

**Renous River Sub-Watershed Monitoring**  
**2006**

**By:**

Miramichi River Environmental Assessment Committee

**Written by:**

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## 1.0 - Introduction:

The Miramichi River watershed covers approximately 14,000 km<sup>2</sup> of the province of New Brunswick. Within the Miramichi River watershed, the area has been divided into sub-watersheds based on major tributaries that branch off of the main Miramichi River. One of those branches, which is the focus river for this sub-watershed study, is the Renous River.

Figure 1.1 – Miramichi Watershed showing location of the Renous River Sub-Watershed



The Renous River is found in the Miramichi River Watershed in the Northumberland County of New Brunswick. It discharges into the Southwest Miramichi River and covers a gross drainage area of 611 km<sup>2</sup>. The river flows west along the Plaster Rock Highway, Highway 108, until it branches on either side into the North and South Branch of the Renous River. Both of these branches meet up again in the Kennedy Lake area where several small, connecting lakes empty into either branch of the Renous River.

Highway 108 has allowed for a considerable number of camps to be built along the Renous River. This sub-watershed has also been harvested regularly for its timber resources and has an intricate network of lumber roads.

The Renous River encompasses two protected areas, the Kennedy Lakes Conservation Area and the Plaster Rock–Renous Wildlife Management Area. The Kennedy Lakes Conservation Area covers approximately 170 km<sup>2</sup> and has been a protected habitat for many different species of wild fowl since 1996. The Plaster Rock-Renous Wildlife Management Area became a protected area in 1939 and is monitored by the Plaster Rock-Renous Gaming Refuge, covering an area of approximately 800 km<sup>2</sup>. This land is a designated area for generating wildlife populations, where regulated hunting and trapping

are currently allowed. With the Renous River running through these two protected areas, a large part of the river's sub-watershed is now protected from human activity (*Kennedy Lakes*, 2006).

Data has been collected on the Renous River from a hydrometric station located at McGraw Brook for 31 years. The station was decommissioned in 1995 (*Archived Hydrometric Data*). More recently, a water quality study was conducted by the Miramichi River Environmental Assessment Committee (MREAC) in 2006, obtaining bacterial and chemical water quality results throughout the sub-watershed. The Renous River is a popular river for Atlantic salmon and trout fishing, therefore the water quality of this river is of great interest in order to encourage the growth of fish populations.

## 2.0 - Materials and Methods:

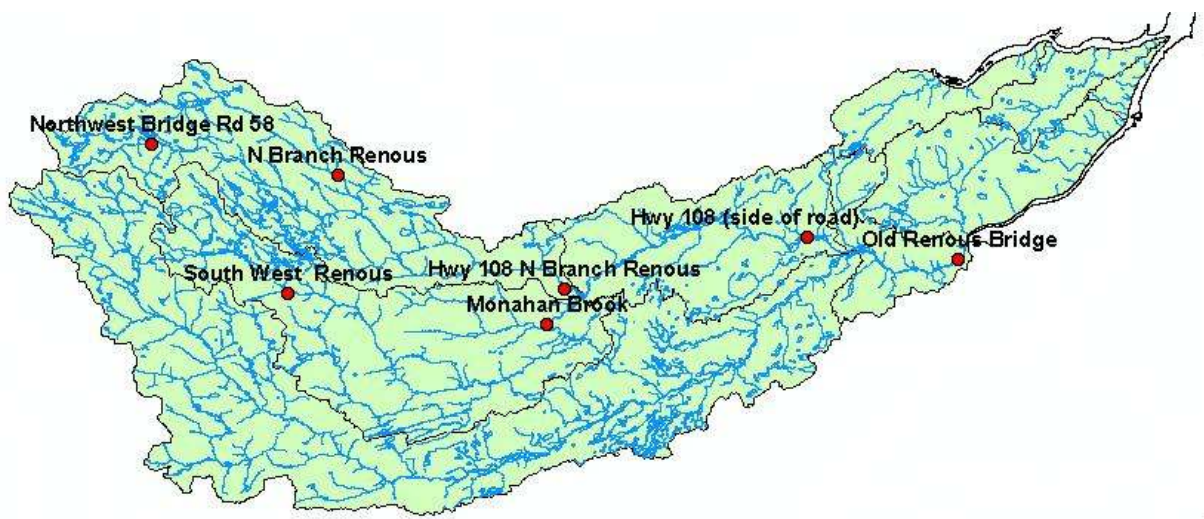
Water samples were collected at seven different locations along the Renous River during two different time periods for different water levels, once in July 2006 during low water levels and once again in September 2006 during high water levels. The seven locations were: Highway 108 North Branch Renous, Southwest Renous, Northwest Bridge on Road 58, Monahan Brook, North Branch Renous, Old Renous Bridge and the side of the road on Highway 108. For site coordinates, see Table 2.1.

Table 2.1 – Renous River Sampling Location Coordinates.

SITE #	LOCATION	X	Y	ZONE
1	Old Renous Bridge	286619	5187984	20
2	Hwy 108 (side of road)	274915	5190207	20
3	N Branch Renous	695961	5194192	19
4	Hwy 108 N Branch Renous	713879	5185955	19
5	Monahan Brook	712619	5183100	19
6	South West Renous	692435	5184845	19
7	Northwest Bridge Rd 58	681435	5196095	19

The water samples at all seven sites were collected by grab samples using sterile water bottles for E. coli, suspended solids, nutrients, metals and general chemistry tests. The samples remained in a cooler during field collection, then given to the Department of Environment of Canada where they were delivered to the laboratory in Fredericton for analysis. The results for all sites during both sampling occasions were returned to MREAC for comparison and analysis.

Figure 2.1 – Map of the Renous River monitoring sites.



### 3.0 - Results:

The E. coli results for all locations during both July and September were collected and entered into Table 3.1, which demonstrates the number of E. coli present in a 100ml water sample. The presence of E. coli has little effect on aquatic life therefore, the low numbers that was collected during both sample runs poses little to no concern regarding the health for aquatic life.

Table 3.1 – E. coli results from a 100ml sample for all seven sites in July and September 2006.

Site #	E. coli Results	
	July 24/06	Sept. 21/06
1	100	100
2	140	10
3	10	10
4	30	<10
5	120	60
6	60	60
7	190	10

The test results for the water samples were all compared with the Canadian Water Quality Guidelines for the Protection of Aquatic Life. This document was used to compare the results provided with the allowed limit for sustainable aquatic life, the Limit of Quantitation (LOQ). This limit was used to determine if the water quality in the Renous River was suitable for aquatic life, such as Atlantic salmon and trout, which are common species of fish found in this river. Using the document to compare with the collected results, it was determined that the parameter results for all sites were under the Limit of Quantitation, except for one parameter. The parameter for aluminum at three sites in July exceeded the acceptable limit for aquatic life, sites 1, 4 and 5. (See Appendix #1 for all water quality results).

#### 4.0 - Discussion:

After analysis of the results, it was determined that only one chemical parameter exceeded the allowed limit for sustainable aquatic life, aluminum, and only at three of the sites during the low water season. Obtaining high levels of aluminum during low water flow is not surprising as aluminum is a naturally occurring product found in the soil that is heavily mined in various areas of Canada. Therefore, during heavy rain falls or snow melting periods an increase of runoff occurs, causing a significant increase of aluminum into rivers, brooks and streams.

Aluminum affects on aquatic life are dependent on the pH and the DO levels of the water. High levels of aluminum can be toxic to aquatic life. Aquatic plants are more tolerant of aluminum than aquatic invertebrates, amphibians and fish. Also different species and life cycle stages will be affected differently. Aluminum toxicity causes respiratory problems within fish as it precipitates on the gills. Atlantic salmon alevins are very sensitive to aluminum at both a high and low pH levels, resulting in 100% mortality (*Canadian Water Quality Guidelines for the Protection of Aquatic Life: Aluminum*, 1999).

With the Renous River being a major tributary for Atlantic salmon spawning, high levels of aluminum in the water may be of concern. However, not all sites showed significant levels of aluminum and is not a year round problem, as the second sample run during high water levels indicated acceptable amounts of aluminum throughout the sub-watershed.

The results for the suspended solids, nutrients, metals and general chemistry parameters were all below the L.O.Q. and acceptable, and therefore do not cause any significant concern for aquatic life.

## **5.0 – Conclusion:**

After conducting this study on the Renous River sub-watershed, it can be concluded that the water is safe and agreeable for aquatic life such as Atlantic salmon, trout and other wildlife found in this river system. It was discovered that aluminum was the only parameter that exceeded the Canadian Water Quality Guidelines for the Protection of Aquatic Life. This parameter does not raise any great concern for the health of the aquatic life as it only exceeded the limit at three of the seven sites during one of the two sample runs. Thus, the Renous River is currently considered to be healthy river with good water quality as the result of this sub-watershed study conducted in 2006.

## **References**

*Archived Hydrometric Data: Renous River at McGraw Brook.* Water Survey of Canada.  
[Online] [http://www.wsc.ec.gc.ca/hydat/H2O/index\\_e.cfm?cname=graph.cfm](http://www.wsc.ec.gc.ca/hydat/H2O/index_e.cfm?cname=graph.cfm)

*Canadian Water Quality Guidelines for the Protection of Aquatic Life: Summary Table.*  
Canadian Council of Ministries of the Environment. 2002.

*Canadian Water Quality Guidelines for the Protection of Aquatic Life: Aluminum.*  
Canadian Council of Ministries of the Environment. 1999. [Online]  
[http://www.ec.gc.ca/ceparegistry/documents/part/Aluminium\\_factsheet-April03\\_e.pdf](http://www.ec.gc.ca/ceparegistry/documents/part/Aluminium_factsheet-April03_e.pdf)

*Kennedy Lakes Protected Natural Area.* Department of Natural Resources, 2006.