Maine. It is also important to consider that it is these energy rich shrimp on which the Semipalmated Sandpiper largely depends on for food when 95% of its entire population visits the Bay of Fundy in mid migration. The Mud Shrimp feed on diatoms and detritus churned up by the tides and require the right combination of silt and gravel in order to construct their burrows. As of yet, the river banks continue to provide these conditions to the Mud Shrimp. However, the ongoing build up of silt along the banks and the reduced tidal levels have possibly contributed to a recent reduction in their numbers.

This build up of silt can also be attributed to the construction of the Petitcodiac causeway. With all five gates closed, the natural tidal flow of the river is disrupted. The outgoing tides are not carrying the sediment back out into the bay and therefore it is settling along the river banks and bed and slowly filling in the river channel. Originally the Petitcodiac River measured 1.6 kilometers across, but now the mounds of silt are only 80m apart and growing closer. Once, the Micmac natives used the Petitcodiac as a mode of transportation, riding the 13 km/hour current from the Shepody Bay all the way up to what is now known as Elgin. Later the European settlers navigated large vessels during high tide and fishing was prosperous. The muddy river banks are not merely a cosmetic problem. It is believed that if the natural flow of the Petitcodiac is not reinstated, that the river will eventually fill in completely.

This conversion has already begun to take place. Along both banks, below the causeway is a brand new ecosystem classified as a marsh. This newly evolving marshland ecosystem supports new plants, animals and micro organisms not previously existing in the original ecosystem. The marine biodiversity of the area is changing to

adapt to the new environmental conditions. This adaptation is taking place above the causeway as well. The upper part of the river and the head pond known as Petitcodiac Lake, formed as a result of the causeway, is experiencing similar ecosystem adjustments. Wildlife such as bald eagles, osprey, loons and two species of illegally introduced fish where not previously connected with the Petitcodiac River ecosystem but now depend on newly formed head pond. This newly evolving ecosystem has also led to the introduction of new economic development. An eel fishery situated in the Petitcodiac Lake is prospering while lobster fishing located near the mouth of the Petitcodiac is also finding success. An area which was once too silt-covered to be a profitable lobster fishing ground but has since cleared up. There is uncertainty as to what caused the heavy silt to clear away from the mouth of the river but some are of the opinion that the clear up is a result of the causeway. Others attribute it to the Groundhog Day storm of 1976. The actual reason is not determined.

One thing that is certain is that restoring the river to its natural tidal flow would have an affect on these two new industries. The lobster industry worries, that reinstatement of free tidal flow could cause the silt which has accumulated in the Petitcodiac to wash down into their fishing grounds. A sudden build up of silt could have negative effects on fish crops.

These new ecosystems complicate the issue even further. Now in order to restore the original Petitcodiac ecosystem and therefore restore the original marine biodiversity of the area, it has become necessary to destroy two new ecosystems and by doing this endanger a whole new range of organisms. However it is also possible that these new

ecosystems are not self sustainable and therefore would eventually deteriorate if the natural tidal flow of the river is not reestablished.

The complexity of the issues surrounding the Petitcodiac River can be partially attributed to a lack of consideration for the environment as well as an overall ignorance concerning the importance of marine biodiversity and what effect our actions it have on it. It can also be partially attributed to the extended time lapse between the acknowledgment of the issues and any reparative action. These complex issues, though difficult to resolve, could have been easily avoided had considerations been made regarding the Petitcodiac causeway and its impacts on the ecosystem, prior to construction. This demonstrates the importance for Canadians to be conscious of the marine life surrounding them and what needs to be done in order to preserve it. Canada's commitment to the Convention of Biological Diversity is a positive step. It is now essential that individual Canadians begin to increase their personal knowledge and awareness regarding the concept of marine biodiversity.

The role of young Canadians is to be proactive in increasing the understanding and awareness of what effects our decisions have on our environment. In being proactive such complex problems and the expensive restorative measures required to correct them may be avoided. It is proving to be cheaper to protect the environment then it is to clean it up after the fact. As the future decision makers we as young Canadians will have the means and opportunity to positively affect the outcome of marine ecosystems and protect the marine biodiversity of our country and the world at large.

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