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To: Denis Comier, President of the Margaree Rivers Association

RE: Summary of May 2025 Site Visit

This summary describes the site visit that was conducted between May 21st and 22nd, 2025 to the Margaree River and the two main tributaries, South West Branch and North East branch of the Margaree River.

In total, ten sites were visited over the two days; Carmichael cottage, Cemetery Pool, Portree, Edsel's property, Nile Brook, Brown's Cottages, 2024 Bank Rehabilitation (new rock work), eroding bank on the Southwest Margaree Road, culvert site on the Southwest Margaree Road, and Leo-Paul's property . While these sites do not represent all of the channel changes that have occurred on the North East branch of the Margaree River, they do provide a good insight into how the river is changing and adapting to climate change and the increased frequency of high-water events.

The locations that were visited on the North East branch of the Margaree River included the Carmichael cottage, Cemetery Pool, Portree, Edsel's property, Nile Brook, Brown's Cottages, and the 2024 Bank Rehabilitation project (new rock work).

The most notable visual impacts at these sites were the indications of lateral channel migration between the valley corridor and the volume of deposition within the channel that was creating point bars, mid-channel bars, and the large quantity of woody debris. Based on rough measurements, in the field and using Google Earth, sites such as the Carmichael cottage and Edsel's property were undergoing bank erosion at a rate of approximately four metres per year. The deposition in the channel, which the majority of material, would be the accumulation of bedload and river bank material, was in many locations at or above the elevation of the associated floodplain.

The natural process of a watercourse is to create a channel by redistributing sediment loads to manage the flow coming from the catchment area, while attempting to maintain a balance of sediment/water volume inputs and outputs through the associated hydraulic reaches. When this balance becomes impaired, for example; too much water volume related to the sediment load, the velocity of the flowing water increases, and when sufficient enough to over come the channel bed or bank material's resistance factor, the water's flow will have enough energy to scour the channel bed and channel banks until the balance is reestablished. This is a natural process of channel evolution. However, when these evolutionary processes occur at a rate that is beyond what the "normal" rate of erosion is for any particular reach of a watercourse, significant property loss or channel changes such as loss of floodplain access are experienced. In the case of the Margaree River system, these changes have occurred as a result of numerous significant rain events and spring freshets. While watercourses are very good at adjusting themselves to these changes, it requires time, and in many cases, decades to reestablish a balanced system.

The volume of instream woody debris accumulated in the channel and on the gravel bars through the system, is also a note worthy point. Almost every site visited had a large volume of freshly fallen trees

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laying in the channel or an accumulation of trees piled together on the gravel bars from past flood events. Woody debris is a natural part of any river channel, particularly if the watershed flows though a forested area. Nevertheless, when too much woody debris accumulates in a channel and partially becomes buried with sediment or bedload material, the watercourse may not be able to move the tree, root wad, etc. through the system. In the case of the North East branch of the Margaree River, the volume of woody debris is such that, it is creating flow issues as the river tries to establish a channel. Currently, on the larger and wider sections of the river, multiple shallow channels have formed to circumvent around the piles of woody debris. This has led to poor quality habitat and poor channel function as the river can no longer move the woody debris, but only portions of the gravel bar around the woody debris. With multiple shallow channels flowing over and through gravel bars at various locations along the North East branch of the Margaree River, there is a greater chance that this will warm the river water as the gravel bars will act as heat collectors and radiate the heat from the exposed rocks to the water. As well, confluences of tributaries to the river, such as, Nile Brook have been altered so much so, by deposition and woody debris, that the majority of flow entering the main river, flows upstream and away from any downstream pool. The deposition at the mouth of the Nile Brook is a combination of bedload and bank material from the North East branch of the Margaree River and Nile Brook. Just upstream of the mouth of Nile Brook, the newly constructed bridge on the Big Interval Road, that crosses over Nile Brook, has an accumulation of woody debris on the upstream side of the bridge and a large accumulation of gravel on the south side of the brook, downstream of the bridge. This woody debris directs the flow of water under the bridge in such a way, that the flow is directed to the north side of Nile Brook and into the bank, creating additional erosion and bedload scour. The accumulated gravel bar appears to have sufficient elevation above the streambed, that only significant flows will overtop it. This of course keeps most flows directed towards the north bank, which will continue to erode and contribute additional sediment to a system that is already overwhelmed with sediment load.

The South West branch of the Margaree River seems to be undergoing channel bed aggradation. During the site visit to this branch of the Margaree River, water levels seemed to be above normal summer levels, so getting a good visual interpretation of the streambed elevation was difficult. However, given that many gravel bars were visible even though flows appeared to be at the estimated 2-year flow level, would indicate that the channel might be undergoing the accumulation of additional bedload and bank material. The sites that we did visit were locations of poorly installed culverts and eroding banks that were contributing to the sediment load of the system. Both of these sites, which are located on Southwest Margaree Road, are eroding as a result of human interaction in an attempt to prevent river bank erosion or reduce sediment input into the South West branch of the Margaree River. The eroding bank site is a result of large boulders being placed along the bank to prevent the river from eroding and migrating into the Southwest Margaree Road. However, the placement of the boulders has created a weak point in the river bank and the river is now trying to outflank the boulders to the south, through a field. The second location, is a where the Southwest Margaree Road had washed out. Two culverts (most likely undersized given the size of the upstream channel) have been installed to mange flow coming off the hillside. The alignment of the culverts to the channel are most likely insufficient to mange large flows and will definitely contribute additional sediment input into the river.

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If rehabilitation efforts were to be undertaken, the sites visited on the South West branch of the Margaree River would be on a much smaller scale, both monetarily and effort wise then any project that might occur on the North East branch of the Margaree River.

One thing that must be remembered is that a watercourses' only purpose is to move water and sediment through the catchment (watershed) area. A well balance system creates usable riparian and aquatic habitat by depositing materials to create riffles and scouring other locations to develop pools as a means of managing the energy of the flow. If a watercourse is able to access the associated floodplains during high-water events, nutrients, through sediment deposits on the floodplains, provide essential minerals and materials for a healthy vegetated riparian area. Therefore, channel rehabilitation efforts should focus on establishing channel function based on the fluvial geomorphic process. Instream habitat can be developed, but the installation of any instream feature needs to consider how the watercourse is going to manage sediment and flow through that particular hydraulic reach.

Recommendations to move forward would be to conduct a new fluvial geomorphic assessment of the Margaree River, as the 2017 report has become out dated and the river has undergone many changes since that report. In the immediate future, if the woody debris could be removed from some of the locations we visited in May, that would help the river redistribute some of the accumulated gravel and potential reduce the multiple channels through some of these sections to one or two channels.

Sincerely,

Ron Jenkins, AScT, EP